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# IONOSPHERIC DATA IN JAPAN

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NUKUI-KITAMACHI, KOGANEI-SHI, TOKYO, JAPAN

CONTENTS

## SITE OF THE RADIO WAVE OBSERVATORIES AND HIRAISO BRANCH

Ionospheric observation is carried out at the following four observatories in Japan.

| | Latitude | Longitude | Site |
|---|---|---|---|
| Wakkanai | 45°23.6′N. | 141°41.1′E. | Midori-cho, Wakkanai-shi, Hokkaido |
| Akita | 39°43.5′N. | 140°08.2′E. | Tegata Sumiyoshi-cho, Akita-shi, Akita-ken |
| Kokubunji | 35°42.4′N. | 139°29.3′E. | Nukui-Kitamachi, Koganei-shi, Tokyo-to |
| Yamagawa | 31°12.1′N. | 130°37.1′E. | Yamagawa-machi, Ibusuki-gun, Kagoshima-ken |

Solar radio emission and radio propagation conditions are observed at Hiraiso Branch. and Inubo Radio Wave Observatory.

| | Latitude | Longitude | Site |
|---|---|---|---|
| Hiraiso | 36°22.0′N. | 140°37.5′E. | Isozaki-machi, Nakaminato-shi, Ibaraki-ken |
| Inubo | 35°42.2′N. | 140°51.5′E. | 9912 Tennodai, Choshi-shi, Chiba-ken |

## SYMBOLS AND TERMINOLOGY

### A. IONOSPHERE

All symbols and terminology in the table of ionospheric data are used in accordance with the "URSI Handbook of Ionogram Interpretation and Reduction," 1961.

**Terminology**

$f_0F2$, $f_0F1$, $f_0E$ — The ordinary wave critical frequency for the $F2$, $F1$ and $E$ layers, respectively.

$f_0E_s$ — The ordinary wave top frequency corresponding to highest frequency at which a mainly continuous trace is observed.

$f_bE_s$ — The lowest ordinary wave frequency at which the $E_s$ layer begins to become transparent. This is usually determined from the minimum frequency at which reflections from layers at greater heights are observed.

$f$-min — The frequency below which no echoes are observed.

$M(3000)F2$ — The maximum usable frequency factor for a path of 3000 km for transmission by $F2$ layer.

$M(3000)F1$ — The maximum usable frequency factor for a path of 3000 km for transmission by $F1$ layer.

$h'F2$ — The minimum virtual height, $h'F2$, refers to the highest, most stable stratification observed in the $F$ region and can only be scaled when such stratification is present.

$h'F$ — The natural and most significant $F$ region virtual height parameter is that for lowest $F$ region stratification. This will be denoted by $h'F$. Thus $h'F$ is identical with the current $h'F2$ when $F$ region stratification is absent, e.g., at night, and with the current $h'F1$ when $F1$ stratification is present.

$h'E_s$ — The lowest virtual height of the trace used to give the $f_0E_s$.

$hpF2$ — The virtual height of the $F2$ layer measured on the ordinary

wave component at a frequency equal to $0.834 f_0F2$.

*ypF2* The semi-thickness of the *F2* layer deduced from a parabolic fit to the "nose" of the electron density distribution with height and based on the observed *h'f* trace. (The difference between *hpF2* and the virtual height at $0.969 f_0F2$).

**a. 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 *f*-min.

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. Used in a qualifying sense, see below.

E Measurement influenced by, or impossible because of, the lower limit of the normal frequency range. Used in a qualifying sense, see below.

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.

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.

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 Intermittent trace.

Z Third magneto-ionic component present.

**b. Qualifying Letters**

The following letters are entered in the first column before a numerical

value on the monthly tabulation sheets.

| | |
|---|---|
| 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. |
| 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-ionic component. |

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.

d. **Description of Standard Types of *Es***

The eight standard types of *Es* are identified by corresponding capital letters: *F*, *L*, *C*, *H*, *Q*, *R*, *A*, *S*. These letters suggest the names flat, low, cusp, high, equatorial, retardation, auroral and slant, respectively. The letter '*N*' is used to designate any *Es* trace that does not correspond to any of the eight types.

| | |
|---|---|
| *F* | An *Es* trace which shows no appreciable increase of height with frequency. The trace is usually relatively solid at most latitudes. This classification may only be used at night; apparently flat *Es* traces observed in the daytime are classified according to their virtual hight: *H* or *L*. |
| *L* | A flat *Es* trace at or below the normal *E* layer minimum virtual height in the day or below the night *E* layer minimum virtual height at night. |
| *C* | An *Es* trace showing a relatively symmetrical cusp at or below $f_0E$. This is usually continuous with the normal *E* trace, although when the deviative absorption is large, part or all of the cusp may be missing. (Usually a daytime type.) |
| *H* | An *Es* trace showing a discontinuity in height with the normal *E* layer trace at or above $f_0E$. 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. The spread is most pronounced at the upper edge of the trace. (This type is common in daytime in the vicinity of the magnetic equator.)

*R* An *Es* trace showing an increase in virtual height at the high frequency end similar to group retardation but which is non-blanketing over part or all of its frequency range. This is distinguished from the usual group retardation (as in the case of an occulting thick *E* layer) by the lack of group retardation in the *F* layer traces at corresponding frequencies and the lack of complete blanketing.

*A* An *Es* having a well defined flat or gradually rising lower edge with stratified and diffuse (spread) traces present above it. These sometimes extend over several hundred kilometers of virtual height.

*S* A diffuse *Es* trace which rises steadily with frequency and usually emerges from another type *Es* trace. The rising trace alone is classified as '*S*'; the horizontal trace is classified separately. At high latitudes the slant trace usually starts to rise from a horizontal *Es* trace such as *Es-L* or *Es-F*, at frequencies which greatly exceed the *E* layer critical frequency, whereas at low latitudes it usually rises from *Es-Q* *Es-C* or *Es-H* at frequencies near the regular *E* critical frequency. Type *S* is never used to determine $f_0Es$ and $h'Es$. The slant trace is sometimes observed to start at $f_0E$ without echoes clearly identifiable as *Es* echoes being seen.

*N* The designation '*N*' is used to denote an *Es* trace which cannot be classified into one of the standard types. When a trace appears to be intermediate between any two classes a choice should be made whenever possible even if it is uncertain. '*N*' should be used sparingly.

e. **Multiple Reflections from *Es***

When the ionogram shows the presence of multiple reflections from *Es* the number of traces seen should be recorded after the letter indicating the type.

## B. SOLAR RADIO EMISSION

Solar radio observations are carried out on 200 and 500 MHz at Hiraiso Branch. Antennas are two parabolic reflectors : 10 meter for 200 MHz and 5 meter for 500 MHz, each having the total power receiver. Observations are feasible almost from sunrise to sunset.

a. **Time and Unit**

The time is expressed as U.T.

The unit is $10^{-22}$ $W \cdot m^{-2}Hz^{-1}$ for both components of polarization.

**b. Daily Data**

*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 flux level is counted.

Bracket means that observation time does not exceed one third of the period.

**c. Distinctive Events**

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.

*Starting time* and *Time of maximum* are given to nearest minute in general, but to nearest a tenth minute for short intense occurrences or clear commencements.

*Duration* is given in minutes and to nearest a tenth minute, if short or clear.

*Descriptive type* is denoted by the following symbols:

S =Simple rise and fall of intensity;
C =Complex variation of intensity,
C + =Prolonged broad-band enhancement of radiation, generally of spectral type IV;
F =Group of bursts: multiple peaks probably belonging to the same event, but separated by relatively short period of quietness;
RF =More or less irregular rise and fall of intensity, at metric or decimetric wavelengths;
e =Sudden beginning of burst with steep rise of intensity;
E =Steep rise of intensity of continuum background;
p.i. =post-burst increase;
onset storm=clear-cut beginning of a noise storm.

*Peak intensity* is the flux density of the highest peak reached during the occurrence, measured above the pre-burst level.

*Mean intensity* is the flux density averaged over the burst's duration, measured above the pre-burst level; therefore, multiplying the duration, the total energy of the occurrence can be estimated.

## C. RADIO PROPAGATION CONDITIONS

### a. Field Strengths of WWV and WWVH

Field Strengths observations of WWV and WWVH transmitted from Fort Collins, Colorado and Hawaii, respectively, are carried out at Hiraiso Branch. In order to avoid interferences with other standard frequency waves on the same frequency, the upper side-band of 440 Hz is picked up by the use of a narrow band pass filter with ±40 Hz bandwidth.

The *tabulated field strength* is the average of peak value of the incident upper side-band field intensity in dB above one microvolt per meter. The *duration* of observation is two minutes for WWV and three minutes for WWVH following the time indicated in universal time on the table.

Particulars of the transmitter and receiver are summarized in the following tables:

Transmitter

| | WWV | WWVH |
|---|---|---|
| Location | Fort Collins, Colorado Long. 105°02′ W Lat. 40°41′ N | Maui, Hawaii Long. 156°28′ W Lat. 20°46′ N |
| Power | 3 kW for the upper side-band | 0.5 kW* for the upper side-band |
| Antenna | λ/2 vertical | λ/2 vertical |
| Distance | 9150 km | 6270 km |

* Reduced from the carrier power of 2 kW with amplitude modulation of 100%.

Receiver

| | |
|---|---|
| Antenna | 4.5 m vertical rod |
| Bandwidth | ±40 Hz for the upper side-band |
| Calibration | every half an hour |

The meaning of *Descriptive symbols* is as follows:

C: Measurement influenced by, or impossible because of, any non-propagational reasons.

S: Measurement influenced by, or impossible because of, interferences or atmospherics.

U: Inaccurate measurement influenced by interferences, atmospherics, or non-propagational reasons.

E: Less than the following figure.

**b. Radio Propagation Quality Figures**

Radio propagation quality figures are usually expressed on the scale that ranges from one to five as follows:

1=very poor (very disturbed)
2=poor (disturbed)
3=rather poor (unstable)
4=normal
5=good

The tabulated circuits contain Hamburg (commercial circuit), WWV (10, 15 and 20 MHz frequencies broadcast from Fort Collins, Colorado), Lima (commercial circuit) and WWVH (10 and 15MHz frequencies broadcast from Hawaii), which are received at Hiraiso Branch.

Warnings of radio propagation which are broadcast from JJY station are expressed in three grades:

N=normal
U=unstable
W=disturbed

The letter W expresses HF propagation disturbances which are expected to occur during the following 12 hours after issue. The letter U and N also means unstable and normal conditions, respectively.

Whole day radio quality indices stand for the averages of the 6-hourly indices of the circuits of Hamburg, WWV and Lima.

Start- and end-time of principal geomagnetic storms correlated with radio propagation conditions are tabulated from observations at Kakioka Magnetic observatory.

**c. Sudden Ionospheric Disturbances (S.I.D's.)**

(i) SWF

The data of short wave fade-out (SWF) are prepared from the records of field intensities at Hiraiso, of the following circuits. Start-time, Duration, Type and Importance are obtained from the data of a circuit whose Drop-out Intensity is underlined. Drop-out Intensities of 10, 15 and 20 MHz are indicated by (′), (none), and (″), respectively. Characteristics of the phenomenon are classified as follows.

*Circuits and Drop-out intensities*

C O .....WWV 20, 15 and 10 MHz (Fort Collins, Colorado)
L M .....Various frequencies of commercial circuit (Lima)
H A .....WWVH 15 and 10 MHz (Hawaii)
T O .....JJY 15 and 10 MHz (Tokyo)
S H .....BPV 15 and 10 MHz (Shanghai)
H B .....Various frequencies of commercial circuit (Hamburg)

*Start-time and Duration*

*Types*

S : sudden drop-out and gradual recovery
Slow: slow drop-out taking 5 to 15 minutes and gradual recovery
G : gradual disturbances; irregular change in both drop-out and recovery

*Importances*

Degrees of SWF are classified into 9 grades according to the amplitude of fade-out;

| | | |
|---|---|---|
| 1− | 1 | 1+ |
| 2− | 2 | 2+ |
| 3− | 3 | 3+ |

Besides, the time of phenomena associated with SID's, that is, solar flare, solar radio noise outburst and crochet (solar flare effect in magnetic record), are given in this table from interchange messages of IUWDS or measurements at Hiraiso.

(ii) SPA

The data of sudden phase anomaly (SPA) are prepared from the records of phase measurement of VLF radio wave propagation received at Inubo Radio Wave Observatory. Characteristics of the VLF radio wave propagation are as the following table. In the last column, a spherical earth with a radius of 6371.2 km is assumed.

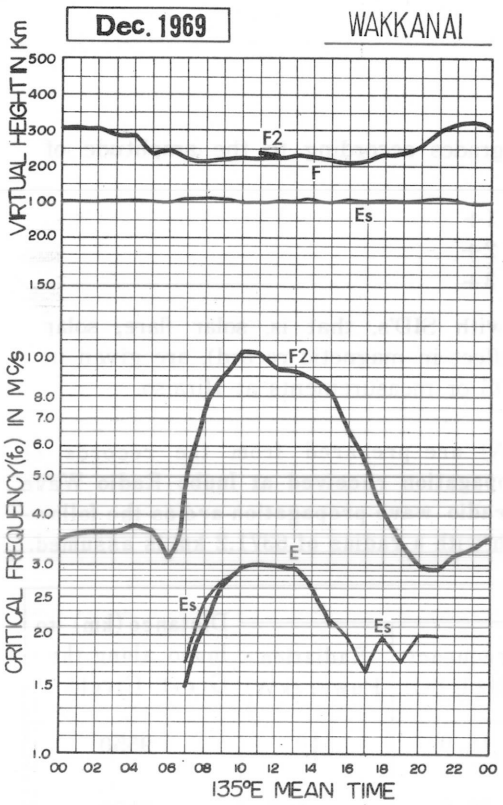
| Transmitting Site | | | | | Distance (km) to Inubo along the Great Circle |
|---|---|---|---|---|---|
| Name | Location (Geographic Coordinate) | Station Call | Frequency (kHz-UTC) | Radiation Power (kW) | |
| Rugby | 52° 22′ N<br>001° 11′ W | GBR | 16.0 | 40 | 9550 |
| Fort Collins | 40° 41′ N<br>105° 03′ W | WWVL | 20.0 | 1.8 | 9190 |
| Cutler | 44° 39′ N<br>067° 17′ W | NAA | 17.8 | 1000 | 10650 |
| North West Cape | 21° 49′ S<br>114° 10′ E | NWC | 22.3 | 1000 | 6990 |
| Lualualei | 21° 26′ N<br>158° 09′ W | NPM | 23.4 | 300 | 6070 |
| Jim Creek | 48° 12′ N<br>121° 55′ W | NPG | 18.6 | 250 | 7620 |
| Haiku | 21° 24′ N<br>157° 50′ W | HA0<br>HA2<br>HA3 | 10.2<br>12.2<br>13.6 | 2 | 6100 |
| Aldra | 66° 25′ N<br>013° 09′ E | AL0<br>AL2<br>AL3 | 10.2<br>12.2<br>13.6 | 4 | 7820 |

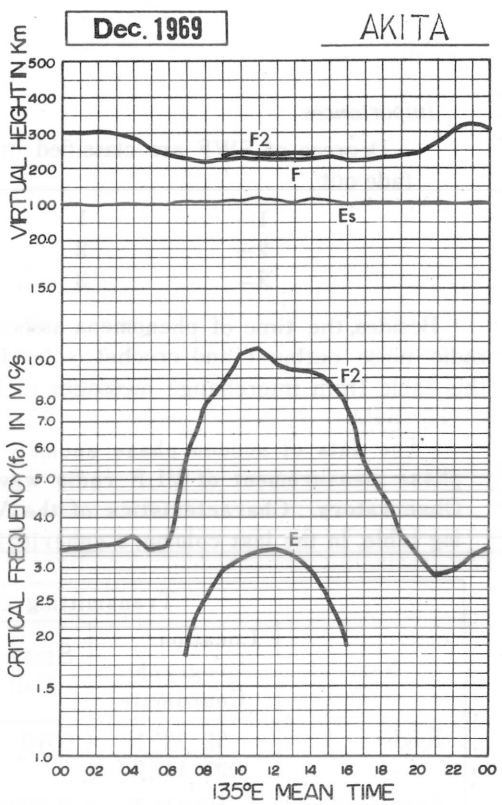
The phase advance is shown in its maximum stage. In the column 'Phase Advance', —means no transmission or no reception during the period, and blank means indistinguishable record.

Out of more than two circuits to have observed the same SPA event listed in the text, the phase advance on some circuit on which the event is the most remarkable or distinct is underlined. As for the underlined phase advance, the starting, the ending, and the maximum times are described.

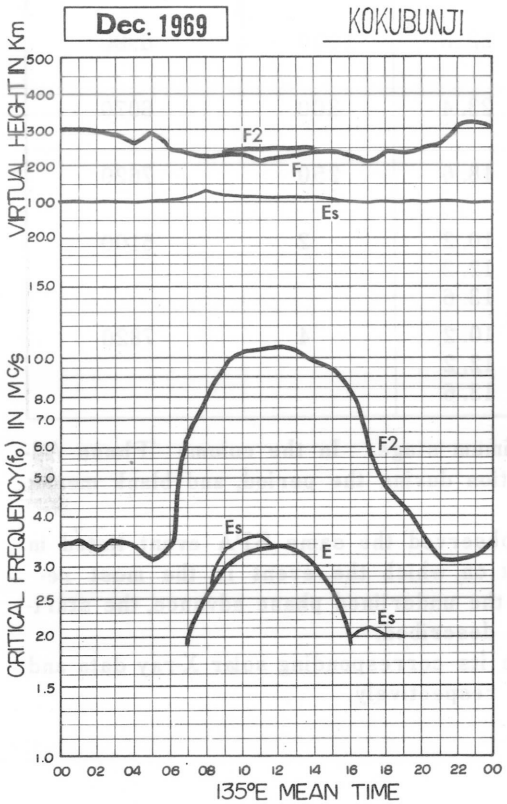
In the column 'Remarks', the event with its corresponding solar X-ray data and solar radio data is shown by 'X' and 'R', respectively.

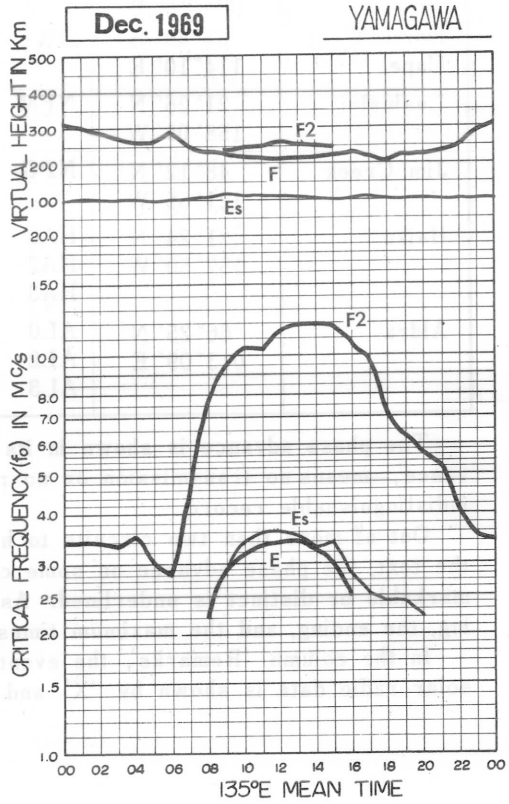
IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS




IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS



## IONOSPHERIC DATA
## LIST OF MEDIAN VALUES

OBSERVED AT: WAKKANAI

Dec. 1969

135° E Mean Time (G.M.T. +9h)

| CHAR | HR | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| foF2 | MED | 035 | 036 | 036 | 036 | 038 | 037 | 031 | 051 | 073 | 090 | 102 | 102 | 094 | 093 | 088 | 082 | 064 | 052 | 040 | 034 | 030 | 029 | 032 | 033 |
| | CNT | 31 | 31 | 30 | 29 | 30 | 31 | 30 | 30 | 31 | 31 | 30 | 30 | 30 | 30 | 30 | 30 | 31 | 31 | 31 | 30 | 30 | 30 | 30 | 31 |
| | Q R | 002 | 004 | 004 | 004 | 006 | 006 | 006 | 007 | 008 | 014 | 013 | 012 | 008 | 009 | 011 | 016 | 013 | 014 | 006 | 007 | 004 | 003 | 004 | 004 |
| foF1 | MED | | | | | | | | | | | | U400L | 400L | 360 | | | | | | | | | | |
| | CNT | | | | | | | | | | | | 4 | 4 | 1 | | | | | | | | | | |
| foE | MED | | | | | | | | 148 | 210 | 265 | 295 | 300 | 300 | 295 | 260 | 210 | E | | | | | | | |
| | CNT | | | | | | | | 10 | 21 | 27 | 29 | 27 | 26 | 24 | 22 | 18 | 4 | | | | | | | |
| foEs | MED | E016E | 017 | E | E | E | E | E016E | 017 | 024 | 027G | 022G | 026G | 022G | 021G | 020G | 022 | 020 | 016 | 020 | 017 | 020 | 020 | E016E | 020 |
| | CNT | 30 | 31 | 30 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 30 | 30 | 30 | 29 | 29 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| | Q R | | | | | | | | D008 | | | | | | | | | D011 | D011 | D018 | D015 | D010 | D007 | | D010 |
| f·min | MED | E | E | E | E | E | E | E | E | 015 | 016 | 017 | 017 | 018 | 017 | 016 | 016 | E012S | E | E | E013S | E013S | E | E | E012S |
| | CNT | 30 | 31 | 30 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 30 | 30 | 30 | 29 | 29 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| M (3000) F2 | MED | 275 | 270 | 275 | 275 | 285 | 310 | 310 | 325 | 345 | 340 | 332 | 342 | 335 | 328 | 330 | 340 | 335 | 325 | 320 | 320 | 308 | 275 | 270 | 275 |
| | CNT | 31 | 31 | 30 | 29 | 30 | 31 | 30 | 30 | 31 | 31 | 30 | 30 | 30 | 30 | 30 | 30 | 31 | 31 | 31 | 30 | 30 | 30 | 30 | 31 |
| M (3000) F1 | MED | | | | | | | | | | | | U410L | 413L | 380 | | | | | | | | | | |
| | CNT | | | | | | | | | | | | 4 | 4 | 1 | | | | | | | | | | |
| h'F2 | MED | | | | | | | | | | | 252 | 232 | 220 | 225 | | | | | | | | | | |
| | CNT | | | | | | | | | | | 2 | 8 | 6 | 3 | | | | | | | | | | |
| h'F | MED | 305 | 305 | 300 | 290 | 285 | 235 | 245 | 220 | 210 | 220 | 225 | 225 | 225 | 230 | 230 | 218 | 210 | 215 | 230 | 240 | 260 | 300 | 315 | 320 |
| | CNT | 31 | 31 | 31 | 31 | 31 | 31 | 29 | 30 | 31 | 31 | 30 | 30 | 30 | 30 | 30 | 30 | 31 | 31 | 31 | 30 | 30 | 30 | 30 | 31 |
| h'Es | MED | 100 | 100 | 100 | 105 | 105 | 105 | 105 | 110 | 110 | 110 | 105 | 105 | 105 | 105 | 108 | 102 | 110 | 105 | 105 | 105 | 105 | 100 | 100 | 102 |
| | CNT | 13 | 14 | 6 | 13 | 11 | 7 | 13 | 15 | 21 | 19 | 16 | 16 | 17 | 17 | 16 | 16 | 19 | 15 | 16 | 15 | 16 | 17 | 12 | 16 |
| hpF2 | MED | | | | | | | | | | | | | | | | | | | | | | | | |
| | CNT | | | | | | | | | | | | | | | | | | | | | | | | |
| ypF2 | MED | | | | | | | | | | | | | | | | | | | | | | | | |
| | CNT | | | | | | | | | | | | | | | | | | | | | | | | |

## IONOSPHERIC DATA
## LIST OF MEDIAN VALUES

OBSERVED AT: AKITA

Dec. 1969

135° E Mean Time (G.M.T. +9h)

| CHAR | HR | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| foF2 | MED | 033 | 033 | 034 | 034 | 036 | 033 | 034 | 058 | 079 | 087 | 103 | 106 | 097 | 094 | 094 | 088 | 075 | 054 | 046 | 036 | 032 | 028 | 029 | 032 |
| | CNT | 31 | 31 | 31 | 30 | 29 | 28 | 27 | 27 | 27 | 28 | 30 | 29 | 29 | 29 | 29 | 30 | 30 | 29 | 29 | 29 | 30 | 31 | 31 | 31 |
| | Q R | 002 | 004 | 004 | 005 | 005 | 005 | 005 | 008 | 010 | 019 | 013 | 010 | 015 | 011 | 007 | 022 | 015 | 009 | 015 | 007 | 006 | 004 | 003 | 004 |
| foF1 | MED | | | | | | | | | | 360 | 390 | 425L | 480L | 360 | 345 | | | | | | | | | |
| | CNT | | | | | | | | | | 1 | 7 | 4 | 4 | 5 | 4 | | | | | | | | | |
| foE | MED | | | | | | | | 182 | 250 | 295 | 310 | 325 | 330 | 320 | 295 | 250 | 190 | | | | | | | |
| | CNT | | | | | | | | 12 | 23 | 25 | 26 | 25 | 27 | 26 | 24 | 25 | 15 | | | | | | | |
| foEs | MED | E014S | E014S | E014S | E014S | E014S | E014S | E014S | E018G | G | G | G | G | G | G | G | G | 020 | E014S | E014S | E014S | E014S | E014S | E014S | E014S |
| | CNT | 31 | 31 | 31 | 30 | 29 | 28 | 26 | 27 | 27 | 28 | 30 | 29 | 29 | 28 | 29 | 29 | 30 | 29 | 29 | 29 | 30 | 31 | 31 | 30 |
| | Q R | D002 | D004 | | | D002 | | | | | | | | | | | | | D010 | D009 | | D010 | D006 | | |
| f·min | MED | E014S | E014S | E014S | E014S | E014S | E014S | E014S | 014 | 015 | 016 | 018 | 019 | 018 | 018 | 018 | 016 | 014 | E014S | E014S | E014S | E014S | E014S | E014S | E014S |
| | CNT | 31 | 31 | 31 | 30 | 29 | 28 | 26 | 27 | 27 | 28 | 30 | 29 | 29 | 28 | 29 | 29 | 30 | 29 | 29 | 29 | 30 | 31 | 31 | 30 |
| M (3000) F2 | MED | 280 | 280 | 285 | 285 | 290 | 300 | 310 | 330 | 340 | 335 | 322 | 330 | 325 | 320 | 320 | 330 | 340 | 320 | 320 | 320 | 315 | 290 | 280 | 280 |
| | CNT | 31 | 31 | 31 | 30 | 29 | 28 | 27 | 27 | 27 | 28 | 30 | 29 | 29 | 29 | 29 | 30 | 30 | 29 | 29 | 29 | 30 | 31 | 31 | 31 |
| M (3000) F1 | MED | | | | | | | | | | 420 | 385 | 375L | 370L | 400 | 412 | | | | | | | | | |
| | CNT | | | | | | | | | | 1 | 7 | 4 | 4 | 5 | 4 | | | | | | | | | |
| h'F2 | MED | | | | | | | | | | 230 | 250 | 245 | 245 | 245 | 242 | | | | | | | | | |
| | CNT | | | | | | | | | | 7 | 30 | 29 | 29 | 23 | 12 | | | | | | | | | |
| h'F | MED | 305 | 300 | 305 | 300 | 290 | 260 | 240 | 225 | 220 | 230 | 230 | 230 | 222 | 230 | 235 | 230 | 220 | 220 | 230 | 240 | 245 | 268 | 312 | 320 |
| | CNT | 31 | 31 | 31 | 30 | 29 | 28 | 27 | 27 | 27 | 28 | 29 | 28 | 28 | 29 | 29 | 30 | 30 | 29 | 29 | 29 | 29 | 30 | 30 | 31 |
| h'Es | MED | 100 | 100 | 100 | 105 | 105 | 105 | 105 | 110 | 110 | 110 | 115 | 120 | 110 | 105 | 120 | 115 | 105 | 105 | 105 | 105 | 105 | 102 | 102 | 100 |
| | CNT | 8 | 11 | 6 | 4 | 8 | 6 | 5 | 11 | 11 | 9 | 12 | 11 | 6 | 10 | 11 | 12 | 15 | 13 | 11 | 7 | 10 | 3 | 6 | 5 |
| hpF2 | MED | | | | | | | | | | | | | | | | | | | | | | | | |
| | CNT | | | | | | | | | | | | | | | | | | | | | | | | |
| ypF2 | MED | | | | | | | | | | | | | | | | | | | | | | | | |
| | CNT | | | | | | | | | | | | | | | | | | | | | | | | |

## IONOSPHERIC DATA
## LIST OF MEDIAN VALUES

OBSERVED AT: KOKUBUNJI

Dec. 1969

135° E Mean Time (G.M.T. +9h)

| CHAR \ HR | | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| foF2 | MED | 034 | 035 | 033 | 035 | 034 | 031 | 034 | 063 | 080 | 095 | 102 | 104 | 106 | 104 | 098 | 095 | 083 | 058 | 047 | 042 | 036 | 031 | 031 | 032 |
| | CNT | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 31 | 29 | 31 | 31 | 31 | 30 | 30 | 31 | 31 | 30 | 31 | 31 | 31 | 31 | 29 | 30 | 31 |
| | Q R | 003 | 004 | 005 | 004 | 007 | 003 | 005 | 010 | 009 | 018 | 014 | 011 | 008 | 018 | 013 | 018 | 020 | 012 | 017 | 010 | 006 | 004 | 003 | 005 |
| foF1 | MED | | | | | | | | | | | | | | 1 | | | | | | | | | | |
| | CNT | | | | | | | | | | | | | | 350L | | | | | | | | | | |
| foE | MED | | | | | | | | 190 | 252 | 298 | 320 | 330 | 335 | 325 | 300 | 258 | 190 | E | | | | | | |
| | CNT | | | | | | | | 16 | 18 | 16 | 13 | 13 | 19 | 21 | 24 | 18 | 12 | 1 | | | | | | |
| foEs | MED | E016S | E016 | 020 | E014E | E013E | E013B | E015B | E015G | G | 033 | 035 | 038 | 032G | G | G | G | 020 | J021X | 020 | 020 | E016 | E016 | E016 | 020 |
| | CNT | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 30 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| | Q R | D005 | D005 | D005 | D008 | | | D008 | | | | 007 | | | | | | | 011 | D009 | D006 | D005 | D007 | D006 | D008 |
| f-min | MED | E015S | E015S | E015S | 012 | 011 | 012 | 012 | 015 | 014 | 015 | 016 | 016 | 016 | 016 | 015 | 015 | 015 | 012 | E015S | E015S | E015S | E015S | E015S | E015S |
| | CNT | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 30 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| M (3000) F2 | MED | 280 | 280 | 285 | 285 | 295 | 285 | 310 | 335 | 340 | 340 | 330 | 325 | 325 | 320 | 320 | 330 | 335 | 330 | 325 | 325 | 310 | 295 | 275 | 270 |
| | CNT | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 31 | 29 | 31 | 31 | 31 | 30 | 30 | 31 | 31 | 30 | 31 | 31 | 31 | 31 | 29 | 30 | 31 |
| M (3000) F1 | MED | | | | | | | | | | | | | | 1 | | | | | | | | | | |
| | CNT | | | | | | | | | | | | | | 430L | | | | | | | | | | |
| h'F2 | MED | | | | | | | | | 245 | 240 | 250 | 245 | 250 | 248 | 248 | 230 | 240 | | | | | | | |
| | CNT | | | | | | | | | 3 | 23 | 30 | 28 | 29 | 30 | 20 | 6 | 1 | | | | | | | |
| h'F | MED | 300 | 305 | 300 | 290 | 260 | 290 | 250 | 230 | 225 | 230 | 230 | 210 | 220 | 225 | 240 | 240 | 220 | 205 | 240 | 230 | 250 | 259 | 308 | 312 |
| | CNT | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 30 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 30 | 31 |
| h'Es | MED | 100 | 100 | 100 | 100 | 100 | 100 | 105 | 108 | 130 | 115 | 112 | 110 | 110 | 110 | 110 | 105 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | CNT | 12 | 13 | 18 | 13 | 10 | 6 | 13 | 12 | 12 | 21 | 24 | 21 | 17 | 10 | 14 | 13 | 19 | 23 | 20 | 19 | 15 | 14 | 15 | 16 |
| hpF2 | MED | 380 | 390 | 370 | 350 | 330 | 350 | 300 | 270 | 260 | 270 | 290 | 300 | 300 | 300 | 300 | 280 | 260 | 290 | 295 | 290 | 300 | 330 | 390 | 390 |
| | CNT | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 31 | 29 | 31 | 31 | 31 | 30 | 30 | 31 | 31 | 30 | 31 | 31 | 31 | 31 | 29 | 30 | 31 |
| ypF2 | MED | 100 | 100 | 100 | 100 | 100 | 100 | 095 | 090 | 090 | 090 | 070 | 090 | 080 | 090 | 090 | 080 | 090 | 095 | 095 | 095 | 090 | 090 | 100 | 100 |
| | CNT | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 31 | 29 | 31 | 31 | 31 | 30 | 30 | 31 | 31 | 30 | 31 | 31 | 31 | 31 | 29 | 30 | 31 |

## IONOSPHERIC DATA
## LIST OF MEDIAN VALUES

OBSERVED AT: YAMAGAWA

Dec. 1969

135° E Mean Time (G.M.T. +9h)

| CHAR \ HR | | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| foF2 | MED | 034 | 034 | 034 | 033 | 035 | 030 | 028 | 047 | 079 | 095 | 102 | 102 | 114 | 118 | 119 | 119 | 106 | 098 | 069 | 062 | 056 | 052 | 040 | 035 |
| | CNT | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 30 | 31 | 31 | 29 | 29 | 30 | 31 | 30 | 29 | 31 | 31 | 31 |
| | Q R | 009 | 006 | 006 | 007 | 008 | 004 | 004 | 005 | 009 | 011 | 010 | 014 | 016 | 019 | 020 | 020 | 031 | 031 | 022 | 021 | 013 | 008 | 009 | 010 |
| foF1 | MED | | | | | | | | | | 330L | 370L | 410L | U460L | 520L | 455L | 365L | 310L | | | | | | | |
| | CNT | | | | | | | | | | 3 | 3 | 3 | 1 | 1 | 4 | 4 | 1 | | | | | | | |
| foE | MED | | | | | | | | | 220 | 290 | 315 | 330 | 340 | 340 | 322 | 300 | 250 | 155 | | | | | | |
| | CNT | | | | | | | | | 29 | 31 | 31 | 30 | 28 | 24 | 26 | 25 | 26 | 2 | | | | | | |
| foEs | MED | E016S | E015C | E015B | E015C | E013B | E015C | E015S | E015S | G | 028 | 034 | 036 | 036 | 035 | 032G | J034 | J028 | J025X | J024X | J024X | 022 | E016S | E016S | E017S |
| | CNT | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 31 | 30 | 31 | 30 | 31 | 31 | 30 | 30 | 30 | 31 | 31 | 30 | 30 | 31 | 31 |
| | Q R | | | D005 | | | | | D007 | | | 007 | 008 | 004 | 006 | 013 | 014 | 010 | 007 | D012 | 006 | D009 | D009 | D008 | D006 |
| f-min | MED | E015C | E015C | E015C | E015C | E012E | E015S | E015S | E015S | 015 | 015 | 016 | 017 | 018 | 018 | 016 | 015 | 015 | E015S | E015S | E015S | E015C | E015S | E015S | E015C |
| | CNT | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 31 | 30 | 31 | 30 | 31 | 31 | 30 | 30 | 30 | 31 | 31 | 30 | 30 | 31 | 31 |
| M (3000) F2 | MED | 265 | 270 | 285 | 285 | 285 | 275 | 285 | 305 | 335 | 335 | 335 | 320 | 315 | 305 | 305 | 310 | 315 | 320 | 320 | 305 | 305 | 300 | 285 | 265 |
| | CNT | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 30 | 30 | 30 | 29 | 29 | 30 | 31 | 30 | 29 | 31 | 31 | 31 |
| M (3000) F1 | MED | | | | | | | | | | 420L | 415L | 405L | U400L | 345L | 385L | 392L | 405L | | | | | | | |
| | CNT | | | | | | | | | | 3 | 3 | 3 | 1 | 1 | 4 | 4 | 1 | | | | | | | |
| h'F2 | MED | | | | | | | | | | 235 | 245 | 250 | 260 | 255 | 255 | 245 | 238 | | | | | | | |
| | CNT | | | | | | | | | | 19 | 29 | 31 | 31 | 31 | 31 | 27 | 4 | | | | | | | |
| h'F | MED | 308 | 308 | 285 | 272 | 259 | 258 | 290 | 250 | 230 | 230 | 225 | 215 | 212H | 210 | 215 | 228 | 235 | 220 | 205 | 228 | 220 | 235 | 250 | 288 |
| | CNT | 30 | 31 | 31 | 31 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 30 | 30 | 31 | 31 | 31 | 30 | 31 | 29 |
| h'Es | MED | 100 | 102 | 102 | 100 | 100 | 100 | 100 | 100 | 110 | 120 | 110 | 115 | 105 | 105 | 105 | 100 | 105 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | CNT | 7 | 6 | 8 | 7 | 6 | 4 | 7 | 10 | 11 | 18 | 25 | 25 | 29 | 30 | 24 | 24 | 24 | 27 | 22 | 23 | 20 | 12 | 11 | 9 |
| hpF2 | MED | | | | | | | | | | | | | | | | | | | | | | | | |
| | CNT | | | | | | | | | | | | | | | | | | | | | | | | |
| ypF2 | MED | | | | | | | | | | | | | | | | | | | | | | | | |
| | CNT | | | | | | | | | | | | | | | | | | | | | | | | |

# IONOSPHERIC DATA

DEC. 1969 | FOF2 (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 37 | 38 | 37 | 38 | 38 | 41 | 34 | 60 | 84 | 93 | 113 | 120 | 107 | 97 | 101 | 85 | 77 | 62 | 43 | 43 | 27 | 24 | 28 | 29 |
| 2 | 29 | 31 | 30 | F 30 | F 33 | 38 | 28 | 62 | 74 | 88 | 97 | 108 | 97 | 96 | 83 | I C 90 | I C 70 | 56 | 41 | 38 | 32 | 25 | 31 | 33 |
| 3 | I C 34 | 34 | I C 34 | I C 35 | 36 | 36 | S 31 | 56 | 73 | 74 | 108 | 115 | 95 | 87 | I C 88 | 90 | 63 | 51 | 32 | 31 | 31 | F 29 | U F 31 | F 33 |
| 4 | 36 | 36 | 36 | 36 | 37 | 35 | 36 | 53 | 80 | 102 | 93 | 100 | 94 | 96 | 91 | 83 | 57 | 64 | 52 | 32 | 26 | 29 | U S 33 | U S 34 |
| 5 | 36 | U S 37 | 38 | 37 | 39 | 36 | 32 | 51 | 76 | 94 | 112 | 105 | 107 | 100 | 88 | 74 | 64 | 49 | 38 | 39 | 29 | 28 | 30 | 33 |
| 6 | 33 | 35 | 34 | 34 | 38 | U S 37 | 36 | 61 | H 90 | 90 | 125 | 118 | 103 | 104 | 108 | 92 | 81 | 56 | 47 | 35 | 33 | S 35 | 36 | U S 40 |
| 7 | U S 40 | 40 | F 43 | F 47 | U S 47 | 37 | 28 | 54 | 79 | 95 | 117 | 111 | 94 | 87 | 97 | 93 | 77 | 46 | 41 | 35 | 30 | 33 | 37 | F 40 |
| 8 | 40 | 41 | 41 | 43 | 41 | 35 | 30 | 58 | 73 | 82 | 96 | 100 | 86 | 85 | 84 | 73 | 73 | 42 | 33 | 34 | 29 | 29 | 32 | 34 |
| 9 | 36 | 38 | 38 | 39 | 35 | 34 | 29 | 47 | 64 | 77 | 84 | 94 | 90 | 90 | 82 | 77 | 57 | 37 | 39 | 32 | 32 | 27 | 30 | F 30 |
| 10 | 36 | 36 | 38 | 38 | 36 | 30 | 26 | 47 | 61 | 73 | 90 | 98 | 83 | 71 | 85 | 78 | 60 | 37 | 33 | 29 | 26 | 29 | 30 | 33 |
| 11 | 34 | 35 | 36 | 34 | 34 | 34 | 29 | 51 | 73 | 80 | 97 | 80 | 83 | 91 | 81 | 80 | 67 | 43 | 41 | 36 | 34 | 29 | 31 | 32 |
| 12 | 33 | 34 | 35 | 36 | 41 | 41 | 23 | 48 | 74 | 77 | 86 | 104 | H 83 | 88 | 82 | 75 | 60 | 44 | 36 | 31 | 27 | 29 | F 33 | F 33 |
| 13 | 35 | 36 | 34 | F 36 | 38 | 35 | F 30 | 50 | 68 | 75 | 96 | 97 | 81 | 76 | 82 | 73 | 61 | 40 | 36 | 31 | 23 | 23 | 27 | 29 |
| 14 | 30 | F 30 | F 30 | F 32 | 36 | 36 | 22 | 43 | 64 | 81 | C | C | C | C | C | C | 56 | 40 | 28 | 30 | 30 | F 31 | F 30 | F 30 |
| 15 | 36 | 36 | 37 | 38 | 38 | 40 | 34 | 50 | 63 | 78 | 85 | 100 | 93 | 101 | 90 | 93 | 57 | 45 | 36 | 29 | 28 | 28 | 31 | 33 |
| 16 | 32 | 33 | 34 | 33 | 34 | 37 | 28 | 46 | 64 | 93 | 88 | 97 | 93 | 103 | 88 | 82 | 67 | 52 | 45 | 43 | 39 | 34 | 37 | 38 |
| 17 | 40 | 41 | 40 | 41 | 46 | 43 | 34 | 48 | 70 | 100 | 118 | 103 | 121 | 92 | 107 | 74 | 64 | 45 | 33 | 30 | 28 | 30 | 33 | 34 |
| 18 | 34 | 36 | 36 | 35 | 37 | 37 | 38 | 51 | 73 | 91 | 97 | 105 | 91 | I R 106 | 88 | 84 | 61 | 43 | 41 | 35 | 29 | 28 | 36 | 37 |
| 19 | 38 | 41 | 41 | F 41 | F 43 | 43 | 33 | 51 | 74 | 89 | 101 | 96 | 86 | 109 | 96 | 76 | 67 | 53 | 38 | 31 | I A 31 | 33 | 37 | 38 |
| 20 | F 35 | F 39 | 38 | 38 | 41 | 43 | 33 | 51 | 70 | 84 | 109 | 110 | 93 | 93 | 96 | 89 | 65 | 46 | 43 | 34 | 29 | 28 | 31 | I A 31 |
| 21 | 33 | 33 | 34 | 34 | 35 | 34 | 26 | 46 | 67 | R 93 | 109 | 113 | 96 | 93 | 86 | 93 | 63 | 55 | 43 | 34 | 28 | 31 | 32 | 35 |
| 22 | 35 | 36 | 36 | 38 | 40 | 45 | 26 | 49 | 64 | 77 | 103 | 108 | 92 | 86 | 88 | 81 | 57 | 52 | 40 | 40 | 34 | 33 | 40 | 43 |
| 23 | 43 | 43 | 44 | 41 | 43 | 40 | 35 | 50 | 77 | 88 | 103 | 109 | 94 | 93 | 100 | 93 | 60 | 64 | 41 | 34 | 30 | 31 | 32 | 35 |
| 24 | 34 | 35 | 35 | 37 | 36 | 35 | 31 | 55 | 76 | 98 | 102 | 98 | 116 | 100 | 93 | 98 | 63 | 63 | 44 | 36 | 31 | 28 | 30 | 30 |
| 25 | 32 | 33 | 34 | F 33 | F 33 | 37 | 37 | 51 | 73 | 93 | 84 | 95 | 89 | 90 | 97 | 100 | 73 | 61 | 46 | 39 | 33 | 31 | 33 | 33 |
| 26 | 35 | 34 | 36 | 38 | 38 | 38 | 42 | 56 | 70 | 97 | 103 | 104 | 100 | 94 | 95 | 78 | 80 | 58 | 43 | I A 40 | 38 | 40 | 40 | F 41 |
| 27 | F 40 | 43 | F | F | F 43 | F 44 | F 43 | 56 | 81 | 94 | 103 | 93 | 97 | 94 | 96 | 90 | 76 | 61 | 47 | 38 | 33 | F 30 | F 30 | F 33 |
| 28 | F 34 | 33 | F 33 | F | F | F 29 | A | S | 62 | 115 | 113 | 105 | 92 | 95 | 86 | 69 | 58 | 54 | 39 | A | A | A | A | F 31 |
| 29 | 34 | 34 | F 29 | F 30 | F 33 | 31 | 31 | 47 | 70 | 88 | 100 | 96 | 86 | 93 | 96 | 67 | 69 | 57 | 40 | 33 | 30 | 33 | 34 | 36 |
| 30 | 37 | 27 | 28 | 30 | 33 | 33 | 30 | 43 | 71 | 91 | 118 | 96 | 96 | 91 | 81 | 67 | 73 | 68 | 38 | 27 | 25 | 27 | 28 | 31 |
| 31 | 31 | 30 | 30 | 31 | 31 | 32 | 29 | 53 | 81 | 97 | 97 | 96 | 100 | 84 | 85 | 71 | 73 | 51 | 40 | 30 | 29 | 31 | 32 | 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 | 30 | 29 | 30 | 31 | 30 | 30 | 31 | 31 | 30 | 30 | 30 | 30 | 30 | 30 | 31 | 31 | 31 | 30 | 30 | 30 | 30 | 31 |
| MED | 35 | 36 | 36 | 36 | 38 | 37 | 31 | 51 | 73 | 90 | 102 | 102 | 94 | 93 | 88 | 82 | 64 | 52 | 40 | 34 | 30 | 29 | 32 | 33 |
| UQ | 36 | 38 | 38 | 38 | 41 | 40 | 34 | 55 | 76 | 94 | 109 | 108 | 97 | 97 | 96 | 90 | 73 | 58 | 43 | 38 | 32 | 31 | 34 | 36 |
| LQ | 34 | 34 | 34 | 34 | 35 | 34 | 28 | 48 | 68 | 80 | 96 | 96 | 89 | 88 | 85 | 74 | 60 | 44 | 37 | 31 | 28 | 28 | 30 | 32 |



DEC. 1969 | FOF2 (0.1 MHZ)

# IONOSPHERIC DATA

DEC. 1969 | FOF1 (0.01 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | 400 | | | | | | | | | | | |
| 3 | | | | | | | | | | | L | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | U L 400 | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | L | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | U L 440 | | L | | | | | | | | | | |
| 7 | | | | | | | | | | | | U L 400 | | L | | | | | | | | | | |
| 8 | | | | | | | | | | | | L | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | U L 400 | U L 400 | 360 | | | | | | | | | | |
| 11 | | | | | | | | | | | L | L | 380 | | L | | | | | | | | | |
| 12 | | | | | | | | | | | | L | U L 400 | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | C | C | C | C | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | L | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | 4 | 4 | 1 | | | | | | | | | | |
| MED | | | | | | | | | | | | U L 400 | 400 | 360 | | | | | | | | | | |
| UQ | | | | | | | | | | | | U L 420 | 400 | | | | | | | | | | | |
| LQ | | | | | | | | | | | | U L 400 | 390 | | | | | | | | | | | |

The Radio Research Laboratories, Japan

DEC. 1969 | FOF1 (0.01 MHZ)

# IONOSPHERIC DATA

DEC. 1969 | FOE (0.01 MHZ) | 135 E Mean Time (G. M. T.+ 9h)

Station WAKKANAI Lat. 45 23·6 N. Long. 141 41·1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | A | 230 | 285 | 300 | 305 | 305 | 290 | 255 | H 210 | S | | | | | | | |
| 2 | | | | | | | | 150 | 225 | 275 | 290 | 300 | 295 | 290 | 265 | I C 210 | C | | | | | | | |
| 3 | | | | | | | | 180 | 240 | 275 | 290 | 300 | 285 | 295 | I C 260 | 195 | S | | | | | | | |
| 4 | | | | | | | | 160 | 225 | 260 | 300 | 310 | 305 | 295 | 255 | 185 | S | | | | | | | |
| 5 | | | | | | | | 145 | 205 | 270 | 310 | 305 | 300 | 285 | 260 | 200 | S | | | | | | | |
| 6 | | | | | | | | 165 | 220 | 260 | I A 290 | 300 | 300 | 295 | 245 | 200 | E | | | | | | | |
| 7 | | | | | | | | S | 205 | 265 | 280 | 300 | 300 | 290 | 250 | 220 | E | | | | | | | |
| 8 | | | | | | | | A | A | 260 | 290 | 300 | 295 | 280 | 250 | A | A | | | | | | | |
| 9 | | | | | | | | 115 | 200 | 260 | 290 | 295 | 300 | 295 | 270 | 200 | S | | | | | | | |
| 10 | | | | | | | | E | 210 | I A 255 | I A 290 | 300 | 300 | A | A | 215 | E | | | | | | | |
| 11 | | | | | | | | S | 200 | 275 | 295 | 305 | 300 | 300 | 265 | 220 | E | | | | | | | |
| 12 | | | | | | | | 170 | 220 | 260 | 295 | 295 | 300 | 265 | 250 | 220 | A | | | | | | | |
| 13 | | | | | | | | S | 225 | I A 270 | 290 | 295 | 300 | 290 | 260 | 210 | A | | | | | | | |
| 14 | | | | | | | | S | 210 | 265 | C | C | C | C | C | C | S | | | | | | | |
| 15 | | | | | | | | S | A | 255 | 295 | 295 | 300 | 290 | 250 | S | S | | | | | | | |
| 16 | | | | | | | | E | 195 | 265 | 290 | A | A | A | 265 | A | A | | | | | | | |
| 17 | | | | | | | | A | A | 270 | 300 | 300 | 300 | 295 | 245 | S | A | | | | | | | |
| 18 | | | | | | | | S | 210 | 250 | 290 | 300 | 300 | 280 | 250 | A | S | | | | | | | |
| 19 | | | | | | | | A | 205 | 275 | A | A | A | A | A | A | A | | | | | | | |
| 20 | | | | | | | | A | A | A | 300 | 305 | 300 | 300 | 265 | 235 | S | | | | | | | |
| 21 | | | | | | | | S | A | A | 300 | I A 310 | A | A | A | A | S | | | | | | | |
| 22 | | | | | | | | S | 205 | 265 | 300 | 300 | 300 | 290 | A | A | S | | | | | | | |
| 23 | | | | | | | | E | 220 | 270 | 290 | 300 | 300 | 300 | 280 | 210 | S | | | | | | | |
| 24 | | | | | | | | A | 210 | 260 | 290 | 300 | 300 | 295 | 265 | 210 | S | | | | | | | |
| 25 | | | | | | | | S | A | A | 300 | 300 | 305 | 300 | A | A | A | | | | | | | |
| 26 | | | | | | | | S | A | 265 | 295 | 300 | 300 | 300 | 270 | 210 | A | | | | | | | |
| 27 | | | | | | | | A | A | 260 | 300 | 300 | 300 | 290 | A | A | A | | | | | | | |
| 28 | | | | | | | | A | A | 255 | 290 | 295 | 295 | A | A | A | S | | | | | | | |
| 29 | | | | | | | | A | 225 | 280 | 300 | A | A | A | A | A | A | | | | | | | |
| 30 | | | | | | | | A | 200 | 280 | 300 | 300 | 300 | 300 | 255 | 205 | S | | | | | | | |
| 31 | | | | | | | | A | A | A | 295 | 305 | 305 | 295 | 280 | 205 | 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 | 21 | 27 | 29 | 27 | 26 | 24 | 22 | 18 | 4 | | | | | | | |
| MED | | | | | | | | 148 | 210 | 265 | 295 | 300 | 300 | 295 | 260 | 210 | E | | | | | | | |
| UQ | | | | | | | | 165 | 225 | 272 | 300 | 302 | 300 | 298 | 265 | 215 | E | | | | | | | |
| LQ | | | | | | | | E | 205 | 260 | 290 | 300 | 300 | 290 | 250 | 200 | E | | | | | | | |

DEC. 1969 | FOE (0.01 MHZ)

# IONOSPHERIC DATA

DEC. 1969 | FOES (0.1 MHZ) | 135 E Mean Time (G. M. T.+ 9h)

Station WAKKANAI Lat. 45 23.6 N. Long. 141 41.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 23 | E | E | E | E | E | E | J X 30 | G | G 26 | G | G | G | G | G | J X 31 | E S 14 | E | E | E | J X 24 | E | E | E |
| 2 | E S 13 | E S 13 | E | 13 | 14 | E | E | G | G | G | J X 32 | G | G 20 | G 23 | G 20 | C | C | E | E | E | E | E | E | E |
| 3 | C | E S 12 | C | C | E | E | E S 12 | G | G 20 | G | G 27 | G | G | G | C | G | E S 16 | E | 25 | 24 | E S 11 | E S 16 | E S 16 | 25 |
| 4 | E S 16 | 20 | 20 | E | 20 | E S 16 | E S 15 | G | G | G 19 | M 31 | G 24 | G 25 | G 21 | J X 27 | G | E S 14 | E S 16 | E S 15 | E S 14 | E S 13 | 21 | E S 17 | J X 26 |
| 5 | 22 | E S 17 | E S 16 | E | E | E S 16 | E S 16 | G | 27 | G | G 24 | G | G 28 | G | G | G | E S 16 | E S 16 | E S 15 | E S 17 | E S 17 | E S 16 | E S 16 | 23 |
| 6 | E S 16 | 18 | E | E S 15 | E | E S 16 | 23 | G | G 24 | J X 33 | J X 43 | M 31 | G 19 | G 20 | G | G | 14 | J X 18 | E S 13 | E S 13 | E S 13 | 24 | E S 17 | E S 16 |
| 7 | E S 17 | E S 17 | E | 24 | E | E | E S 16 | E S 17 | 28 | 30 | 32 | J X 41 | 32 | G 26 | G | G | 15 | E | E | J X 24 | E | E | E S 14 | E |
| 8 | E | E | E | E | E | E | 21 | 20 | 25 | G | G | G | G | G 22 | G 23 | J X 31 | J X 28 | E | E | E S 16 | J X 35 | J X 21 | E | E S 15 |
| 9 | E | E S 16 | E S 15 | E | E | E S 15 | J X 20 | G | G | G | G | J X 45 | G | G 24 | 30 | G | E S 14 | E S 15 | E S 16 | E | E S 15 | E | E | E |
| 10 | E | E | E | E | E | E | E | 19 | 26 | J X 29 | 50 | J X 52 | M 34 | 28 | 25 | G 18 | J X 23 | E S 16 | J X 21 | E S 16 | 20 | E S 17 | E S 16 | E S 12 |
| 11 | E S 16 | 20 | E | 23 | E | E S 13 | E S 17 | E S 16 | G | G 27 | G 19 | G | G | G | G | 25 | J X 23 | 25 | E S 16 | E S 13 | E S 16 | E S 16 | E S 16 | E S 16 |
| 12 | E S 16 | E | E | E | 19 | E | E S 16 | G | 24 | G 24 | J X 61 | G | G 28 | G 24 | G 20 | 26 | J X 24 | J X 20 | 24 | E S 16 | 24 | E S 13 | E | E |
| 13 | E | E | E | E | E | E | E | E S 16 | G | 31 | G | G | G | G 21 | G | G | 15 | 16 | 20 | J X 30 | E S 16 | J X 23 | E | J X 24 |
| 14 | E | E | E | E | E | E | E S 15 | 20 | 29 | 41 | C | C | C | C | C | C | E S 15 | E S 12 | E S 14 | J X 35 | E S 13 | E | E | E |
| 15 | E | E | E | J X 25 | J X 30 | J X 33 | E | E S 15 | J X 43 | 33 | G | 33 | G | G | 36 | E S 22 | E S 15 | E | E | E | J X 20 | J X 30 | J X 50 | J X 23 |
| 16 | E | E | J X 26 | 18 | E | E | E S 15 | 17 | G | 31 | G | 35 | 33 | 35 | J X 64 | J X 60 | 20 | E S 16 | J X 43 | E S 12 | J X 24 | J X 23 | E | J X 30 |
| 17 | J X 21 | J X 23 | E | E | E | E | 19 | J X 33 | 30 | G | G | G | G | G | G | 21 | J X 23 | 20 | E | E | E S 16 | E S 15 | E | J X 25 |
| 18 | J X 23 | J X 23 | E | 17 | E | E | J X 20 | E S 15 | G | 34 | G | G | G | G | G | J X 30 | E S 16 | E S 15 | E S 13 | E S 15 | E S 13 | J X 21 | E S 17 | J X 23 |
| 19 | E | 22 | E | E | J X 40 | J X 30 | J X 28 | 18 | 27 | 28 | J X 71 | J X 60 | J X 51 | 33 | J X 58 | 31 | J X 30 | J X 23 | J X 53 | J X 40 | J X 60 | J X 31 | E S 15 | E S 16 |
| 20 | 20 | J X 23 | 19 | J X 31 | J X 28 | J X 33 | J X 21 | J X 30 | 50 | 34 | G | 35 | 34 | G | G | G | E S 15 | E S 13 | E | E S 14 | 20 | E S 17 | J X 40 | J X 61 |
| 21 | J X 26 | J X 23 | E S 16 | E | E | E | E | E S 14 | J X 31 | J X 35 | J X 64 | J X 33 | J X 41 | 30 | J X 43 | J X 33 | J X 33 | J X 28 | E S 16 | E S 15 | E S 14 | E S 15 | E | J X 20 |
| 22 | J X 21 | E | E | 20 | J X 21 | E | 20 | E S 15 | G | G | G | G | G | 35 | J X 32 | 23 | E S 15 | J X 25 | J X 31 | J X 33 | J X 27 | E S 17 | J X 21 | J X 23 |
| 23 | J X 23 | E | E | 20 | E | E | E | 18 | J X 28 | G | G | 37 | 33 | G | G | G | 19 | E S 15 | J X 31 | J X 40 | J X 25 | J X 24 | J X 20 | E S 15 |
| 24 | E | J X 23 | E | E | E | J X 35 | J X 33 | J X 24 | G 20 | G | G | G | 33 | 33 | G | G | J X 30 | J X 25 | J X 41 | J X 24 | 20 | 21 | 21 | J X 24 |
| 25 | E | J X 24 | J X 23 | J X 20 | J X 21 | E S 13 | E | E S 15 | J X 33 | J X 34 | J X 43 | 33 | G 25 | G 25 | J X 33 | J X 30 | J X 40 | J X 33 | J X 24 | J X 28 | 20 | 21 | J X 25 | J X 25 |
| 26 | J X 25 | E S 15 | E S 12 | E | E | E | E | E S 13 | J X 33 | 33 | 41 | 32 | G | G | 43 | J X 50 | J X 41 | J X 73 | J X 53 | J X 70 | J X 51 | 16 | J X 25 | J X 23 |
| 27 | J X 30 | J X 28 | E | E | J X 29 | J X 53 | J X 53 | J X 33 | 22 | G | G | G | G | G | 34 | J X 31 | 26 | J X 30 | J X 24 | J X 24 | E S 15 | J X 20 | J X 25 | E S 16 |
| 28 | E | E | E | 15 | J X 23 | 18 | J X 76 | J X 34 | 21 | 30 | G | G | G | J X 53 | 34 | 24 | J X 68 | 61 | J X 54 | J X 104 | J X 53 | J X 70 | J X 44 | J X 51 |
| 29 | J X 40 | J X 30 | J X 24 | 21 | 19 | J X 40 | 18 | J X 23 | G | G | 30 | J X 55 | J X 58 | J X 63 | J X 58 | J X 50 | J X 23 | E S 14 | J X 54 | J X 43 | J X 53 | J X 51 | J X 43 | J X 33 |
| 30 | J X 23 | J X 30 | J X 31 | J X 24 | E | E | E | 20 | 23 | G | 33 | G 28 | G 23 | G | G | G | G | 20 | J X 24 | J X 24 | J X 24 | J X 30 | J X 25 | E S 15 |
| 31 | J X 21 | 18 | E | E | E | E | J X 29 | J X 25 | J X 63 | J X 45 | G 25 | G 30 | G 29 | G | G | G | J X 26 | J X 43 | J X 35 | J X 24 | E S 14 | J X 21 | J X 21 | E |
| | 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 | 31 | 30 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 30 | 30 | 30 | 29 | 29 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| MED | E E 16 | 17 | E | E | E | E | E E 16 | 17 | 24 | G 27 | G 22 | G 26 | G 22 | G 21 | G 20 | 22 | 20 | 16 | 20 | 17 | 20 | 20 | E E 16 | 20 |
| UQ | J X 23 | J X 23 | 16 | 20 | 20 | 16 | 20 | 22 | 28 | 33 | 33 | 35 | 33 | 28 | 34 | J X 31 | J X 26 | J X 25 | J X 31 | J X 29 | J X 24 | J X 23 | J X 23 | J X 24 |
| LQ | E | E | E | E | E | E | E | E S 14 | G | G | G | G | G | G | G | G | E S 15 | E S 14 | E S 13 | E S 14 | E S 14 | E S 16 | E | E S 14 |

The Radio Research Laboratories, Japan

DEC. 1969 | FOES (0.1 MHZ)

# IONOSPHERIC DATA

DEC. 1969 | FBES (0.1 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | E | E | E | E | E | E | E | 17 | G | G 23 | G | G | G | G | G | 15 | E S 14 | E | E | E | E | E | E | E |
| 2 | E S 13 | E S 13 | E | E | E | E | E | G | G | G | 22 | G | G 18 | G 17 | G 15 | C | C | E | E | E | E | E | E | E |
| 3 | C | E S 12 | C | C | E | E | E S 12 | G | G 20 | G | G 26 | G | G | G | C | G | E S 16 | E | E | E | E S 11 | E S 16 | E S 16 | E |
| 4 | E S 16 | E | E | E | E | E S 16 | E S 16 | G | G | G 19 | 24 | G 22 | G 22 | G 20 | 22 | G | E S 14 | E S 16 | E S 15 | E S 14 | E S 13 | E | E S 17 | E |
| 5 | E | E S 17 | E S 16 | E | E | E S 16 | E S 16 | G | G | G | G 19 | G | G 22 | G | G | G | E S 16 | E S 16 | E S 15 | E S 17 | E S 17 | E S 16 | E S 16 | E |
| 6 | E S 16 | E | E | E S 15 | E | E S 16 | E | G | G 20 | 24 | 35 | 22 | G 19 | G 18 | G | G | 13 | 15 | E S 13 | E S 13 | E S 13 | E | E S 17 | E S 16 |
| 7 | E S 17 | E S 17 | E | E | E | E | E S 16 | E S 17 | G | G 22 | G | 25 | G 21 | G 25 | G | G | G | E | E | E | E | E | E S 14 | E |
| 8 | E | E | E | E | E | E | E | 17 | 25 | G | G | G | G | G 20 | G 20 | 22 | 15 | E | E | E S 16 | 20 | 16 | E | E S 15 |
| 9 | E | E S 16 | E S 15 | E | E | E S 15 | E | G | G | G | G | G | G | G 20 | 24 | G | E S 14 | E S 15 | E S 16 | E | E S 15 | E | E | E |
| 10 | E | E | E | E | E | E | E | G | G | 29 | 30 | 27 | 24 | 22 | 20 | G 18 | 19 | E S 16 | E | E S 16 | E | E S 17 | E S 16 | E S 12 |
| 11 | E S 16 | E | E | E | E | E S 13 | E S 17 | E S 16 | G | G 20 | G 19 | G | G | G | G | 18 | 16 | E | E S 16 | E S 13 | E S 16 | E S 16 | E S 16 | E S 16 |
| 12 | E S 16 | E | E | E | E | E | E S 16 | G | G | G 20 | 17 | G | G 27 | G 22 | G 20 | 19 | 22 | 16 | E | E S 16 | E | E S 13 | E | E |
| 13 | E | E | E | E | E | E | E | E S 16 | G | 26 | G | G | G | G 20 | G | G | 15 | 14 | 12 | E | E S 16 | E | E | E |
| 14 | E | E | E | E | E | E | E S 15 | 18 | G | 20 | C | C | C | C | C | C | E S 15 | E S 12 | E S 14 | 16 | E S 13 | E | E | E |
| 15 | E | E | E | E | 17 | 20 | E | E S 15 | 22 | G | G | G | G | G | G | E S 22 | E S 15 | E | E | E | 12 | 16 | 18 | 17 |
| 16 | E | E | 15 | E | E | E | E S 15 | G | G | G | G | 30 | 30 | 30 | 20 | 23 | 16 | E S 16 | 25 | E S 12 | E | 18 | E | E |
| 17 | E | 15 | E | E | E | E | E | 15 | 24 | G | G | G | G | G | G | G | 17 | E | E | E | E S 16 | E S 15 | E | 17 |
| 18 | 19 | E | E | E | E | E | E | E S 15 | G | G | G | G | G | G | G | 23 | E S 16 | E S 15 | E S 13 | E S 15 | E S 13 | 17 | E S 17 | 16 |
| 19 | E | E | E | E | 23 | 25 | 16 | 14 | G | 27 | 68 | 37 | 58 | 32 | 47 | 27 | 26 | 17 | 26 | 27 | A | 15 | E S 13 | E S 16 |
| 20 | E | 15 | 13 | 18 | 17 | 20 | 16 | 24 | 38 | 30 | G | G | 28 | G | G | G | E S 15 | E S 13 | E | E S 14 | E | E S 17 | 20 | A |
| 21 | 15 | 13 | E S 16 | E | E | E | E | E S 14 | 23 | 28 | 28 | 31 | 33 | 30 | 27 | 23 | 18 | E | E S 16 | E S 15 | E S 14 | E S 15 | E | E |
| 22 | E | E | E | 17 | 16 | E | E | E S 15 | G | G | G | G | G | G | 28 | 22 | E S 15 | E | 19 | 20 | 20 | E S 17 | 17 | E |
| 23 | E | E | E | 17 | E | E | E | G | 16 | G | G | G | G | G | G | G | G | E S 15 | 20 | 20 | 15 | 17 | E | E S 15 |
| 24 | E | E | E | E | E | 28 | 17 | 17 | G 17 | G | G | G | G | G | G | G | G | 17 | 20 | 16 | 16 | 15 | 12 | 17 |
| 25 | E | E | E | E | E | E S 13 | E | E S 15 | 23 | 29 | 26 | 25 | G 23 | G 22 | 27 | 23 | 20 | 18 | 18 | 23 | 18 | E | 17 | E |
| 26 | 17 | E S 15 | E S 12 | E | E | E | E | E S 13 | 27 | 22 | 22 | 21 | G | G | G | G | 18 | 50 | 17 | A | 17 | E | 16 | E |
| 27 | E | 20 | E | E | 15 | 17 | 17 | 17 | 22 | G | G | G | G | G | 28 | 22 | 17 | 13 | E | E | E S 15 | 19 | 22 | E S 16 |
| 28 | E | E | E | E | 15 | 15 | A | 32 | 20 | G | G | G | G | 36 | 32 | 23 | 19 | 21 | 23 | A | A | A | A | 20 |
| 29 | 24 | 18 | 16 | E | 14 | 21 | 14 | 16 | G | G | 24 | 36 | 40 | 30 | 37 | 34 | 19 | E S 14 | 17 | 17 | 20 | 29 | 29 | 20 |
| 30 | 16 | 17 | 19 | 18 | E | E | E | 16 | 16 | G | 24 | G 23 | G 21 | G | G | G | G | 16 | 16 | 17 | 17 | 12 | 17 | E S 15 |
| 31 | 20 | 12 | E | E | E | E | 16 | 23 | 32 | 30 | G 23 | G 25 | G 27 | G | G | G | 25 | 30 | 17 | 16 | E S 14 | 19 | 16 | E |
| | 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 | 31 | 30 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 30 | 30 | 30 | 29 | 29 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| MED | E | E | E | E | E | E | E | E G 15 | G | G | E G 17 | G | E G 18 | E G 17 | G | E G 15 | 16 | E E 15 | E E 15 | E E 15 | E E 15 | E E 15 | E E 16 | E |
| UQ | E E 16 | E E 15 | E E 12 | E | E | 16 | E S 16 | 17 | 22 | 24 | 24 | 25 | G 24 | G 22 | 24 | 22 | 18 | 16 | 17 | 17 | 17 | 17 | 17 | 16 |
| LQ | E | E | E | E | E | E | E | G | G | G | G | G | G | G | G | G | E S 14 | E | E | E | E S 12 | E | E | E |

The Radio Research Laboratories, Japan

DEC. 1969 | FBES (0.1 MHZ)

# IONOSPHERIC DATA

DEC. 1969 | F-MIN (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

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



DEC. 1969 | F-MIN (0.1 MHZ)

# IONOSPHERIC DATA

DEC. 1969 | M(3000)F2 (0.01) | 135 E Mean Time (G. M. T.+ 9h)

Station WAKKANAI Lat. 45 23.6 N, Long. 141 41.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 270 | 270 | 250 | 245 | 260 | 300 | 325 | 320 | 335 | 330 | 320 | 315 | 335 | 320 | 330 | 330 | 310 | 325 | 305 | 325 | 345 | 290 | 260 | 275 |
| 2 | 260 | 270 | 265 | 260F | 280F | 315 | 295 | 325 | 355 | 345 | 330 | 335 | 320 | 335 | 330 | 345IC | 325IC | 320 | 300 | 325 | 320 | 295 | 265 | 270 |
| 3 | 265IC | 265 | 275IC | 270IC | 270 | 305 | 340S | 340 | 370 | 345 | 335 | 330 | 340 | 310 | 320IC | 335 | 335 | 345 | 305 | 310 | 310 | 285F | 270UF | 250F |
| 4 | 265 | 265 | 280 | 285 | 290 | 315 | 305 | 330 | 365 | 350 | 345 | 320 | 330 | 325 | 330 | 335 | 325 | 330 | 330 | 350 | 290 | 255 | 260US | 265US |
| 5 | 265 | 285US | 265 | 280 | 300 | 315 | 305 | 330 | 335 | 320 | 330 | 325 | 325 | 320 | 340 | 325 | 315 | 305 | 315 | 320 | 335 | 265 | 255 | 250 |
| 6 | 275 | 275 | 290 | 265 | 255 | 275US | 295 | 330 | 285H | 320 | 335 | 320 | 325 | 310 | 330 | 315 | 325 | 315 | 320 | 315 | 280 | 255S | 265 | 290US |
| 7 | 265US | 275 | 255F | 295F | 305US | 345 | 295 | 330 | 285 | 315 | 340 | 330 | 330 | 330 | 330 | 340 | 340 | 305 | 310 | 345 | 300 | 285 | 250 | 250F |
| 8 | 285 | 295 | 285 | 300 | 315 | 315 | 290 | 330 | 355 | 335 | 355 | 360 | 330 | 330 | 355 | 355 | 355 | 340 | 295 | 310 | 320 | 285 | 280 | 265 |
| 9 | 285 | 265 | 280 | 305 | 290 | 310 | 310 | 340 | 345 | 350 | 325 | 340 | 330 | 335 | 335 | 350 | 335 | 325 | 330 | 295 | 290 | 335 | 290 | 235F |
| 10 | 280 | 280 | 285 | 315 | 305 | 285 | 310 | 315 | 350 | 320 | 310 | 345 | 350 | 350 | 340 | 345 | 335 | 330 | 325 | 345 | 310 | 280 | 300 | 275 |
| 11 | 275 | 285 | 290 | 275 | 290 | 310 | 315 | 315 | 340 | 340 | 350 | 340 | 335 | 350 | 325 | 340 | 325 | 300 | 300 | 305 | 325 | 290 | 270 | 280 |
| 12 | 275 | 260 | 265 | 280 | 325 | 340 | 305 | 330 | 340 | 345 | 315 | 340 | 315H | 305 | 330 | 360 | 335 | 305 | 340 | 305 | 310 | 270 | 275F | 275F |
| 13 | 270 | 265 | 265 | 265F | 290 | 315 | 300F | 330 | 355 | 350 | 295 | 365 | 330 | 350 | 340 | 355 | 320 | 345 | 335 | 325 | 310 | 260 | 265 | 270 |
| 14 | 275 | 260F | 265F | 280F | 300 | 360 | 320 | 325 | 350 | 335 | C | C | C | C | C | C | 355 | 280 | 355 | 305 | 300 | 270F | 280F | 265F |
| 15 | 280 | 265 | 275 | 285 | 290 | 325 | 340 | 340 | 345 | 345 | 330 | 350 | 335 | 345 | 290 | 335 | 345 | 335 | 335 | 320 | 320 | 280 | 260 | 275 |
| 16 | 275 | 275 | 275 | 275 | 275 | 330 | 320 | 350 | 355 | 325 | 330 | 330 | 325 | 330 | 315 | 355 | 350 | 315 | 310 | 325 | 325 | 295 | 305 | 285 |
| 17 | 270 | 270 | 260 | 270 | 280 | 325 | 355 | 315 | 310 | 325 | 340 | 355 | 345 | 330 | 355 | 345 | 315 | 340 | 320 | 325 | 300 | 275 | 275 | 290 |
| 18 | 275 | 280 | 270 | 265 | 270 | 295 | 315 | 325 | 350 | 350 | 330 | 345 | 340 | IR330 | 345 | 350 | 365 | 325 | 340 | 350 | 340 | 285 | 280 | 290 |
| 19 | 280 | 280 | 270 | 285F | 285F | 325 | 335 | 315 | 350 | 300 | 340 | 355 | 335 | 325 | 335 | 355 | 350 | 320 | 350 | 330 | IA295 | 275 | 270 | 280 |
| 20 | 290F | 265F | 265 | 285 | 285 | 305 | 320 | 320 | 335 | 320 | 340 | 335 | 330 | 300 | 320 | 340 | 340 | 325 | 315 | 330 | 310 | 295 | 275 | IA270 |
| 21 | 260 | 260 | 275 | 295 | 310 | 325 | 345 | 325 | 320 | 345R | 335 | 345 | 335 | 320 | 320 | 345 | 335 | 325 | 305 | 340 | 270 | 265 | 265 | 270 |
| 22 | 265 | 265 | 265 | 275 | 280 | 320 | 275 | 325 | 345 | 320 | 330 | 335 | 325 | 305 | 340 | 320 | 335 | 290 | 295 | 310 | 295 | 280 | 270 | 255 |
| 23 | 270 | 270 | 290 | 290 | 280 | 300 | 335 | 325 | 345 | 335 | 320 | 350 | 320 | 345 | 320 | 340 | 320 | 335 | 325 | 290 | 315 | 260 | 265 | 265 |
| 24 | 265 | 260 | 275 | 270 | 265 | 275 | 290 | 315 | 330 | 345 | 335 | 355 | 335 | 320 | 315 | 310 | 295 | 315 | 310 | 315 | 310 | 270 | 265 | 265 |
| 25 | 260 | 290 | 295 | 275F | 280F | 290 | 295 | 315 | 340 | 355 | 330 | 340 | 335 | 310 | 330 | 340 | 330 | 330 | 310 | 310 | 305 | 275 | 290 | 265 |
| 26 | 275 | 270 | 260 | 270 | 270 | 270 | 310 | 340 | 355 | 350 | 330 | 345 | 340 | 340 | 280 | 345 | 325 | 375 | 300 | IA320 | 295 | 270 | 290 | 275F |
| 27 | 275F | 270 | F | F | 300F | 280F | 305F | 320 | 335 | 360 | 320 | 330 | 330 | 320 | 325 | 320 | 320 | 310 | 310 | 315 | 295 | 290F | 300F | 275F |
| 28 | 270F | 290 | 280F | F | F | 275F | A | S | 295 | 350 | 350 | 345 | 340 | 340 | 335 | 335 | 310 | 320 | 335 | A | A | A | A | 285F |
| 29 | 290 | 295 | 275F | 255F | 275F | 295 | 315 | 340 | 360 | 340 | 355 | 365 | 340 | 325 | 345 | 325 | 340 | 335 | 325 | 305 | 280 | 265 | 265 | 290 |
| 30 | 330 | 265 | 260 | 265 | 275 | 305 | 335 | 310 | 340 | 330 | 350 | 355 | 355 | 310 | 335 | 345 | 335 | 350 | 340 | 325 | 295 | 275 | 265 | 280 |
| 31 | 290 | 265 | 275 | 270 | 290 | 290 | 310 | 320 | 335 | 355 | 350 | 360 | 345 | 335 | 355 | 350 | 340 | 320 | 350 | 340 | 275 | 270 | 275 | 275 |
| | 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 | 30 | 29 | 30 | 31 | 30 | 30 | 31 | 31 | 30 | 30 | 30 | 30 | 30 | 30 | 31 | 31 | 31 | 30 | 30 | 30 | 30 | 31 |
| MED | 275 | 270 | 275 | 275 | 285 | 310 | 310 | 325 | 345 | 340 | 332 | 342 | 335 | 328 | 330 | 340 | 335 | 325 | 320 | 320 | 308 | 275 | 270 | 275 |
| UQ | 280 | 280 | 280 | 285 | 300 | 322 | 325 | 330 | 352 | 350 | 340 | 355 | 340 | 335 | 340 | 350 | 340 | 335 | 335 | 330 | 320 | 285 | 280 | 280 |
| LQ | 265 | 265 | 265 | 270 | 275 | 292 | 300 | 320 | 335 | 325 | 330 | 330 | 330 | 320 | 320 | 335 | 322 | 315 | 308 | 310 | 295 | 270 | 265 | 265 |



DEC. 1969 | M(3000)F2 (0.01)

# IONOSPHERIC DATA

DEC. 1969 | M(3000)F1 (0.01) | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | L 420 | | | | | | | | | | | |
| 3 | | | | | | | | | | | L | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | U L 410 | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | L | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | U L 410 | L | | | | | | | | | | | |
| 7 | | | | | | | | | | | | U L 425 | L | | | | | | | | | | | |
| 8 | | | | | | | | | | | | L | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | U L 410 | U L 415 | 380 | | | | | | | | | | |
| 11 | | | | | | | | | | | L | L | 435 | L | | | | | | | | | | |
| 12 | | | | | | | | | | | | L | U L 400 | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | C | C | C | C | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | L | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | | | | | |
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| 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 | | | | | | | | | | | | 4 | 4 | 1 | | | | | | | | | | |
| MED | | | | | | | | | | | | U L 410 | L 418 | 380 | | | | | | | | | | |
| UQ | | | | | | | | | | | | U L 418 | 428 | | | | | | | | | | | |
| LQ | | | | | | | | | | | | U L 410 | U L 408 | | | | | | | | | | | |

The Radio Research Laboratories, Japan

DEC. 1969 | M(3000)F1 (0.01)

# IONOSPHERIC DATA

DEC. 1969 | H'F2 (KM) | 135° E Mean Time (G. M. T.+ 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | 215 | | | | | | | | | | | |
| 3 | | | | | | | | | | | 255 | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | 230 | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | 235 | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | 230 | 230 | | | | | | | | | | | |
| 7 | | | | | | | | | | | | 220 | 220 | | | | | | | | | | | |
| 8 | | | | | | | | | | | | 240 | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | 235 | 220 | 225 | | | | | | | | | | |
| 11 | | | | | | | | | | | 250 | 220 | 240 | 245 | | | | | | | | | | |
| 12 | | | | | | | | | | | | 240 | 220 | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | C | C | C | C | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | 225 | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | | | | | | |
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| 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 | | | | | | | | | | | 2 | 8 | 6 | 3 | | | | | | | | | | |
| MED | | | | | | | | | | | 252 | 232 | 220 | 225 | | | | | | | | | | |
| UQ | | | | | | | | | | | | 238 | 230 | 235 | | | | | | | | | | |
| LQ | | | | | | | | | | | | 225 | 220 | 225 | | | | | | | | | | |

The Radio Research Laboratories, Japan

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 300 | 300 | 330 | 320 | 305 | 240 | 220 | 210 | 215 | 220 | 235 | 230 | 220 | 220 | 240 | 210 | 210 | 210 | 220 | 230 | 225 | 300 | 320 | 300 |
| 2 | 325 | 310 | 310 | 300 | 265 | 225 | 240 | 225 | 210 | 220 | 215 | 230 | 210 | 235 | 225 | I C 225 | I C 210 | 205 | 250 | 225 | 235 | 260 | 305 | 310 |
| 3 | I C 320 | 325 | I C 310 | I C 295 | 285 | 255 | 205 | 220 | 205 | 220 | 215 | 235 | 220 | 220 | I C 240 | 225 | 205 | 205 | 240 | 260 | 250 | 290 | 350 | 340 |
| 4 | 310 | 310 | 300 | 270 | 255 | 250 | 215 | 220 | 215 | 230 | 225 | 205 | 215 | 235 | 230 | 220 | 200 | 230 | 230 | 225 | 255 | 355 | 350 | 330 |
| 5 | 320 | 300 | 310 | 285 | 250 | 245 | 250 | 215 | 215 | 230 | 235 | 225 | 230 | 230 | 220 | 215 | 205 | 205 | 240 | 235 | 235 | 355 | 385 | 355 |
| 6 | 335 | 305 | 255 | 310 | 335 | 290 | 265 | 230 | 205 | 215 | 245 | 220 | 215 | 235 | 225 | 225 | 215 | 200 | 220 | 220 | 260 | 310 | 315 | 290 |
| 7 | 325 | 305 | 300 | 250 | 235 | 205 | 290 | 220 | 215 | 220 | 235 | 210 | 220 | 220 | H 220 | 220 | 210 | 200 | 215 | 230 | 250 | 300 | 325 | 320 |
| 8 | 300 | 275 | 255 | 250 | 220 | 225 | 250 | 225 | 210 | 220 | 210 | 240 | 220 | 225 | 225 | 215 | 220 | 200 | 250 | 240 | 285 | 290 | 300 | 325 |
| 9 | 300 | 305 | 300 | 250 | 255 | 235 | 235 | 220 | 215 | 220 | 225 | 225 | 235 | 225 | 225 | 215 | 205 | 260 | 235 | 240 | 260 | 235 | 310 | 365 |
| 10 | 275 | 300 | 275 | 250 | 250 | 215 | 250 | 210 | 210 | 215 | 220 | 235 | 220 | 215 | 240 | 225 | 205 | 205 | 220 | 215 | 260 | 310 | 295 | 315 |
| 11 | 315 | 305 | 285 | 275 | 280 | 220 | 245 | 220 | 215 | 230 | 235 | 215 | 215 | 230 | 230 | 225 | 220 | 225 | 255 | 230 | 250 | 275 | 335 | 300 |
| 12 | 305 | 310 | 330 | 270 | 235 | 205 | A | 235 | 220 | 230 | 225 | 240 | 215 | 240 | 235 | 220 | 220 | 220 | 225 | 245 | 250 | 310 | 305 | 325 |
| 13 | 315 | 300 | 300 | 295 | 265 | 225 | 250 | 225 | 205 | 210 | 200 | 220 | 225 | 220 | 235 | 220 | 225 | 205 | 215 | 225 | 275 | 350 | 350 | 325 |
| 14 | 310 | 325 | 325 | 290 | 260 | 195 | 250 | 215 | 210 | 235 | C | C | C | C | C | C | 205 | 200 | 210 | 260 | 250 | 290 | 350 | 340 |
| 15 | 295 | 300 | 300 | 275 | 275 | 230 | 215 | 215 | 200 | 225 | 225 | 240 | 225 | 245 | 225 | 210 | 210 | 210 | 230 | 235 | 245 | 320 | 340 | 325 |
| 16 | 300 | 310 | 315 | 300 | 290 | 220 | 250 | 210 | 200 | 220 | 220 | 235 | 220 | 230 | 225 | 215 | 215 | 230 | 275 | 245 | 250 | 270 | 265 | 280 |
| 17 | 290 | 315 | 325 | 300 | 270 | 200 | 210 | 240 | 215 | 225 | 245 | 235 | 225 | 225 | 240 | 210 | 220 | 200 | 240 | 240 | 270 | 340 | 305 | 315 |
| 18 | 325 | 290 | 300 | 300 | 295 | 250 | 240 | 240 | 210 | 220 | 225 | 230 | 225 | 210 | 220 | 240 | 200 | 240 | 225 | 225 | 240 | 300 | 290 | 305 |
| 19 | 305 | 295 | 310 | 270 | 305 | 245 | 220 | 215 | 220 | 220 | I A 235 | 235 | I A 230 | 260 | A 250 | 215 | 250 | 215 | 230 | A 290 | I A 310 | 310 | 310 | 280 |
| 20 | 290 | 315 | 325 | 305 | 300 | 250 | 220 | 225 | A 215 | 220 | 245 | 225 | 220 | 205 | 225 | 220 | 215 | 215 | 235 | 230 | 270 | 290 | 350 | I A 340 |
| 21 | 340 | 340 | 305 | 250 | 250 | 220 | 220 | 220 | 205 | 220 | 225 | 230 | 230 | 205 | 225 | 215 | 215 | 220 | 210 | 225 | 310 | 315 | 300 | 300 |
| 22 | 305 | 305 | 300 | 300 | 290 | 225 | 240 | 220 | 210 | 210 | 240 | 240 | 225 | 225 | 235 | 225 | 200 | 245 | 250 | 250 | 250 | 275 | 315 | 350 |
| 23 | 300 | 300 | 270 | 260 | 275 | 225 | 225 | 225 | 210 | 220 | 225 | 235 | 225 | 230 | 250 | 225 | 215 | 225 | 220 | 295 | 250 | 345 | 325 | 325 |
| 24 | 320 | 325 | 300 | 300 | 300 | I A 290 | 260 | 220 | 215 | 240 | 225 | 225 | 225 | 240 | 230 | 210 | 210 | 225 | 250 | 250 | 265 | 300 | 310 | 340 |
| 25 | 300 | 270 | 260 | 290 | 310 | 285 | 250 | 210 | 210 | 215 | 220 | 225 | 225 | 230 | 240 | 235 | 210 | 230 | 250 | 270 | 265 | 300 | 290 | 345 |
| 26 | 325 | 315 | 340 | 300 | 300 | 280 | 250 | 210 | 215 | 230 | 230 | 225 | 225 | 240 | 230 | 210 | 260 | I A 210 | 265 | I A 250 | 280 | 275 | 275 | 275 |
| 27 | 320 | 300 | 325 | 355 | 300 | 250 | 260 | 240 | 210 | 225 | 205 | 225 | 240 | 230 | 235 | 225 | 210 | 215 | 210 | 250 | 260 | 305 | 335 | 280 |
| 28 | 290 | 260 | 260 | 250 | 300 | 305 | A | A | 220 | 245 | 235 | 220 | 225 | 240 | 220 | 210 | 205 | 245 | 245 | A | A | A | A | 360 |
| 29 | 325 | 260 | 285 | 345 | 320 | 300 | 250 | 225 | 210 | 220 | 225 | 220 | 230 | 240 | 235 | 215 | 220 | 230 | 235 | 250 | 340 | 350 | 345 | 300 |
| 30 | 250 | 315 | 350 | 360 | 290 | 225 | 220 | 215 | 215 | 225 | 235 | 225 | 210 | 220 | 225 | 210 | 240 | 215 | 210 | 265 | 290 | 300 | 360 | 315 |
| 31 | 300 | 300 | 300 | 280 | 290 | 250 | 260 | 230 | 200 | 230 | 215 | 220 | 225 | 225 | 240 | 215 | 240 | 260 | 230 | 220 | 285 | 330 | 300 | 300 |
| | 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 | 29 | 30 | 31 | 31 | 30 | 30 | 30 | 30 | 30 | 30 | 31 | 31 | 31 | 30 | 30 | 30 | 30 | 31 |
| MED | 305 | 305 | 300 | 290 | 285 | 235 | 245 | 220 | 210 | 220 | 225 | 225 | 225 | 230 | 230 | 218 | 210 | 215 | 230 | 240 | 260 | 300 | 315 | 320 |
| UQ | 320 | 312 | 320 | 300 | 300 | 250 | 250 | 225 | 215 | 230 | 235 | 235 | 225 | 235 | 240 | 225 | 220 | 230 | 248 | 250 | 275 | 320 | 345 | 340 |
| LQ | 300 | 300 | 292 | 270 | 258 | 222 | 220 | 215 | 210 | 220 | 220 | 220 | 220 | 220 | 225 | 215 | 205 | 205 | 220 | 225 | 250 | 290 | 300 | 300 |



DEC. 1969 | H'F (KM)

# IONOSPHERIC DATA

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Station WAKKANAI Lat. 45 23.6 N. Long. 141 41.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 100 | E | E | E | E | E | E | 110 | G | 110 | G | G | G | G | G | 100 | S | E | E | E | 110 | E | E | E |
| 2 | S | S | E | 105 | 100 | E | E | G | G | G | 105 | G | 100 | 100 | 100 | C | C | E | E | E | E | E | E | E |
| 3 | C | S | C | C | E | E | S | G | 110 | G | 105 | G | G | G | C | G | S | E | 100 | 100 | S | S | S | 115 |
| 4 | S | 100 | 100 | E | 100 | S | S | G | G | 110 | 105 | 105 | 105 | 100 | 100 | G | S | S | S | S | S | 120 | S | 110 |
| 5 | 100 | S | S | E | E | S | S | G | 135 | G | 105 | G | 100 | G | G | G | S | S | S | S | S | S | S | 105 |
| 6 | S | 100 | E | S | E | S | 100 | G | 110 | 105 | 105 | 105 | 105 | 105 | G | G | 100 | 100 | S | S | S | 100 | S | S |
| 7 | S | S | E | 100 | E | E | S | S | 130 | 170 | 150 | 105 | 130 | 110 | G | G | 115 | E | E | 115 | E | E | S | E |
| 8 | E | E | E | E | E | E | 110 | 110 | 110 | G | G | G | G | 100 | 100 | 100 | 100 | E | E | S | 105 | 100 | E | S |
| 9 | E | S | S | E | E | S | 105 | G | G | G | G | 115 | G | 105 | 105 | G | S | S | S | E | S | E | E | E |
| 10 | E | E | E | E | E | E | E | 135 | 145 | 115 | 135 | 110 | 115 | 120 | 120 | 115 | 100 | S | 100 | S | 100 | S | S | S |
| 11 | S | 105 | E | 100 | E | S | S | S | G | 105 | 105 | G | G | G | G | 100 | 100 | 100 | S | S | S | S | S | S |
| 12 | S | E | E | E | 115 | E | S | G | 160 | 110 | 105 | G | 110 | 105 | 110 | 105 | 100 | 100 | 100 | S | 100 | S | E | E |
| 13 | E | E | E | E | E | E | E | S | G | 110 | G | G | G | 100 | G | G | 100 | 100 | 100 | 105 | S | 100 | E | 110 |
| 14 | E | E | E | E | E | E | S | 150 | 150 | 110 | C | C | C | C | C | C | S | S | S | 110 | S | E | E | E |
| 15 | E | E | E | 110 | 110 | 110 | E | S | 105 | 160 | G | 165 | G | G | 120 | S | S | E | E | E | 115 | 110 | 110 | 110 |
| 16 | E | E | 105 | 105 | E | E | S | 150 | G | 135 | G | 110 | 110 | 110 | 110 | 100 | 110 | S | 110 | S | 110 | 110 | E | 110 |
| 17 | 110 | 100 | E | E | E | E | 130 | 110 | 110 | G | G | G | G | G | G | 145 | 115 | 115 | E | E | S | S | E | 110 |
| 18 | 110 | 110 | E | 105 | E | E | 110 | S | G | 115 | G | G | G | G | G | 100 | S | S | S | S | S | 100 | S | 100 |
| 19 | E | 100 | E | E | 105 | 105 | 105 | 105 | 150 | 115 | 110 | 110 | 110 | 110 | 110 | 110 | 105 | 105 | 100 | 100 | 100 | 110 | S | S |
| 20 | 105 | 100 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 | G | 145 | 110 | G | G | G | S | S | E | S | 100 | S | 105 | 105 |
| 21 | 105 | 105 | S | E | E | E | E | S | 105 | 105 | 100 | 100 | 100 | 100 | 100 | 100 | 110 | 110 | S | S | S | S | E | 100 |
| 22 | 100 | E | E | 110 | 110 | E | 110 | S | G | G | G | G | G | 115 | 110 | 115 | S | 110 | 105 | 100 | 100 | S | 100 | 100 |
| 23 | 100 | E | E | 110 | E | E | E | 160 | 105 | G | G | 125 | 105 | G | G | G | 190 | S | 110 | 100 | 105 | 100 | 100 | S |
| 24 | E | 100 | E | E | E | 105 | 105 | 100 | 100 | G | G | G | 145 | 125 | G | G | 120 | 110 | 110 | 105 | 105 | 105 | 105 | 100 |
| 25 | E | 105 | 100 | 100 | 100 | S | E | S | 105 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 110 | 100 | 100 |
| 26 | 100 | S | S | E | E | E | E | S | 110 | 100 | 100 | 100 | G | G | 145 | 125 | 110 | 110 | 110 | 105 | 105 | 105 | 100 | 100 |
| 27 | 100 | 100 | E | E | 105 | 100 | 100 | 100 | 100 | G | G | G | G | G | 110 | 110 | 110 | 105 | 105 | 105 | S | 100 | 100 | S |
| 28 | E | E | E | 100 | 100 | 115 | 110 | 110 | 105 | 170 | G | G | G | 105 | 105 | 115 | 115 | 110 | 110 | 105 | 105 | 100 | 100 | 100 |
| 29 | 100 | 105 | 100 | 110 | 110 | 105 | 100 | 100 | G | G | 100 | 100 | 100 | 100 | 100 | 100 | 100 | S | 105 | 105 | 105 | 105 | 105 | 100 |
| 30 | 100 | 100 | 100 | 100 | E | E | E | 110 | 100 | G | 105 | 105 | 105 | G | G | G | G | 100 | 100 | 100 | 100 | 100 | 100 | S |
| 31 | 100 | 100 | E | E | E | E | 105 | 100 | 100 | 100 | 100 | 100 | 100 | G | G | G | 110 | 110 | 105 | 105 | S | 100 | 100 | E |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 13 | 14 | 6 | 13 | 11 | 7 | 13 | 15 | 21 | 19 | 16 | 16 | 17 | 17 | 16 | 16 | 19 | 15 | 16 | 15 | 16 | 17 | 12 | 16 |
| MED | 100 | 100 | 100 | 105 | 105 | 105 | 105 | 110 | 110 | 110 | 105 | 105 | 105 | 105 | 108 | 102 | 110 | 105 | 105 | 105 | 105 | 100 | 100 | 102 |
| UQ | 105 | 105 | 105 | 110 | 110 | 108 | 110 | 122 | 130 | 115 | 105 | 112 | 110 | 110 | 110 | 115 | 112 | 110 | 110 | 105 | 105 | 110 | 105 | 110 |
| LQ | 100 | 100 | 100 | 100 | 100 | 105 | 105 | 102 | 105 | 105 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

# IONOSPHERIC DATA

DEC. 1969 | TYPES OF ES | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | F1 | | | | | | | L1 | | L1 | | | | | | L1 | | | | | F1 | | | |
| 2 | | | | | F1 | | | | | | L2 | | L1 | L1 | L1 | | | | | | | | | |
| 3 | | | | | | | | | L1 | | L1 | | | | | | | | F1 | F1 | | | | F1 |
| 4 | | F1 | F1 | | F1 | | | | | L1 | L1 | L1 | L1 | L1 | L1 | | | | | | | F1 | | F1 |
| 5 | F1 | | | | | | | | H1 | | L1 | | L1 | | | | | | | | | | | F1 |
| 6 | | F1 | | | | | F1 | | L1 | L2 | L2 | L1 | L1 | L1 | | | L1 | F1 | | | | F1 | | |
| 7 | | | | F1 | | | | | H1 | HL11 | H1 | LH11 | HL11 | L1 | | | C1 | | | F1 | | | | |
| 8 | | | | | | | F1 | L1 | L1 | | | | | L1 | L1 | L2 | L1 | | | | F2 | F1 | | |
| 9 | | | | | | | F1 | | | | | C1 | | L1 | L1 | | | | | | | | | |
| 10 | | | | | | | | H1 | H1 | L1 | HL11 | L2 | L1 | CL11 | CL11 | L1 | L1 | | F3 | | F1 | | | |
| 11 | | F1 | | F1 | | | | | | L1 | L1 | | | | | L1 | L1 | F1 | | | | | | |
| 12 | | | | | F1 | | | | H1 | L1 | L1 | | L1 | L1 | L1 | L1 | L2 | F1 | F1 | | F1 | | | |
| 13 | | | | | | | | | | L1 | | | | L1 | | | L1 | F1 | F1 | F1 | | F1 | | F1 |
| 14 | | | | | | | | H1 | H1 | LH11 | | | | | | | | | | F1 | | | | |
| 15 | | | | F2 | F2 | F2 | | | L1 | H1 | | H1 | | | C1 | | | | | | F1 | F2 | F2 | F2 |
| 16 | | | F2 | F1 | | | | H1 | | H1 | | L1 | L1 | L1 | L1 | L1 | L1 | | F3 | | F1 | F2 | | F2 |
| 17 | F1 | F2 | | | | | F1 | L1 | L1 | | | | | | | H1 | L1 | F1 | | | | | | F2 |
| 18 | F2 | F1 | | F1 | | | F1 | | | C1 | | | | | | L1 | | | | | | F1 | | F1 |
| 19 | | F1 | | | F3 | F4 | F2 | L1 | H1 | L1 | L3 | L2 | L2 | L1 | L2 | L1 | L2 | F1 | F2 | F3 | F2 | F1 | | |
| 20 | F1 | F1 | F1 | F2 | F2 | F2 | F1 | L2 | L2 | L1 | | H1 | L1 | | | | | | | | F1 | | F2 | F2 |
| 21 | F1 | F1 | | | | | | | L1 | L1 | L1 | L1 | L2 | L1 | L1 | L1 | C1 | F1 | | | | | | F1 |
| 22 | F1 | | | F1 | F2 | | F1 | | | | | | | C1 | L1 | L1 | | F1 | F2 | F2 | F1 | | F1 | F1 |
| 23 | F1 | | | F1 | | | | H1 | L1 | | | C1 | L1 | | | | H1 | | F2 | F2 | F1 | F1 | F1 | |
| 24 | | F1 | | | | F3 | F2 | L2 | L1 | | | | H1 | C1 | | | C1 | F1 | F2 | F1 | F1 | F1 | F2 | F1 |
| 25 | | F1 | F1 | F1 | F1 | | | | L1 | L1 | L1 | L1 | L1 | L1 | L1 | L1 | L1 | F1 | F1 | F2 | F1 | F1 | F1 | F1 |
| 26 | F1 | | | | | | | | L1 | L1 | LH11 | L1 | | | H1 | C1 | L2 | F3 | F2 | F3 | F2 | F1 | F1 | F1 |
| 27 | F1 | F2 | F2 | F2 | F2 | F2 | F2 | L1 | L1 | | | | | | L1 | L1 | L1 | F1 | F1 | F1 | | F2 | F3 | |
| 28 | | | | F1 | F1 | F1 | F3 | L2 | L1 | H1 | | | | L1 | L1 | L1 | C1 | FF21 | FF11 | F3 | F3 | F4 | F4 | F1 |
| 29 | F2 | F1 | F1 | F1 | F1 | F3 | F1 | L1 | | | L1 | L1 | L1 | L1 | L2 | L2 | L1 | | F2 | F2 | F3 | F2 | F2 | F2 |
| 30 | F1 | F3 | F2 | F2 | | | | L1 | L1 | | L1 | L1 | L1 | | | | | F1 | F1 | F2 | F2 | F2 | F1 | |
| 31 | F2 | F2 | | | | | F2 | L2 | L3 | L2 | L1 | L1 | L1 | | | | L2 | F2 | F2 | F1 | | F1 | F1 | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | | | | | | | | | | | | | | | | | | | | | | | | |
| MED | | | | | | | | | | | | | | | | | | | | | | | | |
| UQ | | | | | | | | | | | | | | | | | | | | | | | | |
| LQ | | | | | | | | | | | | | | | | | | | | | | | | |

The Radio Research Laboratories, Japan

DEC. 1969 | TYPES OF ES

# IONOSPHERIC DATA

DEC. 1969 | FOF2 (0.1 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 34 | 34 | 35 | 33 | 30 | 36 | 36 | 69 | 76 | 104 | 107 | 117 | 117 | 103 | 97 | 98 | 83 | 71 | 67 | 36 | 28 | 23 | 26 | 26 |
| 2 | 27 | 28 | 29 | 29 | 31 | 31 | 32 | I R 62 | 89 | 98 | 96 | 106 | 100 | 91 | 91 | 86 | 85 | 57 | 45 | 43 | 37 | 28 | 30 | 33 |
| 3 | 33 | 33 | 35 | 33 | 34 | 34 | 34 | 59 | 87 | 84 | 96 | 108 | 118 | 93 | 94 | I C 95 | 79 | 51 | 34 | 28 | 33 | 33 | 29 | 33 |
| 4 | 33 | 36 | 38 | 41 | 39 | 34 | C | C | C | 88 | 97 | 92 | 104 | 97 | 97 | 93 | 76 | 56 | 58 | 38 | 27 | 26 | 31 | 32 |
| 5 | I R 33 | 33 | I R 34 | 36 | 36 | 32 | 31 | 66 | 79 | 91 | 107 | 118 | 106 | 106 | 92 | 88 | 67 | 61 | 45 | 38 | 35 | 26 | 29 | 32 |
| 6 | 34 | 35 | 35 | 31 | 33 | 33 | 36 | 68 | 89 | I R 98 | 115 | 117 | 106 | 100 | 116 | 94 | 84 | 54 | 48 | 41 | 34 | 32 | 36 | 39 |
| 7 | 38 | 38 | 38 | 41 | C | C | C | C | C | C | 116 | 112 | 94 | 89 | 96 | 99 | 84 | 56 | 36 | 36 | 34 | 32 | 33 | 35 |
| 8 | 38 | 41 | 41 | 42 | 37 | 31 | 34 | I R 60 | 84 | 94 | 94 | 95 | 87 | 94 | 99 | 90 | 66 | 51 | 36 | 30 | 33 | 29 | 29 | 31 |
| 9 | 32 | 35 | 37 | 37 | 36 | 33 | 29 | 59 | 70 | 72 | 83 | 93 | 91 | 94 | 90 | 73 | 59 | 39 | 36 | 35 | 31 | 30 | 29 | 32 |
| 10 | 35 | 36 | 37 | C | C | C | C | C | C | C | 94 | 111 | 97 | 80 | 71 | 87 | 71 | 48 | 30 | 25 | 20 | 27 | 26 | 29 |
| 11 | S 32 | 31 | 32 | 33 | 33 | 28 | 29 | S 57 | 74 | 76 | 87 | 96 | 81 | 88 | 92 | 72 | 71 | 57 | 37 | 39 | 41 | 29 | 26 | 29 |
| 12 | 31 | 31 | 32 | 37 | 41 | 31 | 25 | 53 | 68 | 85 | 91 | 101 | 96 | 86 | 92 | 76 | 66 | 43 | 38 | 33 | 35 | 23 | 27 | 31 |
| 13 | 32 | 33 | 31 | 32 | 32 | 33 | 34 | 60 | 83 | 71 | 86 | C | C | C | C | 76 | 74 | 53 | 34 | 32 | 26 | 23 | 23 | 26 |
| 14 | 28 | 29 | 30 | 32 | 36 | 34 | I S 24 | 47 | 63 | 74 | 106 | 100 | 81 | 80 | 82 | 81 | 68 | C | C | C | 35 | 27 | 26 | 28 |
| 15 | 31 | 32 | 33 | 36 | 38 | 37 | 28 | 62 | 73 | 66 | 88 | 103 | 111 | 104 | 96 | 75 | 77 | 39 | 44 | 32 | 29 | 26 | 27 | I S 30 |
| 16 | 30 | 31 | 32 | 33 | 32 | 36 | 36 | 55 | 79 | 71 | 96 | 108 | 87 | 105 | 99 | 80 | 77 | 55 | 48 | 46 | 45 | 34 | 29 | I R 32 |
| 17 | 35 | 37 | 34 | 34 | 39 | 37 | 31 | 56 | 73 | 97 | 112 | 122 | 106 | 116 | 96 | 98 | 62 | 53 | 40 | 32 | 32 | 24 | 30 | 31 |
| 18 | 33 | 33 | 34 | 31 | 32 | 33 | 33 | 56 | 77 | 92 | 105 | 106 | 101 | 96 | 90 | 74 | 82 | 50 | 40 | 31 | 32 | 27 | 29 | 34 |
| 19 | 34 | 37 | 40 | 39 | 41 | 41 | 34 | 48 | 74 | 82 | 106 | I A 106 | 86 | 90 | 106 | 101 | 76 | 60 | 45 | 29 | 28 | 30 | 34 | 34 |
| 20 | 35 | 35 | 36 | 34 | 38 | 36 | 33 | 58 | 74 | 85 | 103 | 114 | 97 | I C 95 | 102 | 105 | 77 | 53 | 46 | 34 | 32 | 29 | 28 | 28 |
| 21 | I A 30 | 33 | 33 | 34 | 37 | 30 | 31 | 57 | 84 | 89 | 104 | 111 | 126 | 96 | 96 | 83 | 71 | 48 | 46 | 30 | 28 | 29 | 31 | 32 |
| 22 | 33 | 34 | 35 | 35 | 36 | 37 | 43 | 56 | 76 | 74 | 93 | 103 | 102 | 86 | 86 | 86 | 73 | 44 | 47 | 39 | 33 | 28 | I R 30 | I R 32 |
| 23 | 36 | 39 | 41 | 36 | 37 | 41 | 42 | 54 | 79 | 91 | 107 | 107 | 110 | 97 | 96 | 102 | 86 | 54 | 58 | 33 | 30 | 27 | I A 30 | 29 |
| 24 | 33 | 33 | 34 | 34 | 36 | 33 | 37 | 58 | 87 | 86 | 112 | I R 106 | 93 | 110 | 111 | 101 | 83 | 51 | 47 | 44 | I A 32 | I A 27 | I A 28 | 29 |
| 25 | I R 30 | 30 | 31 | 31 | 30 | 33 | 38 | 64 | I R 75 | 96 | 96 | 87 | 91 | 93 | 97 | 103 | 93 | 54 | 54 | 46 | 33 | 26 | 29 | 29 |
| 26 | 33 | 33 | 33 | 34 | 36 | 33 | 36 | I R 62 | 86 | 76 | 108 | 103 | 89 | 107 | 88 | 91 | I A 74 | 68 | 65 | 44 | 34 | 36 | 36 | 37 |
| 27 | 37 | 36 | 38 | 37 | 42 | 43 | I A 41 | S 66 | I R 97 | 97 | 93 | 97 | 91 | 93 | 91 | 89 | 87 | 69 | 59 | 39 | 36 | 34 | 33 | I R 32 |
| 28 | 31 | 34 | 29 | 29 | 33 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | 27 | 28 | 30 |
| 29 | 32 | 34 | 29 | 30 | 30 | 31 | 35 | 51 | 83 | 86 | 103 | 106 | 98 | 86 | 87 | 86 | 66 | 63 | 53 | 43 | I A 30 | 31 | 32 | 34 |
| 30 | 34 | 31 | 26 | 27 | 29 | 31 | 30 | 54 | 67 | 93 | 107 | 109 | 93 | 89 | 88 | 71 | 64 | 71 | 74 | 37 | 27 | 28 | 27 | 31 |
| 31 | 32 | 32 | 28 | 28 | 30 | 31 | 34 | 54 | 79 | 98 | 116 | 103 | 88 | 86 | 81 | 76 | 71 | 63 | 49 | 37 | 26 | 30 | 33 | 33 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 31 | 31 | 31 | 30 | 29 | 28 | 27 | 27 | 27 | 28 | 30 | 29 | 29 | 29 | 29 | 30 | 30 | 29 | 29 | 29 | 30 | 31 | 31 | 31 |
| MED | 33 | 33 | 34 | 34 | 36 | 33 | 34 | 58 | 79 | 87 | 103 | 106 | 97 | 94 | 94 | 88 | 75 | 54 | 46 | 36 | 32 | 28 | 29 | 32 |
| UQ | 34 | 36 | 36 | 36 | 37 | 36 | 36 | 62 | 84 | 95 | 107 | 111 | 106 | 100 | 97 | 98 | 83 | 60 | 53 | 39 | 34 | 30 | 31 | 33 |
| LQ | 32 | 32 | 32 | 31 | 32 | 31 | 31 | 54 | 74 | 76 | 94 | 101 | 91 | 89 | 90 | 76 | 68 | 51 | 38 | 32 | 28 | 26 | 28 | 29 |

DEC. 1969 | FOF2 (0.1 MHZ)

The Radio Research Laboratories, Japan

# IONOSPHERIC DATA

DEC. 1969 | FOF1 (0.01 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | L | L | L | L | L | | | | | | | | | | |
| 2 | | | | | | | | | | 360 | L | L | L 500 | L | 350 | | | | | | | | | |
| 3 | | | | | | | | | | L | L | 510 | L | | L | | | | | | | | | |
| 4 | | | | | | | | | | | L | L | H 500 | L | | | | | | | | | | |
| 5 | | | | | | | | | | | L | L | L | | | | | | | | | | | |
| 6 | | | | | | | | | | L | L | L | L | | | | | | | | | | | |
| 7 | | | | | | | | | | C | L | L | L | 360 | | | | | | | | | | |
| 8 | | | | | | | | | | | L | L 410 | L 400 | 350 | | | | | | | | | | |
| 9 | | | | | | | | | | L | L | L | L | L | | | | | | | | | | |
| 10 | | | | | | | | | | | L | L | L | L | 340 | | | | | | | | | |
| 11 | | | | | | | | | | | L 400 | L 420 | L | L | L | | | | | | | | | |
| 12 | | | | | | | | | | | L | L | L | L 400 | L | | | | | | | | | |
| 13 | | | | | | | | | | L | L | C | C | C | C | | | | | | | | | |
| 14 | | | | | | | | | | | 470 | L | L | L | | | | | | | | | | |
| 15 | | | | | | | | | | | 360 | L | L 460 | L | L | | | | | | | | | |
| 16 | | | | | | | | | | | L | L | L | L | L | | | | | | | | | |
| 17 | | | | | | | | | | | L | L | L | L | L | | | | | | | | | |
| 18 | | | | | | | | | | | L 370 | L | L | L 350 | 340 | | | | | | | | | |
| 19 | | | | | | | | | | | A | A | L | 400 | | | | | | | | | | |
| 20 | | | | | | | | | | | L | L 430 | L | C | | | | | | | | | | |
| 21 | | | | | | | | | | L | 480 | L | L | L | L | | | | | | | | | |
| 22 | | | | | | | | | | | 370 | L | L | | 500 | | | | | | | | | |
| 23 | | | | | | | | | | | L | L | L | L | | | | | | | | | | |
| 24 | | | | | | | | | | | L | L | L | L | | | | | | | | | | |
| 25 | | | | | | | | | | | L | L | L | L | L | | | | | | | | | |
| 26 | | | | | | | | | | | 390 | L | L | L | | | | | | | | | | |
| 27 | | | | | | | | | | | L | L | L | | | | | | | | | | | |
| 28 | | | | | | | | | | C | C | C | C | C | C | | | | | | | | | |
| 29 | | | | | | | | | | | L | L | L | L | | | | | | | | | | |
| 30 | | | | | | | | | | | L | L | L | | | | | | | | | | | |
| 31 | | | | | | | | | | | L | L | L | L | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | | | | | | | | | | 1 | 7 | 4 | 4 | 5 | 4 | | | | | | | | | |
| MED | | | | | | | | | | 360 | 390 | L 425 | L 480 | 360 | 345 | | | | | | | | | |
| UQ | | | | | | | | | | | 435 | 470 | 500 | 400 | 425 | | | | | | | | | |
| LQ | | | | | | | | | | | 370 | L 415 | L 430 | 350 | 340 | | | | | | | | | |



DEC. 1969 | FOF1 (0.01 MHZ)

# IONOSPHERIC DATA

DEC. 1969 | FOE (0.01 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | 180 | I A 250 | I A 300 | 320 | 330 | 340 | 325 | 285 | 240 | 180 | | | | | | | |
| 2 | | | | | | | | 200 | 255 | 305 | 320 | 335 | 340 | 325 | 295 | 250 | 190 | | | | | | | |
| 3 | | | | | | | | A | 255 | 300 | 325 | 330 | 345 | 325 | 295 | I C 250 | A | | | | | | | |
| 4 | | | | | | | | C | C | 305 | 320 | 330 | 335 | I A 310 | A | A | A | | | | | | | |
| 5 | | | | | | | | 185 | 255 | 305 | A | A | 335 | 320 | 290 | 245 | A | | | | | | | |
| 6 | | | | | | | | 195 | 255 | 305 | 320 | 335 | 335 | I A 310 | 285 | 225 | 165 | | | | | | | |
| 7 | | | | | | | | C | C | C | 315 | 325 | 335 | 330 | 290 | I A 250 | 190 | | | | | | | |
| 8 | | | | | | | | 190 | I A 250 | 305 | 320 | 330 | 335 | 320 | 280 | 240 | A | | | | | | | |
| 9 | | | | | | | | 185 | 255 | 300 | 310 | 315 | 305 | 300 | 270 | 215 | S | | | | | | | |
| 10 | | | | | | | | C | C | C | 305 | 310 | 310 | I A 290 | 270 | I A 220 | S | | | | | | | |
| 11 | | | | | | | | 160 | 250 | 300 | 315 | 325 | 335 | 320 | 290 | 250 | 190 | | | | | | | |
| 12 | | | | | | | | 195 | 245 | 295 | 320 | 325 | 330 | 330 | 305 | 255 | A | | | | | | | |
| 13 | | | | | | | | 175 | 245 | 295 | 315 | C | C | C | C | 255 | 200 | | | | | | | |
| 14 | | | | | | | | A | 250 | 300 | 310 | 320 | 330 | 325 | 300 | 260 | 200 | | | | | | | |
| 15 | | | | | | | | B | 240 | 285 | I A 305 | 325 | 330 | 325 | 290 | 250 | 195 | | | | | | | |
| 16 | | | | | | | | 165 | 235 | 290 | A | A | 335 | I A 325 | 295 | 255 | 205 | | | | | | | |
| 17 | | | | | | | | B | A | A | I A 310 | 325 | 335 | 315 | 295 | 245 | 185 | | | | | | | |
| 18 | | | | | | | | A | 230 | 290 | 310 | 325 | 335 | 320 | 295 | 240 | I A 185 | | | | | | | |
| 19 | | | | | | | | 165 | 245 | 295 | A | A | A | A | 290 | 240 | B | | | | | | | |
| 20 | | | | | | | | A | I A 255 | 285 | A | A | A | C | A | 275 | A | | | | | | | |
| 21 | | | | | | | | S | A | 290 | I A 310 | 330 | 330 | 325 | I A 290 | 255 | 205 | | | | | | | |
| 22 | | | | | | | | A | 235 | 290 | 310 | 320 | 325 | 320 | I A 300 | 255 | 190 | | | | | | | |
| 23 | | | | | | | | 165 | 250 | I A 285 | 310 | 320 | 325 | 325 | 300 | 260 | 205 | | | | | | | |
| 24 | | | | | | | | S | A | A | 305 | 320 | 330 | 320 | A | A | 180 | | | | | | | |
| 25 | | | | | | | | A | 235 | 295 | 315 | 325 | 335 | 330 | 295 | I A 245 | A | | | | | | | |
| 26 | | | | | | | | S | 240 | 290 | 310 | 325 | I B 325 | 320 | A | A | A | | | | | | | |
| 27 | | | | | | | | S | A | A | I B 305 | 315 | 325 | A | A | A | A | | | | | | | |
| 28 | | | | | | | | C | C | C | C | C | C | C | C | C | C | | | | | | | |
| 29 | | | | | | | | S | I A 250 | 280 | 305 | I R 320 | I R 325 | 320 | 300 | 270 | A | | | | | | | |
| 30 | | | | | | | | B | 235 | 290 | 310 | 320 | 330 | I B 320 | 300 | 260 | A | | | | | | | |
| 31 | | | | | | | | B | 235 | 290 | 310 | 320 | B 330 | 325 | 295 | 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 | | | | | | | | 12 | 23 | 25 | 26 | 25 | 27 | 26 | 24 | 25 | 15 | | | | | | | |
| MED | | | | | | | | 182 | 250 | 295 | 310 | 325 | 330 | 320 | 295 | 250 | 190 | | | | | | | |
| UQ | | | | | | | | 192 | 252 | 300 | 320 | 330 | 335 | 325 | 298 | 255 | 200 | | | | | | | |
| LQ | | | | | | | | 165 | 238 | 290 | 310 | 320 | 328 | 320 | 290 | 240 | 185 | | | | | | | |

# IONOSPHERIC DATA

DEC. 1969 | FOES (0.1 MHZ) | 135 E Mean Time (G. M. T. + 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | E S 13 | J X 18 | J X 18 | J X 18 | J X 18 | E S 13 | E S 13 | G | J X 29 | J X 35 | G | G | G | G | G | G | G | E S 14 | E S 13 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 2 | E S 14 | E S 14 | E S 13 | E | E | E S 14 | E S 14 | G | G | G | G | G | G | G | G | J X 29 | G | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 3 | E S 14 | E S 14 | E S 14 | E S 14 | E S 13 | E S 14 | E S 14 | 23 | G | G | G | G | G | G | J X 32 | C | J X 29 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 13 |
| 4 | E S 14 | E S 14 | E | E S 13 | E S 13 | J X 20 | C | C | C | G | G | G | G | J X 53 | J X 46 | J X 38 | J X 25 | J X 34 | J X 24 | E S 14 | E S 14 | E S 13 | E S 14 | E S 14 |
| 5 | E S 14 | E S 14 | E S 14 | E S 14 | E | E S 13 | E S 14 | G | G | 33 | J X 38 | 35 | G | J G 24 | 33 | G | J X 21 | J X 18 | E S 14 | E S 14 | E S 13 | E S 14 | E S 14 | E S 14 |
| 6 | E S 14 | E S 14 | E S 13 | J X 20 | E S 14 | E S 14 | E S 14 | G | G | G | J X 34 | J G 33 | J X 46 | J X 64 | G | G | G | J X 21 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 7 | E S 14 | E S 14 | E S 14 | E S 13 | C | C | C | C | C | C | G | 35 | G | G | G | 27 | G | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 8 | J X 18 | E S 14 | E S 14 | E | E | E S 14 | E S 14 | J X 20 | J X 30 | J X 33 | G | G | J G 30 | J G 31 | G | G | J X 33 | J X 21 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 9 | E S 14 | J X 19 | J X 16 | E S 14 | E S 14 | E S 14 | E S 14 | G | G | G | G | G | 32 | G | G | 27 | E S 15 | E S 14 | E S 13 | E S 13 | E S 13 | E S 13 | E S 13 | E S 13 |
| 10 | E S 13 | E S 13 | E S 13 | C | C | C | C | C | C | C | J X 60 | J X 46 | G | J X 44 | J X 40 | J X 28 | E S 15 | E S 14 | E S 13 | E S 13 | E S 14 | E S 13 | E S 14 | E S 13 |
| 11 | E S 13 | E S 13 | E S 13 | E S 13 | E S 14 | E S 13 | E S 13 | G | G | G | G | G | G | G | G | G | G | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 12 | E S 14 | E S 14 | E S 14 | E S 13 | E | E S 14 | E S 14 | G | G | G | G | G | G | G | G | G | J X 25 | J X 33 | J X 26 | E S 14 | E S 13 | E S 14 | E S 14 | E S 14 |
| 13 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | G | G | G | J X 50 | C | C | C | C | G | G | J X 24 | J X 25 | E S 14 | E S 14 | E B 19 | E B 17 | E S 14 |
| 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | S | 21 | 36 | 40 | 34 | G | G | G | G | G | G | C | C | C | J X 24 | E S 14 | E S 14 | E S 14 |
| 15 | E S 14 | E S 14 | E S 14 | E S 14 | E | E S 14 | E S 14 | E B 18 | J X 33 | G | J X 45 | 37 | G | G | G | G | G | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | S |
| 16 | E S 14 | J X 18 | J X 34 | E S 14 | E S 14 | E S 14 | E S 14 | G | G | 33 | J X 41 | J X 39 | G | J X 35 | G | G | G | J X 30 | E S 14 | J X 29 | J X 28 | J X 23 | J X 34 | E S 14 |
| 17 | J X 33 | E S 14 | E S 14 | E S 14 | J X 16 | E S 14 | E S 14 | E B 19 | J X 41 | J X 40 | 33 | 36 | G | G | G | G | G | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 18 | E S 14 | J X 20 | E S 14 | E S 14 | J X 20 | E S 14 | E S 14 | 20 | G | G | G | G | G | G | G | 29 | 22 | E S 14 | E S 13 | J X 21 | J X 24 | J X 20 | E S 14 | E S 14 |
| 19 | E S 14 | E | E | E S 14 | E S 14 | E S 14 | E S 14 | G | G | G | J X 86 | J X 131 | J X 64 | J X 43 | G | G | E B 19 | E S 14 | J X 20 | J X 20 | E S 14 | E S 14 | E S 14 | E S 14 |
| 20 | E S 14 | E S 14 | J X 20 | E | J X 25 | E S 14 | J X 21 | J X 30 | 29 | G | J X 37 | J X 34 | J X 43 | C | J X 36 | G | 26 | J X 20 | J X 23 | J X 24 | J X 24 | E S 14 | E S 14 | E S 13 |
| 21 | J X 44 | J X 29 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 16 | 27 | G | 34 | G | G | G | J X 36 | J X 33 | J X 24 | J X 24 | J X 20 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 22 | E S 14 | E S 14 | E S 14 | E S 14 | E | J X 24 | J X 21 | J X 20 | G | G | G | G | G | G | 33 | G | G | E S 14 | E S 14 | E S 14 | J X 30 | J X 21 | J X 24 | E S 14 |
| 23 | E S 14 | J X 19 | E S 13 | J X 29 | J X 14 | E S 14 | E S 14 | G | 30 | J X 44 | G | G | G | G | G | G | 23 | E S 13 | E S 14 | E S 14 | J X 30 | J X 26 | J X 39 | J X 28 |
| 24 | J X 20 | J X 24 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | J X 33 | J X 43 | J X 38 | G | 37 | G | 40 | 38 | 27 | G | E S 13 | J X 26 | J X 28 | J X 36 | J X 34 | J X 32 | J X 20 |
| 25 | J X 29 | J X 20 | E S 14 | E | E S 14 | J X 17 | J X 20 | J X 20 | G | G | G | G | J G 29 | J G 31 | G | J X 31 | 23 | J X 28 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 26 | E S 14 | E S 14 | E S 14 | E S 14 | J X 21 | J X 21 | E S 14 | J X 20 | G | G | 37 | 36 | E B 36 | G | 35 | 50 | J X 94 | J X 88 | J X 36 | J X 22 | J X 24 | E S 14 | J X 44 | J X 33 |
| 27 | J X 21 | E S 14 | J X 18 | J X 26 | J X 26 | J X 20 | J X 56 | J X 26 | J X 40 | J X 36 | E B 34 | G | G | 37 | J X 40 | 28 | J X 86 | J X 123 | J X 66 | J X 26 | J X 20 | E S 14 | E S 14 | J X 28 |
| 28 | J X 21 | J X 28 | J X 19 | E B 18 | E S 14 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | J X 66 | E S 14 | E S 14 |
| 29 | E S 14 | E B 18 | E B 16 | E B 18 | E B 18 | J X 20 | J X 28 | J X 20 | J X 34 | G | G | G | G | G | 34 | G | 29 | E S 14 | J X 21 | E S 14 | J X 85 | J X 29 | J X 43 | J X 28 |
| 30 | J X 24 | J X 20 | E B 17 | E B 18 | J X 18 | E B 16 | E S 14 | E B 18 | G | G | G | G | G | G | G | G | 24 | E B 18 | E B 17 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 31 | E S 14 | J X 18 | E B 17 | E B 17 | E B 16 | E B 16 | E B 17 | E B 18 | G | G | G | G | G | G | G | 28 | J X 41 | J X 33 | J X 23 | E S 14 | E S 14 | J X 23 | E S 14 | E S 14 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 31 | 31 | 31 | 30 | 29 | 28 | 26 | 27 | 27 | 28 | 30 | 29 | 29 | 28 | 29 | 29 | 30 | 29 | 29 | 29 | 30 | 31 | 31 | 30 |
| MED | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E G 18 | G | G | G | G | G | G | G | G | 20 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| UQ | 16 | J X 18 | E S 16 | E S 17 | J X 15 | E 16 | E S 14 | J X 20 | 30 | 33 | J X 37 | 35 | G | J 33 | 34 | 28 | J X 25 | J X 24 | J X 23 | E S 14 | J X 24 | 20 | E S 14 | E S 14 |
| LQ | E S 14 | E S 14 | E S 14 | E S 13 | E S 13 | E S 14 | E S 14 | G | G | G | G | G | G | G | G | G | G | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |

The Radio Research Laboratories, Japan

DEC. 1969 | FOES (0.1 MHZ)

# IONOSPHERIC DATA

DEC. 1969 | FBES (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | E S 13 | E | E | 14 | E | E S 13 | E S 13 | G | 29 | 31 | G | G | G | G | G | G | G | E S 14 | E S 13 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 2 | E S 14 | E S 14 | E S 13 | E | E | E S 14 | E S 14 | G | G | G | G | G | G | G | G | 20 | G | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 3 | E S 14 | E S 14 | E S 14 | E S 14 | E S 13 | E S 14 | E S 14 | 20 | G | G | G | G | G | G | 19 | C | 22 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 13 |
| 4 | E S 14 | E S 14 | E | E S 13 | E S 13 | E | C | C | C | G | G | G | G | 35 | 31 | 26 | 23 | 20 | 18 | E S 14 | E S 14 | E S 13 | E S 14 | E S 14 |
| 5 | E S 14 | E S 14 | E S 14 | E S 14 | E | E S 13 | E S 14 | G | G | G | 33 | 34 | G | G 24 | G | G | 19 | E | E S 14 | E S 14 | E S 13 | E S 14 | E S 14 | E S 14 |
| 6 | E S 14 | E S 14 | E S 13 | E | E S 14 | E S 14 | E S 14 | G | G | G | 28 | G 28 | 27 | 35 | G | G | G | E | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 7 | E S 14 | E S 14 | E S 14 | E S 13 | C | C | C | C | C | C | G | 35 | G | G | G | 27 | G | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 8 | E | E S 14 | E S 14 | E | E | E S 14 | E S 14 | 14 | 20 | 22 | G | G | G 25 | G 2 | G | G | 21 | 18 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 9 | E S 14 | E | E | E S 14 | E S 14 | E S 14 | E S 14 | G | G | G | G | G | G | G | G | 26 | E S 15 | E S 14 | E S 13 | E S 13 | E S 13 | E S 13 | E S 13 | E S 13 |
| 10 | E S 13 | E S 13 | E S 13 | C | C | C | C | C | C | C | 31 | G | G | 34 | G | 27 | E S 15 | E S 14 | E S 13 | E S 13 | E S 14 | E S 13 | E S 13 | E S 13 |
| 11 | E S 13 | E S 13 | E S 13 | E S 13 | E S 14 | E S 13 | E S 13 | G | G | G | G | G | G | G | G | G | G | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 12 | E S 14 | E S 14 | E S 14 | E S 13 | E | E S 14 | E S 14 | G | G | G | G | G | G | G | G | G | 22 | 19 | E | E S 14 | E S 13 | E S 14 | E S 14 | E S 14 |
| 13 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | G | G | G | 26 | C | C | C | C | G | G | E | E | E S 14 | E S 14 | E B 19 | E B 17 | E S 14 |
| 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | S | 20 | 30 | 38 | 34 | G | G | G | G | G | G | C | C | C | E | E S 14 | E S 14 | E S 14 |
| 15 | E S 14 | E S 14 | E S 14 | E S 14 | E | E S 14 | E S 14 | E B 18 | 20 | G | 32 | 36 | G | G | G | G | G | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | S |
| 16 | E S 14 | E | 20 | E S 14 | E S 14 | E S 14 | E S 14 | G | G | 33 | 34 | 34 | G | 34 | G | G | G | E | E S 14 | 18 | E | E | 23 | E S 14 |
| 17 | E | E S 14 | E S 14 | E S 14 | 13 | E S 14 | E S 14 | E B 19 | 27 | 31 | 33 | G | G | G | G | G | G | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 18 | E S 14 | E | E S 14 | E S 14 | 16 | E S 14 | E S 14 | 18 | G | G | G | G | G | G | G | 29 | 20 | E S 14 | E S 13 | E | 17 | 17 | E S 14 | E S 14 |
| 19 | E S 14 | E | E | E S 14 | E S 14 | E S 14 | E S 14 | G | G | G | 56 | A | 36 | 31 | G | G | E B 19 | E S 14 | E | E | E S 14 | E S 14 | E S 14 | E S 14 |
| 20 | E S 14 | E S 14 | E | E | E | E S 14 | 18 | 20 | 29 | G | 34 | 34 | 36 | C | 34 | G | 26 | 16 | 20 | 19 | 21 | E S 14 | E S 14 | E S 13 |
| 21 | A | 24 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 16 | 26 | G | 34 | G | G | G | 33 | 21 | 19 | 20 | 20 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 22 | E S 14 | E S 14 | E S 14 | E S 14 | E | 16 | 16 | 18 | G | G | G | G | G | G | 32 | G | G | E S 14 | E S 14 | E S 14 | 26 | 20 | 24 | E S 14 |
| 23 | E S 14 | E | E S 13 | 20 | E | E S 14 | E S 14 | G | 30 | 35 | G | G | G | G | G | G | 18 | E S 13 | E S 14 | E S 14 | E | E | A | 21 |
| 24 | E | 19 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | 22 | 26 | 31 | G | 36 | G | 37 | 36 | 27 | G | E S 14 | 20 | 18 | A | A | A | 19 |
| 25 | 20 | 19 | E S 14 | E | E S 14 | E | E | 18 | G | G | G | G | G 29 | G 27 | G | 28 | 21 | 17 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 26 | E S 14 | E S 14 | E S 14 | E S 14 | 16 | 18 | E S 14 | 16 | G | G | 34 | 36 | E B 36 | G | 34 | 34 | A | 20 | E | E | E | E S 14 | E | 23 |
| 27 | 21 | E S 14 | E | E | E | 17 | A | 18 | 28 | 31 | E B 34 | G | G | 34 | 35 | 28 | 22 | 58 | 20 | 18 | E | E S 14 | E S 14 | 25 |
| 28 | 19 | 19 | E | E B 18 | E S 14 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | 17 | E S 14 | E S 14 |
| 29 | E S 14 | E B 18 | E B 16 | E B 18 | E B 18 | 14 | 18 | 17 | 34 | G | G | G | G | G | 34 | G | 29 | E S 14 | 18 | E S 14 | A | 17 | 18 | 18 |
| 30 | 21 | 19 | E B 17 | E B 18 | 18 | E B 16 | E S 14 | E B 18 | G | G | G | G | G | G | G | G | 23 | E B 18 | E B 17 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 31 | E S 14 | 15 | E B 17 | E B 17 | E B 16 | E B 16 | E B 17 | E B 18 | G | G | G | G | G | G | G | 28 | 24 | 18 | 19 | E S 14 | E S 14 | 18 | E S 14 | E S 14 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 31 | 31 | 31 | 30 | 29 | 28 | 26 | 27 | 27 | 28 | 30 | 29 | 29 | 28 | 29 | 29 | 30 | 29 | 29 | 29 | 30 | 31 | 31 | 30 |
| MED | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E G 16 | G | G | G | G | G | G | G | G | E G 18 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| UQ | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | 18 | 26 | 26 | 33 | 34 | G | 29 | 31 | 27 | 22 | 18 | E 17 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| LQ | E S 14 | E S 14 | E S 13 | E S 13 | E | E S 14 | E S 14 | G | G | G | G | G | G | G | G | G | G | E S 14 | E S 13 | E S 14 | E S 13 | E S 14 | E S 14 | E S 14 |



DEC. 1969 | FBES (0.1 MHZ)

# IONOSPHERIC DATA

DEC. 1969 | F-MIN (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | E S 13 | E S 14 | E S 13 | E S 13 | E | E S 13 | E S 13 | 14 | 15 | 15 | 15 | 15 | 16 | 15 | 16 | 15 | 13 | E S 14 | E S 13 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 2 | E S 14 | E S 14 | E S 13 | E | E | E S 14 | E S 14 | 15 | 14 | 15 | 15 | 16 | 15 | 17 | 14 | 14 | 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 3 | E S 14 | E S 14 | E S 14 | E S 14 | E S 13 | E S 14 | E S 14 | 14 | 14 | 14 | 18 | 17 | 14 | 18 | 16 | C | 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 13 |
| 4 | E S 14 | E S 14 | E | E S 13 | E S 13 | E S 14 | C | C | C | 15 | 17 | 20 | 18 | 15 | 14 | 13 | 13 | E S 13 | E S 13 | E S 14 | E S 14 | E S 13 | E S 14 | E S 14 |
| 5 | E S 14 | E S 14 | E S 14 | E S 14 | E | E S 13 | E S 14 | 14 | 15 | 15 | 18 | 16 | 16 | 17 | 17 | 14 | 13 | E S 14 | E S 14 | E S 14 | E S 13 | E S 14 | E S 14 | E S 14 |
| 6 | E S 14 | E S 14 | E S 13 | E S 14 | E S 14 | E S 14 | E S 14 | 16 | 15 | 15 | 15 | 15 | 18 | 13 | 15 | 15 | 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 7 | E S 14 | E S 14 | E S 14 | E S 13 | C | C | C | C | C | C | 18 | 21 | 16 | 18 | 19 | 16 | 15 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 8 | E S 14 | E S 14 | E S 14 | E | E | E S 14 | E S 14 | 14 | 15 | 16 | 16 | 17 | 16 | 16 | 15 | 14 | 13 | E S 13 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 9 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | 14 | 15 | 16 | 17 | 17 | 17 | 18 | 15 | 15 | E S 15 | E S 14 | E S 13 | E S 13 | E S 13 | E S 13 | E S 13 | E S 13 |
| 10 | E S 13 | E S 13 | E S 13 | C | C | C | C | C | C | C | 19 | 19 | 17 | 16 | 17 | 17 | E S 15 | E S 14 | E S 13 | E S 13 | E S 14 | E S 13 | E S 13 | E S 13 |
| 11 | E S 13 | E S 13 | E S 13 | E S 13 | E S 14 | E S 13 | E S 13 | 14 | 18 | 18 | 16 | 16 | 19 | 19 | 19 | 16 | 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 12 | E S 14 | E S 14 | E S 14 | E S 13 | E | E S 14 | E S 14 | 14 | 16 | 14 | 18 | 21 | 21 | 20 | 19 | 18 | E | E S 14 | E S 14 | E S 14 | E S 13 | E S 14 | E S 14 | E S 14 |
| 13 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | 15 | 16 | 15 | 16 | C | C | C | C | 16 | 15 | E S 14 | E S 14 | E S 14 | E S 14 | 19 | 17 | E S 14 |
| 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | S | 15 | 15 | 15 | 16 | 20 | 16 | 18 | 15 | 15 | 15 | C | C | C | E S 14 | E S 14 | E S 14 | E S 14 |
| 15 | E S 14 | E S 14 | E S 14 | E S 14 | E | E S 14 | E S 14 | 18 | 14 | 16 | 15 | 16 | 18 | 19 | 16 | 18 | 16 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | S |
| 16 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | 14 | 16 | 19 | 19 | 18 | 18 | 18 | 19 | 16 | 18 | E S 14 | E S 14 | E S 13 | E S 14 | E S 14 | E S 14 | E S 14 |
| 17 | E S 14 | E S 14 | E S 14 | E S 14 | E | E S 14 | E S 14 | 19 | 17 | 18 | 24 | 19 | 18 | 17 | 16 | 16 | 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 18 | E S 14 | E S 14 | E S 14 | E S 14 | E | E S 14 | E S 14 | 14 | 16 | 18 | 18 | 17 | 19 | 17 | 18 | 16 | 14 | E S 14 | E S 13 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 19 | E S 14 | E | E | E S 14 | E S 14 | E S 14 | E S 14 | 14 | 16 | 14 | 19 | 20 | 21 | 21 | 20 | 19 | 19 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 20 | E S 14 | E S 14 | E S 14 | E | E S 14 | E S 14 | E S 14 | 14 | 18 | 15 | 20 | 21 | 21 | C | 19 | 18 | 14 | E | E S 13 | E S 13 | E S 13 | E S 14 | E S 14 | E S 13 |
| 21 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 16 | 15 | 17 | 19 | 19 | 19 | 18 | 18 | 15 | 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 22 | E S 14 | E S 14 | E S 14 | E S 14 | E | E | E S 13 | 14 | 15 | 15 | 18 | 19 | 20 | 18 | 15 | 15 | 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 13 | E S 13 | E S 14 |
| 23 | E S 14 | E S 14 | E S 13 | E S 13 | E | E S 14 | E S 14 | 14 | 16 | 17 | 17 | 15 | 15 | 17 | 15 | 16 | 14 | E S 13 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 24 | E S 14 | E S 13 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | 15 | 18 | 18 | 18 | 20 | 20 | 20 | 16 | 14 | E S 13 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 25 | E S 14 | E | E S 14 | E | E S 14 | E S 14 | E S 14 | 14 | 15 | 16 | 19 | 22 | 18 | 18 | 18 | 16 | 15 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 26 | E S 14 | E S 14 | E S 14 | E S 14 | E | E S 14 | E S 14 | E S 14 | 15 | 16 | 20 | 22 | 36 | 24 | 19 | 16 | 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 27 | E S 14 | E S 14 | E S 14 | E S 13 | E S 14 | E S 14 | E S 14 | E S 14 | 17 | 18 | 34 | 26 | 22 | 27 | 26 | 20 | 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 28 | E S 14 | E S 14 | E S 14 | 18 | E S 14 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | E S 14 | E S 14 | E S 14 |
| 29 | E S 14 | 18 | 16 | 18 | 18 | E | E | E S 14 | 18 | 20 | 22 | 26 | 26 | 24 | 21 | 21 | 19 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 30 | E S 14 | E | 17 | 18 | E | 16 | E S 14 | 18 | 17 | 19 | 20 | 21 | 26 | 21 | 20 | 19 | 18 | 18 | 17 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| 31 | E S 14 | E | 17 | 17 | 16 | 16 | 17 | 18 | 16 | 16 | 21 | 24 | 22 | 23 | 20 | 20 | 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 31 | 31 | 31 | 30 | 29 | 28 | 26 | 27 | 27 | 28 | 30 | 29 | 29 | 28 | 29 | 29 | 30 | 29 | 29 | 29 | 30 | 31 | 31 | 30 |
| MED | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | 14 | 15 | 16 | 18 | 19 | 18 | 18 | 18 | 16 | 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| UQ | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | 15 | 16 | 18 | 19 | 21 | 21 | 20 | 19 | 18 | 15 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |
| LQ | E S 14 | E S 14 | E S 14 | E S 13 | E | E S 14 | E S 14 | 14 | 15 | 15 | 16 | 17 | 16 | 17 | 15 | 15 | 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 | E S 14 |



DEC. 1969 | F-MIN (0.1 MHZ)

# IONOSPHERIC DATA

DEC. 1969 | M(3000)F2 (0.01) | 135° E Mean Time (G. M. T.+ 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec 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 | 285 | 270 | 260 | 270 | 320 | 285 | 315 | 335 | 330 | 330 | 320 | 325 | 310 | 320 | 320 | 335 | 320 | 320 | 330 | 335 | 320 | 275 | 270 | 270 |
| 2 | 275 | 285 | 275 | 270 | 270 | 295 | 300 | IR 330 | 345 | 340 | 325 | 335 | 310 | 320 | 335 | 325 | 340 | 320 | 305 | 320 | 325 | 310 | 275 | 285 |
| 3 | 280 | 270 | 285 | 285 | 300 | 290 | 305 | 335 | 340 | 345 | 320 | 315 | 330 | 330 | 330 | IC 330 | 340 | 315 | 330 | 320 | 310 | 300 | 285 | 280 |
| 4 | 280 | 280 | 290 | 300 | 300 | 305 | C | C | C | 335 | 340 | 335 | 325 | 320 | 315 | 325 | 345 | 285 | 310 | 335 | 300 | 270 | 270 | 285 |
| 5 | IR 290 | 285 | IR 275 | 290 | 310 | 290 | 305 | 330 | 340 | 320 | 320 | 325 | 310 | 335 | 335 | 340 | 325 | 320 | 315 | 295 | 315 | 280 | 255 | 255 |
| 6 | 265 | 280 | 290 | 265 | 255 | 270 | 290 | 320 | 330 | IR 340 | 305 | 315 | 310 | 310 | 320 | 330 | 320 | 315 | 310 | 310 | 300 | 280 | 260 | 280 |
| 7 | 280 | 285 | 280 | 305 | C | C | C | C | C | C | 350 | 330 | 340 | 330 | 335 | 335 | 350 | 320 | 315 | 300 | 295 | 290 | 280 | 285 |
| 8 | 280 | 290 | 290 | 310 | 325 | 300 | 300 | IR 320 | 320 | 350 | 330 | 330 | 330 | 330 | 335 | 345 | 325 | 330 | 340 | 310 | 305 | 280 | 280 | 280 |
| 9 | 285 | 285 | 295 | 305 | 295 | 305 | 315 | 335 | 345 | 340 | 340 | 340 | 320 | 320 | 350 | 355 | 350 | 320 | 300 | 315 | 320 | 300 | 280 | 260 |
| 10 | 265 | 290 | 300 | C | C | C | C | C | C | C | 320 | 335 | 330 | 345 | 320 | 335 | 340 | 360 | 355 | 330 | 355 | 285 | 280 | 260 |
| 11 | S 290 | 290 | 285 | 285 | 285 | 300 | 300 | S 330 | 345 | 335 | 310 | 330 | 330 | 310 | 350 | 320 | 325 | 320 | 315 | 315 | 320 | 280 | 270 | 280 |
| 12 | 260 | 285 | 275 | 290 | 320 | 305 | 270 | 325 | 340 | 335 | 320 | 315 | 320 | 330 | 315 | 315 | 335 | 320 | 330 | 305 | 335 | 295 | 290 | 295 |
| 13 | 290 | 290 | 270 | 280 | 285 | 305 | 330 | 335 | 325 | 350 | 315 | C | C | C | C | 330 | 340 | 330 | 310 | 325 | 315 | 270 | 280 | 270 |
| 14 | 290 | 280 | 265 | 285 | 320 | 325 | IS 320 | 350 | 350 | 335 | 320 | 340 | 325 | 315 | 320 | 345 | 340 | C | C | C | 305 | 280 | 285 | 285 |
| 15 | 265 | 270 | 275 | 285 | 310 | 325 | 325 | 350 | 345 | 335 | 310 | 330 | 330 | 320 | 350 | 325 | 340 | 335 | 335 | 325 | 315 | 290 | 295 | IS 290 |
| 16 | 300 | 280 | 280 | 280 | 290 | 305 | 325 | 350 | 360 | 365 | 300 | 340 | 330 | 330 | 335 | 320 | 335 | 320 | 315 | 310 | 310 | 325 | 270 | IR 280 |
| 17 | 280 | 280 | 265 | 275 | 310 | 345 | 335 | 340 | 330 | 330 | 315 | 330 | 320 | 325 | 320 | 340 | 335 | 315 | 325 | 335 | 280 | 290 | 280 | 290 |
| 18 | 285 | 280 | 295 | 265 | 280 | 305 | 305 | 340 | 335 | 330 | 345 | 340 | 340 | 320 | 335 | 325 | 345 | 320 | 320 | 315 | 345 | 285 | 285 | 280 |
| 19 | 275 | 280 | 285 | 300 | 295 | 300 | 315 | 355 | 330 | 345 | 340 | IA 345 | 325 | 320 | 330 | 340 | 340 | 315 | 315 | 300 | 320 | 300 | 285 | 275 |
| 20 | 280 | 275 | 285 | 290 | 300 | 310 | 305 | 330 | 345 | 330 | 320 | 320 | 335 | IC 320 | 305 | 340 | 350 | 320 | 310 | 300 | 335 | 310 | 300 | 280 |
| 21 | IA 270 | 250 | 280 | 295 | 305 | 305 | 310 | 335 | 345 | 340 | 325 | 320 | 335 | 330 | 335 | 315 | 340 | 315 | 320 | 315 | 310 | 305 | 280 | 270 |
| 22 | 275 | 280 | 275 | 285 | 290 | 300 | 330 | 325 | 340 | 330 | 310 | 320 | 330 | 310 | 305 | 325 | 340 | 280 | 315 | 320 | 335 | 285 | IR 275 | IR 265 |
| 23 | 270 | 280 | 300 | 280 | 280 | 290 | 335 | 325 | 340 | 335 | 335 | 325 | 330 | 330 | 325 | 330 | 340 | 300 | 330 | 335 | 300 | 275 | IA 290 | 280 |
| 24 | 280 | 280 | 280 | 275 | 280 | 275 | 320 | 330 | 345 | 315 | 320 | IR 330 | 300 | 320 | 300 | 320 | 340 | 280 | 300 | 320 | IA 305 | IA 295 | IA 280 | 285 |
| 25 | IR 285 | 280 | 305 | 295 | 270 | 285 | 320 | 345 | IR 340 | 340 | 345 | 320 | 310 | 315 | 320 | 320 | 315 | 335 | 315 | 320 | 320 | 305 | 290 | 275 |
| 26 | 280 | 275 | 275 | 275 | 280 | 280 | 305 | IR 340 | 320 | 360 | 345 | 330 | 315 | 335 | 310 | 320 | IA 310 | 300 | 320 | 320 | 315 | 305 | 290 | 305 |
| 27 | 285 | 290 | 290 | 265 | 280 | 280 | IA 300 | S 325 | IR 320 | 340 | 325 | 325 | 300 | 325 | 320 | 325 | 310 | 310 | 320 | 325 | 310 | 295 | 305 | IR 305 |
| 28 | 300 | 315 | 300 | 265 | 280 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | 280 | 290 | 285 |
| 29 | 290 | 305 | 295 | 275 | 275 | 290 | 320 | 315 | 340 | 335 | 330 | 335 | 345 | 325 | 320 | 350 | 320 | 325 | 325 | 315 | IA 320 | 275 | 265 | 295 |
| 30 | 315 | 315 | 270 | 275 | 275 | 295 | 305 | 325 | 345 | 330 | 335 | 340 | 320 | 325 | 320 | 320 | 330 | 315 | 350 | 335 | 295 | 315 | 280 | 290 |
| 31 | 290 | 300 | 290 | 295 | 280 | 295 | 310 | 325 | 335 | 355 | 335 | 330 | 340 | 320 | 335 | 340 | 340 | 325 | 325 | 335 | 290 | 280 | 275 | 285 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 31 | 31 | 31 | 30 | 29 | 28 | 27 | 27 | 27 | 28 | 30 | 29 | 29 | 29 | 29 | 30 | 30 | 29 | 29 | 29 | 30 | 31 | 31 | 31 |
| MED | 280 | 280 | 285 | 285 | 290 | 300 | 310 | 330 | 340 | 335 | 322 | 330 | 325 | 320 | 320 | 330 | 340 | 320 | 320 | 320 | 315 | 290 | 280 | 280 |
| UQ | 290 | 290 | 290 | 295 | 305 | 305 | 320 | 340 | 345 | 342 | 335 | 335 | 330 | 330 | 335 | 340 | 340 | 320 | 330 | 325 | 320 | 300 | 288 | 285 |
| LQ | 275 | 280 | 275 | 275 | 280 | 290 | 305 | 325 | 330 | 330 | 320 | 325 | 315 | 320 | 320 | 320 | 325 | 315 | 315 | 310 | 305 | 280 | 275 | 275 |



DEC. 1969 | M(3000)F2 (0.01)

# IONOSPHERIC DATA

DEC. 1969 | M(3000)F1 (0.01) | 135° E Mean Time (G. M. T. + 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | L | L | L | L | L | | | | | | | | | | |
| 2 | | | | | | | | | | 420 | L | L | L 370 | L | 410 | | | | | | | | | |
| 3 | | | | | | | | | | L | L | 370 | L | | L | | | | | | | | | |
| 4 | | | | | | | | | | | L | L | H 370 | L | | | | | | | | | | |
| 5 | | | | | | | | | | | L | L | L | | | | | | | | | | | |
| 6 | | | | | | | | | | L | L | L | L | | | | | | | | | | | |
| 7 | | | | | | | | | | C | L | L | L | 405 | | | | | | | | | | |
| 8 | | | | | | | | | | | L | L 390 | L 400 | 400 | | | | | | | | | | |
| 9 | | | | | | | | | | L | L | L | L | L | | | | | | | | | | |
| 10 | | | | | | | | | | | L | L | L | L | 415 | | | | | | | | | |
| 11 | | | | | | | | | | | L 375 | L 380 | L | L | L | | | | | | | | | |
| 12 | | | | | | | | | | | L | L | L | L 380 | L | | | | | | | | | |
| 13 | | | | | | | | | | L | L | C | C | C | C | | | | | | | | | |
| 14 | | | | | | | | | | | 365 | L | L | L | | | | | | | | | | |
| 15 | | | | | | | | | | | 420 | L | L 350 | L | L | | | | | | | | | |
| 16 | | | | | | | | | | | L | L | L | L | L | | | | | | | | | |
| 17 | | | | | | | | | | | L | L | L | L | L | | | | | | | | | |
| 18 | | | | | | | | | | | L 385 | L | L | L 405 | 430 | | | | | | | | | |
| 19 | | | | | | | | | | | A | A | L | 360 | | | | | | | | | | |
| 20 | | | | | | | | | | | L | L 350 | L | C | | | | | | | | | | |
| 21 | | | | | | | | | | L | 375 | L | L | L | L | | | | | | | | | |
| 22 | | | | | | | | | | | 405 | L | L | | L 360 | | | | | | | | | |
| 23 | | | | | | | | | | | L | L | L | L | | | | | | | | | | |
| 24 | | | | | | | | | | | L | L | L | L | | | | | | | | | | |
| 25 | | | | | | | | | | | L | L | L | L | L | | | | | | | | | |
| 26 | | | | | | | | | | | 385 | L | L | L | | | | | | | | | | |
| 27 | | | | | | | | | | | L | L | L | | | | | | | | | | | |
| 28 | | | | | | | | | | C | C | C | C | C | C | | | | | | | | | |
| 29 | | | | | | | | | | | L | L | L | L | | | | | | | | | | |
| 30 | | | | | | | | | | | L | L | L | | | | | | | | | | | |
| 31 | | | | | | | | | | | L | L | L | L | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | | | | | | | | | | 1 | 7 | 4 | 4 | 5 | 4 | | | | | | | | | |
| MED | | | | | | | | | | 420 | 385 | 375 | 370 | 400 | 412 | | | | | | | | | |
| UQ | | | | | | | | | | | 395 | 385 | 385 | 405 | 422 | | | | | | | | | |
| LQ | | | | | | | | | | | 375 | 360 | 360 | 380 | 385 | | | | | | | | | |

The Radio Research Laboratories, Japan

DEC. 1969 | M(3000)F1 (0.01)

# IONOSPHERIC DATA

DEC. 1969 | H'F2 (KM) | 135° E Mean Time (G. M. T.+ 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | 245 | 250 | 250 | 250 | 230 | | | | | | | | | | |
| 2 | | | | | | | | | | 240 | 235 | 250 | 250 | 245 | 235 | | | | | | | | | |
| 3 | | | | | | | | | | 230 | 250 | 275 | 240 | | 260 | | | | | | | | | |
| 4 | | | | | | | | | | | 230 | 230 | 265 | 245 | | | | | | | | | | |
| 5 | | | | | | | | | | | 240 | 245 | 285 | | | | | | | | | | | |
| 6 | | | | | | | | | | 230 | 265 | 250 | 240 | | | | | | | | | | | |
| 7 | | | | | | | | | | C | 250 | 230 | 230 | 240 | | | | | | | | | | |
| 8 | | | | | | | | | | | 250 | 245 | 230 | 240 | | | | | | | | | | |
| 9 | | | | | | | | | | 225 | 240 | 240 | 245 | 245 | | | | | | | | | | |
| 10 | | | | | | | | | | | 250 | 250 | 245 | 240 | 230 | | | | | | | | | |
| 11 | | | | | | | | | | | 245 | 240 | 255 | 245 | 240 | | | | | | | | | |
| 12 | | | | | | | | | | | 255 | 250 | 265 | 245 | 250 | | | | | | | | | |
| 13 | | | | | | | | | | 210 | 250 | C | C | C | C | | | | | | | | | |
| 14 | | | | | | | | | | | 280 | 230 | 240 | 240 | | | | | | | | | | |
| 15 | | | | | | | | | | | 240 | 255 | 265 | 260 | 245 | | | | | | | | | |
| 16 | | | | | | | | | | | 260 | 245 | 240 | 255 | 240 | | | | | | | | | |
| 17 | | | | | | | | | | | 245 | 250 | 260 | 245 | 235 | | | | | | | | | |
| 18 | | | | | | | | | | | 250 | 235 | 250 | 230 | 235 | | | | | | | | | |
| 19 | | | | | | | | | | | 255 | I A 250 | 240 | 255 | | | | | | | | | | |
| 20 | | | | | | | | | | | 260 | 250 | 240 | I C 250 | | | | | | | | | | |
| 21 | | | | | | | | | | 250 | 270 | 250 | 255 | 230 | 255 | | | | | | | | | |
| 22 | | | | | | | | | | | 240 | 240 | 250 | | 280 | | | | | | | | | |
| 23 | | | | | | | | | | | 250 | 240 | 250 | 245 | | | | | | | | | | |
| 24 | | | | | | | | | | | 250 | 235 | 240 | 240 | | | | | | | | | | |
| 25 | | | | | | | | | | | 230 | 230 | 250 | 250 | 270 | | | | | | | | | |
| 26 | | | | | | | | | | | 240 | 250 | 230 | 250 | | | | | | | | | | |
| 27 | | | | | | | | | | | 225 | 240 | 240 | | | | | | | | | | | |
| 28 | | | | | | | | | | C | C | C | C | C | C | | | | | | | | | |
| 29 | | | | | | | | | | | 250 | 240 | 245 | 250 | | | | | | | | | | |
| 30 | | | | | | | | | | | 250 | 240 | 250 | | | | | | | | | | | |
| 31 | | | | | | | | | | | 245 | 240 | 230 | 230 | | | | | | | | | | |
| | 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 | 30 | 29 | 29 | 23 | 12 | | | | | | | | | |
| MED | | | | | | | | | | 230 | 250 | 245 | 245 | 245 | 242 | | | | | | | | | |
| UQ | | | | | | | | | | 242 | 250 | 250 | 250 | 250 | 258 | | | | | | | | | |
| LQ | | | | | | | | | | 228 | 240 | 240 | 240 | 240 | 235 | | | | | | | | | |

The Radio Research Laboratories, Japan

DEC. 1969 | H'F2 (KM)

# IONOSPHERIC DATA

DEC. 1969 | H'F (KM) | 135° E Mean Time (G. M. T.+ 9h)

Station AKITA Lat. 39 43.5 N Long. 140 08.2 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 290 | 290 | 320 | 325 | 320 | 280 | 235 | 215 | 225 | 235 | 230 | 230 | 230 | 225 | 235 | 230 | 220 | 220 | 215 | 210 | 240 | 290S | 325 | 330 |
| 2 | 305 | 320 | 300 | 315 | 305 | 260 | 250 | 225 | 230 | 200 | 225 | 230 | 205 | 230 | 220 | 235 | 215 | 215 | 235 | 240 | 230 | 245 | 330 | 300 |
| 3 | 305 | 320 | 300 | 270 | 270 | 255 | 225 | 220 | 230 | 230 | 230 | 215 | 235 | 235 | 225 | I C 235 | 215 | 205 | 205 | 250 | 275 | 265 | 300 | 325 |
| 4 | 330 | 315 | 290 | 270 | 260 | 215 | C | C | C | 230 | 230 | 230 | 205H | 235 | 230 | 235 | 215 | 240 | 240 | 225 | 245 | 355 | 345 | 340 |
| 5 | 290 | 300 | 320 | 295 | 240 | 270 | 245 | 230 | 225 | 230 | 230 | 235 | 220H | 240 | 235 | 235 | 220 | 235 | 215 | 260 | 240 | 250 | 360 | 360 |
| 6 | 315 | 290 | 260 | 290 | 350 | 320 | 270 | 240 | 235 | 215 | 230 | 235 | 230 | 240 | 240 | 225 | 225 | 200 | 230 | 240 | 245 | 300 | 325 | 300 |
| 7 | 290 | 310 | 310 | 245 | C | C | C | C | C | C | 230 | 230 | 220 | 220 | 230 | 235 | 205 | 200 | 225 | 240 | 265 | 265 | 320 | 310 |
| 8 | 315 | 270 | 260 | 240 | 225 | 245 | 265 | 240 | 220 | 235 | 230 | 230 | 210 | 220 | 250 | 225 | 215 | 220 | 220 | 255 | 250 | 280 | 280 | 310 |
| 9 | 320 | 310 | 270 | 250 | 260 | 240 | 250 | 230 | 215 | 220 | 235 | 215 | 200H | 240 | 240 | 225 | 215 | 235 | 250 | 230 | 235 | 250 | 275 | 320 |
| 10 | 335 | 290 | 270 | C | C | C | C | C | C | C | 235 | 240 | 215 | 225A | 210 | 240 | 225 | 210 | 210 | 220 | 220 | 280 | 300 | 335 |
| 11 | 290 | 300 | 305 | 290 | 290 | 220 | 240 | 230 | 215 | 230 | 215 | 210 | 240 | 240 | 245 | 235 | 220 | 215 | 245 | 240 | 245 | 235 | 340 | 360 |
| 12 | 320 | 305 | 330 | 290 | 230 | 205 | 260 | 235 | 230 | 240 | 235 | 230 | 245 | 215 | 245 | 225 | 220 | 215 | 240 | 245 | 240 | 270 | 300 | 305 |
| 13 | 300 | 290 | 300 | 320 | 295 | 260 | 230 | 225 | 220 | 210 | 225 | C | C | C | C | 230 | 225 | 205 | 245 | 210 | 260 | I B 270 | I B 320 | 340 |
| 14 | 315 | 310 | 340 | 305 | 250 | 210 | I S 230 | 210 | 215 | 225 | 225 | 230 | 220 | 240 | 240 | 225 | 210 | C | C | C | 245 | 255 | 295 | 340 |
| 15 | 330 | 320 | 320 | 300 | 245 | 230 | 210 | 215 | 210 | 215 | 190 | 250 | 240 | 240 | 240 | 220 | 220 | 200 | 230 | 245 | 245 | 280 | 320 | I S 320 |
| 16 | 295 | 310 | 340 | 300 | 300 | 310 | 205 | 210 | 215 | 230 | 230 | 245 | 235 | 230 | 235 | 230 | 215 | 230 | 240 | 240 | 240 | 220 | I A 290 | 320 |
| 17 | 300 | 300 | 340 | 330 | 250 | 205 | 250 | 230 | 215 | 230 | 230 | 235 | 225 | 235 | 235 | 225 | 215 | 245 | 220 | 220 | 245 | 260 | 320 | 300 |
| 18 | 300 | 300 | 290 | 290 | 305 | 260 | 240 | 225 | 215 | 230 | 230 | 215 | 225 | 210 | 190 | 220 | 220 | 210 | 230 | 235 | 225 | 270 | 295 | 300 |
| 19 | 310 | 300 | 290 | 250 | 265 | 245 | 210 | 200 | 215 | 220 | A | A | A | 215 | 250 | 235 | 210 | 205 | 245 | 250 | 250 | 260 | 340 | 340 |
| 20 | 310 | 300 | 305 | 305 | 290 | 255 | 240 | 235 | 220 | 230 | 235 | 230 | 240 | I C 235 | 240 | 230 | 210 | 230 | 235 | 240 | 240 | 265 | 300 | 310 |
| 21 | I A 355 | I A 345 | 310 | 255 | 240 | 245 | 240 | 235 | 220 | 230 | 210 | 230 | 195H | 215 | 230 | 220 | 210 | 220 | 240 | 220 | 240 | 265 | 310 | 350 |
| 22 | 310 | 315 | 315 | 280 | 270 | 265 | 230 | 235 | 215 | 215 | 200 | 230 | 230 | 220 | 230 | 230 | 215 | 245 | 250 | 245 | A | A | A | 350 |
| 23 | 350 | 295 | 255 | 300 | 300 | 260 | 215 | 220 | 220 | 225 | 240 | 220 | 230 | 220 | 245 | 240 | 220 | 210 | 230 | 240 | 250 | 300 | I A 315 | I A 335 |
| 24 | 295 | 320 | 315 | 305 | 300 | 310 | 240 | 240 | 220 | 230 | 230 | 220 | 215 | 240 | 245 | 245 | 215 | 200 | 250 | 225 | I A 260 | I A 275 | I A 310 | 330 |
| 25 | 320 | 280 | 275 | 260 | 320 | 295 | 255 | 220 | 215 | 230 | 225 | 225 | 225 | 230 | 240 | 245 | 220 | 205 | 235 | 235 | 235 | 255 | 300 | 325 |
| 26 | 310 | 300 | 310 | 305 | 290 | 310 | 275 | 225 | 225 | 205 | 225 | 230 | 220 | 250 | 230 | 220 | I A 255 | 245 | 220 | 245 | 230 | 260 | 270 | 270 |
| 27 | 300 | 285 | 305 | 350 | 300 | 265 | I A 260 | 240 | 230 | 220 | 210 | 210 | 220 | 240 | 240 | 235 | 240 | I A 235 | 240 | 230 | 260 | 280 | 270 | I A 285 |
| 28 | 305 | 255 | 250 | 340 | 305 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | 340 | 315 | 320 |
| 29 | 290 | 255 | 280 | 305 | 320 | 295 | 245 | 225 | 225 | 220 | 230 | 230 | 230 | 220 | 225 | 225 | 230 | 220 | 230 | 225 | I A 245 | 320 | 330 | 305 |
| 30 | 270 | 255 | 310 | 340 | 320 | 270 | 235 | 215 | 215 | 225 | 240 | 240 | 220 | 230 | 240 | 220 | 230 | 230 | 210 | 220 | 255 | 260 | 310 | 300 |
| 31 | 290 | 270 | 300 | 300 | 300 | 290 | 240 | 220 | 220 | 230 | 230 | 210 | 220 | 220 | 230 | 220 | 230 | 225 | 230 | 205 | 290 | 315 | 320 | 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 | 31 | 31 | 31 | 30 | 29 | 28 | 27 | 27 | 27 | 28 | 29 | 28 | 28 | 29 | 29 | 30 | 30 | 29 | 29 | 29 | 29 | 30 | 30 | 31 |
| MED | 305 | 300 | 305 | 300 | 290 | 260 | 240 | 225 | 220 | 230 | 230 | 230 | 222 | 230 | 235 | 230 | 220 | 220 | 230 | 240 | 245 | 268 | 312 | 320 |
| UQ | 318 | 310 | 315 | 305 | 305 | 285 | 250 | 235 | 225 | 230 | 230 | 232 | 230 | 240 | 240 | 235 | 225 | 230 | 240 | 245 | 250 | 280 | 325 | 338 |
| LQ | 295 | 290 | 285 | 270 | 260 | 242 | 230 | 220 | 215 | 220 | 225 | 220 | 218 | 220 | 230 | 225 | 215 | 205 | 220 | 225 | 240 | 260 | 300 | 302 |

The Radio Research Laboratories, Japan

DEC. 1969 | H'F (KM)

# IONOSPHERIC DATA

DEC. 1969 | H'ES (KM) | 135° E Mean Time (G. M. T. + 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | S | 100 | 100 | 100 | 100 | S | S | G | 115 | 110 | G | G | G | G | G | G | G | S | S | S | S | S | S | S |
| 2 | S | S | S | E | E | S | S | G | G | G | G | G | G | G | G | 100 | G | S | S | S | S | S | S | S |
| 3 | S | S | S | S | S | S | S | 150 | G | G | G | G | G | G | 100 | C | 100 | S | S | S | S | S | S | S |
| 4 | S | S | E | S | S | 100 | C | C | C | G | G | G | G | 100 | 100 | 100 | 100 | 100 | 100 | S | S | S | S | S |
| 5 | S | S | S | S | E | S | S | G | G | 125 | 115 | 120 | G | 105 | 130 | G | 100 | 100 | S | S | S | S | S | S |
| 6 | S | S | S | 105 | S | S | S | G | G | G | 110 | 110 | 110 | 105 | G | G | G | 100 | S | S | S | S | S | S |
| 7 | S | S | S | S | C | C | C | C | C | C | G | 140 | G | G | G | 150 | G | S | S | S | S | S | S | S |
| 8 | 105 | S | S | E | E | S | S | 110 | 110 | 105 | G | G | 105 | 100 | G | G | 100 | 100 | S | S | S | S | S | S |
| 9 | S | 100 | 100 | S | S | S | S | G | G | G | G | G | 115 | G | G | 125 | S | S | S | S | S | S | S | S |
| 10 | S | S | S | C | C | C | C | C | C | C | 125 | 120 | G | 115 | 130 | 100 | S | S | S | S | S | S | S | S |
| 11 | S | S | S | S | S | S | S | G | G | G | G | G | G | G | G | G | G | S | S | S | S | S | S | S |
| 12 | S | S | S | S | E | S | S | G | G | G | G | G | G | G | G | G | 105 | 105 | 105 | S | S | S | S | S |
| 13 | S | S | S | S | S | S | S | G | G | G | 110 | C | C | C | C | G | G | 105 | 105 | S | S | B | B | S |
| 14 | S | S | S | S | S | S | S | 155 | 150 | 145 | 145 | G | G | G | G | G | G | C | C | C | 115 | S | S | S |
| 15 | S | S | S | S | E | S | S | B | 110 | G | 110 | 155 | G | G | G | G | G | S | S | S | S | S | S | S |
| 16 | S | 100 | 105 | S | S | S | S | G | G | 150 | 115 | 115 | G | 105 | G | G | G | 110 | S | 110 | 110 | 110 | 105 | S |
| 17 | 105 | S | S | S | 105 | S | S | B | 110 | 115 | 115 | 120 | G | G | G | G | G | S | S | S | S | S | S | S |
| 18 | S | 105 | S | S | 105 | S | S | 115 | G | G | G | G | G | G | G | 145 | 100 | S | S | 100 | 110 | 100 | S | S |
| 19 | S | E | E | S | S | S | S | G | G | G | 115 | 110 | 115 | 115 | G | G | B | S | 100 | 100 | S | S | S | S |
| 20 | S | S | 100 | E | 110 | S | 105 | 105 | 110 | G | 120 | 110 | 110 | C | 105 | G | 105 | 100 | 105 | 100 | 100 | S | S | S |
| 21 | 105 | 105 | S | S | S | S | S | S | 130 | G | 120 | G | G | G | 115 | 110 | 105 | 100 | 100 | S | S | S | S | S |
| 22 | S | S | S | S | E | 110 | 105 | 110 | G | G | G | G | G | G | 125 | G | G | S | S | S | 100 | 100 | 100 | S |
| 23 | S | 110 | S | 105 | 105 | S | S | G | 170 | 105 | G | G | G | G | G | G | 110 | S | S | S | 105 | 105 | 100 | 100 |
| 24 | 100 | 100 | S | S | S | S | S | 105 | 105 | 105 | G | 130 | G | 130 | 120 | 120 | G | S | 110 | 105 | 105 | 100 | 100 | 100 |
| 25 | 100 | 100 | S | E | S | 100 | 110 | 110 | G | G | G | G | 105 | 100 | G | 105 | 105 | 105 | S | S | S | S | S | S |
| 26 | S | S | S | S | 110 | 105 | S | 105 | G | G | 150 | 155 | B | G | 140 | 115 | 110 | 110 | 110 | 105 | 110 | S | 105 | 100 |
| 27 | 100 | S | 110 | 110 | 105 | 110 | 105 | 105 | 100 | 105 | B | G | G | 120 | 115 | 115 | 110 | 105 | 105 | 105 | 105 | S | S | 100 |
| 28 | 100 | 100 | 100 | B | S | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | 105 | S | S |
| 29 | S | B | B | B | B | 105 | 105 | 110 | 120 | G | G | G | G | G | 150 | G | 150 | S | 130 | S | 105 | 105 | 105 | 105 |
| 30 | 100 | 100 | B | B | 115 | B | S | B | G | G | G | G | G | G | G | G | 155 | B | B | S | S | S | S | S |
| 31 | S | 100 | B | B | B | B | B | B | G | G | G | G | G | G | G | 115 | 110 | 110 | 105 | S | S | 100 | 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 | 8 | 11 | 6 | 4 | 8 | 6 | 5 | 11 | 11 | 9 | 12 | 11 | 6 | 10 | 11 | 12 | 15 | 13 | 11 | 7 | 10 | 8 | 6 | 5 |
| MED | 100 | 100 | 100 | 105 | 105 | 105 | 105 | 110 | 110 | 110 | 115 | 120 | 110 | 105 | 120 | 115 | 105 | 105 | 105 | 105 | 105 | 102 | 102 | 100 |
| UQ | 105 | 102 | 105 | 108 | 110 | 110 | 105 | 112 | 125 | 125 | 122 | 135 | 115 | 115 | 130 | 122 | 110 | 105 | 108 | 105 | 110 | 105 | 105 | 100 |
| LQ | 100 | 100 | 100 | 102 | 105 | 100 | 105 | 105 | 110 | 105 | 112 | 112 | 105 | 100 | 110 | 102 | 100 | 100 | 102 | 100 | 105 | 100 | 100 | 100 |



DEC. 1969 | H'ES (KM)

# IONOSPHERIC DATA

DEC. 1969 | TYPES OF ES | 135° E Mean Time (G. M. T. + 9h)

Station AKITA Lat. 39° 43.5' N, Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | F1 | F1 | F1 | F1 | | | | C2 | L2 | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | L2 | | | | | | | | |
| 3 | | | | | | | | H1 | | | | | | | L1 | | L1 | | | | | | | |
| 4 | | | | | | F1 | | | | | | | | L2 | L3 | L2 | L3 | F3 | F1 | | | | | |
| 5 | | | | | | | | | | C1 | C1 | C1 | | L2 | H1 | | L2 | F1 | | | | | | |
| 6 | | | | F1 | | | | | | | L1 | L1 | L2 | L2 | | | | F1 | | | | | | |
| 7 | | | | | | | | | | | | H1 | | | | H2 | | | | | | | | |
| 8 | F1 | | | | | | | L1 | L2 | L1 | | | L1 | L2 | | | L3 | F1 | | | | | | |
| 9 | | F1 | F1 | | | | | | | | | | C1 | | | H11 | | | | | | | | |
| 10 | | | | | | | | | | | H1 | C1 | | C2 | H1 | L2 | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | L2 | F1 | F1 | | | | | |
| 13 | | | | | | | | | | | L1 | | | | | | | F1 | F1 | | | | | |
| 14 | | | | | | | | H1 | H2 | H1 | H1 | | | | | | | | | | F1 | | | |
| 15 | | | | | | | | | L1 | | L1 | H1 | | | | | | | | | | | | |
| 16 | | F1 | F2 | | | | | | | H1 | C1 | C1 | | L1 | | | | F1 | | F1 | F1 | F1 | F2 | |
| 17 | F1 | | | | F1 | | | | L1 | C1 | C1 | C1 | | | | | | | | | | | | |
| 18 | | F1 | | | F1 | | | C1 | | | | | | | | H1 | L1 | | | F1 | F1 | F1 | | |
| 19 | | | | | | | | | | | C2 | C3 | C1 | C1 | | | | | F1 | F1 | | | | |
| 20 | | | F1 | | F1 | | F1 | L2 | L1 | | C1 | L1 | L1 | | L1 | | L2 | F1 | F1 | F1 | F2 | | | |
| 21 | F1 | F1 | | | | | | | H2 | | C1 | | | | C1 | L1 | L1 | F1 | F1 | | | | | |
| 22 | | | | | | F3 | F2 | L1 | | | | | | | H1 | | | | | | F3 | F1 | F1 | |
| 23 | | F1 | | F2 | F1 | | | | H1 | L1 | | | | | | | L1 | | | | F1 | F1 | F1 | F1 |
| 24 | F1 | F1 | | | | | | L2 | L2 | L1 | | H1 | | H1 | C2 | C2 | | | F1 | F1 | F2 | F2 | F1 | F1 |
| 25 | F2 | F1 | | | | F1 | F1 | L2 | | | | | L1 | L1 | | L1 | L1 | F1 | | | | | | |
| 26 | | | | | F1 | F1 | | L1 | | | H1 | H1 | | | H1 | C1 | C3 | F2 | F1 | F1 | F1 | | F1 | F1 |
| 27 | F1 | | F1 | | | F2 | F3 | L1 | L1 | L1 | | | | C1 | C1 | C1 | L1 | F2 | F1 | F1 | F1 | | | F2 |
| 28 | F1 | F1 | F1 | | | | | | | | | | | | | | | | | | | F2 | | |
| 29 | | | | | | F2 | F1 | L1 | C2 | | | | | | H1 | | H1 | | F1 | | F2 | F1 | F1 | F1 |
| 30 | F2 | F1 | | | F1 | | | | | | | | | | | | H1 | | | | | | | |
| 31 | | F1 | | | | | | | | | | | | | | C1 | L1 | F1 | F1 | | | F1 | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | | | | | | | | | | | | | | | | | | | | | | | | |
| MED | | | | | | | | | | | | | | | | | | | | | | | | |
| UQ | | | | | | | | | | | | | | | | | | | | | | | | |
| LQ | | | | | | | | | | | | | | | | | | | | | | | | |

The Radio Research Laboratories, Japan

DEC. 1969 | TYPES OF ES

# IONOSPHERIC DATA

DEC. 1969 | FOF2 (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

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

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 35 | 35 | 35 | 34 | 34 | 35 | 41 | J R 78 | 80 | 101 | 118 | 120 | 117 | 120 | 108 | J R 104 | J R 103 | J R 83 | 76 | 42 | 36 | 33 | 26 | 28 |
| 2 | 29 | 30 | 31 | 30 | 30 | 31 | 33 | 67 | 83 | 100 | 108 | 104 | 103 | 101 | 87 | 87 | 91 | 58 | 49 | 37 | 37 | 34 | 32 | J R 38 |
| 3 | 39 | 35 | 36 | 36 | 32 | 33 | 37 | 74 | 85 | 101 | 100 | 101 | 126 | 113 | 111 | J R 105 | 83 | 56 | 43 | 33 | 37 | 35 | 33 | 36 |
| 4 | 38 | 38 | 38 | 38 | 39 | 30 | 31 | J R 69 | J R 73 | 99 | 101 | 100 | 92 | J R 105 | 106 | J R 105 | 96 | 61 | 58 | 46 | 35 | 29 | 31 | 35 |
| 5 | 36 | 33 | 35 | 36 | 35 | 31 | 35 | 66 | 90 | 90 | 111 | 120 | 109 | 113 | 97 | 82 | 70 | 58 | 50 | 39 | 42 | 36 | 33 | 35 |
| 6 | 36 | 37 | 38 | 34 | 33 | 33 | 38 | 71 | 80 | 110 | 113 | 115 | 126 | 113 | 119 | 109 | 78 | 67 | 45 | 43 | 35 | 35 | 35 | 40 |
| 7 | 40 | 40 | 41 | 41 | 30 | 28 | 31 | 69 | 101 | J R 105 | 108 | 110 | J R 105 | 96 | 101 | 96 | 84 | 60 | 38 | 33 | 34 | 32 | 35 | 35 |
| 8 | 35 | 38 | 40 | 38 | 29 | 30 | 33 | 66 | 86 | 95 | J R 106 | 96 | C | 101 | 100 | 95 | 69 | J R 53 | 40 | 35 | 36 | 38 | 34 | 32 |
| 9 | 33 | 37 | 39 | 35 | 38 | 30 | 30 | 61 | 71 | 83 | 86 | 87 | 98 | 103 | 93 | 84 | 66 | 53 | 36 | 44 | 36 | 31 | 31 | 32 |
| 10 | 35 | J R 36 | J R 40 | 42 | 28 | 26 | 29 | 55 | 70 | 86 | 93 | J R 107 | 110 | 109 | 81 | 80 | 84 | 55 | 31 | 28 | 29 | 28 | 29 | 30 |
| 11 | 32 | 31 | 32 | 34 | 33 | 33 | 31 | 63 | 79 | 74 | 88 | 102 | 84 | 88 | 93 | 86 | 76 | 60 | 43 | 33 | J R 40 | 30 | 25 | 29 |
| 12 | 30 | 31 | 33 | 36 | 37 | 25 | 25 | 54 | R 76 | 81 | J R 105 | 101 | J R 108 | 116 | 97 | 93 | 71 | 47 | 39 | 33 | 36 | J R 27 | 26 | 29 |
| 13 | 31 | 31 | 31 | 31 | 30 | 33 | 34 | J R 65 | R 83 | 81 | 88 | 88 | J R 103 | 97 | J R 106 | 90 | 84 | 68 | 40 | 36 | 30 | 29 | 22 | 25 |
| 14 | 29 | 29 | 29 | 32 | 38 | 29 | J R 26 | 53 | 64 | 76 | 91 | J R 100 | 87 | V 84 | 83 | 84 | 70 | 44 | 41 | 32 | 35 | 30 | 28 | 28 |
| 15 | 29 | 31 | 32 | 35 | 43 | 34 | 27 | 57 | 70 | 77 | 86 | J R 104 | 110 | 107 | 97 | 86 | 79 | 66 | 41 | 40 | 36 | 30 | 31 | 33 |
| 16 | 36 | 34 | 33 | 34 | 34 | 37 | 38 | 57 | 64 | 78 | 86 | 101 | 110 | 96 | J R 101 | 96 | 90 | 57 | 47 | 47 | 45 | 38 | A | 30 |
| 17 | 34 | 34 | 32 | 34 | 43 | 31 | 26 | 57 | 80 | 102 | 123 | 123 | 116 | 125 | 126 | 123 | 75 | 52 | 50 | 45 | 40 | 31 | 29 | 30 |
| 18 | 31 | 30 | 31 | 31 | 31 | 31 | 31 | 71 | 87 | R 97 | 101 | I C 105 | J R 104 | R | 91 | J R 102 | R | 66 | 35 | 31 | 34 | 30 | 30 | 32 |
| 19 | 32 | 37 | 41 | 38 | 46 | 35 | 38 | 63 | J R 74 | 85 | 102 | 113 | 101 | 88 | J R 104 | 130 | 99 | 56 | 47 | 40 | 30 | 30 | 32 | 32 |
| 20 | 35 | 36 | 36 | 38 | 36 | 33 | 36 | 63 | R | 84 | 103 | 115 | 110 | 109 | 113 | V 112 | 89 | 58 | 46 | 42 | 44 | 41 | 30 | 31 |
| 21 | 30 | 32 | 33 | 37 | 36 | 30 | 31 | 61 | 80 | 79 | 106 | 108 | 113 | 118 | 91 | 95 | 83 | 53 | 45 | 41 | 33 | 31 | 32 | 35 |
| 22 | 34 | 36 | 36 | 37 | 37 | 36 | 39 | 59 | 85 | 82 | 93 | 99 | 102 | 108 | 95 | J R 102 | 70 | 46 | 50 | 42 | 34 | 30 | 30 | 31 |
| 23 | 35 | 36 | 36 | 36 | 35 | 39 | 36 | 60 | 80 | 95 | J R 107 | 112 | 115 | 117 | J R 107 | J R 105 | 107 | 53 | 59 | 46 | 35 | 31 | 31 | 32 |
| 24 | 34 | 34 | 35 | 35 | 34 | 33 | 36 | 61 | 97 | 96 | 110 | J R 109 | 116 | J R 104 | 105 | J R 99 | J R 104 | 62 | 56 | 50 | 38 | 30 | I A 31 | 31 |
| 25 | 34 | 28 | 31 | 33 | 31 | 33 | 35 | 66 | I R 84 | R 82 | J R 107 | 87 | 101 | 110 | 98 | 105 | 111 | 75 | 66 | 55 | 45 | 30 | 30 | 31 |
| 26 | 31 | 33 | 33 | 32 | 33 | 33 | 35 | 73 | 80 | J R 104 | 95 | 101 | 106 | 95 | 114 | 95 | 91 | 61 | J R 71 | 50 | 42 | R | 35 | 31 |
| 27 | 33 | 36 | 36 | F 36 | F | 35 | 33 | J R 68 | 96 | 110 | 95 | 93 | J R 102 | 95 | 95 | 94 | 86 | 85 | 69 | 59 | 42 | A | 42 | 36 |
| 28 | 34 | 35 | 28 | 27 | 30 | 29 | 35 | 64 | 86 | 100 | 105 | 122 | 106 | 92 | 96 | J R 104 | 81 | 56 | 66 | 73 | 31 | 29 | 30 | 31 |
| 29 | 32 | 32 | 30 | 29 | 31 | 30 | 34 | 55 | 84 | 100 | 101 | 109 | 104 | 94 | 90 | 86 | 69 | 68 | 61 | J R 55 | 33 | 29 | 34 | 37 |
| 30 | 38 | 40 | 29 | 27 | 29 | 30 | 30 | 58 | C | 86 | 100 | 104 | 106 | 90 | 98 | 84 | 71 | 66 | 87 | 44 | 36 | 34 | 32 | 35 |
| 31 | 35 | 37 | 29 | 29 | 30 | 30 | 34 | 59 | 78 | 100 | 129 | 97 | 95 | 80 | 84 | 78 | 62 | 68 | 50 | 43 | 42 | 39 | 40 | 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 | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 31 | 29 | 31 | 31 | 31 | 30 | 30 | 31 | 31 | 30 | 31 | 31 | 31 | 31 | 29 | 30 | 31 |
| MED | 34 | 35 | 33 | 35 | 34 | 31 | 34 | 63 | 80 | 95 | 102 | 104 | 106 | 104 | 98 | 95 | 83 | 58 | 47 | 42 | 36 | 31 | 31 | 32 |
| UQ | 35 | 36 | 36 | 36 | 37 | 33 | 36 | 68 | 85 | 100 | 108 | 111 | 110 | 113 | 106 | 104 | 91 | 66 | 58 | 46 | 40 | 34 | 33 | 35 |
| LQ | 32 | 32 | 31 | 32 | 30 | 30 | 31 | 58 | 76 | 82 | 94 | 100 | 102 | 95 | 93 | 86 | 71 | 54 | 41 | 36 | 34 | 30 | 30 | 30 |



DEC. 1969 | FOF2 (0.1 MHZ)

# IONOSPHERIC DATA

DEC. 1969 | FOF1 (0.01 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42·4' N Long. 139° 29·3' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

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

The Radio Research Laboratories, Japan

DEC. 1969 | FOF1 (0.01 MHZ)

# IONOSPHERIC DATA

DEC. 1969 | FOE (0.01 MHZ) | 135° E Mean Time (G. M. T. + 9h)

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

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | 175 | A | A | A | A | I A 340 | 335 | 300 | 250 | 190 | B | | | | | | |
| 2 | | | | | | | | 190 | 260 | A | A | A | A | A | 300 | A | 170 | B | | | | | | |
| 3 | | | | | | | | 140 | A | 300 | A | A | 330 | 330 | 290 | 260 | B | B | | | | | | |
| 4 | | | | | | | | B | I A 270 | A | A | R | 340 | 330 | 305 | 285 | A | A | | | | | | |
| 5 | | | | | | | | B | 260 | 300 | 310 | 330 | I A 330 | 320 | 300 | 250 | 190 | E | | | | | | |
| 6 | | | | | | | | 205 | 250 | A | A | A | A | 325 | A | A | A | A | | | | | | |
| 7 | | | | | | | | 210 | A | A | A | A | 325 | 320 | 295 | 250 | A | B | | | | | | |
| 8 | | | | | | | | 230 | R | A | 350 | 330 | C | I R 325 | I A 305 | I R 255 | B | B | | | | | | |
| 9 | | | | | | | | 230 | 300 | A | A | A | A | R | 290 | R | 200 | B | | | | | | |
| 10 | | | | | | | | I A 200 | A | A | A | A | A | A | 290 | 260 | 220 | B | | | | | | |
| 11 | | | | | | | | 195 | R | I R 295 | 310 | I R 325 | 335 | 325 | 310 | 235 | 180 | B | | | | | | |
| 12 | | | | | | | | 180 | 265 | A | A | A | 325 | 315 | 290 | A | 170 | A | | | | | | |
| 13 | | | | | | | | 190 | I R 255 | 295 | I R 320 | 330 | I R 330 | 330 | 310 | 255 | A | | | | | | | |
| 14 | | | | | | | | 160 | 220 | 295 | 310 | I A 325 | 330 | 330 | 300 | 250 | A | | | | | | | |
| 15 | | | | | | | | B | 240 | 290 | 310 | A | A | 325 | 290 | I R 260 | I B 200 | A | | | | | | |
| 16 | | | | | | | | B | 230 | 295 | A | A | A | 325 | R | R | A | B | | | | | | |
| 17 | | | | | | | | R | A | A | A | A | I A 335 | 325 | 305 | R 265 | 200 | A | | | | | | |
| 18 | | | | | | | | 190 | 260 | 330 | A | C | 325 | I R 320 | I A 290 | I R 255 | R | A | | | | | | |
| 19 | | | | | | | | A | A | A | A | A | R | R | A | A | A | A | | | | | | |
| 20 | | | | | | | | B | 275 | 300 | 320 | A | A | A | A | A | A | | | | | | | |
| 21 | | | | | | | | 170 | 255 | 300 | 320 | 330 | 335 | 325 | 290 | 265 | 170 | | | | | | | |
| 22 | | | | | | | | A | 250 | 290 | 310 | 325 | 340 | I R 330 | 300 | R | A | A | | | | | | |
| 23 | | | | | | | | B | R | 300 | 335 | R | R | A | A | R | A | A | | | | | | |
| 24 | | | | | | | | B | R | 300 | A | 335 | 340 | A | A | A | A | A | | | | | | |
| 25 | | | | | | | | 205 | A | A | A | A | A | A | A | 285 | 185 | B | | | | | | |
| 26 | | | | | | | | A | 250 | A | A | 330 | 340 | 320 | 300 | 260 | A | A | | | | | | |
| 27 | | | | | | | | A | 250 | A | 320 | I A 340 | 350 | 320 | 290 | A | A | | | | | | | |
| 28 | | | | | | | | A | A | A | R | A | A | B | I B 310 | B | A | | | | | | | |
| 29 | | | | | | | | A | 250 | 275 | A | R 330 | I R 335 | I R 335 | 315 | I B 280 | R | | | | | | | |
| 30 | | | | | | | | 180 | C | 300 | 330 | 340 | 340 | A | 310 | A | A | | | | | | | |
| 31 | | | | | | | | A | 245 | 290 | I A 320 | 330 | I R 330 | 330 | I A 310 | 250 | 210 | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | | | | | | | | 16 | 18 | 16 | 13 | 13 | 19 | 21 | 24 | 18 | 12 | 1 | | | | | | |
| MED | | | | | | | | 190 | 252 | 298 | 320 | 330 | 335 | 325 | 300 | 258 | 190 | E | | | | | | |
| UQ | | | | | | | | 205 | 260 | 300 | 320 | 330 | 340 | 330 | 308 | 265 | 200 | | | | | | | |
| LQ | | | | | | | | 178 | 250 | 292 | 310 | 330 | 330 | 320 | 290 | 250 | 175 | | | | | | | |

The Radio Research Laboratories, Japan

DEC. 1969 | FOE (0.01 MHZ)

# IONOSPHERIC DATA

DEC. 1969 | FOES (0.1 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42·4' N. Long. 139° 29·3' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | E S 15 | E S 16 | 21 | 20 | E | E S 15 | E B 12 | G | 35 | J X 37 | J X 41 | 39 | J X 36 | G | G | G | G | 20 | 20 | E S 16 | E S 15 | E S 15 | E S 16 | E S 15 |
| 2 | E S 15 | E S 15 | E S 15 | E B 12 | E | E S 16 | E S 15 | G | G | 35 | J X 36 | 38 | J X 36 | 36 | G | 30 | G | E B 12 | E S 15 | 21 | E B 12 | 23 | E S 16 | E S 16 |
| 3 | E S 16 | E S 16 | E B 13 | E B 12 | E B 12 | E S 15 | 21 | J X 29 | 30 | G | 35 | 36 | G | G | G | G | E B 16 | 21 | 20 | 21 | E S 15 | E S 16 | E S 16 | E S 16 |
| 4 | E S 16 | E S 16 | E S 15 | E B 13 | 21 | E B 13 | E S 16 | E B 14 | 28 | 35 | 35 | G | G | G | G | G | J X 25 | J X 24 | 23 | J X 29 | 19 | 20 | 20 | E S 15 |
| 5 | E S 15 | E B 13 | 20 | E | E | E B 12 | E B 13 | E B 15 | G | G | 33 | 36 | 33 | G 29 | G 23 | G 17 | J G 18 | J X 22 | J X 17 | M 21 | M 20 | E B 14 | E S 15 | M 21 |
| 6 | E S 15 | E S 15 | E | J X 14 | E | 17 | E B 11 | G | G | 36 | J X 35 | J X 35 | 36 | G | J X 35 | J X 41 | J X 36 | J X 29 | E B 12 | 21 | E S 15 | E S 15 | E S 15 | E S 16 |
| 7 | E S 16 | E S 15 | E S 16 | E S 15 | E B 11 | E B 13 | E S 15 | G | 34 | 36 | 35 | 36 | 35 | 35 | G | 30 | 22 | E B 12 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 |
| 8 | E S 16 | E S 15 | J X 24 | E | 20 | E S 15 | 20 | G | G | J X 42 | G | G | C | G | 35 | G | E B 15 | 19 | E S 15 | E S 16 | E S 16 | E B 12 | 18 | 21 |
| 9 | 20 | E S 15 | 21 | 23 | 20 | E S 16 | E S 15 | 29 | 32 | 36 | J X 35 | 36 | J X 36 | G | G | G | G | E S 15 | E S 15 | E S 16 | E S 15 | E S 16 | E S 15 | 135 |
| 10 | E S 16 | E S 16 | E S 15 | E B 12 | E | E | 20 | 23 | J X 29 | 35 | J X 37 | J X 41 | J X 35 | J X 35 | G | G | G | E B 15 | E S 15 | E S 16 | E S 15 | E S 16 | E S 15 | E S 16 |
| 11 | E B 12 | E B 12 | E S 15 | E | E B 12 | E B 11 | E B 12 | G | G | G | G | G | G | G | G | G | G | E B 16 | E S 15 | E B 13 | E S 15 | E S 16 | E S 16 | E S 16 |
| 12 | E S 15 | E S 15 | E S 15 | E | E | E B 13 | E S 15 | G | G | 35 | 35 | 35 | G | G | G | 31 | G | J X 21 | 30 | 21 | E B 12 | E S 15 | E S 15 | E S 16 |
| 13 | E S 16 | E S 15 | 20 | E | E B 12 | E S 15 | E S 15 | G | G | J G 29 | G | G | G | G | G | G | J X 33 | J X 17 | E S 15 | E B 14 | M 20 | J X 15 | E B 13 | J X 25 |
| 14 | J X 25 | 19 | J X 16 | J X 23 | J X 14 | J X 24 | J X 14 | G | 30 | 33 | 36 | 35 | 39 | G | J G 29 | G 21 | 22 | 21 | 18 | J X 18 | J X 27 | E S 15 | E S 15 | E S 15 |
| 15 | E S 15 | J X 17 | J X 17 | E B 13 | E | E S 15 | E B 11 | E B 17 | G | G | 36 | J X 41 | J X 37 | G | G | G | E B 16 | 22 | 20 | E S 16 | 20 | 22 | 21 | E S 15 |
| 16 | E S 16 | 21 | E S 16 | E S 15 | 22 | E B 13 | E S 15 | E B 16 | G | 33 | 36 | J X 40 | J X 37 | G | G | 35 | J X 27 | J X 21 | E S 15 | 20 | J X 85 | J X 43 | J X 41 | J X 41 |
| 17 | 21 | E S 15 | E S 15 | 20 | 21 | E S 16 | E B 12 | G | J X 29 | J X 43 | 43 | J X 37 | J X 36 | G | G | G | G | E B 15 | 20 | E S 15 | E S 15 | E B 12 | E S 16 | 20 |
| 18 | E S 16 | 20 | 20 | E B 13 | E S 15 | 19 | 21 | 20 | G | G | J X 36 | C | G | G | 35 | G | G | 21 | 21 | 20 | 22 | 23 | 22 | J X 25 |
| 19 | 24 | J X 24 | 20 | 20 | E S 15 | E S 15 | E S 15 | J X 24 | J X 29 | J X 42 | 35 | J X 48 | G | G | J X 41 | J X 70 | J X 38 | J X 29 | J X 24 | E S 15 | E S 16 | 22 | E S 16 | E S 16 |
| 20 | 20 | 21 | 20 | E S 15 | E B 12 | E B 13 | 19 | E B 14 | G | G | G | J X 37 | J X 40 | J X 42 | J X 80 | J X 71 | J X 36 | J X 29 | 21 | J X 25 | J X 29 | J X 26 | J X 21 | 21 |
| 21 | E S 15 | J X 24 | J X 25 | 18 | J X 17 | E B 13 | J X 14 | G | G | G | G | G | G | G | G | G | G 17 | J X 24 | E S 15 | M 20 | E S 15 | E B 12 | E S 15 | E B 14 |
| 22 | E S 15 | E B 13 | E B 14 | E | E | E | J X 19 | J X 37 | G 23 | G 19 | G | G | G | G | G | G | J X 25 | J X 25 | J X 25 | J X 26 | E S 16 | E S 16 | 20 | 20 |
| 23 | 21 | E S 15 | 20 | 20 | E B 13 | 21 | E B 12 | E B 15 | G | J G 29 | J G 29 | G | J G 29 | J X 40 | J X 37 | G | J X 35 | J X 27 | 20 | 20 | 20 | E S 15 | 20 | 20 |
| 24 | J X 24 | E S 15 | 20 | 20 | 20 | E B 11 | E S 15 | E B 15 | G | G | 36 | 36 | G | 36 | J X 41 | 31 | J X 29 | J X 27 | 20 | J X 36 | 20 | J X 29 | J X 38 | J X 25 |
| 25 | 20 | 21 | E S 15 | E B 13 | E S 15 | E B 13 | E | G | 34 | 36 | 36 | 36 | 41 | 40 | 35 | G | G | E B 13 | 21 | E S 15 | E S 15 | 21 | 21 | J X 24 |
| 26 | 20 | 20 | 22 | 22 | 21 | J X 25 | 22 | J X 29 | G | 35 | 36 | 36 | G | G | 35 | 31 | J X 29 | J X 54 | J X 41 | J X 36 | J X 27 | J X 29 | J X 42 | J X 24 |
| 27 | 22 | 23 | J X 24 | J X 24 | 21 | E B 12 | 23 | 21 | G | J X 30 | G 29 | J X 40 | G 31 | 36 | J X 38 | J X 61 | J X 84 | J X 61 | J X 29 | J X 51 | J X 54 | J X 55 | J X 43 | J X 25 |
| 28 | J X 29 | 22 | 20 | J X 23 | E B 14 | E B 12 | J X 15 | 23 | J X 53 | 30 | G 30 | J X 54 | 36 | E B 37 | E B 39 | E B 29 | J X 29 | J X 29 | J X 25 | J X 24 | 20 | 22 | 20 | M 20 |
| 29 | E S 15 | M 20 | E B 14 | E B 14 | E B 14 | E | J X 25 | J X 25 | G | J X 51 | 38 | G | G | G | G | E B 25 | G 19 | E S 15 | E B 12 | E B 14 | E S 15 | E S 15 | J X 43 | J X 41 |
| 30 | J X 38 | J X 25 | J X 24 | 19 | E | J X 24 | J X 29 | 20 | C | G | G | G | G 32 | J X 37 | G 25 | J X 29 | J X 30 | J X 36 | J X 29 | 21 | 20 | E S 16 | E B 13 | E B 12 |
| 31 | E B 12 | E | 21 | E B 14 | E | E B 11 | E B 12 | 23 | G | G | 34 | G 32 | G | G | 32 | G | G 20 | J X 24 | J X 63 | J X 29 | J X 28 | M 20 | M 22 | M 20 |
| | 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 | 30 | 31 | 31 | 30 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| MED | E S 16 | E 16 | 20 | E E 14 | E E 13 | E B 13 | E B 15 | E G 15 | G | 33 | 35 | 36 | G 32 | G | G | G | 20 | J X 21 | 20 | 20 | E 16 | E 16 | E 16 | 20 |
| UQ | 20 | 20 | 20 | 20 | 18 | E S 16 | 20 | 23 | 29 | 36 | 36 | J X 38 | J X 36 | 36 | 35 | 30 | J X 29 | J X 27 | 24 | 22 | 20 | 22 | 21 | 24 |
| LQ | E S 15 | E S 15 | E S 15 | E B 12 | E | E B 12 | E B 12 | G | G | G | G 29 | G | G | G | G | G | G | 16 | E S 15 | E S 16 | E S 15 | E S 15 | E S 15 | E S 16 |

The Radio Research Laboratories, Japan

DEC. 1969 | FOES (0.1 MHZ)

# IONOSPHERIC DATA

DEC. 1969 | FBES (0.1 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

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

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | E S 15 | E S 16 | E | E | E | E S 15 | E B 12 | G | 28 | 34 | 36 | 33 | 34 | G | G | G | G | G | E | E S 16 | E S 15 | E S 15 | E S 16 | E S 15 |
| 2 | E S 15 | E S 15 | E S 15 | E B 12 | E | E S 16 | E S 15 | G | G | 33 | 35 | 35 | 33 | 33 | G | 28 | G | E B 12 | E S 15 | E | E B 12 | E | E S 16 | E S 16 |
| 3 | E S 16 | E S 16 | E B 13 | E B 12 | E B 12 | E S 15 | E | 26 | 28 | G | 33 | 34 | G | G | G | G | E B 16 | 15 | E | E | E S 15 | E S 16 | E S 16 | E S 16 |
| 4 | E S 16 | E S 16 | E S 15 | E B 13 | E | E B 13 | E S 16 | E B 14 | 26 | 32 | 32 | G | G | G | G | G | 25 | 20 | .16 | 22 | E | E | E | E S 15 |
| 5 | E S 15 | E B 13 | E | E | E | E B 12 | E B 13 | E B 15 | G | G | 32 | 36 | 33 | G 25 | G 21 | G 17 | G 17 | 18 | E | E | E | E B 14 | E S 15 | E |
| 6 | E S 15 | E S 15 | E | E | E | E | E B 11 | G | G | 31 | 35 | 34 | 33 | G | 32 | 30 | 32 | G | E B 12 | 15 | E S 15 | E S 15 | E S 15 | E S 16 |
| 7 | E S 16 | E S 15 | E S 16 | E S 15 | E B 11 | E B 13 | E S 15 | G | 26 | 31 | 32 | 34 | 34 | 34 | G | 28 | 20 | E B 12 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 | E S 15 |
| 8 | E S 16 | E S 15 | E | E | E | E S 15 | E | G | G | 33 | G | G | C | G | 30 | G | E B 15 | G | E S 15 | E S 16 | E S 16 | E B 12 | E | 16 |
| 9 | E | E S 15 | E | E | E | E S 16 | E S 15 | G | 28 | 30 | 33 | 34 | 34 | G | G | G | G | E B 15 | E S 15 | E S 15 | E S 16 | E S 15 | E S 16 | E S 15 |
| 10 | E S 16 | E S 16 | E S 15 | E B 12 | E | E | E | 21 | 26 | 31 | 35 | 34 | 33 | 33 | G | G | G | E B 15 | E S 15 | E S 16 | E S 16 | E S 16 | E S 15 | E S 16 |
| 11 | E B 12 | E B 12 | E S 15 | E | E B 12 | E B 11 | E B 12 | G | G | G | G | G | G | G | G | G | G | E B 16 | E S 15 | E B 13 | E S 15 | E S 16 | E S 16 | E S 16 |
| 12 | E S 15 | E S 15 | E S 15 | E | E | E B 13 | E S 15 | G | G | 31 | 33 | 32 | G | G | G | 27 | G | 16 | E | E | E B 12 | E S 15 | E S 15 | E S 16 |
| 13 | E S 16 | E S 15 | E | E | E B 12 | E S 15 | E S 15 | G | G | G | G | G | G | G | G | G | 24 | E | E S 15 | E B 14 | E | E | E B 13 | E |
| 14 | E | E | E | E | E | E | E | G | 28 | 33 | 36 | 34 | 38 | G | G 26 | G 21 | 21 | 17 | 17 | 17 | 20 | E S 15 | E S 15 | E S 15 |
| 15 | E S 15 | 15 | 15 | E B 13 | E | E S 15 | E B 11 | E B 17 | G | G | 34 | 34 | 35 | G | G | G | E B 16 | 15 | E | E S 16 | E | E | E | E S 15 |
| 16 | E S 16 | E | E S 16 | E S 15 | 15 | E B 13 | E S 15 | E B 16 | G | 32 | 35 | 34 | 35 | G | G | 33 | 26 | 16 | E S 15 | E | E | 43 | A | 20 |
| 17 | E | E S 15 | E S 15 | E | 13 | E S 16 | E B 12 | G | 27 | 34 | 37 | 35 | 35 | G | G | G | G | E B 15 | E | E S 15 | E S 15 | E B 12 | E S 16 | E |
| 18 | E S 16 | E | E | E B 13 | E S 15 | E | E | G | G | G | 34 | C | G | G | 32 | G | G | 15 | E | E | 16 | 19 | E | 25 |
| 19 | 24 | E | E | E | E S 15 | E S 15 | E S 15 | 19 | 28 | 35 | 34 | 47 | G | G | 36 | 35 | 29 | 21 | 19 | E S 15 | E S 16 | 16 | E S 16 | E S 16 |
| 20 | E | E | E | E S 15 | E B 12 | E B 13 | E | E B 14 | G | G | G | 34 | 33 | 40 | 40 | 41 | 30 | 19 | 16 | 16 | 25 | 25 | 17 | 16 |
| 21 | E S 15 | 16 | 16 | 15 | E | E B 13 | E | G | G | G | G | G | G | G | G | G | G 16 | 15 | E S 15 | E | E S 15 | E B 12 | E S 15 | E B 14 |
| 22 | E S 15 | E B 13 | E B 14 | E | E | E | 15 | 25 | G 19 | G 16 | G | G | G | G | G | G | 25 | 24 | E | 17 | E S 16 | E S 16 | E | E |
| 23 | E | E S 15 | E | E | E B 13 | E | E B 12 | E B 15 | G | G 27 | G 27 | G | G 26 | 34 | 33 | G | 26 | 24 | E | E | E | E S 15 | E | E |
| 24 | E | E S 15 | E | E | E | E B 11 | E S 15 | E B 15 | G | G | 35 | 35 | G | 35 | 40 | 28 | 25 | 17 | E | 25 | 17 | E | A | 19 |
| 25 | E | E | E S 15 | E B 13 | E S 15 | E B 13 | E | G | 27 | 31 | 34 | 34 | 35 | 35 | 32 | G | G | E B 13 | E | E S 15 | E S 15 | E | E | E |
| 26 | 16 | 12 | 15 | E | E | 15 | 15 | 29 | G | 31 | 35 | 35 | G | G | 33 | 27 | 25 | 40 | 20 | 25 | 22 | 27 | E | E |
| 27 | E | 15 | 15 | 15 | 15 | E B 12 | 15 | 19 | G | 30 | G 27 | 34 | G 31 | 36 | 34 | 40 | 25 | 30 | 17 | 27 | 27 | A | 26 | 25 |
| 28 | 17 | 14 | 18 | E | E B 14 | E B 12 | E | 19 | 30 | 30 | E R 30 | 54 | 36 | E B 37 | E B 39 | E B 29 | 25 | 25 | 25 | E | E | 17 | E | E |
| 29 | E S 15 | E | E B 14 | E B 14 | E B 14 | E | 19 | 18 | G | 51 | 36 | G | G | G | G | E B 25 | G 19 | E S 15 | E B 12 | E B 14 | E S 15 | E S 15 | 25 | 25 |
| 30 | 24 | 25 | 17 | E | E | E | 18 | 16 | C | G | G | G | G 31 | 37 | G 25 | 25 | 29 | 26 | 25 | E | E | E S 16 | E B 13 | E B 12 |
| 31 | E B 12 | E | E | E B 14 | E | E B 11 | E B 12 | 17 | G | G | 33 | G 32 | G | G | 32 | G | G | 20 | 34 | 19 | 16 | 17 | 17 | 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 | 30 | 31 | 31 | 30 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| MED | E S 15 | E B 15 | E E 14 | E | E | E B 13 | E B 12 | E G 14 | G | 30 | 33 | 34 | G 31 | G | G | G | 19 | 16 | 15 | E E 15 | E B 15 | E B 15 | E B 15 | E E 15 |
| UQ | E S 16 | E S 15 | E S 15 | E B 13 | E B 13 | E S 15 | E S 15 | 18 | 27 | 32 | 35 | 34 | 34 | 34 | 32 | 28 | 25 | 20 | 16 | 16 | E S 16 | 16 | E S 16 | 16 |
| LQ | E B 12 | E E 12 | E | E | E | E B 11 | E | G | G | G | E G 27 | G | G | G | G | G | G | E B 15 | E | E | E B 12 | E B 12 | E | E B 12 |

The Radio Research Laboratories, Japan

DEC. 1969 | FBES (0.1 MHZ)

# IONOSPHERIC DATA

DEC. 1969 | F-MIN (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

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

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Es 15 | Es 16 | Es 15 | Es 16 | 10 | Es 15 | 12 | 15 | 15 | 15 | 16 | 15 | 13 | 15 | 13 | 14 | 15 | 15 | Es 16 | Es 16 | Es 15 | Es 15 | Es 16 | Es 15 |
| 2 | Es 15 | Es 15 | Es 15 | 12 | 10 | Es 16 | Es 15 | 15 | 12 | 14 | 15 | 16 | 15 | 15 | 13 | 16 | 15 | 12 | Es 15 | Es 16 | 12 | 12 | Es 16 | Es 16 |
| 3 | Es 16 | Es 16 | 13 | 12 | 12 | Es 15 | Es 16 | 15 | 13 | 15 | 14 | 14 | 16 | 15 | 15 | 15 | 16 | 12 | Es 16 | Es 16 | Es 15 | Es 16 | Es 16 | Es 16 |
| 4 | Es 16 | Es 16 | Es 15 | 13 | 12 | 13 | Es 16 | 14 | 14 | 15 | 15 | 18 | 15 | 15 | 12 | 12 | 10 | 12 | 10 | Es 15 | Es 15 | Es 15 | Es 15 | Es 15 |
| 5 | Es 15 | 13 | Es 15 | 10 | 10 | 12 | 13 | 15 | 13 | 13 | 16 | 16 | 16 | 16 | 15 | 12 | 10 | 10 | Es 15 | Es 15 | 13 | 14 | Es 15 | Es 15 |
| 6 | Es 15 | Es 15 | 10 | 10 | 10 | Es 15 | 11 | 14 | 13 | 14 | 15 | 15 | 15 | 18 | 15 | 12 | 12 | 12 | 12 | 12 | Es 15 | Es 15 | Es 15 | Es 16 |
| 7 | Es 16 | Es 15 | Es 16 | Es 15 | 11 | 13 | Es 15 | 16 | 13 | 12 | 12 | 16 | 15 | 16 | 15 | 16 | 12 | 12 | Es 15 | Es 15 | Es 15 | Es 15 | Es 15 | Es 15 |
| 8 | Es 16 | Es 15 | 10 | 10 | 10 | Es 15 | Es 15 | 15 | 15 | 15 | 15 | 15 | C | 14 | 15 | 16 | 15 | 15 | Es 15 | Es 16 | Es 16 | 12 | Es 15 | Es 15 |
| 9 | Es 16 | Es 15 | Es 16 | Es 15 | Es 16 | Es 16 | Es 15 | 15 | 16 | 14 | 13 | 16 | 15 | 15 | 16 | 15 | 17 | 15 | Es 15 | Es 15 | Es 16 | Es 15 | Es 16 | Es 15 |
| 10 | Es 16 | Es 16 | Es 15 | 12 | 10 | 10 | Es 15 | 15 | 13 | 15 | 15 | 16 | 16 | 15 | 15 | 16 | 16 | 15 | Es 15 | Es 16 | Es 15 | Es 16 | Es 15 | Es 16 |
| 11 | 12 | 12 | Es 15 | 10 | 12 | 11 | 12 | 15 | 15 | 16 | 16 | 16 | 16 | 15 | 12 | 13 | 14 | 16 | Es 15 | 13 | Es 15 | Es 16 | Es 16 | Es 16 |
| 12 | Es 15 | Es 15 | Es 15 | 10 | 10 | 13 | Es 15 | 13 | 13 | 15 | 16 | 15 | 17 | 20 | 15 | 15 | 14 | 12 | Es 25 | Es 15 | 12 | Es 15 | Es 15 | Es 16 |
| 13 | Es 16 | Es 15 | 12 | 10 | 12 | Es 15 | Es 15 | 14 | 13 | 14 | 14 | 19 | 14 | 17 | 14 | 15 | 14 | 13 | Es 15 | 14 | Es 15 | 13 | 13 | Es 15 |
| 14 | 13 | 13 | 11 | 10 | 12 | 10 | 13 | 14 | 13 | 14 | 15 | 14 | 15 | 26 | 14 | 14 | 14 | Es 15 | 12 | 13 | 14 | Es 15 | Es 15 | Es 15 |
| 15 | Es 15 | 11 | 12 | 13 | 10 | Es 15 | 11 | 17 | 13 | 14 | 16 | 16 | 16 | 16 | 15 | 16 | 16 | 10 | 12 | Es 16 | Es 16 | Es 15 | Es 16 | Es 15 |
| 16 | Es 16 | Es 15 | Es 16 | Es 15 | 12 | 13 | Es 15 | 16 | 16 | 16 | 25 | 19 | 26 | 17 | 16 | 15 | 15 | 13 | Es 15 | Es 16 | Es 16 | Es 16 | Es 16 | Es 15 |
| 17 | Es 16 | Es 15 | Es 15 | Es 15 | 12 | Es 16 | 12 | 15 | 15 | 15 | 26 | 25 | 15 | 16 | 16 | 16 | 15 | 15 | Es 15 | Es 15 | Es 15 | 12 | Es 16 | Es 15 |
| 18 | Es 16 | 12 | Es 15 | 13 | Es 15 | 12 | Es 15 | 14 | 15 | 15 | 16 | C | 16 | 16 | 17 | 18 | 15 | 12 | Es 16 | Es 16 | 11 | Es 15 | Es 16 | Es 15 |
| 19 | 12 | Es 15 | Es 16 | Es 15 | Es 15 | Es 15 | Es 15 | 15 | 15 | 17 | 25 | 25 | 26 | 25 | 25 | 16 | 15 | 15 | 12 | Es 15 | Es 16 | 11 | Es 16 | Es 16 |
| 20 | Es 16 | Es 16 | Es 15 | Es 15 | 12 | 13 | Es 15 | 14 | 15 | 16 | 17 | 24 | 16 | 18 | 15 | 15 | 16 | 11 | 13 | 11 | Es 15 | Es 15 | Es 15 | 11 |
| 21 | Es 15 | 11 | 13 | 11 | 12 | 13 | 11 | 14 | 14 | 14 | 16 | 16 | 15 | 15 | 15 | 14 | 14 | 13 | Es 15 | 14 | Es 15 | 12 | Es 15 | 14 |
| 22 | Es 15 | 13 | 14 | 10 | 10 | 10 | 11 | 12 | 14 | 14 | 13 | 16 | 25 | 17 | 16 | 15 | 15 | 15 | 13 | Es 15 | Es 16 | Es 16 | Es 15 | Es 15 |
| 23 | Es 15 | Es 15 | Es 15 | Es 15 | 13 | Es 15 | 12 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 13 | 14 | 15 | 10 | Es 15 | Es 15 | Es 15 | Es 15 | Es 16 | Es 15 |
| 24 | Es 16 | Es 15 | Es 15 | Es 15 | Es 15 | 11 | Es 15 | 15 | 15 | 16 | 15 | 18 | 15 | 17 | 15 | 13 | 12 | 15 | Es 16 | Es 16 | 13 | 13 | 13 | 13 |
| 25 | Es 16 | 13 | Es 15 | 13 | Es 15 | 13 | 10 | 15 | 15 | 15 | 15 | 14 | 16 | 18 | 15 | 13 | 15 | 13 | Es 15 | Es 15 | Es 15 | Es 15 | Es 15 | Es 15 |
| 26 | 12 | 10 | 11 | 13 | 13 | 12 | 11 | 12 | 14 | 25 | 25 | 25 | 28 | 15 | 16 | 15 | 12 | 15 | 12 | 12 | 13 | 13 | Es 16 | Es 15 |
| 27 | Es 15 | 11 | 10 | 12 | 10 | 12 | 10 | 12 | 15 | 16 | 25 | 18 | 25 | 25 | 17 | 15 | 15 | 11 | 14 | 14 | Es 15 | 13 | 13 | 11 |
| 28 | 11 | 12 | 14 | Es 15 | 14 | 12 | 10 | 12 | 16 | 19 | 25 | 25 | 26 | 37 | 39 | 29 | 16 | 11 | 14 | Es 15 | 14 | 12 | Es 15 | Es 15 |
| 29 | Es 15 | Es 15 | 14 | 14 | 14 | 10 | 10 | 10 | 15 | 15 | 25 | 25 | 27 | 26 | 26 | 25 | 16 | Es 15 | 12 | 14 | Es 15 | Es 15 | 13 | 14 |
| 30 | 14 | 14 | Es 15 | 13 | 10 | 13 | 10 | 10 | C | 17 | 26 | 25 | 25 | 25 | 15 | 15 | 12 | 10 | 12 | Es 15 | Es 15 | Es 16 | 13 | 12 |
| 31 | 12 | 10 | 11 | 14 | 10 | 11 | 12 | 14 | 14 | 18 | 25 | 25 | 26 | 26 | 24 | 16 | 16 | 11 | 14 | 13 | Es 15 | Es 15 | 13 | 11 |
| | 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 | 30 | 31 | 31 | 30 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| MED | Es 15 | Es 15 | Es 15 | 12 | 11 | 12 | 12 | 15 | 14 | 15 | 16 | 16 | 16 | 16 | 15 | 15 | 15 | 12 | Es 15 | Es 15 | Es 15 | Es 15 | Es 15 | Es 15 |
| UQ | Es 16 | Es 15 | Es 15 | Es 15 | 12 | Es 15 | Es 15 | 15 | 15 | 16 | 25 | 24 | 25 | 19 | 16 | 16 | 16 | 15 | Es 15 | Es 16 | Es 15 | Es 15 | Es 16 | Es 15 |
| LQ | Es 15 | 12 | 12 | 10 | 10 | 12 | 11 | 14 | 13 | 14 | 15 | 15 | 15 | 15 | 15 | 14 | 14 | 12 | 12 | 13 | 12 | 12 | Es 15 | Es 15 |



DEC. 1969 | F-MIN (0.1 MHZ)

# IONOSPHERIC DATA

DEC. 1969 | M(3000)F2 (0.01) | 135° E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35 42.4 N. Long. 139 29.3 E Sweep 1 MHz to 20 MHz in 20 sec 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 | 285 | 280 | 270 | 260 | 265 | 280 | 325 | J R 330 | 335 | 325 | 320 | 320 | 310 | 315 | 315 | J R 315 | J R 320 | J R 315 | 325 | 335 | 300 | 310 | 280 | 280 |
| 2 | 270 | 265 | 285 | 275 | 270 | 285 | 295 | 340 | 335 | 330 | 335 | 325 | 330 | 325 | 320 | 320 | 340 | 330 | 335 | 330 | 325 | 290 | 270 | J R 270 |
| 3 | 280 | 285 | 305 | 305 | 310 | 270 | 325 | 330 | 315 | 345 | 330 | 305 | 315 | 315 | 320 | J R 305 | 335 | 325 | 350 | 325 | 295 | 310 | 290 | 270 |
| 4 | 285 | 270 | 290 | 310 | 305 | 295 | 300 | J R 325 | J R 335 | 335 | 330 | 340 | 305 | J R 305 | 310 | J R 320 | 330 | 300 | 345 | 335 | 285 | 250 | 260 | 265 |
| 5 | 300 | 280 | 275 | 285 | 320 | 290 | 285 | 320 | 335 | 325 | 325 | 325 | 320 | 320 | 330 | 330 | 340 | 330 | 330 | 285 | 295 | 305 | 255 | 250 |
| 6 | 280 | 280 | 300 | 290 | 250 | 260 | 295 | 335 | 325 | 335 | 330 | 315 | 310 | 310 | 320 | 340 | 325 | 330 | 315 | 330 | 310 | 290 | 250 | 280 |
| 7 | 275 | 280 | 275 | 320 | 335 | 265 | 285 | 315 | 335 | J R 325 | 330 | 325 | J R 325 | 315 | 340 | 335 | 335 | 365 | 345 | 285 | 305 | 290 | 265 | 285 |
| 8 | 290 | 295 | 310 | 315 | 345 | 270 | 260 | 335 | 345 | 325 | J R 355 | 335 | C | 330 | 325 | 340 | 350 | J R 345 | 310 | 255 | 305 | 315 | 290 | 270 |
| 9 | 265 | 280 | 295 | 310 | 315 | 315 | 285 | 345 | 350 | 345 | 325 | 350 | 325 | 320 | 325 | 355 | 325 | 340 | 315 | 325 | 335 | 290 | 280 | 260 |
| 10 | 255 | J R 285 | J R 310 | 335 | 295 | 300 | 275 | 330 | 330 | 345 | 325 | J R 315 | 325 | 330 | 335 | 300 | 355 | 360 | 315 | 285 | 280 | 280 | 280 | 265 |
| 11 | 285 | 280 | 290 | 275 | 285 | 300 | 300 | 335 | 325 | 355 | 340 | 340 | 320 | 320 | 340 | 345 | 345 | 330 | 305 | 310 | J R 320 | 295 | 290 | 270 |
| 12 | 260 | 275 | 275 | 305 | 350 | 290 | 290 | 255 | R 340 | 330 | J R 325 | 325 | J R 305 | 335 | 330 | 325 | 340 | 340 | 315 | 310 | 310 | J R 335 | 275 | 270 |
| 13 | 285 | 295 | 285 | 270 | 270 | 305 | 305 | J R 340 | R 335 | 355 | 340 | 315 | J R 335 | 305 | J R 310 | 325 | 325 | 335 | 345 | 330 | 290 | 310 | 315 | 270 |
| 14 | 265 | 270 | 275 | 280 | 340 | 310 | J R 345 | 355 | 340 | 340 | 340 | J R 310 | 325 | V 340 | 340 | 330 | 355 | 315 | 315 | 340 | 315 | 280 | 280 | 270 |
| 15 | 260 | 260 | 265 | 295 | 310 | 305 | 310 | 345 | 340 | 350 | 300 | J R 315 | 305 | 335 | 330 | 335 | 320 | 340 | 325 | 330 | 300 | 275 | 265 | 280 |
| 16 | 295 | 275 | 280 | 285 | 275 | 295 | 345 | 345 | 360 | 345 | 325 | 315 | 325 | 295 | J R 320 | 335 | 350 | 320 | 315 | 315 | 360 | 340 | A | 275 |
| 17 | 275 | 270 | 255 | 270 | 320 | 295 | 310 | 365 | 340 | 315 | 335 | 315 | 335 | 305 | 315 | 325 | 345 | 330 | 330 | 320 | 305 | 295 | 270 | 270 |
| 18 | 280 | 285 | 295 | 295 | 280 | 295 | 325 | 325 | 350 | R 320 | 330 | I C 330 | J R 315 | R | 330 | J R 330 | R | 350 | 310 | 315 | 320 | 295 | 265 | 275 |
| 19 | 280 | 250 | 310 | 335 | 350 | 285 | 320 | 350 | J R 325 | 330 | 320 | 325 | 325 | 310 | J R 290 | 315 | 340 | 305 | 325 | 310 | 310 | 270 | 280 | 280 |
| 20 | 255 | 285 | 290 | 310 | 305 | 295 | 330 | 335 | R | 325 | 320 | 325 | 310 | 310 | 335 | V 330 | 345 | 305 | 330 | 310 | 320 | 300 | 280 | 270 |
| 21 | 265 | 255 | 270 | 300 | 335 | 315 | 310 | 345 | 350 | 340 | 360 | 315 | 310 | 350 | 320 | 325 | 335 | 345 | 310 | 345 | 290 | 285 | 270 | 270 |
| 22 | 260 | 260 | 275 | 280 | 295 | 290 | 310 | 350 | 340 | 340 | 325 | 325 | 325 | 330 | 320 | J R 330 | 330 | 320 | 340 | 335 | 325 | 295 | 270 | 260 |
| 23 | 265 | 295 | 305 | 295 | 285 | 275 | 330 | 320 | 330 | 320 | J R 315 | 320 | 310 | 320 | J R 325 | J R 330 | 330 | 325 | 305 | 330 | 285 | 295 | 260 | 275 |
| 24 | 275 | 275 | 265 | 285 | 260 | 265 | 335 | 295 | 340 | 335 | 320 | J R 315 | 325 | J R 300 | 305 | J R 315 | J R 325 | 325 | 340 | 325 | 315 | 305 | I A 270 | 270 |
| 25 | 290 | 280 | 290 | 295 | 285 | 265 | 265 | 335 | I R 350 | R 345 | J R 320 | 325 | 305 | 310 | 310 | 305 | 325 | 335 | 305 | 310 | 285 | 295 | 280 | 260 |
| 26 | 270 | 270 | 275 | 280 | 305 | 275 | 295 | 340 | 355 | J R 355 | 310 | 335 | 325 | 305 | 325 | 320 | 340 | 295 | J R 325 | 320 | 315 | R | 315 | 290 |
| 27 | 290 | 285 | 270 | F 260 | F | 280 | 305 | J R 320 | 340 | 350 | 330 | 325 | J R 325 | 305 | 305 | 315 | 330 | 315 | 330 | 330 | 310 | A | 285 | 295 |
| 28 | 290 | 310 | 335 | 255 | 265 | 270 | 310 | 330 | 350 | 340 | 325 | 330 | 330 | 335 | 315 | J R 335 | 320 | 320 | 315 | 360 | 325 | 260 | 270 | 290 |
| 29 | 285 | 300 | 295 | 255 | 270 | 270 | 330 | 345 | 315 | 345 | 335 | 325 | 325 | 335 | 310 | 325 | 330 | 325 | 320 | J R 325 | 335 | 260 | 275 | 295 |
| 30 | 290 | 320 | 275 | 250 | 255 | 275 | 320 | 345 | C | 350 | 330 | 315 | 330 | 335 | 330 | 345 | 365 | 320 | 345 | 365 | 310 | 320 | 265 | 285 |
| 31 | 285 | 300 | 275 | 270 | 265 | 285 | 330 | 340 | 345 | 320 | 345 | 325 | 325 | 325 | 325 | 335 | 355 | 330 | 350 | 350 | 285 | 290 | 280 | 270 |
| | 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 | 30 | 31 | 31 | 31 | 29 | 31 | 31 | 31 | 30 | 30 | 31 | 31 | 30 | 31 | 31 | 31 | 31 | 29 | 30 | 31 |
| MED | 280 | 280 | 285 | 285 | 295 | 285 | 310 | 335 | 340 | 340 | 330 | 325 | 325 | 320 | 320 | 330 | 335 | 330 | 325 | 325 | 310 | 295 | 275 | 270 |
| UQ | 285 | 285 | 295 | 305 | 320 | 295 | 325 | 345 | 345 | 345 | 335 | 325 | 325 | 330 | 330 | 335 | 345 | 338 | 338 | 332 | 320 | 305 | 280 | 280 |
| LQ | 265 | 270 | 275 | 272 | 270 | 272 | 295 | 328 | 335 | 325 | 322 | 315 | 310 | 310 | 315 | 320 | 325 | 320 | 315 | 310 | 295 | 285 | 265 | 270 |



The Radio Research Laboratories, Japan

# IONOSPHERIC DATA

DEC. 1969 | M(3000)F1 (0.01) | 135° E Mean Time (G. M. T.+ 9h)

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

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | L | L | L | L | L | L | | | | | | | | | |
| 2 | | | | | | | | | | L | | L | L | L | L | L | | | | | | | | |
| 3 | | | | | | | | | | L | L | L | L | L | L | L | | | | | | | | |
| 4 | | | | | | | | | | L | L | L | L | L | L | | | | | | | | | |
| 5 | | | | | | | | | L | L | L | L | L | L | | | | | | | | | | |
| 6 | | | | | | | | | | L | L | L | L | L | L | | | | | | | | | |
| 7 | | | | | | | | | | L | L | L | L | L | L | | | | | | | | | |
| 8 | | | | | | | | | | | L | L | C | L | L | | | | | | | | | |
| 9 | | | | | | | | | | L | L | L | L | L | L | | | | | | | | | |
| 10 | | | | | | | | | | | L | L | L | L | L | | | | | | | | | |
| 11 | | | | | | | | | | L | L | L | L | L | L | | | | | | | | | |
| 12 | | | | | | | | | | L | L | L | L | L | L | | | | | | | | | |
| 13 | | | | | | | | | | L | L | L | L | L | | L | | | | | | | | |
| 14 | | | | | | | | | | | L | L | L | | L | | | | | | | | | |
| 15 | | | | | | | | | L | L | L | L | | L | L | | | | | | | | | |
| 16 | | | | | | | | | | | L | L | L | L | L | | | | | | | | | |
| 17 | | | | | | | | | | L | L | L | L | L | | | | | | | | | | |
| 18 | | | | | | | | | | L | L | C | L | 430 | L | | | | | | | | | |
| 19 | | | | | | | | | | L | L | | L | L | | L | | | | | | | | |
| 20 | | | | | | | | | | | L | L | L | L | | | | | | | | | | |
| 21 | | | | | | | | | | L | L | L | L | L | L | | | | | | | | | |
| 22 | | | | | | | | | | L | L | L | L | L | | | | | | | | | | |
| 23 | | | | | | | | | | | L | L | L | L | L | | | | | | | | | |
| 24 | | | | | | | | | | | L | L | L | L | L | | | | | | | | | |
| 25 | | | | | | | | | | | L | L | L | L | L | | | | | | | | | |
| 26 | | | | | | | | | | L | L | L | L | L | | | | | | | | | | |
| 27 | | | | | | | | | | L | L | | L | L | | | | | | | | | | |
| 28 | | | | | | | | | | L | L | A | L | L | | | | L | | | | | | |
| 29 | | | | | | | | | L | A | L | L | L | L | L | | | | | | | | | |
| 30 | | | | | | | | | C | L | L | L | L | L | | L | | | | | | | | |
| 31 | | | | | | | | | | L | L | L | L | L | | L | | | | | | | | |

| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CNT | | | | | | | | | | | | | | 1 | | | | | | | | | | |
| MED | | | | | | | | | | | | | | 430 | | | | | | | | | | |
| UQ | | | | | | | | | | | | | | | | | | | | | | | | |
| LQ | | | | | | | | | | | | | | | | | | | | | | | | |

The Radio Research Laboratories, Japan

DEC. 1969 | M(3000)F1 (0.01)

# IONOSPHERIC DATA

DEC. 1969 | H'F2 (KM) | 135° E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42·4 N. Long. 139° 29·3 E Sweep 1 MHz to 20 MHz in 20 sec 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 | | | | | | | | | | 250 | 250 | 250 | 245 | 245 | 250 | | | | | | | | | |
| 2 | | | | | | | | | | 240 | | 245 | 245 | 245 | 240 | 230 | | | | | | | | |
| 3 | | | | | | | | | | 250 | 245 | 240 | 260 | 250 | 250 | 250 | | | | | | | | |
| 4 | | | | | | | | | | 240 | 245 | 240 | 240 | 240 | 250 | | | | | | | | | |
| 5 | | | | | | | | | 245 | 230 | 250 | 245 | 240 | 250 | | | | | | | | | | |
| 6 | | | | | | | | | | 240 | 260 | 245 | 250 | 250 | 245 | | | | | | | | | |
| 7 | | | | | | | | | | 245 | 245 | 250 | 245 | 245 | 245 | | | | | | | | | |
| 8 | | | | | | | | | | | 250 | 250 | C | 250 | 250 | | | | | | | | | |
| 9 | | | | | | | | | | 250 | 245 | 245 | 250 | 250 | 250 | | | | | | | | | |
| 10 | | | | | | | | | | | 240 | 250 | 255 | 250 | 250 | | | | | | | | | |
| 11 | | | | | | | | | | 230 | 250 | 250 | 240 | 240 | 240 | | | | | | | | | |
| 12 | | | | | | | | | | 250 | 260 | 250 | 260 | 250 | 250 | | | | | | | | | |
| 13 | | | | | | | | | | 230 | 240 | 240 | 255 | 270 | | 230 | | | | | | | | |
| 14 | | | | | | | | | | | 260 | 240 | 245 | | 240 | | | | | | | | | |
| 15 | | | | | | | | | 220 | 250 | 250 | 295 | | 250 | 245 | | | | | | | | | |
| 16 | | | | | | | | | | | 250 | 250 | 250 | 245 | 250 | | | | | | | | | |
| 17 | | | | | | | | | | 255 | 250 | 245 | 240 | 250 | | | | | | | | | | |
| 18 | | | | | | | | | | 250 | 245 | C | 250 | 240 | 245 | | | | | | | | | |
| 19 | | | | | | | | | | 250 | 250 | | 240 | 245 | | 260 | | | | | | | | |
| 20 | | | | | | | | | | | 250 | 250 | 250 | 255 | | | | | | | | | | |
| 21 | | | | | | | | | | 220 | 245 | 255 | 250 | 230 | 240 | | | | | | | | | |
| 22 | | | | | | | | | | 230 | 250 | 240 | 250 | 240 | | | | | | | | | | |
| 23 | | | | | | | | | | | 240 | 245 | 245 | 250 | 250 | | | | | | | | | |
| 24 | | | | | | | | | | | 250 | 245 | 250 | 250 | 280 | | | | | | | | | |
| 25 | | | | | | | | | | | 245 | 240 | 250 | 250 | 245 | | | | | | | | | |
| 26 | | | | | | | | | | 245 | 245 | 245 | 255 | 250 | | | | | | | | | | |
| 27 | | | | | | | | | | 230 | 240 | | 250 | 240 | | | | | | | | | | |
| 28 | | | | | | | | | | 230 | 250 | 250 | 240 | 240 | | | 240 | | | | | | | |
| 29 | | | | | | | | | 250 | 230 | 240 | 245 | 225 | 225 | 230 | | | | | | | | | |
| 30 | | | | | | | | | C | 230 | 250 | 250 | 245 | 240 | | 230 | | | | | | | | |
| 31 | | | | | | | | | | 255 | 245 | 225 | 245 | 230 | | 230 | | | | | | | | |
| | 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 | 23 | 30 | 28 | 29 | 30 | 20 | 6 | 1 | | | | | | | |
| MED | | | | | | | | | 245 | 240 | 250 | 245 | 250 | 248 | 248 | 230 | 240 | | | | | | | |
| UQ | | | | | | | | | 248 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | | | | | | | | |
| LQ | | | | | | | | | 232 | 230 | 245 | 242 | 245 | 240 | 242 | 230 | | | | | | | | |

# IONOSPHERIC DATA

DEC. 1969 | H'F (KM) | 135° E Mean Time (G. M. T.+ 9h)

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

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 300 | 310 | 305 | 350 | 310 | 300 | 230 | 230 | 230 | 240 | 230 | 230 | 220 | 220 | 230 | 240 | 215 | 230 | 210 | 200 | 250 | 250 | 330 | 310 |
| 2 | 305 | 310 | 300 | 300 | 300 | 295 | 250 | 230 | 230 | 210 | 245 | 200 | 210 | 240 | 230 | 200 | 220 | 205 | 200 | 230 | 215 | 210 | 300 | 310 |
| 3 | 295 | 310 | 290 | 290 | 250 | 300 | 240 | 240 | 210 | 240 | 230 | 210 | 210 | 240 | 240 | 240 | 215 | 200 | 210 | 240 | 290 | 250 | 290 | 330 |
| 4 | 310 | 310 | 300 | 290 | 250 | 270 | 255 | 240 | 220 | 220 | 230 | 210 | 210 | 210 | 240 | 240 | 230 | 205 | 230 | 245 | 260 | 305 | 350 | 315 |
| 5 | 290 | 295 | 295 | 290 | 240 | 245 | 270 | 230 | 240 | 220 | 210H | 245 | 220 | 225 | 230 | 220 | 220 | 210 | 210 | 245 | 270 | 245 | 350 | 355 |
| 6 | 305 | 290 | 245 | 255 | 350 | 340 | 270 | 220 | 225 | 230 | 240 | 210 | 240 | 240 | 220 | 230 | 220 | 200 | 210 | 240 | 245 | 290 | 340 | 300 |
| 7 | 300 | 300 | 300 | 235 | 200 | 275 | 290 | 240 | 230 | 230 | 220 | 240 | 210 | 230 | 220 | 240 | 210 | 245 | 200 | 210 | 250 | 255 | 310 | 300 |
| 8 | 300 | 290 | 245 | 240 | 200 | 260 | 300 | 240 | 240 | 250 | 225 | 210 | C | 220 | 235H | 230 | 225 | 205 | 220 | 240 | 250 | 245 | 265 | 320 |
| 9 | 325 | 300 | 270 | 260 | 240 | 250 | 275 | 230 | 225 | 240 | 230 | 230 | 210 | 240 | 240 | 240 | 220 | 200 | 245 | 250 | 210 | 295 | 300 | 345 |
| 10 | 350 | 300 | 250 | 240 | 210 | 300 | 250 | 230 | 220 | 240 | 220 | 210 | 210 | 210 | 240 | 250 | 220 | 220 | 210 | 280 | 285 | 300 | 300 | 350 |
| 11 | 300 | 290 | 295 | 295 | 290 | 250 | 205 | 240 | 240 | 210 | 230 | 240 | 210 | 230 | 210 | 240 | 230 | 205 | 245 | 210 | 245 | 260 | 310 | 350 |
| 12 | 350 | 340 | 300 | 290 | 210 | 260 | 290 | 240 | 240 | 240 | 240 | 200H | 230 | 240 | 230 | 240 | 210 | 200 | 250 | 250 | 250 | 230 | 320 | 315 |
| 13 | 300 | 295 | 290 | 285 | 290 | 260 | 240 | 220 | 240 | 220 | 205 | 210 | 205 | 205 | 245 | 225 | 225 | 205 | 200 | 220 | 250 | 250 | 290 | 355 |
| 14 | 320 | 340 | 310 | 300 | 230 | 220 | 210 | 220 | 220 | 220 | 225 | 210 | 230 | 230 | 230 | 240 | 210 | 205 | 240 | 220 | 270 | 250 | 305 | 320 |
| 15 | 340 | 345 | 340 | 290 | 250 | 240 | 225 | 220 | 210 | 240 | 230 | 205 | 245 | 220 | 210 | 230 | 230 | 250 | 240 | 240 | 250 | 290 | 340 | 300 |
| 16 | 290 | 305 | 310 | 300 | 300 | 275 | 205 | 205 | 210 | 240 | 230 | 220 | 245 | 210 | 240 | 245 | 230 | 210 | 240 | 245 | 210 | 230 | A | 360 |
| 17 | 310 | 305 | 320 | 345 | 250 | 290 | 250 | 240 | 230 | 245 | 240 | 200 | 210 | 240 | 240 | 240 | 200 | 200 | 240 | 230 | 245 | 210 | 330 | 310 |
| 18 | 300 | 300 | 300 | 300 | 290 | 290 | 230 | 230 | 235 | 230 | 220 | C | 210 | 200 | 200 | 245 | 210 | 210 | 240 | 240 | 250 | 290 | 310 | EA 360 |
| 19 | 350 | 340 | 290 | 245 | 240 | 280 | 240 | 220 | 230 | 240 | 240 | 250 | 220 | 220 | 250 | 250 | 210 | 210 | 240 | 245 | 240 | 300 | 290 | 310 |
| 20 | 345 | 320 | 300 | 295 | 250 | 245 | 250 | 240 | 210 | 225 | 225 | 220 | 240 | 245 | 240 | 245 | 225 | 205 | 220 | 230 | 250 | 260 | 300 | 340 |
| 21 | 350 | 350 | 325 | 270 | 230 | 255 | 250 | 230 | 220 | 220 | 245 | 205 | 220 | 250 | 220 | 225 | 220 | 210 | 240 | 220 | 260 | 280 | 300 | 300 |
| 22 | 300 | 330 | 310 | 290 | 255 | 260 | 240 | 220 | 220 | 220 | 240 | 210 | 240 | 220 | 240 | 245 | 210 | 205 | 245 | 245 | 210 | 260 | 345 | 350 |
| 23 | 345 | 310 | 290 | 260 | 260 | 300 | 240 | 220 | 220 | 240 | 220 | 210 | 220 | 240 | 240 | 245 | 240 | 200 | 240 | 200 | 255 | 250 | 340 | 305 |
| 24 | 300 | 305 | 310 | 300 | 310 | 330 | 240 | 245 | 240 | 245 | 240 | 210 | 240 | 220 | 250 | 245 | 240 | 200 | 240 | 250 | 240 | 270 | IA 350 | 340 |
| 25 | 295 | 290 | 290 | 290 | 300 | 310 | 250 | 240 | 210 | 230 | 220 | 220 | 210 | 240 | 240 | 240 | 230 | 200 | 240 | 210 | 205 | 250 | 295 | 340 |
| 26 | 310 | 300 | 305 | 300 | 290 | 310 | 260 | 245 | 220 | 220 | 230 | 230 | 220 | 210 | 250 | 240 | 210 | 300A | 260 | 230 | 250 | EA 390 | 250 | 295 |
| 27 | 300 | 305 | 300 | 380 | 350 | 295 | 290 | 245 | 230 | 220 | 210 | 210 | 240 | 205 | 235 | 240 | 220 | 245 | 205 | 240 | 250 | A | 300 | 250 |
| 28 | 280 | 260 | 240 | 350 | 340 | 310 | 260 | 220 | 230 | 230 | 205 | IA 230 | 220 | 230 | 245 | 245 | 220 | 220 | 255 | 205 | 230 | 320 | 300 | 295 |
| 29 | 270 | 270 | 280 | 300 | 320 | 310 | 240 | 220 | 220 | IA 230 | 220 | 220 | 220 | 225 | 225 | 220 | 205 | 240 | 220 | 210 | 220 | 300 | 350 | 305 |
| 30 | 320 | 260 | 300 | 340 | 300 | 300 | 240 | 220 | C | 200 | 220 | 220 | 230 | 230 | 245 | 230 | 220 | 240 | 230 | 200 | 240 | 255 | 320 | 290 |
| 31 | 280 | 250 | 240 | 300 | 295 | 300 | 230 | 220 | 220 | 210 | 240 | 220 | 210 | 210 | 230 | 220 | 210 | 225 | 220 | 220 | 220 | 280 | 305 | 300 |
| | 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 | 30 | 31 | 31 | 30 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 30 | 31 |
| MED | 300 | 305 | 300 | 290 | 260 | 290 | 250 | 230 | 225 | 230 | 230 | 210 | 220 | 225 | 240 | 240 | 220 | 205 | 240 | 230 | 250 | 259 | 308 | 312 |
| UQ | 322 | 310 | 305 | 300 | 300 | 300 | 260 | 240 | 230 | 240 | 240 | 230 | 230 | 240 | 240 | 245 | 225 | 222 | 240 | 245 | 250 | 290 | 340 | 341 |
| LQ | 300 | 292 | 290 | 278 | 240 | 260 | 240 | 220 | 220 | 220 | 220 | 210 | 210 | 215 | 230 | 230 | 210 | 202 | 210 | 215 | 235 | 250 | 300 | 300 |



DEC. 1969 | H'F (KM)

# IONOSPHERIC DATA

DEC. 1969 | H'ES (KM) | 135° E Mean Time (G. M. T. + 9h)

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

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | S | S | 100 | 100 | E | S | B | G | 110 | 110 | 110 | 110 | 105 | G | G | G | G | 100 | 100 | S | S | S | S | S |
| 2 | S | S | S | B | E | S | S | G | G | 140 | 110 | 110 | 110 | 110 | G | 110 | G | B | S | 100 | B | 110 | S | S |
| 3 | S | S | B | B | B | S | 150 | 140 | 140 | G | 115 | 110 | G | G | G | G | B | 100 | 100 | 100 | S | S | S | S |
| 4 | S | S | S | B | 100 | B | S | B | 130 | 120 | 120 | G | G | G | G | G | 100 | 100 | 100 | 100 | 100 | 100 | 100 | S |
| 5 | S | B | 100 | E | E | B | B | B | G | G | 130 | 125 | 115 | 105 | 105 | 100 | 100 | 100 | 100 | 100 | 100 | B | S | 105 |
| 6 | S | S | E | 100 | E | 100 | B | G | G | 140 | 110 | 115 | 110 | G | 105 | 100 | 100 | 100 | B | 100 | S | S | S | S |
| 7 | S | S | S | S | B | B | S | G | 140 | 130 | 130 | 140 | 145 | 140 | G | 130 | 100 | B | S | S | S | S | S | S |
| 8 | S | S | 100 | E | 100 | S | 100 | G | G | 110 | G | G | C | G | 130 | G | B | 100 | S | S | S | B | 105 | 100 |
| 9 | 100 | S | 100 | 100 | 100 | S | S | 180 | 130 | 115 | 115 | 110 | 110 | G | G | G | G | B | S | S | S | S | S | S |
| 10 | S | S | S | B | E | E | 150 | 160 | 130 | 130 | 120 | 110 | 110 | 110 | G | G | G | B | S | S | S | S | S | S |
| 11 | B | B | S | E | B | B | B | G | G | G | G | G | G | G | G | G | G | B | S | B | S | S | S | S |
| 12 | S | S | S | E | E | B | S | G | G | 115 | 115 | 110 | G | G | G | 105 | G | 100 | 100 | 100 | B | S | S | S |
| 13 | S | S | 100 | E | B | S | S | G | G | 100 | G | G | G | G | G | G | 105 | 105 | S | B | 100 | 100 | B | 100 |
| 14 | 100 | 100 | 100 | 100 | 105 | 100 | 100 | G | 180 | 160 | 140 | 115 | 155 | G | 100 | 100 | 130 | 100 | 105 | 105 | 105 | S | S | S |
| 15 | S | 110 | 110 | B | E | S | B | B | G | G | 110 | 110 | 105 | G | G | G | B | 100 | 100 | S | 100 | 100 | 100 | S |
| 16 | S | 110 | S | S | 100 | B | S | B | G | 150 | 140 | 110 | 110 | G | G | 110 | 110 | 110 | S | 100 | 110 | 110 | 105 | 105 |
| 17 | 100 | S | S | 105 | 100 | S | B | G | 115 | 115 | 110 | 110 | 110 | G | G | G | G | B | 100 | S | S | B | S | 100 |
| 18 | S | 100 | 100 | B | S | 100 | 100 | 100 | G | G | 110 | C | G | G | 110 | G | G | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 19 | 100 | 100 | 100 | 100 | S | S | S | 110 | 110 | 120 | 110 | 110 | G | G | 110 | 105 | 100 | 100 | 100 | S | S | 100 | S | S |
| 20 | 100 | 100 | 100 | S | B | B | 100 | B | G | G | G | 105 | 105 | 105 | 105 | 105 | 105 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 21 | S | 105 | 105 | 105 | 105 | B | 105 | G | G | G | G | G | G | G | G | G | 100 | 100 | S | 100 | S | B | S | B |
| 22 | S | B | B | E | E | E | 105 | 105 | 105 | 100 | G | G | G | G | G | G | 115 | 110 | 100 | 100 | S | S | 100 | 100 |
| 23 | 100 | S | 100 | 100 | B | 110 | B | B | G | 110 | 110 | G | 105 | 105 | 105 | G | 100 | 100 | 100 | 100 | 100 | S | 100 | 100 |
| 24 | 100 | S | 100 | 100 | 100 | B | S | B | G | G | 105 | 130 | G | 135 | 120 | 105 | 105 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 25 | 100 | 100 | S | B | S | B | E | G | 140 | 130 | 110 | 120 | 120 | 110 | 110 | G | G | B | 100 | S | S | 100 | 100 | 100 |
| 26 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | G | 140 | 120 | 160 | G | G | 150 | 140 | 110 | 110 | 100 | 100 | 100 | 100 | 100 | 100 |
| 27 | 100 | 100 | 100 | 100 | 100 | B | 110 | 110 | G | 100 | 105 | 100 | 100 | 120 | 115 | 115 | 110 | 105 | 105 | 105 | 105 | 100 | 100 | 100 |
| 28 | 100 | 100 | 100 | 100 | B | B | 105 | 105 | 105 | 100 | 100 | 100 | 100 | B | B | B | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 29 | S | 100 | B | B | B | E | 100 | 100 | G | 115 | 115 | G | G | G | G | B | 100 | S | B | B | S | S | 105 | 100 |
| 30 | 105 | 105 | 100 | 100 | E | 100 | 105 | 110 | C | G | G | G | 105 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | S | B | B |
| 31 | B | E | 100 | B | E | B | B | 105 | G | G | 115 | 110 | G | G | 115 | G | 105 | 105 | 105 | 105 | 100 | 105 | 100 | 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 | 12 | 13 | 18 | 13 | 10 | 6 | 13 | 12 | 12 | 21 | 24 | 21 | 17 | 10 | 14 | 13 | 19 | 23 | 20 | 19 | 15 | 14 | 15 | 16 |
| MED | 100 | 100 | 100 | 100 | 100 | 100 | 105 | 108 | 130 | 115 | 112 | 110 | 110 | 110 | 110 | 105 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| UQ | 100 | 105 | 100 | 100 | 100 | 100 | 105 | 125 | 140 | 130 | 120 | 115 | 110 | 120 | 115 | 110 | 108 | 102 | 100 | 100 | 100 | 100 | 100 | 100 |
| LQ | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 102 | 110 | 110 | 110 | 110 | 105 | 105 | 105 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

The Radio Research Laboratories, Japan

DEC. 1969 | H'ES (KM)

# IONOSPHERIC DATA

DEC. 1969 | TYPES OF ES | 135° E Mean Time (G. M. T. + 9h)

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

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | F1 | F1 | | | | | C1 | C2 | C2 | C1 | L2 | | | | | L1 | F1 | | | | | |
| 2 | | | | | | | | | | H1 | C1 | C1 | C1 | C1 | | C1 | | | | F1 | | F1 | | |
| 3 | | | | | | | F1 | H1 | H1 | | C1 | C1 | | | | | | L1 | F1 | F1 | | | | |
| 4 | | | | | F1 | | | | H1 | H1 | H1 | | | | | | L2 | L3 | F2 | F2 | F1 | F1 | F1 | |
| 5 | | | F1 | | | | | | | | H1 | H2 | C1 | L1 | L2 | L1 | L2 | L2 | F1 | F1 | F1 | | | F1 |
| 6 | | | | F1 | | F1 | | | | H1 | C2 | C1 | C1 | | L3 | L3 | L3 | L3 | | F2 | | | | |
| 7 | | | | | | | | | H1 | H1 | H1 | H1 | H1 | H1 | | H1 | L1 | | | | | | | |
| 8 | | | L1 | | F1 | | F1 | | | C1 | | | | | H1 | | | L1 | | | | | F1 | F1 |
| 9 | F1 | | F1 | F2 | F1 | | | H1 | C1 | C1 | C1 | C1 | C1 | | | | | | | | | | | |
| 10 | | | | | | | F1 | H1 | H1 | H1 | H1 | C1 | C1 | C1 | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | C1 | C1 | C1 | | | | L1 | | L1 | F1 | F1 | | | | |
| 13 | | | F1 | | | | | | | L1 | | | | | | | L2 | F1 | | | F1 | F1 | | F1 |
| 14 | F1 | F1 | F1 | F1 | F1 | F1 | F1 | | H1 | H1 | H1 | C1 | HL11 | | L1 | L2 | HL22 | F2 | F2 | F2 | F3 | | | |
| 15 | | F2 | F2 | | | | | | | | L1 | L1 | L1 | | | | | L1 | F1 | | F1 | F1 | F1 | |
| 16 | | F1 | | | F1 | | | | | H1 | H1 | C1 | C1 | | | C1 | L1 | L2 | | F1 | F1 | F2 | F2 | F2 |
| 17 | F1 | | | F1 | F1 | | | | C1 | C1 | C1 | C1 | C1 | | | | | | F1 | | | | | F1 |
| 18 | | F1 | F1 | | | F1 | F1 | L1 | | | C1 | | | | C1 | | | L1 | F1 | F1 | F2 | F2 | F1 | F2 |
| 19 | F2 | F1 | F1 | F1 | | | | L1 | C1 | H2 | C1 | C2 | | | L2 | L2 | L2 | L2 | F2 | | | F1 | | |
| 20 | F1 | F1 | F1 | | | | F1 | | | | | L2 | L2 | L2 | L2 | L2 | L2 | F1 | F1 | F2 | F3 | F2 | F2 | F2 |
| 21 | | F1 | F2 | F1 | F1 | | F1 | | | | | | | | | | L1 | F1 | | F1 | | | | |
| 22 | | | | | | | F2 | L3 | L1 | L1 | | | | | | | C2 | L2 | F2 | F3 | | | F1 | F1 |
| 23 | F1 | | F1 | F1 | | F1 | | | | L1 | L1 | | L1 | L2 | L2 | | L2 | L2 | F1 | F1 | F1 | | F1 | F1 |
| 24 | 100 | S | 100 | 100 | 100 | B | S | B | G | G | 105 | 130 | | H1 | H1 | L1 | L2 | L3 | F2 | F2 | F1 | F2 | F3 | F3 |
| 25 | F2 | F1 | | | | | | | H1 | H1 | C1 | H1 | H1 | C1 | C1 | | | | F1 | | | F1 | F1 | F2 |
| 26 | F1 | F1 | F2 | F1 | F1 | F2 | F2 | L3 | | H1 | H1 | H1 | | | H1 | H1 | L1 | L2 | F2 | F2 | F4 | F2 | F2 | F2 |
| 27 | F1 | F1 | F2 | F2 | F2 | | F2 | L1 | | L1 | L1 | L1 | L1 | C1 | CL11 | CL21 | C2 | F2 | F1 | F3 | F3 | F3 | F3 | F2 |
| 28 | F2 | F1 | F1 | F1 | | | F1 | L3 | L2 | L1 | L1 | L1 | L1 | | | | L1 | F2 | F2 | F1 | F1 | F1 | F1 | F1 |
| 29 | | F1 | | | | | F3 | L3 | | C2 | C1 | | | | | | L1 | | | | | | F2 | F2 |
| 30 | F2 | F3 | F1 | F1 | | F1 | F3 | L1 | | | | | L1 | L2 | L1 | L1 | L2 | F3 | F2 | F1 | F1 | | | |
| 31 | | | F1 | | | | | L1 | | | C1 | L1 | | | L1 | | L1 | F3 | F4 | F2 | F2 | F1 | F2 | F1 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | | | | | | | | | | | | | | | | | | | | | | | | |
| MED | | | | | | | | | | | | | | | | | | | | | | | | |
| UQ | | | | | | | | | | | | | | | | | | | | | | | | |
| LQ | | | | | | | | | | | | | | | | | | | | | | | | |



DEC. 1969 | TYPES OF ES

# IONOSPHERIC DATA

DEC. 1969 | HPF2 (KM) | 135° E Mean Time (G. M. T.+ 9h)

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

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 380 | 390 | 390 | 400 | 410 | 390 | 300 | ↓R 280 | 280 | 300 | 300 | 300 | 300 | 300 | 300 | ↓R 290 | ↓R 280 | ↓R 300 | 295 | 270 | 350 | 300 | 390 | 380 |
| 2 | 400 | 400 | 380 | 400 | 400 | 350 | 315 | 280 | 290 | 280 | 260 | 280 | 280 | 250 | 270 | 300 | 260 | 290 | 270 | 290 | 300 | 370 | 400 | ↓R 380 |
| 3 | 390 | 390 | 350 | 350 | 310 | 390 | 300 | 280 | 300 | 260 | 290 | 300 | 300 | 300 | 300 | ↓R 280 | 260 | 280 | 260 | 290 | 360 | 310 | 340 | 400 |
| 4 | 380 | 400 | 370 | 330 | 300 | 360 | 300 | ↓R 280 | ↓R 260 | 290 | 290 | 260 | 300 | ↓R 300 | 300 | ↓R 300 | 280 | 300 | 270 | 290 | 380 | 420 | 410 | 390 |
| 5 | 330 | 390 | 390 | 380 | 300 | 310 | 350 | 300 | 290 | 285 | 290 | 280 | 280 | 300 | 270 | 270 | 255 | 270 | 290 | 330 | 340 | 315 | 430 | 440 |
| 6 | 370 | 355 | 310 | 340 | 440 | 410 | 330 | 255 | 270 | 290 | 290 | 300 | 300 | 300 | 300 | 270 | 290 | 290 | 300 | 290 | 310 | 360 | 410 | 390 |
| 7 | 390 | 395 | 380 | 290 | 270 | 380 | 380 | 300 | 260 | ↓R 290 | 290 | 300 | ↓R 300 | 300 | 260 | 280 | 260 | 250 | 260 | 350 | 300 | 350 | 395 | 380 |
| 8 | 370 | 350 | 300 | 300 | 270 | 390 | 400 | 290 | 260 | 270 | ↓R 270 | 280 | C | 280 | 280 | 270 | 250 | ↓R 245 | 320 | 400 | 320 | 305 | 340 | 395 |
| 9 | 400 | 365 | 340 | 320 | 300 | 300 | 350 | 250 | 255 | 280 | 300 | 260 | 300 | 300 | 300 | 260 | 280 | 260 | 300 | 300 | 290 | 340 | 400 | 400 |
| 10 | 400 | ↓R 380 | ↓R 310 | 290 | 320 | 340 | 350 | 280 | 290 | 260 | 300 | ↓R 300 | 300 | 290 | 260 | 350 | 250 | 250 | 310 | 340 | 350 | 350 | 400 | 410 |
| 11 | 380 | 370 | 350 | 390 | 350 | 310 | 300 | 280 | 280 | 250 | 260 | 260 | 300 | 300 | 260 | 270 | 260 | 290 | 320 | 310 | ↓R 300 | 310 | 370 | 420 |
| 12 | 430 | 400 | 390 | 320 | 240 | 315 | 340 | 300 | R 260 | 290 | ↓R 300 | 300 | ↓R 340 | 280 | 290 | 260 | 280 | 270 | 300 | 300 | 310 | ↓R 270 | 360 | 375 |
| 13 | 380 | 350 | 360 | 350 | 400 | 310 | 300 | ↓R 270 | R 260 | 250 | 260 | 300 | ↓R 275 | 315 | ↓R 300 | 290 | 260 | 260 | 250 | 285 | 315 | 290 | 310 | 390 |
| 14 | 380 | 390 | 380 | 350 | 270 | 290 | ↓R 240 | 250 | 250 | 280 | 280 | ↓R 305 | 290 | V 260 | 260 | 275 | 240 | 290 | 300 | 290 | 300 | 330 | 355 | 370 |
| 15 | 400 | 400 | 390 | 340 | 300 | 300 | 270 | 250 | 250 | 250 | 300 | ↓R 300 | 300 | 290 | 290 | 280 | 290 | 270 | 300 | 290 | 350 | 400 | 400 | 390 |
| 16 | 360 | 390 | 390 | 380 | 395 | 350 | 260 | 260 | 245 | 250 | 280 | 300 | 290 | 350 | ↓R 300 | 280 | 260 | 300 | 310 | 290 | 250 | 260 | A | 400 |
| 17 | 395 | 390 | 400 | 400 | 300 | 340 | 310 | 250 | 250 | 300 | 280 | 310 | 280 | 305 | 300 | 300 | 260 | 280 | 290 | 300 | 300 | 310 | 390 | 400 |
| 18 | 360 | 380 | 350 | 330 | 360 | 350 | 280 | 260 | 250 | R 300 | 290 | I C 280 | ↓R 295 | R | 290 | ↓R 280 | R | 250 | 300 | 300 | 300 | 350 | 400 | 390 |
| 19 | 390 | 410 | 320 | 300 | 250 | 360 | 290 | 250 | ↓R 270 | 280 | 290 | 300 | 280 | 320 | ↓R 340 | 300 | 260 | 320 | 300 | 300 | 310 | 400 | 360 | 380 |
| 20 | 400 | 380 | 350 | 330 | 320 | 350 | 290 | 270 | R | 270 | 290 | 290 | 305 | 300 | 250 | V 290 | 255 | 300 | 280 | 300 | 280 | 305 | 390 | 390 |
| 21 | 400 | 405 | 380 | 320 | 260 | 300 | 290 | 260 | 250 | 250 | 255 | 300 | 305 | 250 | 300 | 290 | 270 | 250 | 305 | 250 | 310 | 330 | 360 | 375 |
| 22 | 380 | 400 | 380 | 350 | 320 | 350 | 290 | 250 | 250 | 270 | 300 | 290 | 300 | 290 | 300 | ↓R 290 | 280 | 300 | 280 | 290 | 280 | 320 | 400 | 420 |
| 23 | 410 | 360 | 350 | 350 | 360 | 390 | 295 | 300 | 280 | 300 | ↓R 300 | 300 | 310 | 300 | ↓R 300 | ↓R 290 | 290 | 295 | 330 | 290 | 380 | 300 | 400 | 390 |
| 24 | 390 | 390 | 400 | 380 | 390 | 400 | 290 | 330 | 280 | 290 | 300 | ↓R 300 | 300 | ↓R 320 | 300 | ↓R 300 | ↓R 290 | 280 | 280 | 300 | 300 | 340 | I A 400 | 400 |
| 25 | 370 | 350 | 370 | 350 | 360 | 400 | 300 | 290 | I R 250 | R 260 | ↓R 300 | 300 | 320 | 300 | 300 | 320 | 300 | 280 | 320 | 300 | 380 | 330 | 390 | 400 |
| 26 | 400 | 390 | 390 | 380 | 340 | 390 | 330 | 275 | 250 | ↓R 260 | 310 | 260 | 300 | 325 | 300 | 280 | 260 | 350 | ↓R 290 | 300 | 300 | R | 300 | 350 |
| 27 | 370 | 380 | 390 | F 430 | F | 390 | 340 | ↓R 295 | 260 | 250 | 270 | 290 | ↓R 280 | 300 | 305 | 300 | 280 | 300 | 270 | 290 | 290 | A | 350 | 310 |
| 28 | 320 | 300 | 260 | 390 | 390 | 390 | 310 | 270 | 250 | 250 | 280 | 280 | 290 | 260 | 300 | ↓R 270 | 280 | 290 | 300 | 240 | 290 | 390 | 360 | 330 |
| 29 | 320 | 315 | 320 | 390 | 390 | 390 | 270 | 250 | 300 | 250 | 260 | 285 | 275 | 265 | 305 | 290 | 280 | 290 | 290 | ↓R 270 | 250 | 380 | 365 | 340 |
| 30 | 350 | 300 | 340 | 385 | 390 | 370 | 295 | 250 | C | 250 | 290 | 300 | 280 | 270 | 280 | 255 | 250 | 295 | 260 | 240 | 300 | 300 | 395 | 370 |
| 31 | 345 | 315 | 320 | 380 | 380 | 350 | 270 | 270 | 250 | 300 | 260 | 280 | 280 | 290 | 270 | 260 | 250 | 280 | 250 | 255 | 330 | 330 | 350 | 380 |
| | 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 | 30 | 31 | 31 | 31 | 29 | 31 | 31 | 31 | 30 | 30 | 31 | 31 | 30 | 31 | 31 | 31 | 31 | 29 | 30 | 31 |
| MED | 380 | 390 | 370 | 350 | 330 | 350 | 300 | 270 | 260 | 270 | 290 | 300 | 300 | 300 | 300 | 280 | 260 | 290 | 295 | 290 | 300 | 330 | 390 | 390 |
| UQ | 400 | 392 | 390 | 382 | 390 | 390 | 330 | 285 | 280 | 290 | 300 | 300 | 300 | 300 | 300 | 295 | 280 | 298 | 300 | 300 | 335 | 350 | 400 | 400 |
| LQ | 370 | 358 | 340 | 330 | 300 | 328 | 290 | 252 | 250 | 250 | 275 | 280 | 280 | 280 | 275 | 270 | 260 | 270 | 275 | 290 | 300 | 305 | 360 | 378 |

The Radio Research Laboratories, Japan

DEC. 1969 | HPF2 (KM)

# IONOSPHERIC DATA

DEC. 1969 | YPF2 (KM) | 135° E Mean Time (G. M. T.+ 9h)

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

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 110 | 110 | 100 | 100 | 90 | 110 | 90 | J R 100 | 70 | 80 | 90 | 90 | 100 | 90 | 90 | J R 90 | J R 100 | J R 90 | 95 | 110 | 90 | 100 | 100 | 90 |
| 2 | 100 | 100 | 110 | 100 | 100 | 90 | 95 | 100 | 90 | 100 | 90 | 110 | 100 | 100 | 90 | 80 | 80 | 100 | 100 | 90 | 90 | 110 | 100 | J R 100 |
| 3 | 100 | 100 | 100 | 100 | 100 | 100 | 90 | 110 | 90 | 90 | 100 | 90 | 80 | 90 | 90 | J R 60 | 90 | 100 | 80 | 120 | 80 | 90 | 90 | 100 |
| 4 | 120 | 100 | 110 | 110 | 100 | 80 | 100 | J R 100 | J R 90 | 90 | 60 | 90 | 100 | J R 90 | 90 | J R 80 | 70 | 100 | 110 | 110 | 110 | 80 | 90 | 100 |
| 5 | 110 | 100 | 100 | 110 | 100 | 100 | 100 | 90 | 90 | 90 | 55 | 90 | 90 | 55 | 60 | 75 | 65 | 90 | 70 | 115 | 70 | 85 | 70 | 60 |
| 6 | 85 | 95 | 100 | 105 | 60 | 60 | 80 | 50 | 85 | 90 | 90 | 100 | 80 | 90 | 90 | 80 | 90 | 70 | 100 | 100 | 90 | 90 | 100 | 100 |
| 7 | 100 | 95 | 110 | 90 | 80 | 110 | 100 | 90 | 90 | J R 80 | 70 | 80 | J R 80 | 90 | 80 | 70 | 120 | 100 | 120 | 100 | 100 | 90 | 95 | 110 |
| 8 | 120 | 100 | 100 | 110 | 110 | 100 | 100 | 100 | 90 | 55 | J R 50 | 60 | C | 65 | 75 | 55 | 70 | J R 105 | 80 | 95 | 110 | 135 | 85 | 75 |
| 9 | 100 | 115 | 130 | 130 | 100 | 100 | 165 | 95 | 75 | 100 | 80 | 80 | 80 | 90 | 90 | 90 | 100 | 90 | 100 | 100 | 90 | 70 | 90 | 100 |
| 10 | 100 | J R 110 | J R 90 | 90 | 100 | 110 | 120 | 110 | 100 | 90 | 80 | J R 80 | 90 | 90 | 120 | 90 | 90 | 90 | 90 | 120 | 120 | 110 | 100 | 90 |
| 11 | 100 | 110 | 100 | 100 | 90 | 100 | 100 | 100 | 110 | 100 | 110 | 90 | 80 | 100 | 120 | 80 | 90 | 100 | 90 | 90 | J R 100 | 90 | 100 | 85 |
| 12 | 100 | 100 | 100 | 90 | 100 | 135 | 120 | 90 | R 90 | 90 | J R 80 | 90 | J R 100 | 70 | 90 | 110 | 90 | 110 | 100 | 90 | 90 | J R 80 | 120 | 95 |
| 13 | 110 | 100 | 90 | 100 | 100 | 80 | 100 | J R 80 | R 80 | 40 | 65 | 75 | J R 45 | 80 | J R 70 | 100 | 90 | 80 | 95 | 65 | 85 | 65 | 90 | 70 |
| 14 | 75 | 80 | 65 | 90 | 50 | 60 | J R 60 | 50 | 70 | 40 | 35 | J R 85 | 60 | V 60 | 60 | 75 | 60 | 80 | 55 | 60 | 70 | 130 | 90 | 85 |
| 15 | 95 | 95 | 65 | 60 | 70 | 70 | 90 | 50 | 70 | 100 | 100 | J R 90 | 90 | 60 | 90 | 80 | 90 | 110 | 90 | 90 | 140 | 100 | 100 | 90 |
| 16 | 110 | 100 | 100 | 110 | 95 | 100 | 90 | 70 | 95 | 80 | 70 | 90 | 100 | 90 | J R 80 | 60 | 90 | 90 | 90 | 100 | 90 | 90 | A | 100 |
| 17 | 95 | 100 | 90 | 90 | 90 | 110 | 120 | 70 | 100 | 90 | 70 | 80 | 100 | 95 | 80 | 90 | 110 | 110 | 100 | 90 | 90 | 90 | 100 | 100 |
| 18 | 90 | 80 | 100 | 90 | 100 | 90 | 110 | 90 | 90 | R 90 | 70 | I C 75 | J R 295 | R | 290 | J R 280 | R | 250 | 300 | 300 | 300 | 350 | 400 | 390 |
| 19 | 90 | 90 | 80 | 100 | 110 | 90 | 90 | 90 | J R 90 | 80 | 70 | 80 | 110 | 90 | J R 110 | 90 | 100 | 80 | 100 | 100 | 90 | 100 | 100 | 100 |
| 20 | 90 | 100 | 100 | 110 | 110 | 100 | 110 | 120 | R | 80 | 60 | 55 | 70 | 70 | 70 | V 55 | 65 | 100 | 70 | 100 | 90 | 95 | 60 | 100 |
| 21 | 100 | 85 | 70 | 80 | 60 | 70 | 70 | 60 | 60 | 50 | 45 | 90 | 95 | 50 | 70 | 55 | 50 | 55 | 95 | 50 | 90 | 70 | 90 | 80 |
| 22 | 95 | 90 | 80 | 95 | 80 | 95 | 80 | 100 | 55 | 80 | 80 | 90 | 80 | 100 | 90 | J R 90 | 110 | 100 | 100 | 90 | 110 | 80 | 100 | 100 |
| 23 | 90 | 120 | 100 | 100 | 90 | 100 | 95 | 100 | 110 | 90 | J R 90 | 80 | 90 | 90 | J R 80 | J R 100 | 90 | 95 | 70 | 100 | 110 | 100 | 100 | 100 |
| 24 | 100 | 100 | 100 | 100 | 100 | 100 | 90 | 80 | 60 | 90 | 90 | J R 90 | 80 | J R 90 | 100 | J R 100 | J R 90 | 120 | 80 | 90 | 100 | 100 | I A 100 | 100 |
| 25 | 120 | 120 | 110 | 90 | 100 | 100 | 100 | 100 | I R 95 | R 90 | J R 90 | 90 | 80 | 100 | 100 | 80 | 80 | 100 | 120 | 100 | 120 | 110 | 110 | 100 |
| 26 | 100 | 110 | 100 | 110 | 100 | 100 | 70 | 75 | 90 | J R 100 | 90 | 90 | 90 | 75 | 90 | 70 | 90 | 100 | J R 100 | 100 | 100 | R | 100 | 90 |
| 27 | 90 | 80 | 100 | F 90 | F | 100 | 100 | J R 95 | 70 | 50 | 70 | 65 | J R 75 | 80 | 90 | 100 | 65 | 55 | 85 | 55 | 100 | A | 90 | 100 |
| 28 | 90 | 55 | 80 | 110 | 105 | 70 | 90 | 90 | 50 | 50 | 70 | 45 | 55 | 115 | 75 | J R 50 | 75 | 80 | 70 | 55 | 70 | 80 | 80 | 70 |
| 29 | 80 | 80 | 80 | 115 | 60 | 65 | 80 | 55 | 70 | 55 | 60 | 60 | 80 | 90 | 90 | 65 | 65 | 55 | 95 | J R 70 | 50 | 95 | 85 | 65 |
| 30 | 95 | 55 | 105 | 110 | 125 | 85 | 105 | 55 | C | 50 | 55 | 60 | 70 | 75 | 50 | 55 | 40 | 75 | 45 | 60 | 95 | 70 | 100 | 80 |
| 31 | 100 | 85 | 125 | 75 | 120 | 60 | 75 | 50 | 50 | 50 | 45 | 90 | 65 | 70 | 80 | 65 | 60 | 45 | 60 | 50 | 125 | 70 | 100 | 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 | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 31 | 29 | 31 | 31 | 31 | 30 | 30 | 31 | 31 | 30 | 31 | 31 | 31 | 31 | 29 | 30 | 31 |
| MED | 100 | 100 | 100 | 100 | 100 | 100 | 95 | 90 | 90 | 90 | 70 | 90 | 80 | 90 | 90 | 80 | 90 | 95 | 95 | 95 | 90 | 90 | 100 | 100 |
| UQ | 100 | 100 | 100 | 110 | 100 | 100 | 100 | 100 | 90 | 90 | 90 | 90 | 100 | 90 | 90 | 90 | 90 | 100 | 100 | 100 | 110 | 100 | 100 | 100 |
| LQ | 90 | 88 | 90 | 90 | 90 | 80 | 90 | 70 | 70 | 55 | 60 | 78 | 80 | 70 | 78 | 65 | 65 | 80 | 80 | 80 | 90 | 80 | 90 | 85 |



DEC. 1969 | YPF2 (KM)

# IONOSPHERIC DATA

DEC. 1969 | FOF2 (0.1 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 31 | 34 | 35 | 33 | 35 | 35 | 34 | 59S | 84 | 108 | 127 | 128 | 134 | 133 | 146 | 143 | 142 | 146S | 144R | R | R | 66US | 55H | 34 |
| 2 | 34 | 33 | 31 | 29 | 33 | 29 | 25 | 52S | 76 | 108 | 121S | 106 | 107 | 101R | 103 | 106 | 99 | 90JS | 81US | 63S | 65 | 60S | 38S | 34 |
| 3 | 35 | 35 | 35 | 34 | 29 | 27 | 27 | 56 | 91S | 113 | 111 | 98 | 122 | 130 | 130 | 121 | 115S | 96 | 68 | 52 | 53 | 53S | 48 | 35 |
| 4 | 34 | 35 | 37 | 37 | 46 | 25H | 24 | 51 | 72 | 85 | 106 | 102 | 91 | 110 | 121 | 135S | 134S | 104 | 69 | 59S | 64 | 52JS | 41S | 44IS |
| 5 | 50JS | 45S | 45S | 43 | 38 | 26 | 25 | 48 | 86JS | 102S | 102 | 125 | 106 | 108H | 107 | 103JS | 85 | 71 | 59 | 50S | 52S | 54 | 40JS | 41S |
| 6 | 54S | 57 | 59 | 45 | 35 | 35 | 43S | 59 | 84 | 108S | 115S | 117S | 128S | 136S | 138S | 129 | 104US | 98 | 70 | 58 | 52JS | 51JS | 48JS | 40S |
| 7 | 39 | 40 | 42US | 46 | 27 | 20 | 26 | 52US | 89 | 99 | 95 | 108 | 126 | 120 | 105 | 105 | 105 | 90 | 69 | 49 | 53 | 48 | 42 | 36 |
| 8 | 39 | 40 | 40 | 36 | 31 | 31 | 29S | 49S | 81 | 107S | 115Z | 109V | 117US | 116S | 127 | 115S | 98S | 81S | 56 | 52US | 54 | 54 | 47 | 38 |
| 9 | 36 | 38 | 39 | 40 | 45 | 30 | 24 | 42S | 84 | 100JS | 101JS | 91 | 100 | 114 | 115 | 106 | 97 | 79 | 57 | 51 | 55 | 47 | 42 | 31 |
| 10 | 32 | 35 | 42 | 47 | 35 | 22 | 26 | 44 | 69 | 97US | 100JS | 98R | 106 | 128 | 111 | 91 | 94 | 99 | 56 | 47 | 38US | 37S | 37 | 32 |
| 11 | 29 | 32 | 35 | 32 | 32 | 31 | 25 | 39S | 75 | 95 | 87 | 96C | 103S | 108JS | 142H | 131JS | 106 | 100 | 64 | 55 | 42 | 54 | 42 | 26 |
| 12 | 28 | 28 | 30 | 36 | 36 | 19 | 21 | 42 | 72 | 79 | 102 | 92S | 122UC | 126JC | 124IC | 119S | 115S | 92 | 54US | 46US | 45US | 48S | 37JS | 27 |
| 13 | 29C | 33 | 33 | 31 | 31 | 32 | 30 | 47 | 80S | 89 | 86 | 88JC | 99 | 116S | 145 | 144 | 137S | 128JS | 106C | 56 | 50IC | 46IC | 38 | 25 |
| 14 | 26 | 27 | 29 | 30 | 40 | 29 | 20 | 43 | 65 | 77 | 90 | 89C | 109 | 103 | 85 | 82 | 80 | 70 | 50 | 52 | 48S | 48JS | 39S | 30 |
| 15 | 29 | 29 | 30 | 32 | 36 | 30 | 26 | 40JS | 76JS | 87 | 78 | 92 | 121 | 120 | 124 | C | C | C | 84UC | 61 | 65 | 56 | 47S | 40 |
| 16 | 34 | 34 | 32 | 32 | 32 | 33 | 36S | 49S | 73 | 68 | 78 | 102 | 110 | 99C | 109 | 113 | 98 | 84V | 73 | 68 | 67UC | 45 | 32S | 28IA |
| 17 | 30 | 31 | 32 | 33 | 41JS | 32 | 27 | 44S | 77 | 99 | 114 | 129 | 135 | 140 | 144 | 147 | 132 | 104S | 86IC | 73 | 68JS | 50 | 38US | 32 |
| 18 | 32 | 35 | 34 | 36 | 37 | 32 | 35 | 47 | 78 | 87S | 104 | 110C | 105 | 102 | 104V | 96S | 91 | 88 | 58 | 45US | 54 | 52JS | 30 | 31 |
| 19 | 32 | 33 | 34 | 39 | 47 | 28 | 30 | 48 | 74 | 90 | 102 | 110 | 118 | 126US | 136 | 155H | 158US | 116IS | 67 | 65JS | 57 | 45S | 36 | 33 |
| 20 | 31 | 32S | 34S | 38 | 43 | 30 | 29 | 49 | 78S | 88C | 110 | 102 | 113 | 124JC | 128 | 124JC | 129C | 125JC | 72 | 62US | 73S | 63JS | 32 | 30 |
| 21 | 31 | 31 | 32 | 36 | 40 | 26 | 25 | 42 | 73S | 92S | 99 | 91 | 112 | 132H | 119S | 117IS | 104 | 91 | 50 | 56 | 47 | 45 | 41 | 38 |
| 22 | 39 | 34 | 34 | 33 | 41S | 31 | 32IC | 46 | 83S | 99S | 99S | 97H | 112 | 124C | 128JC | 109 | 102JS | 97US | 55 | 64 | 55 | 47S | 32 | 30 |
| 23 | 29 | 31 | 32 | 33 | 35 | 31 | 33 | 49 | 75 | 98US | 105 | 103 | 120S | 126 | 117 | 121IS | 125JC | 117S | 68 | 71 | 61S | 59S | 55 | 51JS |
| 24 | 50S | 45 | 42 | 39 | 29 | 29 | 32 | 49 | 82S | 98 | 105IC | 116US | 122S | 118 | 115 | 126S | 124JS | 117IS | 88JC | 67 | 63 | 57 | 55 | 50S |
| 25 | 42 | 34S | 33 | 30 | 32 | 30 | 28 | 47S | 82 | 92 | 107 | 92 | 97C | 121S | 121 | 123S | 130 | 135JS | 107IS | 82 | 84JC | 57 | 47US | 42S |
| 26 | 38 | 39JS | 39US | 36JS | 36IS | 27 | 29 | 49 | 91 | 85US | 94 | 98 | 115 | 106 | 118S | 122S | 110 | 102 | 60S | 78S | 81 | 56IA | 40 | 28 |
| 27 | 29F | 30 | 30 | 31F | 32F | 33 | 30 | 48IS | 94S | 98S | 101 | 101 | 118S | 108 | 112 | 118S | 112S | 115S | 104JS | 103JS | 107C | 86JC | 80US | 73 |
| 28 | 53JS | 32 | 26 | 25 | 24IA | 27 | 26 | 45 | 87IS | 98US | 108 | 131 | 130 | 122C | 125JC | 125C | 140JS | 108US | 73US | 92C | C | 57 | 40US | 38 |
| 29 | 29 | 28 | 28 | 25 | 27 | 28 | 27 | 42US | 78 | 90S | 109 | C | C | 103JC | 100JC | C | C | 75US | 76 | 83IS | 56C | 48US | 48UC | 37IC |
| 30 | 36IC | 37 | 34 | 31 | 30 | 31 | 31 | 43 | 80US | 93US | 96 | 100 | 115IC | 106 | 104 | 110S | 95S | 74 | 74 | 86C | 67JS | 50 | 40 | 41S |
| 31 | 43 | 41 | 33 | 28 | 28 | 30 | 28 | 44JS | 78US | 89JS | 99 | 112IS | 105 | 104JS | 100 | 96 | 87 | 68 | 78 | 73JS | 58US | 53 | 40 | 40 |
| | 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 | 31 | 31 | 29 | 29 | 30 | 31 | 30 | 29 | 31 | 31 | 31 |
| MED | 34 | 34 | 34 | 33 | 35 | 30 | 28 | 47 | 79 | 95 | 102 | 102 | 114 | 118 | 119 | 119 | 106 | 98 | 69 | 62 | 56 | 52 | 40 | 35 |
| UQ | 39 | 38 | 38 | 38 | 39 | 31 | 30 | 49 | 84S | 99S | 108 | 110 | 122 | 126 | 128 | 126 | 129S | 115S | 80 | 73 | 65 | 56 | 47 | 40 |
| LQ | 30 | 32 | 32 | 31 | 31 | 27 | 26 | 44 | 75 | 88 | 98 | 96 | 106 | 107 | 108 | 106 | 98 | 84 | 58 | 52 | 52 | 48S | 38 | 30 |

# IONOSPHERIC DATA

DEC. 1969 | FOF1 (0.01 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | L | L | L | L | L | L | L | | | | | | | | |
| 2 | | | | | | | | | | | L | L | L | L | L | L | | | | | | | | |
| 3 | | | | | | | | | | L | L | L | L | L | L | L | | | | | | | | |
| 4 | | | | | | | | | | | L | L | L | L | L | L 360 | | | | | | | | |
| 5 | | | | | | | | | | L | L | L | L | L | L | L | | | | | | | | |
| 6 | | | | | | | | | | | L | L | L | L | L | L | | | | | | | | |
| 7 | | | | | | | | | | | L | L | L | L | L | L | | | | | | | | |
| 8 | | | | | | | | | | L | L | L | L | L | 380 | | | | | | | | | |
| 9 | | | | | | | | | | L | L | L | L | L | L | L | | | | | | | | |
| 10 | | | | | | | | | | L | L | L | L | L | L | L | | | | | | | | |
| 11 | | | | | | | | | | L 340 | L 370 | L | L | L | L | L 370 | | | | | | | | |
| 12 | | | | | | | | | | | L | U L 460 | L | L | L | L | | | | | | | | |
| 13 | | | | | | | | | | L | L | L | L | L 520 | L 500 | L | | | | | | | | |
| 14 | | | | | | | | | | H 330 | L | L | L | L | L | L | | | | | | | | |
| 15 | | | | | | | | | | L 310 | | L | L | L | L | C | C | | | | | | | |
| 16 | | | | | | | | | | L | L 360 | L | L | L | L | L | | | | | | | | |
| 17 | | | | | | | | | | | L | L | L | L | L | L | L | | | | | | | |
| 18 | | | | | | | | | | L | L | L | U L 460 | L | U L 410 | L | | | | | | | | |
| 19 | | | | | | | | | | L | L | L | L | L | L | L | L | | | | | | | |
| 20 | | | | | | | | | | | L | L | L | L | L | L | L | | | | | | | |
| 21 | | | | | | | | | | | L | L | L | L | L | 350 | 310 L | | | | | | | |
| 22 | | | | | | | | | | | L | L | L | L | L | L | | | | | | | | |
| 23 | | | | | | | | | | L | | L | L | L | L | L | | | | | | | | |
| 24 | | | | | | | | | | | C | L | L | L | L | | | | | | | | | |
| 25 | | | | | | | | | | L | L | L | L | L | L | | | | | | | | | |
| 26 | | | | | | | | | | L | L 380 | L | L | L | L | L | | | | | | | | |
| 27 | | | | | | | | | | L | L | L | L | L | L | L | | | | | | | | |
| 28 | | | | | | | | | | L | L | L 400 | L | L | U L 500 | U L 540 | | | | | | | | |
| 29 | | | | | | | | | | L | L | L | L | L | L | L | | | | | | | | |
| 30 | | | | | | | | | | | L | L | C | L | L | L | | | | | | | | |
| 31 | | | | | | | | | | | L | H 410 | L | L | L | L | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | | | | | | | | | | 3 | 3 | 3 | 1 | 1 | 4 | 4 | 1 | | | | | | | |
| MED | | | | | | | | | | L 330 | L 370 | L 410 | U L 460 | L 520 | L 455 | L 365 | L 310 | | | | | | | |
| UQ | | | | | | | | | | 335 | L 375 | 435 | | | L 500 | L 455 | | | | | | | | |
| LQ | | | | | | | | | | 320 | L 365 | 405 | | | 395 | 355 | | | | | | | | |



DEC. 1969 | FOF1 (0.01 MHZ)

# IONOSPHERIC DATA

DEC. 1969 | FOE (0.01 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | S | 230 | 295 | 315 | 340 | 350 | 340 | 320 | H 290 | 230 | S | | | | | | |
| 2 | | | | | | | | S | 220 | 290 | 325 | 330 | 340 | A | A | A | A | S | | | | | | |
| 3 | | | | | | | | S | F 240 | 280 | 320 | I A 330 | 350 | 345 | 320 | 300 | 230 | S | | | | | | |
| 4 | | | | | | | | S | I A 235 | 290 | 315 | 320 | 350 | 340 | 325 | 290 | 260 | A | | | | | | |
| 5 | | | | | | | | S | 220 | 290 | 320 | 330 | 330 | A | A | A | 230 | S | | | | | | |
| 6 | | | | | | | | S | 230 | 280 | 310 | 325 | I A 340 | 340 | 315 | 290 | 250 | A | | | | | | |
| 7 | | | | | | | | S | 220 | 280 | 310 | 320 | 330 | 320 | H 320 | 300 | 240 | S | | | | | | |
| 8 | | | | | | | | S | 230 | I A 285 | 315 | 325 | 335 | 320 | 300 | 290 | 230 | S | | | | | | |
| 9 | | | | | | | | S | 210 | 290 | 310 | 320 | 320 | 330 | 310 | 280 | 240 | S | | | | | | |
| 10 | | | | | | | | S | 220 | 300 | 320 | I A 325 | I A 335 | 330 | 315 | 275 | H 230 | S | | | | | | |
| 11 | | | | | | | | S | I A 215 | 290 | 305 | I A 320 | 330 | 335 | 320 | 280 | 240 | S | | | | | | |
| 12 | | | | | | | | S | 230 | 290 | I A 315 | 325 | 335 | 330 | 320 | 290 | 240 | S | | | | | | |
| 13 | | | | | | | | S | 220 | 290 | 310 | 320 | 340 | 350 | 325 | 300 | 250 | 150 | | | | | | |
| 14 | | | | | | | | S | H 220 | 280 | 300 | H 330 | 335 | I A 340 | 325 | 300 | 265 | S | | | | | | |
| 15 | | | | | | | | S | 210 | 280 | 315 | 325 | 340 | 340 | 320 | C | C | C | | | | | | |
| 16 | | | | | | | | S | A | 280 | 305 | 320 | A | A | 325 | 295 | 260 | S | | | | | | |
| 17 | | | | | | | | S | 210 | 290 | 320 | I A 335 | 340 | 340 | I A 335 | 300 | 260 | S | | | | | | |
| 18 | | | | | | | | S | A | 270 | 310 | 330 | 330 | 330 | I A 310 | I A 285 | 260 | S | | | | | | |
| 19 | | | | | | | | S | 220 | 290 | 320 | 340 | I A 340 | 330 | 330 | 300 | 250 | A | | | | | | |
| 20 | | | | | | | | S | 220 | 290 | 320 | 330 | I A 330 | 335 | 330 | 310 | 270 | S | | | | | | |
| 21 | | | | | | | | S | 230 | 290 | 320 | 330 | 350 | 350 | 320 | 300 | 250 | S | | | | | | |
| 22 | | | | | | | | S | 220 | 295 | 320 | 340 | 350 | 345 | 330 | 300 | 270 | A | | | | | | |
| 23 | | | | | | | | S | 215 | 280 | 320 | I A 330 | I A 340 | 340 | I A 320 | I A 300 | 270 | A | | | | | | |
| 24 | | | | | | | | S | 210 | 290 | I C 325 | 340 | 345 | A | A | 300 | 250 | 160 | | | | | | |
| 25 | | | | | | | | S | 210 | 280 | 310 | A | A | I A 345 | 340 | 305 | 255 | A | | | | | | |
| 26 | | | | | | | | S | 210 | 275 | 315 | I A 330 | 350 | A | A | 310 | 250 | A | | | | | | |
| 27 | | | | | | | | S | 230 | 275 | 320 | 330 | 340 | 345 | 330 | A | A | A | | | | | | |
| 28 | | | | | | | | S | 220 | 290 | 310 | 325 | 335 | 340 | 330 | 300 | 260 | A | | | | | | |
| 29 | | | | | | | | S | 215 | 275 | 320 | 335 | I A 340 | A | A | A | A | S | | | | | | |
| 30 | | | | | | | | S | 220 | 285 | 320 | 330 | I C 340 | 345 | 330 | A | A | A | | | | | | |
| 31 | | | | | | | | S | 210 | 280 | 310 | 320 | A | A | 330 | I A 310 | 260 | A | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | | | | | | | | | 29 | 31 | 31 | 30 | 28 | 24 | 26 | 25 | 26 | 2 | | | | | | |
| MED | | | | | | | | | 220 | 290 | 315 | 330 | 340 | 340 | 322 | 300 | 250 | 155 | | | | | | |
| UQ | | | | | | | | | 230 | 290 | 320 | 330 | 342 | 345 | 330 | 300 | 260 | | | | | | | |
| LQ | | | | | | | | | 215 | 280 | 310 | 325 | 335 | 330 | 320 | 290 | 240 | | | | | | | |



DEC. 1969 | FOE (0.01 MHZ)

# IONOSPHERIC DATA

DEC. 1969 | FOES (0.1 MHZ) | 135 E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31° 12·1' N. Long. 130° 37·1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | E C 16 | E C 15 | E B 14 | E C 15 | E | E C 15 | E S 15 | E S 15 | G | 30 | J X 33 | J X 38 | J X 39 | J G 32 | J G 34 | G | G | J X 24 | J X 26 | E B 15 | 24 | E S 15 | E S 15 | 23 |
| 2 | 18 | J X 24 | J X 26 | 25 | E B 12 | E B 13 | E S 15 | E S 15 | G | 31 | 34 | G | 37 | 39 | 38 | J X 39 | J X 34 | 25 | J X 25 | 25 | 24 | E B 15 | J X 21 | E C 18 |
| 3 | 24 | E B 12 | E C 16 | E | E B 11 | E S 12 | E S 12 | 22 | J X 25 | 30 | G 30 | 39 | G 34 | G 27 | G 29 | G | G | J X 25 | J X 20 | J X 25 | E B 14 | E B 11 | E B 14 | E C 15 |
| 4 | E | E C 14 | E C 14 | E C 17 | E B 12 | E | E S 12 | E S 15 | J X 31 | 32 | 35 | 36 | G | G 33 | G 26 | G 21 | J X 32 | J X 36 | J X 33 | J X 24 | 22 | 19 | E S 15 | E S 16 |
| 5 | E S 15 | E C 15 | E C 15 | 24 | E | E S 15 | E S 15 | E S 15 | G | G | G | 37 | 37 | 35 | 34 | J X 41 | 27 | J X 23 | J X 26 | J X 27 | E S 15 | E S 15 | E S 15 | 20 |
| 6 | E S 17 | E S 15 | E S 15 | E S 15 | E B 13 | E B 14 | E S 15 | E S 15 | G | G | 38 | 38 | J X 39 | J X 35 | G | G | J X 27 | J X 29 | E S 15 | E S 14 | E S 15 | E S 15 | E S 15 | E S 15 |
| 7 | E S 15 | E B 12 | E S 13 | E B 12 | E S 15 | E S 15 | E S 15 | E S 15 | G | G | 34 | 35 | 35 | 38 | G | 35 | J G 21 | J X 30 | J X 21 | J X 26 | 22 | E S 15 | E S 14 | E S 14 |
| 8 | E S 15 | E B 12 | E B 14 | E C 17 | E | 23 | E S 15 | E S 15 | J X 30 | 33 | J X 33 | G 32 | G 28 | G 23 | 32 | G | 26 | J X 25 | J X 21 | J X 31 | J X 23 | E S 15 | E S 15 | E S 15 |
| 9 | E S 14 | E S 15 | E B 13 | E C 17 | E B 12 | E S 15 | E S 15 | E S 15 | G | 31 | J X 37 | J X 41 | 34 | J X 36 | J G 29 | J X 30 | J X 31 | J X 24 | E S 15 | E S 15 | E B 15 | E S 15 | E B 15 | E B 14 |
| 10 | E B 16 | E B 15 | E B 15 | E B 14 | E B 13 | E B 15 | E S 15 | E S 15 | G | 35 | J X 53 | J X 37 | J X 38 | J X 36 | G | G | G | E S 15 | E S 15 | E S 15 | E S 15 | 24 | E S 15 | E S 15 |
| 11 | E S 15 | E B 13 | E S 14 | E C 15 | E C 15 | E C 15 | E S 15 | E S 15 | J X 33 | G | 39 | J X 40 | G 32 | J A 34 | J G 31 | J X 34 | J X 29 | 36 | E C 16 | 23 | E C 15 | E C 15 | 22 | E C 16 |
| 12 | E C 14 | 25 | E C 14 | E C 15 | E | E C 17 | E S 14 | E S 11 | G | J X 35 | J X 37 | G | J G 32 | G | G | J G 28 | J X 26 | E S 15 | 25 | E C 17 | E C 19 | E S 16 | E S 16 | E S 15 |
| 13 | E S 15 | E C 16 | E | E S 15 | E | E C 14 | E S 15 | E S 15 | G | G | 33 | 35 | G 34 | G 23 | G | J G 30 | G | G | E C 15 | E C 15 | C | C | E C 15 | J X 26 |
| 14 | E C 17 | E C 14 | E C 15 | E C 14 | E C 14 | E B 12 | E S 12 | E S 15 | G | G | J X 41 | G | 43 | 36 | 38 | 34 | G 18 | 23 | J X 39 | J X 31 | J X 22 | 23 | 23 | E S 16 |
| 15 | E C 16 | E C 15 | E C 13 | E C 12 | E C 13 | E C 15 | E S 16 | E S 15 | G | G | G 23 | 38 | 37 | J G 32 | G | C | C | C | J X 26 | J X 24 | 27 | E C 15 | E C 15 | E C 15 |
| 16 | E S 15 | E S 14 | E C 16 | E C 14 | E C 14 | E C 14 | J X 25 | J X 33 | J X 31 | J X 29 | 33 | 40 | 41 | 42 | J X 48 | J X 37 | 31 | 24 | J X 28 | J X 23 | 21 | J X 23 | J X 27 | J X 69 |
| 17 | J X 26 | E C 18 | J X 21 | E C 18 | E C 16 | E S 15 | 23 | 21 | G | G | 41 | 57 | J X 36 | J X 40 | J X 40 | J X 41 | J X 31 | J X 31 | J X 26 | J X 26 | J X 23 | J X 27 | E S 16 | 22 |
| 18 | E S 14 | E C 15 | E C 14 | E C 15 | E B 11 | 26 | 24 | 21 | 22 | 28 | J X 38 | J X 43 | J X 49 | J X 36 | J X 36 | J X 36 | J X 30 | 25 | J X 24 | J X 24 | J X 26 | E S 16 | 23 | E S 15 |
| 19 | E C 15 | 24 | J X 22 | 22 | 21 | E C 17 | 24 | E S 15 | G | 42 | 35 | G | 35 | G 31 | G 29 | J G 29 | J X 40 | J X 28 | E C 16 | E C 18 | E C 15 | E C 16 | E C 17 | E C 15 |
| 20 | E C 17 | E C 15 | E C 15 | E C 16 | E C 16 | E C 15 | E S 15 | E S 16 | G | G | G | 36 | 37 | G 33 | G 24 | G 23 | G 25 | J X 28 | J X 29 | J X 25 | 22 | E C 17 | E S 16 | E C 17 |
| 21 | E C 15 | E C 15 | 27 | J X 22 | J X 24 | J X 21 | 23 | 22 | G | J X 33 | 35 | 39 | G 35 | J G 32 | G 30 | 31 | G | J X 26 | J X 22 | 23 | E C 15 | E C 14 | E C 15 | E C 15 |
| 22 | E C 17 | E C 15 | E C 15 | E C 17 | E | E C 15 | C | 22 | G | G | G | G 31 | J G 34 | G 28 | G 31 | J X 38 | G 21 | 22 | J X 31 | J X 22 | J X 25 | J X 20 | E C 16 | E C 17 |
| 23 | E C 17 | E C 17 | E C 15 | E C 14 | E | E B 12 | E S 15 | E S 15 | G | G 25 | G 25 | J X 35 | 37 | J X 39 | J X 49 | J X 37 | J X 30 | J X 44 | J X 31 | J X 27 | J X 24 | 25 | 23 | E C 18 |
| 24 | E S 17 | E C 17 | E C 15 | E C 16 | E C 16 | E C 16 | E C 15 | E S 15 | G | G | C | 43 | 44 | 42 | J X 62 | J X 54 | J X 29 | J X 30 | J X 37 | J X 50 | J X 29 | J X 29 | J X 29 | J X 29 |
| 25 | 23 | E C 17 | E C 17 | E C 15 | E B 11 | E B 13 | E S 15 | E S 14 | G | 30 | J X 36 | J X 50 | J X 37 | 36 | J X 39 | J X 37 | J X 29 | J X 25 | E S 15 | J X 22 | 23 | E S 15 | E S 15 | E S 17 |
| 26 | E C 16 | E C 15 | J X 31 | J X 19 | J X 37 | J X 27 | 23 | 23 | J X 25 | 30 | 33 | J X 45 | 37 | 42 | J X 41 | G 28 | J X 40 | J X 32 | J X 34 | J X 29 | J X 37 | J X 65 | J X 70 | J X 26 |
| 27 | J X 25 | J X 38 | J X 36 | J X 38 | J X 33 | E B 12 | 24 | 25 | G 21 | J X 30 | J X 36 | 34 | 38 | 39 | J X 47 | 33 | J X 44 | J X 42 | J X 43 | J X 33 | J X 30 | J X 31 | J X 36 | J X 32 |
| 28 | J X 28 | J X 25 | 23 | J X 23 | M 28 | E C 16 | E S 15 | 23 | J G 22 | G 23 | G 23 | J G 32 | 35 | G 26 | G | G | G | 21 | E C 16 | E B 13 | E C 15 | E C 17 | 23 | E C 19 |
| 29 | E C 15 | E C 15 | E C 15 | E B 12 | E C 15 | E C 16 | E S 15 | E S 14 | 24 | 31 | G 31 | G 32 | 35 | 38 | 36 | 35 | 30 | 22 | 23 | J X 37 | J X 31 | J X 31 | J X 24 | J X 33 |
| 30 | J X 31 | 23 | J X 26 | E C 16 | 23 | E C 14 | E S 15 | 23 | G 21 | G | G | G | C | G 25 | J X 34 | J X 37 | J X 47 | 26 | J X 24 | J X 26 | J X 24 | J X 29 | E C 17 | E C 18 |
| 31 | E C 16 | E C 16 | E C 16 | E C 15 | E | E B 11 | E S 14 | E S 15 | G | G | 32 | G | 35 | 40 | 36 | J X 34 | G 25 | 20 | E C 17 | J X 24 | J X 23 | E C 18 | E C 16 | E C 16 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 31 | 30 | 31 | 30 | 31 | 31 | 30 | 30 | 30 | 31 | 31 | 30 | 30 | 31 | 31 |
| MED | E S 16 | E C 15 | E B 15 | E C 15 | E B 13 | E C 15 | E S 15 | E S 15 | G | 28 | 34 | 36 | 36 | 35 | G 32 | J 34 | J 28 | J X 25 | J X 24 | J X 24 | 22 | E S 16 | E S 16 | E S 17 |
| UQ | E 17 | E C 17 | 19 | E C 18 | E 16 | E C 16 | E S 16 | 22 | 22 | 31 | 37 | 40 | 38 | 38 | J X 38 | J X 37 | J X 31 | J X 30 | J X 28 | J X 26 | J X 24 | J X 24 | 23 | 21 |
| LQ | E S 15 | E 15 | E B 14 | E C 14 | E B 11 | E B 14 | E S 15 | E S 15 | G | G | G 30 | G 32 | G 34 | G 32 | G 25 | G 23 | G 21 | 23 | E S 16 | 20 | E S 15 | E S 15 | E S 15 | E S 15 |

The Radio Research Laboratories, Japan

DEC. 1969 | FOES (0.1 MHZ)

# IONOSPHERIC DATA

DEC. 1969 | FBES (0.1 MHZ) | 135 E Mean Time (G. M. T.+ 9h)

Station YAMAGAWA Lat. 31 12·1 N. Long. 130 37·1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | E C 16 | E C 15 | E B 14 | E C 15 | E | E C 15 | E S 15 | E S 15 | G | 26 | 30 | 30 | 30 | G 29 | G 27 | G | G | 18 | 19 | E B 15 | E | E S 15 | E S 15 | 15 |
| 2 | E | 17 | 15 | E | E B 12 | E B 13 | E S 15 | E S 15 | G | G | G | G | G | 35 | 35 | 33 | 30 | 16 | 21 | E | E | E B 15 | 18 | E C 18 |
| 3 | E | E B 12 | E C 16 | E | E B 11 | E S 12 | E S 12 | S | 19 | G | G 29 | 35 | G 32 | G 27 | G 29 | G | G | 18 | E | 15 | E B 14 | E B 11 | E B 14 | E C 15 |
| 4 | E | E C 14 | E C 14 | E C 17 | E B 12 | E | E S 12 | E S 15 | 25 | G | G | 34 | G | G 32 | G 23 | G 20 | 20 | 26 | 23 | 16 | E | E | E S 15 | E S 16 |
| 5 | E S 15 | E C 15 | E C 15 | 15 | E | E S 15 | E S 15 | E S 15 | G | G | G | G | 36 | 35 | 33 | 31 | G | 19 | 18 | 25 | E S 15 | E S 15 | E S 15 | E |
| 6 | E S 17 | E S 15 | E S 15 | E S 15 | E B 13 | E B 14 | E S 15 | E S 15 | G | G | 36 | 35 | 34 | 31 | G | G | G | 20 | E S 15 | E S 14 | E S 15 | E S 15 | E S 15 | E S 15 |
| 7 | E S 15 | E B 12 | E S 13 | E B 12 | E S 15 | E S 15 | E S 15 | E S 15 | G | G | G | G | G | G | G | 27 | G 17 | 18 | 18 | E | E | E S 15 | E S 14 | E S 14 |
| 8 | E S 15 | E B 12 | E B 14 | E C 17 | E | E | E S 15 | E S 15 | 19 | 31 | 29 | G 31 | G 27 | G 21 | G | G | G | 21 | 19 | 25 | 20 | E S 15 | E S 15 | E S 15 |
| 9 | E S 14 | E S 15 | E B 13 | E C 17 | E B 12 | E S 15 | E S 15 | E S 15 | G | G | 30 | 30 | G | 29 | G 24 | 20 | 16 | S | E S 15 | E S 15 | E B 15 | E S 15 | E B 15 | E B 14 |
| 10 | E B 16 | E B 15 | E B 15 | E B 14 | E B 13 | E B 15 | E S 15 | E S 15 | G | 32 | G | 34 | 35 | 31 | G | G | G | E S 15 | E S 15 | E S 15 | E S 15 | E | E S 15 | E S 15 |
| 11 | E S 15 | E B 13 | E S 14 | E C 15 | E C 15 | E C 15 | E S 15 | E S 15 | 24 | G | G | 34 | G 30 | 28 | G 24 | 24 | 18 | 18 | E C 16 | E | E C 15 | E C 15 | E | E C 16 |
| 12 | E C 14 | E | E C 14 | E C 15 | E | E C 17 | E S 14 | E S 11 | G | G | 32 | G | G 30 | G | G | G 23 | 21 | E S 15 | E | E C 17 | E C 19 | E S 16 | E S 16 | E S 15 |
| 13 | E S 15 | E C 16 | E | E S 15 | E | E C 14 | E S 15 | E S 15 | G | G | G | 34 | G 32 | G 23 | G | G 22 | G | G | E C 15 | E C 15 | C | C | E C 15 | 18 |
| 14 | E C 17 | E C 14 | E C 15 | E C 14 | E C 14 | E B 12 | E S 12 | E S 15 | G | G | 27 | G | 43 | 36 | 37 | 34 | G 18 | 20 | 28 | 25 | 19 | E | E | E S 16 |
| 15 | E C 16 | E C 15 | E C 13 | E C 12 | E C 13 | E C 15 | E S 16 | E S 15 | G | G | G 23 | G | 37 | G 29 | G | C | C | C | 22 | 18 | E | E C 15 | E C 15 | E C 15 |
| 16 | E S 15 | E S 14 | E C 16 | E C 14 | E C 14 | E C 14 | E | 17 | 26 | 26 | G | 39 | 40 | 40 | 27 | 25 | G | 17 | 23 | 23 | E | 22 | 25 | A |
| 17 | 21 | E C 18 | E | E C 18 | E C 16 | E S 15 | E | S | G | G | 41 | 38 | 30 | 29 | 35 | 25 | 24 | 25 | 18 | 20 | 20 | 19 | E S 16 | E |
| 18 | E S 14 | E C 15 | E C 14 | E C 15 | E B 11 | E | E | S | E R 22 | 26 | 30 | 29 | 32 | 27 | 34 | 32 | 25 | 20 | 21 | 21 | 22 | E S 16 | E | E S 15 |
| 19 | E C 15 | E | 16 | E | E | E C 17 | E | E S 15 | G | 26 | G | G | 34 | 31 | G 29 | G 21 | 20 | 21 | E C 16 | E C 18 | E C 15 | E C 16 | E C 17 | E C 15 |
| 20 | E C 17 | E C 15 | E C 15 | E C 16 | E C 16 | E C 15 | E S 15 | E S 16 | G | G | G | G | 37 | G 32 | G 24 | G 22 | G 18 | 24 | 21 | 22 | E | E C 17 | E S 16 | E C 17 |
| 21 | E C 15 | E C 15 | 18 | E | 16 | E | E | S | G | G | G | 37 | G 33 | G 28 | G 26 | 22 | G | 20 | 18 | E | E C 15 | E C 14 | E C 15 | E C 15 |
| 22 | E C 17 | E C 15 | E C 15 | E C 17 | E | E C 15 | C | S | G | G | G | G 30 | G 29 | G | G 30 | 27 | G 20 | 22 | 21 | 18 | 16 | 17 | E C 16 | E C 17 |
| 23 | E C 17 | E C 17 | E C 15 | E C 14 | E | E B 12 | E S 15 | E S 15 | G | G 25 | G | 35 | 36 | 31 | 33 | 29 | 24 | 29 | 25 | 16 | 24 | 18 | 19 | E C 18 |
| 24 | E S 17 | E C 17 | E C 15 | E C 16 | E C 16 | E C 16 | E S 15 | E S 15 | G | G | C | 40 | 42 | 41 | 43 | 28 | 21 | 15 | 25 | 40 | 19 | 22 | 24 | 22 |
| 25 | 20 | E C 17 | E C 17 | E C 15 | E B 11 | E B 13 | E S 15 | E S 14 | G | G | G | 38 | 35 | 35 | 31 | 28 | 24 | 16 | E S 15 | E | E | E S 15 | E S 15 | E C 17 |
| 26 | E C 16 | E C 15 | 24 | 18 | 30 | 20 | E | S | G | G | G | 35 | 34 | 39 | 37 | G 28 | 23 | 25 | 33 | 18 | 24 | A | 21 | 19 |
| 27 | 20 | 20 | 22 | 20 | 20 | E B 12 | E | S | G 19 | 25 | 31 | G | 38 | 38 | 44 | 31 | 35 | 42 | 23 | 20 | 27 | 20 | 17 | 28 |
| 28 | 25 | 21 | E | E | A | E C 16 | E S 15 | S | G 17 | G 19 | G 22 | G 29 | G | G 24 | G | G | G | 17 | E C 16 | E B 13 | E C 15 | E C 17 | 20 | E C 19 |
| 29 | E C 15 | E C 15 | E C 15 | E B 12 | E C 15 | E C 16 | E S 15 | E S 14 | G | G | G 31 | G 32 | E R 35 | 37 | 35 | 30 | 28 | 22 | E | 37 | 19 | 24 | 21 | C |
| 30 | C | 20 | 20 | E C 16 | 15 | E C 14 | E S 15 | S | G 20 | G | G | G | C | G 24 | 27 | 35 | 47 | 23 | 17 | 17 | E | 23 | E C 17 | E C 18 |
| 31 | E C 16 | E C 16 | E C 16 | E C 15 | E | E B 11 | E S 14 | E S 15 | G | G | 30 | G | 35 | 39 | 31 | 33 | G 23 | 18 | E C 17 | 20 | 18 | E C 18 | E C 16 | E C 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 | 31 | 31 | 31 | 31 | 31 | 30 | 22 | 31 | 31 | 30 | 31 | 30 | 31 | 31 | 30 | 30 | 29 | 31 | 31 | 30 | 30 | 31 | 30 |
| MED | E S 16 | E C 15 | E C 15 | E C 15 | E B 13 | E C 15 | E S 15 | E S 15 | G | G | G | 30 | 33 | 31 | G 27 | 25 | 19 | 20 | 18 | 16 | E E 15 | E S 16 | E B 15 | E C 16 |
| UQ | E C 17 | E C 16 | E C 16 | E C 16 | E C 15 | E C 15 | E S 15 | E S 15 | G 18 | G 22 | 30 | 35 | 36 | 35 | 34 | 30 | 24 | 22 | 22 | 20 | 19 | 18 | 17 | E C 18 |
| LQ | E S 15 | E C 14 | E B 14 | E B 13 | E | E S 12 | E S 12 | E S 15 | G | G | G | G | G 30 | G 27 | E G 23 | G 20 | G | 17 | E S 16 | E E 15 | E | E 15 | E 15 | E S 15 |



DEC. 1969 | FBES (0.1 MHZ)

# IONOSPHERIC DATA

DEC. 1969 | F-MIN (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31° 12.1' N Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

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

DEC. 1969 | F-MIN (0.1 MHZ)

The Radio Research Laboratories, Japan

# IONOSPHERIC DATA

DEC. 1969 | M(3000)F2 (0.01) | 135 E Mean Time (G. M. T.+ 9h)

Station YAMAGAWA Lat. 31 12·1 N Long. 130 37·1 E Sweep 1 MHz to 20 MHz in 20 sec 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 | 260 | 275 | 295 | 260 | 275 | 270 | 285 | 320 S | 335 | 315 | 315 | 310 | 315 | 300 | 305 | 295 | 305 | 300 S | 305 R | R | R | U S 285 | 265 H | 245 |
| 2 | 245 | 260 | 285 | 260 | 280 | 305 | 280 | 290 S | 315 | 340 | 330 S | 350 | 315 | 300 R | 340 | 315 | 320 | J S 325 | U S 335 | 315 S | 300 | 310 S | 280 S | 250 |
| 3 | 270 | 275 | 295 | 290 | 300 | 260 | 285 | 320 | 330 S | 335 | 340 | 310 | 320 | 295 | 305 | 315 | 315 S | 335 | 335 | 295 | 280 | 285 S | 295 | 285 |
| 4 | 265 | 265 | 275 | 270 | 275 | 325 H | 290 | 325 | 335 | 335 | 340 | 340 | 310 | 315 | 310 | 310 S | 310 S | 335 | 310 | 295 S | 295 | J S 295 | 260 S | I S 260 |
| 5 | J S 290 | 285 S | 295 S | 305 | 325 | 305 | 265 | 300 | J S 340 | 335 S | 330 | 335 | 315 | 305 H | 310 | J S 285 | 340 | 325 | 320 | 260 S | 305 S | 295 | J S 250 | 245 S |
| 6 | 250 S | 285 | 320 | 290 | 265 | 255 | 255 S | 300 | 320 | 325 S | 325 S | 305 S | 305 S | 305 S | 295 S | 315 | U S 310 | 325 | 305 | 310 | J S 275 | J S 290 | J S 280 | 270 S |
| 7 | 265 | 265 | U S 295 | 335 | 395 | 260 | 270 | U S 325 | 340 | 345 | 335 | 320 | 315 | 315 | 335 | 305 | 335 | 320 | 335 | 295 | 270 | 290 | 275 | 260 |
| 8 | 270 | 275 | 300 | 335 | 275 | 290 | 275 S | 295 S | 335 | 335 S | 330 Z | 335 V | U S 335 | 305 S | 305 | 325 S | 340 S | 340 S | 335 | U S 300 | 295 | 305 | 295 | 290 |
| 9 | 270 | 270 | 285 | 300 | 315 | 355 | 275 | 310 S | 340 | J S 340 | J S 345 | 320 | 310 | 310 | 315 | 315 | 310 | 330 | 340 | 300 | 290 | 285 | 290 | 260 |
| 10 | 250 | 260 | 265 | 310 | 340 | 250 | 290 | 295 | 330 | J S 340 | J S 340 | 340 R | 310 | 330 | 340 | 320 | 340 | 315 | 375 | 305 | U S 310 | 265 S | 305 | 280 |
| 11 | 260 | 275 | 305 | 305 | 310 | 335 | 345 | 305 S | 330 | 335 | 325 | 325 C | 340 S | J S 290 | 295 H | J S 300 | 300 | 340 | 320 | 320 | 285 | 300 | 335 | 240 |
| 12 | 250 | 255 | 275 | 295 | 325 | 265 | 280 | 300 | 320 | 315 | 345 | 310 S | U C 320 | J C 305 | I C 315 | S 300 | S 315 | 330 | U S 315 | U S 320 | U S 275 | 305 S | J S 325 | 265 |
| 13 | C 275 | 295 | 300 | 300 | 285 | 305 | 315 | 325 | 345 S | 345 | 340 | J C 330 | 325 | 300 S | 310 | 305 | 305 S | J S 305 | 330 C | 270 | I C 300 | I C 295 | 305 | 240 |
| 14 | 250 | 250 | 260 | 275 | 315 | 345 | 280 | 305 | 340 | 335 | 335 | 320 C | 335 | 335 | 330 | 325 | 330 | 345 | 325 | 315 | 300 S | J S 310 | 285 S | 265 |
| 15 | 270 | 270 | 275 | 255 | 295 | 355 | 320 | J S 310 | J S 325 | 355 | 320 | 305 | 315 | 325 | 305 | C | C | C | U C 320 | 285 | 300 | 290 | 280 S | 260 |
| 16 | 265 | 265 | 260 | 270 | 270 | 280 | 310 S | 315 S | 340 | 345 | 325 | 335 | 325 | 295 C | 320 | 320 | 325 | 315 V | 330 | 305 | U C 330 | 300 | 280 S | I A 270 |
| 17 | 265 | 270 | 265 | 270 | J S 290 | 330 | 275 | 320 S | 320 | 325 | 315 | 310 | 325 | 300 | 300 | 310 | 320 | 300 S | I C 295 | 310 | J S 325 | 300 | U S 245 | 265 |
| 18 | 265 | 260 | 265 | 260 | 285 | 270 | 295 | 330 | 320 | 345 S | 330 | 345 C | 320 | 295 | 295 V | 315 S | 330 | 320 | 335 | U S 280 | 310 | J S 315 | 275 | 275 |
| 19 | 280 | 265 | 275 | 295 | 340 | 265 | 295 | 305 | 340 | 335 | 335 | 320 | 300 | U S 300 | 300 | 305 H | U S 315 | I S 320 | 290 | J S 280 | 280 | 290 S | 280 | 275 |
| 20 | 270 | 260 S | 265 S | 270 | 325 | 275 | 275 | 300 | 330 S | 325 C | 325 | 330 | 295 | J C 320 | 305 | J C 300 | 325 C | J C 315 | 345 | U S 275 | 325 S | 310 S | 310 | 265 |
| 21 | 265 | 265 | 265 | 290 | 350 | 320 | 290 | 305 | 345 S | 325 S | 345 | 310 | 305 | 315 H | 285 S | I S 310 | 325 | 330 | 300 | 320 | 320 | 265 | 270 | 275 |
| 22 | 260 | 265 | 265 | 265 | 285 S | 320 | I C 275 | 300 | 335 S | 350 S | 340 S | 280 H | 310 | 305 C | J C 305 | 300 | J S 315 | U S 315 | 310 | 310 | 320 | 315 S | 285 | 260 |
| 23 | 260 | 275 | 295 | 280 | 320 | 270 | 285 | 320 | 335 | U S 335 | 335 | 330 | 305 S | 305 | 300 | I S 295 | J C 300 | 330 S | 315 | 310 | 305 S | 310 S | 280 | J S 280 |
| 24 | 270 S | 280 | 285 | 285 | 285 | 250 | 310 | 305 | 330 S | 320 | I C 320 | U S 310 | 305 S | 300 | 295 | 295 S | J S 310 | I S 320 | J C 315 | 290 | 330 | 305 | 270 | 270 S |
| 25 | 300 | 280 S | 290 | 290 | 280 | 305 | 270 | 295 S | 345 | 345 | 330 | 315 | 300 C | 305 S | 300 | 290 S | 305 | J S 310 | I S 325 | 300 | J C 355 | 310 | U S 295 | 295 S |
| 26 | 260 | J S 255 | U S 265 | J S 295 | I S 325 | 275 | 290 | 305 | 340 | U S 355 | 335 | 305 | 305 | 300 | 295 S | 310 S | 315 | 340 | 290 S | 315 S | 310 | I A 310 | 300 | 295 |
| 27 | F 270 | 260 | 285 | F 260 | F 245 | 290 | 285 | I S 310 | S 345 | S 345 | 330 | 315 | 315 S | 305 | 300 | 300 S | 305 S | 315 S | J S 320 | J S 300 | C 355 | J C 270 | U S 295 | 320 |
| 28 | J S 320 | 285 | 295 | 275 | I A 265 | 260 | 290 | 330 | I S 340 | U S 335 | 340 | 320 | 315 | 300 C | J C 290 | C 295 | J S 305 | U S 320 | U S 275 | C 315 | C | 340 | U S 305 | 305 |
| 29 | 295 | 305 | 300 | 275 | 265 | 270 | 290 | U S 330 | 345 | 320 S | 350 | C | C | C | C | C | C | U S 315 | 310 | I C 350 | C 350 | U S 300 | U C 300 | I C 320 |
| 30 | I C 295 | 300 | 310 | 275 | 275 | 270 | 300 | 315 | U S 350 | J S 335 | 355 | 310 | I C 320 | 320 | 310 | 320 S | 340 | 340 | 310 | C 335 | J S 315 | 305 | 300 | 255 S |
| 31 | 280 | 290 | 305 | 285 | 270 | 265 | 285 | J S 305 | U S 350 | J S 350 | 345 | I S 330 | 325 | J S 300 | 310 | 330 | 335 | 310 | 335 | J S 330 | U S 290 | 320 | 265 | 265 |
| | 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 | 29 | 29 | 30 | 31 | 30 | 29 | 31 | 31 | 31 |
| MED | 265 | 270 | 285 | 285 | 285 | 275 | 285 | 305 | 335 | 335 | 335 | 320 | 315 | 305 | 305 | 310 | 315 | 320 | 320 | 305 | 305 | 300 | 285 | 265 |
| UQ | 272 | 280 | 295 | 295 | 322 | 312 | 292 | 320 S | 340 | 345 | 340 | 330 | 320 | 315 | 310 | 315 | 330 | 330 | 335 | 315 | 320 | 310 | 300 | 280 |
| LQ | 260 | 262 | 265 | 270 | 275 | 265 | 275 | 300 | 330 | 330 | 328 | 310 | 305 | 300 | 300 | 300 S | 310 S | 315 S | 310 | 295 | 290 | 290 | 275 | 260 |

The Radio Research Laboratories, Japan

DEC. 1969 | M(3000)F2 (0.01)

# IONOSPHERIC DATA

DEC. 1969 | M(3000)F1 (0.01) | 135° E Mean Time (G. M. T.+ 9h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | L | L | L | L | L | L | L | | | | | | | | |
| 2 | | | | | | | | | | | L | L | L | L | L | L | | | | | | | | |
| 3 | | | | | | | | | | L | L | L | L | L | L | L | | | | | | | | |
| 4 | | | | | | | | | | | L | L | L | L | L | L 410 | | | | | | | | |
| 5 | | | | | | | | | | L | L | L | L | L | L | L | | | | | | | | |
| 6 | | | | | | | | | | | L | L | L | L | L | L | | | | | | | | |
| 7 | | | | | | | | | | | L | L | L | L | L | L | | | | | | | | |
| 8 | | | | | | | | | | L | L | L | L | L | 430 | | | | | | | | | |
| 9 | | | | | | | | | | L | L | L | L | L | L | L | | | | | | | | |
| 10 | | | | | | | | | | L | L | L | L | L | L | L | | | | | | | | |
| 11 | | | | | | | | | | L 405 | L 420 | L | L | L | L | L 385 | | | | | | | | |
| 12 | | | | | | | | | | | L | U L 390 | L | L | L | L | | | | | | | | |
| 13 | | | | | | | | | | L | L | L | L | L 345 | L 350 | L | | | | | | | | |
| 14 | | | | | | | | | | H 440 | L | L | L | L | L | L | | | | | | | | |
| 15 | | | | | | | | | | L 420 | | L | L | L | L | C | C | | | | | | | |
| 16 | | | | | | | | | | L | L 415 | L | L | L | L | L | | | | | | | | |
| 17 | | | | | | | | | | | L | L | L | L | L | L | L | | | | | | | |
| 18 | | | | | | | | | | L | L | L | U L 400 | L | U L 410 | L | | | | | | | | |
| 19 | | | | | | | | | | L | L | L | L | L | L | L | L | | | | | | | |
| 20 | | | | | | | | | | | L | L | L | L | L | L | L | | | | | | | |
| 21 | | | | | | | | | | | L | L | L | L | L | 400 | L 405 | | | | | | | |
| 22 | | | | | | | | | | | L | L | L | L | L | L | | | | | | | | |
| 23 | | | | | | | | | | L | | L | L | L | L | L | | | | | | | | |
| 24 | | | | | | | | | | | C | L | L | L | L | | | | | | | | | |
| 25 | | | | | | | | | | L | L | L | L | L | L | | | | | | | | | |
| 26 | | | | | | | | | | L | L 405 | L | L | L | L | L | | | | | | | | |
| 27 | | | | | | | | | | L | L | L | L | L | L | L | | | | | | | | |
| 28 | | | | | | | | | | L | L | L 405 | L | L | U L 360 | U L 360 | | | | | | | | |
| 29 | | | | | | | | | | L | L | L | L | L | L | L | | | | | | | | |
| 30 | | | | | | | | | | | L | L | C | L | L | L | | | | | | | | |
| 31 | | | | | | | | | | | L | H 415 | L | L | L | L | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | | | | | | | | | | 3 | 3 | 3 | 1 | 1 | 4 | 4 | 1 | | | | | | | |
| MED | | | | | | | | | | L 420 | L 415 | L 405 | U L 400 | L 345 | L 385 | L 392 | L 405 | | | | | | | |
| UQ | | | | | | | | | | 430 | L 418 | 410 | | | 420 | 405 | | | | | | | | |
| LQ | | | | | | | | | | L 412 | L 410 | L 398 | | | L 355 | L 372 | | | | | | | | |

The Radio Research Laboratories, Japan

DEC. 1969 | M(3000)F1 (0.01)

# IONOSPHERIC DATA

DEC. 1969 | H'F2 (KM)

135° E Mean Time (G. M. T.+ 9h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | 270 | 250 | 250 | 260 | 250 | 260 | 250 | | | | | | | | |
| 2 | | | | | | | | | | | 255 | 240 | 250 | 290 | 250 | 265 | | | | | | | | |
| 3 | | | | | | | | | | 240 | 230 | 240 | 260 | 275 | 250 | 240 | | | | | | | | |
| 4 | | | | | | | | | | | 255 | 250 | 255 | 260 | 275 | 255 | | | | | | | | |
| 5 | | | | | | | | | | 245 | 245 | 255 | 235 | 240 | 250 | 225 | | | | | | | | |
| 6 | | | | | | | | | | | 260 | 275 | 260 | 255 | 255 | 230 | | | | | | | | |
| 7 | | | | | | | | | | | 230 | 250 | 255 | 255 | 230 | 245 | | | | | | | | |
| 8 | | | | | | | | | | 255 | 245 | 240 | 245 | 255 | 240 | | | | | | | | | |
| 9 | | | | | | | | | | 235 | 240 | 225 | 250 | 295 | 255 | 245 | | | | | | | | |
| 10 | | | | | | | | | | 265 | 250 | 250 | 275 | 255 | 225 | 245 | | | | | | | | |
| 11 | | | | | | | | | | 245 | 245 | 245 | 245 | 255 | 260 | 245 | | | | | | | | |
| 12 | | | | | | | | | | | 250 | 240 | 270 | 280 | 230 | 270 | | | | | | | | |
| 13 | | | | | | | | | | 230 | 245 | 240 | 260 | 300 | 280 | 245 | | | | | | | | |
| 14 | | | | | | | | | | 225 | 250 | 235 | 270 | 245 | 245 | 245 | | | | | | | | |
| 15 | | | | | | | | | | 230 | | 250 | 270 | 255 | 250 | C | C | | | | | | | |
| 16 | | | | | | | | | | 225 | 235 | 255 | 260 | 250 | 245 | 250 | | | | | | | | |
| 17 | | | | | | | | | | | 255 | 250 | 250 | 290 | 250 | 245 | 235 | | | | | | | |
| 18 | | | | | | | | | | 240 | 240 | 230 | 240 | 240 | 225 | 240 | | | | | | | | |
| 19 | | | | | | | | | | 240 | 250 | 250 | 280 | 250 | 280 | 260 | 230 | | | | | | | |
| 20 | | | | | | | | | | | 255 | 240 | 300 | 250 | 255 | 260 | 240 | | | | | | | |
| 21 | | | | | | | | | | | 240 | 225 | 245 | 255 | 230 | 245 | 240 | | | | | | | |
| 22 | | | | | | | | | | | 230 | 270 | 260 | 290 | 250 | 240 | | | | | | | | |
| 23 | | | | | | | | | | 240 | | 240 | 270 | 255 | 240 | 245 | | | | | | | | |
| 24 | | | | | | | | | | | I C 250 | 250 | 250 | 260 | 280 | | | | | | | | | |
| 25 | | | | | | | | | | 230 | 250 | 220 | 250 | 270 | 280 | | | | | | | | | |
| 26 | | | | | | | | | | 225 | 240 | 280 | 270 | 240 | 290 | 255 | | | | | | | | |
| 27 | | | | | | | | | | 225 | 250 | 250 | 270 | 275 | 275 | 270 | | | | | | | | |
| 28 | | | | | | | | | | 230 | 240 | 250 | 250 | 250 | 280 | 285 | | | | | | | | |
| 29 | | | | | | | | | | 225 | 230 | 250 | 245 | 260 | 255 | 240 | | | | | | | | |
| 30 | | | | | | | | | | | 235 | 265 | I C 265 | 250 | 280 | 245 | | | | | | | | |
| 31 | | | | | | | | | | | 240 | 250 | 245 | 240 | 255 | 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 | | | | | | | | | | 19 | 29 | 31 | 31 | 31 | 31 | 27 | 4 | | | | | | | |
| MED | | | | | | | | | | 235 | 245 | 250 | 260 | 255 | 255 | 245 | 238 | | | | | | | |
| UQ | | | | | | | | | | 242 | 250 | 250 | 270 | 272 | 275 | 255 | 240 | | | | | | | |
| LQ | | | | | | | | | | 228 | 240 | 240 | 250 | 250 | 245 | 245 | 232 | | | | | | | |

The Radio Research Laboratories, Japan

DEC. 1969 | H'F2 (KM)

# IONOSPHERIC DATA

DEC. 1969 | H'F (KM) | 135° E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31° 12.1' N, Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 350 | 315 | 275 | E B 310 | 300 | 300 | 300 | 255 | 235 | 220 H | 225 | E A 235 | 210 H | 220 H | 200 H | 230 | 240 | 225 | 200 | 195 | 200 | 215 | 245 | 310 |
| 2 | 335 | E A 315 | 300 | E C 325 | 275 | 240 | E S 250 | 240 | 230 | 245 | 225 | 205 H | 215 | 215 H | 205 | 230 | 225 | 220 | 210 | 220 | 220 | 235 | 245 | 350 |
| 3 | 330 | 305 | 280 | 260 | 225 | 300 | 290 | 250 | 240 | 240 | 240 | 220 H | 200 H | 210 H | 215 | 230 H | 230 | 205 | 200 | 230 | 240 | 245 | 235 | 250 |
| 4 | 280 | 300 | 275 | 265 | 250 | 195 | E S 250 | 240 | 230 | 230 | 205 H | 215 | 215 H | 210 | 210 H | 205 | 240 | 210 | 220 | 230 | 240 | 235 | 270 | 320 |
| 5 | 270 | 280 | 255 | 240 | 220 | 250 | 320 | 265 | 245 | 220 H | 190 H | 245 | 225 | 200 H | 200 H | 230 | 225 | 210 | 210 | 255 | 250 | 245 | 270 | 365 |
| 6 | 320 | 260 | 225 | 230 | 270 | E B 350 | 300 | 255 | 230 | 240 | 225 | 225 | 230 H | 220 | 220 | 230 | 225 | 230 | 200 | 225 | 230 | 250 | 260 | 275 |
| 7 | 300 | 310 | 285 | 225 | 200 | E C 410 | 315 | 255 | 230 | 235 | 225 | 215 H | 200 H | 225 | 215 | 205 H | 225 | 220 | 205 | 205 H | 235 | 250 | 265 | 300 |
| 8 | 280 | 275 | 250 | 215 | 250 | 250 | 305 | 255 | 230 | 240 | 220 | 210 | 205 H | 200 H | 185 | 225 | 230 H | 220 | 200 | 255 | 250 | 235 | 230 | 270 |
| 9 | 310 | 310 | 285 | 270 | 235 | 205 | 300 | 255 | 250 | 230 | 205 H | 225 | 200 H | 185 H | 195 H | 200 H | 235 | 205 | 200 | 230 | 245 | 235 | 240 | 310 |
| 10 | 345 | 330 | 275 | 245 | 205 | 390 | 295 | 240 | 240 | 250 | 230 | 220 | 205 H | 205 | 225 | 210 | 225 | 225 | 200 | 210 H | 230 | 305 | 270 | 270 |
| 11 | 330 | 300 | 260 | 260 | 260 | 225 | 215 | 260 | 200 H | 210 | 205 | 225 | 240 H | 195 H | 225 H | 200 | 225 | 235 | 205 | 215 | 210 | 250 | 210 | E C 350 |
| 12 | 350 | 350 | 325 | 250 | 205 | E C 350 | E S 350 | 245 | 240 | 240 | 240 | 215 | 200 H | 220 | 220 | 220 | 225 | 210 | 200 | 220 | 250 | 250 | 230 | 320 |
| 13 | 335 | 300 | 260 | 275 | 255 | 265 | 250 | 230 | 230 | 225 | 225 | 205 H | 205 H | 210 | 215 H | 220 | 225 | 215 | 200 | 195 H | I C 225 | I C 240 | 240 | E A 400 |
| 14 | E C 390 | 350 | 350 | 300 | 245 | 210 | E S 250 | 250 | 225 | 190 H | 240 | 215 | E A 250 | 250 | 230 | 230 | 225 | 215 | 230 | 250 | 220 | 235 | 250 | E S 300 |
| 15 | 330 | 325 | 320 | 355 | 320 | 215 | 230 | 210 H | 240 | 225 | 240 | 230 | 245 | 240 | 210 | C | C | C | 200 | 225 | 220 | 230 | 240 | 250 |
| 16 | 300 | 330 | 325 | 300 | 300 | 275 | 240 | 225 | 210 | 220 | 220 | E A 240 | 250 | 235 | 235 | 225 | 235 | 220 | 215 | 240 | 210 | 230 | E A 350 | A |
| 17 | E A 370 | 350 | 350 | 350 | 270 | 220 | 310 | 240 | 240 | 245 | 230 | 230 | 230 | 200 H | 200 H | 240 | 240 | 220 | 205 | 225 | 215 | 220 | 225 | 300 |
| 18 | 300 | 300 | 295 | 300 | 260 | 260 | 260 | 230 | 225 | 225 H | 200 H | 220 | 210 | 180 H | 205 | 215 | 240 | 215 | 205 | 225 | 240 | 215 | 255 | 325 |
| 19 | 300 | 325 | 320 | 270 | 225 | E C 310 | 285 | 240 | 220 | 225 | 230 | 210 H | 215 H | 200 | 200 H | 245 | 240 | 200 | 200 | 210 | 220 | 230 | 255 | 270 |
| 20 | 300 | 325 | 325 | 300 | 240 | 245 | 250 | 260 | 230 | 235 | 230 | 215 | 205 H | 210 | 205 H | 200 H | 240 | 225 | 200 | 235 | 230 | 225 | 225 | 315 |
| 21 | 340 | 330 | 350 | 290 | 225 | 250 | 260 | 260 | 225 | 235 | 230 | 220 | 225 H | 200 H | 225 | 200 | 220 | 225 | 200 | 225 | 225 | 230 | 260 | 275 |
| 22 | 300 | 300 | 300 | 325 | 270 | 245 | I C 295 | 250 | 235 | 240 | 225 | 200 H | 250 | 210 H | 240 | 245 | 225 | 210 | 210 | 250 | 220 | 235 | 260 | 350 |
| 23 | 370 | 330 | 300 | 305 | 250 | 305 | 300 | 240 | 225 | 235 | 240 | 215 | 200 H | 220 | 220 | 220 | 240 | 220 | 215 | 230 | 210 | 235 | 250 | 270 |
| 24 | 275 | 305 | 270 | 250 | 285 | E C 400 | 270 | 250 | 230 | 240 | I C 220 | 230 | E A 240 | 225 H | E A 240 | 250 | 245 | 225 | 200 | E A 275 | 220 | 250 | 280 | 290 |
| 25 | 265 | 275 | 280 | 295 | 285 | 260 | 305 | 260 | 225 | 220 | 235 | 220 | 205 | 200 H | 230 | 240 | 255 | 225 | 200 | 240 | 220 | 220 | 230 | 255 |
| 26 | 320 | 325 | 335 | 265 | 265 | E A 375 | 290 | 250 | 225 | 220 H | 205 | 205 H | 200 | 225 | 230 | 240 | 235 | 225 | 245 | 250 | 230 | A | E A 310 | 275 |
| 27 | 365 | E A 410 | 350 | E A 430 | E A 400 | 255 | 280 | 275 | 235 | 225 | 205 H | 215 | 225 H | 220 H | 240 | 220 | 235 | 245 | 220 | 240 | 225 | 220 | 250 | 250 |
| 28 | 225 | 305 | 300 | 315 | A | 360 | 315 | 255 | 225 | 225 | 220 | 200 H | 220 | 200 | 190 H | 205 H | 235 | 220 | 205 | 205 | 205 | 220 | 250 | 250 |
| 29 | 270 | 275 | 285 | 250 | 320 | 350 | 300 | 235 | 230 | 220 | 210 H | 215 | 225 | 215 | 220 | 230 | 230 | 215 | 240 | 230 | 220 | 270 | 255 | C |
| 30 | C | 290 | 280 | 300 | 310 | 305 | 290 | 230 | 230 | 235 | 225 | 200 H | I C 205 | 230 | 215 | 240 | 240 | 210 | 235 H | 215 | 205 | 250 | 235 | 310 |
| 31 | 295 | 260 | 250 | 275 | 295 | 320 | 300 | 255 | 235 | 230 | 230 | 200 H | 205 H | 225 | 210 | 240 | 240 | 210 | 220 | 235 | 215 | 240 | 255 | 300 |
| | 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 | 31 | 31 | 31 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 30 | 30 | 31 | 31 | 31 | 30 | 31 | 29 |
| MED | 308 | 308 | 285 | 272 | 259 | 258 | 290 | 250 | 230 | 230 | 225 | 215 | 212 H | 210 | 215 | 228 | 235 | 220 | 205 | 228 | 220 | 235 | 250 | 288 |
| UQ | 338 | 326 | 322 | 301 | 285 | U 312 | 300 | 255 | 235 | 240 | 230 | 222 | 226 | 222 | 225 | 240 | 240 | 225 | 215 | 239 | 232 | 250 | 259 | 315 |
| LQ | 295 | 300 | 275 | 255 | 235 | 245 | 255 | 240 | 225 | 222 | 215 | 210 H | 205 H | 200 H | 205 H | 210 | 225 | 210 | 200 | 218 | 218 | 230 | 238 | 270 |



DEC. 1969 | H'F (KM)

# IONOSPHERIC DATA

DEC. 1969 | H'ES (KM) | 135° E Mean Time (G. M. T.+ 9h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

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



DEC. 1969 | H'ES (KM)

# IONOSPHERIC DATA

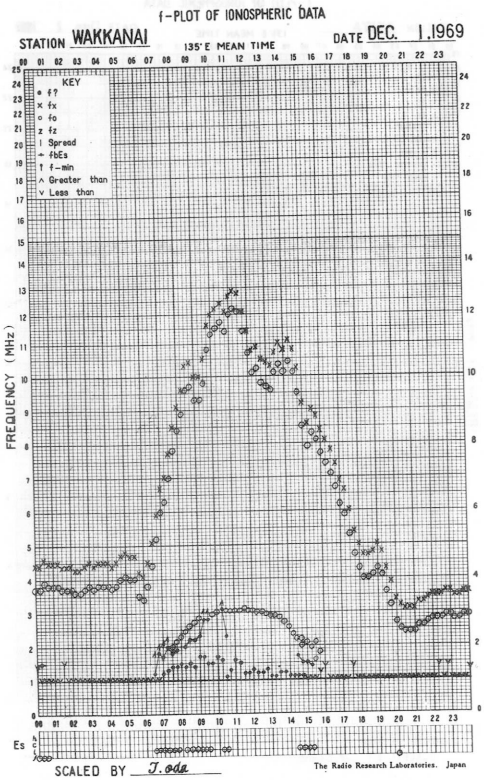
DEC. 1969 | TYPES OF ES | 135 E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42·4' N Long. 139° 29·3' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

| Hour / Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | F1 | F1 | | | | | C1 | C2 | C2 | C1 | L2 | | | | | L1 | F1 | | | | | |
| 2 | | | | | | | | | | H1 | C1 | C1 | C1 | C1 | | C1 | | | | F1 | | F1 | | |
| 3 | | | | | | | F1 | H1 | H1 | | C1 | C1 | | | | | | L1 | F1 | F1 | | | | |
| 4 | | | | | F1 | | | | H1 | H1 | H1 | | | | | | L2 | L3 | F2 | F2 | F1 | F1 | F1 | |
| 5 | | | F1 | | | | | | | | H1 | H2 | C1 | L1 | L2 | L1 | L2 | L2 | F1 | F1 | F1 | | | F1 |
| 6 | | | | F1 | | F1 | | | | H1 | C2 | C1 | C1 | | L3 | L3 | L3 | L3 | | F2 | | | | |
| 7 | | | | | | | | | H1 | H1 | H1 | H1 | H1 | H1 | | H1 | L1 | | | | | | | |
| 8 | | | L1 | | F1 | | F1 | | | C1 | | | | | H1 | | | L1 | | | | | F1 | F1 |
| 9 | F1 | | F1 | F2 | F1 | | | H1 | C1 | C1 | C1 | C1 | C1 | | | | | | | | | | | |
| 10 | | | | | | | F1 | H1 | H1 | H1 | H1 | C1 | C1 | C1 | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | C1 | C1 | C1 | | | | L1 | | L1 | F1 | F1 | | | | |
| 13 | | | F1 | | | | | | | L1 | | | | | | | L2 | F1 | | | F1 | F1 | | F1 |
| 14 | F1 | F1 | F1 | F1 | F1 | F1 | F1 | | H1 | H1 | H1 | C1 | HL 11 | | L1 | L2 | HL 22 | F2 | F2 | F2 | F3 | | | |
| 15 | | F2 | F2 | | | | | | | | L1 | L1 | L1 | | | | | L1 | F1 | | F1 | F1 | F1 | |
| 16 | | F1 | | | F1 | | | | | H1 | H1 | C1 | C1 | | | C1 | L1 | L2 | | F1 | F1 | F2 | F2 | F2 |
| 17 | F1 | | | F1 | F1 | | | | C1 | C1 | C1 | C1 | C1 | | | | | | F1 | | | | | F1 |
| 18 | | F1 | F1 | | | F1 | F1 | L1 | | | C1 | | | | C1 | | | L1 | F1 | F1 | F2 | F2 | F1 | F2 |
| 19 | F2 | F1 | F1 | F1 | | | | L1 | C1 | H2 | C1 | C2 | | | L2 | L2 | L2 | L2 | F2 | | | F1 | | |
| 20 | F1 | F1 | F1 | | | | F1 | | | | | L2 | L2 | L2 | L2 | L2 | L2 | F1 | F1 | F2 | F3 | F2 | F2 | F2 |
| 21 | | F1 | F2 | F1 | F1 | | F1 | | | | | | | | | | L1 | F1 | | F1 | | | | |
| 22 | | | | | | | F2 | L3 | L1 | L1 | | | | | | | C2 | L2 | F2 | F3 | | | F1 | F1 |
| 23 | F1 | | F1 | F1 | | F1 | | | | L1 | L1 | | L1 | L2 | L2 | | L2 | L2 | F1 | F1 | F1 | | F1 | F1 |
| 24 | F1 | | C1 | F1 | F1 | | | | | | L1 | HL 11 | | H1 | H1 | L1 | L2 | L3 | F2 | F2 | F1 | F2 | F3 | F3 |
| 25 | F2 | F1 | | | | | | | H1 | H1 | C1 | H1 | H1 | C1 | C1 | | | | F1 | | | F1 | F1 | F2 |
| 26 | F1 | F1 | F2 | F1 | F1 | F2 | F2 | L3 | | H1 | H1 | H1 | | | H1 | H1 | L1 | L2 | F2 | F2 | F4 | F2 | F2 | F2 |
| 27 | F1 | F1 | F2 | F2 | F2 | | F2 | L1 | | L1 | L1 | L1 | L1 | C1 | CL 11 | CL 21 | C2 | F2 | F1 | F3 | F3 | F3 | F3 | F2 |
| 28 | F2 | F1 | F1 | F1 | | | F1 | L3 | L2 | L1 | L1 | L1 | L1 | | | | L1 | F2 | F2 | F1 | F1 | F1 | F1 | F1 |
| 29 | | F1 | | | | | F3 | L3 | | C2 | C1 | | | | | | L1 | | | | | | F2 | F2 |
| 30 | F2 | F3 | F1 | F1 | | F1 | F3 | L1 | | | | | L1 | L2 | L1 | L1 | L2 | F3 | F2 | F1 | F1 | | | |
| 31 | | | F1 | | | | | L1 | | | C1 | L1 | | | L1 | | L1 | F3 | F4 | F2 | F2 | F1 | F2 | F1 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | | | | | | | | | | | | | | | | | | | | | | | | |
| MED | | | | | | | | | | | | | | | | | | | | | | | | |
| UQ | | | | | | | | | | | | | | | | | | | | | | | | |
| LQ | | | | | | | | | | | | | | | | | | | | | | | | |

The Radio Research Laboratories, Japan

DEC. 1969 | TYPES OF ES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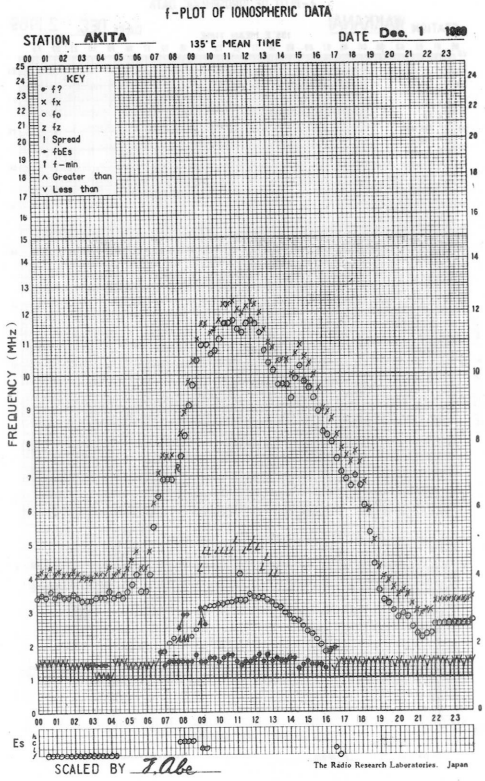
DATE DEC. 1.1969
KEY
FREQUENCY (MHz)
SCALED BY J. Oda
The Radio Research Laboratories. Japan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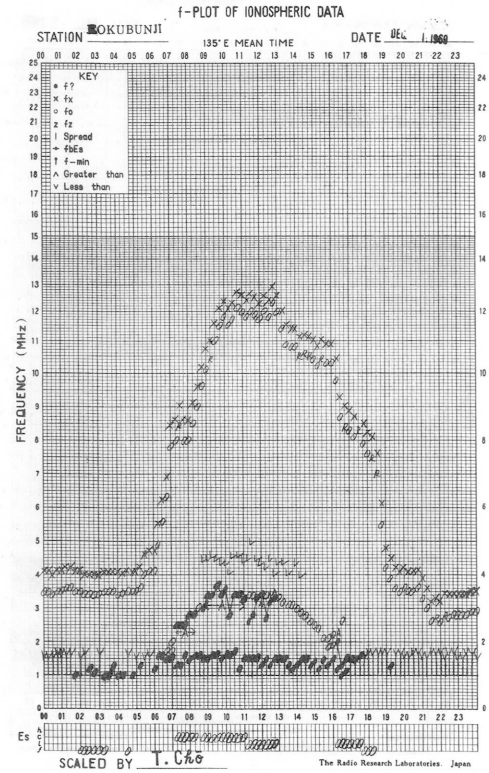
The Radio Research Laboratories. Japan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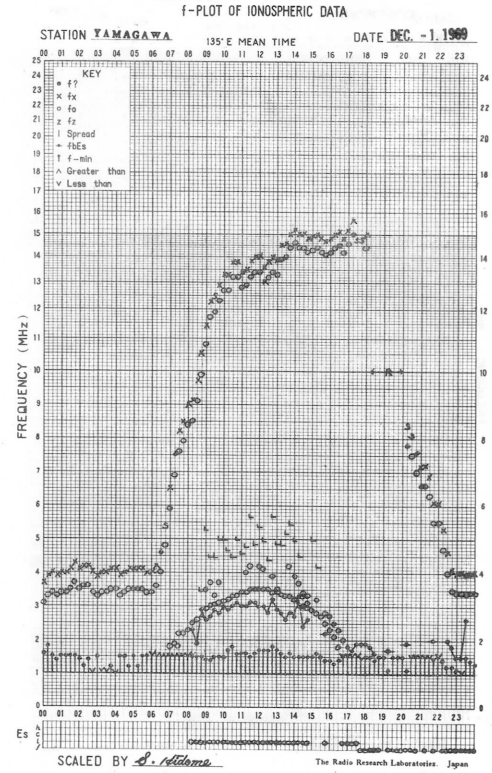
The Radio Research Laboratories. Japan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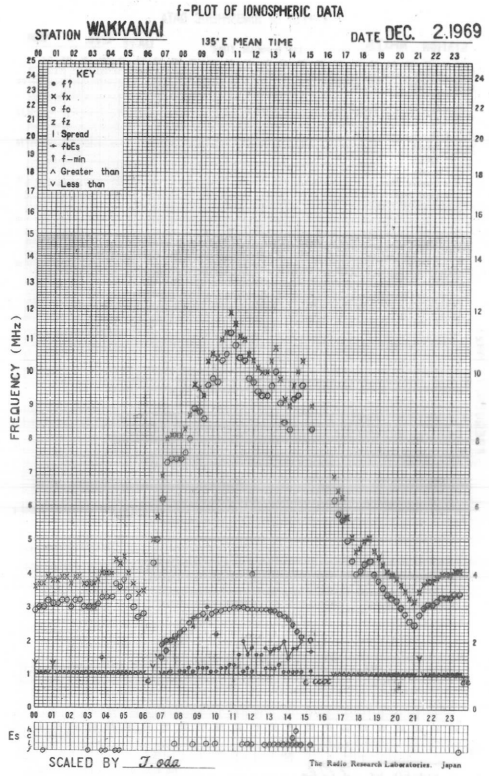
The Radio Research Laboratories. Japan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KEY
* f?
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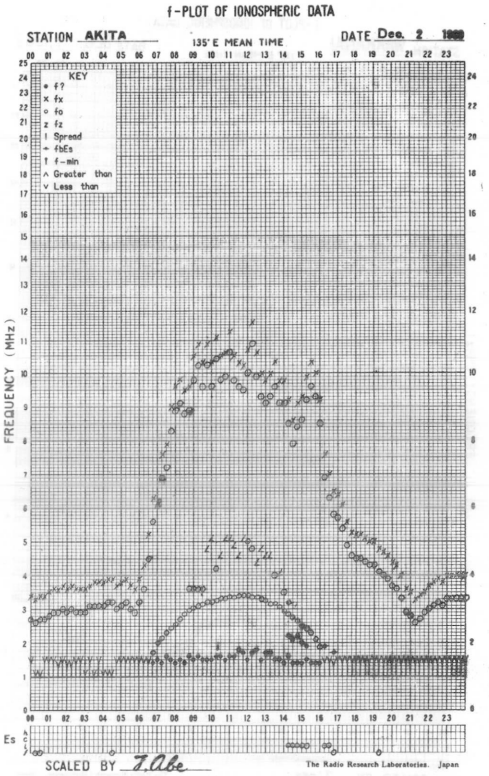
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY T. Oda
The Radio Research Laboratories. Japan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DATE Dec. 2
KEY
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fbEs
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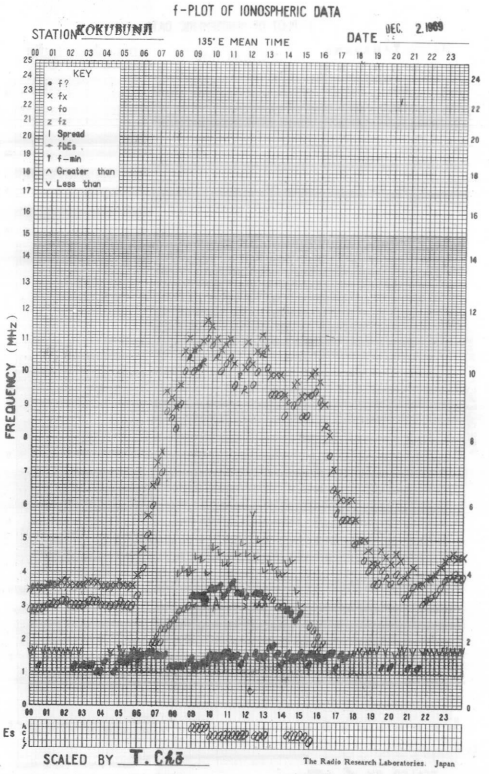
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan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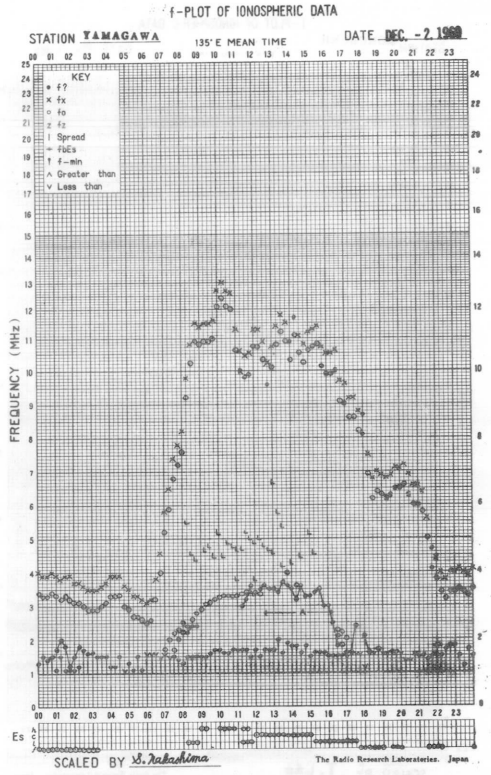
SCALED BY T. Ota
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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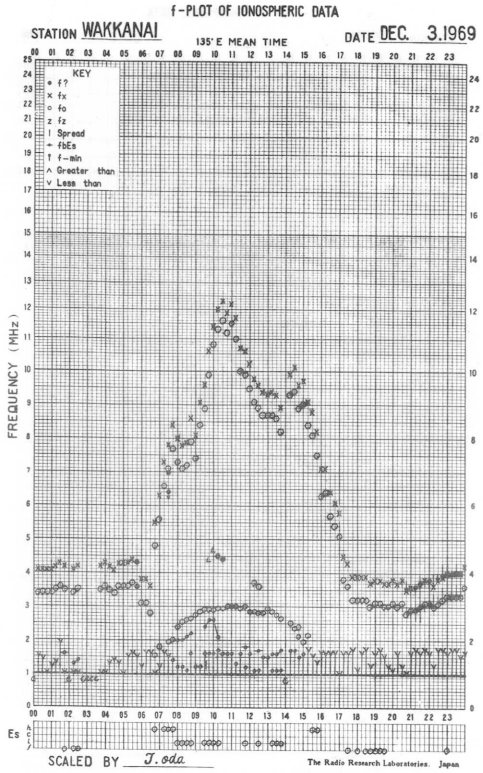
SCALED BY S. Takashima
The Radio Research Laboratories. Japan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DATE DEC. 3.1969
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FREQUENCY (MHz)
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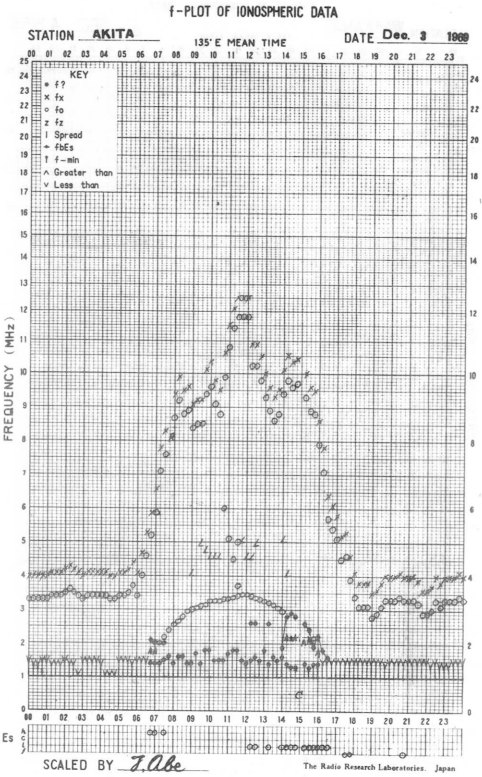
SCALED BY J. Oda
The Radio Research Laboratories. Japan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135°E MEAN TIME
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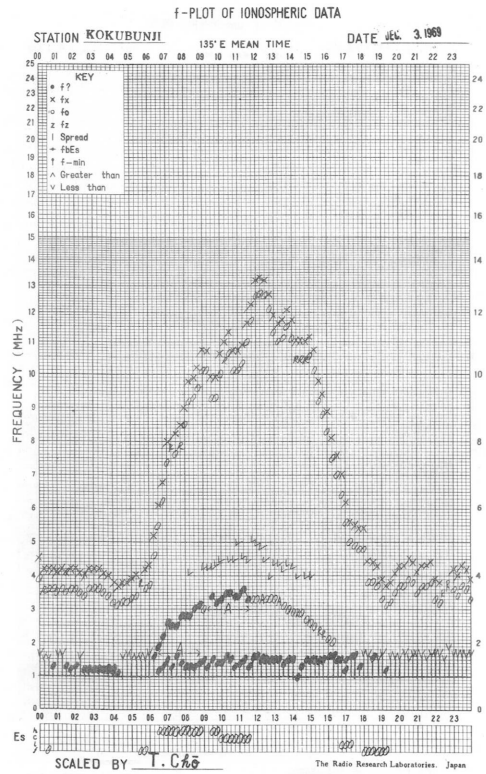
SCALED BY T. Abe
The Radio Research Laboratories. Japan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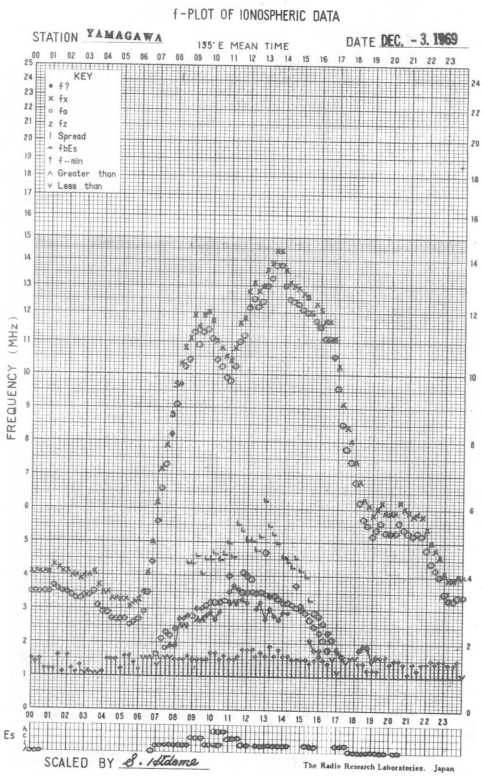
SCALED BY T. Cho
The Radio Research Laboratories. Japan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DATE DEC. - 3. 1969
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FREQUENCY (MHz)
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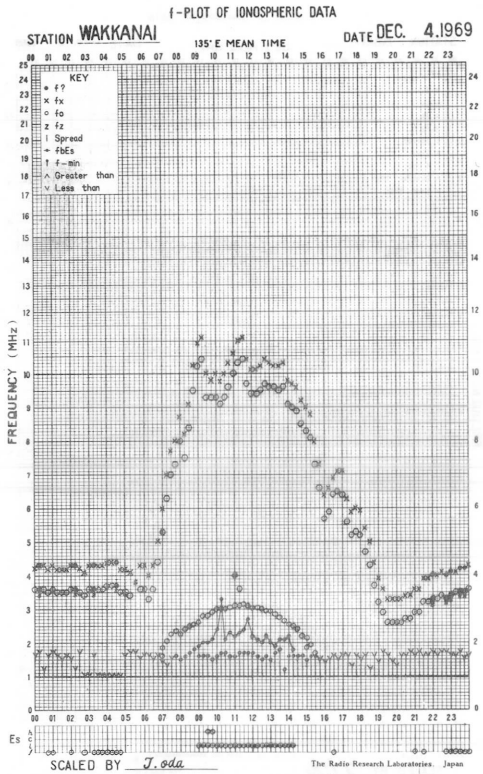
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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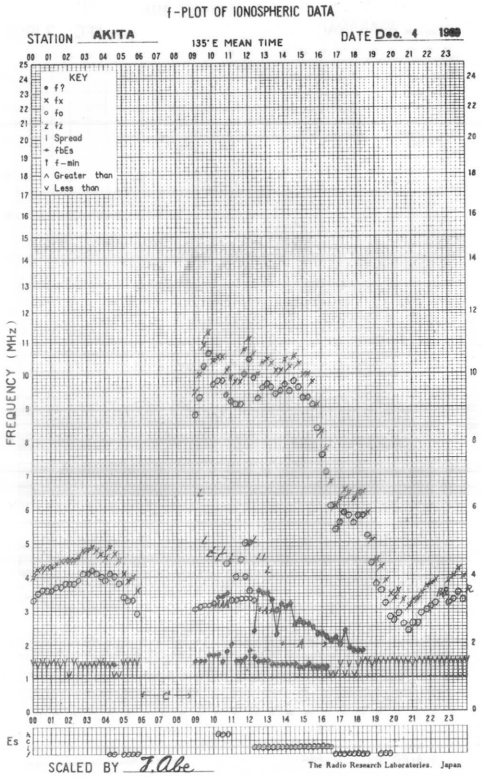
SCALED BY T. Oda
The Radio Research Laboratories. Japan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DATE Dec. 4 1969
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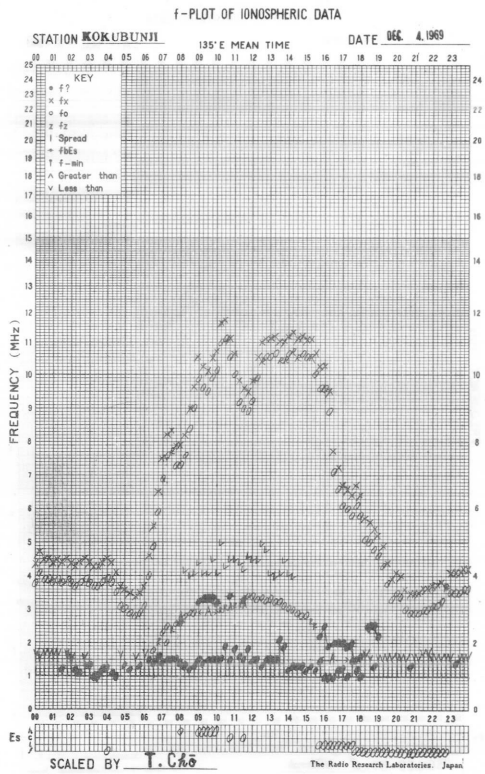
SCALED BY T. Abe
The Radio Research Laboratories. Japan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135°E MEAN TIME
DATE DEC. 4.1969
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FREQUENCY (MHz)
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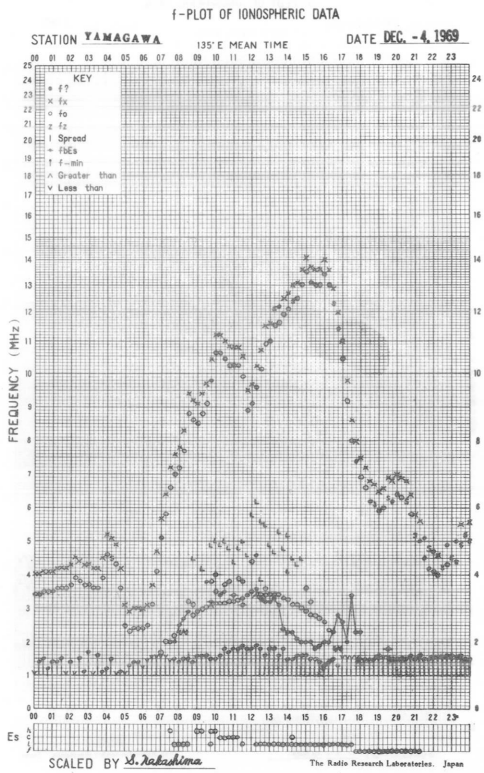
SCALED BY T. Cho
The Radio Research Laboratories. Japan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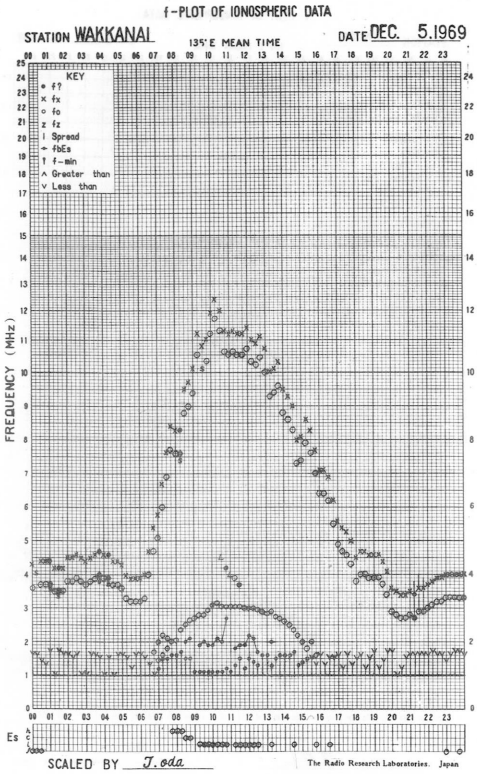
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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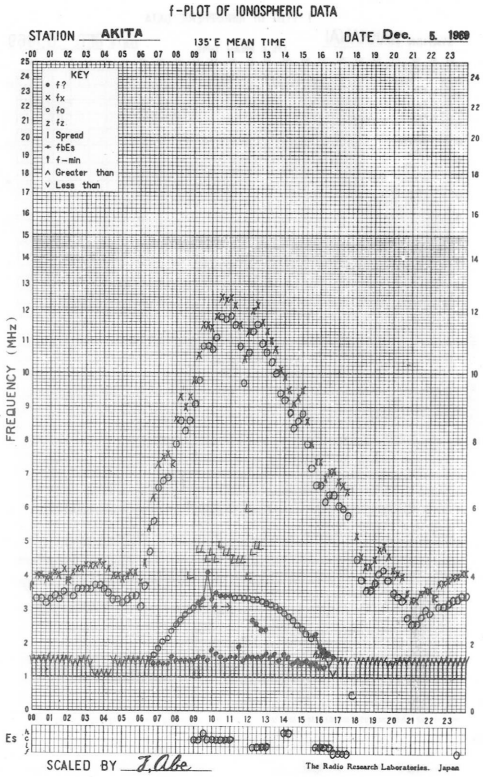
SCALED BY T. oda
The Radio Research Laboratories. Japan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135°E MEAN TIME
DATE Dec. 5. 1969
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FREQUENCY (MHz)
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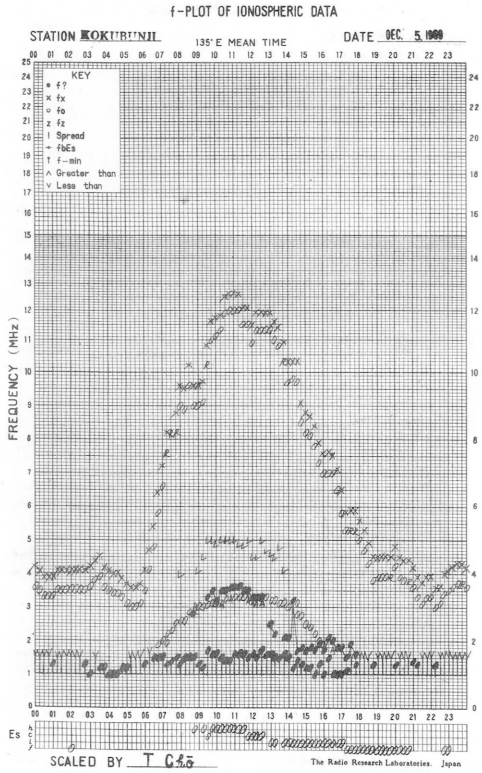
SCALED BY T. Abe
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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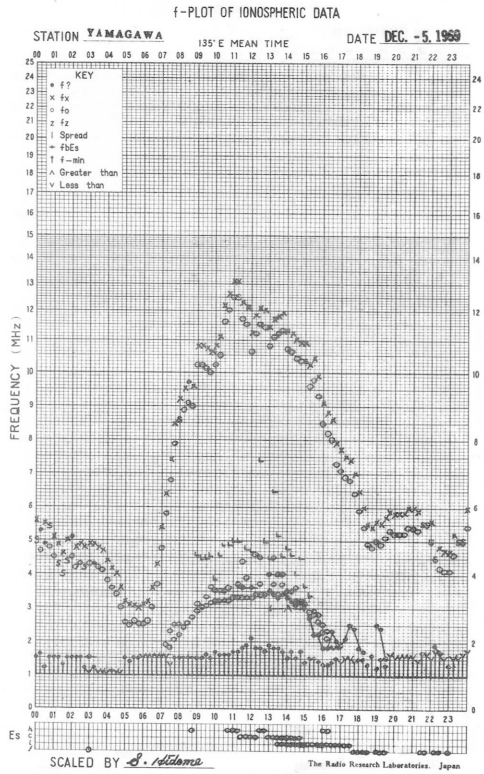
SCALED BY T. Ozo
The Radio Research Laboratories. Japan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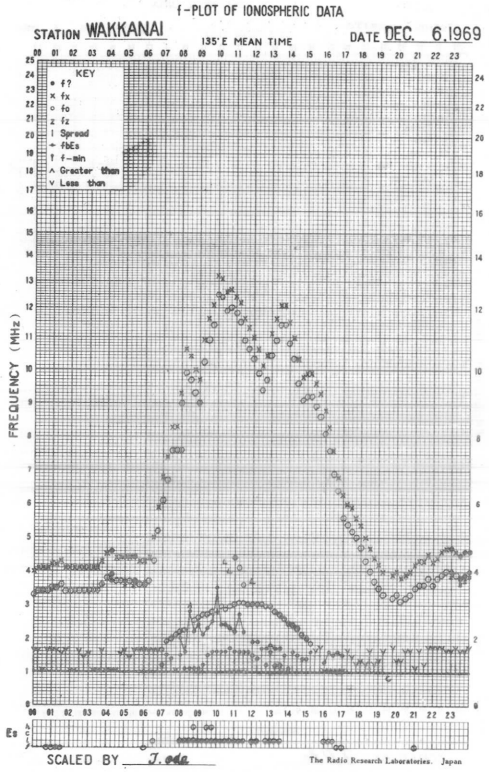
The Radio Research Laboratories. Japan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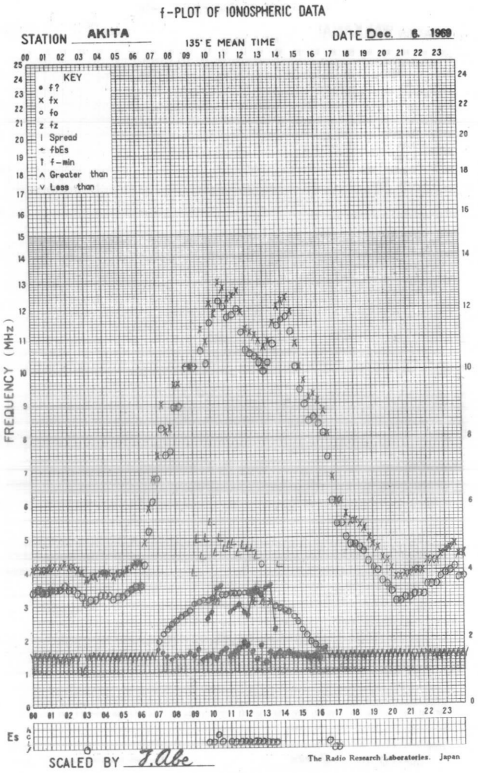
The Radio Research Laboratories. Japan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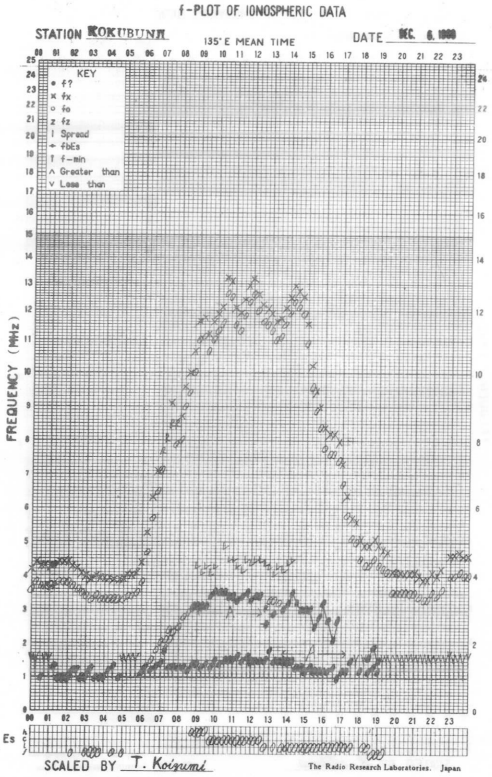
The Radio Research Laboratories. Japan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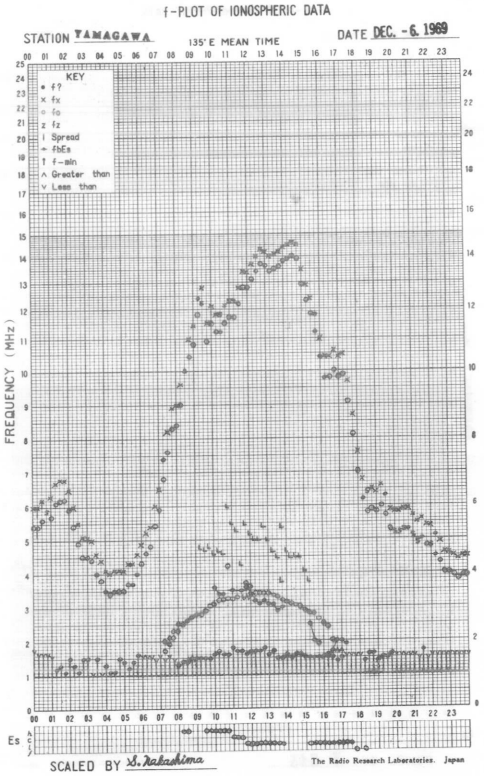
The Radio Research Laboratories. Japan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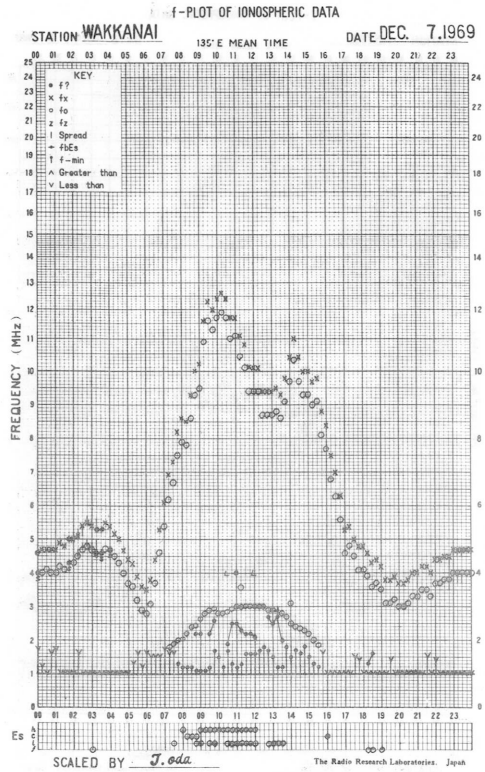
The Radio Research Laboratories. Japan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* f?
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○ fo
z fz
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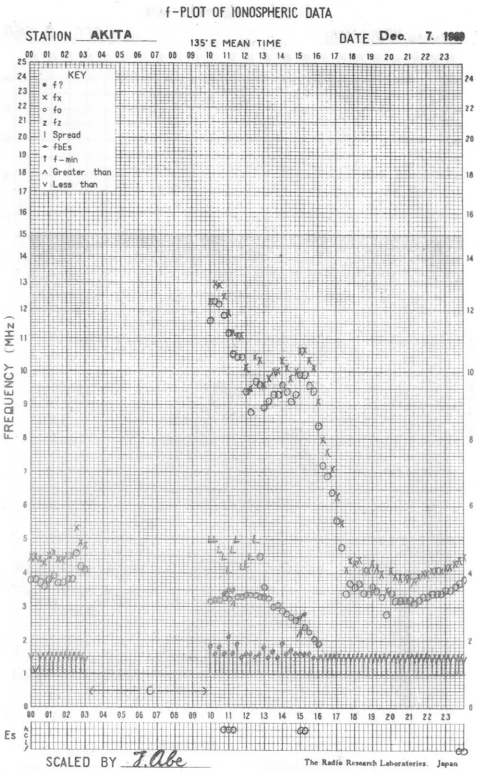
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Oda
The Radio Research Laboratories. Japan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STATION AKITA
135°E MEAN TIME
DATE Dec. 7. 1969
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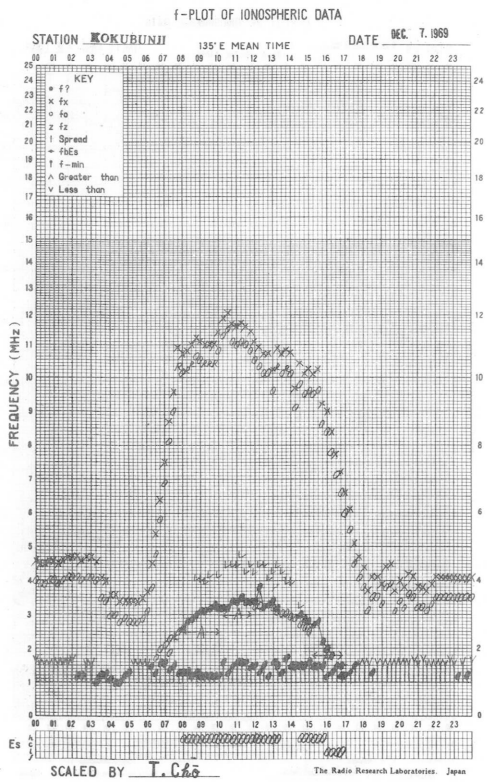
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan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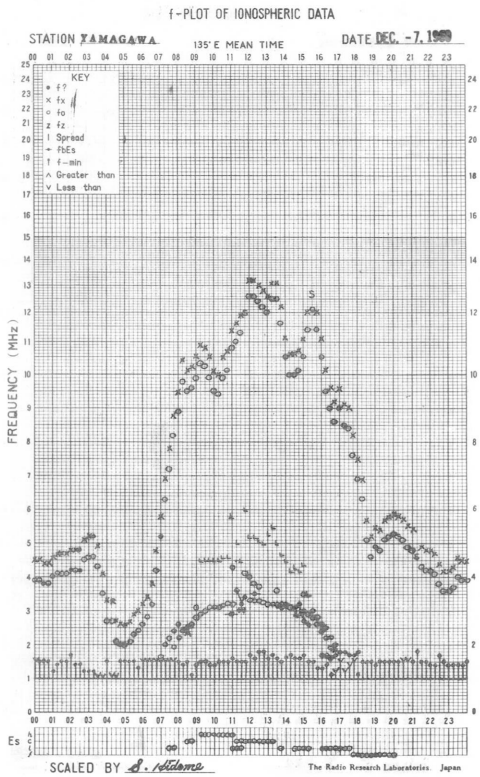
SCALED BY T. Chō
The Radio Research Laboratories. Japan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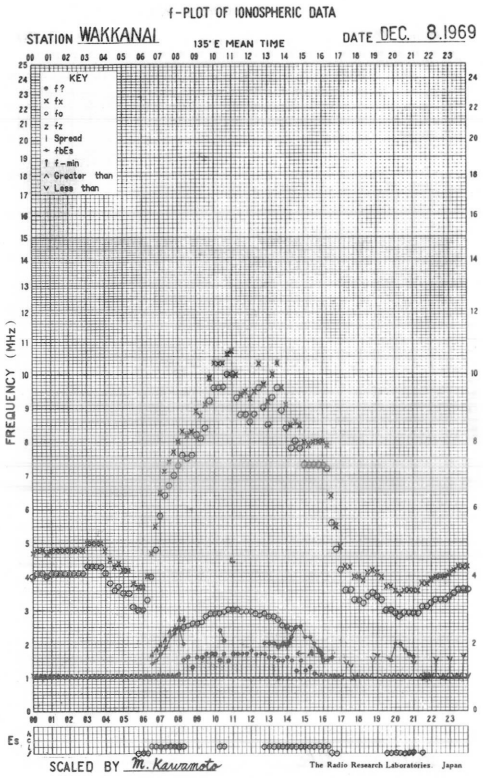
SCALED BY A. Ashizawa
The Radio Research Laboratories. Japan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DATE DEC. 8.1969
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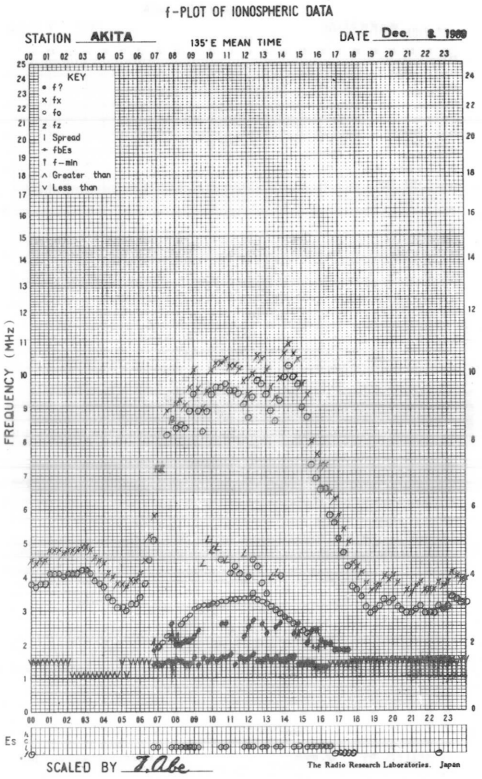
The Radio Research Laboratories. Japan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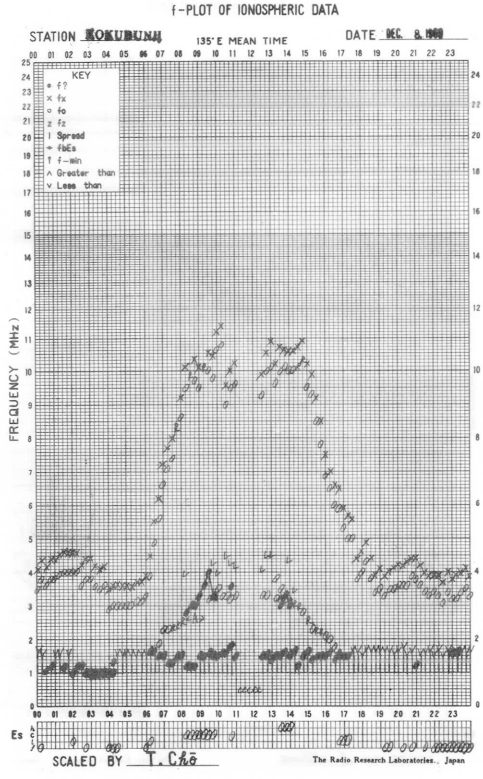
The Radio Research Laboratories. Japan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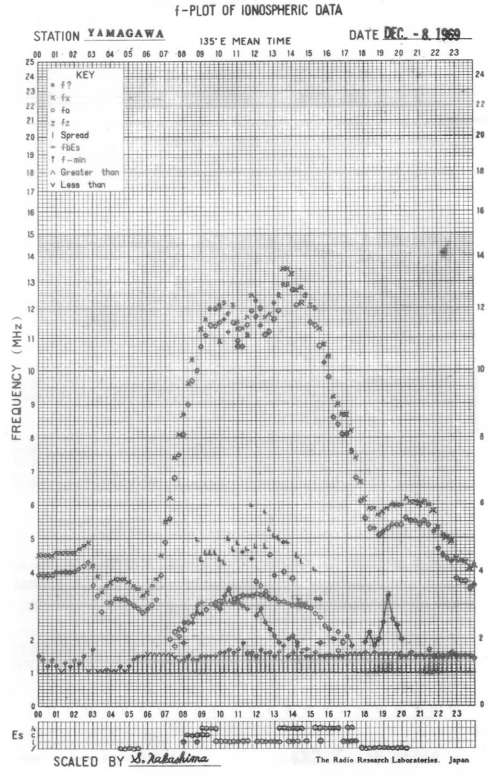
The Radio Research Laboratories. Japan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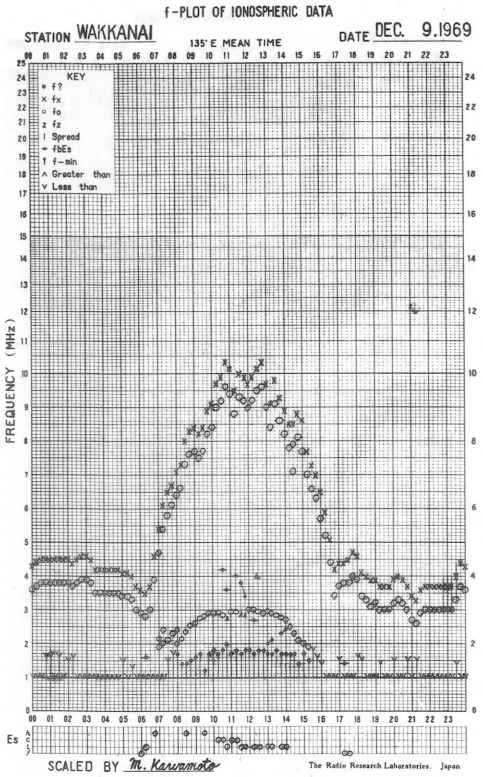
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan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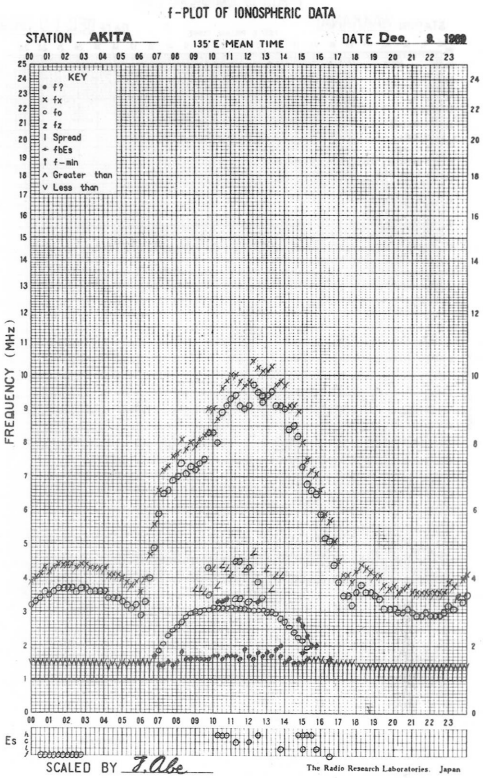
v Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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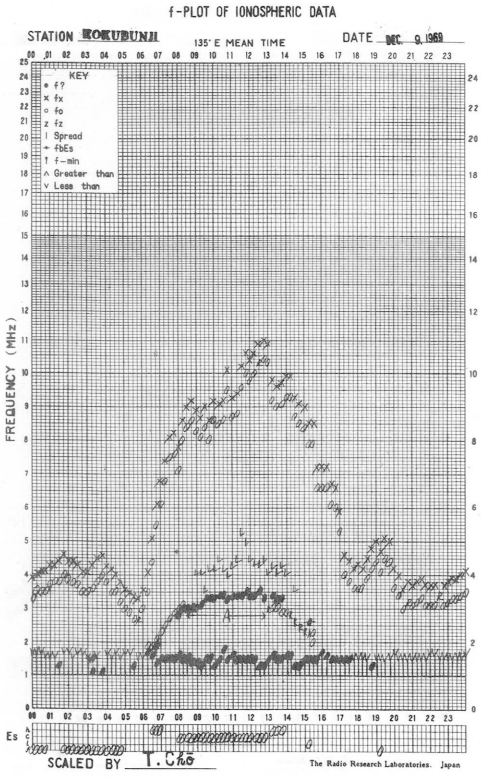
SCALED BY T. Abe
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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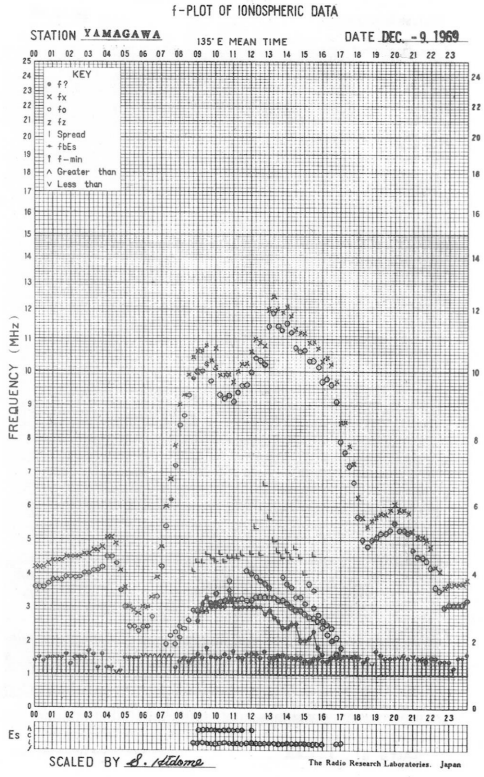
SCALED BY T. Cho
The Radio Research Laboratories. Japan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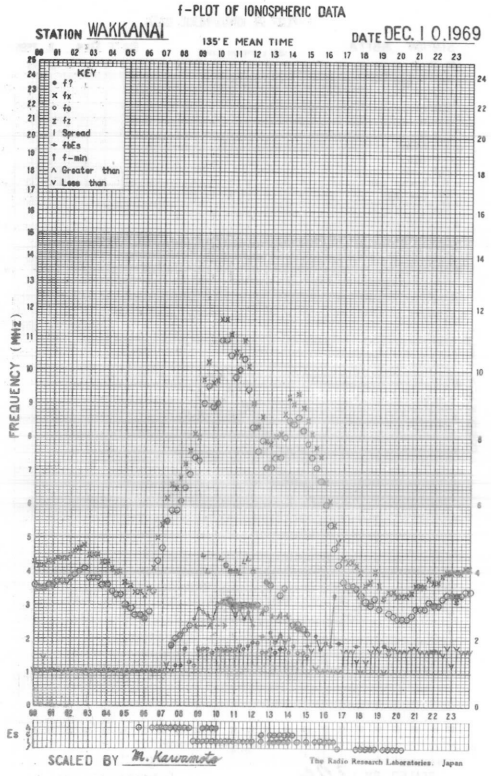
SCALED BY S. Ishidoma
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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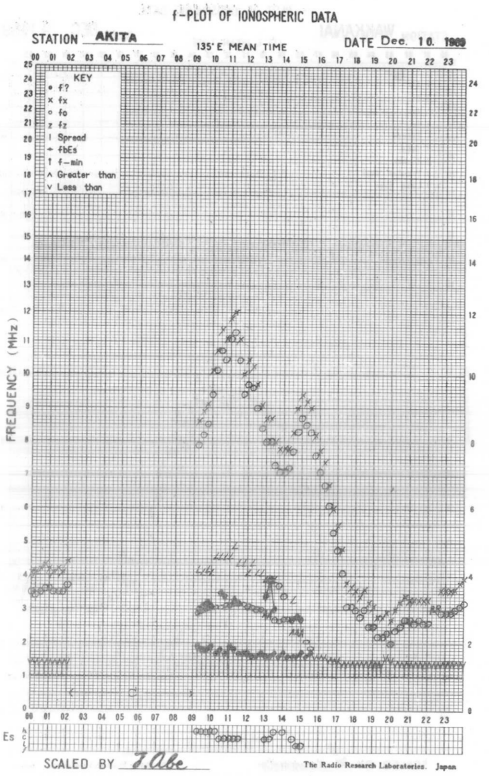
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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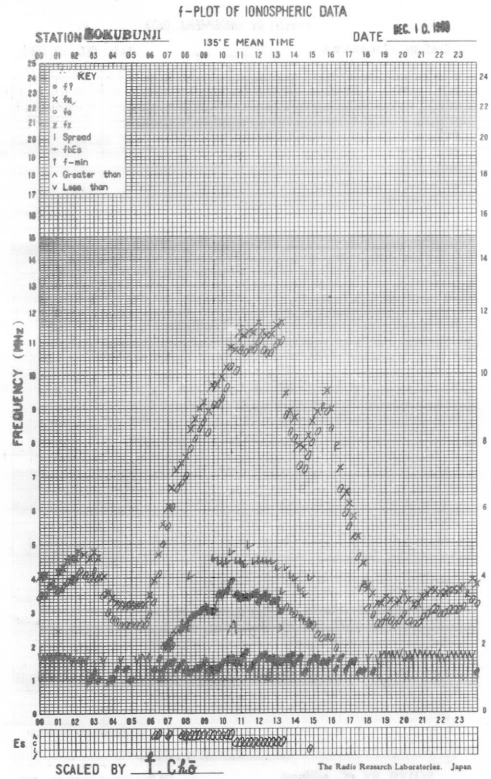
SCALED BY T. Abe
The Radio Research Laboratories. Japan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KEY
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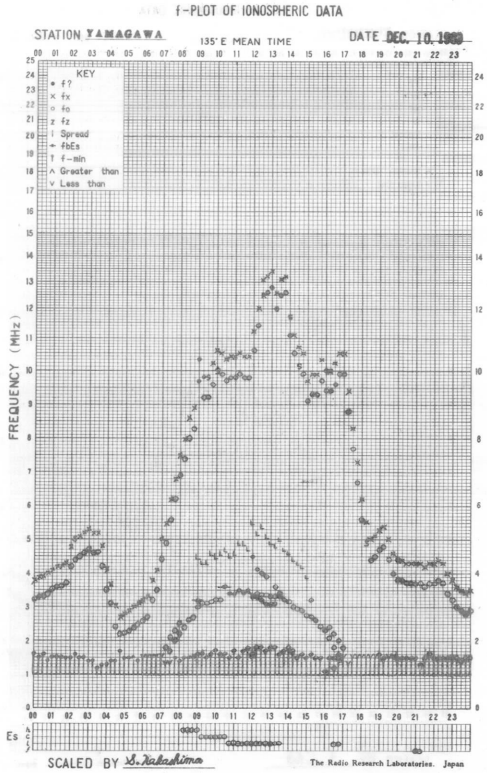
The Radio Research Laboratories. Japan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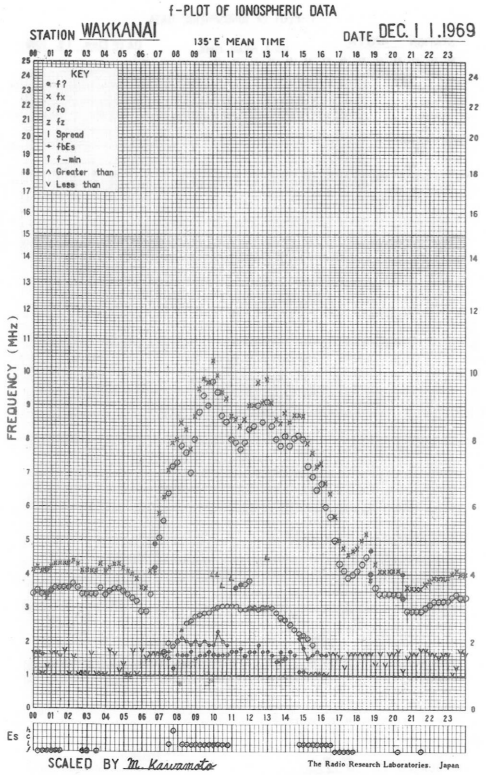
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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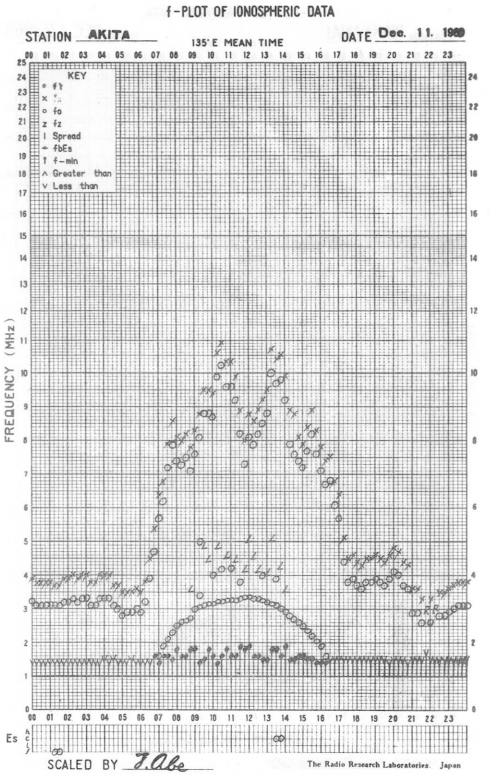
SCALED BY M. Kasuamoto
The Radio Research Laboratories. Japan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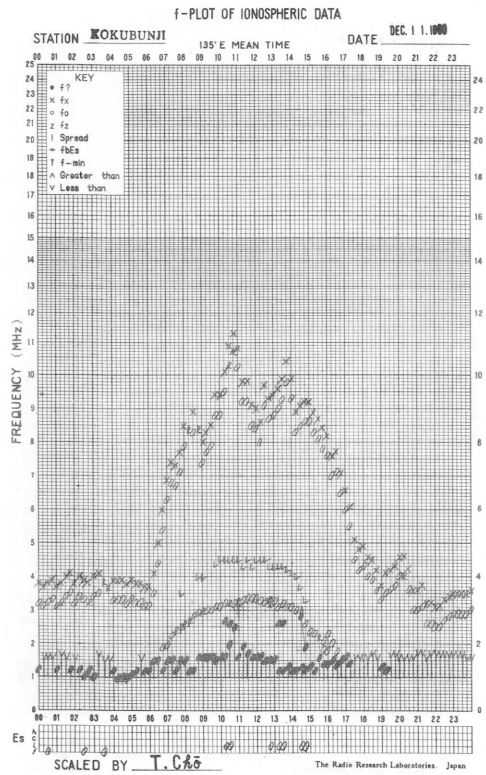
SCALED BY T. Abe
The Radio Research Laboratories. Japan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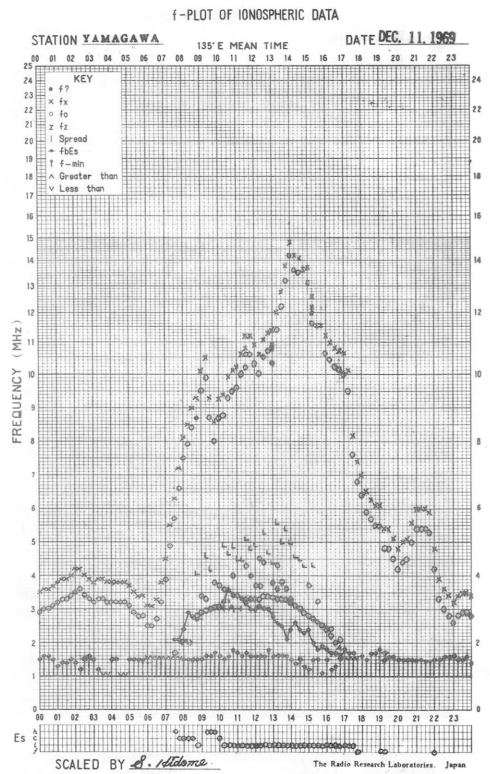
SCALED BY T. Cho
The Radio Research Laboratories. Japan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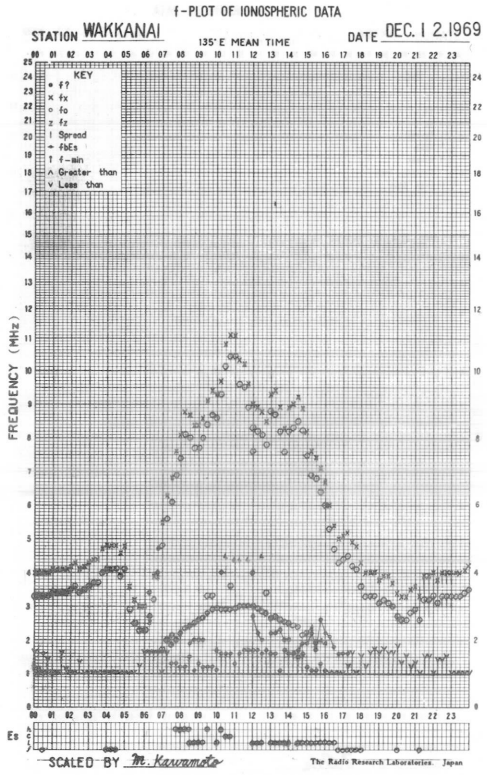
The Radio Research Laboratories. Japan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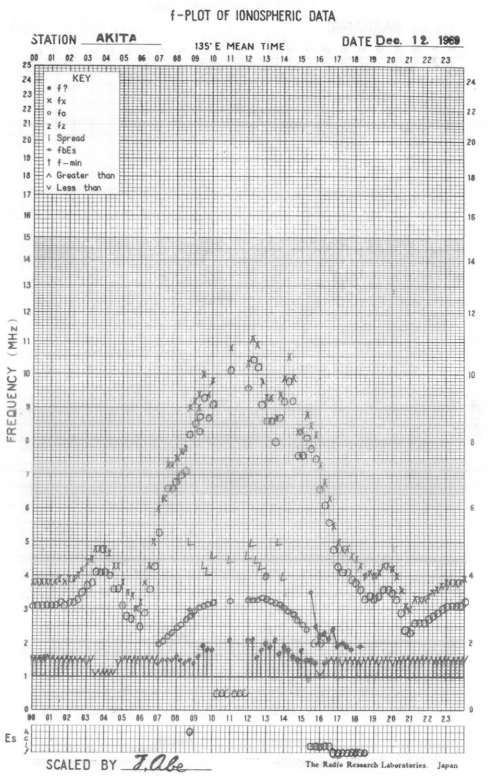
The Radio Research Laboratories. Japan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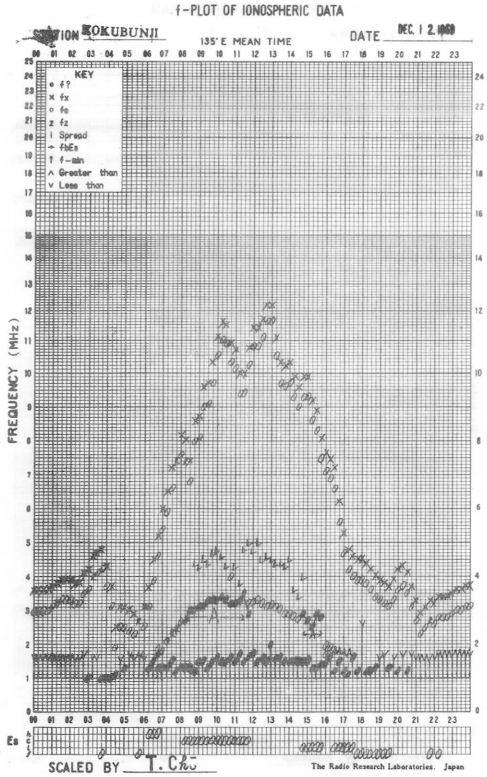
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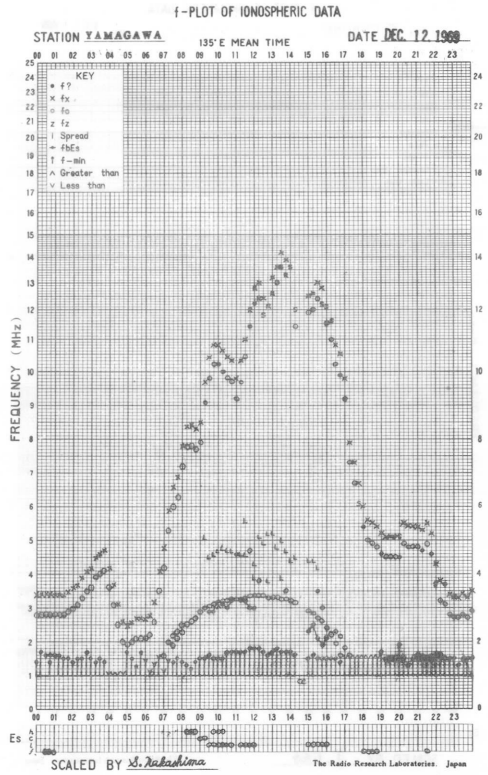
The Radio Research Laboratories. Japan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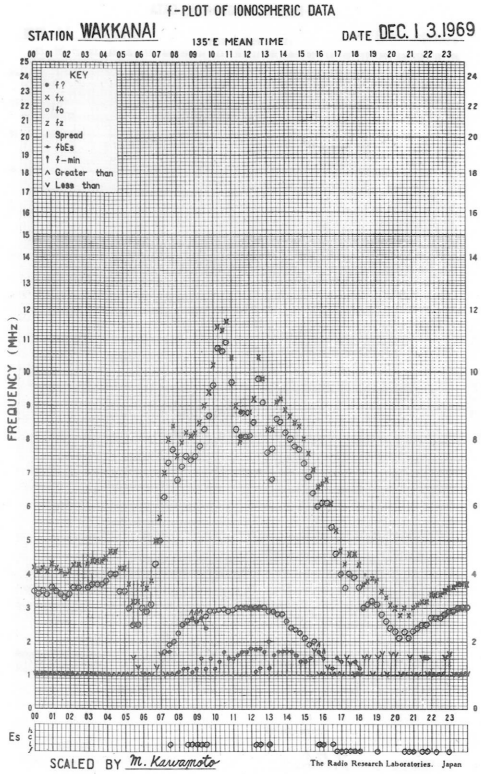
The Radio Research Laboratories. Japan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∧ Greater than
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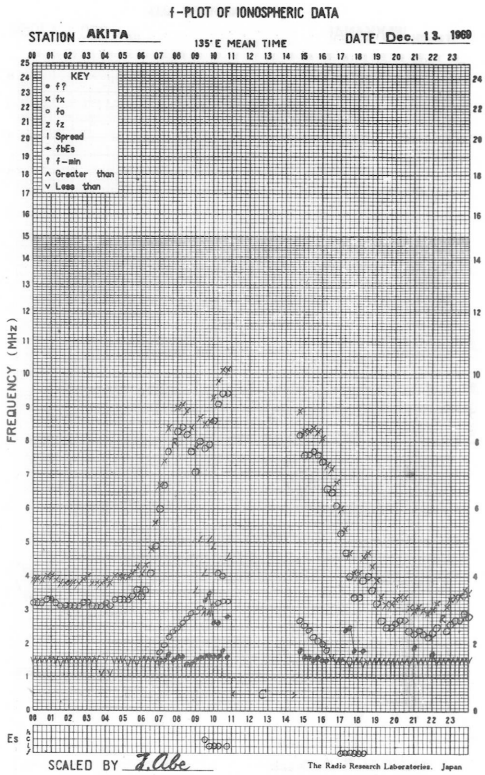
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan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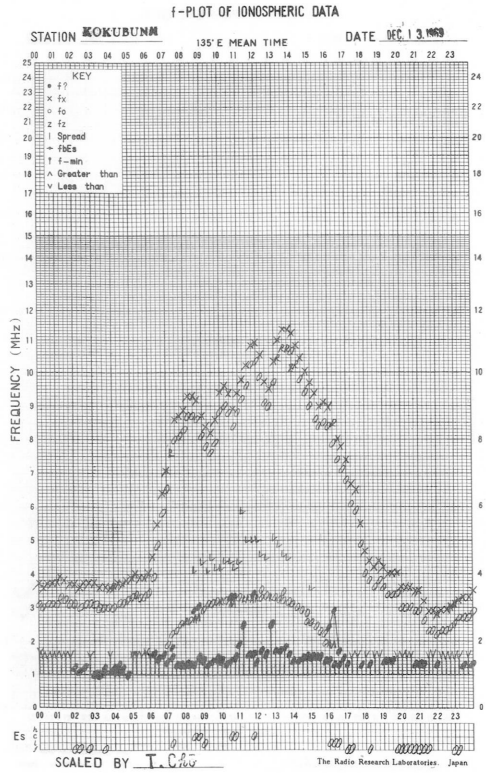
SCALED BY T. Abe
The Radio Research Laboratories. Japan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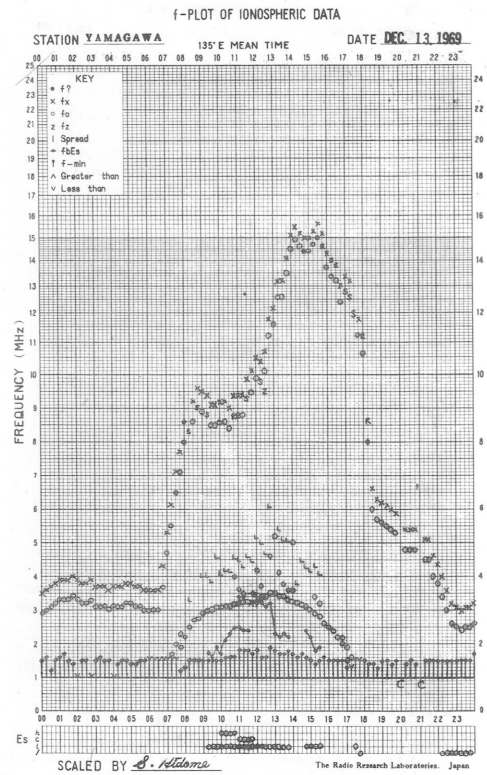
SCALED BY T. Ohe
The Radio Research Laboratories. Japan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∨ Less than
FREQUENCY (MHz)
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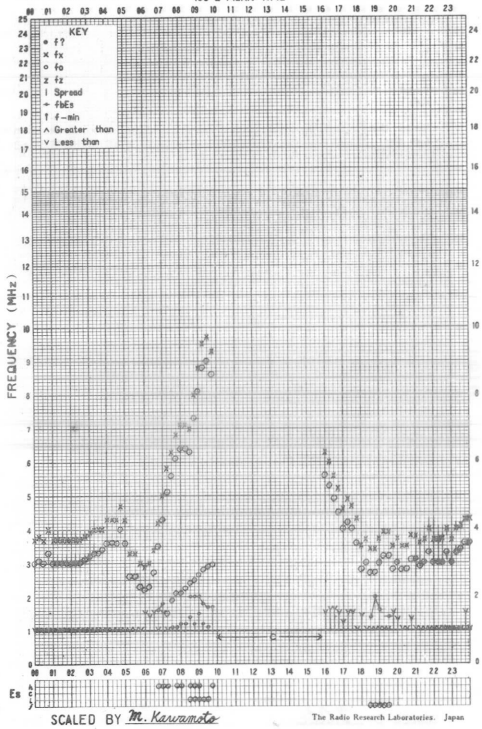
SCALED BY S. Shidama
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE DEC. 14.1969




SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

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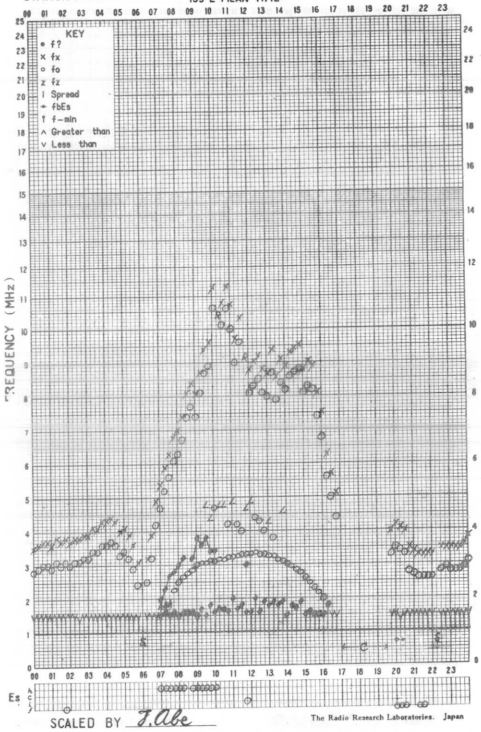


SCALED BY T. Abe

The Radio Research Laboratories. Japan

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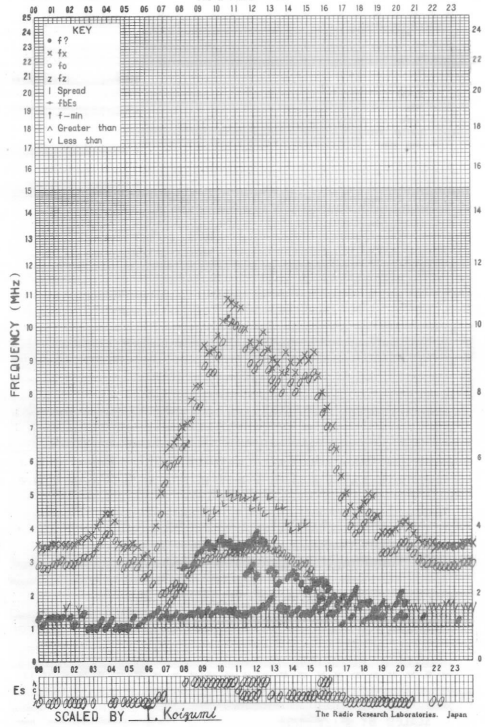


SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

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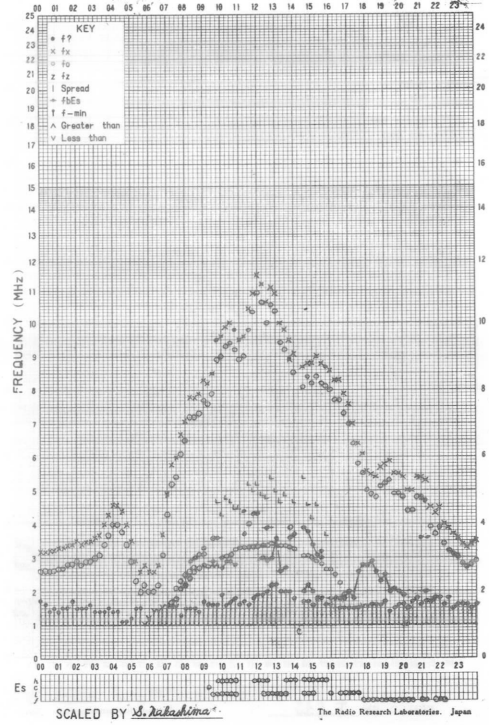
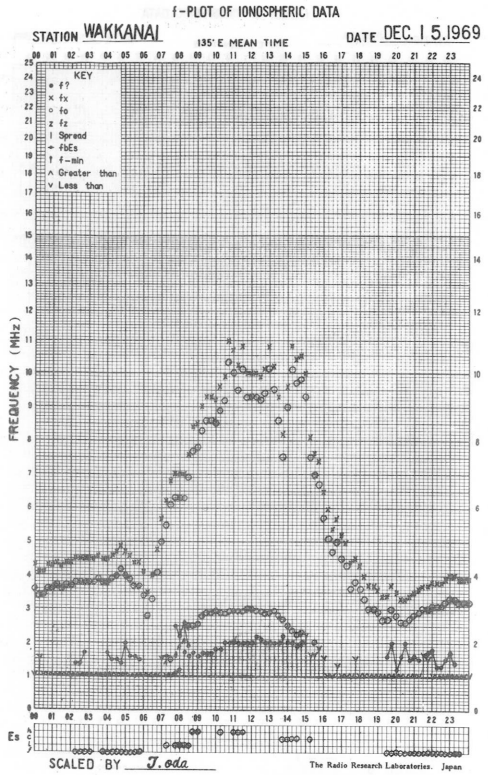



SCALED BY S. Nakashima

The Radio Research Laboratories. Japan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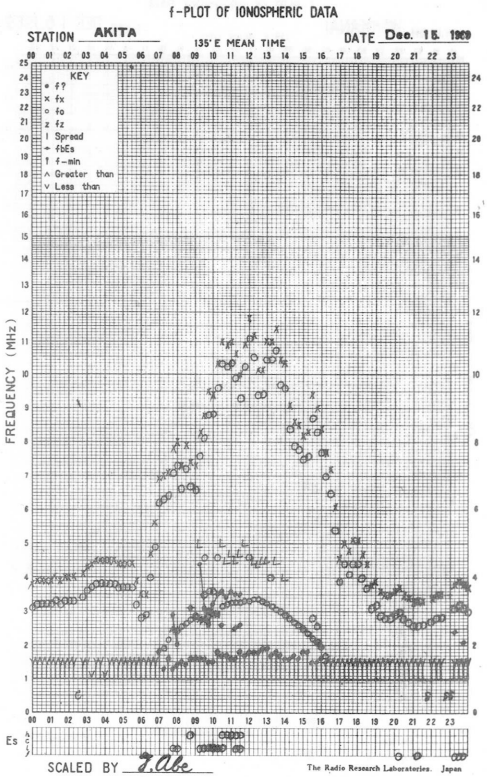
FREQUENCY (MHz)
Es
SCALED BY T. Oda
The Radio Research Laboratories. Japan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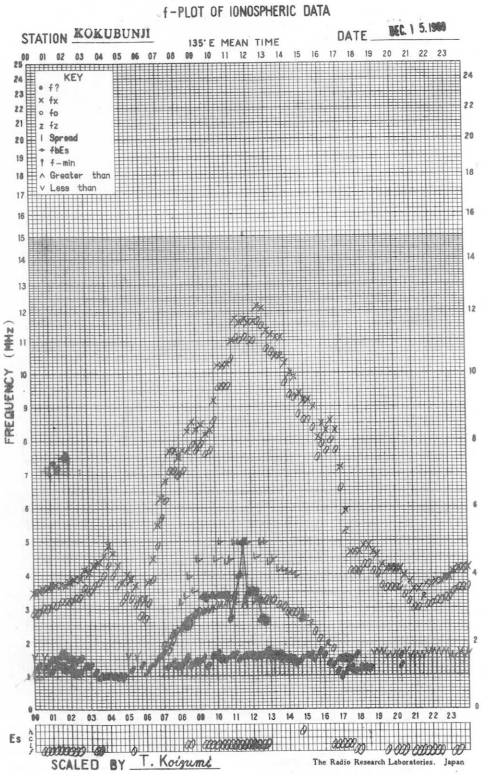
SCALED BY T. Abe
The Radio Research Laboratories. Japan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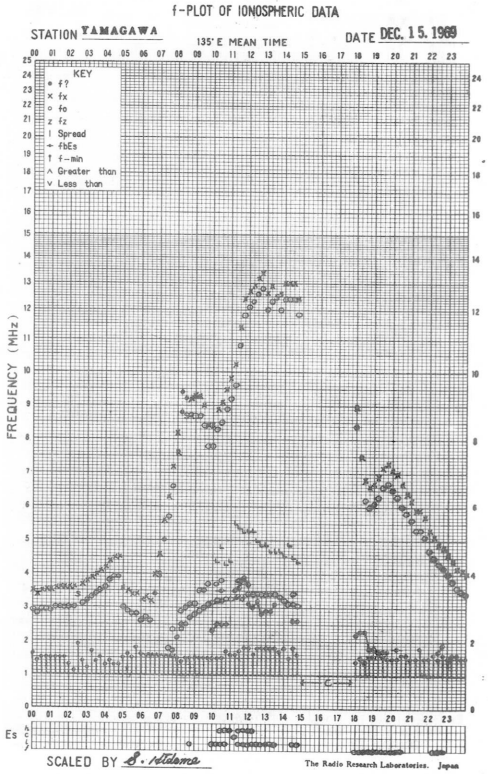
SCALED BY T. Koizumi
The Radio Research Laboratories. Japan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v Less than
FREQUENCY (MHz)
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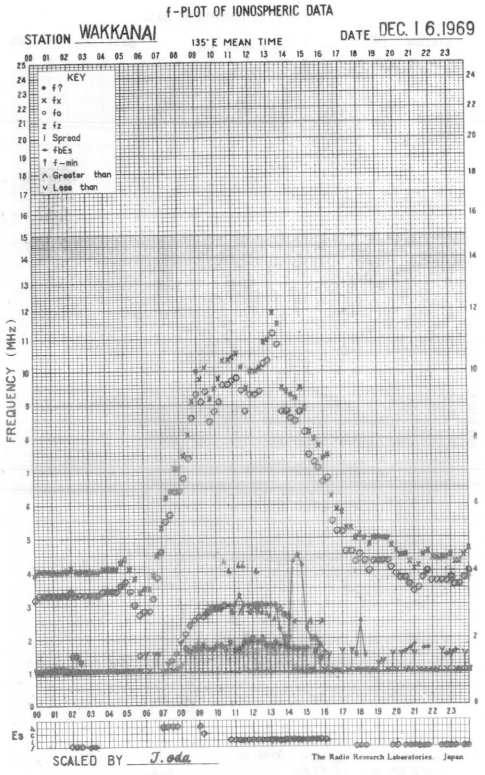
SCALED BY S. Shibuya
The Radio Research Laboratories. Japan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135°E MEAN TIME
DATE DEC. 16.1969
KEY
FREQUENCY (MHz)
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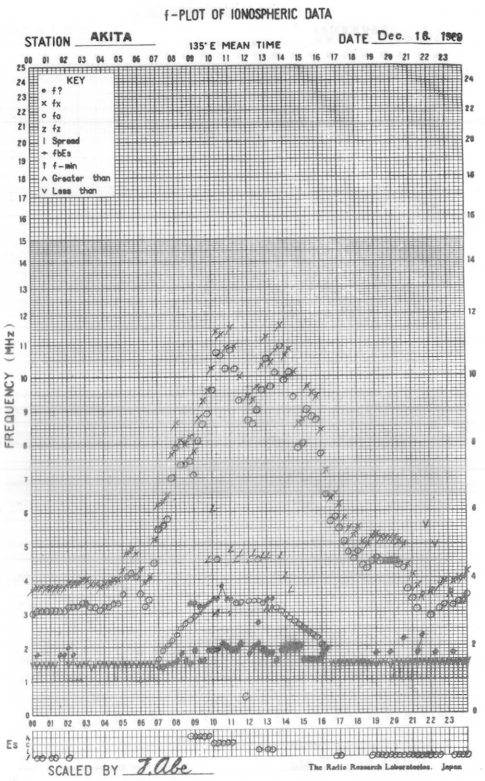
The Radio Research Laboratories. Japan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DATE Dec. 16. 1969
KEY
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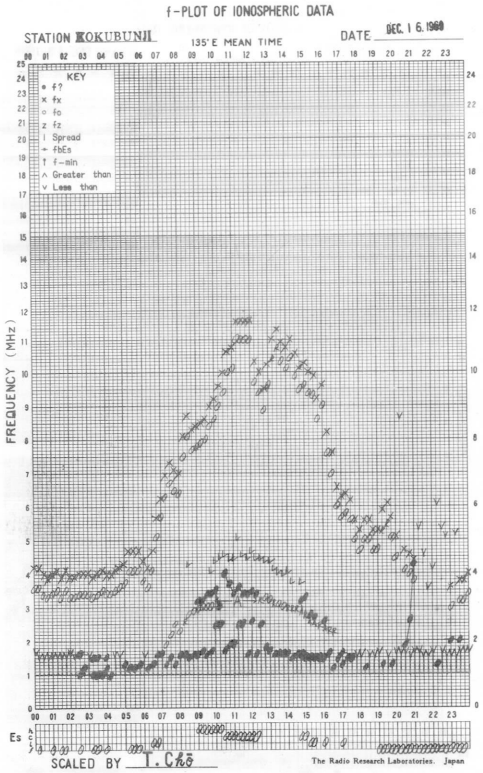
The Radio Research Laboratories. Japan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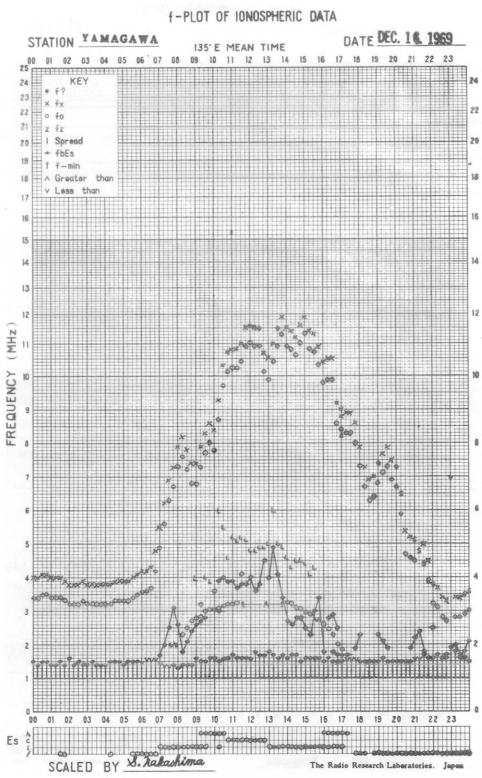
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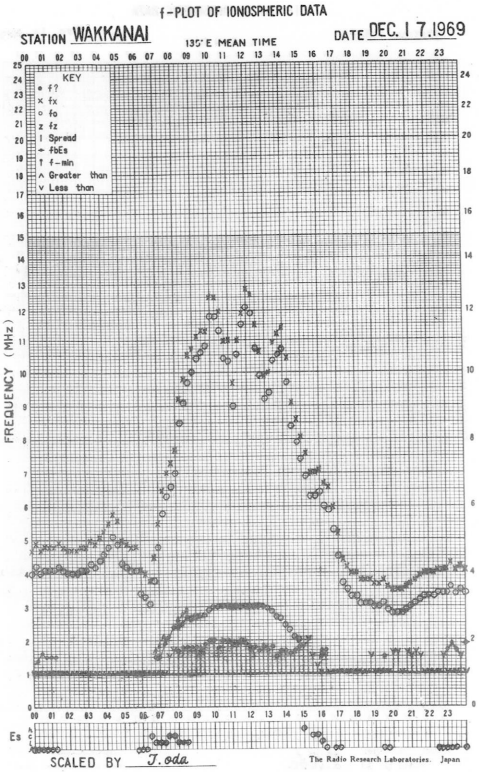
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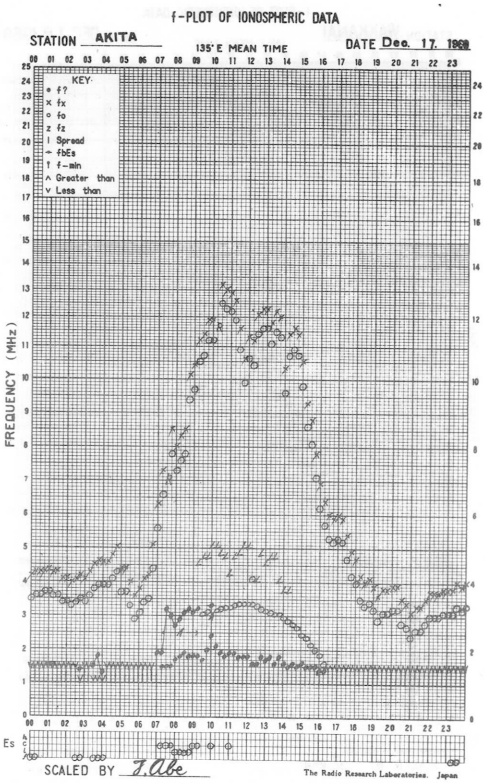
SCALED BY T. oda
The Radio Research Laboratories. Japan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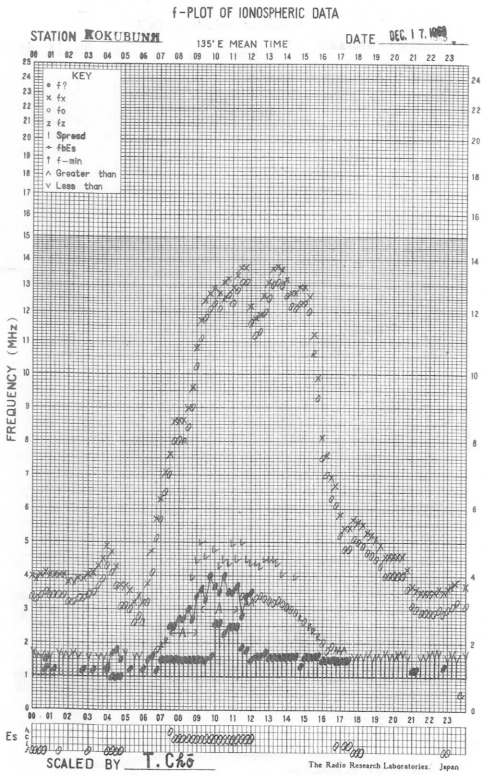
The Radio Research Laboratories. Japan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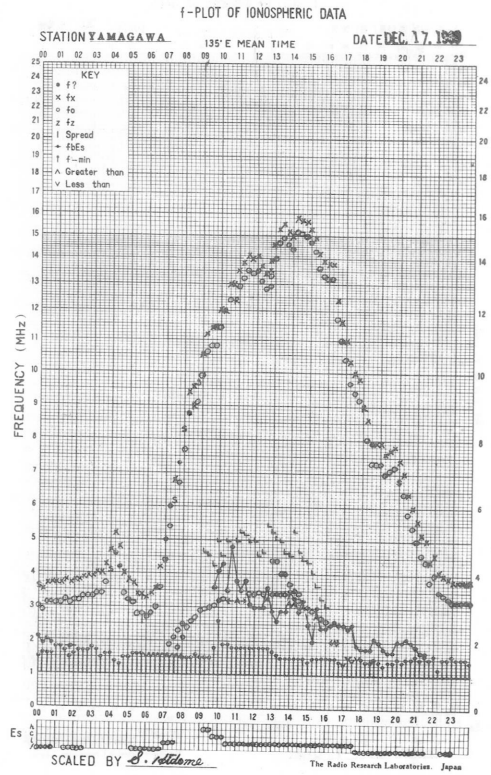
The Radio Research Laboratories. Japan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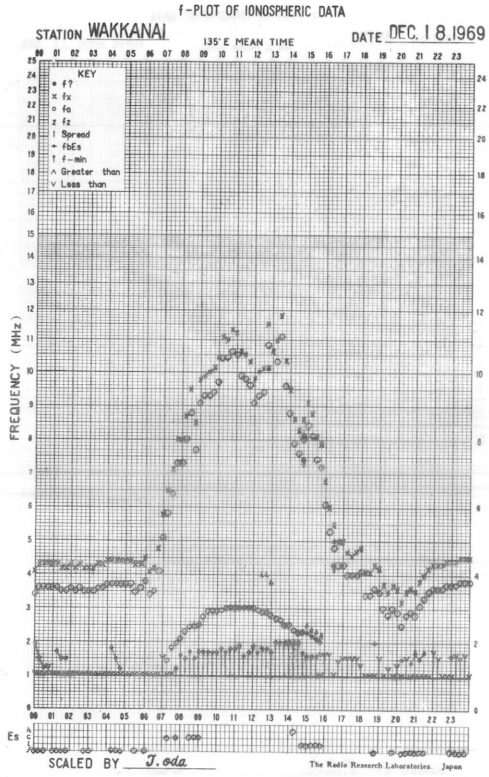
The Radio Research Laboratories. Japan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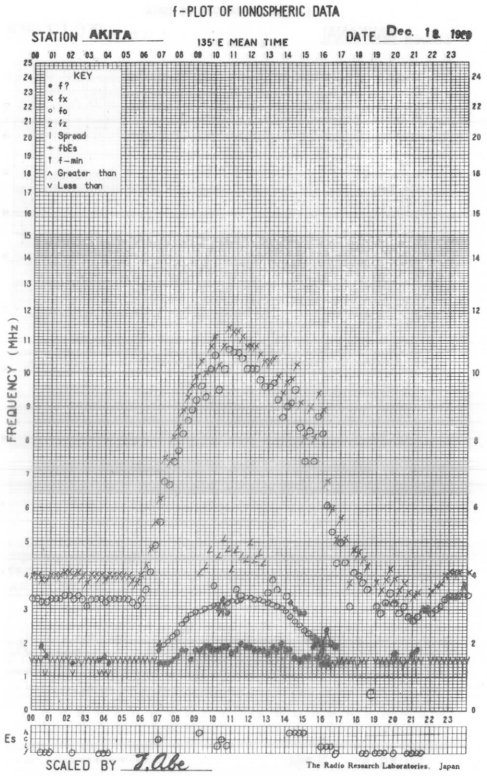
The Radio Research Laboratories. Japan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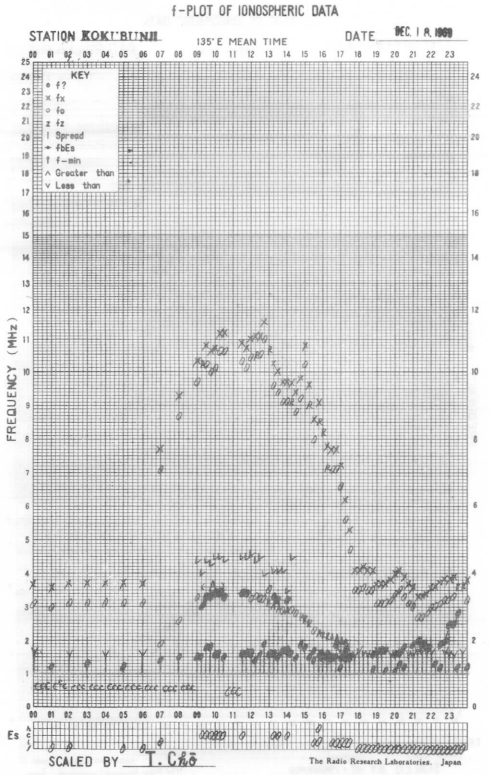
The Radio Research Laboratories. Japan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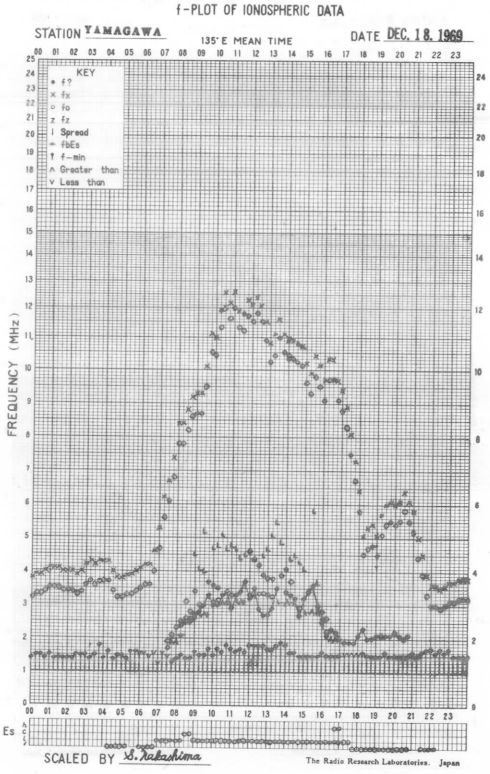
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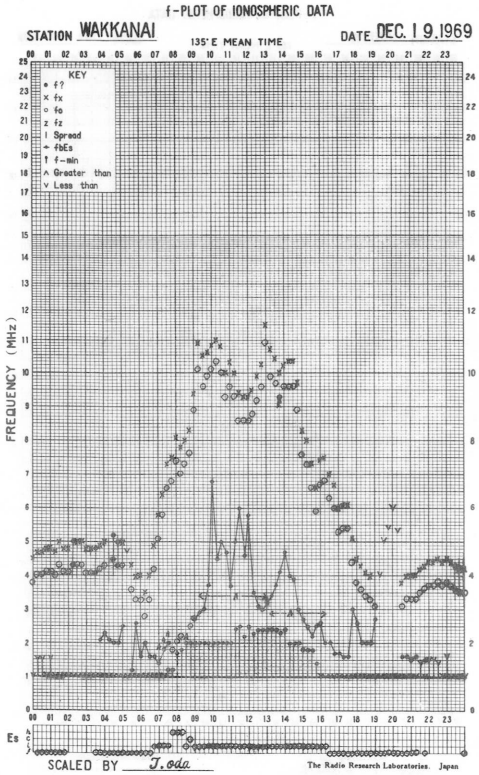
The Radio Research Laboratories. Japan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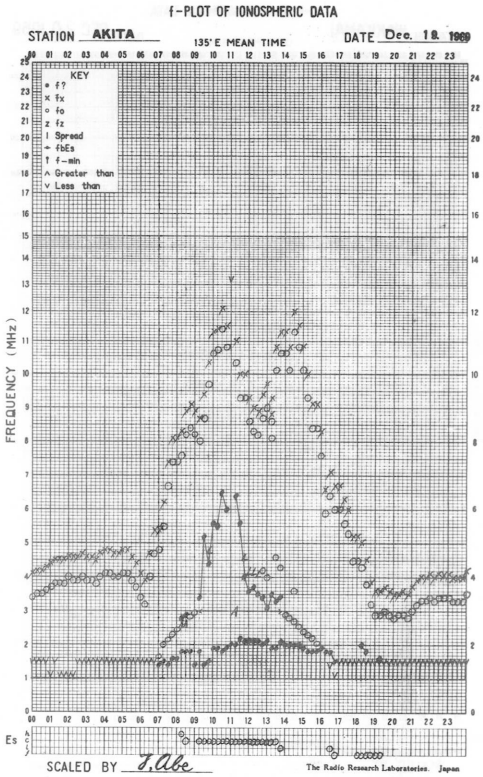
The Radio Research Laboratories. Japan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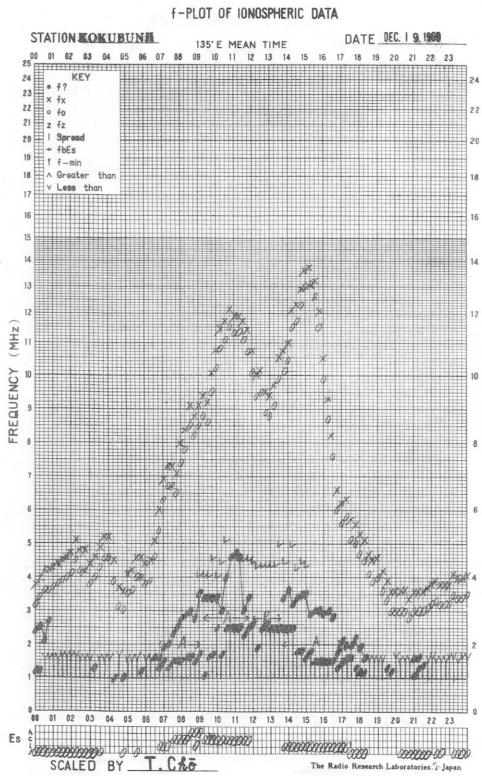
The Radio Research Laboratories. Japan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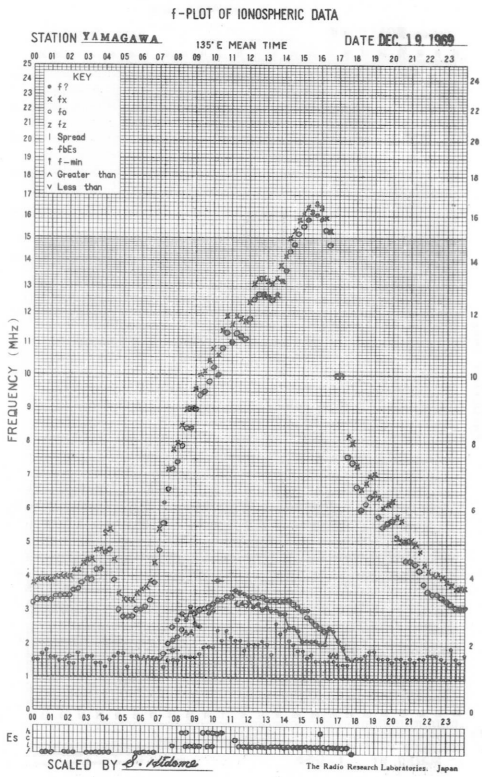
The Radio Research Laboratories. Japan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SCALED BY S. Ichikawa
The Radio Research Laboratories. Japan

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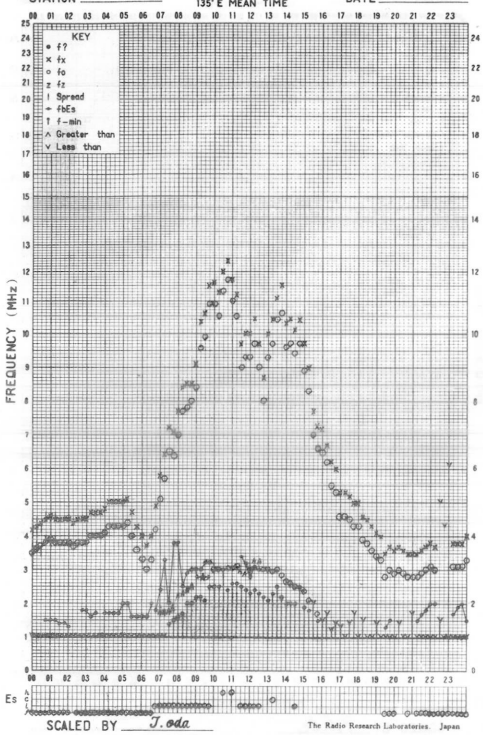


SCALED BY T. oda

The Radio Research Laboratories. Japan

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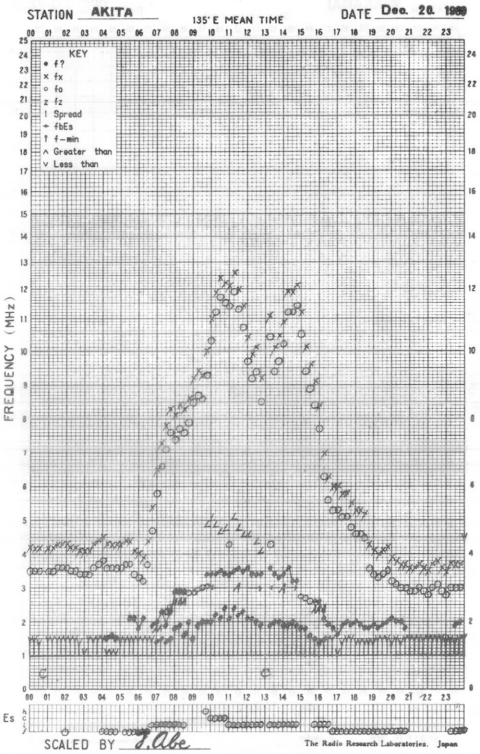


SCALED BY T. Abe

The Radio Research Laboratories. Japan

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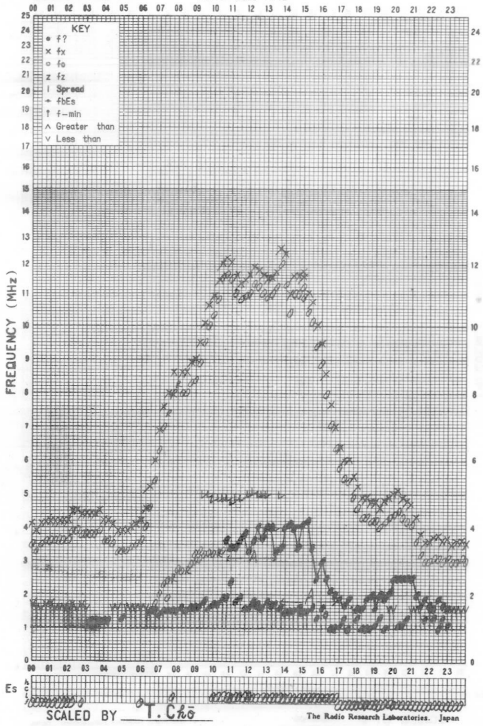


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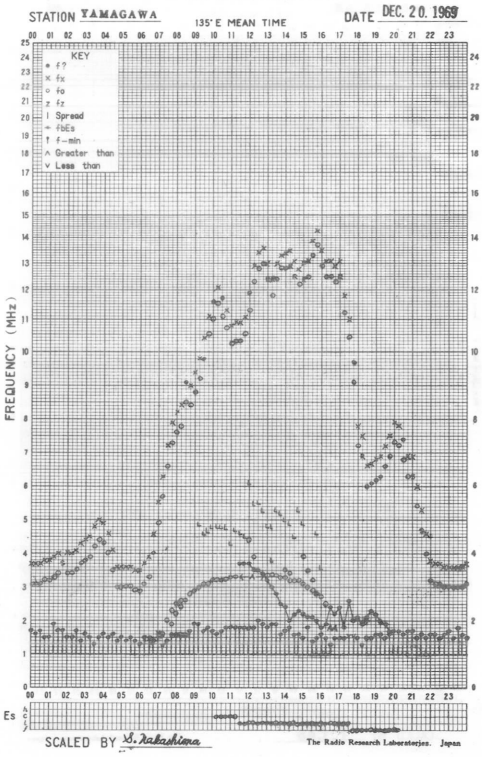
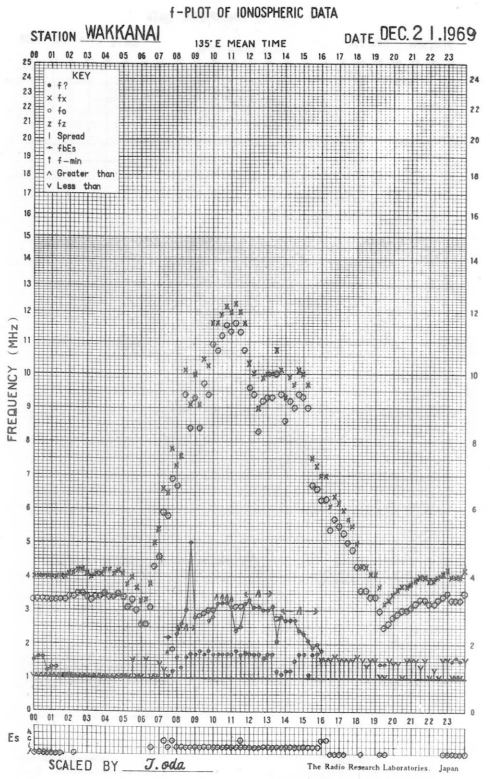



SCALED BY S. Nakashima

The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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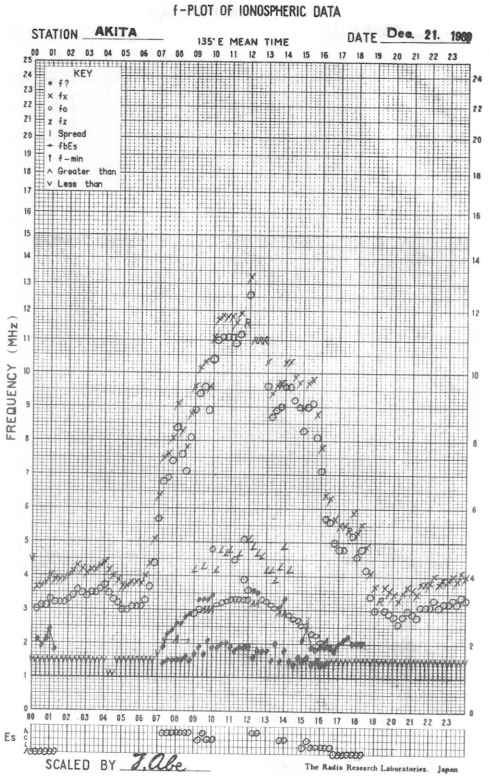
SCALED BY T. oda
The Radio Research Laboratories. Japan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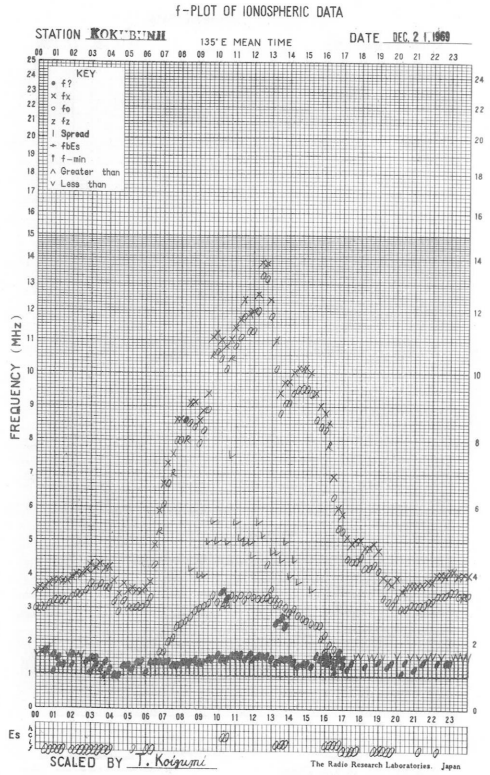
SCALED BY T. Abe
The Radio Research Laboratories. Japan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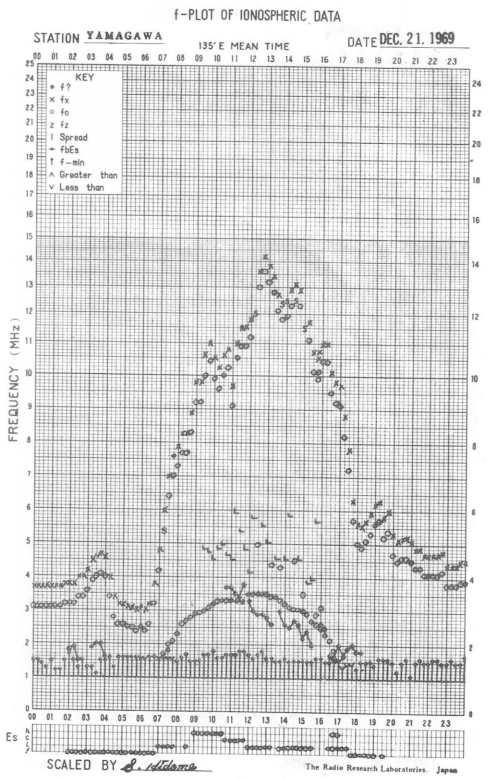
SCALED BY T. Koizumi
The Radio Research Laboratories. Japan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The Radio Research Laboratories. Japan

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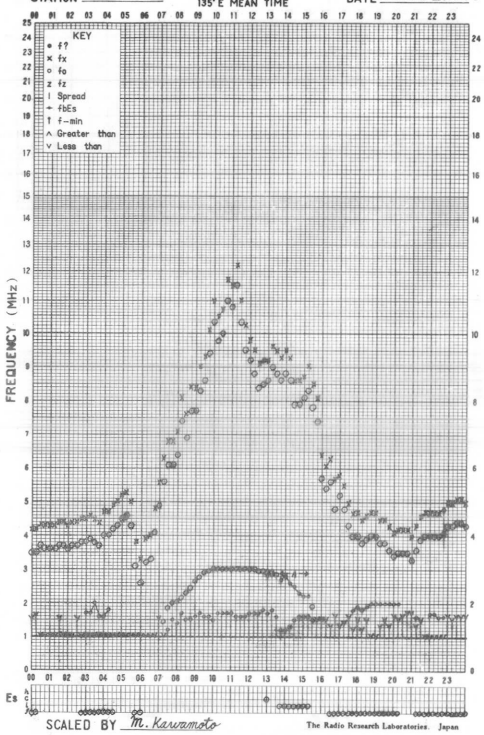


SCALED BY M. Kawamoto The Radio Research Laboratories. Japan

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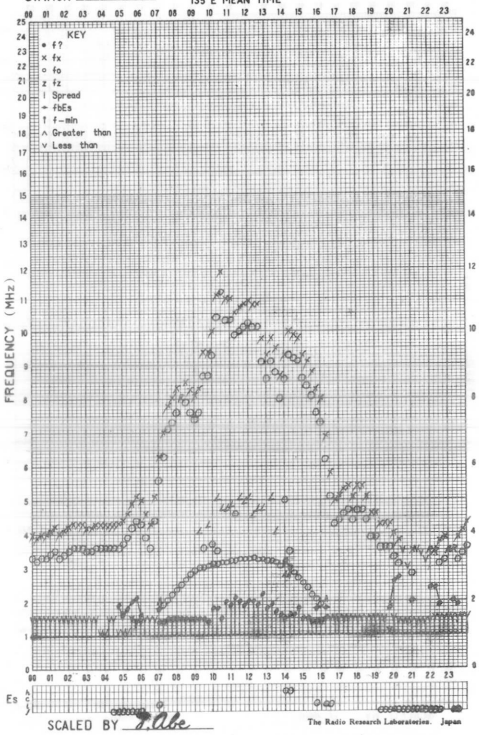


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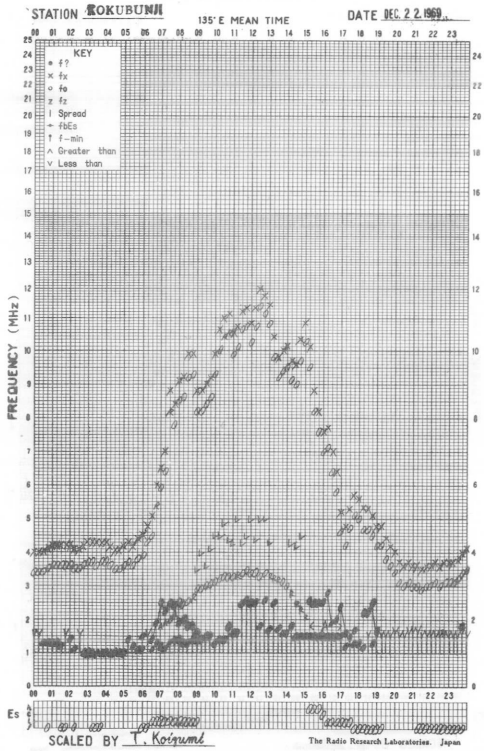


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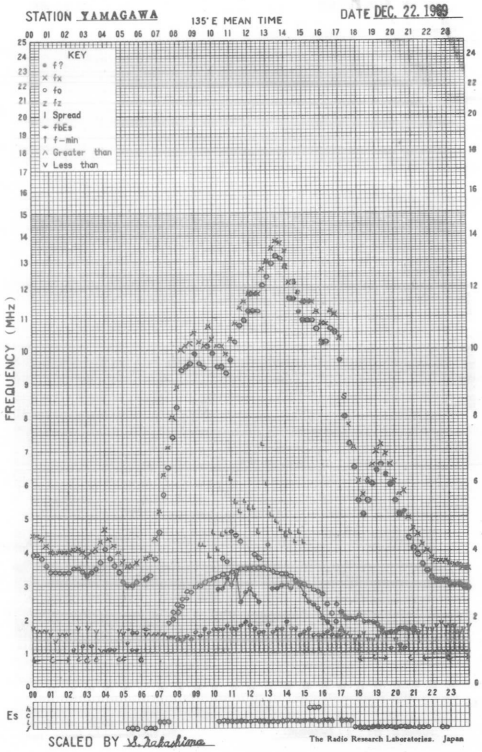
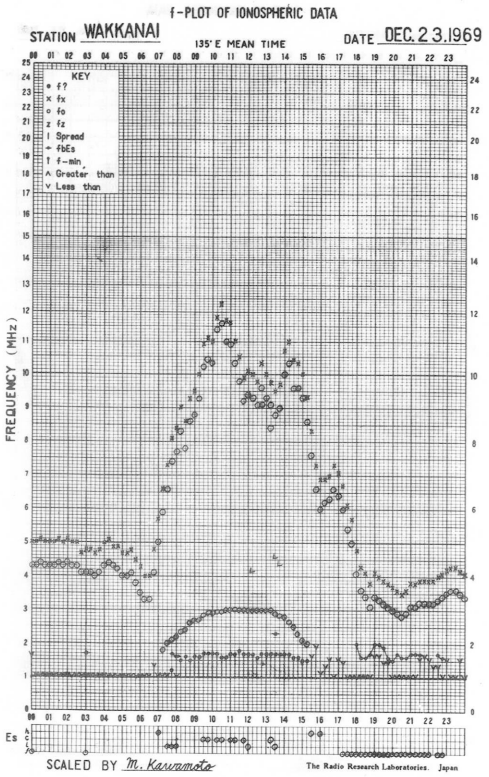



SCALED BY S. Takashima The Radio Research Laboratories. Japan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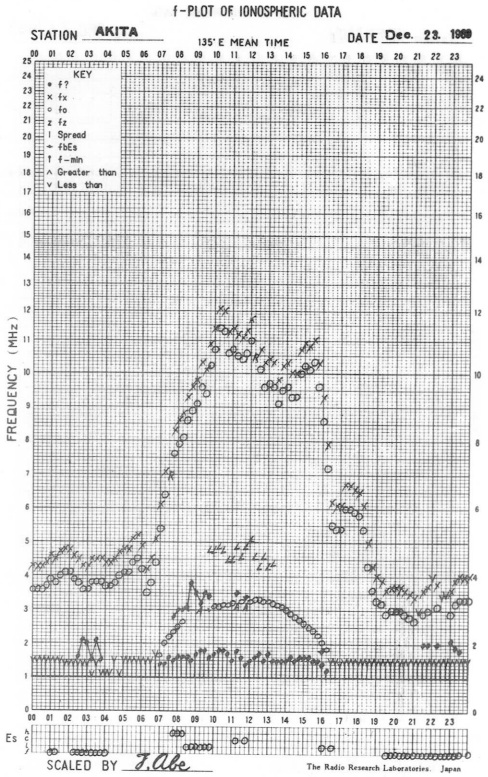
SCALED BY M. Kasumoto
The Radio Research Laboratories. Japan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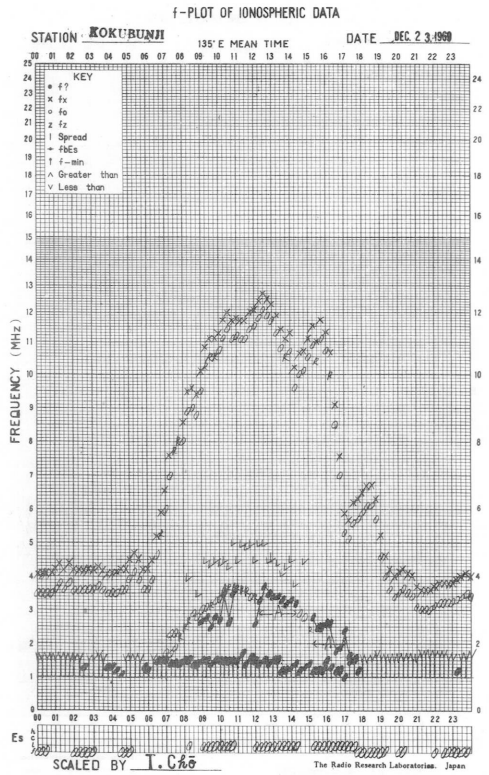
The Radio Research Laboratories. Japan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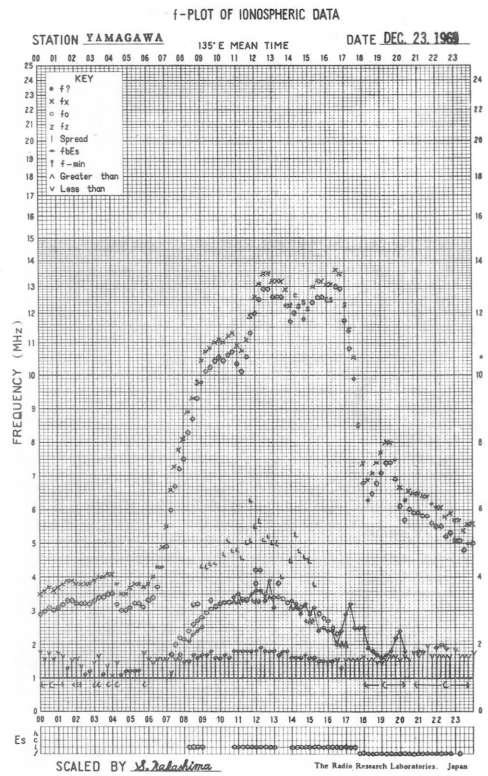
The Radio Research Laboratories. Japan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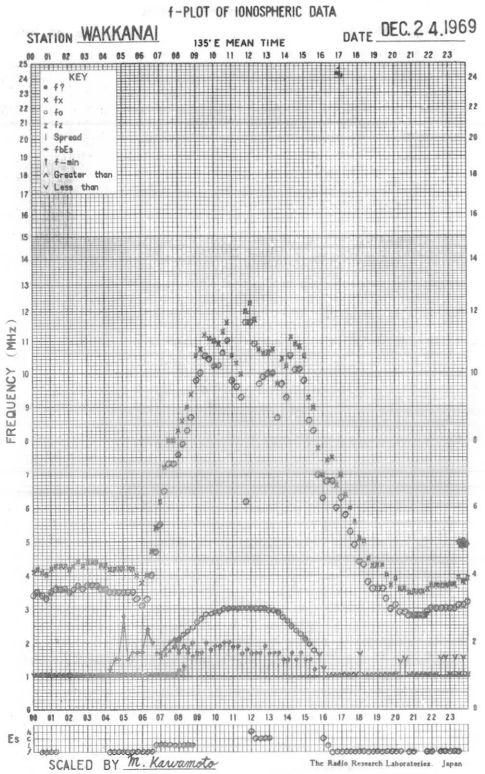
SCALED BY S. Takashima
The Radio Research Laboratories. Japan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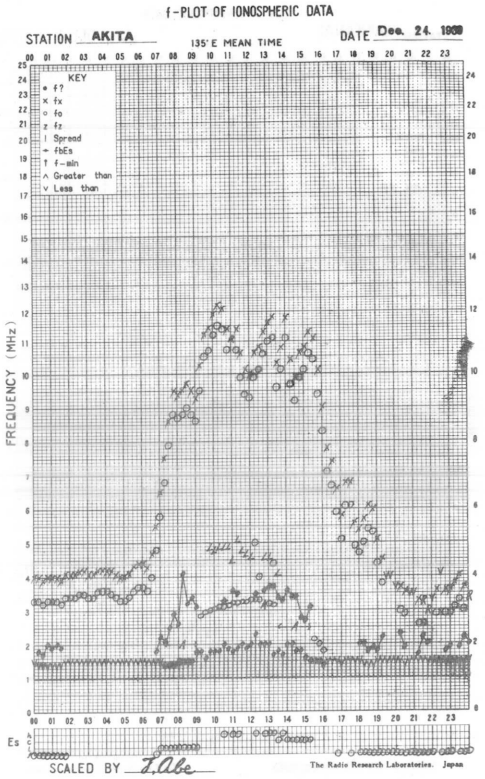
The Radio Research Laboratories. Japan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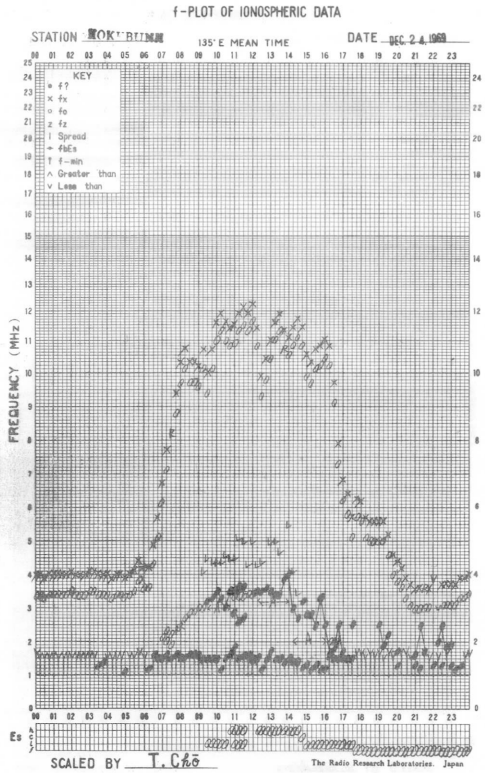
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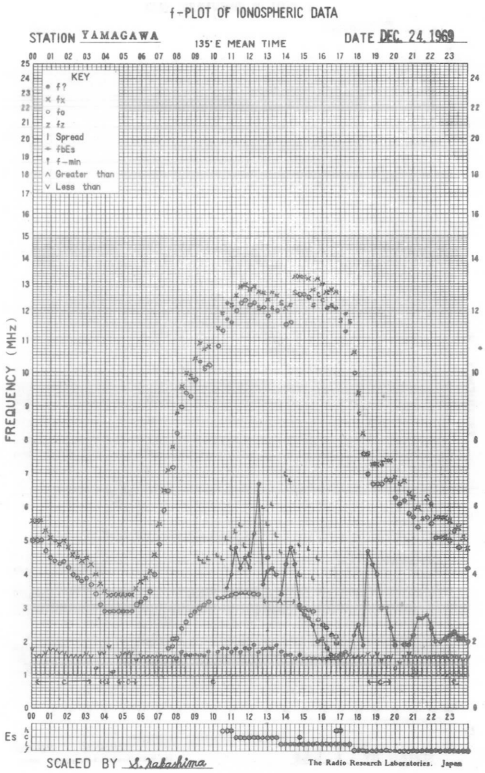
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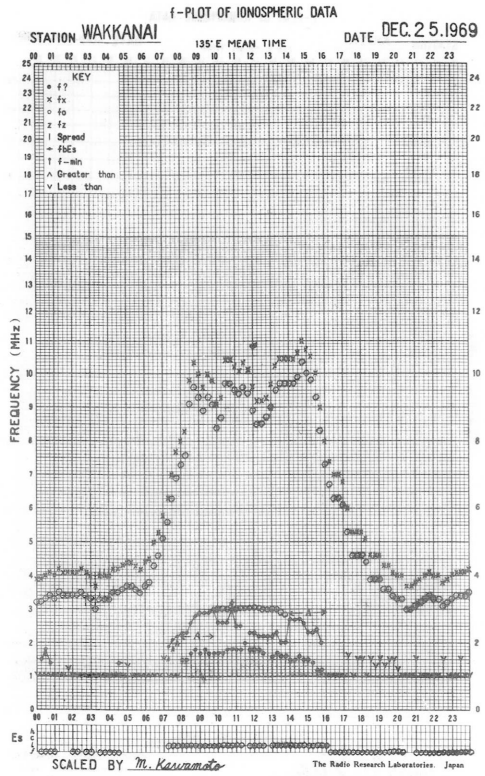
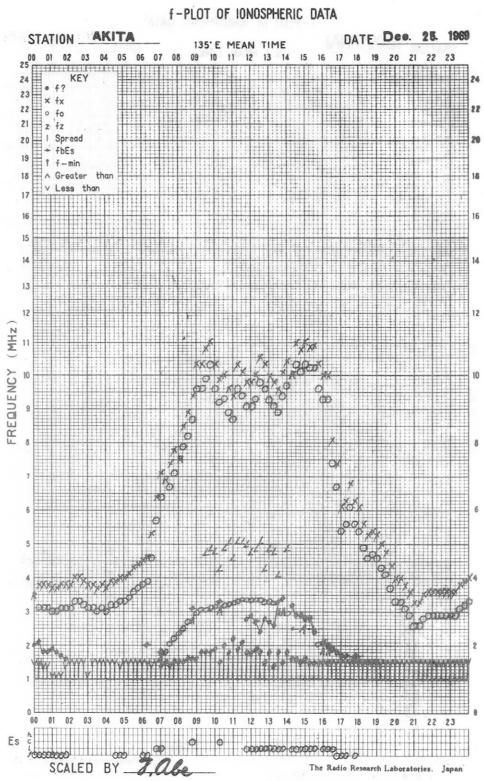
SCALED BY S. Takashima
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135° E MEAN TIME
DATE DEC. 25. 1969
KEY
• f?
× fx
○ fo
z fz
| Spread
÷ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan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STATION AKITA
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DATE Dec. 25. 1969
KEY
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○ fo
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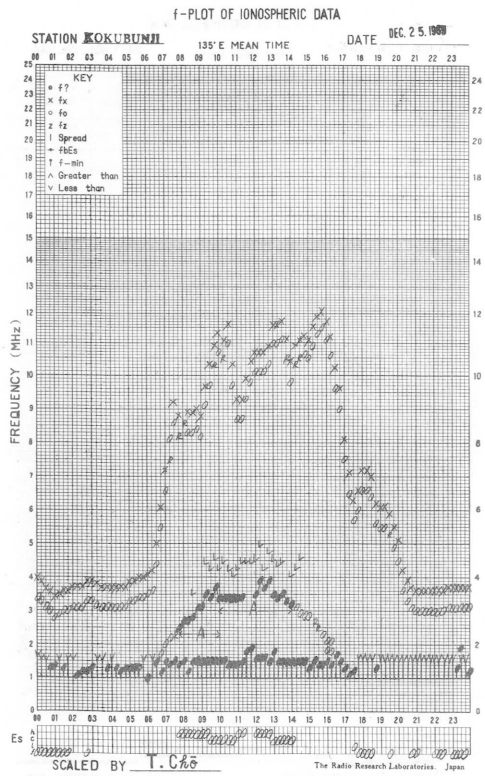
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan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○ fo
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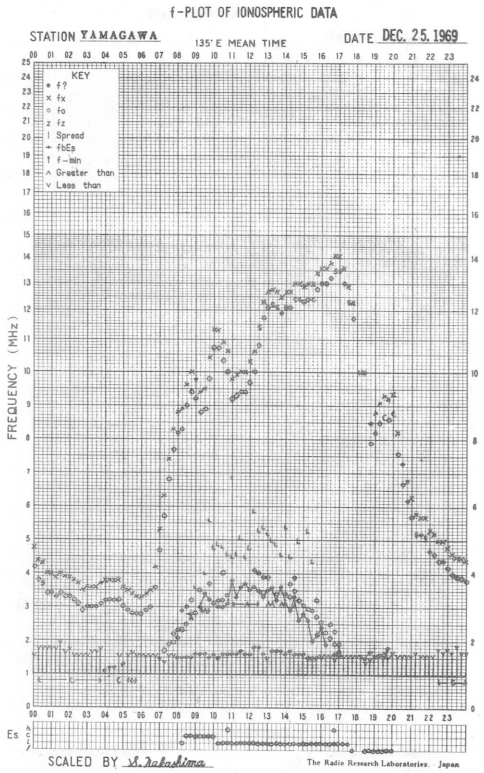
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Cho
The Radio Research Laboratories. Japan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STATION YAMAGAWA
135° E MEAN TIME
DATE DEC. 25. 1969
KEY
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○ fo
z fz
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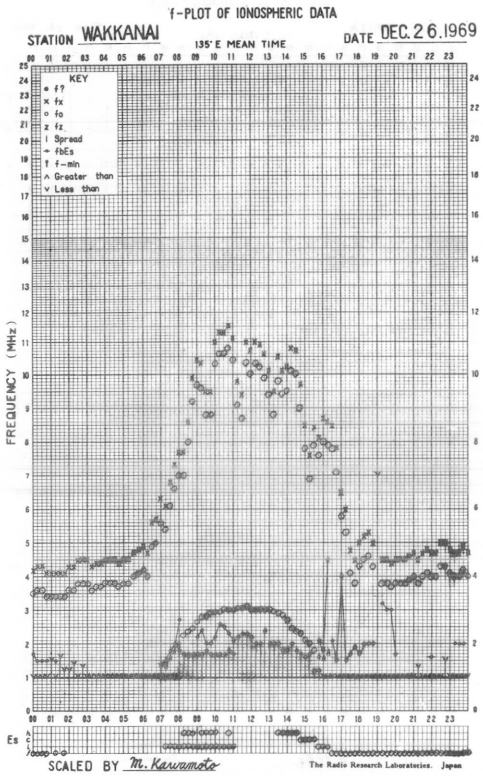
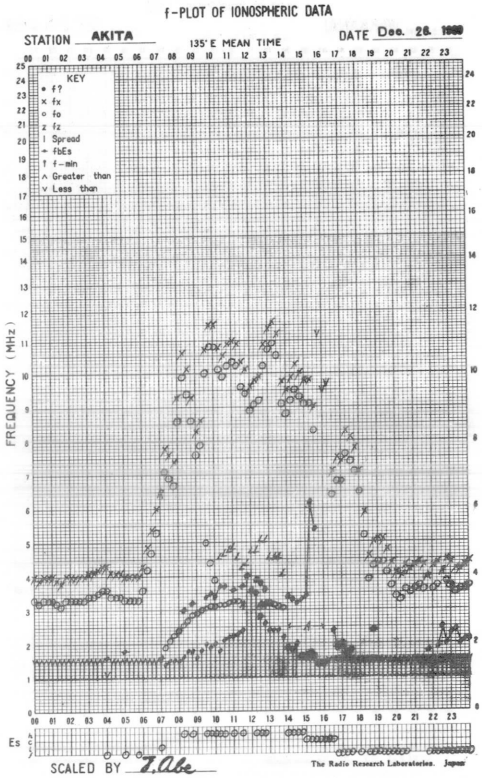
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135° E MEAN TIME
DATE DEC. 26. 1969
KEY
FREQUENCY (MHz)
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
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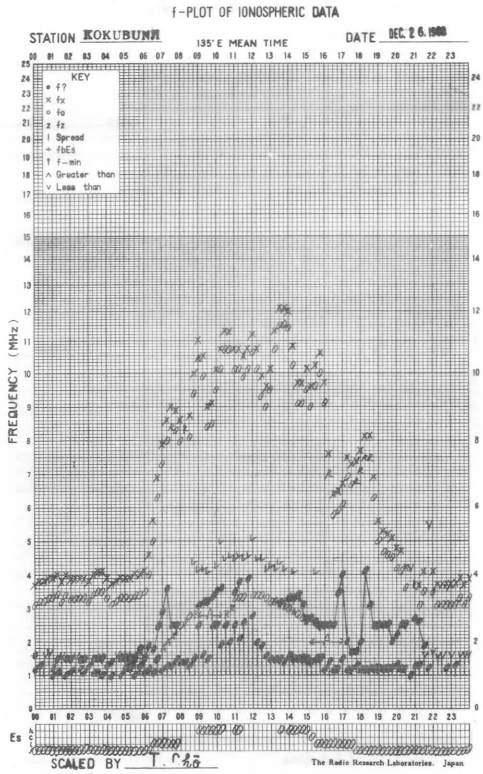
135° E MEAN TIME
DATE Dec. 26. 1969
KEY
FREQUENCY (MHz)
SCALED BY T. Abe
The Radio Research Laboratories. Japan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DATE DEC. 26. 1969
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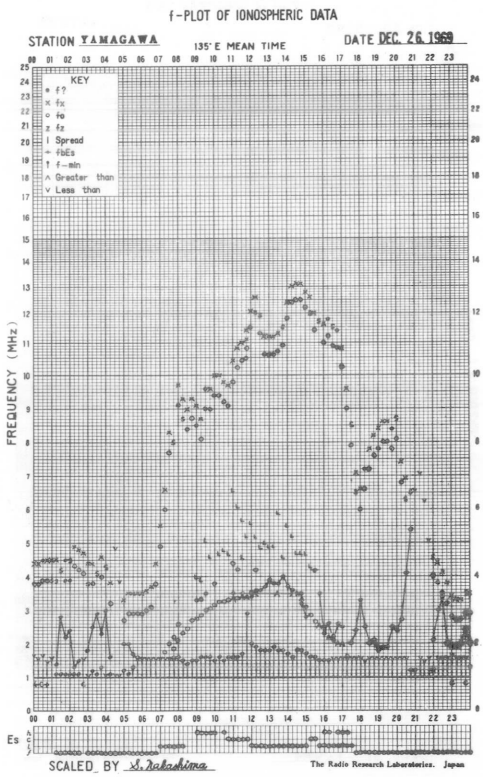
SCALED BY T. Obi
The Radio Research Laboratories. Japan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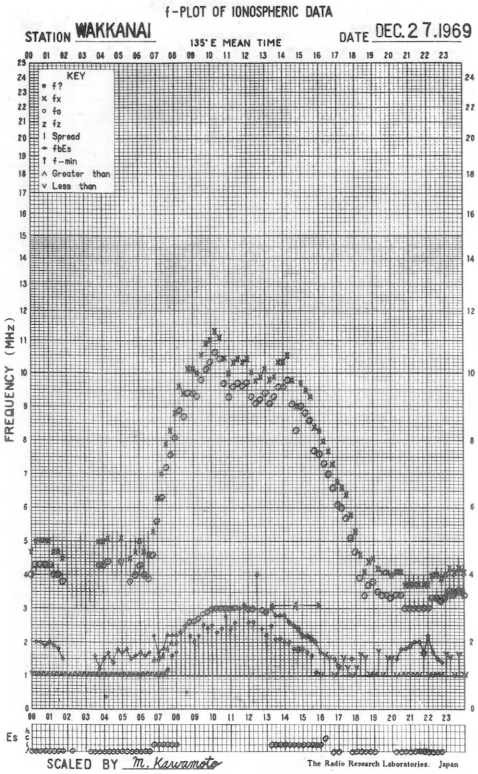
DATE DEC. 26. 1969
KEY
FREQUENCY (MHz)
SCALED BY S. Takashima
The Radio Research Laboratories. Japan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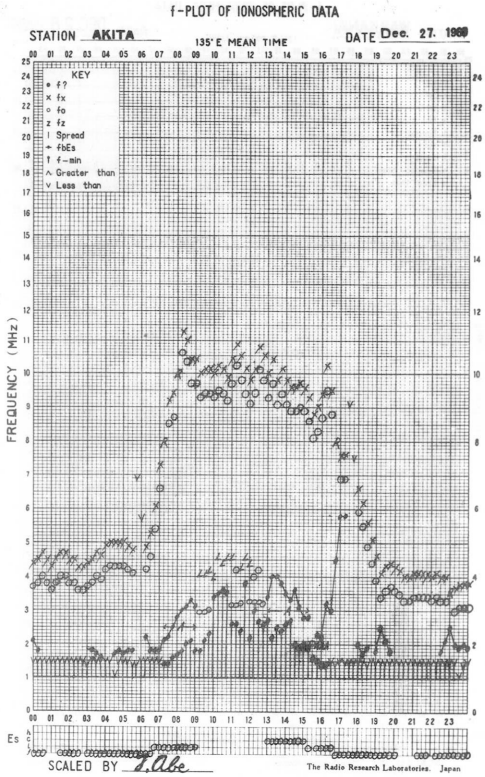
135°E MEAN TIME
DATE DEC. 27. 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
÷ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan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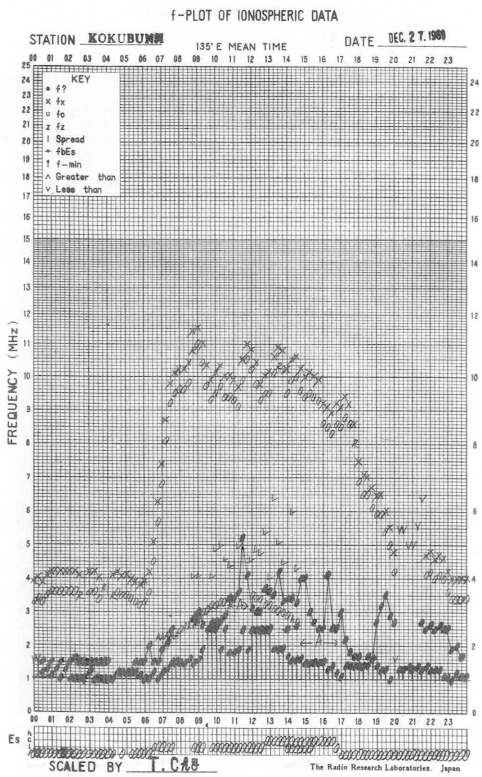
STATION AKITA
135°E MEAN TIME
DATE Dec. 27. 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
÷ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Abe
The Radio Research Laboratories. Japan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KEY
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○ fo
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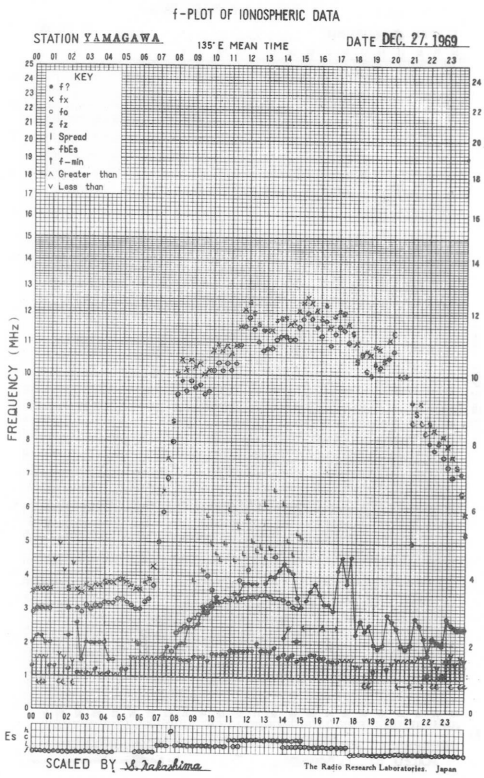
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Ca8
The Radio Research Laboratories. Japan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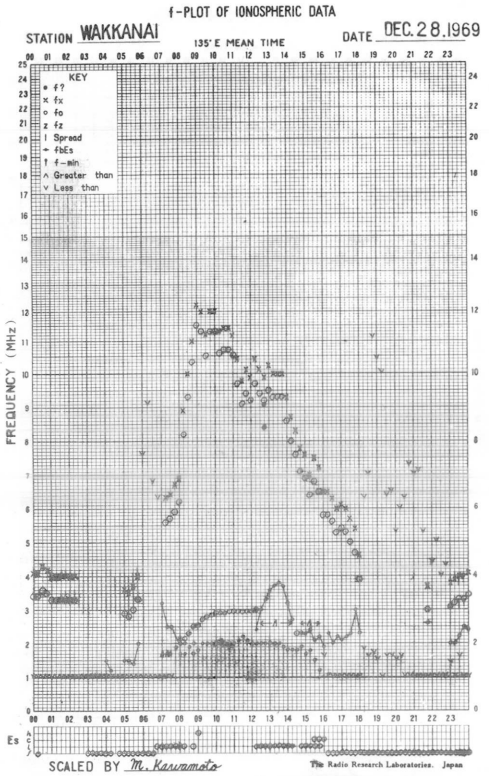
STATION YAMAGAWA
135°E MEAN TIME
DATE DEC. 27. 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
÷ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Takashima
The Radio Research Laboratories. Japan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STATION WAKKANAI
135° E MEAN TIME
DATE DEC. 28, 1969
KEY
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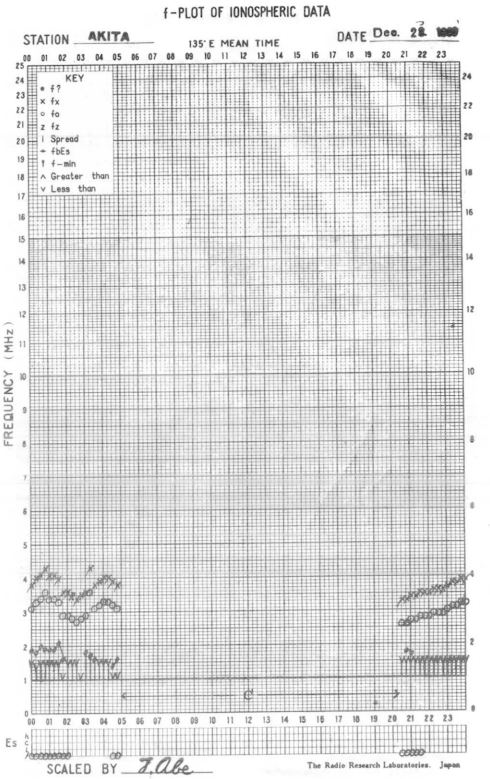
× fx
○ fo
z fz
| Spread
+ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kasumoto
The Radio Research Laboratories. Japan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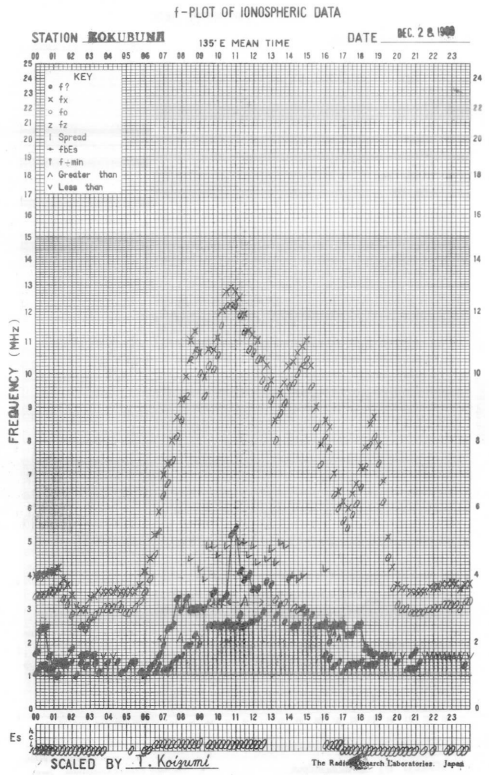
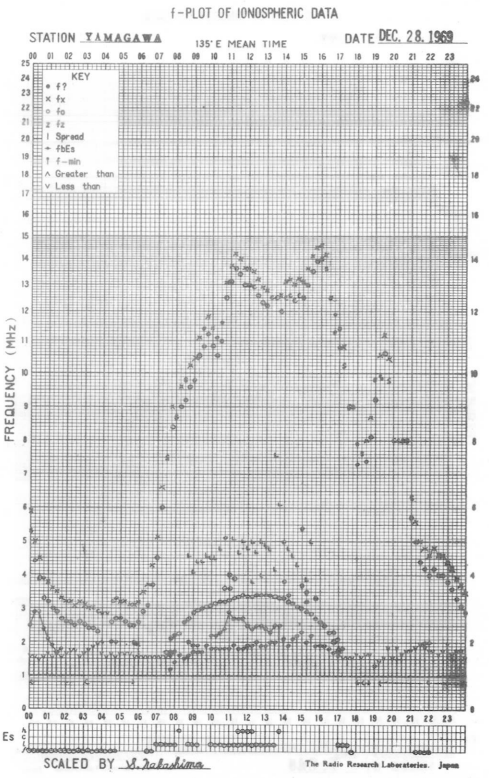
STATION AKITA
135° E MEAN TIME
DATE Dec. 28, 1969
KEY
• f?
× fx
○ fo
z fz
| Spread
+ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135° E MEAN TIME
DATE DEC. 28, 1969
KEY
• f?
× fx
○ fo
z fz
| Spread
+ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Koizumi
The Radio Research Laboratories. Japan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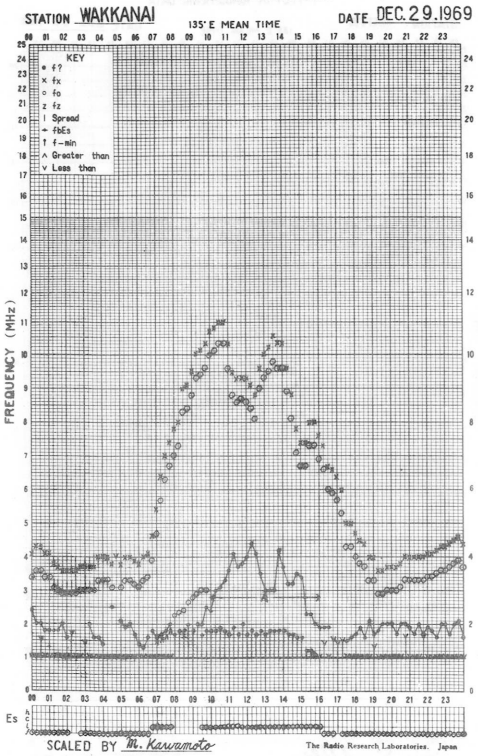
DATE DEC. 28, 1969
KEY
• f?
× fx
○ fo
z fz
| Spread
+ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Takashima
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
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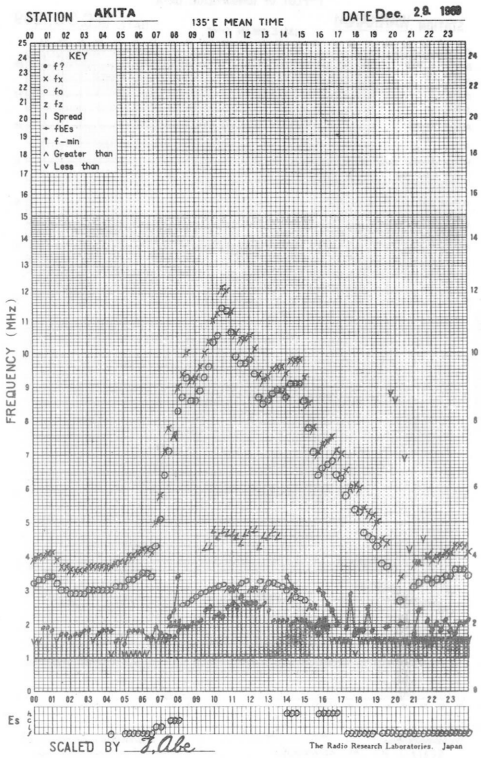
135°E MEAN TIME
DATE DEC. 29.1969
KEY
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
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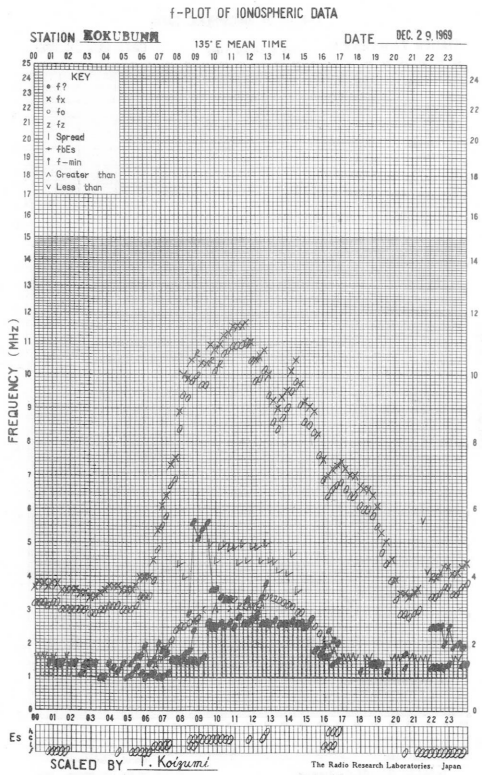
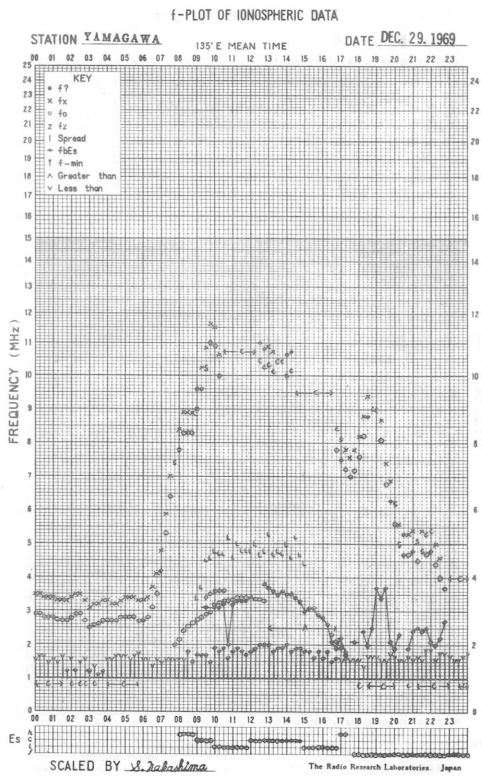
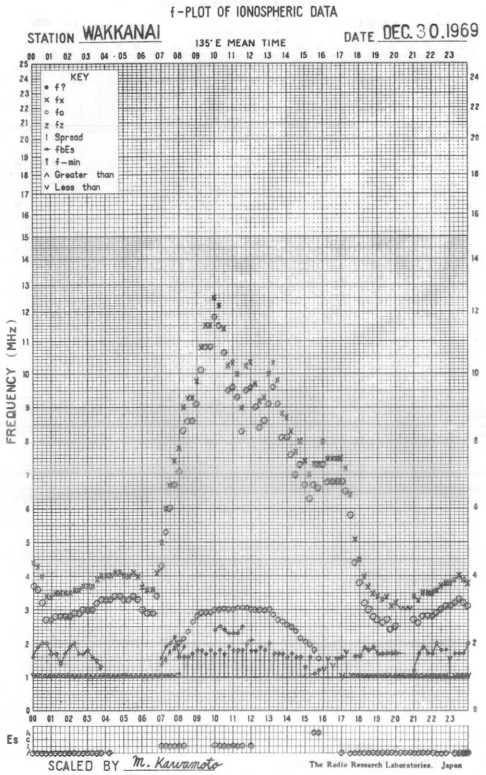
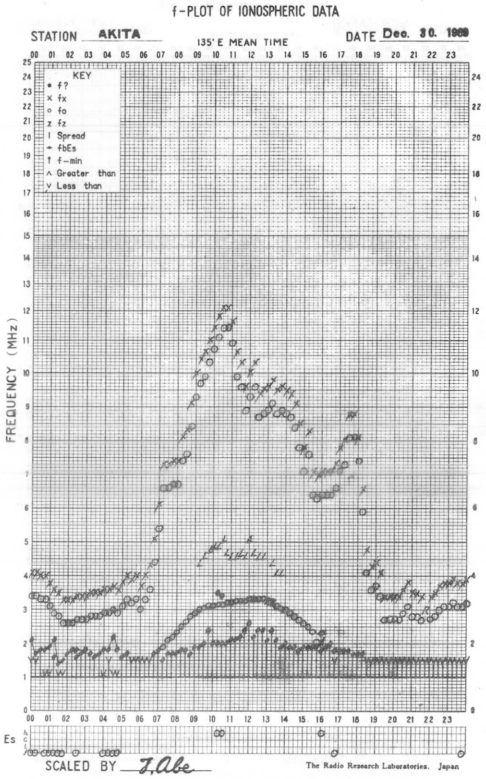
135°E MEAN TIME
DATE Dec. 29. 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
DATE DEC. 29.1969
KEY
FREQUENCY (MHz)
Es
SCALED BY T. Koizumi
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE DEC. 29. 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE DEC. 30. 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
⇔ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan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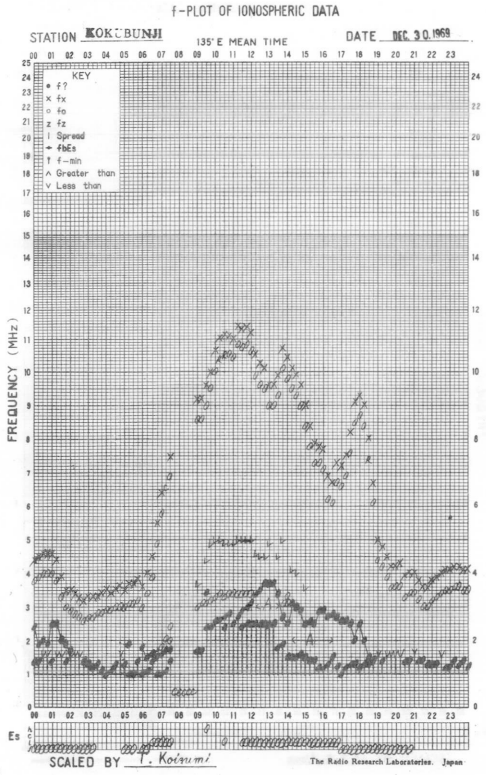
STATION AKITA
135°E MEAN TIME
DATE Dec. 30. 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
⇔ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan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○ fo
z fz
| Spread
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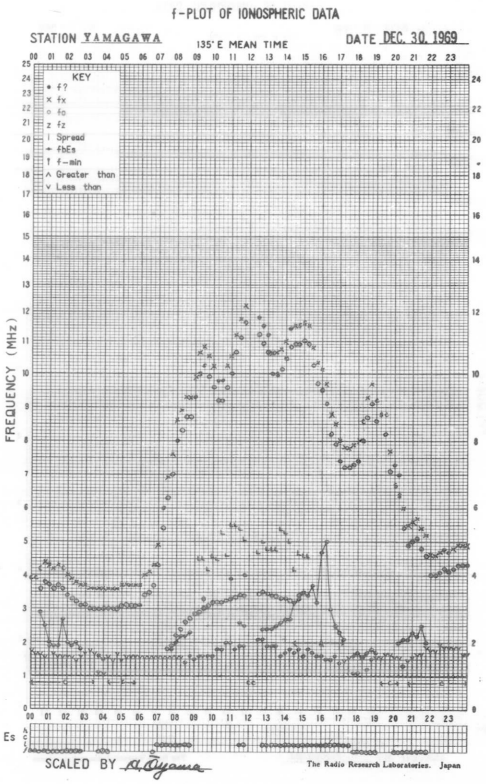
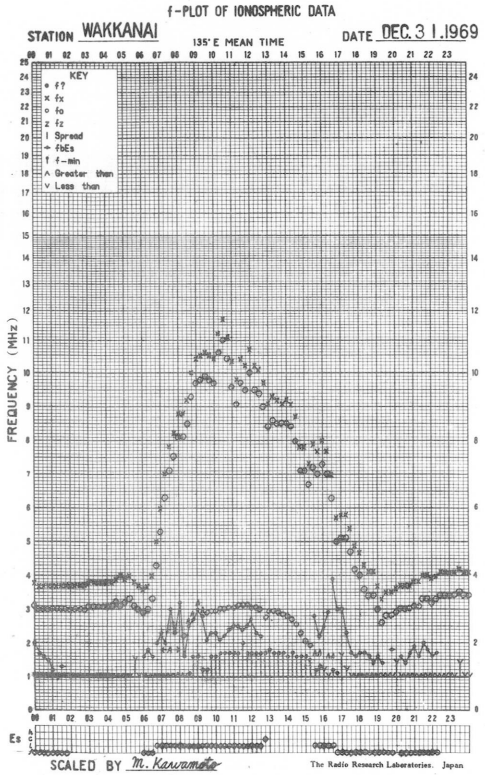
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Koizumi
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE DEC. 30. 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
⇔ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY A. Oyama
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE DEC. 31.1969
KEY
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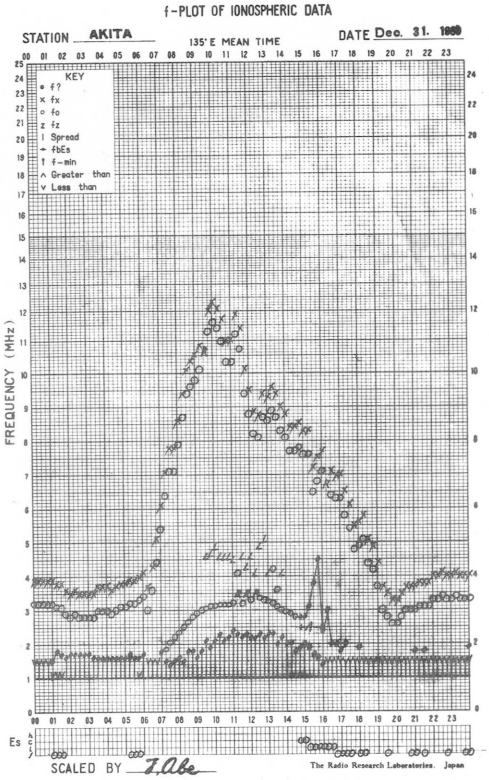
○ fo
z fz
| Spread
⇥ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE Dec. 31. 1969
KEY
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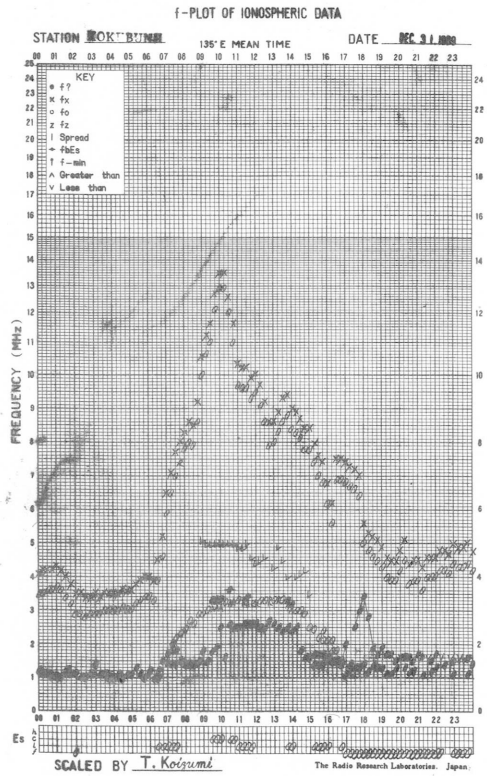
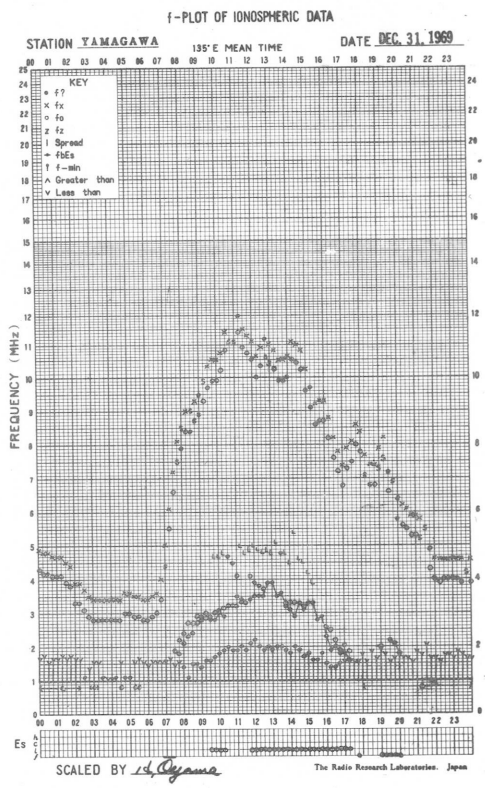
○ fo
z fz
| Spread
⇥ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION [illegible]
135°E MEAN TIME
DATE DEC 31 1969
KEY
• f?
× fx
○ fo
z fz
| Spread
⇥ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Koizumi
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE DEC. 31. 1969
KEY
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× fx
○ fo
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⇥ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY K. Oyama
The Radio Research Laboratories. Japan

# SOLAR RADIO EMISSION

## Flux Density and Variability

Month: December 1969
Observing station: Hiraiso
Frequency: 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 | 18 | 17 | (22) | - | 19 | 0 | 1 | (1) | - | 1 |
| 2 | 9 | 7 | (7) | 5 | 8 | 1 | 1 | (*) | 0 | 1 |
| 3 | 5 | 5 | (6) | 6 | 5 | 0 | 0 | (*) | 0 | 0 |
| 4 | 6 | 5 | (7) | 6 | 6 | 0 | 0 | (1) | 0 | 0 |
| 5 | 6 | 6 | (6) | 5 | 6 | 1 | 1 | (0) | 0 | 0 |
| 6 | 6 | 5 | (5) | 6 | 5 | 0 | 0 | (0) | 0 | 0 |
| 7 | 6 | 6 | (5) | 5 | 6 | 0 | 0 | (*) | 0 | 0 |
| 8 | 5 | 6 | (6) | 6 | 6 | 0 | 0 | (0) | 0 | 0 |
| 9 | 6 | 5 | (6) | 5 | 6 | 0 | 0 | (0) | 0 | 0 |
| 10 | 5 | 6 | (5) | 6 | 5 | 0 | 0 | (0) | 0 | 0 |
| 11 | 6 | 5 | (5) | 7 | 5 | 0 | 0 | (0) | 0 | 0 |
| 12 | 6 | 6 | (6) | 7 | 6 | 0 | 0 | (0) | 0 | 0 |
| 13 | 6 | 6 | (5) | 6 | 6 | 0 | 0 | (0) | 0 | 0 |
| 14 | 6 | 7 | (7) | 6 | 6 | 0 | 0 | (0) | 0 | 0 |
| 15 | 6 | 6 | (6) | 6 | 6 | 0 | 0 | (0) | 0 | 0 |
| 16 | 7 | 7 | (8) | 8 | 7 | 0 | 0 | (0) | 1 | 0 |
| 17 | 14 | 14 | (16) | 7 | 13 | 1 | 1 | (1) | 0 | 1 |
| 18 | 9 | 9 | (6) | q | 8 | 0 | 0 | (0) | 0 | 0 |
| 19 | q | q | (q) | q | q | 0 | 0 | (0) | 0 | 0 |
| 20 | 6 | 6 | (q) | 8 | 6 | 0 | 0 | (0) | 0 | 0 |
| 21 | 8 | 8 | (7) | 7 | 8 | 0 | 0 | (0) | 0 | 0 |
| 22 | 8 | 8 | (8) | 15 | 8 | 0 | 0 | (1) | 1 | 0 |
| 23 | (15) | 15 | (15) | (6) | 15 | (1) | 1 | (1) | (0) | 1 |
| 24 | 6 | 7 | (6) | 7 | 6 | 0 | 0 | (0) | 0 | 0 |
| 25 | 6 | 7 | - | 16 | 7 | 0 | 0 | - | 1 | 0 |
| 26 | 22 | 48 | (33) | (10) | 30 | 1 | 1 | (1) | (0) | 1 |
| 27 | 7 | 6 | (6) | - | 7 | 0 | 0 | (0) | - | 0 |
| 28 | 6 | 5 | (5) | 6 | 6 | 0 | 0 | (0) | 0 | 0 |
| 29 | 5 | 6 | (7) | 7 | 6 | 0 | 0 | (0) | 0 | 0 |
| 30 | 6 | 6 | (5) | 5 | 6 | 0 | 0 | (0) | 0 | 0 |
| 31 | 5 | 6 | (6) | 5 | 5 | 0 | 0 | (0) | 0 | 0 |

Note No observations during the following periods:

| | | | | | |
|---|---|---|---|---|---|
| 1st | 2140- | 2400 | 23rd | 2140- | 2330 |
| 10th | 0155- | 0300 | 25th | 0430- | 0620 |
| 11th | 0435- | 0515 | 26th | 2330- | 2400 |
| 18th | 0650- | 0730 | 27th | 2140- 28th | 0020 |
| 23rd | 0030- | 0200 | | | |

*: interference by atmospherics.

q: quiet level, radiometer being unstable.

## Flux Density

Month: December 1969
Observing station: Hiraiso Frequency: 500 MHz

Flux density $10^{-22}$ $Wm^{-2}(Hz)^{-1}$

| UT | 00-03 | 03-06 | 06-09 | 21-24 | Day |
|---|---|---|---|---|---|
| Date | | | | | |
| 1 | 29 | 30 | (28) | 31 | 29 |
| 2 | 31 | 31 | (28) | 31 | 31 |
| 3 | 30 | 30 | (27) | 31 | 30 |
| 4 | 31 | 31 | (28) | 31 | 31 |
| 5 | 29 | 29 | (28) | q | 30 |
| 6 | 30 | 28 | (26) | 29 | 28 |
| 7 | 29 | 27 | (26) | (26) | 28 |
| 8 | 26 | 26 | (26) | 26 | 26 |
| 9 | 27 | 27 | (25) | 27 | 27 |
| 10 | 26 | (26) | (25) | 27 | 26 |
| 11 | 26 | 25 | (24) | 27 | 26 |
| 12 | 28 | 29 | (27) | 28 | 28 |
| 13 | 29 | 28 | (27) | 28 | 28 |
| 14 | 29 | 29 | (28) | 28 | 29 |
| 15 | (28) | (27) | (26) | 28 | 27 |
| 16 | 28 | 28 | (26) | 28 | 28 |
| 17 | 30 | 29 | - | 30 | 29 |
| 18 | 31 | 30 | (29) | q | 30 |
| 19 | 28 | 28 | (27) | 26 | 28 |
| 20 | 29 | 29 | (27) | 28 | 28 |
| 21 | 30 | 30 | (28) | 28 | 29 |
| 22 | 30 | 29 | (27) | 30 | 29 |
| 23 | (31) | 31 | (31) | - | 31 |
| 24 | 32 | 31 | (29) | 29 | 31 |
| 25 | 31 | (32) | - | 38 | 30 |
| 26 | 37 | 44 | (33) | 33 | 39 |
| 27 | 35 | 37 | (37) | 30 | 36 |
| 28 | 33 | 33 | (29) | 28 | 32 |
| 29 | 31 | 31 | (29) | 30 | 30 |
| 30 | 31 | 31 | (29) | 29 | 31 |
| 31 | 29 | 30 | (29) | - | 29 |

Note No observations during the following periods:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 7th | 2300- | 8th | 0020 | 22nd | 0200- | | 0340 |
| 8th | 2200- | | 2230 | 23rd | 0030- | | 0300 |
| 10th | 0200- | | 0500 | 23rd | 2145- | 24th | 0010 |
| 15th | 0140- | | 0500 | 25th | 0425- | | 0725 |
| 17th | 0625- | | 0700 | 31st | 2145- | 1st | 0040 |

q: quiet level, radiometer being unstable.

## Distinctive Events

(single-frequency observations)

Month: December 1969
Observing station: Hiraiso
Normal observing period: 2150 - 0710 (sunrise to sunset)

| Date | Frequency | Starting time | Time of maximum | Duration | Type | Flux density $10^{-22}Wm^{-2}(Hz)^{-1}$ | | Remarks |
|---|---|---|---|---|---|---|---|---|
| | MHz | UT | UT | minutes | | peak | mean | |
| 9 | 200 | 0131.0 | 0134.0 | 3.5 | C | 110 | 40 | |
| 13 | 500 | 2208.0 | 2209.0 | 1.5 | C | 55 | 10 | |
| | 200 | 2209.0 | 2209.0 | 0.8 | C | 315 | 30 | |
| | 100 | 2209.0 | 2209.0 | 1.0 | C | > 230 | 30 | |
| 17 | 500 | 0036.0 | 0046.5 | 16.0 | C | 15 | 4 | |
| | 200 | 0045.0 | 0047.0 | 6.0 | C | 40 | 20 | |
| | 100 | 0658.0 | - | 10.0 | C | > 150 | > 10 | |
| 19 | 200 | 0334.8 | 0335.5 | 7.0 | C | 5 | 2 | |
| | 100 | 0335.5 | 0336.0 | 11.5 | C | > 150 | > 10 | first peak |
| | | | 0346 | | | > 150 | | second peak |
| 20 | 500 | 2337.5 | 2352.5 | 39.0 | C | 37 | 20 | |
| 26 | 500 | - | - | > 3 | C | - | - | * |
| | 500 | 0255.5 | 0256.3 | 3.0 | C | 740 | 140 | |
| | 200 | 0242.0 | 0243.4 | 3.0 | C | 730 | 60 | |
| | 200 | 0254.0 | 0255.6 | 6.0 | C | 510 | 145 | |
| | 100 | 0243.5 | 0243.5 | 2.0 | C | 170 | 5 | |
| | 100 | 0249.5 | 0250.5 | 4.0 | C | > 210 | 20 | |

*: End 0246.5, preceding part missing.

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

DEC 1969 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 | 9 | 16 | 17 | 18 | 0 | -8 | -5 | ES 0 | ES -1 | ES -4 | ES -15 | ES -24 | ES -22 | ES -33 | S | S | S | S | S | S | ES -3 | 7 | 8 | 10 |
| 2 | 11 | 15 | 17 | 11 | 16 | 9 | FS -21 | -1 | ES -11 | ES 3 | ES -4 | -15 | ES -33 | ES -33 | ES -33 | -25 | ES -33 | ES -33 | ES -33 | ES -33 | ES -33 | 2 | 11 | 7 |
| 3 | 13 | 16 | 15 | ES -3 | ES -6 | ES -2 | ES 5 | ES -8 | ES -12 | ES -18 | ES -15 | ES -32 | ES -32 | ES -32 | ES -32 | ES -32 | ES -32 | ES -32 | ES -32 | ES -32 | ES -32 | -1 | 4 | 9 |
| 4 | 9 | 11 | 16 | -11 | ES -1 | ES -4 | ES -3 | ES 2 | ES -3 | ES -11 | ES -9 | ES -2 | ES -3 | ES -32 | ES -32 | ES -32 | ES -32 | ES -32 | ES -31 | ES -31 | -3 | 0 | 9 | 8 |
| 5 | 6 | 11 | 17 | 8 | ES -13 | ES -9 | ES -13 | ES -8 | ES 6 | ES -9 | ES -7 | ES -22 | ES -19 | ES -34 | -20 | -11 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | 4 | 5 | 8 |
| 6 | 1 | 16 | 15 | 4 | -5 | ES -6 | ES -8 | ES -6 | ES -4 | ES -8 | ES -17 | ES -19 | ES -28 | ES -33 | -22 | ES -33 | ES -33 | ES -33 | -18 | ES -33 | ES -33 | 1 | 8 | 12 |
| 7 | 16 | 16 | 20 | 4 | ES -11 | ES -10 | ES -8 | ES -8 | ES -3 | ES -21 | ES -18 | ES -26 | ES -30 | ES -33 | -26 | ES -15 | ES -15 | ES -15 | ES -17 | ES -16 | ES -33 | 3 | 11 | 17 |
| 8 | 19 | 16 | 11 | -11 | ES -8 | ES -8 | ES -3 | ES -8 | ES -7 | ES -27 | ES -27 | ES -23 | ES -22 | ES -28 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | 2 | 11 | 13 |
| 9 | 7 | 7 | 11 | 7 | ES -7 | ES -2 | ES -9 | ES -12 | ES -27 | ES -24 | ES -24 | ES -25 | ES -28 | ES -33 | ES -33 | -31 | -26 | -28 | -28 | C | C | C | C | C |
| 10 | 8 | 14 | 8 | -6 | S | ES -10 | ES -10 | ES -3 | ES 0 | ES -18 | ES -29 | C | C | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | -3 | 8 | 5 |
| 11 | 8 | 16 | 21 | -1 | ES -17 | ES -2 | ES 1 | ES -1 | ES -3 | ES -17 | ES -23 | ES -24 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | -22 | -11 | 14 | ES -31 | 6 | 13 | 16 |
| 12 | 9 | 16 | 15 | ES -2 | -2 | 1 | ES -15 | ES -13 | ES -12 | ES -20 | ES -25 | ES -23 | ES -23 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | 8 | 14 | 11 |
| 13 | 16 | 7 | 7 | 6 | -5 | 4 | -6 | ES -2 | ES -14 | ES -27 | ES -27 | ES -27 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | -26 | -17 | -26 | 6 | 13 | 12 |
| 14 | 12 | 15 | 9 | -7 | ES -7 | ES -6 | ES -7 | ES -2 | ES -12 | ES -14 | ES -32 | ES -32 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | -26 | -21 | 6 | 9 | 7 |
| 15 | 6 | 14 | 14 | 8 | 2 | 0 | ES -15 | ES -12 | ES -12 | ES -7 | ES 0 | ES -24 | ES -26 | ES -34 | ES -34 | -26 | ES -34 | ES -34 | ES -34 | ES -34 | -22 | 5 | 9 | 6 |
| 16 | 3 | 4 | 7 | -10 | ES -6 | ES -9 | ES -24 | ES -7 | ES -17 | ES -22 | ES -27 | ES -5 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | -26 | 7 | 4 | 0 | 6 | 6 |
| 17 | 8 | 7 | 10 | -2 | 16 | ES -7 | -10 | ES -12 | ES -6 | ES -18 | ES -22 | ES -20 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | 3 | 8 | 8 |
| 18 | 4 | 7 | 0 | 3 | 9 | ES -11 | ES -11 | ES -7 | ES -7 | ES -18 | ES -24 | ES -22 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | -14 | -3 | 2 | 4 | 5 |
| 19 | -1 | 1 | 3 | -1 | ES -6 | ES -14 | ES -20 | ES -11 | ES -4 | ES -9 | ES -31 | ES -23 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | -16 | -10 | -4 | 12 | 3 |
| 20 | -8 | -4 | -5 | ES -7 | ES -2 | ES -4 | ES -5 | ES -7 | ES -7 | ES -9 | ES -15 | ES -13 | ES -26 | ES -31 | -31 | -26 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | -4 | 6 | 8 |
| 21 | 5 | 8 | 5 | -15 | ES -8 | ES -6 | ES -8 | ES -7 | ES -7 | ES -11 | S | ES -32 | -31 | -31 | -31 | -31 | -31 | -31 | -31 | -31 | -15 | 2 | 3 | 4 |
| 22 | 8 | 13 | 4 | ES 2 | ES -7 | ES -10 | ES -3 | ES -6 | ES -13 | ES -13 | ES -13 | ES -30 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | -23 | -25 | ES -31 | ES -31 | 10 | 15 | 15 |
| 23 | 14 | C | 20 | ES -1 | ES -3 | ES -6 | ES -21 | ES -12 | 4 | ES -2 | S | -19 | ES -26 | ES -31 | ES -31 | -26 | ES -31 | -26 | -27 | ES -31 | -4 | 9 | 15 | 11 |
| 24 | 8 | 10 | 20 | 5 | 14 | ES -6 | ES -6 | ES 0 | ES -8 | ES -12 | ES -17 | ES -19 | ES -31 | ES -23 | -20 | -26 | -21 | -26 | ES -31 | ES -31 | -13 | 7 | 14 | 10 |
| 25 | 5 | 5 | 2 | ES -12 | ES -7 | ES -6 | -6 | ES -1 | ES -4 | ES -1 | ES -17 | ES -13 | ES -23 | ES -26 | ES -31 | ES -31 | ES -31 | -26 | ES -31 | ES -31 | ES -31 | 6 | 12 | 9 |
| 26 | 2 | 5 | -4 | -7 | ES -13 | ES -7 | ES 0 | ES -9 | 9 | ES 4 | ES -11 | ES -14 | ES -25 | ES -27 | ES -27 | -8 | ES -27 | ES -27 | ES -27 | -9 | -1 | 3 | 13 | 9 |
| 27 | 1 | 3 | 4 | -13 | ES -14 | ES -15 | -10 | ES -8 | ES -1 | ES -7 | ES -8 | ES -14 | ES -24 | ES -27 | -18 | -17 | ES -27 | ES -27 | -18 | -11 | -7 | 5 | 6 | 5 |
| 28 | 4 | 3 | 3 | -1 | -12 | ES -12 | ES -9 | ES -12 | ES -12 | ES -14 | ES -12 | ES -32 | ES -29 | ES -29 | ES -29 | ES -29 | ES -29 | ES -29 | -26 | -10 | 2 | 5 | 12 | 7 |
| 29 | 6 | 8 | 2 | -18 | ES -16 | ES -13 | ES -1 | ES -1 | S | ES -1 | S | S | ES -22 | ES -28 | ES -28 | ES -28 | ES -28 | ES -28 | ES -28 | ES -28 | ES -28 | -1 | 8 | 5 |
| 30 | 5 | 5 | 8 | -2 | ES -4 | ES -11 | ES -21 | ES -19 | ES -10 | S | ES -23 | ES -23 | ES -31 | ES -31 | ES -31 | -26 | ES -31 | ES -31 | ES -31 | ES -31 | -10 | 3 | 16 | 15 |
| 31 | 8 | 8 | 3 | -11 | ES -12 | ES -8 | ES -17 | ES -6 | ES -2 | ES -8 | ES -20 | ES -23 | ES -27 | ES -27 | ES -30 | -21 | S | ES -30 | C | C | C | C | C | C |
| CNT | 31 | 30 | 31 | 31 | 30 | 31 | 31 | 31 | 30 | 30 | 28 | 29 | 30 | 31 | 30 | 30 | 29 | 30 | 29 | 28 | 29 | 29 | 29 | 29 |
| MED | 8 | 9 | 9 | US -2 | ES -6 | ES -7 | ES -8 | ES -7 | ES -7 | ES -12 | ES -18 | ES -23 | ES -28 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | US -26 | 3 | 9 | 8 |
| UD | 16 | 16 | 20 | 8 | 14 | 1 | ES 0 | ES 0 | ES 4 | ES -1 | ES -7 | ES -13 | ES -22 | ES -27 | -20 | ES -15 | ES -26 | ES -23 | ES -18 | -9 | -1 | 8 | 15 | 15 |
| LD | 1 | 3 | 0 | ES -13 | ES -14 | ES -13 | ES -21 | ES -12 | ES -14 | ES -24 | ES -29 | ES -32 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -33 | -3 | 4 | 5 |

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

DEC 1969 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 | 5 | 4 | 9 | 13 | 20 | ES -1 | -1 | ES -4 | ES -4 | ES -9 | ES -20 | ES -24 | ES -22 | ES -33 | S | S | S | S | S | S | 11 | 13 | 10 | 7 |
| 2 | 5 | 6 | 6 | ES -5 | ES -11 | 7 | 0 | 12 | 6 | -5 | ES -10 | ES -15 | ES -33 | ES -33 | ES -33 | ES -33 | ES -33 | ES -33 | ES -33 | ES -33 | 8 | 11 | 7 | 6 |
| 3 | 8 | 10 | 10 | 14 | 20 | 13 | 10 | ES -4 | -12 | -11 | -21 | ES -32 | ES -32 | ES -32 | ES -32 | ES -32 | ES -32 | ES -32 | ES -32 | ES -32 | 5 | 7 | 4 | 5 |
| 4 | 4 | 7 | 10 | 13 | 14 | 10 | 0 | 15 | 9 | ES -11 | ES -9 | ES -2 | ES -3 | ES -32 | ES -32 | ES -32 | ES -32 | ES -32 | ES -31 | ES -31 | 8 | 6 | 9 | 5 |
| 5 | 8 | 5 | 8 | 13 | 18 | 21 | 15 | 13 | -1 | ES -11 | ES -1 | ES -21 | ES -19 | ES -34 | -22 | -22 | ES -34 | ES -34 | ES -34 | ES -34 | 7 | 7 | 6 | 7 |
| 6 | 3 | 7 | 12 | 17 | 4 | 22 | 4 | 3 | -6 | ES -16 | ES -17 | ES -19 | -17 | -22 | -25 | ES -33 | ES -33 | -23 | ES -33 | -28 | 6 | 8 | 7 | 4 |
| 7 | 4 | 6 | 8 | 17 | 16 | 21 | 3 | -6 | ES -8 | ES -14 | -14 | -18 | -26 | -22 | ES -20 | ES -15 | ES -15 | ES -15 | ES -21 | ES -14 | 2 | 8 | 6 | 6 |
| 8 | 6 | 6 | 13 | 22 | C | 4 | ES -3 | -5 | -10 | -18 | -19 | -18 | -16 | -24 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | 0 | 9 | 5 | 4 |
| 9 | 5 | 8 | 18 | 15 | 23 | 13 | ES -3 | ES -11 | -15 | -13 | -16 | -18 | -28 | ES -33 | ES -33 | -28 | ES -37 | ES -33 | C | C | C | C | C | 4 |
| 10 | 5 | 6 | 12 | 14 | S | 22 | 14 | -7 | ES -13 | ES -21 | ES -29 | C | C | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | 0 | 10 | 9 | 4 |
| 11 | 2 | 4 | 7 | 17 | 17 | 5 | ES -7 | 23 | -5 | ES -10 | ES -29 | ES -24 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | -17 | -14 | ES -31 | 4 | 7 | 7 | 5 |
| 12 | 3 | 6 | 13 | 17 | 22 | 9 | 13 | S | -11 | ES -20 | -23 | -17 | -17 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | -5 | 1 | 14 | 8 |
| 13 | 7 | 7 | 14 | 15 | 20 | 18 | 4 | ES -7 | ES -6 | -23 | -18 | ES -27 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | 6 | 7 | 2 | 5 |
| 14 | 3 | 5 | 14 | 9 | 14 | -1 | 3 | ES -4 | -17 | ES -20 | ES -32 | ES -32 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | -13 | ES -34 | -2 | 7 | 1 | 10 |
| 15 | 2 | 4 | 9 | 13 | 21 | 17 | 12 | 13 | -8 | ES -14 | ES -24 | ES -24 | -22 | -20 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | -1 | 5 | 0 | 1 |
| 16 | 0 | 2 | 13 | 12 | 16 | 13 | 4 | 21 | -2 | -7 | -3 | ES -17 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | -20 | ES -34 | 8 | 1 | 3 | 3 |
| 17 | -7 | -4 | 8 | 10 | 17 | 16 | 12 | 16 | -3 | -8 | -13 | ES -20 | -13 | -18 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | 0 | 7 | 4 | 5 |
| 18 | -1 | 1 | 7 | 14 | 13 | -7 | -5 | 2 | -13 | -16 | ES -18 | ES -22 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | -26 | 5 | 6 | 4 | 1 |
| 19 | -1 | 3 | 7 | 15 | 14 | 14 | 9 | 12 | ES -2 | ES -9 | ES -12 | ES -32 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | -14 | 2 | 5 | 2 | 2 |
| 20 | -2 | 1 | 4 | 14 | 14 | 17 | 18 | 13 | ES -2 | ES -10 | ES -8 | ES -10 | -14 | -20 | -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | -2 | 10 | 14 | 8 |
| 21 | 3 | 3 | 9 | 10 | 17 | 18 | 13 | 4 | -13 | S | ES -12 | -26 | -31 | -31 | -31 | -31 | -31 | -31 | -31 | -16 | 4 | 6 | 5 | 5 |
| 22 | 2 | 5 | 6 | 13 | 18 | 8 | ES -7 | 13 | 2 | -13 | -21 | ES -30 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | -31 | ES -31 | ES -31 | 4 | 6 | 5 | 6 |
| 23 | C | C | 8 | 12 | 17 | 19 | 13 | 13 | 8 | -11 | ES -23 | -15 | -16 | -23 | -29 | ES -31 | ES -31 | -26 | ES -31 | ES -31 | 6 | 2 | 12 | 7 |
| 24 | 0 | 5 | 6 | 14 | 25 | 21 | 10 | 6 | -6 | ES -13 | ES -13 | ES -25 | -22 | -23 | -20 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | 5 | 9 | 7 | 1 |
| 25 | 4 | 3 | 10 | 13 | 20 | 14 | 22 | 22 | 15 | -5 | ES -12 | -17 | -17 | -20 | ES -31 | ES -31 | ES -31 | -21 | -11 | ES -31 | 7 | 7 | 5 | 1 |
| 26 | -3 | -1 | -17 | 4 | 11 | 4 | 11 | 11 | 9 | -3 | ES -9 | -10 | -19 | ES -27 | ES -27 | ES -27 | ES -27 | ES -27 | -13 | -10 | 0 | 3 | 0 | -5 |
| 27 | -7 | -5 | -1 | 4 | 17 | 15 | 17 | 19 | 15 | ES -7 | -10 | -13 | -14 | -15 | -27 | ES -27 | ES -27 | ES -27 | ES -27 | ES -27 | 2 | 7 | 1 | -3 |
| 28 | -6 | -2 | -1 | 4 | 12 | -4 | 23 | 6 | 4 | ES -12 | -15 | -23 | ES -29 | ES -29 | ES -29 | ES -29 | ES -29 | ES -29 | ES -29 | -3 | 5 | 4 | 0 | 5 |
| 29 | -3 | 4 | 4 | 4 | 12 | 22 | 24 | 7 | S | ES -1 | S | ES -27 | ES -19 | ES -28 | ES -28 | ES -28 | ES -28 | ES -28 | ES -28 | -12 | -5 | 4 | 2 | 0 |
| 30 | 1 | -1 | 12 | 13 | 11 | 9 | 20 | 14 | -2 | S | -17 | ES -23 | -22 | -22 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | -5 | 8 | 1 | 10 |
| 31 | 0 | 0 | 12 | 13 | 12 | 19 | 15 | 11 | -4 | ES -8 | -11 | -15 | ES -27 | -23 | -27 | S | S | ES -30 | C | C | C | C | C | C |
| CNT | 30 | 30 | 31 | 31 | 29 | 31 | 31 | 30 | 30 | 29 | 30 | 30 | 30 | 31 | 30 | 29 | 29 | 30 | 28 | 28 | 29 | 29 | 29 | 30 |
| MED | 2 | 4 | 9 | 13 | 17 | 14 | 10 | 11 | ES -4 | ES -11 | ES -16 | ES -20 | ES -22 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | ES -31 | 4 | 7 | 5 | 5 |
| UD | 7 | 7 | 14 | 17 | 22 | 22 | 22 | 21 | 9 | ES -5 | ES -8 | ES -10 | ES -14 | -20 | ES -22 | ES -27 | ES -27 | ES -21 | -13 | -12 | 8 | 10 | 12 | 8 |
| LD | -6 | -2 | -1 | 4 | 11 | ES -1 | ES -5 | ES -7 | ES -13 | ES -20 | ES -29 | ES -32 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | ES -34 | -5 | 2 | 0 | 0 |

## RADIO PROPAGATION QUALITY FIGURES

HIRAISO

Time in U.T.

| Dec. 1969 | Whole Day Index | H B 06 12 18 / 12 18 24 | W W V 00 06 12 18 / 06 12 18 24 | L M 00 06 12 18 / 06 12 18 24 | W W V H 00 06 12 18 / 06 12 18 24 | Warning 00 06 12 18 / 06 12 18 24 | Principal magnetic storms Start | End | ΔH |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4- | 4 3 4 | 4 - 3 4 | (4) 4 - 4 | 4 4 - (4) | N N N N | | | |
| 2 | 4o | 4 4 (4) | 4 - 3 4 | (4) 4 - 4 | 4 4 - 4 | N N N N | | | |
| 3 | 4- | 3 (4)(4) | 4 - 3 4 | 4 4 - 4 | 4 4 - 4 | N N N N | | | |
| 4 | 4o | 4 4 (4) | 4 - 4 4 | 4 4 - 4 | 4 4 - 4 | N N N N | | | |
| 5 | 4o | 4 4 (4) | 4 - 4 4 | 4 4 - 4 | 4 4 - 4 | N N N N | | | |
| 6 | 4o | 4 (4)(4) | 4 (4) 4 4 | 4 4 - - | 4 4 - 4 | N N N N | | | |
| 7 | 4o | (4) 4 (4) | 4 - 4 4 | (5) - - - | 4 4 - 4 | N N N N | | | |
| 8 | 4- | (3)(4)(4) | 4 - 4 4 | 3 4 - 4 | 4 4 - 4 | N N N N | | | |
| 9 | 4o | 3 (4)(4) | 4 - 4 (4) | 4 4 - 4 | 4 4 - C | N N N N | | | |
| 10 | 4o | 3 (4)(4) | 4 (4) 4 4 | 4 (4) - 4 | 4 4 - 4 | N N N N | | | |
| 11 | 4o | 4 4 5 | 4 - 3 4 | 4 4 - 4 | 4 4 - 4 | N N N N | | | |
| 12 | 4o | 4 4 4 | 4 - 3 (4) | 4 (4) - 4 | 4 4 - 4 | N N N N | | | |
| 13 | 4o | 3 4 5 | 4 - 4 4 | 4 (4) - - | 4 4 - 4 | N N N N | | | |
| 14 | 4+ | 4 5 5 | 4 - 4 4 | (4) - - - | 4 4 - 5 | N N N N | | | |
| 15 | 4o | 4 4 4 | 4 - 4 4 | 4 4 - 4 | 4 4 - 4 | N N N N | | | |
| (16) | 4+ | 5 5 4 | 4 - 5 5 | 3 4 - 4 | 4 5 - 4 | N N N N | | | |
| (17) | 4o | 3 4 4 | 4 - 4 4 | 4 4 - 4 | 4 4 - 4 | N N N N | | | |
| (18) | 4- | 4 4 3 | 4 - 4 4 | 4 4 - 3 | 3 3 - 4 | N N N N | | | |
| 19 | 4+ | 4 5 4 | 4 - 5 4 | 4 4 - 4 | 4 4 - 4 | N N N N | | | |
| 20 | 4o | 4 4 4 | 3 - 4 4 | 4 4 - - | 4 4 - 4 | N N N N | | | |
| 21 | 4o | 4 4 4 | 4 - 5 4 | (3) - - - | 4 4 - 4 | N N N N | | | |
| 22 | 4o | 4 (4) 4 | 4 - 4 4 | 4 4 - 4 | 4 4 - 4 | N N N N | | | |
| 23 | 4o | 4 4 4 | (4) - 4 4 | 5 4 - 4 | 4 5 - 4 | N N N N | | | |
| 24 | 4o | 4 4 4 | 4 - 5 4 | 4 4 - 4 | 4 4 - 4 | N N N N | | | |
| 25 | 4+ | (4) 4 (4) | 4 (5) 5 4 | 4 5 - 4 | 4 4 - 4 | N N N N | | | |
| 26 | 5- | 5 5 4 | 4 (5) 5 4 | 4 5 - 4 | 4 5 - 4 | N N N N | | | |
| 27 | 4+ | (5) 4 4 | 4 (5) 5 4 | 4 5 - - | 4 5 - 4 | N N N N | | | |
| 28 | 4o | 4 4 (4) | 4 - 4 (4) | (4) - - - | 4 3 - 4 | N N N N | | | |
| 29 | 4o | 5 4 4 | 4 - 4 4 | 4 4 - 4 | 4 4 - 4 | N N N N | | | |
| 30 | 4o | 4 4 4 | 4 - 4 4 | 4 4 - 4 | 4 4 - 4 | N N N N | | | |
| 31 | 4o | 4 (4) 4 | 4 - (4) 4 | 4 4 - 4 | 4 4 - C | N N N N | | | |

IQSY GEOALERT and ADALERT (Western Pacific Region)

* = MAGSTORM

o = MAGCALME

△ = COSMIC EVENT

( ) = Regular World Day

\- = impossible to evaluate

( ) = inaccurate

C = artificial accident

--- = continuing magnetic storm

SUDDEN IONOSPHERIC DISTURBANCES

(S.I.D.)

HIRAISO

Time in U.T.

| Dec. 1969 | S W F | | | | | | | | | Correspondence | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Drop-out Intensities (db) | | | | | | Start-time | Duration | Type | Imp. | Flare | Solar Noise | Mag. |
| | CO | LM | HA | TO | HB | SH | | | | | | | |
| 17 | 12 | | | | | | 00.39 | 126 | G | 2 | x | x | |

INUBO

| 1969 Dec. | S P A | | | | | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| | Phase Advance (degrees) | | | | | | Time (U. T.) | | | |
| DATE | GBR | WWVL | NAA | NWC | NPM | HA3 | Start | End | Maximum | |
| 1 | | | | | 6 | — | 0017 | 0200 | 0029 | X |
| 5 | | | 10 | 24 | 6 | — | 0219 | 0305 | 0230 | X |
| 11 | | | | 16 | | — | 0317 | 0450 | 0326 | |
| 11 | | | | | 21 | — | 2219 | 2334 | 2230 | X |
| 13 | | | | 8 | — | | 0213 | 0241 | 0218 | |
| 13 | | | 10 | 48 | — | | 0327 | 0520 | 0353 | X |
| 14 | | 14 | 11 | 24 | — | | 0303 | 0340 | 0313 | X |
| 14 | 15 | 14 | 19 | 56 | — | | 0341 | 0500 | 0355 | X |
| 14 | | | | 8 | — | | 0542 | 0612 | 0547 | |
| 15 | — | — | | 84 | — | | 0615 | 0750 | 0620 | |
| 17 | | | 16 | 88 | — | 56 | 0040 | 0320 | 0105 | X |
| 17 | | | | 84 | — | | 0700 | 0823 | 0710 | X |
| 19 | | | | 56 | — | | 0420 | 0613 | 0435 | X |
| 21 | | | | 12 | — | | 0333 | 0420 | 0340 | |
| 26 | 26 | —41 | 24 | 96 | — | 85 | 0243 | 0314 | 0250 | X |
| 27 | | — | 29 | 32 | — | | 0514 | 0610 | 0523 | X |
| 29 | | | | 16 | — | 22 | 2323 | 2346 | 2332 | |
| 31 | | 22 | 8 | 28 | — | | 2227 | 2300 | 2233 | X |

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