

# IONOSPHERIC DATA IN JAPAN

FOR JANUARY 1987

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## BRIEFING

This Series contains data on ionosphere (I), solar radio emis-

sion (S) and radio propagation (P) obtained at the following stations under the Radio Research Laboratory, Ministry of Posts and Telecommunications of Japan.

| Station   | Geographic |            | Geomagnetic |           | Technical Method       |
|-----------|------------|------------|-------------|-----------|------------------------|
|           | Latitude   | Longitude  | Latitude    | Longitude |                        |
| Wakkanai  | 45°23.5'N  | 141°41.2'E | 35.3°N      | 206.5°    | Vertical Sounding (I)  |
| Akita     | 39°43.5'N  | 140°08.0'E | 29.5°N      | 205.9°    | " (I)                  |
| Kokubunji | 35°42.4'N  | 139°29.3'E | 25.5°N      | 205.8°    | " (I)                  |
| Yamagawa  | 31°12.1'N  | 130°37.1'E | 20.4°N      | 198.3°    | " (I)                  |
| Okinawa   | 26°16.9'N  | 127°48.4'E | 15.3°N      | 196.0°    | " (I)                  |
| Hiraiso   | 36°22.0'N  | 140°37.5'E | 26.3°N      | 206.8°    | Radio Receiving (S, P) |
| Inubo     | 35°42.2'N  | 140°51.5'E | 25.6°N      | 207.0°    | " (P)                  |

## A. IONOSPHERE

Ionospheric observations are carried out at five stations in Japan by means of vertical sounding method.

The published data consist of tabulations of hourly values of the ionospheric characteristics and figures of daily  $f$ -plot.

All symbols and terminology in the tables or figures of ionospheric data are used in accordance with the "URSI Handbook of Ionogram Interpretation and Reduction (Second Edition) 1972" and its revision of chapters 1-4, published in July 1978.

## a. Characteristics of Ionosphere

|                                     |  |
|-------------------------------------|--|
| $f_xI$                              | Top frequency of spread $F$ trace  |
| $foF2$<br>$foF1$<br>$foE$<br>$foEs$ | Ordinary wave critical frequency for the $F2$ , $F1$ , $E$ and $Es$ including particle $E$ layers respectively |
| $fbEs$                              | Blanketing frequency of the $Es$ layer, e.g. the lowest ordinary wave frequency visible through $Es$           |
| $fmin$                              | Lowest frequency which shows vertical ionospheric reflections  |
| $M(3000)F2$<br>$M(3000)F1$          | Maximum usable frequency factor for a path of 3000 km for transmission by $F2$ and $F1$ layers respectively    |
| $h'F2$<br>$h'F$<br>$h'E$<br>$h'Es$  | Minimum virtual height on the ordinary wave for the $F2$ , whole $F$ , $E$ and $Es$ layers respectively        |
| Types of $Es$                       | See below A. b. (iii)  |

## b. Symbols

## (i) Descriptive Letters

The following letters are entered after, or used to replace a numerical value on the monthly tabulation sheets.

- A Measurement influenced by, or impossible because of, the presence of a lower thin layer, for example  $Es$ .
- B Measurement influenced by, or impossible because of, absorption in the vicinity of  $fmin$ .
- C Measurement influenced by, or impossible because of, any non-ionospheric reason.
- D Measurement influenced by, or impossible because of, the upper limit of the normal frequency range in use.
- E Measurement influenced by, or impossible because of, the lower limit of the normal frequency range in use.
- F Measurement influenced by, or impossible because of, the presence of spread echoes.
- G Measurement influenced or impossible because the ionization density of the layer is too small to enable it to be made accurately.
- H Measurement influenced by, or impossible because of, the presence of a stratification.
- K Presence of particle  $E$  layer.
- L Measurement influenced or impossible because the trace has no sufficiently definite cusp between layers.
- M Interpretation of measurement questionable because the ordinary and extraordinary components are not distinguishable.
- N Conditions are such that the measurement cannot be interpreted.

- O Measurement refers to the ordinary component.
- P Man-made perturbations of the observed parameter; or spur type spread  $F$  present.
- Q Range spread present.
- R Measurement influenced by, or impossible because of, attenuation in the vicinity of a critical frequency.
- S Measurement influenced by, or impossible because of, interference or atmospheric.
- T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
- V Forked trace which may influence the measurement.
- W Measurement influenced or impossible because the echo lies outside the height range recorded.
- X Measurement refers to the extraordinary component.
- Y Lacuna phenomena, severe layer tilt.
- Z Third magneto-electronic component present.

## (ii) Qualifying Letters

The following letters are entered in the first column before a numerical value on the monthly tabulation sheets.

- A Less than. Used only when  $fbEs$  is deduced from  $foEs$  because total blanketing of higher layer is present.
- D Greater than.
- E Less than.
- I Missing value has been replaced by an interpolated value.
- J Ordinary component characteristic deduced from the extraordinary component.
- M Mode interpretation uncertain.
- O Extraordinary component characteristic deduced from the ordinary component. (Used for x-characteristics only.)
- T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
- U Uncertain or doubtful numerical value.
- Z Measurement deduced from the third magneto-electronic component.

(iii) Description of Types of  $Es$ 

When more than one type of  $Es$  trace are present on the ionogram, the type for the trace used to determine  $foEs$  must be written first. The number of multiple traces is indicated after the type letter.

- The types are:
- f An  $Es$  trace which shows no appreciable increase of height with frequency.
- l A flat  $Es$  trace at or below normal  $E$  layer minimum virtual height or below the particle  $E$  layer minimum virtual height.
- c An  $Es$  trace showing a relatively symmetrical cusp at or below  $foE$ . (Usually a daytime type.)
- h An  $Es$  trace showing a discontinuity in height with the normal  $E$  layer trace at or above  $foE$ . The cusp is not symmetrical, the low frequency end of the  $Es$  trace lying clearly above the high frequency end of the normal  $E$  trace. (Usually a daytime type.)
- q An  $Es$  trace which is diffuse and non-blanketing over a wide frequency range.
- r An  $Es$  trace showing an increase in virtual height at the high frequency end similar to group retardation.
- a An  $Es$  trace having a well-defined flat or gradually rising lower edge with stratified and diffuse traces

present above it.

s A diffuse *Es* trace which rises steadily with frequency and usually emerges from another type *Es* trace.

d A weak diffuse trace at heights below 95 km associated with high absorption and large *fmin*.

n The designation 'n' is used to denote an *Es* trace which cannot be classified into one of the standard types.

k The designation 'k' is used to show the presence of particle *E*. When *foEs* > *foE* (particle *E*) the *Es* type precedes k.

c. Definitions of the CNT, MED, UQ and LQ

*Median count* (CNT) is the number of values from which a median has been computed. In addition to numerical values, the count may include certain descriptive letters.

*Median* (MED) of a set of numbers is the middle value when the numbers are arranged in order of magnitude, or the average of the two middle values if there is an even number of values.

*Upper quartile* (UQ) is the median value of the upper half of the values when they are ranked according to magnitude; the *lower quartile* (LQ) is the median value of the lower half.

**B. SOLAR RADIO EMISSION**

Solar radio observations are carried out on 100, 200 and 500 MHz at Hiraiso. Observation equipments are: a pair of crossed doublet antennas with a 6-meter and a 10-meter parabolic reflectors for 500 MHz and for 100 and 200 MHz, respectively, and three appropriate receivers. Each pair of crossed doublet antennas is used as a polarimeter. Observations are feasible almost from sunrise to sunset.

Time is expressed in hours, minutes and tenths of minutes U.T. and the unit of flux density is  $10^{-22} \text{ Wm}^{-2} \text{ Hz}^{-1}$  for both components of polarization.

All symbols and terminology in the table of data are used in accordance with the "Descriptive Text of Solar-Geophysical Data, NOAA" and "Instruction Manual for Monthly Report of Solar Radio Emission, WDC-C2".

a. Daily Data at Hiraiso

*Flux density.* The three-hourly and daily mean values are given.

*Variability.* The three-hourly and daily mean values are given at 200 MHz only. Variability is expressed in the following four grades.

- 0 quiet or no burst,
- 1 a few bursts,
- 2 many bursts,
- 3 very many bursts.

The number of bursts exceeding the mean flux level is counted.

Daily data with parentheses mean that observation time does not exceed one third of the period.

b. Outstanding Occurrences at Hiraiso

The phenomena are picked up on the following criteria:

1. distinct from the prevailing kind of activity,
2. correlated with other known solar phenomena,
3. remarkable change-over from one situation to another.

*Type* is denoted by numerical code and letter symbol in parallel as follows:

| SGD Cord | Letter Symbol | Morphological Classification |
|----------|---------------|------------------------------|
| 1        | S             | Simple 1                     |
| 2        | S/F           | Simple 1F                    |
| 3        | S             | Simple 2                     |
| 4        | S/F           | Simple 2F                    |
| 5        | S             | Simple                       |
| 6        | S             | Minor                        |
| 7        | C             | Minor+                       |
| 8        | S             | Spike                        |
| 20       | GRF           | Simple 3                     |
| 21       | GRF           | Simple 3A                    |
| 22       | GRF           | Simple 3F                    |
| 23       | GRF           | Simple 3AF                   |
| 24       | R             | Rise                         |
| 25       | R             | Rise A                       |
| 26       | FAL           | Fall                         |
| 27       | RF            | Rise and Fall                |
| 28       | PRE           | Precursor                    |
| 29       | PBI           | Post Burst Increase          |
| 30       | PBI           | Post Burst Increase A        |
| 31       | ABS           | Post Burst Decrease          |
| 32       | ABS           | Absorption                   |
| 40       | F             | Fluctuations                 |
| 41       | F             | Group of Bursts              |
| 42       | SER           | Series of Bursts             |
| 43       | NS            | Onset of Noise Storm         |
| 44       | NS            | Noise Storm in progress      |
| 45       | C             | Complex                      |
| 46       | C             | Complex F                    |
| 47       | GB            | Great Burst                  |
| 48       | C             | Major                        |
| 49       | GB            | Major+                       |

*Flux density* is the increase of flux over the level at which daily flux is calculated, or the increase of flux over the underlying burst when the event is superposed on another burst of long duration.

*Polarization* is expressed by the polarization degree and sense as follows:

- R or L right- or left-handed polarization,
- W, M or S weak, moderate or strong polarization,
- 0 almost zero or unable to detect polarization due to small increase of flux,
- 00 polarization degree of less than 1 percent.

The following symbols may be attached after numerical values in table, if necessary.

- D greater than, or later than,
- E less than, or earlier than,
- U approximate, or uncertain.

**C. RADIO PROPAGATION**

a. H.F. Field Strength at Hiraiso

Field strength observation of 15 MHz standard waves transmitted from WWV and WWVH stations which are located respectively at Fort Collins, Colorado and Kauai, Hawaii, is carried out at Hiraiso. In order to avoid interference among the same frequency waves, the upper sideband of WWV or WWVH with the audio tone 660 Hz is picked up by the use of a narrow band pass filter with 80 Hz bandwidth. Particulars of the transmitters and the receiver are summarized in the following table.

| Characteristics        | Transmitter            |                        | Receiver                 |
|------------------------|------------------------|------------------------|--------------------------|
| Station Call           | WWV                    | WWVH                   |                          |
| Location               | Fort Collins, Colorado | Kauai, Hawaii          | Hiraiso, Ibaraki         |
| latitude               | 40° 41' N              | 22° 00' N              | 36° 22' N                |
| longitude              | 105° 02' W             | 159° 46' W             | 140° 38' E               |
| Distance               | 9150 km                | 5910 km                | —                        |
| Carrier Power          | 10 kW                  | 10 kW                  | —                        |
| Power in each sideband | 625 W                  | 625 W                  | —                        |
| Modulation             | 50 %                   | 50 %                   | —                        |
| Antenna                | $\lambda / 2$ vertical | $\lambda / 2$ vertical | 4.5 m vertical rod       |
| Bandwidth              | —                      | —                      | 80 Hz for upper sideband |
| Calibration            | —                      | —                      | Every an hour            |

The tabulated *field strength* in dB above one microvolt per meter is the peak average of the incident upper sideband field intensity in 45 seconds after the universal time indicated on the table. Abbreviated symbols are as follows:

|     |  |
|-----|--|
| CNT | number of observed values,   |
| MED | median,  |
| UD  | value of the uppermost decile when they are ranked according to magnitude, |
| LD  | value of the lowest decile when they ranked according to magnitude,        |
| U   | uncertain,   |
| E   | less than,   |
| C   | influenced by, or impossible because of, any artificial accident,          |
| S   | influenced by, or impossible because of, interferences or atmospherics.    |

#### b. Radio Propagation Quality Figures at Hiraiso

The tabulated six-hourly quality figures are calculated for standard waves WWV transmitted from Fort Collins and WWVH transmitted from Kauai.

*Quality figures* expressing radio propagation conditions are ranged over five grades as follows:

|   |                             |
|---|-----------------------------|
| 1 | very poor (very disturbed), |
| 2 | poor (disturbed),           |
| 3 | rather poor (unstable),     |
| 4 | normal,                     |
| 5 | good.                       |

*Whole day quality figure* ranged in grades of 10, 1+, 2-, 20, 2+, 3-, 30, 3+, 4-, 40, 4+, 5-, 50 stands for an average of six-hourly ones of the two circuits. Abbreviated symbols are as follows:

|   |                         |
|---|-------------------------|
| C | artificial accident,    |
| S | propagational accident, |
| U | inaccurate.             |

*Radio propagation conditions* which can be described with a code in the following

|   |           |
|---|-----------|
| N | normal,   |
| U | unstable, |
| W | disturbed |

are forecast 12 hours in advance and broadcast six times per hour from JJY station.

Data on a *geomagnetic storm* correlated with a radio propagation disturbance are tabulated from observation at Kakioka Magnetic Observatory, Japan Meteorological Agency. *Time* (U.T.) is expressed in unit of hour and minute (or tenth of hour), and *range* in nanotesla. When they are uncertain quantitatively, /'s are used to replace the numerical values. Continuation of a geomagnetic storm is denoted by - - -.

#### c. Phase Variations in OMEGA Radio Waves at Inubou

Variations in phase and in phase deviation are monthly depicted for four OMEGA radio waves received at Inubou. Particulars of transmitting stations concerned which relate to the measurement are given in the table below.

In each of the four figures, variations in phase ( $\phi$ ) and those in phase deviation ( $\Delta\phi$ ) are shown in the lower part and the upper one, respectively. Variations in phase ( $\phi$ ) are expressed by relative values at intervals of 30 minutes within every day (U.T.) (48 dots). An increasing value in this case denotes a phase delay. On the other hand, variations in phase deviation ( $\Delta\phi$ ) are expressed by values at intervals of 30 minutes within every day (U.T.)

(48 dots), deviated from average values at the same time for the six quietest days within the month concerned. A negative value in this case denotes a phase advance.

When a polar cap phase anomaly (PCPA) is detected on the Aldra-Inubou and/or the North Dakota-Inubou circuit[s], PCPA's detected only on the Aldra-Inubou circuit are listed, in principle, below the four figures. The list mentions the start, the end, and the maximum times of a PCPA in a form of day/hour & minute in U.T. and its maximum phase deviation as a negative value.

The following letters may be attached to values, if necessary.

|   |                        |
|---|------------------------|
| D | greater than,          |
| E | less than,             |
| U | uncertain or doubtful. |

#### d. Sudden Ionospheric Disturbances

##### (i) Short Wave Fade-out (SWF) at Hiraiso

The table of short wave fade-out (SWF) is prepared from the record of field intensities measured at Hiraiso.

*Drop-out intensities* of the 10 MHz, the 20 MHz, and the 25 MHz waves are respectively distinguished by marks ', " , and "' from these of the 15 MHz wave for WWV and WWVH. Values of *start*, *duration*, *type*, and *importance* are obtained from data of the circuit whose drop-out intensity in dB is underlined as xx. When these quantities are not given correctly, they are accompanied by the following symbols.

|   |                        |
|---|------------------------|
| D | greater than,          |
| E | less than,             |
| U | uncertain or doubtful. |

*Types* of fade-out are as follows:

|    |  |
|----|--|
| S  | sudden drop-out and gradual recovery,                      |
| SL | slow drop-out taking 5 to 15 minutes and gradual recovery, |
| G  | gradual and irregular in both drop-out and recovery.       |

*Importance* of fade-out is scaled according to its amplitude into nine ascending grades as 1-, 1, 1+, 2-, 2, 2+, 3-, 3, 3+.

*Correspondence* of solar optical flare, solar radio burst, and geomagnetic crochet to SWF is marked by X in accordance with interchange messages of IUWDS and observations at Hiraiso.

In table (i) SWF, *date* indicates the day to which *start-time* of event belongs.

##### (ii) Sudden Phase Anomaly (SPA) at Inubou

Data of sudden phase anomaly (SPA) are prepared from the records of phase measurement of VLF radio waves received at Inubou. The transmitting stations are listed in the following table.

*Phase advance* is shown in unit of degree at its maximum stage. No transmission or no reception during the period is indicated by —, and indistinguishable record is spaced out, and multi-peak event is marked by \*.

Out of more than two circuits on which the same SPA event is observed, the *phase advance* on the circuit on which the SPA is the most remarkable or distinct is underlined. As for the underlined, *phase advance*, *start*, *end*, and *maximum times* are obtained.

In table (ii) SPA, *date* indicates the day to which *start-time* of event belongs.

The following letters may be attached to the value, if necessary.

|   |                        |
|---|------------------------|
| D | greater than,          |
| E | less than,             |
| U | uncertain or doubtful. |

| Transmitting Stations |                                     |           |           |                    |                             |                                     |
|-----------------------|-------------------------------------|-----------|-----------|--------------------|-----------------------------|-------------------------------------|
| Name                  | Location<br>(Geographic Coordinate) |           | Call Sign | Frequency<br>(kHz) | Radiation<br>Power<br>(kHz) | Arc Distance<br>from Inubou<br>(km) |
| Rugby                 | 52° 22'N                            | 001° 11'W | GBR       | 16.0               | 60                          | 9550                                |
| North West Cape       | 21° 49'S                            | 114° 10'E | NWC       | 22.3               | 1000                        | 6990                                |
| Norway                | 66° 25'N                            | 013° 08'E | Ω/N       | 13.6               | 10                          | 7820                                |
| North Dakota          | 46° 22'N                            | 098° 20'W | Ω/ND      | 13.6               | 10                          | 9140                                |
| Hawaii                | 21° 24'N                            | 157° 50'W | Ω/H       | 13.6               | 10                          | 6100                                |
| La Reunion            | 20° 58'S                            | 055° 17'E | Ω/LR      | 13.6               | 10                          | 10970                               |

# IONOSPHERIC DATA

JAN. 1987

FXI (0.1 MHz)

135° E Mean Time (G.M.T. + 9h)

| Station     | WAKKANAI |    |    |    |    |    |    | Lat. 45° 23.5' N | Long. 141° 41.2' E | Sweep 1 MHz to 25 MHz in 2 sec in automatic operation |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-------------|----------|----|----|----|----|----|----|------------------|--------------------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Hour<br>Day | 00       | 01 | 02 | 03 | 04 | 05 | 06 | 07               | 08                 | 09  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 1           | 43       | 50 | 47 | 47 | X  | X  | X  |                  |                    |   |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  |
| 2           | X        | X  | X  | X  | X  | X  | X  |                  |                    |   |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  |
| 3           | 37       | 35 | 36 | 30 | 34 | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 4           | X        | X  | X  | X  | X  | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 5           | 40       | 40 | 40 | 40 | 40 | 44 | 38 |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 6           | 40       | 44 | 44 | 44 | 45 | 50 | 44 |                  |                    |   |    |    |    |    |    |    | X  | A  | A  | A  | A  | X  | X  | X  |
| 7           | 38       | 42 | 45 | 50 | 40 | 40 | 36 |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 8           | 40       | 46 | 45 | 44 | 48 | X  | X  |                  |                    |   |    |    |    |    |    |    | A  | A  | X  | X  | X  | X  | X  | X  |
| 9           | 44       | 45 | 42 | 37 | X  | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 10          | X        | X  | X  | X  | X  | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 11          | X        | 47 | 46 | 44 | 43 | 47 | 40 |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 12          | 60       | 57 | 55 | 44 | X  | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 13          | X        | X  | X  | X  | X  | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 14          | 39       | X  | X  | X  | 37 | 38 | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 15          | 36       | 36 | 36 | 36 | X  | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 16          | 40       | X  | X  | X  | X  | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 17          | X        | X  | X  | X  | X  | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 18          | X        | 40 | 40 | 40 | 37 | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 19          | 51       | 56 | 54 | 55 | 48 | 45 | 40 |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 20          | X        | X  | X  | X  | X  | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 21          | X        | X  | X  | X  | X  | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 22          | X        | X  | X  | X  | X  | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 23          | X        | X  | X  | X  | X  | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 24          | X        | X  | X  | X  | X  | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 25          | 44       | 47 | 48 | 44 | 50 | 43 | 40 |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 26          | X        | X  | 40 | X  | X  | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 27          | X        | X  | X  | X  | X  | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 28          | X        | X  | X  | X  | X  | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 29          | X        | X  | X  | X  | X  | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | A  | X  | X  | X  | X  | X  | X  |
| 30          | 41       | 45 | 40 | 37 | 45 | 40 | 30 |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| 31          | 43       | 39 | 42 | 40 | 42 | X  | X  |                  |                    |   |    |    |    |    |    |    | A  | X  | X  | X  | X  | X  | X  | X  |
|             | 00       | 01 | 02 | 03 | 04 | 05 | 06 | 07               | 08                 | 09  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT         | 31       | 31 | 31 | 31 | 31 | 31 | 31 |                  |                    |   |    |    |    |    |    |    | 29 | 28 | 29 | 29 | 30 | 31 | 31 | 31 |
| MED         | X        | X  | X  | X  | X  | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |
| UQ          | 42       | 44 | 44 | 44 | 42 | 42 | 38 |                  |                    |   |    |    |    |    |    |    | 41 | 40 | 39 | 37 | 40 | 40 | 42 | 42 |
| LQ          | X        | X  | X  | X  | X  | X  | X  |                  |                    |   |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |

JAN. 1987

FXI (0.1 MHz)

# IONOSPHERIC DATA

JAN. 1987

FOF2 (0.1 MHz)

135° E Mean Time (G.M.T. + 9h)

Station WAKKANAI Lat. 45° 23.5' N, Long. 141° 41.2' E Sweep 1 MHz to 25 MHz in 24sec in automatic operation

| Hour<br>Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |    |
|-------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1           | F  | F  | F  | F  | 30 | 27 | 24 | 32 | 64 | 53 | 66 | 75 | 55 | 52 | 49 | 45 | 42 | 29 | 27 | 26 | 28 | 30 | 31 | 30 |    |
| 2           | 31 | 29 | 28 | 31 | 31 | 25 | 23 | 33 | 45 | 57 | 66 | 68 | 66 | 57 | 51 | 50 | 37 | 29 | 28 | 32 | 33 | F  | F  | F  |    |
| 3           | F  | F  | F  | F  | F  | 23 | 20 | 30 | 44 | 55 | 63 | 64 | 63 | 56 | 50 | 45 | 36 | 32 | 31 | 26 | 23 | 23 | 25 | 25 |    |
| 4           | 26 | 28 | 28 | 26 | 27 | 30 | 31 | 34 | 49 | 56 | 49 | 59 | 52 | 54 | 53 | 45 | 34 | 30 | 25 | 25 | 25 | F  | F  | F  |    |
| 5           | F  | F  | F  | F  | F  | F  | F  | 30 | 44 | 53 | 53 | 56 | 57 | 53 | 52 | 45 | 40 | 33 | 30 | 33 | 26 | F  | F  | F  |    |
| 6           | F  | F  | F  | F  | F  | F  | F  | 34 | 45 | 53 | 49 | 46 | 46 | 51 | 59 | 51 | 37 | 31 | A  | A  | A  | A  | 28 | F  |    |
| 7           | F  | F  | F  | F  | F  | F  | F  | 31 | 40 | 46 | 57 | 54 | 50 | 50 | 51 | 47 | 35 | 33 | 29 | F  | F  | F  | F  | F  |    |
| 8           | F  | F  | F  | F  | F  | 40 | 38 | 40 | 47 | 51 | 56 | 54 | 61 | 63 | 54 | 47 | 42 | A  | A  | 30 | 30 | 30 | F  | F  |    |
| 9           | F  | F  | F  | F  | 30 | 32 | 18 | 30 | 42 | 52 | 63 | 61 | 58 | 55 | 47 | 50 | 45 | 30 | 33 | 30 | 25 | 31 | F  | F  |    |
| 10          | 33 | 33 | 32 | 31 | 32 | 33 | 24 | 27 | 39 | 54 | 58 | 67 | 55 | 49 | 53 | 49 | 41 | 30 | 33 | 32 | 25 | 29 | 30 | 32 |    |
| 11          | 34 | F  | F  | F  | F  | F  | F  | 35 | 41 | 46 | 55 | 51 | 59 | 50 | 55 | 46 | 40 | 39 | 32 | 26 | 28 | 36 | 45 | F  |    |
| 12          | F  | F  | F  | 37 | F  | F  | 26 | 36 | 48 | 55 | 58 | H  | 55 | 49 | 56 | 44 | 39 | 32 | 27 | 27 | 22 | 26 | 28 | 30 |    |
| 13          | 30 | 30 | 30 | 32 | 24 | 24 | 20 | 31 | 38 | 48 | 56 | 61 | 54 | H  | 47 | 43 | 36 | 38 | 30 | 24 | 26 | 30 | 32 | F  |    |
| 14          | F  | 33 | 30 | 34 | F  | F  | 24 | 32 | 47 | 58 | 59 | 59 | 52 | 48 | 49 | 45 | 39 | 26 | 28 | 28 | 29 | F  | F  | F  |    |
| 15          | F  | F  | F  | F  | 28 | F  | 21 | 30 | 49 | 54 | 60 | 54 | 57 | 53 | 53 | 45 | 38 | 26 | 27 | 29 | 25 | 30 | 30 | 31 |    |
| 16          | F  | 33 | 31 | 32 | 34 | 27 | 23 | 32 | 50 | 55 | H  | 63 | 58 | 60 | 60 | 50 | 42 | 31 | 34 | 38 | 35 | 38 | 39 | 37 |    |
| 17          | 37 | F  | 31 | 31 | 33 | 34 | 30 | 36 | 56 | 64 | 60 | 63 | 63 | 65 | 59 | 46 | 40 | 33 | 29 | 26 | 27 | 30 | 34 | 32 |    |
| 18          | 33 | F  | F  | F  | F  | 27 | 23 | 30 | 55 | 54 | 57 | 61 | 64 | 60 | 57 | 50 | 44 | 32 | 33 | 36 | 33 | 34 | F  | F  |    |
| 19          | F  | F  | F  | F  | F  | F  | F  | 30 | 35 | 52 | 52 | 52 | 51 | 52 | 53 | 57 | 54 | 47 | 31 | 30 | 29 | 26 | 23 | 25 | 28 |
| 20          | 29 | 30 | 30 | 30 | 33 | 35 | 28 | 32 | 50 | 66 | 68 | 55 | 58 | 55 | 53 | 47 | 39 | 33 | 40 | 33 | 35 | 27 | 29 | 30 |    |
| 21          | 30 | 31 | 31 | 30 | 31 | 31 | 25 | 35 | 50 | 49 | 59 | 67 | 60 | 61 | 73 | 59 | 44 | 36 | 29 | 31 | 34 | 37 | 35 | 35 |    |
| 22          | 42 | 35 | 36 | 38 | 36 | 34 | 33 | 37 | 56 | 70 | H  | 64 | 68 | 62 | 51 | 49 | 41 | 32 | 33 | 36 | 30 | 29 | 27 | 27 |    |
| 23          | 31 | 32 | 32 | 30 | 32 | 34 | 24 | 43 | 54 | 65 | 52 | 62 | 55 | 57 | 58 | 51 | 52 | 40 | 29 | A  | A  | 27 | 30 | 25 |    |
| 24          | 28 | 28 | 27 | 28 | 27 | 28 | 23 | 35 | 51 | 63 | 62 | H  | H  | H  | 47 | 46 | 39 | 36 | 27 | 28 | 30 | 30 | F  | 30 |    |
| 25          | F  | F  | F  | F  | F  | F  | F  | 38 | 55 | 61 | 60 | 56 | 54 | 52 | 55 | 45 | 43 | 37 | 28 | 30 | 27 | 26 | 24 | 28 |    |
| 26          | 30 | 30 | F  | 33 | 33 | 23 | 22 | 34 | 49 | 51 | 53 | 60 | 58 | 50 | C  | 49 | 42 | 32 | 30 | 30 | 29 | 30 | 32 | 32 |    |
| 27          | 33 | 33 | 30 | 30 | 25 | 25 | 22 | 36 | 49 | 57 | 59 | 57 | 53 | 53 | 51 | 50 | 46 | 27 | 27 | 27 | 24 | 26 | 28 | 28 |    |
| 28          | 28 | 30 | 27 | 26 | 27 | 23 | 20 | 32 | 51 | 55 | 59 | 60 | H  | 49 | 56 | 50 | 39 | 35 | 33 | 32 | 25 | 27 | 29 | 29 |    |
| 29          | 28 | 29 | 28 | 26 | 27 | 26 | 20 | 34 | 50 | 57 | 64 | 60 | 62 | 49 | 59 | 50 | 45 | 34 | A  | 24 | 25 | F  | F  | 36 |    |
| 30          | F  | F  | F  | 30 | F  | F  | 23 | 36 | 51 | 50 | 63 | 62 | 58 | 57 | 56 | 56 | 42 | 32 | 34 | 36 | 25 | 28 | F  | F  |    |
| 31          | F  | F  | F  | F  | F  | 40 | 38 | 40 | 48 | 46 | 55 | 58 | 61 | 52 | 56 | 57 | 46 | A  | 25 | 24 | F  | F  | F  | F  |    |
|             | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |    |
| CNT         | 22 | 19 | 19 | 22 | 23 | 22 | 26 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 29 | 28 | 29 | 28 | 24 | 21 | 18 |    |
| MED         | 30 | 30 | 30 | 30 | 30 | 28 | 24 | 34 | 49 | 54 | 59 | 60 | 57 | 53 | 54 | 49 | 41 | 32 | 30 | 29 | 27 | 30 | 30 | 30 |    |
| UQ          | 33 | 33 | 31 | 32 | 32 | 34 | 28 | 36 | 51 | 57 | 61 | 63 | 60 | 57 | 57 | 50 | 44 | 34 | 33 | 32 | 30 | 30 | 32 | 32 |    |
| LQ          | 30 | 29 | 28 | 28 | 27 | 25 | 22 | 32 | 45 | 52 | 56 | 56 | 54 | 50 | 51 | 45 | 39 | 30 | 28 | 26 | 25 | 27 | 28 | 28 |    |

JAN. 1987

FOF2 (0.1 MHz)

# IONOSPHERIC DATA

JAN. 1987

FOF1 (0.01 MHz)

135 E Mean Time (G.M.T. + 9h)

| Station     |    | WAKKANAI |    |    |    |    |    |    | Lat. 45 23.5 N. |    | Long. 141 41.2 E |     | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |     |     |    |    |    |    |    |    |    |    |    |
|-------------|----|----------|----|----|----|----|----|----|-----------------|----|------------------|-----|---|-----|-----|----|----|----|----|----|----|----|----|----|
| Hour<br>Day | 00 | 01       | 02 | 03 | 04 | 05 | 06 | 07 | 08              | 09 | 10               | 11  | 12  | 13  | 14  | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 1           |    |          |    |    |    |    |    |    |                 |    | L                | L   | L   |     |     |    |    |    |    |    |    |    |    |    |
| 2           |    |          |    |    |    |    |    |    |                 |    | L                | 370 | 350   |     |     |    |    |    |    |    |    |    |    |    |
| 3           |    |          |    |    |    |    |    |    |                 |    | L                | 380 | L   | L   |     |    |    |    |    |    |    |    |    |    |
| 4           |    |          |    |    |    |    |    |    |                 |    | L                |     |   |     |     |    |    |    |    |    |    |    |    |    |
| 5           |    |          |    |    |    |    |    |    |                 |    | 370              | L   | 360   |     |     |    |    |    |    |    |    |    |    |    |
| 6           |    |          |    |    |    |    |    |    |                 |    |                  |     | L   | L   |     |    |    |    |    |    |    |    |    |    |
| 7           |    |          |    |    |    |    |    |    |                 |    |                  | L   | A   | A   |     |    |    |    |    |    |    |    |    |    |
| 8           |    |          |    |    |    |    |    |    |                 |    | 420              |     |   | L   |     |    |    |    |    |    |    |    |    |    |
| 9           |    |          |    |    |    |    |    |    |                 |    | L                | 380 |   | L   |     |    |    |    |    |    |    |    |    |    |
| 10          |    |          |    |    |    |    |    |    |                 |    | L                | L   |   |     |     |    |    |    |    |    |    |    |    |    |
| 11          |    |          |    |    |    |    |    |    |                 |    | L                | 370 |   |     |     |    |    |    |    |    |    |    |    |    |
| 12          |    |          |    |    |    |    |    |    |                 |    | L                | 360 |   | L   |     |    |    |    |    |    |    |    |    |    |
| 13          |    |          |    |    |    |    |    |    |                 |    | L                | 370 | 370   |     |     |    |    |    |    |    |    |    |    |    |
| 14          |    |          |    |    |    |    |    |    |                 |    | 390              | 380 |   | L   |     |    |    |    |    |    |    |    |    |    |
| 15          |    |          |    |    |    |    |    |    |                 |    | L                | 390 | L   |     |     |    |    |    |    |    |    |    |    |    |
| 16          |    |          |    |    |    |    |    |    |                 |    | 360              |     |   | L   | L   |    |    |    |    |    |    |    |    |    |
| 17          |    |          |    |    |    |    |    |    |                 |    | L                | 390 |   | L   | L   |    |    |    |    |    |    |    |    |    |
| 18          |    |          |    |    |    |    |    |    |                 |    | L                | 390 |   | L   |     |    |    |    |    |    |    |    |    |    |
| 19          |    |          |    |    |    |    |    |    |                 |    |                  |     | L   |     | L   |    |    |    |    |    |    |    |    |    |
| 20          |    |          |    |    |    |    |    |    |                 | L  | L                | 380 | 390   | L   | L   |    |    |    |    |    |    |    |    |    |
| 21          |    |          |    |    |    |    |    |    |                 |    | L                | L   |   | A   |     |    |    |    |    |    |    |    |    |    |
| 22          |    |          |    |    |    |    |    |    |                 |    | L                | 380 |   | L   | L   |    |    |    |    |    |    |    |    |    |
| 23          |    |          |    |    |    |    |    |    |                 |    | A                | 400 |   | L   | A   | A  |    |    |    |    |    |    |    |    |
| 24          |    |          |    |    |    |    |    |    |                 |    | L                | 380 |   |     | L   |    |    |    |    |    |    |    |    |    |
| 25          |    |          |    |    |    |    |    |    |                 | L  | L                | 400 |   | L   |     | L  |    |    |    |    |    |    |    |    |
| 26          |    |          |    |    |    |    |    |    |                 |    | L                | L   | L   | C   |     |    |    |    |    |    |    |    |    |    |
| 27          |    |          |    |    |    |    |    |    |                 |    | L                | 380 | 380   |     |     |    |    |    |    |    |    |    |    |    |
| 28          |    |          |    |    |    |    |    |    |                 |    | L                | 400 | 400   |     |     |    |    |    |    |    |    |    |    |    |
| 29          |    |          |    |    |    |    |    |    |                 |    | L                | 400 | 390   |     | L   |    |    |    |    |    |    |    |    |    |
| 30          |    |          |    |    |    |    |    |    |                 |    | L                | 390 | 400   | 390 | 390 | L  |    |    |    |    |    |    |    |    |
| 31          |    |          |    |    |    |    |    |    |                 |    | 390              | 400 | 390   |     |     |    |    |    |    |    |    |    |    |    |
|             | 00 | 01       | 02 | 03 | 04 | 05 | 06 | 07 | 08              | 09 | 10               | 11  | 12  | 13  | 14  | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT         |    |          |    |    |    |    |    |    |                 |    | 4                | 16  | 13  | 3   |     |    |    |    |    |    |    |    |    |    |
| MED         |    |          |    |    |    |    |    |    |                 |    | 385              | 390 | 380   | 380 |     |    |    |    |    |    |    |    |    |    |
| UQ          |    |          |    |    |    |    |    |    |                 |    | 390              | 400 | 390   | 385 |     |    |    |    |    |    |    |    |    |    |
| LQ          |    |          |    |    |    |    |    |    |                 |    | 370              | 380 | 370   | 370 |     |    |    |    |    |    |    |    |    |    |

JAN. 1987

FOF1 (0.01 MHz)

# IONOSPHERIC DATA

JAN. 1987

FOE (0.01 MHz)

135° E Mean Time (G.M.T. + 9h)

| Station     | WAKKANAI  |    |    |    |    |    |    |       |              |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |
|-------------|---|----|----|----|----|----|----|-------|--------------|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|
| Lat.        | 45° 23.5' N                                     |    |    |    |    |    |    | Long. | 141° 41.2' E |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |
| Sweep       | 1 MHz to 25 MHz in 24sec in automatic operation |    |    |    |    |    |    |       |              |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |
| Hour<br>Day | 00  | 01 | 02 | 03 | 04 | 05 | 06 | 07    | 08           | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 1           |   |    |    |    |    |    |    | S     | S            | A   | 240 | 250 | 250 | 250 | 215 | A   | S   |    |    |    |    |    |    |    |
| 2           |   |    |    |    |    |    |    | S     | 190          | A   | A   | 250 | 250 | A   | B   | 190 | S   |    |    |    |    |    |    |    |
| 3           |   |    |    |    |    |    |    | A     | A            | A   | 245 | 250 | 250 | 240 | 220 | S   | S   |    |    |    |    |    |    |    |
| 4           |   |    |    |    |    |    |    | S     | A            | 220 | 245 | 260 | 255 | 250 | 225 | 185 | S   |    |    |    |    |    |    |    |
| 5           |   |    |    |    |    |    |    | S     | A            | 215 | 240 | 250 | 260 | B   | a   | B   | S   |    |    |    |    |    |    |    |
| 6           |   |    |    |    |    |    |    | S     | A            | B   | B   | B   | B   | B   | B   | B   | S   |    |    |    |    |    |    |    |
| 7           |   |    |    |    |    |    |    | S     | A            | A   | A   | A   | A   | A   | 235 | S   | S   |    |    |    |    |    |    |    |
| 8           |   |    |    |    |    |    |    | S     | A            | A   | A   | A   | 270 | 255 | 220 | A   | S   |    |    |    |    |    |    |    |
| 9           |   |    |    |    |    |    |    | S     | A            | 225 | 240 | 250 | 260 | 255 | 225 | 205 | S   |    |    |    |    |    |    |    |
| 10          |   |    |    |    |    |    |    | S     | S            | 235 | 250 | 265 | 260 | 250 | 220 | 200 | S   |    |    |    |    |    |    |    |
| 11          |   |    |    |    |    |    |    | S     | 195          | 220 | A   | 260 | 265 | 250 | 225 | 195 | S   |    |    |    |    |    |    |    |
| 12          |   |    |    |    |    |    |    | S     | S            | 215 | 245 | A   | A   | A   | 240 | 205 | S   |    |    |    |    |    |    |    |
| 13          |   |    |    |    |    |    |    | S     | S            | A   | 265 | 275 | 275 | 270 | 240 | 195 | S   |    |    |    |    |    |    |    |
| 14          |   |    |    |    |    |    |    | S     | 200          | 225 | 250 | 275 | 275 | 265 | 230 | 200 | S   |    |    |    |    |    |    |    |
| 15          |   |    |    |    |    |    |    | S     | 205          | A   | A   | 275 | A   | A   | 240 | 205 | S   |    |    |    |    |    |    |    |
| 16          |   |    |    |    |    |    |    | S     | 200          | 240 | 260 | 270 | 275 | 270 | 240 | 205 | S   |    |    |    |    |    |    |    |
| 17          |   |    |    |    |    |    |    | S     | A            | A   | A   | A   | A   | 265 | 240 | 200 | S   |    |    |    |    |    |    |    |
| 18          |   |    |    |    |    |    |    | E     | A            | H   | 240 | 275 | 285 | 285 | 275 | 255 | 205 | S  |    |    |    |    |    |    |
| 19          |   |    |    |    |    |    |    | S     | 205          | 225 | 255 | 275 | 280 | 275 | 240 | 200 | S   |    |    |    |    |    |    |    |
| 20          |   |    |    |    |    |    |    | S     | 205          | A   | 265 | 270 | 280 | 275 | 250 | 210 | 170 | S  |    |    |    |    |    |    |
| 21          |   |    |    |    |    |    |    | S     | 190          | 230 | 245 | 270 | 275 | 270 | 250 | 200 | A   |    |    |    |    |    |    |    |
| 22          |   |    |    |    |    |    |    | S     | 190          | 235 | 260 | A   | 270 | 270 | 250 | 200 | S   |    |    |    |    |    |    |    |
| 23          |   |    |    |    |    |    |    | S     | A            | 230 | A   | A   | A   | A   | A   | 200 | S   |    |    |    |    |    |    |    |
| 24          |   |    |    |    |    |    |    | A     | A            | 240 | 260 | 270 | 280 | 275 | 250 | 210 | S   |    |    |    |    |    |    |    |
| 25          |   |    |    |    |    |    |    | S     | 200          | 235 | 270 | 285 | 280 | 270 | 250 | 205 | S   |    |    |    |    |    |    |    |
| 26          |   |    |    |    |    |    |    | S     | A            | A   | A   | A   | 280 | A   | C   | 210 | S   |    |    |    |    |    |    |    |
| 27          |   |    |    |    |    |    |    | S     | 205          | 245 | 275 | 290 | 285 | 270 | 250 | 210 | S   |    |    |    |    |    |    |    |
| 28          |   |    |    |    |    |    |    | S     | 200          | 235 | 260 | 275 | 270 | A   | 250 | 210 | S   |    |    |    |    |    |    |    |
| 29          |   |    |    |    |    |    |    | S     | 200          | 235 | 260 | 275 | 270 | 260 | 240 | 205 | A   |    |    |    |    |    |    |    |
| 30          |   |    |    |    |    |    |    | S     | 180          | 220 | 260 | A   | 285 | 265 | 240 | 205 | S   |    |    |    |    |    |    |    |
| 31          |   |    |    |    |    |    |    | S     | 190          | 230 | 275 | 285 | 285 | 270 | 250 | 215 | S   |    |    |    |    |    |    |    |
| Hour<br>Day | 00  | 01 | 02 | 03 | 04 | 05 | 06 | 07    | 08           | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT         |   |    |    |    |    |    |    | 1     | 15           | 20  | 22  | 22  | 25  | 22  | 26  | 25  | 1   |    |    |    |    |    |    |    |
| MED         |   |    |    |    |    |    |    | E     | 200          | 230 | 260 | 270 | 275 | 268 | 240 | 205 | 170 |    |    |    |    |    |    |    |
| UQ          |   |    |    |    |    |    |    |       | 202          | 235 | 265 | 275 | 280 | 270 | 250 | 205 |     |    |    |    |    |    |    |    |
| LQ          |   |    |    |    |    |    |    |       | 190          | 222 | 245 | 260 | 260 | 255 | 225 | 200 |     |    |    |    |    |    |    |    |

JAN. 1987

FOE (0.01 MHz)



# IONOSPHERIC DATA

JAN. 1987

FOES (0.1 MHz)

135 E Mean Time (G.M.T. + 9h)

| Station     | WAKKANAI |        |        |        |        |        |        | Lat. 45 23.5 N. | Long. 141 41.2 E | Sweep 1 MHz to 25 MHz in 2 sec in automatic operation |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
|-------------|----------|--------|--------|--------|--------|--------|--------|-----------------|------------------|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Hour<br>Day | 00       | 01     | 02     | 03     | 04     | 05     | 06     | 07              | 08               | 09  | 10     | 11     | 12     | 13     | 14     | 15     | 16     | 17     | 18     | 19     | 20     | 21     | 22     | 23     |        |
| 1           | 27       | E S 15 | E S 15 | E S 15 | E S 15 | E S 16 | E S 15 | J A 52          | E S 19           | 37  | G      | G      | G      | G      | G      | 20     | 20     | E S 16 | E S 17 | E S 17 | 28     | E S 16 | E S 16 | E S 16 | E S 15 |
| 2           | E S 16   | 27     | E S 16 | E S 15 | E S 17 | E S 16 | 21     | E S 16          | G                | J A 33  | 26     | G      | 30     | 40     | E B 24 | G      | E S 15 | 29     | E S 15 | E S 15 | E S 17 | E S 15 | E S 12 | 27     |        |
| 3           | 27       | 27     | E S 16 | E S 16 | E S 15 | E S 16 | 23     | 36              | 31               | 29  | 30     | 23     | G      | G      | G      | E S 17 | E S 15 | E S 16 | E S 16 | E S 17 | 27     | 27     | 27     | 27     |        |
| 4           | 28       | E S 16 | E S 15 | E S 15 | E S 16 | E S 16 | E S 16 | E S 16          | 28               | 23  | G      | G      | G      | G      | G      | E S 16 | E S 15 | E S 17 | E S 17 | 28     | E S 15 | 28     | 24     |        |        |
| 5           | 30       | E S 16 | E S 16 | E      | E      | E S 17 | E S 16 | E S 15          | 23               | G   | G      | G      | G      | E B 27 | E B 25 | E B 20 | E S 16 | E S 16 | 40     | J A 33 | 28     | E S 15 | 28     | E S 16 |        |
| 6           | E S 16   | 30     | E S 15 | 30     | E S 16 | E S 16 | E S 15 | E S 15          | J A 50           | 43  | J A 55 | J A 46 | E B 30 | E B 30 | E B 28 | E B 24 | E S 17 | 22     | J A 58 | 41     | J A 60 | 43     | 30     | 39     |        |
| 7           | 40       | 30     | 32     | E S 17 | 29     | E S 16 | E S 17 | E S 15          | J A 50           | 43  | 40     | 37     | J A 53 | J A 50 | G      | E S 20 | E S 16 | E S 16 | E S 16 | 32     | E S 16 | 35     | J A 50 | 40     |        |
| 8           | 31       | E S 16 | E S 15 | E S 16 | E S 16 | E S 16 | E S 15 | E S 15          | 20               | 40  | J A 50 | 43     | G      | G      | 22     | 30     | 40     | 47     | 35     | 32     | 24     | E S 15 | E S 15 | E S 15 |        |
| 9           | E S 15   | E S 16 | 24     | E      | E S 16 | E S 16 | E S 15 | E S 15          | 35               | 29  | G      | 33     | G      | G      | G      | E S 16 | 26     | E S 17 | E S 17 | 40     | E S 16 | E S 16 | 35     |        |        |
| 10          | 28       | 28     | E S 16 | 22     | 25     | E S 15 | E S 19 | E S 17          | 20               | G   | G      | G      | 27     | G      | G      | E S 16 | E S 19 | E S 17 | E S 17 | E S 15 | E S 15 | E S 15 | E S 16 |        |        |
| 11          | E S 15   | E S 15 | E S 15 | E S 15 | 22     | E S 15 | E S 16 | E S 15          | G                | G   | 37     | G      | G      | G      | G      | E S 16 | 27     | 34     | E S 17 | E S 16 | E S 16 | 31     | 40     |        |        |
| 12          | 28       | E S 16 | E S 15 | E S 16 | E      | E S 15 | E S 16 | E S 15          | E S 18           | G   | 33     | 30     | 30     | G      | G      | E S 17 | 27     | E S 17 | E S 17 | E S 15 | E S 15 | E      | 23     |        |        |
| 13          | E S 16   | E      | E S 15 | E S 15 | E S 15 | E S 17 | E S 16 | E S 15          | 21               | 36  | 31     | G      | G      | G      | G      | E S 17 | E S 17 | E S 16 | E S 16 | E S 15 | E S 17 | E S 15 | E S 15 |        |        |
| 14          | 26       | E S 15 | 23     | E S 17 | E S 15 | E      | E S 16 | E S 17          | G                | G   | G      | G      | G      | G      | G      | E S 16 | E S 16 | E S 16 | E S 17 | E S 15 | 29     | E S 17 | 23     |        |        |
| 15          | 25       | 21     | 22     | E S 15 | E      | E S 17 | E S 16 | E S 15          | 25               | 40  | 37     | 31     | 34     | 26     | 23     | G      | E S 17 | 31     | 27     | 24     | 27     | 23     | 29     | 30     |        |
| 16          | 25       | E S 16 | E S 16 | E S 16 | E S 15 | 21     | 26     | 24              | 30               | 21  | G      | 24     | G      | G      | G      | E S 16 | E S 16 | 26     | E S 17 | E S 16 | E S 16 | E S 15 | 27     |        |        |
| 17          | E S 15   | E S 16 | E S 16 | E S 15 | E S 14 | 21     | E S 15 | 21              | 29               | 32  | 40     | 32     | 36     | 28     | G      | E S 18 | E S 16 | E S 16 | E S 11 | E S 16 | E S 15 | 30     | E S 15 |        |        |
| 18          | 27       | 21     | E S 16 | E S 16 | E S 16 | E S 17 | E S 16 | 22              | 35               | G   | G      | G      | G      | G      | 27     | 23     | E S 18 | E S 16 | 28     | 31     | E S 15 | 27     | 40     | 23     |        |
| 19          | E S 16   | E S 16 | E S 16 | E S 15 | E S 15 | E S 17 | E S 16 | E S 16          | G                | G   | G      | G      | G      | G      | G      | E S 16 | E S 17 | E S 17 | E S 15 | E S 16 | E S 16 | E S 16 | E S 16 |        |        |
| 20          | E S 11   | E S 16 | E S 16 | E S 16 | E S 14 | E S 15 | E S 17 | E S 17          | G                | 26  | G      | G      | G      | G      | G      | G      | 30     | 35     | 22     | 27     | 23     | 23     | 23     |        |        |
| 21          | 22       | 25     | 22     | E S 17 | E S 17 | E S 17 | 22     | G               | G                | 22  | 33     | 35     | 33     | 37     | 40     | 36     | J A 60 | 35     | 33     | E S 16 | E S 16 | E S 16 | E S 15 |        |        |
| 22          | 30       | 31     | 29     | 23     | E S 16 | E S 15 | E S 16 | E S 15          | G                | 30  | G      | 30     | G      | G      | 23     | G      | E S 16 | E S 16 | E S 16 | 31     | 33     | 29     | 25     | E S 15 |        |
| 23          | E S 16   | 20     | 30     | 30     | 24     | E S 16 | E S 15 | E S 16          | 26               | G   | J A 73 | 29     | 30     | 50     | 60     | 20     | E S 17 | 30     | 31     | 40     | J A 50 | 42     | 39     | 30     |        |
| 24          | E S 15   | 30     | 24     | 22     | E S 16 | 23     | 31     | 37              | 31               | G   | G      | G      | G      | G      | G      | 20     | 32     | 31     | 27     | E S 16 | E S 16 | 26     | E S 16 |        |        |
| 25          | E S 15   | E S 15 | E S 15 | E S 16 | E S 15 | E S 16 | E S 16 | E S 17          | 23               | G   | 33     | G      | G      | G      | G      | 24     | E S 17 | 30     | E S 16 | E S 15 | 25     | E S 17 | E S 16 | E S 15 |        |
| 26          | E S 15   | E S 15 | E S 16 | E      | E S 12 | 22     | 24     | 29              | 35               | 31  | 32     | 36     | G      | 29     | C      | J A 50 | 23     | 23     | 22     | E S 16 | 23     | 24     | E S 16 | 30     |        |
| 27          | J A 60   | 33     | 29     | 33     | 20     | E S 16 | E S 15 | E S 17          | 27               | 23  | G      | G      | G      | G      | 29     | G      | E S 17 | E S 16 | E S 16 | E S 16 | E S 15 | E S 16 | E S 17 | E S 16 |        |
| 28          | E S 17   | E S 15 | 21     | E S 16 | 21     | 26     | E S 16 | E S 17          | G                | G   | G      | G      | G      | 32     | G      | G      | E S 17 | E S 15 | E S 15 | E S 16 | E      | E S 15 | 31     | E S 16 |        |
| 29          | 25       | E S 15 | E      | E S 15 | E S 16 | E S 16 | E S 16 | E S 16          | G                | 30  | G      | G      | G      | G      | 30     | 26     | 31     | 38     | 36     | 24     | 28     | 27     | 36     | 32     |        |
| 30          | E S 15   | 21     | 21     | 22     | 27     | 32     | 21     | 19              | 24               | G   | G      | 31     | G      | G      | G      | E S 16 | 27     | E S 16 | 36     | E S 16 | E S 15 | E S 15 | E S 16 |        |        |
| 31          | E S 15   | E S 16 | E      | 23     | 21     | 26     | E S 16 | E S 16          | G                | G   | G      | G      | G      | G      | 35     | 38     | 30     | 62     | 36     | J A 51 | E S 15 | E S 16 | E S 16 | E S 16 |        |
|             | 00       | 01     | 02     | 03     | 04     | 05     | 06     | 07              | 08               | 09  | 10     | 11     | 12     | 13     | 14     | 15     | 16     | 17     | 18     | 19     | 20     | 21     | 22     | 23     |        |
| CNT         | 31       | 31     | 31     | 31     | 31     | 31     | 31     | 31              | 31               | 31  | 31     | 31     | 31     | 31     | 30     | 31     | 31     | 31     | 31     | 31     | 31     | 31     | 31     | 31     |        |
| MED         | 22       | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16          | 23               | 26  | G      | G      | G      | G      | G      | E S 17 | 22     | E S 17 | E S 17 | E S 16 | E S 16 | 17     | 23     |        |        |
| UQ          | 28       | 26     | 22     | 20     | 18     | E S 17 | E S 17 | 20              | 30               | 32  | 33     | 32     | 28     | 28     | 24     | 21     | E S 18 | 30     | 32     | 31     | 27     | 26     | 30     | 28     |        |
| LQ          | E S 15   | E S 16 | E S 15 | E S 15 | E S 15 | E S 16 | E S 16 | E S 15          | G                | G   | G      | G      | G      | G      | G      | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 15 | E S 16 | E S 16 |        |

JAN. 1987

FOES (0.1 MHz)

The Radio Research Laboratory, Japan

# IONOSPHERIC DATA

JAN. 1987

FBES (0.1 MHz)

135 E Mean Time (G.M.T. + 9h)

| Station |     | WAKKANAI |        |        |        |        |        |        | Lat. 45 23.5 N |        | Long. 141 41.2 E |    | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |        |        |        |        |        |        |        |        |        |        |        |        |        |
|---------|-----|----------|--------|--------|--------|--------|--------|--------|----------------|--------|------------------|----|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Hour    | Day | 00       | 01     | 02     | 03     | 04     | 05     | 06     | 07             | 08     | 09               | 10 | 11  | 12     | 13     | 14     | 15     | 16     | 17     | 18     | 19     | 20     | 21     | 22     | 23     |        |
| 1       |     | E S 16   | E S 15 | E S 15 | E S 15 | E S 15 | E S 16 | E S 15 | 20             | E S 19 | 24               | G  | G   | G      | G      | G      | 20     | E S 16 | E S 17 | E S 17 | E S 15 | E S 16 | E S 16 | E S 16 | E S 15 |        |
| 2       |     | E S 16   | 17     | E S 16 | E S 15 | E S 17 | E S 16 | 15     | E S 16         | G      | 24               | 25 | G   | G      | E S 24 | G      | E S 15 | 19     | E S 15 | E S 15 | E S 17 | E S 15 | E S 12 | E S 15 |        |        |
| 3       |     | E S 17   | E S 16 | E S 16 | E S 16 | E S 15 | E S 16 | E S 15 | 24             | 20     | 23               | 21 | G   | G      | G      | E S 17 | E S 15 | E S 16 | E S 16 | E S 17 | 18     | E S 16 | E S 17 | E S 17 |        |        |
| 4       |     | E S 16   | E S 16 | E S 15 | E S 15 | E S 16 | E S 16 | E S 16 | E S 16         | 20     | G                | G  | G   | G      | G      | G      | E S 16 | E S 15 | E S 17 | E S 17 | E S 15 | E S 15 | E S 15 | E S 16 |        |        |
| 5       |     | E S 16   | E S 16 | E S 16 | E      | E      | E S 17 | E S 16 | E S 15         | 21     | G                | G  | G   | G      | E B 27 | E B 25 | E B 20 | E S 16 | E S 16 | 19     | 17     | 20     | E S 15 | E S 16 | E S 16 |        |
| 6       |     | E S 16   | E S 16 | E S 15 | E S 16 | E S 16 | E S 16 | E S 15 | E S 15         | 36     | 40               | 39 | 31  | E B 30 | E B 30 | E B 28 | E B 24 | E S 17 | 21     | A A 58 | A A 41 | A A 60 | A A 43 | A A 17 | 27     |        |
| 7       |     | 19       | 18     | 19     | E S 17 | E S 16 | E S 16 | E S 17 | E S 15         | 19     | 38               | 29 | 28  | 36     | 40     | G      | E S 20 | E S 16 | E S 16 | E S 16 | 18     | E S 16 | 20     | E S 15 | 20     |        |
| 8       |     | E S 16   | E S 16 | E S 15 | E S 16 | E S 16 | E S 16 | E S 16 | E S 15         | 18     | 27               | 31 | 30  | G      | G      | 20     | 21     | 21     | A A 47 | A A 35 | 19     | E S 15 | E S 15 | E S 15 | E S 15 |        |
| 9       |     | E S 15   | E S 16 | 17     | E      | E S 16 | E S 16 | E S 15 | E S 15         | 21     | G                | G  | G   | G      | G      | G      | E S 16 | E S 18 | E S 17 | E S 17 | E S 17 | E S 17 | E S 16 | E S 18 |        |        |
| 10      |     | E S 17   | 18     | E S 16 | E S 16 | E S 16 | E S 15 | E S 15 | E S 17         | G      | G                | G  | G   | G      | 22     | G      | E S 16 | E S 19 | E S 17 | E S 17 | E S 17 | E S 15 | E S 15 | E S 16 |        |        |
| 11      |     | E S 15   | E S 15 | E S 15 | E S 15 | E S 16 | E S 15 | E S 16 | E S 15         | G      | G                | 27 | G   | G      | G      | G      | E S 16 | E S 16 | 20     | E S 17 | E S 16 | E S 16 | E S 16 | 20     |        |        |
| 12      |     | E S 17   | E S 16 | E S 15 | E S 16 | E      | E S 15 | E S 16 | E S 15         | E S 18 | G                | G  | G   | G      | G      | G      | E S 17 | E S 19 | E S 17 | E S 17 | E S 17 | E S 15 | E S 15 | E S 15 |        |        |
| 13      |     | E S 16   | E      | E S 15 | E S 15 | E S 15 | E S 17 | E S 16 | E S 15         | G      | 26               | 23 | G   | G      | G      | G      | E S 17 | E S 17 | E S 16 | E S 16 | E S 15 | E S 17 | E S 15 | E S 15 |        |        |
| 14      |     | E S 12   | E S 15 | E S 16 | E S 17 | E S 15 | E      | E S 16 | E S 17         | G      | G                | G  | G   | G      | G      | G      | E S 16 | E S 16 | E S 16 | E S 17 | E S 15 | E S 16 | E S 17 | E S 16 |        |        |
| 15      |     | E S 16   | E S 14 | E S 12 | E S 15 | E      | E S 17 | E S 16 | E S 15         | 17     | 31               | 28 | 22  | 29     | 26     | 22     | G      | E S 17 | 20     | 20     | E S 17 | E S 17 | E S 16 | E S 17 |        |        |
| 16      |     | E S 17   | E S 16 | E S 16 | E S 16 | E S 15 | E S 16 | E S 17 | E S 17         | G      | G                | G  | G   | G      | G      | G      | E S 16 | E S 16 | E S 16 | E S 17 | E S 16 | E S 16 | E S 15 | E S 15 |        |        |
| 17      |     | E S 15   | E S 16 | E S 16 | E S 15 | E S 14 | E S 16 | E S 15 | G              | 21     | 24               | 29 | 28  | 28     | 20     | G      | E S 18 | E S 16 | E S 16 | E S 11 | E S 16 | E S 15 | E S 17 | E S 15 |        |        |
| 18      |     | E S 16   | E S 16 | E S 16 | E S 16 | E S 16 | E S 17 | E S 16 | 16             | 28     | G                | G  | G   | G      | G      | 23     | G      | E S 18 | E S 16 | 18     | E S 17 | E S 15 | E S 17 | E S 16 |        |        |
| 19      |     | E S 16   | E S 16 | E S 16 | E S 15 | E S 15 | E S 17 | E S 16 | E S 16         | G      | G                | G  | G   | G      | G      | G      | E S 16 | E S 17 | E S 17 | E S 15 | E S 16 | E S 16 | E S 16 | E S 16 |        |        |
| 20      |     | E S 11   | E S 16 | E S 16 | E S 16 | E S 14 | E S 15 | E S 17 | E S 17         | G      | G                | G  | G   | G      | G      | G      | G      | 16     | E S 17 | E S 17 | E S 16 | E S 15 | E S 17 | E S 17 |        |        |
| 21      |     | E S 16   | E S 17 | E S 17 | E S 17 | E S 17 | E S 17 | E S 17 | E S 17         | G      | 21               | 32 | 35  | G      | 32     | 39     | 32     | 40     | 29     | 25     | E S 16 | E S 16 | E S 16 | E S 15 |        |        |
| 22      |     | E S 16   | 21     | 15     | E S 16 | E S 16 | E S 15 | E S 16 | E S 15         | G      | G                | G  | G   | G      | G      | 21     | G      | E S 16 | E S 16 | E S 16 | 22     | E S 16 | E S 16 | E S 17 | E S 15 |        |
| 23      |     | E S 16   | E S 17 | E S 13 | E      | E S 17 | E S 16 | E S 15 | E S 15         | 21     | G                | 47 | 29  | 30     | 45     | 49     | 19     | E S 17 | E S 16 | E S 17 | A A 40 | A A 50 | 20     | E S 17 | E S 17 |        |
| 24      |     | E S 15   | E S 16 | E S 16 | E S 17 | E S 16 | E S 16 | E S 16 | 18             | 21     | G                | G  | G   | G      | G      | G      | G      | G      | 23     | 23     | E S 17 | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 25      |     | E S 15   | E S 15 | E S 15 | E S 16 | E S 15 | E S 16 | E S 16 | E S 17         | G      | G                | G  | G   | G      | G      | G      | E S 17 | 20     | E S 16 | E S 15 | E S 17 | E S 17 | E S 16 | E S 15 |        |        |
| 26      |     | E S 15   | E S 15 | E S 16 | E      | E S 12 | 16     | E S 16 | E S 16         | 23     | 26               | 29 | 29  | G      | 29     | C      | 30     | 19     | E S 15 | E S 17 | E S 16 | E S 17 | E S 17 | E S 16 | E S 15 |        |
| 27      |     | 18       | 19     | 17     | 20     | E S 17 | E S 16 | E S 15 | E S 17         | G      | G                | G  | G   | G      | G      | G      | G      | E S 17 | E S 16 | E S 16 | E S 16 | E S 15 | E S 16 | E S 17 | E S 16 |        |
| 28      |     | E S 17   | E S 15 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 17         | G      | G                | G  | G   | G      | 27     | G      | G      | E S 17 | E S 15 | E S 15 | E S 16 | E      | E S 15 | E S 16 | E S 16 |        |
| 29      |     | E S 16   | E S 15 | E      | E S 15 | E S 16 | E S 16 | E S 16 | E S 16         | G      | G                | G  | G   | G      | G      | 30     | G      | 23     | 29     | A A 36 | 17     | E S 17 | E S 17 | E S 16 | 20     |        |
| 30      |     | E S 15   | E S 15 | E S 16 | E S 14 | 19     | E S 16 | E S 16 | 18             | G      | G                | G  | 29  | G      | G      | G      | G      | E S 16 | E S 16 | E S 16 | 22     | E S 16 | E S 15 | E S 15 | E S 16 |        |
| 31      |     | E S 15   | E S 16 | E      | E S 12 | 16     | E S 16 | E S 16 | E S 16         | G      | G                | G  | G   | G      | G      | G      | 37     | 29     | A A 62 | 20     | 19     | E S 15 | E S 16 | E S 16 | E S 16 |        |
|         |     | 00       | 01     | 02     | 03     | 04     | 05     | 06     | 07             | 08     | 09               | 10 | 11  | 12     | 13     | 14     | 15     | 16     | 17     | 18     | 19     | 20     | 21     | 22     | 23     |        |
| CNT     |     | 31       | 31     | 31     | 31     | 31     | 31     | 31     | 31             | 31     | 31               | 31 | 31  | 31     | 31     | 30     | 31     | 31     | 31     | 31     | 31     | 31     | 31     | 31     | 31     |        |
| MED     |     | E S 16   | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16         | G      | G                | G  | G   | G      | G      | G      | G      | E S 16 | E S 16 | E S 17 | E S 17 | E S 16 | E S 16 | E S 16 | E S 16 |        |
| UQ      |     | E S 16   | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 17         | 20     | 24               | 28 | 28  | E G 22 | U      | 25     | 21     | E G 20 | E S 17 | 20     | 20     | 17     | E S 17 | E S 16 | E S 17 | E S 17 |
| LQ      |     | E S 15   | E S 15 | E S 15 | E S 15 | E S 15 | E S 16 | E S 16 | E S 15         | G      | G                | G  | G   | G      | G      | G      | G      | E S 16 | E S 16 | E S 16 | E S 16 | E S 15 | E S 15 | E S 15 | E S 15 |        |

JAN. 1987

FBES (0.1 MHz)

# IONOSPHERIC DATA

JAN. 1987

FMIN (0.1 MHZ)

135 E Mean Time (G.M.T. + 9h)

| Station     | WAKKANAI |        |        |        |        |        |        |        | Lat.   | 45 | 23.5 | N. | Long. | 141 | 41.2 | E      | Sweep  | 1      | MHz    | to     | 25     | MHz    | in     | 2      | sec | in | automatic | operation |
|-------------|----------|--------|--------|--------|--------|--------|--------|--------|--------|----|------|----|-------|-----|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----|----|-----------|-----------|
| Hour<br>Day | 00       | 01     | 02     | 03     | 04     | 05     | 06     | 07     | 08     | 09 | 10   | 11 | 12    | 13  | 14   | 15     | 16     | 17     | 18     | 19     | 20     | 21     | 22     | 23     |     |    |           |           |
| 1           | E S 16   | E S 15 | E S 15 | E S 15 | E S 15 | E S 16 | E S 15 | E S 16 | E S 19 | 17 | 18   | 18 | 18    | 19  | 18   | 10     | E S 16 | E S 17 | E S 17 | E S 15 | E S 16 | E S 16 | E S 16 | E S 15 |     |    |           |           |
| 2           | E S 16   | E S 15 | E S 16 | E S 15 | E S 17 | E S 16 | E S 16 | E S 16 | 17     | 17 | 19   | 20 | 19    | 20  | 24   | 17     | E S 15 | E S 15 | E S 15 | E S 15 | E S 17 | E S 15 | E S 12 | E S 15 |     |    |           |           |
| 3           | E S 17   | E S 16 | E S 16 | E S 16 | E S 15 | E S 16 | E S 15 | E S 15 | 15     | 10 | 17   | 18 | 18    | 17  | 17   | E S 17 | E S 15 | E S 16 | E S 16 | E S 17 | E S 17 | E S 16 | E S 17 | E S 17 |     |    |           |           |
| 4           | E S 16   | E S 16 | E S 15 | E S 15 | E S 16 | E S 16 | E S 16 | E S 16 | 17     | 12 | 17   | 17 | 19    | 19  | 17   | 10     | E S 16 | E S 15 | E S 17 | E S 17 | E S 15 | E S 15 | E S 15 | E S 16 |     |    |           |           |
| 5           | E S 16   | E S 16 | E S 16 | E S 16 | E S 17 | E S 16 | E S 15 | E S 15 | 16     | 13 | 18   | 21 | 21    | 27  | 25   | 20     | E S 16 | E S 16 | E S 16 | E S 16 | E S 15 | E S 15 | E S 16 | E S 16 |     |    |           |           |
| 6           | E S 16   | E S 16 | E S 15 | E S 16 | E S 16 | E S 16 | E S 15 | E S 15 | 19     | 25 | 25   | 30 | 30    | 30  | 28   | 24     | E S 17 | E S 17 | E S 17 | E S 15 | E S 17 | E S 16 | E S 17 | E S 16 |     |    |           |           |
| 7           | E S 17   | E S 16 | E S 16 | E S 17 | E S 16 | E S 16 | E S 17 | E S 15 | 17     | 17 | 18   | 17 | 17    | 19  | 18   | E S 20 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 15 | E S 17 |     |    |           |           |
| 8           | E S 16   | E S 16 | E S 15 | E S 16 | E S 16 | E S 16 | E S 15 | E S 15 | 16     | 17 | 17   | 17 | 17    | 18  | 17   | 17     | E S 17 | E S 17 | E S 17 | E S 17 | E S 16 | E S 15 | E S 15 | E S 15 |     |    |           |           |
| 9           | E S 15   | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 15 | E S 15 | 17     | 17 | 17   | 18 | 18    | 17  | 17   | 17     | E S 16 | E S 18 | E S 17 | E S 17 | E S 17 | E S 17 | E S 16 | E S 16 |     |    |           |           |
| 10          | E S 17   | E S 15 | E S 16 | E S 16 | E S 16 | E S 15 | E S 19 | E S 17 | E S 18 | 17 | 17   | 17 | 18    | 18  | 20   | 18     | E S 16 | E S 19 | E S 17 | E S 17 | E S 15 | E S 15 | E S 15 | E S 16 |     |    |           |           |
| 11          | E S 15   | E S 15 | E S 15 | E S 15 | E S 16 | E S 15 | E S 16 | E S 15 | 17     | 17 | 17   | 18 | 20    | 19  | 19   | 18     | E S 16 | E S 17 | E S 17 | E S 17 | E S 16 | E S 16 | E S 16 | E S 16 |     |    |           |           |
| 12          | E S 17   | E S 16 | E S 15 | E S 16 | E S 15 | E S 16 | E S 15 | E S 15 | E S 18 | 17 | 18   | 17 | 18    | 18  | 18   | 17     | E S 17 | E S 19 | E S 17 | E S 17 | E S 15 | E S 15 | E S 15 | E S 15 |     |    |           |           |
| 13          | E S 16   | E S 15 | E S 15 | E S 15 | E S 15 | E S 17 | E S 16 | E S 15 | E S 18 | 16 | 17   | 18 | 17    | 17  | 16   | 16     | E S 17 | E S 17 | E S 16 | E S 16 | E S 15 | E S 17 | E S 15 | E S 15 |     |    |           |           |
| 14          | E S 12   | E S 15 | E S 16 | E S 17 | E S 15 | E S 16 | E S 17 | E S 17 | 11     | 17 | 17   | 17 | 18    | 17  | 18   | 12     | E S 16 | E S 16 | E S 16 | E S 16 | E S 15 | E S 16 | E S 17 | E S 16 |     |    |           |           |
| 15          | E S 16   | E S 14 | E S 12 | E S 15 | E S 17 | E S 16 | E S 15 | E S 15 | 11     | 17 | 17   | 17 | 17    | 15  | 17   | 17     | E S 17 | E S 17 | E S 17 | E S 17 | E S 17 | E S 16 | E S 17 | E S 17 |     |    |           |           |
| 16          | E S 17   | E S 16 | E S 16 | E S 16 | E S 15 | E S 16 | E S 17 | E S 17 | 17     | 12 | 17   | 17 | 18    | 17  | 17   | 17     | E S 16 | E S 16 | E S 16 | E S 17 | E S 16 | E S 16 | E S 15 | E S 15 |     |    |           |           |
| 17          | E S 15   | E S 16 | E S 16 | E S 15 | E S 14 | E S 16 | E S 15 | E S 17 | 11     | 12 | 17   | 18 | 17    | 17  | 20   | 18     | E S 18 | E S 16 | E S 16 | E S 11 | E S 16 | E S 15 | E S 17 | E S 15 |     |    |           |           |
| 18          | E S 16   | E S 16 | E S 16 | E S 16 | E S 16 | E S 17 | E S 16 | E S 16 | 17     | 17 | 18   | 18 | 17    | 19  | 17   | 17     | E S 18 | E S 16 | E S 17 | E S 17 | E S 15 | E S 17 | E S 16 | E S 16 |     |    |           |           |
| 19          | E S 16   | E S 16 | E S 16 | E S 15 | E S 15 | E S 17 | E S 16 | E S 16 | 17     | 17 | 18   | 18 | 18    | 18  | 18   | 17     | E S 16 | E S 17 | E S 17 | E S 15 | E S 16 | E S 16 | E S 16 | E S 16 |     |    |           |           |
| 20          | E S 11   | E S 16 | E S 16 | E S 16 | E S 14 | E S 15 | E S 17 | E S 17 | 17     | 17 | 18   | 17 | 17    | 18  | 11   | 17     | E S 15 | E S 17 | E S 17 | E S 17 | E S 16 | E S 15 | E S 17 | E S 17 |     |    |           |           |
| 21          | E S 16   | E S 17 | E S 17 | E S 17 | E S 17 | E S 17 | E S 17 | E S 17 | E S 16 | 17 | 18   | 19 | 18    | 18  | 17   | 17     | 15     | E S 17 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 15 |     |    |           |           |
| 22          | E S 16   | E S 14 | E S 16 | E S 16 | E S 16 | E S 15 | E S 16 | E S 15 | 17     | 17 | 18   | 18 | 19    | 18  | 18   | 17     | E S 16 | E S 16 | E S 16 | E S 15 | E S 16 | E S 16 | E S 17 | E S 15 |     |    |           |           |
| 23          | E S 16   | E S 17 | E S 15 | E S 16 | E S 17 | E S 16 | E S 15 | E S 15 | 17     | 16 | 17   | 19 | 18    | 18  | 19   | 17     | E S 17 | E S 16 | E S 17 | E S 17 | E S 16 | E S 17 | E S 17 | E S 17 |     |    |           |           |
| 24          | E S 15   | E S 16 | E S 16 | E S 17 | E S 16 | E S 16 | E S 16 | E S 16 | 16     | 18 | 18   | 17 | 20    | 19  | 19   | 18     | E S 17 | E S 17 | E S 15 | E S 17 | E S 16 | E S 16 | E S 16 | E S 16 |     |    |           |           |
| 25          | E S 15   | E S 15 | E S 15 | E S 16 | E S 15 | E S 16 | E S 16 | E S 17 | 17     | 17 | 17   | 18 | 20    | 17  | 17   | 17     | E S 17 | E S 17 | E S 16 | E S 15 | E S 17 | E S 17 | E S 16 | E S 15 |     |    |           |           |
| 26          | E S 15   | E S 15 | E S 16 | E S 16 | E S 12 | E S 16 | E S 16 | E S 16 | E S 17 | 17 | 17   | 17 | 18    | 19  | C    | 18     | E S 15 | E S 15 | E S 17 | E S 16 | E S 17 | E S 17 | E S 16 | E S 15 |     |    |           |           |
| 27          | E S 15   | E S 17 | E S 16 | E S 16 | E S 17 | E S 16 | E S 15 | E S 17 | 17     | 17 | 18   | 18 | 17    | 17  | 18   | 17     | E S 17 | E S 16 | E S 16 | E S 16 | E S 15 | E S 16 | E S 17 | E S 16 |     |    |           |           |
| 28          | E S 17   | E S 15 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 17 | 17     | 18 | 17   | 17 | 18    | 18  | 16   | 11     | E S 17 | E S 15 | E S 15 | E S 16 | E S 16 | E S 15 | E S 16 | E S 16 |     |    |           |           |
| 29          | E S 16   | E S 15 | E S 15 | E S 15 | E S 16 | E S 16 | E S 16 | E S 16 | 17     | 11 | 17   | 17 | 17    | 18  | 18   | 10     | 10     | E S 17 | E S 17 | E S 17 | E S 17 | E S 17 | E S 16 | E S 16 |     |    |           |           |
| 30          | E S 15   | E S 15 | E S 16 | E S 14 | E S 17 | E S 16 | E S 16 | E S 15 | 11     | 16 | 17   | 17 | 18    | 18  | 18   | 17     | E S 16 | E S 16 | E S 16 | E S 17 | E S 16 | E S 15 | E S 15 | E S 16 |     |    |           |           |
| 31          | E S 15   | E S 16 | E S 12 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 17 | 20 | 20   | 20 | 20    | 20  | 20   | 18     | E S 17 | E S 18 | E S 16 | E S 16 | E S 15 | E S 16 | E S 16 | E S 16 |     |    |           |           |
| CNT         | 31       | 31     | 31     | 31     | 31     | 31     | 31     | 31     | 31     | 31 | 31   | 31 | 31    | 31  | 30   | 31     | 31     | 31     | 31     | 31     | 31     | 31     | 31     | 31     |     |    |           |           |
| MED         | E S 16   | E S 16 | E S 16 | E S 15 | E S 16 | E S 16 | E S 16 | E S 16 | 17     | 17 | 17   | 18 | 18    | 18  | 18   | 17     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |     |    |           |           |
| UQ          | E S 16   | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 17 | 17     | 17 | 18   | 18 | 19    | 19  | 19   | 18     | E S 17 | E S 17 | E S 17 | E S 17 | E S 16 | E S 16 | E S 17 | E S 16 |     |    |           |           |
| LQ          | E S 15   | E S 15 | E S 15 | E S 15 | E S 15 | E S 16 | E S 15 | E S 15 | 16     | 16 | 17   | 17 | 17    | 17  | 17   | 17     | E S 16 | E S 16 | E S 16 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 |     |    |           |           |

JAN. 1987

FMIN (0.1 MHZ)

The Radio Research Laboratory, Japan

# IONOSPHERIC DATA

JAN. 1987

M(3000)F2 (0.01)

135° E Mean Time (G.M.T. + 9h)

| Station     | WAKKANAI |     |     |     | Lat. 45° 23.5' N |     |     |     | Long. 141° 41.2' E |     |     |     | Sweep 1 MHz to 25 MHz in 2 sec in automatic operation |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-------------|----------|-----|-----|-----|------------------|-----|-----|-----|--------------------|-----|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Hour<br>Day | 00       | 01  | 02  | 03  | 04               | 05  | 06  | 07  | 08                 | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  |     |     |
| 1           | F        | F   | F   | F   | 335              | 340 | 325 | 310 | 375                | 340 | 340 | 360 | 370   | 365 | 375 | 375 | 355 | 340 | 335 | 300 | 285 | 285 | 305 | 335 |     |     |
| 2           | 320      | 310 | 295 | 320 | 335              | 300 | 305 | 350 | 360                | 345 | 350 | 365 | 360   | 375 | 360 | 370 | 350 | 345 | 320 | 330 | 320 | F   | F   | F   |     |     |
| 3           | F        | F   | F   | F   | F                | 315 | 300 | 335 | 345                | 345 | 340 | 345 | 315   | 355 | 355 | 350 | 350 | 360 | 345 | 345 | 340 | 280 | 310 | 330 |     |     |
| 4           | 320      | 310 | 320 | 300 | 305              | 335 | 340 | 325 | 345                | 355 | 325 | 350 | 325   | 345 | 350 | 335 | 330 | 325 | 310 | 310 | 310 | F   | F   | F   |     |     |
| 5           | F        | F   | F   | F   | F                | F   | F   | F   | 325                | 340 | 360 | 360 | 355   | 370 | 375 | 375 | 375 | 360 | 340 | 345 | 355 | 335 | F   | F   |     |     |
| 6           | F        | F   | F   | F   | F                | F   | F   | F   | 340                | 355 | 345 | 375 | 360   | 370 | 365 | 355 | 370 | 350 | 320 | A   | A   | A   | A   | 285 | F   |     |
| 7           | F        | F   | F   | F   | F                | F   | F   | F   | 355                | 355 | 370 | 350 | 350   | 370 | 345 | 370 | 370 | 340 | 345 | 320 | 335 | F   | F   | F   |     |     |
| 8           | F        | F   | F   | F   | F                | 310 | 315 | 350 | 380                | 370 | 365 | 325 | 350   | 350 | 370 | 360 | 355 | A   | A   | 335 | 315 | 300 | F   | F   |     |     |
| 9           | F        | F   | F   | F   | 300              | 350 | 305 | 350 | 345                | 350 | 365 | 360 | 365   | 365 | 360 | 360 | 370 | 315 | 340 | 330 | 330 | 310 | F   | F   |     |     |
| 10          | 305      | 305 | 310 | 310 | 310              | 365 | 335 | 365 | 380                | 370 | 325 | 375 | 380   | 385 | 345 | 365 | 360 | 335 | 320 | 345 | 300 | 310 | 335 | 310 |     |     |
| 11          | 310      | F   | F   | F   | F                | F   | F   | F   | 340                | 365 | 335 | 365 | 370   | 370 | 360 | 365 | 370 | 350 | 335 | 345 | 345 | 320 | 305 | 290 | F   |     |
| 12          | F        | F   | F   | F   | 325              | 335 | F   | 305 | 335                | 375 | 365 | 345 | 335   | H   | 380 | 375 | 360 | 375 | 350 | 345 | 335 | 335 | 320 | 275 | 285 | 315 |
| 13          | 315      | 300 | 315 | 355 | 310              | 335 | 345 | 355 | 370                | 345 | 355 | 350 | 370   | 340 | H   | 355 | 370 | 345 | 340 | 345 | 325 | 290 | 300 | 310 | F   |     |
| 14          | F        | 310 | 335 | 350 | 305              | 320 | 335 | 345 | 360                | 345 | 350 | 370 | 370   | 375 | 365 | 365 | 345 | 305 | 350 | 315 | 310 | F   | F   | F   |     |     |
| 15          | F        | F   | F   | F   | 315              | 325 | 355 | F   | 355                | 335 | 365 | 365 | 350   | 375 | 370 | 360 | 375 | 400 | 340 | 305 | 335 | 345 | 320 | 300 | 305 | 320 |
| 16          | F        | 310 | 310 | 330 | 340              | 370 | 305 | 330 | 365                | 350 | 325 | H   | 350   | 345 | 350 | 350 | 365 | 360 | 320 | 325 | 315 | 305 | 295 | 305 | 295 |     |
| 17          | 325      | 285 | 305 | 310 | 305              | 325 | 305 | 335 | 365                | 375 | 335 | 335 | 350   | 340 | 355 | 370 | 350 | 335 | 335 | 355 | 295 | 300 | 325 | 310 | F   |     |
| 18          | 305      | 325 | F   | F   | 305              | 335 | 315 | 335 | 365                | 370 | 370 | 360 | 360   | 355 | 375 | 380 | 365 | 345 | 335 | 325 | 325 | 310 | F   | F   |     |     |
| 19          | F        | F   | F   | F   | F                | F   | F   | F   | 335                | 335 | 385 | 355 | 365   | 360 | 370 | 340 | 340 | 370 | 360 | 310 | 330 | 345 | 340 | 305 | 295 | 290 |
| 20          | 310      | 325 | 305 | 300 | 310              | 350 | 300 | 345 | 345                | 350 | 365 | 360 | 380   | 350 | 360 | 360 | 360 | 305 | 320 | 325 | 340 | 300 | 275 | 275 |     |     |
| 21          | 300      | 300 | 290 | 300 | 315              | 320 | 320 | 330 | 360                | 305 | 320 | 350 | 350   | 330 | 355 | 370 | 365 | 335 | 325 | 320 | 325 | 325 | 300 | 295 |     |     |
| 22          | 310      | 310 | 290 | 300 | 315              | 300 | 325 | 335 | 345                | 360 | 335 | H   | 370   | 350 | 355 | 350 | 345 | 355 | 320 | 325 | 335 | 335 | 320 | 320 | 315 |     |
| 23          | 310      | 305 | 310 | 295 | 310              | 325 | 295 | 325 | 360                | 355 | 385 | 355 | 365   | 340 | 360 | 340 | 370 | 335 | 345 | A   | A   | 310 | 335 | 290 |     |     |
| 24          | 285      | 295 | 295 | 295 | 320              | 330 | 340 | 335 | 335                | 350 | 360 | 330 | H   | H   | 345 | 340 | 360 | 360 | 335 | 335 | 335 | 300 | 325 | 300 | F   |     |
| 25          | F        | F   | F   | F   | F                | F   | F   | F   | 330                | 350 | 360 | 365 | 355   | 365 | 360 | 365 | 375 | 370 | 350 | 320 | 335 | 325 | 305 | 310 | 305 |     |
| 26          | 295      | 290 | F   | 320 | 335              | 305 | 320 | 340 | 345                | 355 | 355 | 350 | 355   | 370 | C   | 370 | 355 | 330 | 315 | 335 | 310 | 300 | 295 | 310 |     |     |
| 27          | 305      | 305 | 335 | 335 | 320              | 350 | 320 | 335 | 365                | 350 | 340 | 350 | 365   | 360 | 350 | 360 | 390 | 350 | 335 | 335 | 295 | 305 | 305 | 295 |     |     |
| 28          | 295      | 315 | 325 | 345 | 335              | 340 | 340 | 345 | 360                | 350 | 345 | 355 | 340   | H   | 365 | 370 | 390 | 360 | 330 | 325 | 330 | 290 | 310 | 300 | 310 |     |
| 29          | 320      | 310 | 290 | 305 | 315              | 345 | 300 | 325 | 355                | 335 | 360 | 335 | 370   | 365 | 345 | 380 | 400 | 340 | A   | 335 | 280 | F   | F   | 310 |     |     |
| 30          | F        | F   | F   | 300 | 335              | F   | 285 | 340 | 370                | 350 | 340 | 355 | 335   | 345 | 355 | 375 | 355 | 345 | 330 | 335 | 320 | 305 | F   | F   |     |     |
| 31          | F        | F   | F   | F   | F                | 320 | 330 | 350 | 365                | 370 | 350 | 345 | 360   | 345 | 345 | 350 | 370 | A   | 340 | 335 | 295 | F   | F   | F   |     |     |
| CNT         | 22       | 19  | 19  | 22  | 23               | 22  | 26  | 31  | 31                 | 31  | 31  | 31  | 31  | 31  | 30  | 31  | 31  | 29  | 28  | 29  | 28  | 24  | 21  | 18  |     |     |
| MED         | 308      | 310 | 310 | 310 | 315              | 332 | 320 | 335 | 360                | 350 | 350 | 355 | 365   | 355 | 358 | 370 | 355 | 335 | 335 | 335 | 335 | 318 | 305 | 305 | 310 |     |
| UQ          | 315      | 310 | 320 | 325 | 335              | 345 | 335 | 345 | 365                | 362 | 365 | 360 | 370   | 365 | 365 | 375 | 362 | 345 | 340 | 335 | 325 | 310 | 310 | 315 |     |     |
| LQ          | 300      | 302 | 300 | 300 | 310              | 320 | 305 | 332 | 348                | 345 | 340 | 350 | 350   | 345 | 350 | 360 | 350 | 320 | 322 | 325 | 298 | 300 | 295 | 295 |     |     |

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M(3000)F2 (0.01)

# IONOSPHERIC DATA

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M(3000)F1 (0.01)

135 E Mean Time (G.M.T. + 9h)

| Station     | WAKKANAI |    |    |    | Lat. | 45 23.5 N. |    |    |    | Long. | 141 41.2 E |     |     |     | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |    |    |    |    |    |    |    |    |    |
|-------------|----------|----|----|----|------|------------|----|----|----|-------|------------|-----|-----|-----|---|----|----|----|----|----|----|----|----|----|
| Hour<br>Day | 00       | 01 | 02 | 03 | 04   | 05         | 06 | 07 | 08 | 09    | 10         | 11  | 12  | 13  | 14  | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 1           |          |    |    |    |      |            |    |    |    |       | L          | L   | L   |     |   |    |    |    |    |    |    |    |    |    |
| 2           |          |    |    |    |      |            |    |    |    |       | L          | 380 | 370 |     |   |    |    |    |    |    |    |    |    |    |
| 3           |          |    |    |    |      |            |    |    |    |       | L          | 380 | L   | L   |   |    |    |    |    |    |    |    |    |    |
| 4           |          |    |    |    |      |            |    |    |    |       | L          |     |     |     |   |    |    |    |    |    |    |    |    |    |
| 5           |          |    |    |    |      |            |    |    |    |       | 380        | L   | 390 |     |   |    |    |    |    |    |    |    |    |    |
| 6           |          |    |    |    |      |            |    |    |    |       |            |     | L   | L   |   |    |    |    |    |    |    |    |    |    |
| 7           |          |    |    |    |      |            |    |    |    |       |            | L   | A   | A   |   |    |    |    |    |    |    |    |    |    |
| 8           |          |    |    |    |      |            |    |    |    |       |            | 355 |     | L   |   |    |    |    |    |    |    |    |    |    |
| 9           |          |    |    |    |      |            |    |    |    |       |            | L   | 385 | L   |   |    |    |    |    |    |    |    |    |    |
| 10          |          |    |    |    |      |            |    |    |    |       |            | L   | L   |     |   |    |    |    |    |    |    |    |    |    |
| 11          |          |    |    |    |      |            |    |    |    |       |            | L   | 380 |     |   |    |    |    |    |    |    |    |    |    |
| 12          |          |    |    |    |      |            |    |    |    |       |            | L   | 400 | L   |   |    |    |    |    |    |    |    |    |    |
| 13          |          |    |    |    |      |            |    |    |    |       | L          | 380 | 400 |     |   |    |    |    |    |    |    |    |    |    |
| 14          |          |    |    |    |      |            |    |    |    |       |            | 380 | 380 | L   |   |    |    |    |    |    |    |    |    |    |
| 15          |          |    |    |    |      |            |    |    |    |       | L          | 385 | L   |     |   |    |    |    |    |    |    |    |    |    |
| 16          |          |    |    |    |      |            |    |    |    |       | 390        |     |     | L   | L   |    |    |    |    |    |    |    |    |    |
| 17          |          |    |    |    |      |            |    |    |    |       |            | L   | 385 | L   | L   |    |    |    |    |    |    |    |    |    |
| 18          |          |    |    |    |      |            |    |    |    |       |            | L   | 385 | L   |   |    |    |    |    |    |    |    |    |    |
| 19          |          |    |    |    |      |            |    |    |    |       |            |     | L   |     | L   |    |    |    |    |    |    |    |    |    |
| 20          |          |    |    |    |      |            |    |    |    | L     | L          | 395 | 385 | L   | L   |    |    |    |    |    |    |    |    |    |
| 21          |          |    |    |    |      |            |    |    |    |       |            | L   | L   |     | A   |    |    |    |    |    |    |    |    |    |
| 22          |          |    |    |    |      |            |    |    |    |       | L          | 370 | L   | L   |   |    |    |    |    |    |    |    |    |    |
| 23          |          |    |    |    |      |            |    |    |    |       | A          | 375 | L   | A   | A   |    |    |    |    |    |    |    |    |    |
| 24          |          |    |    |    |      |            |    |    |    |       | 390        |     |     | L   |   |    |    |    |    |    |    |    |    |    |
| 25          |          |    |    |    |      |            |    |    |    | L     | L          | 375 | L   |     | L   |    |    |    |    |    |    |    |    |    |
| 26          |          |    |    |    |      |            |    |    |    |       |            | L   | L   | L   | C   |    |    |    |    |    |    |    |    |    |
| 27          |          |    |    |    |      |            |    |    |    |       |            | L   | 390 | 370 |   |    |    |    |    |    |    |    |    |    |
| 28          |          |    |    |    |      |            |    |    |    |       | L          | 390 | 400 |     |   |    |    |    |    |    |    |    |    |    |
| 29          |          |    |    |    |      |            |    |    |    |       | L          | 360 | 375 |     | L   |    |    |    |    |    |    |    |    |    |
| 30          |          |    |    |    |      |            |    |    |    |       | L          | 380 | 360 | 375 | 370   | L  |    |    |    |    |    |    |    |    |
| 31          |          |    |    |    |      |            |    |    |    |       | 375        | 370 | 375 |     |   |    |    |    |    |    |    |    |    |    |
| CNT         |          |    |    |    |      |            |    |    |    |       | 4          | 16  | 13  | 3   |   |    |    |    |    |    |    |    |    |    |
| MED         |          |    |    |    |      |            |    |    |    |       | 385        | 380 | 385 | 370 |   |    |    |    |    |    |    |    |    |    |
| UQ          |          |    |    |    |      |            |    |    |    |       | 390        | 382 | 390 | 380 |   |    |    |    |    |    |    |    |    |    |
| LQ          |          |    |    |    |      |            |    |    |    |       | 378        | 370 | 375 | 370 |   |    |    |    |    |    |    |    |    |    |

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M(3000)F1 (0.01)

# IONOSPHERIC DATA

JAN. 1987

H<sup>o</sup>F<sub>2</sub> (KM)

135° E Mean Time (G.M.T. + 9h)

| Station                              | WAKKANAI |    |    |    |    |    |    |    |     |     |     |     | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |     |     |    |    |    |    |    |    |    |    |    |
|--------------------------------------|----------|----|----|----|----|----|----|----|-----|-----|-----|-----|---|-----|-----|----|----|----|----|----|----|----|----|----|
| Lat. 45° 23.5' N, Long. 141° 41.2' E |          |    |    |    |    |    |    |    |     |     |     |     |   |     |     |    |    |    |    |    |    |    |    |    |
| Hour<br>Day                          | 00       | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 1                                    |          |    |    |    |    |    |    |    |     |     | 250 | 230 | 210   |     |     |    |    |    |    |    |    |    |    |    |
| 2                                    |          |    |    |    |    |    |    |    |     |     | 240 | 230 | 225   |     |     |    |    |    |    |    |    |    |    |    |
| 3                                    |          |    |    |    |    |    |    |    |     |     | 225 | 250 | 240   | 235 |     |    |    |    |    |    |    |    |    |    |
| 4                                    |          |    |    |    |    |    |    |    |     |     |     | 245 |   |     |     |    |    |    |    |    |    |    |    |    |
| 5                                    |          |    |    |    |    |    |    |    |     |     | 250 | 225 | 225   |     |     |    |    |    |    |    |    |    |    |    |
| 6                                    |          |    |    |    |    |    |    |    |     |     |     |     | 245   | 250 |     |    |    |    |    |    |    |    |    |    |
| 7                                    |          |    |    |    |    |    |    |    |     |     | 230 | 230 | 300   |     |     |    |    |    |    |    |    |    |    |    |
| 8                                    |          |    |    |    |    |    |    |    |     |     | 305 |     | 230   |     |     |    |    |    |    |    |    |    |    |    |
| 9                                    |          |    |    |    |    |    |    |    |     |     | 230 | 225 | 240   |     |     |    |    |    |    |    |    |    |    |    |
| 10                                   |          |    |    |    |    |    |    |    |     |     | 220 | 220 |   |     |     |    |    |    |    |    |    |    |    |    |
| 11                                   |          |    |    |    |    |    |    |    |     |     | 240 | 225 |   |     |     |    |    |    |    |    |    |    |    |    |
| 12                                   |          |    |    |    |    |    |    |    |     |     | 230 | 220 | 225   |     |     |    |    |    |    |    |    |    |    |    |
| 13                                   |          |    |    |    |    |    |    |    |     | 250 | 245 | 215 |   |     |     |    |    |    |    |    |    |    |    |    |
| 14                                   |          |    |    |    |    |    |    |    |     |     | 230 | 235 | 225   |     |     |    |    |    |    |    |    |    |    |    |
| 15                                   |          |    |    |    |    |    |    |    |     |     | 245 | 235 | 230   |     |     |    |    |    |    |    |    |    |    |    |
| 16                                   |          |    |    |    |    |    |    |    |     | 250 |     |     | 245   | 230 |     |    |    |    |    |    |    |    |    |    |
| 17                                   |          |    |    |    |    |    |    |    |     |     | 225 |     | 225   | 220 |     |    |    |    |    |    |    |    |    |    |
| 18                                   |          |    |    |    |    |    |    |    |     |     | 240 | 230 | 245   |     |     |    |    |    |    |    |    |    |    |    |
| 19                                   |          |    |    |    |    |    |    |    |     |     |     | 230 |   | 250 |     |    |    |    |    |    |    |    |    |    |
| 20                                   |          |    |    |    |    |    |    |    | 225 | 230 | 230 | 215 | 230   | 220 |     |    |    |    |    |    |    |    |    |    |
| 21                                   |          |    |    |    |    |    |    |    |     |     | 235 | 250 |   | 240 |     |    |    |    |    |    |    |    |    |    |
| 22                                   |          |    |    |    |    |    |    |    |     | 230 | 230 | 220 | 240   |     |     |    |    |    |    |    |    |    |    |    |
| 23                                   |          |    |    |    |    |    |    |    |     | A   | 250 | 245 | 250   | 250 |     |    |    |    |    |    |    |    |    |    |
| 24                                   |          |    |    |    |    |    |    |    |     | 225 |     |     | 245   |     |     |    |    |    |    |    |    |    |    |    |
| 25                                   |          |    |    |    |    |    |    |    | 225 | 225 | 250 | 230 |   | 225 |     |    |    |    |    |    |    |    |    |    |
| 26                                   |          |    |    |    |    |    |    |    |     |     | 250 | 250 | 240   |     | C   |    |    |    |    |    |    |    |    |    |
| 27                                   |          |    |    |    |    |    |    |    |     |     | 250 | 250 | 255   |     |     |    |    |    |    |    |    |    |    |    |
| 28                                   |          |    |    |    |    |    |    |    |     | 250 | 230 | 255 |   |     |     |    |    |    |    |    |    |    |    |    |
| 29                                   |          |    |    |    |    |    |    |    |     | 230 | 270 | 225 |   | 245 |     |    |    |    |    |    |    |    |    |    |
| 30                                   |          |    |    |    |    |    |    |    |     | 245 | 250 | 250 | 255   | 245 |     |    |    |    |    |    |    |    |    |    |
| 31                                   |          |    |    |    |    |    |    |    |     | 260 | 260 | 240 |   |     |     |    |    |    |    |    |    |    |    |    |
| Hour<br>Day                          | 00       | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT                                  |          |    |    |    |    |    |    |    |     | 2   | 14  | 27  | 26  | 18  | 9   |    |    |    |    |    |    |    |    |    |
| MED                                  |          |    |    |    |    |    |    |    |     | 225 | 242 | 240 | 230   | 240 | 240 |    |    |    |    |    |    |    |    |    |
| UQ                                   |          |    |    |    |    |    |    |    |     | 250 | 250 | 245 | 250   | 245 |     |    |    |    |    |    |    |    |    |    |
| LQ                                   |          |    |    |    |    |    |    |    |     | 230 | 230 | 225 | 230   | 225 |     |    |    |    |    |    |    |    |    |    |

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H<sup>o</sup>F<sub>2</sub> (KM)

# IONOSPHERIC DATA

JAN. 1987

H\*F (KM)

135° E Mean Time (G.M.T. + 9h)

| Station     | WAKKANAI  |     |     |     |     |     |     |     |                  |                  |     |     |                    |                  |                  |                  |     |     |     |     |     |     |     |     |     |
|-------------|---|-----|-----|-----|-----|-----|-----|-----|------------------|------------------|-----|-----|--------------------|------------------|------------------|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Lat.        | 45° 23.5' N                                     |     |     |     |     |     |     |     |                  |                  |     |     | Long. 141° 41.2' E |                  |                  |                  |     |     |     |     |     |     |     |     |     |
| Sweep       | 1 MHz to 25 MHz in 24sec in automatic operation |     |     |     |     |     |     |     |                  |                  |     |     |                    |                  |                  |                  |     |     |     |     |     |     |     |     |     |
| Hour<br>Day | 00  | 01  | 02  | 03  | 04  | 05  | 06  | 07  | 08               | 09               | 10  | 11  | 12                 | 13               | 14               | 15               | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  |     |
| 1           | 285   | 270 | 265 | 245 | 200 | 235 | 260 | A   | 220              | 230              | 240 | 230 | 205                | 205              | 205 <sup>H</sup> | 205              | 215 | 215 | 250 | 255 | 285 | 310 | 290 | 235 |     |
| 2           | 265   | 265 | 280 | 260 | 245 | 245 | 265 | 225 | 220              | 225              | 235 | 210 | 225                | 225              | 210 <sup>H</sup> | 210              | 200 | 230 | 240 | 240 | 245 | 300 | 320 | 305 |     |
| 3           | 260   | 275 | 230 | 230 | 275 | 230 | S   | A   | 225              | 240              | 215 | 210 | 200                | 215              | 210              | 205 <sup>H</sup> | 205 | 250 | 225 | 220 | 250 | 350 | 305 | 285 |     |
| 4           | 285   | 270 | 250 | 265 | 285 | 250 | 240 | 235 | 210              | 220              | 200 | 205 | 205 <sup>H</sup>   | 210 <sup>H</sup> | 220 <sup>H</sup> | 210 <sup>H</sup> | 210 | 230 | 240 | 240 | 250 | 270 | 305 | 245 |     |
| 5           | 250   | 220 | 255 | 255 | 250 | 235 | 225 | 205 | 205              | 210              | 235 | 205 | 220                | 205              | 215              | 205              | 200 | 215 | 245 | 205 | 235 | 300 | 305 | 250 |     |
| 6           | 250   | 255 | 260 | 235 | 240 | 230 | 225 | 200 | A                | A                | A   | 210 | 200                | 235              | 245              | 215              | 200 | 265 | A   | A   | A   | A   | 305 | A   |     |
| 7           | 305   | 250 | 250 | 230 | 225 | 245 | 230 | 200 | 205              | A                | 245 | 210 | A                  | A                | 215              | 210              | 210 | 220 | 235 | 240 | 285 | 305 | 275 | 290 |     |
| 8           | 275   | 235 | 225 | 230 | 250 | 250 | 250 | 205 | 200              | 205              | 225 | 205 | 200 <sup>H</sup>   | 220              | 200 <sup>H</sup> | 210              | 210 | A   | A   | 245 | 265 | 265 | 270 | 270 |     |
| 9           | 265   | 265 | 265 | 280 | 250 | 215 | S   | 220 | 210              | 225              | 245 | 230 | 205                | 205              | 205              | 215              | 200 | 250 | 245 | 230 | 285 | 245 | 275 | 300 |     |
| 10          | 285   | 265 | 275 | 255 | 250 | 210 | S   | 225 | 200              | 215              | 210 | 220 | 215                | 200              | 195 <sup>H</sup> | 215              | 210 | 225 | 250 | 245 | 240 | 275 | 245 | 255 |     |
| 11          | 260   | 250 | 230 | 225 | 215 | 215 | 220 | 205 | 205              | 200 <sup>H</sup> | 220 | 210 | 210                | 200 <sup>H</sup> | 225              | 210              | 200 | 215 | 240 | 215 | 225 | 255 | 270 | 315 |     |
| 12          | 265   | 250 | 250 | 220 | 200 | 215 | 250 | 215 | 215              | 215              | 225 | 210 | 200                | 200              | 220              | 205              | 210 | 230 | 240 | 245 | 275 | 300 | 260 | 260 |     |
| 13          | 280   | 285 | 255 | 220 | 250 | 240 | 250 | 210 | 200              | 235              | 235 | 215 | 205                | 210              | 210              | 215              | 200 | 215 | 215 | 230 | 290 | 280 | 280 | 250 |     |
| 14          | 275   | 265 | 250 | 210 | 255 | 225 | 250 | 230 | 210              | 220              | 225 | 215 | 205                | 205              | 200 <sup>H</sup> | 210              | 205 | 255 | 250 | 250 | 270 | 270 | 250 | 275 |     |
| 15          | 300   | 275 | 250 | 255 | 210 | 260 | 250 | 230 | 200              | A                | 230 | 225 | 205                | 225              | 220              | 205 <sup>H</sup> | 205 | 210 | A   | 250 | 230 | 250 | 280 | 285 | 275 |
| 16          | 300   | 275 | 270 | 250 | 225 | 200 | S   | 235 | 210              | 220              | 205 | 200 | 200 <sup>H</sup>   | 220              | 220              | 220              | 205 | 230 | 250 | 245 | 265 | 275 | 255 | 230 |     |
| 17          | 230   | 250 | 265 | 255 | 270 | 230 | 250 | 225 | 200              | 215              | 225 | 205 | 200 <sup>H</sup>   | 225              | 215              | 205 <sup>H</sup> | 205 | 215 | 220 | 220 | 265 | 290 | 275 | 265 |     |
| 18          | 285   | 255 | 250 | 250 | 250 | 240 | 255 | 220 | 215              | 210              | 215 | 240 | 215                | 235              | 215              | 215              | 210 | 220 | 250 | 230 | 245 | 250 | 250 | 240 |     |
| 19          | 270   | 250 | 265 | 240 | 250 | 245 | 240 | 215 | 205              | 215              | 210 | 215 | 210                | 210              | 200              | 225              | 215 | 230 | 250 | 225 | 250 | S   | 300 | 285 |     |
| 20          | 265   | 250 | 265 | 265 | 265 | 215 | 245 | 230 | 230              | 225              | 230 | 200 | 200 <sup>H</sup>   | 210              | 205              | 210              | 210 | 265 | 245 | 225 | 220 | 250 | 300 | 285 |     |
| 21          | 295   | 295 | 300 | 270 | 270 | 245 | 260 | 245 | 210              | 215              | 240 | A   | 220                | 245              | A                | 210              | A   | A   | A   | 245 | 240 | 230 | 265 | 270 |     |
| 22          | 255   | 275 | 275 | 250 | 240 | 260 | 250 | 220 | 245              | 220              | 210 | 205 | 210                | 200              | 210              | 205 <sup>H</sup> | 210 | 220 | 250 | 250 | 225 | 250 | 270 | 265 |     |
| 23          | 295   | 285 | 265 | 270 | 290 | 235 | 230 | 210 | 210              | 210              | A   | 200 | 205                | A                | A                | 220              | 205 | 210 | 220 | A   | A   | 275 | 260 | S   | 330 |
| 24          | 300   | 290 | 275 | 270 | 250 | 250 | 255 | 220 | 230              | 225              | 225 | 215 | 200 <sup>H</sup>   | 200 <sup>H</sup> | 200              | 210              | 225 | 210 | 230 | 250 | 250 | 255 | 255 | 275 | 260 |
| 25          | 255   | 210 | 280 | 280 | 285 | 245 | 230 | 220 | 210              | 220              | 215 | 205 | 215                | 210              | 225              | 210              | 200 | 230 | 250 | 240 | 260 | 250 | 255 | 295 |     |
| 26          | 285   | 275 | 255 | 245 | 235 | A   | S   | 230 | 225              | 220              | 215 | 230 | 230                | 230              | C                | 220              | 205 | 250 | 250 | 250 | 255 | 300 | 285 | 255 |     |
| 27          | 280   | 280 | 250 | 255 | 250 | 245 | 265 | 225 | 215              | 220              | 225 | 230 | 215                | 200              | 230              | 220              | 200 | 200 | 250 | 245 | 270 | 295 | 295 | 290 |     |
| 28          | 300   | 250 | 255 | 245 | 250 | 250 | S   | 210 | 220              | 205 <sup>H</sup> | 215 | 220 | 205                | 200 <sup>H</sup> | 230              | 205              | 205 | 250 | 250 | 225 | 275 | 280 | 280 | 245 |     |
| 29          | 260   | 265 | 270 | 265 | 255 | 205 | S   | 230 | 230              | 230              | 230 | 225 | 215                | 215              | A                | 215 <sup>H</sup> | 205 | A   | A   | 250 | S   | 300 | 300 | 275 | 275 |
| 30          | 280   | 250 | 280 | 275 | 235 | 205 | S   | 230 | 225              | 215              | 225 | 220 | 215                | 200              | 200              | 215              | 200 | 220 | 245 | 240 | 210 | 250 | 265 | 265 |     |
| 31          | 275   | 285 | 275 | 270 | 260 | 230 | 205 | 200 | 200 <sup>H</sup> | 215              | 225 | 205 | 240                | 200 <sup>H</sup> | 260              | 230              | 210 | A   | 250 | A   | 260 | 260 | 260 | 275 | 255 |
|             | 00  | 01  | 02  | 03  | 04  | 05  | 06  | 07  | 08               | 09               | 10  | 11  | 12                 | 13               | 14               | 15               | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  |     |
| CNT         | 31  | 31  | 31  | 31  | 31  | 31  | 27  | 31  | 30               | 29               | 30  | 30  | 30                 | 29               | 27               | 31               | 30  | 27  | 27  | 29  | 29  | 30  | 31  | 30  |     |
| MED         | 275   | 265 | 265 | 255 | 250 | 235 | 250 | 220 | 210              | 220              | 225 | 210 | 208                | 210              | 210              | 210              | 205 | 230 | 250 | 240 | 255 | 275 | 275 | 268 |     |
| UQ          | 285   | 275 | 272 | 265 | 258 | 245 | 260 | 230 | 220              | 225              | 230 | 220 | 215                | 220              | 220              | 215              | 210 | 250 | 250 | 245 | 270 | 300 | 292 | 285 |     |
| LQ          | 262   | 250 | 250 | 238 | 238 | 220 | 235 | 210 | 205              | 215              | 215 | 205 | 200                | 200              | 205              | 208              | 200 | 218 | 240 | 230 | 245 | 255 | 265 | 255 |     |

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H<sup>o</sup>E (KM)

135 E Mean Time (G.M.T. + 9h)

| Station |     | WAKKANAI |    |    |    |    |    |    | Lat. 45 23.5 N |     | Long 141 41.2 E |     | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |     |     |     |     |     |    |    |    |    |    |    |    |
|---------|-----|----------|----|----|----|----|----|----|----------------|-----|-----------------|-----|---|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|
| Hour    | Day | 00       | 01 | 02 | 03 | 04 | 05 | 06 | 07             | 08  | 09              | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 1       |     |          |    |    |    |    |    | S  | S              | A   | 125             | 120 | 115   | 120 | 125 | A   | S   |     |    |    |    |    |    |    |    |
| 2       |     |          |    |    |    |    |    | S  | 130            | A   | A               | 125 | 120   | A   | B   | 140 | S   |     |    |    |    |    |    |    |    |
| 3       |     |          |    |    |    |    |    | A  | A              | A   | 125             | 125 | 120   | 120 | 120 | S   | S   |     |    |    |    |    |    |    |    |
| 4       |     |          |    |    |    |    |    | S  | A              | 120 | 120             | 115 | 120   | 125 | 120 | 125 | S   |     |    |    |    |    |    |    |    |
| 5       |     |          |    |    |    |    |    | S  | A              | 115 | 120             | 125 | 125   | B   | B   | B   | S   |     |    |    |    |    |    |    |    |
| 6       |     |          |    |    |    |    |    | S  | A              | B   | B               | B   | B   | B   | B   | B   | S   |     |    |    |    |    |    |    |    |
| 7       |     |          |    |    |    |    |    | S  | A              | A   | A               | A   | A   | A   | A   | 125 | S   | S   |    |    |    |    |    |    |    |
| 8       |     |          |    |    |    |    |    | S  | A              | A   | A               | A   | 115   | 120 | 130 | A   | A   | S   |    |    |    |    |    |    |    |
| 9       |     |          |    |    |    |    |    | S  | A              | 115 | 115             | 120 | 110   | 120 | 125 | 125 | S   |     |    |    |    |    |    |    |    |
| 10      |     |          |    |    |    |    |    | S  | S              | 125 | 120             | 120 | 115   | 115 | 130 | 150 | S   |     |    |    |    |    |    |    |    |
| 11      |     |          |    |    |    |    |    | S  | 115            | 115 | A               | 110 | 125   | 110 | 130 | 135 | S   |     |    |    |    |    |    |    |    |
| 12      |     |          |    |    |    |    |    | S  | S              | 115 | 115             | A   | A   | A   | 120 | 125 | S   |     |    |    |    |    |    |    |    |
| 13      |     |          |    |    |    |    |    | S  | S              | A   | 135             | 115 | 110   | 115 | 120 | 125 | S   |     |    |    |    |    |    |    |    |
| 14      |     |          |    |    |    |    |    | S  | 120            | 115 | 115             | 115 | 115   | 115 | 115 | 120 | S   |     |    |    |    |    |    |    |    |
| 15      |     |          |    |    |    |    |    | S  | 140            | A   | A               | 125 | A   | A   | A   | 125 | S   |     |    |    |    |    |    |    |    |
| 16      |     |          |    |    |    |    |    | S  | 130            | 125 | 120             | 125 | 120   | 120 | 115 | 125 | S   |     |    |    |    |    |    |    |    |
| 17      |     |          |    |    |    |    |    | S  | A              | A   | A               | A   | A   | 125 | 125 | 120 | S   |     |    |    |    |    |    |    |    |
| 18      |     |          |    |    |    |    |    | E  | A              | 110 | 120             | 120 | 120   | 125 | 130 | A   | 120 | S   |    |    |    |    |    |    |    |
| 19      |     |          |    |    |    |    |    | S  | 135            | 115 | 115             | 115 | 115   | 115 | 120 | 120 | S   |     |    |    |    |    |    |    |    |
| 20      |     |          |    |    |    |    |    | S  | 125            | A   | 120             | 115 | 115   | 115 | 115 | 125 | 150 | S   |    |    |    |    |    |    |    |
| 21      |     |          |    |    |    |    |    | S  | 150            | A   | 115             | 115 | 115   | 115 | 120 | 120 | B   | A   |    |    |    |    |    |    |    |
| 22      |     |          |    |    |    |    |    | S  | 125            | 125 | 120             | A   | 115   | 115 | 140 | 125 | S   |     |    |    |    |    |    |    |    |
| 23      |     |          |    |    |    |    |    | S  | A              | 115 | A               | A   | A   | A   | A   | A   | S   |     |    |    |    |    |    |    |    |
| 24      |     |          |    |    |    |    |    | A  | A              | 120 | 115             | 115 | 120   | 120 | 120 | 125 | S   |     |    |    |    |    |    |    |    |
| 25      |     |          |    |    |    |    |    | S  | 135            | 120 | 130             | 115 | 120   | 115 | 115 | 115 | S   |     |    |    |    |    |    |    |    |
| 26      |     |          |    |    |    |    |    | S  | A              | A   | A               | A   | 110   | A   | C   | 115 | S   |     |    |    |    |    |    |    |    |
| 27      |     |          |    |    |    |    |    | S  | 140            | 125 | 115             | 115 | 115   | 115 | 115 | 115 | S   |     |    |    |    |    |    |    |    |
| 28      |     |          |    |    |    |    |    | S  | 130            | 125 | 115             | 110 | 110   | A   | 105 | 110 | S   |     |    |    |    |    |    |    |    |
| 29      |     |          |    |    |    |    |    | S  | 145            | 120 | 115             | 115 | 115   | 115 | 115 | 120 | A   |     |    |    |    |    |    |    |    |
| 30      |     |          |    |    |    |    |    | S  | 130            | 120 | 115             | 115 | 110   | 115 | 115 | 120 | S   |     |    |    |    |    |    |    |    |
| 31      |     |          |    |    |    |    |    | S  | 150            | 135 | B               | 125 | 120   | 125 | 125 | 120 | 125 | S   |    |    |    |    |    |    |    |
|         |     | 00       | 01 | 02 | 03 | 04 | 05 | 06 | 07             | 08  | 09              | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT     |     |          |    |    |    |    |    |    |                | 15  | 19              | 22  | 23  | 25  | 22  | 25  | 24  | 1   |    |    |    |    |    |    |    |
| MED     |     |          |    |    |    |    |    |    |                | 130 | 120             | 120 | 115   | 115 | 115 | 120 | 125 | 150 |    |    |    |    |    |    |    |
| UQ      |     |          |    |    |    |    |    |    |                | 140 | 125             | 120 | 120   | 120 | 120 | 125 | 125 |     |    |    |    |    |    |    |    |
| LQ      |     |          |    |    |    |    |    |    |                | 128 | 115             | 115 | 115   | 115 | 115 | 115 | 120 |     |    |    |    |    |    |    |    |

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H<sup>o</sup>E (KM)



### IONOSPHERIC DATA

JAN. 1987

H<sup>°</sup>ES (KM)

135 E Mean Time (G.M.T. + 9h)

| Station                          |     | WAKKANAI   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |
|----------------------------------|-----|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Lat. 45 23.5 N. Long. 141 41.2 E |     | Sweep 1 MHz to 25 MHz in 2sec in automatic operation |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |
| Hour<br>Day                      | 00  | 01   | 02  | 03  | 04  | 05  | 06  | 07  | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  |  |
| 1                                | 100 | S  | S   | S   | S   | S   | S   | 110 | S   | 105 | G   | G   | G   | G   | 100 | 100 | S   | S   | S   | 110 | S   | S   | S   | S   |  |
| 2                                | S   | 100  | S   | S   | S   | S   | 115 | S   | G   | 105 | 110 | G   | 105 | 105 | 3   | G   | S   | 100 | S   | S   | S   | S   | S   | 105 |  |
| 3                                | 105 | 105  | S   | S   | S   | S   | 125 | 115 | 110 | 110 | 110 | 100 | G   | G   | G   | S   | S   | S   | S   | S   | 105 | 105 | 105 | 105 |  |
| 4                                | 100 | S  | S   | S   | S   | S   | S   | S   | 105 | 105 | G   | G   | G   | G   | G   | G   | S   | S   | S   | S   | 140 | S   | 105 | 105 |  |
| 5                                | 100 | S  | S   | E   | E   | S   | S   | S   | 105 | G   | G   | G   | G   | B   | 3   | 3   | S   | S   | 115 | 110 | 110 | S   | 120 | S   |  |
| 6                                | S   | 105  | S   | 110 | S   | S   | S   | S   | 115 | 115 | 110 | 110 | B   | B   | 3   | B   | S   | 125 | 115 | 110 | 110 | 110 | 110 | 105 |  |
| 7                                | 105 | 110  | 100 | S   | 105 | S   | S   | S   | 110 | 110 | 110 | 110 | 105 | 100 | G   | S   | S   | S   | S   | 115 | S   | 110 | 110 | 105 |  |
| 8                                | 105 | S  | S   | S   | S   | S   | S   | S   | 115 | 110 | 110 | 110 | G   | G   | 105 | 105 | 100 | 100 | 100 | 100 | 100 | S   | S   | S   |  |
| 9                                | S   | S  | 110 | E   | S   | S   | S   | S   | 110 | 150 | G   | 120 | G   | G   | G   | G   | S   | 100 | S   | S   | S   | S   | S   | 105 |  |
| 10                               | 105 | 100  | S   | 100 | 100 | S   | S   | S   | 150 | G   | G   | G   | 105 | G   | G   | G   | S   | S   | S   | S   | S   | S   | S   | S   |  |
| 11                               | S   | S  | S   | S   | 100 | S   | S   | S   | G   | G   | 105 | G   | G   | G   | G   | G   | S   | 105 | 100 | S   | S   | S   | S   | 110 |  |
| 12                               | 105 | S  | S   | S   | E   | S   | S   | S   | S   | G   | G   | 105 | 100 | 100 | G   | G   | S   | 100 | S   | S   | S   | S   | S   | E   |  |
| 13                               | S   | E  | S   | S   | S   | S   | S   | S   | 140 | 110 | 110 | G   | G   | G   | G   | G   | S   | S   | S   | S   | S   | S   | S   | S   |  |
| 14                               | 105 | S  | 100 | S   | S   | E   | S   | S   | G   | G   | G   | G   | G   | G   | G   | G   | S   | S   | S   | S   | S   | S   | 115 | S   |  |
| 15                               | 105 | 100  | 105 | S   | E   | S   | S   | S   | 110 | 105 | 105 | 105 | 100 | 100 | 110 | G   | S   | 110 | 110 | 105 | 105 | 105 | 105 | 100 |  |
| 16                               | 105 | S  | S   | S   | S   | 110 | 110 | 110 | 115 | 105 | G   | 105 | G   | G   | G   | G   | S   | S   | 110 | S   | S   | S   | S   | 110 |  |
| 17                               | S   | S  | S   | S   | S   | 115 | S   | 150 | 115 | 110 | 100 | 105 | 100 | 100 | G   | G   | S   | S   | S   | S   | S   | S   | 100 | S   |  |
| 18                               | 100 | 100  | S   | S   | S   | S   | S   | 105 | 100 | G   | G   | G   | G   | G   | 100 | 120 | S   | S   | 115 | 110 | S   | 105 | 105 | 105 |  |
| 19                               | S   | S  | S   | S   | S   | S   | S   | S   | G   | G   | G   | G   | G   | G   | G   | G   | S   | S   | S   | S   | S   | S   | S   | S   |  |
| 20                               | S   | S  | S   | S   | S   | S   | S   | S   | G   | 155 | G   | G   | G   | G   | G   | G   | G   | 110 | 105 | 110 | 110 | 105 | 105 | 105 |  |
| 21                               | 105 | 100  | 100 | S   | S   | S   | S   | 110 | G   | 110 | 130 | 125 | 130 | 125 | 120 | 110 | 110 | 105 | 105 | S   | S   | S   | S   | S   |  |
| 22                               | 105 | 100  | 105 | 105 | S   | S   | S   | S   | G   | 130 | G   | 110 | G   | G   | 105 | G   | S   | S   | S   | 110 | 110 | 120 | 120 | S   |  |
| 23                               | S   | 120  | 115 | 110 | 105 | S   | S   | S   | 120 | G   | 105 | 105 | 105 | 105 | 105 | 105 | S   | 105 | 110 | 115 | 110 | 110 | 105 | 105 |  |
| 24                               | S   | 110  | 105 | 105 | S   | 110 | 105 | 105 | 105 | G   | G   | G   | G   | G   | G   | G   | 115 | 105 | 105 | 110 | S   | S   | 105 | S   |  |
| 25                               | S   | S  | S   | S   | S   | S   | S   | S   | 155 | G   | 100 | G   | G   | G   | G   | 115 | S   | 100 | S   | S   | 115 | S   | S   | S   |  |
| 26                               | S   | S  | S   | E   | S   | 115 | 115 | 115 | 105 | 110 | 105 | 105 | G   | 115 | C   | 115 | 110 | 110 | 105 | S   | 100 | 100 | S   | 120 |  |
| 27                               | 110 | 110  | 105 | 105 | 105 | S   | S   | S   | 100 | 100 | G   | G   | G   | G   | 115 | G   | S   | S   | S   | S   | S   | S   | S   | S   |  |
| 28                               | S   | S  | 110 | S   | 120 | 110 | S   | S   | G   | G   | G   | G   | G   | 110 | G   | G   | S   | S   | S   | S   | E   | S   | 105 | S   |  |
| 29                               | 105 | S  | E   | S   | S   | S   | S   | S   | G   | 150 | G   | G   | G   | G   | 135 | 125 | 105 | 105 | 105 | 105 | 100 | 100 | 100 | 120 |  |
| 30                               | S   | 150  | 120 | 110 | 105 | 105 | 110 | 160 | 150 | G   | G   | 115 | G   | G   | G   | G   | S   | 115 | S   | 105 | S   | S   | S   | S   |  |
| 31                               | S   | S  | E   | 125 | 110 | 110 | S   | S   | G   | G   | G   | G   | G   | G   | 150 | 130 | 120 | 105 | 105 | 105 | S   | S   | S   | S   |  |
|                                  | 00  | 01   | 02  | 03  | 04  | 05  | 06  | 07  | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  |  |
| CNT                              | 16  | 13   | 11  | 8   | 8   | 7   | 6   | 9   | 19  | 18  | 13  | 14  | 8   | 9   | 10  | 9   | 6   | 16  | 14  | 14  | 13  | 11  | 15  | 16  |  |
| MED                              | 105 | 105  | 105 | 108 | 105 | 110 | 112 | 110 | 110 | 110 | 110 | 108 | 105 | 105 | 108 | 115 | 110 | 105 | 105 | 110 | 110 | 105 | 105 | 105 |  |
| UQ                               | 105 | 110  | 110 | 110 | 108 | 112 | 115 | 115 | 118 | 115 | 110 | 110 | 105 | 110 | 120 | 120 | 115 | 110 | 110 | 110 | 110 | 110 | 110 | 108 |  |
| LQ                               | 102 | 100  | 102 | 105 | 102 | 110 | 110 | 110 | 105 | 105 | 105 | 105 | 100 | 100 | 105 | 105 | 105 | 100 | 105 | 105 | 105 | 105 | 105 | 105 |  |

JAN. 1987

H<sup>°</sup>ES (KM)

# IONOSPHERIC DATA

JAN. 1987

TYPES OF ES

135° E Mean Time (G.M.T. + 9h)

Station **WAKKANAI** Lat. **45° 23.5' N**, Long. **141° 41.2' E** Sweep **1 MHz** to **25 MHz** in **2 sec** in **automatic operation**

| Hour<br>Day | 00             | 01             | 02             | 03             | 04             | 05             | 06             | 07             | 08             | 09             | 10              | 11             | 12             | 13             | 14             | 15             | 16             | 17             | 18             | 19             | 20             | 21             | 22             | 23             |                |
|-------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 1           | F <sub>2</sub> |                |                |                |                |                |                | L <sub>4</sub> |                | L <sub>2</sub> |                 |                |                |                | L <sub>1</sub> | L <sub>1</sub> |                |                |                | F <sub>1</sub> |                |                |                |                |                |
| 2           |                | F <sub>2</sub> |                |                |                |                | F <sub>1</sub> |                |                | L <sub>2</sub> | L <sub>1</sub>  |                | L <sub>1</sub> | L <sub>2</sub> |                |                |                | F <sub>2</sub> |                |                |                |                |                | F <sub>2</sub> |                |
| 3           | F <sub>2</sub> | F <sub>2</sub> |                |                |                |                | F <sub>1</sub> | L <sub>2</sub> | L <sub>1</sub> | L <sub>1</sub> | L <sub>1</sub>  | L <sub>1</sub> |                |                |                |                |                |                |                |                | F <sub>2</sub> | F <sub>2</sub> | F <sub>2</sub> | F <sub>2</sub> |                |
| 4           | F <sub>2</sub> |                |                |                |                |                |                |                | L <sub>2</sub> | L <sub>1</sub> |                 |                |                |                |                |                |                |                |                |                | F <sub>1</sub> |                | F <sub>1</sub> | F <sub>1</sub> |                |
| 5           | F <sub>1</sub> |                |                |                |                |                |                |                | L <sub>1</sub> |                |                 |                |                |                |                |                |                |                | F <sub>2</sub> | F <sub>1</sub> | F <sub>1</sub> |                | F <sub>1</sub> |                |                |
| 6           |                | F <sub>1</sub> |                | F <sub>1</sub> |                |                |                |                | L <sub>2</sub> | C <sub>1</sub> | C <sub>1</sub>  | C <sub>1</sub> |                |                |                |                | F <sub>1</sub> | F <sub>3</sub> | F <sub>3</sub> |                | F <sub>4</sub> | F <sub>4</sub> | F <sub>2</sub> | F <sub>5</sub> |                |
| 7           | F <sub>2</sub> | F <sub>2</sub> | F <sub>2</sub> |                | F <sub>1</sub> |                |                |                | L <sub>1</sub> | L <sub>3</sub> | L <sub>2</sub>  | L <sub>2</sub> | L <sub>2</sub> | L <sub>3</sub> |                |                |                |                |                | F <sub>2</sub> |                | F <sub>2</sub> | F <sub>2</sub> | F <sub>2</sub> |                |
| 8           | F <sub>2</sub> |                |                |                |                |                |                |                | L <sub>1</sub> | L <sub>2</sub> | L <sub>2</sub>  | L <sub>2</sub> |                |                | L <sub>1</sub> | L <sub>1</sub> | L <sub>2</sub> | F <sub>3</sub> | F <sub>3</sub> | F <sub>2</sub> | F <sub>2</sub> |                |                |                |                |
| 9           |                |                | F <sub>2</sub> |                |                |                |                |                | L <sub>2</sub> | H <sub>1</sub> |                 | C <sub>2</sub> |                |                |                |                |                | F <sub>1</sub> |                |                | F <sub>3</sub> |                |                | F <sub>2</sub> |                |
| 10          | F <sub>1</sub> | F <sub>1</sub> |                | F <sub>1</sub> | F <sub>1</sub> |                |                |                | H <sub>1</sub> |                |                 |                | L <sub>1</sub> |                |                |                |                |                |                |                |                |                |                |                |                |
| 11          |                |                |                |                | F <sub>1</sub> |                |                |                |                |                | L <sub>2</sub>  |                |                |                |                |                |                | F <sub>1</sub> | F <sub>2</sub> |                |                |                | F <sub>1</sub> | F <sub>2</sub> |                |
| 12          | F <sub>2</sub> |                |                |                |                |                |                |                |                |                |                 | L <sub>2</sub> | L <sub>2</sub> | L <sub>2</sub> |                |                |                | F <sub>1</sub> |                |                |                |                |                | F <sub>1</sub> |                |
| 13          |                |                |                |                |                |                |                |                | C <sub>1</sub> | L <sub>2</sub> | L <sub>2</sub>  |                |                |                |                |                |                |                |                |                |                |                |                |                |                |
| 14          | F <sub>1</sub> |                | F <sub>2</sub> |                |                |                |                |                |                |                |                 |                |                |                |                |                |                |                |                |                |                |                | F <sub>2</sub> |                | F <sub>2</sub> |
| 15          | F <sub>2</sub> | F <sub>2</sub> | F <sub>1</sub> |                |                |                |                |                | L <sub>1</sub> | L <sub>5</sub> | L <sub>2</sub>  | L <sub>2</sub> | L <sub>3</sub> | L <sub>2</sub> | L <sub>2</sub> |                |                | F <sub>2</sub> | F <sub>3</sub> | F <sub>2</sub> | F <sub>2</sub> | F <sub>2</sub> | F <sub>2</sub> | F <sub>2</sub> |                |
| 16          | F <sub>2</sub> |                |                |                | F <sub>1</sub> | F <sub>2</sub> | C <sub>1</sub> |                | L <sub>1</sub> | L <sub>2</sub> |                 | L <sub>1</sub> |                |                |                |                |                |                | F <sub>2</sub> |                |                |                |                | F <sub>1</sub> |                |
| 17          |                |                |                |                | F <sub>1</sub> |                | C <sub>1</sub> |                | L <sub>1</sub> | L <sub>2</sub> | L <sub>3</sub>  | L <sub>2</sub> | L <sub>2</sub> | L <sub>1</sub> |                |                |                |                |                |                |                |                | F <sub>2</sub> |                |                |
| 18          | F <sub>2</sub> | F <sub>1</sub> |                |                |                |                | L <sub>2</sub> |                | L <sub>2</sub> |                |                 |                |                |                | L <sub>1</sub> | C <sub>1</sub> |                |                | F <sub>2</sub> | F <sub>2</sub> |                | F <sub>2</sub> | F <sub>3</sub> | F <sub>2</sub> |                |
| 19          |                |                |                |                |                |                |                |                |                |                |                 |                |                |                |                |                |                |                |                |                |                |                |                |                |                |
| 20          |                |                |                |                |                |                |                |                |                |                | H <sub>12</sub> |                |                |                |                |                |                | F <sub>1</sub> | F <sub>1</sub> | F <sub>1</sub> | F <sub>1</sub> | F <sub>2</sub> | F <sub>2</sub> | F <sub>2</sub> |                |
| 21          | F <sub>2</sub> | F <sub>2</sub> | F <sub>2</sub> |                |                |                | L <sub>1</sub> |                | L <sub>1</sub> | C <sub>2</sub> | C <sub>1</sub>  | C <sub>2</sub> | C <sub>2</sub> | C <sub>3</sub> | C <sub>2</sub> | L <sub>3</sub> | F <sub>5</sub> | F <sub>3</sub> |                |                |                |                |                |                |                |
| 22          | F <sub>2</sub> | F <sub>4</sub> | F <sub>2</sub> | F <sub>2</sub> |                |                |                |                | C <sub>1</sub> |                | L <sub>1</sub>  |                |                |                | L <sub>1</sub> |                |                |                |                | F <sub>3</sub> | F <sub>1</sub> | F <sub>1</sub> | F <sub>1</sub> |                |                |
| 23          |                | F <sub>2</sub> | F <sub>2</sub> | F <sub>2</sub> | F <sub>2</sub> |                |                |                | L <sub>2</sub> |                | L <sub>3</sub>  | L <sub>2</sub> | L <sub>2</sub> | L <sub>2</sub> | L <sub>2</sub> | L <sub>1</sub> |                | F <sub>1</sub> | F <sub>1</sub> | F <sub>2</sub> | F <sub>3</sub> | F <sub>3</sub> | F <sub>2</sub> | F <sub>2</sub> |                |
| 24          |                | F <sub>1</sub> | F <sub>2</sub> | F <sub>2</sub> |                | F <sub>2</sub> | F <sub>2</sub> | L <sub>2</sub> | L <sub>1</sub> |                |                 |                |                |                |                |                | C <sub>1</sub> | F <sub>2</sub> | F <sub>4</sub> | F <sub>1</sub> |                |                | F <sub>1</sub> |                |                |
| 25          |                |                |                |                |                |                |                |                | H <sub>1</sub> |                | L <sub>2</sub>  |                |                |                |                | C <sub>2</sub> |                | F <sub>2</sub> |                |                | F <sub>2</sub> |                |                |                |                |
| 26          |                |                |                |                | F <sub>1</sub> | F <sub>2</sub> | C <sub>1</sub> |                | L <sub>1</sub> | L <sub>1</sub> | L <sub>2</sub>  | L <sub>2</sub> |                | L <sub>2</sub> |                | C <sub>2</sub> | C <sub>1</sub> | F <sub>1</sub> | F <sub>2</sub> |                | F <sub>2</sub> | F <sub>2</sub> |                | F <sub>1</sub> |                |
| 27          | F <sub>2</sub> | F <sub>2</sub> | F <sub>2</sub> | F <sub>3</sub> | F <sub>1</sub> |                |                |                | L <sub>1</sub> | L <sub>1</sub> |                 |                |                |                | C <sub>1</sub> |                |                |                |                |                |                |                |                |                |                |
| 28          |                |                | F <sub>2</sub> |                | F <sub>1</sub> | F <sub>2</sub> |                |                |                |                |                 |                |                | L <sub>1</sub> |                |                |                |                |                |                |                |                |                | F <sub>2</sub> |                |
| 29          | F <sub>2</sub> |                |                |                |                |                |                |                | H <sub>1</sub> |                |                 |                |                |                | H <sub>2</sub> | C <sub>2</sub> | L <sub>4</sub> | F <sub>2</sub> | F <sub>5</sub> | F <sub>2</sub> | F <sub>2</sub> | F <sub>2</sub> | F <sub>2</sub> | F <sub>2</sub> |                |
| 30          |                | F <sub>1</sub> | F <sub>2</sub> | F <sub>2</sub> | F <sub>4</sub> | F <sub>2</sub> | F <sub>1</sub> | C <sub>1</sub> | C <sub>1</sub> |                |                 | C <sub>1</sub> |                |                |                |                |                | F <sub>1</sub> |                | F <sub>3</sub> |                |                |                |                |                |
| 31          |                |                |                | F <sub>2</sub> | F <sub>1</sub> | F <sub>1</sub> |                |                |                |                |                 |                |                |                | H <sub>1</sub> | C <sub>2</sub> | C <sub>2</sub> | F <sub>4</sub> | F <sub>3</sub> | F <sub>2</sub> |                |                |                |                |                |
| CNT         |                |                |                |                |                |                |                |                |                |                |                 |                |                |                |                |                |                |                |                |                |                |                |                |                |                |
| MED         |                |                |                |                |                |                |                |                |                |                |                 |                |                |                |                |                |                |                |                |                |                |                |                |                |                |
| UQ          |                |                |                |                |                |                |                |                |                |                |                 |                |                |                |                |                |                |                |                |                |                |                |                |                |                |
| LQ          |                |                |                |                |                |                |                |                |                |                |                 |                |                |                |                |                |                |                |                |                |                |                |                |                |                |

JAN. 1987

TYPES OF ES

IONOSPHERIC DATA

JAN. 1987

FXI (0.1 MHz)

135 E Mean Time (G.M.T. + 9h)

| Station |     | AKITA |    |    |    |    |    |    | Lat. 39 43.5 N. |    | Long. 140 08.0 E |    | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |    |    |    |    |    |    |    |    |    |    |    |    |    |
|---------|-----|-------|----|----|----|----|----|----|-----------------|----|------------------|----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Hour    | Day | 00    | 01 | 02 | 03 | 04 | 05 | 06 | 07              | 08 | 09               | 10 | 11  | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |    |
| 1       |     | 44    | 44 | 49 | 40 | 37 | 34 | 34 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | 39 | 39 | X  |    |
| 2       |     | X     | X  | X  | X  | X  | X  | X  |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | 43 | 40 |    |
| 3       |     | 38    | 40 | 39 | A  | 27 | 30 | 30 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 4       |     | X     | X  | X  | X  | X  | X  | X  |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 5       |     | 43    | 47 | 43 | 39 | 39 | 38 | 37 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 6       |     | 38    | 39 | 40 | 38 | 39 | 45 | 40 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | A  | 35 | 40 |    |
| 7       |     | 48    | 51 | 50 | 51 | 50 | 40 | 38 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 8       |     | X     | 40 | 39 | 41 | 43 | 47 | 44 |                 |    |                  |    |   |    |    |    |    | A  | A  | A  | A  | A  | 40 | 40 | 42 | 40 |
| 9       |     | 44    | 45 | 48 | 39 | 43 | 41 | 30 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 10      |     | 40    | 41 | 40 | 38 | 38 | 33 | 32 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 11      |     | 40    | 51 | 50 | 40 | 45 | 50 | 32 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 12      |     | 52    | 51 | 58 | 59 | 39 | 40 | 43 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 13      |     | 40    | 44 | 40 | X  | X  | X  | X  |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 14      |     | 38    | 40 | 42 | X  | X  | X  | X  |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 15      |     | 32    | 35 | 35 | 36 | 30 | 30 | 28 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 16      |     | 37    | 39 | 40 | X  | 30 | 30 | 31 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 17      |     | 50    | 48 | 40 | X  | X  | 47 | 40 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 18      |     | 40    | 40 | 40 | X  | X  | X  | 30 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 19      |     | X     | X  | 52 | 52 | 51 | 59 | 46 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 20      |     | X     | X  | X  | X  | X  | X  | 31 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 21      |     | X     | X  | X  | 38 | 34 | 38 | 29 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 22      |     | 40    | 40 | 40 | 40 | 40 | 38 | 35 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 23      |     | X     | X  | X  | X  | X  | 40 | 35 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 24      |     | 38    | X  | X  | 36 | 37 | X  | X  |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 25      |     | 38    | 39 | 39 | 36 | 50 | 56 | 58 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 26      |     | S     | X  | X  | X  | X  | X  | X  |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 27      |     | X     | 46 | 40 | X  | X  | X  | 31 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 28      |     | X     | X  | 40 | X  | X  | 30 | 29 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 29      |     | X     | X  | X  | X  | 32 | X  | X  |                 |    |                  |    |   |    |    |    |    | X  | A  | X  | X  | X  | X  | X  | X  |    |
| 30      |     | 43    | 40 | 38 | 38 | 44 | A  | X  |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| 31      |     | 39    | 39 | 39 | 39 | 43 | 50 | 40 |                 |    |                  |    |   |    |    |    |    | A  | A  | A  | A  | A  | 40 | 48 | 48 |    |
| CNT     |     | 31    | 31 | 31 | 30 | 31 | 30 | 31 | 1               |    |                  |    |   |    |    |    |    | 19 | 29 | 28 | 30 | 30 | 31 | 31 |    |    |
| MED     |     | 38    | 40 | 40 | 38 | 37 | 36 | 32 | 58              |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| UQ      |     | 40    | 44 | 41 | 40 | 42 | 41 | 38 |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |
| LQ      |     | X     | X  | X  | X  | X  | X  | X  |                 |    |                  |    |   |    |    |    |    | X  | X  | X  | X  | X  | X  | X  | X  |    |

JAN. 1987

FXI (0.1 MHz)

The Radio Research Laboratory, Japan

# IONOSPHERIC DATA

JAN. 1987

FOF2 (0.1 MHz)

135° E Mean Time (G.M.T. + 9h)

| Station |     | AKITA |    |    |    | Lat. 39° 43.5' N |    | Long. 140° 08.0' E |    | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |
|---------|-----|-------|----|----|----|------------------|----|--------------------|----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|---|
| Hour    | Day | 00    | 01 | 02 | 03 | 04               | 05 | 06                 | 07 | 08  | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |    |   |   |
| 1       |     | F     | F  | F  | F  | F                | F  | F                  | 34 | 44  | 69 | 67 | 70 | 60 | 50 | 52 | 46 | 41 | 37 | 30 | 28 | 29 | F  | F  | 30 |    |   |   |
| 2       |     | 28    | F  | F  | F  | 29               | 25 | 22                 | 32 | 51  | 53 | 72 | 70 | 58 | 64 | 54 | 54 | 42 | 32 | 25 | 27 | 30 | 32 | F  | F  |    |   |   |
| 3       |     | F     | F  | F  | A  | F                | F  | F                  | 33 | 44  | 60 | 76 | 74 | 60 | 53 | 58 | 47 | 39 | 28 | 32 | 35 | 22 | 21 | 24 | 24 |    |   |   |
| 4       |     | 26    | 26 | 22 | 23 | 24               | 24 | 26                 | 34 | 48  | 46 | 54 | 66 | 56 | 50 | 43 | 48 | 39 | 28 | 29 | 27 | F  | F  | F  | F  |    |   |   |
| 5       |     | F     | F  | F  | F  | F                | F  | F                  | 35 | 46  | 51 | H  | 61 | 59 | 61 | 50 | 46 | 39 | 33 | 35 | 34 | F  | F  | F  | F  |    |   |   |
| 6       |     | F     | F  | F  | F  | F                | F  | F                  | 31 | 46  | 51 | 56 | 61 | 55 | A  | 56 | 56 | 46 | 27 | 27 | 29 | 29 | A  | F  | F  |    |   |   |
| 7       |     | F     | F  | F  | F  | F                | F  | F                  | 26 | 35  | 46 | H  | 43 | 60 | 56 | 54 | 49 | 46 | 39 | 31 | 31 | 27 | F  | F  | F  | F  |   |   |
| 8       |     | 30    | F  | F  | F  | F                | F  | F                  | 40 | 50  | 56 | 59 | 53 | 60 | 62 | 59 | 50 | A  | A  | A  | A  | F  | F  | F  | F  |    |   |   |
| 9       |     | F     | F  | F  | F  | F                | F  | F                  | 24 | 33  | 42 | 52 | 66 | 62 | 54 | 52 | 50 | 50 | 44 | 33 | 34 | 32 | 28 | F  | F  | F  |   |   |
| 10      |     | F     | F  | F  | F  | 30               | 32 | F                  | 25 | 26  | 34 | 42 | 51 | 66 | 57 | 62 | 53 | 47 | 49 | 49 | 32 | 29 | F  | F  | F  | F  |   |   |
| 11      |     | F     | F  | F  | F  | F                | F  | F                  | 26 | 37  | 42 | 43 | 64 | 56 | 53 | 50 | 52 | 56 | 46 | 31 | 37 | 31 | 28 | 30 | 40 | F  |   |   |
| 12      |     | F     | F  | F  | F  | F                | F  | F                  | 32 | F   | 38 | 45 | 52 | 54 | 68 | 61 | 50 | 50 | H  | 43 | 32 | 31 | 29 | 24 | 25 | F  | F |   |
| 13      |     | F     | F  | F  | 28 | 24               | 27 | 25                 | 33 | 43  | 44 | 54 | 68 | 56 | 48 | 51 | 49 | 42 | 29 | 34 | 27 | 25 | 29 | 32 | F  | F  |   |   |
| 14      |     | F     | F  | 36 | 28 | 22               | 26 | 24                 | 35 | 46  | I  | C  | 48 | 66 | 59 | 59 | 52 | 47 | 46 | 41 | 30 | 26 | 31 | 30 | F  | F  | F |   |
| 15      |     | F     | F  | 29 | 30 | 24               | 24 | 22                 | 36 | 42  | 49 | 56 | 70 | 56 | 56 | 54 | 48 | 40 | 33 | 28 | 32 | 29 | 29 | 32 | F  | F  |   |   |
| 16      |     | F     | F  | F  | 35 | F                | F  | F                  | 34 | 45  | 58 | 58 | 62 | 57 | 58 | 56 | 58 | 44 | 30 | 31 | 36 | 37 | 36 | 38 | 36 | F  |   |   |
| 17      |     | F     | F  | 34 | 33 | 33               | F  | F                  | 31 | 38  | 50 | 60 | 66 | 69 | 54 | 56 | 57 | 51 | 41 | 33 | 29 | 27 | 26 | 29 | 30 | F  | F |   |
| 18      |     | F     | F  | 33 | 29 | 30               | 30 | 24                 | 36 | 46  | 58 | 63 | 61 | 61 | 66 | 65 | 51 | 47 | 37 | 32 | 38 | 32 | 31 | 36 | 33 | F  | F |   |
| 19      |     | 34    | 35 | F  | F  | F                | F  | 40                 | 44 | 45  | 56 | 52 | 55 | 56 | 51 | 53 | 56 | 51 | 41 | 35 | 32 | 30 | 24 | 25 | 27 | F  | F |   |
| 20      |     | 29    | 30 | 30 | 29 | 29               | 30 | 25                 | 36 | 47  | 65 | 70 | 65 | 53 | 55 | 53 | 51 | 41 | 29 | 36 | 36 | 32 | 29 | 28 | 30 | F  | F |   |
| 21      |     | 30    | 30 | 27 | F  | 28               | 28 | 32                 | 22 | 39  | 54 | 54 | 52 | 66 | 56 | H  | 60 | 66 | 54 | 36 | 31 | 32 | 32 | 31 | 32 | F  | F |   |
| 22      |     | F     | 34 | F  | 34 | 34               | 32 | 29                 | 39 | H   | 49 | 67 | 66 | 68 | 63 | 57 | 51 | 51 | 48 | 38 | 32 | 36 | 30 | 29 | 26 | 28 | F | F |
| 23      |     | 29    | 31 | 31 | 28 | 30               | 34 | 29                 | 43 | 58  | 59 | 64 | 67 | 56 | 53 | 59 | 55 | 50 | 51 | 44 | 25 | 24 | 27 | F  | F  | F  | F |   |
| 24      |     | F     | 29 | 29 | F  | F                | F  | F                  | 37 | 44  | 56 | 68 | 69 | 53 | 50 | H  | 53 | 52 | 45 | 36 | 40 | 35 | 34 | F  | F  | F  | F |   |
| 25      |     | F     | F  | F  | F  | F                | F  | F                  | F  | 48  | 45 | 64 | 61 | 58 | 56 | 53 | 57 | 57 | 46 | 35 | 32 | 30 | 33 | 26 | 27 | 25 | F | F |
| 26      |     | S     | 29 | 29 | 31 | 27               | 24 | 24                 | 38 | 45  | 49 | 55 | 56 | 56 | 58 | 52 | 54 | 44 | 35 | 26 | 33 | F  | 35 | F  | F  | F  | F |   |
| 27      |     | 32    | F  | 34 | 28 | 26               | 27 | 25                 | 40 | 49  | 52 | 62 | 65 | 58 | 53 | 48 | 59 | 52 | 31 | 24 | 30 | 27 | 27 | 29 | 30 | F  | F |   |
| 28      |     | 28    | 30 | 33 | 24 | 20               | F  | 24                 | 23 | 35  | 46 | 51 | 63 | 72 | 61 | 52 | 52 | 54 | 41 | 32 | 34 | 37 | 26 | F  | F  | F  | F |   |
| 29      |     | 30    | 30 | 28 | 27 | F                | F  | F                  | 39 | 47  | 46 | 72 | 61 | 60 | H  | 54 | 54 | 61 | 48 | A  | 31 | A  | 25 | F  | F  | F  | F |   |
| 30      |     | F     | F  | F  | F  | F                | F  | F                  | 35 | A   | 24 | 40 | 50 | 47 | 54 | 59 | 66 | 52 | 58 | 51 | 46 | 32 | 31 | 36 | 27 | F  | F | F |
| 31      |     | F     | F  | F  | F  | F                | F  | F                  | F  | F   | 32 | 36 | 46 | 50 | 49 | 57 | 65 | 56 | 52 | 59 | 56 | 37 | A  | A  | A  | F  | F | F |
|         |     | 00    | 01 | 02 | 03 | 04               | 05 | 06                 | 07 | 08  | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |    |   |   |
| CNT     |     | 17    | 15 | 19 | 21 | 20               | 21 | 25                 | 31 | 31  | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 30 | 29 | 29 | 27 | 25 | 21 | 16 | 14 |    |   |   |
| MED     |     | 30    | 30 | 30 | 28 | 26               | 26 | 25                 | 36 | 46  | 52 | 62 | 62 | 57 | 53 | 53 | 51 | 44 | 32 | 31 | 32 | 29 | 29 | 30 | 30 |    |   |   |
| UQ      |     | 31    | 32 | 32 | 30 | 30               | 30 | 26                 | 39 | 48  | 58 | 66 | 68 | 60 | 56 | 56 | 56 | 48 | 36 | 34 | 35 | 32 | 31 | 32 | 31 |    |   |   |
| LQ      |     | 28    | 30 | 28 | 27 | 24               | 24 | 24                 | 34 | 44  | 49 | 54 | 59 | 56 | 52 | 50 | 49 | 41 | 31 | 29 | 28 | 26 | 26 | 28 | 28 |    |   |   |

JAN. 1987

FOF2 (0.1 MHz)

# IONOSPHERIC DATA

JAN. 1987

FOF1 (0.01 MHz)

135 E Mean Time (G.M.T. + 9h)

| Station     | AKITA |    |    |    | Lat. 39 43.5 N, Long. 140 08.0 E |    |    |    | Sweep 1 MHz to 25 MHz in 2 sec in automatic operation |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|-------------|-------|----|----|----|----------------------------------|----|----|----|---|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|
| Hour<br>Day | 00    | 01 | 02 | 03 | 04                               | 05 | 06 | 07 | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 1           |       |    |    |    |                                  |    |    |    |   |     | L   | 380 | 380 | L   | L   |     |    |    |    |    |    |    |    |    |
| 2           |       |    |    |    |                                  |    |    |    |   | L   | L   | 390 | 390 | L   | 360 | L   |    |    |    |    |    |    |    |    |
| 3           |       |    |    |    |                                  |    |    |    |   | L   | L   | 380 | 380 | L   | 350 |     |    |    |    |    |    |    |    |    |
| 4           |       |    |    |    |                                  |    |    |    |   | L   | L   | L   | L   | L   | L   |     |    |    |    |    |    |    |    |    |
| 5           |       |    |    |    |                                  |    |    |    |   | L   | L   | 380 | L   | 360 | L   |     |    |    |    |    |    |    |    |    |
| 6           |       |    |    |    |                                  |    |    |    |   |     | L   | 390 | 390 | A   | L   |     |    |    |    |    |    |    |    |    |
| 7           |       |    |    |    |                                  |    |    |    |   |     |     |     | L   | L   | L   |     |    |    |    |    |    |    |    |    |
| 8           |       |    |    |    |                                  |    |    |    |   |     | L   | 380 | 390 | 370 | A   |     |    |    |    |    |    |    |    |    |
| 9           |       |    |    |    |                                  |    |    |    |   | L   | L   | L   | L   | L   | L   |     |    |    |    |    |    |    |    |    |
| 10          |       |    |    |    |                                  |    |    |    |   |     | L   | 380 | 370 | L   | L   |     |    |    |    |    |    |    |    |    |
| 11          |       |    |    |    |                                  |    |    |    |   |     | L   | L   | L   | 350 | L   |     |    |    |    |    |    |    |    |    |
| 12          |       |    |    |    |                                  |    |    |    |   | L   | L   | L   | 380 | L   |     |     |    |    |    |    |    |    |    |    |
| 13          |       |    |    |    |                                  |    |    |    |   | L   | L   | 390 | L   | L   | L   |     |    |    |    |    |    |    |    |    |
| 14          |       |    |    |    |                                  |    |    |    |   | C   | L   | 380 | 390 | 380 | L   | L   |    |    |    |    |    |    |    |    |
| 15          |       |    |    |    |                                  |    |    |    |   |     | L   | 390 | 390 | L   | L   |     |    |    |    |    |    |    |    |    |
| 16          |       |    |    |    |                                  |    |    |    |   | L   | L   | 400 | 380 | 360 | L   |     |    |    |    |    |    |    |    |    |
| 17          |       |    |    |    |                                  |    |    |    |   | L   | L   | L   | L   | 390 | L   |     |    |    |    |    |    |    |    |    |
| 18          |       |    |    |    |                                  |    |    |    |   | L   | L   | 400 | 400 | 370 | L   | L   |    |    |    |    |    |    |    |    |
| 19          |       |    |    |    |                                  |    |    |    |   | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 20          |       |    |    |    |                                  |    |    |    |   | L   | 390 | 400 | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 21          |       |    |    |    |                                  |    |    |    |   | A   | L   | L   | A   | L   | A   | L   |    |    |    |    |    |    |    |    |
| 22          |       |    |    |    |                                  |    |    |    |   | L   | L   | 400 | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 23          |       |    |    |    |                                  |    |    |    |   | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 24          |       |    |    |    |                                  |    |    |    |   | L   |     | L   | L   | L   |     |     |    |    |    |    |    |    |    |    |
| 25          |       |    |    |    |                                  |    |    |    |   | L   | L   | L   | L   | 390 | L   | 310 |    |    |    |    |    |    |    |    |
| 26          |       |    |    |    |                                  |    |    |    |   |     | L   | L   | 390 | 370 | L   |     |    |    |    |    |    |    |    |    |
| 27          |       |    |    |    |                                  |    |    |    |   | L   | L   | 400 | L   | 380 | L   | L   |    |    |    |    |    |    |    |    |
| 28          |       |    |    |    |                                  |    |    |    |   | L   | 390 | 400 | 400 | 400 | L   |     |    |    |    |    |    |    |    |    |
| 29          |       |    |    |    |                                  |    |    |    |   | 330 | L   | 400 | 400 | L   | A   | A   |    |    |    |    |    |    |    |    |
| 30          |       |    |    |    |                                  |    |    |    |   | L   | L   | 400 | 400 | 400 | L   | L   |    |    |    |    |    |    |    |    |
| 31          |       |    |    |    |                                  |    |    |    |   | L   | L   | 410 | 400 | 390 | L   | L   |    |    |    |    |    |    |    |    |
|             | 00    | 01 | 02 | 03 | 04                               | 05 | 06 | 07 | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT         |       |    |    |    |                                  |    |    |    |   | 1   | 4   | 21  | 18  | 13  | 1   | 1   |    |    |    |    |    |    |    |    |
| MED         |       |    |    |    |                                  |    |    |    |   | 330 | 390 | 390 | 385 | 370 | 350 | 310 |    |    |    |    |    |    |    |    |
| UQ          |       |    |    |    |                                  |    |    |    |   |     | 390 | 400 | 400 | 390 |     |     |    |    |    |    |    |    |    |    |
| LQ          |       |    |    |    |                                  |    |    |    |   |     | 385 | 380 | 380 | 360 |     |     |    |    |    |    |    |    |    |    |

JAN. 1987

FOF1 (0.01 MHz)

### IONOSPHERIC DATA

JAN. 1987

FOE (0.01 MHz)

135° E Mean Time (G.M.T. + 9h)

| Station     | AKITA |    |    |    | Lat. 39° 43.5' N | Long. 140° 08.0' E | Sweep 1 MHz to 25 MHz in 2 sec in automatic operation |    |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |
|-------------|-------|----|----|----|------------------|--------------------|---|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|
| Hour<br>Day | 00    | 01 | 02 | 03 | 04               | 05                 | 06  | 07 | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 1           |       |    |    |    |                  |                    |   | S  | 185 | A   | 255 | A   | 280 | 260 | 245 | 200 | S   |    |    |    |    |    |    |    |
| 2           |       |    |    |    |                  |                    |   | S  | 200 | A   | 245 | 260 | 280 | 255 | 240 | 210 | S   |    |    |    |    |    |    |    |
| 3           |       |    |    |    |                  |                    |   | S  | A   | A   | A   | 270 | 275 | 255 | A   | 205 | S   |    |    |    |    |    |    |    |
| 4           |       |    |    |    |                  |                    |   | S  | 195 | 230 | A   | A   | 280 | 270 | 250 | 210 | S   |    |    |    |    |    |    |    |
| 5           |       |    |    |    |                  |                    |   | S  | 220 | 250 | 260 | 290 | 280 | 265 | 245 | 210 | S   |    |    |    |    |    |    |    |
| 6           |       |    |    |    |                  |                    |   | S  | A   | A   | A   | A   | 280 | A   | A   | A   | S   |    |    |    |    |    |    |    |
| 7           |       |    |    |    |                  |                    |   | S  | A   | A   | A   | 300 | 280 | 275 | 250 | 205 | S   |    |    |    |    |    |    |    |
| 8           |       |    |    |    |                  |                    |   | S  | A   | A   | A   | A   | A   | A   | A   | A   | S   |    |    |    |    |    |    |    |
| 9           |       |    |    |    |                  |                    |   | S  | A   | A   | A   | A   | A   | 270 | 260 | 230 | S   |    |    |    |    |    |    |    |
| 10          |       |    |    |    |                  |                    |   | S  | 195 | A   | 260 | 290 | 280 | 260 | 245 | 220 | S   |    |    |    |    |    |    |    |
| 11          |       |    |    |    |                  |                    |   | S  | 175 | 225 | 250 | 275 | 280 | 275 | 255 | 225 | S   |    |    |    |    |    |    |    |
| 12          |       |    |    |    |                  |                    |   | S  | 185 | A   | 260 | 280 | A   | A   | A   | A   | S   |    |    |    |    |    |    |    |
| 13          |       |    |    |    |                  |                    |   | S  | 180 | A   | 270 | 290 | 285 | 280 | 255 | 225 | 130 | S  |    |    |    |    |    |    |
| 14          |       |    |    |    |                  |                    |   | S  | 200 | C   | A   | A   | 285 | 275 | 255 | 225 | 195 | S  |    |    |    |    |    |    |
| 15          |       |    |    |    |                  |                    |   | S  | 205 | 240 | A   | A   | A   | A   | A   | A   | S   |    |    |    |    |    |    |    |
| 16          |       |    |    |    |                  |                    |   | S  | 200 | 255 | 270 | 280 | 285 | 275 | 255 | 235 | 130 | S  |    |    |    |    |    |    |
| 17          |       |    |    |    |                  |                    |   | S  | 205 | 240 | A   | A   | 290 | 280 | 265 | 240 | S   |    |    |    |    |    |    |    |
| 18          |       |    |    |    |                  |                    |   | S  | 205 | 240 | A   | A   | 290 | A   | A   | 245 | 190 | S  |    |    |    |    |    |    |
| 19          |       |    |    |    |                  |                    |   | S  | 205 | A   | A   | 295 | 290 | 280 | 260 | 220 | S   |    |    |    |    |    |    |    |
| 20          |       |    |    |    |                  |                    |   | S  | 205 | 260 | A   | 280 | 280 | 275 | 260 | 245 | 190 | S  |    |    |    |    |    |    |
| 21          |       |    |    |    |                  |                    |   | S  | 205 | A   | A   | 280 | A   | 280 | A   | A   | A   | S  |    |    |    |    |    |    |
| 22          |       |    |    |    |                  |                    |   | S  | 200 | 250 | A   | A   | A   | A   | 260 | 235 | 135 | S  |    |    |    |    |    |    |
| 23          |       |    |    |    |                  |                    |   | S  | 205 | A   | A   | 280 | 290 | 280 | 265 | 240 | A   | S  |    |    |    |    |    |    |
| 24          |       |    |    |    |                  |                    |   | S  | 225 | A   | 280 | 290 | A   | 285 | 275 | A   | A   | S  |    |    |    |    |    |    |
| 25          |       |    |    |    |                  |                    |   | S  | A   | 250 | A   | A   | A   | A   | A   | 235 | S   | S  |    |    |    |    |    |    |
| 26          |       |    |    |    |                  |                    |   | S  | 200 | 240 | 270 | 280 | 300 | 290 | 270 | 245 | A   | S  |    |    |    |    |    |    |
| 27          |       |    |    |    |                  |                    |   | S  | A   | 250 | 275 | 295 | 305 | 290 | A   | A   | S   | S  |    |    |    |    |    |    |
| 28          |       |    |    |    |                  |                    |   | S  | 200 | 250 | 270 | 290 | 300 | 285 | A   | A   | S   | S  |    |    |    |    |    |    |
| 29          |       |    |    |    |                  |                    |   | S  | 205 | 255 | 280 | 290 | 290 | 280 | 260 | 240 | S   | S  |    |    |    |    |    |    |
| 30          |       |    |    |    |                  |                    |   | S  | 205 | 245 | 255 | A   | A   | A   | A   | 230 | S   | S  |    |    |    |    |    |    |
| 31          |       |    |    |    |                  |                    |   | S  | 200 | 245 | 275 | 290 | 285 | 280 | 255 | 230 | A   | S  |    |    |    |    |    |    |
|             | 00    | 01 | 02 | 03 | 04               | 05                 | 06  | 07 | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT         |       |    |    |    |                  |                    |   |    | 24  | 16  | 15  | 19  | 22  | 23  | 20  | 23  | 6   |    |    |    |    |    |    |    |
| MED         |       |    |    |    |                  |                    |   |    | 200 | 248 | 270 | 290 | 285 | 275 | 255 | 230 | 188 |    |    |    |    |    |    |    |
| UQ          |       |    |    |    |                  |                    |   |    | 205 | 250 | 272 | 290 | 290 | 280 | 260 | 238 | 190 |    |    |    |    |    |    |    |
| LQ          |       |    |    |    |                  |                    |   |    | 198 | 240 | 258 | 280 | 280 | 270 | 250 | 215 | 180 |    |    |    |    |    |    |    |

JAN. 1987

FOE (0.01 MHz)

IONOSPHERIC DATA

JAN. 1987      FOES (0.1 MHz)      135 E Mean Time (G.M.T. + 9h)

| Station     | AKITA  |        |        |        | Lat.   | 39 43.5 N |        |        |        | Long.  | 140 08.0 E |        |        |        | Sweep 1 MHz to 25 MHz in 2sec in automatic operation |        |        |        |        |        |        |        |        |        |
|-------------|--------|--------|--------|--------|--------|-----------|--------|--------|--------|--------|------------|--------|--------|--------|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Hour<br>Day | 00     | 01     | 02     | 03     | 04     | 05        | 06     | 07     | 08     | 09     | 10         | 11     | 12     | 13     | 14   | 15     | 16     | 17     | 18     | 19     | 20     | 21     | 22     | 23     |
| 1           | J A 24 | J A 21 | J A 24 | J A 18 | E S 15 | E S 15    | E S 15 | 20     | J A 52 | J A 44 | 30         | J A 36 | J A 52 | 29     | J A 25   | G      | E S 16 | E S 15 | J A 23 | J A 21 | E S 16 | E S 15 | J A 28 | E S 15 |
| 2           | E S 16 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15    | E S 15 | E S 16 | G      | 23     | G          | G      | G      | J A 26 | J A 24   | J A 27 | J A 26 | J A 23 | E S 15 | E S 15 | J A 28 | J A 28 | J A 22 | J A 22 |
| 3           | J A 25 | J A 24 | J A 24 | J A 24 | E S 16 | E S 15    | E S 15 | 19     | J A 42 | J A 32 | J A 29     | G      | G      | G      | J A 26   | G      | E S 16 | E S 15 | E S 15 | J A 46 | J A 23 | E S 15 | E S 15 | J A 24 |
| 4           | J A 21 | J A 22 | J A 23 | J A 22 | J A 20 | E S 15    | J A 23 | E S 15 | G      | G      | J A 32     | J A 38 | J A 40 | J A 42 | J A 26   | G      | E S 16 | E S 15 | E S 15 | E S 15 | J A 20 | E S 15 | J A 33 | J A 21 |
| 5           | J A 19 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15    | E S 15 | E S 15 | G      | 30     | G          | G      | G      | G      | G  | G      | E S 17 | E S 15 | E S 15 | J A 24 | J A 24 | E S 15 | E S 15 | E S 15 |
| 6           | J A 25 | E S 16 | J A 24 | J A 26 | E S 15 | E S 15    | E S 15 | J A 24 | J A 28 | J A 64 | 53         | J A 35 | J A 44 | J A 75 | J A 44   | J A 39 | J A 24 | J A 19 | J A 46 | J A 25 | J A 76 | J A 65 | J A 36 | J A 40 |
| 7           | J A 32 | J A 34 | J A 24 | J A 24 | J A 24 | J A 20    | E S 15 | E S 15 | J A 24 | J A 29 | J A 59     | G      | G      | G      | G  | G      | E S 16 | E S 15 | E S 15 | E S 15 | J A 41 | J A 25 | J A 44 | J A 32 |
| 8           | J A 42 | J A 52 | J A 73 | J A 20 | E S 15 | E S 15    | E S 15 | E S 15 | J A 50 | J A 31 | J A 40     | J A 32 | J A 32 | J A 45 | J A 50   | J A 53 | J A 48 | J A 59 | J A 44 | J A 34 | J A 25 | J A 24 | J A 28 | J A 24 |
| 9           | J A 24 | J A 25 | J A 19 | J A 20 | E S 16 | J A 20    | J A 18 | E S 16 | J A 30 | J A 43 | J A 43     | J A 41 | J A 32 | 31     | J A 25   | G      | J A 20 | J A 31 | J A 29 | J A 27 | E S 15 | J A 23 | J A 35 | J A 29 |
| 10          | J A 24 | J A 30 | J A 26 | J A 24 | E S 15 | J A 23    | E S 15 | E S 16 | 23     | J A 29 | G          | G      | G      | G      | G  | G      | J A 28 | E S 15 | J A 22 | J A 21 | J A 20 | E S 15 | E S 15 | E S 15 |
| 11          | E S 15 | E S 15 | E S 15 | J A 24 | E S 15 | E S 15    | E S 15 | E S 15 | G      | G      | G          | J A 36 | G      | G      | 28   | J A 25 | 24     | J A 24 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 | J A 42 |
| 12          | J A 41 | J A 30 | J A 19 | E S 15 | E S 15 | E S 15    | E S 15 | E S 15 | G      | 31     | 30         | G      | J A 36 | J A 52 | J A 32   | J A 32 | J A 26 | J A 24 | J A 29 | J A 21 | E S 16 | E S 16 | E S 16 | E S 15 |
| 13          | E S 15 | J A 20 | E S 16 | E S 16 | E S 15 | E S 15    | E S 15 | E S 15 | G      | J A 29 | G          | G      | J A 26 | G      | G  | G      | G      | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 |
| 14          | J A 20 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15    | E S 15 | E S 15 | G      | C      | J A 29     | J A 31 | G      | G      | G  | G      | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 |
| 15          | E S 15 | E S 16 | E S 16 | E S 16 | E S 15 | E S 16    | E S 16 | E S 16 | G      | G      | 30         | J A 30 | J A 34 | J A 38 | J A 30   | J A 30 | J A 22 | J A 22 | E S 16 | J A 21 | J A 24 | E S 16 | E S 16 | J A 24 |
| 16          | J A 24 | J A 23 | J A 18 | E S 15 | E S 15 | E S 15    | E S 15 | E S 15 | G      | G      | G          | G      | G      | G      | G  | G      | G      | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 |
| 17          | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15    | E S 15 | E S 15 | G      | G      | J A 29     | J A 52 | G      | G      | G  | G      | E S 17 | E S 15 | E S 15 | J A 18 | E S 15 | E S 15 | E S 15 | E S 15 |
| 18          | E S 15 | E S 15 | E S 15 | E S 15 | J A 24 | E S 16    | E S 15 | J A 24 | G      | 31     | J A 33     | J A 36 | G      | J A 33 | J A 36   | G      | G      | E S 15 | E S 15 | E S 16 | E S 15 | E S 15 | E S 15 | E S 15 |
| 19          | J A 24 | E S 15 | E S 15 | E S 15 | J A 18 | E S 15    | E S 15 | E S 15 | G      | J A 29 | J A 29     | G      | G      | J A 53 | G  | G      | E S 17 | E S 17 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 |
| 20          | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15    | E S 15 | E S 16 | G      | G      | 30         | G      | G      | G      | G  | G      | G      | E S 15 | J A 21 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 |
| 21          | E S 15 | E S 15 | J A 21 | J A 21 | J A 21 | E S 15    | E S 15 | E S 15 | G      | J A 32 | 35         | 40     | J A 44 | 35     | J A 46   | J A 29 | J A 21 | E S 15 | J A 23 | J A 20 | E S 16 | E S 15 | J A 20 | E S 15 |
| 22          | J A 33 | J A 24 | E S 15 | J A 25 | J A 21 | E S 15    | E S 15 | E S 15 | G      | G      | 32         | 32     | J A 37 | J A 29 | G  | G      | G      | E S 15 | E S 16 | J A 24 | J A 19 | J A 49 | J A 24 | J A 32 |
| 23          | E S 15 | J A 24 | J A 24 | J A 21 | E S 15 | E S 15    | E S 15 | E S 15 | 24     | J A 50 | J A 29     | G      | G      | G      | G  | G      | J A 28 | J A 23 | J A 19 | E S 15 | E S 15 | J A 24 | J A 24 | J A 21 |
| 24          | J A 30 | J A 24 | J A 26 | J A 21 | E S 15 | J A 21    | E S 16 | E S 16 | G      | 32     | 32         | G      | J A 32 | G      | G  | 28     | 22     | E S 15 | E S 15 | E S 16 | E S 16 | J A 20 | E S 16 | E S 16 |
| 25          | J A 23 | J A 18 | J A 19 | J A 19 | E S 15 | E S 15    | E S 15 | E S 15 | J A 23 | G      | J A 32     | J A 31 | J A 32 | J A 32 | J A 32   | G      | 20     | J A 52 | J A 29 | J A 23 | J A 21 | E S 15 | J A 18 | E S 15 |
| 26          | E S 17 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15    | E S 16 | E S 15 | G      | 30     | 31         | 32     | G      | G      | G  | G      | J A 21 | E S 16 | E S 15 | E S 15 | J A 21 | E S 16 | E S 15 | E S 15 |
| 27          | E S 15 | J A 24 | E S 15 | E S 15 | E S 15 | E S 15    | E S 15 | E S 15 | J A 24 | G      | G          | G      | G      | G      | 31   | J A 31 | J A 23 | J A 44 | J A 21 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 |
| 28          | E S 15 | E S 16 | E S 15 | E S 15 | J A 20 | E S 15    | E S 15 | E S 15 | G      | G      | G          | G      | G      | G      | J A 29   | J A 27 | J A 24 | J A 20 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 |
| 29          | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15    | E S 16 | E S 16 | G      | G      | G          | G      | G      | 35     | J A 42   | J A 40 | J A 32 | J A 44 | J A 50 | J A 43 | J A 18 | E S 15 | E S 15 | E S 15 |
| 30          | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 | J A 37    | E S 16 | E S 15 | G      | G      | 35         | 35     | 33     | J A 42 | J A 29   | G      | E S 17 | E S 16 | E S 15 | J A 26 | E S 15 | E S 15 | J A 24 | J A 24 |
| 31          | E S 15 | J A 20 | J A 21 | J A 29 | J A 29 | J A 37    | J A 21 | J A 21 | J A 24 | J A 29 | J A 28     | J A 35 | 32     | 22     | 32   | J A 28 | 30     | J A 29 | J A 37 | J A 61 | J A 57 | J A 27 | J A 24 | J A 23 |
|             | 00     | 01     | 02     | 03     | 04     | 05        | 06     | 07     | 08     | 09     | 10         | 11     | 12     | 13     | 14   | 15     | 16     | 17     | 18     | 19     | 20     | 21     | 22     | 23     |
| CNT         | 31     | 31     | 31     | 31     | 31     | 31        | 31     | 31     | 31     | 30     | 31         | 31     | 31     | 31     | 31   | 31     | 31     | 31     | 31     | 31     | 31     | 31     | 31     | 31     |
| MED         | J A 19 | J A 18 | E S 16 | E S 16 | E S 15 | E S 15    | E S 15 | E S 15 | G      | 29     | 30         | 30     | G      | G      | 26   | G      | 20     | E S 16 | E S 16 | J A 18 | E S 16 | E S 15 | E S 16 | E S 15 |
| UQ          | J A 24 | J A 24 | J A 24 | J A 22 | 17     | E S 16    | E S 15 | E S 16 | J A 24 | J A 31 | 32         | J A 35 | J A 32 | J A 35 | J A 32   | J A 28 | J A 24 | J A 24 | J A 23 | J A 24 | J A 21 | J A 22 | J A 24 | J A 24 |
| LQ          | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15    | E S 15 | E S 15 | G      | G      | G          | G      | G      | G      | G  | G      | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 |

JAN. 1987      FOES (0.1 MHz)      The Radio Research Laboratory, Japan

# IONOSPHERIC DATA

JAN., 1987

FBES (0.1 MHz)

135 E Mean Time (G.M.T. + 9h)

| Station |     | AKITA |      | Lat. 39 43.5 N |        | Long. 140 08.0 E |      | Sweep 1 MHz to 25 MHz in 2 sec in |      | automatic operation |    |      |      |          |        |      |      |        |        |        |        |        |        |      |      |    |
|---------|-----|-------|------|----------------|--------|------------------|------|-----------------------------------|------|---------------------|----|------|------|----------|--------|------|------|--------|--------|--------|--------|--------|--------|------|------|----|
| Hour    | Day | 00    | 01   | 02             | 03     | 04               | 05   | 06                                | 07   | 08                  | 09 | 10   | 11   | 12       | 13     | 14   | 15   | 16     | 17     | 18     | 19     | 20     | 21     | 22   | 23   |    |
| 1       |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | 18   | E 16                | 26 | G 23 | 28   | G 20     | G 20   | G 17 | G    | E 16   | E 15   | E 15   | E 15   | E 16   | E 15   | E 15 | E 15 |    |
| 2       |     | E 16  | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 16 | G                   | 26 | G    | G    | G        | G      | G    | G    | E 16   | E 15   | E 15   | E 15   | E 15   | E 15   | E 15 | E 15 |    |
| 3       |     | E 15  | E 15 | E 15           | A A 24 | E 16             | E 15 | E 15                              | E 15 | 30                  | 25 | 26   | G    | G        | G      | 26   | G    | E 16   | E 15   | E 15   | E 15   | 31     | 20     | E 15 | E 15 | 19 |
| 4       |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 15 | G                   | G  | 28   | 28   | 20       | 20     | 19   | G    | E 16   | E 15   | E 15   | E 15   | E 15   | E 15   | E 15 | E 15 |    |
| 5       |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 15 | G                   | 29 | G    | G    | G        | G      | G    | G    | E 17   | E 15   | E 15   | E 15   | E 15   | E 15   | E 15 | E 15 |    |
| 6       |     | E 15  | E 16 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 15 | 26                  | 26 | 29   | 29   | G A A 25 | A A 75 | 26   | 22   | E 18   | E 15   | E 15   | E 15   | E 15   | A A 65 | E 15 | E 15 |    |
| 7       |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 15 | 23                  | 29 | 30   | G    | G        | G      | G    | G    | E 16   | E 15   | E 15   | E 15   | E 15   | E 15   | E 15 | E 15 |    |
| 8       |     | E 15  | 20   | E 15           | E 15   | E 15             | E 15 | E 15                              | E 15 | 23                  | 26 | 25   | 28   | 28       | 30     | 50   | 42   | A A 48 | A A 59 | A A 44 | A A 34 | 20     | E 15   | E 15 | E 15 |    |
| 9       |     | 20    | 18   | E 15           | E 15   | E 16             | 18   | E 15                              | E 16 | 19                  | 30 | 28   | 29   | 28       | 31     | 13   | G    | 18     | 22     | 18     | E 15   | E 15   | E 15   | 21   | E 15 |    |
| 10      |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 16 | 23                  | 27 | G    | G    | G        | G      | G    | G    | 19     | E 15   | E 15   | E 15   | E 15   | E 15   | E 15 | E 15 |    |
| 11      |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 15 | G                   | G  | G    | G    | G        | G      | G    | G    | 21     | E 16   | E 15   | E 15   | E 15   | E 15   | E 15 | 22   |    |
| 12      |     | 20    | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 15 | G                   | 30 | 30   | G    | 29       | 28     | 23   | 23   | 19     | E 15   | 21     | E 15   | E 16   | E 16   | E 16 | E 15 |    |
| 13      |     | E 15  | E 15 | E 16           | E 16   | E 15             | E 15 | E 15                              | E 15 | G                   | 28 | G    | G    | G        | G      | G    | G    | E 15   | E 15   | E 15   | E 15   | E 15   | E 15   | E 15 | E 15 |    |
| 14      |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 15 | G                   | C  | 28   | 29   | G        | G      | G    | G    | E 15   | E 15   | E 15   | E 15   | E 15   | E 15   | E 15 | E 15 |    |
| 15      |     | E 15  | E 16 | E 16           | E 16   | E 15             | E 16 | E 16                              | E 16 | G                   | G  | 30   | 29   | 33       | 30     | 29   | 24   | 19     | E 15   | E 16   | E 16   | 21     | E 16   | E 16 | 18   |    |
| 16      |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 15 | G                   | G  | G    | G    | G        | G      | G    | G    | G      | E 15   | E 15   | E 15   | E 15   | E 15   | E 15 | E 15 |    |
| 17      |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 15 | G                   | G  | 29   | 30   | G        | G      | G    | G    | E 17   | E 15   | E 15   | E 15   | E 15   | E 15   | E 15 | E 15 |    |
| 18      |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 16 | E 15                              | E 15 | G                   | 31 | 32   | 30   | G        | 30     | 32   | G    | G      | E 15   | E 15   | E 16   | E 15   | E 15   | E 15 | E 15 |    |
| 19      |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 15 | G                   | 28 | 29   | G    | G        | G      | 19   | G    | E 17   | E 17   | E 15   | E 15   | E 15   | E 15   | E 15 | E 15 |    |
| 20      |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 16 | G                   | G  | 30   | G    | G        | G      | G    | G    | E 15   | E 15   | 19     | E 15   | E 15   | E 15   | E 15 | E 15 |    |
| 21      |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 15 | G                   | 32 | 35   | 37   | 42       | 32     | 44   | 28   | 20     | E 15   | E 15   | E 15   | E 16   | E 15   | E 15 | E 15 |    |
| 22      |     | E 15  | E 15 | E 15           | 19     | E 15             | E 15 | E 15                              | E 15 | G                   | G  | 30   | 32   | 35       | 29     | G    | G    | G      | E 15   | E 16   | E 15   | E 15   | 20     | E 15 | E 15 |    |
| 23      |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 15 | 24                  | 29 | 28   | G    | G        | G      | G    | G    | 20     | E 15   | E 16   | E 15   | E 15   | E 15   | E 15 | E 15 |    |
| 24      |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 16 | E 16                              | E 16 | G                   | 28 | 31   | G    | 30       | G      | G    | 27   | 20     | E 15   | E 15   | E 16   | E 16   | E 15   | E 16 | E 16 |    |
| 25      |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 15 | 21                  | G  | 29   | 30   | 30       | 30     | 28   | G    | 20     | 22     | E 15   | E 15   | E 15   | E 15   | E 15 | E 15 |    |
| 26      |     | E 17  | E 15 | E 15           | E 15   | E 15             | E 15 | E 16                              | E 15 | G                   | 30 | 31   | 31   | G        | G      | G    | G    | 20     | E 16   | E 15   | E 15   | E 15   | E 16   | E 15 | E 15 |    |
| 27      |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 15 | 21                  | G  | G    | G    | G        | G      | G    | G    | 22     | 20     | E 15   | E 15   | E 15   | E 15   | E 15 | E 15 |    |
| 28      |     | E 15  | E 16 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 15 | G                   | G  | G    | G    | G        | G      | 27   | 25   | 21     | E 16   | E 15   | E 15   | E 15   | E 15   | E 15 | E 15 |    |
| 29      |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 16 | G                   | G  | G    | G    | G        | 35     | 40   | 39   | 28     | A A 44 | A A 22 | A A 43 | E 15   | E 15   | E 15 | E 15 |    |
| 30      |     | E 15  | E 15 | E 15           | E 15   | E A A 37         | E 16 | E 15                              | E 15 | G                   | G  | 35   | 32   | 31       | 30     | 27   | G    | E 17   | E 16   | E 15   | 22     | E 15   | E 15   | E 15 | E 15 |    |
| 31      |     | E 15  | E 15 | E 15           | E 15   | 22               | 26   | E 15                              | E 16 | G                   | G  | 25   | G 25 | G 20     | G 20   | 32   | G 21 | 29     | 19     | A A 87 | A A 61 | A A 57 | E 15   | 19   | E 15 |    |
|         |     | 00    | 01   | 02             | 03     | 04               | 05   | 06                                | 07   | 08                  | 09 | 10   | 11   | 12       | 13     | 14   | 15   | 16     | 17     | 18     | 19     | 20     | 21     | 22   | 23   |    |
| CNT     |     | 31    | 31   | 31             | 31     | 31               | 31   | 31                                | 31   | 31                  | 30 | 31   | 31   | 31       | 31     | 31   | 31   | 31     | 31     | 31     | 31     | 31     | 31     | 31   | 31   |    |
| MED     |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 15 | G                   | 26 | 28   | 25   | G        | G      | G    | G    | 18     | E 15   | E 15   | E 15   | E 15   | E 15   | E 15 | E 15 |    |
| UQ      |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 16 | 20                  | 29 | 30   | 29   | 28       | 30     | 28   | 22   | 20     | E 16   | E 16   | E 16   | E 16   | E 15   | E 15 | E 15 |    |
| LQ      |     | E 15  | E 15 | E 15           | E 15   | E 15             | E 15 | E 15                              | E 15 | G                   | G  | G    | G    | G        | G      | G    | G    | E 16   | E 15   | E 15   | E 15   | E 15   | E 15   | E 15 | E 15 |    |

JAN. 1987

FBES (0.1 MHz)



## IONOSPHERIC DATA

JAN. 1987

FMIN (0.1 MHz)

135 E Mean Time (G.M.T. + 9h)

| Station     | AKITA |      |      |      | Lat. | 39 43.5 N. |      |      |      | Long. | 140 08.0 E |    |      |    | Sweep 1 MHz to 25 MHz in 24sec in |      |      |      | automatic operation |      |      |      |      |      |      |
|-------------|-------|------|------|------|------|------------|------|------|------|-------|------------|----|------|----|-----------------------------------|------|------|------|---------------------|------|------|------|------|------|------|
| Hour<br>Day | 00    | 01   | 02   | 03   | 04   | 05         | 06   | 07   | 08   | 09    | 10         | 11 | 12   | 13 | 14                                | 15   | 16   | 17   | 18                  | 19   | 20   | 21   | 22   | 23   |      |
| 1           | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 16 | E 16 | 16    | 16         | 16 | 16   | 16 | 16                                | E 16 | E 16 | E 15 | E 15                | E 15 | E 15 | E 16 | E 15 | E 15 | E 15 |
| 2           | E 16  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 16 | 16   | 16    | 17         | 17 | 19   | 16 | 16                                | 16   | E 16 | E 15 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 3           | E 15  | E 15 | E 15 | E 15 | E 16 | E 15       | E 15 | E 15 | E 16 | 16    | 16         | 16 | 16   | 16 | 16                                | 16   | E 16 | E 15 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 4           | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 15 | E 16 | 16    | 16         | 16 | 16   | 16 | 16                                | 16   | E 16 | E 15 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 5           | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 15 | E 16 | 16    | 17         | 18 | 18   | 18 | 18                                | 16   | E 17 | E 15 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 6           | E 15  | E 16 | E 15 | E 15 | E 15 | E 15       | E 15 | E 15 | 18   | 17    | 17         | 18 | 18   | 19 | 17                                | 16   | E 18 | E 15 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 7           | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 15 | 15   | 15    | 16         | 16 | 17   | 16 | 17                                | 16   | E 16 | E 15 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 8           | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 15 | 15   | 16    | 17         | 16 | 16   | 16 | 17                                | 15   | E 15 | E 15 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 9           | E 16  | E 15 | E 15 | E 15 | E 16 | E 15       | E 15 | E 16 | E 16 | 16    | 16         | 17 | 16   | 16 | 16                                | 17   | E 16 | E 16 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 10          | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 16 | 16   | 16    | 17         | 17 | 17   | 16 | 17                                | 16   | E 16 | E 15 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 11          | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 15 | E 15 | 16    | 16         | 16 | 17   | 17 | 17                                | 15   | E 16 | E 16 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 12          | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 15 | E 16 | 16    | 16         | 16 | 16   | 17 | 15                                | 16   | E 16 | E 16 | E 15                | E 15 | E 15 | E 16 | E 16 | E 16 | E 15 |
| 13          | E 15  | E 15 | E 16 | E 16 | E 15 | E 15       | E 15 | E 15 | E 15 | 16    | 16         | 16 | 16   | 16 | 16                                | 16   | E 15 | E 15 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 14          | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 15 | E 16 | 16    | 16         | 16 | 16   | 17 | 16                                | 16   | E 16 | E 15 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 15          | E 15  | E 16 | E 16 | E 16 | E 15 | E 16       | E 16 | E 16 | E 16 | 16    | 16         | 15 | 16   | 16 | 15                                | 16   | E 15 | E 15 | E 16                | E 16 | E 15 | E 16 | E 16 | E 16 | E 16 |
| 16          | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 15 | 16   | 16    | 16         | 16 | 16   | 16 | 16                                | 16   | E 15 | E 15 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 17          | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 15 | E 16 | 16    | 16         | 16 | 16   | 16 | 16                                | 15   | E 17 | E 15 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 18          | E 15  | E 15 | E 15 | E 15 | E 15 | E 16       | E 15 | E 15 | E 16 | 16    | 16         | 16 | 16   | 16 | 16                                | 16   | 16   | E 15 | E 15                | E 16 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 19          | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 15 | E 16 | 16    | 16         | 16 | 16   | 16 | 16                                | 16   | E 17 | E 17 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 20          | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 16 | 16   | 16    | 16         | 16 | 16   | 16 | 15                                | 16   | E 16 | E 15 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 21          | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 15 | 16   | 16    | 17         | 17 | 16   | 17 | 16                                | 16   | 16   | E 15 | E 15                | E 15 | E 15 | E 16 | E 15 | E 15 | E 15 |
| 22          | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 15 | E 16 | 16    | 16         | 16 | 16   | 16 | 16                                | 16   | E 16 | E 15 | E 16                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 23          | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 15 | E 15 | 16    | 16         | 17 | 17   | 16 | 16                                | 15   | 16   | E 16 | E 16                | E 16 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 24          | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 16 | E 16 | 16   | 16    | 16         | 16 | 16   | 16 | 18                                | 15   | E 16 | E 15 | E 15                | E 16 | E 16 | E 15 | E 16 | E 15 | E 16 |
| 25          | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 15 | 16   | 16    | 16         | 17 | 16   | 16 | 16                                | 16   | E 17 | E 15 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 26          | E 17  | E 15 | E 15 | E 15 | E 15 | E 15       | E 16 | E 15 | 16   | 16    | 16         | 16 | 17   | 16 | 16                                | 16   | 15   | E 16 | E 15                | E 15 | E 15 | E 15 | E 16 | E 15 | E 15 |
| 27          | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 15 | 16   | 17    | 16         | 17 | E 22 | 16 | 15                                | 16   | E 16 | E 15 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 28          | E 15  | E 16 | E 15 | E 15 | E 15 | E 15       | E 15 | E 15 | E 16 | 16    | 16         | 17 | 16   | 17 | 16                                | 16   | E 16 | E 16 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 29          | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 16 | E 16 | 16    | 16         | 16 | 17   | 16 | 16                                | 16   | E 16 | E 15 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 30          | E 15  | E 15 | E 15 | E 15 | E 15 | E 16       | E 16 | E 15 | E 16 | 17    | 16         | 16 | 15   | 16 | 16                                | 16   | E 17 | E 16 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 31          | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 16 | 16   | 16    | 17         | 16 | 16   | 16 | 17                                | 16   | 16   | E 15 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| CNT         | 31    | 31   | 31   | 31   | 31   | 31         | 31   | 31   | 31   | 30    | 31         | 31 | 31   | 31 | 31                                | 31   | 31   | 31   | 31                  | 31   | 31   | 31   | 31   | 31   | 31   |
| MED         | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 15 | E 16 | 16    | 16         | 16 | 16   | 16 | 15                                | 16   | E 16 | E 15 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| UQ          | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 16 | 16   | 16    | 16         | 17 | 17   | 16 | 16                                | 16   | E 16 | E 16 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| LQ          | E 15  | E 15 | E 15 | E 15 | E 15 | E 15       | E 15 | E 15 | E 16 | 16    | 16         | 16 | 16   | 16 | 16                                | 16   | E 16 | E 15 | E 15                | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |

JAN. 1987

FMIN (0.1 MHz)

The Radio Research Laboratory, Japan

# IONOSPHERIC DATA

JAN. 1987

M(3000)F2 (0.01)

135° E Mean Time (G.M.T. + 9h)

| Station |     | AKITA |     | Lat. | 39 43.5 N. |     | Long. | 140 08.0 E |     | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
|---------|-----|-------|-----|------|------------|-----|-------|------------|-----|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| Hour    | Day | 00    | 01  | 02   | 03         | 04  | 05    | 06         | 07  | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23 |
| 1       | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 2       | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 3       | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 4       | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 5       | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 6       | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 7       | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 8       | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 9       | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 10      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 11      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 12      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 13      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 14      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 15      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 16      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 17      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 18      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 19      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 20      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 21      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 22      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 23      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 24      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 25      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 26      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 27      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 28      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 29      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 30      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
| 31      | F   | F     | F   | F    | F          | F   | F     | F          | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   | F   |    |
|         | 00  | 01    | 02  | 03   | 04         | 05  | 06    | 07         | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  |    |
| CNT     | 17  | 15    | 19  | 21   | 20         | 21  | 25    | 31         | 31  | 31  | 31  | 31  | 31  | 30  | 31  | 31  | 30  | 29  | 29  | 27  | 25  | 21  | 16  | 14  |    |
| MED     | 310 | 320   | 325 | 335  | 335        | 335 | 340   | 360        | 370 | 355   | 355 | 370 | 370 | 375 | 360 | 370 | 375 | 355 | 340 | 345 | 340 | 320 | 315 | 320 |    |
| UQ      | 320 | 330   | 342 | 355  | 342        | 340 | 355   | 370        | 382 | 360   | 365 | 375 | 378 | 375 | 370 | 375 | 385 | 360 | 350 | 365 | 355 | 320 | 340 | 325 |    |
| LQ      | 305 | 315   | 318 | 320  | 310        | 325 | 325   | 350        | 360 | 345   | 345 | 360 | 360 | 365 | 355 | 362 | 365 | 335 | 325 | 335 | 325 | 310 | 308 | 305 |    |

JAN. 1987

M(3000)F2 (0.01)

# IONOSPHERIC DATA

JAN. 1987

M(3000)F1 (0.01)

135 E Mean Time (G.M.T. + 9h)

| Station     | AKITA   |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
|-------------|---|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|
| Lat.        | 39 43.5 N.                                      |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
| Long.       | 140 08.0 E                                      |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
| Sweep       | 1 MHz to 25 MHz in 24sec in automatic operation |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |
| Hour<br>Day | 00  | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 1           |   |    |    |    |    |    |    |    |     |     | L   | 395 | 395 | L   | L   |     |    |    |    |    |    |    |    |    |
| 2           |   |    |    |    |    |    |    |    |     | L   | 380 | 385 | 400 | 410 | L   |     |    |    |    |    |    |    |    |    |
| 3           |   |    |    |    |    |    |    |    |     | L   | L   | 390 | 395 | L   | 405 |     |    |    |    |    |    |    |    |    |
| 4           |   |    |    |    |    |    |    |    |     | L   | L   | L   | 400 | L   | L   |     |    |    |    |    |    |    |    |    |
| 5           |   |    |    |    |    |    |    |    |     | L   | L   | 405 | L   | 420 | L   |     |    |    |    |    |    |    |    |    |
| 6           |   |    |    |    |    |    |    |    |     |     | L   | 385 | 395 | A   | L   |     |    |    |    |    |    |    |    |    |
| 7           |   |    |    |    |    |    |    |    |     |     |     |     | L   | L   | L   |     |    |    |    |    |    |    |    |    |
| 8           |   |    |    |    |    |    |    |    |     |     | L   | 420 | 385 | 405 | A   |     |    |    |    |    |    |    |    |    |
| 9           |   |    |    |    |    |    |    |    |     | L   | L   | L   | 420 | L   | L   |     |    |    |    |    |    |    |    |    |
| 10          |   |    |    |    |    |    |    |    |     |     | L   | 410 | 410 | L   | L   |     |    |    |    |    |    |    |    |    |
| 11          |   |    |    |    |    |    |    |    |     |     | L   | 400 | L   | 430 | L   |     |    |    |    |    |    |    |    |    |
| 12          |   |    |    |    |    |    |    |    |     | L   | L   | L   | 400 | L   |     |     |    |    |    |    |    |    |    |    |
| 13          |   |    |    |    |    |    |    |    |     | L   | L   | 385 | L   | L   | L   |     |    |    |    |    |    |    |    |    |
| 14          |   |    |    |    |    |    |    |    |     | C   | L   | 390 | 395 | 400 | L   | L   |    |    |    |    |    |    |    |    |
| 15          |   |    |    |    |    |    |    |    |     |     | L   | 360 | 385 | L   | L   |     |    |    |    |    |    |    |    |    |
| 16          |   |    |    |    |    |    |    |    |     | L   | L   | 390 | 415 | 440 | L   |     |    |    |    |    |    |    |    |    |
| 17          |   |    |    |    |    |    |    |    |     | L   | L   | 390 | L   | 405 | L   |     |    |    |    |    |    |    |    |    |
| 18          |   |    |    |    |    |    |    |    |     | L   | L   | 395 | 380 | 395 | L   | L   |    |    |    |    |    |    |    |    |
| 19          |   |    |    |    |    |    |    |    |     | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 20          |   |    |    |    |    |    |    |    |     | L   | 400 | 385 | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 21          |   |    |    |    |    |    |    |    |     | A   | L   | L   | A   | L   | A   | L   |    |    |    |    |    |    |    |    |
| 22          |   |    |    |    |    |    |    |    |     | L   | L   | 395 | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 23          |   |    |    |    |    |    |    |    |     | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 24          |   |    |    |    |    |    |    |    |     | L   |     | L   | L   | L   |     |     |    |    |    |    |    |    |    |    |
| 25          |   |    |    |    |    |    |    |    |     | L   | L   | L   | L   | 400 | L   | 410 |    |    |    |    |    |    |    |    |
| 26          |   |    |    |    |    |    |    |    |     |     | L   | L   | 395 | 400 | L   |     |    |    |    |    |    |    |    |    |
| 27          |   |    |    |    |    |    |    |    |     | L   | L   | 380 | L   | 400 | L   | L   |    |    |    |    |    |    |    |    |
| 28          |   |    |    |    |    |    |    |    |     | L   | 375 | 370 | 380 | 400 | L   |     |    |    |    |    |    |    |    |    |
| 29          |   |    |    |    |    |    |    |    |     | 430 | L   | 380 | 395 | L   | A   | A   |    |    |    |    |    |    |    |    |
| 30          |   |    |    |    |    |    |    |    |     | L   | L   | 380 | 375 | 395 | L   | L   |    |    |    |    |    |    |    |    |
| 31          |   |    |    |    |    |    |    |    |     | L   | L   | 370 | 395 | 385 | L   | L   |    |    |    |    |    |    |    |    |
| 00          | 01  | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17 | 18 | 19 | 20 | 21 | 22 | 23 |    |
| CNT         |   |    |    |    |    |    |    |    | 1   | 4   | 21  | 18  | 13  | 1   | 1   |     |    |    |    |    |    |    |    |    |
| MED         |   |    |    |    |    |    |    |    | 430 | 385 | 390 | 395 | 400 | 405 | 410 |     |    |    |    |    |    |    |    |    |
| UQ          |   |    |    |    |    |    |    |    |     | 395 | 395 | 400 | 410 |     |     |     |    |    |    |    |    |    |    |    |
| LQ          |   |    |    |    |    |    |    |    |     | 378 | 380 | 385 | 400 |     |     |     |    |    |    |    |    |    |    |    |

JAN. 1987

M(3000)F1 (0.01)

# IONOSPHERIC DATA

JAN. 1987

H<sup>o</sup>F<sub>2</sub> (KM)

135° E Mean Time (G.M.T. + 9h)

| Station     | AKITA   |    |    |    |    |    |    |       |              |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |  |
|-------------|---|----|----|----|----|----|----|-------|--------------|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|--|
| Lat.        | 39° 43.5' N.                                    |    |    |    |    |    |    | Long. | 140° 08.0' E |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |  |
| Sweep       | 1 MHz to 25 MHz in 2 sec in automatic operation |    |    |    |    |    |    |       |              |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |  |
| Hour<br>Day | 00  | 01 | 02 | 03 | 04 | 05 | 06 | 07    | 08           | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17 | 18 | 19 | 20 | 21 | 22 | 23 |  |
| 1           |   |    |    |    |    |    |    |       |              |     | 250 | 230 | 230 | 220 | 225 |     |     |    |    |    |    |    |    |    |  |
| 2           |   |    |    |    |    |    |    |       |              | 255 | 255 | 230 | 230 | 235 | 230 |     |     |    |    |    |    |    |    |    |  |
| 3           |   |    |    |    |    |    |    |       |              | 260 | 240 | 240 | 240 | 230 | 255 |     |     |    |    |    |    |    |    |    |  |
| 4           |   |    |    |    |    |    |    |       |              | 240 | 245 | 230 | 250 | 240 | 230 |     |     |    |    |    |    |    |    |    |  |
| 5           |   |    |    |    |    |    |    |       |              | 260 | 240 | 245 | 250 | 240 | 225 |     |     |    |    |    |    |    |    |    |  |
| 6           |   |    |    |    |    |    |    |       |              | 260 | 240 | 240 | A   | 250 |     |     |     |    |    |    |    |    |    |    |  |
| 7           |   |    |    |    |    |    |    |       |              |     |     |     | 245 | 240 | 230 |     |     |    |    |    |    |    |    |    |  |
| 8           |   |    |    |    |    |    |    |       |              | 240 | 230 | 275 | 230 | A   | 245 |     |     |    |    |    |    |    |    |    |  |
| 9           |   |    |    |    |    |    |    |       |              | 260 | 245 | 225 | 240 | 240 | 230 |     |     |    |    |    |    |    |    |    |  |
| 10          |   |    |    |    |    |    |    |       |              | 230 | 240 | 220 | 220 | 220 |     |     |     |    |    |    |    |    |    |    |  |
| 11          |   |    |    |    |    |    |    |       |              | 245 | 230 | 240 | 220 | 245 |     |     |     |    |    |    |    |    |    |    |  |
| 12          |   |    |    |    |    |    |    |       |              | 245 | 250 | 240 | 240 | 240 |     |     |     |    |    |    |    |    |    |    |  |
| 13          |   |    |    |    |    |    |    |       |              | 240 | 275 | 240 | 240 | 225 | 240 |     |     |    |    |    |    |    |    |    |  |
| 14          |   |    |    |    |    |    |    |       |              | C   | 235 | 245 | 235 | 230 | 230 |     |     |    |    |    |    |    |    |    |  |
| 15          |   |    |    |    |    |    |    |       |              | 260 | 240 | 230 | 230 | 230 |     |     |     |    |    |    |    |    |    |    |  |
| 16          |   |    |    |    |    |    |    |       |              | 245 | 255 | 245 | 240 | 245 | 245 |     |     |    |    |    |    |    |    |    |  |
| 17          |   |    |    |    |    |    |    |       |              | 250 | 230 | 240 | 230 | 230 | 250 |     |     |    |    |    |    |    |    |    |  |
| 18          |   |    |    |    |    |    |    |       |              | 250 | 240 | 235 | 260 | 245 | 230 | 225 |     |    |    |    |    |    |    |    |  |
| 19          |   |    |    |    |    |    |    |       |              | 230 | 235 | 245 | 250 | 245 | 245 | 235 |     |    |    |    |    |    |    |    |  |
| 20          |   |    |    |    |    |    |    |       |              | 260 | 240 | 230 | 240 | 240 | 245 | 230 |     |    |    |    |    |    |    |    |  |
| 21          |   |    |    |    |    |    |    |       |              | 235 | 250 | 250 | 245 | 245 | 255 | 230 |     |    |    |    |    |    |    |    |  |
| 22          |   |    |    |    |    |    |    |       |              | 240 | 235 | 240 | 250 | 230 | 235 | 240 |     |    |    |    |    |    |    |    |  |
| 23          |   |    |    |    |    |    |    |       |              | 240 | 220 | 240 | 240 | 260 | 240 | 240 |     |    |    |    |    |    |    |    |  |
| 24          |   |    |    |    |    |    |    |       |              | 245 |     | 240 | 225 | 220 |     |     |     |    |    |    |    |    |    |    |  |
| 25          |   |    |    |    |    |    |    |       |              | 240 | 250 | 230 | 245 | 240 | 250 | 230 |     |    |    |    |    |    |    |    |  |
| 26          |   |    |    |    |    |    |    |       |              | 260 | 270 | 250 | 250 | 240 |     |     |     |    |    |    |    |    |    |    |  |
| 27          |   |    |    |    |    |    |    |       |              | 230 | 250 | 250 | 240 | 255 | 230 | 240 |     |    |    |    |    |    |    |    |  |
| 28          |   |    |    |    |    |    |    |       |              | 240 | 275 | 240 | 240 | 240 | 235 |     |     |    |    |    |    |    |    |    |  |
| 29          |   |    |    |    |    |    |    |       |              | 240 | 265 | 250 | 250 | 250 | 250 | 240 |     |    |    |    |    |    |    |    |  |
| 30          |   |    |    |    |    |    |    |       |              | 230 | 295 | 255 | 240 | 270 | 255 | 230 |     |    |    |    |    |    |    |    |  |
| 31          |   |    |    |    |    |    |    |       |              | 240 | 270 | L   | 290 | 250 | 250 | 250 | 255 |    |    |    |    |    |    |    |  |
| CNT         |   |    |    |    |    |    |    |       |              | 22  | 29  | 30  | 31  | 30  | 29  | 11  |     |    |    |    |    |    |    |    |  |
| MED         |   |    |    |    |    |    |    |       |              | 240 | 250 | 240 | 240 | 240 | 240 | 235 |     |    |    |    |    |    |    |    |  |
| UQ          |   |    |    |    |    |    |    |       |              | 250 | 260 | 245 | 250 | 245 | 250 | 240 |     |    |    |    |    |    |    |    |  |
| LQ          |   |    |    |    |    |    |    |       |              | 240 | 240 | 230 | 240 | 230 | 230 | 230 |     |    |    |    |    |    |    |    |  |

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H<sup>o</sup>F<sub>2</sub> (KM)

### IONOSPHERIC DATA

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H \* F (KM)

135 E Mean Time (G.M.T. + 9h)

| Station     | AKITA                            |     |     |     |     |     |     |     |     |     |                  |   |                  |                  |                  |                  |                  |                  |                  |     |     |     |     |     |     |
|-------------|----------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------------|---|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----|-----|-----|-----|-----|-----|
|             | Lat. 39 43.5 N. Long. 140 08.0 E |     |     |     |     |     |     |     |     |     |                  | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |                  |                  |                  |                  |                  |                  |                  |     |     |     |     |     |     |
| Hour<br>Day | 00                               | 01  | 02  | 03  | 04  | 05  | 06  | 07  | 08  | 09  | 10               | 11  | 12               | 13               | 14               | 15               | 16               | 17               | 18               | 19  | 20  | 21  | 22  | 23  |     |
| 1           | 275                              | 275 | 245 | 220 | 245 | 235 | 260 | 245 | 230 | 250 | 240              | 205   | 200              | 200              | 225              | 200 <sup>H</sup> | 205              | 230              | 210              | 230 | 270 | E S | 285 | 240 |     |
| 2           | 255                              | 240 | 250 | 255 | 230 | 270 | 230 | 240 | 220 | 230 | 240              | 215   | 220              | 200              | 200              | 210 <sup>H</sup> | 200              | 220              | 250              | 225 | 230 | 250 | 300 | 305 |     |
| 3           | 255                              | 240 | 210 | A   | E S | 270 | E S | 235 | 230 | A   | 240              | 230   | 210              | 200              | 200              | 195              | 210              | 200              | 230              | 250 | A   | 210 | E S | E S | E A |
| 4           | E S                              | 240 | E S | E S | 270 | 265 | 245 | 230 | 210 | 200 | 220              | 200   | 200              | 220              | 200              | 220              | 205              | 205              | 240              | 245 | 220 | 270 | 260 | 265 |     |
| 5           | 240                              | 265 | 250 | 220 | 260 | 275 | 245 | 205 | 220 | 230 | 220              | 220   | 195 <sup>H</sup> | 195              | 210              | 205 <sup>H</sup> | 200              | 220              | 225              | 205 | 200 | 275 | 310 | E S | 300 |
| 6           | E S                              | 275 | 255 | 200 | 250 | 235 | 225 | 230 | 220 | 220 | 210              | 230   | 210              | A                | 225              | 230              | 210              | 205              | 245              | 225 | 210 | A   | E S | E S | E S |
| 7           | 280                              | 260 | 245 | 240 | 245 | 220 | 220 | 205 | 210 | 205 | 220              | 250   | 220              | 205              | 200              | 230              | 205              | 210              | 220              | 220 | 240 | E S | 270 | E S | 285 |
| 8           | 240                              | E A | 250 | 220 | 255 | 260 | 240 | 210 | 210 | 220 | 220              | 205   | 200              | 200              | A                | 230 <sup>A</sup> | A                | A                | A                | A   | A   | A   | 250 | 260 | 245 |
| 9           | 235                              | 275 | 240 | 290 | 240 | 205 | 250 | 200 | 200 | 230 | 240              | 220   | 210              | 210              | 210              | 235              | 220              | 225              | 220              | 220 | 210 | 250 | A   | 300 |     |
| 10          | 310                              | 260 | 270 | 265 | 225 | 245 | 250 | 200 | 210 | 215 | 225              | 210   | 205              | 215              | 200              | 220              | 215              | 205              | 240              | 240 | 240 | E S | 255 | 270 |     |
| 11          | 270                              | 245 | 225 | 200 | 265 | 200 | 220 | 200 | 205 | 210 | 200 <sup>H</sup> | 220   | 200              | 200              | 210              | 225              | 205              | 220              | 220              | 220 | 235 | 255 | 220 | A   | 280 |
| 12          | 260                              | 250 | 250 | 200 | 205 | 230 | 225 | 200 | 210 | 230 | 210              | 200   | 205              | 200              | 210              | 210              | 205              | 210              | 230 <sup>A</sup> | 220 | 220 | 275 | 280 | 270 |     |
| 13          | 260                              | 270 | 250 | 220 | 260 | 240 | 230 | 200 | 220 | 200 | 200              | 235   | 210              | 200              | 230              | 225              | 200              | 205              | 225              | 210 | 270 | 270 | 270 | 245 |     |
| 14          | 285                              | 270 | 220 | 200 | E S | 245 | 240 | 230 | 220 | I C | 220              | 225   | 205              | 200              | 200              | 200              | 220              | 215              | 205              | 270 | 235 | 240 | E S | 280 | 270 |
| 15          | 290                              | 295 | 270 | 230 | 205 | 215 | E S | 225 | 205 | 230 | 235              | 230 <sup>A</sup>                                      | 215              | 200              | A                | 210              | 210              | 210              | 260              | 225 | A   | 260 | 285 | E A | 305 |
| 16          | E S                              | 285 | 245 | 215 | 200 | E S | 270 | 230 | 210 | 220 | 245              | 200   | 200              | 200              | 230              | 225              | 205              | 200              | 250              | 250 | 220 | 275 | 270 | 250 |     |
| 17          | 260                              | 215 | 240 | 245 | 270 | 235 | 225 | 210 | 205 | 240 | 225              | 220   | 205              | 220              | 195              | 225              | 210              | 210              | 220              | 230 | 230 | 255 | 285 | 255 |     |
| 18          | 280                              | 270 | 235 | 230 | 225 | 250 | 220 | 220 | 205 | 240 | 235              | 220   | 200              | 210              | 225              | 205              | 225              | 210              | 235              | 230 | 220 | 235 | 230 | 225 |     |
| 19          | 240                              | 270 | 250 | 220 | 230 | 255 | 220 | 205 | 210 | 220 | 225              | 220   | 220              | 220              | 200              | 200              | 220              | 220              | 235              | 220 | 225 | 245 | 285 | E S | 300 |
| 20          | 255                              | 255 | 245 | 240 | 270 | 245 | 270 | 230 | 230 | 230 | 210              | 220   | 200              | 200              | 195              | 225              | 205              | 210              | 255              | 230 | 220 | 230 | 275 | 275 |     |
| 21          | 290                              | 290 | 300 | 270 | 280 | 205 | 255 | 240 | 230 | A   | A                | A   | A                | 200              | A                | 220              | 205              | 210              | 220              | 225 | 210 | 260 | 245 | 270 |     |
| 22          | 300                              | 240 | 275 | 250 | 240 | 250 | 265 | 220 | 220 | 220 | 230              | 210   | 220              | 200              | 200              | 200              | 220              | 220              | 240              | 235 | 240 | E A | 225 | 260 |     |
| 23          | 295                              | 280 | 250 | 275 | 275 | 235 | 240 | 210 | 220 | 220 | 205              | 220   | 205              | 200              | 200 <sup>H</sup> | 230              | 220              | 210              | 200              | E S | 255 | 275 | 275 | E S | 300 |
| 24          | 305                              | 270 | 250 | 255 | 255 | 250 | 220 | 220 | 200 | 220 | 230              | 230   | 210              | 195              | 235              | 220              | 220              | 200              | 220              | 235 | 245 | 235 | 250 | 245 |     |
| 25          | 250                              | 245 | 255 | 275 | 245 | 250 | 245 | 205 | 205 | 235 | 200              | 200   | 200              | 220              | 225              | 200              | 210              | 225 <sup>A</sup> | 220              | 240 | 210 | 250 | 240 | 275 |     |
| 26          | E S                              | 255 | 255 | 220 | 230 | 235 | 255 | 220 | 220 | 240 | 240              | 220   | 225              | 210              | 220              | 235              | 205              | 205              | 270              | 250 | 250 | 240 | 250 | 260 |     |
| 27          | 275                              | 255 | 220 | 230 | 245 | 250 | 270 | 225 | 205 | 200 | 225              | 230   | 220              | 210              | 210              | A                | 210              | 210              | E S              | 255 | 230 | 265 | 275 | 260 |     |
| 28          | 290                              | 260 | 220 | 205 | E S | E S | 250 | 200 | 220 | 200 | 220              | 230   | 225              | 205              | 200              | 235              | 200              | 230              | 245              | 220 | 210 | E S | 265 | 250 |     |
| 29          | 290                              | 275 | 275 | 230 | 245 | 220 | 270 | 235 | 220 | 200 | 275              | 240   | 230              | A                | A                | A                | 205              | A                | A                | A   | 210 | E S | E S | E S | 300 |
| 30          | 250                              | 270 | E S | 270 | 200 | A   | 250 | 230 | 220 | 200 | A                | 225   | 225              | 200              | 200              | 210              | 200 <sup>H</sup> | 205              | 255              | 220 | 225 | E S | E S | 275 |     |
| 31          | E S                              | 290 | 290 | 270 | A   | A   | 200 | 210 | 230 | 225 | 220              | 195 <sup>H</sup>                                      | 200              | 200 <sup>H</sup> | 235              | 240              | 205              | 205              | A                | A   | A   | 270 | E A | 280 |     |
|             | 00                               | 01  | 02  | 03  | 04  | 05  | 06  | 07  | 08  | 09  | 10               | 11  | 12               | 13               | 14               | 15               | 16               | 17               | 18               | 19  | 20  | 21  | 22  | 23  |     |
| CNT         | 31                               | 31  | 31  | 30  | 31  | 29  | 31  | 31  | 31  | 30  | 29               | 30  | 30               | 29               | 27               | 29               | 30               | 29               | 28               | 27  | 29  | 30  | 30  | 31  |     |
| MED         | 270                              | 265 | 250 | 230 | 245 | 242 | 242 | 220 | 220 | 220 | 225              | 220   | 205              | 200              | 210              | 220              | 205              | 210              | 236              | 228 | 225 | 260 | 268 | 262 |     |
| UQ          | 289                              | 275 | 258 | 260 | 263 | 252 | 255 | 230 | 220 | 230 | 235              | 230   | 220              | 210              | 225              | 230              | 215              | 220              | 250              | 236 | 240 | E S | 282 | U   | 285 |
| LQ          | 255                              | 250 | 242 | 220 | 230 | 235 | 225 | 205 | 208 | 210 | 220              | 205   | 200              | 200              | 200              | 210              | 205              | 205              | 220              | 220 | 210 | 250 | 255 | 258 |     |

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H \* F (KM)

# IONOSPHERIC DATA

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H<sup>o</sup>E (KM)

135 E Mean Time (G.M.T. + 9h)

| Station     | AKITA   |    |    |    |    |    |    |    |            |     |     |     |            |     |     |            |     |    |    |    |    |    |    |    |  |
|-------------|---|----|----|----|----|----|----|----|------------|-----|-----|-----|------------|-----|-----|------------|-----|----|----|----|----|----|----|----|--|
| Lat.        | 39 43.5 N.                                      |    |    |    |    |    |    |    |            |     |     |     |            |     |     |            |     |    |    |    |    |    |    |    |  |
| Long.       | 140 08.0 E                                      |    |    |    |    |    |    |    |            |     |     |     |            |     |     |            |     |    |    |    |    |    |    |    |  |
| Sweep       | 1 MHz to 25 MHz in 2 sec in automatic operation |    |    |    |    |    |    |    |            |     |     |     |            |     |     |            |     |    |    |    |    |    |    |    |  |
| Hour<br>Day | 00  | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08         | 09  | 10  | 11  | 12         | 13  | 14  | 15         | 16  | 17 | 18 | 19 | 20 | 21 | 22 | 23 |  |
| 1           |   |    |    |    |    |    |    | S  | S          | A   | A   | A   | 110        | 115 | 110 | E S<br>120 | S   |    |    |    |    |    |    |    |  |
| 2           |   |    |    |    |    |    |    | S  | 115        | 110 | 110 | 105 | 110        | 110 | A   | A          | S   |    |    |    |    |    |    |    |  |
| 3           |   |    |    |    |    |    |    | S  | S          | 110 | 105 | 105 | 105        | 110 | A   | 110        | S   |    |    |    |    |    |    |    |  |
| 4           |   |    |    |    |    |    |    | S  | S          | 115 | A   | A   | 110        | 110 | 110 | 110        | S   |    |    |    |    |    |    |    |  |
| 5           |   |    |    |    |    |    |    | S  | S          | 115 | 110 | 110 | 110        | 110 | 110 | 115        | S   |    |    |    |    |    |    |    |  |
| 6           |   |    |    |    |    |    |    | S  | 110        | 110 | 110 | A   | A          | A   | A   | A          | S   |    |    |    |    |    |    |    |  |
| 7           |   |    |    |    |    |    |    | S  | 110        | 110 | A   | 110 | 105        | 105 | 110 | 110        | S   |    |    |    |    |    |    |    |  |
| 8           |   |    |    |    |    |    |    | S  | 110        | 110 | 105 | A   | A          | A   | A   | A          | S   |    |    |    |    |    |    |    |  |
| 9           |   |    |    |    |    |    |    | S  | S          | A   | A   | A   | A          | 105 | 110 | 120        | S   |    |    |    |    |    |    |    |  |
| 10          |   |    |    |    |    |    |    | S  | 115        | A   | 105 | 105 | 110        | 105 | 110 | E S<br>120 | S   |    |    |    |    |    |    |    |  |
| 11          |   |    |    |    |    |    |    | S  | S          | 110 | 110 | A   | 105        | 105 | A   | A          | S   |    |    |    |    |    |    |    |  |
| 12          |   |    |    |    |    |    |    | S  | S          | 110 | 105 | 105 | A          | 105 | A   | A          | S   |    |    |    |    |    |    |    |  |
| 13          |   |    |    |    |    |    |    | S  | S          | A   | 105 | 105 | 110        | 110 | 110 | 115        | S   |    |    |    |    |    |    |    |  |
| 14          |   |    |    |    |    |    |    | S  | S          | C   | A   | 105 | 105        | 105 | 110 | 115        | S   |    |    |    |    |    |    |    |  |
| 15          |   |    |    |    |    |    |    | S  | S          | 110 | 110 | A   | A          | A   | A   | A          | S   |    |    |    |    |    |    |    |  |
| 16          |   |    |    |    |    |    |    | S  | 110        | 110 | 105 | 105 | 105        | 105 | 105 | 110        | S   |    |    |    |    |    |    |    |  |
| 17          |   |    |    |    |    |    |    | S  | S          | 110 | 110 | 105 | 110        | 110 | 110 | 110        | S   |    |    |    |    |    |    |    |  |
| 18          |   |    |    |    |    |    |    | S  | S          | 110 | 110 | 105 | 110        | 110 | 110 | 115        | 115 |    |    |    |    |    |    |    |  |
| 19          |   |    |    |    |    |    |    | S  | S          | 110 | 110 | 105 | 105        | A   | 110 | 110        | S   |    |    |    |    |    |    |    |  |
| 20          |   |    |    |    |    |    |    | S  | 115        | 110 | 110 | 110 | 105        | 105 | 110 | 110        | S   |    |    |    |    |    |    |    |  |
| 21          |   |    |    |    |    |    |    | S  | 110        | A   | A   | 105 | 105        | 105 | 110 | 110        | 110 | S  |    |    |    |    |    |    |  |
| 22          |   |    |    |    |    |    |    | S  | S          | 110 | 110 | 110 | 110        | 110 | 105 | 105        | S   | S  |    |    |    |    |    |    |  |
| 23          |   |    |    |    |    |    |    | S  | S          | 110 | 105 | 110 | 105        | 105 | 105 | 105        | A   | S  |    |    |    |    |    |    |  |
| 24          |   |    |    |    |    |    |    | S  | 115        | 110 | A   | 105 | A          | 105 | 110 | 115        | S   | S  |    |    |    |    |    |    |  |
| 25          |   |    |    |    |    |    |    | S  | 110        | 110 | 105 | 110 | 110        | 110 | 110 | 110        | S   | S  |    |    |    |    |    |    |  |
| 26          |   |    |    |    |    |    |    | S  | 110        | 110 | 110 | 110 | 105        | 105 | 105 | 110        | A   | S  |    |    |    |    |    |    |  |
| 27          |   |    |    |    |    |    |    | S  | A          | 110 | 110 | 110 | E S<br>120 | 110 | 110 | A          | S   | S  |    |    |    |    |    |    |  |
| 28          |   |    |    |    |    |    |    | S  | E S<br>125 | 110 | 110 | 110 | 110        | 105 | A   | A          | S   | S  |    |    |    |    |    |    |  |
| 29          |   |    |    |    |    |    |    | S  | S          | 110 | 110 | 105 | 105        | 105 | 110 | 110        | S   | S  |    |    |    |    |    |    |  |
| 30          |   |    |    |    |    |    |    | S  | E S<br>120 | 110 | 110 | 105 | 110        | 110 | 110 | 110        | S   | S  |    |    |    |    |    |    |  |
| 31          |   |    |    |    |    |    |    | S  | A          | A   | A   | 110 | 110        | 110 | 110 | A          | A   | S  |    |    |    |    |    |    |  |
|             | 00  | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08         | 09  | 10  | 11  | 12         | 13  | 14  | 15         | 16  | 17 | 18 | 19 | 20 | 21 | 22 | 23 |  |
| CNT         |   |    |    |    |    |    |    |    | 13         | 24  | 23  | 24  | 25         | 27  | 23  | 22         | 2   |    |    |    |    |    |    |    |  |
| MED         |   |    |    |    |    |    |    |    | 110        | 110 | 110 | 105 | 110        | 105 | 110 | 110        | 112 |    |    |    |    |    |    |    |  |
| UQ          |   |    |    |    |    |    |    |    | 115        | 110 | 110 | 110 | 110        | 110 | 110 | 115        |     |    |    |    |    |    |    |    |  |
| LQ          |   |    |    |    |    |    |    |    | 110        | 110 | 105 | 105 | 105        | 105 | 110 | 110        |     |    |    |    |    |    |    |    |  |

JAN. 1987

H<sup>o</sup>E (KM)

### IONOSPHERIC DATA

JAN. 1987

H°ES (KM)

135° E Mean Time (G.M.T. + 9h)

| Station     | AKITA |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     | Lat. 39° 43.5' N, | Long. 140° 08.0' E | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------------|--------------------|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Hour<br>Day | 00    | 01  | 02  | 03  | 04  | 05  | 06  | 07  | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23                |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1           | 100   | 100 | 100 | 100 | S   | S   | S   | 155 | 105 | 100 | 105 | 105 | 100 | 100 | 100 | G   | S   | S   | 100 | 100 | S   | S   | 100 | S                 |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2           | S     | S   | S   | S   | S   | S   | S   | S   | G   | 110 | G   | G   | G   | G   | 100 | 100 | 100 | 100 | 100 | S   | S   | 110 | 105 | 105               |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3           | 100   | 100 | 100 | 100 | S   | S   | S   | 120 | 110 | 110 | 110 | G   | G   | G   | 95  | G   | S   | S   | S   | 105 | 100 | S   | S   | 100               |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4           | 100   | 100 | 95  | 95  | 100 | S   | 105 | S   | G   | G   | 100 | 100 | 100 | 100 | 100 | G   | S   | S   | S   | S   | 135 | S   | 110 | 110               |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5           | 100   | S   | S   | S   | S   | S   | S   | S   | G   | 150 | G   | G   | G   | G   | G   | G   | S   | S   | S   | S   | 115 | 110 | S   | S                 | S                  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6           | 100   | S   | 125 | 110 | S   | S   | S   | 120 | 115 | 110 | 110 | 105 | 105 | 100 | 100 | 100 | 105 | 110 | 120 | 120 | 110 | 110 | 105 | 105               |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7           | 105   | 100 | 100 | 100 | 100 | 105 | S   | S   | 120 | 110 | 105 | G   | G   | G   | G   | G   | S   | S   | S   | S   | 110 | 110 | 110 | 105               |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 8           | 105   | 105 | 100 | 100 | S   | S   | S   | S   | 110 | 120 | 110 | 105 | 105 | 100 | 100 | 100 | 100 | 95  | 95  | 95  | 100 | 105 | 105 | 105               |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 9           | 105   | 100 | 100 | 105 | S   | 100 | 100 | S   | 105 | 105 | 105 | 100 | 100 | 150 | 100 | G   | 110 | 110 | 100 | 110 | S   | 120 | 105 | 100               |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 10          | 100   | 100 | 100 | 100 | S   | 100 | S   | S   | 150 | 105 | G   | G   | G   | G   | G   | G   | 100 | S   | 100 | 100 | 100 | S   | S   | S                 |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 11          | S     | S   | S   | 100 | S   | S   | S   | S   | G   | G   | G   | 105 | G   | G   | 100 | 100 | 100 | 100 | S   | S   | S   | S   | S   | 105               |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 12          | 100   | 100 | 100 | S   | S   | S   | S   | S   | G   | 155 | 150 | G   | 105 | 120 | 100 | 100 | 100 | 100 | 100 | 95  | S   | S   | S   | S                 |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 13          | S     | 105 | S   | S   | S   | S   | S   | S   | G   | 105 | G   | G   | 100 | G   | G   | G   | G   | S   | S   | S   | S   | S   | S   | S                 |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 14          | 105   | S   | S   | S   | S   | S   | S   | S   | G   | C   | 105 | 115 | G   | G   | G   | G   | G   | S   | S   | S   | S   | S   | S   | S                 |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 15          | S     | S   | S   | S   | S   | S   | S   | S   | G   | G   | 115 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | S   | 100 | 105 | S   | S   | 100               |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 16          | 100   | 100 | 100 | S   | S   | S   | S   | S   | G   | G   | G   | G   | G   | G   | G   | G   | G   | S   | S   | S   | S   | S   | S   | S                 |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17          | S     | S   | S   | S   | S   | S   | S   | S   | G   | G   | 115 | 110 | G   | G   | G   | G   | S   | S   | S   | S   | S   | S   | S   | S                 |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 18          | S     | S   | S   | S   | 105 | S   | S   | 105 | G   | 150 | 125 | 120 | G   | 120 | 120 | G   | G   | S   | S   | S   | S   | S   | S   | S                 |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 19          | 105   | S   | S   | S   | 100 | S   | S   | S   | G   | 115 | 115 | G   | G   | 100 | 100 | G   | S   | S   | S   | S   | S   | S   | S   | S                 |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 20          | S     | S   | S   | S   | S   | S   | S   | S   | G   | G   | 120 | G   | G   | G   | G   | G   | G   | S   | 105 | S   | S   | S   | S   | S                 |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 21          | S     | S   | 100 | 100 | 100 | S   | S   | S   | G   | 100 | 140 | 130 | 125 | 130 | 120 | 115 | 110 | S   | 100 | 100 | S   | S   | 105 | S                 |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 22          | 105   | 100 | S   | 100 | 105 | S   | S   | S   | G   | G   | 120 | 120 | 110 | 110 | G   | G   | G   | S   | S   | 110 | 105 | 105 | 110 | 110               |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 23          | S     | 105 | 105 | 105 | S   | S   | S   | S   | 130 | 110 | 110 | G   | G   | G   | G   | G   | 105 | 105 | 100 | S   | S   | 110 | 110 | 110               |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 24          | 105   | 105 | 105 | 105 | S   | 115 | S   | S   | G   | 120 | 150 | G   | 100 | G   | G   | 120 | 110 | S   | S   | S   | S   | 105 | S   | S                 |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 25          | 100   | 100 | 100 | 100 | S   | S   | S   | S   | 110 | G   | 105 | 115 | 120 | 120 | 120 | G   | 130 | 100 | 100 | 100 | 100 | S   | 100 | S                 |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 26          | S     | S   | S   | S   | S   | S   | S   | S   | G   | 155 | 150 | 150 | G   | G   | G   | G   | 105 | S   | S   | S   | 100 | S   | S   | S                 |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 27          | S     | 110 | S   | S   | S   | S   | S   | S   | 100 | G   | G   | G   | G   | G   | G   | 110 | 105 | 105 | 100 | 105 | S   | S   | S   | S                 |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 28          | S     | S   | S   | S   | 105 | S   | S   | S   | G   | G   | G   | G   | G   | G   | G   | 105 | 100 | 100 | 100 | S   | S   | S   | S   | S                 |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 29          | S     | S   | S   | S   | S   | S   | S   | S   | G   | G   | G   | G   | G   | 145 | 130 | 120 | 110 | 105 | 100 | 100 | 95  | S   | S   | S                 |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 30          | S     | S   | S   | S   | S   | 105 | S   | S   | G   | G   | 145 | 135 | 110 | 110 | 115 | G   | S   | S   | S   | 105 | S   | S   | 105 | 120               |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 31          | S     | 145 | 135 | 120 | 110 | 105 | 105 | 105 | 105 | 100 | 100 | 100 | 100 | 100 | 100 | 150 | 100 | 135 | 100 | 105 | 100 | 100 | 100 | 100               |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CNT         | 16    | 16  | 15  | 15  | 8   | 6   | 3   | 5   | 11  | 18  | 22  | 16  | 14  | 15  | 19  | 12  | 17  | 13  | 14  | 16  | 13  | 9   | 13  | 13                |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MED         | 100   | 100 | 100 | 100 | 102 | 105 | 105 | 120 | 110 | 110 | 112 | 108 | 105 | 110 | 100 | 100 | 105 | 100 | 100 | 100 | 100 | 110 | 105 | 105               |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| UQ          | 105   | 105 | 102 | 105 | 105 | 105 | 105 | 120 | 118 | 120 | 125 | 120 | 110 | 120 | 118 | 110 | 110 | 105 | 105 | 108 | 110 | 110 | 110 | 110               |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| LQ          | 100   | 100 | 100 | 100 | 100 | 100 | 102 | 105 | 105 | 105 | 105 | 105 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 105 | 105 | 100               |                    |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

JAN. 1987

H°ES (KM)

# IONOSPHERIC DATA

JAN. 1987

TYPES OF ES

135° E Mean Time (G.M.T. + 9h)

Station **AKITA** Lat. 39° 43.5' N, Long. 140° 08.0' E Sweep 1 MHz to 25 MHz in 24sec in automatic operation

| Hour<br>Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08   | 09   | 10   | 11   | 12 | 13   | 14 | 15 | 16   | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|-------------|----|----|----|----|----|----|----|----|------|------|------|------|----|------|----|----|------|----|----|----|----|----|----|----|
| 1           | F1 | F2 | F2 | F1 |    |    |    | H1 | L2   | L2   | L1   | L2   | L2 | L1   | L1 |    |      |    | F2 | F1 |    |    | F2 |    |
| 2           |    |    |    |    |    |    |    |    |      | C2   |      |      |    |      | L1 | L1 | L1   | F2 | F1 |    |    | F2 | F2 | F1 |
| 3           | F2 | F2 | F2 | F3 |    |    |    | C1 | C3   | C2   | C1   |      |    |      | L1 |    |      |    | F4 |    | F2 |    |    | F3 |
| 4           | F2 | F2 | F3 | F2 | F1 |    | F1 |    |      |      | L2   | L2   | L1 | L1   | L1 |    |      |    |    |    | F1 |    | F3 | F1 |
| 5           | F1 |    |    |    |    |    |    |    |      | H2   |      |      |    |      |    |    |      |    | F1 |    | F1 |    |    |    |
| 6           | F2 |    | F1 | F1 |    |    |    | C1 | C1   | C2   | C2   | L2   | L1 | L3   | L1 | L1 | L1   | F1 | F2 | F1 | F2 | F4 | F2 | F3 |
| 7           | F2 | F2 | F2 | F2 | F1 | F1 |    |    | C1   | C3   | L3   |      |    |      |    |    |      |    |    |    | F2 | F1 | F2 | F3 |
| 8           | F2 | F2 | F2 | F1 |    |    |    |    | C1   | CL11 | C2   | L2   | L1 | L2   | L2 | L3 | L3   | F4 | F3 | F4 | F2 | F1 | F1 | F1 |
| 9           | F1 | F3 | F2 | F1 |    | F2 | F2 |    | LH11 | L2   | L2   | L2   | L2 | H2   | L1 |    | C2   | F2 | F1 | F1 |    | F1 | F3 | F2 |
| 10          | F2 | F2 | F1 | F1 |    | F1 |    |    | H2   | L1   |      |      |    |      |    |    | L1   |    | F1 | F1 | F1 |    |    |    |
| 11          |    |    |    | F1 |    |    |    |    |      |      |      | L1   |    |      | L1 | L1 | L2   | F1 |    |    |    |    |    | F2 |
| 12          | F2 | F3 | F1 |    |    |    |    |    |      | H2   | H1   |      | L2 | C1   | L2 | L1 | L1   | F1 | F2 | F2 |    |    |    |    |
| 13          |    | F1 |    |    |    |    |    |    |      | L1   |      |      | L2 |      |    |    |      |    |    |    |    |    |    |    |
| 14          | F2 |    |    |    |    |    |    |    |      |      | L1   | C1   |    |      |    |    |      |    |    |    |    |    |    |    |
| 15          |    |    |    |    |    |    |    |    |      |      | C1   | LH11 | L3 | L3   | L3 | L3 | L1   | F1 |    | F1 | F4 |    |    | F1 |
| 16          | F2 | F1 | F1 |    |    |    |    |    |      |      |      |      |    |      |    |    |      |    |    |    |    |    |    |    |
| 17          |    |    |    |    |    |    |    |    |      |      | C1   | C1   |    |      |    |    |      |    |    | F1 |    |    |    |    |
| 18          |    |    |    |    | F1 |    | L2 |    | H2   | C1   | C1   |      |    | C1   | C2 |    |      |    |    |    |    |    |    |    |
| 19          | F2 |    |    |    | F1 |    |    |    | C1   | C1   |      |      |    | LH11 | L1 |    |      |    |    |    |    |    |    |    |
| 20          |    |    |    |    |    |    |    |    |      |      | C2   |      |    |      |    |    |      |    | F2 |    |    |    |    |    |
| 21          |    |    | F2 | F3 | F2 |    |    |    | L3   | HL22 | C2   | C2   | C2 | C2   | C4 | C1 | C1   |    | F1 | F1 |    |    | F2 |    |
| 22          | F2 | F4 |    | F3 | F1 |    |    |    |      | C1   | C2   | C3   | C1 |      |    |    |      |    |    | F2 | F2 | F4 | F2 | F2 |
| 23          |    | F2 | F2 | F2 |    |    |    |    | C2   | C2   | C1   |      |    |      |    |    | L1   | L1 | F1 |    |    | F1 | F1 | F2 |
| 24          | F2 | F2 | F2 | F2 |    | F2 |    |    |      | C1   | HL11 |      | L1 |      |    | C2 | C2   |    |    |    |    | F1 |    |    |
| 25          | F2 | F1 | F1 | F1 |    |    |    |    | C1   | C1   | C1   | C2   | C1 | C1   | C1 |    | C1   | L3 | F2 | F1 | F1 |    | F1 |    |
| 26          |    |    |    |    |    |    |    |    |      | H2   | H2   | HL11 |    |      |    |    | L2   |    |    |    |    | F1 |    |    |
| 27          |    | F1 |    |    |    |    |    |    |      | L1   |      |      |    |      | C2 | L3 | L2   | L3 | F1 |    |    |    |    |    |
| 28          |    |    |    |    | F1 |    |    |    |      |      |      |      |    |      | L2 | L2 | L1   | L1 |    |    |    |    |    |    |
| 29          |    |    |    |    |    |    |    |    |      |      |      |      |    | H2   | C3 | C3 | C3   | L4 | F3 | F4 | F2 |    |    |    |
| 30          |    |    |    |    |    | F4 |    |    |      | H2   | H1   | C2   | C2 | C1   |    |    |      |    |    | F5 |    |    | F1 | F1 |
| 31          |    | F2 | F1 | F2 | F3 | F7 | F1 | L1 | L1   | L2   | L2   | L2   | L1 | L1   | H1 | L1 | HL21 | L2 | F3 | F4 | F2 | F2 | F2 | F1 |
|             | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08   | 09   | 10   | 11   | 12 | 13   | 14 | 15 | 16   | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT         |    |    |    |    |    |    |    |    |      |      |      |      |    |      |    |    |      |    |    |    |    |    |    |    |
| MED         |    |    |    |    |    |    |    |    |      |      |      |      |    |      |    |    |      |    |    |    |    |    |    |    |
| UQ          |    |    |    |    |    |    |    |    |      |      |      |      |    |      |    |    |      |    |    |    |    |    |    |    |
| LQ          |    |    |    |    |    |    |    |    |      |      |      |      |    |      |    |    |      |    |    |    |    |    |    |    |

JAN. 1987

TYPES OF ES



# IONOSPHERIC DATA

JAN. 1987

FXI (0.1 MHz)

135° E Mean Time (G.M.T. + 9h)

Station: **OKUBUNJI TOKYO** Lat. **35° 42.4' N**, Long. **139° 29.3' E** Sweep **1 MHz to 20 MHz** in **2 sec** in **automatic operation**

| Hour<br>Day | 00      | 01      | 02      | 03      | 04      | 05      | 06      | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18      | 19      | 20      | 21      | 22      | 23      |
|-------------|---------|---------|---------|---------|---------|---------|---------|----|----|----|----|----|----|----|----|----|----|----|---------|---------|---------|---------|---------|---------|
| 1           | X<br>37 | X<br>38 | X<br>40 | X<br>33 | X<br>30 | X<br>31 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>48 | X<br>35 | X<br>32 | X<br>36 | X<br>37 | X<br>37 |
| 2           | X<br>34 | X<br>36 | X<br>37 | X<br>28 | X<br>34 | X<br>29 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>31 | X<br>33 | X<br>37 | X<br>37 | U<br>39 | X<br>40 |
| 3           | X<br>39 | X<br>35 | X<br>32 | X<br>25 | X<br>22 | X<br>24 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>31 | X<br>41 | X<br>33 | X<br>28 | X<br>29 | X<br>30 |
| 4           | A       | X<br>32 | X<br>31 | X<br>30 | X<br>29 | X<br>29 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>28 | X<br>35 | X<br>30 | X<br>33 | X<br>34 | X<br>38 |
| 5           | X<br>35 | X<br>40 | X<br>39 | X<br>33 | X<br>30 | X<br>30 | X<br>35 |    |    |    |    |    |    |    |    |    |    |    | X<br>38 | X<br>36 | X<br>33 | X<br>31 | X<br>34 | X<br>33 |
| 6           | X<br>32 | X<br>33 | X<br>35 | X<br>32 | X<br>31 | X<br>35 |         |    |    |    |    |    |    |    |    |    |    |    | S       | X<br>37 | X<br>39 | X<br>29 | X<br>32 | X<br>33 |
| 7           | X<br>34 | X<br>34 | X<br>37 | X<br>36 | X<br>32 | X<br>31 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>35 | X<br>35 | X<br>31 | X<br>35 | X<br>35 | S       |
| 8           | A       | A       | X<br>40 | X<br>36 | X<br>34 | X<br>36 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>34 | X<br>39 | X<br>41 | X<br>42 | X<br>40 | X<br>41 |
| 9           | X<br>42 | X<br>41 | X<br>41 | X<br>36 | X<br>41 | X<br>32 | X<br>32 |    |    |    |    |    |    |    |    |    |    |    | X<br>42 | X<br>34 | X<br>35 | X<br>33 | X<br>34 | X<br>34 |
| 10          | X<br>36 | X<br>39 | X<br>36 | X<br>36 | X<br>36 | X<br>33 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>35 | X<br>34 | X<br>36 | X<br>35 | X<br>34 | X<br>35 |
| 11          | X<br>35 | X<br>36 | X<br>40 | X<br>31 | X<br>40 | X<br>35 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>39 | X<br>41 | X<br>33 | X<br>35 | X<br>43 | X<br>47 |
| 12          | X<br>50 | X<br>47 | X<br>47 | X<br>46 | X<br>36 | X<br>36 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>39 | X<br>40 | X<br>37 | X<br>37 | X<br>37 | X<br>36 |
| 13          | X<br>36 | X<br>37 | X<br>41 | X<br>40 | X<br>33 | X<br>30 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>37 | X<br>37 | X<br>33 | X<br>34 | X<br>36 | X<br>38 |
| 14          | X<br>36 | X<br>36 | X<br>40 | X<br>30 | X<br>26 | X<br>30 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>31 | X<br>38 | X<br>38 | X<br>37 | X<br>38 | X<br>37 |
| 15          | X<br>33 | X<br>36 | X<br>37 | X<br>38 | X<br>31 | X<br>27 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>36 | X<br>36 | X<br>35 | X<br>33 | X<br>35 | X<br>38 |
| 16          | X<br>36 | X<br>36 | X<br>39 | X<br>44 | X<br>26 | X<br>27 | X<br>28 |    |    |    |    |    |    |    |    |    |    |    | X<br>36 | X<br>41 | X<br>44 | X<br>39 | X<br>40 | X<br>42 |
| 17          | X<br>43 | X<br>46 | X<br>37 | X<br>37 | X<br>39 | X<br>40 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>35 | X<br>32 | X<br>33 | X<br>33 | X<br>37 | S       |
| 18          | X<br>34 | X<br>33 | X<br>37 | X<br>34 | X<br>34 | X<br>34 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>39 | X<br>39 | X<br>41 | X<br>36 | X<br>38 | X<br>37 |
| 19          | X<br>36 | X<br>38 | X<br>41 | X<br>43 | X<br>37 | X<br>40 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>44 | X<br>41 | X<br>38 | X<br>33 | X<br>33 | X<br>32 |
| 20          | X<br>34 | X<br>36 | X<br>39 | X<br>34 | X<br>33 | X<br>33 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>38 | X<br>44 | X<br>40 | X<br>36 | X<br>33 | X<br>34 |
| 21          | X<br>35 | X<br>35 | X<br>34 | X<br>34 | X<br>35 | X<br>35 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>39 | X<br>38 | X<br>30 | X<br>32 | X<br>34 | X<br>34 |
| 22          | X<br>34 | X<br>37 | X<br>34 | X<br>37 | X<br>34 | X<br>35 | X<br>34 |    |    |    |    |    |    |    |    |    |    |    | X<br>38 | X<br>37 | X<br>37 | X<br>37 | X<br>37 | X<br>33 |
| 23          | X<br>33 | X<br>35 | X<br>35 | X<br>34 | X<br>34 | X<br>37 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>58 | X<br>35 | X<br>33 | X<br>32 | X<br>34 | X<br>36 |
| 24          | X<br>38 | X<br>40 | X<br>38 | X<br>32 | X<br>33 | X<br>33 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>49 | X<br>45 | X<br>40 | X<br>39 | X<br>35 | X<br>36 |
| 25          | X<br>35 | X<br>37 | X<br>38 | X<br>34 | X<br>37 | X<br>37 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>39 | X<br>38 | X<br>35 | X<br>34 | X<br>35 | X<br>33 |
| 26          | X<br>33 | X<br>36 | X<br>35 | X<br>33 | X<br>28 | X<br>30 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>33 | X<br>37 | X<br>41 | X<br>40 | X<br>40 | X<br>39 |
| 27          | X<br>39 | X<br>40 | X<br>43 | X<br>32 | X<br>31 | X<br>31 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>30 | X<br>35 | X<br>37 | X<br>34 | X<br>34 | X<br>35 |
| 28          | X<br>34 | X<br>37 | X<br>41 | X<br>28 | X<br>23 | X<br>27 |         |    |    |    |    |    |    |    |    |    |    |    | X<br>40 | X<br>45 | X<br>44 | X<br>40 | X<br>41 | X<br>40 |
| 29          | X<br>39 | X<br>39 | X<br>37 | X<br>38 | X<br>29 | X<br>29 |         |    |    |    |    |    |    |    |    |    |    |    | 0       | X<br>34 | X<br>43 | X<br>33 | X<br>30 | X<br>34 |
| 30          | X<br>37 | X<br>33 | X<br>33 | X<br>35 | X<br>33 | X<br>25 |         |    |    |    |    |    |    |    |    |    |    |    | S       | X<br>41 | X<br>37 | X<br>29 | X<br>31 | X<br>34 |
| 31          | X<br>34 | X<br>32 | X<br>30 | X<br>31 | X<br>35 | X<br>31 |         |    |    |    |    |    |    |    |    |    |    |    | A       | A       | A       | X<br>32 | A       | X<br>37 |
|             | 00      | 01      | 02      | 03      | 04      | 05      | 06      | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18      | 19      | 20      | 21      | 22      | 23      |
| CNT         | 29      | 30      | 31      | 31      | 31      | 31      | 4       |    |    |    |    |    |    |    |    |    |    |    | 28      | 30      | 30      | 31      | 30      | 28      |
| MED         | X<br>35 | X<br>36 | X<br>37 | X<br>34 | X<br>33 | X<br>31 | X<br>33 |    |    |    |    |    |    |    |    |    |    |    | X<br>38 | X<br>38 | X<br>37 | X<br>34 | X<br>35 | X<br>36 |
| UQ          | X<br>37 | X<br>39 | X<br>40 | X<br>36 | X<br>35 | X<br>35 | X<br>34 |    |    |    |    |    |    |    |    |    |    |    | X<br>39 | X<br>41 | X<br>39 | X<br>37 | X<br>38 | X<br>38 |
| LQ          | X<br>34 | X<br>35 | X<br>35 | X<br>32 | X<br>30 | X<br>30 | X<br>30 |    |    |    |    |    |    |    |    |    |    |    | X<br>34 | X<br>35 | X<br>33 | X<br>32 | X<br>34 | X<br>34 |

JAN. 1987

FXI (0.1 MHz)

# IONOSPHERIC DATA

JAN. 1987

FOF2 (0.1 MHz)

135 E Mean Time (G.M.T. + 9h)

| Station |     | OKUBUNJI TOKYO  |                 | Lat. 35 42.4 N  |                 | Long. 139 29.3 E |                 | Sweep 1 MHz to 20 MHz in 2sec in automatic operation |                 |    |                   |                   |                 |                 |                 |                 |    |    |                 |                 |                 |                 |                 |                   |                   |
|---------|-----|-----------------|-----------------|-----------------|-----------------|------------------|-----------------|--|-----------------|----|-------------------|-------------------|-----------------|-----------------|-----------------|-----------------|----|----|-----------------|-----------------|-----------------|-----------------|-----------------|-------------------|-------------------|
| Hour    | Day | 00              | 01              | 02              | 03              | 04               | 05              | 06   | 07              | 08 | 09                | 10                | 11              | 12              | 13              | 14              | 15 | 16 | 17              | 18              | 19              | 20              | 21              | 22                | 23                |
| 1       |     | S <sub>31</sub> | S <sub>32</sub> | S <sub>34</sub> | 27              | 24               | 25              | S <sub>24</sub>                                      | 35              | 48 | 56                | J S <sub>81</sub> | 39              | 60              | 51              | 49              | 48 | 41 | 35              | S <sub>42</sub> | 29              | 25              | 30              | S <sub>31</sub>   | S <sub>31</sub>   |
| 2       |     | 28              | 30              | 31              | 22              | S <sub>28</sub>  | S <sub>23</sub> | 22   | 34              | 50 | 50                | 69                | 85              | 57              | 56              | 55              | 54 | 47 | 38              | 25              | 27              | 31              | 31              | U S <sub>33</sub> | F                 |
| 3       |     | F               | S <sub>29</sub> | S <sub>25</sub> | S <sub>19</sub> | S                | S <sub>18</sub> | S <sub>19</sub>                                      | 35              | 48 | 58                | 78                | 80              | 61              | 55              | 50              | 53 | 43 | 29              | 25              | 35              | 27              | 22              | 23                | 24                |
| 4       |     | A               | 26              | 25              | 24              | 23               | 23              | S <sub>23</sub>                                      | 42              | 43 | S <sub>51</sub>   | 58                | 60              | 62              | 53              | 49              | 49 | 40 | 31              | 22              | 29              | 24              | S <sub>27</sub> | F                 | F                 |
| 5       |     | F               | F               | F               | F <sub>27</sub> | S <sub>24</sub>  | F               | F  | S <sub>40</sub> | 44 | 47                | J R <sub>56</sub> | 60              | 53              | 59              | 54              | 50 | 41 | 34              | 32              | 30              | 27              | F               | F                 | F                 |
| 6       |     | F               | F <sub>24</sub> | S <sub>29</sub> | 26              | F <sub>25</sub>  | F <sub>31</sub> | J S <sub>31</sub>                                    | 35              | 48 | 50                | 56                | 66              | 64              | H <sub>62</sub> | 50              | 57 | 49 | 37              | A               | 31              | 33              | 23              | 26                | S <sub>27</sub>   |
| 7       |     | S <sub>28</sub> | S <sub>28</sub> | S <sub>31</sub> | S <sub>30</sub> | S <sub>26</sub>  | 25              | S <sub>22</sub>                                      | 35              | 45 | 46                | 49                | 53              | 66              | 58              | 50              | 50 | 45 | 35              | 29              | 29              | 25              | S <sub>29</sub> | S <sub>29</sub>   | I S <sub>32</sub> |
| 8       |     | A               | A               | F               | S <sub>30</sub> | 28               | 30              | S <sub>27</sub>                                      | S <sub>41</sub> | 51 | 57                | 64                | 61              | 55              | 59              | 65              | 55 | 46 | 33              | 28              | 33              | S <sub>35</sub> | 36              | S <sub>34</sub>   | S <sub>35</sub>   |
| 9       |     | S <sub>36</sub> | F <sub>35</sub> | S <sub>35</sub> | F               | F                | 26              | F <sub>26</sub>                                      | S <sub>39</sub> | 45 | 45                | 66                | 59              | 53              | 56              | 52              | 50 | 45 | 37              | 36              | 28              | 29              | 27              | 28                | A                 |
| 10      |     | S <sub>30</sub> | F <sub>30</sub> | S <sub>30</sub> | 30              | S <sub>30</sub>  | 27              | 28   | 41              | 46 | 51                | 54                | 66              | 53              | 53              | 54              | 47 | 49 | 39              | 29              | 28              | S <sub>30</sub> | S <sub>29</sub> | S <sub>28</sub>   | 29                |
| 11      |     | 29              | S <sub>30</sub> | S <sub>34</sub> | 25              | F                | 29              | 27   | 37              | 43 | 43                | 55                | 64              | 52              | 50              | 50              | 54 | 47 | 29              | 33              | 35              | 27              | 29              | S <sub>37</sub>   | 41                |
| 12      |     | F               | 41              | 41              | S <sub>40</sub> | S <sub>30</sub>  | F <sub>30</sub> | S <sub>37</sub>                                      | 46              | 44 | 47                | 54                | 69              | 68              | 51              | 54              | 55 | 45 | 34              | 33              | 34              | F <sub>31</sub> | F <sub>29</sub> | F                 | S <sub>30</sub>   |
| 13      |     | S <sub>30</sub> | S <sub>31</sub> | S <sub>35</sub> | F               | S <sub>27</sub>  | 24              | S <sub>25</sub>                                      | 37              | 44 | 44                | 55                | S <sub>74</sub> | 55              | 50              | 49              | 55 | 46 | 29              | 31              | 31              | 27              | 28              | 30                | S <sub>32</sub>   |
| 14      |     | 30              | 30              | 34              | 24              | 20               | 24              | S <sub>25</sub>                                      | S <sub>37</sub> | 45 | 51                | 65                | 68              | 57              | 54              | 51              | 49 | 45 | 35              | 25              | S <sub>32</sub> | 32              | S <sub>31</sub> | F                 | F                 |
| 15      |     | F <sub>27</sub> | F               | S <sub>31</sub> | S <sub>32</sub> | 25               | S <sub>21</sub> | 21   | S <sub>38</sub> | 43 | 48                | 65                | S <sub>79</sub> | 55              | 54              | 49              | 49 | 43 | 38              | 30              | 30              | 29              | S <sub>27</sub> | S <sub>29</sub>   | S <sub>32</sub>   |
| 16      |     | S <sub>30</sub> | S <sub>30</sub> | 33              | S <sub>38</sub> | S <sub>20</sub>  | F <sub>21</sub> | F  | 36              | 46 | 56                | S <sub>63</sub>   | 65              | 56              | 54              | 55              | 58 | 49 | 36              | 30              | 35              | 38              | 33              | S <sub>34</sub>   | S <sub>36</sub>   |
| 17      |     | S <sub>37</sub> | 40              | S <sub>31</sub> | S <sub>31</sub> | S <sub>33</sub>  | S <sub>34</sub> | S <sub>31</sub>                                      | 41              | 49 | 54                | S <sub>79</sub>   | 65              | 59              | 54              |                 |    |    |                 | 35              | 29              | 26              | 27              | 27                | I S <sub>28</sub> |
| 18      |     | S <sub>28</sub> | 27              | S <sub>31</sub> | 28              | S <sub>28</sub>  | S <sub>28</sub> | S <sub>25</sub>                                      | S <sub>39</sub> | 45 | 52                | 64                | 66              | 57              | 60              | 54              | 52 | 45 | 41              | 33              | 33              | 35              | 30              | 32                | 31                |
| 19      |     | 30              | S <sub>32</sub> | S <sub>35</sub> | 37              | S <sub>31</sub>  | S <sub>34</sub> | S <sub>37</sub>                                      | 44              | 48 | S <sub>54</sub>   | 61                | 60              | 57              | 54              | 58              | 55 | 51 | 46              | 38              | S <sub>35</sub> | 32              | 27              | 27                | 26                |
| 20      |     | S <sub>28</sub> | 30              | 33              | 28              | 27               | 27              | 26   | 42              | 55 | 56                | J S <sub>74</sub> | 68              | 59              | 53              | 54              | 60 | 45 | 33              | 32              | 38              | 34              | 30              | 27                | 28                |
| 21      |     | 29              | 29              | 28              | 28              | 29               | 29              | 26   | 40              | 56 | 55                | 58                | 71              | 65              | 57              | 68              | 66 | 59 | 39              | 33              | 32              | 24              | 26              | 28                | 28                |
| 22      |     | 28              | 31              | 28              | S <sub>31</sub> | 28               | F <sub>26</sub> | F  | 45              | 49 | 60                | S <sub>72</sub>   | 69              | 64              | 60              | 50              | 55 | 52 | 39              | 32              | S <sub>31</sub> | 31              | 31              | S <sub>31</sub>   | 27                |
| 23      |     | 27              | S <sub>29</sub> | S <sub>29</sub> | 28              | 28               | S <sub>31</sub> | 28   | 47              | 60 | S <sub>51</sub>   | 69                | 64              | 70              | 57              | 58              | 59 | 55 | 57              | 52              | 29              | 27              | 26              | S <sub>28</sub>   | S <sub>30</sub>   |
| 24      |     | S <sub>32</sub> | S <sub>34</sub> | S <sub>32</sub> | S <sub>26</sub> | 27               | 27              | 25   | S <sub>40</sub> | 49 | 50                | 59                | S <sub>80</sub> | 60              | 52              | 54              | 54 | 50 | 43              | 43              | 39              | S <sub>34</sub> | 33              | 29                | 30                |
| 25      |     | 29              | 31              | 32              | 28              | S <sub>31</sub>  | S <sub>31</sub> | 33   | S <sub>51</sub> | 48 | 55                | 69                | 65              | 58              | 51              | 56              | 59 | 48 | 39              | 33              | 32              | 32              | 28              | 29                | 27                |
| 26      |     | 27              | 30              | 29              | 27              | 22               | 24              | 23   | 41              | 45 | 45                | 55                | 64              | 61              | 57              | 53              | 53 | 47 | 39              | S <sub>27</sub> | 31              | 35              | 34              | S <sub>34</sub>   | S <sub>33</sub>   |
| 27      |     | S <sub>33</sub> | S <sub>34</sub> | 37              | 26              | S <sub>25</sub>  | S <sub>25</sub> | S <sub>22</sub>                                      | S <sub>41</sub> | 54 | 54                | 55                | S <sub>71</sub> | 58              | 54              | 51              | 53 | 52 | 37              | 24              | 29              | 31              | 28              | 28                | 29                |
| 28      |     | 28              | 31              | 35              | 22              | 17               | 21              | 21   | 44              | 49 | 51                | 59                | 81              | 66              | 56              | 50              | 49 | 45 | 35              | 34              | S <sub>39</sub> | 38              | 34              | 35                | 34                |
| 29      |     | 33              | S <sub>33</sub> | 31              | 32              | 23               | 23              | 24   | S <sub>45</sub> | 48 | 45                | S <sub>61</sub>   | S <sub>75</sub> | 67              | 51              | H <sub>51</sub> | 62 | 51 | 38              | 28              | 37              | 27              | 24              | S <sub>28</sub>   | S <sub>28</sub>   |
| 30      |     | F               | S <sub>27</sub> | S <sub>27</sub> | 29              | 27               | 19              | S <sub>23</sub>                                      | S <sub>43</sub> | 55 | 48                | 46                | 62              | 65              | 57              | 55              | 55 | 45 | 38              | A               | 35              | 31              | 23              | S <sub>25</sub>   | F                 |
| 31      |     | F               | 26              | S <sub>24</sub> | 25              | 29               | S <sub>25</sub> | S <sub>27</sub>                                      | S <sub>38</sub> | 46 | J S <sub>49</sub> | 54                | 60              | R <sub>74</sub> | 62              | 55              | 59 | 60 | S <sub>40</sub> | A               | A               | A               | S <sub>26</sub> | A                 | F                 |
|         |     | 00              | 01              | 02              | 03              | 04               | 05              | 06   | 07              | 08 | 09                | 10                | 11              | 12              | 13              | 14              | 15 | 16 | 17              | 18              | 19              | 20              | 21              | 22                | 23                |
| CNT     |     | 23              | 28              | 29              | 29              | 28               | 29              | 28   | 31              | 31 | 31                | 31                | 31              | 31              | 31              | 30              | 30 | 30 | 31              | 28              | 30              | 30              | 31              | 26                | 24                |
| MED     |     | 29              | 30              | S <sub>31</sub> | 28              | 27               | 25              | S <sub>25</sub>                                      | 40              | 48 | 51                | 61                | 66              | 59              | 54              | 54              | 54 | 46 | 37              | 32              | 32              | 31              | 28              | 29                | 30                |
| UQ      |     | S <sub>30</sub> | 32              | 34              | 30              | S <sub>28</sub>  | 29              | 28   | 42              | 49 | 54                | 68                | 72              | 64              | 57              | 55              | 57 | 50 | 39              | 33              | 35              | 33              | 30              | S <sub>32</sub>   | S <sub>32</sub>   |
| LQ      |     | 28              | 29              | S <sub>29</sub> | 26              | 24               | 23              | S <sub>23</sub>                                      | 37              | 45 | 48                | 55                | 63              | 56              | 53              | 50              | 50 | 45 | 34              | 28              | 29              | 27              | 26              | 28                | 28                |

The Radio Research Laboratory, Japan

JAN. 1987

FOF2 (0.1 MHz)

# IONOSPHERIC DATA

JAN. 1987

FOF1 (0.01 MHz)

135 E Mean Time (G.M.T. + 9h)

Station **OKUBUNJI TOKYO** Lat. **35 42.4 N**, Long. **139 29.3 E** Sweep **1 MHz** to **20 MHz** in **2 sec** in **automatic operation**

| Hour<br>Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|-------------|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|
| 1           |    |    |    |    |    |    |    |    | A  | L   | L   | L   | L   | U   | L   | L   |    |    |    |    |    |    |    |    |
| 2           |    |    |    |    |    |    |    |    |    | 390 | 400 | 410 | 400 | 390 | 350 | 300 |    |    |    |    |    |    |    |    |
| 3           |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | 270 |    |    |    |    |    |    |    |    |
| 4           |    |    |    |    |    |    |    |    | L  | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 5           |    |    |    |    |    |    |    |    |    |     | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 6           |    |    |    |    |    |    |    |    |    | A   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 7           |    |    |    |    |    |    |    |    |    |     | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 8           |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | A   |    |    |    |    |    |    |    |    |
| 9           |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 10          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 11          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 12          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 13          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 14          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 15          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 16          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 17          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 18          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 19          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 20          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 21          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 22          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 23          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 24          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 25          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 26          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 27          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 28          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 29          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 30          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
| 31          |    |    |    |    |    |    |    |    |    | L   | L   | L   | L   | L   | L   | L   |    |    |    |    |    |    |    |    |
|             | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT         |    |    |    |    |    |    |    |    | 2  | 7   | 23  | 29  | 28  | 26  | 15  | 5   | 4  |    |    |    |    |    |    |    |
| MED         |    |    |    |    |    |    |    |    | L  | L   | L   | L   | L   | L   | L   | L   | L  |    |    |    |    |    |    |    |
| UQ          |    |    |    |    |    |    |    |    | L  | L   | L   | L   | L   | L   | L   | L   | L  |    |    |    |    |    |    |    |
| LQ          |    |    |    |    |    |    |    |    | L  | L   | L   | L   | L   | L   | L   | L   | L  |    |    |    |    |    |    |    |

JAN. 1987

FOF1 (0.01 MHz)

The Radio Research Laboratory, Japan

# IONOSPHERIC DATA

JAN. 1987

FOE (0.01 MHz)

135 E Mean Time (G.M.T. + 9h)

Station **OKUBUNJI TOKYO** Lat. **35 42.4 N**, Long. **139 29.3 E** Sweep 1 MHz to 20 MHz in 2sec in automatic operation

| Hour<br>Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08      | 09      | 10      | 11      | 12      | 13      | 14      | 15      | 16      | 17 | 18 | 19 | 20 | 21 | 22 | 23 |  |
|-------------|----|----|----|----|----|----|----|----|---------|---------|---------|---------|---------|---------|---------|---------|---------|----|----|----|----|----|----|----|--|
| 1           |    |    |    |    |    |    | S  | S  | 210     | 250     | A       | 285     | 290     | 280     | 265     | A       | A       | S  |    |    |    |    | S  |    |  |
| 2           |    |    |    |    |    |    | S  | S  | A       | A       | U A 270 | U A 275 | 285     | 275     | 255     | 245     | A       | S  |    |    |    |    |    |    |  |
| 3           |    |    |    |    |    |    | S  | S  | A       | A       | A       | 290     | 295     | 285     | 265     | 230     | S       | S  |    |    | S  |    |    |    |  |
| 4           |    |    |    |    |    |    | S  | S  | 220     | 255     | A       | 230     | 290     | 290     | 270     | A       | A       | S  |    |    |    |    |    |    |  |
| 5           |    |    |    |    |    |    | S  | S  | A       | A       | U A 275 | A       | 280     | 290     | 265     | 230     | S       | S  |    |    |    |    |    |    |  |
| 6           |    |    |    |    |    |    | S  | S  | U A 230 | A       | A       | A       | A       | A       | A       | A       | S       | S  |    |    |    |    |    |    |  |
| 7           |    |    |    |    |    |    | S  | S  | A       | A       | A       | A       | A       | A       | 270     | 240     | A       | S  |    |    |    |    |    |    |  |
| 8           |    |    |    |    |    |    | S  | S  | A       | A       | A       | 295     | A       | A       | A       | A       | A       | S  |    |    |    |    |    |    |  |
| 9           |    |    |    |    |    |    | S  | S  | A       | U A 250 | 265     | A       | 280     | A       | 265     | 245     | S       | S  |    |    |    |    |    |    |  |
| 10          |    |    |    |    |    |    | S  | S  | 215     | U A 260 | 270     | 290     | 295     | 280     | 260     | 240     | A       | S  |    |    |    |    |    |    |  |
| 11          |    |    |    |    |    |    | S  | S  | 200     | A       | 270     | 285     | 290     | A       | A       | A       | S       | S  |    |    | S  | S  | S  | S  |  |
| 12          |    |    |    |    |    |    | S  | S  | 210     | U A 260 | A       | 290     | 300     | A       | A       | 245     | 200     | S  |    | S  |    |    |    |    |  |
| 13          |    |    |    |    |    |    | S  | S  | 200     | 250     | 280     | 295     | A       | 290     | 275     | 240     | 160     | S  |    |    |    |    | S  |    |  |
| 14          |    |    |    |    |    |    | S  | S  | 220     | A       | A       | 300     | 300     | 295     | 275     | 245     | 175     | S  |    |    |    |    |    |    |  |
| 15          |    |    |    |    |    |    | S  | S  | 210     | H 260   | 290     | A       | A       | A       | A       | H 240   | H 220   | S  |    |    |    |    | S  |    |  |
| 16          |    |    |    |    |    |    | S  | S  | A       | U A 260 | 280     | 290     | 295     | 285     | 275     | A       | S       | S  |    |    |    |    | S  |    |  |
| 17          |    |    |    |    |    |    | S  | S  | 220     | H 260   | H 280   | 290     | 290     | 280     | C       | C       | C       | S  |    |    |    |    |    |    |  |
| 18          |    |    |    |    |    |    | S  | S  | 220     | 265     | 285     | 300     | 300     | 300     | A       | 260     | A       | B  |    |    |    |    |    |    |  |
| 19          |    |    |    |    |    |    | S  | B  | 210     | U A 270 | U A 290 | U A 300 | 300     | 290     | 270     | 250     | A       | S  |    |    |    |    |    |    |  |
| 20          |    |    |    |    |    |    | S  | S  | 225     | H 265   | 275     | A       | 295     | 300     | 280     | 250     | 200     | S  |    |    |    |    |    |    |  |
| 21          |    |    | S  | S  | S  |    | S  | S  | 205     | 255     | 275     | 295     | 295     | 295     | 275     | U A 250 | U A 200 | S  |    |    |    |    |    |    |  |
| 22          |    |    |    |    |    |    | S  | S  | 220     | H 260   | 280     | 290     | A       | A       | A       | A       | A       | S  |    |    |    |    |    |    |  |
| 23          |    |    |    |    |    |    | S  | S  | 230     | A       | A       | 300     | 300     | 300     | 280     | 260     | A       | S  |    |    |    |    |    |    |  |
| 24          |    |    |    |    |    |    | S  | S  | A       | U A 270 | 290     | 305     | 310     | 305     | A       | A       | A       | S  |    |    |    | S  |    |    |  |
| 25          |    |    |    |    |    |    | S  | S  | 220     | A       | A       | 300     | 300     | 300     | 290     | 260     | 135     | S  |    |    |    |    |    |    |  |
| 26          |    |    |    |    |    |    | S  | S  | 220     | 265     | 285     | 300     | 305     | 300     | 290     | A       | 220     | S  |    |    |    |    |    |    |  |
| 27          |    |    |    |    |    |    | S  | S  | 220     | 260     | A       | A       | 300     | 290     | A       | 250     | 210     | S  |    |    |    |    | S  | S  |  |
| 28          |    |    |    |    |    |    | S  | S  | 215     | H 270   | U A 275 | A       | U A 310 | U A 305 | 270     | 245     | 170     | S  |    |    |    |    |    |    |  |
| 29          |    |    |    |    |    |    | S  | S  | 230     | 260     | 290     | 300     | 300     | 290     | H 275   | H 255   | A       | S  |    |    |    |    |    |    |  |
| 30          |    |    |    |    |    |    | S  | S  | 205     | 255     | 280     | 300     | 295     | A       | U A 285 | A       | A       | S  |    |    |    |    |    |    |  |
| 31          |    |    |    |    |    |    | S  | S  | A       | A       | 280     | 300     | R 300   | 295     | 280     | 250     | A       | S  |    |    |    |    |    |    |  |
|             | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08      | 09      | 10      | 11      | 12      | 13      | 14      | 15      | 16      | 17 | 18 | 19 | 20 | 21 | 22 | 23 |  |
| CNT         |    |    |    |    |    |    |    |    | 22      | 20      | 20      | 23      | 25      | 22      | 21      | 20      | 10      |    |    |    |    |    |    |    |  |
| MED         |    |    |    |    |    |    |    |    | 220     | 260     | 280     | 295     | 295     | 290     | 275     | 245     | 200     |    |    |    |    |    |    |    |  |
| UQ          |    |    |    |    |    |    |    |    | 220     | 265     | 285     | 300     | 300     | 300     | 280     | 250     | 210     |    |    |    |    |    |    |    |  |
| LQ          |    |    |    |    |    |    |    |    | 210     | 255     | 275     | 290     | 290     | 285     | 265     | 240     | 175     |    |    |    |    |    |    |    |  |

JAN. 1987

FOE (0.01 MHz)

# IONOSPHERIC DATA

JAN. 1987

FOES (0.1 MHz)

135 E Mean Time (G.M.T. + 9h)

| Station     |     | RUBUNJI TOKYO Lat. 35 42.4 N, Long. 139 29.3 E |     |     |     |     |     |     | Sweep 1 MHz to 20 MHz in 2 sec in automatic operation |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-------------|-----|--|-----|-----|-----|-----|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Hour<br>Day | 00  | 01   | 02  | 03  | 04  | 05  | 06  | 07  | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  |
| 1           | 20  | 20   | J A | E S | E S | E S | E S | 32  | 32  | J A | J A | G   | J A | J A | 25  | J A | J A | 19  | E S | E S | E S | E S | J A |     |
| 2           | J A | J A  | E B | E S | E S | E S | E S | 25  | 33  | 30  | 31  | 33  | 31  | 21  | G   | J A | J A | J A | 21  | 19  | 23  | E S | 23  |     |
| 3           | J A | J A  | J A | 21  | 19  | 18  | E S | 21  | 25  | J A | J A | J A | G   | G   | G   | G   | 16  | E S | 21  | E S | 17  | J A | E S |     |
| 4           | J A | J A  | J A | J A | E S | E S | 21  | 24  | G   | 27  | 35  | 30  | 32  | J A | G   | J A | J A | J A | 19  | E S | 17  | 21  | 16  | E S |
| 5           | E S | E S  | 19  | 18  | E S | E S | E S | 21  | 32  | 31  | 32  | J A | G   | G   | G   | 19  | E S | 22  | 21  | J A | 23  | J A | E S |     |
| 6           | J A | E S  | E S | E S | E S | E S | E S | J A | J A   | J A | J A | J A | J A | J A | J A | 25  | J A | J A | J A | J A | J A | J A | J A | J A |
| 7           | J A | J A  | J A | J A | J A | J A | E S | 25  | 33  | J A | J A | J A | J A | J A | J A | 20  | J A | J A | J A | J A | J A | J A | J A | J A |
| 8           | J A | J A  | J A | J A | J A | J A | J A | J A | J A   | J A | J A | J A | J A | J A | J A | J A | J A | J A | J A | J A | J A | J A | J A | J A |
| 9           | J A | J A  | J A | J A | J A | J A | J A | J A | J A   | J A | J A | J A | J A | J A | J A | J A | J A | J A | J A | J A | J A | J A | J A | J A |
| 10          | J A | J A  | J A | J A | J A | J A | J A | J A | J A   | J A | J A | J A | J A | J A | J A | J A | J A | J A | J A | J A | J A | J A | J A | J A |
| 11          | E S | E S  | E S | 20  | 19  | 19  | 20  | 20  | G   | 19  | 27  | G   | 32  | G   | J A | J A | J A | E S | 19  | 23  | E S | E S | E S | E S |
| 12          | J A | J A  | J A | J A | E B | 24  | 20  | 18  | G   | 20  | 32  | J A | J A | G   | J A | J A | 27  | 23  | 18  | E S | E S | E S | E S | E S |
| 13          | E S | J A  | J A | J A | E S | E S | E S | G   | G   | 36  | 32  | J A | J A | G   | G   | G   | G   | E S | E S | E S | E S | E S | E S | E S |
| 14          | E S | E S  | E S | E S | E S | E S | E S | G   | J A   | J A | 30  | 25  | G   | G   | G   | 20  | 20  | 19  | 18  | E S | 18  | E S | E S | E S |
| 15          | E S | 20   | E S | 20  | 20  | E S | E S | G   | 29  | 27  | 31  | J A | J A | J A | 25  | G   | J A | E S | E S | E S | E S | J A | E S | E S |
| 16          | E S | E S  | J A | 24  | 21  | E S | E S | 22  | J A   | J A | 35  | G   | G   | G   | 25  | J A | J A | 20  | E S | E S | E S | E S | E S | E S |
| 17          | E S | E S  | E S | E S | E S | E S | E S | G   | 31  | 33  | 30  | 31  | 35  | C   | C   | C   | E S | J A | J A | 19  | E S | E S | E S | E S |
| 18          | E S | E S  | E S | E S | E S | E S | E S | G   | 33  | 33  | 31  | G   | G   | 32  | 26  | 23  | E B | E S | E S | E S | E S | E S | E S | E S |
| 19          | E S | E S  | 22  | 18  | 20  | 20  | E S | E B | G   | 33  | 32  | 32  | 36  | 31  | G   | G   | J A | 20  | 22  | E S | J A | 25  | 18  | E S |
| 20          | 17  | E S  | E S | E S | E S | E S | E S | G   | G   | 29  | 31  | 27  | G   | G   | G   | 25  | G   | E S | E S | E S | E S | E S | E S | E S |
| 21          | E S | E S  | E S | E S | E S | E S | 19  | 20  | G   | 19  | 30  | 39  | 38  | J A | J A | 36  | 27  | 25  | 19  | 17  | E S | E S | E S | E S |
| 22          | E S | 16   | E S | E S | J A | J A | 21  | G   | 28  | 35  | 35  | 34  | 35  | J A | J A | J A | J A | J A | J A | J A | E S | E S | E S | E S |
| 23          | J A | J A  | J A | J A | J A | J A | E S | G   | 32  | J A | J A | J A | G   | J A | J A | J A | J A | J A | J A | J A | E S | 19  | J A | E S |
| 24          | E S | J A  | J A | J A | 21  | 17  | E S | 20  | J A   | J A | J A | G   | G   | G   | G   | 23  | E S | J A | J A | 22  | 22  | 22  | J A | 21  |
| 25          | 23  | 20   | 23  | J A | 21  | 19  | 20  | E S | G   | 34  | 32  | 30  | 30  | 30  | G   | G   | G   | 17  | 18  | J A | J A | J A | J A | J A |
| 26          | E S | E S  | E S | E S | 19  | 20  | E S | E S | G   | G   | 32  | 32  | 33  | G   | G   | 29  | G   | J A | J A | J A | 16  | E S | E S | E S |
| 27          | E S | E S  | E S | E S | E S | 19  | 18  | E S | G   | G   | 30  | 34  | G   | 31  | 29  | 25  | 16  | J A | E S | E S | E S | E S | E S | E S |
| 28          | E S | E S  | 16  | E S | E S | 19  | E S | E S | G   | G   | 33  | J A | 37  | 43  | 30  | G   | G   | E S | E S | E S | E S | E S | E S | E S |
| 29          | 21  | J A  | J A | J A | E S | E S | E S | E S | G   | G   | 34  | 35  | 35  | 39  | 40  | J A | J A | J A | J A | J A | J A | J A | J A | E S |
| 30          | 17  | E S  | 17  | E S | 19  | 18  | 19  | E S | G   | G   | 35  | 36  | 33  | 36  | J A | 33  | 26  | 22  | J A | J A | 20  | J A | E S | J A |
| 31          | 23  | E S  | 22  | J A | J A | J A | J A | 26  | 27  | J A | J A | G   | G   | G   | G   | 32  | 29  | J A | J A | J A | J A | J A | J A | J A |
|             | 00  | 01   | 02  | 03  | 04  | 05  | 06  | 07  | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  |
| CNT         | 31  | 31   | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 30  | 30  | 30  | 31  | 31  | 31  | 31  | 31  | 31  | 31  |
| MED         | 17  | 16   | 21  | 18  | 19  | 18  | E S | E S | G   | 31  | 33  | 32  | 31  | 31  | 29  | 26  | 23  | J A | 20  | 19  | 16  | 18  | 16  | E S |
| UQ          | J A | J A  | J A | J A | 21  | 20  | 20  | 20  | 25  | 33  | 36  | 35  | 34  | J A | 33  | 28  | J A | J A | J A | J A | 21  | 22  | J A | 20  |
| LQ          | E S | E S  | E S | E S | E S | E S | E S | E S | G   | 27  | 30  | 30  | G   | G   | G   | G   | 19  | 16  | E S | E S | E S | E S | E S | E S |

JAN. 1987

FOES (0.1 MHz)

The Radio Research Laboratory, Japan

# IONOSPHERIC DATA

JAN. 1987

FBES (0.1 MHZ)

135 E Mean Time (G.M.T. + 9h)

Station WAKUBUNJI TOKYO Lat. 35 42.4 N. Long. 139 29.3 E Sweep 1 MHz to 20 MHz in 2 sec in automatic operation

| Hour<br>Day | 00   | 01   | 02   | 03   | 04   | 05   | 06   | 07   | 08   | 09   | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   | 21   | 22   | 23   |      |
|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1           | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 | G 32 | G 31 | G 28 | G 26 | G 26 | G 21 | G 16 | G 24 | G 22 | G 20 | E 15 | E 15 | E 15 | E 14 | E 15 | E 15 | E 14 |
| 2           | E 15 | E 14 | E 13 | E 15 | E 15 | E 15 | E 15 | E 14 | G 25 | G 31 | G 30 | G 31 | G 32 | G 31 | G 16 | G 19 | G 22 | G 16 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 3           | E 15 | E 13 | E 16 | E 14 | E 16 | E 14 | E 15 | E 15 | G 24 | G 29 | G 28 | G 25 | G 23 | G 25 | G 24 | G 19 | G 15 | E 14 | E 15 | E 14 | E 15 | E 16 | E 15 | E 15 |      |
| 4           | A 35 | E 15 | E 14 | E 15 | E 14 | E 14 | E 15 | E 15 | G 27 | G 33 | G 30 | G 24 | G 25 | G 22 | G 25 | G 24 | G 24 | E 15 | E 14 | E 15 | E 15 | E 14 | E 15 | E 15 |      |
| 5           | E 15 | E 15 | E 14 | E 14 | E 14 | E 14 | E 15 | E 17 | G 21 | G 30 | G 31 | G 38 | G 23 | G 19 | G 19 | G 19 | G 19 | E 15 | E 14 | E 14 | E 15 | E 14 | E 15 | E 15 |      |
| 6           | E 15 | E 15 | E 14 | E 14 | E 14 | E 14 | E 15 | E 14 | G 23 | G 40 | G 31 | G 34 | G 30 | G 31 | G 28 | G 25 | G 24 | G 22 | A 27 | E 14 | E 14 | E 17 | E 15 | E 14 |      |
| 7           | E 15 | E 20 | E 14 | E 14 | E 21 | E 14 | E 14 | E 15 | G 24 | G 27 | G 28 | G 32 | G 31 | G 31 | G 28 | G 20 | G 16 | G 24 | E 21 | E 15 | E 14 | E 20 | E 14 | E 14 |      |
| 8           | A 41 | A 37 | E 20 | E 21 | E 14 | E 15 | E 16 | E 15 | G 25 | G 37 | G 34 | G 27 | G 31 | G 33 | G 33 | G 40 | G 27 | E 15 | E 20 | E 16 | E 16 | E 15 | E 16 | E 22 |      |
| 9           | E 20 | E 20 | E 19 | E 19 | E 19 | E 15 | E 15 | E 16 | G 23 | G 25 | G 24 | G 34 | G 25 | G 31 | G 28 | G 27 | G 26 | E 15 | E 23 | E 20 | E 15 | E 15 | E 21 | A 48 |      |
| 10          | E 25 | E 14 | E 18 | E 20 | E 16 | E 15 | E 15 | E 15 | G 25 | G 26 | G 25 | G 23 | G 22 | G 18 | G 20 | G 26 | G 22 | G 19 | E 15 | E 16 | E 15 | E 15 | E 15 | E 15 |      |
| 11          | E 14 | E 14 | E 14 | E 14 | E 14 | E 15 | E 15 | E 15 | G 16 | G 27 | G 25 | G 32 | G 24 | G 33 | G 27 | G 26 | E 19 | E 19 | E 17 | E 14 | E 15 | E 14 | E 15 | E 15 |      |
| 12          | E 20 | E 17 | E 16 | E 14 | E 13 | E 15 | E 15 | E 15 | G 20 | G 31 | G 29 | G 26 | G 31 | G 28 | G 23 | G 22 | G 17 | E 15 | E 14 | E 14 | E 15 | E 15 | E 15 | E 15 |      |
| 13          | E 15 | E 14 | E 15 | E 15 | E 14 | E 14 | E 15 | E 15 | G 19 | G 34 | G 32 | G 30 | G 21 | G 19 | G 19 | G 19 | G 14 | E 15 | E 15 | E 15 | E 15 | E 14 | E 15 | E 15 |      |
| 14          | E 15 | E 15 | E 14 | E 14 | E 14 | E 14 | E 15 | E 15 | G 29 | G 30 | G 25 | G 24 | G 21 | G 20 | G 17 | G 20 | E 15 | E 14 | E 14 | E 15 | E 15 | E 15 | E 15 | E 15 |      |
| 15          | E 16 | E 14 | E 14 | E 14 | E 14 | E 14 | E 15 | E 16 | G 29 | G 27 | G 29 | G 31 | G 32 | G 32 | G 25 | G 19 | G 15 | E 15 | E 15 | E 15 | E 14 | E 15 | E 14 | E 15 |      |
| 16          | E 14 | E 14 | E 14 | E 24 | E 14 | E 14 | E 15 | E 16 | G 22 | G 26 | G 26 | G 33 | G 24 | G 23 | G 23 | G 25 | G 24 | G 18 | E 15 | E 14 | E 15 | E 15 | E 15 | E 14 |      |
| 17          | E 14 | E 14 | E 14 | E 14 | E 15 | E 16 | E 15 | E 14 | G 31 | G 33 | G 30 | G 31 | G 33 | C 30 | C 24 | C 22 | C 15 | E 23 | E 17 | E 14 | E 14 | E 15 | E 15 | E 15 |      |
| 18          | E 15 | E 15 | E 14 | E 15 | E 15 | E 15 | E 15 | E 15 | G 33 | G 33 | G 31 | G 30 | G 30 | G 30 | G 24 | G 22 | E 14 | E 15 | E 14 | E 15 | E 15 | E 15 | E 15 | E 15 |      |
| 19          | E 15 | E 15 | E 15 | E 13 | E 15 | E 15 | E 15 | E 15 | G 27 | G 31 | G 32 | G 33 | G 31 | G 31 | G 19 | G 22 | E 15 | E 15 | E 14 | E 24 | E 15 | E 15 | E 15 | E 15 |      |
| 20          | E 15 | E 15 | E 14 | E 15 | E 14 | E 14 | E 14 | E 15 | G 29 | G 31 | G 27 | G 27 | G 27 | G 27 | G 24 | G 24 | G 15 | E 14 | E 15 | E 15 | E 14 | E 15 | E 14 | E 15 |      |
| 21          | E 14 | E 14 | E 14 | E 14 | E 15 | E 14 | E 15 | E 15 | G 16 | G 30 | G 35 | G 38 | G 37 | G 40 | G 35 | G 27 | G 20 | E 14 | E 14 | E 14 | E 15 | E 15 | E 15 | E 16 |      |
| 22          | E 14 | E 14 | E 15 | E 15 | E 15 | E 21 | E 19 | E 15 | G 28 | G 34 | G 34 | G 34 | G 31 | G 29 | G 28 | G 22 | G 21 | E 23 | E 14 | E 15 | E 14 | E 15 | E 15 | E 15 |      |
| 23          | E 15 | E 15 | E 25 | E 19 | E 14 | E 15 | E 15 | E 15 | G 28 | G 31 | G 29 | G 27 | G 27 | G 24 | G 23 | G 25 | G 19 | E 16 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |      |
| 24          | E 16 | E 15 | E 20 | E 15 | E 14 | E 15 | E 15 | E 15 | G 25 | G 27 | G 27 | G 27 | G 21 | G 24 | G 31 | G 28 | G 22 | E 14 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |      |
| 25          | E 15 | E 14 | E 15 | E 15 | E 15 | E 14 | E 16 | E 15 | G 32 | G 30 | G 28 | G 29 | G 29 | G 25 | G 19 | G 19 | G 14 | E 15 | E 15 | E 19 | E 21 | E 15 | E 15 | E 14 |      |
| 26          | E 15 | E 14 | E 15 | E 14 | E 14 | E 15 | E 15 | E 15 | G 25 | G 32 | G 32 | G 32 | G 23 | G 17 | G 27 | G 18 | G 18 | E 15 | E 20 | E 20 | E 15 | E 14 | E 15 | E 15 |      |
| 27          | E 15 | E 15 | E 14 | E 14 | E 15 | E 15 | E 15 | E 15 | G 29 | G 34 | G 31 | G 29 | G 24 | G 15 | G 15 | G 15 | G 15 | E 15 | E 15 | E 14 | E 14 | E 15 | E 15 | E 15 |      |
| 28          | E 15 | E 15 | E 15 | E 14 | E 15 | E 15 | E 14 | E 15 | G 32 | G 30 | G 36 | G 43 | G 30 | G 30 | G 30 | G 19 | G 14 | E 15 | E 15 | E 15 | E 16 | E 15 | E 15 | E 15 |      |
| 29          | E 14 | E 15 | E 13 | E 18 | E 15 | E 15 | E 15 | E 14 | G 34 | G 35 | G 35 | G 35 | G 40 | G 38 | G 35 | G 35 | G 21 | E 26 | E 24 | E 15 | E 15 | E 15 | E 15 | E 15 |      |
| 30          | E 15 | E 15 | E 15 | E 15 | E 14 | E 15 | E 15 | E 15 | G 34 | G 34 | G 33 | G 34 | G 29 | G 26 | G 21 | G 27 | A 33 | A 14 | E 14 | E 14 | E 14 | E 15 | E 15 | E 15 |      |
| 31          | E 15 | E 15 | E 14 | E 22 | E 21 | E 21 | E 19 | E 20 | G 24 | G 24 | G 18 | G 18 | G 18 | G 38 | G 30 | G 28 | G 28 | A 44 | A 76 | A 55 | A 17 | A 55 | A 20 | E 20 |      |
| CNT         | 31   | 31   | 31   | 31   | 31   | 31   | 31   | 31   | 31   | 31   | 31   | 31   | 31   | 31   | 30   | 30   | 30   | 31   | 31   | 31   | 31   | 31   | 31   | 31   | 31   |
| MED         | E 15 | E 15 | E 14 | E 15 | E 15 | E 15 | E 15 | E 15 | G 27 | G 30 | G 31 | G 27 | G 31 | G 28 | G 24 | G 22 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |      |
| UQ          | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 | G 23 | G 30 | G 33 | G 34 | G 32 | G 32 | G 30 | G 27 | G 24 | G 19 | G 22 | E 16 | E 15 | E 15 | E 15 | E 15 |      |
| LQ          | E 15 | E 14 | E 14 | E 14 | E 14 | E 14 | E 15 | E 15 | G 26 | G 28 | G 28 | G 28 | G 23 | G 22 | G 20 | G 17 | G 16 | E 15 | E 15 | E 14 | E 14 | E 14 | E 15 | E 15 |      |

JAN. 1987

FBES (0.1 MHZ)

# IONOSPHERIC DATA

JAN. 1987

FMIN (0.1 MHz)

135 E Mean Time (G.M.T. + 9h)

Station **OKUBUNJI TOKYO** Lat. **35 42.4 N** Long. **139 29.3 E** Sweep **1 MHz** to **20 MHz** in **2 sec** in **automatic operation**

| Hour<br>Day | 00   | 01   | 02   | 03   | 04   | 05   | 06   | 07   | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16   | 17   | 18   | 19   | 20   | 21   | 22   | 23   |      |
|-------------|------|------|------|------|------|------|------|------|----|----|----|----|----|----|----|----|------|------|------|------|------|------|------|------|------|
| 1           | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 | 13 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 13   | E 14 | E 15 | E 15 | E 15 | E 14 | E 15 | E 15 | E 14 |
| 2           | E 15 | E 14 | E 13 | E 15 | E 15 | E 15 | E 15 | E 14 | 14 | 14 | 15 | 16 | 15 | 14 | 13 | 15 | 14   | E 14 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 3           | E 15 | E 13 | E 15 | E 14 | E 16 | E 14 | E 15 | E 15 | 14 | 14 | 14 | 14 | 14 | 15 | 15 | 13 | E 14 | E 14 | E 15 | E 14 | E 15 | E 14 | E 15 | E 15 | E 15 |
| 4           | E 14 | E 15 | E 13 | E 15 | E 14 | E 14 | E 15 | E 15 | 14 | 13 | 14 | 13 | 13 | 14 | 14 | 13 | 15   | E 15 | E 14 | E 15 | E 15 | E 15 | E 14 | E 15 | E 15 |
| 5           | E 15 | E 15 | E 14 | E 14 | E 14 | E 14 | E 15 | E 14 | 13 | 14 | 14 | 15 | 15 | 16 | 15 | 14 | E 15 | E 15 | E 14 | E 14 | E 15 | E 14 | E 15 | E 15 | E 15 |
| 6           | E 15 | E 15 | E 14 | E 14 | E 14 | E 14 | E 15 | E 14 | 13 | 13 | 13 | 14 | 16 | 19 | 15 | 14 | E 15 | E 14 | E 14 | E 14 | E 15 | E 14 | E 15 | E 15 | E 14 |
| 7           | E 15 | E 14 | E 14 | E 14 | E 14 | E 14 | E 14 | E 15 | 15 | 13 | 14 | 14 | 14 | 14 | 14 | 14 | 13   | E 15 | E 15 | E 14 | E 15 | E 14 | E 15 | E 15 | E 14 |
| 8           | E 14 | E 13 | E 14 | E 14 | E 14 | E 15 | E 15 | E 15 | 14 | 14 | 14 | 14 | 15 | 14 | 15 | 14 | 13   | E 15 | E 15 | E 15 | E 16 | E 16 | E 15 | E 15 | E 15 |
| 9           | E 15 | E 15 | E 14 | E 14 | E 14 | E 14 | E 15 | E 15 | 14 | 14 | 15 | 14 | 15 | 15 | 14 | 15 | E 15 | E 15 | E 14 | E 20 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 10          | E 14 | E 14 | E 14 | E 14 | E 15 | E 15 | E 15 | E 15 | 13 | 15 | 14 | 14 | 14 | 15 | 13 | 14 | 13   | E 14 | E 15 | E 16 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 11          | E 14 | E 14 | E 14 | E 14 | E 14 | E 15 | E 15 | E 15 | 13 | 14 | 15 | 14 | 14 | 15 | 14 | 14 | E 19 | E 15 | E 17 | E 14 | E 15 | E 14 | E 15 | E 15 | E 15 |
| 12          | E 15 | E 14 | E 13 | E 14 | E 13 | E 15 | E 15 | E 15 | 13 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14   | E 14 | E 15 | E 14 | E 14 | E 14 | E 15 | E 15 | E 15 |
| 13          | E 15 | E 14 | E 15 | E 15 | E 14 | E 14 | E 15 | E 15 | 14 | 14 | 15 | 14 | 14 | 14 | 14 | 14 | 14   | E 14 | E 15 | E 15 | E 15 | E 15 | E 14 | E 15 | E 15 |
| 14          | E 15 | E 15 | E 14 | E 14 | E 14 | E 14 | E 15 | E 15 | 14 | 15 | 14 | 16 | 15 | 14 | 14 | 14 | E 14 | E 15 | E 14 | E 14 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 15          | E 16 | E 14 | E 14 | E 14 | E 14 | E 14 | E 15 | E 16 | 14 | 14 | 15 | 14 | 15 | 15 | 15 | 14 | 14   | E 15 | E 15 | E 15 | E 14 | E 15 | E 14 | E 15 | E 15 |
| 16          | E 14 | E 14 | E 14 | E 13 | E 14 | E 14 | E 15 | E 16 | 14 | 14 | 14 | 15 | 14 | 15 | 14 | 14 | E 14 | E 14 | E 15 | E 14 | E 15 | E 15 | E 15 | E 15 | E 14 |
| 17          | E 14 | E 14 | E 14 | E 14 | E 15 | E 16 | E 15 | E 14 | 14 | 14 | 14 | 14 | 14 | 15 |    |    |      | E 15 | E 15 | E 14 | E 14 | E 14 | E 15 | E 15 | E 15 |
| 18          | E 15 | E 15 | E 14 | E 15 | E 15 | E 15 | E 15 | E 15 | 14 | 14 | 14 | 16 | 16 | 15 | 15 | 14 | 14   | 14   | E 15 | E 14 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 19          | E 15 | E 15 | E 15 | E 13 | E 15 | E 15 | E 15 | 15   | 14 | 14 | 14 | 15 | 14 | 14 | 13 | 14 | 14   | E 15 | E 15 | E 14 | E 14 | E 15 | E 15 | E 15 | E 15 |
| 20          | E 15 | E 15 | E 14 | E 15 | E 14 | E 14 | E 14 | E 15 | 15 | 14 | 15 | 15 | 14 | 15 | 14 | 15 | 14   | E 15 | E 14 | E 15 | E 14 | E 15 | E 14 | E 15 | E 15 |
| 21          | E 14 | E 14 | E 14 | E 14 | E 15 | E 14 | E 15 | E 15 | 14 | 14 | 14 | 14 | 14 | 14 | 16 | 14 | 14   | E 14 | E 14 | E 14 | E 15 | E 15 | E 15 | E 15 | E 16 |
| 22          | E 14 | E 14 | E 15 | E 15 | E 15 | E 14 | E 14 | E 15 | 15 | 14 | 14 | 14 | 14 | 14 | 15 | 14 | 13   | E 15 | E 14 | E 14 | E 15 | E 14 | E 15 | E 15 | E 15 |
| 23          | E 15 | E 14 | E 14 | E 14 | E 14 | E 15 | E 15 | E 15 | 14 | 15 | 14 | 15 | 14 | 15 | 14 | 14 | 14   | E 15 | E 16 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 24          | E 16 | E 15 | E 14 | E 14 | E 14 | E 15 | E 15 | E 15 | 14 | 16 | 15 | 16 | 14 | 15 | 15 | 14 | 15   | E 14 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 25          | E 15 | E 14 | E 15 | E 15 | E 15 | E 14 | E 16 | E 15 | 14 | 14 | 14 | 14 | 15 | 15 | 15 | 14 | 14   | E 14 | E 15 | E 15 | E 14 | E 15 | E 15 | E 15 | E 14 |
| 26          | E 15 | E 14 | E 15 | E 14 | E 14 | E 15 | E 15 | E 15 | 14 | 15 | 14 | 16 | 16 | 15 | 15 | 14 | 14   | E 15 | E 13 | E 15 | E 15 | E 14 | E 15 | E 15 | E 15 |
| 27          | E 15 | E 15 | E 14 | E 14 | E 15 | E 15 | E 15 | E 15 | 14 | 15 | 15 | 14 | 16 | 17 | 14 | 14 | 14   | E 15 | E 15 | E 14 | E 14 | E 15 | E 15 | E 15 | E 15 |
| 28          | E 15 | E 15 | E 15 | E 14 | E 15 | E 15 | E 14 | E 15 | 14 | 14 | 14 | 15 | 14 | 15 | 14 | 14 | 15   | E 14 | E 15 | E 15 | E 16 | E 15 | E 15 | E 15 | E 15 |
| 29          | E 14 | E 14 | E 13 | E 13 | E 15 | E 15 | E 15 | E 14 | 14 | 14 | 15 | 14 | 14 | 14 | 14 | 14 | 14   | E 14 | E 14 | E 14 | E 15 | E 15 | E 15 | E 15 | E 15 |
| 30          | E 15 | E 15 | E 15 | E 15 | E 14 | E 15 | E 15 | E 15 | 15 | 14 | 14 | 16 | 14 | 15 | 14 | 14 | 14   | E 15 | E 15 | E 14 | E 14 | E 14 | E 15 | E 15 | E 15 |
| 31          | E 15 | E 15 | E 14 | E 14 | E 14 | E 14 | E 14 | E 14 | 14 | 15 | 14 | 15 | 15 | 15 | 23 | 15 | 14   | E 14 | E 15 | E 15 | E 15 | E 14 | E 15 | E 15 | E 16 |
|             | 00   | 01   | 02   | 03   | 04   | 05   | 06   | 07   | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16   | 17   | 18   | 19   | 20   | 21   | 22   | 23   |      |
| CNT         | 31   | 31   | 31   | 31   | 31   | 31   | 31   | 31   | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 30 | 30   | 31   | 31   | 31   | 31   | 31   | 31   | 31   | 31   |
| MED         | E 15 | E 14 | E 14 | E 14 | E 14 | E 15 | E 15 | E 15 | 14 | 14 | 14 | 14 | 14 | 15 | 14 | 14 | 14   | E 15 | E 15 | E 14 | E 15 | E 15 | E 15 | E 15 | E 15 |
| UQ          | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 | 14 | 14 | 15 | 15 | 15 | 15 | 15 | 14 | 14   | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 | E 15 |
| LQ          | E 14 | E 14 | E 14 | E 14 | E 14 | E 14 | E 15 | E 15 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14   | E 14 | E 14 | E 14 | E 14 | E 14 | E 15 | E 15 | E 15 |

JAN. 1987

FMIN (0.1 MHz)

# IONOSPHERIC DATA

JAN. 1987

M(3000)F2 (0.01)

135 E Mean Time (G.M.T. + 9h)

| Station     | KOKUBUNJI TOKYO Lat. 35 42.4 N, Long. 139 29.3 E Sweep 1 MHz to 20 MHz in 20sec in automatic operation |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-------------|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Hour<br>Day | 00   | 01  | 02  | 03  | 04  | 05  | 06  | 07  | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  |
| 1           | S  | S   | S   | S   | S   | S   | S   | S   | S   | S   | J S | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 2           | S  | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 3           | F  | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 4           | A  | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 5           | F  | F   | F   | F   | S   | F   | F   | S   | S   | S   | J R | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 6           | F  | F   | S   | S   | S   | F   | F   | J S | S   | S   | S   | S   | S   | H   | S   | S   | S   | S   | A   | S   | S   | S   | S   | S   |
| 7           | S  | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 8           | A  | A   | F   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 9           | S  | F   | S   | F   | F   | S   | F   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | A   |
| 10          | S  | F   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 11          | S  | S   | S   | S   | F   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 12          | F  | S   | F   | S   | S   | F   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 13          | S  | S   | S   | F   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 14          | S  | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 15          | F  | F   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 16          | S  | S   | S   | S   | S   | S   | F   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 17          | S  | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 18          | S  | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 19          | S  | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 20          | S  | S   | S   | S   | S   | S   | S   | S   | S   | S   | J S | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 21          | S  | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 22          | S  | S   | S   | S   | S   | F   | F   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 23          | S  | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 24          | S  | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 25          | S  | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 26          | S  | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 27          | S  | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 28          | S  | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 29          | S  | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   |
| 30          | F  | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | S   | A   | S   | S   | S   | S   | F   |
| 31          | F  | S   | S   | S   | S   | S   | S   | S   | S   | J S | S   | S   | R   | S   | S   | S   | S   | S   | A   | A   | A   | S   | A   | F   |
| 00          | 01   | 02  | 03  | 04  | 05  | 06  | 07  | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  |     |
| CNT         | 23   | 28  | 29  | 29  | 28  | 29  | 28  | 31  | 31  | 31  | 31  | 31  | 31  | 31  | 30  | 30  | 30  | 31  | 28  | 30  | 30  | 31  | 26  | 24  |
| MED         | 300  | 310 | 320 | 335 | 322 | 315 | 325 | 350 | 360 | 340 | 340 | 350 | 350 | 355 | 350 | 355 | 360 | 345 | 325 | 328 | 332 | 320 | 308 | 305 |
| UQ          | 310  | 318 | 330 | 350 | 335 | 325 | 330 | 355 | 360 | 348 | 348 | 355 | 360 | 360 | 360 | 360 | 370 | 352 | 340 | 345 | 340 | 320 | 320 | 315 |
| LQ          | 290  | 300 | 310 | 315 | 310 | 310 | 312 | 340 | 355 | 328 | 332 | 342 | 340 | 345 | 340 | 345 | 350 | 340 | 320 | 320 | 325 | 310 | 290 | 292 |

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M(3000)F2 (0.01)



# IONOSPHERIC DATA

JAN. 1987

M(3000)F1 (0.01)

135 E Mean Time (G.M.T. + 9h)

Station **OKUBUNJI TOKYO** Lat. 35 42.4 N, Long. 139 29.3 E Sweep 1 MHz to 20 MHz in 2 sec in automatic operation

| Hour<br>Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18 | 19 | 20 | 21 | 22 | 23 |  |
|-------------|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|--|
| 1           |    |    |    |    |    |    |    |    | A   | L   | L   | L   | U   | L   | L   | L   |     |     |    |    |    |    |    |    |  |
| 2           |    |    |    |    |    |    |    |    |     | 355 | 360 | 360 | 380 | 380 | 380 | 430 |     |     |    |    |    |    |    |    |  |
| 3           |    |    |    |    |    |    |    |    |     | L   | 360 | 365 | 360 | L   | L   | 420 |     |     |    |    |    |    |    |    |  |
| 4           |    |    |    |    |    |    |    |    | L   | L   | 350 | 375 | 350 | 375 | 400 | L   |     |     |    |    |    |    |    |    |  |
| 5           |    |    |    |    |    |    |    |    |     |     | 375 | A   | 380 | 360 | L   | L   |     |     |    |    |    |    |    |    |  |
| 6           |    |    |    |    |    |    |    |    |     | A   | 350 | 370 | 390 | 370 | L   | L   |     |     |    |    |    |    |    |    |  |
| 7           |    |    |    |    |    |    |    |    |     |     | 385 | 380 | 355 | 380 | L   |     |     |     |    |    |    |    |    |    |  |
| 8           |    |    |    |    |    |    |    |    |     | L   | L   | 375 | 370 | 360 | 380 | A   |     |     |    |    |    |    |    |    |  |
| 9           |    |    |    |    |    |    |    |    |     | 420 | L   | L   | L   | 370 | 390 | L   |     |     |    |    |    |    |    |    |  |
| 10          |    |    |    |    |    |    |    |    |     |     | L   | 370 | 380 | U   | 370 | L   |     |     |    |    |    |    |    |    |  |
| 11          |    |    |    |    |    |    |    |    |     | L   | 360 | U   | 360 | U   | 380 | 380 | 400 | L   |    |    |    |    |    |    |  |
| 12          |    |    |    |    |    |    |    |    |     |     | 390 | 375 | 385 | 390 | 400 | 400 |     |     |    |    |    |    |    |    |  |
| 13          |    |    |    |    |    |    |    |    |     |     | 370 | 355 | 380 | 375 | U   | 365 | L   |     |    |    |    |    |    |    |  |
| 14          |    |    |    |    |    |    |    |    |     | L   | 360 | 375 | 380 | 375 | U   | 400 | L   |     |    |    |    |    |    |    |  |
| 15          |    |    |    |    |    |    |    |    |     | L   | 360 | 360 | 370 | L   | 375 | L   | L   |     |    |    |    |    |    |    |  |
| 16          |    |    |    |    |    |    |    |    |     | 375 | 370 | 360 | 380 | L   | L   | L   |     |     |    |    |    |    |    |    |  |
| 17          |    |    |    |    |    |    |    |    |     |     | L   | 370 | U   | 380 | 380 | C   | C   |     |    |    |    |    |    |    |  |
| 18          |    |    |    |    |    |    |    |    |     |     | 360 | 365 | 380 | 370 | L   | L   |     |     |    |    |    |    |    |    |  |
| 19          |    |    |    |    |    |    |    |    |     | L   | L   | 365 | U   | 350 | 365 | 355 | 425 | 435 |    |    |    |    |    |    |  |
| 20          |    |    |    |    |    |    |    |    |     | L   | 365 | 360 | 400 | 410 | U   | 355 | L   |     |    |    |    |    |    |    |  |
| 21          |    |    |    |    |    |    |    |    |     |     | L   | A   | L   | A   | L   | L   | L   |     |    |    |    |    |    |    |  |
| 22          |    |    |    |    |    |    |    |    |     |     | 355 | 375 | 360 | 375 | L   | L   |     |     |    |    |    |    |    |    |  |
| 23          |    |    |    |    |    |    |    |    |     |     | L   | 360 | 370 | 355 | 350 | U   | 365 | L   |    |    |    |    |    |    |  |
| 24          |    |    |    |    |    |    |    |    |     |     | 370 | 380 | 380 | 380 | L   | L   |     |     |    |    |    |    |    |    |  |
| 25          |    |    |    |    |    |    |    |    | L   | L   | 370 | 375 | U   | 375 | 380 | L   | L   | 430 |    |    |    |    |    |    |  |
| 26          |    |    |    |    |    |    |    |    | 420 | L   | 360 | 360 | 355 | U   | 370 | 365 | L   |     |    |    |    |    |    |    |  |
| 27          |    |    |    |    |    |    |    |    | L   | 400 | 365 | 360 | 370 | U   | 380 | 385 | L   | L   |    |    |    |    |    |    |  |
| 28          |    |    |    |    |    |    |    |    | 410 | L   | 360 | 360 | 365 | A   | 420 | L   | 430 |     |    |    |    |    |    |    |  |
| 29          |    |    |    |    |    |    |    |    | 420 | L   | 355 | 365 | L   | A   | A   |     |     |     |    |    |    |    |    |    |  |
| 30          |    |    |    |    |    |    |    |    |     | 430 | L   | 360 | 360 | 375 | 360 | 440 | 435 |     |    |    |    |    |    |    |  |
| 31          |    |    |    |    |    |    |    |    |     | L   | 350 | 370 | 385 | 360 | A   | L   |     |     |    |    |    |    |    |    |  |
|             | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18 | 19 | 20 | 21 | 22 | 23 |  |
| CNT         |    |    |    |    |    |    |    |    | 2   | 7   | 23  | 28  | 28  | 26  | 15  | 5   | 4   |     |    |    |    |    |    |    |  |
| MED         |    |    |    |    |    |    |    |    | 415 | 400 | 360 | 368 | 380 | 375 | 380 | 425 | 432 |     |    |    |    |    |    |    |  |
| UQ          |    |    |    |    |    |    |    |    | 420 | 370 | 375 | 380 | 380 | 400 | 430 | 435 |     |     |    |    |    |    |    |    |  |
| LQ          |    |    |    |    |    |    |    |    | 363 | 360 | 360 | 360 | 360 | 370 | 365 | 420 | 430 |     |    |    |    |    |    |    |  |

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M(3000)F1 (0.01)

The Radio Research Laboratory, Japan

# IONOSPHERIC DATA

JAN. 1937

H<sup>o</sup>F<sub>2</sub> (KM)

135° E Mean Time (G.M.T. + 9h)

| Station |    | OKUBUNJI TOKYO |    | Lat. 35 42.4 N. |    | Long. 139 29.3 E |    | Sweep 1 MHz to 20 MHz in 20sec in automatic operation |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |
|---------|----|----------------|----|-----------------|----|------------------|----|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|
|         |    | 00             | 01 | 02              | 03 | 04               | 05 | 06  | 07  | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17 | 18 | 19 | 20 | 21 | 22 |
| 1       |    |                |    |                 |    |                  |    |   | 260 | 305 | 245 | 230 | 250 | 235 | 230 | 225 |     |     |    |    |    |    |    |    |
| 2       |    |                |    |                 |    |                  |    |   |     |     | 255 | 230 | 255 | 235 | 240 | 225 |     |     |    |    |    |    |    |    |
| 3       |    |                |    |                 |    |                  |    |   |     | 275 | 255 | 240 | 240 | 235 | 255 | 230 |     |     |    |    |    |    |    |    |
| 4       |    |                |    |                 |    |                  |    |   | 215 | 240 | 255 | 245 | 230 | 250 | 235 | 230 |     |     |    |    |    |    |    |    |
| 5       |    |                |    |                 |    |                  |    |   |     | 280 | 260 | 260 | 245 | 225 | 225 |     |     |     |    |    |    |    |    |    |
| 6       |    |                |    |                 |    |                  |    |   |     | 240 | 270 | 245 | 250 | 235 | 245 | 235 |     |     |    |    |    |    |    |    |
| 7       |    |                |    |                 |    |                  |    |   |     |     | 295 | 305 | 250 | 255 | 230 |     |     |     |    |    |    |    |    |    |
| 8       |    |                |    |                 |    |                  |    |   |     | 250 | 235 | 240 | 265 | 260 | 240 | 225 |     |     |    |    |    |    |    |    |
| 9       |    |                |    |                 |    |                  |    |   |     | 245 | 235 | 240 | 255 | 250 | 265 | 240 |     |     |    |    |    |    |    |    |
| 10      |    |                |    |                 |    |                  |    |   |     | 245 | 230 | 240 | 240 | 240 |     |     |     |     |    |    |    |    |    |    |
| 11      |    |                |    |                 |    |                  |    |   |     | 230 | 290 | 235 | 240 | 230 | 260 | 240 |     |     |    |    |    |    |    |    |
| 12      |    |                |    |                 |    |                  |    |   |     |     | 265 | 255 | 225 | 240 | 235 | 250 |     |     |    |    |    |    |    |    |
| 13      |    |                |    |                 |    |                  |    |   |     |     | 260 | 240 | 240 | 260 | 255 | 235 |     |     |    |    |    |    |    |    |
| 14      |    |                |    |                 |    |                  |    |   |     | 250 | 260 | 230 | 260 | 245 | 250 | 230 |     |     |    |    |    |    |    |    |
| 15      |    |                |    |                 |    |                  |    |   |     | 325 | 265 | 230 | 235 | 250 | 235 | 220 |     |     |    |    |    |    |    |    |
| 16      |    |                |    |                 |    |                  |    |   |     | 275 | 240 | 240 | 250 | 240 | 250 | 235 |     |     |    |    |    |    |    |    |
| 17      |    |                |    |                 |    |                  |    |   |     |     | 245 | 240 | 250 | 270 | c   | c   |     |     |    |    |    |    |    |    |
| 18      |    |                |    |                 |    |                  |    |   |     |     | 250 | 255 | 255 | 245 | 235 | 225 |     |     |    |    |    |    |    |    |
| 19      |    |                |    |                 |    |                  |    |   |     | 255 | 250 | 260 | 270 | 245 | 255 | 245 | 225 |     |    |    |    |    |    |    |
| 20      |    |                |    |                 |    |                  |    |   |     | 250 | 250 | 245 | 230 | 250 | 265 | 245 |     |     |    |    |    |    |    |    |
| 21      |    |                |    |                 |    |                  |    |   |     |     | 250 | 260 | 245 | 260 | 250 | 255 | 215 |     |    |    |    |    |    |    |
| 22      |    |                |    |                 |    |                  |    |   |     |     | 255 | 235 | 235 | 235 | 250 | 245 |     |     |    |    |    |    |    |    |
| 23      |    |                |    |                 |    |                  |    |   |     | 230 | 265 | 255 | 230 | 280 | 260 | 240 |     |     |    |    |    |    |    |    |
| 24      |    |                |    |                 |    |                  |    |   |     |     | 265 | 245 | 230 | 235 | 240 | 235 |     |     |    |    |    |    |    |    |
| 25      |    |                |    |                 |    |                  |    |   |     | 205 | 230 | 245 | 250 | 255 | 245 | 270 | 235 | 220 |    |    |    |    |    |    |
| 26      |    |                |    |                 |    |                  |    |   |     | 220 |     | 270 | 250 | 260 | 260 | 240 | 240 |     |    |    |    |    |    |    |
| 27      |    |                |    |                 |    |                  |    |   |     | 220 | 235 | 295 | 245 | 240 | 250 | 250 | 240 | 215 |    |    |    |    |    |    |
| 28      |    |                |    |                 |    |                  |    |   |     | 230 | 240 | 270 | 255 | 240 | 230 | 255 | 230 | 230 |    |    |    |    |    |    |
| 29      |    |                |    |                 |    |                  |    |   |     | 240 | 280 | 240 | 255 | 250 | 270 | 235 |     |     |    |    |    |    |    |    |
| 30      |    |                |    |                 |    |                  |    |   |     | 240 |     | 260 | 270 | 245 | 250 | 235 | 205 |     |    |    |    |    |    |    |
| 31      |    |                |    |                 |    |                  |    |   |     | 250 | 265 | 295 | 250 | 260 | 260 | 250 |     |     |    |    |    |    |    |    |
|         | 00 | 01             | 02 | 03              | 04 | 05               | 06 | 07  | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT     |    |                |    |                 |    |                  |    |   | 6   | 19  | 30  | 31  | 31  | 31  | 30  | 28  | 6   |     |    |    |    |    |    |    |
| MED     |    |                |    |                 |    |                  |    |   | 220 | 245 | 258 | 245 | 250 | 245 | 250 | 235 | 218 |     |    |    |    |    |    |    |
| UQ      |    |                |    |                 |    |                  |    |   | 230 | 252 | 270 | 255 | 255 | 252 | 255 | 240 | 225 |     |    |    |    |    |    |    |
| LQ      |    |                |    |                 |    |                  |    |   | 215 | 240 | 250 | 240 | 240 | 238 | 240 | 230 | 215 |     |    |    |    |    |    |    |

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H<sup>o</sup>F<sub>2</sub> (KM)

# IONOSPHERIC DATA

JAN. 1987

H\*F (KM)

135 E Mean Time (G.M.T. + 9h)

Station **OKUBUNJI TOKYO** Lat. **35 42.4 N**, Long. **139 29.3 E** Sweep **1 MHz to 20 MHz** in **2 sec** in **automatic operation**

| Hour<br>Day | 00  | 01  | 02  | 03  | 04  | 05  | 06  | 07  | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  |     |     |     |     |     |     |     |     |     |   |     |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|-----|
| 1           | 295 | 265 | 225 | 220 | 260 | 260 | 270 | 240 | A   | 235 | 235 | 225 | H   | H   | H   | H   | 205 | 235 | 220 | 235 | 280 | 275 | 300 | 250 |     |     |     |     |     |     |     |     |     |   |     |
| 2           | 270 | 255 | 210 | 300 | 240 | 295 | 250 | 235 | 230 | 240 | 225 | 230 | H   | 215 | 215 | 200 | 205 | 220 | 200 | 225 | 265 | 250 | 255 | 245 | 325 |     |     |     |     |     |     |     |     |   |     |
| 3           | 270 | 215 | 255 | 220 | S   | E   | S   | 295 | 240 | 235 | 235 | A   | 220 | 220 | 215 | 205 | 195 | 195 | 205 | 205 | 260 | 230 | 205 | E   | A   | 320 | 320 |     |     |     |     |     |     |   |     |
| 4           | A   | 275 | 260 | 260 | 270 | 270 | 270 | 230 | 195 | 190 | E   | A   | 215 | H   | 210 | 200 | 180 | 210 | 215 | 215 | 250 | 220 | 230 | S   | 260 | 285 | 275 |     |     |     |     |     |     |   |     |
| 5           | 300 | 275 | 255 | 225 | H   | 235 | 305 | 260 | 205 | 215 | 225 | 195 | H   | A   | 195 | 180 | 225 | 215 | H   | 205 | 215 | 220 | 220 | 225 | 275 | 295 | 345 |     |     |     |     |     |     |   |     |
| 6           | 300 | 295 | 240 | 215 | 230 | 255 | 215 | 220 | 235 | A   | 215 | E   | A   | 235 | 200 | 200 | 205 | 180 | H   | 210 | 215 | A   | 265 | 215 | E   | A   | 275 | 320 |     |     |     |     |     |   |     |
| 7           | 335 | E   | A   | 255 | 225 | E   | A   | 270 | 235 | 255 | 215 | 230 | 220 | 205 | 195 | H   | 175 | 205 | 210 | 230 | 215 | 210 | E   | A   | E   | A   | 275 | 275 | E   | A   | 305 | 280 |     |   |     |
| 8           | A   | A   | E   | A   | 220 | 275 | 250 | 250 | 210 | 220 | E   | A   | 245 | 230 | 215 | 200 | 195 | E   | A   | 220 | A   | 215 | 220 | E   | A   | 280 | 275 | 260 | 240 | 235 | 265 |     |     |   |     |
| 9           | 270 | 315 | 295 | 320 | 235 | 215 | 260 | 225 | 215 | 175 | 235 | 235 | H   | 175 | 235 | 205 | 215 | 235 | 230 | 260 | 255 | 220 | 265 | E   | A   | 265 | A   |     |     |     |     |     |     |   |     |
| 10          | E   | A   | 260 | 305 | 270 | 250 | 280 | 240 | 215 | 220 | 220 | 220 | H   | 185 | 195 | H   | 175 | 230 | 225 | 215 | 235 | 230 | 270 | 220 | 275 | 250 |     |     |     |     |     |     |     |   |     |
| 11          | 295 | 255 | 245 | 230 | 245 | 240 | 215 | 205 | 215 | H   | 195 | H   | 230 | 225 | H   | 190 | 190 | 180 | 230 | 210 | H   | 220 | 250 | 215 | 240 | 235 | 250 | 215 |     |     |     |     |     |   |     |
| 12          | 295 | 250 | 250 | 200 | 215 | 225 | 250 | 220 | 210 | 230 | 195 | 175 | H   | 195 | 205 | 185 | 210 | 220 | 230 | 240 | 220 | 240 | 285 | 300 | 275 |     |     |     |     |     |     |     |     |   |     |
| 13          | 280 | 280 | 245 | 225 | 215 | 260 | 260 | 225 | 225 | 190 | E   | A   | 250 | 210 | H   | 205 | 200 | 195 | 190 | H   | 205 | 190 | 250 | 225 | 230 | 270 | 285 | 260 |     |     |     |     |     |   |     |
| 14          | 305 | 280 | 220 | 185 | 255 | 255 | 255 | 225 | 225 | 230 | 225 | 215 | 210 | 195 | H   | 195 | 210 | 220 | 225 | 255 | 265 | 235 | 255 | 280 | 260 |     |     |     |     |     |     |     |     |   |     |
| 15          | 295 | 315 | 265 | 215 | 210 | 230 | E   | S   | 295 | 230 | H   | 205 | 195 | 240 | 180 | H   | 185 | 205 | 230 | 220 | 215 | 220 | 220 | 250 | 215 | 260 | 295 | 265 |     |     |     |     |     |   |     |
| 16          | 300 | 300 | 245 | 210 | 340 | 285 | 265 | 220 | 195 | H   | 220 | 185 | H   | 220 | 195 | 215 | H   | 195 | 230 | 225 | 210 | 265 | 255 | 220 | 260 | 280 | 235 |     |     |     |     |     |     |   |     |
| 17          | 265 | 230 | 215 | 260 | 275 | 255 | 220 | 215 | 220 | H   | 235 | 245 | 180 | 220 | 195 | C   | C   | C   | 210 | E   | A   | 265 | 240 | 225 | 255 | 275 | 290 |     |     |     |     |     |     |   |     |
| 18          | 285 | 295 | 245 | 220 | 245 | 240 | 240 | 220 | 225 | 235 | 230 | 225 | 215 | 215 | 200 | 215 | 220 | 215 | 225 | 235 | 205 | 260 | 250 | 240 |     |     |     |     |     |     |     |     |     |   |     |
| 19          | 295 | 280 | 245 | 215 | 240 | 270 | 235 | 210 | 220 | 225 | 230 | 215 | 225 | 210 | 200 | H   | 195 | 205 | H   | 215 | 225 | 225 | E   | A   | 250 | 250 | 255 | 285 |     |     |     |     |     |   |     |
| 20          | 290 | 275 | 250 | 240 | 255 | 255 | 260 | 235 | 225 | H   | 215 | 195 | 200 | H   | 210 | 185 | H   | 195 | 225 | 215 | 205 | 260 | 225 | 225 | 235 | 260 | 300 |     |     |     |     |     |     |   |     |
| 21          | 300 | 280 | 295 | 295 | 280 | 220 | 235 | 220 | 235 | 230 | 240 | A   | A   | A   | A   | 220 | 220 | 210 | 225 | 210 | 220 | 285 | 255 | 300 |     |     |     |     |     |     |     |     |     |   |     |
| 22          | 305 | 265 | 275 | 230 | 220 | E   | A   | 305 | E   | A   | 225 | 220 | 180 | 240 | 225 | 235 | 210 | 205 | 230 | 230 | 225 | A   | E   | A   | 250 | 250 | 240 | 280 | 240 | 265 |     |     |     |   |     |
| 23          | 290 | 285 | A   | 270 | 275 | 260 | 225 | 220 | 220 | 215 | 220 | 210 | 200 | 185 | 195 | H   | 245 | 230 | 215 | 205 | 210 | 240 | 265 | 360 | 290 |     |     |     |     |     |     |     |     |   |     |
| 24          | 305 | 260 | 245 | 270 | 265 | 255 | 230 | 220 | 220 | 225 | 215 | 200 | 215 | 200 | 210 | 230 | 225 | 220 | 235 | 210 | 250 | 220 | 270 | 260 |     |     |     |     |     |     |     |     |     |   |     |
| 25          | 285 | 270 | 245 | 255 | 265 | 285 | 250 | 210 | 205 | E   | A   | 230 | H   | 190 | 190 | H   | 205 | 205 | H   | 190 | 215 | H   | 205 | 210 | 240 | 255 | 260 | 235 | 270 | 280 |     |     |     |   |     |
| 26          | 265 | 260 | 240 | 205 | 230 | 255 | 280 | 225 | 190 | 220 | 235 | 200 | H   | 215 | 210 | 205 | 205 | 210 | H   | 215 | E   | A   | E   | A   | 240 | 240 | 255 | 290 |     |     |     |     |     |   |     |
| 27          | 305 | 265 | 215 | 220 | 260 | 275 | 300 | 220 | 210 | H   | 190 | H   | 180 | 215 | 200 | 220 | 200 | 225 | H   | 205 | 195 | 245 | 260 | 230 | 265 | 280 | 275 |     |     |     |     |     |     |   |     |
| 28          | 300 | 270 | 215 | 190 | S   | E   | S   | 270 | 225 | 200 | 190 | H   | 225 | 180 | E   | A   | 250 | A   | 190 | 185 | H   | 190 | 230 | 250 | 245 | 220 | 250 | 255 | 245 |     |     |     |     |   |     |
| 29          | 290 | 280 | 260 | 230 | 255 | 270 | 265 | 230 | 215 | H   | 190 | 255 | 250 | E   | A   | 240 | E   | A   | 230 | A   | 205 | 205 | A   | 245 | 195 | 295 | 320 | 295 |     |     |     |     |     |   |     |
| 30          | 260 | 295 | 280 | 245 | 185 | E   | S   | 320 | 255 | 215 | 220 | H   | 195 | H   | 225 | 230 | 215 | 225 | 230 | 180 | H   | 185 | 215 | A   | A   | 235 | 225 | 265 | 310 | 295 |     |     |     |   |     |
| 31          | 310 | 305 | 300 | A   | E   | A   | E   | A   | 255 | 265 | E   | A   | 245 | 220 | 230 | H   | 185 | 220 | 205 | H   | 190 | H   | 260 | A   | 250 | 225 | 210 | A   | A   | A   | E   | A   | 275 | A | 320 |
| CNT         | 29  | 30  | 30  | 30  | 29  | 31  | 31  | 31  | 30  | 30  | 31  | 29  | 30  | 29  | 27  | 28  | 30  | 31  | 27  | 30  | 30  | 31  | 30  | 30  | 31  | 30  | 30  |     |     |     |     |     |     |   |     |
| MED         | 295 | 275 | 246 | 225 | 250 | 258 | 252 | 220 | 220 | 219 | 225 | 215 | 202 | 205 | 198 | 215 | 215 | 215 | 242 | 236 | 230 | 260 | 275 | 278 |     |     |     |     |     |     |     |     |     |   |     |
| UQ          | 300 | 290 | 262 | 260 | 265 | 276 | 265 | 225 | 225 | 230 | 234 | 225 | 215 | 212 | 205 | 230 | 220 | 220 | 254 | 255 | 250 | 272 | 295 | 295 |     |     |     |     |     |     |     |     |     |   |     |
| LQ          | 285 | 260 | 240 | 215 | 232 | 252 | 239 | 215 | 210 | H   | 190 | 215 | 200 | H   | 195 | 195 | 200 | 205 | 210 | 225 | 225 | 220 | 250 | 255 | 260 |     |     |     |     |     |     |     |     |   |     |

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# IONOSPHERIC DATA

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H<sup>°</sup>E (KM)

135 E Mean Time (G.M.T. + 9h)

Station **OKUBUNJI TOKYO** Lat. **35 42.4 N**, Long. **139 29.3 E** Sweep **1 MHz** to **20 MHz** in **20sec** in **automatic operation**

| Hour<br>Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19 | 20 | 21 | 22 | 23 |   |
|-------------|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|---|
| 1           |    |    |    |    |    |    | S  | S  | 120 | 125 | A   | A   | E A | A   | A   | A   | A   | A   | S   |    |    |    | S  |    |   |
| 2           |    |    |    |    |    |    | S  | S  | A   | A   | A   | A   | 120 | 115 | 115 | 120 | A   | A   | S   |    |    |    |    |    |   |
| 3           |    |    |    |    |    |    | S  | S  | 115 | A   | A   | E A | E A | 130 | 120 | E A | A   | S   | S   |    |    | S  |    |    |   |
| 4           |    |    |    |    |    |    | S  | S  | 115 | 115 | 110 | 120 | 120 | 120 | 120 | A   | A   | S   |     |    |    |    |    |    |   |
| 5           |    |    |    |    |    |    | S  | S  | A   | A   | A   | A   | 120 | 115 | 115 | 115 | S   | S   |     |    |    |    |    |    |   |
| 6           |    |    |    |    |    |    | S  | S  | A   | A   | A   | A   | A   | A   | A   | A   | S   | S   |     |    |    |    |    |    |   |
| 7           |    |    |    |    |    |    | S  | S  | A   | A   | A   | A   | A   | A   | 120 | 115 | A   | S   |     |    |    |    |    |    |   |
| 8           |    |    |    |    |    |    | S  | S  | A   | A   | A   | E A | A   | A   | A   | A   | A   | S   |     |    |    |    |    |    |   |
| 9           |    |    |    |    |    |    | S  | S  | A   | A   | E A | A   | E A | A   | E A | E A | S   | S   |     |    |    |    |    |    |   |
| 10          |    |    |    |    |    |    | S  | S  | A   | A   | 120 | 120 | 115 | 110 | 115 | A   | A   | S   |     |    |    |    |    |    |   |
| 11          |    |    |    |    |    |    | S  | S  | E A | E A | E A | E A | E A | A   | A   | A   | S   | S   |     |    |    | S  | S  | S  | S |
| 12          |    |    |    |    |    |    | S  | S  | A   | A   | A   | E A | 130 | 105 | A   | A   | A   | S   |     |    | S  |    |    |    |   |
| 13          |    |    |    |    |    |    | S  | S  | 120 | 110 | E A | 130 | 115 | A   | 115 | 110 | 115 | 115 | S   |    |    |    | S  |    |   |
| 14          |    |    |    |    |    |    | S  | S  | 115 | 110 | A   | 125 | 125 | 110 | 120 | 120 | E S | S   |     |    |    |    |    |    |   |
| 15          |    |    |    |    |    |    | S  | S  | 120 | 115 | E A | 135 | A   | A   | A   | A   | E A | 125 | 125 |    |    |    | S  |    |   |
| 16          |    |    |    |    |    |    | S  | S  | A   | A   | 125 | 110 | 110 | 120 | A   | 120 | A   | S   | S   |    |    |    | S  |    |   |
| 17          |    |    |    |    |    |    | S  | S  | 120 | 110 | 115 | 115 | 115 | 115 | C   | C   | C   | S   |     |    |    |    |    |    |   |
| 18          |    |    |    |    |    |    | S  | S  | 120 | 120 | 110 | 115 | 115 | 115 | A   | E A | A   | B   |     |    |    |    |    |    |   |
| 19          |    |    |    |    |    |    | S  | B  | 120 | A   | A   | A   | E A | E A | 105 | 110 | A   | S   |     |    |    |    |    |    |   |
| 20          |    |    |    |    |    |    | S  | S  | 120 | 110 | 110 | 120 | E A | E A | E A | E A | 120 | S   |     |    |    |    |    |    |   |
| 21          |    |    | S  | S  | S  |    | S  | S  | E A | E A | A   | 115 | 110 | 110 | 105 | 115 | A   | A   | S   |    |    |    |    |    |   |
| 22          |    |    |    |    |    |    | S  | S  | 115 | 110 | 110 | 110 | 110 | A   | A   | A   | A   | S   |     |    |    |    |    |    |   |
| 23          |    |    |    |    |    |    | S  | S  | 120 | 110 | A   | A   | E A | 125 | 110 | 125 | 120 | A   | S   |    |    |    |    |    |   |
| 24          |    |    |    |    |    |    | S  | S  | A   | A   | E A | E A | 110 | 115 | 120 | 115 | 120 | A   | S   |    |    | S  |    |    |   |
| 25          |    |    |    |    |    |    | S  | S  | 115 | 110 | A   | E A | 130 | 130 | A   | E A | 125 | 110 | 115 |    |    |    |    |    |   |
| 26          |    |    |    |    |    |    | S  | S  | 115 | 120 | 120 | 120 | 120 | 115 | 115 | A   | E A | 120 | S   |    |    |    |    |    |   |
| 27          |    |    |    |    |    |    | S  | S  | 115 | 110 | 110 | 110 | 110 | 110 | 110 | E A | E A | S   |     |    |    |    | S  | S  |   |
| 28          |    |    |    |    |    |    | S  | S  | 115 | 110 | A   | A   | A   | A   | E A | 125 | 110 | 115 | S   |    |    |    |    |    |   |
| 29          |    |    |    |    |    |    | S  | S  | 115 | 115 | 115 | 110 | 110 | 105 | 105 | 110 | 120 | S   |     |    |    |    |    |    |   |
| 30          |    |    |    |    |    |    | S  | S  | 115 | 110 | 110 | 110 | 110 | 110 | 110 | A   | A   | S   |     |    |    |    |    |    |   |
| 31          |    |    |    |    |    |    | S  | S  | A   | A   | A   | E A | 120 | 120 | 115 | 115 | E A | 125 | A   | S  |    |    |    |    |   |
|             | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19 | 20 | 21 | 22 | 23 |   |
| CNT         |    |    |    |    |    |    |    |    | 20  | 18  | 18  | 22  | 25  | 21  | 23  | 19  | 11  |     |     |    |    |    |    |    |   |
| MED         |    |    |    |    |    |    |    |    | 116 | 110 | 114 | 115 | 115 | 115 | 115 | 115 | 120 |     |     |    |    |    |    |    |   |
| UQ          |    |    |    |    |    |    |    |    | 120 | 118 | E A | E A | E A | 125 | 115 | 120 | E A | 125 | 120 |    |    |    |    |    |   |
| LQ          |    |    |    |    |    |    |    |    | 115 | 110 | 110 | 110 | 110 | 110 | 115 | 114 | 116 |     |     |    |    |    |    |    |   |

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H<sup>°</sup>ES (KM)

135° E Mean Time (G.M.T. + 9h)

Station **OKUBUNJI TOKYO** Lat. **35° 42.4' N.** Long. **139° 29.3' E** Sweep 1 MHz to 20 MHz in 20sec in automatic operation

| Hour<br>Day | 00  | 01  | 02  | 03  | 04  | 05  | 06  | 07  | 08  | 09  | 10         | 11  | 12         | 13         | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------|-----|------------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1           | 110 | 105 | 100 | 100 | S   | S   | S   | S   | 145 | 145 | 105        | 110 | 110        | 105        | 105 | 100 | 100 | 100 | 100 | S   | S   | S   | S   | 115 |
| 2           | 105 | 105 | B   | S   | S   | S   | S   | S   | 170 | 110 | 175        | 160 | 145        | 140        | 105 | 145 | 100 | 100 | 100 | 100 | 100 | 110 | S   | 110 |
| 3           | 105 | 105 | 100 | 105 | 105 | 155 | S   | 135 | 115 | 110 | 110        | 110 | 110        | 110        | 110 | 110 | 110 | S   | 110 | S   | 105 | 105 | 100 | S   |
| 4           | 100 | 100 | 100 | 95  | S   | S   | 100 | 105 | G   | 130 | 115        | 130 | 100        | 95         | 100 | 110 | 110 | 105 | 100 | S   | 120 | 120 | 125 | S   |
| 5           | S   | S   | 110 | 105 | S   | S   | S   | 105 | 115 | 160 | 160        | 105 | 110        | G          | G   | G   | 140 | S   | 120 | 120 | 120 | 115 | 115 | S   |
| 6           | 115 | S   | S   | S   | S   | S   | S   | S   | 115 | 110 | 110        | 105 | 105        | 105        | 105 | 115 | 105 | 100 | 100 | 125 | 130 | 110 | 115 | 110 |
| 7           | 105 | 105 | 105 | 105 | 105 | 105 | 105 | S   | 170 | 110 | 110        | 105 | 150        | 110        | 165 | G   | 140 | 105 | 100 | 105 | 110 | 115 | 110 | 110 |
| 8           | 110 | 105 | 105 | 105 | 105 | 105 | 100 | 100 | 115 | 110 | 110        | 105 | 105        | 100        | 100 | 100 | 100 | 100 | 100 | 105 | S   | 100 | 100 | 110 |
| 9           | 105 | 100 | 100 | 105 | 110 | 105 | 105 | 100 | 110 | 110 | 105        | 105 | 105        | 105        | 130 | 120 | 110 | 100 | 100 | 100 | 100 | S   | 110 | 110 |
| 10          | 105 | 100 | 100 | 100 | 100 | 100 | S   | 100 | 145 | 110 | 110        | 105 | 105        | 105        | 100 | 150 | 100 | 100 | S   | S   | 105 | S   | S   | S   |
| 11          | S   | S   | S   | 105 | 105 | 100 | 100 | 100 | 115 | 150 | 105        | 160 | 105        | 100        | 100 | 95  | S   | 100 | S   | S   | S   | S   | S   | S   |
| 12          | 105 | 105 | 100 | 100 | B   | 100 | 100 | 100 | 115 | 175 | 110        | 105 | G          | G          | 105 | 100 | 155 | 130 | 120 | S   | S   | S   | S   | S   |
| 13          | S   | 105 | 105 | 100 | 100 | S   | S   | S   | G   | G   | 145        | 135 | 100        | 100        | G   | G   | G   | S   | S   | S   | S   | S   | S   | S   |
| 14          | S   | S   | S   | S   | S   | S   | S   | S   | G   | 110 | 105        | 105 | 110        | 105        | 105 | 105 | 150 | 105 | 105 | 115 | S   | 100 | S   | S   |
| 15          | S   | 110 | S   | 105 | 105 | S   | S   | S   | G   | 145 | 110        | 110 | 110        | 105        | 105 | 145 | G   | 100 | S   | S   | S   | S   | 120 | S   |
| 16          | S   | S   | 100 | 100 | 100 | S   | S   | S   | 115 | 110 | 110        | 140 | G          | 110        | 105 | 105 | 100 | 100 | 105 | S   | S   | S   | S   | S   |
| 17          | S   | S   | S   | S   | S   | S   | S   | S   | G   | 160 | 140        | 130 | 125        | 115        | C   | C   | C   | S   | 105 | 105 | 105 | S   | S   | S   |
| 18          | S   | S   | S   | S   | S   | S   | S   | S   | G   | 145 | 150        | 165 | G          | G          | 115 | 115 | 120 | B   | S   | S   | S   | S   | S   | S   |
| 19          | S   | S   | 105 | 100 | 100 | 100 | S   | B   | G   | 115 | E G<br>175 | 165 | E G<br>175 | 160        | G   | G   | 100 | 95  | 100 | S   | 115 | 130 | 120 | S   |
| 20          | 115 | S   | S   | S   | S   | S   | S   | S   | G   | G   | 125        | 115 | 110        | 115        | 120 | 115 | G   | S   | S   | 105 | S   | 105 | 105 | 105 |
| 21          | S   | S   | S   | S   | S   | S   | 115 | 110 | 105 | 165 | 130        | 130 | 120        | 120        | 115 | 150 | 105 | 100 | 100 | S   | S   | S   | S   | S   |
| 22          | S   | 130 | S   | S   | 100 | 100 | 100 | 105 | G   | 145 | 120        | 110 | 110        | 105        | 110 | 105 | 110 | 110 | 110 | 120 | S   | S   | S   | S   |
| 23          | 115 | 105 | 105 | 105 | 105 | 110 | 110 | S   | G   | 110 | 110        | 110 | 105        | G          | 105 | 105 | 100 | 100 | 100 | 100 | S   | 100 | 115 | S   |
| 24          | S   | 110 | 105 | 105 | 105 | 105 | S   | 100 | 115 | 110 | 110        | 110 | 105        | 105        | 120 | 115 | 120 | S   | 110 | 110 | 110 | 105 | 105 | 100 |
| 25          | 100 | 100 | 100 | 100 | 100 | 100 | 100 | S   | G   | 110 | 110        | 110 | 110        | 110        | 110 | G   | G   | 105 | 105 | 125 | 120 | 115 | 120 | 100 |
| 26          | S   | S   | S   | S   | 110 | 105 | S   | S   | G   | 110 | 150        | 150 | 140        | 105        | 105 | 105 | 100 | 100 | 100 | 95  | 100 | S   | S   | S   |
| 27          | S   | S   | S   | S   | S   | 105 | 105 | S   | G   | G   | 125        | 155 | G          | E G<br>175 | 120 | 110 | 105 | 105 | S   | 100 | S   | S   | S   | S   |
| 28          | S   | S   | 130 | S   | S   | 150 | S   | S   | G   | G   | 130        | 110 | 140        | 130        | 130 | G   | G   | S   | S   | S   | S   | S   | 115 | 110 |
| 29          | 110 | 110 | 110 | 105 | S   | S   | S   | S   | G   | G   | E G<br>170 | 160 | 150        | 130        | 125 | 120 | 115 | 110 | 105 | 100 | 120 | 130 | 115 | S   |
| 30          | 145 | S   | 135 | S   | 115 | 115 | 115 | S   | G   | G   | 165        | 140 | 120        | 150        | 120 | 110 | 110 | 105 | 105 | 105 | 105 | S   | 115 | 110 |
| 31          | 105 | S   | 120 | 120 | 110 | 110 | 105 | 105 | 105 | 105 | 100        | 100 | 100        | 105        | 145 | 155 | 130 | 115 | 105 | 105 | 100 | 100 | 100 | 110 |
| CNT         | 16  | 16  | 19  | 19  | 17  | 17  | 13  | 12  | 15  | 25  | 31         | 31  | 27         | 28         | 27  | 24  | 24  | 23  | 22  | 18  | 16  | 16  | 16  | 12  |
| MED         | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 102 | 115 | 110 | 110        | 110 | 110        | 105        | 110 | 112 | 110 | 100 | 102 | 105 | 108 | 110 | 115 | 110 |
| UQ          | 112 | 108 | 108 | 105 | 105 | 110 | 105 | 105 | 130 | 145 | 136        | 140 | 121        | 116        | 120 | 132 | 120 | 105 | 105 | 115 | 120 | 118 | 115 | 110 |
| LQ          | 105 | 102 | 100 | 100 | 100 | 100 | 100 | 100 | 115 | 110 | 110        | 105 | 105        | 105        | 105 | 105 | 100 | 100 | 100 | 100 | 102 | 102 | 105 | 108 |

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# IONOSPHERIC DATA

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TYPES OF ES

135° E Mean Time (G.M.T. + 9h)

| Station     | OKUBUNJI TOKYO |    | Lat. | 35 42.4 N. |      | Long. | 139 29.3 E |      | Sweep 1 MHz to 20 MHz in 2sec in automatic operation |      |       |      |      |      |      |      |       |      |      |      |      |      |      |      |
|-------------|----------------|----|------|------------|------|-------|------------|------|--|------|-------|------|------|------|------|------|-------|------|------|------|------|------|------|------|
| Hour<br>Day | 00             | 01 | 02   | 03         | 04   | 05    | 06         | 07   | 08   | 09   | 10    | 11   | 12   | 13   | 14   | 15   | 16    | 17   | 18   | 19   | 20   | 21   | 22   | 23   |
| 1           | F2             | F1 | F1   | F1         |      |       |            |      | H4   | HL32 | LH21  | L2   | L2   | L2   | L1   | L3   | L3    | L4   | F2   |      |      |      | K1   | F1   |
| 2           | F2             | F2 |      |            |      |       |            |      | HL12   | L3   | HL11  | HL12 | HL21 | HL21 | L1   | HL11 | L3    | L1   | F1   | F2   | F2   | F2   |      | F1   |
| 3           | F2             | F1 | F2   | F1         | F3   | F1    |            | HL11 | C3   | L3   | L2    | L2   | L2   | L2   | L3   | L2   | L1    | L1   | F2   |      | LK11 | F3   | F2   |      |
| 4           | F4             | F2 | F2   | F2         |      |       | L1         | LH11 |  | C3   | C3    | HL12 | L1   | L2   | L2   | LL21 | LL22  | L1   | F1   |      | F1   | F1   | F1   | F1   |
| 5           |                |    | F1   | F1         |      |       |            | L2   | LH22   | HL22 | HL22  | L3   | L1   |      |      |      | H1    |      | F1   | F1   | F1   | F1   | F1   | F1   |
| 6           | F1             |    |      |            |      |       |            |      | LH22   | L3   | L3    | L2   | L2   | L2   | L1   | LL12 | L3    | L2   | F3   | F1   | FF11 | F3   | F1   | F2   |
| 7           | F2             | F2 | F4   | F2         | F4   | F1    | L2         |      | HL12   | L2   | L2    | L3   | HL12 | L1   | HL11 |      | HL12  | L1   | F3   | F2   | F4   | F2   | F2   | F2   |
| 8           | FF3            | F3 | F2   | F1         | F1   | F2    | L2         | L1   | L5   | L2   | L2    | L2   | L2   | L2   | L3   | L4   | L3    | L2   | F1   | F1   |      | F2   | F1   | FF11 |
| 9           | F2             | F2 | F2   | F2         | FF22 | F1    | L1         | L2   | L2   | L2   | LH21  | L2   | L2   | L2   | HL11 | CL11 | C2    | LL11 | F2   | F1   | F1   |      | F3   | F5   |
| 10          | F3             | F2 | F2   | F2         | F1   | F1    |            | L1   | HL32   | LH21 | L2    | L1   | L1   | L1   | L1   | HL11 | L2    | L1   |      |      | F1   |      |      |      |
| 11          |                |    |      | F1         | F1   | F1    | L2         | L1   | L1   | HL11 | L1    | HL11 | L2   | L2   | L2   | L2   |       | L1   |      |      | K1   | K1   | K1   | K1   |
| 12          | F2             | F2 | F2   | F1         |      | F2    | L2         | L1   | L2   | HL12 | L2    | L2   |      | L3   | L3   | HL11 | HL21  | C1   |      | K1   |      |      |      |      |
| 13          |                | F2 | F2   | F3         | F2   |       |            |      |  | C3   | L2    | L1   | L1   | L1   | L1   | L2   | HL11  | L1   | F1   | F1   |      | F1   |      |      |
| 14          |                |    |      |            |      |       |            |      |  | H2   | L2    | L2   | L2   | L2   | L3   | HL12 |       | L1   |      |      |      | LK11 |      |      |
| 15          |                | F2 |      | F1         | F1   |       |            |      |  | H2   | L2    | L2   | L2   | L2   | L2   | L3   | L3    | L3   | F1   |      |      | K1   |      |      |
| 16          |                |    | F2   | F2         | F2   |       |            |      | L2   | LH21 | L2    | H1   |      | L2   | L2   | L3   | L3    | L3   | F1   |      |      | K1   |      |      |
| 17          |                |    |      |            |      |       |            |      |  | H2   | HHL22 | HL12 | CL12 | C2   |      |      |       |      | F4   | F2   | F2   |      |      |      |
| 18          |                |    |      |            |      |       |            |      |  | H2   | H2    | H1   |      |      | L2   | L2   | L2    |      |      |      |      |      |      |      |
| 19          |                |    | F2   | F3         | F3   | F2    |            |      | L2   | HL12 | HL11  | HL12 | HL13 |      |      |      | L2    | L2   | F1   |      | F2   | F1   | F1   |      |
| 20          | F1             |    |      |            |      |       |            |      |  | C2   | CL22  | LL11 | LL21 | LL22 | L2   |      |       |      |      | F4   |      | F1   | F1   | F2   |
| 21          |                |    | K1   | K1         | K1   |       | L1         | L1   | L2   | HL23 | HL32  | H2   | C2   | C2   | C2   | HL12 | LHL11 | LL21 | F1   |      |      |      |      |      |
| 22          |                | F1 |      |            | F3   | F3    | L3         | L1   |  | H1   | C2    | C2   | C2   | L2   | L2   | L2   | L2    | LL31 | F4   | F1   |      |      |      |      |
| 23          | F1             | F2 | F3   | F2         | F2   | F3    | L1         |      |  | C3   | L2    | L1   | L1   |      | L2   | L3   | L3    | L3   | F2   | F1   |      | F1   | F1   |      |
| 24          |                | F1 | F3   | F2         | F2   | F1    |            | L1   | L2   | L2   | L2    | L2   | L1   | L1   | CL11 | CL11 | CL11  |      | F1   | F1   | LK11 | F1   | F3   | F2   |
| 25          | F2             | F2 | F2   | F1         | F2   | F2    | L1         |      |  | C3   | L2    | L2   | L2   | L2   | L2   |      |       | L1   | F2   | FF22 | FF32 | FF22 | FF11 | F1   |
| 26          |                |    |      | F1         | F2   |       |            |      | L2   | HL12 | HL11  | HL11 | L1   | L1   | L4   | L3   | L2    | F4   | F2   | F1   |      |      |      |      |
| 27          |                |    |      |            | F2   | L1    |            |      |  | C1   | HC11  |      | HC11 | C1   | L2   | L1   | L1    |      | F1   |      |      | K1   | K1   |      |
| 28          |                |    | F1   |            | F1   |       |            |      |  | HL22 | L2    | HL22 | HL23 | CL22 |      |      |       | F1   | F1   |      |      | F1   | F3   |      |
| 29          | F4             | F3 | F3   | F6         |      |       |            |      |  | H2   | H1    | H1   | H2   | H3   | C3   | C4   | C6    | F5   | F3   | F1   | FF11 | F2   |      |      |
| 30          | F1             |    | F2   |            | F2   | F2    | LH21       |      |  | H2   | H2    | C2   | HC12 | C2   | L2   | L3   | L3    | F5   | F2   | FF32 |      | F1   | F1   |      |
| 31          | F2             |    | F2   | F5         | F3   | F4    | L6         | L3   | L2   | L2   | L2    | L2   | L1   | L1   | H2   | HL12 | HL13  | CL53 | FF43 | F3   | F3   | F2   | F3   | F1   |
|             | 00             | 01 | 02   | 03         | 04   | 05    | 06         | 07   | 08   | 09   | 10    | 11   | 12   | 13   | 14   | 15   | 16    | 17   | 18   | 19   | 20   | 21   | 22   | 23   |
| CNT         |                |    |      |            |      |       |            |      |  |      |       |      |      |      |      |      |       |      |      |      |      |      |      |      |
| MED         |                |    |      |            |      |       |            |      |  |      |       |      |      |      |      |      |       |      |      |      |      |      |      |      |
| UQ          |                |    |      |            |      |       |            |      |  |      |       |      |      |      |      |      |       |      |      |      |      |      |      |      |
| LQ          |                |    |      |            |      |       |            |      |  |      |       |      |      |      |      |      |       |      |      |      |      |      |      |      |

The Radio Research Laboratory, Japan

JAN. 1987

TYPES OF ES

# IONOSPHERIC DATA

JAN. 1987

FXI (0.1 MHz)

135 E Mean Time (G.M.T. + 9h)

| Station     | YAMAGAWA |    |    |    |    |    |    | Lat. 31 12.1 N. | Long. 130 37.1 E | Sweep 1 MHz to 25 MHz in 2 sec in automatic operation |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-------------|----------|----|----|----|----|----|----|-----------------|------------------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Hour<br>Day | 00       | 01 | 02 | 03 | 04 | 05 | 06 | 07              | 08               | 09  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 1           | X        | X  | X  | X  | X  | 32 | 31 | X               |                  |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| 2           | X        | X  | X  | X  | X  | 30 | 25 | 34              | X                |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| 3           | X        | S  | 40 | 39 | 29 | S  | 29 | 29              | X                |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| 4           | X        | X  | X  | X  | X  | 30 | 28 | 35              | X                |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| 5           | X        | 34 | 35 | 33 | 31 | 26 | 27 | 31              | X                |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| 6           | A        | 35 | 40 | 42 | 35 | 33 | 31 | X               | X                |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| 7           | 38       | 40 | 39 | 39 | 33 | 32 | 29 | A               |                  |   |    |    |    |    |    |    |    |    | X  | A  | A  | X  | X  | X  |
| 8           | 42       | A  | 37 | 36 | 33 | 34 | 31 | 37              |                  |   |    |    |    |    |    |    |    |    | A  | A  | X  | X  | X  | X  |
| 9           | 41       | 40 | 40 | 41 | 43 | A  | 30 | 33              |                  |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| 10          | 32       | 33 | 32 | 35 | 29 | 28 | 28 | 40              |                  |   |    |    |    |    |    |    |    |    | X  | X  | 35 | 40 | 35 | 36 |
| 11          | 32       | 32 | 29 | 39 | 34 | 30 | 28 | 35              |                  |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| 12          | X        | X  | X  | X  | X  | X  | 45 | 46              |                  |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | 36 | 35 |
| 13          | 39       | 37 | 40 | X  | X  | A  | X  | X               |                  |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| 14          | X        | X  | X  | X  | X  | X  | X  | X               |                  |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| 15          | 37       | 38 | 37 | 37 | 30 | 25 | 28 | 27              |                  |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| 16          | X        | X  | X  | X  | X  | X  | X  | X               |                  |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| 17          | X        | X  | X  | X  | X  | X  | X  | X               |                  |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| 18          | X        | 35 | 37 | 37 | 41 | 40 | 35 | 33              |                  |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| 19          | X        | X  | 39 | 36 | 33 | 34 | 36 | 39              |                  |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | 40 | 40 |
| 20          | 44       | 38 | 37 | 39 | 35 | 29 | 30 | 34              |                  |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| 21          | X        | X  | X  | X  | 41 | X  | X  | X               |                  |   |    |    |    |    |    |    |    |    | X  | X  | A  | A  | X  | S  |
| 22          | A        | X  | X  | X  | X  | X  | X  | X               |                  |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| 23          | X        | X  | X  | X  | X  | X  | X  | X               |                  |   |    |    |    |    |    |    |    |    | X  | X  | U  | X  | X  | X  |
| 24          | X        | X  | X  | X  | X  | X  | X  | X               |                  |   |    |    |    |    |    |    |    |    | X  | X  | 0  | X  | X  | X  |
| 25          | X        | X  | 36 | 35 | 34 | 28 | 35 | 40              |                  |   |    |    |    |    |    |    |    |    | X  | X  | 47 | 36 | 37 | 38 |
| 26          | X        | X  | X  | X  | X  | X  | X  | X               |                  |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| 27          | X        | U  | X  | X  | X  | X  | X  | X               |                  |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| 28          | X        | X  | X  | X  | A  | X  | X  | X               |                  |   |    |    |    |    |    |    |    |    | X  | X  | U  | X  | X  | X  |
| 29          | U        | X  | X  | X  | X  | X  | X  | X               |                  |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| 30          | X        | X  | 36 | 41 | 34 | 23 | 23 | 34              |                  |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| 31          | 0        | X  | X  | X  | U  | X  | X  | A               |                  |   |    |    |    |    |    |    |    |    | A  | A  | X  | X  | X  | A  |
|             | 00       | 01 | 02 | 03 | 04 | 05 | 06 | 07              | 08               | 09  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT         | 29       | 29 | 31 | 31 | 30 | 28 | 30 | 30              |                  |   |    |    |    |    | 1  |    |    |    | 29 | 28 | 29 | 30 | 31 | 29 |
| MED         | X        | X  | X  | X  | X  | X  | X  | X               |                  |   |    |    |    |    | 76 |    |    |    | X  | X  | X  | X  | X  | X  |
| UQ          | X        | X  | 40 | 39 | 38 | 34 | 32 | 36              |                  |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |
| LQ          | X        | X  | 34 | 34 | X  | X  | X  | X               |                  |   |    |    |    |    |    |    |    |    | X  | X  | X  | X  | X  | X  |

JAN. 1987

FXI (0.1 MHz)

# IONOSPHERIC DATA

JAN. 1987      FOF2 (0.1 MHZ)

135 E Mean Time (G.M.T. + 9h)

| Station |     | YAMAGAWA |        |        |        |          |        |        | Lat. 31 12 1 N |    | Long. 130 37 1 E |    | Sweep 1 MHz to 25 MHz in 2 sec in automatic operation |         |         |        |        |        |        |      |      |        |      |      |        |
|---------|-----|----------|--------|--------|--------|----------|--------|--------|----------------|----|------------------|----|---|---------|---------|--------|--------|--------|--------|------|------|--------|------|------|--------|
| Hour    | Day | 00       | 01     | 02     | 03     | 04       | 05     | 06     | 07             | 08 | 09               | 10 | 11  | 12      | 13      | 14     | 15     | 16     | 17     | 18   | 19   | 20     | 21   | 22   | 23     |
| 1       |     | 30       | 34     | J F 37 | 26     | 22       | J F 22 | F 24   | 25             | 49 | 51               | 66 | 94  | 71      | C       | C      | C      | 55     | 44     | 36   | 35   | 36     | 32   | 36   | 35     |
| 2       |     | F 39     | F 40   | 35     | 30     | 25       | 20     | S 20   | 25             | 45 | 49               | 64 | 80  | 66      | 62      | 58     | 54     | 57     | 47     | 28   | 24   | 29     | 34   | 28   | F 25   |
| 3       |     | S 25     | S      | F 33   | F 26   | 18       | S      | F      | 23             | 45 | 54               | 67 | 77  | C       | 58      | 60     | 52     | 52     | 42     | 28   | 31   | 33     | 25   | 24   | 24     |
| 4       |     | 25       | 27     | 27     | 25     | 26       | 25     | 22     | 29             | 42 | 48               | 50 | 56  | 67      | 56      | 53     | C      | 55     | 49     | H 33 | 28   | 24     | 25   | 23   | F      |
| 5       |     | S 21     | F 26   | F 25   | 27     | 25       | F 19   | F      | 25             | 45 | 43               | 51 | 69  | 56      | 55      | 53     | 58     | 54     | 42     | 30   | 37   | 25     | F 25 | F 24 | F 24   |
| 6       |     | A        | F      | F 30   | F      | F 25     | F 25   | J F 19 | 25             | 43 | 47               | 54 | 64  | 75      | 68      | 54     | 60     | 59     | 43     | 31   | 27   | S 25   | 31   | F    | F      |
| 7       |     | J F 29   | U F 29 | F      | F      | F        | F      | U F 19 | A              | 41 | 45               | 47 | 47  | 64      | 73      | 63     | 53     | 53     | 46     | 30   | A    | A      | 26   | S 25 | J F 32 |
| 8       |     | F        | A      | F 26   | F 29   | F 23     | F 23   | F      | F 27           | 43 | 56               | 58 | 71  | 68      | 65      | 61     | 58     | 56     | 44     | A    | A    | 36     | 33   | 36   | 34     |
| 9       |     | F        | F 31   | F 30   | F 33   | F 35     | A      | F 23   | S 27           | 46 | 49               | 60 | 55  | 60      | 53      | 57     | 50     | 48     | 55     | 48   | 36   | 29     | 22   | 27   | 25     |
| 10      |     | F 26     | F 24   | 26     | 27     | 23       | F 20   | F 20   | F 29           | 48 | 47               | 55 | 71  | 54      | 52      | 49     | 52     | 53     | 47     | 37   | 24   | F 26   | F 30 | F    | F 27   |
| 11      |     | F 25     | F U 22 | F      | F      | F        | F      | F      | F 26           | 45 | 41               | 49 | 63  | 58      | 51      | 52     | 57     | 53     | 42     | 31   | 33   | 31     | 24   | 24   | 29     |
| 12      |     | 30       | 38     | 45     | 46     | 43       | 35     | F      | 40             | 47 | 46               | 50 | 67  | 83      | 70      | 53     | 55     | 51     | 46     | 37   | 31   | 33     | 25   | F    | F      |
| 13      |     | F        | F      | F      | 32     | 36       | A      | 19     | 22             | 45 | 47               | 48 | 64  | 60      | 53      | 54     | 53     | 53     | 44     | 26   | 33   | 33     | 31   | 26   | 28     |
| 14      |     | 31       | 28     | 33     | 31     | 23       | 23     | 24     | 26             | 46 | 47               | 52 | 67  | 66      | 57      | 55     | 56     | 47     | 42     | 33   | 26   | 31     | S 32 | 24   | 29     |
| 15      |     | F        | F 27   | F 28   | 31     | 24       | 19     | F      | 21             | 48 | 55               | 58 | 67  | 62      | 54      | 50     | 47     | 48     | 44     | 37   | 28   | 26     | 23   | 25   | 26     |
| 16      |     | 25       | 25     | 27     | 31     | 23       | 19     | 20     | 26             | 46 | 51               | C  | 62  | 71      | 58      | 55     | 56     | 52     | 49     | 33   | 27   | 34     | 34   | 29   | 32     |
| 17      |     | 32       | 37     | 38     | 28     | 29       | 30     | 32     | 30             | 47 | 51               | 68 | 83  | 68      | 62      | 54     | 58     | 58     | 48     | 33   | 30   | 31     | 29   | 25   | 24     |
| 18      |     | 26       | F      | F      | F      | F        | F      | F      | 27             | 45 | 46               | 57 | 64  | 63      | 63      | 55     | 50     | 50     | 47     | 38   | 27   | 31     | 28   | 24   | 28     |
| 19      |     | 25       | 28     | F      | 30     | 27       | 28     | 30     | 33             | 47 | 52               | 49 | 65  | 79      | 64      | H 66   | J R 77 | J R 77 | J R 77 | 62   | 47   | 35     | 30   | F    | F      |
| 20      |     | F        | 31     | 31     | F 29   | 29       | 23     | 24     | 28             | 54 | 53               | 59 | 69  | 78      | H 70    | 59     | 75     | 55     | 49     | 35   | 35   | 39     | 37   | 26   | 28     |
| 21      |     | 30       | 30     | 28     | 28     | F 30     | 29     | 24     | 29             | 51 | H 58             | 59 | 71  | 85      | 64      | 56     | 71     | 66     | 53     | 47   | 40   | A      | A    | 26   | S      |
| 22      |     | A        | 28     | 28     | 30     | 31       | 23     | 20     | 26             | 49 | 50               | 56 | 71  | 74      | 63      | 55     | 64     | 66     | 55     | 41   | 34   | 30     | 29   | 31   | 32     |
| 23      |     | 29       | 27     | 28     | 30     | 29       | 29     | 29     | 32             | 57 | 50               | 63 | 81  | 90      | 78      | F 65   | J R 75 | 84     | S 96   | 69   | 53   | J S 52 | 32   | 29   | 30     |
| 24      |     | 29       | C 30   | C 32   | J C 30 | J C 30   | 29     | 26     | 30             | 47 | 50               | 59 | 69  | 75      | 59      | U H 55 | 65     | 57     | 54     | 45   | 39   | 38     | 40   | 36   | 28     |
| 25      |     | 25       | 26     | 30     | 30     | 28       | F      | F 29   | 34             | 54 | 48               | 66 | 70  | 68      | 65      | 58     | R 63   | 59     | 50     | 40   | 30   | 31     | 32   | 29   | 28     |
| 26      |     | 26       | 27     | 27     | 26     | 24       | 23     | 23     | 24             | 47 | 47               | 55 | 61  | 61      | 69      | H 60   | 59     | 52     | 47     | 33   | 31   | 34     | 37   | 35   | 32     |
| 27      |     | 30       | U S 31 | 35     | 26     | 24       | 23     | F 24   | 23             | 55 | 68               | 58 | C   | C       | C       | C      | C      | C      | 48     | 41   | 26   | 36     | 31   | 29   | 31     |
| 28      |     | 30       | 29     | 33     | 25     | A J S 18 | 19     | 27     | 54             | 51 | H 48             | 82 | 83  | H 83    | 67      | 57     | 52     | 52     | 42     | 41   | S 34 | U S 40 | S 40 | S 39 | S 45   |
| 29      |     | U S 45   | 48     | 49     | 47     | 39       | 26     | 26     | 31             | 52 | 58               | 49 | 71  | 73      | I C 61  | I C 54 | 58     | 61     | 48     | 33   | 30   | 35     | 27   | 25   | 29     |
| 30      |     | S 31     | 28     | U F 30 | J S 35 | S 28     | J S 17 | 17     | 28             | 53 | 56               | 48 | C   | C       | C       | C      | C      | 57     | 46     | 33   | 30   | 34     | 29   | 22   | 25     |
| 31      |     | S 25     | 25     | F 25   | 26     | U S 33   | S 23   | A      | 29             | 51 | 51               | 54 | C   | U R 104 | U R 106 | 92     | 88     | 88     | 59     | A    | A    | 35     | 31   | 29   | A      |
|         |     | 00       | 01     | 02     | 03     | 04       | 05     | 06     | 07             | 08 | 09               | 10 | 11  | 12      | 13      | 14     | 15     | 16     | 17     | 18   | 19   | 20     | 21   | 22   | 23     |
| CNT     |     | 24       | 25     | 27     | 27     | 28       | 24     | 23     | 30             | 31 | 31               | 30 | 28  | 28      | 28      | 28     | 27     | 30     | 31     | 29   | 28   | 29     | 30   | 27   | 25     |
| MED     |     | 29       | 28     | 30     | 30     | 26       | 23     | 23     | 27             | 47 | 50               | 56 | 69  | 68      | 62      | 55     | 58     | 55     | 47     | 35   | 31   | 33     | 30   | 26   | 28     |
| UQ      |     | 30       | 31     | 33     | 31     | 30       | 27     | 25     | 29             | 51 | 52               | 59 | 71  | 76      | 68      | 60     | 64     | 59     | 50     | 41   | 35   | 35     | 32   | 29   | 32     |
| LQ      |     | 25       | 27     | 27     | 26     | 24       | 20     | 20     | 25             | 45 | 47               | 50 | 64  | 62      | 56      | 54     | 53     | 52     | 44     | 33   | 28   | 30     | 26   | 24   | 26     |

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JAN. 1987      FOF2 (0.1 MHZ)



# IONOSPHERIC DATA

JAN. 1987

FOF1 (0.01 MHz)

135 E Mean Time (G.M.T. + 9h)

| Station |     | YAMAGAWA |    |    |    |    |    |    | Lat. 31 12.1 N |     | Long. 130 37.1 E |     | Sweep 1 MHz to 25 MHz in 2 sec in automatic operation |     |     |     |     |     |     |     |     |    |    |    |    |
|---------|-----|----------|----|----|----|----|----|----|----------------|-----|------------------|-----|---|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|
| Hour    | Day | 00       | 01 | 02 | 03 | 04 | 05 | 06 | 07             | 08  | 09               | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20 | 21 | 22 | 23 |
| 1       |     |          |    |    |    |    |    |    |                | L   | L                | 400 | 400   | L   | C   | C   | C   | L   | A   |     |     |    |    |    |    |
| 2       |     |          |    |    |    |    |    |    |                |     |                  | 400 | 400   | 400 | 400 | L   | L   | L   |     |     |     |    |    |    |    |
| 3       |     |          |    |    |    |    |    |    |                |     | L                | 400 | 400   | C   | 400 | 400 | L   | L   | A   |     |     |    |    |    |    |
| 4       |     |          |    |    |    |    |    |    |                | 220 | L                | 400 | 400   | 400 | 410 | 390 | L   | C   | L   |     |     |    |    |    |    |
| 5       |     |          |    |    |    |    |    |    |                |     | L                | L   | 390   | 410 | U L | 400 | U L | L   |     |     |     |    |    |    |    |
| 6       |     |          |    |    |    |    |    |    |                |     | U L              | 400 | 410   | 410 | 410 | U L | U L |     |     |     |     |    |    |    |    |
| 7       |     |          |    |    |    |    |    |    |                |     | A                | A   | 410   | 410 | 390 | L   | L   |     |     |     |     |    |    |    |    |
| 8       |     |          |    |    |    |    |    |    |                | 320 | U L              | 400 | 410   | 410 | 410 | U L | L   | A   |     |     |     |    |    |    |    |
| 9       |     |          |    |    |    |    |    |    |                |     | A                | 370 | 410   | 410 | 400 | A   | A   |     |     |     |     |    |    |    |    |
| 10      |     |          |    |    |    |    |    |    |                |     | 410              | L   | 400   | U L | 410 | U L | U L |     |     |     |     |    |    |    |    |
| 11      |     |          |    |    |    |    |    |    |                |     | L                | U L | 390   | 410 | L   | 400 | U L | L   | L   |     |     |    |    |    |    |
| 12      |     |          |    |    |    |    |    |    |                | L   | L                | 400 | 410   | 410 | L   | L   | L   |     |     |     |     |    |    |    |    |
| 13      |     |          |    |    |    |    |    |    |                |     | L                | L   | 400   | U L | 420 | 420 | 400 | L   |     |     |     |    |    |    |    |
| 14      |     |          |    |    |    |    |    |    |                |     | L                | L   | 410   | 420 | 420 | 420 | 370 | L   |     |     |     |    |    |    |    |
| 15      |     |          |    |    |    |    |    |    |                |     | L                | L   | 400   | 400 | L   | U L | L   | L   |     |     |     |    |    |    |    |
| 16      |     |          |    |    |    |    |    |    |                |     | L                | C   | 400   | 420 | 410 | 410 | L   | L   |     |     |     |    |    |    |    |
| 17      |     |          |    |    |    |    |    |    |                |     | L                | L   | 420   | L   | 420 | 420 | L   | L   |     |     |     |    |    |    |    |
| 18      |     |          |    |    |    |    |    |    |                |     | L                | L   | 420   | L   | L   | L   | L   | L   |     |     |     |    |    |    |    |
| 19      |     |          |    |    |    |    |    |    |                | L   | L                | U L | 390   | 410 | 410 | 420 | 410 | 400 | H   | 350 |     |    |    |    |    |
| 20      |     |          |    |    |    |    |    |    |                |     | L                | L   | 420   | 410 | L   | 430 | L   | L   |     |     |     |    |    |    |    |
| 21      |     |          |    |    |    |    |    |    |                | H   | 240              | L   | A   | A   | A   | 430 | L   | A   |     |     |     |    |    |    |    |
| 22      |     |          |    |    |    |    |    |    |                |     | L                | L   | 400   | 420 | 420 | 410 | L   | L   |     |     |     |    |    |    |    |
| 23      |     |          |    |    |    |    |    |    |                |     | L                | A   | 410   | 440 | L   | A   | 400 | L   | A   |     |     |    |    |    |    |
| 24      |     |          |    |    |    |    |    |    |                |     | L                | 340 | 410   | 410 | 420 | 410 | 400 | L   | L   |     |     |    |    |    |    |
| 25      |     |          |    |    |    |    |    |    |                |     | L                | H   | 340   | 390 | 420 | 430 | 420 | L   | 400 | L   | L   |    |    |    |    |
| 26      |     |          |    |    |    |    |    |    |                |     | L                | L   | U L   | 310 | 400 | 410 | 420 | 410 | 410 | U L | 390 | L  |    |    |    |
| 27      |     |          |    |    |    |    |    |    |                |     | L                | L   | 390   | C   | C   | C   | C   | C   | C   |     |     |    |    |    |    |
| 28      |     |          |    |    |    |    |    |    |                |     | L                | U L | U L   | 370 | 390 | A   | 420 | U L | L   | L   |     |    |    |    |    |
| 29      |     |          |    |    |    |    |    |    |                |     | L                | L   | U L   | 400 | 400 | 410 | 410 | I C | I C | U L | 400 |    |    |    |    |
| 30      |     |          |    |    |    |    |    |    |                |     | L                | L   | U L   | 400 | C   | C   | C   | C   | C   |     |     |    |    |    |    |
| 31      |     |          |    |    |    |    |    |    |                |     | L                | U L | 240   | 390 | 400 | I C | 410 | 410 | 410 | A   | A   |    |    |    |    |
|         |     | 00       | 01 | 02 | 03 | 04 | 05 | 06 | 07             | 08  | 09               | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20 | 21 | 22 | 23 |
| CNT     |     |          |    |    |    |    |    |    |                | 3   | 6                | 19  | 27  | 22  | 23  | 22  | 9   | 1   |     |     |     |    |    |    |    |
| MED     |     |          |    |    |    |    |    |    |                | 240 | 340              | 400 | 410   | 410 | 410 | 410 | 390 | 350 |     |     |     |    |    |    |    |
| UQ      |     |          |    |    |    |    |    |    |                | 240 | U L              | 370 | 400   | 410 | 420 | 420 | 410 | 400 |     |     |     |    |    |    |    |
| LQ      |     |          |    |    |    |    |    |    |                | 230 | 320              | U L | 395   | 400 | 410 | 410 | 400 | U L | 370 |     |     |    |    |    |    |

JAN. 1987

FOF1 (0.01 MHz)

The Radio Research Laboratory, Japan

# IONOSPHERIC DATA

JAN. 1987

FOE (0.01 MHz)

135 E Mean Time (G.M.T. + 9h)

| Station     | YAMAGAWA |    |    |    |    |    |    | Lat. 31 12.1 N. Long. 130 37.1 E |     |     |     |     |     |     | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |     |     |     |     |     |    |    |     |     |     |
|-------------|----------|----|----|----|----|----|----|----------------------------------|-----|-----|-----|-----|-----|-----|---|-----|-----|-----|-----|-----|----|----|-----|-----|-----|
| Hour<br>Day | 00       | 01 | 02 | 03 | 04 | 05 | 06 | 07                               | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20 | 21 | 22  | 23  |     |
| 1           |          |    |    |    |    |    |    |                                  | 165 | R   | R   | A   | A   | C   | C   | C   | 210 | S   |     |     |    |    |     |     |     |
| 2           |          |    |    |    |    |    |    |                                  |     | R   | 250 | 270 | 285 | A   | A   | A   | 260 | 215 | S   |     |    |    |     |     |     |
| 3           |          |    |    |    |    |    |    |                                  | 135 | 240 | 250 |     | A   | C   | A   | A   | A   | A   |     |     |    |    |     |     |     |
| 4           |          |    |    |    |    |    |    |                                  | A   | 245 | 270 | 290 | 300 | 300 | 235   |     | C   | 210 | S   |     |    |    |     |     |     |
| 5           |          |    |    |    |    |    |    |                                  | 180 | 250 | U A | 280 | A   | A   | U A   | 295 | 280 | 260 | 235 | S   |    |    |     |     |     |
| 6           |          |    |    |    |    |    |    |                                  | 195 | U A | 250 | A   | A   | A   | A   | A   | A   | U A | 210 | S   |    |    |     |     |     |
| 7           |          |    |    |    |    |    |    |                                  | 180 | R   | 235 | A   | A   | A   | A   | A   | A   | U A | 215 | S   |    |    |     |     |     |
| 8           |          |    |    |    |    |    |    |                                  | U A | 180 | A   | A   | A   | A   | A   | A   | A   | A   | A   | S   |    |    |     |     |     |
| 9           |          |    |    |    |    |    |    |                                  | A   | A   | A   | A   | A   | A   | A   | A   | A   | A   | A   | A   |    |    |     |     |     |
| 10          |          |    |    |    |    |    |    |                                  | 175 | A   | A   | A   | A   | A   | A   | 285 | 265 | A   | A   |     |    |    |     |     |     |
| 11          |          |    |    |    |    |    |    |                                  | 170 | 230 | A   | 290 | U R | 300 | A   | 285 | 275 | H   | 250 | 165 |    |    |     |     |     |
| 12          |          |    |    |    |    |    |    |                                  | 130 | 240 | A   | A   | A   | A   | A   | A   | A   | 220 | 190 | S   |    |    |     |     |     |
| 13          |          |    |    |    |    |    |    |                                  | 180 | 240 | 290 | 300 | 305 | 300 |   |     | A   | 215 | S   |     |    |    |     |     |     |
| 14          |          |    |    |    |    |    |    |                                  | 210 | 255 | A   | A   | A   | A   |   | 300 | 280 | A   | 180 | S   |    |    |     |     |     |
| 15          |          |    |    |    |    |    |    |                                  | 175 | 245 | 275 | A   | A   | A   |   | 290 | 260 | 225 | S   |     |    |    |     |     |     |
| 16          |          |    |    |    |    |    |    |                                  | 210 | 280 | C   | A   | 310 | A   | A   | A   | A   | A   | S   |     |    |    |     |     |     |
| 17          |          |    |    |    |    |    |    |                                  | 175 | 250 | 275 | A   | A   |     | 300   |     | 275 | A   | S   |     |    |    |     |     |     |
| 18          |          |    |    |    |    |    |    |                                  | 200 | 255 | 300 | A   | A   | A   |   | 300 | 285 | 260 | S   |     |    |    |     |     |     |
| 19          |          |    |    |    |    |    |    |                                  | 190 | 240 | 305 | A   | A   |     | 305   | 295 | R   | 240 | R   |     |    |    |     |     |     |
| 20          |          |    |    |    |    |    |    |                                  | 195 | 235 | 260 | 300 | A   |     | 305   | 300 | 235 | 240 | A   |     |    |    |     |     |     |
| 21          |          |    |    |    |    |    |    |                                  | S   | 235 | 270 | 295 | 300 | 300 |   | A   | A   | A   | A   |     |    |    |     |     |     |
| 22          |          |    |    |    |    |    |    |                                  | S   | 240 | 275 | 300 | 300 |     | A   | A   | 290 | 255 | 195 |     |    |    |     |     |     |
| 23          |          |    |    |    |    |    |    |                                  | A   | 250 | A   | A   | A   | A   | A   | A   | A   | A   | A   |     |    | K  | K   | 180 | 180 |
| 24          |          |    |    |    |    |    |    |                                  | 200 | A   | A   | A   | A   | A   | A   | A   | A   | A   | 200 |     |    |    |     |     |     |
| 25          |          |    |    |    |    |    |    |                                  | 190 | 250 | A   | A   | A   | A   | A   |     | 280 | 245 | 190 |     |    |    |     |     |     |
| 26          |          |    |    |    |    |    |    |                                  | 200 | A   | A   | U A | 285 | A   | 310   | 305 | 285 | 255 | A   |     |    |    |     |     |     |
| 27          |          |    |    |    |    |    |    |                                  | 200 | A   | A   | C   | C   | C   | C   | C   | C   | C   | A   |     |    |    |     |     |     |
| 28          |          |    |    |    |    |    |    |                                  | 175 | 235 | 275 | 300 | 310 | U A | A   | A   | A   | R   | 235 | 180 |    |    |     |     |     |
| 29          |          |    |    |    |    |    |    |                                  | A   | 245 | R   | 270 | 290 | 295 | I C   | I C | A   | A   | A   |     |    |    |     |     |     |
| 30          |          |    |    |    |    |    |    |                                  | 190 | 235 | C   | C   | C   | C   | C   | C   | C   | A   | 175 |     |    |    |     |     |     |
| 31          |          |    |    |    |    |    |    |                                  | 200 | 250 | 290 | I C | 295 | 305 | 300   | 295 | 270 | A   | A   |     |    |    |     |     |     |
|             | 00       | 01 | 02 | 03 | 04 | 05 | 06 | 07                               | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20 | 21 | 22  | 23  |     |
| CNT         |          |    |    |    |    |    |    |                                  | 24  | 25  | 15  | 11  | 9   | 11  | 12  | 14  | 17  | 8   |     |     |    | 1  | 1   |     |     |
| MED         |          |    |    |    |    |    |    |                                  | 188 | 245 | 275 | 295 | 300 | 300 | 292   | 275 | 235 | 185 |     |     | K  | K  | 180 | 180 |     |
| UQ          |          |    |    |    |    |    |    |                                  | 200 | 250 | 285 | 300 | 305 | 302 | 300   | 285 | 245 | 192 |     |     |    |    |     |     |     |
| LQ          |          |    |    |    |    |    |    |                                  | 178 | 235 | 270 | 290 | 300 | 300 | 285   | 260 | 215 | 178 |     |     |    |    |     |     |     |

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JAN. 1987

FOE (0.01 MHz)

# IONOSPHERIC DATA

JAN. 1987

FOES (0.1 MHZ)

135 E Mean Time (G.M.T. + 9h)

| Station     | YAMAGAWA |       |       |       | Lat.  | 31 12.1 N |       |       |        | Long. | 130 37.1 E |       |       |       | Sweep 1 MHz to 25 MHz in 2sec in automatic operation |       |       |       |       |       |       |       |       |       |
|-------------|----------|-------|-------|-------|-------|-----------|-------|-------|--------|-------|------------|-------|-------|-------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Hour<br>Day | 00       | 01    | 02    | 03    | 04    | 05        | 06    | 07    | 08     | 09    | 10         | 11    | 12    | 13    | 14   | 15    | 16    | 17    | 18    | 19    | 20    | 21    | 22    | 23    |
| 1           | ES 16    | JA 33 | JA 23 | JA 19 | ES 16 | ES 16     | ES 16 | ES 16 | G      | 31    | 37         | 31    | 35    | C     | C  | C     | JA 24 | JA 34 | JA 30 | 21    | ES 16 | ES 16 | ES 16 | ES 16 |
| 2           | ES 16    | JA 24 | JA 16 | ES 16 | ES 16 | JA 18     | ES 16 | ES 16 | 25     | 28    | 33         | 36    | 39    | JA 30 | 32   | 25    | 24    | G     | ES 16 | ES 16 | ES 16 | JA 17 | ES 16 | ES 16 |
| 3           | ES 16    | JA 24 | JA 32 | JA 23 | 23    | 23        | ES 16 | ES 16 | JA 23  | 31    | 31         | JA 88 | C     | JA 35 | JA 34  | 39    | JA 26 | JA 25 | JA 24 | ES 16 | ES 16 | ES 16 | ES 16 | ES 16 |
| 4           | ES 16    | ES 16 | ES 16 | ES 16 | ES 16 | JA 18     | ES 16 | ES 16 | JA 22  | JA 29 | 34         | 35    | 29    | JA 44 | 30   | C     | G     | 21    | 21    | JA 18 | JA 18 | ES 16 | ES 16 | ES 16 |
| 5           | ES 16    | JA 17 | JA 29 | JA 20 | JA 20 | JA 20     | ES 16 | ES 16 | G      | 31    | JA 39      | JA 53 | JA 41 | JA 36 | JA 33  | 28    | JA 29 | JA 18 | JA 18 | 20    | 20    | JA 28 | JA 33 | JA 33 |
| 6           | JA 50    | JA 33 | JA 30 | JA 31 | 20    | JA 18     | 20    | 22    | 25     | JA 33 | JA 41      | JA 40 | JA 73 | 33    | 30   | JA 31 | JA 31 | 28    | JA 25 | JA 21 | JA 31 | JA 64 | JA 38 | JA 25 |
| 7           | JA 23    | JA 29 | JA 21 | JA 27 | JA 53 | JA 24     | JA 25 | JA 33 | 22     | 32    | JA 50      | JA 65 | JA 51 | JA 49 | JA 82  | JA 44 | JA 30 | JA 33 | JA 31 | 38    | JA 39 | JA 21 | JA 34 | JA 41 |
| 8           | JA 40    | JA 41 | JA 32 | JA 34 | JA 31 | JA 22     | 28    | JA 61 | 36     | JA 35 | JA 75      | JA 66 | JA 49 | JA 65 | JA 70  | JA 47 | JA 46 | JA 42 | JA 34 | JA 62 | JA 22 | 18    | JA 17 | 22    |
| 9           | JA 17    | 20    | 20    | 17    | JA 34 | JA 31     | JA 22 | JA 33 | JA 35  | JA 33 | JA 43      | JA 33 | JA 45 | JA 52 | JA 40  | JA 60 | JA 46 | JA 38 | 18    | JA 24 | ES 16 | ES 16 | ES 15 | ES 16 |
| 10          | 21       | JA 33 | JA 29 | JA 30 | JA 19 | JA 22     | JA 23 | JA 18 | JA 21  | JA 30 | JA 53      | JA 49 | JA 43 | JA 48 | JA 21  | G     | JA 33 | JA 33 | JA 35 | JA 22 | JA 22 | JA 22 | JA 21 | 21    |
| 11          | 22       | 21    | ES 16 | 23    | 24    | JA 21     | ES 16 | 22    | G      | 27    | JA 35      | 31    | 31    | JA 37 | JA 24  | JA 21 | JA 21 | 20    | 20    | ES 16 | 19    | 17    | ES 16 | ES 16 |
| 12          | ES 16    | JA 30 | JA 42 | JA 30 | JA 19 | JA 17     | JA 17 | ES 16 | G      | JA 32 | JA 36      | 39    | JA 42 | JA 33 | JA 33  | 33    | G     | JA 33 | JA 22 | ES 16 | ES 16 | ES 16 | ES 16 | ES 16 |
| 13          | ES 16    | ES 16 | JA 23 | JA 18 | JA 21 | JA 22     | JA 20 | JA 17 | 23     | 28    | 32         | JA 40 | G     | JA 31 | JA 40  | JA 30 | 26    | 21    | JA 24 | JA 26 | ES 16 | ES 16 | ES 16 | ES 16 |
| 14          | ES 16    | ES 16 | JA 17 | JA 18 | JA 17 | JA 17     | ES 16 | ES 16 | G      | G     | JA 36      | JA 36 | JA 35 | JA 33 | G  | 22    | 33    | 20    | JA 29 | JA 33 | JA 17 | ES 16 | JA 21 | JA 17 |
| 15          | ES 16    | JA 17 | JA 19 | ES 16 | ES 16 | ES 16     | ES 16 | ES 16 | 23     | 28    | 30         | 33    | JA 35 | JA 37 | 33   | G     | 26    | JA 22 | ES 16 | ES 16 | ES 16 | ES 16 | ES 16 | ES 16 |
| 16          | ES 16    | ES 16 | ES 16 | ES 16 | ES 16 | ES 16     | ES 16 | ES 16 | G      | G     | C          | JA 35 | G     | JA 36 | JA 31  | JA 39 | JA 29 | JA 25 | JA 20 | ES 16 | JA 17 | ES 16 | ES 16 | ES 16 |
| 17          | ES 16    | ES 16 | ES 16 | ES 16 | ES 16 | JA 17     | JA 17 | ES 16 | 22     | 23    | 31         | JA 32 | 35    | 26    | 32   | G     | JA 31 | JA 17 | JA 19 | ES 16 | JA 17 | ES 16 | ES 16 | ES 16 |
| 18          | ES 16    | ES 16 | ES 16 | ES 16 | ES 16 | ES 16     | ES 16 | JA 21 | 24     | 31    | G          | 33    | 35    | JA 32 | G  | G     | G     | 20    | JA 17 | ES 16 | ES 16 | ES 16 | ES 16 | ES 16 |
| 19          | ES 16    | ES 16 | JA 21 | JA 20 | JA 17 | ES 16     | ES 16 | ES 16 | G      | G     | 34         | 36    | 35    | G     | G  | JA 22 | 27    | 24    | JA 17 | JA 18 | ES 16 | ES 16 | ES 16 | JA 23 |
| 20          | ES 16    | 18    | ES 16 | ES 16 | ES 16 | ES 16     | ES 16 | ES 16 | G      | G     | 27         | 33    | 35    | G     | G  | 29    | 29    | JA 25 | JA 41 | JA 26 | ES 16 | ES 16 | ES 16 | ES 16 |
| 21          | ES 16    | ES 16 | ES 16 | ES 16 | ES 16 | ES 16     | ES 16 | ES 16 | G      | G     | 38         | 53    | 44    | 50    | 35   | 35    | JA 44 | JA 32 | JA 39 | JA 51 | JA 33 | JA 49 | JA 65 | JA 51 |
| 22          | JA 81    | JA 17 | JA 17 | ES 16 | JA 19 | JA 20     | 21    | 22    | JA 159 | G     | 32         | 35    | 36    | 37    | JA 33  | G     | G     | G     | ES 16 | JA 17 | ES 16 | JA 23 | ES 16 | ES 16 |
| 23          | ES 16    | ES 16 | 21    | ES 16 | JA 23 | JA 25     | ES 16 | ES 16 | 24     | 31    | JA 53      | JA 77 | JA 50 | JA 61 | JA 81  | JA 44 | JA 54 | JA 53 | JA 37 | JA 20 | G     | G     | JA 22 | EC 17 |
| 24          | EC 16    | EC 17 | EC 20 | EC 20 | EC 17 | EC 14     | JA 23 | 22    | G      | JA 35 | JA 35      | JA 46 | JA 64 | JA 53 | JA 49  | 34    | 29    | 21    | JA 21 | JA 22 | JA 32 | 23    | ES 16 | 22    |
| 25          | JA 18    | JA 25 | JA 17 | 20    | 22    | ES 16     | ES 16 | ES 16 | G      | G     | 36         | JA 49 | JA 34 | JA 47 | JA 31  | 19    | G     | G     | 20    | ES 16 | ES 16 | ES 16 | ES 16 | ES 16 |
| 26          | 17       | ES 16 | 19    | 20    | JA 18 | 18        | ES 16 | ES 16 | G      | JA 29 | JA 35      | JA 33 | JA 35 | G     | JA 29  | JA 33 | JA 26 | JA 25 | JA 26 | JA 21 | ES 15 | ES 16 | ES 16 | ES 16 |
| 27          | ES 16    | ES 16 | ES 16 | ES 16 | ES 15 | 20        | ES 16 | ES 16 | G      | JA 27 | 29         | C     | C     | C     | C  | C     | C     | JA 33 | 25    | JA 23 | 18    | ES 16 | ES 16 | 17    |
| 28          | ES 16    | 18    | 20    | 21    | JA 20 | JA 20     | ES 16 | ES 16 | 20     | 25    | 36         | 37    | JA 51 | 37    | JA 31  | 30    | G     | 24    | JA 25 | JA 17 | 20    | ES 16 | JA 17 | ES 16 |
| 29          | JA 19    | 17    | 20    | 20    | JA 17 | 20        | 18    | 21    | JA 21  | 26    | 28         | 36    | 36    | C     | C  | 33    | JA 39 | JA 21 | 20    | ES 16 | 20    | 21    | 20    | ES 16 |
| 30          | ES 16    | ES 16 | 19    | JA 20 | JA 18 | 18        | 17    | ES 16 | G      | G     | C          | C     | C     | C     | C  | C     | 26    | 26    | JA 22 | JA 25 | JA 19 | 21    | 17    | 22    |
| 31          | ES 16    | ES 16 | 20    | 20    | JA 32 | JA 30     | JA 23 | 21    | G      | G     | G          | C     | 35    | 18    | 33   | JA 44 | JA 54 | JA 42 | JA 54 | JA 42 | JA 52 | JA 30 | JA 25 | JA 25 |
|             | 00       | 01    | 02    | 03    | 04    | 05        | 06    | 07    | 08     | 09    | 10         | 11    | 12    | 13    | 14   | 15    | 16    | 17    | 18    | 19    | 20    | 21    | 22    | 23    |
| CNT         | 31       | 31    | 31    | 31    | 31    | 31        | 31    | 31    | 31     | 31    | 29         | 28    | 28    | 27    | 27   | 27    | 30    | 31    | 31    | 31    | 31    | 31    | 31    | 31    |
| MED         | ES 16    | 17    | 20    | 20    | JA 18 | JA 18     | ES 16 | ES 16 | 20     | 28    | 35         | 36    | 36    | JA 37 | JA 32  | 30    | JA 29 | JA 24 | JA 24 | JA 21 | 17    | ES 16 | ES 16 | ES 16 |
| UQ          | 18       | JA 24 | JA 22 | JA 20 | JA 22 | JA 22     | 20    | 21    | 23     | 31    | JA 38      | JA 49 | JA 44 | JA 48 | JA 36  | JA 37 | JA 33 | JA 32 | JA 30 | JA 24 | 21    | 21    | JA 20 | 22    |
| LQ          | ES 16    | ES 16 | ES 16 | ES 16 | ES 16 | ES 16     | ES 16 | ES 16 | G      | G     | 31         | 33    | 35    | 32    | 30   | 21    | G     | 24    | 20    | JA 18 | ES 16 | ES 16 | ES 16 | ES 16 |

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FOES (0.1 MHZ)

The Radio Research Laboratory, Japan

# IONOSPHERIC DATA

JAN. 1987

FBES (0.1 MHz)

135 E Mean Time (G.M.T. + 9h)

| Station | YAMAGAWA |        |        |        |        |        |        |        |        |    |    |    |    |    |    |    |        |        |        |        |        |        |        |        |        |
|---------|----------|--------|--------|--------|--------|--------|--------|--------|--------|----|----|----|----|----|----|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|         | 00       | 01     | 02     | 03     | 04     | 05     | 06     | 07     | 08     | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16     | 17     | 18     | 19     | 20     | 21     | 22     | 23     |        |
| 1       | E S 16   | E S 22 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G      | 30 | 34 | 30 | 30 | C  | C  | C  | E S 16 | 24     | 21     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 2       | E S 16   | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | 24     | 26 | 32 | 35 | 39 | 30 | 30 | 25 | 24     | G      | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 3       | E S 16   | E S 16 | 23     | 19     | E S 16 | E S 16 | E S 16 | E S 16 | 21     | 30 | 30 | 30 | C  | 29 | 27 | 26 | S      | 23     | 19     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 4       | E S 16   | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | 21     | 25 | 30 | 31 | 29 | G  | G  | 25 | C      | G      | 20     | 20     | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 5       | E S 16   | E S 16 | E S 16 | E S 15 | E C 17 | E S 15 | E S 16 | E S 16 | G      | 23 | 34 | 27 | 33 | 31 | G  | 27 | 28     | G      | 21     | 18     | E S 16 | E S 16 | E S 16 | 17     | E S 16 |
| 6       | A A 50   | E S 16 | E S 16 | 18     | E S 16 | E S 15 | E S 15 | E S 15 | 25     | 25 | 34 | 31 | 32 | 33 | 29 | 31 | 21     | 23     | 25     | E S 16 | E S 16 | 20     | 21     | E S 16 |        |
| 7       | E S 16   | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | A A 33 | 22     | 28 | 39 | 39 | 32 | 31 | 33 | 32 | 22     | 21     | 21     | A A 38 | A A 39 | E S 16 | 18     | E S 16 |        |
| 8       | 19       | A A 41 | E S 16 | 18     | E S 16 | E S 16 | E S 16 | E S 16 | 35     | 30 | 33 | 37 | 30 | 34 | 34 | 26 | 36     | 30     | A A 34 | A A 62 | 19     | E S 16 | E S 16 | E S 16 |        |
| 9       | E S 16   | E S 16 | E S 16 | E S 16 | 20     | A A 31 | E S 16 | 17     | 28     | 28 | 37 | 30 | 30 | 30 | 31 | 37 | 30     | 35     | 17     | 18     | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 10      | E S 16   | E S 16 | E S 16 | 22     | E S 16 | E S 16 | E S 16 | 18     | G      | 26 | 30 | 37 | 31 | 29 | 20 | 21 | 23     | 22     | 22     | 20     | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 11      | E S 16   | E S 16 | E S 16 | E S 16 | 18     | E S 16 | E S 16 | E S 16 | G      | 27 | 28 | G  | 28 | 30 | 23 | 18 | G      | G      | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 12      | E S 16   | E S 16 | 24     | 30     | E S 16 | E S 16 | E S 16 | E S 16 | G      | G  | 28 | 32 | 34 | 32 | 29 | 25 | 31     | G      | 18     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 13      | E S 16   | E S 16 | E S 16 | E S 16 | 21     | A A 22 | E S 16 | E S 16 | G      | 23 | 30 | 33 | G  | 28 | 30 | 25 | 25     | 19     | 22     | 18     | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 14      | E S 16   | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G      | G  | 28 | 30 | 31 | 31 | G  | G  | 22     | 28     | 17     | 20     | 19     | E S 16 | E S 16 | E S 16 |        |
| 15      | E S 16   | E S 16 | E S 16 | E S 15 | E S 16 | E S 16 | E S 16 | E S 16 | 23     | 27 | 30 | 33 | 34 | 32 | 32 | G  | 18     | 20     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 16      | E S 16   | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G      | G  | C  | 32 | G  | 30 | 30 | 28 | 25     | 20     | 20     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 17      | E S 16   | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G      | 28 | 30 | 32 | 32 | 26 | 28 | G  | 25     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 18      | E S 16   | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | 24     | 31 | G  | 32 | 32 | 31 | G  | G  | G      | 19     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 19      | E S 16   | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G      | G  | 34 | 34 | 34 | G  | 25 | G  | 21     | 24     | G      | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 20      | E S 16   | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G      | G  | 27 | 32 | 34 | G  | 29 | G  | 29     | E S 16 | E S 16 | 25     | 24     | E S 16 | E S 16 | E S 16 |        |
| 21      | E S 16   | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G      | G  | 36 | 51 | 42 | 46 | 34 | 27 | 35     | 30     | 37     | 27     | A A 33 | A A 49 | E S 16 | 18     |        |
| 22      | A A 81   | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G  | 31 | 34 | 34 | 35 | 31 | G  | G      | G      | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 23      | E S 16   | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | 20     | 30 | 44 | 39 | 31 | 31 | 40 | 34 | 27     | 43     | 24     | E S 16 | G      | G      | 21     | E C 17 |        |
| 24      | E C 16   | E C 17 | E C 20 | E C 20 | E C 17 | E C 14 | E S 16 | E S 16 | G      | 28 | 30 | 34 | 39 | 40 | 35 | 33 | 19     | G      | E S 16 | E S 16 | 25     | E S 16 | E S 16 | E S 16 |        |
| 25      | E S 16   | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G      | G  | 34 | 31 | 32 | 36 | 31 | 19 | G      | G      | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 26      | E S 16   | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G      | 26 | 30 | 32 | 32 | G  | G  | G  | G      | 23     | 23     | 20     | 17     | E S 15 | E S 16 | E S 16 |        |
| 27      | E S 16   | E S 16 | E S 16 | E S 16 | E S 15 | E S 16 | E S 16 | E S 16 | G      | 26 | 28 | C  | C  | C  | C  | C  | C      | 27     | 17     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 28      | E S 16   | E S 15 | E S 16 | E S 16 | A A 20 | E S 16 | E S 16 | E S 16 | 21     | G  | 36 | 37 | 51 | 33 | 30 | 30 | G      | 23     | E S 15 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 29      | E S 16   | E S 16 | E S 16 | 18     | E S 15 | E S 16 | E S 16 | E S 16 | 19     | 26 | 28 | 36 | 36 | C  | C  | 33 | 23     | 19     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 30      | E S 16   | E S 16 | E S 15 | 20     | E S 16 | E S 16 | E S 16 | E S 16 | G      | G  | C  | C  | C  | C  | C  | C  | 25     | 26     | 20     | 24     | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 31      | E S 16   | E S 16 | E S 16 | E S 16 | 25     | 20     | A A 23 | E S 16 | G      | G  | G  | C  | 35 | 18 | G  | 33 | 43     | 43     | 40     | A A 54 | A A 42 | 24     | 27     | 21     | A A 25 |
| CNT     | 31       | 31     | 31     | 31     | 31     | 31     | 31     | 31     | 31     | 31 | 29 | 28 | 28 | 27 | 27 | 27 | 30     | 31     | 31     | 31     | 31     | 31     | 31     | 31     |        |
| MED     | E S 16   | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G      | 26 | 30 | 32 | 32 | 31 | 30 | 26 | 23     | 20     | 17     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |        |
| UQ      | E S 16   | E S 16 | E S 15 | E S 17 | E S 16 | E S 16 | E S 16 | E S 16 | 21     | 23 | 34 | 36 | 34 | 32 | 32 | 30 | 27     | 24     | 21     | 18     | E S 16 | E S 16 | E S 16 | E S 16 |        |
| LQ      | E S 16   | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G      | G  | 28 | 31 | 30 | 29 | 27 | G  | G      | 19     | 16     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |        |

JAN. 1987

FBES (0.1 MHz)

# IONOSPHERIC DATA

JAN. 1987

FMIN (0.1 MHz)

135 E Mean Time (G.M.T. + 9h)

| Station     | YAMAGAWA |     |     |     | Lat. 31 12.1 N |     |     |     | Long. 130 37.1 E |     |     |     | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |    |     |     |     |     |     |     |     |     |     |     |
|-------------|----------|-----|-----|-----|----------------|-----|-----|-----|------------------|-----|-----|-----|---|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Hour<br>Day | 00       | 01  | 02  | 03  | 04             | 05  | 06  | 07  | 08               | 09  | 10  | 11  | 12  | 13 | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  |
| 1           | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 15  | 16  | C  | C   | C   | 13  | E S | E S | E S | E S | E S | E S | E S |
| 2           | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 13  | 15  | 15 | 16  | 15  | E S | E S | E S | E S | E S | E S | E S | E S |
| 3           | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 15  | C   | 15 | E S | E S | E S | E S | E S | E S | E S | E S | E S | E S |
| 4           | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 15  | 15  | 15 | 15  | C   | E S | E S | E S | E S | E S | E S | E S | E S |
| 5           | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 17  | 16  | 14 | 15  | 15  | 15  | 15  | 14  | 12  | E S | E S | E S | E S |
| 6           | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 16  | 16  | 16 | 15  | 16  | 16  | 16  | 16  | 16  | E S | E S | E S | E S |
| 7           | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 16  | 16  | 16 | 14  | 15  | 14  | 15  | 15  | 13  | E S | E S | E S | E S |
| 8           | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 16  | 14  | 14 | 14  | 15  | 14  | 15  | 15  | 15  | E S | E S | E S | E S |
| 9           | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 12  | 12  | 14 | 14  | 14  | 14  | 15  | 15  | 15  | E S | E S | E S | E S |
| 10          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 12  | 12  | 14 | 14  | 14  | 14  | 14  | 14  | 14  | 14  | 14  | E S | E S |
| 11          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 14  | 12  | 12 | 12  | 15  | 14  | 14  | 15  | 15  | E S | E S | E S | E S |
| 12          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 15  | 15  | 15 | 16  | 16  | 16  | 13  | 15  | 15  | E S | E S | E S | E S |
| 13          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 16  | 15  | 15 | 16  | 16  | 15  | 15  | 12  | E S | E S | E S | E S |     |
| 14          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 15  | 16  | 15 | 16  | 15  | 15  | 15  | 15  | E S | E S | E S | E S |     |
| 15          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 15  | 16  | 15 | 16  | 16  | 16  | 15  | 15  | 16  | E S | E S | E S | E S |
| 16          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 15  | C   | 15 | 15  | 15  | 16  | 15  | 15  | E S | E S | E S | E S |     |
| 17          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 16  | 16  | 15 | 15  | 15  | 16  | 16  | 15  | E S | E S | E S | E S |     |
| 18          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 15  | 16  | 16 | 16  | 16  | 16  | 15  | 16  | E S | E S | E S | E S |     |
| 19          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 13  | 15  | 15 | 15  | 11  | E S | E S | E S | E S | E S | E S | E S |     |
| 20          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 14  | 15  | 15 | 14  | 15  | E S | E S | E S | E S | E S | E S | E S |     |
| 21          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 14  | 16  | 15 | 12  | 15  | E S | E S | E S | E S | E S | E S | E S |     |
| 22          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 15  | 15  | 15 | 15  | 16  | E S | E S | E S | E S | E S | E S | E S |     |
| 23          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 15  | 15  | 15 | 14  | 16  | E S | E S | E S | E S | E S | E S | E S |     |
| 24          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 15  | 15  | 15 | 15  | 14  | E S | E S | E S | E S | E S | E S | E S |     |
| 25          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 14  | 16  | 14 | 15  | 15  | 15  | E S | E S | E S | E S | E S | E S |     |
| 26          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 15  | 15  | 15 | 15  | 14  | 13  | 14  | E S | E S | E S | E S | E S |     |
| 27          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 12  | 16  | C  | C   | C   | C   | C   | E S | E S | E S | E S | E S |     |
| 28          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 14  | 14  | 14 | 14  | 14  | 12  | 12  | E S | E S | E S | E S | E S |     |
| 29          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 16  | 12  | 15 | 14  | C   | C   | 14  | 13  | E S | E S | E S | E S |     |
| 30          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 16  | E S   | C  | C   | C   | C   | 16  | 15  | E S | E S | E S | E S |     |
| 31          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | E S | 17  | 16  | C  | 20  | 15  | 14  | 13  | 14  | 14  | E S | E S | E S | E S |
|             | 00       | 01  | 02  | 03  | 04             | 05  | 06  | 07  | 08               | 09  | 10  | 11  | 12  | 13 | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  |
| CNT         | 31       | 31  | 31  | 31  | 31             | 31  | 31  | 31  | 31               | 31  | 30  | 28  | 28  | 27 | 27  | 27  | 30  | 31  | 31  | 31  | 31  | 31  | 31  | 31  |
| MED         | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | 15  | 15  | 15  | 15 | 15  | 15  | 14  | E S | E S | E S | E S | E S | E S | E S |
| UQ          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | 16  | E S | 15  | 16 | 15  | 15  | 15  | E S | E S | E S | E S | E S | E S | E S |
| LQ          | E S      | E S | E S | E S | E S            | E S | E S | E S | E S              | E S | 14  | 14  | 14  | 15 | 15  | 14  | 14  | E S | E S | E S | E S | E S | E S | E S |

JAN. 1987

FMIN (0.1 MHz)

The Radio Research Laboratory, Japan

# IONOSPHERIC DATA

JAN. 1987 M(3000)F2 (0.01)

135 E Mean Time (G.M.T. + 9h)

| Station     | YAMAGAWA |     |     |     | Lat. | 31 12.1 N. |     |     |     | Long. | 130 37.1 E |     |     |     | Sweep 1 MHz to 25 MHz in 2 sec in automatic operation |     |     |     |     |     |     |     |     |     |     |     |     |     |   |     |
|-------------|----------|-----|-----|-----|------|------------|-----|-----|-----|-------|------------|-----|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|-----|
| Hour<br>Day | 00       | 01  | 02  | 03  | 04   | 05         | 06  | 07  | 08  | 09    | 10         | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  |     |     |     |     |   |     |
| 1           | 300      | 325 | F   | 365 | 320  | F          | F   | 310 | 320 | 345   | S          | 335 | 365 | 400 | C   | C   | C   | 365 | 365 | 360 | 340 | 305 | 310 | 305 | 300 |     |     |     |   |     |
| 2           | F        | F   | F   | 335 | 340  | 300        | S   | 325 | 320 | 355   | 345        | 345 | 360 | 365 | 385   | 345 | 335 | 360 | 370 | 340 | 290 | 345 | 365 | 320 | F   |     |     |     |   |     |
| 3           | S        | S   | F   | F   | 360  | S          | F   | 325 | 345 | 335   | 345        | 365 | C   | 360 | 350   | 365 | 355 | 380 | 355 | 320 | 335 | 360 | 310 | 290 |     |     |     |     |   |     |
| 4           | 300      | 315 | 315 | 320 | 325  | 340        | 320 | 345 | 380 | 375   | 340        | 375 | 360 | 355 | 310   | C   | 345 | 345 | 365 | H   | 340 | 335 | 320 | 325 | F   |     |     |     |   |     |
| 5           | S        | F   | F   | 335 | 320  | 290        | F   | F   | 340 | 365   | 360        | 350 | 375 | 365 | 365   | 340 | 355 | 360 | 380 | 315 | 350 | 320 | 340 | 335 | 310 |     |     |     |   |     |
| 6           | A        | F   | F   | F   | 380  | 340        | J   | F   | 320 | 360   | 340        | 340 | 350 | 360 | 350   | 315 | 340 | 370 | 385 | 320 | 315 | 340 | S   | 340 | F   | F   |     |     |   |     |
| 7           | J        | F   | U   | F   | F    | F          | U   | F   | A   | 380   | 355        | 360 | 310 | 330 | 355   | 355 | 350 | 360 | 380 | 350 | A   | A   | 325 | 360 | S   | J   | F   | 330 |   |     |
| 8           | F        | A   | F   | F   | 325  | 325        | F   | F   | 350 | 370   | 365        | 360 | 365 | 350 | 355   | 345 | 335 | 365 | 385 | A   | A   | 320 | 320 | 335 | 350 |     |     |     |   |     |
| 9           | F        | F   | F   | F   | 385  | A          | F   | S   | 370 | 355   | 340        | 345 | 365 | 340 | 360   | 350 | 320 | 345 | 365 | 335 | 345 | 320 | 350 | 300 |     |     |     |     |   |     |
| 10          | 290      | F   | 290 | 305 | 315  | 370        | 325 | F   | 325 | 360   | 385        | 380 | 335 | 380 | 380   | 355 | 325 | 365 | 350 | 380 | 350 | 335 | 305 | 335 | F   | F   | F   | 350 |   |     |
| 11          | F        | F   | U   | F   | F    | F          | F   | F   | 375 | 380   | 345        | 350 | 370 | 370 | 335   | 360 | 365 | 370 | 340 | 320 | 340 | 355 | 310 | 325 | F   | F   |     |     |   |     |
| 12          | 335      | 340 | 345 | 370 | 370  | 315        | F   | 325 | 350 | 360   | 330        | 345 | 35  | 380 | 340   | 355 | 265 | 345 | 350 | 320 | 350 | 320 | F   | F   |     |     |     |     |   |     |
| 13          | F        | F   | F   | 360 | 390  | A          | 315 | 320 | 355 | 360   | 375        | 365 | 360 | 360 | 350   | 350 | 375 | 375 | 385 | 320 | 350 | 320 | 345 | 305 |     |     |     |     |   |     |
| 14          | 340      | 320 | 335 | 385 | 345  | 260        | 310 | 325 | 345 | 340   | 345        | 345 | 350 | 350 | 355   | 365 | 360 | 370 | 350 | 325 | 320 | S   | 345 | 310 | 295 |     |     |     |   |     |
| 15          | F        | F   | F   | 370 | 355  | 370        | F   | 335 | 355 | 370   | 355        | 360 | 330 | 340 | 360   | 360 | 355 | 365 | 380 | 375 | 345 | 325 | 340 | 325 |     |     |     |     |   |     |
| 16          | 300      | 320 | 335 | 370 | 415  | 315        | 350 | 345 | 370 | 350   | C          | 340 | 350 | 360 | 365   | 355 | 355 | 355 | 365 | 295 | 325 | 350 | 295 | 310 |     |     |     |     |   |     |
| 17          | 310      | 335 | 340 | 320 | 310  | 315        | 330 | 335 | 360 | 335   | 330        | 320 | 350 | 340 | 335   | 345 | 360 | 375 | 365 | 350 | 340 | 360 | 340 | 335 |     |     |     |     |   |     |
| 18          | 325      | F   | F   | F   | F    | F          | F   | 335 | 375 | 370   | 340        | 335 | 350 | 355 | 365   | 360 | 350 | 350 | 370 | 335 | 340 | 375 | 310 | 320 |     |     |     |     |   |     |
| 19          | 320      | 285 | F   | 350 | 335  | 320        | 335 | 365 | 360 | 375   | 315        | 345 | 365 | 345 | 320   | H   | J   | R   | J   | R   | J   | R   | 340 | 340 | 340 | 350 | F   | F   |   |     |
| 20          | F        | 320 | 340 | 345 | 345  | 325        | 310 | 320 | 370 | 360   | 330        | 345 | 360 | 355 | H   | 320 | 340 | 345 | 365 | 340 | 330 | 335 | 350 | 305 | 285 |     |     |     |   |     |
| 21          | 300      | 350 | 285 | 285 | 315  | 345        | 335 | 345 | 350 | 335   | H          | 330 | 325 | 345 | 360   | 320 | 350 | 365 | 375 | 350 | 360 | A   | A   | 290 | S   |     |     |     |   |     |
| 22          | A        | 305 | 305 | 335 | 355  | 325        | 325 | 325 | 375 | 360   | 330        | 365 | 365 | 375 | 335   | 330 | 350 | 365 | 365 | 365 | 365 | 300 | 310 | 340 | 330 |     |     |     |   |     |
| 23          | 295      | 295 | 285 | 315 | 310  | 295        | 310 | 345 | 385 | 340   | 335        | 335 | 355 | 340 | 330   | F   | J   | R   | 335 | 355 | S   | 375 | 350 | J   | S   | 330 | 310 | 315 |   |     |
| 24          | 295      | C   | C   | C   | C    | 345        | 310 | F   | 335 | 370   | 350        | 340 | 345 | 365 | 370   | U   | H   | 310 | 340 | 360 | 350 | 320 | 295 | 315 | 285 | 345 | 305 |     |   |     |
| 25          | 320      | 305 | 300 | 335 | 320  | F          | 310 | F   | 350 | 390   | 385        | 350 | 340 | 345 | 360   | 345 | R   | 340 | 355 | 360 | 350 | 335 | 320 | 345 | 310 | 320 |     |     |   |     |
| 26          | 325      | 315 | 335 | 345 | 310  | 305        | 325 | 335 | 350 | 360   | 345        | 345 | 325 | 370 | 340   | H   | 345 | 355 | 360 | 335 | 290 | 310 | 325 | 330 | 310 |     |     |     |   |     |
| 27          | 300      | U   | S   | 370 | 310  | 325        | 310 | F   | 305 | 345   | 360        | 320 | C   | C   | C   | C   | C   | C   | 365 | 390 | 290 | 335 | 320 | 295 | 305 |     |     |     |   |     |
| 28          | 315      | 310 | 350 | 380 | A    | J          | S   | 305 | 315 | 315   | 360        | 360 | 335 | H   | 335   | H   | 360 | 370 | 335 | 365 | 355 | 355 | S   | 310 | U   | S   | 310 | S   | S | 300 |
| 29          | U        | S   | 290 | 305 | 340  | 320        | 290 | 305 | 320 | 345   | 360        | 325 | 315 | 355 | I   | C   | I   | C   | 360 | 375 | 335 | 300 | 340 | 350 | 300 | 325 |     |     |   |     |
| 30          | 290      | S   | 305 | U   | F    | J          | S   | 395 | S   | 325   | 320        | 360 | 375 | 365 | C   | C   | C   | C   | C   | 370 | 390 | 380 | 315 | 340 | 360 | 295 | 300 |     |   |     |
| 31          | 320      | S   | 300 | 280 | 325  | U          | S   | S   | A   | 345   | 370        | 345 | 325 | C   | U   | R   | U   | R   | 330 | 335 | 365 | 370 | A   | A   | 330 | 305 | 360 | A   |   |     |
| CNT         | 24       | 24  | 25  | 26  | 27   | 22         | 23  | 30  | 31  | 31    | 30         | 28  | 28  | 28  | 27  | 30  | 31  | 29  | 28  | 29  | 30  | 27  | 25  |     |     |     |     |     |   |     |
| MED         | 305      | 312 | 335 | 342 | 345  | 322        | 325 | 335 | 360 | 360   | 340        | 345 | 358 | 358 | 340   | 345 | 360 | 365 | 350 | 328 | 335 | 332 | 310 | 310 |     |     |     |     |   |     |
| UQ          | 322      | 322 | 340 | 365 | 368  | 325        | 328 | 345 | 372 | 368   | 345        | 365 | 365 | 362 | 352   | 355 | 365 | 375 | 365 | 340 | 340 | 350 | 340 | 325 |     |     |     |     |   |     |
| LQ          | 300      | 302 | 305 | 325 | 320  | 305        | 310 | 320 | 352 | 345   | 330        | 338 | 348 | 350 | 328   | 335 | 350 | 355 | 340 | 312 | 320 | 320 | 305 | 300 |     |     |     |     |   |     |

JAN. 1987 M(3000)F2 (0.01)

# IONOSPHERIC DATA

JAN. 1987

M(3000)F1 (0.01)

135 E Mean Time (G.M.T. + 9h)

Station YAMAGAWA Lat. 31 12.1 N. Long.130 37.1 E Sweep 1 MHz to 25 MHz in 24sec in automatic operation

| Hour<br>Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08         | 09         | 10         | 11         | 12         | 13         | 14         | 15         | 16         | 17  | 18 | 19 | 20 | 21 | 22 | 23 |
|-------------|----|----|----|----|----|----|----|----|------------|------------|------------|------------|------------|------------|------------|------------|------------|-----|----|----|----|----|----|----|
| 1           |    |    |    |    |    |    |    |    | L          | L          | 350        | 375        | L          | C          | C          | C          | L          | A   |    |    |    |    |    |    |
| 2           |    |    |    |    |    |    |    |    |            |            | 350        | 385        | A          | 385        | L          | L          | L          |     |    |    |    |    |    |    |
| 3           |    |    |    |    |    |    |    |    | L          |            | 360        | 375        | C          | 375        | 375        | L          | L          | A   |    |    |    |    |    |    |
| 4           |    |    |    |    |    |    |    | A  | L          | 375        | 375        | 385        | 390        | 395        | L          | C          | L          |     |    |    |    |    |    |    |
| 5           |    |    |    |    |    |    |    |    | L          | L          | A          | A          | U L<br>380 | 375        | U L<br>390 | L          |            |     |    |    |    |    |    |    |
| 6           |    |    |    |    |    |    |    |    |            |            | U L<br>375 | 380        | 380        | 380        | U L<br>355 | U L<br>370 |            |     |    |    |    |    |    |    |
| 7           |    |    |    |    |    |    |    |    |            |            | A          | A          | H<br>390   | 365        | A          | L          | L          |     |    |    |    |    |    |    |
| 8           |    |    |    |    |    |    |    |    | 405        | U L<br>360 | L<br>355   | 390        | 380        | U L<br>365 | L          | A          |            |     |    |    |    |    |    |    |
| 9           |    |    |    |    |    |    |    |    |            |            | A          | 430        | 380        | 380        | U L<br>375 | A          | A          |     |    |    |    |    |    |    |
| 10          |    |    |    |    |    |    |    |    |            |            | L<br>365   | A          | U L<br>400 | 390        | U L<br>420 | U L<br>405 |            |     |    |    |    |    |    |    |
| 11          |    |    |    |    |    |    |    |    |            |            | L<br>370   | U L<br>365 | L<br>380   | 400        | U L<br>365 | L          | L          |     |    |    |    |    |    |    |
| 12          |    |    |    |    |    |    |    |    | L          | L          | 375        | 380        | 365        | L          | L          | L          |            |     |    |    |    |    |    |    |
| 13          |    |    |    |    |    |    |    |    |            | L          | L          | 375        | U L<br>380 | 370        | 375        | L          |            |     |    |    |    |    |    |    |
| 14          |    |    |    |    |    |    |    |    |            | L          | L          | L<br>390   | 380        | 390        | 380        | 380        | L          |     |    |    |    |    |    |    |
| 15          |    |    |    |    |    |    |    |    |            | L          | L          | 375        | 400        | L<br>390   | U L        | L          | L          |     |    |    |    |    |    |    |
| 16          |    |    |    |    |    |    |    |    |            | L          | C          | I<br>385   | 380        | 390        | 390        | L          | L          |     |    |    |    |    |    |    |
| 17          |    |    |    |    |    |    |    |    |            | L          | L          | 370        | L          | 380        | 380        | L          | L          |     |    |    |    |    |    |    |
| 18          |    |    |    |    |    |    |    |    |            |            | L          | 370        | L          | L          | L          | L          | L          |     |    |    |    |    |    |    |
| 19          |    |    |    |    |    |    |    |    | L          | L          | U L<br>395 | 390        | 365        | 380        | 390        | 360        | 370        | H   |    |    |    |    |    |    |
| 20          |    |    |    |    |    |    |    |    |            | L          | L          | 380        | 390        | H<br>390   | L          | H<br>370   | L          | L   |    |    |    |    |    |    |
| 21          |    |    |    |    |    |    |    |    | H<br>395   |            | L          | A          | A          | A          | 370        | L          | A          |     |    |    |    |    |    |    |
| 22          |    |    |    |    |    |    |    |    |            | L          | L          | 360        | 370        | 380        | U L<br>390 | L          | L          |     |    |    |    |    |    |    |
| 23          |    |    |    |    |    |    |    |    |            | L          | A          | A          | 365        | L          | A          | A          | L          | A   |    |    |    |    |    |    |
| 24          |    |    |    |    |    |    |    |    |            | L          | 410        | 365        | 390        | A          | A          | L          | L          |     |    |    |    |    |    |    |
| 25          |    |    |    |    |    |    |    |    |            | L          | H<br>410   | 360        | 380        | 370        | H<br>370   | A          | L          | 360 | L  | L  |    |    |    |    |
| 26          |    |    |    |    |    |    |    |    |            | L          | L<br>420   | U L<br>360 | 390        | 370        | 390        | 390        | U L<br>360 | L   |    |    |    |    |    |    |
| 27          |    |    |    |    |    |    |    |    |            | L          | L          | 395        | C          | C          | C          | C          | C          | C   |    |    |    |    |    |    |
| 28          |    |    |    |    |    |    |    |    |            | L          | U L<br>380 | A          | A          | A          | 355        | U L<br>380 | L          | L   |    |    |    |    |    |    |
| 29          |    |    |    |    |    |    |    |    |            | L          | L          | U L<br>400 | 400        | 355        | I C<br>375 | I C<br>370 | U L<br>360 |     |    |    |    |    |    |    |
| 30          |    |    |    |    |    |    |    |    |            | L          | L          |            | C          | C          | C          | C          | C          |     |    |    |    |    |    |    |
| 31          |    |    |    |    |    |    |    |    |            | L          | U L<br>370 | L<br>375   | I C<br>380 | 415        | 380        | A          | A          | A   |    |    |    |    |    |    |
|             | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08         | 09         | 10         | 11         | 12         | 13         | 14         | 15         | 16         | 17  | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT         |    |    |    |    |    |    |    |    | 2          | 6          | 17         | 23         | 19         | 21         | 19         | 8          | 1          |     |    |    |    |    |    |    |
| MED         |    |    |    |    |    |    |    |    | 405        | 408        | L<br>370   | 380        | 380        | 380        | 375        | L<br>365   | U L<br>370 | H   |    |    |    |    |    |    |
| UQ          |    |    |    |    |    |    |    |    | 410        | 375        | L<br>375   | 390        | 388        | 390        | 390        | L<br>385   | U L        |     |    |    |    |    |    |    |
| LQ          |    |    |    |    |    |    |    |    | U L<br>380 | 360        | 375        | 370        | 380        | 370        | 380        | L<br>360   |            |     |    |    |    |    |    |    |

JAN. 1987

M(3000)F1 (0.01)

# IONOSPHERIC DATA

JAN. 1987

H<sup>o</sup>F<sub>2</sub> (KM)

135° E Mean Time (G.M.T. + 9h)

| Station     | YAMAGAWA |    |    |    |    |    |    | Lat. 31 12.1 N. |     | Long. 130 37.1 E |         | Sweep 1 MHz to 25 MHz in 2 sec in automatic operation |         |         |         |       |     |     |    |    |    |    |    |    |
|-------------|----------|----|----|----|----|----|----|-----------------|-----|------------------|---------|---|---------|---------|---------|-------|-----|-----|----|----|----|----|----|----|
| Hour<br>Day | 00       | 01 | 02 | 03 | 04 | 05 | 06 | 07              | 08  | 09               | 10      | 11  | 12      | 13      | 14      | 15    | 16  | 17  | 18 | 19 | 20 | 21 | 22 | 23 |
| 1           |          |    |    |    |    |    |    |                 | 245 | U L 255          | 280     | 240   | 240     | C       | C       | C     | 235 | 215 |    |    |    |    |    |    |
| 2           |          |    |    |    |    |    |    |                 |     | 280              | 240     | 240   | 240     | 260     | 245     | L 235 |     |     |    |    |    |    |    |    |
| 3           |          |    |    |    |    |    |    |                 |     | 275              | 255     | 245   | C       | 245     | 250     | 240   | 240 | 205 |    |    |    |    |    |    |
| 4           |          |    |    |    |    |    |    |                 | 210 | 230              | 300     | 245   | 265     | 250     | L 265   | C     | 245 |     |    |    |    |    |    |    |
| 5           |          |    |    |    |    |    |    |                 |     | 225              | 260     | 235   | 230     | 245     | 270     | 250   | 235 |     |    |    |    |    |    |    |
| 6           |          |    |    |    |    |    |    |                 |     | 260              | 250     | 230   | 245     | 250     | L 255   |       |     |     |    |    |    |    |    |    |
| 7           |          |    |    |    |    |    |    |                 |     | 260              | E A 280 | 295   | 245     | 255     | 245     |       |     |     |    |    |    |    |    |    |
| 8           |          |    |    |    |    |    |    |                 | 225 | 250              | 270     | 235   | 250     | 250     | 245     | 240   |     |     |    |    |    |    |    |    |
| 9           |          |    |    |    |    |    |    |                 |     | 250              | 250     | 240   | 300     | 245     | 250     | A 240 |     |     |    |    |    |    |    |    |
| 10          |          |    |    |    |    |    |    |                 |     | 295              | 235     | 235   | 250     | 255     | L 250   |       |     |     |    |    |    |    |    |    |
| 11          |          |    |    |    |    |    |    |                 | 220 | 275              | 265     | 245   | 245     | 275     | L 245   | 225   |     |     |    |    |    |    |    |    |
| 12          |          |    |    |    |    |    |    |                 | 230 | 230              | 295     | 250   | 240     | 235     | 250     | 250   |     |     |    |    |    |    |    |    |
| 13          |          |    |    |    |    |    |    |                 | 250 | 250              | 250     | 260   | 270     | 265     | 250     |       |     |     |    |    |    |    |    |    |
| 14          |          |    |    |    |    |    |    |                 | 250 | 260              | 250     | 255   | 265     | 265     | 240     |       |     |     |    |    |    |    |    |    |
| 15          |          |    |    |    |    |    |    |                 | 240 | 250              | 240     | 240   | 275     | 260     | 270     |       |     |     |    |    |    |    |    |    |
| 16          |          |    |    |    |    |    |    |                 | 250 | C                | 280     | 260   | 250     | 250     | 250     | 250   |     |     |    |    |    |    |    |    |
| 17          |          |    |    |    |    |    |    |                 | 250 | 280              | 260     | 250   | 255     | 280     | 275     | 240   |     |     |    |    |    |    |    |    |
| 18          |          |    |    |    |    |    |    |                 |     | 270              | 275     | 250   | 255     | 255     | 250     | 250   |     |     |    |    |    |    |    |    |
| 19          |          |    |    |    |    |    |    |                 | 220 | 235              | U L 265 | 270   | 240     | 260     | 270     | 265   | 250 |     |    |    |    |    |    |    |
| 20          |          |    |    |    |    |    |    |                 | 285 | 285              | 260     | 240   | 240     | 310     | 255     | 230   |     |     |    |    |    |    |    |    |
| 21          |          |    |    |    |    |    |    |                 | 235 |                  | 270     | A 285   | 250     | 240     | 310     | 255   | 240 |     |    |    |    |    |    |    |
| 22          |          |    |    |    |    |    |    |                 |     | 230              | 265     | 250   | 245     | 240     | U L 265 | 270   | 250 |     |    |    |    |    |    |    |
| 23          |          |    |    |    |    |    |    |                 |     | U L 240          | 270     | 275   | 245     | 250     | 280     | 265   | 255 | 220 |    |    |    |    |    |    |
| 24          |          |    |    |    |    |    |    |                 | 220 | 240              | 280     | 260   | 240     | 250     | 240     | 285   | 240 |     |    |    |    |    |    |    |
| 25          |          |    |    |    |    |    |    |                 | 205 | 220              | 270     | 255   | 260     | 250     | 280     | 260   | 230 | 215 |    |    |    |    |    |    |
| 26          |          |    |    |    |    |    |    |                 | 235 | 225              | 270     | 270   | 280     | 245     | 250     | 260   | 240 |     |    |    |    |    |    |    |
| 27          |          |    |    |    |    |    |    |                 | 250 | 240              | 255     | C   | C       | C       | C       | C     | C   |     |    |    |    |    |    |    |
| 28          |          |    |    |    |    |    |    |                 | 235 | 255              | 260     | 275   | 235     | 250     | 245     | L 250 | 235 |     |    |    |    |    |    |    |
| 29          |          |    |    |    |    |    |    |                 | 235 | 245              | L 300   | 260   | I C 250 | I C 270 | 265     |       |     |     |    |    |    |    |    |    |
| 30          |          |    |    |    |    |    |    |                 | 235 | 245              | 255     | C   | C       | C       | C       | C     |     |     |    |    |    |    |    |    |
| 31          |          |    |    |    |    |    |    |                 | 230 | 275              | 300     | I C 300   | 255     | 240     | 245     | 250   | 225 |     |    |    |    |    |    |    |
| Hour<br>Day | 00       | 01 | 02 | 03 | 04 | 05 | 06 | 07              | 08  | 09               | 10      | 11  | 12      | 13      | 14      | 15    | 16  | 17  | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT         |          |    |    |    |    |    |    |                 | 13  | 24               | 29      | 29  | 28      | 28      | 28      | 27    | 21  | 4   |    |    |    |    |    |    |
| MED         |          |    |    |    |    |    |    |                 | 235 | 240              | 270     | 258   | 245     | 250     | 260     | 250   | 240 | 215 |    |    |    |    |    |    |
| UQ          |          |    |    |    |    |    |    |                 | 235 | 250              | 280     | 272   | 258     | 252     | 270     | 262   | 245 | 213 |    |    |    |    |    |    |
| LQ          |          |    |    |    |    |    |    |                 | 220 | 230              | 260     | 250   | 240     | 245     | 250     | 250   | 235 | 210 |    |    |    |    |    |    |

JAN. 1987

H<sup>o</sup>F<sub>2</sub> (KM)



# IONOSPHERIC DATA

JAN. 1987

H\*F (KM)

135 E Mean Time (G.M.T. + 9h)

| Station | YAMAGAWA |     |     |     |     |     |     | Lat. 31 12.1 N |     | Long. 130 37.1 E |     | Sweep 1 MHz to 25 MHz in 2sec in automatic operation |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|---------|----------|-----|-----|-----|-----|-----|-----|----------------|-----|------------------|-----|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|         | Hour     | 00  | 01  | 02  | 03  | 04  | 05  | 06             | 07  | 08               | 09  | 10   | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  |     |     |     |
| 1       | E S      | E A | S   | E S | E S | E S | E S | E S            | 240 | 240              | A   | 225  | 210 | C   | C   | C   | 245 | A   | A   | S   | E S | E S | E S | E S |     |     |     |     |
| 2       | S        | S   | S   | E S | E S | S   | E S | E S            | 230 | 240              | 245 | E A  | A   | 200 | 200 | 210 | 235 | 210 | E S | E S | E S | A   | E S | E S |     |     |     |     |
| 3       | E S      | E S | A   | E A | S   | S   | S   | E S            | 240 | 245              | 225 | 205  | C   | 210 | 200 | 210 | A   | A   | E S | E S | 240 | E S | E S | E S |     |     |     |     |
| 4       | E S      | E S | E S | E S | E S | E S | E S | E S            | A   | H                | A   | A  | A   | 190 | 205 | 190 | C   | 215 | 215 | 200 | E S | E S | E S | E S |     |     |     |     |
| 5       | 250      | E S | E S | 235 | E S | E S | E S | 245            | 210 | A                | A   | A  | A   | 180 | H   | H   | 210 | 215 | 205 | 200 | 220 | E S | E S | E S |     |     |     |     |
| 6       | A        | E S | 245 | 225 | 215 | 230 | 245 | 250            | 235 | 230              | 220 | 205  | 205 | 210 | 195 | H   | 235 | 220 | 205 | E A | E S | E S | E S | E S |     |     |     |     |
| 7       | 250      | S   | E S | 240 | E S | E S | E S | A              | 210 | 230              | A   | A  | 195 | 180 | A   | 220 | 205 | 220 | 225 | A   | A   | E S | A   | 265 |     |     |     |     |
| 8       | E A      | A   | 280 | 265 | E S | E S | E S | E S            | 235 | 215              | 240 | E A  | 195 | H   | 200 | 240 | 220 | A   | 215 | A   | A   | 255 | 245 | 230 | 210 |     |     |     |
| 9       | A        | 300 | 300 | 250 | 220 | A   | E S | E A            | 225 | 235              | A   | A  | 185 | 175 | 185 | 230 | A   | A   | 250 | 215 | 250 | 225 | E S | E S | E S |     |     |     |
| 10      | E S      | E S | E S | E A | 215 | E S | E S | E S            | 210 | 215              | 205 | A  | 195 | H   | 195 | 170 | 230 | 225 | 225 | E A | E S | 250 | 250 | 245 |     |     |     |     |
| 11      | E S      | E S | 260 | 230 | 205 | E S | E S | 235            | 180 | H                | 220 | 210  | 185 | 170 | 195 | 180 | 180 | 220 | H   | 235 | E S | 225 | 230 | E S | 250 |     |     |     |
| 12      | S        | 220 | E A | 200 | 200 | 205 | E S | 240            | 190 | H                | H   | 205  | 215 | E A | H   | H   | 210 | 225 | 220 | E A | E S | 220 | E S | E S | S   |     |     |     |
| 13      | E S      | E S | E S | 205 | 210 | A   | S   | E S            | 235 | 230              | 220 | 220  | 195 | H   | 190 | H   | 225 | 230 | 210 | H   | 210 | E A | 230 | E S | E S | E S |     |     |
| 14      | E S      | E S | E S | 205 | E S | E S | E S | E S            | 225 | H                | 200 | 225  | 200 | H   | H   | H   | H   | A   | H   | A   | E A | E S | S   | S   | E S |     |     |     |
| 15      | E S      | E S | E S | 225 | 220 | E S | E S | E S            | 230 | 225              | 220 | 200  | H   | 235 | 195 | H   | 220 | 205 | 240 | H   | 225 | 205 | 210 | E S | E S | E S |     |     |
| 16      | E S      | E S | E S | 215 | 190 | S   | E S | E S            | 235 | 230              | C   | 210  | H   | H   | 220 | 210 | 200 | 210 | 220 | 220 | E S | E S | E S | E S | E S |     |     |     |
| 17      | E S      | 245 | 230 | 245 | E S | E S | E S | S              | 225 | 200              | 235 | 245  | 205 | 200 | 200 | 210 | 240 | 225 | 215 | E S | E S | 215 | E S | E S | E S |     |     |     |
| 18      | E S      | E S | E S | 245 | E S | E S | E S | S              | 225 | 225              | 230 | 225  | 230 | 200 | H   | 220 | 220 | 220 | 220 | 205 | 225 | S   | 230 | 225 | E S | 245 |     |     |
| 19      | E S      | E S | E S | E S | E S | E S | E S | S              | 220 | 195              | 220 | 215  | 225 | 195 | H   | 200 | 205 | 205 | 220 | 210 | 205 | 215 | E S | E S | E S | E S |     |     |
| 20      | E S      | E S | E S | E S | E S | E S | E S | S              | 225 | 215              | 215 | 225  | 200 | H   | 200 | 190 | H   | 225 | 230 | 215 | E S | E S | E A | 210 | E S | E S | 320 |     |
| 21      | E S      | E S | E S | E S | E S | E S | E S | S              | 180 | 240              | 265 | A  | A   | A   | 200 | 240 | A   | 225 | E A | E A | A   | A   | A   | E S | E A | 255 |     |     |
| 22      | A        | E A | E A | E A | 235 | E S | E S | E S            | 215 | 235              | 205 | 240  | 230 | 205 | 195 | 185 | 235 | 230 | 205 | 200 | E S | E S | E S | E S | 250 |     |     |     |
| 23      | E S      | E S | E S | E S | E S | E S | E S | S              | 205 | 205              | A   | A  | A   | H   | 240 | A   | A   | 230 | A   | A   | 200 | 200 | S   | 230 | 250 | A   | E S | 280 |
| 24      | E C      | E C | E C | E C | E C | E C | E S | E S            | 190 | 190              | 225 | 205  | A   | A   | 205 | 205 | 225 | 230 | 220 | 210 | A   | S   | A   | S   | E S | E S |     |     |
| 25      | E S      | E S | E S | E S | E S | E S | E S | S              | 210 | 195              | 255 | 205  | 190 | A   | 205 | 205 | 210 | H   | 205 | 205 | E S | E S | E S | E S | E S | E S |     |     |
| 26      | S        | S   | S   | 225 | S   | S   | E S | E S            | 200 | 195              | 205 | 205  | H   | H   | 220 | 195 | 210 | 220 | 220 | A   | E A | 255 | 245 | 235 | 245 |     |     |     |
| 27      | 285      | 285 | 215 | 230 | 255 | E S | E S | E S            | 220 | 215              | 200 | C  | C   | C   | C   | C   | C   | C   | 220 | 200 | E S | 245 | 235 | E S | 260 |     |     |     |
| 28      | 270      | 270 | 225 | 205 | A   | S   | E S | S              | 220 | 195              | A   | A  | A   | 200 | 205 | 200 | 185 | 220 | 215 | 240 | S   | 270 | 245 | 280 | 255 |     |     |     |
| 29      | 255      | 265 | 240 | 230 | 225 | E S | E S | S              | 180 | 205              | 195 | 195  | 275 | I   | C   | I   | C   | A   | H   | S   | S   | 230 | 220 | E S | S   | S   |     |     |
| 30      | E S      | E S | E S | 245 | 200 | S   | E S | S              | 220 | 205              | E C | C  | C   | C   | C   | C   | 200 | 205 | 205 | E S | 245 | 210 | E S | E S | E S |     |     |     |
| 31      | E S      | E S | S   | E S | A   | A   | A   | 245            | 185 | H                | H   | I  | C   | 200 | 195 | A   | A   | A   | A   | A   | A   | E A | E A | E A | A   |     |     |     |
|         | 00       | 01  | 02  | 03  | 04  | 05  | 06  | 07             | 08  | 09               | 10  | 11   | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  |     |     |     |     |
| CNT     | 29       | 30  | 30  | 31  | 29  | 24  | 28  | 30             | 30  | 30               | 24  | 23   | 23  | 25  | 25  | 24  | 26  | 28  | 29  | 28  | 28  | 30  | 30  | 29  |     |     |     |     |
| MED     | E S      | E S | E S | U   | U   | E S | E S | E S            | 220 | 215              | 220 | 208  | 200 | 200 | 200 | 210 | 222 | 220 | 210 | E S | U S | U S | E S | E S | E S |     |     |     |
| UQ      | E S      | E S | E S | E S | E S | E S | E S | E S            | 230 | 230              | 228 | 222  | 213 | 205 | 210 | 220 | 230 | 225 | 222 | E S | E S | E S | E S | E S | E S |     |     |     |
| LQ      | E S      | E S | U   | 218 | 215 | E S | E S | S              | 205 | 200              | 205 | 202  | 195 | H   | H   | H   | 200 | 210 | 208 | 205 | U S | S   | E S | U S | U S |     |     |     |

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# IONOSPHERIC DATA

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135° E Mean Time (G.M.T. + 9h)

| Station     |    | YAMAGAWA |    |    |    |    |    |    | Lat. 31 12.1 N. |       | Long. 130 37.1 E |         | Sweep 1 MHz to 25 MHz in 2 sec in automatic operation |         |         |         |         |     |         |     |    |    |    |    |  |
|-------------|----|----------|----|----|----|----|----|----|-----------------|-------|------------------|---------|---|---------|---------|---------|---------|-----|---------|-----|----|----|----|----|--|
| Hour<br>Day | 00 | 01       | 02 | 03 | 04 | 05 | 06 | 07 | 08              | 09    | 10               | 11      | 12  | 13      | 14      | 15      | 16      | 17  | 18      | 19  | 20 | 21 | 22 | 23 |  |
| 1           |    |          |    |    |    |    |    |    | S               | 110   | 105              | A       | 105   | C       | C       | C       | A       | S   |         |     |    |    |    |    |  |
| 2           |    |          |    |    |    |    |    |    | S               | H 115 | 110              | 110     | H 110   | 110     | 110     | A       | 115     | S   |         |     |    |    |    |    |  |
| 3           |    |          |    |    |    |    |    |    | S               | 110   | 110              | 110     | C   | A       | A       | A       | A       | A   |         |     |    |    |    |    |  |
| 4           |    |          |    |    |    |    |    |    | A               | A     | A                | A       | A   | A       | A       | C       | A       | S   |         |     |    |    |    |    |  |
| 5           |    |          |    |    |    |    |    |    | E C 135         | 110   | A                | 105     | A   | 110     | E A 115 | E A 115 | E A 140 | S   |         |     |    |    |    |    |  |
| 6           |    |          |    |    |    |    |    |    | 130             | 110   | 105              | A       | 105   | 105     | 105     | A       | A       | S   |         |     |    |    |    |    |  |
| 7           |    |          |    |    |    |    |    |    | E S 130         | 110   | 105              | 105     | A   | A       | A       | A       | A       | S   |         |     |    |    |    |    |  |
| 8           |    |          |    |    |    |    |    |    | A               | A     | A                | A       | A   | A       | A       | A       | A       | S   |         |     |    |    |    |    |  |
| 9           |    |          |    |    |    |    |    |    | A               | A     | A                | A       | A   | A       | A       | A       | A       | A   |         |     |    |    |    |    |  |
| 10          |    |          |    |    |    |    |    |    | S               | A     | 105              | 105     | A   | A       | 115     | E A 120 | A       | A   |         |     |    |    |    |    |  |
| 11          |    |          |    |    |    |    |    |    | E S 140         | 105   | 105              | 105     | A   | A       | A       | 120     | 115     | 120 | E S 125 |     |    |    |    |    |  |
| 12          |    |          |    |    |    |    |    |    | S               | 120   | 110              | 110     | 105   | A       | A       | A       | A       | A   | S       | 120 |    |    |    |    |  |
| 13          |    |          |    |    |    |    |    |    | E S 130         | 110   | 110              | 105     | 110   | A       | A       | A       | A       | S   |         |     |    |    |    |    |  |
| 14          |    |          |    |    |    |    |    |    | S               | 125   | 110              | 110     | 115   | 115     | 105     | 105     | A       | A   | A       |     |    |    |    |    |  |
| 15          |    |          |    |    |    |    |    |    | E S 130         | 115   | 110              | 110     | 105   | A       | 110     | 110     | 110     | S   |         |     |    |    |    |    |  |
| 16          |    |          |    |    |    |    |    |    | E S 140         | 110   | C                | 105     | 110   | A       | A       | A       | A       | S   |         |     |    |    |    |    |  |
| 17          |    |          |    |    |    |    |    |    | E S 140         | 110   | 105              | 105     | 110   | A       | A       | 105     | A       | S   |         |     |    |    |    |    |  |
| 18          |    |          |    |    |    |    |    |    | E S 125         | 115   | 110              | 110     | 110   | 110     | 110     | 110     | 115     | S   |         |     |    |    |    |    |  |
| 19          |    |          |    |    |    |    |    |    | S               | 110   | 110              | 110     | A   | 110     | A       | A       | A       | A   |         |     |    |    |    |    |  |
| 20          |    |          |    |    |    |    |    |    | S               | 110   | 110              | 110     | 110   | 110     | A       | 110     | H 110   | A   |         |     |    |    |    |    |  |
| 21          |    |          |    |    |    |    |    |    | S               | 110   | 110              | 105     | A   | A       | A       | A       | A       | A   |         |     |    |    |    |    |  |
| 22          |    |          |    |    |    |    |    |    | S               | 110   | A                | 110     | 110   | 110     | 105     | 110     | 105     | S   |         |     |    |    |    |    |  |
| 23          |    |          |    |    |    |    |    |    | S               | 110   | 110              | A       | 105   | A       | A       | A       | A       | A   |         |     |    | S  | S  |    |  |
| 24          |    |          |    |    |    |    |    |    | 120             | 110   | 110              | 110     | 110   | 110     | 110     | A       | A       | A   |         |     |    |    |    |    |  |
| 25          |    |          |    |    |    |    |    |    | S               | 110   | 105              | 105     | 110   | 105     | A       | A       | 110     | S   |         |     |    |    |    |    |  |
| 26          |    |          |    |    |    |    |    |    | 130             | 115   | 105              | 110     | 105   | 105     | E A 125 | E A 130 | E A 130 | A   |         |     |    |    |    |    |  |
| 27          |    |          |    |    |    |    |    |    | 125             | 110   | 105              | C       | C   | C       | C       | C       | C       | A   |         |     |    |    |    |    |  |
| 28          |    |          |    |    |    |    |    |    | 125             | 110   | 110              | A 115   | 110   | 105     | 105     | A       | 105     | 120 |         |     |    |    |    |    |  |
| 29          |    |          |    |    |    |    |    |    | A               | 110   | 105              | 105     | 105   | I C 115 | C       | A       | A       | A   |         |     |    |    |    |    |  |
| 30          |    |          |    |    |    |    |    |    | 115             | 110   | C                | C       | C   | C       | C       | C       | A       | 115 |         |     |    |    |    |    |  |
| 31          |    |          |    |    |    |    |    |    | E S 130         | 115   | 115              | I C 115 | 110   | 110     | 115     | A 125   | A       | A   |         |     |    |    |    |    |  |
|             | 00 | 01       | 02 | 03 | 04 | 05 | 06 | 07 | 08              | 09    | 10               | 11      | 12  | 13      | 14      | 15      | 16      | 17  | 18      | 19  | 20 | 21 | 22 | 23 |  |
| CNT         |    |          |    |    |    |    |    |    | 17              | 27    | 24               | 23      | 18  | 14      | 13      | 10      | 11      | 4   |         |     |    |    |    |    |  |
| MED         |    |          |    |    |    |    |    |    | E S 130         | 110   | 110              | 110     | 110   | 110     | 110     | 111     | 112     | 119 |         |     |    |    |    |    |  |
| UQ          |    |          |    |    |    |    |    |    | E S 130         | 110   | 110              | 110     | 110   | 110     | 112     | E A 120 | 116     | 121 | S       |     |    |    |    |    |  |
| LQ          |    |          |    |    |    |    |    |    | S 122           | 110   | 105              | 105     | 105   | 105     | 105     | 110     | 110     | 118 |         |     |    |    |    |    |  |

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135 E Mean Time (G.M.T. + 9h)

| Station | YAMAGAWA |     |     |     | Lat. 31 12.1 N |     |     |     | Long. 130 37.1 E |     |     |     | Sweep 1 MHz to 25 MHz in 2 sec in automatic operation |     |     |     |     |     |     |     |     |     |     |     |
|---------|----------|-----|-----|-----|----------------|-----|-----|-----|------------------|-----|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|         | Hour     | 00  | 01  | 02  | 03             | 04  | 05  | 06  | 07               | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  |
| 1       | S        | 100 | 100 | 100 | S              | S   | S   | S   | G                | 150 | 135 | 170 | 110   | C   | C   | C   | 100 | 95  | 100 | 100 | S   | S   | S   | S   |
| 2       | S        | 100 | S   | S   | S              | 100 | S   | S   | 155              | 155 | 130 | 120 | 115   | 125 | 110 | 110 | 160 | G   | S   | S   | S   | 115 | S   | S   |
| 3       | S        | 105 | 100 | 100 | 100            | 100 | S   | S   | 125              | 115 | 115 | 110 | C   | 110 | 110 | 105 | 105 | 100 | 100 | S   | S   | S   | S   |     |
| 4       | S        | S   | S   | S   | S              | 115 | S   | S   | 130              | 135 | 115 | 115 | 115   | 105 | 110 | C   | 105 | 140 | S   | 120 | S   | S   | S   | S   |
| 5       | S        | 115 | 105 | 105 | E.C.<br>110    | 100 | S   | S   | G                | 165 | 145 | 105 | 105   | 105 | 105 | 155 | 100 | 100 | 95  | 95  | 115 | 110 | 110 | 105 |
| 6       | 105      | 110 | 105 | 105 | 115            | 105 | 115 | 135 | 165              | 125 | 110 | 110 | 110   | 110 | 110 | 105 | 105 | 105 | 115 | 150 | 125 | 110 | 110 | 110 |
| 7       | 115      | 110 | 125 | 105 | 105            | 105 | 105 | 105 | 170              | 130 | 120 | 110 | 105   | 105 | 105 | 105 | 135 | 105 | 100 | 100 | 100 | 100 | 110 | 110 |
| 8       | 130      | 105 | 105 | 105 | 100            | 100 | 105 | 100 | 180              | 125 | 105 | 105 | 105   | 100 | 100 | 100 | 95  | 95  | 95  | 95  | 95  | 100 | 100 | 100 |
| 9       | 100      | 95  | 100 | 95  | 100            | 95  | 100 | 100 | 100              | 115 | 110 | 115 | 105   | 100 | 95  | 95  | 95  | 95  | 95  | 105 | S   | S   | S   | S   |
| 10      | 125      | 105 | 105 | 105 | 100            | 100 | 95  | 95  | 95               | 125 | 110 | 105 | 105   | 100 | 100 | 100 | 100 | 95  | 95  | 95  | 100 | 95  | 95  | 100 |
| 11      | 100      | 100 | S   | 105 | 105            | 105 | S   | 105 | G                | 170 | 120 | 160 | 105   | 105 | 100 | 100 | 105 | 100 | 95  | S   | 105 | 105 | S   | S   |
| 12      | S        | 100 | 100 | 100 | 100            | 100 | 100 | S   | G                | G   | 120 | 110 | 140   | 100 | 100 | 100 | 120 | G   | 100 | 100 | S   | S   | S   | S   |
| 13      | S        | S   | 120 | 100 | 100            | 100 | 100 | 100 | 170              | 170 | 150 | 140 | G   | 100 | 100 | 100 | 160 | 125 | 100 | 100 | S   | S   | S   | S   |
| 14      | S        | S   | 100 | 100 | 100            | 100 | S   | S   | G                | G   | 115 | 115 | 115   | 110 | G   | 100 | 100 | 100 | 100 | 100 | 100 | S   | 100 | 100 |
| 15      | S        | 115 | 110 | S   | S              | S   | S   | S   | 160              | 160 | 140 | 115 | 105   | 100 | 160 | G   | 165 | 130 | S   | S   | S   | S   | S   | S   |
| 16      | S        | S   | S   | S   | S              | S   | S   | S   | G                | G   | C   | 120 | G   | 100 | 100 | 100 | 100 | 100 | 100 | S   | 100 | S   | S   | S   |
| 17      | S        | S   | S   | S   | 110            | 105 | S   | S   | 170              | 175 | 170 | 115 | 120   | 100 | 115 | G   | 100 | 100 | 100 | S   | 100 | S   | S   | S   |
| 18      | S        | S   | S   | S   | S              | S   | S   | 120 | 165              | 140 | G   | 120 | 120   | 120 | G   | G   | G   | 110 | 100 | S   | S   | S   | S   | S   |
| 19      | S        | S   | 100 | 100 | 100            | S   | S   | S   | G                | G   | 165 | 150 | 170   | G   | 105 | 100 | 145 | 100 | 100 | 95  | S   | S   | S   | 115 |
| 20      | S        | 105 | S   | S   | S              | S   | S   | S   | G                | G   | 150 | 140 | 125   | G   | 110 | G   | 155 | 130 | 100 | 100 | 120 | S   | S   | S   |
| 21      | S        | S   | S   | S   | S              | S   | S   | S   | G                | G   | 145 | 130 | 130   | 120 | 115 | 110 | 105 | 105 | 105 | 105 | 105 | 105 | 100 | 105 |
| 22      | 100      | 100 | 110 | S   | 115            | 115 | 115 | 100 | 100              | G   | 160 | 135 | 120   | 115 | 110 | G   | G   | G   | S   | 110 | S   | 95  | S   | S   |
| 23      | S        | S   | 100 | S   | 100            | 105 | S   | S   | 120              | 115 | 110 | 110 | 105   | 105 | 100 | 100 | 95  | 95  | 95  | 95  | G   | G   | 140 | C   |
| 24      | C        | C   | C   | C   | C              | C   | 120 | 120 | G                | 115 | 110 | 110 | 110   | 110 | 110 | 110 | 145 | 145 | 100 | 120 | 110 | 110 | S   | 105 |
| 25      | 100      | 100 | 100 | 100 | 100            | S   | S   | S   | G                | G   | 165 | 110 | 115   | 105 | 105 | 105 | G   | 150 | S   | S   | S   | S   | S   | S   |
| 26      | 145      | S   | 125 | 110 | 115            | 110 | S   | S   | G                | 125 | 125 | 120 | 120   | G   | 105 | 100 | 100 | 100 | 100 | 100 | S   | S   | S   | S   |
| 27      | S        | S   | S   | S   | 100            | S   | S   | S   | G                | 120 | 120 | C   | C   | C   | C   | C   | C   | 115 | 115 | 110 | 95  | S   | S   | 130 |
| 28      | S        | 115 | 115 | 110 | 110            | 110 | S   | S   | 155              | 170 | 180 | 145 | 120   | 115 | 115 | 105 | G   | 165 | 105 | 105 | 100 | S   | 105 | S   |
| 29      | 110      | 110 | 105 | 105 | 105            | 105 | 100 | 100 | 120              | 175 | 165 | 170 | 155   | C   | C   | 130 | 115 | 110 | 120 | S   | 150 | 130 | 125 | S   |
| 30      | S        | S   | 125 | 110 | 110            | 110 | 115 | S   | G                | G   | C   | C   | C   | C   | C   | C   | 110 | 170 | 105 | 110 | 105 | 100 | 100 | 105 |
| 31      | S        | S   | 120 | 110 | 105            | 105 | 105 | 105 | G                | G   | G   | C   | 170   | 100 | 145 | 130 | 120 | 110 | 105 | 105 | 100 | 100 | 100 | 95  |
| CNT     | 10       | 17  | 21  | 19  | 21             | 22  | 12  | 12  | 16               | 21  | 27  | 28  | 26  | 24  | 25  | 22  | 26  | 23  | 26  | 22  | 17  | 13  | 12  | 12  |
| MED     | 108      | 105 | 105 | 105 | 102            | 105 | 105 | 102 | 155              | 135 | 125 | 115 | 115   | 105 | 105 | 102 | 105 | 105 | 100 | 100 | 100 | 105 | 102 | 105 |
| UQ      | 125      | 110 | 115 | 105 | 110            | 105 | 115 | 112 | 168              | 165 | 150 | 138 | 120   | 110 | 110 | 110 | 135 | 128 | 105 | 110 | 110 | 110 | 110 | 110 |
| LQ      | 100      | 100 | 100 | 100 | 100            | 100 | 100 | 100 | 120              | 125 | 115 | 110 | 105   | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

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TYPES OF ES

135 E Mean Time (G.M.T. + 9h)

| Station | YAMAGAWA         |                |                  |                  | Lat. 31 12.1 N |                |                |                | Long. 130 37.1 E |                  |                  |                  | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |                  |                  |                  |                   |                   |                  |                  |                   |                |                |                |                |  |
|---------|------------------|----------------|------------------|------------------|----------------|----------------|----------------|----------------|------------------|------------------|------------------|------------------|---|------------------|------------------|------------------|-------------------|-------------------|------------------|------------------|-------------------|----------------|----------------|----------------|----------------|--|
|         | Hour             | 00             | 01               | 02               | 03             | 04             | 05             | 06             | 07               | 08               | 09               | 10               | 11  | 12               | 13               | 14               | 15                | 16                | 17               | 18               | 19                | 20             | 21             | 22             | 23             |  |
| 1       |                  | F <sub>3</sub> | F <sub>2</sub>   | F <sub>2</sub>   |                |                |                |                |                  | H <sub>3</sub>   | H <sub>4</sub>   | HL <sub>11</sub> | C <sub>1</sub>  |                  |                  |                  | L <sub>1</sub>    | L <sub>5</sub>    | F <sub>6</sub>   | F <sub>3</sub>   |                   |                |                |                |                |  |
| 2       |                  | F <sub>4</sub> |                  |                  |                | F <sub>3</sub> |                |                |                  | H <sub>4</sub>   | HH <sub>12</sub> | H <sub>3</sub>   | C <sub>4</sub>  | C <sub>3</sub>   | H <sub>2</sub>   | C <sub>4</sub>   | L <sub>4</sub>    | H <sub>2</sub>    |                  |                  |                   |                | F <sub>2</sub> |                |                |  |
| 3       |                  | F <sub>2</sub> | F <sub>5</sub>   | F <sub>6</sub>   | F <sub>2</sub> | F <sub>4</sub> |                |                |                  | C <sub>6</sub>   | C <sub>4</sub>   | C <sub>3</sub>   | C <sub>3</sub>  |                  | L <sub>2</sub>   | L <sub>3</sub>   | L <sub>3</sub>    | L <sub>6</sub>    | L <sub>5</sub>   | F <sub>2</sub>   |                   |                |                |                |                |  |
| 4       |                  |                |                  |                  |                | F <sub>1</sub> |                |                |                  | HL <sub>51</sub> | HL <sub>31</sub> | CL <sub>41</sub> | CL <sub>21</sub>                                      | LL <sub>21</sub> | LH <sub>21</sub> | L <sub>2</sub>   |                   | L <sub>4</sub>    | H <sub>5</sub>   | F <sub>1</sub>   | F <sub>4</sub>    |                |                |                |                |  |
| 5       |                  | F <sub>2</sub> | F <sub>2</sub>   | F <sub>1</sub>   | F <sub>1</sub> | F <sub>3</sub> |                |                |                  | H <sub>2</sub>   | HL <sub>32</sub> | C <sub>5</sub>   | CL <sub>43</sub>                                      | L <sub>2</sub>   | L <sub>2</sub>   | HL <sub>22</sub> | L <sub>1</sub>    | L <sub>1</sub>    | F <sub>3</sub>   | F <sub>3</sub>   | FFF <sub>11</sub> | F <sub>2</sub> | F <sub>2</sub> | F <sub>3</sub> |                |  |
| 6       | F <sub>4</sub>   | F <sub>2</sub> | F <sub>2</sub>   | F <sub>2</sub>   | F <sub>1</sub> | F <sub>2</sub> | F <sub>1</sub> | F <sub>1</sub> | H <sub>3</sub>   | CH <sub>11</sub> | C <sub>3</sub>   | LL <sub>22</sub> | C <sub>3</sub>  | C <sub>2</sub>   | CL <sub>31</sub> | L <sub>5</sub>   | LH <sub>22</sub>  | L <sub>3</sub>    | F <sub>3</sub>   | F <sub>1</sub>   | F <sub>2</sub>    | F <sub>3</sub> | F <sub>2</sub> | F <sub>2</sub> |                |  |
| 7       | F <sub>2</sub>   | F <sub>2</sub> | FF <sub>12</sub> | F <sub>2</sub>   | F <sub>2</sub> | F <sub>2</sub> | F <sub>2</sub> | F <sub>6</sub> | H <sub>1</sub>   | H <sub>3</sub>   | C <sub>4</sub>   | C <sub>4</sub>   | L <sub>2</sub>  | L <sub>2</sub>   | L <sub>4</sub>   | L <sub>3</sub>   | HL <sub>12</sub>  | L <sub>4</sub>    | F <sub>4</sub>   | F <sub>4</sub>   | F <sub>6</sub>    | F <sub>2</sub> | F <sub>2</sub> | F <sub>2</sub> |                |  |
| 8       | FF <sub>23</sub> | F <sub>7</sub> | F <sub>3</sub>   | F <sub>2</sub>   | F <sub>2</sub> | F <sub>2</sub> | F <sub>3</sub> | F <sub>3</sub> | HL <sub>32</sub> | CL <sub>32</sub> | L <sub>3</sub>   | L <sub>3</sub>   | L <sub>3</sub>  | L <sub>3</sub>   | L <sub>3</sub>   | LH <sub>21</sub> | L <sub>6</sub>    | L <sub>6</sub>    | F <sub>5</sub>   | F <sub>5</sub>   | F <sub>3</sub>    | F <sub>2</sub> | F <sub>1</sub> | F <sub>1</sub> |                |  |
| 9       | F <sub>1</sub>   | F <sub>1</sub> | F <sub>1</sub>   | F <sub>1</sub>   | F <sub>3</sub> | F <sub>5</sub> | F <sub>2</sub> | F <sub>3</sub> | L <sub>5</sub>   | CL <sub>26</sub> | CL <sub>52</sub> | CL <sub>22</sub> | L <sub>3</sub>  | L <sub>3</sub>   | L <sub>4</sub>   | L <sub>6</sub>   | L <sub>5</sub>    | L <sub>3</sub>    | F <sub>2</sub>   | F <sub>3</sub>   |                   |                |                |                |                |  |
| 10      | FF <sub>22</sub> | F <sub>4</sub> | F <sub>3</sub>   | FF <sub>22</sub> | F <sub>4</sub> | F <sub>3</sub> | F <sub>3</sub> | F <sub>3</sub> | L <sub>1</sub>   | CL <sub>22</sub> | C <sub>3</sub>   | C <sub>5</sub>   | L <sub>3</sub>  | L <sub>3</sub>   | L <sub>2</sub>   | L <sub>2</sub>   | LH <sub>22</sub>  | L <sub>4</sub>    | F <sub>3</sub>   | F <sub>3</sub>   | F <sub>2</sub>    | F <sub>2</sub> | F <sub>2</sub> | F <sub>1</sub> |                |  |
| 11      | F <sub>1</sub>   | F <sub>1</sub> |                  | F <sub>1</sub>   | F <sub>1</sub> | F <sub>3</sub> |                | F <sub>1</sub> |                  | H <sub>2</sub>   | CH <sub>11</sub> | H <sub>1</sub>   | L <sub>2</sub>  | L <sub>2</sub>   | L <sub>2</sub>   | L <sub>1</sub>   | L <sub>1</sub>    | L <sub>1</sub>    | F <sub>1</sub>   |                  | F <sub>1</sub>    | F <sub>2</sub> |                |                |                |  |
| 12      |                  | F <sub>3</sub> | F <sub>2</sub>   | F <sub>5</sub>   | F <sub>1</sub> | F <sub>1</sub> | F <sub>2</sub> |                |                  |                  | CH <sub>31</sub> | C <sub>2</sub>   | HL <sub>22</sub>                                      | L <sub>3</sub>   | L <sub>3</sub>   | LH <sub>42</sub> | CL <sub>33</sub>  |                   | F <sub>3</sub>   | F <sub>2</sub>   |                   |                |                |                |                |  |
| 13      |                  |                | F <sub>1</sub>   | F <sub>3</sub>   | F <sub>4</sub> | F <sub>7</sub> | F <sub>3</sub> | F <sub>2</sub> | H <sub>4</sub>   | H <sub>3</sub>   | H <sub>2</sub>   | H <sub>2</sub>   |   | L <sub>3</sub>   | L <sub>4</sub>   | LH <sub>41</sub> | HL <sub>22</sub>  | CL <sub>22</sub>  | F <sub>4</sub>   | F <sub>4</sub>   |                   |                |                |                |                |  |
| 14      |                  |                | F <sub>2</sub>   | F <sub>1</sub>   | F <sub>2</sub> | F <sub>1</sub> |                |                |                  |                  | C <sub>2</sub>   | C <sub>2</sub>   | C <sub>2</sub>  | C <sub>1</sub>   |                  | L <sub>3</sub>   | L <sub>5</sub>    | L <sub>3</sub>    | F <sub>4</sub>   | F <sub>4</sub>   | F <sub>2</sub>    |                | F <sub>2</sub> | F <sub>2</sub> |                |  |
| 15      |                  | F <sub>1</sub> | F <sub>1</sub>   |                  |                |                |                |                | H <sub>4</sub>   | H <sub>2</sub>   | H <sub>2</sub>   | C <sub>5</sub>   | C <sub>3</sub>  | L <sub>3</sub>   | H <sub>3</sub>   |                  | HL <sub>22</sub>  | H <sub>3</sub>    |                  |                  |                   |                |                |                |                |  |
| 16      |                  |                |                  |                  |                |                |                |                |                  |                  |                  | C <sub>2</sub>   |   | LH <sub>21</sub> | L <sub>4</sub>   | L <sub>3</sub>   | L <sub>4</sub>    | L <sub>5</sub>    | F <sub>3</sub>   |                  | F <sub>2</sub>    |                |                |                |                |  |
| 17      |                  |                |                  |                  | F <sub>2</sub> | F <sub>2</sub> |                |                | H <sub>4</sub>   | H <sub>3</sub>   | H <sub>3</sub>   | C <sub>2</sub>   | C <sub>2</sub>  | L <sub>3</sub>   | CL <sub>23</sub> |                  | L <sub>5</sub>    | L <sub>2</sub>    | F <sub>4</sub>   |                  | F <sub>1</sub>    |                |                |                |                |  |
| 18      |                  |                |                  |                  |                |                | F <sub>1</sub> |                | H <sub>4</sub>   | H <sub>3</sub>   |                  | C <sub>2</sub>   | C <sub>2</sub>  | C <sub>2</sub>   |                  |                  |                   | C <sub>5</sub>    | F <sub>1</sub>   |                  |                   |                |                |                |                |  |
| 19      |                  |                | F <sub>2</sub>   | F <sub>2</sub>   | F <sub>2</sub> |                |                |                |                  | H <sub>2</sub>   | HC <sub>22</sub> | HL <sub>22</sub> |   | L <sub>2</sub>   | L <sub>4</sub>   |                  | HL <sub>13</sub>  | L <sub>2</sub>    | F <sub>2</sub>   | F <sub>3</sub>   |                   |                |                | F <sub>2</sub> |                |  |
| 20      |                  | F <sub>2</sub> |                  |                  |                |                |                |                |                  | H <sub>1</sub>   | H <sub>2</sub>   |                  | C <sub>2</sub>  |                  | L <sub>2</sub>   |                  | H <sub>2</sub>    | CHL <sub>52</sub> | F <sub>5</sub>   | F <sub>4</sub>   | FF <sub>73</sub>  |                |                |                |                |  |
| 21      |                  |                |                  |                  |                |                |                |                |                  | H <sub>3</sub>   | C <sub>6</sub>   |                  | CL <sub>22</sub>                                      | CL <sub>52</sub> | CL <sub>32</sub> | CL <sub>33</sub> | L <sub>4</sub>    | L <sub>7</sub>    | F <sub>7</sub>   | F <sub>7</sub>   | F <sub>7</sub>    | F <sub>6</sub> | F <sub>4</sub> | F <sub>3</sub> |                |  |
| 22      | F <sub>5</sub>   | F <sub>7</sub> | F <sub>2</sub>   |                  | F <sub>1</sub> | F <sub>3</sub> | F <sub>2</sub> | F <sub>2</sub> | L <sub>2</sub>   |                  | HL <sub>21</sub> | H <sub>2</sub>   | C <sub>3</sub>  | C <sub>3</sub>   | C <sub>1</sub>   |                  |                   |                   |                  | F <sub>1</sub>   |                   | F <sub>1</sub> |                |                |                |  |
| 23      |                  |                | F <sub>4</sub>   |                  | F <sub>2</sub> | F <sub>2</sub> |                |                | C <sub>5</sub>   | C <sub>5</sub>   | C <sub>3</sub>   | L <sub>3</sub>   | C <sub>3</sub>  | L <sub>3</sub>   | L <sub>3</sub>   | L <sub>4</sub>   | L <sub>4</sub>    | L <sub>5</sub>    | F <sub>3</sub>   | F <sub>2</sub>   | K <sub>1</sub>    | K <sub>1</sub> | F <sub>3</sub> |                |                |  |
| 24      |                  |                |                  |                  |                | F <sub>2</sub> | F <sub>1</sub> |                |                  | C <sub>4</sub>   | C <sub>2</sub>   | C <sub>3</sub>   | C <sub>3</sub>  | C <sub>3</sub>   | C <sub>5</sub>   | CL <sub>52</sub> | HCL <sub>32</sub> | HL <sub>13</sub>  | F <sub>4</sub>   | FF <sub>22</sub> | F <sub>7</sub>    | F <sub>2</sub> |                | F <sub>2</sub> |                |  |
| 25      | F <sub>2</sub>   | F <sub>3</sub> | F <sub>2</sub>   | F <sub>6</sub>   | F <sub>2</sub> |                |                |                |                  | HC <sub>22</sub> | CH <sub>22</sub> |                  | C <sub>2</sub>  | C <sub>4</sub>   | L <sub>4</sub>   | L <sub>2</sub>   |                   | H <sub>1</sub>    |                  |                  |                   |                |                |                |                |  |
| 26      | F <sub>1</sub>   |                | F <sub>1</sub>   | F <sub>1</sub>   | F <sub>1</sub> | F <sub>1</sub> |                |                |                  | C <sub>3</sub>   | C <sub>2</sub>   | C <sub>2</sub>   | C <sub>2</sub>  |                  | L <sub>3</sub>   | L <sub>5</sub>   | L <sub>4</sub>    | L <sub>5</sub>    | F <sub>7</sub>   | F <sub>3</sub>   |                   |                |                |                |                |  |
| 27      |                  |                |                  |                  |                | F <sub>1</sub> |                |                |                  | C <sub>3</sub>   | C <sub>2</sub>   |                  |   |                  |                  |                  |                   | CL <sub>42</sub>  | FF <sub>53</sub> | F <sub>3</sub>   | FF <sub>21</sub>  |                |                |                | F <sub>1</sub> |  |
| 28      |                  | F <sub>2</sub> | F <sub>1</sub>   | F <sub>1</sub>   | F <sub>6</sub> | F <sub>2</sub> |                |                | H <sub>2</sub>   | H <sub>1</sub>   | H <sub>2</sub>   | HL <sub>21</sub> | C <sub>5</sub>  | C <sub>3</sub>   | C <sub>2</sub>   | C <sub>4</sub>   |                   | HL <sub>31</sub>  | F <sub>2</sub>   | F <sub>2</sub>   | F <sub>2</sub>    |                | F <sub>2</sub> | F <sub>3</sub> |                |  |
| 29      | F <sub>3</sub>   | F <sub>1</sub> | F <sub>1</sub>   | F <sub>4</sub>   | F <sub>4</sub> | F <sub>2</sub> | F <sub>3</sub> |                | LL <sub>11</sub> | H <sub>1</sub>   | H <sub>1</sub>   | H <sub>2</sub>   | H <sub>3</sub>  |                  |                  | CL <sub>33</sub> | CL <sub>63</sub>  | CL <sub>61</sub>  | F <sub>1</sub>   |                  | F <sub>1</sub>    | F <sub>2</sub> | F <sub>3</sub> |                |                |  |
| 30      |                  |                | F <sub>2</sub>   | F <sub>3</sub>   | F <sub>2</sub> | F <sub>2</sub> | F <sub>1</sub> |                |                  |                  | C                |                  |   |                  |                  |                  | L <sub>2</sub>    | H <sub>2</sub>    | F <sub>3</sub>   | FF <sub>32</sub> | F <sub>1</sub>    | F <sub>2</sub> | F <sub>1</sub> | F <sub>2</sub> |                |  |
| 31      |                  |                | F <sub>1</sub>   | F <sub>1</sub>   | F <sub>4</sub> | F <sub>5</sub> | F <sub>6</sub> | F <sub>1</sub> |                  |                  |                  |                  |   | H <sub>2</sub>   | L <sub>2</sub>   | HL <sub>22</sub> | CL <sub>33</sub>  | CL <sub>55</sub>  | CL <sub>74</sub> | FF <sub>71</sub> | F <sub>7</sub>    | F <sub>6</sub> | F <sub>6</sub> | F <sub>4</sub> | F <sub>4</sub> |  |
|         | 00               | 01             | 02               | 03               | 04             | 05             | 06             | 07             | 08               | 09               | 10               | 11               | 12  | 13               | 14               | 15               | 16                | 17                | 18               | 19               | 20                | 21             | 22             | 23             |                |  |
| CNT     |                  |                |                  |                  |                |                |                |                |                  |                  |                  |                  |   |                  |                  |                  |                   |                   |                  |                  |                   |                |                |                |                |  |
| MED     |                  |                |                  |                  |                |                |                |                |                  |                  |                  |                  |   |                  |                  |                  |                   |                   |                  |                  |                   |                |                |                |                |  |
| UQ      |                  |                |                  |                  |                |                |                |                |                  |                  |                  |                  |   |                  |                  |                  |                   |                   |                  |                  |                   |                |                |                |                |  |
| LQ      |                  |                |                  |                  |                |                |                |                |                  |                  |                  |                  |   |                  |                  |                  |                   |                   |                  |                  |                   |                |                |                |                |  |

JAN. 1987

TYPES OF ES

IONOSPHERIC DATA

JAN. 1987

FXI (0.1 MHz)

135° E Mean Time (G.M.T. + 9h)

| Station     | OKINAWA |         |         |         |         |         |         | Lat. 26° 16.9' N. | Long. 127° 48.4' E | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |    |    |    |    |    |    |    |         |         |         |         |         |         |         |
|-------------|---------|---------|---------|---------|---------|---------|---------|-------------------|--------------------|---|----|----|----|----|----|----|----|---------|---------|---------|---------|---------|---------|---------|
| Hour<br>Day | 00      | 01      | 02      | 03      | 04      | 05      | 06      | 07                | 08                 | 09  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17      | 18      | 19      | 20      | 21      | 22      | 23      |
| 1           | X<br>33 | X<br>38 | X<br>42 | X<br>33 | X<br>29 | X<br>24 | X<br>26 | X<br>28           |                    |   |    |    |    |    |    |    |    | X<br>50 | X<br>45 | X<br>56 | X<br>58 | U<br>50 | X<br>48 |         |
| 2           |         | 50      | 59      | 56      | 40      | 33      | 26      | 27                |                    |   |    |    |    |    |    |    |    | X<br>46 | X<br>33 | X<br>34 | X<br>36 |         | 41      | 41      |
| 3           |         | 27      | 32      | 28      | 30      | 26      | 26      | S                 |                    |   |    |    |    |    |    |    |    | X<br>46 | X<br>41 | U<br>51 | U<br>58 | X<br>37 | X<br>30 |         |
| 4           | X<br>29 | X<br>31 | X<br>32 | X<br>32 | X<br>34 | X<br>28 |         | A                 |                    |   |    |    |    |    |    |    |    | X<br>62 | A       | X<br>33 | X<br>34 | A       | A       |         |
| 5           |         | 30      | 33      | 33      | 33      | 33      | 24      | 24                |                    |   |    |    |    |    |    |    |    | A       | X<br>37 | X<br>37 | X<br>34 | X<br>26 | X<br>28 |         |
| 6           |         | 31      | 30      | 31      | 37      | X<br>36 | X<br>29 | 25                |                    |   |    |    |    |    |    |    |    | X<br>45 | X<br>32 | X<br>30 | X<br>36 | A       | A       |         |
| 7           |         | 34      | 33      | 33      | 34      | 34      | 32      | 24                |                    |   |    |    |    |    |    |    |    | X<br>43 | X<br>38 | X<br>39 | X<br>33 | X<br>31 | X<br>33 |         |
| 8           |         | A       | 32      | A       | 36      | 32      | 30      | 30                |                    |   |    |    |    |    |    |    |    | 0<br>45 | X<br>35 | X<br>38 | X<br>41 | X<br>45 | X<br>40 |         |
| 9           | X<br>31 | X<br>33 | X<br>33 | U<br>46 | X<br>38 | X<br>25 | X<br>25 | X<br>30           |                    |   |    |    |    |    |    |    |    | X<br>81 | X<br>49 | X<br>46 | X<br>38 | X<br>31 | X<br>30 |         |
| 10          |         | A       | 30      | 40      | A       | A       | A       |                   |                    |   |    |    |    |    |    |    |    | X<br>54 | 0<br>38 | X<br>34 | X<br>36 | X<br>39 | X<br>30 |         |
| 11          |         | 31      | 31      | 31      | 35      | X<br>27 | A       | A                 |                    |   |    |    |    |    |    |    |    | X<br>49 | X<br>39 | X<br>38 | X<br>35 | X<br>32 | X<br>28 |         |
| 12          |         | X<br>31 | X<br>31 | 39      | 31      | 36      | 33      | 32                |                    |   |    |    |    |    |    |    |    | X<br>51 | X<br>41 | X<br>43 | X<br>34 | X<br>32 | X<br>32 |         |
| 13          |         | 32      | 39      | 34      | 32      | 32      | 26      | 26                |                    |   |    |    |    |    |    |    |    | A       | A       |         | X<br>44 | X<br>36 | X<br>31 | X<br>31 |
| 14          |         | X<br>37 | 33      | 32      | 31      | 27      | 26      | 27                |                    |   |    |    |    |    |    |    |    | X<br>47 | X<br>40 | X<br>38 | X<br>42 | X<br>41 | X<br>30 |         |
| 15          |         | X<br>31 | X<br>32 | X<br>33 | X<br>34 | X<br>39 | S       | S                 |                    |   |    |    |    |    |    |    |    |         | X<br>44 | X<br>30 | X<br>32 | X<br>31 | X<br>28 |         |
| 16          |         | X<br>29 | X<br>30 | U<br>32 | X<br>31 | X<br>31 | 0<br>27 | 0<br>28           |                    |   |    |    |    |    |    |    |    |         | X<br>38 | X<br>39 | X<br>45 | X<br>36 | X<br>33 |         |
| 17          |         | 37      | X<br>40 | X<br>42 | X<br>32 | 33      | 32      | 31                |                    |   |    |    |    |    |    |    |    |         | X<br>40 | X<br>36 | X<br>34 | X<br>30 | X<br>30 |         |
| 18          |         | X<br>30 | X<br>31 | X<br>31 | X<br>32 | X<br>35 | X<br>31 | 25                |                    |   |    |    |    |    |    |    |    |         | X<br>40 | X<br>36 | X<br>36 | X<br>32 | X<br>31 |         |
| 19          |         | X<br>31 | X<br>32 | X<br>32 | X<br>33 | X<br>35 | X<br>32 | X<br>30           |                    |   |    |    |    |    |    |    |    |         | X<br>66 | X<br>50 | X<br>50 | X<br>37 | X<br>37 |         |
| 20          |         | S<br>39 | 45      | 45      | 39      | X<br>40 | X<br>26 | X<br>26           |                    |   |    |    |    |    |    |    |    |         | X<br>50 | X<br>49 | 0<br>53 | X<br>48 | X<br>40 |         |
| 21          |         | X<br>43 | X<br>40 | X<br>35 | X<br>33 | X<br>46 | X<br>29 | X<br>32           |                    |   |    |    |    |    |    |    |    |         | X<br>59 | A       | U<br>32 | X<br>39 | X<br>35 |         |
| 22          |         | 40      | X<br>36 | X<br>38 | X<br>40 | X<br>38 | X<br>28 | X<br>25           |                    |   |    |    |    |    |    |    |    |         |         | A       | X<br>45 | X<br>47 | X<br>46 | X<br>44 |
| 23          |         | X<br>37 | X<br>33 | X<br>33 | X<br>34 | X<br>38 | U<br>31 | X<br>35           |                    |   |    |    |    |    |    |    |    |         | X<br>96 | X<br>75 | X<br>63 | X<br>38 | X<br>38 |         |
| 24          |         | X<br>34 | X<br>34 | U<br>36 | X<br>36 | X<br>36 | X<br>33 | 30                |                    |   |    |    |    |    |    |    |    |         | X<br>45 | X<br>49 | U<br>52 | X<br>54 | X<br>33 |         |
| 25          |         | X<br>33 | X<br>31 | X<br>34 | X<br>36 | X<br>33 | X<br>30 | X<br>30           |                    |   |    |    |    |    |    |    |    |         |         | U<br>60 | X<br>60 | X<br>57 | X<br>48 | X<br>43 |
| 26          |         | X<br>43 | X<br>41 | X<br>36 | X<br>36 | X<br>35 | X<br>28 | X<br>30           |                    |   |    |    |    |    |    |    |    |         | X<br>45 | U<br>40 | X<br>44 | X<br>46 | X<br>39 |         |
| 27          |         | X<br>37 | X<br>34 | X<br>39 | X<br>33 | 28      | 28      | 31                |                    |   |    |    |    |    |    |    |    |         | X<br>30 | X<br>36 | X<br>35 | X<br>30 | X<br>29 |         |
| 28          |         | X<br>40 | X<br>36 | X<br>34 | X<br>31 | X<br>20 | X<br>21 | 23                |                    |   |    |    |    |    |    |    |    |         | A       | X<br>53 | X<br>62 | X<br>66 | X<br>66 |         |
| 29          | U<br>58 | X<br>56 | U<br>54 | X<br>43 | X<br>46 | X<br>34 | X<br>34 | X<br>32           |                    |   |    |    |    |    |    |    |    |         | X<br>43 | X<br>40 | X<br>37 | X<br>28 | X<br>29 |         |
| 30          |         | X<br>31 | X<br>32 | X<br>36 | X<br>39 | 28      | 25      | 23                |                    |   |    |    |    |    |    |    |    |         | X<br>39 | X<br>44 | A       | X<br>33 | X<br>28 |         |
| 31          |         | X<br>31 | X<br>32 | X<br>32 | X<br>32 | X<br>35 | A       | A                 |                    |   |    |    |    |    |    |    |    |         |         | A       | A       | X<br>43 | A       | X<br>29 |
| CNT         |         | 29      | 31      | 30      | 30      | 30      | 27      | 25                |                    |   |    |    |    |    |    |    |    |         | 12      | 26      | 29      | 30      | 28      | 29      |
| MED         |         | X<br>33 | X<br>33 | X<br>34 | X<br>34 | X<br>34 | X<br>28 | X<br>27           |                    |   |    |    |    |    |    |    |    |         | X<br>48 | X<br>40 | X<br>40 | X<br>38 | X<br>37 | X<br>32 |
| UQ          |         | X<br>37 | X<br>37 | X<br>39 | X<br>36 | X<br>36 | X<br>31 | X<br>30           |                    |   |    |    |    |    |    |    |    |         | X<br>52 | X<br>45 | X<br>49 | X<br>50 | X<br>46 | X<br>39 |
| LQ          |         | X<br>31 | X<br>32 | X<br>32 | X<br>32 | 31      | X<br>26 | X<br>25           |                    |   |    |    |    |    |    |    |    |         | X<br>46 | X<br>38 | X<br>36 | X<br>35 | X<br>31 | X<br>30 |

JAN. 1987

FXI (0.1 MHz)

The Radio Research Laboratory, Japan

### IONOSPHERIC DATA

JAN. 1987

FOF2 (0.1 MHz)

135 E Mean Time (G.M.T. + 9h)

| Station     | OKINAWA |    |    |    | Lat. 26 16.9 N |    |    |    | Long. 127 48.4 E |    |    |     | Sweep 1 MHz to 25 MHz in 2 sec in automatic operation |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |    |    |
|-------------|---------|----|----|----|----------------|----|----|----|------------------|----|----|-----|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|
| Hour<br>Day | 00      | 01 | 02 | 03 | 04             | 05 | 06 | 07 | 08               | 09 | 10 | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  |     |    |    |    |    |    |    |    |    |    |    |
| 1           | 27      | 32 | 36 | 27 | 23             | 18 | 20 | 22 | 51               | 61 | 67 | 89  | 83  | 65  | 57  | 53  | 62  | 57  | 44  | 39  | S   | 50  | 52  | U   | 44  | S  | 42 |    |    |    |    |    |    |    |    |
| 2           | F       | F  | F  | F  | F              | U  | S  | 20 | U                | S  | 21 | 27  | 49  | 52  | 60  | 80  | 70  | 60  | 70  | 64  | 67  | 54  | 40  | S   | 27  | 28 | 30 | F  | F  |    |    |    |    |    |    |
| 3           | F       | F  | F  | F  | F              | S  | 20 | A  | 21               | R  | 49 | 60  | 72  | R   | 85  | 79  | U   | R   | 98  | 100 | 85  | 67  | 57  | 40  | 35  | 45 | U  | S  | 52 | S  | 31 | S  | 24 |    |    |
| 4           | 23      | 25 | 26 | 26 | 28             | 22 | A  | 24 | 45               | 48 | 53 | 58  | R   | 64  | 88  | 94  | 90  | R   | 94  | 71  | 56  | A   | S   | 27  | S   | 28 | A  | A  |    |    |    |    |    |    |    |
| 5           | F       | F  | F  | F  | F              | F  | F  | 22 | 50               | 47 | 53 | 65  | 59  | 59  | 82  | R   | 72  | 67  | 50  | A   | 31  | 31  | S   | 28  | S   | 20 | S  | F  | 18 |    |    |    |    |    |    |
| 6           | F       | F  | F  | F  | U              | S  | 30 | U  | S                | 23 | F  | U   | S   | 25  | 42  | 48  | 54  | 84  | 85  | R   | 90  | 80  | 80  | 70  | A   | 39 | 26 | S  | 24 | S  | 30 | A  | A  |    |    |
| 7           | F       | F  | F  | F  | F              | F  | F  | F  | 20               | 43 | 46 | 48  | A   | 64  | 84  | 88  | 76  | 62  | R   | 62  | 50  | 37  | 32  | 33  | S   | 27 | 25 | 27 |    |    |    |    |    |    |    |
| 8           | A       | F  | A  | F  | F              | F  | F  | S  | 23               | 46 | 50 | 59  | A   | 81  | 69  | 70  | 75  | 62  | R   | 62  | A   | 39  | 27  | 32  | S   | 35 | 39 | 34 |    |    |    |    |    |    |    |
| 9           | 25      | F  | 27 | U  | S              | 40 | S  | 32 | 19               | 19 | 24 | 57  | 62  | 53  | 62  | 70  | U   | R   | 94  | 90  | 79  | 65  | 72  | U   | S   | 43 | 40 | 32 | 25 | 24 |    |    |    |    |    |
| 10          | A       | F  | F  | A  | A              | A  | A  | F  | 50               | 53 | 50 | 64  | U   | R   | 59  | 59  | 60  | 64  | 69  | 53  | 48  | 32  | 28  | 30  | 33  | F  |    |    |    |    |    |    |    |    |    |
| 11          | F       | F  | F  | F  | 21             | A  | A  | 22 | 47               | 48 | 53 | 55  | 71  | R   | 60  | H   | 60  | 56  | 59  | 53  | 43  | 33  | 32  | 29  | 26  | 22 |    |    |    |    |    |    |    |    |    |
| 12          | 25      | 25 | F  | F  | F              | F  | F  | 25 | 52               | 56 | 57 | 35  | R   | 98  | 91  | 72  | 53  | 50  | 53  | 45  | 35  | 37  | S   | 28  | 26  | 26 |    |    |    |    |    |    |    |    |    |
| 13          | F       | F  | F  | F  | 26             | F  | 20 | 19 | 45               | 62 | 63 | 53  | 55  | R   | 80  | R   | 84  | 60  | 56  | A   | A   | A   | S   | 38  | 30  | 25 | F  |    |    |    |    |    |    |    |    |
| 14          | S       | F  | F  | F  | F              | F  | F  | 22 | 48               | 55 | 71 | 73  | R   | 114 | R   | 104 | 85  | 77  | 64  | R   | 64  | 56  | 41  | 34  | 32  | 36 | 35 | 24 |    |    |    |    |    |    |    |
| 15          | 25      | 26 | 27 | 28 | S              | S  | S  | 19 | R                | 48 | 70 | R   | 95  | R   | 86  | 71  | U   | R   | 74  | 61  | 54  | 53  | 61  | 42  | S   | 38 | U  | S  | 24 | 26 | 25 | 22 |    |    |    |
| 16          | U       | S  | 24 | 26 | 25             | U  | S  | 21 | U                | S  | 22 | 22  | R   | 46  | 54  | 58  | 54  | 80  | R   | 96  | 66  | 50  | 57  | 57  | 48  | 32 | 33 | 39 | 30 | F  |    |    |    |    |    |
| 17          | F       | S  | S  | S  | F              | F  | F  | 23 | 50               | 58 | 70 | 95  | 109   | 107 | 96  | 85  | 84  | 60  | 42  | S   | 34  | 30  | 28  | 24  | 24  |    |    |    |    |    |    |    |    |    |    |
| 18          | 24      | U  | S  | 25 | 26             | 29 | 25 | U  | S                | 17 | 22 | 50  | 49  | 52  | 60  | 79  | 71  | 62  | 58  | 54  | R   | 60  | 48  | 34  | 30  | 30 | 26 | S  | 25 |    |    |    |    |    |    |
| 19          | 25      | 26 | S  | 27 | S              | 29 | S  | 26 | 24               | 28 | 47 | 53  | 54  | 66  | 90  | 107 | 114 | 104 | 107 | U   | R   | 113 | 88  | 60  | U   | S  | 44 | U  | S  | 44 | 31 | 31 |    |    |    |
| 20          | S       | F  | F  | F  | S              | S  | S  | 23 | 51               | 59 | 61 | 84  | 108   | 113 | 112 | R   | 104 | A   | 71  | 50  | 44  | 43  | U   | R   | 47  | U  | R  | 42 | U  | R  | 34 |    |    |    |    |
| 21          | 37      | 34 | S  | 29 | S              | 40 | 23 | 26 | 29               | 54 | 73 | 71  | 82  | 94  | 94  | 70  | 71  | 77  | 72  | 46  | 53  | A   | U   | S   | 26  | 33 | F  |    |    |    |    |    |    |    |    |
| 22          | F       | 30 | 32 | 34 | 32             | 22 | 19 | 23 | 52               | 60 | 54 | 59  | 92  | 116 | 106 | 103 | 106 | 108 | 84  | A   | S   | 39  | 41  | 40  | 38  |    |    |    |    |    |    |    |    |    |    |
| 23          | 31      | 27 | 27 | 28 | 32             | U  | S  | 25 | 27               | 34 | 50 | 55  | 67  | 93  | 92  | U   | R   | 115 | U   | R   | 120 | 117 | 122 | 141 | 114 | 90 | 69 | 57 | 32 | 32 |    |    |    |    |    |
| 24          | 28      | 28 | U  | S  | 30             | 30 | 27 | F  | S                | 24 | 44 | 55  | 52  | 70  | 74  | 67  | 67  | 62  | 69  | U   | S   | 65  | 56  | 39  | S   | 43 | U  | S  | 46 | 48 | 27 |    |    |    |    |
| 25          | 27      | 25 | 28 | 30 | 27             | 24 | 24 | 27 | 62               | 49 | 45 | 80  | 68  | 66  | 83  | 82  | 70  | U   | R   | 85  | U   | R   | 78  | 54  | 54  | S  | 51 | 42 | S  | 37 |    |    |    |    |    |
| 26          | S       | S  | 30 | 30 | S              | 22 | 24 | S  | 22               | 48 | R  | 52  | 62  | 68  | 67  | 77  | 77  | U   | R   | 74  | 78  | R   | 62  | 42  | 39  | U  | S  | 34 | 38 | 40 | 33 |    |    |    |    |
| 27          | 31      | 28 | 33 | 27 | F              | F  | 25 | 21 | 47               | 58 | 70 | 94  | 109   | R   | 105 | U   | R   | 103 | 87  | 83  | 60  | 42  | U   | S   | 24  | 30 | 29 | U  | S  | 24 | 23 |    |    |    |    |
| 28          | S       | S  | 28 | 25 | J              | S  | J  | S  | 14               | J  | S  | 15  | U   | S   | 17  | 22  | 53  | 65  | 64  | 75  | 95  | R   | 79  | 78  | R   | 76 | 64 | 56 | 49 | A  | 47 | 56 | V  | 60 | 60 |
| 29          | U       | S  | U  | S  | U              | S  | 48 | S  | 37               | 40 | 28 | 28  | 26  | 49  | 58  | 66  | 85  | 90  | 76  | R   | 70  | 61  | 60  | 62  | 44  | 37 | 34 | 31 | 22 | 23 |    |    |    |    |    |
| 30          | U       | S  | 26 | S  | 30             | 29 | F  | F  | F                | 23 | 50 | 59  | 76  | 85  | 90  | 124 | 117 | R   | 82  | H   | 68  | 58  | 46  | 33  | 38  | A  | 27 | 22 |    |    |    |    |    |    |    |
| 31          | 25      | 26 | 26 | 26 | 29             | A  | A  | A  | 53               | 50 | 73 | 108 | 120   | R   | 112 | 104 | 105 | 88  | 75  | 55  | A   | A   | 37  | A   | 23  |    |    |    |    |    |    |    |    |    |    |
| CNT         | 21      | 20 | 21 | 21 | 21             | 18 | 16 | 29 | 31               | 31 | 31 | 29  | 31  | 31  | 31  | 31  | 30  | 28  | 29  | 26  | 29  | 30  | 27  | 24  |     |    |    |    |    |    |    |    |    |    |    |
| MED         | 27      | 26 | 28 | 27 | 29             | 22 | 22 | 23 | 49               | 55 | 60 | 80  | 81  | 88  | 82  | 76  | 67  | 60  | 46  | 34  | 34  | 32  | 31  | 26  |     |    |    |    |    |    |    |    |    |    |    |
| UQ          | 31      | 31 | 32 | 30 | S              | 32 | 25 | 24 | 25               | 51 | 60 | 68  | 85  | 93  | 104 | 98  | 85  | 78  | 72  | 55  | 39  | 43  | 44  | 40  | 34  |    |    |    |    |    |    |    |    |    |    |
| LQ          | 25      | 25 | 26 | 26 | 26             | 20 | 20 | 22 | 47               | 50 | 53 | 64  | 70  | 70  | 70  | 62  | 62  | 56  | 42  | 32  | 30  | 29  | 25  | 23  |     |    |    |    |    |    |    |    |    |    |    |

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FOF2 (0.1 MHz)

# IONOSPHERIC DATA

JAN. 1987

FOF1 (0.01 MHz)

135 E Mean Time (G.M.T. + 9h)

| Station     | OKINAWA |    |    |    | Lat. | 26 16.9 N. |    |    |    | Long.      | 127 48.4 E |            |            |            | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |            |            |            |    |    |    |    |    |    |  |
|-------------|---------|----|----|----|------|------------|----|----|----|------------|------------|------------|------------|------------|---|------------|------------|------------|----|----|----|----|----|----|--|
| Hour<br>Day | 00      | 01 | 02 | 03 | 04   | 05         | 06 | 07 | 08 | 09         | 10         | 11         | 12         | 13         | 14  | 15         | 16         | 17         | 18 | 19 | 20 | 21 | 22 | 23 |  |
| 1           |         |    |    |    |      |            |    |    |    | L          | 400        | 410        | 420        | 420        | L   | L          | L          |            |    |    |    |    |    |    |  |
| 2           |         |    |    |    |      |            |    |    |    | L          | L          | U L<br>420 | 420        | 410        | 400   | L          | L          |            |    |    |    |    |    |    |  |
| 3           |         |    |    |    |      |            |    |    |    | L          | 400        | A          | U A<br>420 | 420        | 400   | U L<br>400 | A          | A          |    |    |    |    |    |    |  |
| 4           |         |    |    |    |      |            |    |    | L  | L          | 390        | 410        | 420        | 430        | 410   | 390        | L          | A          |    |    |    |    |    |    |  |
| 5           |         |    |    |    |      |            |    |    | A  | 390        | A          | 420        | 420        | L          | A   | A          | L          |            |    |    |    |    |    |    |  |
| 6           |         |    |    |    |      |            |    |    |    | L          | 400        | 410        | 410        | 430        | 390   | L          | L          | A          |    |    |    |    |    |    |  |
| 7           |         |    |    |    |      |            |    |    |    | L          | A          | A          | A          | 420        | U L<br>410  | 400        | L          | L          | A  |    |    |    |    |    |  |
| 8           |         |    |    |    |      |            |    |    | L  | L          | A          | A          | 420        | 420        | 410   | L          | L          | A          |    |    |    |    |    |    |  |
| 9           |         |    |    |    |      |            |    |    |    | L          | L          | U L<br>420 | U L<br>420 | L          | 420   | U L<br>390 | L          |            |    |    |    |    |    |    |  |
| 10          |         |    |    |    |      |            |    |    |    | L          | A          | L          | L          | U L<br>430 | U L<br>430  | L          | A          |            |    |    |    |    |    |    |  |
| 11          |         |    |    |    |      |            |    |    |    | L          | L          | U L<br>420 | 420        | L          | 420   | L          | L          |            |    |    |    |    |    |    |  |
| 12          |         |    |    |    |      |            |    |    |    | L          | L          | 410        | 420        | U L<br>420 | U A<br>400  | L          | L          |            |    |    |    |    |    |    |  |
| 13          |         |    |    |    |      |            |    |    |    | U L<br>380 | 400        | L          | U L<br>420 | 420        | 410   | A          | A          | A          |    |    |    |    |    |    |  |
| 14          |         |    |    |    |      |            |    |    |    | L          | 400        | 420        | 420        | 420        | 410   | 400        | L          | L          |    |    |    |    |    |    |  |
| 15          |         |    |    |    |      |            |    |    | L  | U L<br>400 | 410        | 420        | 410        | L          | 410   | U L<br>400 | L          | A          |    |    |    |    |    |    |  |
| 16          |         |    |    |    |      |            |    |    |    | L          | U L<br>410 | L          | 430        | 420        | 420   | L          | L          | A          |    |    |    |    |    |    |  |
| 17          |         |    |    |    |      |            |    |    |    | L          | L          | U L<br>410 | L          | 460        | 430   | 460        | 420        | L          | L  |    |    |    |    |    |  |
| 18          |         |    |    |    |      |            |    |    |    | L          | U L<br>420 | 430        | 430        | L          | 420   | L          | L          |            |    |    |    |    |    |    |  |
| 19          |         |    |    |    |      |            |    |    |    | L          | L          | L          | 420        | 430        | 430   | 410        | L          | L          | L  |    |    |    |    |    |  |
| 20          |         |    |    |    |      |            |    |    |    | L          | 400        | A          | A          | A          | A   | L          | A          | A          |    |    |    |    |    |    |  |
| 21          |         |    |    |    |      |            |    |    |    | L          | L          | U L<br>420 | U L<br>430 | L          | L   | L          | L          |            |    |    |    |    |    |    |  |
| 22          |         |    |    |    |      |            |    |    |    | L          | L          | U L<br>440 | 430        | 430        | L   | 420        | L          | L          |    |    |    |    |    |    |  |
| 23          |         |    |    |    |      |            |    |    | L  | L          | 410        | 430        | U L<br>440 | U L<br>440 | L   | L          | L          |            |    |    |    |    |    |    |  |
| 24          |         |    |    |    |      |            |    |    |    | L          | L          | U L<br>420 | 430        | L          | U L<br>420  | A          | L          |            |    |    |    |    |    |    |  |
| 25          |         |    |    |    |      |            |    |    |    | L          | L          | 410        | 430        | 430        | 430   | A          | U L<br>390 | L          |    |    |    |    |    |    |  |
| 26          |         |    |    |    |      |            |    |    | L  | L          | 410        | 410        | 420        | 420        | 410   | U L<br>400 | L          | L          |    |    |    |    |    |    |  |
| 27          |         |    |    |    |      |            |    |    |    | L          | U L<br>420 | 410        | 450        | 430        | 420   | 410        | U L<br>380 | L          |    |    |    |    |    |    |  |
| 28          |         |    |    |    |      |            |    |    |    | L          | U L<br>400 | 410        | L          | 430        | 430   | 440        | 410        | U L<br>380 |    |    |    |    |    |    |  |
| 29          |         |    |    |    |      |            |    |    |    | L          | U L<br>420 | 420        | 420        | 420        | A   | A          | A          | L          |    |    |    |    |    |    |  |
| 30          |         |    |    |    |      |            |    |    |    | L          | 410        | 410        | 420        | 420        | L   | 410        | L          |            |    |    |    |    |    |    |  |
| 31          |         |    |    |    |      |            |    |    |    | L          | U L<br>420 | 420        | 430        | 420        | 430   | U A<br>390 | L          | L          |    |    |    |    |    |    |  |
|             | 00      | 01 | 02 | 03 | 04   | 05         | 06 | 07 | 08 | 09         | 10         | 11         | 12         | 13         | 14  | 15         | 16         | 17         | 18 | 19 | 20 | 21 | 22 | 23 |  |
| CNT         |         |    |    |    |      |            |    |    |    | 2          | 17         | 23         | 28         | 26         | 25  | 13         | 3          |            |    |    |    |    |    |    |  |
| MED         |         |    |    |    |      |            |    |    |    | U L<br>390 | L<br>400   | L<br>420   | 420        | 420        | L<br>420  | L<br>400   | U L<br>380 |            |    |    |    |    |    |    |  |
| UQ          |         |    |    |    |      |            |    |    |    | L<br>410   | U L<br>420 | L<br>420   | 430        | 430        | L<br>420  | 410        | U L<br>385 |            |    |    |    |    |    |    |  |
| LQ          |         |    |    |    |      |            |    |    |    | 400        | 410        | 420        | 420        | L<br>410   | U L<br>400  | U L<br>380 |            |            |    |    |    |    |    |    |  |

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FOF1 (0.01 MHz)

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### IONOSPHERIC DATA

JAN. 1987
FOE (0.01 MHz)
135 E Mean Time (G.M.T. + 9h)

| Station     | OKINAWA |    |    |    |    |    |    | Lat. 26 16.9 N. | Long. 127 48.4 E | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |         |         |         |         |         |         |         |       |    |    |    |    |    |    |
|-------------|---------|----|----|----|----|----|----|-----------------|------------------|---|---------|---------|---------|---------|---------|---------|---------|-------|----|----|----|----|----|----|
| Hour<br>Day | 00      | 01 | 02 | 03 | 04 | 05 | 06 | 07              | 08               | 09  | 10      | 11      | 12      | 13      | 14      | 15      | 16      | 17    | 18 | 19 | 20 | 21 | 22 | 23 |
| 1           |         |    |    |    |    |    |    |                 | S                | 240   | 280     | R 300   | A       | A       | A       | A       | 245     | A     |    |    |    |    |    |    |
| 2           |         |    |    |    |    |    |    |                 | 195              | R 250   | R 280   | A       | A       | A       | A       | A       | A       | A     |    |    |    |    |    |    |
| 3           |         |    |    |    |    |    |    |                 | 190              | A   | A       | 295     | A       | A       | A       | A       | A       | A     |    |    |    |    |    |    |
| 4           |         |    |    |    |    |    |    |                 | R 195            | R 250   | A       | A       | A       | A       | A       | A       | 275     | 220   |    |    |    |    |    |    |
| 5           |         |    |    |    |    |    |    |                 | A                | A   | A       | A       | A       | A       | 295     | 280     | 255     | A     |    |    |    |    |    |    |
| 6           |         |    |    |    |    |    |    |                 | R 175            | R 240   | A       | A       | A       | A       | A       | 310     | U A 265 | R 205 |    |    |    |    |    |    |
| 7           |         |    |    |    |    |    |    |                 | 225              | R 245   | A       | A       | A       | A       | A       | A       | A       | A     |    |    |    |    |    |    |
| 8           |         |    |    |    |    |    |    |                 | S                | A   | A       | A       | A       | A       | A       | 230     | A       | A     |    |    |    |    |    |    |
| 9           |         |    |    |    |    |    |    |                 | S                | 260   | A       | A       | A       | A       | A       | A       | A       | A     | S  |    |    |    |    |    |
| 10          |         |    |    |    |    |    |    |                 | S                | A   | A       | A       | A       | A       | A       | A       | A       | A     |    |    |    |    |    |    |
| 11          |         |    |    |    |    |    |    |                 | S                | 235   | U R 280 | A       | A       | A       | R 300   | A       | A       | 210   |    |    |    |    |    |    |
| 12          |         |    |    |    |    |    |    |                 | 180              | A   | U A 280 | U A 305 | U A 320 | A       | A       | U A 290 | A       | A     |    |    |    |    |    |    |
| 13          |         |    |    |    |    |    |    |                 | 180              | 240   | 280     | A       | A       | A       | A       | R 290   | R 250   | R 210 |    |    |    |    |    |    |
| 14          |         |    |    |    |    |    |    |                 | 185              | 240   | 280     | R 300   | A       | A       | 305     | 290     | 260     | A     |    |    |    |    |    |    |
| 15          |         |    |    |    |    |    |    |                 | 180              | 240   | A       | A       | A       | A       | U A 305 | U A 290 | 260     | 200   | S  |    |    |    |    |    |
| 16          |         |    |    |    |    |    |    |                 | R 190            | 250   | A       | A       | A       | U A 315 | A       | A       | A       | A     | S  |    |    |    |    |    |
| 17          |         |    |    |    |    |    |    |                 | A                | A   | A       | A       | A       | A       | A       | R 300   | 270     | 200   | A  |    |    |    |    |    |
| 18          |         |    |    |    |    |    |    |                 | 200              | R 240   | A       | 305     | 305     | A       | A       | A       | 250     | A     | A  |    |    |    |    |    |
| 19          |         |    |    |    |    |    |    |                 | R 180            | R 240   | R 290   | A       | A       | A       | A       | A       | A       | A     |    |    |    |    |    |    |
| 20          |         |    |    |    |    |    |    |                 | R 185            | R 250   | 295     | 310     | 310     | A       | A       | A       | A       | A     |    |    |    |    |    |    |
| 21          |         |    |    |    |    |    |    |                 | S                | 240   | A       | A       | 315     | A       | A       | A       | A       | A     | S  |    |    |    |    |    |
| 22          |         |    |    |    |    |    |    |                 | S                | R 240   | A       | R 300   | 310     | A       | A       | A       | A       | A     | S  |    |    |    |    |    |
| 23          |         |    |    |    |    |    |    |                 | 190              | A   | A       | A       | A       | A       | A       | A       | 270     | A     | S  |    |    |    |    |    |
| 24          |         |    |    |    |    |    |    |                 | S                | R 250   | R 290   | A       | A       | A       | A       | A       | A       | A     | S  |    |    |    |    |    |
| 25          |         |    |    |    |    |    |    |                 | 190              | 250   | 280     | A       | A       | A       | A       | A       | A       | A     | S  |    |    |    |    |    |
| 26          |         |    |    |    |    |    |    |                 | A                | A   | A       | A       | 320     | 320     | 310     | 300     | 260     | 215   | S  |    |    |    |    |    |
| 27          |         |    |    |    |    |    |    |                 | 195              | 240   | A       | A       | A       | A       | A       | 290     | 260     | 200   | S  |    |    |    |    |    |
| 28          |         |    |    |    |    |    |    |                 | 175              | 255   | 290     | A       | 315     | A       | A       | A       | A       | A     |    |    |    |    |    |    |
| 29          |         |    |    |    |    |    |    |                 | R 190            | 245   | R 270   | 300     | R 310   | 310     | 305     | 290     | A       | R 200 | A  |    |    |    |    |    |
| 30          |         |    |    |    |    |    |    |                 | R 190            | 240   | R 280   | A       | A       | A       | 330     | A       | A       | R 205 | S  |    |    |    |    |    |
| 31          |         |    |    |    |    |    |    |                 | A                | A   | A       | A       | 315     | R 320   | 305     | 290     | 260     | A     | A  |    |    |    |    |    |
|             | 00      | 01 | 02 | 03 | 04 | 05 | 06 | 07              | 08               | 09  | 10      | 11      | 12      | 13      | 14      | 15      | 16      | 17    | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT         |         |    |    |    |    |    |    |                 | 19               | 22  | 13      | 8       | 9       | 4       | 8       | 12      | 13      | 10    |    |    |    |    |    |    |
| MED         |         |    |    |    |    |    |    |                 | 190              | 240   | 280     | 300     | 315     | 318     | 305     | 290     | 260     | 205   |    |    |    |    |    |    |
| UQ          |         |    |    |    |    |    |    |                 | 192              | 250   | R 290   | 305     | 315     | 320     | 308     | 295     | 265     | 210   |    |    |    |    |    |    |
| LQ          |         |    |    |    |    |    |    |                 | 180              | 240   | 280     | 300     | 310     | 312     | 302     | 290     | 260     | 200   |    |    |    |    |    |    |



# IONOSPHERIC DATA

JAN. 1987

FOES (0.1 MHz)

135 E Mean Time (G.M.T. + 9h)

| Station     | OKINAWA |        |        |        | Lat. 26 16.9 N. | Long. 127 48.4 E | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |        |        |        |        |         |        |        |         |        |         |        |        |        |        |        |        |        |
|-------------|---------|--------|--------|--------|-----------------|------------------|---|--------|--------|--------|--------|---------|--------|--------|---------|--------|---------|--------|--------|--------|--------|--------|--------|--------|
| Hour<br>Day | 00      | 01     | 02     | 03     | 04              | 05               | 06  | 07     | 08     | 09     | 10     | 11      | 12     | 13     | 14      | 15     | 16      | 17     | 18     | 19     | 20     | 21     | 22     | 23     |
| 1           | 20      | 20     | 20     | J A 25 | E S 16          | J A 21           | E S 16  | E S 16 | 22     | 28     | 37     | 36      | J A 34 | J A 33 | J A 31  | J A 28 | 28      | 23     | E S 16 | E S 16 | E S 16 | E S 16 | 22     | E S 16 |
| 2           | E S 16  | E S 16 | E S 16 | E S 16 | E S 16          | E S 16           | E S 16  | E S 16 | G      | 29     | 39     | 37      | J A 42 | J A 40 | J A 41  | 32     | J A 27  | J A 25 | 23     | 22     | J A 20 | 19     | 20     | 19     |
| 3           | J A 22  | E S 16 | J A 26 | J A 26 | J A 30          | J A 21           | J A 22  | 22     | G      | 31     | 38     | J A 77  | J A 43 | J A 52 | J A 54  | J A 40 | J A 37  | J A 35 | J A 25 | 22     | J A 22 | 22     | 22     | 22     |
| 4           | E S 16  | E S 15 | E S 15 | E S 15 | J A 22          | J A 22           | J A 23  | 23     | 27     | G      | J A 32 | J A 37  | J A 36 | J A 41 | J A 37  | J A 41 | J A 65  | 33     | J A 38 | J A 44 | J A 88 | J A 66 | J A 52 | J A 41 |
| 5           | 20      | J A 27 | 22     | J A 22 | 22              | 22               | J A 23  | E S 16 | J A 24 | J A 34 | J A 41 | J A 54  | J A 77 | J A 54 | J A 53  | 41     | G       | J A 25 | J A 38 | J A 25 | 23     | J A 26 | J A 22 | E S 15 |
| 6           | J A 30  | J A 26 | J A 33 | J A 30 | E S 15          | J A 22           | E S 16  | 22     | 23     | G      | J A 35 | J A 53  | J A 44 | J A 56 | J A 44  | 38     | 37      | J A 90 | J A 27 | 23     | 22     | 22     | J A 38 | J A 42 |
| 7           | J A 25  | J A 22 | J A 33 | J A 20 | J A 22          | J A 22           | 22  | E S 16 | G      | J A 30 | J A 38 | J A 65  | J A 88 | J A 44 | J A 35  | 33     | J A 35  | J A 33 | J A 26 | J A 34 | J A 26 | J A 25 | 22     | 23     |
| 8           | J A 40  | J A 26 | J A 32 | J A 83 | J A 28          | J A 22           | J A 24  | J A 24 | 22     | J A 35 | J A 51 | J A 102 | J A 84 | J A 77 | J A 42  | 20     | G       | J A 42 | J A 77 | J A 58 | J A 33 | J A 33 | J A 24 | E S 16 |
| 9           | E S 16  | E S 16 | J A 51 | E S 16 | J A 26          | E S 16           | J A 17  | E S 16 | J A 24 | G      | 32     | J A 41  | J A 50 | J A 42 | J A 43  | 33     | 29      | E S 16 | E S 16 | E S 16 | J A 22 | J A 17 | 22     | J A 22 |
| 10          | J A 27  | J A 25 | J A 34 | J A 37 | J A 44          | J A 30           | J A 32  | E S 16 | E S 16 | 28     | J A 51 | J A 44  | J A 88 | J A 50 | J A 36  | J A 54 | J A 65  | J A 44 | J A 33 | J A 33 | J A 22 | E S 16 | E S 16 | E S 16 |
| 11          | E S 16  | E S 16 | J A 22 | E S 16 | J A 22          | 20               | 19  | E S 16 | E S 16 | G      | G      | J A 25  | J A 35 | J A 34 | G       | J A 34 | 31      | G      | E S 16 | E S 16 | J A 17 | J A 22 | E S 16 | J A 20 |
| 12          | E S 16  | 19     | J A 39 | J A 34 | J A 22          | J A 20           | 22  | E S 16 | 22     | J A 26 | 32     | 33      | 35     | J A 32 | 42      | 34     | J A 35  | J A 29 | E S 16 | J A 21 | E S 16 | E S 16 | E S 16 | E S 16 |
| 13          | E S 16  | E S 16 | E S 16 | E S 16 | 22              | 21               | 24  | 20     | 24     | 31     | 35     | J A 36  | J A 38 | J A 40 | 41      | J A 50 | J A 54  | J A 57 | J A 56 | J A 54 | J A 30 | J A 35 | J A 24 | 22     |
| 14          | 18      | 22     | 22     | 20     | E S 16          | E S 16           | E S 16  | E S 16 | 23     | G      | 32     | J A 40  | J A 40 | J A 34 | J A 40  | 35     | 30      | J A 30 | J A 25 | J A 25 | J A 22 | E S 16 | E S 16 | E S 16 |
| 15          | E S 16  | E S 16 | J A 24 | 23     | E S 16          | S                | S   | E S 16 | 23     | G      | J A 37 | 33      | 32     | J A 36 | 38      | 33     | J A 30  | J A 30 | J A 30 | J A 24 | 22     | 19     | J A 23 | E S 16 |
| 16          | 20      | 19     | E S 16 | J A 22 | 18              | 21               | 20  | J A 23 | 25     | 30     | J A 32 | J A 41  | J A 36 | J A 36 | J A 36  | J A 38 | J A 30  | J A 40 | J A 33 | J A 24 | 22     | E S 16 | 20     | E S 16 |
| 17          | E S 16  | E S 15 | E S 16 | 21     | 22              | 22               | 23  | 22     | 22     | J A 27 | J A 33 | J A 36  | J A 39 | J A 40 | J A 54  | G      | G       | 22     | J A 22 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |
| 18          | E S 16  | E S 16 | E S 16 | E S 16 | E S 16          | E S 16           | E S 16  | E S 16 | 23     | 29     | J A 35 | 34      | J A 36 | J A 38 | J A 42  | J A 35 | 32      | 22     | 23     | 22     | E S 16 | E S 16 | E S 16 | E S 16 |
| 19          | E S 15  | E S 15 | E S 15 | E S 15 | E S 16          | E S 16           | E S 16  | E S 15 | G      | G      | G      | 42      | J A 39 | J A 37 | J A 33  | J A 33 | J A 30  | J A 31 | J A 23 | J A 26 | J A 32 | 22     | E S 16 | E S 16 |
| 20          | E S 16  | 22     | 22     | E S 16 | 23              | 22               | 21  | E S 16 | 21     | G      | G      | 43      | 44     | J A 65 | J A 112 | J A 84 | J A 104 | J A 87 | J A 43 | J A 30 | J A 37 | J A 26 | E S 16 | E S 16 |
| 21          | E S 16  | E S 16 | E S 16 | E S 16 | E S 16          | E S 16           | E S 16  | E S 16 | E S 16 | G      | 39     | 38      | 36     | 39     | 37      | J A 41 | 27      | 28     | E S 16 | J A 25 | J A 41 | J A 34 | J A 25 | 18     |
| 22          | E S 16  | E S 16 | E S 16 | E S 16 | E S 16          | E S 16           | E S 16  | E S 16 | E S 16 | G      | J A 35 | 39      | 42     | 42     | 39      | J A 34 | J A 30  | J A 24 | J A 22 | J A 53 | J A 17 | E S 16 | E S 16 | E S 16 |
| 23          | E S 16  | E S 16 | E S 16 | E S 16 | E S 16          | E S 16           | E S 16  | E S 16 | G      | 32     | J A 48 | J A 42  | 37     | J A 54 | J A 65  | J A 42 | G       | 23     | J A 18 | J A 22 | E S 16 | J A 51 | J A 28 | E S 16 |
| 24          | E S 16  | E S 16 | J A 24 | E S 16 | E S 16          | J A 17           | 22  | E S 16 | E S 16 | G      | G      | J A 65  | J A 42 | J A 54 | 37      | J A 40 | J A 38  | J A 26 | J A 21 | J A 24 | J A 25 | 21     | 22     | E S 16 |
| 25          | E S 16  | E S 16 | E S 16 | E S 16 | E S 16          | E S 16           | E S 16  | E S 16 | G      | G      | 33     | 37      | J A 52 | J A 32 | J A 42  | J A 48 | J A 38  | J A 22 | J A 24 | 19     | 19     | E S 16 | E S 16 | J A 25 |
| 26          | 18      | E S 16 | 21     | 22     | 20              | 22               | 20  | E S 16 | 28     | 30     | J A 32 | J A 53  | 40     | 34     | G       | G      | G       | 23     | J A 26 | J A 24 | J A 34 | J A 25 | 22     | 18     |
| 27          | E S 16  | E S 16 | E S 16 | E S 16 | E S 16          | E S 16           | E S 16  | E S 16 | G      | G      | J A 31 | J A 35  | J A 38 | J A 40 | J A 54  | G      | G       | 23     | J A 20 | E S 16 | E S 16 | 19     | E S 16 | E S 16 |
| 28          | E S 16  | E S 16 | E S 16 | 21     | 19              | E S 16           | E S 16  | E S 16 | 23     | G      | G      | J A 35  | 40     | J A 40 | J A 42  | J A 47 | J A 34  | J A 28 | J A 30 | J A 43 | J A 31 | 22     | E S 16 | E S 16 |
| 29          | E S 16  | 22     | E S 16 | E S 15 | E S 16          | E S 16           | E S 16  | 21     | J A 25 | G      | G      | G       | 37     | J A 67 | J A 54  | J A 37 | J A 25  | 24     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |        |
| 30          | E S 16  | E S 16 | E S 15 | E S 15 | 22              | 22               | E S 15  | E S 16 | G      | G      | G      | J A 51  | J A 37 | J A 40 | 43      | J A 41 | 32      | G      | 20     | J A 31 | J A 26 | J A 38 | E S 16 | E S 16 |
| 31          | E S 16  | E S 15 | E S 16 | J A 23 | J A 30          | J A 27           | J A 27  | J A 34 | J A 30 | J A 23 | J A 30 | J A 31  | G      | G      | G       | 39     | 31      | J A 33 | J A 25 | J A 53 | J A 75 | J A 51 | J A 33 | J A 32 |
| CNT         | 31      | 31     | 31     | 31     | 31              | 30               | 30  | 31     | 31     | 31     | 31     | 31      | 31     | 31     | 31      | 31     | 31      | 31     | 31     | 31     | 31     | 31     | 31     | 31     |
| MED         | E S 16  | E S 16 | E S 16 | E S 16 | 19              | 20               | 18  | E S 16 | 22     | G      | 33     | J A 39  | J A 39 | J A 40 | J A 41  | J A 38 | J A 31  | J A 23 | J A 24 | J A 24 | J A 22 | 22     | 20     | E S 16 |
| UQ          | 19      | 21     | J A 24 | J A 22 | J A 22          | J A 22           | 22  | 20     | 24     | 30     | J A 38 | J A 48  | J A 44 | J A 47 | J A 45  | J A 41 | J A 37  | J A 33 | J A 30 | J A 32 | J A 30 | J A 26 | 22     | 21     |
| LQ          | E S 16  | E S 16 | E S 16 | E S 16 | E S 16          | E S 16           | E S 16  | E S 16 | E S 16 | G      | 30     | 36      | J A 36 | J A 36 | J A 36  | 33     | 28      | 23     | 20     | 22     | 17     | E S 16 | E S 16 | E S 16 |

JAN. 1987

FOES (0.1 MHz)

The Radio Research Laboratory, Japan

# IONOSPHERIC DATA

JAN. 1987

FBES (0.1 MHZ)

135° E Mean Time (G.M.T. + 9h)

Station **OKINAWA** Lat. **26 16.9 N**, Long. **127 48.4 E** Sweep 1 MHz to 25 MHz in 24sec in automatic operation

| Hour<br>Day | 00     | 01     | 02     | 03     | 04     | 05     | 06     | 07     | 08     | 09 | 10   | 11      | 12 | 13 | 14 | 15   | 16      | 17     | 18     | 19     | 20     | 21     | 22     | 23     |
|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----|------|---------|----|----|----|------|---------|--------|--------|--------|--------|--------|--------|--------|
| 1           | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | 22     | 28 | 37   | 36      | 32 | 32 | 30 | 28   | 28      | 21     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |
| 2           | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G      | 28 | 37   | 37      | 37 | 32 | 37 | 32   | 27      | 22     | 18     | E S 16 | 20     | E S 16 | E S 16 | E S 16 |
| 3           | E S 16 | E S 16 | E S 16 | 18     | E S 16 | E S 16 | A A 22 | E S 16 | G      | 28 | 37   | 68      | 42 | 39 | 38 | 33   | 37      | 32     | 22     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |
| 4           | E S 16 | E 15   | E 15   | E 15   | E 15   | E 16   | A A 23 | E S 16 | 20     | G  | 30   | 32      | 35 | 35 | 30 | 34   | 64      | 30     | 38     | A A 44 | E S 16 | E S 16 | A A 52 | A A 41 |
| 5           | E S 15 | 20     | E S 16 | E S 16 | E S 15 | E S 15 | E S 15 | E S 16 | 23     | 30 | 33   | 52      | 39 | 40 | 52 | 40   | G       | 24     | A A 38 | 23     | E S 15 | 18     | E S 16 | E S 15 |
| 6           | E S 15 | E S 16 | E S 16 | E S 16 | E S 15 | E S 16 | E S 16 | E S 16 | 22     | G  | 32   | 34      | 40 | 39 | 34 | 37   | 35      | A A 90 | 26     | 17     | E S 16 | E S 16 | A A 38 | A A 42 |
| 7           | E S 15 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G      | 30 | 32   | A A 65  | 48 | 38 | 34 | 30   | 29      | 30     | 16     | E S 16 | 18     | E S 16 | E S 16 | E S 15 |
| 8           | A A 20 | E S 16 | A A 32 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | 17     | 30 | 44   | A A 102 | 33 | 39 | 33 | G 19 | 32      | A A 77 | 30     | E S 16 | 23     | 21     | E S 16 | E S 16 |
| 9           | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | 21     | G  | 30   | 33      | 32 | 36 | 37 | 29   | 25      | E S 16 | E S 16 | E S 16 | 19     | E S 16 | E S 16 | 20     |
| 10          | A A 27 | E S 16 | E S 16 | A A 37 | A A 44 | A A 30 | A A 32 | E S 16 | E S 16 | 27 | 48   | 39      | 40 | 38 | 31 | 36   | 43      | 41     | 28     | 26     | E S 16 | E S 16 | E S 16 | E S 16 |
| 11          | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | A A 20 | A A 19 | E S 16 | E S 16 | G  | G 23 | 32      | 32 | 31 | G  | 28   | 30      | G      | E S 16 | E S 16 | E S 16 | 21     | E S 16 | E S 16 |
| 12          | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | 22     | 26 | 32   | 33      | 35 | 32 | 40 | 34   | 32      | 23     | E S 16 | 18     | E S 16 | E S 16 | E S 16 | E S 16 |
| 13          | E S 16 | E S 16 | E S 16 | E S 16 | 20     | E S 16 | 20     | E S 16 | 24     | 31 | 33   | 33      | 32 | 40 | 38 | 50   | 48      | A A 57 | A A 56 | A A 54 | 19     | 24     | E S 16 | E S 16 |
| 14          | E S 16 | E S 16 | E S 16 | E S 15 | E S 16 | E S 16 | E S 16 | E S 16 | 23     | G  | 31   | 38      | 35 | 33 | 25 | 35   | 30      | 20     | 18     | E S 16 | 20     | E S 16 | E S 16 | E S 16 |
| 15          | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | S      | S      | E S 16 | 23     | G  | 32   | 33      | 32 | 36 | 37 | 33   | 20      | 30     | 27     | 23     | E S 16 | E S 16 | E S 16 | E S 16 |
| 16          | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | 25     | 28 | 32   | 35      | 33 | 36 | 36 | 38   | 28      | 33     | 30     | 18     | E S 16 | E S 16 | E S 16 | E S 16 |
| 17          | E S 16 | E S 15 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | 21     | 27 | 32   | 34      | 33 | 35 | 44 | G    | G       | 22     | 22     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |
| 18          | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | 22     | 28 | 30   | 33      | 34 | 35 | 32 | 30   | 29      | 22     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |
| 19          | E S 15 | E S 15 | E S 15 | E S 15 | E S 16 | E S 16 | E S 16 | E S 15 | G      | G  | G    | 35      | 37 | 33 | 31 | 32   | 30      | 25     | 17     | 22     | 32     | E S 16 | E S 16 | E S 16 |
| 20          | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 15 | E S 15 | 20     | G  | G    | 43      | 44 | 46 | 46 | 40   | A A 104 | 40     | 38     | 25     | 37     | E S 16 | E S 16 | E S 16 |
| 21          | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G  | 36   | 35      | 35 | 37 | 36 | 36   | 26      | U Y 28 | E S 16 | 20     | A A 41 | E S 16 | E S 16 | E S 16 |
| 22          | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G  | 32   | 38      | 40 | 37 | 32 | 34   | 29      | 23     | 17     | A A 53 | E S 16 | E S 16 | E S 16 | E S 16 |
| 23          | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G      | 28 | 34   | 34      | 33 | 33 | 38 | 31   | G       | 22     | 17     | E S 16 | E S 16 | 48     | 27     | E S 16 |
| 24          | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G  | G    | 32      | 35 | 35 | 35 | 39   | 33      | 24     | 17     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |
| 25          | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G      | G  | 32   | 32      | 33 | 32 | 38 | 37   | 30      | 22     | 20     | E S 16 | E S 16 | E S 16 | E S 16 | 20     |
| 26          | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | 22     | 28 | 32   | 35      | 38 | 33 | G  | G    | G       | 28     | 25     | 23     | 23     | 20     | E S 16 | E S 16 |
| 27          | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G      | G  | 31   | 35      | 33 | 35 | 39 | G    | G       | 23     | 20     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |
| 28          | E S 16 | E S 16 | E S 16 | E S 16 | E S 15 | E S 16 | E S 16 | E S 16 | 23     | G  | G    | 35      | 39 | 37 | 34 | 37   | 32      | 26     | 21     | A A 43 | 26     | E S 16 | E S 16 | E S 16 |
| 29          | E S 16 | E S 16 | E S 16 | E S 15 | E S 16 | E S 16 | E S 16 | E S 16 | 25     | G  | G    | G       | G  | 37 | 64 | 51   | 37      | 23     | 18     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |
| 30          | E S 16 | E S 16 | E S 15 | E S 15 | E S 15 | E S 15 | E S 16 | E S 16 | G      | G  | G    | 32      | 37 | 37 | 35 | 33   | 28      | G      | 19     | 20     | 26     | A A 38 | E S 16 | E S 16 |
| 31          | E S 16 | E S 15 | E S 16 | E S 15 | A A 27 | A A 27 | A A 34 | E S 16 | 25     | 26 | 28   | 31      | G  | G  | G  | 39   | 31      | 29     | 23     | A A 53 | A A 75 | 29     | A A 33 | E S 16 |
| 00          | 01     | 02     | 03     | 04     | 05     | 06     | 07     | 08     | 09     | 10 | 11   | 12      | 13 | 14 | 15 | 16   | 17      | 18     | 19     | 20     | 21     | 22     | 23     |        |
| CNT         | 31     | 31     | 31     | 31     | 31     | 30     | 30     | 31     | 31     | 31 | 31   | 31      | 31 | 31 | 31 | 31   | 31      | 31     | 31     | 31     | 31     | 31     | 31     | 31     |
| MED         | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | 20     | G  | 32   | 35      | 35 | 36 | 35 | 34   | 30      | 24     | 20     | 17     | E S 16 | E S 16 | E S 16 | E S 16 |
| UQ          | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | 22     | 28 | 33   | 38      | 38 | 38 | 38 | 37   | 32      | 30     | 26     | 23     | 22     | 17     | E S 16 | E S 16 |
| LQ          | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 | G  | 29   | 33      | 33 | 33 | 32 | 30   | 26      | 22     | 17     | E S 16 | E S 16 | E S 16 | E S 16 | E S 16 |

JAN. 1987

FBES (0.1 MHZ)

# IONOSPHERIC DATA

JAN. 1987

FMIN (0.1 MHz)

135 E Mean Time (G.M.T. + 9h)

| Station     | OKINAWA   |           |           |           | Lat. 26 16.9 N. | Long. 127 48.4 E | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |           |           |    |    |    |    |    |    |    |    |    |           |           |           |           |           |           |
|-------------|-----------|-----------|-----------|-----------|-----------------|------------------|---|-----------|-----------|----|----|----|----|----|----|----|----|----|-----------|-----------|-----------|-----------|-----------|-----------|
| Hour<br>Day | 00        | 01        | 02        | 03        | 04              | 05               | 06  | 07        | 08        | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18        | 19        | 20        | 21        | 22        | 23        |
| 1           | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | E S<br>16 | 14 | 15 | 15 | 16 | 15 | 16 | 15 | 15 | 14 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 2           | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | 15        | 15 | 15 | 15 | 15 | 16 | 15 | 15 | 15 | 15 | E S<br>16 | E S<br>15 | E S<br>15 | E S<br>16 | E S<br>16 | E S<br>16 |
| 3           | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | 15        | 16 | 16 | 14 | 16 | 15 | 16 | 15 | 15 | 15 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 4           | E S<br>16 | E S<br>15 | E S<br>15 | E S<br>15 | E S<br>15       | E S<br>16        | E S<br>15   | E S<br>15 | 16        | 16 | 15 | 14 | 14 | 15 | 13 | 14 | 15 | 14 | E S<br>15 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 5           | E S<br>15 | E S<br>15 | E S<br>16 | E S<br>16 | E S<br>15       | E S<br>15        | E S<br>15   | E S<br>16 | 13        | 13 | 13 | 13 | 14 | 14 | 14 | 14 | 14 | 14 | E S<br>16 | E S<br>16 | E S<br>15 | E S<br>16 | E S<br>16 | E S<br>15 |
| 6           | E S<br>15 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>15       | E S<br>16        | E S<br>16   | E S<br>16 | 13        | 12 | 14 | 14 | 14 | 15 | 13 | 16 | 16 | 14 | E S<br>16 | E S<br>15 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 7           | E S<br>15 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>15   | E S<br>16 | 13        | 12 | 13 | 14 | 14 | 14 | 15 | 14 | 14 | 13 | E S<br>14 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>15 |
| 8           | E S<br>16 | E S<br>15 | E S<br>15 | E S<br>15 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | E S<br>16 | 16 | 14 | 14 | 14 | 14 | 16 | 17 | 16 | 16 | E S<br>15 | E S<br>15 | E S<br>15 | E S<br>16 | E S<br>16 | E S<br>16 |
| 9           | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | E S<br>16 | 15 | 14 | 14 | 14 | 15 | 14 | 14 | 14 | 16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>15 | E S<br>16 | E S<br>15 |
| 10          | E S<br>15 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | E S<br>16 | 14 | 16 | 15 | 17 | 16 | 14 | 15 | 14 | 15 | E S<br>15 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 11          | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | E S<br>16 | 14 | 15 | 14 | 16 | 14 | 16 | 14 | 16 | 16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 12          | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | 15        | 15 | 14 | 15 | 15 | 14 | 15 | 14 | 15 | 14 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 13          | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | 15        | 15 | 14 | 14 | 15 | 14 | 14 | 14 | 14 | 15 | E S<br>15 | E S<br>15 | E S<br>15 | E S<br>16 | E S<br>16 | E S<br>16 |
| 14          | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>15 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | 15        | 15 | 15 | 15 | 15 | 15 | 16 | 15 | 14 | 15 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 15          | E S<br>16 | E S<br>16 | E S<br>15 | E S<br>16 | E S<br>16       | S                | S   | E S<br>16 | 15        | 15 | 14 | 15 | 16 | 16 | 15 | 14 | 14 | 15 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 16          | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>15 | 16        | 15 | 15 | 15 | 15 | 16 | 15 | 16 | 15 | 15 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 17          | E S<br>16 | E S<br>15 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | 16        | 14 | 13 | 14 | 14 | 14 | 13 | 14 | 13 | 14 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 18          | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | 16        | 13 | 14 | 17 | 17 | 14 | 14 | 14 | 16 | 13 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 19          | E S<br>15 | E S<br>15 | E S<br>15 | E S<br>15 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>15 | 15        | 14 | 14 | 16 | 14 | 15 | 16 | 15 | 13 | 13 | E S<br>15 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 20          | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | 14        | 14 | 15 | 14 | 16 | 15 | 14 | 13 | 13 | 14 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 21          | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | E S<br>16 | 14 | 16 | 14 | 16 | 15 | 14 | 14 | 14 | 16 | E S<br>16 | E S<br>15 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 22          | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | E S<br>16 | 16 | 15 | 15 | 16 | 17 | 16 | 17 | 14 | 16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 23          | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | 16        | 16 | 15 | 14 | 16 | 14 | 16 | 14 | 14 | 14 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 24          | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | E S<br>16 | 16 | 15 | 16 | 16 | 16 | 16 | 16 | 14 | 14 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>15 | E S<br>16 |
| 25          | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | 15        | 16 | 16 | 15 | 15 | 15 | 14 | 15 | 14 | 14 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 26          | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | E S<br>16 | 15 | 15 | 16 | 14 | 16 | 16 | 15 | 15 | 15 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 27          | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | 15        | 14 | 14 | 15 | 15 | 15 | 14 | 15 | 14 | 15 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 28          | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>15       | E S<br>16        | E S<br>16   | E S<br>16 | 14        | 14 | 13 | 14 | 14 | 14 | 16 | 14 | 15 | 14 | E S<br>15 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 29          | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>15 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | 14        | 13 | 13 | 14 | 15 | 14 | 14 | 13 | 13 | 16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 30          | E S<br>16 | E S<br>16 | E S<br>15 | E S<br>15 | E S<br>15       | E S<br>15        | E S<br>15   | E S<br>16 | 14        | 14 | 14 | 14 | 16 | 16 | 15 | 14 | 13 | 13 | E S<br>14 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| 31          | E S<br>16 | E S<br>15 | E S<br>16 | E S<br>15 | E S<br>15       | E S<br>15        | E S<br>15   | E S<br>15 | 14        | 14 | 12 | 13 | 14 | 16 | 12 | 14 | 14 | 14 | E S<br>16 | E S<br>16 | E S<br>15 | E S<br>16 | E S<br>16 | E S<br>16 |
|             | 00        | 01        | 02        | 03        | 04              | 05               | 06  | 07        | 08        | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18        | 19        | 20        | 21        | 22        | 23        |
| CNT         | 31        | 31        | 31        | 31        | 31              | 30               | 30  | 31        | 31        | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31        | 31        | 31        | 31        | 31        | 31        |
| MED         | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | 14        | 14 | 14 | 14 | 15 | 15 | 15 | 14 | 14 | 14 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| UQ          | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | E S<br>16 | 15 | 15 | 15 | 16 | 16 | 16 | 15 | 15 | 15 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |
| LQ          | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16       | E S<br>16        | E S<br>16   | E S<br>16 | 14        | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | E S<br>15 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 | E S<br>16 |

JAN. 1987

FMIN (0.1 MHz)

The Radio Research Laboratory, Japan

# IONOSPHERIC DATA

JAN. 1987

M(3000)F2 (0.01)

135 E Mean Time (G.M.T. + 9h)

Station OKINAWA Lat. 26 16.9 N, Long. 127 48.4 E Sweep 1 MHz to 25 MHz in 24sec in automatic operation

| Hour<br>Day | 00  | 01  | 02  | 03  | 04  | 05  | 06  | 07  | 08  | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23 |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| 1           | 315 | 345 | 360 | 335 | 365 | 335 | 325 | 320 | 325 | 345 | 330 | 360 | 360 | 355 | 335 | 340 | 355 | 365 | 365 | 335 | 310 | 315 | U S | S  |
| 2           | F   | F   | F   | F   | F   | U S | U S |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 3           | F   | F   | F   | F   | F   | S   | A   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 4           | 305 | 320 | 305 | 325 | 355 | 320 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 5           | 300 | 355 | 320 | 335 | F   | F   | F   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 6           | F   | F   | F   | F   | U S | U S | F   | U S |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 7           | F   | F   | F   | F   | F   | F   | F   | F   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 8           | A   | F   | A   | F   | F   | F   | F   | S   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 9           | 320 | F   | 315 | U S | S   | 315 | 315 | 355 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 10          | A   | F   | F   | A   | A   | A   | A   | F   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 11          | F   | F   | F   | F   | 380 | A   | A   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 12          | 360 | 360 | F   | F   | F   | F   | F   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 13          | F   | F   | F   | F   | 365 | F   | 365 | 340 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 14          | 355 | F   | F   | F   | F   | F   | F   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 15          | 320 | 325 | 315 | 355 | 365 | S   | S   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 16          | U S | 310 | 345 | 360 | 365 | U S | U S | 320 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 17          | F   | S   | S   | S   | F   | F   | F   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 18          | 335 | U S | 340 | 345 | 345 | 360 | S   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 19          | 320 | 325 | 305 | 315 | 325 | 325 | 355 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 20          | 320 | F   | 320 | 320 | 365 | 350 | 325 | 325 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 21          | 325 | 325 | 325 | 295 | 375 | 345 | 345 | 325 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 22          | F   | 300 | 345 | 350 | 375 | 385 | 340 | 325 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 23          | 320 | 315 | 295 | 320 | 360 | U S | 295 | 350 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 24          | 355 | 320 | U S | 350 | 335 | 335 | F   | 355 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 25          | 315 | 320 | 320 | 335 | 335 | 335 | 335 | 335 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 26          | 335 | 340 | 335 | 335 | 345 | 320 | 335 | 340 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 27          | 320 | 320 | 365 | 315 | F   | F   | 340 | 310 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 28          | 325 | 335 | 320 | 360 | S   | S   | U S | 320 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 29          | U S | U S | U S | S   | 350 | 320 | 320 | 325 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 30          | U S | 305 | 335 | 360 | F   | F   | F   | F   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| 31          | 320 | 305 | 325 | 325 | 345 | A   | A   | A   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| CNT         | 21  | 20  | 21  | 21  | 20  | 17  | 15  | 29  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| MED         | 320 | 320 | 325 | 335 | 362 | 335 | 325 | 335 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| UQ          | 325 | 330 | 345 | 350 | 365 | 350 | 340 | 350 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |
| LQ          | 315 | 310 | 320 | 325 | 345 | 320 | 318 | 325 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |

JAN. 1987

M(3000)F2 (0.01)

# IONOSPHERIC DATA

JAN. 1987

M(3000)F1 (0.01)

135 E Mean Time (G.M.T. + 9h)

| Station     | OKINAWA |    |    |    | Lat. 26 16.9 N | Long. 127 48.4 E | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |    |    |     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |
|-------------|---------|----|----|----|----------------|------------------|---|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|
| Hour<br>Day | 00      | 01 | 02 | 03 | 04             | 05               | 06  | 07 | 08 | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18 | 19 | 20 | 21 | 22 | 23 |
| 1           |         |    |    |    |                |                  |   |    |    | L   | 400 | 415 | 405 | 405 | L   | L   | L   |     |    |    |    |    |    |    |
| 2           |         |    |    |    |                |                  |   |    |    | L   | L   | U L | 390 | 405 | 415 | 400 | L   | L   |    |    |    |    |    |    |
| 3           |         |    |    |    |                |                  |   |    |    | L   | 385 | A   | A   | 390 | 405 | U L | A   | A   |    |    |    |    |    |    |
| 4           |         |    |    |    |                |                  |   |    | L  | L   | 395 | 400 | 390 | 385 | 390 | 395 | L   | A   |    |    |    |    |    |    |
| 5           |         |    |    |    |                |                  |   |    |    | A   | 395 | A   | 390 | A   | A   | A   | L   |     |    |    |    |    |    |    |
| 6           |         |    |    |    |                |                  |   |    |    |     | 385 | 390 | 390 | 385 | 370 | L   |     | A   |    |    |    |    |    |    |
| 7           |         |    |    |    |                |                  |   |    |    |     | L   | A   | A   | 390 | U L | 375 | L   | A   |    |    |    |    |    |    |
| 8           |         |    |    |    |                |                  |   |    | L  | L   | A   | A   | 405 | A   | 400 | L   | L   | A   |    |    |    |    |    |    |
| 9           |         |    |    |    |                |                  |   |    |    | L   | L   | U L | A   | 380 | 370 | U L | L   |     |    |    |    |    |    |    |
| 10          |         |    |    |    |                |                  |   |    |    | L   | A   | L   | L   | U L | U L | L   | A   |     |    |    |    |    |    |    |
| 11          |         |    |    |    |                |                  |   |    |    | L   | L   | U L | 430 | L   | 405 | L   | L   |     |    |    |    |    |    |    |
| 12          |         |    |    |    |                |                  |   |    |    | L   | L   | 415 | 405 | U L | A   | L   | L   |     |    |    |    |    |    |    |
| 13          |         |    |    |    |                |                  |   |    |    | U L | 395 | 400 | L   | U L | 390 | 385 | A   | A   | A  |    |    |    |    |    |
| 14          |         |    |    |    |                |                  |   |    |    | L   | 400 | 420 | 420 | 405 | 390 | 400 | L   | L   |    |    |    |    |    |    |
| 15          |         |    |    |    |                |                  |   |    | L  | U L | 385 | 390 | 420 | 420 | L   | 390 | U L | A   |    |    |    |    |    |    |
| 16          |         |    |    |    |                |                  |   |    |    | L   | U L | L   | 395 | 390 | 395 | L   | L   | A   |    |    |    |    |    |    |
| 17          |         |    |    |    |                |                  |   |    |    | L   | L   | U L | 370 | 385 | A   | L   | L   | L   |    |    |    |    |    |    |
| 18          |         |    |    |    |                |                  |   |    |    |     | L   | U L | 385 | 385 | 390 | L   | L   |     |    |    |    |    |    |    |
| 19          |         |    |    |    |                |                  |   |    |    | L   | L   | 390 | 385 | 385 | 385 | 380 | L   | L   |    |    |    |    |    |    |
| 20          |         |    |    |    |                |                  |   |    |    | L   | 425 | A   | A   | A   | A   | L   | A   | A   |    |    |    |    |    |    |
| 21          |         |    |    |    |                |                  |   |    |    | L   | L   | U L | U L | L   | L   | L   | L   |     |    |    |    |    |    |    |
| 22          |         |    |    |    |                |                  |   |    |    | L   | L   | U L | A   | 395 | 405 | L   | L   |     |    |    |    |    |    |    |
| 23          |         |    |    |    |                |                  |   |    | L  | L   | 380 | 395 | U L | U L | L   | L   | L   |     |    |    |    |    |    |    |
| 24          |         |    |    |    |                |                  |   |    |    | L   | L   | U L | 395 | L   | U L | A   | L   |     |    |    |    |    |    |    |
| 25          |         |    |    |    |                |                  |   |    |    | L   | L   | 415 | 420 | 415 | 395 | A   | U L | L   |    |    |    |    |    |    |
| 26          |         |    |    |    |                |                  |   |    | L  | L   | 390 | 405 | 405 | 405 | 395 | U L | L   | L   |    |    |    |    |    |    |
| 27          |         |    |    |    |                |                  |   |    |    | L   | U L | L   | 400 | 395 | 395 | 390 | U L | L   |    |    |    |    |    |    |
| 28          |         |    |    |    |                |                  |   |    |    | L   | U L | 400 | 385 | 385 | 385 | 390 | U L |     |    |    |    |    |    |    |
| 29          |         |    |    |    |                |                  |   |    |    | L   | U L | 380 | 370 | 380 | A   | A   | A   | L   |    |    |    |    |    |    |
| 30          |         |    |    |    |                |                  |   |    |    | L   | 390 | 400 | 405 | 355 | 370 | U L | L   |     |    |    |    |    |    |    |
| 31          |         |    |    |    |                |                  |   |    |    | L   | U L | 370 | 380 | 395 | 415 | 385 | A   | L   | L  |    |    |    |    |    |
|             | 00      | 01 | 02 | 03 | 04             | 05               | 06  | 07 | 08 | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT         |         |    |    |    |                |                  |   |    |    | 2   | 17  | 23  | 25  | 24  | 23  | 12  | 3   |     |    |    |    |    |    |    |
| MED         |         |    |    |    |                |                  |   |    |    | U L | 390 | 395 | 400 | 395 | 390 | 390 | 390 | U L |    |    |    |    |    |    |
| UQ          |         |    |    |    |                |                  |   |    |    | L   | 400 | 408 | 405 | 405 | 395 | 400 | U L |     |    |    |    |    |    |    |
| LQ          |         |    |    |    |                |                  |   |    |    | L   | 385 | 390 | 390 | 385 | 385 | 380 | U L |     |    |    |    |    |    |    |

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M(3000)F1 (0.01)

### IONOSPHERIC DATA

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H<sup>o</sup>F<sub>2</sub> (KM)

135° E Mean Time (G.M.T. + 9h)

| Station     | OKINAWA |    |    |    |    |    |    | Lat. 26° 16.9' N. | Long. 127° 48.4' E | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |     |     |     |     |     |     |     |     |     |    |    |    |    |    |  |
|-------------|---------|----|----|----|----|----|----|-------------------|--------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|--|
| Hour<br>Day | 00      | 01 | 02 | 03 | 04 | 05 | 06 | 07                | 08                 | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19 | 20 | 21 | 22 | 23 |  |
| 1           |         |    |    |    |    |    |    |                   |                    | 260   | 265 | 240 | 225 | 240 | 270 | 260 | 260 |     |     |    |    |    |    |    |  |
| 2           |         |    |    |    |    |    |    |                   |                    | 250   | 280 | 240 | 240 | 265 | 250 | 245 | 240 |     |     |    |    |    |    |    |  |
| 3           |         |    |    |    |    |    |    |                   |                    | 260   | 270 | A   | 260 | 240 | 250 | 230 | 235 | 225 |     |    |    |    |    |    |  |
| 4           |         |    |    |    |    |    |    |                   | 215                | 255   | 245 | 250 | 260 | 255 | 235 | 255 | 245 |     |     |    |    |    |    |    |  |
| 5           |         |    |    |    |    |    |    |                   | 220                | 245   | 250 | 245 | 295 | 255 | 250 | 230 |     |     |     |    |    |    |    |    |  |
| 6           |         |    |    |    |    |    |    |                   |                    |   |     |     | 275 | 245 | 235 | 225 | 250 | 255 |     |    | A  |    |    |    |  |
| 7           |         |    |    |    |    |    |    |                   |                    |   |     | 255 | A   | 300 | 265 | 240 | 245 | 235 | 220 |    |    |    |    |    |  |
| 8           |         |    |    |    |    |    |    |                   | 225                | U L<br>240  | 250 | A   | 240 | 250 | 250 | 265 | 250 |     |     | A  |    |    |    |    |  |
| 9           |         |    |    |    |    |    |    |                   | 230                | 235   | 270 | 290 | 260 | 250 | 255 | 255 |     |     |     |    |    |    |    |    |  |
| 10          |         |    |    |    |    |    |    |                   | 220                | A   | 245 | 250 | 290 | 310 | 270 | 250 |     |     |     |    |    |    |    |    |  |
| 11          |         |    |    |    |    |    |    |                   | 250                | L   | 250 | 265 | 250 | 265 | 275 | 260 | 260 |     |     |    |    |    |    |    |  |
| 12          |         |    |    |    |    |    |    |                   | 250                | 250   | 275 | 260 | 240 | 240 | 240 | 250 |     |     |     |    |    |    |    |    |  |
| 13          |         |    |    |    |    |    |    |                   | 250                | 250   | 255 | 300 | 260 | 240 |     | A   | A   | A   |     |    |    |    |    |    |  |
| 14          |         |    |    |    |    |    |    |                   | 265                | 240   | 260 | 240 | 225 | 240 | 250 | 240 | 230 |     |     |    |    |    |    |    |  |
| 15          |         |    |    |    |    |    |    |                   | 270                | 260   | 240 | 225 | 260 | 260 | 260 | 260 | 260 | 230 |     |    |    |    |    |    |  |
| 16          |         |    |    |    |    |    |    |                   | 240                | 260   | 330 | L   | 280 | 240 | 240 | 260 | 260 | 240 |     |    |    |    |    |    |  |
| 17          |         |    |    |    |    |    |    |                   | 255                | 295   | 265 | 255 | 255 | 265 | 275 | 245 | 220 |     |     |    |    |    |    |    |  |
| 18          |         |    |    |    |    |    |    |                   |                    | 265   | 280 | 265 | 255 | 260 | 260 | 260 |     |     |     |    |    |    |    |    |  |
| 19          |         |    |    |    |    |    |    |                   | 255                | 245   | 300 | 270 | 260 | 255 | 255 | 265 | 235 |     |     |    |    |    |    |    |  |
| 20          |         |    |    |    |    |    |    |                   | 245                | 255   | 270 | 255 | 250 | 250 | 245 |     | A   | 235 |     |    |    |    |    |    |  |
| 21          |         |    |    |    |    |    |    |                   | 250                | 280   | 290 | 260 | 240 | 270 | 265 | 250 |     |     |     |    |    |    |    |    |  |
| 22          |         |    |    |    |    |    |    |                   | 240                | 245   | 325 | 270 | 225 | 250 | 255 | 260 |     |     |     |    |    |    |    |    |  |
| 23          |         |    |    |    |    |    |    |                   | 215                | 250   | 295 | 250 | 270 | 260 | 245 | 255 | 260 |     |     |    |    |    |    |    |  |
| 24          |         |    |    |    |    |    |    |                   | 250                | 240   | 250 | 255 | 240 | 255 | 250 | 265 |     |     |     |    |    |    |    |    |  |
| 25          |         |    |    |    |    |    |    |                   | 225                | 220   | 260 | 280 | 260 | 270 | 240 | 245 | 240 |     |     |    |    |    |    |    |  |
| 26          |         |    |    |    |    |    |    |                   | 240                | 260   | 260 | 260 | 260 | 260 | 250 | 260 | 250 | 225 |     |    |    |    |    |    |  |
| 27          |         |    |    |    |    |    |    |                   | 240                | 295   | 265 | 260 | 255 | 265 | 280 | 240 | 220 |     |     |    |    |    |    |    |  |
| 28          |         |    |    |    |    |    |    |                   | 230                | 250   | 275 | 240 | 235 | 270 | 230 | 235 |     |     |     |    |    |    |    |    |  |
| 29          |         |    |    |    |    |    |    |                   | 285                | 295   | 255 | 260 | 250 |     | A   | 265 | 250 | 220 |     |    |    |    |    |    |  |
| 30          |         |    |    |    |    |    |    |                   | 270                | 255   | 230 | 310 | 260 | 220 | 225 | 220 |     |     |     |    |    |    |    |    |  |
| 31          |         |    |    |    |    |    |    |                   | 290                | 325   | 285 | 265 | 255 | 255 | 250 | 230 | 225 |     |     |    |    |    |    |    |  |
|             | 00      | 01 | 02 | 03 | 04 | 05 | 06 | 07                | 08                 | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19 | 20 | 21 | 22 | 23 |  |
| CNT         |         |    |    |    |    |    |    |                   | 5                  | 28  | 30  | 28  | 31  | 31  | 30  | 30  | 28  | 13  |     |    |    |    |    |    |  |
| MED         |         |    |    |    |    |    |    |                   | 225                | 250   | 255 | 260 | 260 | 255 | 250 | 255 | 250 | 225 |     |    |    |    |    |    |  |
| UQ          |         |    |    |    |    |    |    |                   | 240                | 260   | 275 | 275 | 270 | 260 | 265 | 260 | 260 | 235 |     |    |    |    |    |    |  |
| LQ          |         |    |    |    |    |    |    |                   | 215                | 240   | 245 | 250 | 250 | 240 | 245 | 245 | 240 | 220 |     |    |    |    |    |    |  |

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H<sup>o</sup>F<sub>2</sub> (KM)

# IONOSPHERIC DATA

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H\*F (KM)

135 E Mean Time (G.M.T. + 9h)

| Station     |         | OKINAWA |       | Lat. 26 16.9 N |       | Long. 127 48.4 E |         | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |       |       |       |       |         |       |       |       |       |       |       |       |       |       |         |         |       |
|-------------|---------|---------|-------|----------------|-------|------------------|---------|---|-------|-------|-------|-------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|---------|-------|
| Hour<br>Day | 00      | 01      | 02    | 03             | 04    | 05               | 06      | 07  | 08    | 09    | 10    | 11    | 12      | 13    | 14    | 15    | 16    | 17    | 18    | 19    | 20    | 21    | 22      | 23      |       |
| 1           | S 280   | S 250   | S 230 | S 210          | S 210 | S                | S       | E S 280   | S 240 | A 240 | A 240 | A 230 | S 210   | S 200 | S 200 | A 240 | A 240 | S 210 | S 190 | S 210 | S 250 | S 240 | S 240   | S 240   |       |
| 2           | S 300   | S 225   | S 210 | S 210          | S 210 | S                | S       | S 240   | S 235 | S 230 | A 235 | A 235 | S 220   | S 190 | A 220 | S 220 | S 210 | S 215 | S 200 | S 245 | A 235 | S 250 | S 250   | S 210   |       |
| 3           | S 280   | S 250   | S 250 | A 250          | S     | S                | A       | E S 280   | S 240 | A 225 | A     | A     | A       | A     | A     | A 220 | A     | A     | S 210 | S 225 | S 240 | S 220 | S 215   | E S 265 |       |
| 4           | S 320   | S 300   | S 275 | S 270          | S 230 | S 255            | A       | S 250   | S 210 | S 225 | S 215 | S 200 | S 205   | S 205 | S 200 | S 200 | A     | S 220 | S 220 | A     | S     | S 280 | A       | A       |       |
| 5           | S 315   | S 280   | S 265 | S 245          | S 220 | S                | S       | S 255   | S 220 | A 240 | A 240 | A 230 | A       | A     | A     | A     | S 220 | S 210 | A     | A     | S 205 | S 230 | S 270   | S 270   |       |
| 6           | S 305   | S 290   | S 250 | S 220          | S 190 | S                | S       | S 250   | S 220 | S 230 | S 215 | S 210 | A       | A     | A     | A 250 | S 235 | A     | S 220 | S 220 | S 265 | S 245 | A       | A       |       |
| 7           | S 260   | S 250   | S 250 | S 230          | S 220 | S 235            | S       | S 250   | S 225 | S 230 | S 230 | A     | A       | S 190 | S 225 | S 215 | S 220 | A     | S 200 | S 255 | S 230 | S 230 | S 245   | S 230   |       |
| 8           | A 315   | A 260   | S 270 | S 250          | S 300 | S 250            | S 180   | S 210   | A     | A     | A     | A     | S 200   | A 190 | S 175 | A     | A     | A     | S 240 | S 300 | S 325 | S 250 | S 220   | S 200   |       |
| 9           | S 300   | S 310   | S 220 | S 200          | S     | S                | S 260   | S 240   | S 210 | S 205 | S 200 | A     | S 245   | S 230 | S 200 | S 195 | S 240 | S 210 | S 195 | S 225 | S 210 | S 250 | S 265   | S 265   |       |
| 10          | A 340   | A 270   | A     | A              | A     | A                | S 250   | S 210   | S 205 | A     | A     | A     | A       | S 215 | S 175 | A     | A     | S 250 | S 215 | S 250 | S 280 | S 245 | S 210   | S 250   |       |
| 11          | S 260   | S 250   | S 290 | S 200          | S 235 | A                | A       | S 275   | S 220 | S 195 | S 220 | S 200 | S 180   | S 175 | S 175 | S 225 | S 220 | S 205 | S 230 | S 220 | S 260 | S 230 | S 260   | S 260   |       |
| 12          | S 290   | S 260   | S 250 | S              | S 220 | S 210            | E S 260 | S   | S 240 | S 230 | S 220 | S 200 | S 200   | S 190 | A     | S 220 | S 230 | S 240 | S 210 | S 230 | S 230 | S 230 | S 255   | E S 275 |       |
| 13          | S 240   | S 250   | S 230 | S 200          | S     | A                | S       | S 240   | A     | S 225 | S 210 | S 190 | A       | A     | A     | A     | A     | A     | A     | A     | S 250 | A     | S       | S       |       |
| 14          | S 235   | S 250   | S 225 | S 200          | S     | S                | S       | S   | S 240 | S 220 | S 210 | S 210 | S 190   | S 200 | S 190 | A     | S 230 | S 215 | S 200 | S 210 | A     | S 240 | S 230   | S       |       |
| 15          | S 290   | S 260   | S 235 | S 210          | S     | S                | S       | A 240   | A 230 | S 220 | S 200 | S 190 | S 210   | A     | S 230 | S 235 | A     | S 220 | S 210 | S 240 | S 260 | S 240 | S       | S       |       |
| 16          | E S 280 | E S 290 | S 255 | E S 280        | S 205 | S 210            | S 220   | S   | S 240 | S 220 | S 205 | S 200 | S 190   | S 220 | A 220 | S 210 | S 200 | A     | S 230 | S 230 | S     | S 240 | S 235   | S       |       |
| 17          | S 300   | S 270   | S 215 | S 230          | S 255 | S 275            | S 295   | S 275   | S 230 | S 215 | S 215 | S 220 | S 200   | S 200 | A     | S 205 | S 205 | S 225 | S 200 | S 200 | S 235 | S 220 | S 245   | S 250   |       |
| 18          | S 285   | S 275   | S 255 | S 255          | S 250 | S 205            | S       | S 270   | S 220 | S 225 | S 215 | S 205 | S 210   | S 215 | S 205 | S 215 | S 220 | S 230 | S 205 | S 200 | S 225 | S 235 | S 240   | S 265   |       |
| 19          | S 250   | S 275   | S 295 | S 270          | S 250 | S 240            | S 225   | S 245   | S 220 | S 215 | S 205 | S 200 | S 220   | S 200 | S 200 | S 215 | S 245 | S 240 | S 200 | S 200 | S 265 | S 225 | S 210   | S       |       |
| 20          | S 275   | S 280   | S 255 | S 235          | S 210 | S                | S       | S 270   | S 220 | S 205 | S 195 | A     | A       | A     | A     | A     | A     | A     | A     | S 220 | S 235 | A     | S 220   | S 220   | S 285 |
| 21          | S 260   | S 250   | S 300 | S 320          | S 220 | S 255            | S 250   | S 260   | S 240 | S 190 | A     | S 215 | S 210   | A     | S 205 | A     | S 200 | S 220 | S 205 | S 210 | A     | S 300 | S 260   | S 270   |       |
| 22          | S 275   | S 300   | S 260 | S 250          | S 220 | S 210            | S       | S 275   | S 240 | S 235 | S 215 | S 220 | A       | S 210 | S 200 | S 240 | S 240 | S 230 | S 200 | A     | S 210 | S 245 | S 250   | S 240   |       |
| 23          | S 250   | S 265   | S 300 | S 280          | S 230 | S 290            | S 290   | S 240   | S 200 | S 200 | S 200 | S 230 | S 200   | S 190 | A     | S 190 | S 220 | S 240 | S 200 | S 195 | S 220 | A     | A       | S 260   |       |
| 24          | S 220   | S 290   | S 270 | S 245          | S 250 | S 275            | S 300   | S 255   | S 225 | S 200 | S 200 | S 180 | S 225   | S 210 | S 200 | A     | A     | A     | S 240 | S 210 | S 210 | S 245 | S 240   | S 210   | S 260 |
| 25          | S 265   | S 270   | S 270 | S 240          | S 260 | S                | S       | S 260   | S 210 | S 205 | S 210 | S 200 | S 200   | S 190 | S 230 | A     | A     | S 205 | S 200 | S 200 | S 200 | S 240 | S 230   | S 220   | S 250 |
| 26          | S 240   | S 230   | S 230 | S 240          | S 230 | S                | E S 270 | S   | S 220 | S 200 | S 230 | S 200 | S 210   | S 200 | S 200 | H 200 | S 220 | A     | A     | S 220 | S 240 | A     | E S 275 | S 240   | S 260 |
| 27          | S 260   | E S 290 | S 235 | S 205          | S 240 | S                | S 260   | S   | S 230 | S 210 | S 210 | S 220 | S 200   | S 200 | A     | S 210 | S 210 | S 210 | S 200 | S 200 | S 235 | S 225 | E S 240 | E S 260 |       |
| 28          | S 240   | S 225   | S 225 | S 205          | S     | S                | S       | S 235   | S 230 | S 220 | S 200 | S 200 | E A 245 | S 220 | S 190 | S 225 | A     | S 200 | S 230 | S 220 | A     | S 300 | S 255   | S 255   | S 250 |
| 29          | S 250   | S 265   | S 220 | S 210          | S 220 | S 240            | S 250   | S 260   | S 240 | S 225 | S 205 | S 200 | S 200   | S 205 | A     | A     | A     | S 220 | S 210 | S 215 | S 230 | S 220 | S 255   | S 275   |       |
| 30          | S 265   | S 270   | S 250 | S 240          | S 210 | S 250            | E S 270 | S 255   | S 230 | S 210 | S 200 | S 200 | S 210   | A     | S 215 | S 205 | S 205 | S 220 | S 200 | S 265 | A 275 | A     | S 230   | E S 280 |       |
| 31          | S 270   | S 275   | S 270 | S 255          | S 230 | A                | A       | A   | S 230 | S 200 | S 190 | S 205 | S 205   | S 195 | S 220 | A     | S 215 | S 220 | S 205 | A     | A     | A     | A       | S       | S     |
|             | 00      | 01      | 02    | 03             | 04    | 05               | 06      | 07  | 08    | 09    | 10    | 11    | 12      | 13    | 14    | 15    | 16    | 17    | 18    | 19    | 20    | 21    | 22      | 23      |       |
| CNT         | 24      | 31      | 30    | 29             | 27    | 15               | 12      | 23  | 31    | 29    | 26    | 25    | 24      | 23    | 19    | 21    | 23    | 22    | 29    | 25    | 23    | 28    | 26      | 24      |       |
| MED         | 264     | 272     | 255   | 240            | 220   | 240              | 258     | 258   | 230   | 215   | 212   | 200   | 201     | 200   | 200   | 215   | 220   | 220   | 205   | 215   | 240   | 239   | 240     | 255     |       |
| UQ          | S 282   | S 290   | S 270 | S 252          | S 238 | S 255            | S 292   | S 268   | S 240 | S 225 | S 220 | S 215 | S 210   | S 210 | S 218 | S 220 | S 230 | S 240 | S 220 | S 235 | S 258 | S 246 | S 250   | S 265   |       |
| LQ          | S 250   | S 250   | S 235 | S 220          | S 210 | S 210            | S 244   | S 250   | S 220 | S 205 | S 205 | S 200 | S 200   | S 192 | S 195 | S 200 | S 205 | S 215 | S 200 | S 200 | S 228 | S 228 | S 220   | S 248   |       |

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The Radio Research Laboratory, Japan

# IONOSPHERIC DATA

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H<sup>o</sup>E (KM)

135° E Mean Time (G.M.T. + 9h)

| Station     | OKINAWA |    |    |    | Lat. 26 16.9 N. |    |    |     | Long. 127 48.4 E |     |     |     | Sweep 1 MHz to 25 MHz in 2 sec in automatic operation |     |     |     |     |    |    |    |    |    |    |    |
|-------------|---------|----|----|----|-----------------|----|----|-----|------------------|-----|-----|-----|---|-----|-----|-----|-----|----|----|----|----|----|----|----|
| Hour<br>Day | 00      | 01 | 02 | 03 | 04              | 05 | 06 | 07  | 08               | 09  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 1           |         |    |    |    |                 |    |    | S   | 110              | 110 | 110 | A   | A   | A   | A   | 110 | A   |    |    |    |    |    |    |    |
| 2           |         |    |    |    |                 |    |    | 115 | 110              | 110 | 110 | 110 | 110   | 110 | 110 |     | A   | A  |    |    |    |    |    |    |
| 3           |         |    |    |    |                 |    |    | 110 | 110              | 110 | 105 | 105 | 105   | A   | A   | A   | A   |    |    |    |    |    |    |    |
| 4           |         |    |    |    |                 |    |    | 110 | 105              | A   | A   | A   | A   | A   | A   | 105 | 105 |    |    |    |    |    |    |    |
| 5           |         |    |    |    |                 |    |    | A   | 105              | 100 | 100 | A   | A   | 100 | 100 | 100 | A   |    |    |    |    |    |    |    |
| 6           |         |    |    |    |                 |    |    | 110 | 105              | 105 | A   | A   | A   | A   | 105 | A   | 110 |    |    |    |    |    |    |    |
| 7           |         |    |    |    |                 |    |    | 110 | 105              | 105 | A   | A   | A   | A   | A   | A   | A   |    |    |    |    |    |    |    |
| 8           |         |    |    |    |                 |    |    | S   | A                | A   | A   | A   | A   | A   | 110 | A   | A   |    |    |    |    |    |    |    |
| 9           |         |    |    |    |                 |    |    | S   | 110              | A   | A   | A   | A   | A   | A   | A   | A   | S  |    |    |    |    |    |    |
| 10          |         |    |    |    |                 |    |    | S   | A                | A   | A   | A   | A   | A   | A   | A   | A   |    |    |    |    |    |    |    |
| 11          |         |    |    |    |                 |    |    | S   | 110              | 110 | A   | A   | A   | 110 | A   | A   | 110 |    |    |    |    |    |    |    |
| 12          |         |    |    |    |                 |    |    | 110 | A                | A   | A   | A   | A   | A   | A   | A   | A   |    |    |    |    |    |    |    |
| 13          |         |    |    |    |                 |    |    | 100 | 110              | 110 | 105 | 105 | A   | A   | 110 | 110 | 110 |    |    |    |    |    |    |    |
| 14          |         |    |    |    |                 |    |    | 110 | 110              | 110 | 110 | 110 | A   | 110 | 110 | 110 | A   |    |    |    |    |    |    |    |
| 15          |         |    |    |    |                 |    |    | 115 | 110              | 110 | 110 | 110 | A   | A   | A   | 110 | 110 | S  |    |    |    |    |    |    |
| 16          |         |    |    |    |                 |    |    | 115 | 110              | A   | A   | A   | A   | A   | A   | A   | A   | S  |    |    |    |    |    |    |
| 17          |         |    |    |    |                 |    |    | A   | A                | A   | A   | A   | A   | A   | 105 | 105 | 100 | A  |    |    |    |    |    |    |
| 18          |         |    |    |    |                 |    |    | 115 | 105              | 105 | 105 | 105 | A   | A   | A   | 105 | 100 | A  |    |    |    |    |    |    |
| 19          |         |    |    |    |                 |    |    | 115 | 105              | 105 | 105 | 105 | A   | A   | A   | A   | A   | A  |    |    |    |    |    |    |
| 20          |         |    |    |    |                 |    |    | 110 | 105              | 105 | 105 | 105 | A   | A   | A   | A   | A   | A  |    |    |    |    |    |    |
| 21          |         |    |    |    |                 |    |    | S   | 110              | A   | A   | 105 | A   | A   | A   | A   | A   | B  | S  |    |    |    |    |    |
| 22          |         |    |    |    |                 |    |    | S   | 110              | 110 | 105 | 110 | 110   | A   | A   | A   | A   | A  | S  |    |    |    |    |    |
| 23          |         |    |    |    |                 |    |    | B   | 115              | 110 | A   | A   | A   | A   | A   | 110 | A   | A  | S  |    |    |    |    |    |
| 24          |         |    |    |    |                 |    |    | S   | 110              | 110 | A   | A   | A   | 110 | A   | A   | A   | A  | S  |    |    |    |    |    |
| 25          |         |    |    |    |                 |    |    | 110 | 110              | 110 | 110 | A   | A   | A   | A   | A   | A   | A  | S  |    |    |    |    |    |
| 26          |         |    |    |    |                 |    |    | 110 | 110              | 110 | A   | 110 | 110   | 110 | 110 | 110 | 110 | S  |    |    |    |    |    |    |
| 27          |         |    |    |    |                 |    |    | 110 | 110              | A   | A   | 110 | 110   | A   | 110 | 110 | 115 | S  |    |    |    |    |    |    |
| 28          |         |    |    |    |                 |    |    | 110 | 105              | 105 | 105 | 105 | A   | A   | A   | A   | A   | A  |    |    |    |    |    |    |
| 29          |         |    |    |    |                 |    |    | 110 | 105              | 105 | 100 | 100 | 100   | 100 | 100 | A   | 100 | A  |    |    |    |    |    |    |
| 30          |         |    |    |    |                 |    |    | 105 | 105              | 105 | 105 | A   | A   | 105 | 105 | A   | 105 | S  |    |    |    |    |    |    |
| 31          |         |    |    |    |                 |    |    | A   | A                | A   | 105 | 105 | 105   | 100 | 105 | 105 | A   | A  |    |    |    |    |    |    |
| CNT         |         |    |    |    |                 |    |    | 20  | 26               | 20  | 16  | 15  | 7   | 9   | 12  | 12  | 12  |    |    |    |    |    |    |    |
| MED         |         |    |    |    |                 |    |    | 110 | 110              | 110 | 105 | 105 | 110   | 110 | 108 | 110 | 110 |    |    |    |    |    |    |    |
| UQ          |         |    |    |    |                 |    |    | 115 | 110              | 110 | 110 | 110 | 110   | 110 | 110 | 110 | 110 |    |    |    |    |    |    |    |
| LQ          |         |    |    |    |                 |    |    | 110 | 105              | 105 | 105 | 105 | 105   | 100 | 105 | 105 | 102 |    |    |    |    |    |    |    |

The Radio Research Laboratory, Japan

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H<sup>o</sup>E (KM)



IONOSPHERIC DATA

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H°ES (KM)

135° E Mean Time (G.M.T. + 9h)

| Station     | OKINAWA |     |     |     | Lat. 26° 16.9' N | Long. 127° 48.4' E | Sweep 1 MHz to 25 MHz in 24sec in automatic operation |     |         |           |     |     |     |         |         |     |     |         |     |     |     |     |     |     |
|-------------|---------|-----|-----|-----|------------------|--------------------|---|-----|---------|-----------|-----|-----|-----|---------|---------|-----|-----|---------|-----|-----|-----|-----|-----|-----|
| Hour<br>Day | 00      | 01  | 02  | 03  | 04               | 05                 | 06  | 07  | 08      | 09        | 10  | 11  | 12  | 13      | 14      | 15  | 16  | 17      | 18  | 19  | 20  | 21  | 22  | 23  |
| 1           | 100     | 105 | 110 | 110 | S                | 100                | S   | S   | 140     | 150       | 130 | 125 | 110 | 105     | 110     | 110 | 160 | 105     | S   | S   | S   | S   | 100 | S   |
| 2           | S       | S   | S   | S   | S                | S                  | S   | S   | G       | 130       | 125 | 125 | 120 | 115     | 115     | 115 | 110 | 110     | 110 | 110 | 110 | 110 | 115 | 110 |
| 3           | 110     | S   | 110 | 105 | 100              | 100                | 100   | 100 | G       | 120       | 120 | 120 | 115 | 115     | 110     | 110 | 100 | 100     | 100 | 105 | 100 | 105 | 100 | 100 |
| 4           | S       | S   | S   | S   | 100              | 100                | 100   | 95  | 130     | G         | 120 | 110 | 105 | 105     | 105     | 105 | 140 | 135     | 120 | 115 | 120 | 105 | 110 | 105 |
| 5           | 105     | 105 | 105 | 105 | 105              | 105                | 100   | S   | 150     | 120       | 120 | 125 | 110 | 105     | 135     | 135 | G   | 100     | 120 | 115 | 110 | 105 | 100 | S   |
| 6           | 105     | 105 | 105 | 105 | S                | 105                | S   | 100 | 120     | G         | 120 | 105 | 105 | 105     | 100     | 150 | 145 | 115     | 135 | 130 | 120 | 120 | 110 | 105 |
| 7           | 105     | 105 | 105 | 100 | 100              | 100                | 100   | S   | G       | 115       | 120 | 105 | 105 | 105     | 105     | 105 | 105 | 105     | 105 | 105 | 105 | 105 | 105 | 100 |
| 8           | 110     | 105 | 105 | 105 | 100              | 100                | 100   | 100 | 100     | 110       | 110 | 105 | 105 | 100     | 100     | 100 | 100 | 100     | 100 | 100 | 100 | 100 | S   | S   |
| 9           | S       | S   | 110 | S   | 100              | S                  | 100   | S   | 100     | G         | 110 | 105 | 100 | 100     | 100     | 115 | 100 | S       | S   | S   | 100 | 100 | 100 | 100 |
| 10          | 100     | 100 | 100 | 100 | 100              | 100                | 100   | S   | S       | 105       | 105 | 105 | 100 | 100     | 100     | 100 | 100 | 100     | 100 | 100 | 100 | S   | S   | S   |
| 11          | S       | S   | 100 | S   | 100              | 100                | 100   | S   | S       | G         | 100 | 110 | 105 | 105     | G       | 100 | 150 | G       | S   | S   | 130 | 120 | S   | 100 |
| 12          | S       | 100 | 100 | 100 | 100              | 100                | 100   | S   | 160     | 110       | 160 | 150 | 150 | 110     | E G 165 | 150 | 130 | 100     | S   | 100 | S   | S   | S   | S   |
| 13          | S       | S   | S   | S   | 100              | 100                | 100   | 100 | 155     | 155       | 150 | 120 | 120 | 110     | 150     | 140 | 140 | 120     | 110 | 110 | 110 | 100 | 100 | 100 |
| 14          | 100     | 100 | 100 | 100 | S                | S                  | S   | S   | 165     | G E G 160 | 120 | 120 | 110 | 100     | 150     | 150 | 110 | 100     | 100 | 100 | 100 | S   | S   | S   |
| 15          | S       | S   | 110 | 110 | S                | S                  | S   | S   | E G 140 | G         | 125 | 120 | 115 | 110     | 160     | 160 | 100 | 125     | 110 | 110 | 110 | 110 | 100 | S   |
| 16          | 100     | 100 | S   | 110 | 110              | 110                | 110   | 110 | 150     | 150       | 110 | 110 | 110 | E G 160 | 110     | 100 | 100 | 100     | 100 | 100 | 100 | 110 | S   | 110 |
| 17          | S       | S   | S   | 105 | 105              | 105                | 105   | 105 | 110     | 105       | 105 | 115 | 110 | 105     | 105     | G   | G   | 140     | 95  | S   | S   | S   | S   | S   |
| 18          | S       | S   | S   | S   | S                | S                  | S   | S   | 150     | 120       | 120 | 120 | 120 | 110     | 105     | 105 | 120 | 115     | 105 | 105 | S   | S   | S   | S   |
| 19          | S       | S   | S   | S   | S                | S                  | S   | S   | G       | G         | G   | 120 | 110 | 105     | 100     | 100 | 100 | 100     | 100 | 95  | 130 | 120 | S   | S   |
| 20          | S       | 120 | 105 | S   | 105              | 100                | 100   | S   | 120     | G         | G   | 155 | 125 | 105     | 105     | 100 | 100 | 100     | 100 | 100 | 110 | 110 | S   | S   |
| 21          | S       | S   | S   | S   | S                | S                  | S   | S   | S       | G         | 150 | 150 | 175 | 160     | 150     | 100 | 105 | 125     | S   | 105 | 105 | 105 | 145 | 125 |
| 22          | S       | S   | S   | S   | S                | S                  | S   | S   | S       | G         | 150 | 125 | 115 | 110     | 110     | 110 | 110 | 110     | 105 | 110 | 110 | S   | S   | S   |
| 23          | S       | S   | S   | S   | S                | S                  | S   | S   | G       | 110       | 105 | 105 | 105 | 100     | 100     | 100 | G   | 100     | 100 | 100 | S   | 135 | 125 | S   |
| 24          | S       | S   | 110 | S   | S                | 100                | 100   | S   | S       | G         | G   | 110 | 110 | 110     | 110     | 145 | 105 | 145     | 105 | 110 | 105 | 105 | 100 | S   |
| 25          | S       | S   | S   | S   | S                | S                  | S   | S   | G       | G         | 160 | 125 | 110 | 110     | 100     | 100 | 100 | 100     | 100 | 100 | 100 | S   | S   | 100 |
| 26          | 110     | S   | 110 | 100 | 100              | 100                | 100   | S   | 125     | 125       | 125 | 110 | 150 | 150     | G       | G   | G   | 145     | 100 | 100 | 110 | 100 | 100 | 100 |
| 27          | S       | S   | S   | S   | S                | S                  | S   | S   | G       | G         | 100 | 110 | 120 | 120     | 110     | G   | G   | E G 140 | 100 | S   | S   | 110 | S   | S   |
| 28          | S       | S   | S   | 105 | 105              | S                  | S   | S   | 145     | G         | G   | 120 | 120 | 105     | 105     | 100 | 100 | 100     | 100 | 95  | 100 | 100 | S   | S   |
| 29          | S       | 105 | S   | S   | S                | S                  | S   | 100 | 115     | G         | G   | G   | G   | 140     | 120     | 115 | 110 | 140     | 105 | S   | S   | S   | S   | S   |
| 30          | S       | S   | S   | S   | 105              | 105                | S   | S   | G       | G         | G   | 125 | 105 | 110     | 125     | 120 | 110 | G       | 135 | 120 | 120 | 105 | S   | S   |
| 31          | S       | S   | S   | 105 | 105              | 105                | 100   | 100 | 100     | 100       | 100 | 120 | G   | G       | G       | 120 | 120 | 110     | 100 | 100 | 100 | 100 | 115 | 100 |
| CNT         | 10      | 11  | 15  | 15  | 17               | 18                 | 16  | 9   | 18      | 15        | 25  | 30  | 29  | 30      | 28      | 28  | 26  | 28      | 26  | 25  | 24  | 21  | 16  | 12  |
| MED         | 105     | 105 | 105 | 105 | 100              | 100                | 100   | 100 | 132     | 120       | 120 | 120 | 110 | 109     | 106     | 110 | 108 | 109     | 100 | 105 | 110 | 105 | 102 | 100 |
| UQ          | 110     | 105 | 110 | 105 | 105              | 105                | 100   | 100 | 150     | 128       | 128 | 125 | 120 | 110     | 115     | 128 | 130 | 124     | 110 | 110 | 110 | 110 | 112 | 105 |
| LQ          | 100     | 100 | 102 | 100 | 100              | 100                | 100   | 100 | 115     | 110       | 110 | 110 | 105 | 105     | 100     | 100 | 100 | 100     | 100 | 100 | 100 | 100 | 100 | 100 |

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H°ES (KM)

# IONOSPHERIC DATA

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TYPES OF ES

135° E Mean Time (G.M.T. + 9h)

| Station |     | OKINAWA |    |    |    |    |    |    | Lat. 26 16.9 N |      | Long. 127 48.4 E |      | Sweep 1 MHz to 25 MHz in 2 sec in automatic operation |      |      |      |      |      |      |      |    |    |      |      |    |
|---------|-----|---------|----|----|----|----|----|----|----------------|------|------------------|------|---|------|------|------|------|------|------|------|----|----|------|------|----|
| Hour    | Day | 00      | 01 | 02 | 03 | 04 | 05 | 06 | 07             | 08   | 09               | 10   | 11  | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19 | 20 | 21   | 22   | 23 |
| 1       | F1  | F4      | F1 | F2 |    | F2 |    |    |                | H2   | H2               | C3   | C2  | L2   | L3   | L2   | L2   | H1   | L2   |      |    |    |      | F2   |    |
| 2       |     |         |    |    |    |    |    |    |                |      | C2               | C4   | C2  | C2   | C2   | C3   | C3   | L4   | L2   | F2   | F2 | F4 | F1   | F1   | F1 |
| 3       | F2  |         | F3 | F5 | F2 | F3 | F2 | F2 |                |      | C3               | C4   | C6  | C5   | C4   | L3   | L6   | L4   | L7   | F7   | F2 | F2 | F2   | F2   |    |
| 4       |     |         |    |    | F2 | F2 | F4 | F4 |                | C2   |                  | CL21 | L2  | L2   | L3   | L3   | L2   | H4   | H5   | F6   | F7 | F2 | F4   | F5   | F6 |
| 5       | F1  | F4      | F3 | F3 | F2 | F2 | F1 |    |                | HL31 | C3               | C3   | C4  | L4   | L3   | H3   | H5   |      | L1   | F6   | F7 | F1 | F3   | F3   |    |
| 6       | F3  | F2      | F2 | F3 |    | F1 |    | F1 |                | C1   |                  | C3   | L2  | L2   | L4   | L3   | HL21 | HL22 | C6   | F3   | F1 | F1 | F1   | F5   | F3 |
| 7       | F2  | F3      | F2 | F1 | F1 | F1 | F2 |    |                |      | C3               | C4   | L5  | L4   | L2   | L2   | L2   | L3   | L4   | F3   | F2 | F3 | F3   | F2   | F2 |
| 8       | F7  | F3      | F4 | F2 | F2 | F2 | F2 | F2 |                | L1   | L2               | L5   | L6  | L3   | L4   | LH31 | L1   | L3   | L4   | F3   | F4 | F3 | F2   |      |    |
| 9       |     |         | F2 |    | F1 |    | F1 |    |                | L2   |                  | CL22 | L2  | L5   | LH21 | L3   | CL12 | L2   |      |      |    | F2 | F1   | F2   | F8 |
| 10      | F4  | F3      | F3 | F5 | F3 | F3 | F2 |    |                |      | L2               | L6   | L3  | L4   | L2   | L2   | L3   | L3   | L3   | F3   | F2 | F1 |      |      |    |
| 11      |     |         | F1 |    | F1 | F2 | F1 |    |                |      |                  | L2   | L1  | L1   | L1   |      | L1   | HL11 |      |      |    | F1 | F3   |      | F1 |
| 12      |     | F1      | F1 | F2 | F2 | F1 | F1 |    |                | H2   | L1               | HL12 | HL11  | HL11 | L1   | HL21 | HL21 | CL11 | L2   |      | F1 |    |      |      |    |
| 13      |     |         |    |    | F3 | F1 | F3 | F1 |                | H2   | H2               | H2   | C1  | C1   | L1   | HL21 | H4   | H5   | C4   | F7   | F4 | F7 | F6   | F2   | F2 |
| 14      | F1  | F1      | F1 | F1 |    |    |    |    |                | H2   |                  | H1   | C3  | C2   | L1   | L1   | H2   | H1   | L2   | F2   | F1 | F1 |      |      |    |
| 15      |     |         | F2 | F1 |    |    |    |    |                | C2   |                  | C2   | C2  | C1   | L2   | HL22 | HL21 | L1   | C2   | L6   | F5 | F2 | F1   | F2   |    |
| 16      | F1  | F1      |    | F2 | F1 | F1 | F2 | F2 |                | H3   | H2               | L2   | L2  | L2   | HL11 | L3   | L3   | L4   | L3   | L3   | F3 | F2 |      | F1   |    |
| 17      |     |         |    | F3 | F1 | F2 | F2 | F1 |                | L1   | L2               | L2   | L2  | L2   | L1   | L4   |      |      | HL23 | L3   |    |    |      |      |    |
| 18      |     |         |    |    |    |    |    |    |                | H2   | C2               | C1   | C1  | C2   | L2   | L2   | L2   | C2   | C3   | L1   | F1 |    |      |      |    |
| 19      |     |         |    |    |    |    |    |    |                |      |                  | C2   | LC22  | L2   | L3   | L3   | L5   | L5   | L3   | L3   | F5 | F3 | F2   |      |    |
| 20      |     | F1      | F2 |    | F3 | F2 | F2 |    |                | C3   |                  | H1   | C2  | L3   | L5   | L5   | L4   | L2   | L3   | F3   | F4 | F2 |      |      |    |
| 21      |     |         |    |    |    |    |    |    |                |      |                  | HL21 | HL11  | H1   | HL21 | HL21 | L5   | L1   | C2   |      | F4 | F5 | F3   | FF12 | F2 |
| 22      |     |         |    |    |    |    |    |    |                |      | HC21             | H2   | C3  | C2   | CL21 | L2   | L2   | L2   | L2   | L1   | F6 | F1 |      |      |    |
| 23      |     |         |    |    |    |    |    |    |                | C2   | L2               | LH11 | L1  | L3   | L3   | L2   |      | L2   | L1   | F1   |    | F2 | F6   |      |    |
| 24      |     |         | F2 |    |    | F2 | F3 |    |                |      |                  | L2   | L2  | L1   | C2   | HL22 | L3   | HL21 | L1   | F2   | F2 | F2 | F2   |      |    |
| 25      |     |         |    |    |    |    |    |    |                |      | H1               | C1   | L2  | L2   | L5   | L3   | L4   | L1   | L2   | F2   | F1 |    |      | F5   |    |
| 26      | F1  |         | F1 | F1 | F1 | F2 | F2 |    |                | C2   | C2               | C1   | L2  | H2   | H1   |      |      | H3   | L2   | F2   | F3 | F4 | F1   | F1   |    |
| 27      |     |         |    |    |    |    |    |    |                |      |                  | L1   | L2  | C2   | C1   | L4   |      |      | HL11 | L1   |    |    | F1   |      |    |
| 28      |     |         |    | F3 | F3 |    |    |    |                | H2   |                  | C2   | C2  | L3   | L2   | L3   | L3   | L3   | L3   | L6   | F4 | F2 | F1   |      |    |
| 29      |     | F2      |    |    |    |    |    | F2 |                | C2   |                  |      |   | H2   | C4   | C4   | L3   | H1   | L2   |      |    |    |      |      |    |
| 30      |     |         |    |    | F1 | F1 |    |    |                |      |                  | C2   | L2  | L2   | C2   | C2   | L2   |      | H3   | FF33 | F6 | F5 |      |      |    |
| 31      |     |         |    | F4 | F4 | F4 | F8 | F6 |                | L4   | L3               | L2   | C1  |      |      | C2   | C2   | L4   | L4   | F7   | F6 | F6 | FF22 | F2   |    |
|         | 00  | 01      | 02 | 03 | 04 | 05 | 06 | 07 | 08             | 09   | 10               | 11   | 12  | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20 | 21 | 22   | 23   |    |
| CNT     |     |         |    |    |    |    |    |    |                |      |                  |      |   |      |      |      |      |      |      |      |    |    |      |      |    |
| MED     |     |         |    |    |    |    |    |    |                |      |                  |      |   |      |      |      |      |      |      |      |    |    |      |      |    |
| UQ      |     |         |    |    |    |    |    |    |                |      |                  |      |   |      |      |      |      |      |      |      |    |    |      |      |    |
| LQ      |     |         |    |    |    |    |    |    |                |      |                  |      |   |      |      |      |      |      |      |      |    |    |      |      |    |

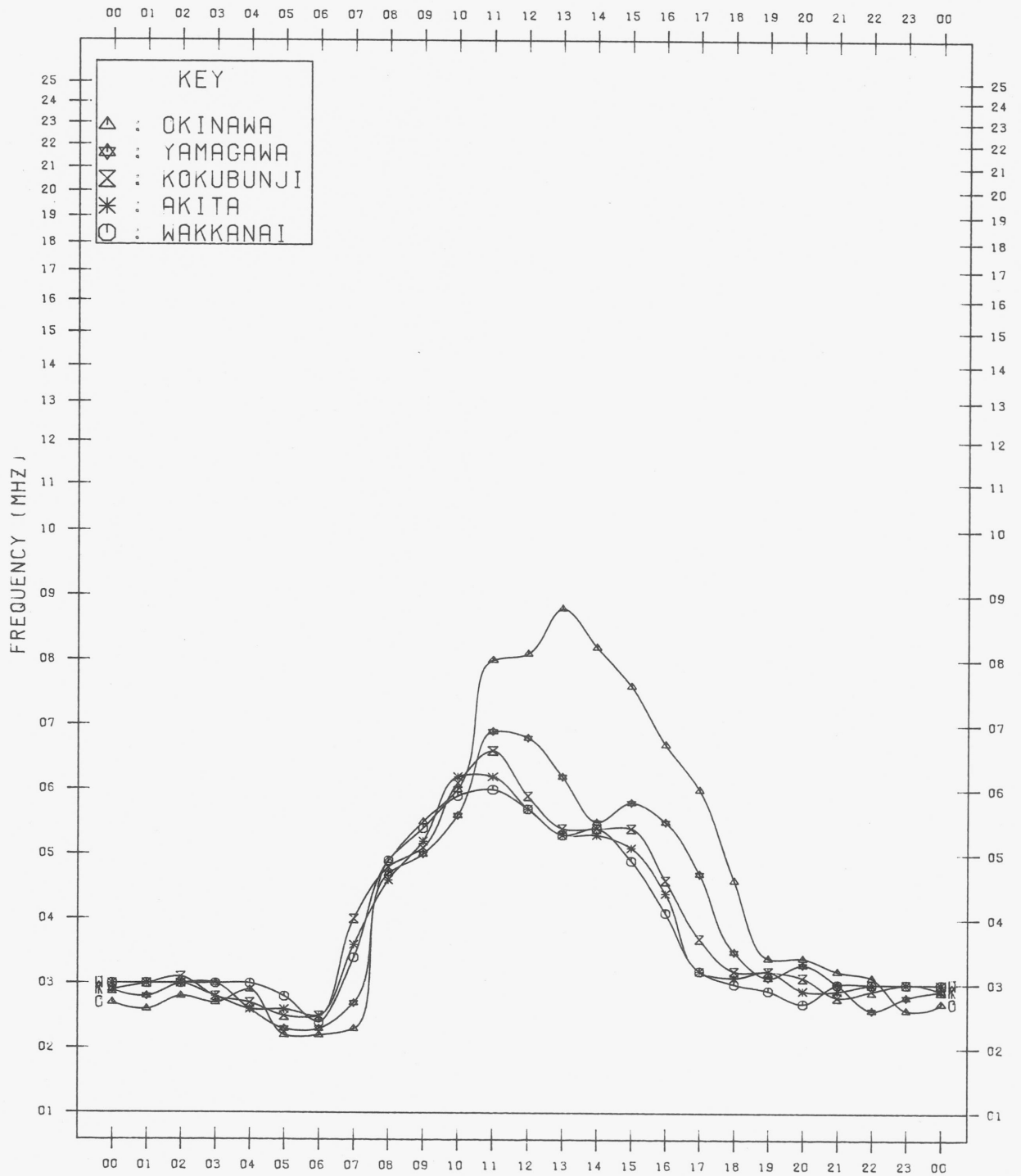
JAN. 1987

TYPES OF ES

# MONTHLY MEDIAN VALUES OF FOF2

135 °E MEAN TIME

JAN. 1987



*f*-PLOTS OF IONOSPHERIC DATA

| KEY OF F-PLOT |   |
|---------------|---|
| I             | SPREAD  |
| ○             | F <sub>0</sub> F <sub>2</sub> , F <sub>0</sub> F <sub>1</sub> , F <sub>0</sub> E          |
| ×             | F <sub>X</sub> F <sub>2</sub>   |
| *             | DOUBTFUL F <sub>0</sub> F <sub>2</sub> , F <sub>0</sub> F <sub>1</sub> , F <sub>0</sub> E |
| ⊗             | FBES  |
| L             | ESTIMATED F <sub>0</sub> F <sub>1</sub>   |
| *.Y           | F <sub>MIN</sub>  |
| ^             | GREATER THAN  |
| v             | LESS THAN   |

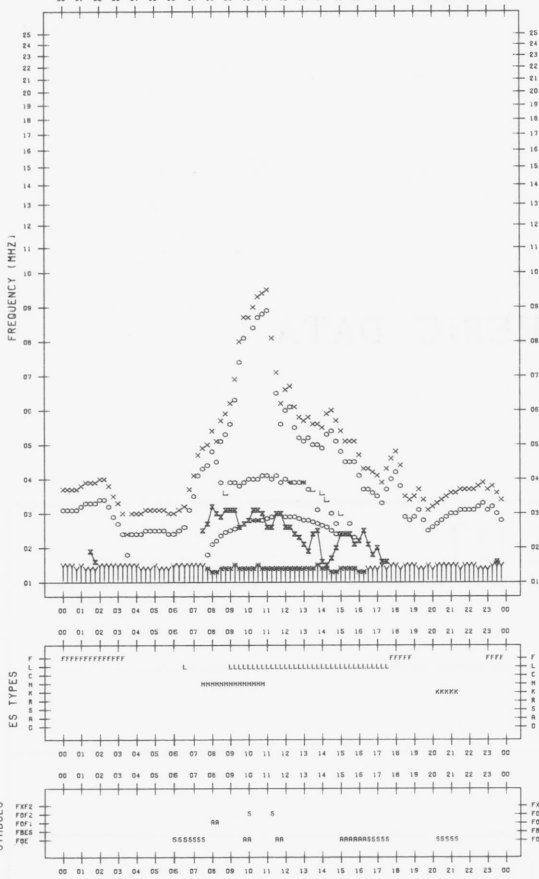
F-PLOT DATA

SCALER : S-HIIDOME

STATION : KOKUBUNJI TOKYO

DATE : 1987 / 1 / 1

135°E MEAN TIME



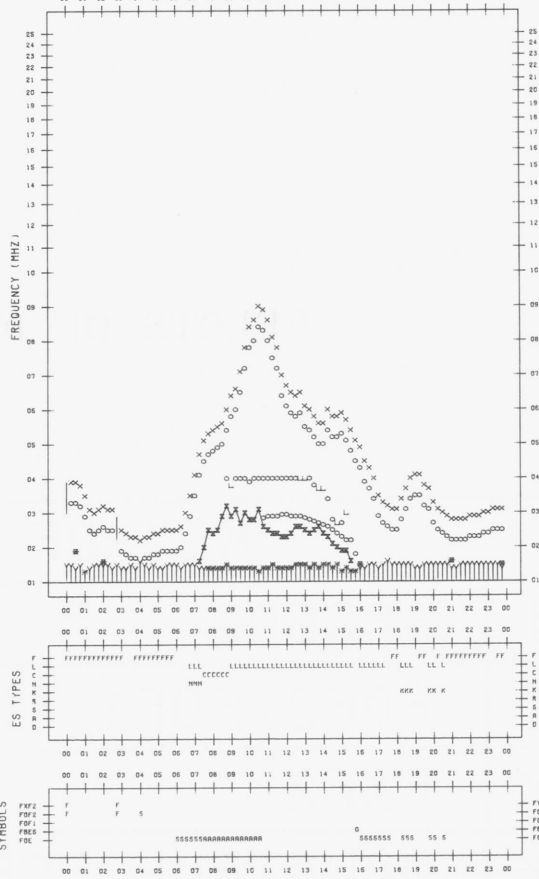
F-PLOT DATA

SCALER : S-HIIDOME

STATION : KOKUBUNJI TOKYO

DATE : 1987 / 1 / 3

135°E MEAN TIME



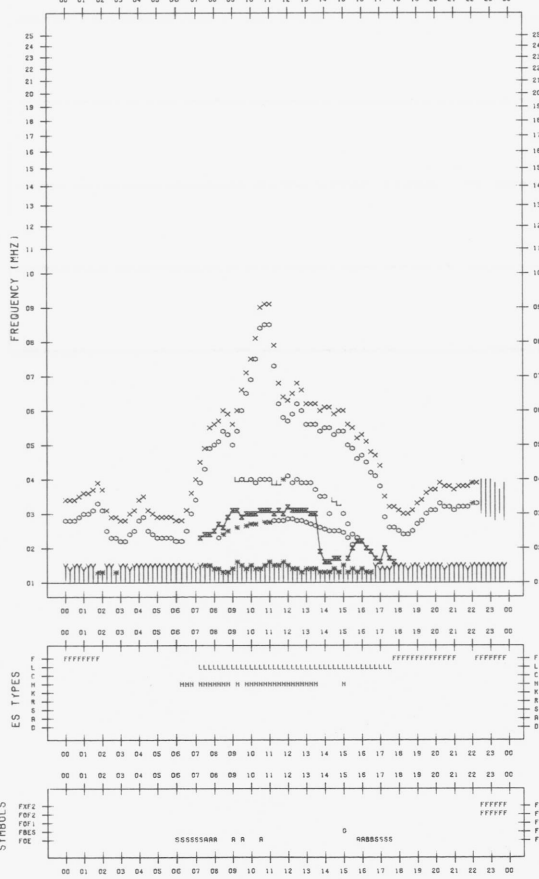
F-PLOT DATA

SCALER : S-HIIDOME

STATION : KOKUBUNJI TOKYO

DATE : 1987 / 1 / 2

135°E MEAN TIME



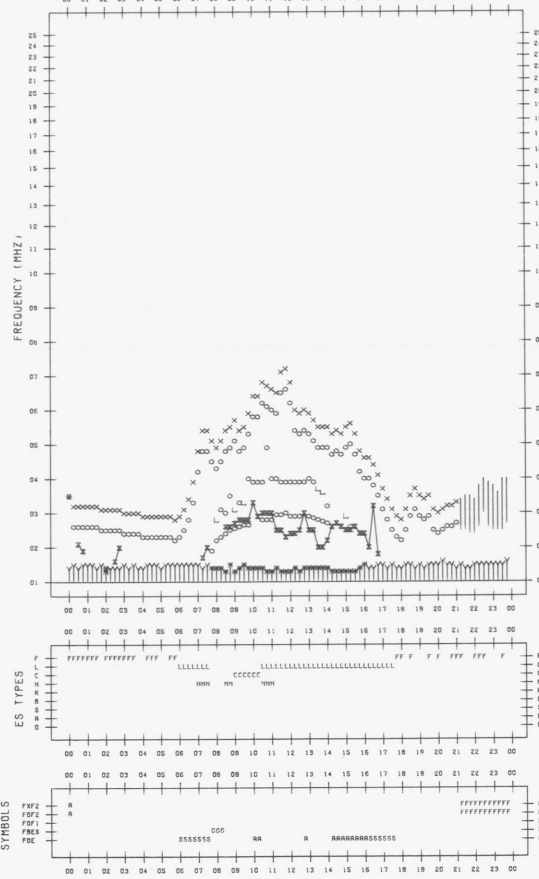
F-PLOT DATA

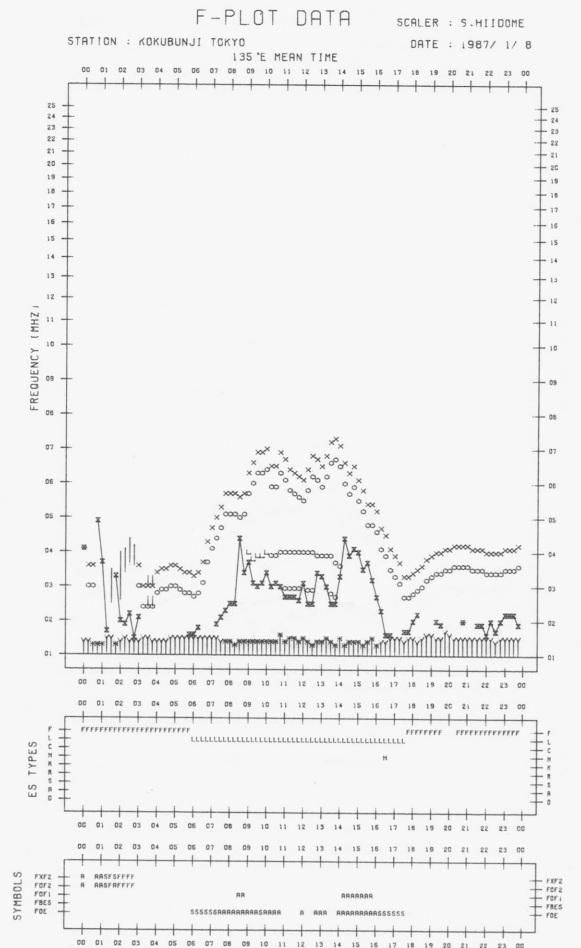
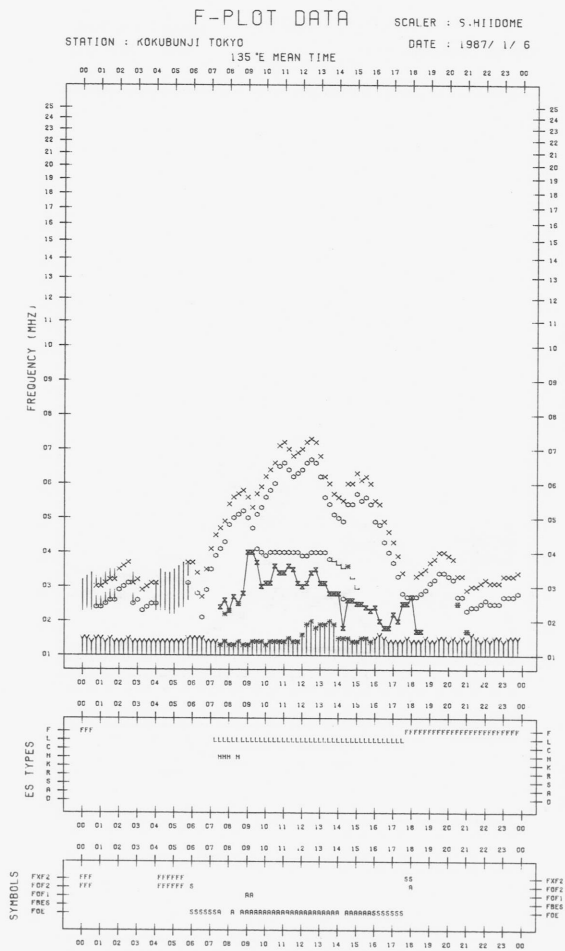
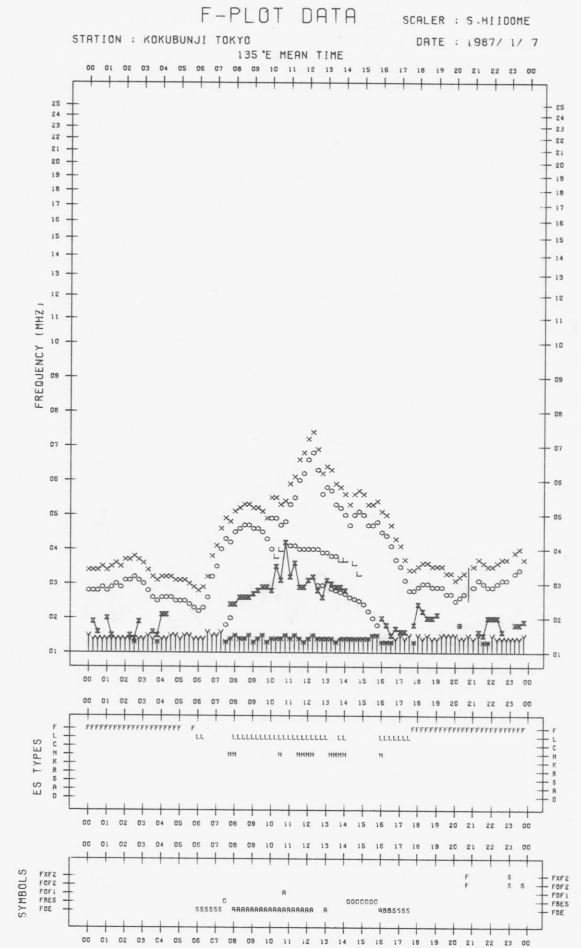
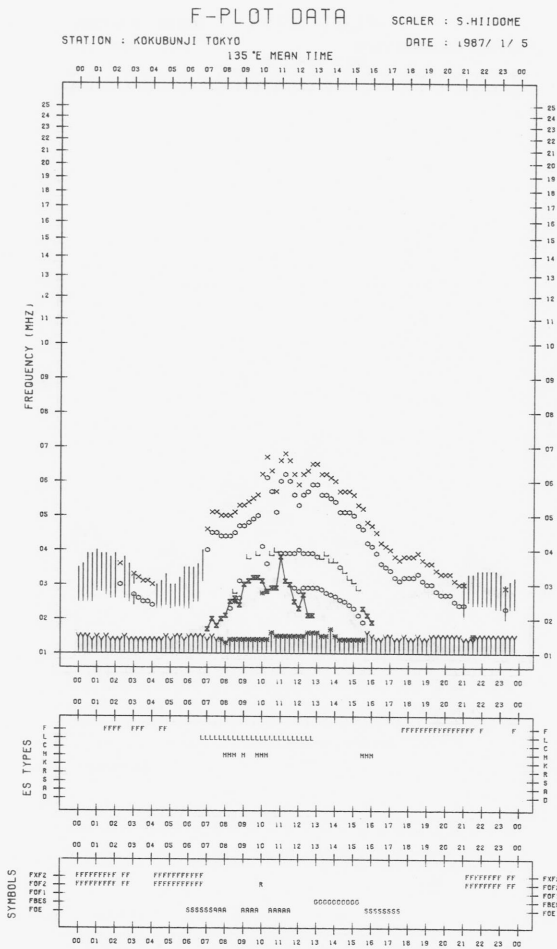
SCALER : S-HIIDOME

STATION : KOKUBUNJI TOKYO

DATE : 1987 / 1 / 4

135°E MEAN TIME

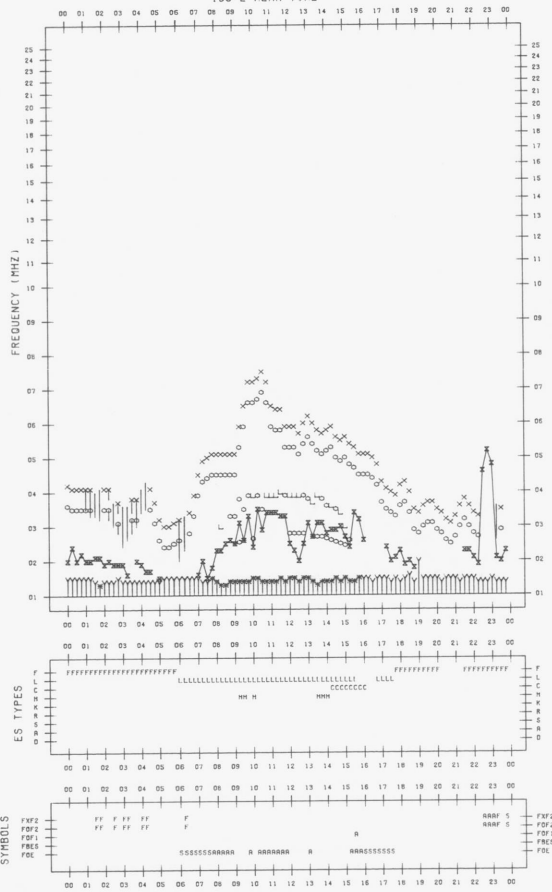




F-PLOT DATA

SCALER : S.HIIDOME

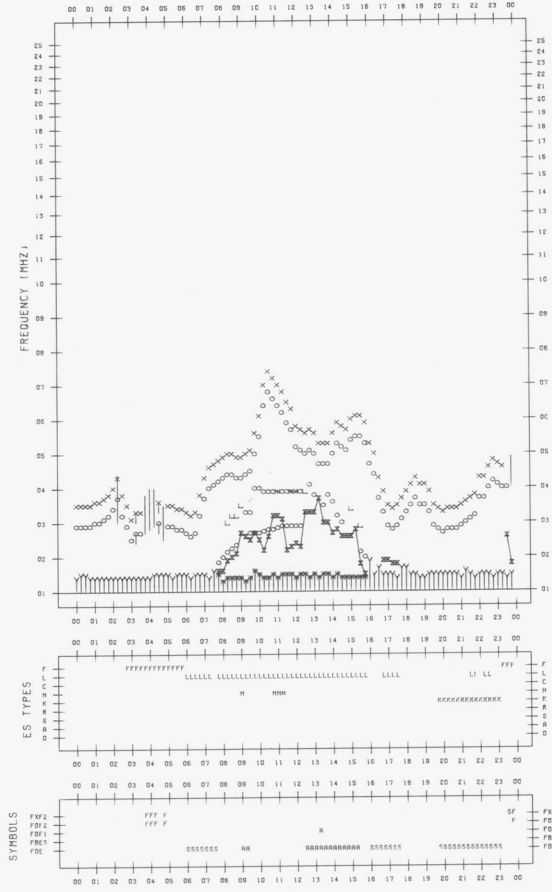
STATION : KOKUBUNJI TOKYO 135°E MEAN TIME DATE : 1987/1/9



F-PLOT DATA

SCALER : S.HIIDOME

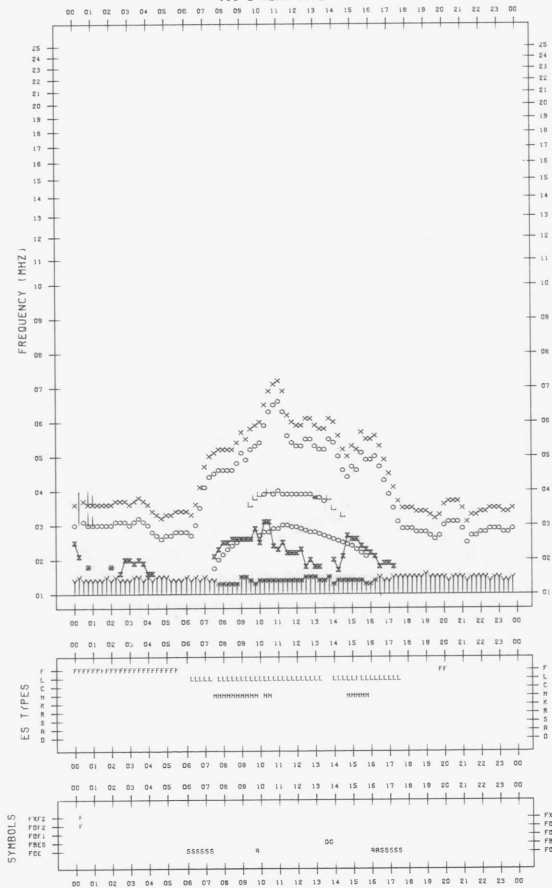
STATION : KOKUBUNJI TOKYO 135°E MEAN TIME DATE : 1987/1/11



F-PLOT DATA

SCALER : S.HIIDOME

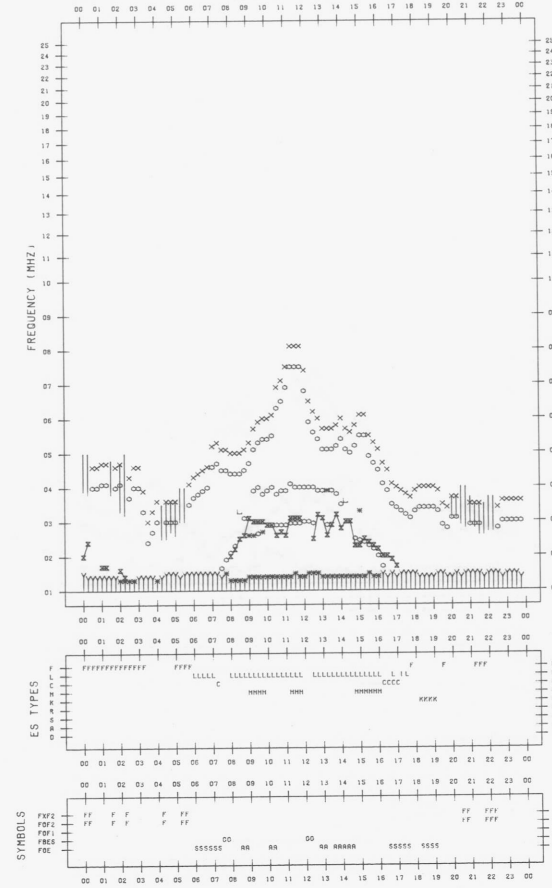
STATION : KOKUBUNJI TOKYO 135°E MEAN TIME DATE : 1987/1/10

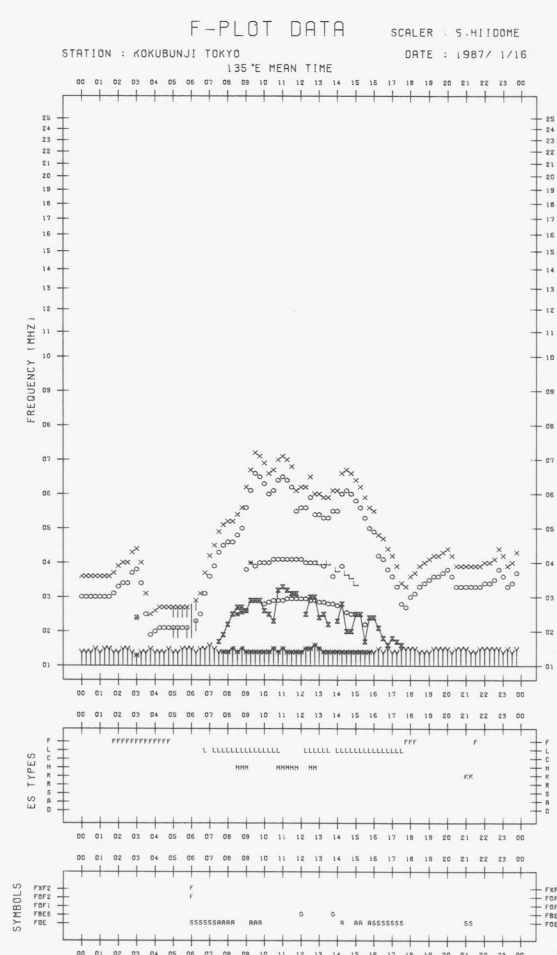
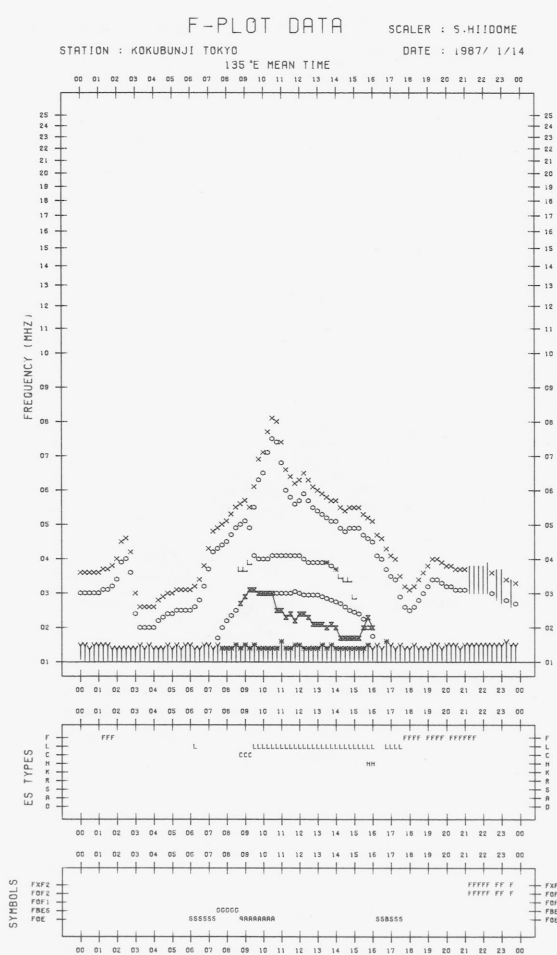
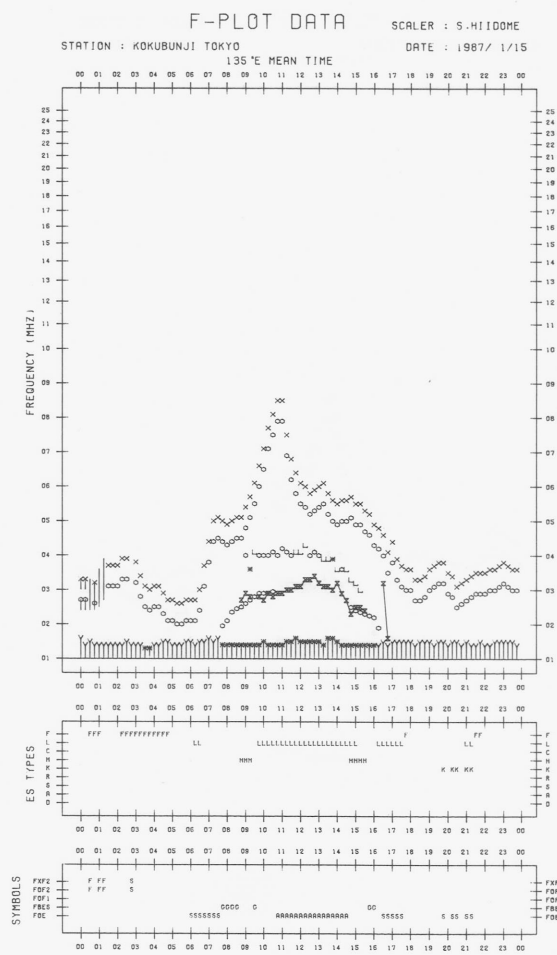
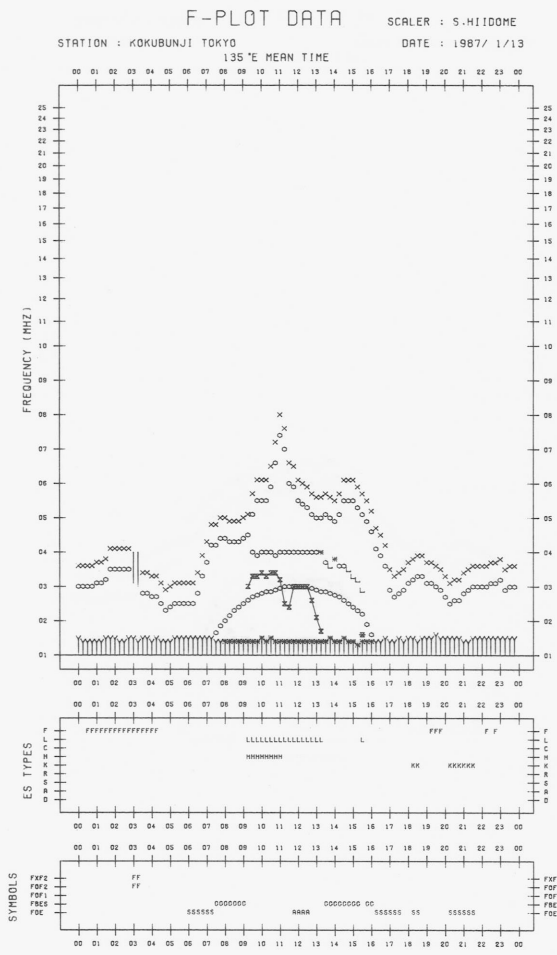


F-PLOT DATA

SCALER : S.HIIDOME

STATION : KOKUBUNJI TOKYO 135°E MEAN TIME DATE : 1987/1/12



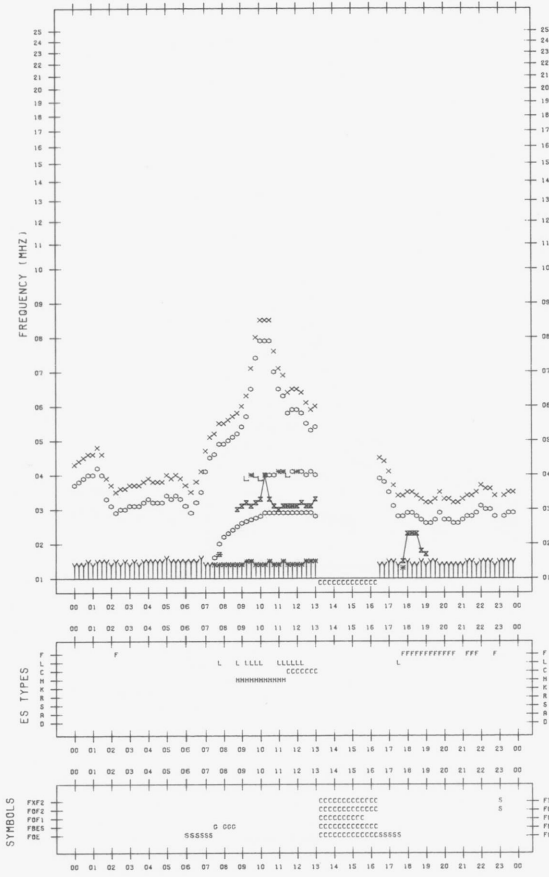




F-PLOT DATA

SCALER : S.HIIDOME

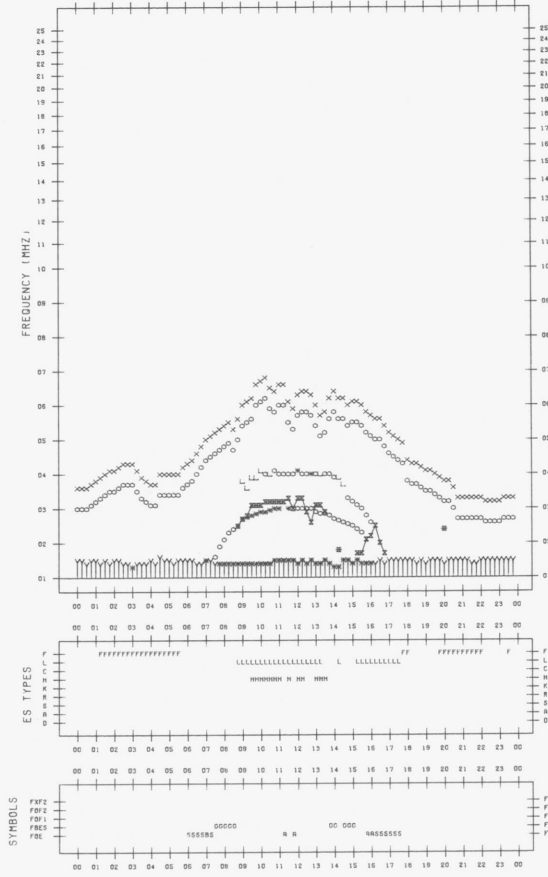
STATION : KOKUBUNJI TOKYO DATE : 1987/ 1/17  
135°E MEAN TIME



F-PLOT DATA

SCALER : S.HIIDOME

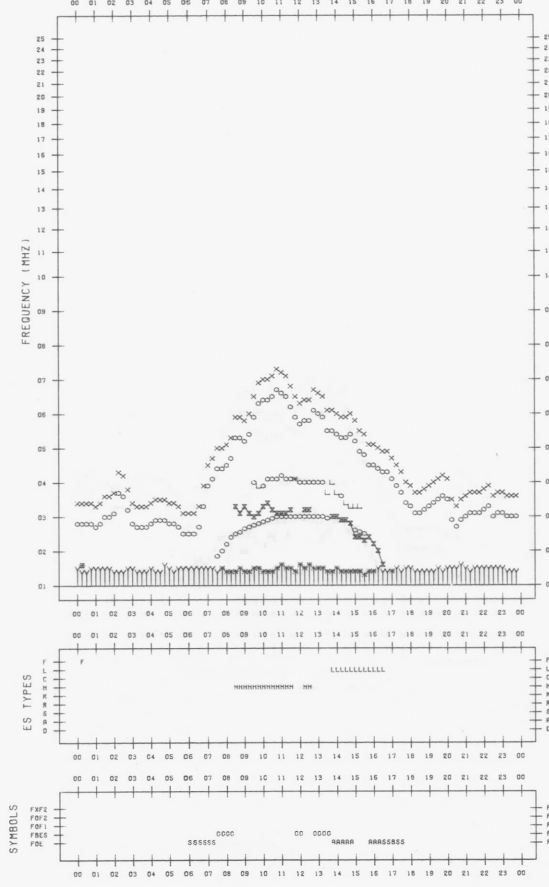
STATION : KOKUBUNJI TOKYO DATE : 1987/ 1/19  
135°E MEAN TIME



F-PLOT DATA

SCALER : S.HIIDOME

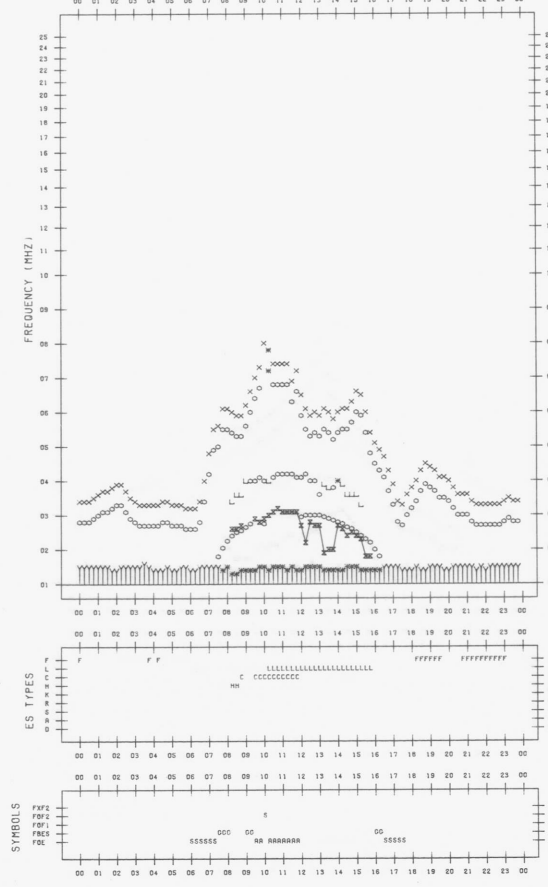
STATION : KOKUBUNJI TOKYO DATE : 1987/ 1/18  
135°E MEAN TIME

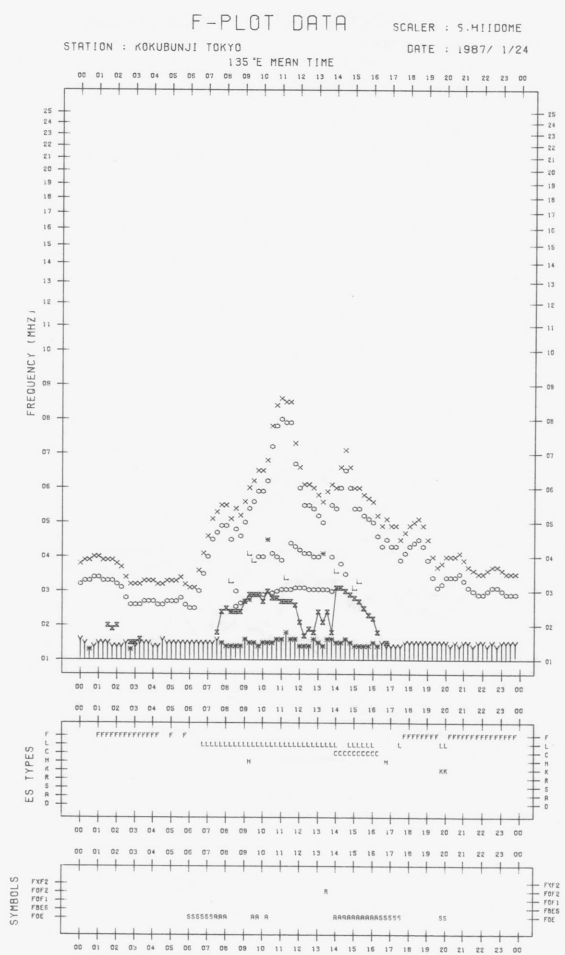
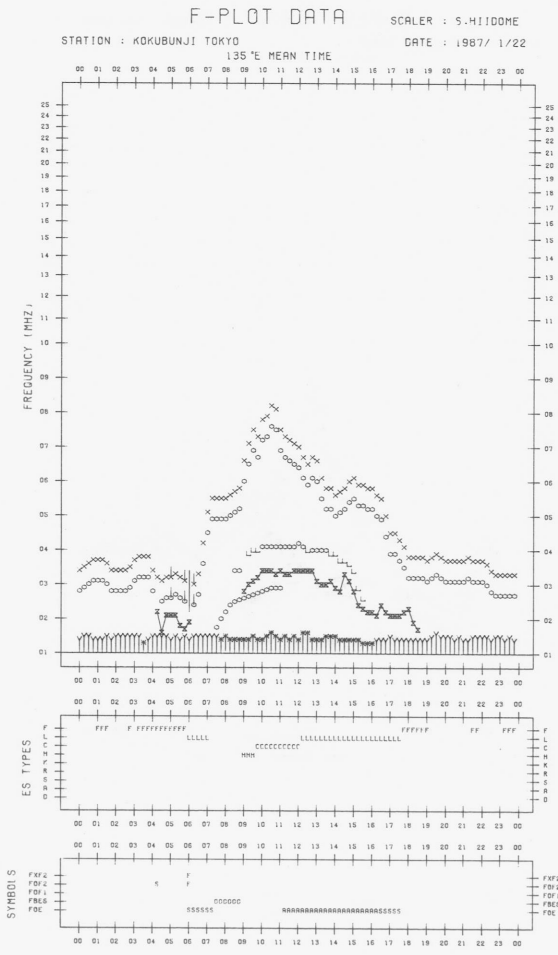
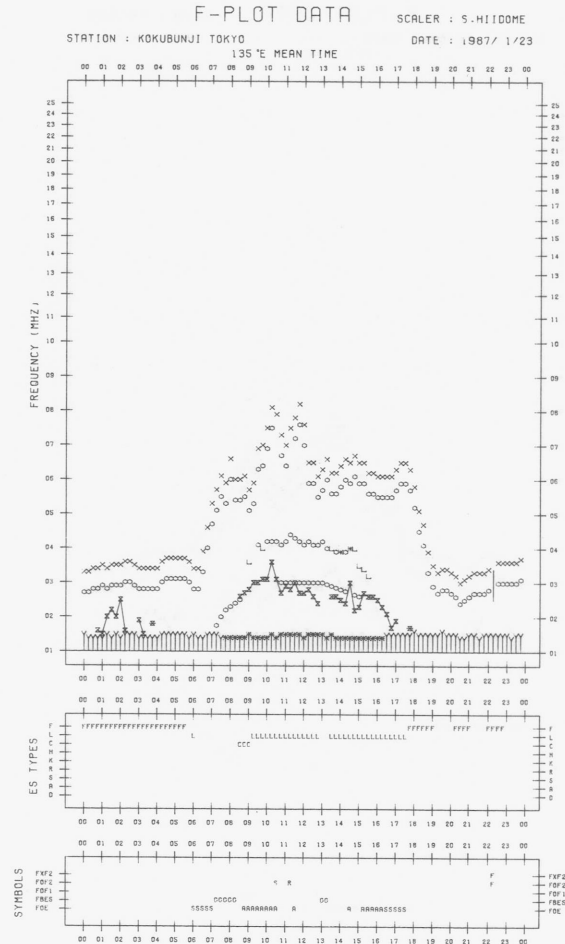
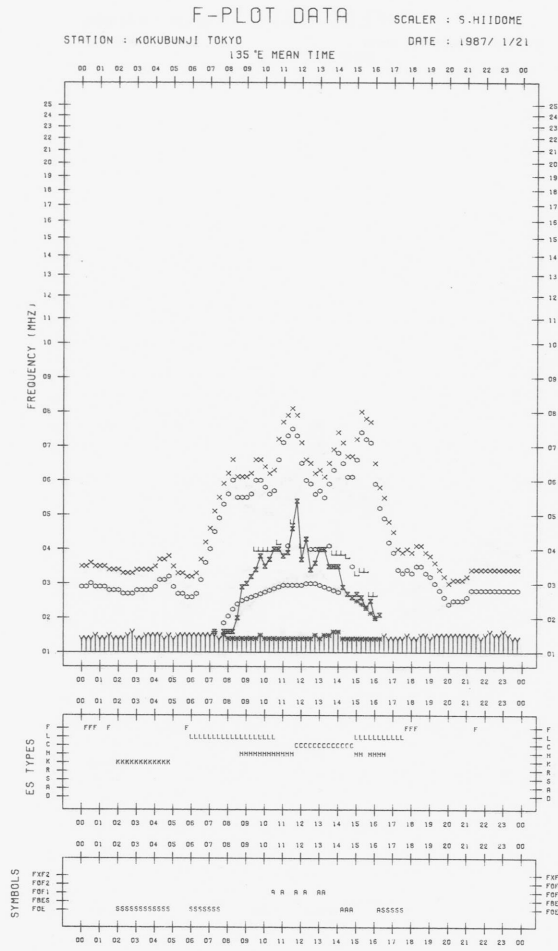


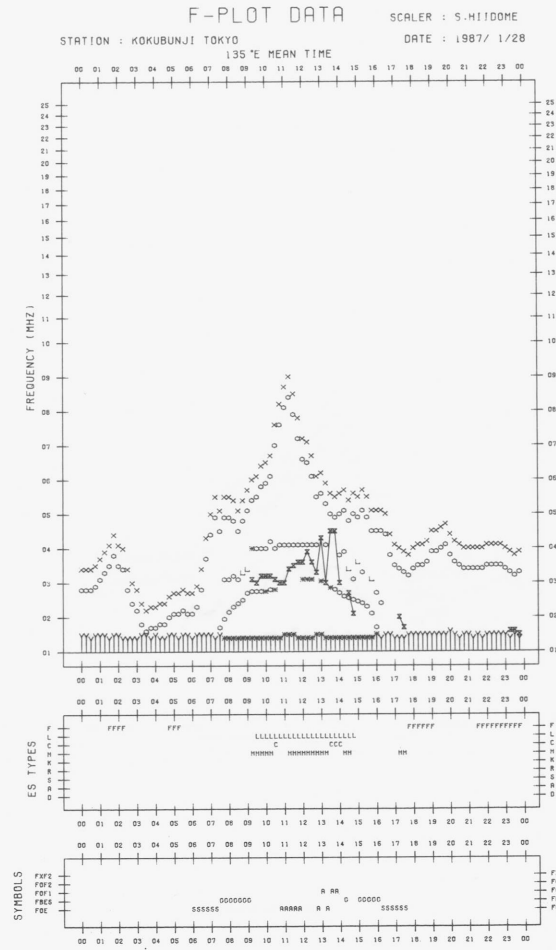
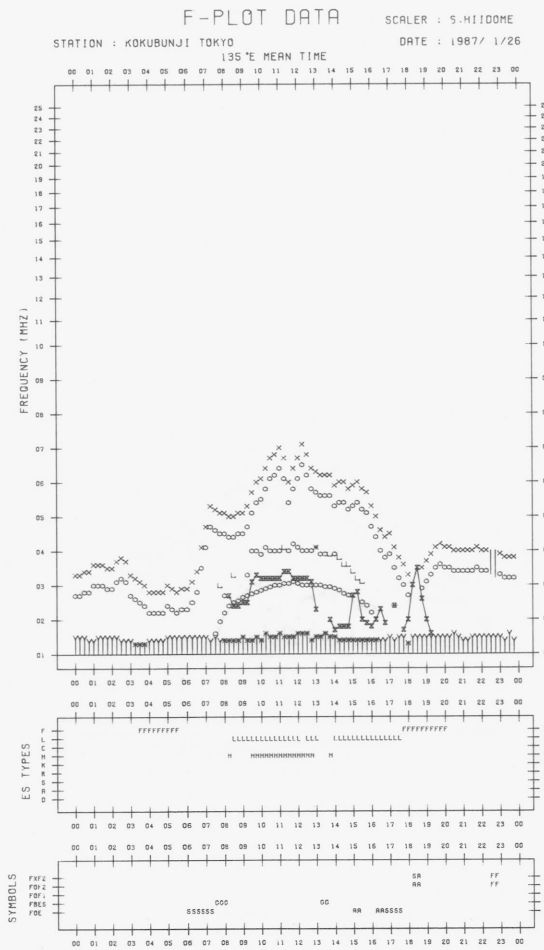
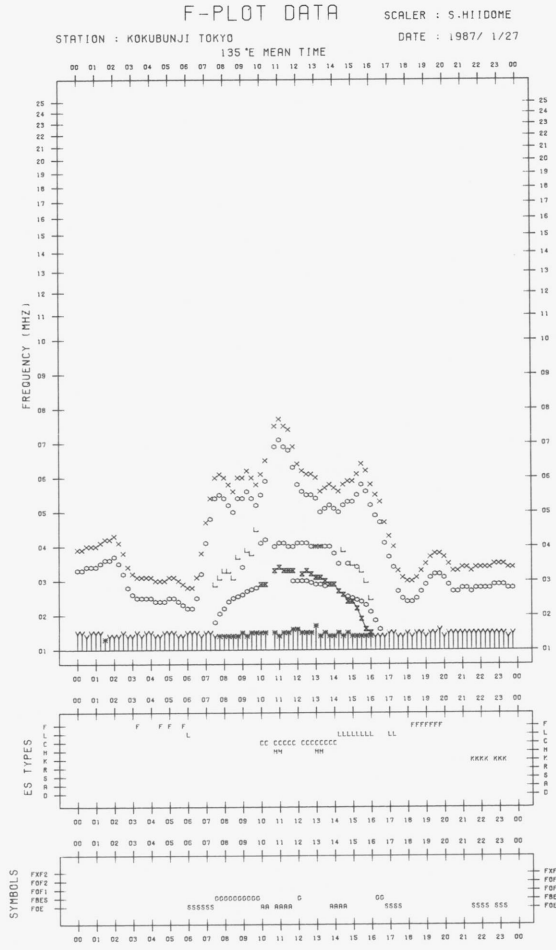
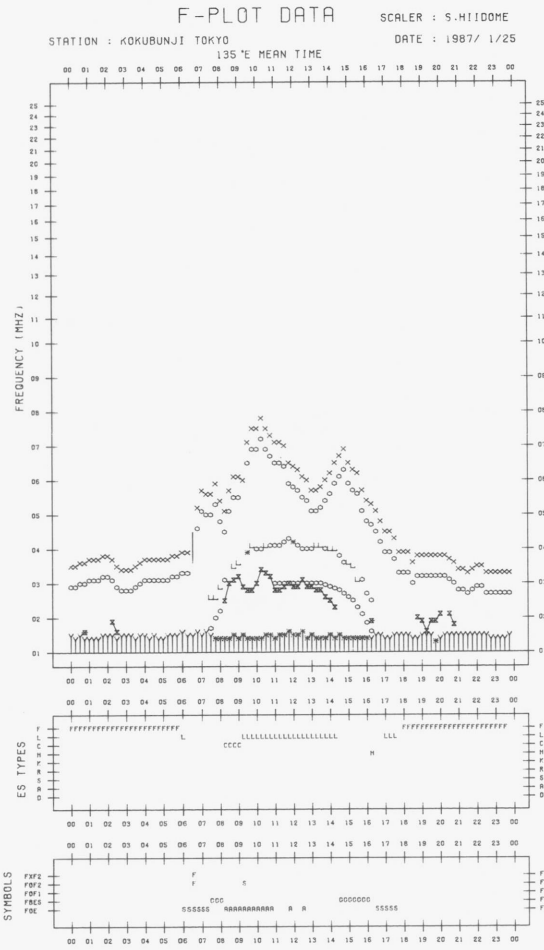
F-PLOT DATA

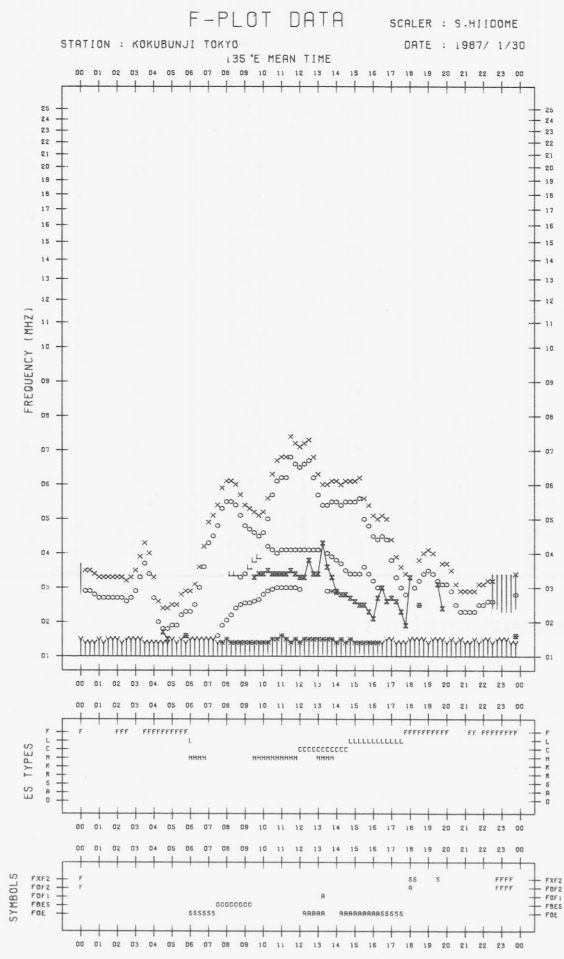
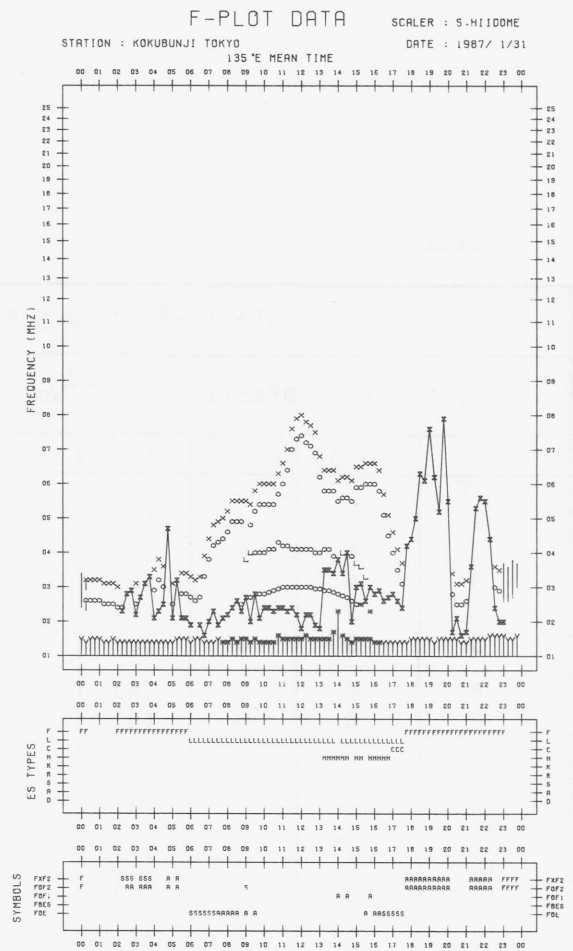
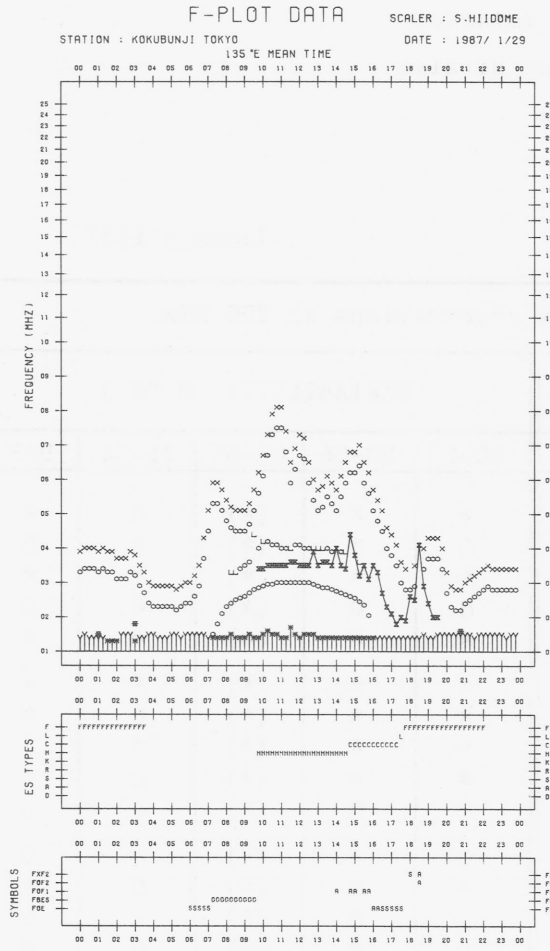
SCALER : S.HIIDOME

STATION : KOKUBUNJI TOKYO DATE : 1987/ 1/20  
135°E MEAN TIME









B. Solar Radio Emission  
 a. Daily Data at Hiraíso  
 200 MHz

Hiraíso

January 1987

| Single-frequency total flux observations at 200 MHz    |       |       |       |       |     |                     |       |       |       |     |
|--|-------|-------|-------|-------|-----|---------------------|-------|-------|-------|-----|
| FLUX DENSITY: $10^{-22} \text{Wm}^{-2} \text{Hz}^{-1}$ |       |       |       |       |     | VARIABILITY: 0 TO 3 |       |       |       |     |
| UT   | 00-03 | 03-06 | 06-09 | 21-24 | DAY | 00-03               | 03-06 | 06-09 | 21-24 | DAY |
| DATE   |       |       |       |       |     |                     |       |       |       |     |
| 1  | 7     | q     | (q)   | 6     | 6   | *                   | *     | (*)   | 0     | *   |
| 2  | 6     | 6     | (6)   | 6     | 6   | 0                   | *     | (*)   | *     | 0   |
| 3  | 6     | 6     | (q)   | 6     | 6   | *                   | *     | (*)   | *     | *   |
| 4  | 7     | 7     | (7)   | 7     | 7   | 0                   | 0     | (*)   | *     | 0   |
| 5  | 6     | 6     | (q)   | 6     | 6   | *                   | *     | (*)   | *     | *   |
| 6  | 6     | 6     | (6)   | 6     | 6   | *                   | *     | (*)   | *     | *   |
| 7  | 6     | 6     | (6)   | 6     | 6   | *                   | *     | (*)   | *     | *   |
| 8  | 7     | 6     | (6)   | 7     | 6   | *                   | *     | (*)   | *     | *   |
| 9  | 6     | 7     | (q)   | 6     | 6   | *                   | *     | (*)   | 0     | *   |
| 10   | 7     | 7     | (7)   | 6     | 7   | 0                   | 0     | (*)   | 0     | 0   |
| 11   | 6     | 6     | (6)   | 7     | 6   | 0                   | *     | (*)   | *     | 0   |
| 12   | 7     | q     | (q)   | 6     | 7   | *                   | *     | (*)   | 0     | *   |
| 13   | 7     | 7     | (6)   | -     | 7   | 0                   | 0     | (0)   | -     | 0   |
| 14   | 6     | 6     | (6)   | 6     | 6   | 0                   | 0     | (0)   | 0     | 0   |
| 15   | 7     | 7     | (7)   | 7     | 7   | 0                   | 0     | (0)   | 0     | 0   |
| 16   | 7     | 7     | (7)   | q     | 7   | *                   | 0     | (*)   | *     | 0   |
| 17   | q     | q     | (q)   | 6     | q   | *                   | *     | (*)   | 0     | *   |
| 18   | 6     | 7     | (q)   | 7     | 6   | 0                   | 0     | (*)   | 0     | 0   |
| 19   | 7     | 7     | (q)   | -     | 7   | 0                   | 0     | (*)   | -     | 0   |
| 20   | 7     | 7     | (7)   | 6     | 7   | 0                   | 0     | (0)   | 0     | 0   |
| 21   | 6     | 6     | (q)   | 6     | 6   | *                   | 0     | (*)   | *     | *   |
| 22   | 6     | 6     | (q)   | q     | 6   | *                   | 0     | (*)   | *     | *   |
| 23   | 6     | 6     | (6)   | 6     | 6   | *                   | *     | (*)   | 0     | *   |
| 24   | 6     | q     | (q)   | 6     | 6   | 0                   | *     | (*)   | 0     | *   |
| 25   | 6     | 6     | (q)   | 6     | 6   | 0                   | 0     | (*)   | *     | 0   |
| 26   | 6     | 6     | (6)   | 6     | 6   | *                   | *     | (*)   | *     | *   |
| 27   | 6     | 6     | (6)   | 6     | 6   | 0                   | *     | (*)   | *     | *   |
| 28   | 6     | 6     | (6)   | q     | 6   | *                   | *     | (*)   | *     | *   |
| 29   | 6     | 6     | (6)   | 6     | 6   | 0                   | 0     | (0)   | *     | 0   |
| 30   | 6     | 6     | (6)   | 6     | 6   | *                   | *     | (*)   | 0     | *   |
| 31   | 6     | 6     | (6)   | 6     | 6   | 0                   | 0     | (0)   | 0     | 0   |

Notes: 1. No observations during the following periods.

13th 2147 - 2340

19th 2143 - 20th 0001

2. (q) likely quiet.

3. (\*) interference.

B. Solar Radio Emission  
 a. Daily Data at Hiraiso  
 500 MHz

Hiraiso

January 1987

| Single-frequency total flux observations at 500 MHz      |       |       |       |       |     |
|--|-------|-------|-------|-------|-----|
| FLUX DENSITY: $10^{-22} \text{ Wm}^{-2} \text{ Hz}^{-1}$ |       |       |       |       |     |
| UT<br>DATE   | 00-03 | 03-06 | 06-09 | 21-24 | DAY |
| 1  | 26    | 26    | (26)  | 25    | 26  |
| 2  | 25    | 25    | (25)  | 25    | 25  |
| 3  | 25    | 25    | (25)  | 25    | 25  |
| 4  | 25    | 25    | (25)  | 25    | 25  |
| 5  | 25    | 25    | (25)  | 24    | 25  |
| 6  | 25    | 25    | (25)  | 25    | 25  |
| 7  | 25    | 25    | (25)  | 25    | 25  |
| 8  | 25    | 25    | (25)  | 24    | 25  |
| 9  | 25    | 25    | (25)  | 25    | 25  |
| 10   | 25    | 25    | (25)  | 25    | 25  |
| 11   | 25    | 25    | (25)  | 25    | 25  |
| 12   | 25    | 25    | (25)  | 25    | 25  |
| 13   | 25    | 25    | (25)  | 26    | 25  |
| 14   | 26    | 26    | (26)  | 25    | 26  |
| 15   | 26    | 26    | -     | -     | 26  |
| 16   | 26    | 26    | (26)  | 25    | 26  |
| 17   | 25    | 26    | (26)  | 26    | 26  |
| 18   | 27    | 26    | (26)  | 25    | 26  |
| 19   | 26    | 26    | (26)  | 25    | 26  |
| 20   | 27    | 27    | (26)  | -     | 26  |
| 21   | 26    | 26    | (26)  | 26    | 26  |
| 22   | 26    | 26    | (26)  | 27    | 26  |
| 23   | 26    | 26    | (26)  | 26    | 26  |
| 24   | 27    | 26    | (26)  | -     | 26  |
| 25   | -     | -     | -     | -     | -   |
| 26   | -     | -     | -     | -     | -   |
| 27   | -     | -     | -     | -     | -   |
| 28   | -     | -     | -     | -     | -   |
| 29   | 26    | 25    | (25)  | 25    | 25  |
| 30   | 25    | 25    | (25)  | -     | 25  |
| 31   | 26    | 26    | (26)  | 26    | 26  |

Note: No observations during the following periods.

|      |             |      |                  |
|------|-------------|------|------------------|
| 5th  | 0300 - 0415 | 22nd | 2333 - 2345      |
| 15th | 0600 - 0730 | 24th | 2150 - 29th 0010 |
| 15th | 2150 - 2345 | 30th | 2145 - 2345      |
| 20th | 2150 - 2345 |      |                  |

B. Solar Radio Emission  
 b. Outstanding Occurrences at Hiraiso

Hiraiso

January 1987

| Single-frequency observations                                 |                |      |                         |                              |                |  |      |                         |
|---|----------------|------|-------------------------|------------------------------|----------------|--|------|-------------------------|
| Normal observing period: 2150 - 0750 U.T. (sunrise to sunset) |                |      |                         |                              |                |  |      |                         |
| JAN<br>1987   | FREQ.<br>(MHz) | TYPE | START<br>TIME<br>(U.T.) | TIME OF<br>MAXIMUM<br>(U.T.) | DUR.<br>(MIN.) | FLUX DENSITY<br>( $10^{-22} \text{ Wm}^{-2} \text{ Hz}^{-1}$ ) |      | POLARIZATION<br>REMARKS |
|   |                |      |                         |                              |                | PEAK   | MEAN |                         |
| 21  | 500            | 7 C  | 2236.8                  | 2238.0                       | 1.9            | 215  | 20   | 0                       |
| 23  | 500            | 7 C  | 2343.0                  | 2343.2                       | 1.5            | 6  | 2    | WR                      |

C. Radio Propagation

a. HF Field Strength at Hiraiso

WWV 15 MHz

January 1987

| UT DAY | 00H 15M | 01H 15M | 02H 15M | 03H 15M | 04H 15M | 05H 15M | 06H 15M | 07H 15M | 08H 15M | 09H 15M | 10H 15M | 11H 15M | 12H 15M | 13H 15M | 14H 15M | 15H 15M | 16H 15M | 17H 15M | 18H 15M | 19H 15M | 20H 15M | 21H 15M | 22H 15M | 23H 15M |        |        |    |    |        |   |      |
|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|--------|----|----|--------|---|------|
| 1      | ES -9   | ES -24  | ES -9   | ES -9   | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | 6       | 11     |        |    |    |        |   |      |
| 2      | 3       | ES 2    | ES 2    | ES 3    | ES 3    | ES -3   | ES -3   | ES -15  | ES -15  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | -1      | -3     | 12     |    |    |        |   |      |
| 3      | ES -24  | ES 3    | ES 3    | ES 2    | ES 2    | ES -9   | ES -9   | ES -9   | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | 5      | 12     |    |    |        |   |      |
| 4      | ES -24  | ES -24  | ES -24  | ES -9   | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | -6     | 2      |    |    |        |   |      |
| 5      | ES -8   | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | -5     | 0      | 5  |    |        |   |      |
| 6      | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | -8     |    |    |        |   |      |
| 7      | ES -24  | ES -24  | ES -24  | ES -15  | ES -3   | ES -9   | ES -9   | ES -15  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -11  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | -9     | ES -24 |    |    |        |   |      |
| 8      | ES -14  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | -8     | -8 |    |        |   |      |
| 9      | ES -11  | ES -14  | ES -14  | ES -14  | ES -14  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | 4      | -6 |    |        |   |      |
| 10     | ES -4   | ES -14  | ES -14  | ES -14  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | -2     | 8  |    |        |   |      |
| 11     | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | 0      | 4  |    |        |   |      |
| 12     | ES -8   | ES -8   | ES -8   | ES -8   | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | -8     | -3 |    |        |   |      |
| 13     | ES -23  | ES -4   | ES -8   | ES -4   | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | -4     | 2  |    |        |   |      |
| 14     | ES -3   | ES -5   | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | 0      | 6  |    |        |   |      |
| 15     | ES 1    | ES -5   | ES -4   | ES -2   | ES -23  | ES -5   | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | 6      | 7  |    |        |   |      |
| 16     | ES 1    | ES 6    | ES -2   | ES -2   | ES -8   | ES -8   | ES -8   | ES -8   | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | 10     | 3  |    |        |   |      |
| 17     | ES -2   | ES -3   | ES -1   | ES -14  | ES -8   | ES -8   | ES -8   | ES -8   | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | -8     | 10 | 7  |        |   |      |
| 18     | ES 10   | ES 5    | ES -8   | ES -8   | ES -8   | ES -5   | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | 6      | 9  |    |        |   |      |
| 19     | ES -2   | ES -8   | ES -14  | ES -5   | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | 8      | 14 |    |        |   |      |
| 20     | ES 0    | ES 1    | ES -4   | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | 4      | 8  |    |        |   |      |
| 21     | ES 4    | ES -8   | ES -2   | ES -5   | ES -14  | ES -8   | ES -2   | ES -14  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | 6      | -2 |    |        |   |      |
| 22     | ES -1   | ES -8   | ES -8   | ES -23  | ES -8   | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | -12    | -2 | -2 |        |   |      |
| 23     | ES 0    | ES -14  | ES -14  | ES -14  | ES -14  | ES -23  | ES -23  | ES -5   | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | -1     | -4 | 4  |        |   |      |
| 24     | ES 7    | ES -14  | ES -8   | ES -23  | ES -6   | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | -14    | 12 | 4  |        |   |      |
| 25     | ES 4    | ES -8   | ES -8   | ES -5   | ES -5   | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | -8     | -2 | 7  | 5      |   |      |
| 26     | ES 8    | ES -4   | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | 12     | 9  |    |        |   |      |
| 27     | ES 2    | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24 | 7      | 9  | 6  |        |   |      |
| 28     | ES 6    | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | C       | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24 | -3     | 1  |    |        |   |      |
| 29     | ES 11   | ES 5    | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24 | 10     | 11 |    |        |   |      |
| 30     | ES -1   | ES -2   | ES -1   | ES -2   | ES -7   | ES -1   | ES -9   | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24 | 6      | -6 | 6  | 6      | 2 |      |
| 31     | ES -5   | ES -3   | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24 | 4      | 4  | 2  | ES -24 | 1 | UC 2 |
| CNT    | 31      | 31      | 31      | 31      | 31      | 31      | 31      | 30      | 31      | 31      | 31      | 31      | 31      | 31      | 31      | 31      | 31      | 31      | 31      | 31      | 31      | 31      | 31      | 31      | 31     | 31     | 31 | 31 |        |   |      |
| MED    | ES -2   | ES -8   | ES -14  | ES -14  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | ES -23 | 4  | 4  |        |   |      |
| UD     | ES 8    | ES 5    | ES -1   | ES -2   | ES -3   | ES -5   | ES -8   | ES -8   | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23  | ES -23 | -8     | -1 | 10 | 12     |   |      |
| LD     | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24  | ES -24 | ES -24 | -8 | -8 |        |   |      |





## C. Radio Propagation

## b. Radio Propagation Quality Figures at Hiraiso

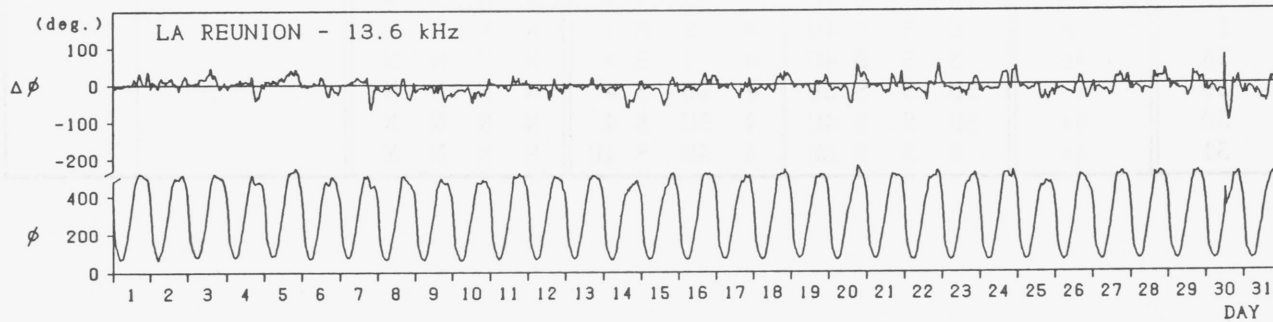
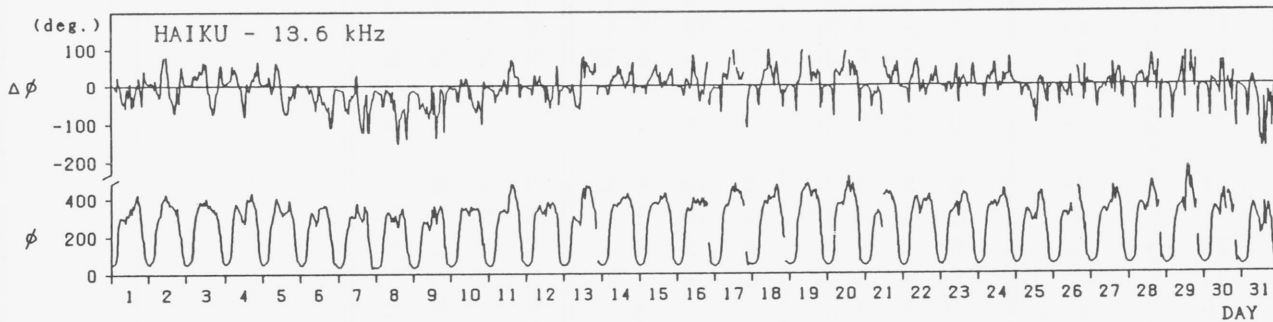
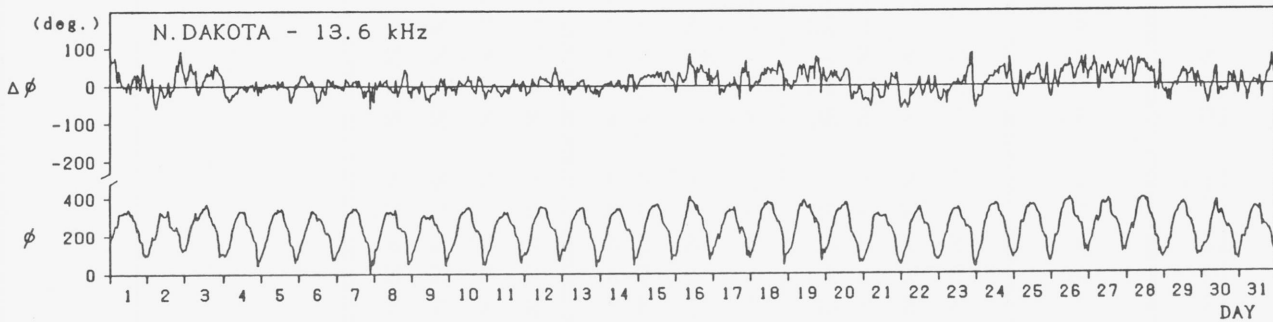
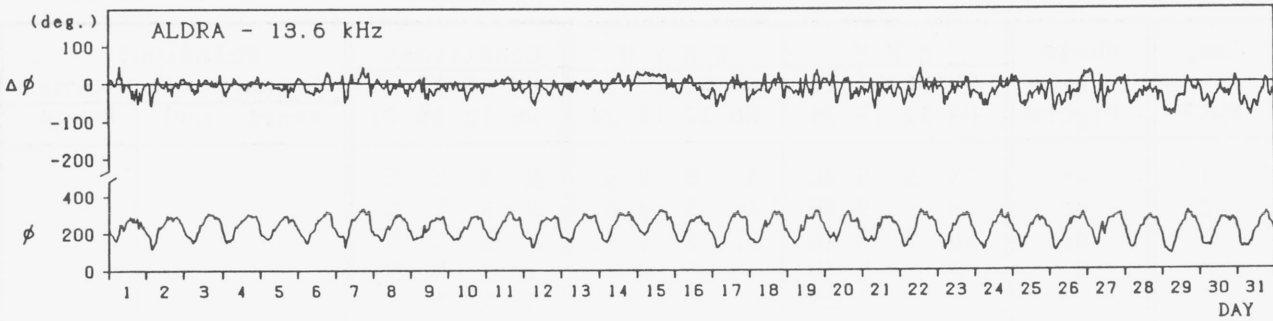
| Hiraiso      |                        | Time in U.T. |          |          |          |          |          |          |          |            |          |          |          |                                 |     |       |
|--------------|------------------------|--------------|----------|----------|----------|----------|----------|----------|----------|------------|----------|----------|----------|---------------------------------|-----|-------|
| Jan.<br>1987 | Whole<br>Day<br>Figure | W W V        |          |          |          | W W V H  |          |          |          | Conditions |          |          |          | Principal<br>Geomagnetic Storms |     |       |
|              |                        | 00<br>06     | 06<br>12 | 12<br>18 | 18<br>24 | 00<br>06 | 06<br>12 | 12<br>18 | 18<br>24 | 00<br>06   | 06<br>12 | 12<br>18 | 18<br>24 | Start                           | End | Range |
| 1            | 4+                     | S            | S        | S        | 4U       | 4        | S        | S        | 5        | N          | N        | N        | N        |                                 |     |       |
| 2            | 4o                     | S            | S        | S        | 4U       | 4        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 3            | 4o                     | 3U           | S        | S        | 4U       | 5        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 4            | 4-                     | S            | S        | S        | 3U       | 4        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 5            | 4o                     | S            | S        | S        | 4U       | 4        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 6            | 3+                     | S            | S        | S        | 2U       | 4        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 7            | 4-                     | S            | S        | S        | 3U       | 4        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 8            | 4-                     | S            | S        | S        | 3U       | 4        | 4U       | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 9            | 4-                     | S            | S        | S        | 4U       | 3        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 10           | 3+                     | S            | S        | S        | 3U       | 3        | 3U       | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 11           | 4-                     | S            | S        | S        | 4U       | 3        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 12           | 3+                     | S            | S        | S        | 3U       | 3        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 13           | 4-                     | S            | S        | S        | 4U       | 3        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 14           | 4o                     | 4U           | S        | S        | 4U       | 4        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 15           | 4-                     | S            | S        | S        | 4U       | 3        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 16           | 4o                     | 4U           | S        | S        | 4U       | 4        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 17           | 4+                     | S            | S        | S        | 5U       | 4        | 5U       | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 18           | 4-                     | 5U           | S        | S        | 4U       | 3        | S        | S        | 3U       | N          | N        | N        | N        |                                 |     |       |
| 19           | 4o                     | S            | S        | S        | 4U       | 4        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 20           | 4+                     | 5U           | S        | S        | 4U       | 4        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 21           | 4+                     | S            | S        | S        | 4U       | 4        | 5U       | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 22           | 4+                     | S            | S        | S        | 4U       | 4        | 5U       | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 23           | 4o                     | S            | S        | S        | 4U       | 4        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 24           | 4+                     | 5U           | S        | S        | 4U       | 4        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 25           | 4o                     | 4U           | S        | S        | 4U       | 4        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 26           | 4-                     | 4U           | S        | S        | 4U       | 3        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 27           | 4o                     | S            | S        | S        | 4U       | 4        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 28           | 4o                     | S            | S        | S        | 4U       | 4        | S        | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 29           | 5-                     | 5U           | S        | S        | 5U       | 4        | 5U       | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 30           | 4+                     | 5U           | S        | S        | 4U       | 4        | 5U       | S        | 4        | N          | N        | N        | N        |                                 |     |       |
| 31           | 4+                     | S            | S        | S        | 5U       | 4        | 5U       | S        | 4U       | N          | N        | N        | N        |                                 |     |       |

## C. Radio Propagation

## c. Phase Variations in OMEGA Radio Waves at Inubo

Inubo

January 1987



Polar Cap Phase Anomaly (PCPA) on Aldra-Inubo Circuit

NONE

## C. Radio Propagation

## d. Sudden Ionospheric Disturbance

## (i) Short Wave Fade-out (SWF) at Hiraiso

Hiraiso

Time in U.T.

| Jan.<br>1987 | S W F                     |    |    |    |       |          | Correspondence |      |             |             |                 |
|--------------|---------------------------|----|----|----|-------|----------|----------------|------|-------------|-------------|-----------------|
|              | Drop-out Intensities (dB) |    |    |    | Start | Duration | Type           | Imp. | Solar Flare | Solar Noise | Geomag. Crochet |
|              | CO                        | HA | 1) | 2) |       |          |                |      |             |             |                 |
|              |                           |    |    |    |       | None     |                |      |             |             |                 |

Notes CO: Colorado(WWV) HA: Hawaii(WWVH) 1): Australia 2): London

## (ii) Sudden Phase Anomaly (SPA) at Inubo

Inubo

| Jan.<br>1987 | S P A                   |              |           |             |              | Time (U.T.) |      |         |
|--------------|-------------------------|--------------|-----------|-------------|--------------|-------------|------|---------|
|              | Phase Advance (degrees) |              |           |             |              | Start       | End  | Maximum |
| Date         | GBR                     | $\Omega$ /LR | NWC       | $\Omega$ /H | $\Omega$ /ND |             |      |         |
| 23           |                         |              | <u>12</u> | 9           |              | 2344        | 2357 | 2346    |

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