ISSN 0021-0382

F—463

IONOSPHERIC DATA IN JAPAN

FOR JULY 1987

VOL. 39 NO. 7

CONTENTS

RADIO RESEARCH LABORATORY
MINISTRY OF POSTS AND TELECOMMUNICATIONS
TOKYO, JAPAN

BRIEFING

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

fxI	Top frequency of spread *F* trace
foF2 *foF1* *foE* *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 *M(3000)F1*	Maximum usable frequency factor for a path of 3000 km for transmission by *F2* and *F1* layers respectively
h'F2 *h'F* *h'E* *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 atmospherics.

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} Wm^{-2} 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	λ /2 vertical	λ /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 1o, 1+, 2–, 2o, 2+, 3–, 3o, 3+, 4–, 4o, 4+, 5–, 5o 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 Inubo

Variations in phase and in phase deviation are monthly depicted for four OMEGA radio waves received at Inubo. 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 (ϕ) and those in phase deviation ($\triangle\phi$) are shown in the lower part and the upper one, respectively. Variations in phase (ϕ) 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 ($\triangle\phi$) 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-Inubo and/or the North Dakota-Inubo circuit[s], PCPA's detected only on the Aldra-Inubo 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 Inubo

Data of sudden phase anomaly (SPA) are prepared from the records of phase measurement of VLF radio waves received at Inubo. 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 (Geographic Coordinate)		Call Sign	Frequency (kHz)	Radiation Power (kHz)	Arc Distance from Inubo (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

JUL. 1987 | FXI (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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	57	54	X 51	56	50																74	60	62	56
2	A	56	52	54	50																X 69	64	X 60	X 56
3	X 54	X 56	53	50			59														X 72	X 70	X 66	X 64
4	X 57	61	61	58	64																X 71	X 69	A	A
5	59	56	55	58	58																X 70	71	X 56	X 56
6	X 59	X 55	56	51	51																X 78	65	47	X 41
7	X 40	41	43	42																	X 76	X 68	X 61	X 55
8	55	56	54	57	53																X 76	A	56	X 46
9	X 45	X 43	X 43	45																A	X 74	X 68	X 46	39
10	X 37	X 40	X 42	43	47																X 62	X 60	X 57	X 54
11	X 50	X 48	X 46	X 48																	X 67	X 70	X 65	X 56
12	X 51	X 47	X 47	44																	X 68	X 69	X 56	X 51
13	X 44	X 42	X 42	X 40																	X 65	X 67	X 74	X 48
14	42	45	43	43																	X 71	X 63	X 55	X 50
15	X 47	X 46	X 44	X 42																	X 73	X 71	X 67	X 62
16	X 51	X 50	X 47	51	50																X 74	X 70	X 62	X 58
17	X 50	52	X 50	X 45	43																X 72	X 56	56	56
18	56	56	61	42	A																X 68	X 70	X 63	A
19	52	49	46	47	A																X 58	69	70	65
20	X 57	X 56	58	53	62															A	X 63	X 63	X 61	62
21	60	57	56	52																	85	80	80	X 72
22	66	X 59	60	55	55															A	X 77	X 72	X 66	X 57
23	X 57	X 55	X 52	X 49	51																X 71	X 75	X 71	X 60
24	56	X 50	X 50	X 51	55																X 78	75	X 72	A
25	A	58	59	57	57															A	X 76	X 80	X 76	X 71
26	X 70	X 62	64	59																	X 65	67	65	59
27	59	57	X 51	54	50																X 75	X 75	X 73	X 65
28	X 64	A	A	50	46																X 71	X 70	72	X 68
29	X 56	X 54	58	X 45	A																X 71	X 71	A	X 65
30	43	A	A	X 38																	64	62	63	X 58
31	X 48	X 48	X 45	X 42																	X 63	X 67	X 63	66
	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	29	31	16		1														31	30	29	28
MED	X 55	X 54	51	50	51		59														X 71	X 69	X 63	X 58
UQ	57	56	56	54	56																X 74	X 71	X 70	X 64
LQ	X 48	X 43	X 46	44	50																X 68	X 65	X 57	X 54

JUL. 1987 | FXI (0.1 MHZ)

IONOSPHERIC DATA

JUL. 1987 | FOF2 (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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

Day \ 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	F 44	44	F	F 43	43	48	50	59	65	57	R	52	57	A	A	53	55	61	64	F 67	F	F	F
2	A	F	F 45	F	F	49	54	66	55	A	A	54	59	58	43	J R 48	50	53	54	64	62	F 56	53	49
3	47	49	F 44	F 43	37	43	F 52	61	61	55	51	51	A	A	59	53	A	A	54	63	65	63	59	57
4	50	F 54	F 54	F 52	F 57	53	45	52	52	54	A	A	A	49	A	A	A	A	67	76	64	62	A	A
5	F	F	F	F	F	41	A	52	57	56	55	56	A	A	A	55	52	A	A	65	63	F 64	49	49
6	52	48	F	F	F 44	A	53	H 58	58	V 60	51	A	R	49	A	50	A	55	58	68	71	F 58	F 40	34
7	33	F	F 36	F 35	36	43	A	A	A	A	53	C	C	C	C	C	C	51	58	65	69	61	54	48
8	F 48	F 49	F	F	F 44	47	52	A	63	A	52	52	51	52	A	50	A	A	A	72	69	A	F	39
9	38	36	36	F	38	43	A	A	48	A	49	R	A	R	R	R	A	A	A	A	67	61	39	F 32
10	30	33	35	F 35	F	43	A	A	A	51	58	R	R	R	R	A	49	49	54	64	55	53	50	47
11	43	41	39	41	31	36	A	A	47	47	A	R	A	A	A	47	46	48	46	51	60	63	58	49
12	44	40	40	F 37	36	40	R	44	47	R	48	47	R	R	R	R	61	A	50	53	61	62	49	44
13	37	35	35	33	35	38	44	49	54	49	R	50	50	51	51	49	48	46	44	45	58	60	67	41
14	F	F 38	F 36	F 36	35	39	43	45	53	56	50	R	R	50	48	R	A	A	55	63	64	56	48	43
15	40	39	37	35	36	45	48	50	A	A	53	50	49	51	R	49	47	50	53	65	66	64	60	55
16	44	43	S 40	F 45	F	S 40	39	43	48	52	A	A	49	43	R	A	49	A	60	70	67	63	55	V 51
17	43	F 43	43	38	F 33	44	47	59	66	58	A	48	A	A	54	A	59	66	67	73	65	49	F 49	F 49
18	F 44	F	F	F 35	A	A	A	A	A	56	52	R	R	R	50	51	A	A	57	58	61	63	56	A
19	F 45	F	F 40	F	A	39	47	A	A	59	A	53	53	A	49	53	57	58	56	55	51	F	F 58	F 58
20	50	49	F 52	F 45	F 43	43	45	43	A	A	50	49	A	47	A	50	51	A	59	A	56	56	54	F 55
21	F 50	F 47	F 50	F 42	37	40	37	A	49	A	61	A	A	A	48	53	56	59	60	74	F	F	F	65
22	F 59	52	F 53	F 44	F 44	A	48	52	55	57	A	53	49	R	52	A	A	A	60	A	70	65	59	50
23	50	48	45	42	F 43	45	A	A	56	A	A	50	51	52	53	A	52	49	51	56	64	68	64	53
24	F 48	43	43	44	F 47	48	A	53	56	61	A	A	56	A	57	55	57	56	60	67	71	F	65	A
25	A	F	F	F 49	F	57	61	69	66	63	60	63	61	60	60	63	63	60	62	A	69	73	69	64
26	63	V 55	F	F 48	J S 47	45	54	62	62	53	58	A	52	56	57	51	55	57	A	55	58	F	F	F
27	F 48	F 48	44	F 44	F	47	51	55	69	58	59	61	68	59	55	59	59	59	60	67	68	68	66	58
28	57	A	A	F	F	49	A	A	A	A	A	A	A	R	R	R	50	43	49	52	64	63	F 65	61
29	49	47	F	38	A	41	39	44	A	47	R	R	R	A	51	53	A	A	51	53	64	64	A	58
30	F	A	A	31	30	37	R	R	A	R	A	A	51	R	A	A	43	43	A	48	F 57	F	F	51
31	41	41	38	35	35	41	45	52	53	53	A	R	R	49	50	53	46	A	A	A	61	60	56	F 49
	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	25	23	22	23	21	28	20	20	22	20	17	14	14	15	16	18	21	18	25	26	30	24	24	26
MED	47	44	42	F 41	37	43	48	52	56	56	53	52	52	51	52	52	52	54	57	64	64	62	56	50
UQ	50	48	F 45	F 44	F 44	46	52	58	61	58	58	54	56	56	56	53	57	58	60	67	67	64	62	57
LQ	43	40	37	35	35	40	44	47	52	52	51	50	50	49	50	50	49	49	53	55	61	59	50	47

JUL. 1987 | FOF2 (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FOF1 (0.01 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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

Day \ 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						L 350	370	A	A	420	A	440	430	430	A	A	A	A	A					
2						L 320	A	A	410	A	A	440	440	420	420	A	A	A	A					
3						A	370	390	400	A	420	440	A	A	410	400	A	A	A					
4							380	A	A	A	A	A	A	430	A	A	A	A	A					
5							A	A	A	A	A	A	A	A	A	A	400	A	A					
6						A	360	390	410	420	440	A	420	420	A	A	A	360	340					
7							A	A	A	A	A	C	C	C	C	C	C	360	A					
8						L 340	360	A	A	A	420	430	420	420	A	A	A	A	A					
9							A	A	390	A	420	420	A	420	400	400	A	A	A					
10							A	A	A	410	H 420	420	420	410	410	A	A	370	A					
11						A	A	A	400	410	A	410	A	A	A	A	A	A	L 340					
12						320	340	360	400	410	420	420	410	410	400	410		A	340					
13							A	A	A	430	420	A	430	420	420	410	390	L 370	350					
14								A	400	A	430	430	430	420	410	H 420	A	A	A					
15							390	410	A	A	420	A	440	420	430	400	A	360	340					
16						300	A	A	A	A	A	A	440	430	430	A	A	A	A					
17							A	A	420	A	A	430	A	A	A	A	A	A	A					
18						A	A	A	A	A	430	430	440	430	430	430	A	A	A					
19							A	A	A	A	A	430	A	A	430	U A 410	400	390	340					
20									A	A	430	440	A	420	A	420	400	A	A					
21							A	A	A	A	A	A	A	A	A	A	A	A	A					
22						A	L 400	400	A	A	A	440	A	440	A	A	A	A	A					
23						L	A	A	U A 440	A	A	A	A	450	A	A	A	L 390	A					
24							A	450	440	A	A	A	A	A	A	A	430	410	A					
25						330	A	A	A	A	430	440	430	440	H 460	A	430	A	A					
26						A	U A 400	420	430	440	A	A	U A 450	A	A	A	A	410	A					
27							390	400	420	A	A	A	U A 470	440	450	430	A	400	L 340					
28							A	A	A	A	A	A	A	420	430	420	420	380	U A 350					
29							330	A	A	400	420	440	410	A	420	400	A	A	A					
30							340	380	A	420	A	A	430	420	A	A	390	370	A					
31							370	A	U A 420	H 440	A	420	420	430	430	430	L 400	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						6	13	9	13	10	13	17	17	21	16	13	9	12	8					
MED						325	370	400	410	420	420	430	430	420	425	410	400	375	340					
UQ						L 340	390	410	420	430	430	440	440	430	430	420	420	395	345					
LQ						320	360	390	400	410	420	420	420	420	410	400	400	365	340					

JUL. 1987 | FOF1 (0.01 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FOE (0.01 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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	H 215	255	285	305	315	320	325	325	A	320	A	A	255	A	S				
2					S	200	250	290	300	310	315	A	330	330	320	305	A	A	A	S				
3					S	210	250	280	A	315	325	335	A	330	A	A	A	A	A	A				
4					S	S	235	285	300	315	B	A	A	A	A	305	275	230	A	S				
5					S	S	245	280	300	305	315	B	B	A	A	A	300	255	200	S				
6					S	S	205	A	310	315	A	320	325	325	315	A	A	A	A	S				
7					S	190	240	280	300	305	310	C	C	C	C	C	C	245	200	A				
8					S	215	235	260	285	305	A	340	340	335	320	305	290	250	200	S				
9					S	200	250	280	300	310	320	A	A	B	320	305	285	245	200	A				
10					S	200	240	270	290	300	A	340	335	330	320	305	280	245	195	S				
11					S	180	225	275	295	310	315	A	A	A	A	A	A	A	A	S				
12					S	185	220	250	290	A	A	330	335	A	A	300	A	250	200	S				
13					S	190	225	250	290	300	A	A	A	A	A	305	A	255	200	S				
14					S	H 200	230	255	295	300	A	340	A	320	310	300	285	240	200	S				
15					S	200	245	275	300	310	315	320	320	A	A	H 305	280	250	200	S				
16					S	195	230	275	300	305	310	310	A	A	315	305	275	260	200	S				
17					S	185	250	275	305	315	320	A	325	A	A	A	A	265	205	A				
18					S	185	240	275	295	A	305	A	A	A	A	305	280	250	205	S				
19					S	S	245	275	295	305	310	315	320	315	305	A	H 280	A	A	S				
20					S	190	230	A	280	305	A	A	350	345	330	315	290	255	200	S				
21					S	U A 175	230	270	305	315	320	320	325	300	A	A	A	A	230	S				
22					S	195	230	270	300	A	315	A	A	325	A	A	295	260	210	S				
23					S	190	255	275	305	305	310	315	A	A	A	A	A	A	A	S				
24					S	185	245	270	290	310	B	B	A	B	A	A	A	260	205	S				
25					S	205	235	275	305	300	315	325	335	330	H 320	A	A	A	A	S				
26					S	180	240	280	305	320	320	A	335	330	A	320	300	250	210	S				
27					S	195	H 240	275	300	310	320	320	A	A	A	315	300	255	200	S				
28					S	190	255	285	310	320	335	U A 335	A	A	A	A	A	255	200	S				
29					S	190	H 235	270	295	300	A	335	A	340	A	315	300	240	210	S				
30					S	A	200	A	280	305	305	A	A	A	315	295	A	A	180	S				
31					S	200	235	250	A	A	A	A	A	320	315	305	290	260	185	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						26	31	28	29	27	20	16	13	14	13	17	16	22	22					
MED						192	240	275	300	310	315	325	330	330	320	305	288	252	200					
UQ						200	245	280	305	315	320	335	335	330	320	305	298	255	205					
LQ						185	230	270	295	305	310	320	325	320	315	305	280	245	200					

JUL. 1987 | FOE (0.01 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FOES (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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	26	26	28	23	ES 16	25	34	41	JA 55	36	44	41	JA 50	40	JA 87	JA 123	JA 105	JA 60	JA 87	JA 60	JA 83	JA 94	JA 77	JA 36
2	JA 74	JA 48	JA 35	27	33	32	43	JA 48	JA 54	JA 70	JA 99	JA 51	JA 50	G	G	54	JA 56	JA 48	JA 156	JA 53	35	JA 24	JA 26	26
3	28	JA 28	JA 36	JA 36	26	JA 43	JA 42	JA 56	JA 57	JA 60	36	40	JA 95	JA 106	34	JA 55	JA 67	JA 58	JA 45	JA 40	25	ES 16	ES 16	26
4	JA 22	23	E	ES 16	19	26	32	JA 52	JA 75	JA 56	JA 69	JA 74	JA 74	JA 56	JA 58	JA 87	JA 88	JA 94	JA 71	56	JA 65	JA 123	JA 96	JA 80
5	JA 52	JA 61	JA 58	47	ES 16	JA 33	JA 58	JA 55	JA 55	JA 56	JA 70	JA 55	JA 58	JA 74	JA 72	JA 43	JA 44	JA 99	JA 127	JA 83	JA 69	JA 70	JA 28	JA 28
6	ES 16	21	21	ES 16	JA 27	JA 75	JA 53	JA 35	G	JA 38	JA 52	JA 76	42	JA 132	JA 60	JA 53	JA 75	JA 33	39	JA 25	JA 22	JA 57	JA 33	E
7	32	23	JA 25	JA 26	27	JA 44	JA 64	JA 66	JA 58	JA 53	46	C	C	C	C	C	C	JA 48	JA 48	JA 41	44	22	JA 29	ES 16
8	26	JA 28	28	30	20	G	G	JA 73	JA 70	JA 77	JA 53	42	JA 51	40	JA 67	JA 59	JA 126	JA 99	JA 81	53	36	JA 63	JA 53	JA 32
9	JA 44	JA 49	39	JA 33	26	40	JA 57	JA 87	JA 59	JA 128	G	36	55	56	36	JA 43	JA 60	JA 70	JA 57	JA 93	JA 28	JA 37	26	23
10	26	JA 26	26	26	ES 16	G	43	JA 84	JA 68	36	40	G	G	G	G	45	JA 47	JA 34	42	26	ES 16	ES 16	30	ES 16
11	ES 16	26	24	JA 24	25	JA 36	49	JA 54	34	39	JA 83	38	JA 58	JA 53	JA 54	JA 52	43	43	33	42	JA 64	JA 29	26	JA 50
12	JA 32	JA 28	JA 24	JA 26	31	26	41	JA 45	35	56	38	G	G	39	35	43	32	JA 55	JA 36	32	ES 16	JA 28	JA 25	JA 27
13	26	27	25	28	ES 16	26	49	48	JA 59	36	35	46	36	39	36	G	30	34	33	JA 45	30	JA 87	JA 49	JA 62
14	JA 29	28	26	23	ES 16	26	35	43	35	JA 45	39	G	35	G	G	35	JA 64	JA 57	JA 37	JA 28	27	22	24	21
15	E	E	E	E	ES 16	28	32	43	JA 64	JA 60	40	45	37	41	41	33	JA 49	JA 40	JA 33	36	JA 31	32	ES 16	ES 16
16	23	ES 16	20	ES 16	ES 16	25	34	40	JA 46	JA 74	JA 67	JA 53	37	35	35	53	JA 62	JA 49	JA 52	JA 43	JA 51	42	JA 28	JA 32
17	JA 53	25	32	JA 25	ES 16	JA 35	JA 48	JA 45	JA 47	JA 56	JA 54	51	61	JA 99	JA 69	JA 56	JA 52	JA 57	JA 57	JA 48	JA 27	JA 29	JA 30	ES 16
18	ES 16	26	ES 16	ES 16	42	JA 69	JA 83	JA 126	JA 89	JA 58	43	37	42	37	36	40	JA 57	JA 75	JA 54	35	JA 52	31	JA 62	JA 51
19	JA 64	32	36	JA 37	JA 72	JA 33	JA 45	JA 58	JA 68	JA 59	JA 68	JA 39	JA 49	JA 71	JA 38	JA 41	G	JA 36	JA 36	JA 32	JA 83	JA 36	JA 48	20
20	31	32	28	24	ES 15	25	JA 40	JA 37	JA 63	JA 55	JA 48	40	JA 66	JA 57	JA 73	43	JA 43	JA 84	JA 74	JA 88	JA 87	JA 63	JA 52	JA 60
21	JA 51	JA 60	JA 49	JA 34	JA 28	30	JA 35	JA 43	JA 49	JA 103	JA 75	JA 83	JA 69	JA 60	JA 56	52	JA 49	45	JA 35	JA 60	JA 64	JA 28	32	JA 27
22	JA 42	35	JA 27	32	JA 35	JA 51	JA 41	33	51	JA 76	JA 57	36	JA 49	G	53	JA 76	JA 73	JA 83	JA 76	JA 70	JA 43	JA 59	JA 32	JA 43
23	JA 33	JA 25	JA 26	JA 25	JA 25	JA 28	JA 64	JA 66	JA 50	JA 57	JA 61	46	JA 49	42	JA 58	JA 58	JA 61	JA 33	JA 41	41	JA 31	JA 38	JA 49	JA 61
24	39	30	26	ES 13	JA 20	JA 43	JA 72	43	33	JA 51	JA 62	JA 62	JA 61	JA 57	JA 60	JA 52	JA 45	JA 51	JA 47	JA 63	JA 63	JA 46	JA 56	JA 62
25	JA 97	36	JA 40	ES 15	JA 42	JA 31	JA 40	JA 56	JA 65	JA 93	JA 42	JA 40	G	G	G	JA 56	JA 45	41	JA 49	JA 70	JA 30	JA 64	JA 47	ES 16
26	JA 31	JA 29	28	30	JA 32	JA 36	44	JA 43	37	JA 37	JA 51	JA 69	JA 66	JA 51	JA 76	JA 45	JA 54	JA 33	JA 63	JA 54	JA 36	JA 46	JA 59	JA 51
27	23	23	21	ES 15	ES 16	G	30	33	JA 42	JA 58	JA 54	JA 61	JA 62	JA 47	JA 43	G	JA 50	JA 46	JA 90	JA 63	JA 40	35	29	26
28	JA 50	JA 50	JA 64	JA 35	JA 36	JA 50	JA 66	JA 96	JA 67	JA 124	JA 121	JA 64	JA 57	38	JA 36	JA 54	JA 44	35	JA 40	JA 35	37	JA 24	JA 35	JA 36
29	ES 17	28	JA 38	JA 32	JA 42	JA 43	JA 30	JA 57	JA 50	JA 53	JA 38	G	JA 37	JA 52	JA 40	36	JA 89	JA 129	JA 55	JA 25	JA 50	JA 71	JA 50	JA 28
30	23	JA 31	JA 50	JA 61	JA 25	JA 44	JA 57	34	JA 43	40	JA 57	JA 86	JA 60	JA 44	JA 48	JA 68	JA 62	JA 57	JA 50	JA 98	JA 54	JA 57	JA 43	JA 37
31	35	35	33	28	31	JA 30	43	JA 51	JA 56	32	JA 59	42	42	G	36	43	JA 45	JA 88	JA 89	JA 85	JA 44	JA 60	JA 68	JA 49
	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	30	30	30	30	30	30	31	31	31	31	31	31	31
MED	31	28	28	26	25	JA 32	JA 43	JA 48	JA 55	JA 56	JA 53	44	JA 50	43	JA 42	JA 52	JA 53	JA 51	JA 50	JA 48	JA 40	JA 38	JA 33	JA 28
UQ	JA 43	JA 34	36	32	32	JA 43	JA 55	JA 58	JA 64	JA 65	JA 64	JA 61	JA 61	JA 57	JA 60	JA 56	JA 64	JA 72	JA 72	JA 63	JA 58	JA 62	JA 51	JA 50
LQ	23	26	24	20	ES 16	26	35	43	JA 44	JA 42	41	38	37	37	36	43	JA 45	JA 40	JA 40	JA 36	30	JA 28	28	22

JUL. 1987 | FOES (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FBES (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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	17	ES 16	ES 16	ES 16	ES 16	G	33	40	46	G	44	37	37	39	AA 87	AA 123	46	51	46	50	31	41	25	25
2	AA 74	36	23	ES 16	23	30	40	41	G	AA 70	AA 99	40	41	G	G	47	41	45	45	46	30	22	ES 16	ES 16
3	18	21	25	26	ES 16	40	35	36	34	49	G	40	AA 95	AA 106	34	36	AA 67	AA 58	37	40	ES 16	ES 16	ES 16	ES 16
4	ES 16	ES 16	E	ES 16	16	23	30	49	45	45	AA 69	AA 74	AA 74	40	AA 58	AA 87	AA 88	AA 94	63	50	51	50	AA 96	AA 80
5	46	41	42	45	ES 16	31	AA 58	50	50	50	52	50	AA 58	AA 74	AA 72	42	38	AA 99	AA 127	35	47	46	ES 16	ES 16
6	ES 16	ES 16	ES 16	ES 16	16	AA 75	34	30	G	G	38	AA 76	G	37	AA 60	44	AA 75	30	32	G	ES 16	41	23	E
7	ES 15	ES 16	ES 16	18	ES 16	40	AA 64	AA 66	AA 58	AA 53	43	C	C	C	C	C	C	34	46	37	40	ES 16	ES 16	ES 16
8	16	ES 16	ES 16	16	ES 15	G	G	AA 73	55	AA 77	36	41	40	39	AA 67	41	AA 126	AA 99	AA 81	48	34	AA 63	42	30
9	34	31	31	29	17	32	AA 57	AA 87	G	AA 128	G	36	AA 55	33	36	39	AA 60	AA 70	AA 57	AA 93	26	34	ES 16	ES 16
10	ES 16	18	ES 16	ES 16	ES 16	G	AA 43	AA 84	AA 68	G	35	G	G	G	G	AA 45	40	G	40	18	ES 16	ES 16	ES 16	ES 16
11	ES 16	ES 16	ES 15	ES 16	20	34	AA 49	AA 54	G	36	AA 83	38	AA 58	AA 53	AA 54	42	40	36	28	34	34	25	ES 16	24
12	ES 16	ES 16	ES 16	ES 16	16	G	33	G	33	36	36	G	G	39	35	40	22	AA 55	30	23	ES 16	24	19	ES 16
13	17	ES 16	ES 16	16	ES 16	G	42	40	51	G	35	45	36	37	36	G	30	30	G	38	22	48	24	31
14	25	19	ES 16	ES 16	ES 16	G	G	40	35	45	36	G	35	G	G	G	AA 64	AA 57	35	22	20	ES 16	ES 16	ES 16
15	E	E	E	E	ES 16	25	G	40	AA 64	AA 60	40	45	37	40	40	G	43	34	31	29	21	22	ES 16	ES 16
16	ES 16	ES 16	ES 16	ES 16	ES 16	G	33	40	46	45	AA 67	AA 53	37	35	34	AA 53	46	AA 49	41	38	47	41	23	ES 16
17	22	ES 15	ES 16	18	ES 16	34	36	41	38	45	AA 54	41	AA 61	AA 99	46	AA 56	39	37	48	32	20	27	23	ES 16
18	ES 16	ES 16	ES 16	ES 16	AA 42	AA 69	AA 83	AA 126	AA 89	45	40	37	40	37	34	37	AA 57	AA 75	46	24	46	22	47	AA 51
19	ES 16	ES 16	16	30	AA 72	26	44	AA 58	AA 68	50	AA 68	39	46	AA 71	38	41	G	27	33	25	45	25	24	ES 16
20	ES 17	ES 16	16	ES 16	ES 15	G	40	31	AA 63	AA 55	38	39	AA 66	39	AA 73	38	37	AA 84	50	AA 88	31	28	48	19
21	29	25	21	20	17	27	26	AA 43	47	AA 108	59	AA 83	AA 69	AA 60	47	47	48	39	33	35	32	23	16	ES 17
22	19	24	20	18	26	AA 51	35	33	46	45	AA 57	36	48	G	45	AA 76	AA 73	AA 83	40	AA 70	37	46	32	18
23	33	ES 17	21	19	ES 17	27	AA 64	AA 66	44	AA 57	AA 61	46	47	42	48	AA 58	44	33	37	40	30	38	37	45
24	23	ES 16	ES 16	ES 13	20	43	AA 72	38	G	51	AA 62	AA 62	54	AA 57	50	51	33	35	45	62	52	43	48	AA 62
25	AA 97	18	22	ES 15	ES 17	30	38	47	55	48	40	39	G	G	G	47	42	40	42	AA 70	29	53	38	ES 16
26	17	27	ES 16	18	ES 17	36	40	38	37	37	51	AA 69	45	51	45	45	52	32	AA 63	50	32	25	43	50
27	ES 15	ES 16	ES 15	ES 15	ES 16	G	30	G	41	51	47	51	47	38	42	G	44	38	28	33	20	18	22	ES 17
28	ES 16	AA 50	AA 64	23	ES 16	47	AA 66	AA 96	AA 67	AA 124	AA 121	AA 64	AA 57	37	36	40	41	35	35	29	26	17	22	ES 15
29	ES 17	ES 16	20	25	AA 42	42	29	40	AA 50	36	38	G	37	AA 52	40	35	AA 89	AA 129	46	20	50	50	AA 50	ES 15
30	ES 16	AA 31	AA 50	18	20	27	27	29	AA 43	40	AA 57	AA 86	40	39	AA 48	AA 68	36	31	AA 50	ES 16	40	33	30	ES 17
31	20	20	24	17	20	28	33	46	42	32	AA 59	39	39	G	34	36	31	AA 88	AA 89	AA 85	26	46	50	34
	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	30	30	30	30	30	30	31	31	31	31	31	31	31
MED	17	ES 16	16	16	ES 16	28	36	41	46	45	47	40	43	39	41	42	44	40	42	37	31	28	23	ES 16
UQ	22	22	22	18	20	38	AA 46	AA 56	55	AA 54	AA 60	AA 53	AA 57	AA 52	AA 50	AA 51	AA 60	AA 72	49	50	40	44	40	28
LQ	ES 16	ES 16	ES 16	ES 16	ES 16	G	32	38	36	36	38	37	37	35	34	37	38	34	34	27	22	22	ES 16	ES 16

JUL. 1987 | FBES (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FMIN (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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	ES 16	ES 16	ES 16	ES 16	ES 16	16	17	16	19	21	25	25	27	24	22	21	18	20	16	ES 16	ES 16	ES 16	ES 15	ES 16
2	ES 16	E	ES 16	ES 16	ES 16	16	17	16	20	21	25	30	24	23	19	18	17	17	16	ES 16	ES 18	ES 16	ES 16	ES 16
3	ES 16	ES 16	ES 16	ES 16	ES 16	16	17	19	19	21	26	25	25	25	25	21	18	17	16	E	ES 16	ES 16	ES 16	ES 16
4	ES 16	ES 16	E	ES 16	ES 13	ES 16	17	17	19	19	33	25	26	21	26	24	19	16	16	ES 16	ES 15	ES 16	ES 16	ES 16
5	ES 15	ES 16	ES 16	ES 16	ES 16	ES 16	16	20	20	24	20	32	32	26	20	20	19	18	17	ES 16	ES 16	ES 16	ES 16	ES 16
6	ES 16	ES 16	ES 16	ES 16	ES 12	ES 16	16	18	19	20	21	20	25	20	23	17	21	17	16	ES 15	ES 16	ES 16	ES 13	E
7	ES 15	ES 16	ES 16	ES 16	ES 16	16	17	18	25	24	20	C	C	C	C	C	C	16	16	E	ES 16	ES 16	ES 16	ES 16
8	E	ES 16	ES 16	E	ES 15	16	15	16	25	18	25	23	22	21	20	20	20	17	16	ES 16	ES 16	ES 16	ES 16	ES 17
9	ES 17	ES 16	ES 16	ES 16	ES 16	16	16	17	25	24	27	26	29	31	21	23	18	17	16	E	ES 16	ES 16	ES 16	ES 16
10	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	17	23	20	22	23	20	23	22	19	17	17	16	ES 13	ES 16	ES 16	ES 16	ES 16
11	ES 16	ES 16	ES 15	ES 16	ES 16	11	16	18	20	20	22	26	24	24	25	18	19	18	10	ES 16	ES 15	ES 16	ES 16	ES 16
12	ES 16	ES 16	ES 16	ES 16	ES 12	ES 16	16	17	17	26	19	21	24	23	25	18	15	16	16	ES 13	ES 16	ES 15	ES 16	ES 16
13	E	ES 16	ES 16	E	ES 16	16	17	18	20	19	26	26	25	26	25	21	17	17	16	ES 16	ES 15	ES 15	ES 15	ES 16
14	ES 16	ES 16	ES 16	ES 16	ES 16	11	17	17	19	20	20	28	25	24	23	22	16	16	16	ES 16	E	ES 16	ES 16	ES 16
15	E	E	E	E	ES 16	16	16	17	20	19	20	24	23	23	19	19	17	17	17	ES 15	ES 16	ES 17	ES 16	ES 16
16	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	19	21	23	27	27	30	25	26	19	18	17	17	ES 16	ES 16	ES 16	ES 16	ES 16
17	ES 16	ES 15	ES 16	E	ES 16	16	17	18	19	20	26	22	26	22	25	18	17	18	16	E	E	E	E	ES 16
18	ES 16	ES 16	ES 16	ES 16	ES 15	13	16	16	18	23	20	28	25	23	20	20	18	17	18	ES 16	ES 16	ES 17	ES 16	ES 17
19	ES 16	ES 16	E	ES 16	ES 16	ES 18	17	19	19	24	21	27	27	28	23	21	18	17	16	ES 17	ES 16	ES 16	ES 16	ES 16
20	ES 17	ES 16	E	E	ES 16	ES 15	ES 17	17	19	19	21	21	25	25	26	20	23	20	17	17	ES 17	ES 16	ES 15	ES 16	ES 16
21	ES 17	ES 18	ES 16	ES 16	ES 17	17	17	19	24	21	27	23	30	26	28	25	19	17	16	ES 18	ES 16	ES 16	E	ES 17
22	ES 17	ES 16	ES 15	ES 16	ES 16	16	18	18	27	26	27	25	25	22	26	20	18	18	19	ES 17	ES 17	E	ES 17	ES 17
23	ES 16	ES 17	ES 17	ES 16	ES 17	17	17	20	20	25	29	26	26	27	26	23	20	17	17	ES 18	ES 15	ES 16	ES 16	ES 16
24	ES 18	ES 16	ES 16	ES 13	ES 15	17	17	19	19	23	36	32	29	31	23	24	18	18	17	ES 16	ES 16	ES 16	E	ES 17
25	ES 17	ES 16	ES 17	ES 15	ES 17	17	17	19	25	20	20	30	30	26	23	18	21	17	17	ES 16	ES 16	ES 16	ES 17	ES 16
26	ES 16	ES 15	ES 16	ES 16	ES 17	ES 17	16	17	19	25	26	26	33	26	20	25	18	18	17	ES 17	ES 17	ES 16	ES 16	ES 16
27	ES 15	ES 16	ES 15	ES 15	ES 16	16	17	19	20	22	27	26	30	27	22	20	20	19	16	ES 17	ES 16	ES 17	ES 17	ES 17
28	ES 16	ES 16	ES 17	ES 16	ES 16	16	17	19	20	24	18	33	31	27	23	24	18	17	18	ES 17	ES 12	ES 15	ES 16	ES 15
29	ES 17	ES 16	ES 16	E	ES 16	17	17	17	19	21	25	30	29	26	25	26	18	16	16	ES 16	E	ES 16	ES 13	ES 15
30	ES 16	ES 16	ES 16	ES 16	ES 16	17	17	17	19	26	25	26	26	24	25	19	18	17	16	ES 16	ES 16	ES 17	ES 17	ES 17
31	ES 17	ES 17	ES 16	ES 17	ES 16	18	19	18	23	24	29	26	27	27	25	20	18	18	16	ES 22	ES 16	ES 17	ES 16	ES 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	31	31	30	30	30	30	30	30	31	31	31	31	31	31	31
MED	ES 16	ES 16	ES 16	ES 16	ES 16	16	17	18	20	21	25	26	26	25	23	20	18	17	16	ES 16	ES 16	ES 16	ES 16	ES 16
UQ	ES 16	ES 16	ES 16	ES 16	ES 16	16	17	19	22	24	27	28	29	26	25	23	19	18	17	ES 17	ES 16	ES 16	ES 16	ES 16
LQ	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	17	19	20	20	25	25	23	21	19	18	17	16	ES 16	ES 16	ES 16	ES 16	ES 16

JUL. 1987 | FMIN (0.1 MHZ)

IONOSPHERIC DATA

JUL. 1987 | M(3000)F2 (0.01) | 135° E Mean Time (G.M.T. + 9 h)

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	F	F 295	320	F	F 300	315	320	295	305	340	335	R	290	330	A	A	340	A	315	325	F 315	F	F	F
2	A	F	F 305	F	F	320	315	355	335	A	A	295	315	335	290	R	300	325	310	315	330	F 285	300	305
3	295	300	F 320	F 300	305	A	F 280	325	345	A	330	325	A	A	325	350	A	A	315	310	315	310	320	330
4	300	F 305	F 310	F 370	F 325	315	315	A	325	330	A	A	A	245	A	A	A	A	A	325	310	310	A	A
5	F	F	F	F	F	365	A	A	A	A	A	A	A	A	A	355	305	A	A	355	340	F 345	325	325
6	325	335	F	F	F 340	A	335	H 325	325	V 315	335	A	R	290	A	300	A	310	315	310	335	F 330	F 300	300
7	305	F	F 310	F 285	305	A	A	A	A	A	345	C	C	C	C	C	C	300	315	315	315	320	325	310
8	F 290	F 305	F	F	F 275	285	325	A	A	A	315	315	295	320	A	305	A	A	A	315	335	A	F	295
9	A	A	A	F	300	325	A	A	290	A	325	R	A	R	R	R	A	A	A	A	315	325	305	F 310
10	295	290	305	F 330	F	365	A	A	A	300	325	R	R	R	R	A	285	300	295	315	320	290	295	295
11	285	280	300	290	300	305	A	A	290	300	A	R	A	A	A	295	310	310	300	295	305	305	320	320
12	300	295	300	F 295	310	315	R	280	295	R	300	290	R	R	R	R	360	A	300	305	310	310	300	315
13	330	290	320	305	295	300		315	A	345	R	310	295	300	310	295	285	310	315	290	300	305	345	330
14	F	F 290	F 300	F 305	320	335	H 325	310	315	335	320	R	R	290	310	R	A	A	310	315	315	320	310	300
15	300	300	320	310	325	315	320	305	A	A	330	320	295	335	R	295	280	300	300	300	300	305	300	300
16	285	285	S 300	F 290	F	S 360	345	A	A	340	A	A	305	360	R	A	A	A	300	300	290	330	295	V 305
17	285	F 290	285	290	F 305	290	295	305	335	325	A	260	A	A	300	A	295	305	300	300	320	310	F 270	F 275
18	F 295	F	F	F 330	A	A	A	A	A	295	325	R	R	R	280	290	A	A	335	315	315	305	305	A
19	F 275	F	F 285	F	A	295	A	A	A	A	A	320	310	A	270	300	315	325	320	310	375	F	F 325	F 310
20	300	290	F 305	F 290	F 325	330	320	350	A	A	305	275	A	310	A	295	295	A	325	A	310	290	295	F 270
21	F 310	F 295	F 290	F 330	335	325	335	A	A	A	A	A	A	A	A	290	310	310	290	265	F	F	F	315
22	F 305	305	F 285	F 275	F 320	A	265	340	325	325	A	290	A	R	290	A	A	A	300	A	310	295	305	290
23	325	285	285	280	F 290	300	A	A	320	A	A	250	275	280	300	A	305	295	305	300	300	290	305	290
24	F 285	285	285	290	F 310	A	A	300	335	345	A	A	A	A	300	295	305	305	305	A	305	F	305	A
25	A	F	F	F 285	F	300	285	305	305	315	305	300	310	290	315	280	305	310	310	A	280	285	290	295
26	305	V 295	F	F 285	S	275	295	315	330	295	320	A	280	295	315	320	A	310	A	A	290	F	F	F
27	F 285	F 290	285	F 300	F	310	305	315	315	325	310	310	315	305	270	310	315	310	305	295	295	290	300	300
28	300	A	A	F	F	A	A	A	A	A	A	A	A	R	R	R	305	295	290	285	290	285	F 285	315
29	275	285	F	295	A	A	260	275	A	280	R	R	R	A	260	285	A	A	280	265	285	295	A	305
30	F	A	A	290	265	285	R	R	A	R	A	A	270	R	A	A	255	290	A	285	F 285	F	F	300
31	300	300	295	315	300	310	270	290	290	350	A	R	R	260	290	265	270	A	A	A	295	300	300	F 310
	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	22	21	23	20	23	18	17	17	17	15	13	12	15	15	17	19	17	24	24	30	24	24	26
MED	300	292	300	F 295	305	315	315	310	320	325	325	300	295	300	300	295	305	310	305	308	310	305	302	305
UQ	305	300	310	F 308	322	325	325	325	330	340	330	315	310	325	310	305	310	310	315	315	315	315	315	315
LQ	285	290	285	290	300	300	285	300	305	300	312	290	285	290	285	290	290	300	300	295	295	290	298	295

JUL. 1987 | M(3000)F2 (0.01)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | M(3000)F1 (0.01) | 135° E Mean Time (G.M.T. + 9 h)

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						L 335	345	A	A	405	A	400	420	385	A	A	A	A	A					
2						A	A	A	400	A	A	A	A	415	420	A	A	A	A					
3						A	A	A	380	A	425	A	A	A	395	A	A	A	A					
4							340	A	A	A	A	A	A	A	A	A	A	A	A					
5							A	A	A	A	A	A	A	A	A	A	A	A	A					
6						A	A	370	400	380	410	A	425	415	A	A	A	340	A					
7							A	A	A	A	A	C	C	C	C	C	C	A	A					
8						L 325	350	A	A	A	430	A	A	A	A	A	A	A	A					
9							A	A	365	A	390	405	A	390	A	A	A	A	A					
10							A	A	A	415	H 405	430	395	395	395	A	A	325	A					
11						A	A	A	370	365	A	A	A	A	A	A	A	A	L 330					
12						335	A	395	350	410	410	410	410	A	380	A		A	A					
13							A	A	A	385	410	A	390	405	340	370	360	L 345	335					
14								A	385	A	370	395	400	385	400	H 355	A	A	A					
15							335	A	A	A	A	A	A	A	A	385	A	A	A					
16						365	A	A	A	A	A	A	380	395	370	A	A	A	A					
17							A	A	A	A	A	A	A	A	A	A	A	A	A					
18						A	A	A	A	A	A	390	A	365	345	355	A	A	A					
19							A	A	A	A	A	A	A	A	380	A	350	330	A					
20									A	A	395	385	A	A	A	A	A	A	A					
21							A	A	A	A	A	A	A	A	A	A	A	A	A					
22						A	A	365	A	A	A	415	A	385	A	A	A	A	A					
23						L	A	A	A	A	A	A	A	A	A	A	A	L 335	A					
24							A	355	385	A	A	A	A	A	A	A	345	340	A					
25						A	A	A	A	A	A	410	385	385	H 380	A	A	A	A					
26						A	A	A	375	410	A	A	A	A	A	A	A	345	A					
27							335	375	A	A	A	A	A	410	A	350	A	A	L 345					
28							A	A	A	A	A	A	A	425	370	A	A	A	A					
29							340	A	A	410	390	385	365	A	A	375	A	A	A					
30							365	320	A	A	A	A	A	A	A	A	A	330	A					
31							350	A	A	H 365	A	A	A	360	370	345	L 365	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						4	8	6	9	9	10	10	9	14	12	7	4	8	3					
MED						335	342	368	380	405	408	402	395	392	380	355	355	338	L 335					
UQ						350	350	375	385	410	410	410	410	410	395	372	362	342	340					
LQ						330	338	355	370	380	390	390	385	385	370	352	348	330	332					

JUL. 1987 | M(3000)F1 (0.01)

IONOSPHERIC DATA

JUL. 1987 | H'F2 (KM) | 135° E Mean Time (G.M.T. + 9 h)

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						305	305	350	340	265	295	R	400	305	A	A	350	A	A					
2						290	315	250	300	A	A	375	325	300	400	A	355	A 300	A 320					
3						A	345	270	260	A	325	335	A	A	300	285	A	A	295					
4							330	A	305	310	A	A	A	540	A	A	A	A	A					
5							A	A	A	A	A	A	A	A	A	325	355	A	A					
6						A	310	295	295	295	305	A	R	405	A	A 350	A	320	285					
7							A	A	A	A	295	C	C	C	C	C	C	340	A 300					
8						430	300	A	A	A	345	350	380	345	A	350	A	A	A					
9							A	A	390	A	340	R	A	R	R	R	A	A	A					
10							A	A	A	350	325	R	R	R	R	A	290	345	325					
11						375	A	A	390	355	A	R	A	A	A	395	350	315	320					
12						295	R	400	350	R	385	400	R	R	325	495		A	300					
13							A	325	A	305	R	375	390	375	355	375	330	325	310					
14								355	335	300	350	R	R	400	370	R	A	A	320					
15							305	350	A	A	315	350	395	340	R	375	A	340	320					
16						250	280	A	A	300	A	A	425	395	R	A	A	A	A					
17							A 300	330	255	320	A	510	A	A	365	A	345	295	A 300					
18						A	A	A	A	355	320	R	R	R	410	385	A	A	A					
19							A	A	A	A	A	355	355	A	455	365	325	290	260					
20									A	A	360	440	A	375	A	380	380	A	A					
21							245	A	A	A	A	A	A	A	A	A 390	A 350	315	295					
22						A	280	290	320	320	A	395	A	R	400	A	A	A	310					
23						275	A	A	325	A	A	535	445	375	A 380	A	A 345	350	300					
24							A	380	280	270	A	A	A	A	A 370	A	340	325	A 300					
25						300	295	285	A 305	290	350	345	340	385	335	345	325	290	285					
26						375	350	280	285	375	A 330	A	430	A 380	340	325	A	305	A					
27							300	325	265	310	350	340	305	350	420	345	325	305	280					
28							A	A	A	A	A	A	A	R	R	R	355	325	320					
29							500	435	A	420	R	R	R	A	455	400	A	A	A					
30							R	R	A	R	A	A	460	R	A	A	530	385	A					
31							410	370	370	290	A	R	R	490	380	475	360	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						9	16	16	17	17	15	13	12	15	16	17	17	17	19					
MED						300	305	328	305	310	330	375	392	375	375	375	350	320	300					
UQ						375	338	362	340	350	350	400	428	398	405	390	355	340	320					
LQ						290	298	288	285	295	318	350	348	348	348	345	330	305	295					

The Radio Research Laboratory, Japan

JUL. 1987 | H'F2 (KM)

IONOSPHERIC DATA

JUL. 1987 | H'F (KM) | 135° E Mean Time (G.M.T. + 9 h)

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	250	265	245	250	215	250	A 255	A	A	210	A	210	200	A 230	A	A	A	A	A	A	250	A	300	260
2	A	A	300	250	270	A	A	A	210	A	A	A	A	200	205	A	A	A	A	A	225	250	250	250
3	260	270	260	A 255	245	A	A	A	210	A	200	A	A	A	205	A	A	A	A	A 275	225	245	240	230
4	245	250	235	250	240	215	210	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
5	A	A	A	A	215	A 230	A	A	A	A	A	A	A	A	A	A	A	A	A	255	A	280	255	255
6	250	245	245	165	240	A	A	225	200	210	210	A	200	205	A	A	A	225	A	H 250	220	A	255	245
7	295	285	260	300	260	A	A	A	A	A	A	C	C	C	C	C	C	A	A	A 255	A	215	250	240
8	255	245	245	260	245	245	225	A	A	A	195	A	A	A	A	A	A	A	A	A	240	A	A	A
9	A	A	A	A	265	A 285	A	A	245	A	220	210	A	220	A	A	A	A	A	A	250	255	200	255
10	295	300	280	250	250	220	A	A	A	200	200	200	220	205	200	A	A	245	A	H 230	220	260	245	250
11	290	285	255	245	265	A	A	A	220	A 230	A	A	A	A	A	A	A	A	A 250	A 250	300	270	220	250
12	250	290	285	275	255	245	A	200	230	210	205	H 195	225	A	220	A	215	A	A	265	250	250	250	250
13	250	260	245	275	275	245	A	A	A	220	205	A	H 200	A 215	A 245	215	215	225	235	A	275	A	225	A 350
14	295	295	275	255	240	230	H 220	A	A 220	A	240	200	200	205	200	H 200	A	A	A	H 250	235	220	240	255
15	240	250	230	250	235	230	230	A	A	A	A	A	A	A	A	205	A	A	A	275	255	230	250	250
16	260	295	270	255	240	225	A	A	A	A	A	A	A 215	200	200	A	A	A	A	A 265	A	A	280	240
17	270	270	265	270	275	A 355	A	A	A	A	A	A	A	A	A	A	A	A	A	255	225	285	320	280
18	285	285	230	200	A	A	A	A	A	A	A	A 210	A	A 205	205	A 245	A	A	A	260	A	250	A	A
19	270	230	285	A 310	A	A 250	A	A	A	A	A	A	A	A	A 210	A	215	240	A	250	A	295	280	245
20	255	230	255	260	230	215	A	200	A	A	A 220	A 225	A	A	A	A	A	A	A	A	255	295	A	275
21	280	290	290	250	210	225	A	A	A	A	A	A	A	A	A	A	A	A	A	285	300	230	255	230
22	275	290	285	260	260	A	A	205	A	A	A	200	A	220	A	A	A	A	A	A	260	A	255	270
23	A 305	250	280	280	275	A 255	A	A	A	A	A	A	A	A	A	A	A	A 245	A	A 300	270	A 290	A 275	A
24	290	295	290	275	250	A	A	A	195	A	A	A	A	A	A	A	H 230	A 255	A	A	A 300	A 275	A 295	A
25	A	325	270	285	300	A	A	A	A	A	A	A 210	195	195	200	A	A	A	A	A	300	A	A 290	245
26	250	295	290	280	290	A	A	A	A 220	200	A	A	A	A	A	A	A	240	A	A	280	260	A 285	A
27	260	255	265	250	260	250	240	210	A	A	A	A	A	200	A	200	A	A	250	270	250	250	250	240
28	250	A	A	300	280	A	A	A	A	A	A	A	A	190	240	A	A	A	A	305	295	285	285	230
29	280	260	250	305	A	A	A 260	A	A	205	210	200	A 250	A	A	235	A	A	A	300	A	A	A	235
30	225	A	A	305	345	360	220	215	A	A	A	A	A	A	A	A	A	A 245	A	275	A	320	305	250
31	270	270	A 300	270	290	275	A 255	A	A	200	A	A	A	220	230	A 255	230	A	A	A	300	A	A	A 295
	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	27	26	27	29	28	19	9	6	9	9	10	10	9	14	12	7	5	8	3	19	23	21	25	25
MED	260	270	265	260	258	245	230	208	220	210	208	205	200	205	205	215	215	242	250	265	255	260	255	250
UQ	282	290	285	280	275	252	A 255	215	220	210	220	A 210	220	220	225	240	230	A 245	250	275	288	285	285	255
LQ	250	250	248	250	240	228	220	200	210	200	200	200	200	200	200	202	215	232	242	252	238	250	250	240

JUL. 1987 | H'F (KM)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | H'E (KM) | 135° E Mean Time (G.M.T. + 9 h)

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

Day \ 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					S	135	125	110	105	110	120	115	115	120	120	115	110	120	A	S				
2					S	130	120	110	110	110	115	A	105	110	105	105	A	A	A	S				
3					S	130	110	110	A	110	125	120	115	115	115	A	115	110	A	A				
4					S	S	120	110	110	110	B	115	A	110	A	105	105	115	125	S				
5					S	S	110	115	110	120	110	B	B	120	110	110	115	110	120	S				
6					S	S	115	A	105	105	A	105	105	105	110	A	115	120	A	S				
7					S	125	115	110	115	110	110	C	C	C	C	C	C	115	125	A				
8					S	130	110	110	125	105	110	110	110	110	110	110	120	120	125	S				
9					S	130	110	110	130	120	115	120	A	B	110	115	110	115	130	A				
10					S	120	110	105	115	105	A	105	105	105	105	105	105	120	125	S				
11					S	125	115	110	110	110	110	125	115	120	A	A	A	A	A	S				
12					S	S 135	115	110	105	120	105	105	105	105	A	110	A	110	125	S				
13					S	130	120	110	115	125	125	120	120	A	A	110	110	115	125	S				
14					S	120	120	110	110	110	105	110	A	110	110	110	110	120	125	S				
15					S	130	120	115	115	110	115	115	115	115	115	115	110	115	125	S				
16					S	130	115	115	115	115	120	115	A	A	115	110	115	120	125	S				
17					S	135	120	115	115	110	115	110	120	110	A	110	110	120	125	A				
18					S	125	120	110	110	115	105	A	110	A	A	110	110	110	135	S				
19					S	S	115	115	110	115	110	115	120	120	110	A	110	A	A	S				
20					S	S 155	110	110	110	105	105	120	115	115	110	115	110	115	125	S				
21					S	A 130	120	110	115	110	120	115	125	120	A	120	A	A	110	S				
22					S	125	120	115	125	125	125	115	115	110	A	A	110	115	130	S				
23					S	105	115	115	110	110	110	105	A	A	A	A	A	A	A	S				
24					S	125	110	115	110	110	B	B	A	B	A	A	A	120	120	S				
25					S	125	115	110	120	110	115	115	125	115	110	100	A	A	A	S				
26					S	S 135	115	115	110	115	115	115	E B 130	115	110	120	120	115	120	S				
27					S	125	110	115	110	110	120	115	A	A	A	105	115	115	120	S				
28					S	125	110	110	110	115	115	E B 135	A	A	A	A	A	110	125	S				
29					S	120	110	110	110	115	120	120	A	110	120	120	115	110	115	S				
30					S	A	110	110	110	115	110	110	A	A	110	105	110	A	115	S				
31					S	125	120	110	120	A	A	A	A	105	110	H 105	120	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						26	31	30	30	30	26	25	18	21	18	22	22	24	23					
MED						128	115	110	110	110	115	115	115	110	110	110	110	115	125					
UQ						130	120	115	115	115	120	118	120	115	115	115	115	120	125					
LQ						125	110	110	110	110	110	110	110	110	110	105	110	112	120					

JUL. 1987 | H'E (KM)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | H'ES (KM) | 135° E Mean Time (G.M.T. + 9 h)

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	105	105	140	100	S	145	135	125	120	125	120	120	120	120	115	115	120	110	105	105	115	110	110	105
2	105	100	100	105	125	125	125	125	125	105	105	105	115	G	G	125	120	120	110	100	100	105	110	105
3	125	100	100	100	105	125	125	120	120	120	125	120	110	110	110	105	105	105	125	110	120	S	S	105
4	105	110	E	S	135	125	125	120	115	115	110	105	105	110	105	110	105	105	105	115	110	110	110	105
5	105	125	100	100	S	125	115	110	110	110	105	105	105	105	105	105	125	110	110	115	110	105	115	115
6	S	100	100	S	105	110	110	105	G	125	115	105	125	125	125	115	110	105	105	125	105	125	110	E
7	110	130	120	105	135	115	110	110	110	110	110	C	C	C	C	C	C	125	115	105	105	115	105	S
8	125	105	105	120	130	G	G	105	105	105	110	130	130	150	125	135	125	115	110	105	105	105	105	105
9	100	100	100	100	105	125	120	115	125	110	G	110	105	110	145	130	125	120	120	105	105	105	110	120
10	110	105	105	105	S	G	125	105	110	115	105	G	G	G	G	130	125	120	110	110	S	S	110	S
11	S	105	105	105	105	120	120	120	130	125	105	110	105	105	105	105	105	105	105	115	110	110	110	105
12	105	105	105	105	105	125	120	115	125	105	105	G	G	110	100	130	100	120	115	115	S	110	105	105
13	105	105	100	100	S	125	120	120	110	110	110	105	110	105	110	G	110	125	125	125	115	115	115	105
14	105	105	125	105	S	125	125	120	115	110	110	G	110	G	G	150	120	115	115	115	110	120	105	115
15	E	E	E	E	S	130	125	120	115	110	115	110	110	110	110	160	125	125	120	115	110	110	S	S
16	135	S	130	S	S	130	115	115	115	115	115	110	115	115	120	125	120	125	120	120	115	110	110	105
17	105	105	105	105	S	125	125	125	120	115	110	110	110	105	105	110	125	120	120	110	110	105	110	S
18	S	115	S	S	150	125	120	110	105	110	105	110	105	105	105	140	125	110	110	120	115	110	110	105
19	100	110	100	100	120	125	125	120	110	110	110	115	115	110	110	110	G	100	105	120	115	115	110	110
20	110	105	100	105	S	120	115	110	115	110	110	125	120	120	115	125	120	115	110	110	120	105	120	115
21	110	100	100	100	110	125	125	125	115	110	110	110	110	110	110	110	105	105	120	120	115	110	110	120
22	100	100	100	130	120	115	115	120	120	110	110	115	105	G	100	120	125	115	120	110	110	110	110	105
23	100	100	100	100	100	125	115	115	110	105	105	105	105	105	105	100	100	105	100	100	110	110	105	105
24	105	105	100	S	120	110	110	110	120	115	105	105	100	100	100	100	100	120	115	115	115	110	110	105
25	105	105	100	S	100	120	115	115	110	110	115	115	G	G	G	110	105	105	115	120	120	110	110	S
26	105	105	150	110	115	120	115	115	115	125	110	110	115	110	110	130	125	125	125	120	115	115	115	110
27	105	105	110	S	S	G	125	130	120	110	115	110	105	105	100	G	120	115	115	110	110	105	110	105
28	100	100	100	100	100	125	120	115	110	110	105	105	110	105	105	105	105	125	115	115	110	120	110	105
29	S	115	105	125	120	115	120	115	115	115	115	G	110	130	125	120	125	120	120	125	110	115	110	115
30	125	110	115	115	115	115	110	115	115	115	115	100	110	120	115	110	105	105	110	110	110	110	110	100
31	100	100	100	105	105	120	120	115	110	115	105	105	105	G	125	130	130	120	115	115	120	115	110	110
	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	26	29	28	23	21	28	30	31	30	31	30	26	27	24	26	28	29	31	31	31	29	29	29	25
MED	105	105	100	105	115	125	120	115	115	110	110	110	110	110	110	118	120	115	115	115	110	110	110	105
UQ	110	105	108	105	120	125	125	120	120	115	115	115	115	118	115	130	125	120	120	120	115	115	110	110
LQ	105	100	100	100	105	120	115	112	110	110	105	105	105	105	105	110	105	105	110	110	110	110	110	105

JUL. 1987 | H'ES (KM)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | TYPES OF ES | 135° E Mean Time (G.M.T. + 9 h)

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	F 2	F 2	FF 12	F 2		C 2	C 3	C 4	C 2	C 1	C 1	C 1	C 1	C 1	C 3	C 2	C 2	C 3	L 4	L 4	F 5	F 6	F 4	F 5
2	F 7	F 7	F 4	F 2	CL 22	CL 41	C 3	C 3	C 1	C 3	C 4	L 2	C 1			C 2	CL 22	CL 22	CL 33	L 2	F 2	F 3	F 2	F 2
3	FF 22	F 3	F 3	F 3	L 1	C 4	C 3	C 2	CL 12	C 3	C 1	C 2	C 3	C 4	C 1	L 2	C 5	C 5	CL 43	L 4	F 1			F 2
4	F 2	F 1			C 2	C 2	C 2	C 3	C 2	C 2	C 4	C 3	L 3	C 1	L 3	C 3	C 5	C 5	C 4	C 5	F 5	F 6	F 4	F 6
5	F 5	FF 24	F 4	F 5		CL 42	C 5	C 6	C 3	C 2	C 3	C 2	C 2	C 3	C 3	C 2	C 2	C 4	C 6	L 7	F 4	F 4	F 1	F 1
6		F 2	F 1		L 2	C 4	C 2	L 1		C 1	CL 12	C 2	C 1	C 1	C 2	CL 22	C 3	C 3	L 2	C 1	F 2	F 2	F 3	
7	F 2	F 1	F 2	F 2	C 1	C 5	C 3	C 7	C 6	C 2	C 2							C 3	C 6	L 7	F 6	F 1	F 3	
8	F 2	F 2	F 2	F 3	C 1			C 5	C 2	C 2	C 1	C 1	C 1	H 1	C 3	C 2	C 4	C 4	C 7	L 7	F 4	F 6	F 6	F 5
9	F 6	F 6	F 3	F 4	L 2	C 5	C 5	C 5	C 1	C 3		C 1	L 2	C 2	H 1	C 2	C 3	C 3	C 4	L 4	F 3	F 4	F 1	F 1
10	F 2	F 2	F 2	F 1			C 4	C 3	C 2	C 1	L 2					C 1	C 2	C 3	C 6	L 2			F 2	
11		F 2	F 2	F 2	LC 12	C 5	C 4	C 3	C 1	C 2	C 4	C 2	C 2	C 2	L 3	L 3	L 3	L 4	L 3	C 6	F 5	F 5	F 2	F 3
12	F 2	F 2	F 2	F 2	L 2	C 2	C 3	C 3	C 2	C 2	C 2			C 2	L 2	CL 21	L 2	C 3	C 3	C 5		F 3	F 4	F 3
13	F 3	F 2	F 2	F 2		C 3	C 4	C 2	C 3	C 1	C 1	C 2	C 2	L 2	L 2		C 2	C 2	C 1	C 4	F 4	F 5	F 2	F 2
14	F 2	F 2	FF 11	F 2		C 2	C 2	C 3	C 2	C 2	C 2		L 2			H 1	C 5	C 5	C 4	C 2	F 3	F 1	F 2	F 2
15						C 3	C 4	C 3	C 4	C 3	C 1	C 2	C 2	C 2	C 2	HC 11	C 3	C 3	C 5	L 2	F 3	F 6		
16	F 1		F 1			C 1	C 3	C 2	C 3	C 2	C 2	C 2	L 1	L 1	C 1	C 2	C 2	C 3	C 4	L 5	F 7	F 7	F 4	F 3
17	F 4	F 2	F 2	F 4		C 6	C 4	C 2	C 2	C 2	C 2	C 2	C 2	C 4	L 3	C 2	C 2	C 3	C 5	L 6	F 3	F 6	F 4	
18		F 2			HC 32	C 6	C 6	C 7	C 4	C 2	C 2	L 2	C 2	L 1	L 1	H 1	C 2	C 3	C 4	C 4	F 5	F 5	F 4	F 7
19	F 4	F 5	F 4	F 3	CL 32	C 3	C 5	C 3	C 6	C 2	C 3	C 1	C 2	C 2	C 2	L 2		L 3	L 3	L 6	F 5	F 6	F 4	F 3
20	F 3	F 2	F 2	F 3		C 2	C 3	C 2	C 2	C 2	C 1	CL 11	C 4	C 1	C 3	C 1	C 2	C 3	C 3	L 6	FF 24	F 4	F 5	F 5
21	F 4	F 5	F 4	F 3	L 3	C 2	C 1	C 3	C 2	C 2	C 2	C 4	C 3	C 2	L 2	C 2	L 4	L 3	C 4	L 4	F 5	F 4	F 4	F 3
22	F 5	F 4	F 4	FF 12	L 3	C 4	C 4	C 1	C 3	C 2	C 2	C 1	C 2		L 2	CL 42	C 4	C 3	C 4	L 4	F 4	F 6	F 7	F 4
23	F 6	F 2	F 3	F 2	L 2	C 2	C 3	C 7	C 2	C 3	C 2	C 2	L 2	L 2	L 2	L 3	L 2	L 2	L 3	L 5	F 4	F 3	F 7	F 5
24	F 2	F 2	F 2		C 3	C 4	C 2	C 3	C 1	C 2	L 3	L 5	L 2	L 3	L 2	L 3	L 2	C 2	C 4	L 4	F 7	F 3	F 3	F 7
25	F 7	F 2	F 3		L 3	C 3	C 4	C 2	C 3	C 2	C 1	C 1				C 1	L 2	L 3	CL 42	C 5	F 7	F 7	F 6	
26	F 5	F 4	F 1	F 2	L 2	C 4	C 4	C 2	C 1	C 1	C 2	C 2	C 2	C 2	C 2	C 2	C 2	C 2	C 6	C 2	F 3	F 4	F 7	F 6
27	F 2	F 2	F 1				C 2	C 1	C 2	C 2	C 2	C 2	L 2	L 1	L 2		C 2	C 4	C 2	L 3	F 2	F 3	F 3	F 2
28	F 2	F 7	F 4	F 4	L 2	C 6	C 3	C 3	C 4	C 3	C 4	C 4	L 2	L 2	L 2	L 2	L 2	C 3	C 4	L 3	F 4	F 3	F 4	F 3
29		F 1	F 2	F 5	L 6	C 3	C 3	C 2	C 2	C 1	C 1		CL 22	CL 11	CL 12	C 1	C 4	C 4	C 3	L 1	F 7	F 7	F 6	F 1
30	F 3	F 3	F 6	F 3	L 2	L 2	C 2	C 1	C 2	C 2	C 1	C 3	L 2	CL 11	C 2	C 3	C 3	L 2	C 5	L 5	F 6	F 3	F 5	F 3
31	F 2	F 2	F 4	F 2	L 2	C 2	C 3	C 2	C 2	L 1	L 2	L 2	L 2		C 2	C 1	C 1	C 4	C 4	L 5	F 5	F 7	F 4	F 7
	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

JUL. 1987 | TYPES OF ES

IONOSPHERIC DATA

JUL. 1987 | FXI (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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	60	57	53	51	X 42																X 78	X 56	A	50
2	50	52	A	52	54	51															66	65	62	50
3	50	53	52	52	53	50	61		71												81	65	61	59
4	A	58	52	51	51																S 72	73	66	56
5	53	55	53	54	44																X 70	63	62	58
6	59	60	55	52	52	54															X 72	X 48	X 48	X 46
7	49	51	52	50	42																X 83	85	80	68
8	63	56	54	52	50	52	61														X 81	X 61	A	A
9	50	52	50	52	49																S 81	A	A	A
10	A	45	44	40	X 44																X 62	X 57	X 57	X 50
11	X 51	X 49	X 45	X 48	40	43															X 68	X 62	62	64
12	54	52	50	49	46		52														X 71	X 63	X 56	X 47
13	X 42	X 42	X 37	X 38	X 37																X 61	65	63	59
14	59	62	58	58	55																X 71	X 50	52	A
15	52	53	50	50	40																X 79	64	64	59
16	62	57	56	54	49																X 79	X 71	X 62	X 51
17	X 49	52	50	49	X 42																X 69	62	62	58
18	A	A	58	51	A																X 74	A	62	59
19	A	58	53	52	50																X 62	X 62	67	64
20	59	60	59	55	55	56															X 59	X 62	64	62
21	56	54	58	49	X 45																73	79	77	66
22	64	A	62	62	54	58			66												A	84	68	61
23	A	54	59	51	50	51															X 71	78	A	69
24	64	60	59	56	55																X 74	64	63	63
25	54	60	61	58	52	58															X 73	76	73	73
26	64	X 56	57	59	58	56															A	62	60	A
27	A	56	53	51	50	50															X 81	X 79	X 62	68
28	69	A	52	51	51	50	65														X 71	X 68	68	70
29	64	61	64	59	59																A	X 65	64	60
30	X 47	X 42	X 36	X 36	X 35																60	62	62	61
31	60	53	47	43	48																X 70	73	64	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	25	28	30	31	30	12	4		2												28	29	27	26
MED	56	54	53	51	50	52	61		68												X 72	64	62	60
UQ	62	58	58	54	53	56	63														X 78	73	65	64
LQ	50	52	50	50	44	50	56														X 63	X 62	62	56

JUL. 1987 | FXI (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FOF2 (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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	36	48	50	A	60	63	51	56	A	53	A	54	55	A	67	66	72	50	A	F
2	F	F	A	F	F	F	A	A	52	51	A	54	A	A	A	A	A	52	53	66	F	F	F	F
3	F	F	F	F	F	F 41	F 52	58	F 60	H 60	54	A	52	H 58	64	58	51	52	59	72	F 72	F 58	F 52	F
4	A	F	F	F	F	44	54	50	56	59	59	64	60	A	A	A	A	59	76	80	S 66	F	F	F
5	F	F	F	F	F	39	48	55	A	A	A	A	A	A	52	60	61	59	63	62	64	F	F	F
6	F	F	F	F	F	F	A	62	62	54	54	50	49	53	51	53	56	66	76	87	66	42	42	40
7	F	F	F	F	F 33	45	48	46	A	A	A	A	A	51	55	53	55	58	A	73	77	F	F	F
8	F	F 46	F 44	F	F	F	F 52	68	52	50	50	A	A	55	56	53	53	A	69	80	75	55	A	A
9	F	F	F	F	F	A	A	A	54	60	A	E G 43	46	E G 42	46	A	A	51	57	65	S 75	A	A	A
10	A	F	F 32	F	38	42	40	47	50	57	A	51	48	A	E G 42	A	53	58	62	62	56	51	51	R 44
11	45	42	39	42	F	F	40	A	A	48	E G 42	48	A	A	49	55	50	46	45	50	62	56	F	F
12	F	F	F 36	F	F	36	F 45	A	51	56	46	48	46	E G 44	46	A	A	A	A	61	65	57	50	41
13	36	36	31	32	31	39	46	55	A	50	A	51	52	53	54	50	50	50	50	48	55	F 56	F 56	F
14	F	F	F	F	F	A	A	56	A	50	56	54	51	53	50	47	A	A	A	72	65	44	F 41	A
15	F	F	F 39	F	F 33	H 42	50	56	60	A	56	54	51	50	51	51	53	52	55	67	73	F 58	F	F
16	F	F 46	F	F	F 36	H 31	A	44	A	A	49	56	58	50	53	47	51	59	64	71	73	65	56	45
17	43	F 42	F 40	F 39	36	44	50	A	62	49	A	49	A	61	61	A	60	71	74	72	63	F	F	F
18	A	A	F	F	A	A	A	A	A	61	A	A	A	A	A	58	56	A	58	A	68	A	F	F
19	A	F	F	F	F	39	46	54	59	56	A	A	A	A	A	59	60	59	60	56	56	56	F	F
20	F 51	F	F	F	F	F 49	40	A	A	A	56	54	51	E G 46	A	54	56	62	A	A	53	56	F 56	F
21	F	F	F	F	39	38	A	A	A	61	A	53	A	A	A	A	A	A	A	65	F	F	F	F
22	F	A	F	F	F	F	52	57	F	56	53	A	A	55	A	A	A	A	A	A	A	F	F	F
23	A	F	F	F	F 41	F 42	54	64	A	A	A	A	A	A	A	58	57	56	56	59	65	F	A	F
24	F	F	F	F 45	F	43	46	66	56	56	A	56	56	56	60	64	61	64	65	71	68	F	F	F
25	F	F	F	F	F 43	F	58	76	73	68	61	A	70	61	66	66	72	76	64	69	67	F	F	F
26	F 56	50	F 46	F	F	F	56	72	69	A	A	A	A	A	62	60	A	A	63	60	A	F	F	A
27	A	F	F	F 42	F 41	F 42	52	67	A	65	56	63	64	65	57	60	65	A	64	A	75	73	56	F
28	F	A	F	F	F	F 40	F 58	70	69	A	54	A	A	A	A	A	54	52	A	A	65	62	F	F
29	F	F	F	F	F 50	42	41	49	49	48	E G 42	A	A	A	53	56	55	51	50	53	A	59	F	F
30	41	36	30	30	29	36	A	A	A	51	56	E G 45	A	A	A	E G 42	44	44	46	48	F	F	F	F
31	F	F	F 36	F 36	F	39	A	49	56	A	A	50	A	55	55	E G 44	53	A	A	A	64	F	F	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	6	7	10	7	13	21	22	21	18	22	17	19	14	18	20	22	23	21	23	25	25	16	9	4
MED	44	42	F 38	F 39	F 36	42	50	56	58	56	54	53	52	53	54	54	55	58	62	66	66	56	52	42
UQ	F 51	46	F 40	F 42	F 41	43	52	66	62	60	56	55	58	56	58	59	58	59	64	72	72	58	F 56	44
LQ	41	39	F 32	34	33	39	46	50	52	50	50	50	49	50	50	51	53	52	56	60	64	53	50	40

JUL. 1987 | FOF2 (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FOF1 (0.01 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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

Day \ 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								A	A	A	450	A	A	A	A	410	A	A	A					
2							A	A	A	A	A	A	A	A	A	A	A	A	A					
3						320	A	A	410	A	A	A	450	450	440	A	410	360	A					
4							340	390	410	410	440	430	440	A	A	A	A	380	A					
5							350	A	A	A	A	A	A	A	A	410	400	A	A					
6							A	390	410	430	440	440	440	430	420	410	390	A	320					
7						L	A	A	A	A	A	A	A	430	A	A	A	A	A					
8							A	A	A	430	440	A	A	A	420	420	410	A	320					
9							A	A	A	420	A	430	420	420	420	A	A	360	A					
10							350	A	400	420	A	A	430	A	420	A	A	A	A					
11							U A 340	A	A	410	420	A	A	A	U A 430	400	390	L	L					
12							360	A	400	410	430	420	420	440	420	A	A	A	A					
13						L 310	U A 360	A	A	A	A	430	430	430	420	410	400	360	A					
14							A	A	A	A	430	440	430	430	420	410	A	A	A					
15							A	A	A	A	A	450	440	430	430	410	400	A	340					
16							A	A	A	A	A	440	U A 450	440	440	420	A	390	320					
17							A	A	A	L	A	440	A	A	420	A	380	380	320					
18							A	A	A	A	A	A	A	A	A	A	410	A	A					
19							A	410	420	A	A	A	A	A	A	A	U A 410	380	L					
20								A	A	A	A	450	450	L	A	U A 430	A	A	A					
21							A	A	A	A	A	A	A	A	A	A	A	A	A					
22							A	A	430	A	460	A	A	450	A	A	A	A	A					
23						310	A	A	A	A	A	A	A	A	A	430	420	390	L					
24								420	A	440	A	460	470	A	430	A	420	410	L					
25							A	A	A	A	460	A	460	460	450	A	420	410	A					
26						L	360	A	A	A	A	A	A	A	A	A	A	A	A					
27							L 390	410	A	A	A	U A 460	460	460	460	A	A	A	A					
28							A	A	A	A	A	A	A	A	A	A	410	A	A					
29						A	U A 330	360	400	410	420	A	A	A	A	U A 430	410	A	A					
30						L	A	A	A	410	430	450	A	A	A	420	390	A	A					
31							A	420	A	A	A	440	A	440	440	440	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	9	7	8	10	11	14	14	13	16	14	17	10	5					
MED						310	350	410	410	415	440	440	440	440	425	415	410	380	320					
UQ						315	360	415	415	430	445	450	450	450	440	430	410	390	320					
LQ						310	340	390	400	410	430	430	430	430	420	410	400	360	320					

JUL. 1987 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

JUL. 1987 | FOE (0.01 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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						180	230	A	A	A	A	350	A	350	345	330	305	255	A	S				
2						S	225	275	A	A	A	A	A	A	A	A	A	A	A	S				
3						A	A	280	A	A	340	350	A	A	A	A	A	A	A	S				
4						A	A	A	A	A	A	A	A	A	A	A	A	A	A	S				
5						A	240	A	A	A	A	A	A	345	A	325	290	A	185	S				
6						A	A	A	A	A	A	A	355	350	340	A	A	255	A	S				
7						A	235	A	300	310	A	A	A	A	340	310	285	250	A	S				
8						S	A	A	A	A	A	A	355	350	340	310	285	250	200	S				
9						A	230	275	300	315	A	A	A	A	A	320	A	245	A	S				
10						A	A	A	A	A	A	A	A	A	A	A	285	A	A	S				
11						S	230	265	A	325	A	A	A	A	A	A	A	A	A	S				
12						S	A	A	A	A	A	A	A	350	U A 320	A	280	A	A	S				
13						S	220	280	A	A	A	A	A	A	A	A	A	A	A	S				
14						A	220	A	A	A	A	A	A	A	A	A	A	A	A	S				
15						S	225	A	305	A	325	335	A	A	330	A	A	A	A	S				
16						S	A	280	305	A	A	A	A	A	A	310	280	245	A	S				
17						S	A	280	A	A	335	A	A	A	A	A	A	255	A	S				
18						S	230	260	295	A	A	A	A	A	A	310	300	250	A	S				
19						A	225	A	300	315	330	A	A	A	A	A	A	A	A	S				
20						S	A	A	A	A	A	A	355	350	335	320	300	255	A	S				
21						S	A	A	A	A	A	A	A	A	A	A	A	A	A	S				
22						A	230	A	A	A	A	A	A	345	340	315	300	A	A	S				
23						A	235	A	300	A	A	A	A	A	A	A	A	A	A	S				
24						S	A	A	A	A	A	355	360	355	340	325	300	265	205	S				
25						S	235	275	A	A	A	A	A	A	A	A	A	255	A	S				
26						A	225	280	A	A	A	A	A	A	350	330	A	A	A	S				
27						S	225	A	305	320	A	A	A	A	A	A	A	A	A	S				
28						S	230	A	A	325	A	A	A	A	A	A	A	250	A	S				
29						S	A	275	A	A	A	A	A	345	340	335	310	A	A	S				
30						A	A	265	A	A	A	A	A	A	A	305	A	A	A	S				
31						A	A	A	300	A	A	A	A	A	A	A	290	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						1	17	12	9	6	4	4	4	9	11	13	13	12	3					
MED						180	230	275	300	313	332	350	355	350	340	320	290	252	200					
UQ							230	280	305	325	338	352	358	350	340	325	300	255	202					
LQ							225	270	300	315	328	342	355	345	338	310	285	250	192					

The Radio Research Laboratory, Japan

JUL. 1987 | FOE (0.01 MHZ)

IONOSPHERIC DATA

JUL. 1987 | FOES (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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

Day \ 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	JA 24	JA 29	JA 22	JA 24	JA 25	28	33	JA 87	JA 54	JA 74	42	JA 55	JA 82	JA 87	JA 170	JA 47	JA 46	JA 77	JA 46	JA 25	JA 52	JA 29	JA 73	JA 54
2	JA 50	JA 37	JA 54	JA 50	JA 45	JA 63	JA 53	JA 64	JA 47	JA 53	JA 129	JA 84	JA 98	JA 90	JA 92	JA 73	JA 82	JA 52	JA 60	JA 64	JA 53	JA 76	JA 40	JA 52
3	JA 50	JA 42	JA 41	JA 53	JA 24	JA 33	JA 61	JA 44	JA 84	JA 54	JA 54	JA 57	JA 48	JA 44	JA 50	JA 44	JA 38	JA 38	JA 44	JA 46	JA 76	JA 29	JA 25	JA 50
4	JA 65	JA 26	JA 24	JA 18	JA 24	JA 26	JA 44	JA 50	JA 47	JA 35	JA 86	JA 114	JA 54	JA 87	JA 156	JA 104	JA 98	JA 91	JA 44	JA 41	JA 47	JA 77	JA 50	JA 84
5	JA 46	JA 30	JA 38	JA 24	JA 28	JA 29	G	JA 49	JA 110	JA 66	JA 83	JA 111	JA 79	JA 52	JA 46	37	35	JA 53	JA 44	JA 23	JA 49	JA 76	JA 32	JA 32
6	JA 84	JA 46	JA 36	JA 34	JA 34	JA 42	JA 72	JA 109	JA 53	JA 54	JA 52	JA 37	JA 44	JA 210	JA 66	JA 84	JA 50	JA 42	JA 29	JA 46	JA 44	ES 15	ES 15	ES 15
7	JA 26	JA 18	JA 30	JA 26	JA 26	JA 29	JA 110	JA 46	JA 65	JA 108	JA 118	JA 102	JA 63	JA 50	JA 50	JA 65	JA 76	JA 65	JA 108	JA 98	JA 138	JA 78	JA 29	JA 28
8	JA 41	JA 70	JA 53	JA 50	JA 36	JA 24	JA 41	JA 50	JA 65	JA 77	JA 64	JA 55	JA 63	JA 64	JA 52	42	38	JA 112	JA 50	JA 64	JA 74	JA 56	JA 88	JA 52
9	JA 50	JA 44	JA 38	JA 41	JA 24	JA 50	JA 60	JA 49	JA 54	JA 83	JA 95	JA 77	JA 42	JA 44	JA 42	JA 60	JA 119	JA 100	JA 53	JA 50	JA 49	JA 86	JA 53	JA 65
10	JA 76	JA 24	ES 16	JA 24	ES 15	JA 29	JA 44	JA 46	JA 86	JA 54	JA 83	JA 51	JA 56	JA 84	JA 49	JA 59	JA 105	JA 53	JA 33	JA 44	JA 25	JA 34	JA 23	JA 22
11	JA 21	JA 24	JA 23	JA 24	JA 29	JA 33	JA 50	JA 34	JA 84	JA 44	40	JA 46	JA 76	JA 104	JA 46	JA 33	JA 30	28	26	JA 21	JA 24	JA 24	JA 50	JA 60
12	JA 65	ES 15	JA 53	JA 44	JA 26	JA 31	JA 120	JA 102	JA 65	38	JA 72	JA 50	JA 36	38	JA 46	JA 87	JA 77	JA 170	JA 76	JA 46	ES 16	ES 15	JA 29	JA 30
13	JA 38	JA 29	JA 18	JA 28	JA 25	ES 16	JA 38	JA 59	JA 54	JA 50	JA 66	JA 40	JA 43	JA 36	35	JA 37	JA 30	28	JA 53	21	JA 24	JA 24	JA 50	JA 60
14	JA 73	JA 56	JA 52	JA 44	JA 28	JA 80	JA 64	JA 89	JA 87	JA 74	JA 54	JA 74	JA 64	JA 49	JA 54	JA 50	JA 161	JA 90	JA 80	JA 77	JA 50	JA 87	JA 84	JA 105
15	JA 76	JA 60	JA 19	JA 24	JA 38	JA 26	JA 39	JA 46	JA 54	JA 64	JA 56	JA 50	JA 44	JA 46	G	JA 36	38	JA 50	JA 34	JA 54	JA 42	JA 32	JA 31	JA 25
16	JA 24	ES 15	ES 15	JA 26	JA 29	JA 22	JA 53	JA 84	JA 49	JA 136	JA 60	JA 74	JA 84	JA 60	JA 44	39	JA 58	35	31	JA 56	JA 81	JA 25	JA 50	JA 50
17	ES 16	JA 52	JA 29	JA 32	ES 16	26	JA 60	JA 65	JA 65	JA 83	JA 84	JA 70	JA 75	JA 103	JA 83	JA 78	JA 31	G	JA 29	JA 70	JA 42	JA 50	JA 88	JA 64
18	JA 65	JA 65	JA 53	JA 41	JA 84	JA 106	JA 160	JA 184	JA 110	JA 76	JA 214	JA 120	JA 74	JA 78	JA 77	JA 50	JA 88	JA 195	JA 119	JA 144	JA 88	JA 104	JA 76	JA 66
19	JA 86	JA 77	JA 60	JA 52	JA 36	JA 38	JA 54	JA 43	JA 43	JA 57	JA 95	JA 64	JA 85	JA 94	JA 66	JA 46	JA 41	JA 31	JA 30	JA 32	JA 24	JA 38	JA 32	JA 50
20	JA 44	JA 50	JA 44	JA 32	JA 42	JA 41	JA 44	JA 63	JA 76	JA 109	JA 88	JA 53	38	JA 54	JA 99	JA 65	JA 73	JA 102	JA 135	JA 68	JA 83	JA 64	JA 54	JA 46
21	JA 25	JA 52	JA 32	JA 31	ES 16	JA 32	JA 65	JA 66	JA 64	JA 80	JA 59	JA 52	JA 76	JA 100	JA 134	JA 128	JA 117	JA 136	JA 136	JA 96	JA 57	JA 50	JA 32	JA 64
22	JA 50	JA 68	JA 49	JA 36	JA 26	JA 32	JA 52	JA 75	JA 48	JA 60	JA 60	JA 73	JA 74	42	JA 56	JA 38	JA 112	JA 136	JA 37	JA 115	JA 174	JA 84	JA 97	JA 69
23	JA 85	JA 107	JA 53	JA 54	JA 26	JA 64	JA 60	JA 83	JA 105	JA 129	JA 131	JA 85	JA 83	JA 72	JA 84	JA 122	JA 35	JA 49	JA 31	JA 46	JA 44	JA 50	JA 77	JA 64
24	JA 65	JA 60	JA 40	JA 44	JA 43	JA 26	JA 50	JA 34	JA 73	JA 54	JA 70	G	46	JA 54	JA 87	48	41	33	JA 39	JA 28	JA 36	JA 50	JA 40	JA 41
25	JA 64	JA 36	JA 53	JA 75	JA 50	JA 31	JA 45	JA 65	JA 78	JA 96	JA 84	JA 84	JA 78	JA 47	JA 54	JA 54	JA 33	37	JA 44	JA 61	JA 53	JA 52	JA 77	JA 50
26	JA 54	JA 29	JA 33	JA 53	JA 29	26	30	JA 65	JA 66	JA 100	JA 77	JA 173	JA 113	JA 100	JA 54	JA 74	JA 86	JA 129	JA 85	JA 84	JA 82	JA 56	JA 32	JA 75
27	JA 34	JA 31	JA 44	JA 44	JA 42	JA 31	29	JA 44	JA 60	JA 61	JA 72	JA 83	JA 76	JA 40	JA 54	JA 59	JA 56	JA 232	JA 84	JA 85	JA 62	JA 53	JA 84	JA 64
28	JA 84	JA 64	JA 50	JA 38	JA 28	JA 29	JA 45	JA 77	JA 99	JA 83	JA 60	JA 83	JA 84	JA 89	JA 83	JA 65	JA 34	JA 46	JA 66	JA 66	JA 28	JA 33	JA 34	JA 50
29	JA 32	JA 21	JA 29	JA 24	JA 28	JA 34	33	32	JA 44	JA 50	JA 60	JA 80	JA 66	JA 64	JA 80	JA 54	38	JA 87	JA 106	JA 53	JA 123	JA 88	JA 64	JA 30
30	ES 16	JA 24	JA 33	JA 50	JA 33	JA 36	JA 50	JA 76	JA 84	JA 53	JA 53	JA 47	JA 84	JA 34	JA 85	JA 44	JA 76	JA 48	JA 65	JA 83	JA 103	JA 50	JA 32	JA 40
31	JA 50	JA 44	JA 50	JA 42	JA 32	JA 50	JA 79	JA 84	JA 66	JA 81	JA 76	JA 54	JA 67	JA 44	JA 66	37	JA 44	JA 87	JA 74	JA 66	JA 64	JA 54	JA 58	JA 90
	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	31	31	31	31	31	31	31	31	31	31
MED	JA 50	JA 42	JA 38	JA 38	JA 28	JA 31	JA 50	JA 65	JA 65	JA 74	JA 72	JA 70	JA 74	JA 64	JA 56	JA 54	JA 56	JA 53	JA 53	JA 56	JA 52	JA 50	JA 50	JA 52
UQ	JA 69	JA 53	JA 51	JA 47	JA 36	JA 40	JA 60	JA 84	JA 84	JA 83	JA 85	JA 84	JA 80	JA 88	JA 86	JA 74	JA 86	JA 101	JA 82	JA 74	JA 78	JA 76	JA 74	JA 64
LQ	JA 35	JA 28	JA 29	JA 26	JA 26	JA 27	JA 42	JA 49	JA 54	JA 54	JA 60	JA 52	JA 51	JA 46	JA 50	JA 44	JA 38	JA 40	JA 36	JA 45	JA 42	JA 32	JA 32	JA 40

JUL. 1987 | FOES (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FBES (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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

Day \ 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	ES 16	18	ES 15	ES 16	ES 16	28	33	AA 87	53	45	40	50	AA 82	45	AA 170	35	45	AA 77	43	21	20	ES 15	AA 73	32
2	25	ES 15	AA 54	30	24	35	AA 53	AA 64	42	42	AA 129	48	AA 98	AA 90	AA 92	AA 73	AA 82	40	41	40	44	30	29	30
3	25	21	19	ES 15	ES 15	29	42	42	39	44	45	AA 57	37	37	40	44	32	27	44	45	20	22	ES 15	26
4	AA 65	ES 15	ES 16	ES 15	ES 15	22	28	33	35	34	36	38	37	AA 87	AA 156	AA 104	AA 98	29	34	ES 16	36	40	32	27
5	18	20	26	20	20	24	G	43	AA 110	AA 66	AA 83	AA 111	AA 79	AA 52	44	35	33	52	38	ES 16	48	30	30	29
6	26	24	25	20	22	34	AA 72	35	34	40	36	36	37	40	38	33	32	38	28	32	ES 15	ES 15	ES 15	ES 15
7	ES 15	ES 15	18	ES 15	ES 15	26	44	42	AA 65	AA 108	AA 118	AA 102	AA 63	40	44	50	51	52	AA 108	21	50	29	22	22
8	26	22	20	28	26	19	41	40	42	38	37	AA 55	AA 63	46	37	37	34	AA 112	30	52	52	43	AA 88	AA 52
9	18	24	22	23	ES 15	AA 50	AA 60	AA 49	48	36	AA 95	36	40	36	36	AA 60	AA 119	31	44	43	48	AA 86	AA 53	AA 65
10	AA 76	ES 15	ES 16	ES 15	ES 15	24	31	42	34	35	AA 83	46	40	AA 84	36	AA 59	41	46	32	32	18	19	19	ES 16
11	ES 16	ES 15	ES 15	18	18	26	34	AA 84	AA 84	35	38	45	AA 76	AA 104	43	33	30	28	25	19	20	ES 15	41	34
12	ES 15	ES 15	ES 15	22	ES 15	25	28	AA 102	33	36	36	37	36	37	40	AA 87	AA 77	AA 170	AA 76	21	ES 16	ES 15	ES 16	ES 16
13	18	18	ES 15	ES 15	19	ES 16	36	43	AA 54	48	AA 66	38	37	36	34	35	30	28	35	19	ES 15	20	40	34
14	42	40	38	25	20	AA 80	AA 64	40	AA 87	45	37	37	37	36	40	35	AA 161	AA 90	AA 80	63	40	34	19	AA 105
15	20	24	ES 15	ES 15	20	20	39	42	48	AA 64	52	40	37	40	G	33	32	48	30	49	21	31	ES 16	ES 16
16	ES 15	ES 15	ES 15	ES 15	ES 15	20	AA 53	39	AA 49	AA 136	46	36	45	39	36	36	48	28	27	45	35	ES 16	ES 16	18
17	ES 16	ES 15	19	ES 15	ES 16	26	46	AA 65	44	39	AA 84	38	AA 75	54	35	AA 78	31	G	26	22	19	21	ES 15	30
18	AA 65	AA 65	29	21	AA 84	AA 106	AA 160	AA 184	AA 110	47	AA 214	AA 120	AA 74	AA 78	AA 77	45	36	AA 195	44	AA 144	46	AA 104	41	35
19	AA 86	29	26	24	ES 15	33	40	40	38	46	AA 95	AA 64	AA 85	AA 94	AA 66	46	41	28	22	30	ES 15	19	ES 15	34
20	26	24	29	21	ES 15	22	26	AA 63	AA 76	AA 109	47	38	38	38	AA 99	43	45	46	AA 135	AA 68	18	28	34	34
21	18	25	26	20	ES 16	20	AA 65	AA 66	AA 64	45	AA 59	47	AA 76	AA 100	AA 134	AA 128	AA 117	AA 136	AA 136	51	40	25	ES 15	18
22	20	AA 68	26	24	ES 15	24	36	48	36	44	45	AA 73	AA 74	42	AA 56	AA 88	AA 112	AA 136	AA 87	AA 115	AA 174	20	28	40
23	AA 85	34	34	24	20	22	47	44	AA 105	AA 129	AA 131	AA 85	AA 83	AA 72	AA 84	36	36	34	24	38	38	42	AA 77	41
24	38	36	29	18	ES 15	20	28	31	44	36	AA 70	G	45	54	37	48	37	30	30	20	36	23	30	34
25	36	ES 15	ES 15	21	20	24	44	65	68	65	40	AA 84	37	38	36	51	31	34	38	60	20	44	28	24
26	25	ES 15	20	ES 15	ES 15	21	29	59	64	AA 100	AA 77	AA 173	AA 113	AA 100	47	46	AA 86	AA 129	48	49	AA 82	31	32	AA 75
27	AA 84	19	18	26	23	25	28	39	AA 60	61	54	46	40	40	36	47	47	AA 232	42	AA 85	35	41	35	40
28	35	AA 64	25	26	ES 15	21	42	66	60	AA 33	47	AA 83	AA 84	AA 89	AA 88	AA 65	31	45	AA 66	AA 66	21	20	31	44
29	30	ES 15	21	ES 15	27	29	33	29	35	34	36	AA 80	AA 66	AA 64	43	43	34	43	34	37	AA 123	34	37	20
30	ES 16	20	20	ES 15	23	26	AA 50	AA 76	AA 84	35	39	36	AA 84	AA 84	AA 35	35	31	39	44	36	24	31	24	19
31	19	ES 15	ES 15	28	18	31	AA 79	30	53	AA 81	AA 76	37	AA 67	36	38	36	35	AA 87	AA 74	AA 66	30	18	46	AA 90
	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	31	31	31	31	31	31	31	31	31	31
MED	25	20	20	20	ES 16	25	41	43	53	45	52	46	AA 63	46	43	45	37	45	41	40	35	28	30	32
UQ	37	24	26	24	20	29	AA 52	AA 65	AA 66	AA 66	AA 83	AA 76	AA 78	AA 84	AA 80	AA 60	64	AA 88	57	56	45	34	38	40
LQ	18	ES 15	ES 16	ES 15	ES 15	22	32	40	40	37	40	38	38	38	36	36	32	30	30	22	20	20	18	21

JUL. 1987 | FBES (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FMIN (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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	ES 16	ES 15	ES 15	ES 16	ES 16	ES 16	16	16	17	17	17	17	17	20	18	17	17	16	ES 16	ES 16	ES 15	ES 15	ES 15	ES 15
2	ES 15	ES 15	ES 15	ES 15	ES 15	ES 16	16	17	16	18	17	17	18	20	18	17	16	16	16	ES 16	ES 16	ES 15	ES 15	ES 15
3	ES 16	ES 15	ES 15	ES 15	ES 15	ES 16	16	17	17	17	18	17	18	18	20	17	18	16	16	ES 16	ES 15	ES 15	ES 15	ES 15
4	ES 16	ES 15	ES 16	ES 15	ES 15	ES 16	16	17	17	17	17	17	20	18	17	17	17	16	16	ES 16	ES 15	ES 15	ES 15	ES 15
5	ES 16	ES 15	ES 16	ES 15	ES 15	15	16	17	17	18	18	18	20	20	18	18	17	16	16	ES 16	ES 15	ES 15	ES 15	ES 15
6	ES 15	ES 15	ES 15	ES 15	ES 15	16	16	16	17	18	19	19	17	17	18	18	16	16	ES 16	ES 16	ES 15	ES 15	ES 15	ES 15
7	ES 15	ES 15	ES 15	ES 15	ES 15	ES 16	16	16	17	17	17	18	20	20	20	19	17	17	16	ES 16	ES 15	ES 15	ES 15	ES 15
8	ES 15	ES 15	ES 15	ES 15	ES 15	ES 16	16	17	17	17	18	19	17	17	20	18	16	16	16	ES 16	ES 16	ES 15	ES 15	ES 16
9	ES 15	ES 15	ES 15	ES 15	ES 15	ES 16	16	16	17	18	17	20	17	20	17	18	17	17	16	ES 16	ES 16	ES 15	ES 15	ES 15
10	ES 15	ES 15	ES 16	ES 15	ES 15	ES 16	17	17	17	20	18	18	18	18	17	18	18	17	16	ES 17	ES 16	ES 15	ES 16	ES 16
11	ES 16	ES 15	ES 15	ES 15	ES 15	ES 15	17	17	17	17	18	21	18	17	17	17	16	16	16	ES 16	ES 15	ES 15	ES 15	ES 15
12	ES 15	ES 15	ES 15	ES 15	ES 15	ES 16	16	17	17	17	20	20	17	18	16	17	16	17	ES 16	ES 16	ES 16	ES 15	ES 16	ES 16
13	ES 15	ES 15	ES 15	ES 15	ES 15	ES 16	16	18	17	17	20	20	18	18	18	16	17	16	15	ES 16	ES 15	ES 15	ES 15	ES 15
14	ES 15	ES 15	ES 15	ES 15	ES 15	ES 16	16	16	16	17	22	17	17	17	17	16	16	16	16	ES 16	ES 15	ES 16	ES 16	ES 16
15	ES 16	ES 15	ES 15	ES 15	ES 15	ES 16	16	17	17	18	17	20	20	19	20	17	16	16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16
16	ES 15	ES 15	ES 15	ES 15	ES 15	ES 16	16	16	17	18	18	20	20	18	20	18	17	17	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16
17	ES 16	ES 15	ES 15	ES 15	ES 16	ES 16	17	16	16	17	17	20	20	17	17	17	17	16	ES 16	ES 16	ES 16	ES 16	ES 15	ES 15
18	ES 16	ES 15	ES 15	ES 15	ES 15	ES 16	16	16	16	17	18	17	19	19	17	18	18	16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16
19	ES 15	ES 15	ES 15	ES 15	ES 15	ES 16	16	18	18	18	18	19	20	20	18	19	17	16	16	ES 16	ES 15	ES 15	ES 15	ES 15
20	ES 15	ES 15	ES 15	ES 15	ES 15	ES 16	16	16	17	18	17	18	24	18	18	17	18	16	ES 16	ES 16	ES 16	ES 15	ES 15	ES 15
21	ES 16	ES 15	ES 15	ES 15	ES 16	ES 16	16	17	20	18	20	20	20	20	20	18	17	17	17	ES 16	ES 15	ES 16	ES 15	ES 15
22	ES 15	ES 15	ES 15	ES 15	ES 15	ES 16	16	17	17	17	25	20	18	20	19	18	17	17	ES 16	ES 16	ES 16	ES 15	ES 16	ES 16
23	ES 16	ES 16	ES 15	ES 15	ES 15	ES 16	16	17	17	20	21	20	21	20	21	21	16	16	16	ES 16	ES 15	ES 16	ES 16	ES 16
24	ES 16	ES 15	ES 15	ES 15	ES 15	ES 15	16	16	17	18	24	19	21	20	21	18	16	16	ES 16	ES 15	ES 16	ES 15	ES 15	ES 15
25	ES 15	ES 15	ES 15	ES 15	ES 15	ES 15	16	17	16	17	20	18	19	20	18	17	18	16	16	ES 16	ES 16	ES 16	ES 16	ES 15
26	ES 16	ES 15	ES 15	ES 15	ES 15	ES 16	16	16	16	18	20	20	23	21	20	18	17	17	ES 15	ES 16	ES 16	ES 15	ES 15	ES 15
27	ES 16	ES 15	ES 15	ES 15	ES 15	ES 16	16	18	17	18	18	24	22	20	21	20	17	17	ES 16	ES 16	ES 16	ES 16	ES 15	ES 15
28	ES 15	ES 15	ES 15	ES 15	ES 15	ES 16	16	16	17	18	18	20	20	18	20	17	17	16	ES 16	ES 16	ES 16	ES 15	ES 15	ES 15
29	ES 15	ES 15	ES 15	ES 15	ES 15	ES 16	16	17	16	17	21	29	18	20	18	20	18	17	ES 16	ES 16	ES 16	ES 15	ES 15	ES 15
30	ES 16	ES 15	ES 15	ES 15	ES 15	ES 16	16	16	16	18	20	18	23	20	19	18	17	16	ES 16	ES 16	ES 16	ES 15	ES 15	ES 15
31	ES 15	ES 15	ES 15	ES 16	ES 15	ES 15	16	16	17	18	18	20	20	18	20	17	17	17	ES 16	ES 16	ES 15	ES 16	ES 15	ES 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	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	ES 15	ES 15	ES 15	ES 15	ES 15	ES 16	16	17	17	18	18	19	20	19	18	18	17	16	ES 16	ES 16	ES 16	ES 15	ES 15	ES 15
UQ	ES 16	ES 15	ES 15	ES 15	ES 15	ES 16	16	17	17	18	20	20	20	20	20	18	17	17	16	ES 16	ES 16	ES 16	ES 16	ES 16
LQ	ES 15	ES 15	ES 15	ES 15	ES 15	ES 16	16	16	16	17	18	18	18	18	18	17	16	16	ES 16	ES 16	ES 15	ES 15	ES 15	ES 15

JUL. 1987 | FMIN (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | M(3000)F2 (0.01) | 135° E Mean Time (G.M.T. + 9 h)

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	305	360	345	A	325	330	315	330	A	285	A	300	290	A	310	380	345	340	A	F
2	F	F	A	F	F	F	A	A	345	315	A	300	A	A	A	A	A	330	285	335	F	F	F	F
3	F	F	F	F	F	F 310	F 315	325	F 335	H 350	355	A	295	H 295	310	310	305	305	310	320	F 320	F 330	F 320	F
4	A	F	F	F	F	340	365	340	310	320	320	325	315	A	A	A	A	280	305	330	S 320	F	F	F
5	F	F	F	F	F	335	310	325	A	A	A	A	A	A	280	310	320	320	310	325	340	F	F	F
6	F	F	F	F	F	F	A	325	350	335	325	285	270	305	300	285	285	305	300	350	365	310	310	310
7	F	F	F	F	F 325	330	335	305	A	A	A	A	A	300	310	A	A	A	A	315	325	F	F	F
8	F	F 305	F 305	F	F	F	F 305	360	325	300	265	A	A	310	325	290	285	A	290	320	340	320	A	A
9	F	F	F	F	F	A	A	A	300	340	A	G	270	G	260	A	A	300	310	300	S 340	A	A	A
10	A	F	F 315	F	345	335	260	285	290	335	A	295	275	A	G	A	305	310	305	320	300	315	295	R 305
11	305	300	290	320	F	F	255	A	A	285	G	280	A	A	290	330	335	315	305	300	315	305	F	F
12	F	F	F 295	F	F	335	F 315	A	295	340	325	295	275	G	275	A	A	A	A	305	320	315	320	305
13	325	340	300	305	310	315	315	360	A	A	A	295	300	300	320	300	300	300	315	300	300	F 310	F 340	F
14	F	F	F	F	F	A	A	330	A	290	320	315	295	285	295	230	A	A	A	325	340	295	F 315	A
15	F	F	F 325	F	F 305	H 325	330	335	330	A	A	315	310	285	295	295	315	A	290	300	325	F 305	F	F
16	F	F 285	F	F	F 325	H 340	A	320	A	A	265	335	325	300	310	270	285	300	305	310	310	310	335	305
17	295	F 290	F 320	F 305	330	325	A	A	355	320	A	255	A	315	315	A	290	320	320	330	315	F	F	F
18	A	A	F	F	A	A	A	A	A	335	A	A	A	A	A	310	325	A	310	A	310	A	F	F
19	A	F	F	F	F	305	290	335	325	310	A	A	A	A	A	305	315	325	335	315	305	275	F	F
20	F 305	F	F	F	F	F 345	375	A	A	A	340	320	335	G	A	290	310	315	A	A	285	295	F 310	F
21	F	F	F	F	325	310	A	A	A	345	A	285	A	A	A	A	A	A	A	305	F	F	F	F
22	F	A	F	F	F	F	325	335	F	320	275	A	A	305	A	A	A	A	A	A	A	F	F	F
23	A	F	F	F	F 315	F 290	300	325	A	A	A	A	A	A	A	300	315	315	310	295	290	F	A	F
24	F	F	F	F 290	F	320	375	360	315	340	A	270	295	A	290	300	305	310	305	305	315	F	F	F
25	F	F	F	F	F 295	F	275	320	325	A	280	A	310	280	300	305	305	325	320	295	290	F	F	F
26	F 340	280	F 280	F	F	F	315	320	360	A	A	A	A	A	305	310	A	A	325	320	A	F	F	A
27	A	F	F	F 320	F 305	F 310	305	360	A	A	A	295	305	300	280	235	310	A	310	A	300	310	300	F
28	F	A	F	F	F	F 305	F 290	A	285	A	300	A	A	A	A	A	310	310	A	A	290	290	F	F
29	F	F	F	F	F 280	255	250	285	275	280	G	A	A	A	265	275	310	280	280	270	A	305	F	F
30	290	310	265	295	315	275	A	A	A	280	330	G	A	A	A	G	270	275	A	325	F	F	F	F
31	F	F	F 290	F 280	F	335	A	275	320	A	A	255	A	305	305	G	290	A	A	A	295	F	F	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	6	7	10	7	13	21	21	20	18	19	15	19	14	17	20	21	22	19	22	25	25	16	9	4
MED	305	300	F 298	F 305	F 315	325	315	325	325	320	315	295	298	300	293	300	305	310	310	315	315	310	315	305
UQ	325	308	F 315	312	325	335	330	338	335	338	325	315	310	305	310	305	315	318	310	325	325	315	F 320	308
LQ	295	288	F 290	F 292	F 305	310	290	320	300	305	270	275	275	285	280	285	290	300	305	300	300	300	310	305

JUL. 1987 | M(3000)F2 (0.01)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | M(3000)F1 (0.01) | 135° E Mean Time (G.M.T. + 9 h)

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								A	A	A	400	A	A	A	A	390	A	A	A					
2							A	A	A	A	A	A	A	A	A	A	A	A	A					
3						A	A	A	A	A	A	A	405	420	A	A	360	400	A					
4							410	380	410	415	375	420	405	A	A	A	A	355	A					
5							380	A	A	A	A	A	A	A	A	380	375	A	A					
6							A	375	375	A	420	385	420	A	405	390	370	A	400					
7						L	A	A	A	A	A	A	A	A	A	A	A	A	A					
8							A	A	A	390	405	A	A	A	400	400	365	A	A					
9							A	A	A	400	A	395	385	405	390	A	A	390	A					
10							A	A	385	385	A	A	410	A	400	A	A	A	A					
11							A	A	A	380	405	A	A	A	A	380	365	L	L					
12							360	A	400	400	420	425	410	365	A	A	A	A	A					
13						L 340	A	A	A	A	A	405	410	390	395	380	370	370	A					
14							A	A	A	A	415	385	395	395	A	370	A	A	A					
15							A	A	A	A	A	395	410	410	390	410	375	A	A					
16							A	A	A	A	A	380	A	390	405	380	A	345	390					
17							A	A	A	L	A	400	A	A	370	A	405	360	370					
18							A	A	A	A	A	A	A	A	A	A	390	A	A					
19							A	A	405	A	A	A	A	A	A	A	A	370	L					
20								A	A	A	A	400	420	L	A	A	A	A	A					
21							A	A	A	A	A	A	A	A	A	A	A	A	A					
22							A	A	435	A	A	A	A	A	A	A	A	A	A					
23						355	A	A	A	A	A	A	A	A	A	365	375	385	L					
24								380	A	425	A	415	A	A	420	A	365	345	L					
25							A	A	A	A	410	A	380	395	395	A	380	355	A					
26						L	375	A	A	A	A	A	A	A	A	A	A	A	A					
27							L 350	A	A	A	A	A	395	395	385	A	A	A	A					
28							A	A	A	A	A	A	A	A	A	A	365	A	A					
29						A	A	400	415	400	405	A	A	A	A	A	370	A	A					
30						L	A	A	A	410	370	390	A	A	A	380	375	A	A					
31							A	370	A	A	A	405	A	385	375	370	345	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	5	5	7	9	10	13	12	10	12	12	16	10	3					
MED						343	375	380	405	400	405	400	408	395	395	380	370	365	390					
UQ							380	380	412	410	415	405	410	405	402	390	375	385	395					
LQ							360	375	392	390	400	390	395	390	383	375	365	355	380					

JUL. 1987 | M(3000)F1 (0.01)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | H'F2 (KM) | 135° E Mean Time (G.M.T. + 9 h)

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								A	A	290	345	325	A	400	A	355	355	A	290					
2							A	A	280	350	A	360	A	A	A	A	A	305	A					
3						350	320	300	270	275	290	A	400	360	295	320	335	335	310					
4							240	295	330	320	310	300	320	A	A	A	A	360	290					
5							340	295	A	A	A	A	A	A	420	340	305	A	295					
6							A	285	255	295	305	410	470	350	370	370	355	300	285					
7						270	A	370	A	A	A	A	A	370	345	A	A	A	A					
8							335	245	325	360	470	A	A	350	310	375	370	A	310					
9							A	A	320	290	A	G	485	G	495	A	A	350	310					
10							500	395	400	290	A	375	440	A	G	A	340	360	290					
11							485	A	A	415	G	445	A	A	400	305	290	300	300					
12							330	A	360	295	350	400	470	G	455	A	A	A	A					
13						315	340	265	A	A	A	395	375	355	330	360	345	340	305					
14							A	290	A	400	330	350	395	400	400	405	A	A	A					
15							300	300	310	A	A	330	360	400	390	375	325	A	310					
16							A	A	A	A	500	325	335	380	355	480	A	335	290					
17							A	A	250	310	A	520	A	A 320	320	A	340	280	260					
18							A	A	A	280	A	A	A	A	A	345	350	A	300					
19							375	300	295	325	A	A	A	A	A	345	300	295	270					
20								A	A	A	325	330	320	G	A	380	340	305	A					
21							A	A	A	285	A	420	A	A	A	A	A	A	A					
22							270	300	310	330	450	A	A	370	A	A	A	A	A					
23						350	A	295	A	A	A	A	A	A	A	350	330	315	295					
24								245	295	300	A	440	380	A	380	340	340	305	285					
25							A	A 295	A	A	355	A	320	395	350	340	305	280	270					
26						L 330	315	290	A	A	A	A	A	A	345	325	A	A	A					
27							320	250	A	A	A	350	340	345	390	380	305	A	290					
28							360	A	A	A	360	A	A	A	A	A	330	325	A					
29						420	460	380	410	420	G	A	A	A	450	395	340	370	360					
30						400	A	A	A	400	325	G	A	A	A	G	465	440	A					
31							A	440	A	A	A	520	A	370	370	G	370	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						7	15	19	14	19	15	19	14	17	20	21	21	18	20					
MED						350	335	295	310	310	350	395	378	370	375	360	340	320	292					
UQ						375	368	300	330	355	460	442	440	400	410	380	350	350	308					
LQ						322	318	288	280	290	325	340	335	355	345	340	325	300	288					

JUL. 1987 | H'F2 (KM)

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IONOSPHERIC DATA

JUL. 1987 | H'F (KM) | 135° E Mean Time (G.M.T. + 9 h)

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

Day \ 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	255	275	265	220	280	240	250	A	A	A	220	A	A	A	A	220	A	A	A	240	220	200	A	A
2	A	265	A	A	A 260	A	A	A	A	A	A	A	A	A	A	A	A	A	A	260	A	A	A	A
3	A	270	265	220	245	A	A	A	A	A	A	A	200	195	A	A	220	220	A	A	230	220	225	A
4	A	250	255	250	250	230	210	220	200	200	220	205	200	A	A	A	A	220	A	230	A	A	A 230	A 230
5	285	260	A	A 260	A 225	245	245	A	A	A	A	A	A	A	A	225	225	A	A	220	A	A	A	A
6	275	A 280	A 270	A 275	280	A	A	A	205	A	195	235	200	A	225	200	235	A	230	220	195	220	250	245
7	255	270	250	255	275	A	A	A	A	A	A	A	A	A	A	A	A	A	A	260	A	250	220	245
8	A	270	270	A	A	220	A	A	A	220	200	A	A	A	220	200	230	A	A	A	A	A	A	A
9	290	A	A	A	210	A	A	A	A	200	A	220	A	210	220	A	A	225	A	A	A	A	A	A
10	A	E S 290	280	255	230	240	A	A	215	200	A	A	225	A	215	A	A	A	A	A 235	235	245	245	275
11	270	280	290	245	240	A	A	A	A	230	205	A	A	A	A	220	220	210	240	260	245	250	A	A
12	255	270	280	A	240	245	230	A	200	210	205	200	200	235	A	A	A	A	A	255	240	230	230	260
13	265	250	E S 270	E S 285	E A 290	225	A	A	A	A	A	205	200	205	200	210	220	220	A	260	260	270	220	A
14	A	A	A	A 270	220	A	A	A	A	A	200	210	220	200	A	215	A	A	A	A	A	A	250	A
15	270	A	240	215	255	245	A	A	A	A	A	210	200	210	200	200	220	A	A	A	220	A	270	245
16	270	290	245	245	240	230	A	A	A	A	A	225	A	220	205	230	A	245	240	A	A 260	220	220	260
17	265	290	245	285	275	240	A	A	A	210	A	200	A	A	220	A	200	205	A	240	235	A 300	330	A
18	A	A	A	275	A	A	A	A	A	A	A	A	A	A	A	A	225	A	A	A	A	A	A	A
19	A	A	A	A	230	A	A	A	220	A	A	A	A	A	A	A	A	220	235	A 250	245	295	260	A
20	A 285	A	A	255	225	250	205	A	A	A	A	220	200	220	A	A	A	A	A	A	270	A	A	A
21	245	A	255	235	250	A 240	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	235	250
22	260	A	A	270	245	A 270	A	A	200	A	A	A	A	A	A	A	A	A	A	A	A	280	A	A
23	A	A	A	A	A 240	245	A	A	A	A	A	A	A	A	A	230	225	210	220	A	A	A	A	A
24	A	A	A	275	225	245	225	200	A	200	A	205	A	A	200	A	A	230	A	240	240	A	A	A
25	A	280	260	A	A 275	A 250	A	A	A	A	195	A	210	210	200	A	230	A	A	A	255	A	A	A 255
26	220	270	A 280	295	305	250	240	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
27	A	275	270	270	270	250	235	A	A	A	A	A	205	210	205	A	A	A	A	A	A 260	A	A	A
28	220	A	A	A	255	250	A	A	A	A	A	A	A	A	A	A	220	A	A	A	280	260	A	A
29	A	300	260	280	A	A	A	220	200	200	205	A	A	A	A	A	230	A	A	A	A	A	A	A 270
30	230	A 260	E A 350	E S 310	A	A	A	A	A	205	A	205	A	A	A	210	230	A	A	A	A	A	A	270
31	270	255	280	A	250	A	A	200	A	A	A	200	A	205	225	235	A	A	A	A	A 270	255	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	18	20	20	22	27	19	8	4	7	10	9	13	11	11	12	12	14	10	5	13	17	14	13	11
MED	265	270	265	260	248	245	232	210	200	202	205	205	200	210	210	218	225	220	235	240	245	250	235	255
UQ	270	280	278	275	268	250	242	220	210	210	205	220	208	215	220	228	230	225	240	260	260	270	250	265
LQ	255	262	255	245	235	240	218	200	200	200	200	205	200	205	200	205	220	210	230	235	235	220	225	245

JUL. 1987 | H'F (KM)

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IONOSPHERIC DATA

JUL. 1987 | H'E (KM) | 135° E Mean Time (G.M.T. + 9 h)

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						S	110	105	105	105	100	105	105	110	110	105	105	110	S	S				
2						S	110	105	105	105	A	A	A	A	A	A	A	A	A	S				
3						S	110	105	105	105	105	105	100	105	105	105	105	A	A	S				
4						S	110	110	105	105	105	100	105	105	105	105	105	105	105	S				
5						A	110	105	105	105	105	A	105	105	105	105	105	110	110	S				
6						110	110	105	105	A	A	105	100	105	105	105	105	105	E S 120	S				
7						S	110	110	105	105	105	105	105	105	105	105	105	105	110	S				
8						S	110	105	105	105	105	A	100	105	100	100	105	110	110	S				
9						S	110	110	105	105	105	105	105	105	105	105	105	105	110	S				
10						S	110	105	105	105	105	105	A	A	100	A	105	110	110	S				
11						S	110	105	105	105	105	105	105	105	A	A	105	A	A	S				
12						S	110	105	105	105	105	105	100	105	A	A	105	105	S	S				
13						S	110	110	110	105	105	105	105	105	105	105	105	110	110	S				
14						S	110	105	105	100	105	105	A	A	A	A	A	A	A	S				
15						S	110	110	105	105	105	110	105	105	105	105	105	105	E S 120	S				
16						S	110	110	105	105	105	105	105	105	105	105	105	110	S	S				
17						S	115	105	105	105	105	105	105	105	105	105	A	105	E S 120	S				
18						S	110	105	105	105	A	A	A	A	A	105	105	110	S	S				
19						S	110	105	105	105	105	105	105	105	105	A	A	A	A	S				
20						S	A 105		105	105	100	100	110	105	105	105	110	110	S	S				
21						S	110	105	105	105	105	105	105	105	105	105	A	A	A	S				
22						S	110	105	105	105	105	105	105	105	105	105	105	110	E S 120	S				
23						S	110	105	105	105	105	105	105	105	A	A	A	A	A	S				
24						S	110	110	A	105	105	105	105	105	105	105	100	110	E S 120	S				
25						S	105	105	105	105	105	A	A	A	A	A	A	A	A	S				
26						S	115	105	105	105	105	105	105	105	105	105	105	110	S	S				
27						S	110	105	105	105	105	105	105	A	100	A	100	105	S	S				
28						S	110	105	105	100	100	A	A	A	A	A	105	105	S	S				
29						S	105	105	105	105	105	E B 120	105	105	105	110	105	105	S	S				
30						S	110	105	105	105	105	105	105	A	A	105	105	110	S	S				
31						S	110	105	105	105	A	A	A	105	105	105	110	110	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						1	30	31	30	30	27	24	24	23	22	21	24	23	12					
MED						110	110	105	105	105	105	105	105	105	105	105	105	110	109					
UQ							110	105	105	105	105	105	105	105	105	105	105	110	E S 120					
LQ							110	105	105	105	105	105	105	105	105	105	105	105	110					

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JUL. 1987 | H'E (KM)

IONOSPHERIC DATA

JUL. 1987 | H'ES (KM) | 135° E Mean Time (G.M.T. + 9 h)

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	105	100	100	100	100	130	125	115	110	110	115	110	110	115	120	120	110	110	110	105	105	100	115	105
2	105	105	95	95	95	120	120	110	120	120	100	100	100	100	100	100	95	95	95	110	120	115	105	100
3	95	100	95	100	95	120	115	120	110	115	110	115	110	110	110	110	120	105	100	100	110	110	110	105
4	105	100	100	100	100	125	110	120	120	125	105	105	105	110	110	110	105	105	110	125	110	110	105	105
5	100	95	95	95	100	115	G	115	110	105	105	100	105	110	110	145	140	115	115	125	110	100	105	105
6	105	100	100	100	100	120	110	105	105	100	100	110	135	120	120	125	120	110	110	110	120	S	S	S
7	120	105	100	110	120	115	110	115	110	105	105	105	105	110	135	125	120	115	110	105	105	105	105	100
8	100	100	100	100	100	100	110	110	105	105	105	100	120	120	130	140	130	110	110	105	105	105	105	100
9	100	100	100	100	100	130	120	110	110	110	105	105	105	110	105	130	120	125	120	115	115	105	105	105
10	105	100	S	100	S	120	120	110	110	115	105	105	100	115	120	115	115	110	110	105	105	105	100	110
11	100	100	100	100	100	125	120	110	110	115	110	110	105	105	105	105	110	130	130	100	100	130	110	105
12	105	S	100	100	95	120	110	110	105	105	110	110	105	150	135	120	120	110	110	110	S	S	105	105
13	105	100	105	100	100	S	120	110	110	105	105	105	110	110	110	105	110	110	110	120	120	110	105	105
14	105	100	100	100	100	125	120	110	105	105	105	105	100	105	100	100	110	115	110	110	110	110	110	105
15	105	105	100	105	100	120	120	120	110	105	105	110	115	105	G	110	110	120	115	110	110	110	105	110
16	140	S	S	105	100	120	115	120	115	110	105	110	105	105	110	135	120	120	125	115	110	110	110	110
17	S	100	100	100	S	140	120	120	110	110	110	110	105	105	105	120	100	G	115	110	110	110	110	110
18	105	105	105	100	100	120	110	110	110	105	100	100	100	100	110	125	120	110	110	110	115	110	110	105
19	100	100	100	100	110	120	115	110	110	110	105	110	110	105	105	100	100	100	100	100	100	100	105	110
20	110	105	100	100	95	100	110	110	105	110	105	110	125	130	120	120	110	110	110	110	110	110	105	105
21	105	100	95	100	S	105	120	110	110	110	105	105	105	105	105	105	100	110	110	100	100	110	105	105
22	105	100	100	100	105	120	110	110	110	110	105	105	105	155	130	125	115	110	110	110	105	110	105	110
23	100	100	100	95	95	110	110	110	105	105	105	105	105	105	100	100	125	100	100	100	110	110	110	105
24	105	100	100	95	110	110	110	110	105	110	105	G	125	120	120	135	135	130	115	115	110	120	110	105
25	105	105	100	100	100	120	115	110	105	105	105	100	105	105	100	100	100	125	115	110	115	105	105	100
26	100	100	125	130	135	135	130	110	110	105	105	105	105	105	130	130	110	110	110	105	115	110	105	105
27	100	100	100	100	100	105	130	120	110	110	105	105	105	100	105	105	120	105	105	105	110	105	105	100
28	100	100	100	100	100	125	120	110	105	105	105	100	100	100	100	100	110	125	120	110	100	105	105	105
29	100	100	100	100	120	115	120	120	110	115	120	110	110	120	125	130	130	110	115	115	110	110	110	100
30	S	105	120	115	115	120	120	110	110	110	110	110	105	100	110	125	110	120	110	110	105	110	105	105
31	105	100	100	95	105	120	110	110	110	105	100	100	105	110	105	120	140	120	110	105	100	100	110	105
	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	29	31	28	30	30	31	31	31	31	30	31	31	30	31	31	30	31	31	30	29	30	30
MED	105	100	100	100	100	120	118	110	110	110	105	105	105	110	110	120	115	110	110	110	110	110	105	105
UQ	105	100	100	100	105	125	120	115	110	110	105	110	110	115	120	125	120	120	115	110	110	110	110	105
LQ	100	100	100	100	100	115	110	110	105	105	105	105	105	105	105	105	110	110	110	105	105	105	105	105

JUL. 1987 | H'ES (KM)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | TYPES OF ES | 135° E Mean Time (G.M.T. + 9 h)

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 3	F 3	F 2	F 2	F 3	C 3	C 2	C 5	C 3	C 2	C 2	C 2	C 3	C 2	C 4	C 1	C 2	C 3	C 7	L 4	F 2	F 1	F 6	F 5
2	F 5	F 2	F 4	F 4	F 2	CL 22	C 3	C 3	C 2	C 2	L 3	L 2	L 4	L 3	L 4	L 3	L 4	L 3	L 2	CL 42	F 6	F 5	F 5	F 3
3	F 3	F 2	F 2	F 3	F 1	C 4	C 4	C 3	C 2	C 2	C 2	C 1	C 1	C 1	C 2	C 2	C 2	L 2	L 4	L 3	FF 23	F 2	F 1	F 4
4	F 6	F 2	F 2	F 2	F 1	C 4	C 2	C 3	C 1	C 1	C 2	C 2	C 1	C 2	C 3	C 3	C 3	C 2	C 3	C 1	F 2	F 4	F 2	F 3
5	F 2	F 2	F 4	F 2	F 2	CL 21		C 3	C 3	C 4	C 3	L 4	C 3	C 2	C 2	H 1	H 2	C 2	C 3	C 1	F 4	F 3	F 5	F 4
6	F 4	F 3	F 2	F 2	F 3	C 4	C 4	C 2	C 2	L 2	L 1	C 1	H 1	C 3	C 1	C 1	C 1	C 3	C 3	C 2	F 2			
7	F 1	F 2	F 2	F 2	F 2	C 2	C 4	C 3	C 3	C 3	C 3	C 3	C 2	C 1	H 2	C 3	C 5	C 4	C 5	L 2	F 3	F 4	F 3	F 2
8	F 3	F 3	F 2	F 3	F 2	L 1	C 3	C 2	C 2	C 2	C 1	L 2	C 2	C 2	C 1	H 1	C 1	C 3	C 6	L 5	F 4	F 5	F 7	F 4
9	F 2	F 5	F 4	F 4	F 1	C 5	C 4	C 2	C 3	C 2	C 2	C 1	C 2	C 1	C 1	C 2	C 5	C 4	C 4	C 3	F 2	F 3	F 6	F 7
10	F 3	F 2		F 2		C 2	C 3	C 3	C 2	C 1	C 4	C 3	L 2	CL 22	C 1	CL 22	C 2	C 4	C 3	L 2	F 2	F 3	F 4	F 2
11	F 2	F 2	F 2	F 3	F 2	CL 12	C 3	C 7	C 4	C 1	C 1	C 1	C 3	C 4	L 2	L 2	C 1	CL 13	CL 42	L 4	L 3	FF 11	F 7	F 5
12	F 2		F 2	F 2	F 1	CL 31	C 2	C 2	C 3	C 2	C 1	C 1	C 1	H 1	HL 21	CL 31	C 2	C 5	C 3	C 3			F 2	F 2
13	F 4	F 2	F 2	F 2	F 2		C 2	C 2	C 2	C 3	C 3	C 2	C 1	C 1	C 1	C 2	C 1	C 2	C 3	C 3	F 2	F 3	F 5	F 5
14	F 5	F 6	F 3	F 3	F 3	C 3	C 3	C 2	C 4	C 3	C 1	C 1	L 1	L 2	L 2	L 2	CL 33	CL 52	CL 41	CL 31	F 6	F 3	F 4	F 5
15	F 7	F 2	F 1	F 1	F 2	C 2	C 3	C 2	C 3	C 3	C 3	C 2	C 1	C 2		C 2	C 2	C 2	C 4	C 4	F 5	F 3	F 2	F 2
16	FF 12			F 2	F 2	C 1	C 4	C 2	C 2	C 3	C 4	C 1	C 2	C 2	C 1	H 1	C 4	C 1	C 2	C 3	F 3	F 1	F 1	F 3
17		F 2	F 3	F 2		H 3	C 4	C 4	C 2	C 3	C 2	C 2	C 3	C 3	C 1	C 2	L 2		C 2	C 2	F 3	F 4	F 2	F 4
18	F 4	F 3	F 4	F 3	F 3	CL 62	C 5	C 6	C 4	C 5	L 3	L 3	L 2	L 2	CL 21	C 2	C 2	C 5	C 2	C 4	F 7	F 5	F 7	F 3
19	F 6	F 4	F 3	F 3	F 2	C 3	C 2	C 2	C 2	C 2	C 4	C 3	C 4	C 5	C 3	L 2	L 2	L 3	L 3	L 4	F 3	F 2	F 1	F 6
20	F 3	F 3	F 4	F 3	F 3	L 2	CL 11	C 3	C 2	C 3	C 2	C 1	C 1	C 1	C 2	C 2	C 3	C 2	C 4	C 3	F 2	F 4	F 3	F 7
21	F 4	F 3	F 3	F 3		L 1	C 5	C 5	C 3	C 2	C 2	C 2	C 3	C 3	C 3	C 4	L 3	CL 63	CL 37	L 3	L 3	F 2	F 2	F 2
22	F 4	F 5	F 3	F 3	F 1	C 2	C 3	C 4	C 1	C 2	C 2	C 3	C 2	H 1	C 2	C 3	C 3	C 3	C 5	C 7	F 4	F 5	F 4	F 4
23	F 5	F 4	F 4	F 3	F 1	C 2	C 3	C 3	C 4	C 4	C 3	C 3	C 5	C 2	L 3	L 2	CL 22	L 2	L 3	L 4	F 3	F 7	F 3	F 3
24	F 5	F 3	F 4	F 2	F 2	C 3	C 3	C 2	L 2	C 1	C 3		C 1	C 2	C 2	H 1	H 1	C 2	C 3	C 2	F 3	F 3	F 7	F 7
25	F 5	F 2	F 2	F 2	F 2	CL 21	C 4	C 3	C 3	C 4	C 2	L 4	L 2	L 1	L 2	L 3	L 2	CL 22	CL 23	CL 32	FF 22	F 3	F 2	F 3
26	F 2	F 2	FF 21	FF 22	F 1	H 1	C 2	C 4	C 4	C 3	C 3	C 4	C 3	C 4	C 2	C 2	C 3	C 4	C 3	L 4	F 3	F 6	F 5	F 6
27	F 3	F 4	F 2	F 4	F 2	L 3	C 2	C 2	C 2	C 2	C 2	C 2	C 2	L 1	C 1	L 2	C 2	C 3	C 3	L 4	F 4	F 3	F 3	F 6
28	F 2	F 3	F 3	F 2	F 2	C 2	C 3	C 4	C 4	C 4	C 2	L 3	L 3	L 4	L 5	L 6	C 1	C 2	C 5	CL 62	F 3	F 6	F 7	F 6
29	F 5	F 2	F 2	FF 22	F 6	C 4	C 5	C 1	C 1	C 1	C 1	C 2	C 1	C 3	C 2	C 1	C 1	C 2	C 3	C 6	F 4	F 4	F 4	F 2
30		F 4	F 3	F 3	F 3	C 2	C 2	C 4	C 3	C 1	C 1	C 1	C 2	L 4	CL 12	C 1	C 2	C 3	C 3	C 3	F 2	F 3	F 3	F 3
31	F 2	F 2	F 2	F 2	F 2	C 4	C 2	C 2	C 2	C 3	L 2	L 2	L 2	C 1	C 2	C 1	H 3	C 5	C 4	L 4	F 5	F 2	F 7	F 4
	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																								

JUL. 1987 | TYPES OF ES

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FXI (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' 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	62	59	52	48	43															X 81	X 76	X 59	X 41	X 43
2	X 44	X 44	43	43	42															X 75	X 74	70	60	54
3	48	A	47	48	43															X 81	X 76	X 73	A	X 50
4	A	54	52	45	X 41															X 84	X 80	X 66	X 46	52
5	48	42	49	41	X 38															U X 66	X 75	X 55	54	60
6	62	60	A	A	48	46														X 92	X 63	X 46	45	X 46
7	46	44	42	A	A															A	A	70	74	72
8	70	60	59	52	46	43														X 101	X 80	X 55	51	50
9	A	42	42	40	37	46														X 84	X 66	A	A	A
10	A	X 38	X 39	43	X 38															A	70	O X 66	X 63	X 56
11	59	X 50	49	51	46	45	51													X 56	X 67	X 60	56	56
12	60	58	53	49	45																71	X 62	X 58	X 42
13	X 42	X 40	44	X 38	X 39															X 62	X 63	X 62	59	A
14	61	57	58	54	48															A	X 61	A	A	A
15	X 45	A	X 41	X 33	33															X 78	X 70	X 62	61	X 58
16	A	58	X 59	A	X 39															X 78	X 76	X 84	X 61	O R 50
17	X 47	52	45	48	43															X 74	60	X 56	S 60	60
18	57	A	A	48	49															X 72	X 73	X 52	53	58
19	58	A	53	55	52															X 63	X 65	X 63	63	X 62
20	X 57	S	R	58	53															X 75	A	65	65	59
21	61	61	65	54	42															X 75	X 71	62	68	62
22	64	60	57	X 51	49															X 87	X 76	A	A	A
23	A	A	64	53	51															X 69	X 69	X 69	73	73
24	67	63	62	59	56															X 86	X 77	X 58	X 56	60
25	X 56	A	54	50	X 44															A	C	C	C	C
26	C	C	52	53	56															X 67	A	X 54	A	A
27	A	A	X 51	A	A															C	C	C	C	C
28	X 58	55	56	X 59	50															C	C	C	C	C
29	C	C	C	C	C															C	C	C	C	C
30	C	C	C	C	C															C	C	C	C	C
31	C	C	C	C	C															C	C	C	C	C
	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	21	19	25	24	26	4	1													21	22	22	20	20
MED	58	55	52	50	44	46	51													X 75	X 71	X 62	60	57
UQ	61	60	57	54	49	46														X 84	X 76	X 66	63	60
LQ	X 48	44	45	44	41	44														X 69	X 66	X 56	54	50

JUL. 1987 | FXI (0.1 MHZ)

IONOSPHERIC DATA

JUL. 1987 | FOF2 (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' 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 50	F 47	F	F 39	F 36	48	46	56	A	A	53	A	A	A	58	A	A	72	A	75	70	53	35	37
2	38	38	F 36	F 36	F 35	44	49	A	58	49	59	A	A	A	66	68	64	57	60	69	68	F 62	F	F
3	F	A	F	F 39	F 35	37	A	A	R 62	54	51	A	A	59	66	66	64	63	63	75	70	67	A	S 44
4	A	F 44	F 43	F 36	35	46	52	52	54	60	61	65	R 64	A	62	53	54	67	77	R 78	J R 74	60	Z 40	F 40
5	F 38	F 32	F 39	F 33	32	35	45	56	62	60	A	A	A	A	A	65	69	69	63	U A 60	V 69	49	F 45	F
6	F 52	F	A	A	F	F 39	48	66	60	50	50	52	A	52	56	57	62	75	93	86	57	40	F 38	40
7	F 38	F 35	F 34	A	A	40	45	A	58	H 59	A	A	A	53	58	54	A	A	A	A	A	F	F	F 64
8	F 61	F 52	F 50	F	F 35	F 36	56	56	56	51	A	52	50	50	59	52	54	58	72	J R 95	74	49	F 40	F 42
9	A	F 34	F 34	F 33	F 28	F 38	51	48	56	63	49	A	A	56	A	54	51	55	60	R 78	60	A	A	A
10	A	32	33	F 36	32	37	E G 38	52	60	61	51	53	50	A	A	A	A	67	66	A	F 61	R 60	57	50
11	F 50	44	F 40	F	F 38	F 37	F 44	A	A	A	A	A	51	A	A	61	51	45	47	50	61	54	F 49	F 48
12	F 46	F 43	F 42	F 41	F 36	37	52	52	A	61	54	E G 45	A	51	A	51	53	55	56	66	F 63	56	52	36
13	36	34	F 35	32	33	37	53	52	A	A	A	A	54	58	55	52	50	51	57	56	57	56	F 52	A
14	F 54	F 49	F 47	F 41	F 37	37	A	A	A	A	54	A	A	A	A	A	A	A	A	A	V 55	A	A	A
15	39	A	35	27	F 26	36	A	49	65	65	60	56	A	50	53	54	60	54	60	72	64	56	F 53	52
16	A	F 48	53	A	33	V 33	A	A	A	A	53	61	66	56	49	49	56	66	69	72	70	78	55	44
17	41	F 37	F 38	F 36	F 34	40	55	62	A	A	A	52	60	A	69	R 63	63	77	80	68	F 53	50	J F 52	F
18	F	A	A	F	F 40	42	A	A	71	A	A	A	A	54	A	65	59	61	60	66	67	V 46	F 46	F 50
19	F	A	F	F 45	F 43	41	48	63	62	47	51	A	57	A	67	71	A	A	64	57	59	57	F	56
20	51	I S 46	R	F	F 45	43	43	50	50	57	63	Z 59	48	A	51	E G 49	58	66	73	69	A	F	F 56	F 52
21	F 52	F 52	F 56	F 44	F 35	42	45	61	A	53	A	51	52	A	A	61	62	64	63	69	65	F 55	F	F
22	F 55	F 51	F 47	45	F 43	46	57	68	A	51	A	R 55	A	57	60	A	65	A	A	81	70	A	A	A
23	A	A	F	F 40	F 41	42	54	64	62	60	A	A	A	A	A	A	64	66	61	63	63	Z 63	F 63	F
24	F 60	F 55	F 55	F 51	F 46	43	56	65	60	V 59	58	57	57	58	R 63	69	69	72	73	80	71	52	50	F 52
25	50	A	F	F 42	38	46	57	S 75	U A 78	A	R 61	68	80	69	79	I C 80	D C 80	78	U A 56	A	C	C	C	C
26	C	C	F 44	F 45	F 45	J R 44	60	S 73	61	A	52	57	A	60	65	67	67	59	A	61	A	48	A	A
27	A	A	45	A	A	J R 40	52	64	60	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
28	52	F	F	53	F	38	55	A	69	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	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	18	18	19	20	24	28	23	20	19	17	16	14	12	14	17	21	21	22	21	22	22	20	16	15
MED	F 50	F 44	F 42	F 40	F 36	40	52	58	60	59	54	56	56	56	60	61	62	65	63	69	64	56	F 51	48
UQ	F 52	F 49	F 47	F 44	F 40	43	55	64	62	60	60	59	62	58	66	66	64	69	72	78	70	60	F 54	F 52
LQ	39	F 35	F 36	F 36	F 34	37	46	52	58	51	51	52	50	52	56	53	54	57	60	63	60	50	F 42	41

JUL. 1987 | FOF2 (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FOF1 (0.01 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' 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							L	U A 400	A	A	A	A	A	A	U A 440	A	A	A	A					
2						L	L 350	A	A	A	A	A	A	A	U A 430	420	390	A	A					
3							A	A	A	U A 410	430	A	A	U A 430	430	U A 420	A	A	330					
4						L	L	370	A	A	U A 440	A	A	A	A	A	400	360	L					
5							380	390	400	U A 420	A	A	A	A	A	400	400	370	A					
6							A	U A 390	U A 410	440	430	420	A	A	U A 430	420	A	360	320					
7						A	L	A	A	A	A	A	A	U A 430	440	A	A	A	A					
8						A	A	390	420	U A 420	A	U A 440	440	A	440	A	A	A	A					
9						A	A	A	A	430	A	A	A	A	A	U A 420	390	380	330					
10							380	390	420	A	U A 430	A	U A 440	A	A	A	A	A	A					
11						300	A	A	A	A	A	A	A	A	A	A	A	L	L					
12						L	A	A	A	430	A	450	A	430	A	A	400	A	A					
13							370	A	A	A	A	A	450	450	440	420	390	380	A					
14						A	A	A	A	A	A	A	A	A	A	A	A	A	A					
15							A	A	A	A	A	U A 460	A	U A 440	440	U A 440	A	A	A					
16							A	A	A	A	U A 450	A	A	A	U A 450	420	A	A	A					
17							A	A	A	A	440	A	A	A	U A 430	S 440	U A 420	A	A					
18							A	A	A	A	A	A	A	U A 440	A	A	410	A	L					
19							L 370	390	A	430	A	A	A	A	430	A	A	A	A					
20								390	430	A	U A 450	460	L	A	A	490	A	390	A					
21							370	A	A	A	A	A	A	A	A	A	A	A	A					
22						L	A	A	A	A	A	S	A	U A 460	U A 460	A	A	A	A					
23							L	A	430	A	A	A	A	A	A	A	A	A	A					
24							A	A	440	470	470	480	490	U A 480	460	440	A	400	L					
25							L 380	A	A	A	A	A	A	470	A	C	A	L	A					
26						L	L	A	A	A	470	U A 470	A	A	460	A	450	A	A					
27							380	A	L	C	C	C	C	C	C	C	C	C	C					
28							L 400	A	A	C	C	C	C	C	C	C	C	C	C					
29						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
30						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
31						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
	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	9	8	7	8	9	7	4	9	14	11	9	7	3					
MED						300	380	390	420	430	440	460	445	U A 440	440	420	400	380	330					
UQ							380	390	430	435	U A 450	465	470	U A 460	450	440	410	385	330					
LQ							370	390	415	U A 420	430	445	440	U A 430	430	420	390	365	325					

JUL. 1987 | FOF1 (0.01 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FOE (0.01 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long 139° 29.3' 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						A	235	270	305	315	330	B	355	355	345	325	300	245	A					
2						180	230	265	300	A	A	A	A	A	A	310	290	245	A					
3						A	240	275	295	320	325	330	340	335	A	A	A	A	A					
4						B	A	A	A	A	A	A	A	A	330	305	280	245	175					
5						A	240	280	300	A	A	A	A	A	A	A	A	240	190					
6						A	195	A	A	A	335	355	350	350	330	310	275	240	A					
7						A	A	255	305	320	325	335	A	330	330	325	295	250	A					
8						A	A	A	A	A	A	335	355	S	345	330	280	250	A					
9						A	A	260	A	A	325	A	A	A	A	A	A	255	190					
10						155	225	260	295	A	A	A	A	A	A	A	285	245	A					
11						A	220	270	A	A	A	A	A	A	A	A	A	A	A					
12						B	220	A	A	A	A	335	A	A	A	315	290	250	190					
13						A	215	255	280	A	A	A	A	A	A	A	A	A	A					
14						A	235	275	A	A	A	A	A	A	A	A	A	A	A					
15						180	225	A	305	A	A	340	A	A	A	A	A	A	B					
16						A	A	A	A	A	A	A	A	A	A	A	295	250	195					
17						160	220	275	295	325	A	A	A	A	A	A	A	255	200					
18						A	A	A	A	A	A	A	A	A	335	325	300	255	195					
19						A	A	285	295	A	335	340	355	340	A	A	A	A	A					
20						A	A	270	A	A	340	355	365	365	350	340	295	265	A					
21						A	250	A	A	A	A	A	A	A	A	335	310	265	190					
22						A	A	A	A	A	A	S	A	365	360	335	310	270	195					
23						A	A	A	A	A	A	A	A	A	A	A	A	A	A					
24						B	A	A	A	335	375	385	380	365	355	330	300	265	200					
25						A	A	A	A	A	A	A	A	A	A	C	A	A	200					
26						170	245	290	A	A	A	A	350	R 370	355	340	305	260	A					
27						A	A	A	A	C	C	C	C	C	C	C	C	C	C					
28						A	A	A	A	C	C	C	C	C	C	C	C	C	C					
29						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
30						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
31						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
	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	14	14	10	5	8	9	8	9	10	13	15	13	11					
MED						170	228	270	298	320	332	340	355	355	345	325	295	250	195					
UQ						180	240	275	305	325	338	355	360	365	355	335	300	260	198					
LQ						160	220	260	295	320	325	335	350	340	330	315	288	245	190					

JUL. 1987 | FOE (0.01 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FOES (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long 139° 29.3' 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	JA 21	JA 50	JA 51	JA 46	JA 29	28	34	JA 43	JA 85	JA 123	JA 53	JA 77	JA 117	JA 79	JA 53	JA 83	JA 81	JA 85	JA 83	JA 78	JA 52	JA 51	JA 32	JA 51
2	JA 33	JA 36	JA 25	JA 23	JA 19	G	31	JA 78	JA 77	JA 52	JA 61	JA 175	JA 81	JA 112	JA 80	36	33	JA 52	JA 84	JA 83	36	JA 52	JA 52	JA 33
3	JA 78	JA 82	JA 44	JA 46	JA 30	JA 35	JA 80	JA 85	JA 101	JA 52	JA 53	JA 52	73	43	42	JA 53	JA 59	JA 51	JA 25	JA 33	JA 33	JA 62	JA 56	JA 84
4	55	JA 78	31	JA 20	JA 27	19	29	JA 40	JA 62	JA 62	JA 50	JA 66	JA 83	JA 90	JA 63	JA 149	JA 51	34	JA 46	JA 29	21	22	JA 52	JA 39
5	JA 44	JA 50	JA 34	JA 28	JA 23	JA 21	JA 43	JA 46	JA 38	JA 43	JA 108	JA 78	JA 89	JA 124	JA 111	36	42	32	JA 49	60	JA 40	JA 22	JA 49	JA 33
6	JA 36	JA 59	JA 79	57	30	JA 31	JA 52	JA 74	JA 84	JA 43	37	38	53	JA 69	JA 51	JA 98	JA 43	JA 28	JA 33	JA 50	JA 42	JA 21	JA 25	JA 21
7	JA 38	JA 50	JA 26	JA 64	JA 82	JA 48	JA 47	JA 126	50	JA 51	79	JA 67	JA 85	JA 49	JA 44	JA 62	JA 128	JA 119	JA 170	117	JA 111	JA 50	JA 62	JA 63
8	JA 36	JA 31	JA 42	JA 32	JA 23	JA 35	JA 61	JA 40	JA 50	JA 52	JA 71	48	JA 57	JA 53	45	JA 69	JA 66	JA 59	JA 61	JA 51	JA 32	JA 51	JA 49	JA 39
9	JA 51	JA 37	JA 32	JA 24	20	JA 52	JA 50	JA 51	JA 110	JA 51	JA 49	JA 111	JA 119	JA 52	JA 74	JA 51	JA 36	35	28	JA 22	JA 34	JA 77	JA 51	JA 61
10	58	JA 29	JA 31	JA 19	22	25	34	JA 41	JA 64	JA 45	JA 46	JA 79	JA 47	JA 64	JA 49	57	71	JA 60	JA 62	JA 121	JA 45	JA 61	JA 52	JA 62
11	JA 51	JA 21	JA 29	JA 29	JA 30	JA 33	JA 43	JA 101	JA 112	JA 78	JA 72	JA 62	JA 51	JA 59	JA 61	JA 51	JA 42	JA 29	JA 25	JA 30	JA 25	JA 23	JA 27	JA 51
12	JA 52	JA 36	JA 41	JA 26	JA 25	25	JA 50	JA 102	JA 111	JA 75	53	39	JA 51	JA 46	JA 58	JA 97	JA 58	JA 81	JA 101	JA 129	JA 65	JA 109	JA 20	JA 33
13	JA 16	JA 30	JA 31	JA 29	JA 20	23	30	JA 46	JA 89	JA 73	JA 68	JA 70	JA 46	42	33	36	JA 43	JA 40	JA 60	JA 59	JA 25	JA 45	JA 50	59
14	JA 49	JA 51	JA 53	JA 52	JA 65	JA 37	JA 93	JA 112	JA 180	JA 101	JA 67	JA 84	JA 78	JA 111	JA 126	JA 91	JA 139	JA 116	JA 196	JA 143	JA 169	JA 104	JA 107	JA 86
15	JA 56	JA 83	JA 63	JA 28	JA 32	JA 44	JA 58	JA 66	JA 64	JA 57	69	JA 50	JA 62	JA 46	JA 48	JA 53	JA 68	JA 81	JA 49	JA 64	JA 66	JA 34	JA 52	JA 62
16	JA 82	JA 51	JA 51	JA 62	JA 37	JA 19	JA 66	JA 102	JA 171	JA 187	JA 49	JA 102	JA 78	JA 54	JA 52	JA 50	JA 65	JA 111	57	JA 75	JA 51	JA 62	JA 28	JA 24
17	JA 26	JA 62	JA 27	JA 28	JA 26	23	JA 43	JA 63	JA 88	JA 92	JA 59	JA 52	JA 84	JA 83	JA 43	48	JA 44	JA 44	JA 35	JA 37	JA 33	JA 32	JA 26	JA 50
18	JA 80	JA 54	JA 76	JA 46	JA 31	JA 49	JA 82	JA 96	JA 137	JA 223	JA 187	JA 140	JA 137	JA 84	JA 101	JA 81	JA 41	JA 62	JA 37	JA 42	JA 51	JA 33	JA 31	JA 52
19	JA 53	JA 62	JA 27	JA 20	E B 13	JA 39	JA 30	JA 38	59	33	JA 48	61	JA 64	JA 67	JA 47	JA 80	JA 136	JA 113	JA 66	JA 53	JA 43	19	JA 45	JA 33
20	JA 46	JA 32	JA 55	JA 33	JA 42	JA 44	JA 46	34	JA 49	JA 97	JA 82	JA 45	40	49	JA 58	JA 59	JA 108	JA 86	JA 78	JA 51	JA 87	JA 83	JA 50	JA 52
21	JA 31	JA 32	JA 29	JA 37	JA 50	JA 34	JA 46	JA 65	JA 93	JA 60	JA 71	JA 60	JA 50	JA 88	JA 67	JA 53	JA 57	JA 52	JA 55	JA 53	JA 99	JA 63	JA 116	E S 14
22	JA 52	JA 30	JA 43	JA 26	JA 44	JA 31	JA 52	JA 84	JA 138	JA 52	JA 77	E S 50	JA 90	JA 70	JA 90	JA 70	JA 83	JA 86	JA 84	JA 118	JA 109	JA 87	JA 53	JA 55
23	JA 84	JA 63	JA 44	JA 27	JA 22	JA 32	JA 53	JA 83	JA 41	JA 68	JA 81	JA 88	JA 175	JA 109	JA 83	JA 100	JA 85	JA 54	43	JA 63	JA 70	JA 64	JA 84	JA 52
24	JA 52	JA 51	JA 52	29	24	JA 34	JA 51	JA 69	JA 78	JA 50	43	44	JA 53	JA 53	JA 48	JA 70	JA 51	35	JA 43	JA 33	JA 27	JA 25	JA 46	JA 47
25	JA 51	JA 62	JA 49	JA 18	JA 31	JA 39	JA 33	JA 67	163	JA 113	JA 110	JA 143	JA 87	JA 51	JA 61	C	JA 54	JA 52	JA 72	D C 55	D C 55	C	C	C
26	C	C	JA 25	JA 19	JA 18	19	32	JA 52	D C 68	71	42	JA 62	JA 66	60	48	D C 70	41	JA 54	72	D C 75	JA 71	JA 22	JA 52	58
27	JA 64	JA 70	JA 60	JA 45	JA 64	JA 30	45	JA 58	JA 65	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
28	JA 51	JA 35	JA 36	31	JA 34	31	39	JA 85	JA 74	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	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	27	27	28	28	28	28	28	28	28	26	26	26	26	26	26	25	26	26	26	26	26	25	25	25
MED	JA 51	JA 50	JA 42	JA 29	JA 30	JA 32	JA 46	JA 66	JA 82	JA 61	JA 64	JA 64	JA 76	JA 62	JA 56	JA 62	JA 58	JA 54	JA 58	JA 58	JA 48	JA 51	JA 50	JA 51
UQ	JA 56	JA 62	JA 52	JA 46	JA 36	JA 38	JA 52	JA 85	JA 110	JA 92	JA 77	JA 84	JA 87	JA 84	JA 74	JA 82	JA 81	JA 85	JA 78	JA 80	JA 70	JA 63	JA 52	JA 59
LQ	JA 37	JA 34	JA 30	JA 25	JA 22	24	34	JA 46	JA 63	JA 51	JA 49	JA 50	JA 53	JA 51	JA 43	JA 51	JA 43	JA 40	JA 43	JA 42	JA 33	JA 25	JA 32	JA 33

JUL. 1987 | FOES (0.1 MHZ)

IONOSPHERIC DATA

JUL. 1987 | FBES (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' 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	18	29	30	31	23	20	26	40	AA 85	AA 123	47	AA 77	AA 117	AA 79	44	AA 83	AA 81	66	AA 33	35	34	44	19	27
2	23	20	EB 15	18	EB 14	G	28	AA 78	54	44	49	AA 175	AA 81	AA 112	43	34	33	45	44	41	24	34	21	20
3	23	AA 82	20	EB 15	EB 13	22	AA 80	AA 85	46	41	37	AA 52	AA 73	43	36	42	44	45	18	20	26	54	AA 56	18
4	AA 55	23	18	EB 14	19	18	24	31	42	48	44	56	54	AA 90	54	49	31	30	28	22	EB 13	EB 14	23	20
5	20	EB 15	18	20	19	19	26	30	35	42	AA 108	AA 78	AA 89	AA 124	AA 111	34	32	27	44	UA 28	29	21	16	20
6	26	38	AA 79	AA 57	22	21	37	39	41	34	36	37	AA 53	47	43	35	40	25	24	26	31	EB 14	EB 14	21
7	20	17	EB 14	AA 64	AA 82	32	31	AA 126	43	48	AA 79	AA 67	AA 85	43	39	45	AA 128	AA 119	AA 170	AA 117	AA 111	33	40	28
8	23	19	22	21	14	30	52	34	36	42	AA 71	44	39	48	36	44	42	50	53	40	30	24	21	28
9	AA 51	23	EB 13	EB 13	EB 14	27	35	42	52	40	43	AA 111	AA 119	50	AA 74	42	31	31	23	20	20	AA 77	AA 51	AA 61
10	AA 58	18	19	19	EB 14	21	31	33	36	43	43	45	44	AA 64	AA 49	AA 57	AA 71	58	56	AA 121	29	41	25	28
11	16	17	18	25	24	20	36	AA 101	AA 112	AA 78	AA 72	AA 62	48	AA 59	AA 61	45	40	28	21	28	20	21	EB 15	32
12	35	16	25	15	EB 14	19	45	40	AA 111	38	45	38	AA 51	37	AA 58	42	38	45	42	46	46	40	19	23
13	EB 14	19	21	18	EB 15	19	27	38	AA 89	AA 78	AA 68	AA 70	39	38	33	34	32	28	31	45	22	19	37	AA 59
14	28	21	34	18	21	32	AA 98	AA 112	AA 180	AA 101	48	AA 84	AA 78	AA 111	AA 126	AA 91	AA 139	AA 116	AA 196	AA 143	44	AA 104	AA 107	AA 86
15	21	AA 83	19	EB 14	17	15	AA 58	45	48	49	57	46	AA 62	44	40	44	52	46	46	39	45	31	40	20
16	AA 82	33	29	AA 62	EB 14	18	AA 66	AA 102	AA 171	AA 187	45	49	51	46	45	37	54	63	48	43	42	35	26	EB 14
17	20	19	EB 14	20	21	19	38	58	AA 88	AA 92	AA 59	46	49	AA 83	43	US 40	42	42	32	20	19	21	18	20
18	38	AA 54	AA 76	28	22	27	AA 82	AA 96	45	AA 223	AA 187	AA 140	AA 137	44	AA 101	48	31	45	27	40	23	30	20	32
19	37	AA 62	18	EB 12	EB 13	22	26	34	52	35	45	AA 61	47	AA 67	40	61	AA 136	AA 118	59	37	20	EB 14	28	20
20	33	29	21	EB 14	20	29	24	30	37	46	45	39	40	AA 49	47	46	43	33	44	30	AA 87	44	31	42
21	EB 15	19	17	EB 14	EB 15	34	34	52	AA 93	48	AA 71	47	48	AA 88	AA 67	47	47	50	55	50	51	24	34	ES 14
22	30	20	EB 15	18	19	20	43	58	AA 138	45	AA 77	ES 50	AA 90	46	46	AA 70	61	AA 86	AA 84	63	58	AA 87	AA 53	AA 55
23	AA 84	AA 63	27	19	EB 14	17	33	43	39	52	AA 81	AA 88	AA 175	AA 109	AA 83	AA 100	53	40	39	43	43	42	24	37
24	29	29	13	EB 14	EB 14	EB 14	40	60	41	39	42	42	43	48	43	42	45	33	31	30	27	15	24	30
25	37	AA 62	23	EB 15	20	26	33	61	UA 65	AA 113	48	59	66	39	48	C	44	32	45	AA 55	21	C	C	C
26	C	C	EB 14	EB 15	EB 15	19	29	44	55	AA 71	41	47	AA 66	50	45	66	41	40	AA 72	37	AA 71	20	AA 52	AA 58
27	AA 64	AA 70	EB 15	AA 45	AA 64	25	31	54	41	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
28	39	31	33	23	21	19	32	AA 85	54	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	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	27	27	28	28	28	28	28	28	28	26	26	26	26	26	26	25	26	26	26	26	26	25	25	25
MED	29	23	19	18	18	20	34	48	52	48	48	54	AA 58	50	46	45	44	45	44	40	30	31	25	28
UQ	38	46	26	24	21	26	44	AA 82	AA 88	AA 78	AA 71	AA 77	AA 85	AA 83	AA 61	57	54	58	56	46	45	42	40	37
LQ	20	19	15	EB 14	EB 14	19	28	38	41	42	44	46	48	44	43	42	38	32	31	28	22	21	20	20

JUL. 1987 | FBES (0.1 MHZ)

IONOSPHERIC DATA

JUL. 1987 | FMIN (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' 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	13	15	14	13	14	13	12	14	14	15	17	36	19	16	19	16	16	15	13	14	14	14	15	15
2	15	13	15	14	14	14	14	13	14	15	16	18	21	16	17	14	15	14	15	14	12	14	15	14
3	14	14	13	15	13	13	14	14	15	16	16	17	21	18	18	16	14	13	13	12	13	13	13	13
4	13	15	14	14	13	13	13	15	18	15	17	16	18	21	17	19	14	13	12	14	13	14	16	13
5	13	15	13	14	15	14	14	13	15	16	20	16	15	19	19	29	15	14	13	13	15	14	14	13
6	14	13	13	13	14	13	13	14	14	15	21	16	20	22	23	22	21	14	14	13	13	14	14	15
7	15	13	14	14	13	13	13	15	ES 27	ES 25	21	22	25	21	22	19	17	13	13	13	14	13	13	14
8	15	14	14	13	13	13	14	15	16	20	20	18	20	ES 38	19	19	15	13	14	14	15	13	13	13
9	14	13	13	13	14	13	14	14	15	15	19	21	20	26	22	18	15	14	13	14	13	14	14	14
10	15	15	14	12	14	13	13	13	15	17	24	20	22	27	21	21	14	14	14	15	13	15	13	15
11	14	13	13	13	13	14	14	14	16	21	21	21	21	18	18	15	16	14	13	13	13	14	15	14
12	13	13	13	13	14	14	14	15	14	20	19	20	21	22	16	19	14	14	14	13	14	14	13	14
13	14	14	13	13	15	13	14	14	16	16	20	21	21	21	20	19	20	14	14	13	13	14	15	14
14	15	14	13	13	13	14	13	14	14	20	21	20	21	20	20	19	20	15	14	13	14	15	13	15
15	15	14	13	14	14	13	14	15	15	20	21	21	22	23	21	22	16	14	18	14	14	14	15	14
16	14	13	13	13	14	15	15	14	19	20	20	22	16	21	21	20	21	14	15	15	14	14	14	14
17	15	13	14	14	14	13	14	15	20	24	19	21	23	23	21	21	16	14	13	14	14	13	14	14
18	14	14	14	14	14	13	13	14	14	16	21	21	22	21	18	21	16	16	14	13	14	14	16	14
19	14	14	15	13	13	14	14	17	15	16	21	23	20	21	20	22	15	14	14	14	14	14	14	14
20	15	13	13	14	14	14	13	19	20	20	20	20	24	25	22	17	20	15	14	13	15	14	14	16
21	15	14	14	14	15	14	13	14	21	20	22	25	23	22	21	20	16	20	14	15	14	14	14	ES 14
22	15	14	14	14	13	14	13	15	22	21	20	ES 50	20	23	22	20	17	14	15	14	14	13	14	15
23	15	13	14	15	14	13	14	16	19	20	22	22	22	21	22	21	16	15	14	17	14	15	14	14
24	13	14	13	14	14	14	13	14	17	21	25	25	26	22	22	21	20	16	14	14	13	14	13	14
25	15	14	14	15	16	14	13	14	16	20	21	22	21	23	23	C	15	15	15	15	15	C	C	C
26	C	C	14	15	15	15	15	16	18	21	25	25	26	26	21	18	18	15	14	15	15	15	15	15
27	15	14	15	14	14	15	14	14	14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
28	ES 15	ES 15	14	14	ES 15	15	14	15	16	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	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	27	27	28	28	28	28	28	28	28	26	26	26	26	26	26	25	26	26	26	26	26	25	25	25
MED	15	14	14	14	14	14	14	14	16	20	20	21	21	22	21	19	16	14	14	14	14	14	14	14
UQ	15	14	14	14	14	14	14	15	18	20	21	22	22	23	22	21	18	15	14	14	14	14	15	15
LQ	14	13	13	13	13	13	13	14	14	16	19	20	20	21	19	18	15	14	13	13	13	14	13	14

JUL. 1987 | FMIN (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | M(3000)F2 (0.01) | 135° E Mean Time (G.M.T. + 9 h)

Station: KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' 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 305	F 280	F	F 305	F 320	350	335	335	A	A	A	A	A	A	235	A	A	A	A	340	340	A	320	315
2	315	320	F 310	F 315	F 320	335	325	A	A	250	300	A	A	A	310	315	325	295	305	325	325	F 315	F	F
3	F	A	F	F 300	F 350	350	A	A	R 270	335	320	A	A	295	300	305	300	305	305	330	335	355	A	S 315
4	A	F 305	F 320	F 315	335	335	355	350	315	305	320	310	R 305	A	295	A	280	280	305	R 245	J R 335	360	Z 345	F 300
5	F 315	F 295	F 335	F 295	335	350	285	305	330	320	A	A	A	A	A	285	300	305	345	A	V 325	340	F 235	F
6	F 295	F	A	A	F	F 335	295	350	340	330	290	280	A	270	285	290	295	295	325	345	355	335	F 300	315
7	F 305	F 300	F 320	A	A	315	315	A	325	H 325	A	A	A	285	290	285	A	A	A	A	A	F	F	F 325
8	F 315	F 305	F 320	F	F 310	A	A	350	295	315	A	280	265	A	315	285	285	285	300	J R 335	350	355	F 305	F 290
9	A	F 295	F 300	F 320	F 355	F 320	340	265	A	345	255	A	A	265	A	275	280	300	310	R 325	360	A	A	A
10	A	320	305	F 315	345	370	G	290	300	315	255	290	265	A	A	A	A	A	325	A	F 315	R 320	315	295
11	F 310	305	310	F	F	F 310	F 270	F 260	A	A	A	A	A	A	A	315	305	285	285	305	320	320	F 320	F 285
12	F 280	F 305	F 310	F 325	F 330	280	A	300	A	325	325	G	A	270	A	285	295	315	300	330	F 305	315	365	320
13	325	295	F 310	340	315	345	325	355	A	A	A	A	285	300	305	280	300	295	320	305	320	315	F 315	A
14	F 295	F 315	F 295	F 305	F 335	A	A	A	A	A	285	A	A	A	A	A	A	A	A	A	V 335	A	A	A
15	315	A	335	370	F 305	340	A	A	315	315	A	325	A	265	275	275	305	295	300	315	325	305	F 300	320
16	A	F 285	330	A	320	V 320	A	A	A	A	270	285	315	305	260	250	A	A	320	310	320	320	365	305
17	300	F 275	F 305	F 300	F 310	325	315	A	A		A	A	295	A	305	R 310	295	300	325	340	F 325	295	J F 300	F
18	F	A	A	F	F 320	325	A	A	320	A	A	A	A	295	A	310	305	310	335	320	345	V 295	F 295	F 295
19	F	A	F	F 295	F 300	315	290	315	350	290	290	A	285	A	295	310	A	A	A	330	305	310	F	315
20	300	I S 300	R	F	F 335	350	350	315	265	295	340	Z 310	315	A	A	G	285	305	315	325	A	F	F 320	F 285
21	F 300	F 305	F 335	F 320	F 305	335	280	325	A	A	A	270	255	A	A	300	300	300	A	320	305	F 290	F	F
22	F 295	F 320	F 305	335	F 290	300	335	335	A	230	A	S	A	270	295	A	A	A	A	320	360	A	A	A
23	A	A	F	F 300	F 325	325	310	310	300	295	A	A	A	A	A	A	295	325	315	320	305	Z 300	F 315	F
24	F 300	F 300	F 310	F 320	F 330	320	340	345	345	V 250	305	280	255	285	R 280	305	300	315	305	335	335	305	300	F 285
25	290	A	F	F 325	315	315	315	S 300	A	A	R 315	285	300	280	285	I C 280	C	320	A	A	C	C	C	C
26	C	C	F 300	F 295	F 280	J R 280	320	S 325	A	A	300	270	A	275	290	A	300	310	A	A	A	330	A	A
27	A	A	325	A	A	J R 320	300	310	305	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
28	295	F	F	320	F	325	300	A	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	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	18	18	19	20	24	26	21	18	14	16	14	12	11	13	16	19	18	19	18	20	22	19	16	15
MED	F 300	F 302	F 310	F 315	F 320	325	315	320	315	315	300	282	285	280	292	285	300	300	312	325	325	315	F 315	305
UQ	F 315	F 305	F 322	F 322	F 335	340	335	345	330	325	320	300	302	295	302	308	300	310	325	332	340	332	320	315
LQ	F 295	F 295	F 305	F 300	F 310	315	295	305	300	292	285	275	265	270	285	280	295	295	305	318	320	305	F 300	F 292

JUL. 1987 | M(3000)F2 (0.01)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | M(3000)F1 (0.01) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' 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							L	A	A	A	A	A	A	A	A	A	A	A	A					
2						L	L 380	A	A	A	A	A	A	A	A	370	390	A	A					
3							A	A	A	A	395	A	A	A	370	A	A	A	380					
4						L	L	405	A	A	A	A	A	A	A	A	365	350	L					
5							350	370	365	A	A	A	A	A	A	395	395	380	A					
6							A	A	A	395	405	415	A	A	A	385	A	395	370					
7						A	L	A	A	A	A	A	A	A	380	A	A	A	A					
8						A	A	385	395	A	A	A	385	A	385	A	A	A	A					
9						A	A	A	A	A	A	A	A	A	A	A		360	365					
10							400	370	385	A	A	A	A	A	A	A	A	A	A					
11						350	A	A	A	A	A	A	A	A	A	A	A	L	L					
12						L	A	A	A	A	A	375	A	400	A	A	A	A	A					
13							385	A	A	A	A	A	350	365	380	385	385	360	A					
14						A	A	A	A	A	A	A	A	A	A	A	A	A	A					
15							A	A	A	A	A	A	A	A	375	A	A	A	A					
16							A	A	A	A	A	A	A	A	A	360	A	A	A					
17							A	A	A	A	A	A	A	A	A	S 330	A	A	A					
18							A	A	A	A	A	A	A	A	A	A	395	A	L					
19							L 360	370	A	395	A	A	A	A	370	A	A	A	A					
20								400	325	A	A	395	L	A	A	355	A	360	A					
21							A	A	A	A	A	A	A	A	A	A	A	A	A					
22						L	A	A	A	A	A	S	A	A	A	A	A	A	A					
23							L	A	370	A	A	A	A	A	A	A	A	A	A					
24							A	A	A	395	A	375	385	A	385	A	A	350	L					
25							L 350	A	A	A	A	A	A	395	A	C	A	L	A					
26						L	L	A	A	A	380	A	A	A	A	A	A	A	A					
27							390	A	L	C	C	C	C	C	C	C	C	C	C					
28							A	A	A	C	C	C	C	C	C	C	C	C	C					
29						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
30						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
31						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
	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	7	6	5	3	3	4	3	3	7	7	5	7	3					
MED						350	380	378	370	395	395	385	385	395	380	380	390	360	370					
UQ							388	400	385	395	400	405	385	398	382	385	395	370	375					
LQ							L 355	370	365	395	388	375	368	380	372	365	385	355	368					

JUL. 1987 | M(3000)F1 (0.01)

IONOSPHERIC DATA

JUL. 1987 | H'F2 (KM) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long 139° 29.3' 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							265	285	A	A	340	A	A	A	365	A	A	A	A					
2						260	280	A	A	470	335	A	A	A	315	305	275	E A 340	E A 305					
3							A	A	A	280	310	A	A	350	325	315	320	E A 315	305					
4						260	230	265	315	320	310	325	320	A	E A 350	400	385	350	265					
5							380	315	275	295	A	A	A	A	A	355	310	310	255					
6							355	255	270	290	365	380	A	E A 415	370	365	340	315	255					
7						E A 320	L	A	285	295	A	A	A	380	360	350	A	A	A					
8						E A 380	A	245	355	315	A	390	430	E A 425	315	385	370	E A 385	325					
9						E A 295	355	E A 425	E A 365	265	450	A	A	425	A	360	330	330	300					
10							G	365	325	315	445	365	425	A	A	A	A	E A 315	E A 305					
11						380	425	A	A	A	A	A	A	A	A	310	E A 330	L 355	L 360					
12						L	E A 300	E A 330	A	280	305	G	A	420	A	380	355	320	315					
13							285	250	A	A	A	A	370	340	340	390	340	355	295					
14						A	A	A	A	A	375	A	A	A	A	A	A	A	A					
15							A	A	300	295	A	305	A	420	400	385	E A 325	E A 345	E A 320					
16							A	A	A	A	415	365	305	335	A 440	470	A	A	A 280					
17							300	A	A	A		E A 465	355	A	320	320	345	305	260					
18							A	A	290	A	A	A	A	360	A	315	320	320	275					
19							355	290	260	365	375	A	375	A	335	A	A	A	A					
20								320	425	350	270	310	L	A	A	G	375	315	280					
21							395	E A 305	A	A	A	410	455	A	A	340	325	A 315	A					
22						310	275	275	A	540	A	E S 405	A	410	360	A	A	A	A					
23							L 310	315	320	350	A	A	A	A	A	A	E A 350	275	E A 285					
24							260	E A 270	255	460	325	390	460	385	385	320	325	290	300					
25							310	E A 305	A	A	315	E A 375	340	380	350	I C 325	300	250	A					
26						325	250	250	E A 340	A	295	390	A	395	340	A	325	300	A					
27							325	E A 300	L 290	C	C	C	C	C	C	C	C	C	C					
28							320	A	A	C	C	C	C	C	C	C	C	C	C					
29						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
30						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
31						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
	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						8	20	18	15	16	15	14	10	14	16	19	19	20	18					
MED						U 288	310	U 274	295	315	335	375	372	385	350	355	328	312	288					
UQ						338	355	E A 315	325	358	375	398	430	415	368	385	345	331	302					
LQ						269	274	260	280	292	310	U 345	340	360	326	320	318	302	270					

JUL. 1987 | H'F2 (KM)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | H'F (KM) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' 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	270	A	E A 280	E A 330	280	235	225	A	A	A	A	A	A	A	A	A	A	A	A	A 240	A 240	A	E A 285	A
2	E A 310	275	290	300	255	240	220	A	A	A	A	A	A	A	A	230	215	A	A	E A 265	A 255	E A 270	265	260
3	E A 310	A	325	290	235	255	A	A	A	A	210	A	A	A	225	A	A	A	220	240	240	A	A	270
4	A	E A 300	255	260	250	230	210	200	A	A	A	A	A	A	A	A	230	245	A	H 235	215	200	A 255	A 305
5	E A 295	315	255	E A 320	270	235	240	230	240	A	A	A	A	A	A	205	195	225	A	A	A 255	215	285	300
6	E A 305	A	A	A	E A 275	255	A	A	A	205	195	H 185	A	A	A	225	A	210	230	225	A 225	245	275	275
7	310	305	260	A	A	A	E A 240	A	A	A	A	A	A	A	E A 250	A	A	A	A	A	A	A 265	E A 305	A 260
8	260	280	255	270	300	A	A	220	205	A	A	A	215	A	220	A	A	A	A	A 240	225	A 235	315	E A 325
9	A	E A 340	305	265	230	A	A	A	A	A	A	A	A	A	A	A	240	215	240	250	210	A	A	A
10	A	305	320	295	250	215	A 250	E A 260	E A 255	A	A	A	A	A	A	A	A	A	A	A	285	A 275	285	E A 325
11	270	285	A 300	270	E A 305	270	A	A	A	A	A	A	A	A	A	A	A	210	240	E A 290	255	250	275	E A 350
12	E A 355	300	E A 305	255	250	250	A	A	A	A	A	225	A	210	A	A	A	A	A	A	E A 310	A	210	E A 285
13	270	320	300	260	270	235	220	A	A	A	A	A	E A 250	E S 240	220	215	215	E A 245	A	A	265	265	E A 300	A
14	E A 315	280	E A 340	275	265	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E A 280	A	A	A
15	E A 295	A	255	220	305	240	A	A	A	A	A	A	A	A	230	A	A	A	A	E A 280	E A 275	E A 305	E A 320	265
16	A	E A 350	A 260	A	260	265	A	A	A	A	A	A	A	A	A	E A 250	A	A	A	E A 295	E A 275	265	215	260
17	300	E A 355	270	300	310	255	A	A	A	A	A	A	A	A	A	E S 250	A	A	A	220	235	290	295	315
18	A	A	A	E A 360	270	270	A	A	A	A	A	A	A	A	A	A	205	A	E A 260	E A 270	225	E A 320	310	A
19	A	A	300	280	280	H 250	235	240	A	200	A	A	A	A	230	A	A	A	A	E A 260	270	265	A 300	255
20	E A 315	E A 330	310	235	250	E A 240	235	205	E A 285	A	A	205	H 200	A	A	E A 255	A	255	A	250	A	A	E A 275	A
21	285	275	240	265	285	E A 270	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E A 320	E A 325	A 250	230
22	E A 350	260	250	250	315	270	A	A	A	A	A	S	A	A	A	A	A	A	A	A	A	A	A	A
23	A	A	E A 335	305	250	H 235	E A 240	A	240	A	A	A	A	A	A	A	A	A	A	E A 280	E A 305	E A 325	280	E A 295
24	E A 290	E A 320	275	260	240	H 230	A	A	A	210	A	235	230	A	A	A	A	E A 255	A	U A 240	A 235	240	E A 305	E A 340
25	A	A	E A 305	255	305	275	E A 265	A	A	A	A	A	A	215	A	C	A	A	A	A	A 260	C	C	C
26	C	C	300	305	320	250	225	A	A	A	205	A	A	A	A	A	A	A	A	A	A	A 250	A	A
27	A	A	295	A	A	E A 280	E A 250	A	A 240	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
28	A	A	A	270	300	260	A	A	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	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	17	25	24	26	24	13	6	6	3	3	4	4	3	6	7	6	8	5	16	22	18	20	17
MED	E A 300	U 290	U 278	268	269	248	228	218	231	205	205	215	215	212	225	U 218	215	U 224	235	U A 236	U A 242	254	272	272
UQ	E A 310	E A 320	302	292	300	263	E A 240	235	E A 255	208	208	230	235	222	230	E E 250	230	248	240	E A 275	E A 275	E A 290	294	E A 315
LQ	278	280	258	260	250	235	225	205	240	202	200	195	208	212	220	220	205	212	230	240	235	245	261	260

JUL. 1987 | H'F (KM)

IONOSPHERIC DATA

JUL. 1987 | H'E (KM) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' 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						A	E A 135	110	105	110	105	B	E A 130	110	115	110	110	115	A					
2						120	115	110	110	105	110	A	A	A	A	110	115	115	A					
3						A	115	110	110	115	110	110	115	110	110	110	A	A	A					
4						B	110	110	105	110	105	A	A	110	110	115	115	110	105					
5						A	115	110	110	110	110	110	110	110	110	115	A	115	115					
6						A	E A 120	110	105	A	110	110	110	115	120	115	115	115	120					
7						A	110	110	E S 120	115	110	115	120	110	115	110	115	110	115					
8						A	110	110	105	A	A	A	110	S	110	110	110	110	120					
9						A	125	110	105	110	110	110	110	120	A	110	A	125	115					
10						E B 140	115	110	110	110	115	A	110	A	A	A	110	115	A					
11						A	110	110	110	110	110	110	110	110	115	A	A	A	A					
12						B	110	110	110	A	A	105	110	110	A	115	110	115	125					
13						A	115	110	105	110	110	A	A	A	A	110	115	A	A					
14						A	110	110	110	110	A	A	A	A	A	A	A	A	A					
15						E A 135	115	110	105	110	110	115	115	115	110	110	A	A	B					
16						135	115	110	110	110	110	A	110	A	A	A	110	115	120					
17						E B 140	120	115	110	115	115	A	A	A	A	A	A	A	A					
18						A	A	110	105	105	A	A	A	A	110	115	115	110	E B 125					
19						A	115	115	110	110	115	115	115	110	110	A	A	A	A					
20						A	A	E A 120	110	110	110	110	120	115	110	110	115	115	A					
21						130	115	110	115	110	110	115	115	115	115	115	115	120	120					
22						A	115	110	110	115	110	S	110	110	110	115	115	115	125					
23						A	115	110	115	115	115	A	A	A	A	A	A	A	A					
24						B	A	110	110	A	115	115	115	115	115	115	115	115	120					
25						A	110	110	110	110	115	A	A	A	A	C	A	A	E A 125					
26						125	110	110	A	A	115	A	110	115	115	115	115	110	A					
27						A	A	110	110	C	C	C	C	C	C	C	C	C	C					
28						A	A	A	A	C	C	C	C	C	C	C	C	C	C					
29						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
30						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
31						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
	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						7	23	27	26	21	22	12	18	16	16	18	16	17	13					
MED						128	115	110	110	110	110	110	110	110	110	112	115	115	120					
UQ						E E 138	115	110	110	110	115	115	115	115	115	115	115	115	125					
LQ						125	110	110	105	110	110	110	110	110	110	110	110	110	115					

JUL. 1987 | H'E (KM)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | H'ES (KM) | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' 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	105	105	105	105	105	105	130	125	120	115	110	120	115	125	140	120	115	110	105	110	105	105	110	110
2	110	105	100	100	95	G	120	115	115	110	110	110	110	105	120	145	135	120	110	115	115	115	115	110
3	110	110	105	110	105	120	115	115	115	120	115	115	110	115	115	110	105	105	105	105	100	120	115	110
4	115	105	105	110	105	125	115	115	105	110	105	105	105	115	115	110	120	120	115	110	115	110	110	110
5	105	100	110	100	100	105	130	135	125	115	110	110	110	105	110	115	115	120	115	120	115	100	105	110
6	105	105	105	105	100	100	115	110	115	110	160	165	130	125	130	125	125	120	110	115	110	125	115	120
7	120	115	115	110	110	115	115	110	115	110	105	110	115	115	120	125	120	115	110	110	115	110	115	105
8	105	130	110	100	110	115	110	105	105	110	110	130	125	130	135	125	120	115	110	110	105	115	110	105
9	110	110	110	105	110	125	120	115	105	110	115	105	110	115	125	115	110	130	120	115	110	115	110	110
10	100	100	100	100	100	135	115	110	110	110	110	105	105	105	130	125	120	115	110	110	110	105	125	120
11	125	105	100	95	95	100	115	110	115	110	110	110	115	110	110	110	105	110	110	100	105	100	115	110
12	105	100	100	100	130	125	115	110	110	125	105	160	130	120	105	125	115	135	115	115	115	110	105	110
13	105	100	100	100	105	125	120	110	100	110	110	110	110	120	115	120	115	105	110	110	110	110	110	110
14	110	105	110	110	105	125	120	110	115	110	110	110	110	100	105	105	120	115	120	115	110	110	110	110
15	110	110	105	105	105	110	115	110	110	110	110	110	115	120	115	110	110	105	115	115	115	115	110	115
16	110	110	105	105	110	135	115	115	145	45	115	130	110	110	115	110	120	120	115	115	115	110	110	110
17	110	115	110	100	105	155	130	110	110	115	115	110	110	110	110	110	130	120	115	115	100	105	115	110
18	110	105	105	105	100	115	110	115	110	110	105	110	105	120	120	125	130	115	115	115	110	115	110	110
19	110	105	110	145	B	110	110	120	110	120	115	115	115	115	110	105	105	110	105	105	105	105	120	110
20	110	110	110	110	105	105	125	125	115	110	120	125	160	135	120	120	120	120	110	110	110	115	110	110
21	105	105	110	110	105	130	120	115	115	110	110	115	110	115	115	130	125	120	110	115	110	115	110	S
22	110	105	110	110	120	120	115	110	110	115	110	S	120	125	125	125	120	115	115	115	115	110	115	110
23	105	100	100	100	125	115	110	110	115	110	110	110	110	110	110	105	105	105	105	100	115	110	115	110
24	105	110	110	110	115	110	110	105	105	125	135	130	125	120	125	120	120	125	115	110	115	110	110	110
25	105	110	105	105	105	110	120	110	110	110	110	110	110	105	105	C	105	125	115	115	115	C	C	C
26	C	C	110	110	125	125	120	115	110	110	115	105	110	130	130	125	130	115	110	105	110	105	105	105
27	105	105	105	100	105	105	110	110	115	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
28	105	100	95	100	100	120	120	120	110	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	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	27	27	28	28	27	27	28	28	28	26	26	25	26	26	26	25	26	26	26	26	26	25	25	24
MED	110	105	105	105	105	115	115	110	110	110	110	110	110	115	115	120	120	115	110	112	110	110	110	110
UQ	110	110	110	110	110	125	120	115	115	115	115	120	115	120	125	125	120	120	115	115	115	115	115	110
LQ	105	105	102	100	102	110	115	110	110	110	110	110	110	110	110	110	110	110	110	110	110	105	110	110

JUL. 1987 | H'ES (KM)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | TYPES OF ES | 135° E Mean Time (G.M.T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' 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 3	F 5	F 4	F 5	F 5	L 2	CL 22	C 3	C 4	C 4	C 2	C 2	CL 31	C 2	H 2	C 4	C 4	C 4	L 4	F 3	F 3	F 4	F 3	F 3
2	F 4	F 2	F 3	F 3	F 2		C 3	C 4	C 4	C 2	C 3	L 3	L 3	L 3	CL 23	H 2	H 2	C 5	C 3	F 4	F 5	F 5	F 3	F 4
3	F 5	F 4	F 3	F 3	F 3	C 3	C 5	C 4	C 3	C 2	C 2	C 2	C 3	C 2	C 2	C 2	L 3	L 4	LH 41	F 4	F 4	FF 54	F 5	F 4
4	F 5	F 4	F 4	F 2	F 3	C 1	C 3	C 3	C 3	C 3	C 2	L 3	L 3	C 2	C 3	C 3	C 3	C 3	C 3	F 4	F 1	F 1	F 3	F 4
5	FF 22	F 3	F 2	F 3	F 3	C 2	CH 12	H 3	H 2	C 2	C 3	C 3	C 2	C 2	C 3	C 1	C 2	C 2	C 3	FF 41	F 3	F 3	F 2	F 4
6	F 4	F 4	F 4	F 2	F 3	L 3	CL 42	C 4	C 2	L 2	H 1	H 1	H 2	H 2	H 2	C 2	C 2	C 1	C 2	F 4	F 2	F 2	F 2	F 2
7	FF 21	F 3	F 3	F 4	F 3	L 4	C 4	C 4	C 2	C 2	C 4	C 3	C 3	C 2	C 2	H 2	C 4	C 4	C 3	F 3	F 2	F 3	FF 23	F 4
8	F 3	FF 13	F 2	F 2	F 1	CL 41	C 3	C 4	C 2	L 2	L 3	HL 12	C 2	H 1	H 1	H 2	H 2	C 4	C 4	F 4	F 5	F 3	F 4	F 3
9	F 5	F 4	F 3	F 3	F 2	C 5	CL 21	C 3	C 3	C 3	C 2	C 3	C 2	C 2	CL 11	C 2	C 2	HL 22	C 3	F 3	F 3	F 5	F 5	F 5
10	F 3	F 4	F 3	F 4	F 2	HL 31	C 4	C 2	C 2	C 3	C 2	L 2	C 2	L 3	HL 22	HL 23	C 3	C 3	C 3	F 5	F 3	F 4	FF 24	FF 24
11	FF 12	F 3	F 4	F 3	F 3	L 2	C 4	C 3	C 3	C 2	C 2	C 2	C 2	C 3	C 3	L 3	L 3	L 3	L 2	F 4	F 2	F 3	F 2	FF 42
12	F 4	F 4	F 4	F 3	FF 11	C 3	C 3	C 3	C 4	CL 12	L 2	HC 11	HC 21	CL 11	L 2	C 1	C 2	HC 23	C 3	C 4	F 4	F 3	F 2	F 3
13	F 2	F 2	F 3	F 3	F 2	CL 21	C 3	C 4	C 4	C 3	C 3	L 3	L 2	L 1	L 1	C 1	C 2	L 3	L 3	F 4	F 3	F 3	F 3	F 3
14	F 3	F 4	F 4	F 3	F 4	C 4	C 5	C 4	C 3	C 3	L 3	L 3	L 2	L 3	L 3	L 3	CL 23	CH 31	CL 42	F 4	FF 32	F 4	F 4	F 5
15	F 5	F 4	F 4	F 4	F 3	L 2	C 4	C 3	C 3	C 3	C 3	C 2	C 2	C 1	C 2	C 2	L 2	L 3	C 4	F 4	F 4	F 4	F 4	F 3
16	F 4	F 5	F 4	F 4	F 3	C 2	C 4	C 5	HC 12	C 3	C 2	HC 12	C 2	L 2	L 2	L 2	H 3	C 4	C 3	F 4	F 5	F 4	F 3	F 1
17	F 3	F 3	F 2	F 3	F 3	H 2	H 4	C 3	C 4	C 3	C 2	L 2	L 2	L 3	L 2	L 2	HL 22	CL 22	CL 32	FF 23	F 3	F 3	F 3	F 3
18	F 4	F 4	F 4	F 5	F 4	CL 22	CL 52	C 4	C 2	C 3	L 3	L 3	L 3	HL 22	H 3	H 2	H 1	C 2	C 3	F 5	F 2	F 5	F 3	F 5
19	F 4	F 4	F 1	F 1		L 3	C 3	C 2	C 2	C 1	C 2	C 2	C 2	C 2	C 2	L 3	L 3	L 5	L 4	F 4	F 3	F 2	FF 32	F 4
20	F 5	F 3	F 2	F 3	F 3	L 4	CL 12	HL 22	C 2	C 2	C 2	C 2	H 1	H 1	H 2	C 1	C 2	C 2	C 3	F 4	F 2	F 3	F 4	F 3
21	F 2	F 2	F 3	F 3	F 3	C 3	C 3	C 3	C 2	C 3	C 2	C 2	C 2	C 2	C 3	H 3	C 3	C 3	C 5	F 4	FF 24	F 4	F 3	
22	F 4	F 2	F 3	F 3	FF 23	L 3	C 3	C 4	C 3	C 2	C 2		C 2	C 2	H 3	H 2	C 3	C 4	C 4	F 4	F 4	F 3	F 2	F 2
23	F 4	F 4	F 3	F 3	FF 12	C 2	C 3	C 3	C 2	C 3	C 2	L 3	L 3	L 2	L 3	L 3	L 3	L 4	L 4	F 4	FF 34	FF 42	F 4	F 4
24	F 4	F 3	F 4	F 3	F 2	L 2	L 3	C 4	C 2	CL 11	H 1	H 1	H 1	C 2	C 2	C 2	C 2	C 2	C 3	F 5	F 3	F 2	F 3	F 4
25	F 4	F 2	F 3	F 2	F 2	L 3	C 3	C 4	C 4	C 3	C 2	L 3	L 3	L 1	L 2		L 2	CL 22	CL 21	FF 22	FF 22			
26			F 2	F 2	F 1	C 1	C 2	C 2	C 2	C 3	C 1	LC 12	C 2	H 2	H 2	H 3	H 2	C 2	C 4	F 4	F 4	F 3	F 4	F 5
27	F 6	F 3	F 3	F 5	F 4	L 3	CL 32	C 3	C 2															
28	F 3	F 4	F 4	F 3	F 2	C 2	C 3	C 5	C 4															
29																								
30																								
31																								
	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

JUL. 1987 | TYPES OF ES

IONOSPHERIC DATA

JUL. 1987 | FXI (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station YAMAGAWA Lat. 31° 12.1' N, Long. 130° 37.1' 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	48	46	45	A	45	37															X 63	X 44	A	A
2	47	45	X 39	X 35	X 32	X 36															X 78	X 62	57	54
3	53	53	52	50	48	46															X 82	X 67	X 55	64
4	58	55	57	48	52	X 37															X 93	X 72	X 49	A
5	A	A	45	45	35	X 32															C	C	C	C
6	C	C	C	C	C	44															X 64	A	56	58
7	60	47	50	48	52	41															X 75	X 63	70	72
8	61	65	60	55	60	60			73	56											X 84	A	A	A
9	51	40	43	50	50	35															U X 55	X 46	O X 42	A
10	48	48	45	46	44	42							70	63							X 68	63	65	76
11	69	69	60	64	49	50			68												X 66	X 58	X 54	X 51
12	51	X 51	X 50	X 45	X 40	40															X 72	65	70	65
13	A	48	47	46	46	45															71	X 60	X 54	X 43
14	53	47	56	53	43	46															A	A	A	A
15	45	A	A	A	A	A															X 71	64	60	62
16	70	63	57	55	57	54															X 74	X 67	X 58	56
17	50	47	X 48	X 43	X 36	A															X 56	X 58	X 56	60
18	60	62	63	68	60	38															X 70	X 68	70	73
19	68	67	66	59	52	44															X 62	X 63	X 61	66
20	69	57	58	60	X 44	37				80						A					X 72	X 71	72	75
21	63	61	61	55	52	50	61														X 79	79	66	75
22	73	73	67	60	50	A						65									O X 74	70	59	A
23	A	60	61	61	57	49															X 67	O S 63	60	73
24	70	68	67	62	54	60															X 63	X 59	57	60
25	57	59	60	50	54	49	60	79		65											X 79	X 75	72	73
26	72	69	61	53	59	54															X 71	X 58	A	A
27	A	57	A	A	46	45															X 80	X 68	A	60
28	A	65	68	63	62	60															X 78	X 66	X 64	X 66
29	68	64	67	67	65	58															A	X 58	O X 51	X 48
30	X 49	S 53	X 44	A	A	A															X 64	66	63	A
31	63	49	51	55	54	X 36															X 94	X 69	X 60	X 50
	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	25	28	28	26	28	27	2	1	2	3		1	1	1							28	27	25	22
MED	60	57	57	54	51	45	60	79	70	65		65	70	63							X 72	X 64	60	63
UQ	68	64	61	60	56	50				72											X 78	X 68	65	73
LQ	51	48	48	48	44	38				60											X 65	X 60	X 56	56

JUL. 1987 | FXI (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FOF2 (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station YAMAGAWA Lat. 31° 12.1' N, Long. 130° 37.1' 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	A	F	F	44	51	55	A	A	52	A	A	A	62	78	77	80	93	57	38	A	A
2	F	F	33	29	26	30	42	A	55	58	A	A	A	A	73	63	53	59	70	72	72	56	F	F
3	F	F	F	F	F	F	46	55	A	A	A	A	57	61	61	72	79	78	83	85	76	61	49	F
4	F	F	F	F	F	31	39	49	A	66	62	56	56	60	A	72	77	82	89	97	87	66	S 43	A
5	A	A	F	F	F	26	H 36	61	80	A	A	A	A	60	A	A	74	76	C	C	C	C	C	C
6	C	C	C	C	C	F 37	51	A	57	A	A	47	55	53	57	A	69	85	96	76	58	A	F 46	F 44
7	F 45	J F 40	F	F	F	F 30	38	50	63	52	A	A	52	56	59	63	69	79	79	66	68	J S 57	F 60	F
8	F 51	F	F	F	J F 39	F 38	49	51	F 66	F 49	55	47	48	59	56	53	57	69	81	102	78	A	A	A
9	F	F 30	F	F	F	F 25	A	51	R 70	60	A	A	57	64	A	A	63	74	84	81	U S 49	S 40	36	A
10	F	F	F	F 34	F 31	F 32	40	A	A	62	R 60	66	62	F 55	52	64	75	67	65	J R 50	62	F 54	U F 51	F
11	F	F	F	F	F	F	39	49	F 60	54	A	A	A	A	63	59	59	50	A	54	60	52	48	45
12	F 43	45	44	39	34	F 31	43	54	66	77	50	E G 46	51	54	54	56	60	63	54	J S 49	66	F 57	F 61	F
13	A	F	F	F	F	F	46	42	49	55	57	A	61	61	61	H 59	58	61	70	59	F	54	48	S 37
14	F	F	F	F	F	F	46	49	53	61	A	A	A	A	63	56	59	67	58	63	A	A	A	A
15	F	A	A	A	A	A	A	A	68	60	A	A	R 48	A	60	63	64	60	76	67	65	F	F	F
16	F	F	F	F	F	F	41	54	A	A	A	A	64	50	47	A	A	76	71	64	63	61	52	F
17	F	F	42	37	30	A	48	59	50	A	50	58	60	A	64	76	72	81	92	77	50	52	50	F
18	F	F	F	F	F	F	37	A	71	55	56	A	57	58	68	64	68	71	72	82	64	62	F	F
19	F	F	F	F	F	F	47	A	A	48	A	A	56	64	75	73	65	71	64	59	56	57	55	F
20	F	J F 50	S 48	U F 47	S 38	F 24	39	47	59	F 73	A	A	A	64	53	A	54	R 61	A	65	66	65	F 60	F
21	F	F	F	F	J F 38	F 39	F 43	64	61	56	A	A	A	A	A	H 66	68	74	81	79	72	S 71	F	F
22	F	F	F	F	J F 42	A	54	78	A	A	63	F 55	62	A	64	68	65	71	31	83	S 68	F 63	F	A
23	A	F	F	F	U F 45	F 40	47	54	59	62	71	63	A	61	65	77	78	76	67	56	J S 61	U S 57	F	F
24	F	F	F	F	F	F 41	47	68	56	55	R 62	A	63	R 66	71	77	82	80	33	77	S 57	S 53	U F 49	F
25	F 47	F	J F 43	F	F	F	F	U F 73	76	F 56	53	62	66	72	82	99	89	82	81	72	73	69	F 64	F
26	F	F	F	F	F	F	59	60	58	A	A	61	56	61	66	78	87	79	83	J R 75	65	S 52	A	A
27	A	F	A	A	F	F	46	A	60	A	62	A	A	60	65	78	87	84	77	69	74	62	A	F
28	A	F	F	F	F	F	46	64	93	65	A	A	A	A	A	71	A	A	65	69	72	60	58	60
29	F	F	F	F	F	F	30	42	51	A	A	A	A	A	51	58	57	A	52	60	A	52	S 45	42
30	43	47	38	A	A	A	34	48	A	A	A	A	52	A	53	62	59	64	60	57	58	F	F	A
31	F	F	F	F	F	30	34	49	66	62	55	A	56	62	A	63	68	65	66	80	83	63	54	44
	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	5	6	5	9	14	28	24	24	20	13	11	20	20	24	26	29	29	28	30	27	25	18	6
MED	F 45	F 45	42	37	F 38	F 31	44	52	60	59	57	56	56	60	62	64	68	74	76	70	66	57	50	44
UQ	F 47	47	44	39	J F 39	F 38	47	60	67	62	62	62	62	63	66	73	77	79	82	80	72	62	F 58	45
LQ	F 43	F 40	38	34	31	F 30	39	49	56	55	55	50	54	57	56	62	59	65	66	60	59	53	48	42

JUL. 1987 | FOF2 (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FOF1 (0.01 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station YAMAGAWA Lat. 31° 12.1' N, Long 130° 37.1' 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								A	A	A	A	A	A	A	A	U A 430	A	A	A	L				
2								A	A	U A 420	A	A	A	A	A	430	410	390	L 350					
3								A	A	A	A	A	A	U A 450	440	U A 440	A	390	350					
4								A	A	420	A	440	450	U A 450	A	A	A	A	A					
5								L 360	L 390	A	A	A	A	U A 450	A	A	A	A	C	C				
6							L	A	A	A	A	430	U A 450	440		A	A	A	A					
7								360	400	U A 420	A	A	U A 440	430	A	420	U A 410	400	350					
8							L	390	400	U L 430	430	430	440	430	420	420	A	A	A					
9							A	A	A	A	A	A	A	A	A	A	A	U A 400	350					
10							A	A	A	410	A	420	440	440	430	410	U A 410	U A 400	A	L				
11								370	380	A	A	A	A	A	A	420	U A 420	A	A	L				
12							L	L 370	400	U A 410	450	460	440	440	430	A	410	A	A	A				
13									U L 400	430	U A 440	A	A	U A 450	A	U A 440	410	U A 400	A					
14								A	410	420	A	A	A	A	A	430	390	A	L					
15							A	A	400	U A 430	A	A	450	A	A	430	410	390	350					
16							L 310	L	A	A	A	A	450	450		A	A	A	A					
17							L	A	A	A	440	440	U A 450	A	A	A	A	A	360					
18								A	A	U L 430	R 440	A	U A 470	A	A	440	U A 440	A	A					
19							A	A	A	L 430	A	A	A	A	A	440	430	U A 400	350					
20								L 410	400	430	A	A	A	U A 450	470	A	U A 420	A	A					
21								390	U A 400	A	A	A	A	A	A	440	440	A	A					
22							L	A	A	A	A	470	460	A	460	A	430	410	A	L					
23							L	L	A	U A 420	440	A	A	480	490	470	450	420	360					
24								L	420	480	480	A	490	U L 480	470	A	A	A	A	L				
25							L	400	420	440	500	490	480	480	460	450	440	L 430	A	A				
26							L	L	L 410	A	A	470	470	460	460	460	440	420	L 370	A				
27								A	A	A	A	A	A	A	L 450	450	440	420	A	A		A		
28								U A 410	U A 420	U L 450	A	A	A	A	A	430	A	A	L 380	A				
29								350	A	A	A	A	A	A	440	430	430	A	370	A				
30								390	A	A	A	A	A	A	450	U A 440	U A 450	U A 410	L					
31								390	A	420	L 460	A	460	460	A	440	420	L 420	L	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							1	12	14	17	9	9	15	16	13	21	20	15	12					
MED							L 310	390	400	430	440	440	450	450	450	440	425	400	350					
UQ								395	410	430	460	470	465	460	460	440	440	420	365					
LQ								365	400	420	440	430	445	440	440	430	410	400	350					

JUL. 1987 | FOF1 (0.01 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FOE (0.01 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station YAMAGAWA Lat. 31° 12.1' N, Long 130° 37.1' 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							A	255	295	U A 310	325	A	A	350	345	320	A	A	A	S				
2							S	A 290		A	A	A	A	A	A 310		A	A	A	S				
3							A	240	A	305	A	330	A	A	A	A	A	A	A	S				
4							S	A	A	A	A	A	A	A	U A 350	325	300	260	200	S				
5							S	A	A	A	A	A	A	A	A	A	A	A	C	C				
6							S	240	300	A	A	U A 350	350	350	345	320	300	260	A	A				
7							S	A	A	A	A	A	A	A	350	A	A	A	A	A				
8							175	A	A	A	335	350	355	350	345	325	305	270	210	A				
9							S	240	290	A 300	A	A 340	A	A	A	A	A	A	A	A				
10							S	A	A	A	A	U A 345	A	U A 360	U A 345	315	300	270	A 220	A				
11							A	A	A	A	A	A	A	A	A	A	A	A	A	S				
12							S	A 280		A	A	A	A	A	340	R 325	305	270	210	S				
13							S	A	A	A	A	A	A	A	A	A	A	A	A	S				
14							170	240	A	A	A	A	A	A	A	A	305	275	220	S				
15							S	A	A	A	A	A	A	A	A	A	305	270	225	S				
16							S	250	285	S 300	A	A	A	A	A	A	A	A	A	S				
17							S	240	A	A	A	A	A	A	A	A	A	A	A	S				
18							180	240	A	305	340	345	350	350	340	330	305	280	210	S				
19							S	A	A	A	A	A	A	A	A	A	A	A	A	S				
20							S	A	A	A	A	A	350	360	350	330	305	290	A	S				
21							S	245	A 295	A 310	A	A	A	A	A	A	A	295	A	S				
22							S	245	A	A	A	355	360	360	350	325	310	290	A	S				
23							S	A	A	A	U A 350	A	360	R 365	R 355	350	A	A	A	S				
24							A	A	300	320	350	A	U A 360	360	350	340	320	295	220	S				
25							S	A	A	A	A	A	U A 365	U A 365	U A 360	R 345	U A 310	U A 290	A	S				
26							S	U A 250	300	A	A	A	A	U A 360	U A 355	345	320	290	220	S				
27							S	A	A	A	A	A	A	A	R 355	A	320	295	225	S				
28							S	240	A	A	A	A	A	A	A	A	A	A	A	S				
29							S	245	A	A	A	A	A	A	U A 360	340	305	285	215	S				
30							S	A	A	A	A	A	A	A	U A 360	U A 340	305	275	220	S				
31							S	U A 245	A	A	A	A	A	A	A	340	325	280	225	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							3	14	9	7	5	7	8	11	17	17	17	18	13					
MED							175	242	295	305	340	345	358	360	350	330	305	280	220					
UQ							178	245	300	310	350	350	360	360	U A 355	340	310	290	220					
LQ							172	240	290	302	335	342	350	350	345	325	305	270	210					

JUL. 1987 | FOE (0.01 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FOES (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

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

Day \ 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	JA 30	JA 26	JA 27	JA 41	JA 40	JA 27	JA 36	JA 52	JA 78	JA 74	JA 91	JA 72	JA 99	JA 80	JA 121	JA 62	JA 71	JA 75	JA 71	JA 35	ES 16	JA 31	JA 52	JA 87
2	JA 26	JA 25	JA 25	JA 32	JA 22	JA 17	JA 25	JA 65	JA 53	JA 61	JA 90	JA 99	JA 137	JA 80	JA 83	JA 45	39	32	JA 41	JA 50	JA 84	JA 36	JA 34	JA 25
3	JA 28	JA 72	JA 36	JA 34	JA 27	JA 25	JA 34	JA 65	JA 90	JA 142	JA 71	JA 56	JA 67	JA 64	JA 61	JA 50	JA 45	42	JA 41	JA 49	JA 41	JA 31	JA 51	JA 41
4	JA 41	JA 80	JA 43	JA 38	JA 43	JA 65	JA 32	JA 62	JA 168	JA 90	JA 100	JA 40	JA 40	JA 51	JA 88	JA 72	JA 90	JA 84	JA 71	JA 64	JA 42	JA 44	JA 40	JA 44
5	JA 41	JA 40	JA 30	JA 21	JA 18	JA 18	JA 25	JA 40	JA 53	JA 90	JA 86	JA 101	JA 127	JA 84	JA 177	JA 166	JA 61	JA 87	C	C	C	C	C	C
6	C	C	C	C	C	JA 84	24	JA 64	JA 63	JA 99	JA 60	39	JA 49	43	JA 53	JA 62	JA 61	JA 71	JA 64	JA 57	JA 32	JA 82	JA 30	JA 18
7	JA 17	JA 83	JA 32	JA 26	JA 44	JA 80	JA 53	JA 61	JA 62	JA 56	JA 96	JA 74	58	JA 54	JA 50	JA 44	JA 53	JA 42	JA 54	JA 53	JA 25	31	JA 42	JA 75
8	JA 40	JA 29	JA 20	22	JA 19	JA 19	24	JA 50	JA 54	JA 48	JA 36	39	39	47	40	JA 51	JA 60	JA 49	JA 58	JA 70	JA 51	JA 84	JA 84	58
9	JA 25	53	JA 31	JA 20	JA 44	JA 41	JA 84	53	JA 76	JA 60	JA 144	JA 103	JA 69	JA 73	JA 86	JA 95	JA 83	JA 54	JA 34	JA 54	JA 53	JA 40	31	JA 50
10	JA 58	JA 38	JA 41	JA 53	JA 37	JA 86	JA 65	JA 110	JA 87	JA 37	JA 88	JA 40	JA 51	JA 44	41	42	JA 71	JA 102	JA 60	JA 65	JA 110	JA 61	JA 34	JA 30
11	39	JA 50	JA 53	JA 28	JA 30	JA 51	JA 79	JA 53	JA 53	JA 75	JA 107	JA 135	JA 223	JA 97	JA 70	JA 35	JA 45	45	JA 95	JA 22	JA 18	JA 20	JA 17	JA 20
12	JA 17	17	JA 20	ES 16	ES 16	JA 17	JA 42	JA 46	JA 47	JA 63	JA 64	JA 50	JA 52	36	JA 54	JA 64	JA 43	JA 85	JA 41	JA 50	JA 84	JA 78	JA 83	JA 90
13	JA 65	JA 51	JA 30	JA 25	JA 30	JA 17	JA 33	JA 74	JA 41	JA 52	JA 61	JA 77	JA 79	JA 73	JA 74	JA 49	JA 54	JA 47	JA 53	JA 50	JA 48	JA 29	JA 44	JA 33
14	JA 61	JA 70	JA 53	JA 33	JA 39	JA 43	JA 63	JA 41	JA 100	JA 135	JA 150	JA 181	JA 168	JA 130	JA 87	JA 41	JA 82	JA 80	JA 78	JA 38	JA 170	JA 108	JA 95	JA 73
15	JA 65	JA 75	JA 54	JA 61	JA 63	JA 84	JA 45	JA 144	JA 53	JA 55	JA 87	JA 60	JA 50	JA 87	JA 77	JA 47	33	35	29	JA 41	JA 76	JA 41	JA 41	JA 40
16	JA 60	ES 16	JA 50	JA 65	JA 51	JA 17	24	34	JA 61	JA 58	JA 87	JA 114	JA 144	JA 79	JA 85	JA 90	JA 107	JA 86	JA 65	JA 60	JA 70	JA 90	JA 89	JA 87
17	JA 41	JA 33	JA 22	JA 18	JA 44	JA 52	JA 35	JA 53	JA 85	JA 89	JA 80	JA 60	JA 77	JA 138	JA 85	JA 77	JA 76	JA 74	JA 58	JA 54	JA 31	JA 30	JA 40	JA 32
18	JA 42	JA 50	JA 60	JA 42	JA 89	JA 50	JA 47	JA 71	JA 75	JA 170	JA 215	JA 81	51	50	JA 75	JA 47	47	JA 88	JA 78	JA 61	JA 60	JA 75	JA 70	JA 34
19	JA 42	JA 55	JA 40	JA 44	JA 20	JA 30	JA 65	JA 87	JA 140	JA 43	JA 90	JA 144	JA 93	JA 83	JA 81	35	JA 50	JA 70	JA 41	JA 30	JA 31	JA 34	JA 36	JA 21
20	JA 25	JA 40	JA 20	JA 25	24	JA 20	JA 29	JA 41	JA 43	60	JA 108	JA 145	JA 62	51	JA 78	JA 97	JA 110	JA 65	JA 182	93	JA 49	JA 51	JA 82	JA 41
21	JA 40	JA 33	JA 25	18	22	20	22	31	JA 47	JA 61	JA 87	JA 84	JA 73	JA 139	JA 145	JA 42	JA 52	JA 60	JA 74	JA 58	JA 50	JA 84	JA 41	JA 50
22	JA 60	JA 85	JA 50	JA 30	JA 41	JA 65	JA 54	JA 100	JA 120	JA 89	JA 160	JA 143	48	JA 74	JA 57	JA 121	JA 49	JA 43	JA 74	JA 87	JA 84	90	JA 84	JA 84
23	JA 68	JA 73	JA 51	36	JA 17	ES 16	23	JA 114	JA 107	JA 50	JA 45	JA 67	JA 93	43	45	43	JA 45	JA 37	30	JA 101	JA 51	JA 44	JA 39	JA 84
24	JA 25	JA 75	JA 38	JA 41	31	JA 32	JA 25	32	JA 52	JA 64	JA 78	JA 66	JA 45	37	44	JA 67	JA 89	JA 87	JA 82	JA 65	133	JA 32	JA 36	JA 40
25	JA 52	JA 84	JA 26	JA 17	JA 18	21	JA 31	JA 54	JA 42	JA 43	JA 77	JA 47	42	42	33	36	47	JA 54	JA 56	JA 49	JA 43	JA 26	JA 65	JA 50
26	JA 79	JA 83	JA 80	JA 42	JA 19	JA 25	JA 28	29	39	JA 87	JA 107	JA 78	JA 44	42	43	41	43	37	JA 40	JA 58	JA 70	JA 52	JA 95	51
27	JA 65	JA 65	JA 53	JA 80	JA 86	JA 84	JA 64	JA 65	39	JA 80	JA 83	JA 97	JA 141	JA 77	G	JA 56	G	41	JA 71	JA 85	JA 87	JA 84	JA 100	JA 34
28	JA 101	JA 52	JA 24	ES 16	ES 16	ES 16	22	JA 45	JA 61	JA 53	JA 77	JA 181	JA 152	JA 112	JA 92	JA 56	JA 74	JA 77	JA 135	JA 75	JA 50	JA 24	JA 32	JA 24
29	JA 26	JA 37	JA 36	JA 38	JA 39	JA 41	JA 26	JA 32	JA 136	JA 73	JA 110	JA 66	JA 100	JA 87	45	JA 49	JA 46	JA 67	JA 33	JA 38	JA 75	JA 25	JA 80	JA 33
30	JA 24	JA 80	JA 61	JA 85	JA 65	JA 73	28	JA 40	JA 61	JA 83	JA 74	JA 111	JA 46	JA 73	49	JA 50	JA 51	JA 41	JA 36	JA 25	JA 54	JA 32	JA 31	JA 79
31	JA 52	JA 52	JA 26	JA 24	JA 30	JA 30	JA 35	36	JA 85	JA 80	JA 42	JA 103	JA 85	JA 74	JA 135	39	41	33	JA 37	JA 66	JA 76	JA 51	JA 18	JA 17
	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	30	30	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	30	30	30	30
MED	JA 41	JA 52	JA 36	JA 32	JA 30	JA 30	JA 33	JA 53	JA 61	JA 64	JA 87	JA 78	JA 69	JA 74	JA 74	JA 50	JA 52	JA 60	JA 58	JA 56	JA 52	JA 42	JA 42	JA 41
UQ	JA 60	JA 75	JA 51	JA 42	JA 44	JA 58	JA 50	JA 65	JA 86	JA 88	JA 104	JA 107	JA 100	JA 84	JA 86	JA 66	JA 72	JA 78	JA 74	JA 65	JA 76	JA 78	JA 82	JA 73
LQ	JA 26	JA 37	JA 26	JA 22	JA 20	JA 20	JA 25	JA 40	JA 52	JA 56	JA 76	JA 60	JA 50	48	47	JA 42	JA 45	JA 42	JA 41	JA 49	JA 42	JA 31	JA 34	JA 32

JUL. 1987 | FOES (0.1 MHZ)

IONOSPHERIC DATA

JUL. 1987 | FBES (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station YAMAGAWA Lat. 31° 12.1' N, Long 130° 37.1' 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	ES 16	24	ES 16	AA 41	ES 16	20	33	46	46	AA 74	AA 91	48	AA 99	AA 80	AA 121	43	UA 41	72	40	31	ES 16	28	AA 52	AA 87
2	ES 16	ES 16	ES 16	ES 16	18	ES 16	20	AA 65	43	42	AA 90	AA 99	AA 137	AA 80	55	37	32	32	35	28	35	20	ES 16	ES 16
3	ES 16	29	24	25	ES 16	20	26	51	AA 90	AA 142	AA 71	AA 56	54	45	39	44	UA 43	39	32	43	36	21	31	34
4	ES 16	20	30	18	20	ES 16	22	42	AA 168	38	45	38	40	45	AA 88	54	72	62	60	52	41	36	32	AA 44
5	35	AA 40	25	20	18	17	23	30	36	AA 90	AA 86	AA 101	AA 127	45	AA 177	AA 166	46	54	C	C	C	C	C	C
6	C	C	C	C	C	ES 16	21	AA 64	48	AA 99	AA 60	37	45	42	50	AA 62	60	45	33	28	26	AA 82	17	ES 16
7	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	24	33	36	42	AA 96	AA 74	44	G	45	41	41	33	34	53	21	21	30	22
8	30	20	ES 16	ES 16	ES 16	ES 16	23	27	31	34	G	G	G	G	39	37	49	48	53	62	39	AA 84	AA 84	AA 58
9	ES 16	ES 16	ES 16	17	ES 16	19	AA 84	42	60	50	AA 144	AA 103	56	60	AA 86	AA 95	53	40	30	52	36	25	26	AA 50
10	33	ES 16	21	24	ES 16	ES 16	32	AA 110	AA 87	33	49	35	35	36	40	39	41	40	50	20	18	43	25	25
11	31	36	36	26	17	ES 16	24	36	34	47	AA 107	AA 135	AA 223	AA 97	57	32	42	44	AA 95	19	ES 16	ES 16	ES 16	ES 16
12	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	29	29	34	41	41	40	38	36	39	46	36	46	36	36	35	20	43	43
13	AA 65	26	25	ES 16	ES 16	ES 16	28	28	34	39	44	AA 77	50	45	54	44	37	40	33	30	30	22	20	ES 16
14	30	ES 16	27	ES 16	22	ES 16	39	35	33	38	AA 150	AA 181	AA 168	AA 130	55	36	36	44	32	38	AA 170	AA 108	AA 95	AA 73
15	ES 16	AA 75	AA 54	AA 61	AA 63	AA 84	AA 45	AA 144	35	43	AA 87	AA 60	42	AA 87	55	38	G	34	26	40	36	25	ES 16	25
16	30	ES 16	ES 16	ES 16	23	ES 16	19	33	AA 61	AA 58	AA 87	AA 114	40	41	41	AA 90	AA 107	53	40	39	52	42	33	40
17	ES 16	ES 16	18	ES 16	ES 16	AA 52	20	50	41	AA 89	40	40	45	AA 138	52	66	51	50	28	33	ES 16	ES 16	20	ES 16
18	25	30	30	24	ES 16	ES 16	34	AA 71	68	38	40	AA 81	47	49	65	39	44	52	64	54	37	ES 16	45	25
19	33	29	23	22	ES 16	19	37	AA 87	AA 140	35	AA 90	AA 144	93	50	69	33	38	40	26	25	ES 16	25	30	ES 16
20	19	ES 16	ES 16	17	21	ES 16	23	27	32	42	AA 108	AA 145	AA 62	45	42	AA 97	42	48	AA 182	22	18	24	30	31
21	22	27	21	ES 16	ES 16	ES 16	20	27	40	47	AA 87	AA 84	AA 78	AA 139	AA 145	40	38	48	74	58	33	53	29	25
22	19	18	22	19	20	AA 65	26	76	AA 120	AA 89	53	45	39	AA 74	44	49	36	37	48	21	36	ES 16	33	AA 84
23	AA 68	45	25	21	ES 16	ES 16	21	29	45	42	35	61	AA 98	42	42	41	36	33	23	50	23	35	33	21
24	ES 16	25	18	20	19	20	19	29	37	43	41	AA 66	39	G	44	61	48	47	42	22	25	19	20	29
25	29	27	17	ES 16	ES 16	ES 16	25	30	36	38	36	36	39	41	37	G	37	31	45	41	32	19	ES 16	35
26	24	ES 16	ES 16	21	18	19	19	25	34	AA 87	AA 107	41	38	41	42	37	34	37	35	40	36	24	AA 95	AA 51
27	AA 65	37	AA 53	AA 80	29	30	40	AA 65	34	AA 80	55	AA 97	AA 141	53	G	40	G	40	52	40	22	52	AA 100	25
28	AA 101	35	20	ES 16	ES 16	ES 16	20	41	42	43	AA 77	AA 181	AA 152	AA 112	AA 92	40	AA 74	AA 77	29	37	29	ES 16	22	ES 16
29	18	27	23	24	28	28	20	30	47	AA 78	AA 110	AA 66	AA 100	AA 87	38	39	42	AA 67	24	37	AA 75	20	ES 16	ES 16
30	ES 16	ES 16	36	AA 85	AA 65	AA 73	G	29	AA 61	AA 88	AA 74	AA 111	46	AA 78	39	44	45	41	34	23	ES 16	21	20	AA 79
31	40	25	ES 16	18	20	25	30	32	53	35	38	AA 103	40	39	AA 135	35	38	32	33	61	59	39	ES 16	ES 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	30	30	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	30	30	30	30
MED	23	24	21	18	16	ES 16	24	35	42	43	AA 74	AA 74	47	45	50	41	41	44	35	38	32	24	30	25
UQ	33	29	25	24	20	20	31	58	60	AA 79	AA 90	AA 103	AA 98	AA 80	67	52	47	49	50	50	36	39	33	AA 44
LQ	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	20	29	34	33	42	43	40	41	40	38	36	38	32	28	21	20	20	ES 16

JUL. 1987 | FBES (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FMIN (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station YAMAGAWA Lat. 31° 12.1' N, Long. 130° 37.1' 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	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	16	17	17	17	17	17	16	16	16	16	ES 16	ES 16	ES 16	ES 16	ES 16
2	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	16	17	17	22	18	20	17	16	16	16	ES 16	ES 16	ES 16	ES 16	ES 16
3	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	15	16	16	16	18	18	17	17	16	16	16	16	ES 16	ES 16	ES 16	ES 16	ES 16
4	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	16	18	17	20	20	20	18	16	16	16	ES 16	ES 16	ES 16	ES 16	ES 16
5	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	18	17	19	18	18	20	16	16	16	15	C	C	C	C	C	C
6	C	C	C	C	C	ES 16	ES 16	16	16	16	18	16	17	17	19	17	17	16	15	ES 16	ES 16	ES 16	ES 16	ES 16
7	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	15	16	16	16	16	17	16	16	17	16	16	16	ES 16	ES 16	ES 16	ES 16	ES 16
8	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	16	16	18	19	18	19	17	16	16	16	ES 16	ES 16	ES 16	ES 16	ES 16
9	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 15	16	15	15	18	18	21	19	17	17	17	15	12	ES 16	ES 16	ES 16	ES 16	ES 16
10	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	15	16	15	16	17	16	18	19	17	16	16	16	ES 16	ES 16	ES 16	ES 16	ES 16
11	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	16	17	20	21	19	20	17	15	16	15	ES 16	ES 16	ES 16	ES 16	ES 16
12	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 15	16	16	16	16	16	23	17	18	16	15	15	16	ES 16	ES 16	ES 16	ES 16	ES 16
13	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	16	17	18	18	20	20	20	18	16	16	ES 16	ES 16	ES 16	ES 16	ES 16
14	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	16	16	16	16	16	17	16	16	16	16	ES 16	ES 16	ES 16	ES 16	ES 16
15	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	17	16	17	20	18	19	20	17	17	16	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	16	16	16	17	ES 29	17	18	19	20	17	17	16	ES 16	ES 16	ES 16	ES 16	ES 16
17	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	16	17	17	20	20	18	17	16	16	15	ES 16	ES 16	ES 16	ES 16	ES 16
18	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	15	16	22	18	22	20	20	18	16	16	ES 16	ES 16	ES 16	ES 16	ES 16
19	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	17	17	19	20	20	21	18	17	15	16	ES 16	ES 16	ES 16	ES 16	ES 16
20	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	17	17	18	18	17	19	16	16	16	15	ES 16	ES 16	ES 16	ES 16	ES 16
21	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	15	15	16	18	19	23	20	21	20	16	16	17	ES 15	ES 16	ES 16	ES 16	ES 16
22	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	14	16	16	17	14	22	20	20	17	16	16	15	ES 15	ES 16	ES 16	ES 16	ES 16
23	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	15	18	19	20	26	22	27	17	17	15	15	ES 16	ES 16	ES 16	ES 16	ES 16
24	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	16	24	17	23	20	19	17	16	16	16	ES 16	ES 16	ES 16	ES 16	ES 16
25	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	16	17	18	20	18	20	18	16	16	16	ES 16	ES 16	ES 16	ES 16	ES 16
26	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	16	21	20	21	20	22	17	17	16	15	ES 15	ES 16	ES 16	ES 16	ES 16
27	ES 16	ES 16	ES 16	ES 16	ES 16	ES 15	ES 16	15	16	16	18	21	22	22	22	18	18	15	16	ES 16	ES 16	ES 16	ES 16	ES 16
28	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	15	16	16	17	20	20	20	21	18	17	16	16	ES 16	ES 16	ES 16	ES 16	ES 16
29	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	17	18	23	22	20	21	18	17	17	16	ES 16	ES 16	ES 16	ES 16	ES 16
30	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	18	16	18	19	20	20	16	16	16	16	ES 16	ES 16	ES 16	ES 16	ES 16
31	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 15	ES 16	16	16	18	21	23	20	20	21	17	18	16	ES 16	ES 16	ES 16	ES 16	ES 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	30	30	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	30	30	30	30
MED	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	16	17	18	20	20	20	17	16	16	16	ES 16	ES 16	ES 16	ES 16	ES 16
UQ	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	16	18	20	22	20	20	18	17	16	16	ES 16	ES 16	ES 16	ES 16	ES 16
LQ	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	16	16	16	16	17	18	18	18	17	16	16	15	ES 16	ES 16	ES 16	ES 16	ES 16

JUL. 1987 | FMIN (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | M(3000)F2 (0.01) | 135° E Mean Time (G.M.T. + 9 h)

Station YAMAGAWA Lat. 31° 12.1' N, Long. 130° 37.1' 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	A	F	F	335	320	325	A	A	305	A	A	A	290	315	310	310	315	335	315	A	A
2	F	F	335	325	325	350	355	A	345	345	A	A	A	A	315	315	275	295	300	320	335	350	F	F
3	F	F	F	F	F	F	370	355	A	A	A	A	305	305	295	300	295	295	315	325	340	350	305	F
4	F	F	F	F	F	355	345	345	A	340	330	310	305	310	A	275	285	285	305	330	345	365	S 300	A
5	A	A	F	F	F	305	H 335	345	330	A	A	A	A	310	A	A	310	320	C	C	C	C	C	C
6	C	C	C	C	C	F 295	345	A	370	A	A	275	310	275	305	A	275	305	340	330	325	A	F 305	F 305
7	F 300	J F 300	F	F	F	F 350	330	320	340	335	A	A	300	305	290	275	280	305	330	310	315	J S 340	F 315	F
8	F 315	F	F	F	J F 295	F 330	355	325	F 365	F 335	325	320	260	320	305	275	270	280	295	340	360	A	A	A
9	F	F 300	F	F	F	F 360	A	295	R 335	335	A	A	A	310	A	A	285	295	325	350	U S 335	S 310	305	A
10	F	F	F	F 310	F 320	F 330	310	A	A	290	R 290	295	300	F 280	255	275	315	335	270	J R 290	315	F 285	U F 285	F
11	F	F	F	F	F	F	260	285	F 315	270	A	A	A	A	310	295	315	290	A	315	310	300	290	290
12	F 290	300	305	305	310	F 320	315	315	325	365	340	G	275	295	295	295	310	335	315	J S 300	310	F 290	F 305	F
13	A	F	F	F	F	F	370	380	305	310	335	A	310	320	295	H 290	295	310	330	320	F	335	300	S 325
14	F	F	F	F	F	F	315	335	360	335	A	A	A	A	325	295	305	330	300	325	A	A	A	A
15	F	A	A	A	A	A	A	A	365	350	A	A	R 310	A	A	310	320	290	330	330	325	F	F	F
16	F	F	F	F	F	F	305	370	A	A	A	A	335	270	265	A	A	290	330	310	315	325	335	F
17	F	F	335	295	300	A	365	355	360	A	340	310	325	A	295	300	275	295	325	365	310	300	280	F
18	F	F	F	F	F	F	295	A	A	325	295	A	325	295	A	295	315	315	300	340	295	290	F	F
19	F	F	F	F	F	F	340	A	A	335	A	A	285	305	315	320	290	315	330	315	305	300	290	F
20	F	J F 305	S 280	U F 330	S 370	F 310	345	295	315	F 330	A	A	A	310	285	A	285	R 305	A	275	305	300	F 315	F
21	F	F	F	F	J F 330	F 320	F 315	350	350	350	A	A	A	A	A	H 280	280	275	300	310	305	S 310	F	F
22	F	F	F	F	J F 335	A	335	A	A	A	315	F 290	300	A	275	310	300	290	300	320	S 330	F 300	F	A
23	A	F	F	F	U F 320	F 350	330	325	315	290	315	A	A	270	270	285	305	315	335	310	I S 310	U S 290	F	F
24	F	F	F	F	F	F 330	320	360	365	300	R 320	A	295	R 270	290	285	305	305	320	345	S 305	S 310	U F 285	F
25	F 285	F	J F 305	F	F	F	F	U F 315	355	F 340	275	290	280	270	275	295	305	290	315	305	295	290	F 290	F
26	F	F	F	F	F	F	355	360	370	A	A	305	275	280	280	290	305	305	320	J R 305	340	S 315	A	A
27	A	F	A	A	F	F	345	A	340	A	330	A	A	275	270	270	300	310	320	295	315	300	A	F
28	A	F	F	F	F	F	295	320	355	300	A	A	A	A	A	310	A	A	300	305	320	300	265	285
29	F	F	F	F	F	F	335	260	315	A	A	A	A	A	235	275	300	A	260	290	A	305	S 300	275
30	265	285	315	A	A	A	310	300	A	A	A	A	A	A	295	315	315	330	325	325	310	F	F	A
31	F	F	F	F	F	300	340	295	335	360	280	A	260	280	A	300	295	300	285	295	340	325	315	305
	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	5	6	5	9	14	28	23	23	20	13	10	18	20	22	26	29	29	28	30	27	25	18	6
MED	F 290	F 300	310	310	F 320	F 330	335	325	345	335	320	300	300	295	292	295	300	305	315	315	315	305	300	298
UQ	F 300	J F 300	335	F 325	F 330	F 350	345	352	362	342	330	310	310	310	305	300	310	315	328	330	335	325	305	305
LQ	F 285	300	305	305	F 310	F 310	315	308	325	305	295	290	280	275	275	280	285	290	300	305	310	300	290	285

JUL. 1987 | M(3000)F2 (0.01)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | M(3000)F1 (0.01) | 135° E Mean Time (G.M.T. + 9 h)

Station YAMAGAWA Lat. 31° 12.1' N, Long. 130° 37.1' 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								A	A	A	A	A	A	A	A	A	A	A	L					
2								A	A	A	A	A	A	A	A	370	390	360	A					
3								A	A	A	A	A	A	A	395	A	A	A	370					
4								A	A	A	A	395	390	A	A	A	A	A	A					
5								L 36	A	A	A	A	A	A	A	A	A	A	C	C				
6							L	A	A	A	A	405	A	A	A	A	A	A	370					
7								360	360	A	A	A	A	395	A	A	A	360	A					
8							L	345	410	U L 405	405	420	420	420	405	380	A	A	A					
9							A	A	A	A	A	A	A	A	A	A	A	A	355					
10							A	A	A	400	A	430	410	395	350	390	A	A	A	L				
11								A	380	A	A	A	A	A	A	390	A	A	A	L				
12							L	L 350	375	A	365	380	410	395	395	A	380	A	A	A				
13									U L 400	370	A	A	A	A	A	A	365	A	A					
14								A	380	380	A	A	A	A	A	395	410	A	L					
15							A	A	360	A	A	A	375	A	A	370	380	360	355					
16							L 340	L	A	A	A	A	390	390		A	A	A	A					
17							L	A	A	A	385	410	A	A	A	A	A	A	360					
18								A	A	U L 385	R 395	A	A	A	A	385	A	A	A					
19							A	A	A	L 405	A	A	A	A	A	395	370	A	370					
20								L 340	410	A	A	A	A	A	360	A	A	A	A					
21								345	A	A	A	A	A	A	A	365	330	A	A					
22							A	A	A	A	A	A	415	A	A	A	360	355	A	L				
23							L	L	A	A	410	A	A	400	380	350	345	355	360					
24								L	390	A	355	A	405	U L 375	A	A	A	A	A	L				
25							L	350	380	395	355	385	400	380	390	375	365	L 335	A	A				
26							L	L	L 400	A	A	360	380	390	380	380	375	345	A	A				
27								A	A	A	A	A	A	A	L 400	375	375	A	A	A		A		
28								A	A	A	A	A	A	A	A	395	A	A	L 340	A				
29								355	A	A	A	A	A	A	365	340	A	A	325	A				
30								335	A	A	A	A	A	A	390	A	A	A	L					
31								360	A	415	410	A	390	380	A	395	370	L 355	L	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							1	10	11	8	8	8	11	10	11	16	13	8	9					
MED							L 340	348	380	398	390	400	400	392	390	380	370	355	360					
UQ								355	400	405	408	415	410	395	395	392	380	360	370					
LQ								340	378	382	360	382	390	380	372	370	365	350	355					

JUL. 1987 | M(3000)F1 (0.01)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | H'F2 (KM) | 135° E Mean Time (G.M.T. + 9 h)

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

Day \ 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								A	A	A	A	A	A	A	A	365	300	A	275	230				
2								A	290	270	A	A	A	A	A	305	310	345	300					
3								A	A	A	A	A	A	350	365	330	320	310	290					
4								E A 290	A	290	300	350	375	350	A	A	A	E A 350	E A 305					
5								275	74	A	A	A	A	355	A	A	320	280	C	C				
6							275	A	235	A	A	440	365	435	360	A	E A 390	300	250					
7								325	265	295	A	A	380	375	375	370	340	295	255					
8							250	320	245	285	320	350	R	325	345	410	A 420	A 340	A 315					
9							A	A 350	E A 275	285	A	A	A	E A 350	A	A	A 360	300	270					
10							A 305	A	A	345	350	335	230	415	485	370	300	270	A 330	295				
11								375	295	410	A	A	A	A	E A 350	335	320	375	A	270				
12							305	300	275	245	305	G	445	375	380	355	315	275	285	295				
13									330	330	310	A	350	330	A	370	370	320	280					
14								E A 300	270	300	A	A	A	A	310	375	355	295	320					
15							A	A	250	275	A	A	A 620	A	A	330	305	350	275					
16							335	245	A	A	A	A	290	480		A	A	E A 300	270					
17							245	E A 255	250	A	480	355	310	A	A	A	A	315	265					
18								A	A	280	290	A	335	390	A	350	320	300	A					
19							E A 275	A	A	320	A	A	E A 400	360	A	300	340	300	255					
20								L 360	320	275	A	A	A	325	400	A	395	345	A					
21								260	250	285	A	A	A	A	A	360	360	335	A					
22							260	A	A	A	320	360	355	A	390	320	335	330	290	255				
23							275	300	295	350	300	E A 335	A	415	405	345	305	295	255					
24								245	250	375	315	A	380	395	340	A 345	300	305	275	230				
25							300	265	245	270	415	375	370	375	365	310	295	295	270	270				
26							245	255	235	A	A	345	440	410	375	335	305	280	280	E A 280				
27								A	275	A	A	A	A	A	425	360	320	295	300	A		A		
28								295	250	270	A	A	A	A	A	325	A	A	310	E A 290				
29								490	A	A	A	A	A	A	550	400	355	A	405	E A 305				
30								370	A	A	A	A	A	A	395	330	330	300	280					
31								370	280	260	A	A	470	400	A	350	340	320	320	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							11	20	21	20	11	10	16	19	17	24	27	28	26	10				
MED							275	300	258	285	315	352	370	375	375	348	320	300	280	U 258				
UQ							302	355	280	325	335	375	420	405	400	368	352	328	305	E A 295				
LQ							252	256	250	272	302	345	342	350	360	330	308	295	270	255				

JUL. 1987 | H'F2 (KM)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | H'F (KM) | 135° E Mean Time (G.M.T. + 9 h)

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

Day \ 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	ES 280	A	ES 270	A	ES 260	EA 265	EA 270	A	A	A	A	A	A	A	A	A	A	A	A	A	195	EA 275	A	A
2	ES 290	ES 260	ES 250	ES 280	EA 250	ES 240	210	A	A	A	A	A	A	A	A	EA 240	EA 240	EA 230	A	EA 260	EA 295	230	ES 290	ES 280
3	ES 280	A	EA 300	EA 300	ES 280	200	H 220	A	A	A	A	A	A	A	205	A	A	A	EA 260	255	240	225	EA 280	EA 300
4	ES 255	EA 275	EA 280	EA 290	EA 275	200	220	A	A	A	A	H 190	A 230	A	A	A	A	A	A	270	225	225	EA 240	A
5	A	A	EA 290	EA 260	EA 300	EA 305	A 240	EA 250	240	A	A	A	A	A	A	A	A	A	C	C	C	C	C	C
6	C	C	C	C	C	265	240	A	A	A	A	195	A	A	A	A	A	A	EA 255	235	220	A	A 255	255
7	265	275	290	285	250	240	235	EA 250	EA 250	A	A	A	A	220	A	A	A	EA 255	A	A	230	225	A 255	275
8	A 275	280	275	280	280	245	225	H 195	H 200	200	190	195	185	H 180	210	225	A	A	A	A 250	220	A	A	A
9	325	ES 300	ES 320	EA 300	220	A 250	A	A	A	A	A	A	A	A	A	A	A	A	A 250	A 245	A 250	A 285	A 295	A
10	A	ES 280	A 300	EA 300	250	245	A	A	A	200	A	195	185	H 175	EA 270	EA 245	A	A	A	A 250	250	A	EA 300	EA 310
11	A 310	A 300	A	255	270	265	A 250	A	A 215	A	A	A	A	A	A	195	A	A	A	250	235	240	280	295
12	295	280	250	245	270	ES 255	A 260	225	200	A	EA 250	200	200	195	220	A	A 235	A	A	A	255	EA 280	A 270	A
13	A	A	EA 300	ES 260	ES 250	230	A 245	H 205	215	EA 250	A	A	A	A	A	A	EA 250	A	A	250	EA 260	210	EA 260	ES 270
14	EA 300	ES 275	EA 300	ES 270	EA 290	ES 250	A	A	215	210	A	A	A	A	A	225	A 230	A	EA 250	255	A	A	A	A
15	S	A	A	A	A	A	A	A	EA 250	A	A	A	A	A	A	EA 250	EA 240	A	230	A 255	A 255	EA 280	ES 270	EA 300
16	EA 295	S 245	ES 275	ES 250	EA 300	S 240	250	A	A	A	A	A	EA 230	EA 230	EA 255	A	A	A	A	EA 280	EA 310	EA 265	EA 270	EA 300
17	ES 295	ES 275	EA 250	ES 290	ES 325	A	230	A	A	A	205	200	A	A	A	A	A	A	205	230	ES 255	ES 290	EA 305	ES 295
18	EA 290	A	EA 320	290	200	ES 290	A	A	A	225	210	A	A	A	A	210	A	A	A	A	A 260	ES 275	A	EA 280
19	EA 290	EA 280	230	EA 290	ES 270	EA 280	A	A	A	H 180	A	A	A	A	A	215	EA 250	A	215	255	250	EA 270	EA 305	ES 290
20	270	275	295	245	205	ES 280	A 225	185	205	A	A	A	A	A	EA 250	A	A	A	A	255	260	270	A 250	275
21	265	315	260	245	280	245	235	240	A	A	A	A	A	A	A	A 245	A 245	A	A	EA 280	265	EA 295	275	EA 345
22	EA 330	265	260	A 255	230	A	EA 260	A	A	A	A	A	195	A	A	A	A 225	A 245	A	A 255	A 235	245	EA 300	A
23	A	EA 345	305	280	245	220	240	200	A	A	200	A	A	205	EA 245	EA 250	EA 250	A 220	230	A	255	A 300	EA 300	255
24	255	A 285	A 295	A 280	230	250	220	220	210	A	260	A	190	195	A	A	A	A	A	A	235	A 250	EA 290	EA 305
25	EA 300	EA 335	270	255	295	300	255	235	235	210	H 180	175	205	230	210	205	245	220	A	A	A 260	A 255	ES 275	310
26	310	S 275	S 320	A 340	285	260	235	H 210	205	A	A	200	205	210	EA 255	210	210	EA 250	A	A	A 245	260	A	A
27	A	A	A	A	EA 270	A	EA 280	A	A	A	A	A	A	A	200	EA 240	225	A	A	A	A 250	A	A	EA 295
28	A	EA 300	EA 280	240	ES 280	ES 280	250	A	A	A	A	A	A	A	A	A 225	A	A	EA 240	280	A 250	230	A	ES 300
29	EA 280	A	A	EA 310	A	EA 310	270	EA 250	A	A	A	A	A	A	270	EA 270	A	A	EA 250	A	A	EA 270	ES 270	ES 310
30	ES 300	ES 280	A	A	A	A	250	A 245	A	A	A	A	A	A	210	A	A	A	A	255	250	EA 275	ES 280	A
31	A	A	270	270	245	A	A	EA 255	A	H 200	H 195	A	H 205	220	A	H 200	EA 250	240	A	A	250	240	ES 250	S 245
	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	21	25	26	27	25	24	14	12	8	8	8	10	10	12	16	13	7	10	19	28	25	23	21
MED	EE 290	EE 280	U 255	U 261	U 238	U 235	238	U 216	212	202	200	195	200	204	U 217	U 214	UA 225	A 230	UA 225	252	249	U 245	EA 275	EE 295
UQ	EE 300	EE 300	EA 300	EA 290	EE 280	EE 280	A 251	EA 250	U 226	214	U 219	200	205	220	EA 255	EA 245	EA 250	A 244	EA 250	256	255	EA 275	EA 292	EA 300
LQ	EE 275	ES 275	U 250	250	U 230	240	228	205	205	200	192	192	190	195	210	210	A 228	222	222	250	235	235	EA 265	EE 275

JUL. 1987 | H'F (KM)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1937 | H'E (KM) | 135° E Mean Time (G.M.T. + 9 h)

Station YAMAGAWA Lat. 31° 12.1' N, Long. 130° 37.1' 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							A	A	A	A	A	105	105	105	105	105	105	105	110	S				
2							S	110	110	105	105	105	105	105	105	105	105	105	A	S				
3							A	E A 125	105	A 110	A 110	105	105	105	105	105	A	A	A	S				
4							E S 125	105	105	105	105	105	105	105	105	110	105	105	110	S				
5							S	110	105	105	105	105	105	105	105	105	105	A	C	C				
6							S	110	105	105	105	A	A 110	105	105	105	105	105	115	S				
7							S	A 110	110	105	105	105	105	105	105	105	105	A	A	S				
8							S	110	105	105	A 105	105	105	105	105	105	105	105	110	S				
9							S	110	105	105	105	110	110	105	105	105	A	A	A	S				
10							S	105	105	105	A	A	105	A	A	105	105	105	120	S				
11							115	110	105	105	105	110	105	110	105	105	105	A	A	S				
12							S	105	105	105	105	110	110	A	105	105	105	110	115	S				
13							S	105	105	105	105	105	105	105	105	105	105	105	A	S				
14							S	110	105	105	105	105	A	A	A	A	105	105	115	S				
15							S	105	105	105	105	105	105	105	105	105	105	110	S 120	S				
16							S	110	110	110	105	E S 115	105	105	105	105	A	A	A	S				
17							S	105	105	105	105	105	105	105	105	A	A	A	A	S				
18							E S 125	110	105	105	105	105	105	105	105	110	105	110	S 115	S				
19							S	110	110	110	105	105	105	105	105	105	A	A	A	S				
20							S	105	105	105	105	105	105	105	105	105	105	105	115	S				
21							S	110	105	105	105	105	105	105	110	110	105	120	115	S				
22							S	110	105	105	105	115	105	A 110	105	105	105	105	110	S				
23							S	A 105	110	105	105	115	110	115	105	105	105	105	A	S				
24							S	A 105	105	110	A	A	A	A 120	105	105	105	110	S				
25							S	105	105	105	105	105	A	105	105	E A 115	A	A	A	S				
26							S	A 110	105	110	105	A	A	105	H 110	110	110	110	S					
27							S	A 105	105	110	110	110	110	110	A	105	105	115	S					
28							S	110	105	105	105	105	105	105	105	105	A	A	A	S				
29							S	110	105	105	105	105	105	105	A	105	105	105	A	S				
30							S	110	105	105	105	105	105	105	A	A	105	110	S 115	S				
31							S	A 105	105	105	105	105	110	110	110	110	110	115	S 120	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							3	24	30	30	28	28	27	26	27	27	24	21	17					
MED							E S 125	110	105	105	105	105	105	105	105	105	105	105	115					
UQ							E S 125	110	105	105	105	105	105	105	105	105	105	110	115					
LQ							118	105	105	105	105	105	105	105	105	105	105	105	110					

JUL. 1937 | H'E (KM)

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IONOSPHERIC DATA

JUL. 1987 | H'ES (KM) | 135° E Mean Time (G.M.T. + 9 h)

Station YAMAGAWA Lat. 31° 12.1' N, Long. 130° 37.1' 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	105	105	105	100	100	105	105	125	125	120	120	120	115	120	120	120	115	110	105	100	S	105	105	105
2	125	130	110	110	100	100	125	120	115	110	105	105	105	105	105	110	120	110	100	100	115	120	110	120
3	110	105	105	100	100	100	130	120	115	110	110	110	105	105	105	110	100	175	100	100	100	100	105	110
4	110	105	105	105	110	115	125	110	105	105	105	105	105	115	120	120	115	110	110	100	100	100	100	100
5	100	100	100	100	100	100	100	115	120	105	110	110	105	105	105	105	105	100	C	C	C	C	C	C
6	C	C	C	C	C	115	120	110	105	105	105	150	130	140	125	110	115	105	105	105	105	100	100	105
7	115	110	110	115	110	105	110	105	105	105	105	105	105	120	130	125	105	105	120	115	110	105	105	105
8	100	100	100	125	110	105	135	105	105	105	105	150	145	125	160	125	130	120	115	110	110	110	115	115
9	110	105	105	105	115	105	110	110	105	105	130	105	105	105	105	105	100	105	105	100	115	115	110	105
10	105	120	105	115	115	105	105	105	105	105	105	105	110	105	145	125	120	115	115	110	155	105	105	105
11	100	100	95	95	95	110	115	115	110	105	105	105	105	105	105	110	110	105	100	105	125	105	100	100
12	100	105	110	S	S	125	115	115	115	105	105	105	105	115	125	120	125	115	115	115	105	105	105	105
13	105	100	100	100	105	100	120	115	105	115	105	105	105	105	105	105	105	105	100	100	100	105	105	105
14	105	105	105	105	105	105	125	120	110	105	105	105	100	100	100	100	120	120	115	110	110	110	110	110
15	105	105	105	105	105	105	110	105	105	105	105	105	105	105	105	105	150	130	130	115	115	120	120	120
16	115	S	110	110	110	115	125	120	110	115	105	105	105	105	105	105	100	100	100	100	105	115	110	110
17	105	105	105	100	105	100	105	105	105	105	105	105	115	105	105	100	100	100	100	100	105	150	130	115
18	105	105	105	105	105	115	125	120	105	125	120	125	130	130	125	130	125	120	120	110	110	110	105	105
19	105	105	105	105	110	105	105	105	105	110	110	105	105	105	105	110	100	100	100	100	100	100	100	105
20	110	105	105	100	100	100	115	115	125	115	110	110	130	150	135	120	120	115	110	110	105	105	105	105
21	100	100	100	100	105	145	120	125	110	110	105	105	105	105	105	110	125	115	110	110	105	105	105	105
22	105	105	105	105	125	115	100	110	105	105	105	125	145	125	130	120	125	115	110	105	110	110	105	105
23	105	105	105	105	105	S	105	105	105	120	105	125	115	130	120	120	105	105	105	100	100	95	120	120
24	110	105	105	105	110	105	110	145	125	115	125	120	125	E 160 G	145	120	115	115	110	115	110	105	105	105
25	105	105	105	105	105	130	115	105	110	105	105	110	165	145	165	170	135	125	100	100	120	100	105	110
26	110	105	115	105	100	95	105	105	120	105	105	105	105	150	145	140	130	120	110	105	105	105	120	115
27	115	110	105	105	105	100	105	100	110	105	110	105	105	105	G	100	G	125	115	110	100	100	100	100
28	100	100	100	S	S	S	140	120	115	110	105	105	105	105	105	105	100	100	100	100	100	100	100	100
29	105	105	110	110	115	110	120	120	110	110	105	110	115	110	130	130	125	115	120	120	115	115	105	105
30	110	105	100	100	100	105	125	125	110	110	110	105	110	105	140	130	125	120	115	115	105	105	105	100
31	100	100	105	105	105	100	100	120	115	115	115	110	115	115	105	120	150	145	125	110	110	110	110	100
	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	30	29	30	28	28	29	31	31	31	31	31	31	31	31	30	31	30	31	30	30	29	30	30	30
MED	105	105	105	105	105	105	115	115	110	105	105	105	105	105	120	120	118	115	110	105	105	105	105	105
UQ	110	105	105	105	110	115	125	120	115	112	110	110	115	124	130	122	125	120	115	110	110	110	110	110
LQ	105	105	105	100	100	100	105	105	105	105	105	105	105	105	105	105	105	105	100	100	105	100	105	105

JUL. 1987 | H'ES (KM)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | TYPES OF ES | 135° E Mean Time (G.M.T. + 9 h)

Station YAMAGAWA Lat. 31° 12.1' N, Long 130° 37.1' 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 3	F 5	F 4	F 6	F 5	F 6	L 6	CL 54	CL 62	CL 62	CL 62	C 4	C 6	C 7	C 6	C 3	C 4	C 4	C 4	L 6		F 4	F 7	F 6
2	F 1	F 2	F 2	FF 13	F 2	F 2	C 2	C 6	C 5	C 3	C 4	C 5	C 6	C 5	C 4	C 2	C 2	C 3	L 4	L 7	FF 13	FF 14	F 2	F 2
3	F 3	F 4	F 5	F 5	F 2	F 2	CL 33	CL 43	C 6	CL 42	CL 51	C 4	C 3	C 2	C 3	C 2	L 5	HL 23	L 4	L 4	F 6	F 7	F 5	FF 54
4	F 2	F 3	F 5	F 3	F 3	F 2	C 4	C 5	C 7	C 3	C 4	C 2	C 2	C 2	CL 61	C 3	C 4	C 5	C 5	L 5	F 5	F 4	F 5	F 5
5	F 4	F 3	F 3	F 3	F 2	F 3	L 2	C 3	C 4	C 6	C 4	C 4	C 5	C 4	C 6	C 5	C 5	L 4						
6						FFF 12	C 5	C 4	C 4	C 7	C 5	HL 12	HL 11	H 2	C 3	C 4	C 3	C 4	C 3	L 5	F 5	F 3	F 2	F 1
7	F 2	F 3	F 3	F 2	F 3	F 3	L 4	L 3	C 3	C 4	C 5	C 4	C 3	CH 11	C 3	CC 32	C 3	CC 32	CL 23	LL 72	FF 41	F 4	F 4	F 4
8	F 7	F 3	F 2	F 1	F 1	F 2	HL 32	C 4	C 3	C 2	LH 21	H 1	H 1	C 1	H 1	C 2	C 5	C 4	C 5	CL 32	FF 62	FF 61	FF 61	F 3
9	F 2	F 2	F 2	FF 11	FF 11	FF 41	C 5	C 4	C 5	C 4	CC 23	C 3	C 3	C 4	C 4	C 4	L 5	L 4	L 4	L 5	FF 24	FF 12	FF 42	F 5
10	F 5	F 2	FF 26	FF 14	FF 22	FF 22	C 5	C 8	C 7	C 2	L 3	CH 21	C 1	LH 11	HL 12	C 2	C 3	C 3	C 3	L 5	FF 23	F 6	F 4	F 3
11	F 3	F 3	F 3	F 3	F 2	FF 22	CL 42	C 5	C 3	C 4	C 5	C 8	C 6	C 6	C 5	C 1	C 3	L 3	L 7	LH 42	F 1	F 3	F 2	F 2
12	F 2	F 2	F 2			F 3	L 6	C 4	C 3	C 3	C 2	C 3	CH 11	HCL 11	C 1	C 2	CL 32	C 4	C 5	L 7	F 5	F 3	F 4	F 4
13	F 7	F 4	F 3	F 3	FF 22	F 2	C 4	C 3	C 3	C 4	C 3	C 4	C 4	C 4	C 4	C 3	C 3	C 3	L 3	L 5	F 5	F 5	F 3	FF 22
14	F 5	F 2	F 5	F 5	F 4	F 2	C 7	C 5	C 2	C 3	C 5	C 3	L 4	L 4	L 3	L 2	C 3	C 2	C 4	C 5	F 5	F 6	F 5	F 4
15	F 3	F 5	F 5	F 4	F 3	F 5	C 4	C 6	C 3	C 3	C 4	C 3	C 2	C 3	C 3	C 2	H 1	H 2	H 3	C 5	F 3	F 4	F 3	F 7
16	F 5		F 3	F 2	F 7	F 2	C 4	C 5	C 4	C 3	C 5	C 4	C 2	C 2	C 2	C 4	L 4	L 7	L 5	L 5	FF 43	FF 34	FF 23	F 4
17	F 2	F 3	F 3	F 2	F 2	F 4	C 2	C 6	C 3	C 4	C 2	C 2	CC 23	C 4	C 3	L 6	L 5	L 4	L 3	L 3	F 2	F 4	F 6	F 7
18	F 5	F 5	F 5	F 6	F 3	F 5	C 6	C 5	C 6	C 6	C 4	C 4	C 2	C 2	C 3	C 2	C 3	C 4	C 5	C 5	F 6	F 2	F 4	F 4
19	F 6	F 5	F 6	F 4	F 6	F 3	C 5	C 6	C 5	C 2	C 6	C 5	C 4	C 3	C 6	C 2	L 3	L 3	L 2	L 4	F 3	F 5	F 4	F 2
20	F 3	F 2	F 2	F 3	F 3	F 2	CL 22	C 2	CH 11	C 3	C 5	C 4	C 2	H 2	C 3	C 3	C 3	C 4	C 5	L 2	F 3	F 6	F 3	F 3
21	F 3	F 4	F 2	F 2	F 1	F 1	C 2	C 2	C 3	C 4	C 4	C 5	C 6	C 7	C 7	C 2	CC 21	CL 31	C 7	L 7	FF 32	F 3	F 3	F 3
22	F 3	F 3	F 6	F 2	FF 15	FF 55	LC 14	C 6	C 7	C 6	C 3	C 2	H 1	CL 31	CL 21	CL 31	C 2	C 3	C 3	L 3	F 3	F 3	F 4	F 7
23	F 7	F 3	F 5	F 2	F 1		L 6	L 3	C 4	CC 13	CH 11	CC 32	C 4	H 1	C 1	C 2	CC 32	C 4	LC 41	L 5	F 7	F 4	FF 51	F 3
24	F 3	F 2	F 2	F 3	F 6	F 4	LH 53	HL 23	C 2	C 2	C 1	CL 32	CL 11	HL 11	HL 12	CL 32	CL 31	C 4	C 4	C 4	F 3	F 3	F 3	F 3
25	F 4	F 3	F 2	F 2	F 2	F 1	C 4	C 3	C 3	C 3	C 2	C 1	H 1	HC 12	HC 11	HL 12	CL 22	HL 23	L 5	L 5	FF 26	F 4	F 3	F 7
26	F 7	F 3	FF 23	FF 32	F 1	F 3	LH 31	LH 21	C 3	C 6	C 4	C 2	L 1	HL 11	HC 11	H 2	C 3	C 3	C 3	L 7	F 5	FF 32	F 6	F 7
27	F 7	F 7	F 7	F 7	F 4	F 4	L 6	L 6	C 3	C 7	C 5	C 4	C 4	C 3		L 3		C 4	C 5	C 7	F 5	F 5	F 4	F 4
28	F 5	F 4	F 2				H 2	C 4	C 4	C 3	C 4	C 7	C 8	C 4	C 6	C 2	L 5	L 7	L 3	L 3	F 4	F 2	F 5	F 4
29	F 6	F 4	F 6	F 4	F 7	F 6	C 5	C 4	C 4	C 3	C 4	C 2	C 3	C 2	HL 21	C 2	C 3	C 5	CL 22	CL 22	FF 33	FF 42	F 2	F 3
30	F 1	F 3	F 4	F 5	F 7	F 5	C 2	C 3	C 5	C 5	C 4	C 6	C 2	C 6	HL 12	HL 22	C 5	C 3	C 5	C 5	F 2	F 4	F 3	F 2
31	F 5	F 4	F 2	F 3	F 8	F 4	L 4	HL 22	C 3	C 2	C 2	C 3	C 2	C 2	C 4	H 1	H 3	H 3	C 4	C 5	F 5	F 6	F 3	F 1
	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

JUL. 1987 | TYPES OF ES

IONOSPHERIC DATA

JUL. 1987 | FXI (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station OKINAWA Lat. 26° 16.9' N, Long 127° 48.4' 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	C	C	C	C	C	C															X 58	X 46	X 42	42
2	40	X 43	45	X 38	36	29															X 74	X 50	62	58
3	57	X 46	X 45	X 40	X 39	X 32															X 84	X 71	X 59	46
4	60	65	62	61	X 46	X 38															X 97	X 76	X 60	A
5	A	46	45	A	35	39															X 80	X 57	X 51	X 52
6	51	X 53	X 52	49	47	X 46															X 85	83	83	72
7	71	66	61	59	53	41															X 80	U X 76	X 66	U X 46
8	X 50	X 52	X 49	X 47	X 50	X 43															X 68	A	X 46	42
9	40	46	42	47	45	X 38															X 56	A	50	50
10	U X 46	52	48	44	48	X 40															X 68	X 60	50	59
11	63	63	60	46	X 40	X 42															X 61	X 54	X 54	X 50
12	X 48	X 48	X 47	X 41	X 40	X 39															X 69	X 62	A	A
13	31	32	32	40	38	31															X 68	U X 58	U X 54	48
14	50	55	58	32	36	32															X 72	X 41	38	A
15	A	A	A	35	A	A															X 66	X 66	X 60	50
16	57	55	58	50	45	47															A	U X 68	A	A
17	A	61	50	45	44	A															X 65	X 64	X 71	X 61
18	64	62	X 60	X 67	X 43	X 40															X 76	75	65	73
19	73	64	62	60	51	50															X 81	U X 69	X 63	X 60
20	66	62	58	60	38	S															X 81	X 77	X 80	X 69
21	X 51	57	52	50	45	48															X 83	X 76	X 73	X 66
22	67	72	70	60	57	53															X 73	U X 69	X 48	50
23	51	57	61	55	50	42															X 65	X 60	X 56	62
24	A	60	59	58	54	43															X 60	X 60	X 53	50
25	50	47	50	46	X 46	X 36															X 89	A	X 72	X 70
26	65	71	64	60	60	63															X 71	X 52	X 40	X 46
27	52	46	A	45	43	40															X 86	X 78	64	57
28	60	62	61	X 66	X 63	X 58															X 74	X 64	61	62
29	X 62	X 57	X 56	50	48	38	37														A	X 63	X 52	X 50
30	X 45	X 50	X 50	A	A	A															X 69	X 66	X 60	63
31	58	58	60	60	40	35															X 95	X 66	43	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	26	29	28	28	28	26	1														29	28	29	26
MED	54	57	57	50	45	40	37														X 73	X 65	X 59	54
UQ	63	62	60	60	50	46															X 81	X 73	X 64	62
LQ	50	48	48	44	40	38															X 68	X 59	X 50	50

JUL. 1987 | FXI (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FOF2 (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station OKINAWA Lat. 26° 16.9' N, Long. 127° 48.4' 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	C	C	C	C	C	C	C	C	57	57	A	50	A	A	A	72	85	83	88	80	52	40	36	F
2	F	37	F	J S 32	F	F	35	46	61	59	53	R 52	R 59	67	A	71	R 74	80	90	87	68	44	F	F
3	F	J S 40	39	34	33	26	42	51	54	53	A	A	A	A	A	83	91	90	93	92	78	S 65	J S 53	F
4	F	F	F	F	S 40	S 32	39	A	A	64	A	A	A	66	65	72	83	A	92	102	S 91	S 70	S 54	A
5	A	F	F 35	A	F	F	34	73	59	A	48	48	A	75	A	80	84	A	78	83	S 74	S 51	45	46
6	F	S 47	S 46	F 40	F 38	S 40	50	64	50	50	A	A	54	59	A	64	78	91	A	R 84	79	F 74	F	F
7	F	F	F	F	F	F	32	54	62	A	R 52	52	A	57	59	68	78	89	88	82	74	U S 70	U S 60	U S 40
8	44	46	43	41	44	S 37	38	65	58	57	53	R 52	52	58	55	R 52	55	63	93	U R 96	S 62	A	40	F
9	F	F	F	F	F	32	35	52	66	A	A	56	62	77	A	A	81	94	102	77	50	A	F	F
10	U S 40	F	F	F	F	S 34	34	44	A	58	A	70	78	R 77	73	82	83	R 77	70	R 61	S 62	U S 54	F	F
11	F	F 54	F	F	U S 34	S 36	39	R 49	54	58	68	61	64	75	69	67	73	71	66	69	55	48	48	44
12	42	42	41	35	34	S 33	R 40	54	81	56	52	A	56	66	A	A	67	69	52	55	63	56	A	A
13	F	F	F	F	F	F	33	45	52	62	54	A	71	A	72	75	80	86	92	R 92	S 62	U S 52	48	F
14	F	F	F	F	F	F	37	55	66	A	58	61	63	77	83	83	88	66	69	68	J S 66	35	F	A
15	A	A	A	F	A	A	37	63	64	A	A	A	E G 45	56	63	72	73	82	81	67	60	60	54	F
16	F	F	F	F	F	F	40	56	45	R 48	A	66	A	A	E G 45	52	67	81	80	A	A	U S 62	A	A
17	A	F	F	F	F	A	R 44	59	47	51	57	69	58	63	69	76	82	100	R 110	65	59	S 58	U S 65	55
18	F	F	S 54	S 61	37	S 34	38	53	61	66	52	56	58	64	76	78	82	87	90	72	70	F	F	F
19	F	F	F	F	F	F	R 59	R 61	48	50	62	52	58	69	A	77	74	80	85	78	75	63	S 57	54
20	F	F	F	F	F	S	33	55	60	67	63	58	56	55	64	53	59	65	72	A	75	S 71	74	63
21	45	F	F	F	F	F	51	65	55	54	64	A	58	65	75	79	83	89	92	91	77	70	67	60
22	F	F	F	F	F	F	R 61	U R 61	50	59	63	68	72	68	73	78	83	92	87	R 73	S 67	U S 63	42	F
23	F	F	F	F	F	F	41	52	59	59	68	69	76	76	80	89	93	89	A	67	59	54	S 50	F
24	A	F	F	F	F	F 34	48	56	55	A	67	69	74	89	86	94	97	100	93	R 72	S 54	54	47	F
25	F	F	F	F	S 40	S 30	39	R 65	70	58	55	57	64	77	86	100	94	94	100	79	83	A	66	S 64
26	F	F	F	F	F	F	64	57	60	59	61	65	60	63	72	90	89	92	91	R 96	65	46	34	S 40
27	F	F	A	F	F	F	A	52	57	A	R 61	A	A	66	76	85	89	84	89	86	80	S 72	F 54	F
28	F	F	F	S 60	57	52	R 43	R 67	75	61	A	A	A	A	77	A	A	89	R 98	R 96	68	S 58	F	F
29	S 56	51	S 50	F	F	F	F	44	E G 40	E G 41	49	51	52	E G 44	J R 50	60	62	A	A	A	A	57	46	S 44
30	S 39	S 44	44	A	A	A	35	52	50	56	56	57	63	70	79	88	91	91	R 94	R 74	63	S 60	54	F
31	F	F	F	F	F	F	32	56	57	A	A	A	A	73	82	82	83	84	A	A	89	S 60	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	6	8	8	7	9	12	28	29	29	23	21	21	22	26	23	28	30	28	27	27	29	27	21	10
MED	43	45	44	40	38	S 34	39	55	57	58	57	57	60	66	75	78	82	86	90	79	67	S 58	53	50
UQ	45	49	S 48	50	40	S 36	44	61	61	59	63	66	64	75	78	83	88	91	93	89	75	S 64	57	60
LQ	S 40	41	40	34	34	32	35	52	52	54	53	52	56	63	64	70	74	80	80	70	62	53	46	S 44

JUL. 1987 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

JUL. 1987 | FOF1 (0.01 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station OKINAWA Lat. 26° 16.9' N, Long. 127° 48.4' 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							C	C	A	A	A	A	A	A	A	430	A	400	380					
2								L	A	A	A	430	A	U A 450	A	U A 440	A	380	360					
3								L	L	A	A	A	A	A	A	A	410	A	L 380					
4							L	A	A	A	A	A	A	A	440	L 435	400	A	A					
5								L	L	A	440	440	A	A	A	A	A	A	A					
6							L	L	L	L 420	A	A	440	440	A	A	A	A	A	A				
7								L	U L 400	A	440	430	A	430	U A 450	420	410	400	360					
8								340	410	420	L	440	440	430	430	420	A	A	A					
9								L	L	A	A	U A 450	A	A	A	A	A	A	A	A				
10								L	A	A	A	440	U A 440	A	430	A	A	A	A	L				
11							L	A	A	A	A	440	A	440	440	A	A	A	A					
12							L	L 370	L 400	L 430	U L 440	A	A	U A 440	A	A	A	A	L	L				
13								A	A	A	A	A	U A 460	A	A	A	A	A	A	A				
14								L	A	A	450	A	A	440	430	A	A	A	A	A				
15								A	A	A	A	A	450	A	440	430	U A 420	A	360	L				
16								L	A	410	A	U A 450	A	A	450	420	A	A	A	A				
17									A	L 450	A	U A 450	A	450	A	A	A	A	A					
18								L	L	L 430	U L 440	A	U A 460	A	A	440	A	A	U L 380	A				
19								L	U L 430	U L 430	L 440	460	A	A	A	A	430	L 440	L 370					
20								400	L	430	450	460	460	440	U A 450	460	410	A	A	A				
21								L	L	L	A	A	A	460	450	A	440	420	370					
22								L	L	U A 450	450	470	A	A	A	A	A	A	A	A				
23								L	L	L	460	480	A	A	A	U A 450	440	A	A					
24								L	L	A	460	A	A	U A 470	A	A	A	A	A					
25								L	U L 420	U L 440	U L 450	U L 470	460	470	460	460	L 450	430	A					
26								L	L	U L 470	L 470	L 480	U L 490	480	470	450	A	430	L					
27							A	A	L	A	A	A	A	A	U A 470	440	440	A	L	A				
28								L	L 400	L	A	A	A	A	A	A	A	A	A					
29								L	400	410	430	440	U A 460	440	A	440	A	A	A	A				
30								L	A	A	440	460	460	460	450	440	440	L 420	A					
31								L	L	A	A	A	A	U A 460	A	450	430	420	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	7	12	14	17	11	16	14	16	12	9	8					
MED								370	L 400	L 430	445	450	460	445	450	440	430	420	370					
UQ								385	U L 415	L 445	450	460	U 460	460	450	450	440	430	L 380					
LQ								355	L 400	420	440	440	445	440	440	430	410	400	360					

JUL. 1987 | FOF1 (0.01 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FOE (0.01 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station OKINAWA Lat. 26° 16.9' N, Long. 127° 48.4' 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							C	C	A	A	R 330	R 350	360	360	350	330	310	A	A	S				
2							S	A	R 280	A	A	R 330	A	A	A	A	A	A	A	A				
3							S	225	A	300	320	A	A	A	A	A	A	A	R 220	A				
4							A	A	A	A	A	A	A	A	R 360	340	305	A	A	A				
5							A	A	A	A	A	A	A	A	A	A	A	A	A	A				
6							A	235	280	300	A	A	A	A	A	R 320	300	A	A	A				
7							S	A	A	A	A	A	A	A	A	A	A	A	A	A				
8							S	A	A	A	A	A	A	R 350	A	R 330	R 310	A	A	S				
9							S	A	A	A	A	A	A	A	A	A	A	A	A	A				
10							A	A	A	A	A	A	A	A	U A 350	A	300	275	R 215	S				
11							S	A	A	A	A	A	A	A	A	A	A	A	A	A				
12							S	R 205	A	A	A	A	A	A	R 355	R 335	R 310	270	A	A				
13							S	A	A	R 300	A	A	A	A	A	A	A	A	A	A				
14							S	R 230	270	A	330	A	R 350	R 340	330	320	310	R 280	225	S				
15							S	A	A	A	A	A	A	A	A	A	A	A	R 220	190				
16							S	225	R 270	A	A	A	A	A	A	330	305	280	A	S				
17							A	A	A	A	A	A	A	A	A	A	A	A	A	A				
18							S	A	A	310	325	335	R 355	R 355	350	335	305	275	R 220	A				
19							A	A	A	A	A	A	A	A	A	A	A	A	A	A				
20							S	220	A	A	A	A	A	A	A	A	315	280	225	A				
21							S	A	A	A	A	A	A	R 340	A	A	A	A	A	S				
22							S	R 230	A	A	A	R 340	A	R 350	355	350	320	A	220	S				
23							S	R 225	A	A	A	A	A	360	A	340	R 330	290	A	S				
24							S	A	A	A	355	R 360	375	R 370	365	350	320	290	R 235	S				
25							A	A	A	A	A	A	A	A	R 360	340	320	290	R 240	A				
26							A	A	A	A	A	A	A	A	A	345	320	295	240	A				
27							A	A	A	A	A	A	A	A	R 360	345	325	285	240	A				
28							A	R 235	A	A	A	A	A	A	A	A	A	A	A	A				
29							S	230	A	A	A	A	360	R 375	R 360	A	310	275	A	A				
30							A	A	A	A	A	A	A	R 365	365	340	315	R 285	A	A				
31							S	A	A	300	R 315	A	A	A	340	A	315	280	230	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								10	4	5	6	5	5	10	13	15	19	14	12	1				
MED								228	275	300	328	R 340	360	R 358	355	340	310	280	225	190				
UQ								R 230	280	300	330	R 350	360	R 365	R 360	342	320	290	238					
LQ								225	270	300	320	R 335	R 355	R 350	350	330	308	275	R 220					

JUL. 1987 | FOE (0.01 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FOES (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station OKINAWA Lat. 26° 16.9' N, Long. 127° 48.4' 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	C	C	C	C	C	C	C	C	J 56	J A 53	J A 54	45	J A 54	J A 67	J A 80	J A 76	J A 64	J A 54	J A 53	J A 29	J A 25	J A 25	J A 25	19
2	J A 26	J A 26	J A 25	E S 16	E S 16	21	J A 40	J A 40	J A 65	J A 110	J A 87	J A 77	J A 110	J A 60	J A 145	J A 130	J A 110	J A 34	J A 30	J A 40	J A 50	J A 30	J A 64	J A 40
3	J A 33	J A 33	J A 40	J A 28	J A 30	J A 25	J A 20	J A 27	31	J A 76	J A 65	J A 110	J A 120	J A 102	J A 196	J A 170	J A 43	J A 84	30	J A 40	J A 25	J A 26	J A 40	J A 30
4	J A 39	J A 39	J A 37	J A 84	J A 84	J A 53	J A 30	J A 84	J A 110	J A 107	J A 102	J A 138	J A 100	J A 88	43	43	38	J A 104	J A 77	J A 65	J A 42	J A 84	J A 85	J A 84
5	J A 85	J A 30	J A 55	J A 38	J A 27	J A 65	J A 53	J A 85	J A 103	J A 77	J A 89	J A 128	J A 144	J A 120	J A 102	J A 34	J A 128	J A 170	J A 108	J A 64	J A 76	J A 36	J A 38	J A 25
6	J A 27	J A 21	21	E S 16	J A 26	21	21	26	33	36	J A 88	J A 110	J A 58	54	J A 71	J A 65	J A 64	J A 77	J A 162	J A 88	J A 77	J A 58	J A 37	J A 22
7	J A 20	20	20	J A 26	J A 26	J A 30	J A 53	J A 53	J A 42	J A 75	J A 85	J A 75	J A 85	J A 55	J A 65	J A 53	J A 40	J A 40	J A 30	J A 36	J A 27	J A 32	J A 24	J A 24
8	J A 23	19	E S 16	E S 16	E S 16	E S 16	21	J A 27	J A 77	J A 42	J A 84	J A 64	J A 38	38	J A 50	40	J A 63	J A 64	J A 43	J A 26	J A 50	J A 50	J A 24	J A 25
9	J A 26	J A 40	J A 26	J A 25	E S 16	J A 25	J A 30	J A 39	J A 42	J A 126	J A 82	J A 55	J A 80	J A 76	J A 125	J A 145	J A 143	J A 138	J A 77	J A 75	J A 52	J A 77	J A 33	22
10	J A 21	J A 38	J A 26	J A 33	J A 38	J A 65	J A 54	J A 76	J A 144	J A 84	J A 89	J A 60	J A 88	J A 64	J A 65	J A 136	J A 88	J A 110	J A 41	J A 22	E S 16	E S 16	E S 16	J A 24
11	J A 27	J A 28	J A 28	J A 30	J A 41	J A 26	20	J A 74	J A 87	J A 88	J A 85	J A 87	J A 72	J A 41	J A 45	J A 76	J A 84	J A 65	J A 54	J A 41	J A 32	J A 30	J A 21	J A 21
12	J A 21	J A 21	E S 16	E S 16	E S 16	22	23	J A 40	J A 88	J A 85	J A 120	J A 140	J A 74	J A 56	J A 110	J A 121	J A 78	J A 65	J A 44	J A 28	J A 77	J A 77	J A 37	J A 84
13	J A 54	J A 52	J A 32	J A 26	J A 26	J A 25	J A 22	J A 38	J A 50	J A 80	J A 76	J A 85	J A 75	J A 168	J A 53	J A 74	J A 74	J A 65	J A 76	J A 106	J A 30	22	20	E S 16
14	J A 25	J A 20	J A 52	J A 33	J A 30	22	25	J A 60	J A 56	J A 63	J A 140	J A 76	J A 65	42	40	J A 50	J A 80	J A 110	J A 65	J A 38	J A 40	J A 40	J A 33	J A 50
15	J A 65	J A 54	J A 53	J A 41	J A 87	J A 80	J A 133	J A 87	J A 76	J A 144	J A 170	J A 77	J A 64	J A 110	J A 76	J A 75	J A 65	J A 90	J A 53	G	J A 44	J A 25	J A 20	J A 28
16	J A 40	J A 32	J A 85	J A 41	J A 50	J A 50	J A 42	J A 40	J A 43	J A 53	J A 84	J A 93	J A 110	J A 75	J A 44	40	50	J A 53	J A 64	J A 87	J A 120	J A 106	J A 137	J A 84
17	J A 78	J A 32	J A 33	J A 78	J A 52	J A 81	J A 29	J A 26	J A 65	J A 65	J A 87	J A 144	J A 87	J A 55	J A 77	J A 65	J A 80	J A 88	J A 85	J A 54	J A 58	J A 32	J A 26	J A 42
18	J A 54	J A 77	J A 26	J A 30	J A 23	J A 22	J A 36	J A 41	J A 39	36	J A 41	J A 50	47	51	J A 64	J A 43	J A 51	J A 57	J A 39	J A 74	J A 88	J A 88	J A 108	J A 53
19	J A 44	J A 50	J A 42	J A 62	J A 30	J A 43	J A 38	J A 54	J A 77	J A 64	J A 43	J A 48	J A 58	J A 108	J A 144	J A 57	J A 42	J A 39	J A 45	J A 28	J A 33	J A 25	E S 16	J A 28
20	J A 26	J A 52	J A 42	J A 32	J A 25	J A 22	J A 26	J A 35	J A 42	J A 54	J A 74	40	J A 65	J A 84	J A 87	J A 60	45	J A 74	J A 83	J A 110	J A 50	J A 40	J A 51	J A 50
21	J A 25	J A 26	22	J A 26	21	J A 26	J A 28	J A 32	J A 44	J A 45	J A 90	J A 107	J A 58	41	J A 44	J A 76	J A 47	41	J A 30	J A 40	J A 84	J A 52	J A 50	J A 30
22	J A 30	J A 25	J A 38	J A 28	J A 25	J A 30	J A 30	J A 48	J A 63	J A 53	45	45	49	50	J A 64	J A 67	J A 76	J A 78	J A 45	J A 51	J A 65	J A 33	J A 30	J A 36
23	J A 30	J A 37	J A 28	J A 20	E S 16	E S 16	E S 16	28	34	J A 76	41	J A 65	J A 56	51	J A 65	J A 80	41	J A 53	J A 106	J A 120	J A 52	J A 40	J A 25	J A 25
24	J A 77	J A 54	J A 31	J A 28	J A 28	22	J A 21	J A 30	J A 41	J A 60	J A 46	50	52	J A 49	J A 50	J A 54	J A 56	J A 65	J A 53	J A 53	J A 85	J A 33	J A 33	J A 37
25	J A 51	J A 25	J A 41	J A 33	J A 65	J A 33	J A 26	J A 26	J A 40	J A 65	J A 57	J A 44	J A 43	44	43	42	J A 48	J A 43	J A 47	J A 22	J A 30	J A 88	J A 78	J A 32
26	J A 40	J A 65	J A 36	J A 30	J A 25	J A 25	J A 23	J A 38	J A 41	J A 75	J A 56	J A 56	J A 44	44	46	J A 43	J A 54	J A 42	35	J A 25	J A 22	22	J A 42	J A 36
27	J A 33	J A 40	J A 58	J A 36	J A 44	J A 30	J A 83	J A 60	J A 76	J A 127	J A 145	J A 166	J A 128	J A 58	47	40	42	J A 51	J A 53	J A 70	J A 52	J A 52	J A 58	J A 32
28	J A 26	J A 37	J A 52	J A 31	J A 30	J A 26	J A 21	30	J A 38	J A 39	J A 75	J A 35	J A 96	J A 87	J A 75	J A 161	J A 111	J A 87	J A 65	J A 48	J A 41	J A 32	J A 25	J A 25
29	J A 26	J A 41	J A 33	J A 36	J A 26	E S 16	25	J A 53	J A 54	J A 65	J A 86	J A 77	J A 78	J A 60	J A 51	J A 36	J A 54	J A 101	J A 88	J A 88	J A 88	J A 38	J A 40	J A 33
30	J A 26	J A 65	J A 78	J A 83	J A 58	J A 65	J A 28	J A 41	J A 54	J A 63	J A 54	J A 36	J A 40	G	41	40	J A 40	J A 41	J A 42	J A 40	J A 41	J A 52	J A 26	J A 26
31	J A 17	J A 41	J A 52	J A 53	J A 42	J A 25	J A 40	J A 42	J A 36	J A 62	J A 75	J A 126	J A 95	J A 146	J A 88	J A 126	J A 40	40	J A 107	J A 132	J A 84	J A 50	J A 33	J A 50
	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	30	30	30	30	30	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	J A 28	J A 37	J A 34	J A 30	J A 28	J A 26	J A 25	J A 40	J A 54	J A 65	J A 84	J A 77	J A 72	J A 58	J A 65	J A 65	J A 56	J A 65	J A 53	J A 48	J A 50	J A 38	J A 33	J A 30
UQ	J A 44	J A 50	J A 52	J A 38	J A 42	J A 43	J A 40	J A 54	J A 76	J A 82	J A 88	J A 108	J A 92	J A 86	J A 84	J A 82	J A 79	J A 83	J A 80	J A 74	J A 76	J A 52	J A 50	J A 41
LQ	J A 26	J A 26	J A 26	J A 26	J A 25	22	J A 22	J A 30	J A 41	J A 56	J A 56	J A 52	J A 55	50	J A 46	J A 46	J A 44	J A 47	J A 44	J A 32	J A 32	J A 30	J A 25	J A 25

JUL. 1987 | FOES (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | FBES (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station OKINAWA Lat. 26° 16.9' N, Long 127° 48.4' 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	C	C	C	C	C	C	C	C	42	47	AA 54	45	AA 54	AA 67	AA 80	38	52	35	33	22	21	19	ES 16	ES 16
2	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	30	29	51	53	47	38	48	45	AA 145	44	47	30	30	21	40	30	25	20
3	25	25	25	27	25	25	20	25	30	50	AA 65	AA 110	AA 120	AA 102	AA 196	UA 45	30	46	28	32	21	26	20	25
4	37	ES 16	37	ES 15	18	24	24	AA 84	AA 110	43	AA 102	AA 138	AA 100	49	40	41	36	AA 104	74	44	ES 16	35	23	AA 84
5	AA 85	ES 16	22	AA 38	17	23	25	29	39	AA 77	42	42	AA 144	66	AA 102	65	67	AA 170	66	25	63	29	24	ES 16
6	ES 16	ES 16	ES 16	ES 16	20	ES 16	17	25	32	35	AA 88	AA 110	41	42	AA 71	42	50	65	AA 162	63	30	44	25	ES 16
7	ES 16	ES 16	ES 16	18	ES 16	30	25	35	33	AA 75	37	39	AA 85	39	45	36	38	35	25	35	18	29	20	24
8	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	21	27	35	35	40	38	38	38	38	38	60	60	38	26	40	AA 50	21	ES 16
9	ES 16	ES 16	18	20	ES 16	EA 16	26	32	36	AA 126	AA 82	45	61	65	AA 125	AA 145	68	82	58	65	27	AA 77	20	ES 16
10	ES 16	ES 16	ES 16	20	22	ES 16	30	32	AA 144	50	AA 89	36	44	62	40	80	63	64	37	20	ES 16	ES 16	ES 16	ES 16
11	18	ES 16	ES 16	23	28	18	20	37	49	52	48	38	48	38	39	49	60	54	45	40	29	20	ES 16	ES 16
12	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	18	32	37	40	40	AA 140	50	44	AA 110	AA 121	51	44	33	22	34	30	AA 87	AA 84
13	ES 16	20	20	19	17	ES 16	19	33	46	50	48	AA 85	46	AA 168	50	62	53	48	55	62	30	ES 16	ES 16	ES 16
14	ES 16	ES 16	22	ES 16	23	ES 16	25	33	50	AA 68	38	53	50	40	40	48	45	60	49	38	ES 16	ES 16	20	AA 50
15	AA 65	AA 54	AA 53	22	AA 87	AA 80	28	45	58	AA 144	AA 170	AA 77	38	48	41	40	42	76	33	G	20	18	ES 16	ES 16
16	26	21	ES 16	18	23	20	28	30	42	37	AA 84	45	AA 110	AA 75	37	38	46	45	63	AA 87	AA 120	51	AA 137	AA 84
17	AA 78	26	30	30	ES 16	AA 81	29	26	39	39	50	45	47	43	46	57	72	74	80	49	52	ES 16	25	24
18	30	ES 16	ES 16	20	ES 16	20	30	34	32	35	39	49	46	48	54	40	46	54	34	22	37	41	52	ES 16
19	28	40	30	25	22	24	38	30	40	40	40	41	50	64	AA 144	54	37	39	31	24	29	20	ES 16	ES 16
20	25	ES 16	25	20	20	18	20	31	40	40	40	38	40	40	45	37	35	59	47	AA 110	19	40	42	25
21	ES 16	ES 16	ES 16	ES 16	20	ES 16	26	25	39	38	61	AA 107	50	41	42	50	40	32	30	27	50	35	33	25
22	24	ES 16	25	22	18	25	25	32	35	45	43	43	48	48	52	55	50	55	40	50	37	20	20	20
23	20	20	ES 16	ES 16	ES 16	ES 16	ES 16	26	34	38	41	42	49	50	52	45	39	50	AA 106	20	ES 16	21	25	20
24	AA 77	ES 16	20	ES 16	ES 16	ES 16	18	30	36	AA 60	44	49	50	47	49	52	52	47	47	50	34	29	29	30
25	ES 16	ES 16	20	20	19	20	19	26	30	41	43	43	44	43	41	40	37	40	43	18	19	AA 88	30	22
26	20	24	28	25	ES 16	22	19	28	37	42	42	42	42	41	43	43	48	36	34	21	22	18	30	ES 16
27	29	29	AA 58	27	ES 16	20	AA 88	37	41	AA 127	46	AA 166	AA 128	46	47	39	41	51	34	34	28	38	30	ES 16
28	ES 16	22	ES 16	ES 16	ES 16	20	17	26	32	34	AA 75	AA 85	AA 96	AA 87	50	AA 161	AA 111	74	50	40	26	ES 16	18	20
29	24	24	24	34	24	ES 16	17	29	37	35	36	42	46	40	AA 51	36	51	AA 101	AA 88	AA 88	AA 88	30	30	22
30	19	26	23	AA 83	AA 58	AA 65	22	34	45	48	38	36	39	G	40	40	37	39	40	19	20	25	20	19
31	ES 16	20	52	22	25	ES 16	25	33	36	AA 62	AA 75	AA 126	AA 95	46	80	39	40	37	AA 107	AA 132	43	40	AA 38	AA 50
	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	30	30	30	30	30	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	20	ES 16	20	20	18	19	24	30	39	45	46	45	49	46	49	44	47	51	43	34	29	29	24	20
UQ	28	24	25	25	23	24	28	33	44	56	AA 70	AA 85	AA 73	63	AA 76	54	52	64	60	50	38	39	30	25
LQ	ES 16	ES 16	ES 16	ES 16	ES 16	ES 16	19	27	35	38	40	42	45	41	41	40	40	40	34	22	20	20	20	ES 16

The Radio Research Laboratory, Japan

JUL. 1987 | FBES (0.1 MHZ)

IONOSPHERIC DATA

JUL. 1987 | FMIN (0.1 MHZ) | 135° E Mean Time (G.M.T. + 9 h)

Station OKINAWA Lat. 26° 16.9' N, Long. 127° 48.4' 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	C	C	C	C	C	C	C	C	15	16	20	22	20	24	25	22	16	15	14	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	15	14	23	23	22	27	20	22	16	18	16	14	14	E S 15	E S 16	E S 16	E S 16
3	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	14	14	24	15	29	24	22	24	24	29	15	14	14	E S 16	E S 16	E S 16	E S 16
4	E S 16	E S 16	E S 16	E S 15	E S 16	E S 16	14	14	16	20	23	22	25	22	22	20	20	20	14	13	E S 16	E S 16	E S 16	E S 16
5	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	15	16	17	18	22	22	24	24	22	20	17	17	14	16	E S 16	E S 16	E S 16	E S 16
6	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	13	13	16	26	23	25	24	17	20	17	14	13	13	E S 16	E S 16	E S 16	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	14	15	18	18	22	22	21	22	20	20	16	15	14	E S 16	E S 16	E S 16	E S 16
8	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	14	14	15	20	20	20	18	18	18	20	16	14	E S 16	E S 16	E S 16	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	13	13	21	23	22	21	22	22	21	22	15	15	13	E S 16	E S 16	E S 16	E S 16
10	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	14	15	14	16	21	23	24	26	20	23	20	16	13	E S 16	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	E S 16	E S 16	16	18	21	24	24	22	26	25	22	20	15	13	16	E S 16	E S 16	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	14	15	15	16	22	23	24	20	23	21	15	13	14	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	E S 16	E S 16	E S 16	14	14	18	17	20	24	23	20	20	19	16	14	14	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	14	14	15	20	22	21	22	23	20	20	20	25	E S 16	E S 16	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	E S 16	E S 16	16	19	19	20	23	22	21	28	22	18	16	16	15	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	15	14	18	19	22	21	23	22	21	19	15	15	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	16	13	14	17	23	22	23	24	23	22	20	14	13	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 15	15	13	19	19	24	24	24	24	22	18	17	14	13	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	14	15	20	23	23	24	26	25	25	23	20	14	14	14	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	14	14	20	22	24	20	23	19	20	22	19	15	14	E S 16	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	15	15	22	22	23	22	22	22	22	22	18	17	E S 16	E S 16	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	14	14	20	22	22	22	26	25	22	21	18	14	E S 16	E S 16	E S 16	E S 15	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	14	14	20	23	23	28	26	25	20	22	16	16	E S 16	E S 16	E S 16	E S 16	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	14	18	19	27	27	25	29	25	24	20	20	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	16	14	16	17	21	23	23	21	23	27	20	16	13	14	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	14	16	19	21	22	23	26	26	26	21	23	20	19	14	E S 16	E S 16	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	15	14	16	19	24	24	26	24	25	22	19	18	14	14	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 16	E S 16	14	14	16	19	22	23	24	28	20	23	22	19	14	13	E S 16	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 15	15	15	19	22	23	23	23	25	24	21	19	13	13	E S 16	E S 16	E S 16	E S 16
30	E S 16	E S 16	E S 16	E S 16	E S 15	E S 15	15	13	14	16	16	21	22	22	23	20	19	18	16	16	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	E S 16	E S 16	E S 16	16	18	21	22	17	23	23	24	20	22	18	15	E S 16	E S 16	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	30	30	30	30	30	30	30	30	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	14	15	19	22	23	23	23	23	22	20	16	14	14	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	15	16	20	23	23	24	24	25	22	22	18	15	E S 16	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	14	14	14	17	20	22	22	22	22	20	19	15	14	14	E S 16	E S 16	E S 16	E S 16

IONOSPHERIC DATA

JUL. 1987 | M(3000)F2 (0.01) | 135° E Mean Time (G.M.T. + 9 h)

Station OKINAWA Lat. 26° 16.9' N, Long. 127° 48.4' 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	C	C	C	C	C	C	C	C	340	350	A	290	A	A	A	290	315	300	320	350	325	325	305	F
2	F	325	F	J S 330	F	F	355	315	345	285	350	R 270	275	315	A	285	R 270	285	320	345	345	305	F	F
3	F	J S 310	320	325	330	385	355	350	365	320	A	A	A	A	A	275	305	310	310	335	305	S 340	J S 340	F
4	F	F	F	F	S 360	S 345	345	A	A	335	A	A	A	270	260	270	285	A	305	320	S 375	S 335	S 325	A
5	A	F	F 355	A	F	F	325	375	355	A	290	270	A	305	A	285	290	A	300	325	S 365	S 345	290	295
6	F	S 320	S 305	F 310	F 315	S 325	360	365	340	340	A	A	285	295	A	280	290	305	A	R 325	305	F 305	F	F
7	F	F	F	F	F	F	285	325	350	A	R 280	300	A	290	300	285	280	315	320	315	310	U S 330	U S 335	U S 300
8	295	305	300	290	340	S 335	330	365	345	350	270	R 305	290	300	310	R 280	280	315	310	U R 355	S 370	A	310	F
9	F	F	F	F	F	345	315	305	320	A	A	285	285	305	A	A	285	320	345	350	320	A	F	F
10	U S 310	F	F	F	F	S 365	340	305	A	310	A	270	290	R 280	260	275	300	R 305	320	R 305	S 320	U S 315	F	F
11	F	F 315	F	F	U S 310	S 305	335	R 315	305	310	310	295	280	300	310	285	320	300	325	335	335	290	280	285
12	295	295	315	300	295	S 320	R 310	315	365	350	315	A	265	285	A	A	290	335	315	320	340	310	A	A
13	F	F	F	F	F	F	350	310	315	320	295	A	320	A	285	280	285	315	335	R 325	S 355	U S 305	310	F
14	F	F	F	F	F	F	325	345	365	A	310	295	280	280	295	290	320	305	305	325	J S 330	315	F	A
15	A	A	A	F	A	A	350	340	345	A	A	A	G	275	285	305	295	280	335	315	300	300	295	F
16	F	F	F	F	F	F	325	355	365	U R 285	A	300	A	A	G	275	285	310	325	A	A	U S 295	A	A
17	A	F	F	F	F	A	R 340	365	350	295	305	310	295	275	280	275	280	290	R 350	330	295	S 295	U S 275	290
18	F	F	S 315	S 285	310	S 310	330	310	325	350	315	305	295	290	295	280	305	315	325	310	315	F	F	F
19	F	F	F	F	F	F	R 365	R 360	355	320	345	290	295	290	A	290	275	280	315	315	315	300	S 290	315
20	F	F	F	F	F	S	335	320	335	300	335	325	280	275	290	320	310	290	290	A	300	S 295	305	335
21	300	F	F	F	F	F	350	360	365	300	330	A	285	285	290	275	275	280	305	320	300	315	300	285
22	F	F	F	F	F	F	R 360	U R 365	370	305	300	295	290	290	280	290	290	315	320	R 315	S 295	U S 350	310	F
23	F	F	F	F	F	F	340	320	320	315	310	285	285	275	275	280	310	325	A	345	305	305	S 280	F
24	A	F	F	F	F	F 325	345	365	355	A	300	290	265	280	265	285	295	310	320	R 355	S 315	315	310	F
25	F	F	F	F	S 325	S 300	305	R 345	365	325	280	280	280	270	275	290	285	295	325	295	315	A	285	S 310
26	F	F	F	F	F	F	365	350	350	315	310	315	285	275	285	295	305	305	300	R 350	355	325	310	S 300
27	F	F	A	F	F	F	A	355	315	A	R 350	A	A	265	275	275	280	335	305	325	310	S 335	F 335	F
28	F	F	F	S 285	290	300	R 280	R 345	365	360	A	A	A	A	300	A	A	290	R 310	R 330	325	S 295	F	F
29	S 285	285	S 280	F	F	F	F	295	G	G	265	265	270	G	J R 260	285	305	A	A	A	A	325	280	S 270
30	S 295	S 285	320	A	A	A	285	325	280	285	320	280	260	300	285	285	280	300	R 310	R 310	275	S 300	295	F
31	F	F	F	F	F	F	310	330	335	A	A	A	A	275	A	280	295	285	A	A	335	S 365	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	6	8	8	7	9	12	28	29	29	23	21	21	22	26	22	28	30	28	27	27	29	27	21	10
MED	295	308	315	300	315	S 325	338	345	345	315	310	290	285	282	285	285	290	305	320	325	315	S 315	305	298
UQ	300	318	320	318	330	S 345	350	360	365	333	320	300	290	295	295	290	305	315	325	340	335	S 328	310	S 310
LQ	S 295	290	S 302	288	310	S 308	320	315	325	300	295	280	275	275	275	278	230	290	308	315	305	300	290	285

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IONOSPHERIC DATA

JUL. 1987 | M(3000)F1 (0.01) | 135° E Mean Time (G.M.T. + 9 h)

Station OKINAWA Lat. 26° 16.9' N, Long 127° 48.4' 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							C	C	A	A	A	A	A	A	A	325	A	385	330					
2								L	A	A	A	430	A	A	A	A	A	395	385					
3								L	L	A	A	A	A	A	A	A	415	A	L 385					
4							L	A	A	A	A	A	A	A	385	A	400	A	A					
5								L	L	A	385	395	A	A	A	A	A	A	A					
6							L	L	L	L 390	A	A	410	A	A	A	A	A	A	A				
7								L	U L 400	A	410	420	A	420	A	405	415	375	370					
8								410	400	405	L	410	410	420	415	400	A	A	A					
9								L	L	A	A	A	A	A	A	A	A	A	A	A				
10								L	A	A	A	385	A	A	385	A	A	A	A	L				
11							L	A	A	A	A	385	A	410	395	A	A	A	A					
12							L	L 335	L 375	A	U L 385	A	A	A	A	A	A	A	L	L				
13								A	A	A	A	A	A	A	A	A	A	A	A	A				
14								L	A	A	385	A	A	410	410	A	A	A	A	A				
15								A	A	A	A	A	410	A	385	395	A	A	390	L				
16								L	A	415	A	A	A	A	390	405	A	A	A	A				
17									A	L 375	A	A	A	400	A	A	A	A	A					
18								L	L	L 395	U L 395	A	A	A	A	385	A	A	U L 340	A				
19								L	U L 405	U L 395	L 420	380	A	A	A	A	385	L 350	L 350					
20								375	L	395	385	390	415	410	A	370	380	A	A	A				
21								L	L	L	A	A	A	390	400	A	390	380	380					
22								L	L	A	385	380	A	A	A	A	A	A	A	A				
23								L	L	L	415	415	A	A	A	A	375	A	A					
24								L	L	A	A	A	A	A	A	A	A	A	A					
25								L	U L 380	U L 385	U L 390	U L 380	415	395	400	360	L 365	370	A					
26								L	L	U L 360	L 380	L 385	U L 375	385	A	A	A	370	L					
27							A	A	L	A	A	A	A	A	A	395	A	A	L	A				
28								L	L 385	L	A	A	A	A	A	A	A	A	A					
29								L	A	390	395	375	A	395	A	375	A	A	A	A				
30								L	A	A	395	390	400	390	400	385	365	L 355	A					
31								L	L	A	A	A	A	A	A	390	395	375	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	10	13	14	7	11	10	12	10	9	8					
MED								375	L 392	L 392	390	388	410	400	398	388	388	375	380					
UQ								392	U L 400	395	395	410	412	410	400	398	400	380	385					
LQ								355	L 380	L 385	385	380	405	392	385	372	375	370	360					

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IONOSPHERIC DATA

JUL. 1987 | H'F2 (KM) | 135° E Mean Time (G.M.T. + 9 h)

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

Day \ 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							C	C	A	A	A	A	A	A	A	390	A	300	275					
2								350	A	A	A	470	420	340	A	360	A	335	270					
3								250	250	A	A	A	A	A	A	365	325	320	290					
4							270	A	A	290	A	A	A	380	430	390	345	A	330					
5								235	235	A	450	530	A	340	A	320	345	A	320					
6							240	225	260	300	A	A	420	370	A	400	340	310	A	260				
7								280	260	A	440	390	A	375	390	370	350	290	280					
8								240	280	275	400	400	420	350	350	460	A	A	280					
9								325	280	A	A	380	A	A	A	A	A	A	A	A				
10								330	A	355	A	370	350	365	370	A	320	320	270	285				
11							270	340	A 350	340	315	360	380	330	310	370	300	300	290					
12							300	305	245	270	335	A	A	345	A	A	325	270	300	290				
13								A	A	A	A	A	310	A	A	A	A	A	A	A				
14								270	A	A	330	A	A	380	360	350	290	A	A	A				
15								250	A	A	A	A	G	A	365	330	340	A	250	240				
16								230	A	460	A	330	A	A	G	510	A	290	A	A				
17									250	420	350	320	380	395	370	375	410	340	250					
18								290	285	270	335	355	395	375	325	355	305	300	270	245				
19								235	250	300	295	420	395	A	A	330	370	355	285					
20								305	290	300	315	290	400	500	A	390	380	A	A	A				
21								240	250	380	A	A	A	400	380	A	380	330	280					
22								240	215	350	360	340	350	A	A	A	A	A	265	A				
23								300	300	310	340	375	365	A	A	350	300	A	A					
24								225	235	A	350	350	400	330	370	335	305	295	270					
25								260	240	295	275	320	405	370	365	320	320	320	265					
26								245	235	330	335	330	380	425	370	320	300	305	290					
27							A	255	315	A	250	A	A	A 440	415	370	350	310	295	260				
28								265	230	240	A	A	A	A	335	A	A	370	285					
29								350	G	G	500	465	470	G	A	400	330	A	A	A				
30								310	400	400	335	420	420	360	335	320	305	285	265					
31								280	275	A	A	A	A	400	A	340	325	330	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							4	27	23	19	18	19	18	21	17	24	23	20	22	6				
MED							270	265	260	310	335	370	398	375	370	362	325	310	280	260				
UQ							285	305	288	368	360	410	420	400	380	390	348	330	290	235				
LQ							255	240	242	292	315	335	380	350	350	332	305	298	270	245				

JUL. 1987 | H'F2 (KM)

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IONOSPHERIC DATA

JUL. 1987 | H'F (KM) | 135° E Mean Time (G.M.T. + 9 h)

Station OKINAWA Lat. 26° 16.9' N, Long. 127° 48.4' 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	C	C	C	C	C	C	C	C	A	A	A	A	A	A	A	A	A	A 240	A	225	210	A 250	E S 280	E S 290
2	S	S 275	235	S 255	S 240	S	A	210	A	A	A	190	A	A	A	A	A	200	A 230	A 240	A 230	A	A	E A 280
3	A	A	A	A	A 250	A	220	190	200	A	A	A	A	A	A	A	200	A	A 230	A 240	215	A 240	220	A
4	A	255	A 265	250	235	A	A 220	A	A	A	A	A	A	A	A 230	A	A 215	A	A	265	200	220	280	A
5	A	270	255	A	A 300	A 300	U A 265	U A 250	U A 250	A	A	A	A	A	A	A	A	A	A	250	250	250	280	280
6	275	270	260	275	280	255	220	210	200	200	A	A	210	A	A	A	A	A	A	A	290	290	255	255
7	260	E S 280	E S 280	E A 270	220	A 230	A	A	A 230	A	210	200	A	210	A	210	A 225	210	210	240	230	240	A 235	A
8	E S 300	E S 275	E S 275	S	S 270	235	A	210	210	200	A 230	205	210	190	200	200	A	A	A	225	210	A	E A 280	E S 290
9	S	S	E A 290	A	250	260	A	A 240	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E A 280	E S 310
10	295	310	295	300	265	215	A	A	A	A	A	220	A	A	A	A	A	A	A	245	235	220	290	305
11	215	265	245	A 275	A	A 280	240	A	A	A	A	215	A	200	210	A	A	A	A	250	240	280	295	295
12	305	300	250	250	280	270	240	A	A	A	A 230	A	A	A	A	A	A	A	U A 260	A 250	245	250	A	A
13	S	A	A	E A 260	235	S	A 240	A	A	A	A	A	A	A	A	A	A	A	A	A	200	240	E S 260	E S 280
14	S 265	260	E A 270	S	A	E S 260	A 250	A	A	A	210	A	A	200	A 220	A	A	A	A	A	200	240	A	A
15	A	A	A	A	A	A	A	A	A	A	A	A	190	A	A	A	A	A	A	230	250	240	E S 280	S
16	A	300	270	E A 290	260	E A 260	A	A	A	200	A	A	A	A	190	A 230	A	A	A	A	A	A	A	A
17	A	335	250	A	250	A	270	215	A	215	A	A	A	A	A	A	A	A	A	250	A	295	270	255
18	350	270	250	230	250	A 275	A 295	A 250	225	205	215	A	A	A	A	A 250	A	A	A	A	265	A	325	280
19	320	270	290	305	300	255	220	240	A 225	A	200	A 245	A	A	A	A	225	A	A	250	255	245	280	275
20	E A 290	265	A	240	250	A	A 250	A 225	A	A	200	220	200	200	A	A	210	A	A	A	E A 270	A	A	210
21	250	E S 280	S 270	S 270	A	240	225	205	A	A	A	A	A	A	A 240	A	A	H 210	220	240	A	A 260	A	E A 300
22	E A 300	240	240	E A 280	A 265	A	225	A	200	A	A	A	A	A	A	A	A	A	A	A	A	210	E A 260	A
23	A	E A 305	A 260	250	240	210	230	210	200	A	200	200	A	A	A	A	A	A	A	240	260	E A 280	A	E A 300
24	A	295	270	250	245	215	240	220	A 220	A	A	A	A	A	A	A	A	A	A	235	255	250	270	A 340
25	280	305	265	305	250	A	250	220	205	A 250	A 250	A 240	210	215	220	A 250	235	E A 265	A	230	245	A	300	280
26	300	300	295	320	285	225	205	200	A 225	A	A 220	215	A 250	215	A	A	A	A 230	A	230	215	220	A	330
27	A 330	A 250	A	310	220	250	A	A	A	A	A	A	A	A	A	230	A	A	A	A	245	240	245	300
28	330	340	295	270	270	270	250	220	200	200	A	A	A	A	A	A	A	A	A	245	230	270	330	330
29	295	320	330	330	320	285	270	A 270	A	220	215	A	A	220	A	250	A	A	A	A	A	245	A	320
30	320	350	270	A	A	A	A 285	A	A	A	200	200	200	200	215	A 240	A 230	A	A	240	270	280	270	305
31	S 300	E A 310	A	250	A	S	A	A	A 220	A	A	A	A	A	A	A	A	A	A	A	A 230	A 220	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	26	24	22	24	19	21	17	14	8	12	11	7	9	8	8	7	6	5	20	25	24	21	22
MED	300	275	265	261	250	252	240	220	215	202	212	215	210	200	218	235	225	215	A 230	240	238	244	280	285
UQ	312	302	278	300	275	270	250	A 240	A 225	218	A 225	220	210	215	A 225	A 250	228	A 235	A 230	250	252	260	280	305
LQ	270	268	251	250	242	232	225	210	200	200	200	200	200	200	205	220	212	210	220	232	215	240	U 248	268

JUL. 1987 | H'F (KM)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | H'E (KM) | 135° E Mean Time (G.M.T. + 9 h)

Station OKINAWA Lat. 26° 16.9' N, Long. 127° 48.4' 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							C	C	A	A	110	110	110	110	110	110	110	105	A	S				
2							S	105	105	A	A	105	105	105	A	A	A	A	A	A				
3							S	100	105	105	105	105	105	105	A	A	A	A	105	A				
4							A	A	A	A	A	A	A	A	105	105	105	A	A	A				
5							A	A	A	A	A	A	A	A	A	A	A	A	A	A				
6							A	100	105	100	A	A	A	A	A	105	105	A	A	A				
7							S	A	A	A	A	A	A	110	110	110	A	A	A	A				
8							S	105	A	A	A	110	A	110	110	110	105	105	A	S				
9							S	A	A	A	A	A	105	105	A	A	A	A	A	A				
10							A	A	A	A	A	A	A	A	A	105	105	105	105	S				
11							S	A	A	A	A	A	A	A	A	A	A	A	A	A				
12							S	110	A	A	A	A	A	A	105	105	105	105	100	A				
13							S	105	105	105	105	105	105	A	A	A	A	A	A	A				
14							S	110	110	105	105	105	110	110	110	110	110	110	110	S				
15							S	A	A	A	A	A	A	A	A	A	A	A	105	110				
16							S	110	105	105	105	A	A	A	A	110	110	110	A	S				
17							A	A	A	A	A	A	A	A	A	A	A	A	A	A				
18							S	105	105	105	105	105	105	105	105	105	105	105	105	A				
19							A	A	A	A	A	A	A	A	A	A	A	A	A	A				
20							S	110	A	A	A	A	A	110	105	110	110	110	105	A				
21							S	A	A	A	A	A	105	105	105	A	A	105	A	S				
22							S	105	A	A	A	110	A	110	110	110	110	105	105	S				
23							S	105	105	A	A	A	A	110	110	110	110	110	105	S				
24							S	A	105	105	105	105	105	100	105	105	105	105	105	S				
25							A	A	A	A	A	A	A	100	105	105	105	100	100	A				
26							A	A	A	A	A	A	A	A	A	105	105	105	110	A				
27							A	A	A	A	A	A	A	105	105	100	105	105	100	A				
28							A	105	105	A	A	A	A	A	A	A	A	A	A	A				
29							S	105	105	105	105	105	105	105	105	A	105	105	A	A				
30							A	105	A	A	A	A	A	105	105	105	100	105	A	A				
31							S	A	A	105	105	105	105	105	105	A	105	110	105	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	11	9	9	11	11	18	17	18	19	18	14	1				
MED								105	105	105	105	105	105	105	105	105	105	105	105	110				
UQ								108	105	105	105	108	105	110	110	110	110	110	105					
LQ								105	105	105	105	105	105	105	105	105	105	105	105					

JUL. 1987 | H'E (KM)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | H'ES (KM) | 135° E Mean Time (G.M.T. + 9 h)

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

Day \ 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	C	C	C	C	C	C	C	C	125	125	125	150	145	135	125	125	115	115	110	110	110	110	110	110
2	110	110	110	S	S	100	125	115	115	110	110	125	115	115	110	110	105	110	110	100	100	100	110	115
3	105	105	100	100	100	100	100	120	120	115	115	115	115	115	120	110	105	105	115	100	100	100	115	100
4	110	105	105	115	105	105	110	110	105	105	105	105	100	105	145	150	125	105	105	100	100	110	110	110
5	105	105	100	95	100	115	110	110	110	105	105	105	105	105	105	100	100	100	100	100	100	100	100	100
6	100	95	100	S	100	100	100	150	145	125	100	100	100	135	120	115	115	105	100	100	100	95	95	100
7	100	100	100	110	110	110	110	110	110	110	110	125	110	125	120	125	110	110	110	100	100	100	100	100
8	100	100	S	S	S	S	120	120	110	110	100	125	110	150	125	135	125	125	115	100	110	110	100	100
9	110	110	100	100	S	110	110	110	110	110	110	110	115	115	110	105	105	100	100	110	110	110	110	100
10	120	105	105	105	105	105	105	110	100	100	100	140	100	140	120	115	115	115	110	120	S	S	S	105
11	105	105	100	100	95	100	120	105	105	105	105	105	100	105	105	100	100	100	100	95	95	100	100	100
12	105	100	S	S	S	110	120	115	105	105	105	100	105	105	115	115	115	120	115	100	105	105	105	105
13	105	105	105	105	105	110	130	120	120	115	115	115	115	105	105	105	105	100	105	100	100	100	100	S
14	110	110	110	110	110	110	130	125	115	115	115	115	130	140	E G 160	135	130	115	115	110	110	110	110	110
15	110	110	110	110	110	110	110	110	110	100	100	100	110	105	100	100	100	100	115	G	100	100	100	110
16	100	110	110	110	110	110	125	125	115	125	115	105	105	105	105	140	140	135	115	115	110	110	110	110
17	105	105	105	105	105	105	110	105	105	105	100	105	100	105	100	120	110	110	105	100	100	100	100	105
18	105	105	100	105	105	110	115	115	120	145	130	130	145	130	120	145	120	120	115	105	105	105	105	105
19	105	100	100	105	105	105	105	105	105	105	105	105	105	100	100	100	100	100	100	100	100	100	S	110
20	110	110	100	100	100	100	125	120	110	110	110	150	110	130	115	130	130	115	115	110	110	110	110	110
21	105	105	105	105	105	110	110	110	110	110	110	110	115	120	120	110	110	125	110	100	100	100	100	100
22	100	100	100	100	100	120	120	125	140	150	150	160	140	140	125	120	120	120	110	110	110	100	100	100
23	110	110	110	100	S	S	S	120	115	100	130	125	105	130	120	125	120	115	115	115	110	100	100	100
24	110	105	105	105	105	105	105	140	120	120	130	130	120	130	130	125	120	120	120	115	110	110	105	105
25	105	105	100	100	105	105	105	105	110	105	105	105	105	145	150	150	125	125	120	100	105	105	110	105
26	105	110	100	100	100	100	100	105	105	100	100	100	155	145	135	130	120	125	120	100	100	100	110	105
27	105	105	100	100	105	100	100	125	120	110	105	105	100	140	135	160	135	120	120	110	105	105	100	100
28	100	100	100	100	100	100	105	130	135	105	100	100	100	100	100	100	100	100	100	100	100	95	95	95
29	105	105	105	105	105	S	130	120	120	120	120	120	125	120	120	105	120	110	105	105	105	105	105	100
30	105	105	110	100	105	115	105	120	105	105	105	105	100	G	150	130	125	120	105	105	100	105	95	105
31	110	110	110	110	110	110	100	100	100	115	115	115	115	115	115	110	120	140	115	110	110	110	110	110
	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	30	30	28	26	25	27	29	30	31	31	31	31	31	30	31	31	31	31	31	30	30	30	29	30
MED	105	105	102	105	105	105	110	115	110	110	110	110	110	120	120	120	115	115	110	100	102	102	105	105
UQ	110	110	108	105	105	110	120	120	120	115	115	125	115	135	125	130	122	120	115	110	110	110	110	110
LQ	105	105	100	100	100	100	105	110	105	105	105	105	102	105	108	108	105	105	105	100	100	100	100	100

JUL. 1987 | H'ES (KM)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

JUL. 1987 | TYPES OF ES | 135° E Mean Time (G.M.T. + 9 h)

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

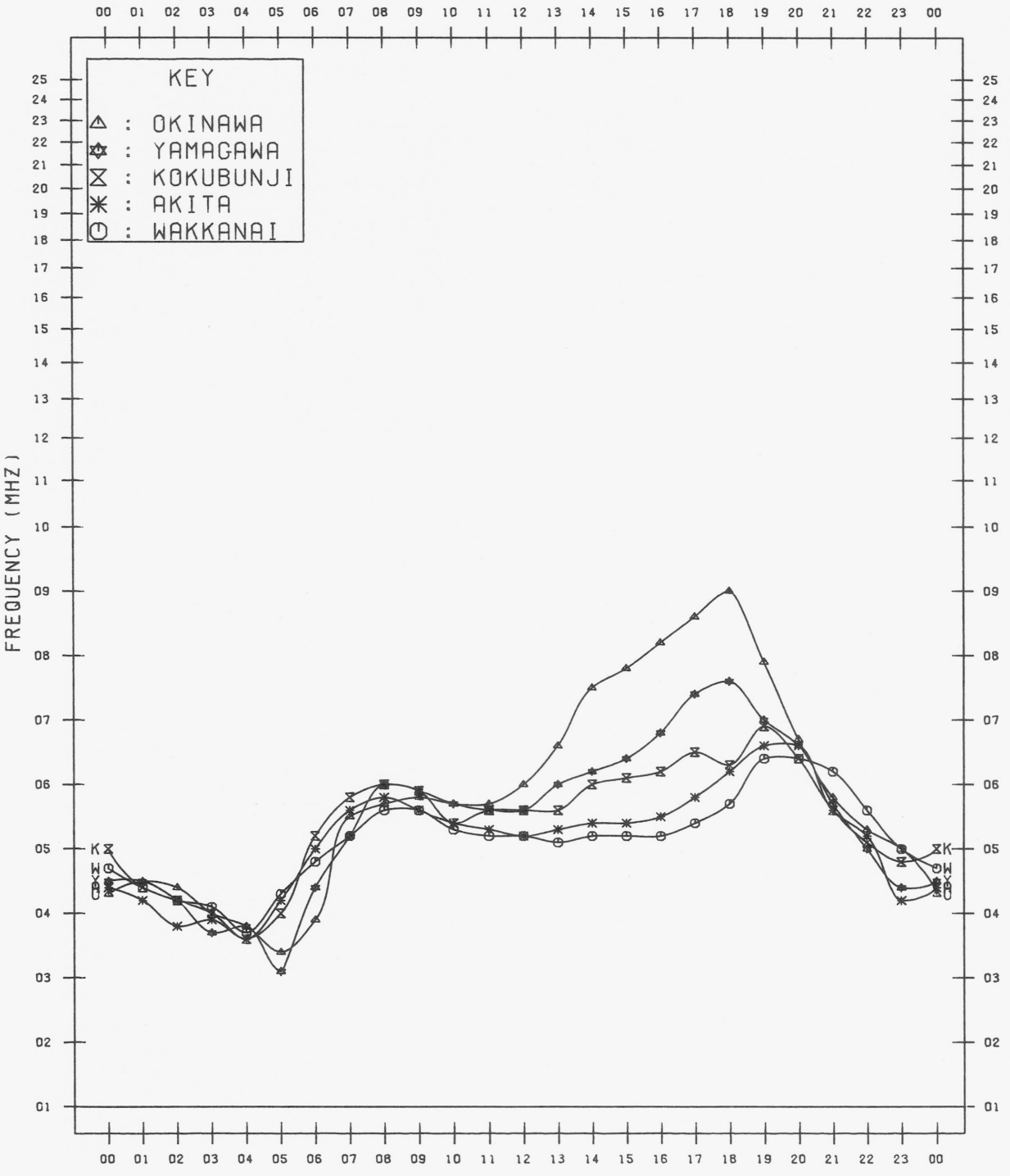
Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									CL 22	CL 22	C 2	H 1	H 2	H 4	C 3	C 2	C 4	C 3	L 2	L 4	F 4	F 4	F 1	F 1
2	F 4	F 2	F 1			F 1	C 4	C 2	C 3	L 4	L 4	C 2	C 3	C 2	L 6	L 3	L 3	L 2	L 3	L 4	F 6	F 6	FF 13	FF 22
3	F 3	F 3	F 5	F 6	F 6	F 6	L 1	C 1	C 1	C 4	C 5	C 6	C 6	C 6	CL 36	L 5	L 2	L 3	C 1	L 3	F 2	F 3	FF 33	F 4
4	FF 73	F 4	F 7	FF 24	F 4	F 2	L 2	L 7	L 7	L 2	L 5	L 5	L 6	L 2	H 1	H 1	C 1	L 3	L 7	L 7	F 4	FF 25	FF 43	F 5
5	F 5	F 3	F 4	F 3	F 1	FF 32	L 5	L 4	L 4	L 4	L 3	L 3	L 4	L 4	L 7	L 7	L 4	L 7	L 6	L 6	F 6	F 8	F 5	F 3
6	F 4	F 4	F 3		F 4	F 2	L 2	H 2	H 1	C 1	L 5	L 4	L 2	CL 21	CL 42	C 4	C 6	L 5	L 5	L 5	F 4	F 3	F 3	L 2
7	F 1	F 2	F 1	F 1	F 1	F 4	L 3	L 2	L 2	L 3	L 2	CL 12	L 5	C 1	C 3	C 2	L 2	L 3	L 3	L 6	F 3	F 3	F 3	F 1
8	F 1	F 1					C 1	C 1	L 2	L 3	L 2	C 1	L 2	H 1	C 1	H 1	C 3	C 3	CL 33	L 4	FF 33	FF 24	F 4	F 2
9	F 2	F 2	F 2	F 2		F 2	L 2	L 4	L 3	L 5	L 3	L 3	C 3	C 3	L 6	L 6	L 5	L 6	L 5	LL 64	FF 23	FL 24	F 2	F 2
10	F 2	F 2	F 4	F 4	F 4	F 1	L 4	L 4	L 6	L 5	L 6	HL 12	L 3	HL 21	CL 21	C 5	C 4	C 7	C 4	C 2				L 4
11	F 5	F 2	F 3	F 3	F 3	F 1	C 1	L 4	L 5	L 4	L 3	L 3	L 3	L 1	L 2	L 4	L 5	L 7	L 8	L 7	F 7	F 3	F 1	F 2
12	F 1	F 2				F 2	C 2	C 5	L 4	L 4	L 5	L 4	L 3	L 3	C 5	C 6	C 5	C 4	C 5	L 3	FF 24	FF 24	F 4	F 3
13	F 3	F 4	F 3	F 2	F 2	F 2	C 3	C 5	C 5	C 5	C 3	C 3	C 2	L 6	L 3	L 5	L 6	L 6	L 5	L 4	F 7	F 2	F 2	
14	F 2	F 1	F 4	F 2	F 7	F 1	C 3	C 5	C 4	C 5	C 2	C 2	H 2	H 1	H 1	H 2	H 3	C 4	C 4	L 7	F 2	F 2	F 2	F 2
15	F 4	FF 13	F 2	FF 12	FF 12	FF 22	L 3	L 2	L 4	L 6	L 5	L 3	L 1	L 4	L 2	L 3	L 4	L 3	C 4		F 2	F 2	F 1	F 2
16	F 5	F 3	F 2	F 2	F 3	F 4	C 3	C 3	C 2	C 2	C 5	L 3	L 7	L 5	L 2	H 1	H 3	H 6	CL 62	CL 43	FF 43	FF 22	FF 72	FF 17
17	F 5	F 6	F 5	F 7	F 5	F 4	L 3	L 2	L 4	L 3	L 4	L 2	L 2	L 2	L 2	CL 42	L 5	L 5	L 7	L 6	F 8	F 5	F 3	F 4
18	F 5	F 4	F 4	F 3	F 3	F 4	C 4	C 6	C 2	HL 11	C 2	C 2	H 1	C 2	C 3	H 2	C 3	C 6	C 4	L 7	F 5	F 4	F 4	F 3
19	F 5	F 7	F 4	F 3	F 3	F 6	L 3	L 4	L 3	L 3	L 2	L 2	L 3	L 4	L 6	L 5	L 3	L 3	L 3	L 3	F 5	F 2		F 3
20	F 1	F 3	F 3	F 3	F 3	F 1	CL 11	C 4	L 3	L 2	L 2	HL 11	L 1	C 1	C 2	C 2	C 1	C 6	C 6	L 5	F 7	F 3	F 4	F 2
21	F 2	F 2	F 1	F 2	F 1	F 2	L 2	L 1	L 3	L 1	L 4	L 7	C 3	C 1	C 1	L 1	L 2	C 1	L 2	L 4	F 4	F 6	F 4	F 4
22	F 2	F 2	F 7	F 2	F 2	FF 32	C 2	C 3	HL 11	HL 31	HL 11	H 1	HL 21	H 1	C 2	C 4	C 2	C 4	C 7	C 7	F 6	F 2	F 3	F 3
23	F 2	F 2	F 2	F 1				C 1	C 2	L 3	HL 11	CL 12	L 2	H 2	C 3	C 2	C 2	C 6	C 7	C 2	F 4	F 4	F 2	F 3
24	F 6	F 4	F 5	F 3	F 3	F 1	LH 12	HL 22	C 2	C 4	C 2	C 2	C 2	C 2	C 2	C 2	C 4	C 4	C 6	C 7	F 4	F 6	F 4	F 4
25	F 4	F 5	F 3	F 3	F 4	F 4	L 2	LH 22	LH 21	L 5	L 2	L 1	L 1	HL 12	H 1	H 2	C 2	C 4	C 5	L 2	F 4	F 4	F 6	F 4
26	F 4	F 4	F 4	F 3	F 1	F 3	L 2	L 3	L 3	L 5	L 3	L 2	HL 12	HL 11	HL 11	C 2	C 2	C 2	C 3	L 3	F 3	F 2	F 6	F 6
27	F 7	F 7	F 6	F 3	F 3	F 4	L 7	CL 37	CL 44	L 7	L 4	L 7	L 6	HL 31	HL 21	H 1	H 2	C 5	CL 32	L 7	F 5	F 5	F 4	F 4
28	F 2	F 5	F 4	F 2	F 4	F 4	L 2	C 2	C 2	L 2	L 4	L 6	L 7	L 5	L 3	L 6	L 8	L 7	L 5	L 7	F 5	F 3	F 3	F 4
29	F 5	FF 44	F 6	F 7	F 6		C 1	C 5	CL 42	CL 11	C 1	C 2	C 2	C 2	C 1	L 1	C 4	C 2	L 7	LL 28	F 4	FF 63	F 7	F 4
30	F 2	F 4	FF 27	F 5	F 7	FF 37	L 3	C 6	L 7	L 4	L 2	L 1	L 2		H 1	C 1	C 2	C 3	L 3	L 3	F 3	F 3	F 2	F 3
31	F 2	FF 13	F 6	F 7	F 4	F 1	L 3	L 8	L 3	C 5	C 5	C 5	C 3	C 3	C 7	L 2	C 2	H 2	C 6	L 7	F 4	F 7	F 4	FF 63
	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

JUL. 1987 | TYPES OF ES

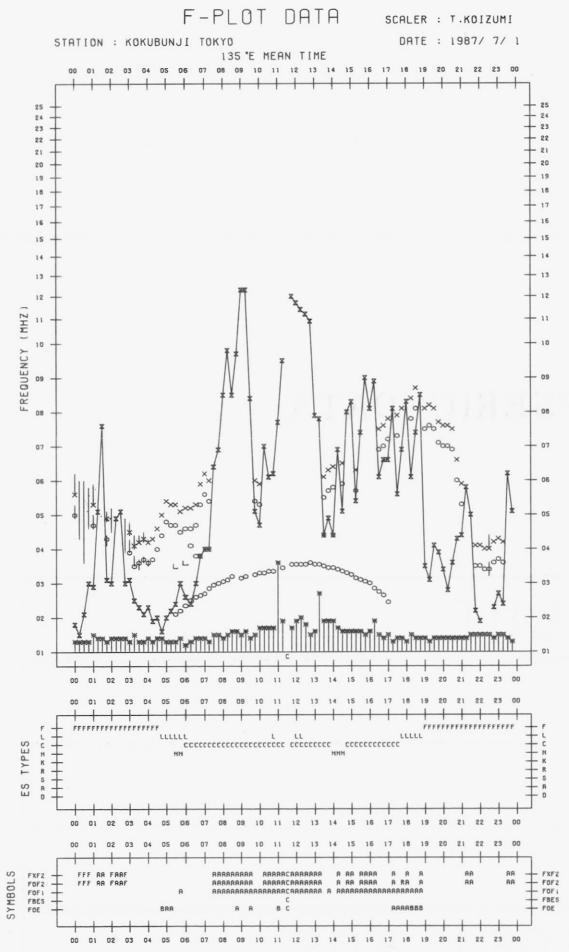
MONTHLY MEDIAN VALUES OF FOF2

135 °E MEAN TIME JUL. 1987



f-PLOTS OF IONOSPHERIC DATA

KEY OF F-PLOT	
I	SPREAD
○	FOF2, FOF1, FOE
×	FXF2
✳	DOUBTFUL FOF2, FOF1, FOE
⊠	FBES
⌊	ESTIMATED FOF1
↑, ↓	FMIN
∧	GREATER THAN
∨	LESS THAN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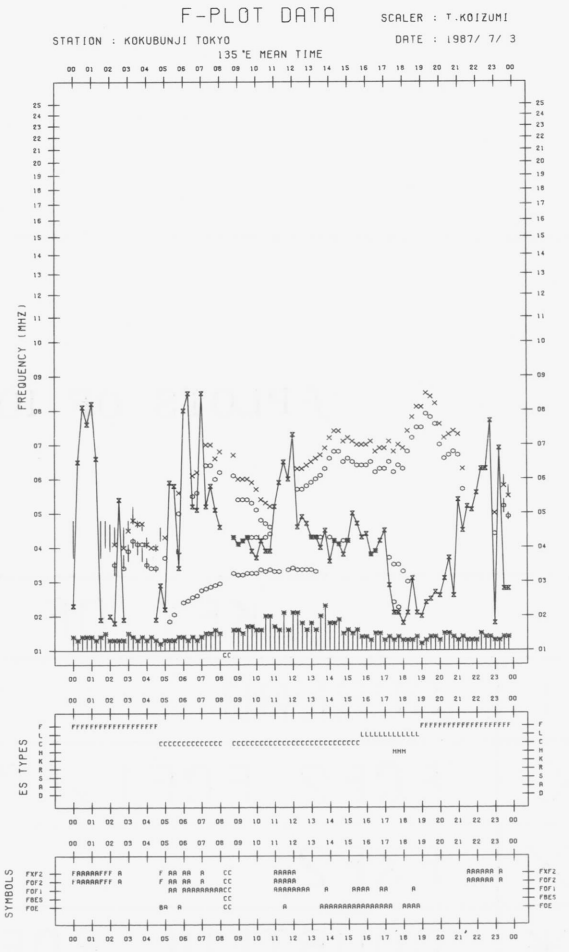
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/ 1
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FDF2
FDF1
FBES
FOE


F-PLOT DATA
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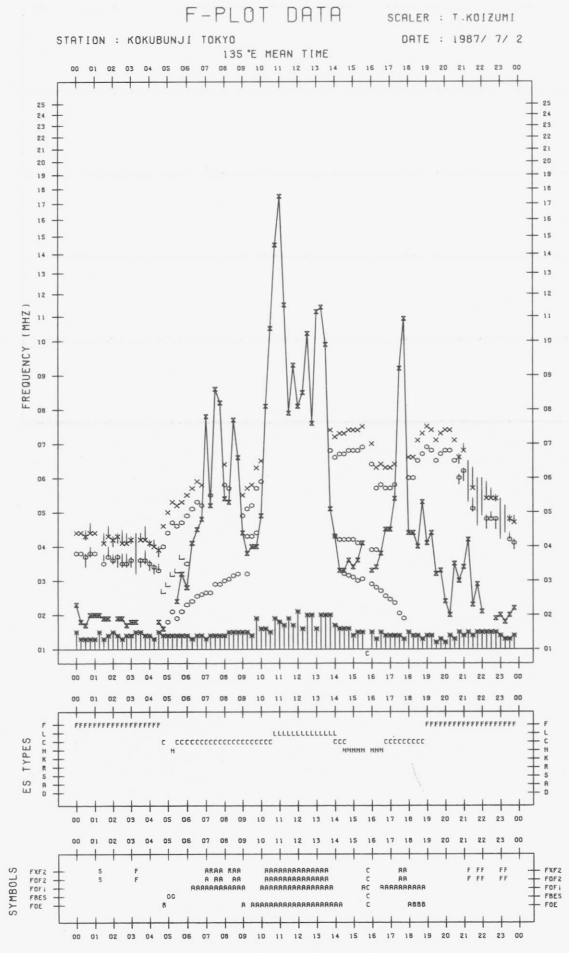
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/ 3
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS
FXF2
FDF2
FDF1
FBES
FOE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STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/ 2
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SYMBOLS
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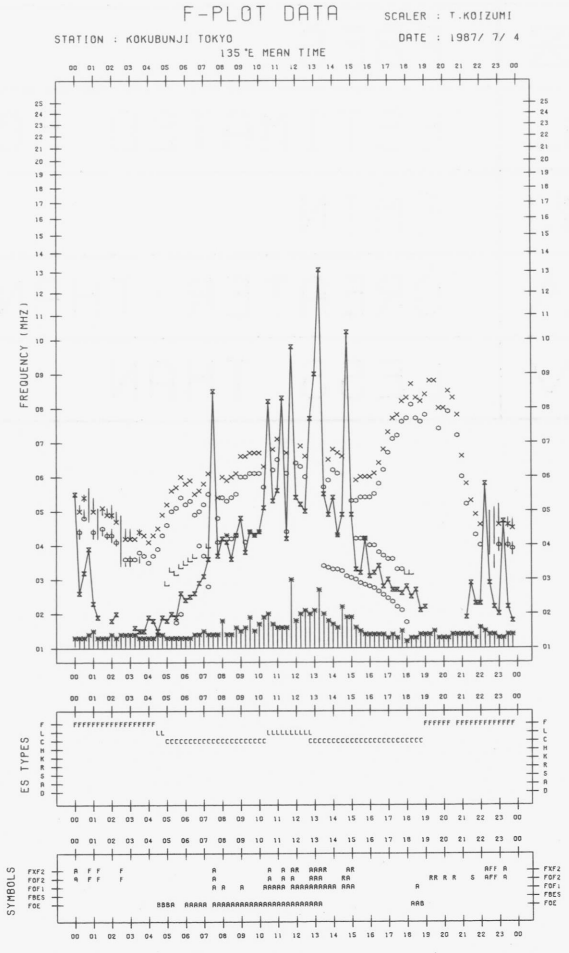
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STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/ 4
135°E MEAN TIME
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ES TYPES
SYMBOLS
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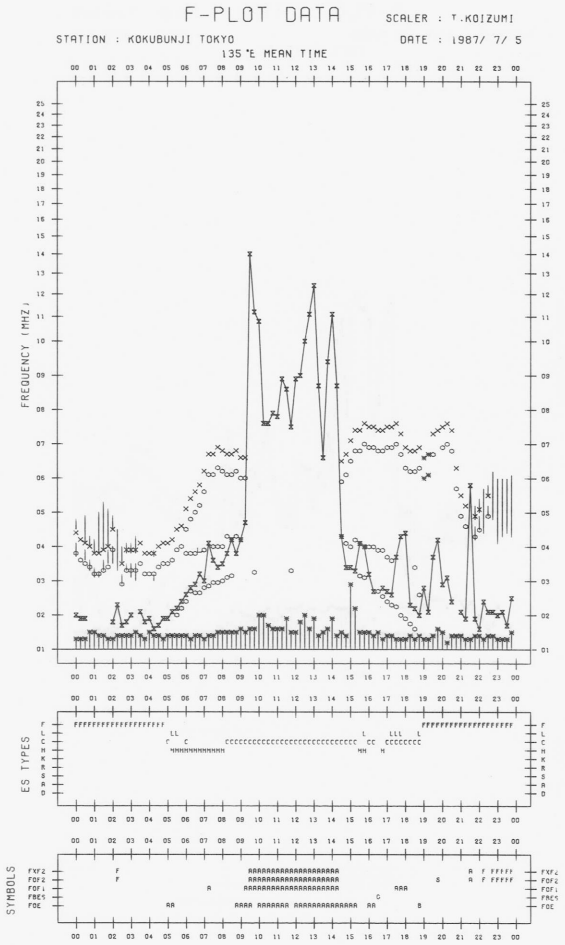
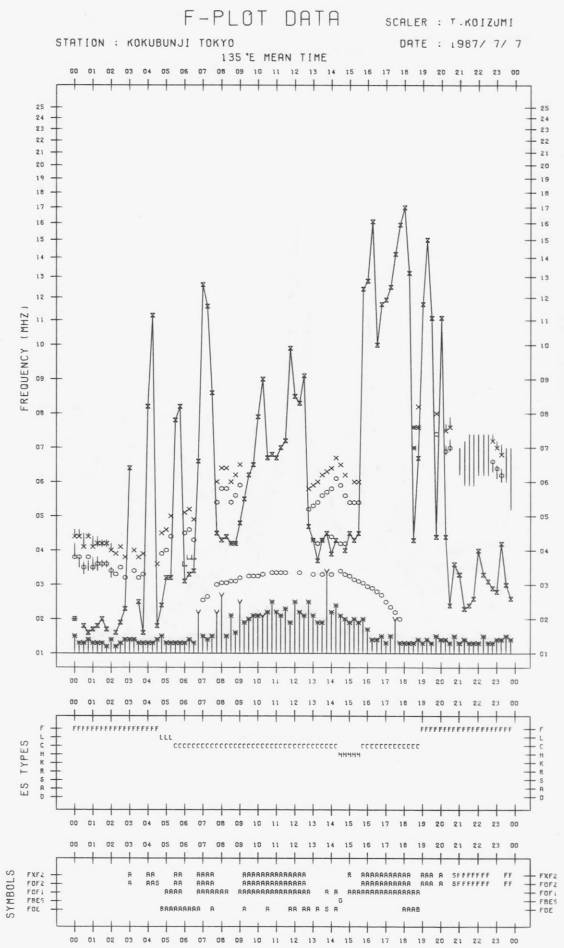
FDF2
FDF1
FBES
FOE


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/ 5
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS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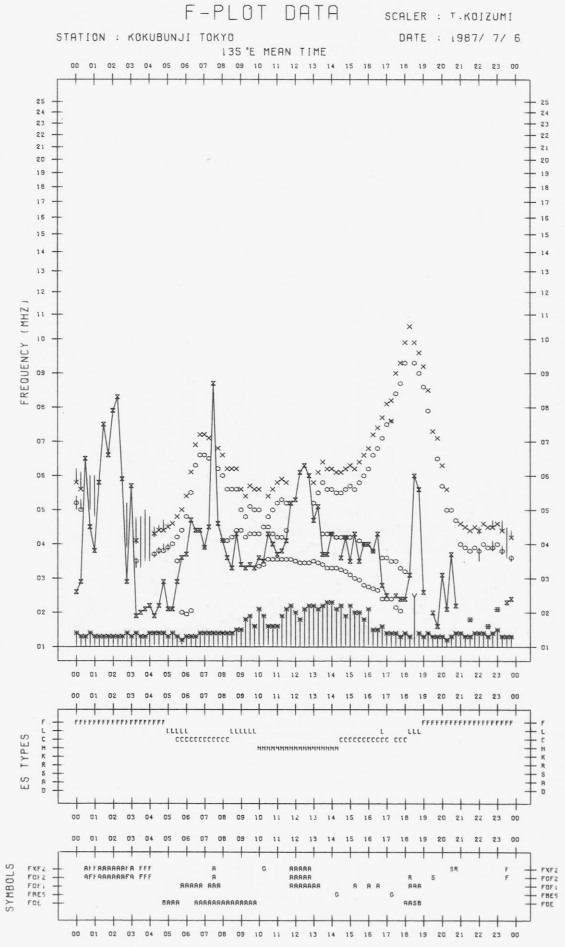
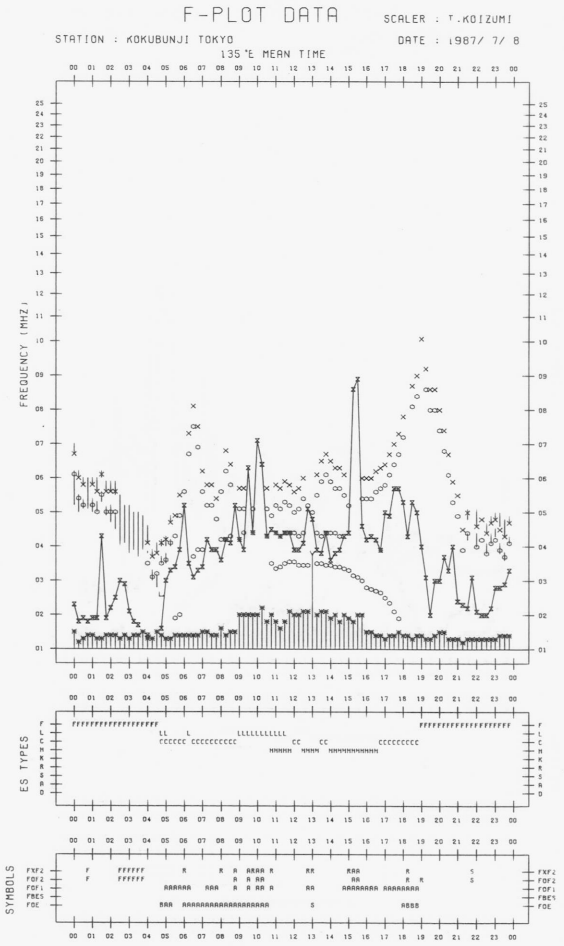
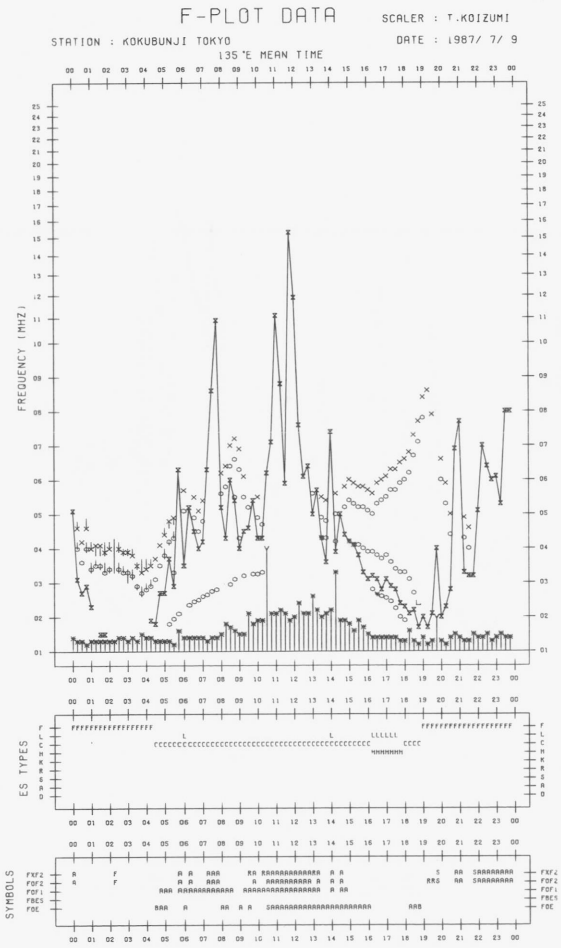
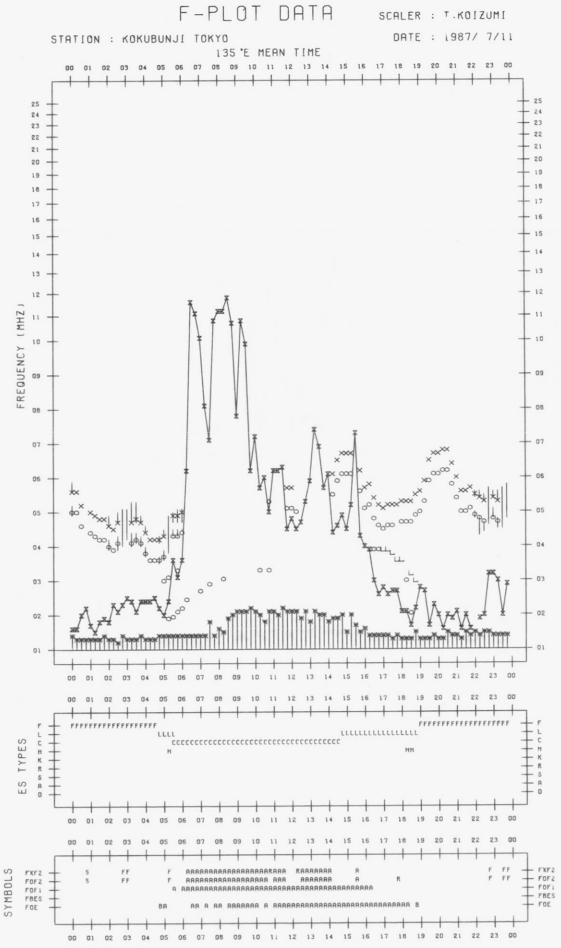
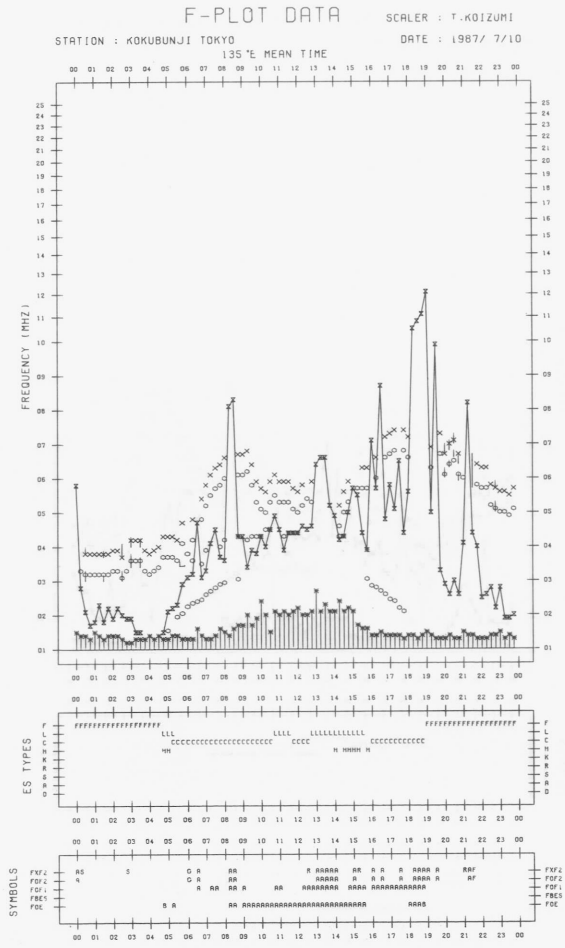
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/ 7
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

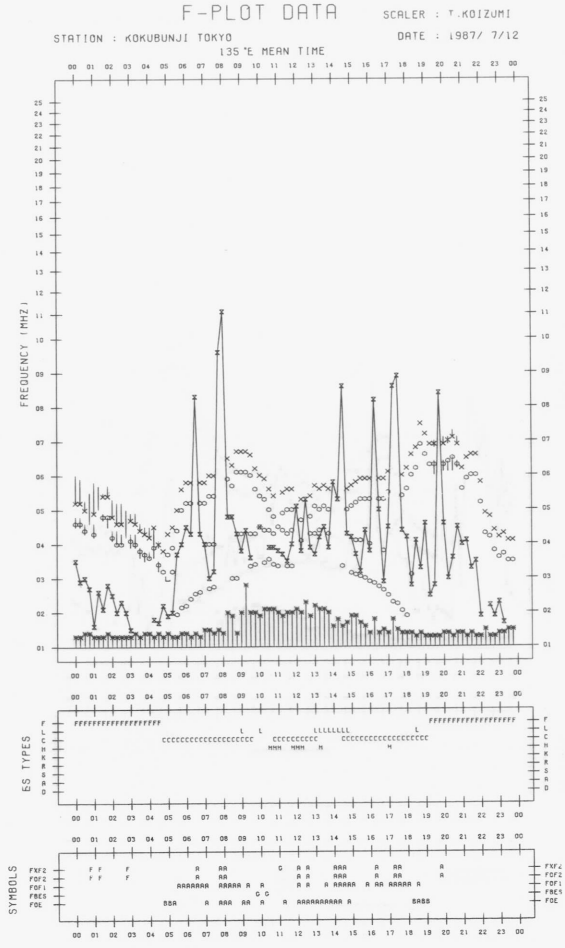

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/ 6
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

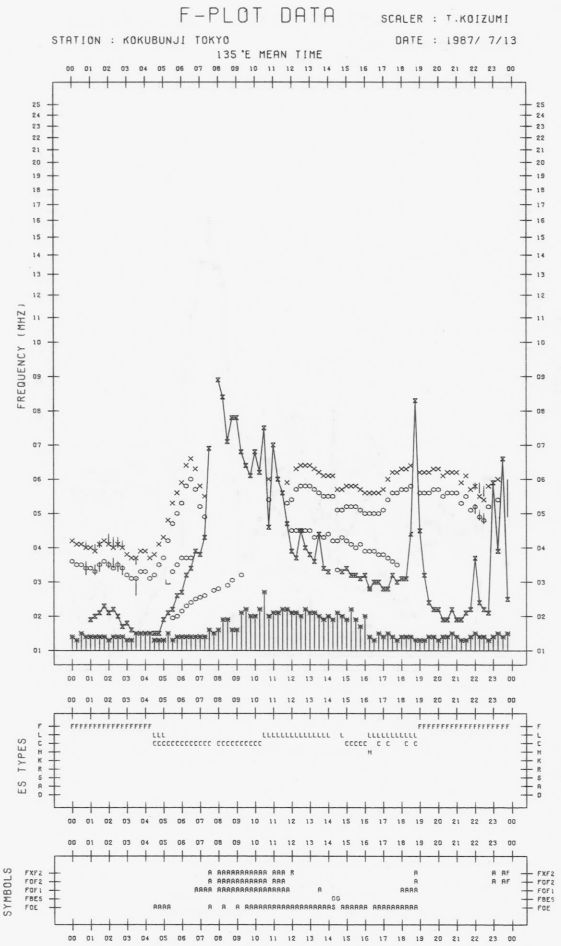

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/ 8
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

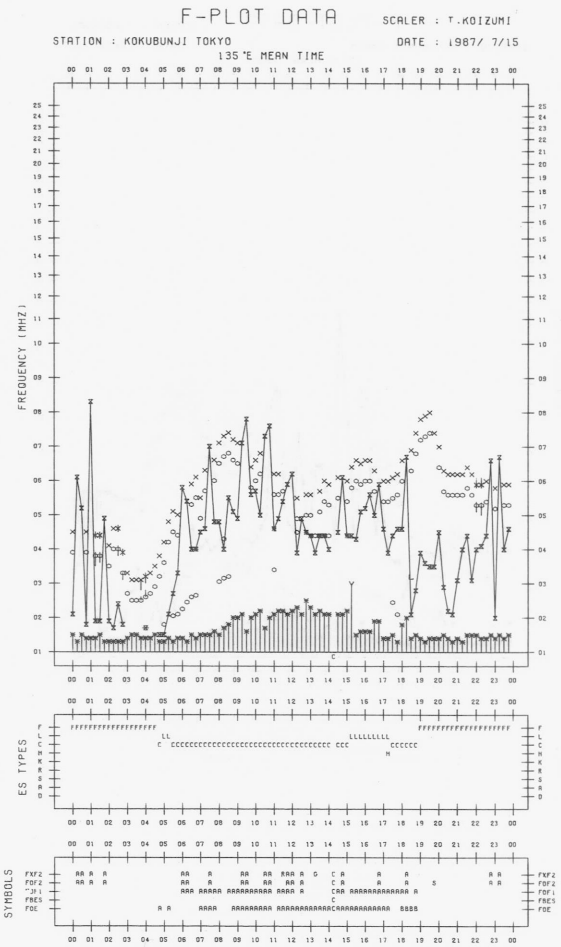

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/ 9
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

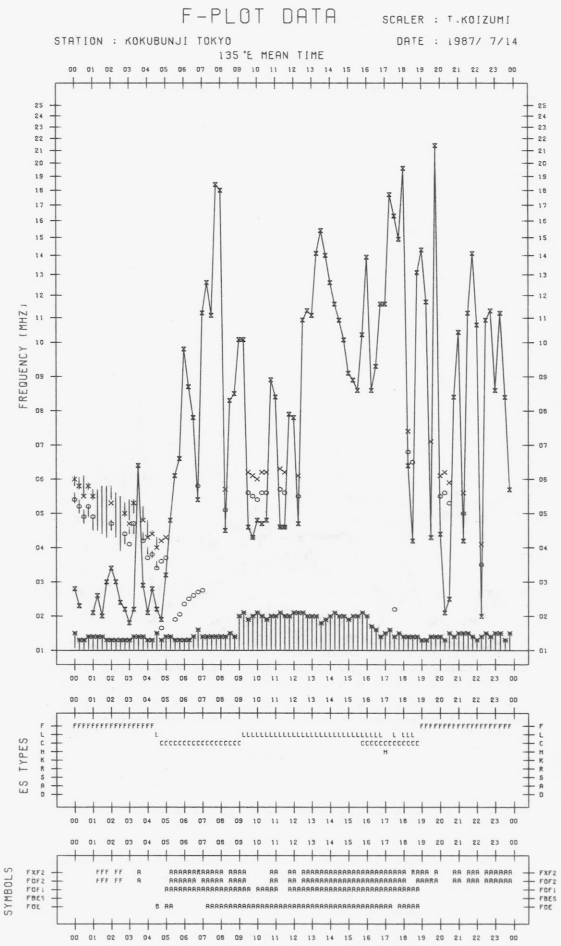

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/11
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

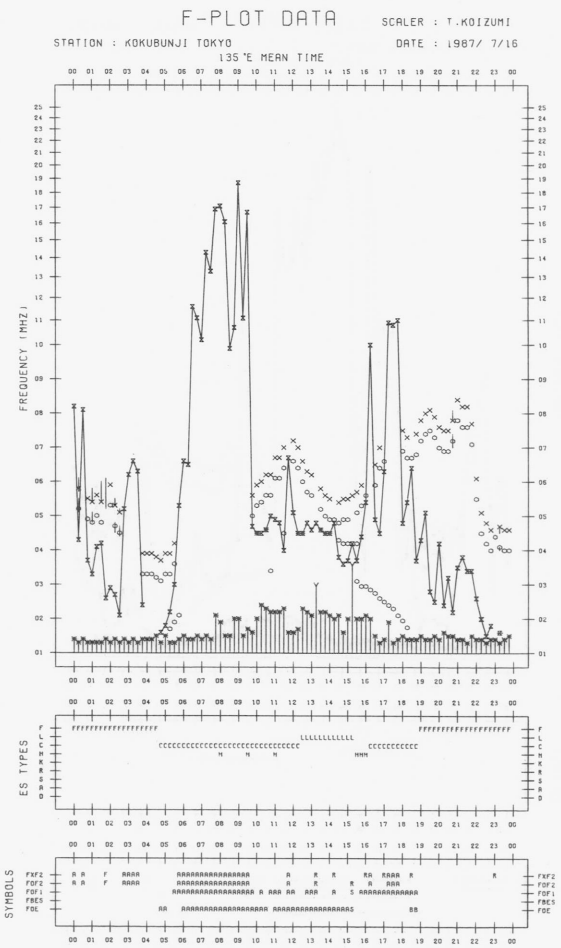

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/10
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

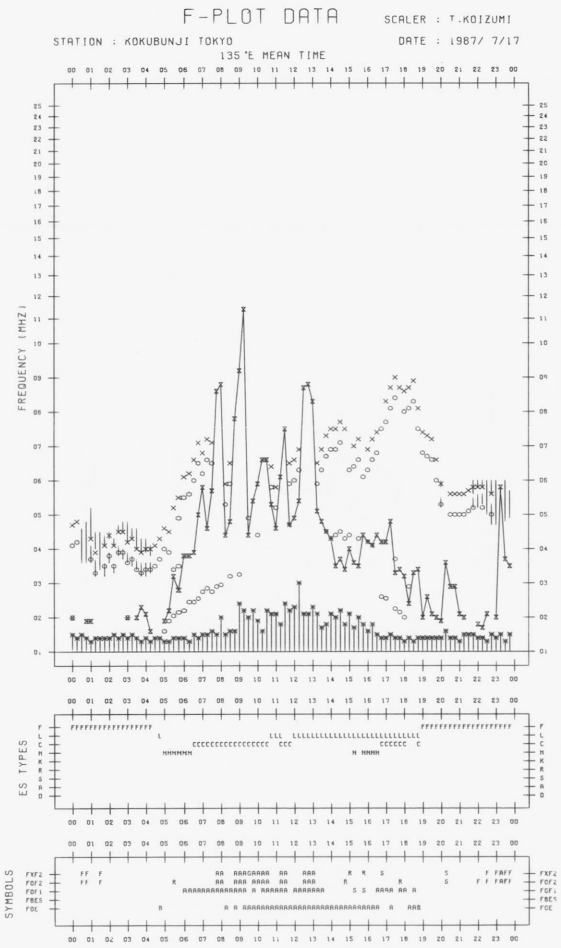

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/12
135°E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

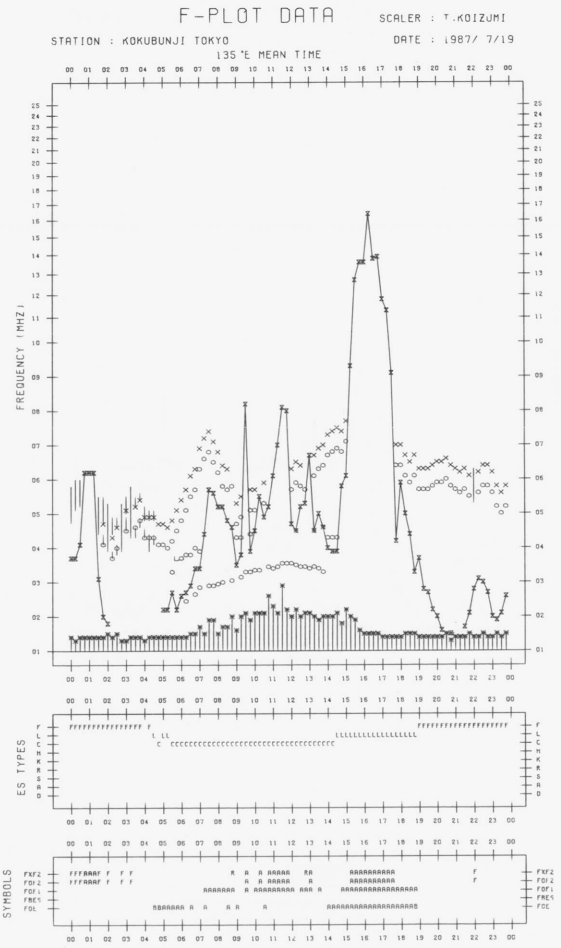

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/13
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

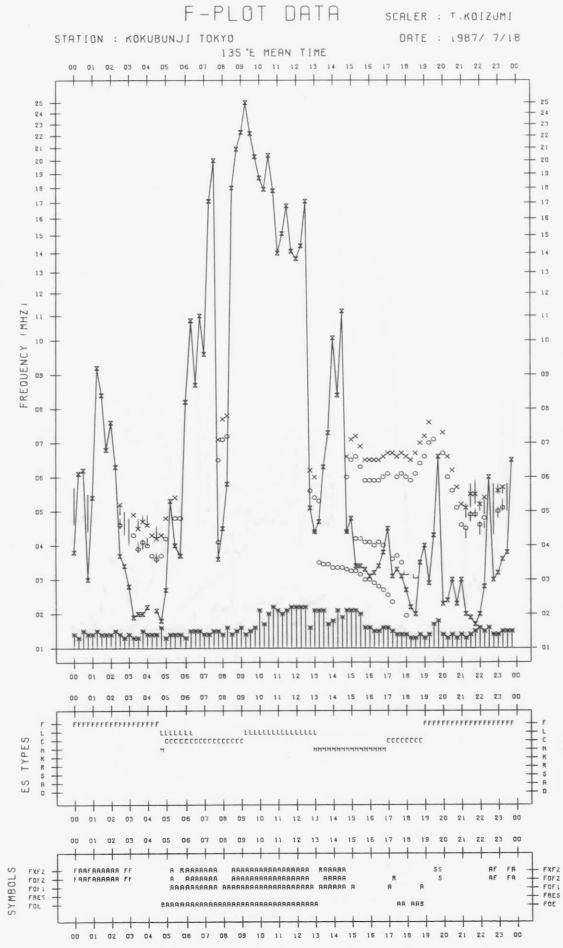

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/15
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

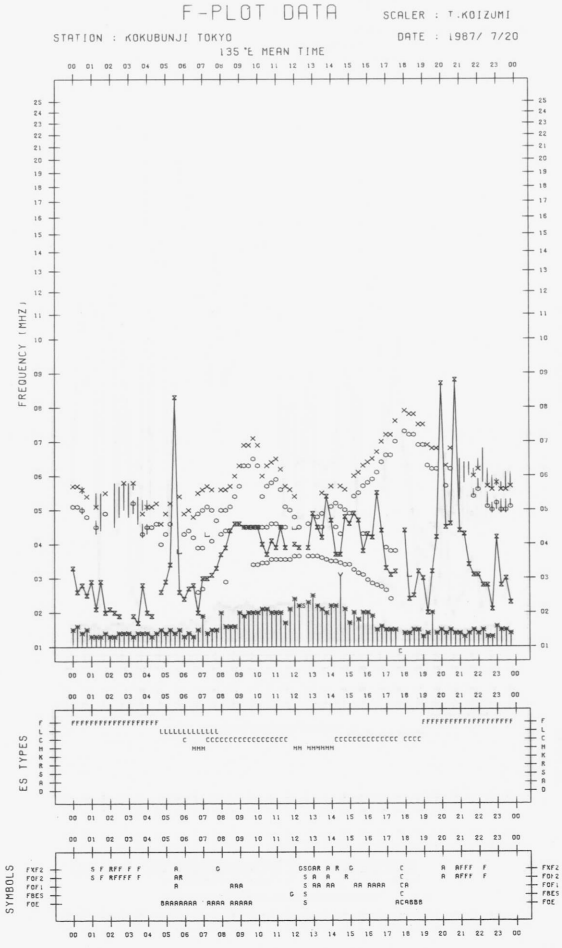

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/14
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

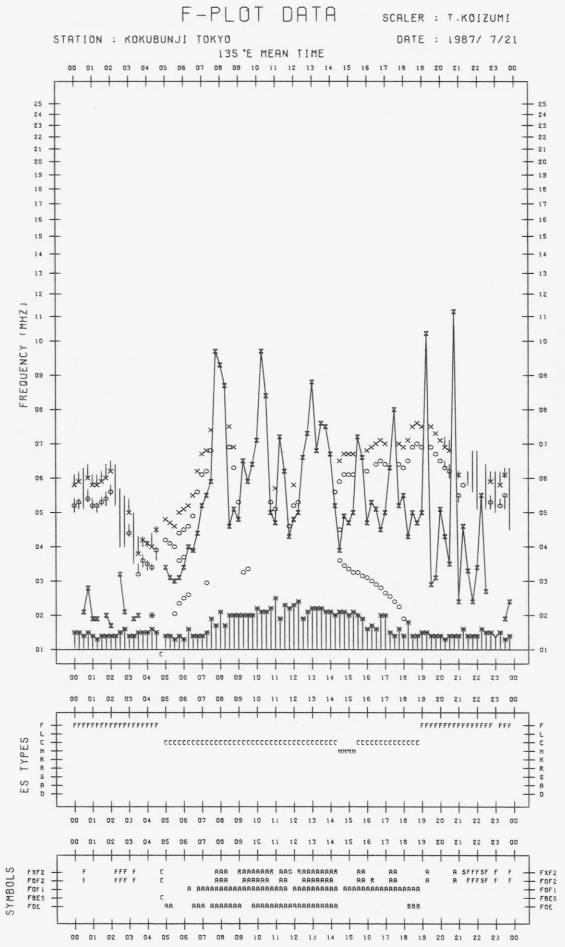

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/16
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

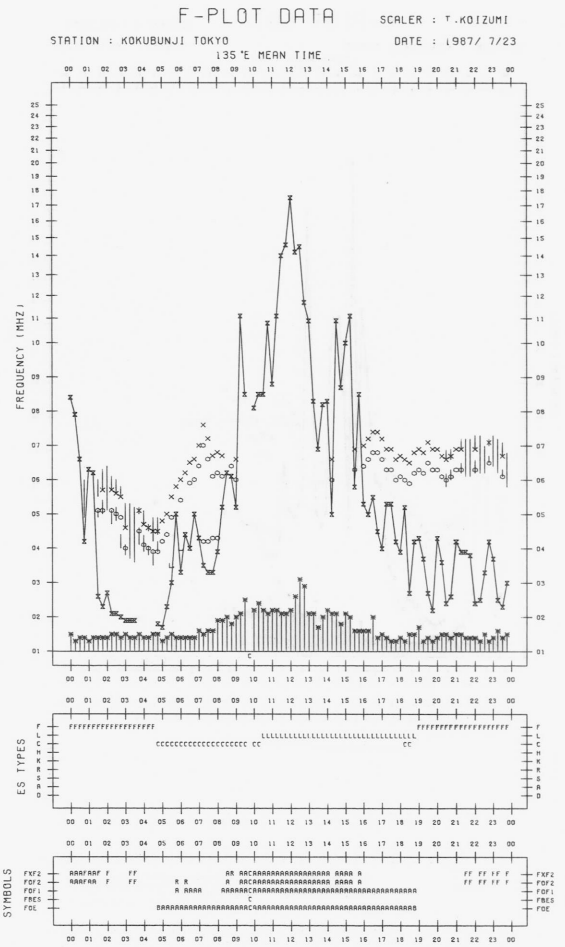

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/17
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

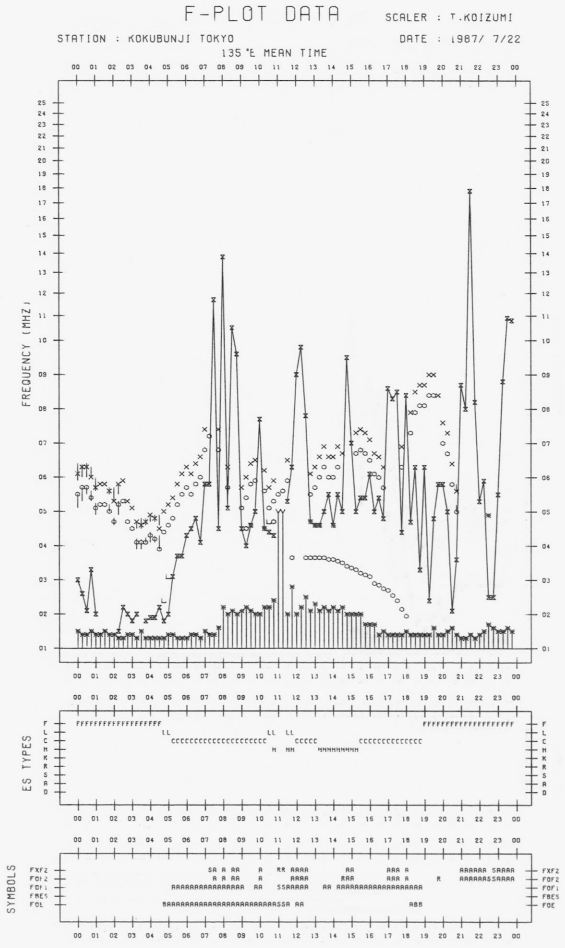

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/19
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

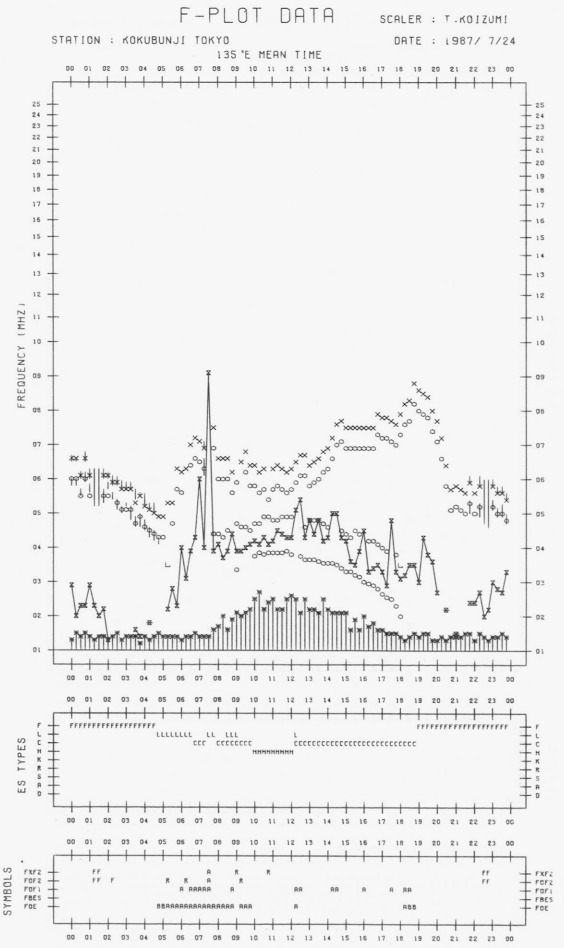

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/18
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

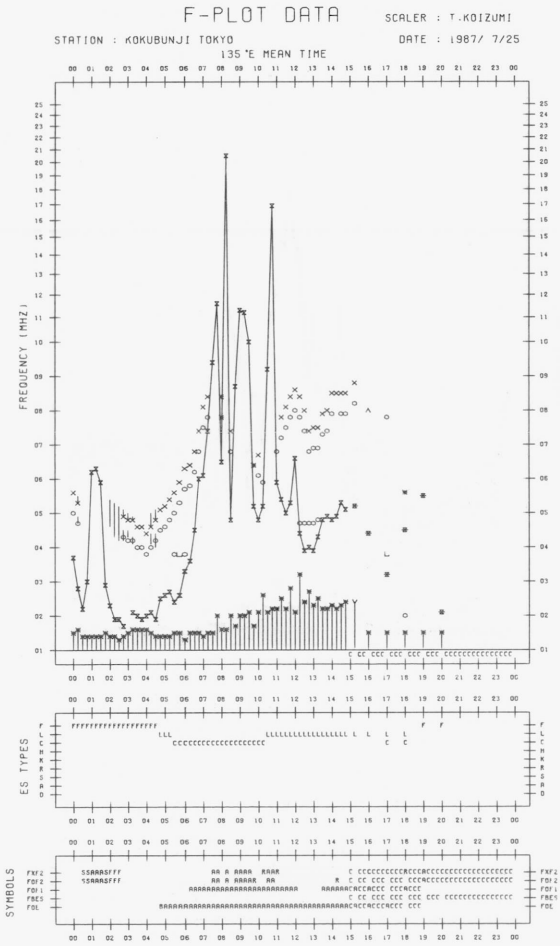

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/20
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

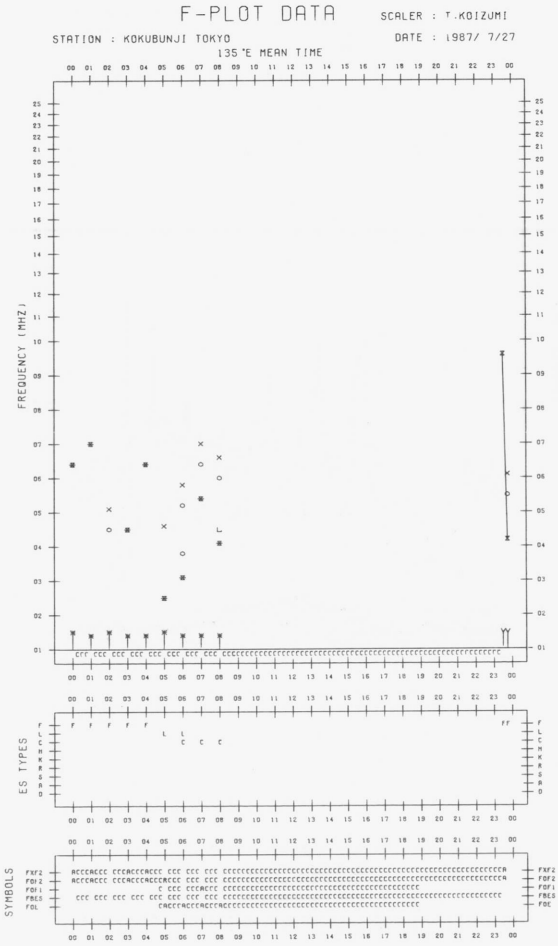

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/21
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

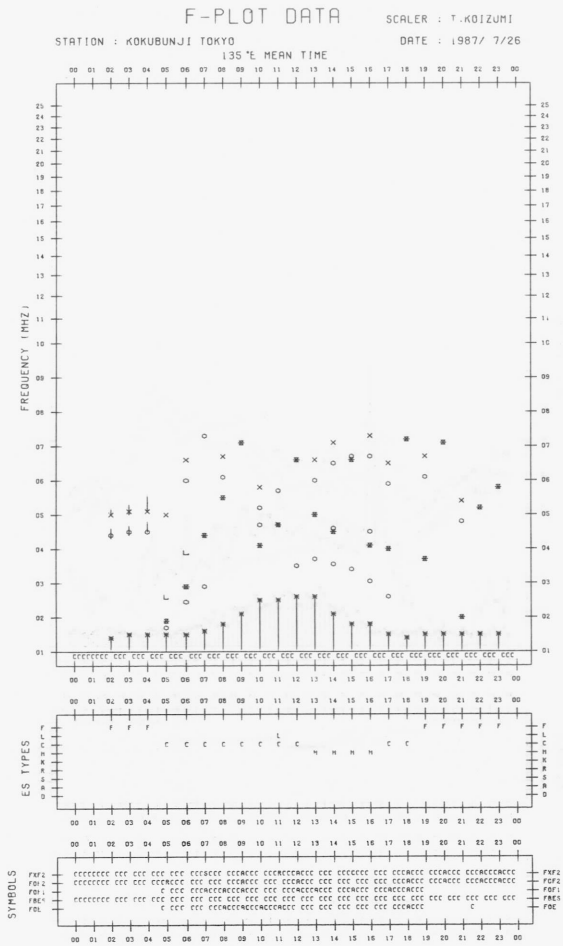

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/23
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

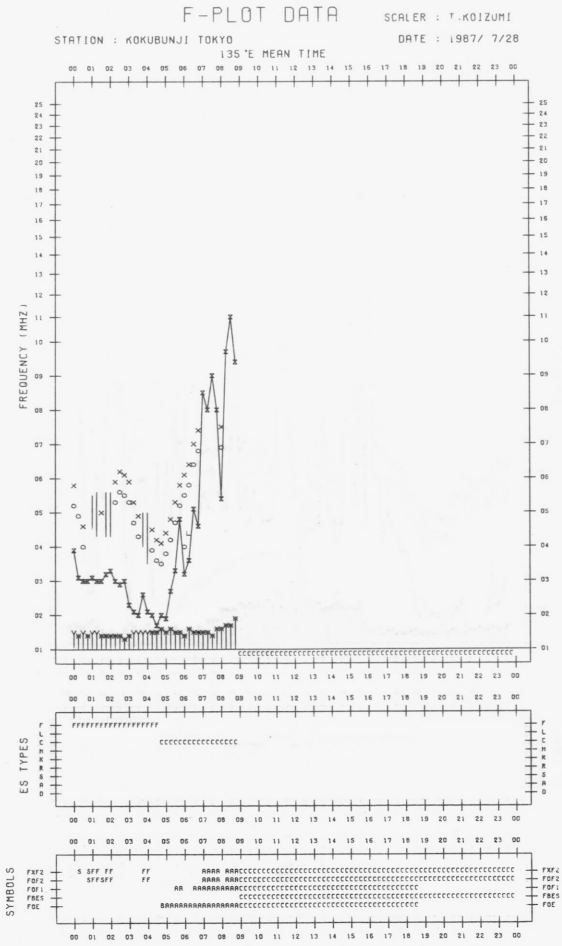

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/22
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

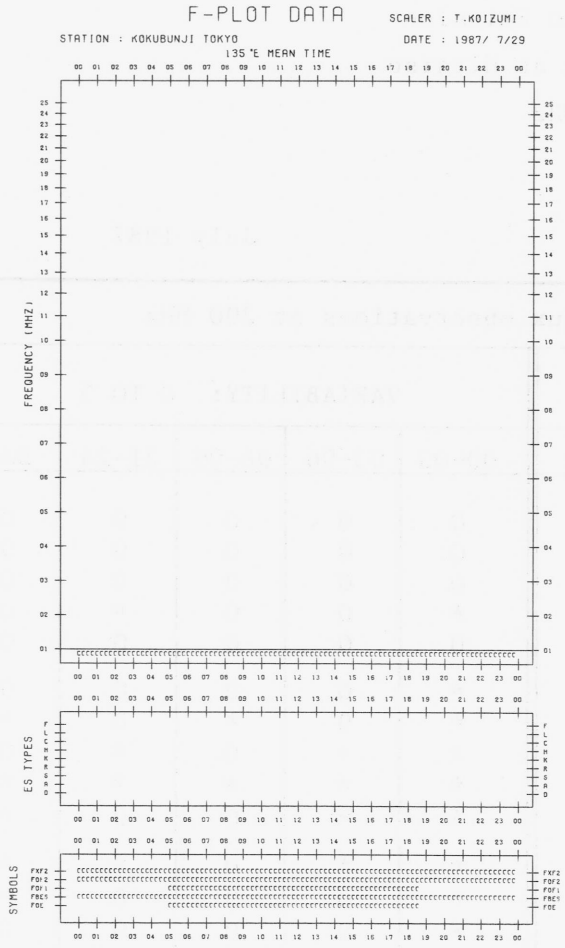

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/24
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

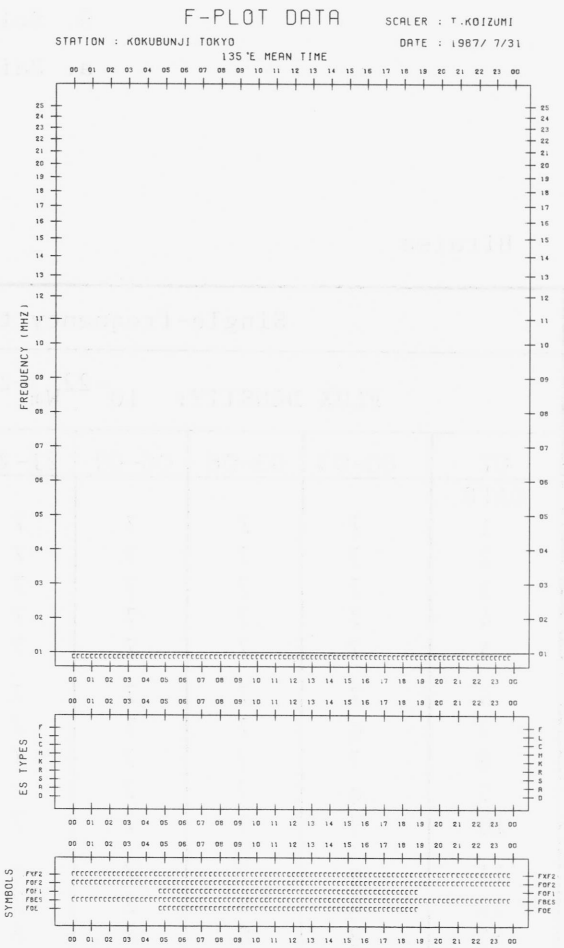

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/25
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

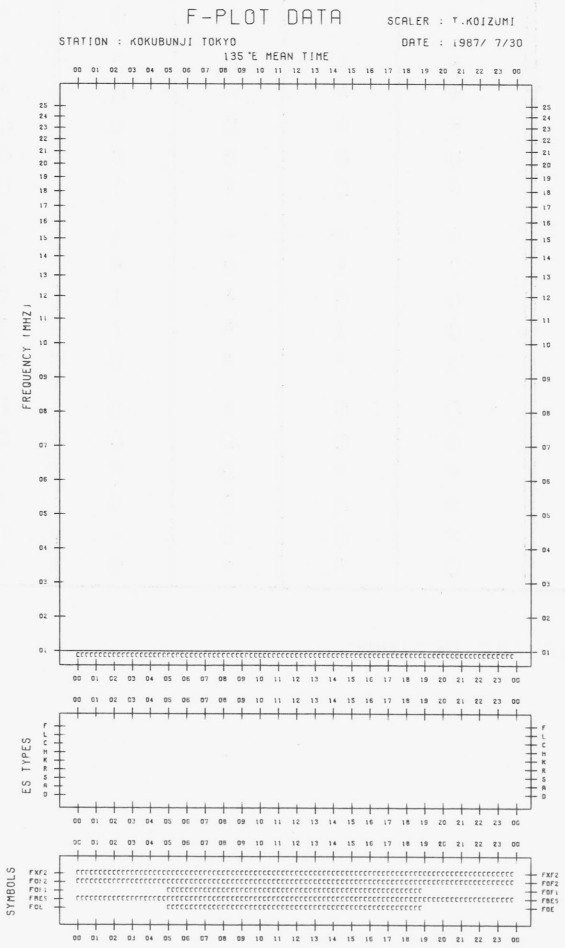

F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/27
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/26
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/28
135 °E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/29
135 'E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/31
135 'E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS


F-PLOT DATA
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1987/ 7/30
135 'E MEAN TIME
FREQUENCY (MHZ)
ES TYPES
SYMBOLS

B. Solar Radio Emission

a. Daily Data at Hiraiso

200 MHz

Hiraiso July 1987

Single-frequency total flux observations at 200 MHz										
	FLUX DENSITY: 10^{-22} Wm^{-2}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	7	7	7	7	0	0	0	0	0
2	7	7	7	7	7	0	0	0	0	0
3	7	7	7	7	7	0	0	0	0	0
4	7	7	7	7	7	*	0	0	*	0
5	7	7	7	7	7	0	0	0	0	0
6	7	7	7	7	7	*	0	0	0	0
7	q	7	7	7	7	*	0	*	0	*
8	7	7	7	7	7	*	*	0	*	0
9	q	7	7	7	7	*	*	*	*	*
10	7	7	7	7	7	*	*	0	0	*
11	q	7	7	q	7	*	*	0	*	*
12	q	8	8	7	8	*	0	0	0	*
13	8	8	8	8	8	*	0	0	0	0
14	q	8	q	7	8	*	0	*	0	*
15	7	8	q	7	8	*	*	*	0	*
16	7	8	8	7	8	*	*	0	0	*
17	q	q	q	8	7	*	*	*	0	*
18	q	8	8	8	8	*	*	0	0	0
19	8	8	8	8	8	0	0	0	0	0
20	8	8	8	8	8	*	0	*	1	0
21	q	q	8	8	8	*	*	*	1	*
22	8	8	8	8	8	2	1	0	*	1
23	8	8	8	8	8	0	0	*	1	0
24	8	8	q	8	8	0	1	*	1	1
25	8	q	8	8	8	1	*	*	0	*
26	8	8	8	8	8	0	0	*	0	0
27	8	8	8	8	8	0	0	0	0	0
28	q	6	6	q	7	*	*	0	*	*
29	q	6	6	6	6	*	0	0	0	*
30	q	6	6	-	6	*	0	0	-	0
31	7	7	7	7	7	0	*	*	0	*

Notes: 1. No observations during the following periods.

30th 0810 - 0940
30th 1940 - 2350

2. (q) likely quiet.

3. (*) interference.

B. Solar Radio Emission

a. Daily Data at Hiraiso

500 MHz

Hiraiso July 1987

Single-frequency total flux observations at 500 MHz					
FLUX DENSITY: 10^{-22} Wm^{-2}Hz^{-1}					
UT	00-03	03-06	06-09	21-24	DAY
DATE					
1	26	26	26	-	26
2	26	26	25	-	26
3	25	26	25	25	25
4	26	26	25	-	25
5	26	26	25	-	25
6	25	26	25	-	25
7	26	26	26	-	26
8	27	-	-	26	(27)
9	26	26	26	27	26
10	27	27	26	-	27
11	-	26	26	27	26
12	27	27	26	26	27
13	27	27	26	27	26
14	27	27	26	28	27
15	28	28	27	26	28
16	27	27	27	29	27
17	29	29	28	30	29
18	30	30	29	(29)	30
19	-	29	28	29	29
20	30	29	28	30	29
21	31	30	30	29	30
22	30	29	28	31	29
23	31	31	31	32	31
24	32	32	31	-	32
25	31	31	30	31	31
26	31	31	30	-	31
27	30	29	29	-	29
28	29	28	29	-	29
29	29	28	(28)	-	28
30	28	29	28	-	28
31	28	28	27	-	28

Note: No observations during the following periods.

1st 1950 - 2352
2nd 1950 - 2345
4th 1950 - 5th 0010
5th 1950 - 2351
6th 1950 - 2349
7th 1950 - 2345
8th 0315 - 0900
10th 1950 - 11th 0408
18th 2200 - 19th 0300
24th 1955 - 2400
26th 1955 - 2400
27th 1955 - 2348
28th 1955 - 2352
29th 0643 - 0912
29th 2000 - 30th 0003
30th 2000 - 2355
31st 2000 - 2355

B. Solar Radio Emission

b. Outstanding Occurrences at Hiraiso

Hiraiso July 1987

Single-frequency observations

Normal observing period: 1940 - 0955 U.T. (sunrise to sunset)

JUL 1987	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY (10^{-22} $Wm^{-2}Hz^{-1}$) PEAK	FLUX DENSITY (10^{-22} $Wm^{-2}Hz^{-1}$) MEAN	POLARIZATION REMARKS
16	200	8 S	0110.8	0111.2	0.8	175	-	O
	500	6 S	0111.6	0112.3	2.0	2	1	O
17	200	46 C	2200.7	2201.5	2.2	150	54	O
20	200	44 NS	1935E	2023	420D	8	4	O
21	200	44 NS	1935E	2326	660D	6	4	O
22	200	41 F	0354.9	0355.8	2.4	420	-	WR
	200	44 NS	1935E	2036	240D	5	3	WL
23	500	42 SER	2054.7	2054.7	4.0	34	-	O
	500	42 SER	2121.0	2122.8	4.0	320	-	WR
24	200	43 NS	0300	0349	98	15	4	WL
	200	44 NS	1935E	2150	330D	8	3	WR

RADIO PROPAGATION

MEASUREMENT OF H.F. FIELD STRENGTH (UPPER SIDE-BAND OF WWV)

JUL 1987 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

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	-6	4	ES -15	ES -15	-5	3	4	6	12	8	13	11	-7	10	2	-5	4	5	-1	3	2	2	3	-4
2	-9	-9	ES -15	-6	-6	4	ES -9	ES -15	-3	3	ES -6	ES -3	-3	-2	9	3	1	6	-2	3	-9	-11	-6	2
3	2	ES -9	ES -15	-9	-3	3	4	3	-3	9	8	-2	-2	11	7	-3	-1	3	ES -9	-2	ES -15	ES -15	ES -15	ES -1
4	-1	ES -9	-9	-9	-6	1	9	4	3	-2	ES 3	S	S	S	7	3	-1	ES -15	ES -24	ES -24	ES -24	ES -24	-3	-1
5	-8	-14	ES -14	-5	-8	9	10	-8	0	ES -5	ES -3	ES 2	ES -1	-5	3	8	1	ES -23	ES -23	-5	ES -23	ES -23	-1	ES -23
6	3	-9	ES -24	ES -15	-6	0	-3	ES -15	13	8	-1	ES -3	ES -2	ES -24	ES -3	-6	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24
7	ES -23	ES -23	ES -23	ES -23	ES -23	-5	-1	1	-2	ES -1	ES 5	ES 5	ES 0	ES -2	5	4	-5	-5	ES -23	ES -23	-2	5	ES -8	ES -23
8	-8	ES -23	-8	-8	-2	3	2	ES -23	ES -5	ES -2	ES -1	ES -2	ES -5	ES -5	-5	0	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -8
9	ES -24	ES -24	ES -24	ES -24	ES -24	1	3	1	3	ES -6	ES -6	ES -9	ES -9	ES -24	ES -24	ES -24	-9	-9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24
10	ES -9	ES -24	ES -24	ES -24	-6	3	-2	0	2	-2	ES -9	ES 9	3	ES 0	ES -6	ES -3	ES -15	ES -24	ES -7	ES -24	ES -24	ES -24	ES -24	ES -24
11	ES -24	ES -24	ES -24	ES -24	-3	-2	-6	2	0	-5	-5	ES -24	ES -24	ES -24	-9	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24
12	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	-5	-2	ES -4	ES -4	ES 0	ES -2	ES -5	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23
13	ES -23	ES -23	ES -12	ES -14	-5	ES -5	0	ES -5	ES -5	ES -8	ES -2	ES -8	ES -23	9	5	-5	ES -23	ES -23	-2	-5	-4	ES -23	-5	ES -4
14	-8	ES -5	ES -23	ES -23	ES -23	6	ES -23	ES -23	ES -6	ES -6	0	ES 0	ES -2	0	0	-4	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	-5
15	ES -23	ES -23	ES -23	3	8	0	9	5	4	ES -5	13	-1	ES -23	ES -23	-5	ES -5	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23
16	ES -23	ES -23	ES -23	ES -23	-1	ES -23	-3	-1	-1	ES -3	ES -5	ES -8	-2	ES -5	0	ES -23	ES -10	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23
17	ES -23	ES -23	ES -23	-6	4	-3	-5	ES -8	ES 2	ES 4	ES -5	-4	ES -23	ES -5	ES 3	ES 1	ES -23	-3	-2	ES -23	ES -23	ES -23	ES -23	ES -23
18	ES -23	ES -23	ES -23	ES -23	ES -23	-8	-8	-2	-1	ES -2	1	0	ES -2	ES -5	ES -5	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23
19	ES -23	ES -23	ES -23	ES -23	ES -23	-8	-8	ES -8	ES -8	ES -8	ES -23	ES -23	ES -8	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	-8	ES -23	ES -23	ES -23	ES -23
20	ES -23	ES -23	ES -23	-4	1	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -8	-2	2	-5	ES -23	ES -23	ES -23	-5	1	ES -23	ES -23	-5
21	-2	ES -23	ES -23	ES -23	-5	3	0	ES -8	ES -8	ES -4	ES -2	ES -4	ES -5	2	1	0	-5	8	-10	-10	-14	3	ES -8	-4
22	ES -23	ES -8	ES -8	ES -23	-3	5	6	3	3	ES -2	ES -8	ES -8	ES -8	ES -14	-5	ES -23	ES -23	ES -23	-3	ES -23	ES -23	ES -23	ES -23	ES -23
23	ES -23	ES -23	ES -23	ES -23	-2	6	9	4	9	11	1	ES -8	ES -5	5	-3	-8	ES -23	ES -23	ES -23	ES -23	8	3	ES -23	-2
24	ES -23	ES -23	ES -23	ES -23	-2	8	11	10	6	2	-5	ES -8	ES -8	9	3	-3	-4	2	-2	2	1	0	-2	3
25	-8	-5	-4	-8	-2	5	7	ES -14	ES -8	ES -14	ES -2	ES -5	ES -5	0	ES -5	ES -5	0	-8	ES -23	ES -23	ES -23	ES -23	ES -23	-6
26	ES -23	ES -23	ES -23	ES -23	-2	3	7	4	12	13	3	ES -5	ES -23	ES -23	ES -8	-3	0	ES -23	-8	-8	0	ES -23	ES -23	ES -23
27	-6	-4	-4	ES -23	-2	8	1	-2	-2	ES -23	ES -8	ES -5	ES -5	ES -5	ES -8	7	-4	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23
28	ES -23	ES -23	ES -23	-8	-6	5	-3	4	10	-3	ES -23	ES -23	ES -23	ES -23	ES -23	ES -8	-10	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23
29	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 -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23
30	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	-2	-8	ES -23	ES -14	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
31	-6	ES -23	ES -23	ES -23	ES -5	ES -2	ES -8	-5	ES -2	ES -23	1	ES -2	ES -8	ES -8	ES -8	ES -23	ES -23	ES -23	-5	ES -23	ES -23	3	ES -14	ES -8
CNT	31	31	31	31	31	31	31	31	31	31	31	30	30	30	31	31	31	31	31	31	31	31	31	31
MED	ES -23	ES -23	ES -23	ES -23	-5	1	-1	-2	US -1	ES -3	ES -2	ES -4	ES -6	ES -5	US -5	US -5	ES -23	ES -23	ES -23	FS -23	ES -23	ES -23	ES -23	ES -23
UD	-1	-5	-8	-5	1	8	9	5	12	9	8	ES 5	ES -1	9	7	4	1	5	-2	2	1	3	-2	-1
LD	ES -24	ES -24	ES -24	ES -24	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -24	ES -23	ES -23	ES -23	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24	ES -24

RADIO PROPAGATION

MEASUREMENT OF H.F. FIELD STRENGTH (UPPER SIDE-BAND OF WWVH)

JUL 1987 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

UT DAY	00H 45M	01H 45M	02H 45M	03H 45M	04H 45M	05H 45M	06H 45M	07H 45M	08H 45M	09H 45M	10H 45M	11H 45M	12H 45M	13H 45M	14H 45M	15H 45M	16H 45M	17H 45M	18H 45M	19H 45M	20H 45M	21H 45M	22H 45M	23H 45M
1	4	6	12	15	10	14	21	23	22	21	17	23	13	13	10	8	2	6	-7	12	16	14	7	12
2	5	2	8	13	16	19	17	22	22	21	16	13	13	12	3	1	8	6	13	12	18	18	9	7
3	5	6	11	14	17	22	22	24	21	22	15	18	12	10	6	-4	-11	15	10	9	14	7	6	-2
4	-3	9	13	14	14	16	19	27	26	25	23	18	S	ES -24	ES -24	ES -24	ES -24	-4	-5	18	4	5	9	8
5	7	5	9	14	24	19	25	28	23	12	ES -1	ES -1	ES -23	ES -23	ES -23	ES -23	-2	-2	5	14	9	12	9	4
6	5	2	4	9	9	14	17	25	27	25	20	6	-6	-1	-6	ES -24	-6	2	11	12	14	9	3	6
7	4	8	7	11	18	19	25	25	22	24	17	18	16	12	ES -23	ES -23	-4	ES -23	-14	7	11	13	4	2
8	-2	10	13	14	18	23	25	25	21	27	24	19	7	4	-2	-8	-8	-8	-5	3	4	-4	7	5
9	2	4	-3	2	2	14	18	19	22	4	11	2	1	-6	ES -24	3	10	7	16	14	11	6	5	12
10	7	12	6	11	7	12	19	25	22	25	20	13	8	6	2	3	-3	11	12	5	7	3	7	8
11	2	1	5	8	12	17	20	16	22	20	17	14	5	-6	0	ES -24	ES -24	-1	-2	6	9	6	5	9
12	2	-2	0	10	10	11	14	20	15	19	20	6	19	ES -23	ES -23	ES -23	ES -23	ES -23	-10	3	9	12	7	2
13	-4	8	9	13	19	16	22	19	20	15	12	11	7	4	7	5	ES -23	-5	4	6	17	10	9	0
14	-2	7	6	9	14	18	19	18	18	18	15	14	14	15	-3	-3	-4	11	4	11	15	3	9	14
15	8	6	10	13	12	22	21	25	24	19	19	16	13	6	12	-10	-2	7	14	8	5	9	4	-2
16	3	9	13	17	15	14	16	24	24	17	15	11	29	10	8	0	ES -23	-1	ES -23	18	9	10	7	3
17	3	1	7	11	17	20	21	21	25	9	7	ES -23	ES -2	ES 0	ES 4	ES -23	-3	7	6	4	7	1	-2	2
18	4	2	0	5	5	17	20	23	18	5	3	-1	ES -5	ES -3	ES -23	ES -23	0	3	5	7	14	-2	1	6
19	3	1	3	7	15	13	22	23	28	14	-8	1	2	-8	ES -23	ES -23	ES -23	20	13	12	3	-1	-2	7
20	1	12	9	13	6	15	20	24	30	25	12	10	13	8	-1	0	3	8	-5	14	6	8	8	7
21	3	0	8	4	17	19	22	23	24	24	22	19	22	16	14	12	2	7	5	10	9	15	11	8
22	-2	3	6	5	11	15	22	22	24	22	23	21	22	15	8	12	1	-1	-2	7	13	11	8	3
23	3	2	3	12	17	17	22	25	23	23	15	17	13	11	6	-4	3	5	8	9	12	14	9	0
24	ES -23	3	6	11	20	21	26	25	27	25	14	10	13	13	-5	-3	22	4	11	9	14	13	11	9
25	6	7	11	14	24	21	26	28	26	-2	15	14	18	27	21	13	15	ES -23	8	0	11	15	11	3
26	3	2	9	11	16	23	22	22	25	20	19	13	-4	-5	-2	ES -23	3	9	11	9	13	13	11	5
27	2	3	5	11	18	13	22	23	24	18	16	17	13	18	3	ES -8	ES -23	-5	-4	7	16	11	8	8
28	-2	-1	-2	10	11	22	23	25	20	20	16	16	9	3	1	-8	-10	ES -23	ES -23	ES -23	0	-1	8	4
29	-6	-6	-9	-3	5	16	20	13	23	24	22	18	1	11	11	ES -23	ES -23	1	5	10	0	3	-2	-3
30	-14	-4	0	8	13	10	4	8	-4	4	5	8	ES -23	-8	ES -23	ES -23	ES -23	10	7	13	9	12	8	7
31	7	-1	4	14	12	17	21	5	10	15	15	11	6	3	2	ES -23	ES -23	6	9	10	10	18	12	7
CNT	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31
MED	3	3	6	11	14	17	21	23	23	20	16	13	10	6	US 1	-8	-4	4	5	9	10	10	8	6
UD	7	10	13	14	20	22	25	27	28	25	23	19	22	16	12	12	10	11	13	14	16	15	11	12
LD	-6	-2	-2	4	5	12	16	13	15	4	3	-1	ES -6	ES -23	ES -23	ES -24	ES -23	ES -23	-14	3	3	-1	-2	-2

C. Radio Propagation

b. Radio Propagation Quality Figures at Hiraiso

Hiraiso

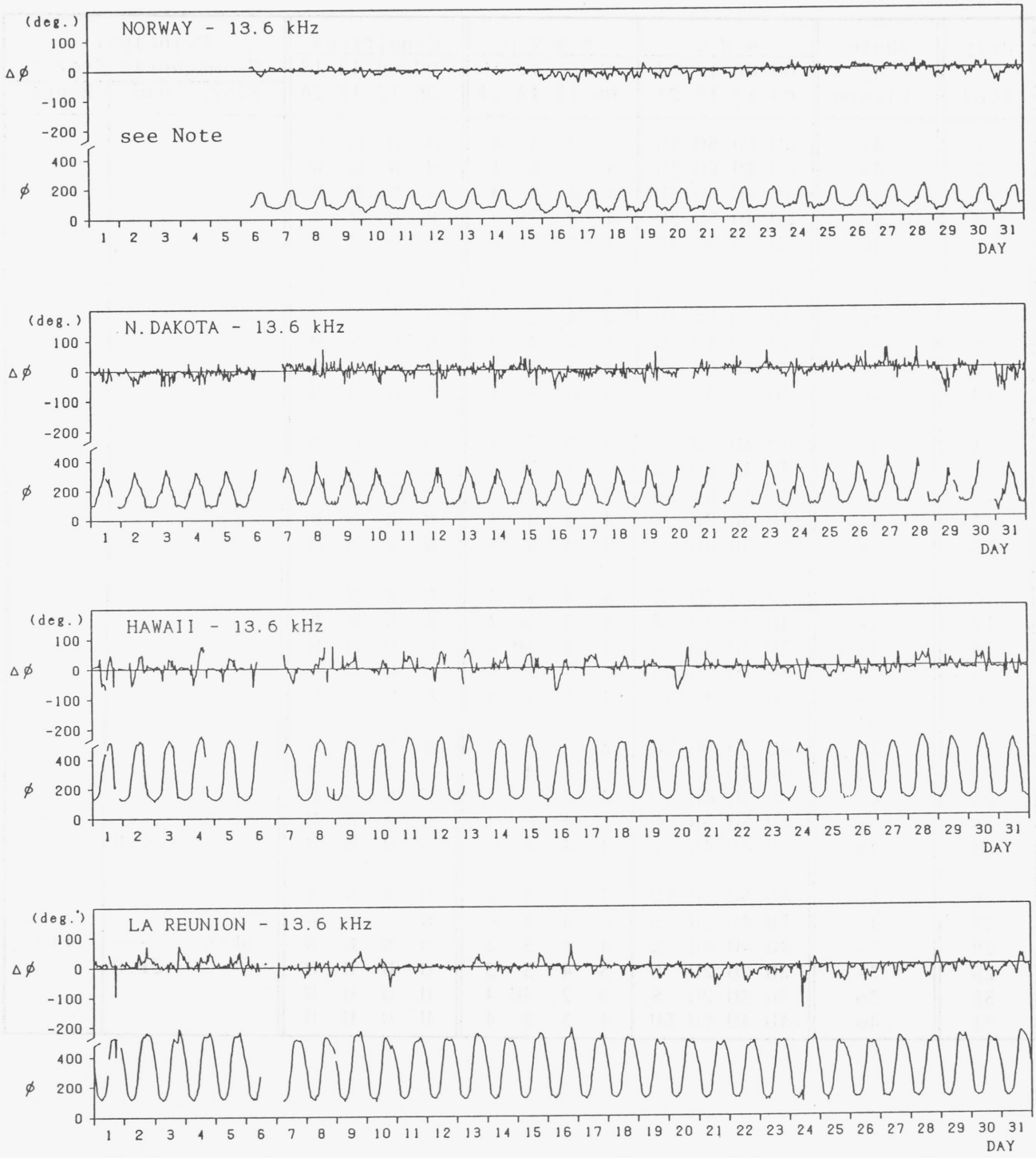
Time in U.T.

July 1987	Whole Day Figure	W W V 00 06 12 18 / 06 12 18 24	W W V II 00 06 12 18 / 06 12 18 24	Conditions 00 06 12 18 / 06 12 18 24	Principal Geomagnetic Storms Start	End	Range
1	4+	4U 5U 5U 5U	4 4 4 4	N N N N			
2	4+	4U 4U 5U 5U	4 4 5 4	N N N N			
3	4+	4U 4U 5U 5U	4 4 4 4	N N N N			
4	4o	5U 4U 5U 5U	4 4 2U 4	N N N N			
5	4o	5U 4U 5U 5U	4 3 2U 4	N N N N			
6	4-	4U 4U S S	4 4 3 4	N N N N			
7	4o	3U 4U 5U 5U	4 4 2 4	N N N N			
8	4-	4U 3U 4U S	4 4 4 3	N N N N			
9	4-	3U 4U 3U S	4 3 4 4	N N N N			
10	4o	4U 4U 4U S	4 4 4 4	N N N N			
11	4-	4U 4U 3U S	4 4 3 4	N N N N			
12	3o	3U 4U 2U S	3 4 2U 3	N N N N			
13	4+	4U 4U 5U 5U	4 4 4 4	U U U U			
14	4-	3U 3U 4U S	4 4 4 4	N N N N			
15	4+	5U 5U 4U S	4 4 4 4	N N N N			
16	4-	3U 4U 3U S	4 4 4 4	N N N N			
17	4-	4U 4U 3U S	4 3 3U 4	N N N N			
18	3+	3U 4U 3U S	4 3 3U 4	U U U U			
19	3+	3U 3U 2U 5U	4 3 3 4	U U U U			
20	4-	3U 2U 4U 5U	4 4 4 4	U U U U			
21	4+	4U 3U 5U 5U	4 4 5 4	N N N N			
22	4o	4U 4U 4U S	4 4 4 4	N N N N			
23	4o	4U 5U 4U 5U	4 4 4 3	N N N N			
24	4+	4U 5U 5U 5U	4 4 4 4	N N N N	1636	---	88
25	4o	5U 4U 4U S	4 4 4 4	N N N N	---	24.0	
26	4+	4U 5U 5U 5U	4 4 4 4	N N N N			
27	4+	5U 4U 5U S	4 4 4 4	N N N N			
28	4-	4U 4U 4U S	4 4 3 3	N N N N	0850	---	149
29	3-	2U 2U 2U S	3 4 3 3	U U U U	---	21.0	
30	3o	3U 3U 2U S	3 2 3U 4	U U U U			
31	4o	4U 4U 4U 5U	4 3 3 4	U U U U			

C. Radio Propagation

c. Phase Variations in OMEGA Radio Waves at Inubo

Inubo July 1987



Note: As for NORWAY - 13.6 kHz, no record during July 01 - July 06, due to the receiver trouble.

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

NONE

C. Radio Propagation

d. Sudden Ionospheric Disturbance

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

Hiraiso Time in U.T.

Jul. 1987	S W F						Correspondence		
	Drop-out Intensities (dB)				Start	Duration	Type	Imp.	Solar Flare	Solar Noise	Geomag. Crochet
	CO	HA	1)	2)							
16	x	x	16		0108	24	SL	1+			

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

(ii) Sudden Phase Anomaly (SPA) at Inubo

Inubo

Jul 1986	S P A							
	Phase Advance (degrees)					Time (U.T.)		
Date	Ω/N	Ω/LR	NWC	Ω/H	Ω/ND	Start	End	Maximum
16		36	45	23	34	0112	0207	0121
22				7	—	2057	2132	2106
23			9	10		0021	0050	0026
23			6	4		0131	0152	0135
23		15	22*	7		0313	0420	0339
23		21*	16	8		0455	0557	0500
23		11	5			0637	0700	0644
23		34	9			0717	0755	0727
23		26				0923	1003	0930
23				18	30	1917	2022	1933
24	17		34*	23*	24*	0035	0154	0105
24		23				0829	0855	0837
24	30	180				0956	1126	1010
25		33	10			0616	0727	0633
25				30	37	2110	2154	2119
25				9		2207	2245	2220
26		22	26	10	20	0330	0451	0336
27		28	—	18	22	0220	0304	0225
27				42	49	1811	1843	1821
28			10	5	12	0239	0257	0242
29			34	18	24	0145	0249	0151

IONOSPHERIC DATA IN JAPAN FOR JULY 1987

F-463 Vol. 39 No. 7 (Not for Sale)

電離層月報（1987年7月）

第39巻 第7号（非売品）

1987年10月24日 印刷

1987年10月30日 発行

編集兼 郵政省電波研究所

発行所 〒184 東京都小金井市貫井北町4丁目2－1

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