

F-168

IONOSPHERIC DATA IN JAPAN

FOR DECEMBER 1962

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Prepared by

THE RADIO RESEARCH LABORATORIES
MINISTRY OF POSTS AND TELECOMMUNICATIONS
KOKUBUNJI, TOKYO, JAPAN

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THE RADIO RESEARCH LABORATORIES

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SITES OF THE RADIO WAVE OBSERVATORIES

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

	Latitude	Longitude	Site
Wakkanai	45°23.6'N.	141°41.1'E.	Wakkanai-shi, Hokkaido
Akita	39°43.5'N.	140°08.2'E.	Tegata Nishishin-machi, Akita-shi, Akita-ken
Kokubunji	35°42.4'N.	139°29.3'E.	Koganei-machi, Kitatama-gun, Tokyo-to
Yamagawa	31°12.5'N.	130°37.7'E.	Yamagawa-machi, Ibusuki-gun, Kagoshima-ken

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

	Latitude	Longitude	Site
Hiraiso	36°22.0'N.	140°37.5'E.	Hiraiso-machi, Nakaminato-shi, Ibaragi-ken

SYMBOLS AND TERMINOLOGY

A. IONOSPHERE

All symbols and terminology in the table of ionospheric data are used in accordance with the First Report of the Special Committee on World-Wide Ionospheric Soundings (URSI/AGI), Brussels, September 2, 1956, and the Second Report of the Committee, May, 1957, supplementary to the First Report.

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_0E_s	The ordinary wave frequency at which the highest blanketing E_s layer becomes effectively transparent. This is usually determined from the minimum frequency at which reflections from layers at greater heights are observed.
f -min	That frequency below which no echoes are observed.
$(M3000)F2$	The maximum usable frequency factor for a path of 3000 km for transmission by $F2$ layer.
$(M3000)F1$	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 .
h_pF2	The virtual height of the $F2$ layer measured on the ordinary-wave branch at a frequency equal to $0.834 f_0F2$.
y_pF2	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 h_pF2 and the virtual height at $0.969 f_0F2$).

a. Descriptive Symbols

Used following the numerical value on monthly tabulation sheets.

A	Measurement influenced by, or impossible because of, the presence of a lower thin layer, for example E_s .
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 is too small compared with that of a lower thick layer.
H	Measurement influenced by, or impossible because of, the presence of a stratification.
L	Measurement influenced by or impossible because the trace has no sufficiently definite cusp between layers.
M	Measurement questionable because the ordinary and extraordinary components are not distinguishable.
N	Conditions are such that the measurement cannot readily be interpreted, for example, in the presence of oblique echoes.
O	Measurement refers to the ordinary component.
R	Measurement influenced by, or impossible because of, absorption in the vicinity of a critical frequency.
S	Measurement influenced by, or impossible because of, interference or atmospheric.
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 Symbols

Used as a preceding symbol on monthly tabulation sheets.

D	<i>greater than.....</i>
E	<i>less than.....</i>
I	Missing value has been replaced by an interpolated value.
J	Ordinary component characteristic deduced from the extraordinary component.
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 magnetoionic component.

c. Description of Standard Types of E_s

The nine standard types of E_s are identified by small (lower case) letters: l , c , h , q , r , a , s , f , n . These letters are suggestive of the names low, cusp, high, equatorial, retardation, auroral, slant, flat and unclassified, respectively; it is strongly emphasized that these names are suggestive, not restrictive. The standard types are:

- l At flat E_s trace at or below the normal E layer minimum virtual height. Use in daytime only.
- c An E_s trace showing a relatively symmetrical cusp at or below f_0E . This is usually continuous with the normal E trace though, when the deviative absorption is large, part or all of the cusp may be missing. Use in daytime only.
- h An E_s 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 E_s trace lying clearly above the high frequency end of the normal E trace. Use in daytime only.
- q An E_s 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 E_s trace which is non-blanketing over part or all of its frequency range showing an increase in virtual height at the high frequency end similar to group retardation. This is distinguished at present from true group retardation (a blanketing thick layer included in the E layer tables: f_0E , $h'E$) by the lack of group retardation in the F traces at corresponding frequencies.
- a An E_s pattern having a well defined flat or gradually rising lower edge with stratified and diffuse (spread) traces present above it. These sometimes exceed over several hundred kilometers of virtual height.
- s A diffuse E_s trace which rises steadily with frequency. This usually emerges from another E_s trace which should be classified separately. At high latitudes the slant trace usually starts to rise from a horizontal E_s trace, l , h or f , and frequencies which greatly exceed the E layer critical frequency (e.g. about 6 Mc/s) whereas at low latitudes it usually rises from equatorial type E_s , q , at frequencies near the E region critical frequency.
- f An E_s 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 E_s traces observed in the daytime are classified according to their virtual height: h or l .

- " An E trace which cannot be classified into one of the standard types. This must not be used for intermediate cases between any two classes. A choice should always be made whenever possible, even if it is doubtful.

d. Multiple Reflections from E_s

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

B. SOLAR RADIO EMISSION

Solar radio emission is received on 200 Mc at Hiraiso Radio Wave Observatory using a 6×4 dipole broadside array and an ordinary superheterodyne receiver. The type of observation is of intensity recording of both steady flux and outstanding occurrences.

a. Daily Data

Steady flux

The mean value of recorded base level. Outstanding occurrences are to be omitted except the phenomena with duration of hours or more.

Variability

Variability is expressed in four grades as follows:

0=no burst

1=a few bursts

2=many bursts

3=exceptionally many bursts

Number of bursts is determined relatively in comparison with the base level. If the number of bursts be fixed, the variability is greater, when bursts are widely distributed, than in the case of being concentrated in a short period.

b. Outstanding occurrences

Starting time

When the start is not obvious, 20% rise time of smoothed flux is adopted and x is suffixed. (e.g. 0234 x)

Maximum time

When the instantaneous maximum can not be taken, the smoothed maximum is used and x is suffixed. (e.g. 0539 x)

Time of end

When the phenomena have ended obscurely the time of 20% of maximum smoothed flux is written.

Type

Outstanding emissions are classified as follows: On another point of view, the classification in the URSI Interchange code is to be added.

S : simple rise and fall of intensity

C : complex variation of intensity

A : appears to be part of general activity

D : distinct from (i.e. apparently superposed upon) the general

activity

M: multiple peaks separated by relatively long period of quietness

F: multiple peaks separated by relatively short period of quietness

E: sudden commencement or rise of activity

Combined letters express one phenomenon (e.g. SD, ECD); letters joined by + express some phenomena occurring in parallel; the preceding term is more important (e.g. SD+F, SA+C).

Maximum intensity

Instantaneous: The highest value above the base level.

Smoothed: By multiplying the duration, the approximate total power of the phenomenon can be estimated.

C. RADIO PROPAGATION CONDITIONS

a. 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)	4=normal
2=poor (disturbed)	5=good
3=rather poor (unstable)	

The tabulated circuits contain London (Commercial circuit), WWV (frequencies 10, 15, 20 Mc broadcast from Washington, D. C.), San Francisco (commercial circuit) and WWVH (frequencies 10, 15 Mc broadcast from Hawaii), which are received at Hiraiso Radio Wave Observatory near Tokyo.

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

N = normal
 U = unstable
 W = disturbed

The letter W expresses disturbed condition expected to be during the following 12 hours after issue. The letter U and N means also unstable or normal conditions, respectively.

Whole day radio quality indices are the averages of the 6-hourly indices of London, WWV and S. F.

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

b. Sudden Ionospheric Disturbances (S. I. D.)

The data of short wave fade-out (SWF) are prepared from the field intensity records on following circuits received at Hiraiso. Characteristics of the phenomenon are classified as follows.

Circuits and Drop-out intensity

W S WWV 20 Mc, 15 Mc and 10 Mc (Washington)

S F Various commercial circuits (San Francisco)

H A WWVH 15 Mc and 10 Mc (Hawaii)

T O JJY 15 Mc and 10 Mc (Tokyo)

S H BPV 15 Mc and 10 Mc (Shanghai)

L N Various commercial circuit (London)

Start-time and Duration, Types and Importances are described from the data of a circuit whose Drop-out Intensity is underlined. Drop-out Intensities

of 10 Mc ('), 15 Mc (none) and 20 Mc ('').

*Start-times and Durations**Types*

S : sudden drop-out and gradual recovery

Slow : slow drop-out taking 5 to 15 minutes and gradual recovery

G : gradual disturbances ; fade irregular in both drop-out and recovery

Importances

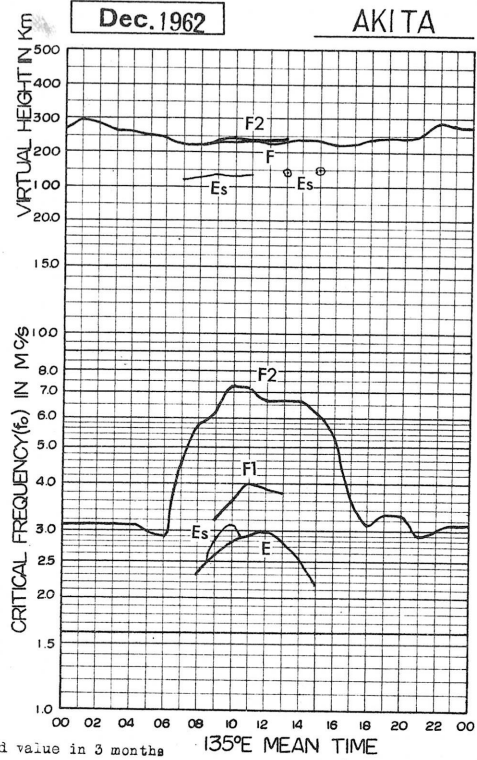
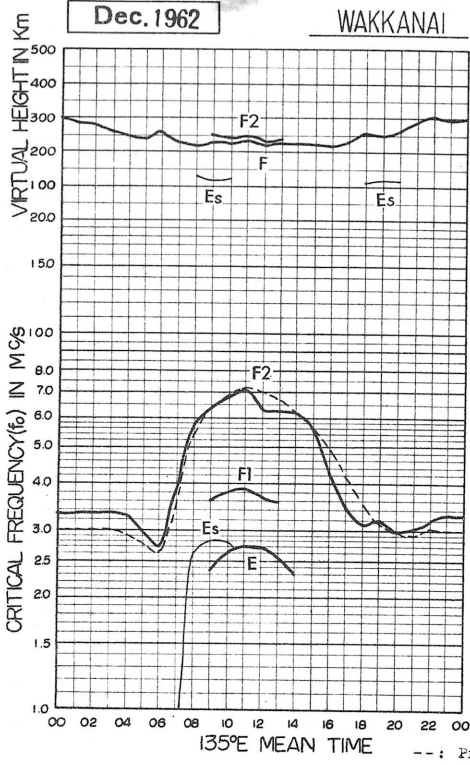
Degrees of SWF are classified into 9 grades according to the amplitude of fade-out ;

1-	1	1+
2-	2	2+
3-	3	3+

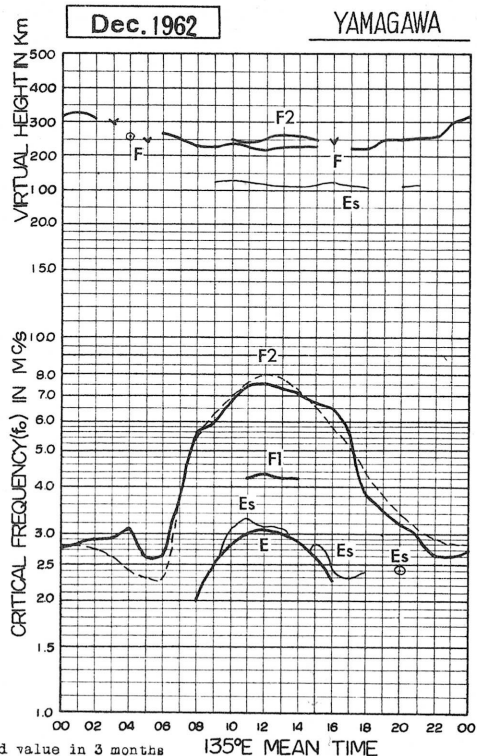
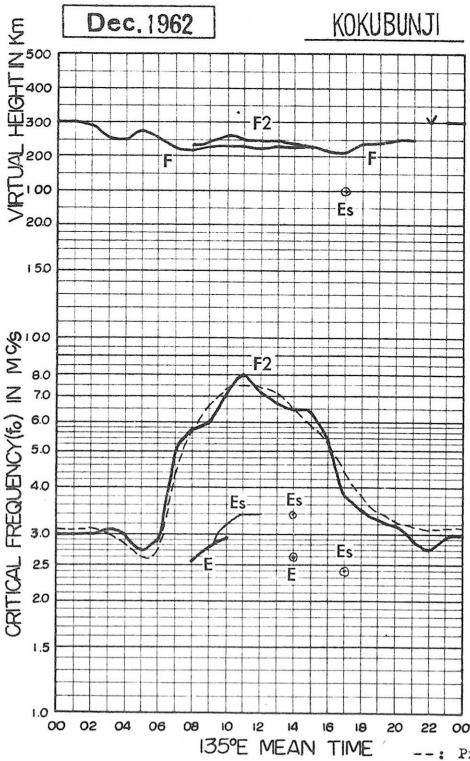
The data of sudden enhancement of atmospheric (SEA) observed on 28 kc are tabulated on each *Start-time, Duration and Importance*.

Besides, the time associated phenomena of 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 or measurements at Hiraiso.

IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS



IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS



IONOSPHERIC DATA

Lat. 45° 23.6' N
Long. 141° 41.1' E

Wakkanai

135° E Mean Time (GMT.+9h.)

foF2

Dec. 1962

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	3.4	3.0	3.1	3.5	3.3	3.0	3.4A	4.7A	4.7A	C	C	7.2	6.3	6.4H	5.7	4.3	3.1	3.3	3.2A	3.2A	3.2A	4.3A	4.3A	4.3A	3.0
2	3.3	3.3F	3.2F	3.3F	3.2	3.2	4.3A	4.4A	4.0A	6.2	8.6	8.4	8.2	6.4	6.0	6.0	5.2	2.7	4.2A	3.0	3.0	3.0	3.0	3.0	3.0
3	2.7F	3.3F	3.3F	3.3F	3.4A	3.7	4.2A	4.4	5.9	7.2	6.8	7.6	6.0	6.3	C	C	C	C	C	3.8	3.8	3.8	3.0	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	7.3	7.1C	5.8	4.9	3.3	2.9	3.1	3.3	3.3	3.3	3.3	3.3
5	4.2A	2.6	2.9	2.8	2.8	3.1A	4.3	4.3	5.9	6.5	4.0A	4.3A	4.3A	7.0	6.9	5.8	4.3	3.3	3.2	3.6	3.6	3.6	3.3	3.3	3.3
6	3.1	3.3A	3.2F	3.5	3.6	3.5	4.3A	4.5	5.7	4.7A	6.8H	7.0A	7.0A	6.3	5.9	5.8	4.3	3.3	3.2	3.8	3.8	3.8	3.3	3.3	3.3
7	3.3	3.4	3.6	3.6	3.8	3.8	4.3A	4.2	5.3	6.2	7.0	6.3	7.3	6.3	5.7	5.8	4.3	3.3	3.2	3.8	3.8	3.8	3.3	3.3	3.3
8	SF	SF	SF	4.3A	3.6A	3.6A	4.3A	4.2	6.1	6.0A	6.6	7.3	6.3	6.0	6.0	6.0	4.3	3.8	2.9	3.3	3.3	3.3	3.3	3.3	3.3
9	SF	3.2A	3.2A	3.5	3.6	3.7	3.6	4.7	4.6A	7.0A	7.2	7.4	6.3	6.3	6.1	5.3	4.2	3.8	2.6A	3.0	3.0	3.0	3.0	3.0	3.0
10	3.3	3.3	3.3	3.1	3.2	3.1	2.6	4.2	5.7	6.4	6.1	6.2	6.5	6.2	5.8	5.3	4.0A	4.3	3.1	3.3	3.1	2.5	2.8	3.0A	
11	3.3	3.3A	3.3A	3.4A	3.3A	3.3A	3.3A	3.3A	3.3A	3.3A	3.3A	3.3A	3.3A	3.3A	3.3A	3.3A	3.3A	3.3A	3.3A	3.3A	3.3A	3.3A	3.3A	3.3A	3.3A
12	SF	3.0A	3.0A	3.1	3.1F	3.2A	3.2A	3.2A	3.2A	3.2A	3.2A	3.2A	3.2A	3.2A	3.2A	3.2A	3.2A	3.2A	3.2A	3.2A	3.2A	3.2A	3.2A	3.2A	3.2A
13	F5	F5	F5	F5	SF	SF	SF	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
14	SF	SF	3.7	3.4	3.1	3.0	3.2A	3.8	5.7	7.3	9.5	7.3H	6.0	5.6	5.7	6.0	5.2A	3.6	2.9	3.2A	3.3	2.8	2.8	3.1	3.0
15	3.1	3.2	2.9	2.7	2.7	2.7	2.2	3.5	5.3	6.4	7.5	7.1	6.3A	7.7	6.3H	5.6A	4.3	2.8	2.9	2.9	2.9	2.9	2.9	2.9	2.9
16	3.1	3.3F	3.3F	3.2F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F
17	SF	SF	3.0F	3.3F	3.4F	3.4F	3.4F	3.4F	3.4F	3.4F	3.4F	3.4F	3.4F	3.4F	3.4F	3.4F	3.4F	3.4F	3.4F	3.4F	3.4F	3.4F	3.4F	3.4F	3.4F
18	2.9	3.0F	2.6F	2.6	2.8F	2.6A	2.9	3.8	4.8	6.2	8.3A	8.0	5.8H	6.0H	6.5	5.3	4.0A	4.3	3.2	2.8	2.8	2.8	2.8	2.8	2.8
19	5.3	4.3	4.5A	3.6H	SF	SF	S	S	4.9A	4.9A	8.1	9.4	8.7	7.5	6.6	5.8	5.0	4.7	3.8	4.5	4.5	4.5	4.5	4.5	4.5
20	4.6A	3.6A	3.3	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
21	SF	F5	F5	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F	3.3F
22	3.0	3.0	3.3	3.3	2.7	3.0	3.2A	3.8	5.9	7.1A	6.8A	8.4	6.6	6.3	6.8	6.1	4.3	3.7A	3.2A	3.6A	3.6A	3.6A	3.6A	3.6A	3.6A
23	3.3	3.4A	3.9	4.3A	4.1A	4.0A	2.7	3.3	5.5	6.0	6.9H	6.3	7.0	6.7	6.7H	5.0	5.3A	4.3	3.1	3.1	3.1	3.1	3.1	3.1	3.1
24	3.3A	3.3A	3.3A	3.3	3.2	3.0A	2.6	3.9	5.6	5.8H	6.3	6.2	6.2	6.8	6.1	5.0	3.7	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
25	SF	SF	3.0	3.4	2.5	2.6	3.2A	3.2	4.7	5.1	5.8	5.8	5.8H	5.8H	5.3	5.0	4.0	3.1	2.6	2.6	2.6	2.6	2.6	2.6	2.6
26	3.5A	4.0F	3.7	3.8A	3.9A	4.1	4.2A	3.5	4.7	3.6	6.1	6.0	5.2	6.1H	5.5	6.1	4.0	3.8	3.4	2.7	3.3	2.8	2.8	2.8	2.8
27	3.0	3.3	2.8	3.3A	3.5A	2.4	4.2A	3.5	6.0	7.8A	6.7	6.8	6.1	5.5	5.8	5.8	5.0	4.6	4.1	3.2	2.3	2.3	2.3	2.3	2.3
28	2.8	3.2	3.3	3.3	3.8A	3.0	2.8	3.4	4.7	5.0A	6.0	5.7	5.7	5.8	5.8	5.1	4.3	3.6	3.0	3.3	2.9A	3.3	3.3	3.3	3.3
29	SF	SF	SF	SF	SF	SF	2.3	3.2	4.8	5.6	6.3	5.8H	5.7	6.0	5.3H	3.8	3.2	3.2	2.9	2.5	2.6	3.2	3.2	3.2	3.0
30	SF	SF	F	3.3F	3.3F	2.5F	3.8	3.8	4.4	6.3	6.8	6.5	4.5A	4.5A	7.0	4.7	4.0	3.6	3.6	3.0A	2.8	2.8	2.8	2.8	2.8
31	F	F	F	F	F5	SF	SF	3.8	5.9	5.7	6.4	6.2A	5.6	5.8	5.8H	5.6	4.2	4.3	4.3	3.6A	3.6A	3.6A	3.6A	3.6A	3.6A
No.	19	21	24	27	26	26	27	29	30	29	29	30	31	30	30	30	29	29	29	26	26	24	20	19	19
Median	3.3	3.3	3.3	3.3	3.3	3.0	3.2A	3.8	5.7	6.4	6.8	7.1	6.3	6.3	6.3	5.7	4.3	3.5	3.1	3.2	3.0	3.0	3.2	3.3	3.3
U.Q.	3.3	3.4	3.5	3.6	3.6	3.5	3.3	4.4	6.0	7.0	7.4	7.9	7.0	6.8	6.6	5.9	5.0	3.8	3.4	3.4	3.3	3.3	3.4	3.3	3.3
L.Q.	3.0	3.1	3.0	3.3	3.1	2.7	2.5	3.5	5.1	5.8	6.3	6.4	5.8	5.8	5.8	5.3	4.2	3.2	2.8	2.9	2.8	2.8	2.9	3.0	3.0
Q.R.	0.3	0.3	0.5	0.3	0.5	0.8	0.8	0.9	0.9	1.2	1.1	1.5	1.2	1.0	0.8	0.6	0.8	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5

Sweep 1.0 Mc to 18.0 Mc in 1 min in automatic operation.

The Radio Research Laboratories, Japan.

foF2

W 1

IONOSPHERIC DATA

Lat. 45° 23.6' N
Long. 141° 41.1' E

Wakkanai

foF1

Dec. 1962

135° E Mean Time (GMT.+9h.)

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1										C	C	C													
2											4.0L	3.9	4.0	4.38L	2.8										
3										4.36L	3.9	C	3.6	4.36L	C	C									
4									C	C	C	C	C	3.8	C										
5											4.36L	3.9	3.8	3.5											
6									L	4.38L				3.3											
7											3.8														
8									3.5		4.1	4.0													
9											3.9														
10													4.36L												
11																									
12									4.38L	3.9	4.40L	4.39L													
13									2.9	3.04	3.74														
14									4.38L	4.38L	5.9L	3.4													
15									L	4.36L	4.39L			4.1L											
16									L	A	3.9	3.5													
17										3.9	4.0			3.3											
18									4.33		3.8	4.35L	4.35L												
19												3.7	3.8												
20																									
21										4.38L	4.38L	3.9													
22											4.40L			3.4											
23									4.39L		4.40L	3.6													
24											4.38L			3.6	4.33L										
25																									
26										4.38L															
27										4.36L	4.39L	B													
28										B	B	B	B	4.5											
29										B	B	B	4.7	B											
30										4.39L	4.370	4.36L	B												
31										B	B	B	4.1L												
No.									7	1.3	1.8	1.3	1.3	3											
Median									4.36	4.38	4.39	3.7	3.6	3.3											

Sweep 1.0 Mc to 2.0 Mc in 1 min in automatic operation.

The Radio Research Laboratories, Japan.

foF1

W 2

IONOSPHERIC DATA

Lat. 45° 23.6' N
Long. 141° 41.1' E

Wakkanai

foE

135° E Mean Time (GMT. + 9h.)

Dec. 1962

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	A	C	C	C	2.80	2.65	¹ 2.40 ^S	S	S							
2								S	S	A	¹ 2.40 ^A	¹ 2.70 ^A	¹ 2.75 ^S	¹ 2.70 ^S	S	S	S							
3								S	S	2.60	2.50	2.90	2.70	2.75	C	C	C							
4								C	C	C	C	C	C	C	C	C	C							
5								S	S	2.35	2.75	¹ 2.70 ^A	2.90	¹ 2.75 ^A	2.45	S	S							
6								S	S	2.50	2.70	¹ 2.70 ^A	2.75	2.70	2.30	S	S							
7								S	A	¹ 2.45 ^A	2.70	2.85	2.80	2.65	¹ 2.20 ^S	S	S							
8								S	S	2.45	2.80	2.70	2.90	2.80	2.30	S	S							
9								S	S	2.40	2.65	2.75	2.75	2.55	S	S	S							
10								S	S	2.50	2.75	2.85	2.75	2.65	S	S	S							
11								S	S	S	2.45	2.70	2.65	¹ 2.55 ^S	2.30	S	S							
12								S	S	A	2.45	¹ 2.70 ^S	2.60	2.45	¹ 2.20 ^S	S	S							
13								S	S	2.30	2.50	2.65	2.70	S	S	S	S							
14								S	S	S	¹ 2.60 ^R	B	B	B	B	S	S							
15								S	S	¹ 2.40 ^S	2.65	2.90	¹ 2.75 ^S	2.60	S	S	S							
16								S	S	S	A	A	A	2.65	2.35	S	S							
17								S	S	¹ 2.20 ^S	¹ 2.60 ^A	¹ 2.65 ^A	¹ 2.55 ^S	2.40	2.10	S	S							
18								S	S	¹ 2.10 ^S	2.30	2.70	2.65	2.50	S	S	S							
19								S	S	¹ 2.20 ^C	¹ 2.50 ^C	2.85	2.85	¹ 2.55 ^A	2.30	S	S							
20								S	S	2.20	2.50	2.65	2.65	2.40	S	S	S							
21								S	S	A	2.55	2.75	2.75	2.45	2.20	S	S							
22								S	S	S	2.45	2.55	¹ 2.65 ^S	2.50	¹ 2.20 ^S	A								
23								S	S	S	2.55	¹ 2.70 ^B	2.60	S	S	S								
24								S	S	2.20	2.60	2.65	2.70	2.50	2.30	S	S							
25								S	S	2.25	2.60	B	B	B	B	B	S							
26								S	S	S	B	2.65	¹ 2.65 ^S	2.40	S	S	S							
27								S	S	A	B	B	B	B	B	B	S							
28								S	S	B	B	B	B	B	B	B	S							
29								S	S	B	B	B	B	B	B	B	S							
30								2.15	B	B	B	B	B	B	B	B	S							
31								B	B	B	B	B	B	B	B	B	S							
N.O.								1	1.5	2.2	2.1	2.2	2.1	1.3										
Median								2.15	2.35	2.60	2.70	2.70	2.55	2.30										

foE

Sweep \uparrow \downarrow Mc to \downarrow \uparrow Mc in $\frac{\text{min}}{\text{sec}}$ in automatic operation.

The Radio Research Laboratories, Japan.

W 3

IONOSPHERIC DATA

Lat. 45° 23.6' N
Long. 141° 41.1' E

Wakkanai

foEs

135° E Mean Time (GMT. + 9h.)

Dec. 1962

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	13.0	E	E	E	12.8	12.8	13.0	16.3	15.0	C	C	C	3.2	G	2.9	2.7	S	12.4	14.3	13.4	14.3	E	E	E
2	E	E	E	E	14.3	E	E	S	15.3	14.1	13.5	13.0	S	G	S	14.3	S	E	13.1	12.5	13.0	15.0	E	E
3	E	E	E	E	E	E	E	13.3	12.5	12.5	12.9	G	G	G	C	C	C	C	E	E	C	E	C	E
4	C	C	C	C	C	C	C	C	C	C	C	C	C	G	C	S	S	E	E	2.5	E	12.5	E	E
5	E	E	E	E	E	13.1	13.4	13.5	2.5	G	G	13.1	G	13.3	G	S	S	E	E	E	E	13.6	E	E
6	E	E	E	E	E	E	E	S	S	3.6	3.1	14.5	G	G	3.1	S	S	E	E	E	E	12.8	E	E
7	E	E	E	E	E	E	E	S	12.6	13.2	G	G	3.1	G	S	S	S	E	E	E	E	E	E	12.4
8	E	E	E	E	E	2.2	E	S	2.6	2.9	3.3	3.2	3.8	G	G	S	S	E	E	E	E	E	E	E
9	E	E	E	E	E	12.9	2.7	S	S	G	3.5	3.2	G	G	S	S	S	E	S	E	12.3	E	E	E
10	E	E	E	E	E	E	E	12.3	2.5	S	G	G	G	G	S	S	S	E	14.0	E	E	E	E	E
11	E	2.3	E	E	E	E	E	C	S	S	G	G	G	S	G	2.5	S	E	E	E	E	E	E	E
12	E	E	E	E	E	E	E	S	2.7	13.5	3.5	S	G	G	S	2.4	S	12.5	12.5	E	E	E	E	E
13	E	E	E	E	E	E	E	S	S	G	G	G	G	G	S	3.0	S	14.0	14.3	13.7	13.0	12.5	E	E
14	E	E	E	E	E	12.3	12.0	12.3	S	S	G	B	B	B	B	S	S	E	E	14.0	13.0	E	E	E
15	12.5	12.0	12.4	12.9	12.5	E	E	S	2.6	2.8	3.2	G	S	3.1	S	S	S	E	E	2.3	12.5	15.0	13.3	E
16	E	E	E	E	E	13.0	E	S	2.5	2.3	15.9	14.3	13.3	G	G	S	S	E	E	E	12.5	12.3	14.9	13.3
17	E	E	E	E	E	E	E	S	S	3.6	3.3	3.5	S	G	G	2.7	S	E	E	E	E	E	E	E
18	E	E	E	E	E	E	E	S	2.5	13.3	2.7	G	G	G	S	S	S	E	E	E	E	E	E	E
19	E	E	E	E	E	E	S	S	2.3	C	C	G	G	2.7	2.8	S	E	E	E	E	E	E	E	E
20	E	E	E	E	E	E	E	S	S	G	3.1	G	G	3.1	S	S	E	E	E	E	E	E	E	13.3
21	E	E	E	E	E	E	E	13.5	E	S	13.8	3.4	G	G	3.0	2.7	S	E	E	E	S	E	E	E
22	E	E	E	E	E	E	E	E	13.4	14.4	G	4.0	3.4	G	4.0	2.6	15.1	16.0	13.5	12.3	E	E	12.4	E
23	E	E	E	E	E	13.0	E	E	13.0	S	G	B	G	S	S	S	E	E	E	E	E	E	E	E
24	E	E	E	E	E	E	E	S	S	G	G	G	G	G	G	S	E	E	E	E	E	E	E	E
25	E	E	E	E	E	1.3	E	S	2.4	G	G	B	B	B	B	B	E	E	E	E	E	E	E	E
26	E	E	E	E	E	E	E	E	2.4	S	B	G	G	G	S	S	E	E	E	E	E	E	E	E
27	E	E	E	E	E	E	E	E	15.0	16.3	B	B	B	B	B	B	12.5	E	12.4	E	E	E	E	E
28	E	E	E	E	E	12.4	13.0	E	S	B	B	B	B	B	B	B	E	E	13.3	12.5	13.3	13.0	13.3	E
29	E	E	E	E	E	E	E	E	S	B	B	B	B	B	B	B	S	E	13.0	E	12.5	E	E	E
30	E	E	E	E	E	E	E	E	G	B	B	B	B	B	B	B	S	15.3	13.0	13.5	12.3	12.5	E	E
31	E	E	E	E	E	E	E	E	B	B	B	B	B	B	B	B	E	E	E	E	E	12.3	E	E
No.	30	30	30	30	30	30	2.8	1.3	17	20	2.2	20	20	20	11	7	11	30	29	30	30	31	30	30
Median	E	E	E	E	E	E	E	E	2.6	2.8	2.8	G	G	G	G	2.7	E	E	E	E	E	E	E	E
U.Q.	E	E	E	E	E	2.0	2.3	2.9	3.2	3.6	3.5	3.2	G	G	2.9	3.0	E	E	30	2.3	2.5	2.3	E	E
L.Q.	E	E	E	E	E	E	E	E	2.4	G	G	G	G	G	G	2.5	E	E	E	E	E	E	E	E
Q.R.									0.8							0.5								

Sweep 1.0 Mc to 18.0 Mc in min in automatic operation.

foEs

The Radio Research Laboratories, Japan.

IONOSPHERIC DATA

Lat. 45° 23.6' N
Long. 141° 41.1' E

Wakkanai

fbEs

Dec. 1962

135° E Mean Time (GMT.+9h.)

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	A	A	3.2	C	C	C	g		g	g	S	E	E	A	A				
2					E		S	S	g	2.4	2.8	3.0	S	S	S	2.2	S	E	E	E	E	A			
3							g	g	g	g	g	C	C	C	C	C	C	C	C	C	C	C	C	C	
4	C	C	C	C	C	C	C	C	C	C	C	C	C		C	S	S		E		E	E	C	C	
5					E	AS	3.1	g	g	g	2.2	3.0	2.9		S	S	S				A				
6							S	S	S	g	2.2	3.0	g		g	S	S				E			E	
7							E	S	2.5	2.6	g	g	g		S	S	S								
8						E	S	S	g	g	g	g	g		S	S	S								
9						E	E	S	S	S	g	g	g		S	S	S		S		2.5				
10						E	E	g	S	S				S	S	S	S		E						
11							C	S	g	S	S			S	g	g	S								
12							S	S	g	2.6	g	S			S	g	S	E	F						
13							S	S	S	S				S	S	g	S	E	E	E	E	E			
14							E	E	S	S		B	B	B	B	S	S		E	A	E				
15	E	2.1	2.2	E	E		S	g	g	g	g	S	S	g	S	S	S		E	E	E	E	E	E	
16				E	E	E	S	g	2.35	4.6	3.0	2.8			S	S	S				E	2.2	A	E	
17							S	S	g	g	3.0	3.0	S		g	g	S								
18							S	S	g	g	g				S	S	S								
19							S	S	g	C	C			2.7	g	S	S								
20							S	S	S	g	g			g	S	S	S							E	
21				E			E		S	2.7	g			g	g	S			S						
22									g	g	3.7	g	g	g	g	2.3	3.3	A	E	E			E		
23						E			2.5	S				S	S	S									
24							S	S	S						S	S									
25					E		S	S	g		B	B	B	B	B	B									
26							g	S	g	S	B				S	S									
27							2.5	3.0	B	B	B	B	B	B	B	B	E		E						
28					E	E	S	B	B	B	B	B	B	B	B	B			E	E	A	E	2.7		
29							S	A	B	B	B	B	B	B	B	B	S		E	E	E	E	E		
30							B	B	B	B	B	B	B	B	B	B	S		E	E	E	E	E		
31							B	B	B	B	B	B	B	B	B	B	S		E	E	E	E	E		
No.																									
Median																									

Sweep 1.0 Mc to 18.0 Mc in 1 min in automatic operation.

The Radio Research Laboratories, Japan.

W 5

fbEs

IONOSPHERIC DATA

Lat. 45° 23.6' N
Long. 141° 41.1' E

Wakkanai

135° E Mean Time (GMT.+9h.)

f-min

Dec. 1962

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	41.90 ^s	41.80 ^s	41.70 ^s	E	E	41.60 ^s	42.00 ^s	42.00 ^s	2.00	C	C	C	2.10	2.15	42.50 ^s	42.10 ^s	41.80 ^s	42.00 ^s	41.85 ^s	42.00 ^s	42.00 ^s	42.00 ^s	41.85 ^s	42.00 ^s
2	42.00 ^s	41.50 ^s	E	E	41.80 ^s	41.60 ^s	42.00 ^s	41.90 ^s	41.85 ^s	2.00	1.95	2.00	43.00 ^s	42.70 ^s	42.50 ^s	42.10 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	C	C	42.10 ^s	42.00 ^s
3	41.80 ^s	E	E	E	41.80 ^s	41.70 ^s	41.90 ^s	41.90 ^s	42.00 ^s	2.00	1.90	2.15	C	2.05	C	C	C	C	C	42.50 ^s	42.00 ^s	42.00 ^s	42.00 ^s	C
4	42.00 ^s	E	E	E	C	C	C	C	C	C	C	C	C	2.00	42.00 ^s	42.10 ^s	41.90 ^s	42.00 ^s	41.80 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
5	42.00 ^s	41.50 ^s	41.20 ^s	E	E	41.20 ^s	41.85 ^s	41.70 ^s	42.00 ^s	2.00	2.10	1.90	2.00	2.10	2.00	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.20 ^s	42.00 ^s	42.00 ^s	42.00 ^s	41.90 ^s
6	41.90 ^s	42.00 ^s	42.00 ^s	E	E	41.70 ^s	42.00 ^s	42.00 ^s	42.30 ^s	2.00	2.00	1.90	2.00	2.00	2.00	42.10 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
7	42.00 ^s	41.50 ^s	41.90 ^s	E	E	41.80 ^s	42.00 ^s	42.00 ^s	42.00 ^s	2.00	2.00	2.00	2.00	2.00	42.50 ^s	42.10 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
8	42.00 ^s	41.50 ^s	E	E	E	42.00 ^s	42.00 ^s	42.00 ^s	42.10 ^s	2.00	2.10	2.00	2.00	2.00	42.00 ^s	42.20 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
9	41.90 ^s	41.50 ^s	41.50 ^s	E	E	41.80 ^s	42.00 ^s	42.00 ^s	42.10 ^s	2.00	2.00	2.00	2.00	2.00	42.50 ^s	42.10 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
10	42.00 ^s	42.00 ^s	E	E	E	41.70 ^s	42.00 ^s	42.00 ^s	42.20 ^s	2.00	2.00	2.15	2.10	2.05	42.30 ^s	42.10 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
11	42.00 ^s	41.40 ^s	42.10 ^s	42.00 ^s	41.50 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.30 ^s	2.00	2.00	2.00	2.00	42.90 ^s	1.90	42.00 ^s	42.00 ^s	42.00 ^s	42.10 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
12	41.85 ^s	41.50 ^s	42.00 ^s	E	E	41.85 ^s	42.00 ^s	42.00 ^s	42.00 ^s	2.00	2.00	42.80 ^s	2.00	2.10	42.60 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
13	42.00 ^s	41.20 ^s	E	E	E	41.80 ^s	41.80 ^s	41.80 ^s	42.15 ^s	2.00	2.00	2.00	2.00	43.00 ^s	42.50 ^s	42.10 ^s	42.00 ^s	42.00 ^s	41.80 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
14	42.00 ^s	41.50 ^s	E	E	E	41.80 ^s	42.00 ^s	42.00 ^s	42.10 ^s	2.05	2.80	2.80	3.00	2.80	2.50	42.10 ^s	42.00 ^s	42.00 ^s	41.80 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
15	41.90 ^s	E	E	E	E	41.70 ^s	42.30 ^s	42.30 ^s	42.00 ^s	2.00	2.00	2.00	43.30 ^s	2.00	42.50 ^s	42.00 ^s	41.90 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
16	41.90 ^s	41.40 ^s	E	E	E	42.00 ^s	41.50 ^s	41.50 ^s	42.10 ^s	2.00	2.00	2.10	2.00	2.10	2.00	42.50 ^s	41.80 ^s	42.00 ^s	41.70 ^s	41.90 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
17	41.90 ^s	E	E	E	E	41.80 ^s	42.00 ^s	42.00 ^s	42.10 ^s	2.10	2.10	2.10	43.00 ^s	2.00	2.00	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
18	42.00 ^s	E	41.40 ^s	E	E	41.90 ^s	41.90 ^s	41.90 ^s	41.80 ^s	2.05	2.05	2.05	2.00	2.00	42.40 ^s	42.40 ^s	42.00 ^s	42.00 ^s	41.90 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
19	42.00 ^s	41.50 ^s	42.00 ^s	E	E	41.50 ^s	42.00 ^s	42.00 ^s	42.00 ^s	2.00	2.00	2.00	2.00	2.05	2.00	42.10 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
20	41.70 ^s	E	E	E	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.10 ^s	2.00	2.00	2.00	2.00	2.00	42.50 ^s	42.10 ^s	42.00 ^s	41.85 ^s	41.75 ^s	42.00 ^s	42.00 ^s	41.90 ^s	41.90 ^s	42.00 ^s
21	41.95 ^s	41.70 ^s	E	E	E	41.80 ^s	41.60 ^s	41.60 ^s	42.10 ^s	2.00	2.00	2.10	2.20	2.05	2.00	42.10 ^s	42.00 ^s	41.70 ^s	41.90 ^s	S	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
22	42.00 ^s	41.50 ^s	41.30 ^s	E	E	41.70 ^s	41.90 ^s	41.90 ^s	42.00 ^s	2.00	2.00	2.00	42.50 ^s	2.00	42.30 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
23	41.85 ^s	E	E	E	E	41.30 ^s	42.00 ^s	42.00 ^s	41.90 ^s	2.15	2.80	2.80	2.00	42.40 ^s	42.70 ^s	42.10 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	41.90 ^s	42.00 ^s
24	42.00 ^s	41.40 ^s	41.50 ^s	E	E	41.80 ^s	42.00 ^s	42.00 ^s	42.00 ^s	2.00	2.00	2.00	2.00	2.00	2.00	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
25	41.85 ^s	41.40 ^s	E	E	E	41.60 ^s	42.00 ^s	42.00 ^s	42.00 ^s	1.90	2.00	3.00	2.90	2.90	3.20	2.30	42.00 ^s	41.90 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
26	42.00 ^s	41.50 ^s	E	E	E	41.90 ^s	41.80 ^s	41.80 ^s	42.00 ^s	2.70	2.10	2.10	2.10	2.00	42.40 ^s	42.10 ^s	41.85 ^s	41.90 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	41.90 ^s
27	41.80 ^s	E	E	E	E	41.50 ^s	42.00 ^s	42.00 ^s	42.00 ^s	2.80	3.50	3.50	4.20	3.30	3.35	2.70	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
28	41.90 ^s	E	E	E	E	41.85 ^s	41.80 ^s	41.80 ^s	42.20 ^s	2.70	4.20	4.30	5.00	4.00	3.20	2.60	42.10 ^s	41.90 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
29	42.00 ^s	41.50 ^s	E	E	E	41.60 ^s	41.80 ^s	41.80 ^s	42.10 ^s	2.90	4.20	4.00	3.00	3.80	2.20	2.40	42.00 ^s	41.85 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
30	41.90 ^s	E	E	E	E	41.40 ^s	41.80 ^s	41.70 ^s	42.00	2.50	3.00	4.85	3.10	4.30	2.85	2.20	42.00 ^s	41.80 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
31	41.85 ^s	41.20 ^s	E	E	E	41.50 ^s	41.80 ^s	41.80 ^s	42.25	2.90	4.30	4.00	3.50	3.20	2.40	2.50	42.10 ^s	41.85 ^s	41.90 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s	42.00 ^s
No.	30	30	19	29	28	30	30	30	30	19	29	28	26	27	17	30	30	30	29	30	30	31	30	30
Median	41.90	41.40	E	E	E	41.20	41.80	41.80	42.05	2.00	2.00	2.00	2.00	2.05	2.00	42.10	42.00	41.90	42.00	42.00	42.00	42.00	42.00	42.00

Sweep \angle μ Mc to \angle δ Mc in $\frac{\text{min}}{\text{sec}}$ in automatic operation.

The Radio Research Laboratories, Japan.

f-min

W 6

IONOSPHERIC DATA

Lat. 45° 23.6' N
Long. 141° 41.1' E

Wakkanai

135° E Mean Time (GM.T. + 9h.)

M(3000)F2

Dec. 1962

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	3.10	2.85	2.90	3.65	2.70	3.10	3.00A	3.25A	3.85S	C	C	C	3.60	3.65	3.30M	3.25	3.50	3.25	3.10	3.20A	3.15A	3.20S	3.20F	3.00	
2	3.65	3.00F	2.90F	3.65F	3.10	3.30	3.55S	3.55S	3.85S	3.40	3.50	3.40	3.50	3.60	3.65	3.55	3.65	2.95	3.15	3.35	3.65	3.00A	3.85SF	3.90F	
3	2.95F	2.75F	2.95F	2.95F	3.65SF	3.50	3.30S	3.65	3.75	3.60	3.65	3.60	3.50	3.50	C	C	C	C	C	3.40	3.15C	3.00	C	C	
4	2.90S	2.80	2.85	2.75	2.95	3.25S	3.35S	3.50	3.40	C	C	C	C	3.60	3.70C	3.60	3.45	3.40	3.15	3.25	3.05	3.95S	3.20S	3.35S	
5	2.90	3.05S	2.95F	3.05	3.10	3.35	3.50S	3.35	3.40	3.35S	3.25M	3.40M	3.25S	3.55S	3.65	3.80	3.70S	3.00	3.30	3.30	3.40S	3.10	3.10	3.05	
6	2.90	2.85	2.90	3.15	3.15	3.40	3.50S	3.40	3.60	3.65S	3.55	3.55	3.55	3.50S	3.65	3.85	3.65	3.40	3.30	3.30	3.35S	3.05	3.05	3.25S	
7	2.80	2.85	2.90	3.15	3.15	3.40	3.50S	3.40	3.60	3.65S	3.55	3.55	3.55	3.50S	3.65	3.85	3.65	3.40	3.30	3.30	3.35S	3.05	3.05	3.25S	
8	SF	SF	SF	3.00S	3.25S	3.30	3.40SF	3.50	3.60	3.65S	3.55	3.50	3.55	3.50M	3.60	3.80	3.65	3.50	3.20	3.50	3.30	3.30S	SF	SF	
9	SF	2.95F	3.10F	3.00	2.90	3.30	3.35	3.60	3.60S	3.30S	3.35	3.60	3.60	3.50	3.60	3.60	3.40	3.70S	3.15S	3.55	3.20S	3.25	3.20S	3.25S	
10	3.10	2.95	2.90	2.95	2.95	3.40	3.35	3.45	3.50	3.45	3.75	3.60	3.55	3.60	3.45	3.60	3.25S	3.50S	3.30	3.20	3.25	3.10	3.05S	3.00S	
11	3.05	3.05S	2.90F	3.05F	2.85SF	3.20	3.05S	3.55C	3.85	3.55	3.50	3.55	3.65	3.60	3.65	3.75	3.40	3.25	3.20	3.55S	3.10	3.05S	SF	SF	
12	SF	2.95F	2.75F	2.90	2.85F	3.00S	3.30S	3.25	3.50S	3.40	3.25	3.45	3.55	3.55	3.50	3.50	3.55	3.50	3.30	3.7	SF	SF	SF	SF	
13	FS	FS	FS	FS	SF	SF	SF	3.35S	3.65S	3.50	3.20	3.45	3.50	3.40	3.35S	3.60	3.50	3.65S	3.00S	S	SF	SF	SF	SF	
14	SF	SF	2.95	3.20	3.25	3.00	3.15S	3.40	3.50	3.30	3.55	3.55M	3.65	3.60	3.35	3.50	3.30S	3.55	3.30	3.15A	3.05	3.95	3.95	3.25S	
15	2.85	3.15	3.15	3.35	3.10	3.15	3.20	3.25	3.40	3.45	3.45	3.50	3.55S	3.60	3.25M	3.55S	3.40	3.45	3.65S	3.05	3.20S	3.00	2.85F	3.20S	
16	2.90	2.95F	2.90F	3.05F	3.35SF	3.35SF	3.25	3.50	3.45	3.65	3.25H	3.25H	3.65	3.65M	3.55	3.65H	3.85	3.15	3.40	3.40	3.40	3.15A	A	SF	
17	SF	SF	3.05F	3.10F	3.20SF	3.15SF	3.35	3.20	3.75	3.45	3.25S	3.55	3.25M	3.65M	3.40	3.60	3.35S	3.65S	3.20	3.20	3.40SF	3.10	3.15	3.10S	
18	3.10	2.95F	3.10F	2.90	2.95F	3.00SF	2.95	2.90	2.95M	3.25S	3.10	3.30	3.45	3.45	3.45	3.30	3.20	3.40	2.95	3.40	3.20S	S	S	SF	
19	3.20	3.00	3.10F	2.80M	SF	SF	S	S	3.40S	3.15C	3.15C	3.55	3.35S	3.45E	3.45	3.40	SF	SF	SF	SF	SF	SF	3.15S	3.05SF	
20	3.30S	3.30S	3.35	3.25	3.05	3.10	3.60S	3.15	3.35	3.55S	3.50	3.65	3.50	3.45S	3.70	3.40	3.60	3.65	3.30F	SF	SF	SF	SF	SF	
21	SF	FS	FS	2.75F	2.90F	2.85SF	3.05F	3.55S	3.35	3.30M	3.60	3.45	3.50	3.30	3.55	3.65	3.35	3.10S	3.90S	3.00S	3.20	2.85	2.75	2.95	
22	3.05	2.95	3.05	3.35	3.10	3.35	3.10S	3.55	3.45	3.40S	3.40S	3.55	3.65	3.65	3.55	3.82	3.50	3.35F	3.85SF	3.05SF	3.00SF	3.10SF	2.80	3.25SF	
23	2.90	3.00S	2.95	3.15S	2.95SF	3.60S	3.30	3.35	3.55	3.50	3.85M	3.55	3.65	3.75	3.45M	3.60	3.60M	3.45S	3.25S	3.40	3.35S	2.90	3.90F	3.20SF	
24	3.90SF	3.05SF	3.00SF	3.40	3.15	3.35S	3.30	3.45	3.70	3.15M	3.50	3.70	3.40	3.45	3.45	3.65	3.20	3.20	3.70	3.35S	3.40	3.40S	3.10S	SF	SF
25	SF	SF	3.00	3.55	3.40	3.85	3.40S	3.40	3.60	3.35	3.50	3.45	3.35M	3.40M	3.60	3.65	3.75	3.25	3.25	3.45S	3.05	3.90S	3.90S	3.25SF	
26	3.90SF	3.00F	3.05	3.00S	3.10SF	3.25	3.20S	3.35	3.60	3.70	3.55	3.55	3.70	2.95H	3.65	3.60	3.75	3.30	3.40	3.20	3.40	2.85	2.85	2.85	
27	2.75	3.05	2.95	3.05	3.20S	3.30	3.85S	3.15	3.35	3.45S	3.30	3.45	3.70	3.25	3.55	3.60	3.15	3.35	3.40	3.45	3.50	3.40S	3.00	3.20S	
28	3.05	3.10	3.05	3.15SF	3.20SF	3.40	3.45	3.45	3.60	3.85M	3.30	3.55	3.25	3.40	3.55	3.55	3.35	3.50	3.30	3.65	3.25A	3.40	3.05S	SF	
29	SF	SF	SF	SF	SF	SF	3.50	3.30	3.70	3.35	3.50	3.45M	3.10M	3.50	3.45	3.20M	3.40	3.10	3.45	3.25	3.10	3.30	3.10	3.05	
30	SF	SF	F	3.05F	3.10F	3.25F	3.15SF	3.50	3.60	3.20	3.65	3.55	3.60R	3.30R	3.60	3.75	3.55	3.40	3.35S	3.45	3.00F	SF	F	F	
31	SF	F	F	F	FS	SF	SF	3.40	3.40	3.60	3.40A	3.65	3.60	3.35F	3.65	3.50	3.35	3.35	3.35	3.55	SF	FS	SF	3.95SF	
No.	19	21	24	27	26	26	27	29	30	29	29	30	31	30	30	30	29	29	29	26	26	24	20	19	
Median	2.95	3.00	2.95	3.05	3.10	3.30	3.40	3.50	3.45	3.55	3.50	3.50	3.50	3.50	3.50	3.60	3.50	3.35	3.35	3.25	3.30	3.00	2.95	3.00	

Sweep 1.0 Mc to 2.0 Mc in 1/10 sec in automatic operation.

The Radio Research Laboratories, Japan.

M(3000)F2

W

IONOSPHERIC DATA

Lat. 45° 23.6' N
Long. 141° 41.1' E

Wakkanai

135° E Mean Time (G.M.T. + 9h.)

M(3000)F1

Dec. 1962

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												
2											3.75 ^L	3.85	3.85	3.75 ^L	4.25									
3										3.90 ^L	4.15	C	4.15	L	C									
4									C	C	C	C	C	3.90	C									
5											3.75 ^L	4.05	3.95	4.00										
6										L	4.00 ^L			4.10										
7												3.95												
8										4.25		3.90	4.00											
9												3.90												
10														3.90 ^L										
11																								
12										4.20 ^L	3.85	3.75 ^L	3.90 ^L											
13										4.40	4.35 ^H	3.85 ^H												
14										3.75 ^L	3.90 ^L	4.10 ^L	4.35											
15										L	3.95 ^L	3.85 ^L		3.85 ^L										
16										L	A	3.75	4.25		3.90									
17											3.90	3.75	3.70 ^L	L										
18										3.95 ^L		3.75	4.10	3.90										
19																								
20																								
21											3.85 ^L	3.95 ^L	4.10											
22												3.90 ^A		4.10										
23										3.70 ^L		3.85 ^L	3.95											
24												3.85 ^L		3.85	L									
25																								
26											3.90 ^L													
27											3.90 ^L	3.80 ^L	B											
28											B	B	B	3.60										
29											B	B	B	3.65	B									
30											3.90 ^L	B	L	B										
31												B	B	3.90 ^L										
N o.									7	12	16	12	11	2										
Median									3.95	3.95	3.90	4.00	3.90	4.10										

Sweep 1.0 Mc to 2.0 Mc in 1 min in automatic operation.

M(3000)F1

The Radio Research Laboratories, Japan.

W 8

IONOSPHERIC DATA

Lat. 45° 23.6' N
 Long. 141° 41.1' E

Wakkanai

R'F2

Dec. 1962

135° E Mean Time (GMT. + 9h.)

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1										C	C	C													
2											250	245	250	240	230										
3										230	235	230	235	C	C										
4									C	C	C	C	C	225	C										
5										250	250	230	235												
6									L	245			225												
7											250														
8									225		240	235													
9											230														
10														240											
11																									
12									260	260	255	235													
13									230	265	230														
14									270	240	215	240													
15									250	240	250			250											
16									250	250	250	225		250											
17										225	250														
18									230		250	245	225	225											
19												225	240												
20																									
21										240	220	225													
22										240	240		230												
23									260		250	260		255	225										
24											240														
25																									
26										245															
27										235	250	230													
28									260	250	235 ⁸	315													
29									265	240	310 ⁴	250													
30									225	245	225	300													
31										250	250	230	245												
No.									9	16	21	16	15	3											
Median									250	245	250	230	240	230											

Sweep 1.0 Mc to 2.0 Mc in 1 min in automatic operation.

R'F2

IONOSPHERIC DATA

Lat. 45° 23.6' N
Long. 141° 41.1' E

Wakkanai

135° E Mean Time (GMT. + 9h.)

f_oF

Dec. 1962

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	350	300	270	300	300	f ₂ 85A	f ₂ 65A	250A	C	C	C	240	230	230	220	210	280	290	f ₂ 80A	f ₂ 85A	315	275	300	
2	295	280	295	270	290	255	260	220	225	235	245	210	235	225	210	225	210	340	300	250	225	f ₃ 35A	390	360	
3	320	295	260	260	255	220	250	220	215	185	240H	215	240	C	C	C	C	C	C	245	f ₂ 85C	320	C	C	
4	C	C	C	C	C	C	C	C	C	C	C	C	C	240	f ₂ 25C	220	225	225	275	265	250	310	345	310	
5	375	350	320	335	310	250	f ₂ 60HS	240	245	225	225	225	230	240	225	220	210	300	305	280	250	f ₂ 80A	285	285	
6	300	290	315	270	255	230	250	230	210	215	215	225H	235	220	225	220	210	220	250	250	230	260	290	310	
7	310	305	305	270	250	235	230	225	225	235	230	210	240	220	225	220	210	240	250	280	290	250	300	315	
8	265	290	280	250	210	260	250	225	225	235	225	210	240	225	240	225	210	230	240	250	250	300	320	305	
9	305	300	265	255	280	260	250	225	230	230	240	235	240	245	230	235	225	210	f ₂ 85S	255	300A	300	270	265	
10	260	275	270	265	250	240	250	230	220	230	225	230	240	230	225	225	240	230	250	270	255	310	320	310	
11	295	290	300	310	285	260	250	f ₂ 30C	210	210H	210H	245	225	225	225	220	235	250	250	225	275	290	320	340	
12	335	320	350	300	270	275	245	250	220	250	230	240	220	240	240	220	220	225	260	250	270	250	260	300	
13	335	300	310	260	250	250	260	235	205	190	195H	200H	225H	230	235	220	230	270	265	240	285	290	260	275	
14	305	260	285	260	265	230	300	245	230	230	250	220	200	235	235	220	225	230	290	f ₂ 75A	295	275	310	260	
15	330	300A	270	280	265	250	300	255	220	230	215	240	250	255	230	220	220	235	250S	275	275	305	315	320	
16	295	300	260	250	225	250	270	220	210	220	f ₂ 20A	215	215	210H	230	220	210	275	230	240	250	f ₂ 55A	f ₂ 75A	265	
17	290	275	275	245	230	240	240	230	210	220	240	240	220	245	230	220	225	225	250	275	255	290	300	280	
18	275	285	320	330	275	300	300	250	250H	240	230	225	205	205	235	230	210	230	245	225	240	275	270	280	
19	250	250	245	200	260	230	f ₃ 80S	270	220	f ₂ 25C	f ₂ 30C	245	220	220	220	210	220	240	265	225	250	325	260	280	
20	245	260	220	250	290	290	230	255	225	220	250	240	210	210	220	230	205	220	245	290	265	235	300	260	
21	275	270	250	290	250	285	260	215	235	220	250	225	215	240	245	210	230	235	250	f ₂ 25S	275	330	350	310	
22	285	300	275	225	275	225	280	230	220	230	240A	225	225	225	230	220	250A	f ₂ 65A	270	265	255	250	305	335	
23	285	285	270	255	240	220	250	235	210	240	235H	230	200	215H	230H	215	225	205	255	240	240	305	315	300	
24	275	280	290	225	250	230	275	240	220	220	230	240	240	245	225	210	220	285	280	245	250	320	440S	335	
25	390	325	270	220	210	205	f ₃ 60S	230	225	225	245	245	235H	225H	235	235	215	245	250	250	275	330	300	300	
26	305	265	240	240	250	235	220	240	220	220	220	200H	215	200H	235	225	210	235	250	245	250	325	325	320	
27	360	280	300	260	230	265	350	265	250	250	220	250	f ₂ 30B	235	230	230	230	250	240	235	245	270	305	250	
28	300	285	290	250	255	220	250	220	225	220H	f ₂ 40B	B	B	B	250	225	210	220	260	235	f ₂ 45A	255	335	275	
29	300	285	285	260	250	210	250	250	215	240	f ₂ 45B	245B	230	f ₂ 45B	245	215	230	240	250	265	290	260	275	285	
30	295	285	290	265	230	240	265	225	220	240	230	240B	225	f ₂ 45B	240	225	225	250	255	265	285	290	280	290	
31	315	260	250	255	245	250	240	225	240	225	B	B	B	245	240	225	225	220	230	250	280	325	280	300	
No.	30	30	30	30	30	30	29	28	27	28	28	27	28	30	30	30	30	30	30	30	31	31	30	30	30
Median	300	285	280	260	250	245	255	230	220	230	230	235	225	230	230	220	220	235	255	250	245	280	360	285	

Sweep 1.0 Mc to 8.0 Mc in /min in automatic operation.

The Radio Research Laboratories, Japan.

f_oF

W 10

IONOSPHERIC DATA

Lat. 45° 23.0' N
Long. 141° 41.1' E

Wakkanai

135° E Mean Time (GMT + 9h.)

f^oEs

Dec. 1962

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	110	105	E	140	120	125	120	110	110	G	C	C	160	G	150	140	S	125	120	115	E	E	E	E	
2	E	E	E	E	115	E	E	S	115	115	115	110	S	S	S	165	S	E	120	120	110	E	E	E	
3	E	E	E	C	C	C	C	C	115	G	125	G	G	G	C	C	C	C	C	E	C	E	C	C	
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	S	E	E	115	E	120	E	E	
5	E	E	E	E	115	130	115	120	G	G	G	105	G	125	G	S	S	E	E	E	E	110	E	E	
6	E	E	E	E	E	E	E	S	S	110	110	105	G	G	140	S	S	E	E	E	E	115	E	E	
7	E	E	E	E	E	E	115	S	115	115	G	105	S	S	S	S	S	E	E	E	E	E	E	110	
8	E	E	E	E	E	115	E	S	150	140	125	135	125	G	G	S	S	E	E	E	E	E	E	E	
9	E	E	E	E	E	115	S	S	S	G	145	140	G	G	S	S	S	E	S	E	E	125	E	E	
10	E	E	E	E	E	E	120	120	S	G	G	G	G	G	S	S	S	E	110	E	E	E	E	E	
11	E	110	E	E	E	E	E	C	S	S	G	G	G	S	G	130	S	E	E	E	E	E	E	E	
12	E	E	E	E	E	E	E	S	150	105	150	S	G	G	S	140	S	115	125	E	E	E	E	E	
13	E	E	E	E	E	E	E	S	S	G	G	G	G	S	S	140	S	110	110	110	110	E	E	E	
14	E	E	E	E	115	110	115	S	S	S	G	B	B	B	B	S	S	E	E	E	115	E	E	E	
15	150	140	130	125	E	E	E	S	150	155	180	G	S	155	S	S	S	E	E	E	140	130	115	110	E
16	E	E	E	E	120	120	E	S	165	120	110	110	115	G	G	S	S	E	E	E	E	125	125	110	E
17	E	E	E	E	E	E	E	S	S	125	115	110	S	G	G	115	S	E	E	E	E	E	E	E	
18	E	E	E	E	E	E	E	S	135	120	125	G	G	S	S	S	S	E	E	E	E	E	E	E	
19	E	E	E	E	E	E	E	S	150	C	C	G	G	120	150	S	E	E	E	E	E	E	E	E	
20	E	E	E	E	E	E	E	S	S	G	135	G	G	125	S	S	E	E	E	E	E	E	E	E	
21	E	E	E	E	E	E	E	E	S	165	135	G	G	140	150	S	E	E	E	S	E	E	E	E	
22	E	E	E	E	E	E	E	E	135	125	G	120	120	G	120	110	105	105	105	110	E	E	120	E	
23	E	E	E	E	E	115	E	E	120	S	G	B	G	S	S	S	E	E	E	E	E	E	E	E	
24	E	E	E	E	E	E	E	S	S	G	G	G	G	G	G	S	E	E	E	E	E	E	E	E	
25	E	E	E	E	E	E	S	S	165	G	G	B	B	B	B	E	E	E	E	E	E	E	E	E	
26	E	E	E	E	E	E	E	E	125	S	B	G	G	G	S	S	E	E	E	E	E	E	E	E	
27	E	E	E	E	E	E	E	E	115	110	B	B	B	B	B	B	110	E	110	E	E	E	E	E	
28	E	E	E	E	E	115	110	E	S	B	B	B	B	B	B	B	E	E	105	110	110	110	110	E	
29	E	E	E	E	E	E	E	E	S	B	B	B	B	B	B	B	S	E	115	E	110	E	E	E	
30	E	E	E	E	E	E	E	E	G	B	B	B	B	B	B	B	S	110	115	115	115	110	E	E	
31	E	E	E	E	E	E	E	E	B	B	B	B	B	B	B	B	E	E	E	E	E	110	E	E	
No.	2	3	1	4	6	8	8	4	16	12	12	8	5	5	5	7	2	5	10	9	11	9	4	3	
Median	130	110	130	130	120	115	115	115	135	120	125	110	120	125	150	130	110	110	110	115	115	110	110	110	

Sweep 1.0 Mc to 18.0 Mc in $\frac{\quad}{\quad}$ min in automatic operation.

f^oEs

IONOSPHERIC DATA

Lat. 45° 23.6' N
Long. 141° 41.1' E

Wakkanai

135° E Mean Time (GMT. + 9h.)

Types of Es

Dec. 1962

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	f	f	f	f	f ₂	f ₂	f ₂	f ₂	f ₂	C	C	C	f	f	f	f	f	f	f ₂	f ₂	f ₂	f	f	f
2					f				C	C	C	C	f	f	f	f	f	f	f	f	f	f	f	f
3									C	C	C													
4									C	C	C													
5						f ₂	f	C ₂	C			f	f	f	f	f	f	f	f	f	f	f	f	f
6									f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
7									f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
8						f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
9						f ₂	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
10																								
11																								
12									f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
13									f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
14									f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
15						f ₂	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
16						f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
17									C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18									C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
19									f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
20									C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
21									f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
22									C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23									C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
24									C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
25						f			f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
26									f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
27									f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
28									f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
29									f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
30									f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
31									f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f
No.																								
Median																								

Sweep 1.0 Mc to 2.0 Mc in 1 min / sec in automatic operation.

The Radio Research Laboratories, Japan.

Types of Es

IONOSPHERIC DATA

Lat. 39° 43.5' N
Long. 140° 08.2' E

Akita

135° E Mean Time (GMT. + 9h.)

Dec. 1962

foF2

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	3.5	3.4	3.6	3.6	3.1	3.2	2.9	5.7	8.0	8.2	7.5	7.1	6.4	7.6	6.4	6.7	6.0	3.1	3.0	3.5	3.6	2.9	2.9	3.1
2	3.3	3.3	3.2	3.1	3.1	3.3	2.5	4.4	6.4	6.4	5.6	7.1	8.5	8.1	6.6	6.4	4.6	3.4	3.0	3.6	3.8	2.8	2.5	2.7
3	2.9	3.0	2.9	2.9	2.9	2.7	3.2	4.9	6.1	6.4	7.3	7.0	7.6	6.3	5.8	7.9	5.2	3.9	3.2	3.0	2.7	2.4	2.7	2.8
4	2.9	3.0	3.0	3.0	3.0	3.0	3.0	5.1	5.7	6.1	7.1	8.1	7.7	6.8	6.3	5.6	5.5	3.3	3.0	3.4	3.3	3.6	3.5	3.6
5	2.6	2.7	2.8	2.8	2.6	3.4	3.5	4.8	8.5	8.5	RH	R	7.7	6.9	6.1	6.3	4.9	3.6	3.6	4.1	3.7	3.4	3.3	3.5
6	2.9	2.9	3.0	3.1	3.1	3.2	3.4	4.6	5.9	5.8	7.9	7.2	7.5	6.6	6.8	6.8	5.7	3.8	3.5	3.3	3.5	2.4	2.9	3.1
7	3.1	3.1	3.2	3.3	3.1	3.4	2.6	4.6	5.7	6.1	6.9	6.6	6.4	6.8	6.8	6.8	5.5	3.8	3.4	3.3	2.9	2.4	2.9	3.1
8	2.8	3.4	3.4	3.4	3.7	3.0	2.9	4.6	6.0	6.3	7.7	7.5	7.4	7.3	6.8	6.1	5.3	3.6	3.2	2.9	2.9	3.0	3.1	3.1
9	F	F	2.9	3.2	3.3	3.5	3.7	4.5	5.9	6.9	7.1	8.0	6.5	7.2	6.6	6.2	5.1	3.6	3.2	R	R	2.9	3.1	3.3
10	3.4	R	R	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
11	3.5	3.3	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
12	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
13	3.4	3.4	3.6	3.6	F	F	F	4.5	5.1	5.6	8.4	9.0	8.4	6.5	5.8	7.1	5.6	3.6	3.1	3.7	3.6	2.7	3.0	3.2
14	F	F	F	F	3.9	F	F	R	5.8	6.5	17.8	17.6	5.9	5.8	5.4	R	R	R	A	A	2.8	3.5	4.2	F
15	3.1	2.9	3.0	3.0	3.0	2.8	2.8	4.7	5.6	6.3	17.3	17.5	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
16	F	F	R	R	F	2.4	2.5	3.6	5.0	6.0	R	R	7.3	7.4	6.4	6.4	5.4	3.0	3.3	3.4	3.0	2.6	2.3	F
17	F	F	3.1	3.0	3.0	2.8	2.8	2.9	6.0	6.0	R	R	R	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
18	F	F	2.6	F	F	F	F	4.3	6.3	6.3	18.5	18.9	7.7	7.4	6.9	7.1	6.2	4.5	4.8	4.8	4.2	4.5	4.2	4.8
19	F	F	4.1	4.3	4.2	4.1	4.1	4.1	7.2	7.4	7.4	6.7	8.7	17.9	7.1	6.7	6.0	4.7	4.8	4.8	4.2	4.5	4.2	4.8
20	S	S	F	F	F	F	F	4.1	6.1	6.6	18.8	19.3	7.8	6.2	6.9	6.3	5.1	3.8	2.7	2.9	3.5	3.6	4.4	5
21	F	F	3.3	3.0	3.3	3.0	3.2	4.6	4.8	6.8	R	R	7.1	6.9	6.5	6.2	4.8	4.1	3.3	3.0	3.6	3.0	3.2	3.3
22	3.2	3.1	3.1	3.1	2.5	2.4	2.5	3.8	5.2	7.3	17.1	17.6	7.6	6.8	6.2	6.1	5.3	2.9	2.9	3.4	4.0	3.5	3.1	3.1
23	2.9	2.5	2.9	2.9	3.1	R	R	4.1	5.1	5.9	16.1	16.6	5.9	6.1	6.3	6.1	4.5	4.0	3.0	2.9	3.6	3.0	3.0	3.0
24	2.9	2.9	3.0	3.2	3.1	2.4	2.5	4.2	5.3	4.9	6.0	6.7	6.3	5.8	6.6	5.5	4.3	3.1	2.9	3.3	3.6	3.5	F	F
25	2.4	2.3	2.6	3.6	2.5	2.3	2.1	3.9	4.6	5.1	16.3	6.3	5.6	5.4	6.1	5.9	5.4	3.0	2.8	3.5	3.5	2.7	R	F
26	3.7	F	F	F	F	3.3	3.0	4.0	5.5	5.1	6.4	6.6	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4
27	3.1	3.4	3.1	3.0	2.9	2.6	2.9	4.0	5.7	8.2	8.1	6.6	6.0	6.3	6.7	5.9	5.9	4.6	4.4	3.5	3.5	2.6	2.6	3.0
28	F	F	F	F	3.4	3.2	2.6	3.6	4.4	6.1	5.5	6.7	6.2	5.3	6.5	5.6	5.0	4.3	2.9	3.0	3.0	2.8	R	F
29	F	F	F	F	2.8	2.5	2.1	3.6	4.3	5.2	6.1	7.6	5.8	5.2	5.7	5.6	4.5	3.4	3.1	3.3	2.6	2.6	2.8	2.8
30	2.7	3.3	3.5	3.1	2.8	2.5	2.5	4.1	4.3	5.1	7.5	8.3	6.1	5.5	6.2	6.9	4.3	3.1	3.1	3.0	2.9	3.3	R	F
31	F	F	3.2	3.1	F	F	F	5.4	6.0	6.4	6.8	5.5	6.1	7.4	6.5	6.5	5.4	4.2	S	F	F	F	F	F
No.	19	17	22	24	25	25	26	29	30	29	27	27	29	30	30	29	28	29	28	27	28	29	23	17
Median	3.1	3.1	3.1	3.1	3.0	2.9	4.5	5.7	6.2	7.3	7.2	6.6	6.6	6.6	6.6	6.2	5.2	3.6	3.1	3.3	3.3	2.9	3.0	3.1
U. Q.	3.4	3.4	3.3	3.4	3.3	3.2	4.8	6.1	7.1	7.8	8.1	7.6	6.9	6.8	6.7	6.7	5.5	4.0	3.5	3.6	3.6	3.4	3.3	3.3
L. Q.	2.9	2.9	2.9	3.0	2.6	2.5	4.0	5.1	5.7	6.4	6.7	6.0	6.0	6.2	5.9	4.8	3.2	3.0	3.0	3.0	2.9	2.6	2.8	3.0
Q. R.	0.5	0.5	0.4	0.4	0.4	0.7	0.8	1.0	1.4	1.4	1.4	1.6	0.9	0.6	0.8	0.7	0.8	0.5	0.5	0.6	0.7	0.8	0.5	0.3

Sweep 1.60 Mc to 20.0 Mc in $\frac{1}{10}$ sec in automatic operation.

The Radio Research Laboratories, Japan.

foF2

IONOSPHERIC DATA

Lat. 39° 43.5' N
Long. 140° 08.2' E

Akita

135° E Mean Time (GMT. + 9h.)

foF1

Dec. 1962

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										A	A	4.1 ^L	L ^H											
2										L	A	A	L	L	L									
3										L	L	L	L	L	L									
4									L	L	I ^F 3.4 ^L	I ^F 3.9 ^L	L	L	L	3.3 ^H								
5									L	A	L	L	4.0	I ^F 3.7 ^L	L									
6									2.7	3.4 ^R	I ^F 3.5 ^L	L	C	L	L									
7										L	L	L	S	S	S									
8										L	L ^H	I ^F 3.6 ^L	I ^F 3.9 ^L	I ^F 3.9 ^L	L									
9									3.2	I ^F 3.6 ^L	4.0 ^L	L	L	L	L									
10									L	L	L	L	L	R	L									
11									L	3.2 ^L	I ^F 3.4 ^L	L ^H	L	L	L									
12									C	L	L	R	L	L	C									
13									C	C	C	C	C	C	C									
14									L	L	S	L	L	L	L									
15									L	L	4.0 ^L	S	R ^S	L	L									
16									L	L	L	L	L	R	L									
17									L	L	4.1	C	L	L	S									
18									L	L	I ^F 3.9 ^C	I ^F 3.8 ^L	I ^F 3.3 ^L	L	L									
19									L	L	L	L	I ^F 4.1 ^L	I ^F 3.8 ^L	3.1									
20									L	L	L	L	L	L	3.2									
21									L	L	L	L	3.7	I ^F 3.3 ^L	L									
22									L	A	L	L	L	L	L									
23									L	L	L	L	L	3.6	L									
24									3.2	L	L	L	L	L	L	3.2	L							
25									L	L	L	L	L	L	L									
26									3.2	L	L	L	L	3.7 ^L	L									
27									L	4.0 ^L	4.0	3.6	L	L	L									
28									L ^H	L	L	L	L	L	L	L								
29									L	L	L	L	L	L	L	L								
30										4.0 ^L	4.0 ^L	L	L	L	L	L								
31										3.2 ^H	4.0 ^L	I ^F 4.0 ^L	I ^F 4.0 ^L	I ^F 4.0 ^L	L									
No.									1	5	8	9	7	8	4									
Median									2.7	3.2	3.6 ^U	4.0	3.9	3.8 ^U	3.2									

Sweep 1.60 Mc to 20.0 Mc in 20 ^{min} sec in automatic operation.

The Radio Research Laboratories, Japan.

foF1

IONOSPHERIC DATA

Lat. 39° 43.5' N
Long. 140° 08.2' E

Akita

foE

135° E Mean Time (GMT. + 9h.)

Dec. 1962

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								B	A	A	A	295	300	288	A	A	B							
2								B	230	A	A	A	A	275	255	220	B							
3								B	240	265	285	300	295	280	250	210	B							
4								B	A	250	275	290	300	280	255	230	B							
5								B	A	A	R	290	300	280	265	235	B							
6								B	215	256	276	285	296	285	260	235	B							
7								B	A	280	290	300	295	280	255	230	B							
8								B	A	255	285	300	290	270	255	A	B							
9								B	A	255	280	290	300	280	255	205	B							
10								B	A	255	280	300	R	R	R	B								
11								B	A	255	265	280	305	285	255	225	B							
12								E	A	A	290	295	285	285	A	A	C							
13								B	C	C	C	C	C	C	C	C	B							
14								B	R	R	S	S	S	S	R	R	B							
15								B	230	290	295	300	R	R	R	R	B							
16								B	R	255	276	300	300	275	250	215	B							
17								B	230	260	A	C	A	A	R	C	C							
18								B	A	A	A	C	295	275	245	215	B							
19								B	220	255	A	R	A	290	A	R	B							
20								B	A	A	270	285	A	A	255	A	B							
21								B	230	250	280	285	A	275	240	210	B							
22								B	R	C	C	C	C	C	C	C	C							
23									A	A	A	R	R	C	C	C	B							
24									220	R	R	R	R	R	255	B								
25									230	R	R	300	300	B	B	B								
26									220	255	275	290	R	R	R	R	B							
27								B	215	R	R	R	B	R	R	210	B							
28									A	R	R	R	B	R	R	B	B							
29									B	B	B	B	B	R	R	B	B							
30									R	B	B	B	B	B	B	B	B							
31								B	R	B	B	B	285	275	245	215	B							
No.									1	11	14	13	17	14	16	15	13							
Median								E	230	255	280	290	300	280	255	215								

Sweep 460 Mc to 240 Mc in 20 sec in automatic operation.

foE

IONOSPHERIC DATA

Lat. 39° 43.5' N
Long. 140° 08.2' E

Akita

135° E Mean Time (GMT + 9h.)

foEs

Dec. 1962

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	2.4	1.8	2.3	2.8	2.9	E	E	2.7	2.3	3.8	4.8	4	4	3.5	3.3	2.7	4	E	E	E	1.8	2.5	E	2.1
2	2.8	E	E	E	E	E	E	2.7	3.2	3.2	4.5	5.0	2.4	4	4	4	2.9	2.4	E	E	E	E	E	E
3	E	E	E	E	E	E	E	2.3	2.5	4	2.5	3.1	4	4	4	2.7	E	2.5	E	E	E	E	E	E
4	E	E	E	E	E	E	E	2.3	2.5	4	2.5	4	4	4	4	4	4	E	E	E	E	E	E	E
5	E	E	E	E	E	E	E	2.3	2.5	4	2.5	4	4	4	4	4	4	E	E	E	E	E	E	E
6	2.1	2.0	2.1	2.0	2.0	1.8	E	4	4	4	3.5	3.5	C	4	4	4	2.3	E	E	E	E	E	E	2.5
7	E	E	E	E	E	E	E	4	2.5	4	3.0	4	4	4	4	4	4	E	E	E	E	E	E	2.9
8	E	E	E	E	E	E	E	2.0	2.2	3.1	3.1	3.4	3.3	3.1	4	3.2	2.4	E	E	E	E	E	E	E
9	E	E	1.9	1.8	1.9	E	E	2.3	2.6	4	2.7	3.6	4	4	4	2.5	2.3	E	E	E	E	E	E	E
10	E	E	E	E	E	E	E	2.3	2.6	4	4	4	4	4	4	4	C	E	E	E	E	E	E	E
11	E	E	E	E	E	E	E	2.5	2.9	2.2	4	4	4	3.0	2.9	4	C	E	E	E	E	E	E	1.9
12	E	E	E	E	E	E	E	2.3	3.3	3.7	3.3	3.6	3.7	3.9	3.4	2.9	2.9	2.3	2.5	3.1	E	E	E	1.9
13	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	4	E	E	E	E	E	E	E
14	E	E	E	E	E	E	E	4	4	4	S	S	S	S	S	2.7	4	E	E	E	E	E	E	E
15	E	E	E	E	E	E	E	1.9	4	4	4	4	4	4	4	4	4	E	E	E	E	E	E	E
16	E	2.4	E	E	2.4	2.3	4	4	4	4	3.2	4	4	4	4	2.5	4	E	E	E	E	E	E	E
17	2.5	2.4	E	E	E	E	E	3.1	4.0	3.1	3.6	C	3.1	3.6	4	4	4	E	E	E	E	E	E	E
18	E	E	E	E	E	E	E	3.1	4.0	3.1	3.6	C	4	4	4	4	4	E	E	E	E	E	E	E
19	E	E	E	E	E	E	E	3.1	4.0	3.1	3.6	C	4	4	4	4	4	E	E	E	E	E	E	E
20	E	E	E	E	E	E	E	2.5	3.0	3.0	3.0	3.1	3.0	3.2	3.2	2.3	4	E	E	E	E	E	E	E
21	2.2	E	E	E	E	E	E	4	4	4	4	3.5	3.1	3.0	4	3.3	4	E	E	E	E	E	E	2.6
22	E	E	E	2.2	E	E	E	4	4	4	4.1	3.5	C	C	C	C	4	E	E	E	E	E	E	E
23	E	2.6	E	E	E	E	E	2.0	2.5	2.5	4	4	4	2.9	C	C	4	E	E	E	E	E	E	E
24	E	E	E	E	E	E	E	4	4	4	3.4	4	4	4	4	4	4	E	E	E	E	E	E	E
25	E	E	E	E	E	E	E	4	4	4	3.1	4	4	4	4	4	4	E	E	E	E	E	E	E
26	E	E	E	E	E	E	E	4	4	4	4	4	4	4	4	4	4	E	E	E	E	E	E	E
27	E	E	E	E	E	E	E	1.9	4	4	4	4	4	4	4	4	2.4	E	E	E	E	E	E	E
28	E	E	E	E	E	E	E	4	4	4	4	4	4	4	4	4	4	E	E	E	E	E	E	E
29	E	E	E	E	E	E	E	2.6	3.0	3.2	3.2	3.1	3.3	4	4	4	4	2.0	2.1	2.0	E	E	E	E
30	E	E	E	E	E	E	E	4	4	4	4	4	4	4	4	2.7	4	E	2.1	E	2.4	E	E	E
31	E	E	E	2.2	E	E	E	2.5	3.0	3.0	3.0	3.0	4	4	4	4	4	E	2.3	3.0	E	2.4	E	E
No.	21	31	31	31	31	31	31	31	30	27	26	24	24	25	26	23	23	30	30	30	31	28	31	31
Median	E	E	E	E	E	E	E	4	4	2.8	3.1	4	4	4	4	4	4	4	E	E	E	E	E	E
U.Q.	E	E	E	E	E	E	E	1.9	2.9	3.1	3.5	3.4	3.1	3.1	2.7	2.7	2.3	E	E	E	E	E	E	E
L.Q.	E	E	E	E	E	E	E	4	4	4	4	4	4	4	4	4	4	E	E	E	E	E	E	E
G.R.																								

The Radio Research Laboratories, Japan.

Sweep 1.0 Mc to 24.2 Mc in 2.0 min in automatic operation.

foEs

A 4

IONOSPHERIC DATA

Lat. 39° 43.5' N
Long. 140° 08.2' E

Akita

135° E Mean Time (GMT. + 9h.)

fbES

Dec. 1962

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	1.8	2.0	2.0	2.7				6.3	3.6	4.0			3.5	3.3	2.5					1.8	1.8		1.8	
2							2.6	3.0	3.1	4.1	4.1	3.8				2.6	1.9	1.9							
3									2.2		2.14						2.5	1.7					1.7		
4									2.5	E 3.5R														1.9	
5	1.7	1.7	1.8	1.8	1.7						3.4	3.5	C				2.3						1.8	1.7	
6									2.5	3.0R															
7							2.0	2.5	3.1	3.1	3.3	3.3	3.3	3.1R		3.1	1.9								
8			1.8	1.7	1.8				3.0	2.74	3.5					2.5	2.3								
9							1.8	2.5									C								
10							1.8	2.2	1.94																
11							1.8	2.6	3.3	3.3	3.5	E 3.7R	3.0	3.0	2.6	2.9	2.3	1.7	1.8		1.8	1.7	1.7		
12								C	C	C	S	S	C	C	C			A	A		1.8	2.3	1.7		
13											S	S	S	S	3.2R	2.5					1.8	2.3	1.7		
14						E	1.8				S	S	S	B							1.8	1.7	1.7		
15																									
16		1.7				A	1.7			3.2				3.1		2.3									
17	2.0	1.8		E					3.0	3.1	C	C	3.1	3.0		C	C	C	C						
18							1.9	3.4	2.8	3.1	C														
19									2.7	3.0			3.1		2.6	2.3R									
20								2.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0								1.7	
21	1.7								2.7		3.4	3.1	3.0	3.0	3.0	3.0									
22				2.0					2.7	E 4.1R	3.2	C	C	C	C	C	C							2.2	
23		1.7						2.7	2.7	3.5				2.9R	C	C						S			
24										3.4															
25									3.1R	3.1							B	B	B			S			
26																	2.4								
27							1.8						B				B								
28					1.8	1.8			2.6	3.0	2.2	3.1	3.3R			B	B	1.9	2.0	1.8					
29										B	B	B	B		2.7		B	B	1.8		1.7				
30								2.5	2.5	B	B	B	B	B	B	B	B	B	1.8	A		2.0			
31				1.7				1.8		3.0	B	B	2.8R						1.7	1.7	1.7	1.7		E	
No.																									
Median																									

Sweep 1.60 Mc to 2.00 Mc in 20 sec in automatic operation.

The Radio Research Laboratories, Japan.

fbES

A 5

Lat. 39° 43.5' N
Long. 140° 08.2' E

Akita

IONOSPHERIC DATA

135° E Mean Time (G.M.T. + 9h.)

f-min

Dec. 1962

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	1.80	1.75	1.70	1.75	1.70	1.80	1.80	1.70	1.80	1.80	2.00	2.00	1.75	1.70	1.85	1.80	1.85	1.80	1.90	1.80	1.80	1.70	1.75	
2	1.75	1.80	1.70	1.70	E	1.65	1.70	1.80	1.80	2.00	1.75	2.00	1.80	1.95	1.75	1.70	1.75	1.70	1.75	1.70	1.80	E	1.70	1.75	
3	1.75	1.75	E	1.65	E	1.65	1.75	1.75	1.70	2.00	1.70	1.90	2.00	2.00	1.90	2.05	1.75	1.85	1.70	1.70	1.75	1.70	1.70	1.70	
4	1.65	1.75	1.75	1.75	1.65	1.80	1.75	1.70	1.70	1.80	1.95	2.00	1.90	1.95	2.00	1.90	1.80	1.90	1.75	1.70	1.90	1.75	1.70	1.70	
5	1.80	1.75	1.75	1.75	1.65	1.70	1.80	1.70	1.75	1.75	1.90	1.95	1.75	1.80	1.95	1.80	2.05	2.05	1.70	1.75	1.70	1.75	E	1.80	1.75
6	1.70	1.70	1.70	1.75	1.70	1.70	1.70	1.75	1.75	1.70	1.80	1.95	1.75	1.75	1.75	1.75	1.70	1.70	1.70	1.75	1.75	1.70	1.75	1.70	
7	1.65	1.75	1.70	1.70	1.75	1.75	1.75	1.85	1.70	1.80	1.80	1.80	1.85	1.85	1.90	1.80	1.70	1.70	1.70	1.80	1.75	1.70	1.75	1.70	
8	1.75	1.70	1.70	1.75	1.70	1.65	1.75	1.75	1.70	1.80	1.85	2.00	1.90	1.80	2.05	1.75	1.70	1.75	1.80	1.70	1.70	1.70	1.70	1.70	
9	1.70	1.70	1.70	1.70	1.75	1.70	1.70	1.70	1.70	1.75	1.75	1.80	1.95	1.90	1.80	1.70	1.75	1.70	1.70	1.75	1.85	1.80	1.70	1.75	
10	1.70	1.70	1.70	1.80	1.70	1.70	1.70	1.80	1.75	1.70	1.75	2.10	1.95	2.20	2.05	2.30	2.20	1.75	1.70	1.75	E	S	E	1.65	
11	1.70	E	1.70	E	E	1.70	1.70	1.70	1.70	1.70	1.75	1.75	1.70	1.75	1.70	1.80	1.70	1.65	1.70	1.70	E	E	1.70	1.65	
12	1.70	E	1.70	E	1.70	E	1.65	1.70	1.65	1.70	1.75	1.80	2.00	1.75	1.70	1.75	2.25	1.70	1.70	1.70	1.70	1.70	1.65	1.75	
13	1.75	1.70	1.75	E	1.70	1.65	1.70	1.80	C	C	C	C	C	C	C	C	1.75	1.80	1.70	1.70	1.75	1.70	1.75	1.70	
14	1.70	E	1.70	E	E	1.70	1.70	1.70	1.80	1.70	2.25	4.30	3.45	3.05	2.10	2.05	1.80	1.80	1.80	1.80	1.80	1.70	1.70	1.70	
15	1.70	E	1.70	1.70	1.70	1.75	E	1.70	1.95	2.00	2.00	2.05	2.05	2.05	2.45	2.00	1.95	1.75	1.75	1.75	1.70	1.80	1.70	1.75	
16	1.65	1.70	E	1.70	1.70	1.70	1.70	1.70	1.80	1.85	1.90	1.90	2.00	2.00	2.05	1.95	1.80	1.75	1.70	1.80	1.80	1.70	1.65	1.70	
17	1.70	1.70	E	1.70	E	1.65	1.70	1.70	1.75	1.80	1.80	C	2.00	1.95	2.00	C	2.20	C	1.75	C	1.65	1.70	1.70	E	
18	E	E	1.70	1.70	1.70	1.70	1.70	1.70	1.95	1.75	1.75	1.90	1.85	1.75	1.90	1.75	1.80	1.70	1.70	1.70	1.75	1.70	1.75	1.75	
19	1.70	E	1.70	1.75	1.65	E	1.75	1.80	1.70	1.70	2.00	1.95	1.80	1.80	1.80	1.75	1.70	1.70	1.75	1.70	1.70	1.70	1.70	2.00	
20	1.70	E	E	E	E	1.70	1.75	1.70	1.70	1.75	1.70	1.80	1.80	1.75	1.75	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.65	1.70	
21	1.70	1.75	1.70	E	1.75	1.70	1.70	1.75	2.00	1.75	1.80	2.00	2.00	2.00	2.00	1.75	1.75	1.80	1.80	1.80	1.75	1.80	1.70	1.70	
22	2.00	1.80	2.00	1.80	1.85	1.80	1.80	1.75	2.05	3.25	3.20	2.80	3.30	3.30	2.55	2.30	1.80	2.00	1.75	1.90	1.70	1.70	1.70	1.80	
23	1.75	1.70	1.80	1.70	1.95	1.80	1.75	1.70	1.75	1.70	1.95	2.00	2.00	2.20	2.80	2.50	1.85	1.75	1.75	1.70	1.70	1.75	1.75	1.70	
24	1.70	1.75	1.75	1.70	1.70	1.80	1.70	1.70	1.80	1.80	2.05	2.05	2.05	2.05	2.05	2.20	1.80	1.70	1.65	1.80	1.95	1.75	1.70	E	
25	E	1.75	1.75	1.70	1.70	E	1.80	1.75	1.80	2.00	2.00	2.05	2.75	3.00	2.60	2.50	1.95	1.75	1.75	1.70	1.70	1.70	1.80	1.70	
26	E	1.65	1.70	1.70	1.70	1.70	1.75	1.65	1.75	1.75	2.00	2.05	2.05	2.05	2.05	2.00	1.80	1.70	1.75	1.75	1.75	1.70	1.75	1.80	
27	1.70	1.80	1.70	1.70	1.70	1.70	1.70	1.70	1.75	1.75	2.00	2.35	2.80	2.00	2.00	1.90	2.00	1.80	1.70	1.75	1.95	1.70	E	E	
28	1.70	1.70	1.65	1.70	1.70	1.75	1.70	1.70	1.75	1.80	2.05	2.05	2.85	2.00	2.00	2.20	1.85	1.75	1.80	1.80	1.70	1.75	1.75	1.70	
29	1.70	1.75	1.65	1.75	1.75	E	1.70	E	2.00	2.80	2.85	3.05	3.25	2.70	2.50	1.95	1.75	1.75	1.70	1.75	1.70	1.70	1.70	1.70	
30	1.75	1.70	1.70	1.70	1.70	1.80	1.70	1.65	1.95	2.75	3.00	3.05	3.55	3.00	3.10	2.80	2.00	1.75	1.65	1.70	1.70	1.75	1.75	1.70	
31	1.70	E	E	1.70	1.65	1.70	1.70	1.70	1.80	2.50	2.70	3.00	2.55	2.00	2.15	1.90	1.90	1.75	1.70	1.70	1.70	1.70	1.70	E	
No.	31	31	31	31	31	31	31	31	27	28	27	28	27	28	27	28	27	27	30	31	30	31	30	31	31
Median	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.75	1.80	1.90	2.00	2.00	1.95	2.00	1.85	1.75	1.75	1.70	1.70	1.75	1.70	1.70	1.70	

Sweep 1.60 Mc to 2.00 Mc in 20 sec in automatic operation.

The Radio Research Laboratories, Japan.

A 6

f-min

IONOSPHERIC DATA

Lat. 39° 43.5' N
Long. 140° 08.2' E

Akita

135° E Mean Time (GM.T. + 9h.)

M(3000)F2

Dec. 1962

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	2.95	3.15	2.90	3.20	2.95	2.95	3.05	3.25	3.50	3.55	3.50	3.60	3.45	3.60	3.50	3.70	3.65	3.40	3.10	3.20	3.40	3.15	3.00	3.05	3.05
2	2.95	2.90	3.05	3.00	2.95	3.20	3.45	3.45	3.65	3.55	3.30	3.45	3.50	3.60	3.65	3.65	3.50	3.40	3.05	3.40	3.25	3.25	2.95	2.95	2.75
3	2.85	2.85	2.95	2.95	3.15	3.00	3.30	3.50	3.85	3.60	3.60	3.40	3.50	3.65	3.60	3.75	3.60	3.60	3.35	3.40	3.00	2.65	2.90	2.95	2.95
4	3.00	2.90	2.90	3.00	3.25	3.05	3.25	3.70	3.85	3.65	3.70	3.70	3.60	3.70	3.70	3.70	3.50	3.40	3.15	2.80	3.00	2.90	2.95	2.95	2.95
5	3.10	2.65	2.65	2.85	2.70	3.05	3.30	3.45	3.50	3.30	R	R	3.50	3.65	3.60	3.65	3.50	3.10	3.25	3.10	3.10	2.90	2.90	2.95	2.95
6	3.05	2.85	2.75	2.95	3.25	3.30	3.55	3.60	3.75	3.70	3.45	3.60	3.60	3.65	3.60	3.60	3.70	3.25	3.15	3.15	3.25	3.45	2.85	2.75	2.75
7	2.80	2.90	2.85	3.05	3.05	3.20	3.35	3.45	3.70	3.50	3.50	3.40	3.65	3.40	3.60	3.60	3.85	3.10	3.10	3.25	3.15	3.10	3.15	3.00	3.00
8	F	F	2.85	2.95	3.05	3.35	3.10	3.45	3.55	3.35	3.65	3.25	3.65	3.55	3.60	3.65	3.60	3.20	3.25	3.25	R	R	R	F	F
9	F	F	3.05	3.10	3.15	3.50	3.35	3.35	3.40	3.40	3.50	3.50	3.60	3.60	3.60	3.65	3.65	3.30	3.30	3.25	R	R	R	2.85	2.85
10	2.85	R	R	3.10	3.15	3.05	3.20	3.50	3.60	3.60	3.55	3.40	3.70	3.45	3.60	3.50	3.60	3.35	3.35	3.40	3.15	3.15	3.05	2.75	3.00
11	2.90	3.20	3.10	2.90	3.00	3.15	3.30	3.60	3.65	3.55	3.35	3.40	3.65	3.55	3.70	3.55	3.45	3.45	3.25	3.35	3.35	2.95	2.95	3.35	F
12	F	F	F	2.70	3.00	3.35	3.45	3.25	3.25	3.30	3.20	3.30	3.60	3.55	3.55	3.45	3.60	3.15	3.45	3.25	3.25	3.05	2.85	3.05	F
13	3.00	2.90	2.80	3.10	F	F	F	3.60	C	C	C	C	C	C	C	C	C	R	R	R	R	2.95	2.95	3.05	F
14	F	F	F	F	3.20	F	F	R	3.50	3.50	3.40	3.70	3.75	3.55	3.50	R	R	2.75	3.05	3.15	3.25	3.05	2.85	3.05	F
15	2.95	3.15	3.15	3.15	3.25	2.95	3.05	3.45	3.40	3.60	3.30	3.50	3.60	3.50	3.70	3.66	3.50	R	R	3.05	3.35	3.00	2.90	2.90	2.95
16	F	F	R	R	F	F	3.10	3.40	3.45	3.55	3.45	3.35	3.55	3.55	3.60	3.60	3.50	3.30	3.20	2.95	3.00	3.00	3.15	F	F
17	F	F	3.00	3.00	3.15	3.15	3.25	3.40	3.65	3.00	3.45	3.35	3.35	3.45	3.55	3.55	3.55	3.20	3.20	3.05	3.05	3.10	3.00	3.00	F
18	F	F	F	F	F	F	F	F	3.45	3.45	3.45	3.30	3.35	3.45	3.50	3.55	3.50	3.35	3.35	3.10	3.10	3.20	3.00	2.95	F
19	F	F	F	F	3.00	3.20	3.20	3.10	3.45	3.60	3.70	3.15	3.35	3.60	3.50	3.60	3.40	3.40	3.00	3.00	3.10	3.15	3.00	3.00	2.95
20	S	S	F	F	F	F	3.10	3.40	3.50	3.45	3.40	3.45	3.45	3.50	3.55	3.55	3.55	3.40	3.40	2.90	2.90	3.20	3.00	3.00	F
21	F	F	3.15	2.85	2.95	2.85	3.15	3.70	3.60	3.50	R	R	3.60	3.65	3.55	3.60	3.60	3.25	3.50	3.20	3.15	3.40	2.80	2.95	F
22	3.05	3.00	3.15	3.25	3.35	2.90	3.25	3.30	3.60	3.45	3.35	3.60	3.55	3.65	3.55	3.65	3.50	3.35	3.20	3.10	3.25	3.05	2.65	3.15	F
23	3.20	2.90	2.85	3.05	3.35	R	R	3.45	3.55	3.50	3.60	3.60	3.55	3.65	3.55	3.75	3.55	3.55	3.70	3.15	3.55	3.55	2.70	2.95	F
24	3.15	3.10	3.00	3.25	3.70	2.95	3.35	3.35	3.45	3.80	3.10	3.60	3.60	3.60	3.65	3.75	3.55	3.05	2.85	3.35	3.15	3.50	3.50	F	F
25	2.90	2.75	2.85	3.50	3.70	3.10	3.50	3.45	3.60	3.20	3.40	3.75	3.50	3.60	3.50	3.70	3.70	3.60	2.95	3.15	3.10	2.90	3.50	F	F
26	3.05	F	F	F	F	3.05	3.20	3.30	3.80	3.30	3.55	3.75	3.55	3.40	3.55	3.50	3.70	3.15	3.30	3.30	3.40	2.90	2.80	2.70	F
27	2.70	2.95	3.00	3.05	3.15	2.90	3.20	3.30	3.20	3.45	3.50	3.70	3.50	3.60	3.05	3.65	3.50	3.30	3.25	3.50	3.05	2.95	3.25	F	F
28	F	F	F	F	3.30	3.45	3.35	3.40	3.40	3.60	3.40	3.45	3.35	3.45	3.60	3.65	3.35	3.30	3.30	3.50	3.45	3.55	3.25	3.25	F
29	F	F	F	F	3.30	3.30	3.30	3.40	3.70	3.65	3.40	3.55	3.25	3.35	3.45	3.45	3.40	3.30	3.30	3.40	3.35	3.40	3.30	3.30	F
30	2.80	2.95	2.90	2.95	3.10	3.20	3.20	3.40	3.50	3.65	3.40	3.60	3.70	3.40	3.80	3.80	3.65	2.95	3.25	3.40	3.25	3.10	3.30	3.30	F
31	F	F	3.10	3.30	F	F	F	F	3.60	3.75	3.55	3.60	3.70	3.70	3.55	3.75	3.75	3.25	3.25	3.50	3.50	3.50	3.50	3.50	F
No.	19	17	22	24	25	26	24	27	27	29	27	27	29	30	30	29	28	29	28	27	28	29	23	17	
Median	2.95	2.90	2.95	3.05	3.15	3.10	3.20	3.40	3.55	3.50	3.45	3.50	3.55	3.60	3.55	3.60	3.60	3.30	3.20	3.20	3.20	3.05	2.95	2.95	

The Radio Research Laboratories, Japan.

Sweep 1.60 Mc to 20.0 Mc in 20 sec in automatic operation.

M(3000)F2

IONOSPHERIC DATA

Lat. 39° 43.5' N
Long. 140° 08.2' E

Akita

M(3000)F1

Dec. 1962

135° E Mean Time (GMT + 9h.)

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										A	A	4.0 ^L	L ^H											
2										L	A	A	L	L	L									
3										L	L	L	L	L	L									
4									L	L	L	4.05 ^L	L	L	4.25 ^H									
5									L	A	L	L	4.00 ^L	L	L									
6									4.35	4.20 ^F	4.20 ^L	L	C	L	L									
7										L	L	L	S	S	S									
8										L	L ^H	4.25 ^L	3.90 ^L	3.85 ^H	L									
9										4.45	4.15 ^L	3.85 ^L	L	L	L									
10										L	L	L	L	R	L									
11									L	4.30 ^L	4.25 ^L	L ^H	L	L	L									
12									C	L	L	R	L	C	C									
13									C	C	C	C	C	C	C									
14									L	L	L	S	L	L	L									
15									L	L	L	3.85 ^L	S	R ^S	L									
16									L	L	L	L	L	L	R									
17									L	L	3.75	C	L	L	S									
18									L	L	L	3.85 ^L	3.90 ^L	4.15 ^L	L									
19									L	L	L	L	3.80 ^L	3.95 ^L	4.30									
20									L	L	L	L	L	L	4.10									
21									L	L	L	L	4.10	4.15 ^L	L									
22									L	A	L	L	L	L	L									
23									L	L	L	L	L	4.05	L									
24									4.35	L	L	L	L	L	4.15	L								
25										L	L	L	L	L	L									
26									4.35	L	L	L	L	3.90 ^L	L									
27									L	3.80 ^L	3.90	4.00	L	L	L									
28									L ^H	L	L	L	L	L	L									
29										L	L	L	L	L	L									
30										3.65 ^L	3.70 ^L	L	L	L	L									
31										4.35 ^H	3.75 ^L	3.65 ^L	3.65 ^L	L	L									
No.									1	5	8	9	7	8	4									
Median									4.35	4.35	4.20	3.85	3.90	4.00	4.20									

M(3000)F1

IONOSPHERIC DATA

Lat. 39° 43.5' N
 Long. 140° 08.2' E

Akita

135° E Mean Time (GM.T. + 9h.)

R'F2

Dec. 1962

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									240	245	245	245													
2									230	275	245	235	245	240											
3									245	245	245	250	235												
4									230	240	250	230	240	240	240										
5									220	250	230	240	250	235	230										
6									225	240	250	240	^I 250 ^C	250	240										
7										250	245	^I 245 ^S	245	240											
8									245	245	280	240	245	245											
9									250	250	250	240	245	250											
10									250	240	240	235	^I 245 ^R	245											
11									220	240	250	255	240	245											
12									^O	^C	^C	^C	^C	^C	^C										
13									245	260	235	240	230												
14									240	260 ^L	275	230	235	245	245										
15									250	245	^C	255	280												
16									240	250	^I 245 ^C	245	235	240											
17									240	240	245 ^L	260	235	225											
18									240	250	250	240	240	245											
19									245	255	240	245	245												
20									245	245	245	245	235	245											
21									245	290	230	245	230	245											
22									245	210	300	260	245	245	240	210									
23									245	245	245	245	235	245											
24									245	255	230	225	255	260											
25									270	250	240	240	255 ^L	260	235										
26									225	245	255	245	245	245											
27									225	245	255	245	245	245											
28									225	245	255	245	245	245											
29									275	245	245	245	245	245											
30									245	245	245	235	245												
31									6	22	27	29	30	27	21	3									
No.									225	245	250	245	245	245	245	235									
Median																									

IONOSPHERIC DATA

Lat. 39° 43.5' N
Long. 140° 08.2' E

Akita

135° E Mean Time (GMT. + 9h.)

f_oF

Dec. 1962

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	295	290	305	265 ^A	280 ^A	290	295	250	245 ^A	240 ^A	215	195 ^H	245	240	240	245	230	225	255	260	225	265	245 ^E	220	230
2	280	290	285	275	295	245	240	220	240	205	A	A	240	230	230	230	205	205	275	245	245	390 ^E	310	345 ^E	
3	320 ^E	315	315	290	245	265	245	210	220	245	235	245	240	240	240	240	205	245 ^A	220	245	215	350 ^E	320	300	
4	295	300	285	295	280	280	240	220	220	195	210	230	230	230	210	240	225	205	245	245	290	305	300	280	
5	250	345 ^E	350	350 ^E	355 ^E	270	325	240	220	235 ^A	225	245	205	220	215	230	220	260	245	260	250	280	265	240	
6	255	320	340 ^A	290	260	245	235	220	200	195	250	240	225	240	240	235	210	205	230	240	230	220	290	325 ^F	
7	310	310	310	290	280	245	235	225	225	240	225	230	210 ^S	220 ^S	235 ^S	235	210	220	260	230	255	295 ^E	290	305 ^E	
8	290	270	285	280	260	205	255	230	225	230	230	215	245	240	240	225	220	200	225	240	245	270	285	300 ^E	
9	290	325	295	250	290	255	220	230	230	195	220	210	220	245	250	240	220	240	240	245	235	235	300	275	
10	280	285	295	270	260	265	250	230	220	205	240	200	230	205 ^R	240	235	220	240	230	220	245	260 ^S	310	280	
11	290	295	280	295	295 ^E	270	230	225	205	195	200	200 ^H	245	240	235	245 ^H	225	235	240	220	235	245 ^F	240	295 ^E	
12	295 ^F	300 ^E	320	320 ^E	280	245	225	220	235	270	245	255	240 ^A	235	230	240	215	230 ^A	220	245	240	220	290 ^A	255	
13	245	295	305	265	275	255	255	230	C	C	C	C	C	C	C	C	215	230 ^A	220	245	240	220	290 ^A	255	
14	245	295	270	225	245	250	250 ^A	240	240	220	200	225 ^S	240 ^S	220	230	225 ^H	210	240 ^E	240	225	255	280	320 ^E	290	
15	275	255	275	245	245	245	245	225	225	245	245	220	235 ^S	200	240	230	205	210	260	240	245	220	320 ^E	280	
16	295 ^F	295 ^F	280	240	240	230 ^A	230	240	220	245	240	240	240	245	235	240	210	225	275	230	240	260	290 ^E	305 ^E	
17	300 ^A	295	300 ^E	290	280	250	245	220	220	240	210	C	200	220	250	235 ^C	220	230 ^C	250 ^C	245	255	235	255	290 ^E	
18	275	245	285	300 ^E	300 ^E	290 ^E	290 ^E	240	270	240	240	240 ^C	215	230	220	235	225	215	220	230	235	235	270	275	
19	270	245	280	245	270	240	225	260	230	240	240	225	245	235	195	215	230	230	215	240	210	240	285	275	
20	250	230	240	240	240	255	250	220	240	225	245	225	240	220	210	230	210	220	220	220	280	230	260	295 ^E	
21	245	300 ^E	255	295 ^E	280	330 ^E	255	205	210	235	250	240	205	220	240	210	210	220	230	260	260	220	310	305	
22	295	300	290	245	245	245	270	225	230	245	245	240 ^C	240	240	205	225	220	235	260	270	255	295	320	305 ^A	
23	250	320 ^E	300	290	240	270	255	230	225	230	230	250	230	205	235	235	220	205	220	265	220	205	345 ^E	310 ^E	
24	275	300	285	255	210	245	245	235	230	195	245	250	235	235	200	210	220	270	250	245	210	265 ^S	390 ^E	345 ^E	
25	305	345 ^E	300 ^E	230	200	295 ^E	240	220	240	240	245	245	220	235	220	235	220	190	260	240	230	290 ^E	295 ^E	275	
26	240	290	270	250	285	255	235	245	210	195	195	240	220	220	245	230	210	240	235	230	220	320 ^S	310	320 ^E	
27	340 ^E	295	275	295	245	240	245	245	250	250	235	220	205	245	240	245	245	225	240	205	220	320 ^E	255	255	
28	305 ^E	305	280	245	225	230	235	220	220	250	245	245	240	235	245	225	235	240	230	225	215	355 ^E	220	270 ^E	
29	255	305	285	270	230	200	300 ^E	230	205	240	200	250	230	245	245	230	210	240	260	230	240	250	240	245	
30	295 ^E	295	275	290	240	280	270	230	245	230	245	240	230 ^B	200	240 ^B	245	205	245	225	230 ^A	245	270	255	270	
31	275	290	270	245	285	240	240	205	210	245	200 ^H	215	230	245	245	240	215	230	215	240	240	290 ^E	260	245	
No.	25	25	28	27	28	24	28	31	30	30	29	28	29	30	30	30	31	30	30	29	31	22	22	20	
Median	275	295	285	265	260	250	245	225	225	235	240	240	230	230	240	235	220	230	240	240	240	250	285	280	

Sweep 1.60 Mc to 2.00 Mc in 2.0 sec in automatic operation.

The Radio Research Laboratories, Japan.

f_oF

A 10

IONOSPHERIC DATA

Lat. 39° 43.5' N
Long. 140° 08.2' E

Akita

135° E Mean Time (GMT.+9h.)

f_oF₂

Dec. 1962

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	140	145	130	E	E	175	115	110	110	110	115	155	150	150	110	E	E	E	105	120	E	120
2	120	E	E	E	E	E	E	175	160	155	145	120	115	155	150	150	110	105	E	E	E	E	E	E
3	E	E	E	E	E	E	E	120	110	110	105	110	110	140	140	160	E	140	135	E	E	E	E	E
4	E	E	E	E	E	E	E	120	120	120	105	110	120	120	120	120	140	E	E	E	E	E	E	E
5	E	E	E	E	E	E	E	120	120	120	105	110	120	120	120	120	140	E	E	E	E	E	E	E
6	105	110	110	110	110	115	E	120	120	160	160	160	160	140	140	140	140	E	E	E	E	E	E	110
7	E	E	E	E	E	E	E	170	150	145	145	130	155	165	145	145	140	E	E	E	E	E	E	E
8	E	E	E	E	E	E	E	120	110	110	110	145	145	145	145	145	145	E	E	E	E	E	E	E
9	E	E	140	130	125	125	E	120	120	120	145	145	145	145	145	145	145	E	E	E	E	E	E	E
10	E	E	E	E	E	E	E	120	120	120	145	145	145	145	145	145	145	E	E	E	110	S	E	E
11	E	E	E	E	E	E	E	110	120	105	105	105	145	145	145	145	140	E	E	E	110	110	105	E
12	E	E	E	E	E	E	E	145	145	165	120	170	145	145	145	145	140	120	120	115	E	E	E	E
13	E	E	E	E	E	E	E	145	145	130	125	125	140	145	145	145	140	E	E	E	E	E	E	E
14	E	E	E	E	E	E	E	120	110	110	110	110	110	170	170	155	145	E	E	E	105	105	E	E
15	E	E	E	E	E	E	E	155	145	145	145	145	145	145	145	145	145	E	E	E	140	120	110	E
16	E	110	E	E	E	E	E	125	120	135	130	130	175	175	145	145	145	E	E	E	E	E	E	E
17	105	110	E	E	E	E	E	145	135	135	135	135	140	105	105	105	140	E	E	E	E	E	E	E
18	E	E	E	E	E	E	E	145	130	130	125	125	140	145	145	145	140	E	E	E	E	E	E	E
19	E	E	E	E	E	E	E	170	170	145	145	145	120	120	120	155	145	E	E	E	E	E	E	E
20	E	E	E	E	E	E	E	140	140	145	130	130	140	130	130	110	145	E	E	E	E	E	E	E
21	115	E	E	E	E	E	E	140	140	150	150	150	150	145	145	145	145	E	E	E	E	E	E	E
22	E	E	E	E	E	E	E	140	140	135	125	125	140	145	145	145	145	E	E	E	E	E	E	E
23	E	110	E	E	E	E	E	130	120	110	110	110	145	145	145	145	145	E	E	E	E	E	E	120
24	E	E	E	E	E	E	E	175	175	155	155	155	145	145	145	145	145	E	E	E	E	E	E	E
25	E	E	E	E	E	E	E	175	175	155	155	155	145	145	145	145	145	E	E	E	E	E	E	E
26	E	E	E	E	E	E	E	115	115	115	115	115	115	115	115	115	120	E	E	E	E	E	E	E
27	E	E	E	E	E	E	E	165	165	155	155	150	145	145	145	145	145	E	E	E	E	E	E	E
28	E	E	E	E	E	E	E	160	160	160	160	160	160	160	160	160	160	E	E	E	E	E	E	E
29	E	E	E	E	E	E	E	160	160	160	160	160	160	160	160	160	160	E	E	E	E	E	E	E
30	E	E	E	E	E	E	E	110	110	110	110	110	110	110	110	110	110	E	E	E	E	E	E	E
31	E	E	E	E	E	E	E	110	110	180	180	180	140	140	140	140	140	E	E	E	E	E	E	110
No.	5	5	3	6	4	5	3	9	15	15	18	10	8	10	8	10	6	4	6	6	7	6	4	6
Median	110	110	140	110	125	120	120	120	130	140	135	140	140	145	140	150	140	115	110	110	110	110	110	120

The Radio Research Laboratories, Japan.

Sweep 1.40 Mc to 24.0 Mc in 20 sec in automatic operation.

f_oF₂

Dec. 1962

IONOSPHERIC DATA

Lat. 39° 43.5' N
Long. 140° 08.2' E

Akita

135° E Mean Time (GMT. + 9h.)

Types of Es

Dec. 1962

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	f	f	f3	f3					C3	L3	L2			h	h	h	C	f	f		f			f	
2	f							h	h3	h	hC	C2	C2		h	h		f	f					f	
3								C	l		l	C						f	f					f	
4									C2	C2	h	h		C										f2	
5	f2	f2	f2	f2	f2	f			h	h	h	h					h4						f	f	
6								h	h	h	C	h	h	h	h	h	h							f	
7								h	h	h	h	h	h	h	h	h	h							f	
8								h	h	h	h	h	h	h	h	h	h							f	
9								h	h	h	h	h	h	h	h	h	h							f	
10								h	h	h	h	h	h	h	h	h	h							f	
11								C2	C	h	C	h	h	h	h	h	h							f	
12								h	h2	h2	h	h	h	h	h	h	h							f	
13								h	h	h	h	h	h	h	h	h	h							f	
14								h	h	h	h	h	h	h	h	h	h							f	
15								h	h	h	h	h	h	h	h	h	h							f	
16								h	h	h	h	h	h	h	h	h	h							f	
17	f2	f						h	h4	h2	h2	h	C2	h	C	h	h							f	
18								h	h	h	h	h	h	h	h	h	h							f	
19								h	h	h	h	h	h	h	h	h	h							f	
20								h	h	h	h	h	h	h	h	h	h							f	
21								h	h	h	h	h	h	h	h	h	h							f	
22								h	h	h	h	h	h	h	h	h	h							f	
23								h	h	h	h	h	h	h	h	h	h							f	
24								h	h	h	h	h	h	h	h	h	h							f	
25								h	h	h	h	h	h	h	h	h	h							f	
26								h	h	h	h	h	h	h	h	h	h							f	
27								h	h	h	h	h	h	h	h	h	h							f	
28								h	h	h	h	h	h	h	h	h	h							f	
29								h	h	h	h	h	h	h	h	h	h							f	
30								h	h	h	h	h	h	h	h	h	h							f	
31								h	h	h	h	h	h	h	h	h	h							f	
No.																									
Median																									

Sweep 1.0 Mc to 2.0 Mc in 2.0 sec ^{min} in automatic operation.

The Radio Research Laboratories, Japan. **A 12**

Types of Es

IONOSPHERIC DATA

Lat. 35° 42.4' N
Long. 139° 29.3' E

Kokubunji Tokyo

135° E Mean Time (GMT.+9h.)

foF1

Dec. 1962

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L	A	A	L	S	L	L	L								
2									L	L	L	A	L	L	L	L								
3									L	L	L	L	L	L	L	L								
4									L	L	L	L	L	L	L	L								
5									L	L	L	L	L	L	L	L								
6									C	L	L	L	L	4.0 ^L	L	L								
7									C	L	L	L	L	L	L	L								
8									L	L	L	L	L	L	L	L								
9									L	L	L	L	L	L	L	L								
10									L	L	L	L	L	L	L	L								
11									L	L	L	L	L	L	L	L								
12									L	L	L	L	L	L	L	L								
13									L	L	L	L	L	L	L	L								
14									L	L	L	L	L	L	L	L								
15									L	L	L	L	L	L	L	L								
16									L	L	L	L	L	L	L	L								
17									L	L	L	L	L	L	L	L								
18									L	L	L	L	L	L	L	L								
19									L	L	L	L	L	L	L	L								
20									L	L	L	L	L	L	L	L								
21									L	L	L	L	L	L	L	L								
22									L	L	L	L	L	L	L	L								
23									L	L	L	L	L	L	L	L								
24									L	L	L	L	L	L	L	L								
25									L	L	L	L	L	L	L	L								
26									L	L	L	L	L	L	L	L								
27									L	L	L	L	L	L	L	L								
28									L	L	L	L	L	L	L	L								
29									L	L	L	L	L	L	L	L								
30									L	L	L	L	L	L	L	L								
31									L	L	L	L	L	L	L	L								
No.																								
Median																								

Sweep / sec to 2.0 Mc in 20 sec in automatic operation.

The Radio Research Laboratories, Japan.

foF1

K 2

IONOSPHERIC DATA

Lat. 35° 42.4' N
Long. 139° 29.3' E

Kokubunji Tokyo

foE

Dec. 1962

135° E Mean Time (GMT.+9h.)

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	R	A	A	A	S	R	R	S	4.80 ^k							
2								S	4.2.60 ^k 1.7.5 1.2.95	A	A	A	S	R	R	S	A							
3								B	R	S	R	S	S	A	S	B	B							
4								S	S	4.2.75	R	S	S	S	S	S	S							
5								S	A	S	R	R	S	S	S	R	S							
6								C	G	C	S	R	S	R	2.70 ^k 1.2.35	2.00								
7								S	S	C	S	A	S	S	S	S	S							
8								S	S	1.3.00 1.3.00	S	S	S	S	R	2.55	S							
9								S	R	A	A	S	B	S	R	S	S							
10								S	2.50 ^k	S	A	S	S	S	S	S	C							
11								S	A	4.2.70 ^k	R	S	S	S	4.2.60 ^s	S	4.2.10 ^s							
12								B	R	1.2.50 1.3.05 1.3.10	S	S	S	1.2.90 ^s	2.60 1.2.35 ^k	S	S							
13								S	B	S	S	S	S	S	S	S	S							
14								S	S	S	A	B	S	S	S	S	S							
15								A	S	S	S	S	S	S	S	S	S							
16								S	S	A	S	S	S	S	S	S	S							
17								S	4.2.70 ^k	S	A	S	S	S	B	S	S							
18								S	A	S	S	S	S	S	R	S	S							
19								S	S	A	S	S	S	S	S	S	S							
20								S	S	A	S	S	S	S	S	S	S							
21								S	S	S	A	S	B	A	S	S	S							
22								S	R	S	A	R	S	A	S	R	B							
23								B	R	1.2.55 1.2.80 ^k	R	S	A	B	R	B	S							
24								S	S	4.2.00 ^k	R	S	S	1.3.00 ^s	2.70 ^k 1.2.60 ^k	S	S							
25								S	1.2.30 ^s	2.30	S	S	S	S	S	S	S							
26								S	S	4.2.95 ^k	B	S	C	B	2.90	S	S							
27								S	2.60 ^k 1.2.80 ^k	S	R	R	R	R	R	S	S							
28								S	2.20	S	S	S	S	S	S	C	S							
29								S	S	S	B	S	S	S	S	S	S							
30								S	S	S	S	S	S	S	S	S	S							
31								B	S	2.85	S	B	S	S	B	R	B							
No.								1	6	8	6	2	2	2	5	3	3							
Median								4.2.00	4.2.55	4.2.75	4.2.95	4.3.05	4.3.05	4.2.80	4.2.60	4.2.35	4.2.00							

IONOSPHERIC DATA

Lat. 35° 42.4' N
Long. 139° 29.3' E

Kokubunji Tokyo

foEs

135° E Mean Time (GMT. + 9h.)

Dec. 1962

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	Z1	Z0	Z1	E	S	S	S	G	53	760	741	S	37	G	S	Z5	Z3	S	S	S	S	S	39
2	S	Z2	S	E	E	Z2	S	S	G	G	S	710.2	749	38	G	73.5	65	3.9M	S	S	S	S	S	S
3	S	E	E	E	E	S	S	B	G	32	G	S	S	B	S	B	B	72.15	S	736	Z35	S	S	S
4	S	S	E	E	S	S	S	S	G	G	G	S	S	S	G	S	S	S	S	Z3	S	S	S	S
5	Z26	Z2	E	Z0	Z0Y	S	S	S	Z85	S	G	S	S	G	G	G	S	S	S	C	S	S	S	S
6	C	C	C	C	C	C	C	C	C	C	C	G	S	G	G	3.1	Z3	S	S	S	S	S	S	S
7	Z9M	S	S	E	C	C	C	C	C	C	S	34	S	S	S	S	Z7	S	S	S	S	S	S	E
8	S	S	S	E	E	E	S	S	G	375	S	S	39	S	G	Z9	S	S	C	S	C	S	C	C
9	C	C	C	E	C	S	S	S	G	37	43	S	B	34	G	S	C	Z2	S	S	S	S	Z1	S
10	C	C	E	C	C	S	S	S	J32	S	Z4	S	S	S	S	S	S	S	S	S	S	S	S	S
11	S	C	E	E	E	1.7	S	Z3	39	G	G	S	S	S	3.1	S	Z3	S	S	S	S	S	S	S
12	S	S	E	E	E	S	S	B	G	S	C	32	S	S	2.9	G	S	36	37M	50M	74	745	38M	S
13	S	S	S	E	Z4	Z9	S	S	G	S	S	S	S	S	S	S	S	S	S	S	745	733	23	S
14	S	S	S	E	E	S	S	S	34	S	39	B	B	S	S	S	S	S	S	S	37M	39M	37	39
15	S	S	S	Z7	1.4	S	5.9	Z95	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
16	S	S	S	S	E	S	S	39	S	36M	S	S	S	S	B	S	S	S	S	S	S	S	S	S
17	S	S	S	E	E	S	S	S	G	C	S	C	S	S	245	S	S	S	S	S	S	S	S	S
18	S	S	Z0Y	E	E	S	S	S	36	34	S	S	S	S	S	S	S	S	S	S	S	S	S	E
19	S	S	E	E	E	S	S	S	26	Z2	S	34	S	S	C	S	S	Z1	S	S	S	S	S	S
20	S	S	Z2	E	E	S	S	S	S	G	S	34	S	39	S	S	S	S	S	S	S	S	S	E
21	Z4	Z4	Z1	33	732Y	S	S	S	S	G	S	35	B	50M	S	S	B	S	S	S	S	S	S	E
22	S	S	E	E	36M	S	S	G	G	S	38	S	S	36	S	G	S	Z4	S	S	S	S	S	S
23	S	S	E	Z5M	Z4	Z1	S	B	G	G	32	7315	35	B	23F	B	S	S	S	S	S	S	S	S
24	S	S	E	E	E	S	S	S	Z4	G	35	S	S	32	3.1	S	S	Z5M	S	S	S	S	S	S
25	S	S	S	E	E	S	S	S	S	G	S	S	S	S	Z3	S	S	S	S	S	S	S	S	S
26	S	S	S	E	S	S	S	S	S	S	32	B	C	B	3.1	S	S	S	S	S	S	S	S	S
27	S	S	E	E	1.2	S	S	S	G	G	S	G	38Y	G	B	Z4F	S	Z3	S	S	S	S	Z2	S
28	S	S	E	E	E	S	S	S	G	S	S	S	S	S	S	C	S	S	S	S	S	S	S	S
29	S	S	E	E	E	S	S	S	G	S	S	S	S	33	S	B	S	S	S	S	S	S	S	S
30	Z4	Z2	Z4	E	E	S	S	S	S	S	B	B	B	B	B	B	Z7	33	39	Z8	Z4	Z7M	Z5	Z9M
31	Z8M	Z9	E	Z0Y	E	S	S	S	S	32	S	B	S	B	B	G	B	Z45	Z3Y	Z4	Z4	Z4	Z6M	Z2M
No.	5	8	Z1	Z8	Z7	5	1	4	18	16	13	10	4	11	13	8	6	11	3	5	8	7	7	8
Median	Z6	Z2	E	E	E	Z1	59	Z6	G	G	3.2	3.4	3.8	3.4	G	G	Z6	Z4	37M	Z8	Z4	Z7	Z5	Z3
U. Q.	Z8	Z3	E	E	Z6			34	Z8	35	38	38	44	38	30	30	Z7	33	39	43	41	39	37	34
L. Q.	Z4	E	E	E	E			G	G	G	G	31	36	G	G	G	Z3	Z2	33	Z3	Z2	Z2	Z2	E
Q. R.	0.4								G		0.7	0.8	0.8				04	1.1	0.6	Z0	19	17	15	

The Radio Research Laboratories, Japan.

Sweep 1.0 Mc to 2.00 Mc in 20 ^{micro} sec in automatic operation.

foEs

K 4

IONOSPHERIC DATA

Lat. 35° 42.4' N
Long. 139° 29.3' E

Kokubunji Tokyo

fbEs

Dec. 1962

135° E Mean Time (G.M.T. + 9h.)

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	1.9	E	1.4		S	S	S		5.3	4.6	3.8	S	3.7		S	EZ5 ^s	S	S	S	S	S	S	A
2	S	1.8	S			E	S	S		3.2	S	A	4.7	3.2		3.2	A	Z.8	S	S	S	S	S	S
3	S					S	S	B				S	S	B	S	S	B	1.9	A	A	Z.0	S	S	S
4	S					S	S	S				S	S	S	S	S	S	S	E	S	S	S	S	S
5	Z.1	E		1.9	1.2	S	S	S	Z.5	S		S	S			Z.9	S	S	S	S	S	S	S	S
6	C	C	C	C	C	C	C	C	C	C	C	3.2	S	S	S	Z.9	Z.3	S	S	S	S	S	S	S
7	Z.1	S	S	C	C	C	C	C	C	3.2	S	3.2	3.9	S	S	Z.9	Z.7	S	S	S	S	S	S	C
8	S	S	S	C	C	C	C	C	S	3.0	4.0	S	B	E3.4 ^R	S	S	S	E	S	S	S	S	S	C
9	C	C	C	C	C	C	C	S	Z.2 ⁵	S	E2.4 ^s	S	S	S	S	S	C	S	S	S	S	S	S	S
10	S	S	S			S	S	S	3.0	S	S	S	S	S	E3.1 ^s	S	Z.3	S	S	S	S	S	S	S
11	S	S	S			1.7	S	G	S	S	C	3.0 ⁹	S	S	E7.9 ^s	S	S	Z.0	Z.1	3.0	S	A	S	S
12	S	S	S			1.9	S	B	S	S	S	S	S	S	S	S	S	S	S	S	S	A	A	S
13	S	S	S			1.4	1.9	S	S	S	3.6	S	B	S	S	S	S	S	S	S	S	A	A	S
14	S	S	S			1.1	S	S	S	S	S	S	S	S	S	S	S	S	S	S	Z.0	A	A	Z.0
15	S	S	S	E	1.1	S	A	Z.1	S	3.1	S	S	S	S	B	S	S	S	S	S	S	S	S	S
16	S	S	S	S	S	S	S	E3.1 ^A	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
17	S	S	S	S	S	S	S	S	S	3.1	S	C	S	S	E2.4 ^s	S	S	S	S	S	S	S	S	S
18	S	S	S	E		S	S	S	3.1	S	S	E3.8 ^s	S	B	S	S	S	S	S	S	S	S	S	S
19	S	S	S	S	S	S	S	S	S	S	S	E3.4 ^s	S	S	S	S	S	E	S	S	S	S	S	S
20	S	S	S	S	S	S	S	S	Z.6	E2.2 ^s	S	S	S	3.7	S	S	S	S	S	S	S	S	S	S
21	1.9	1.8	E	1.2	E3.0 ^A	S	S	S	S	S	S	3.5	B	3.2	S	S	B	S	S	S	S	S	S	S
22	S	S	S	1.8	A	1.9	S	B		S	3.2	E3.1 ^s	3.1	3.1	E2.3 ^K	B	S	Z.1	S	S	S	S	S	S
23	S	S	S	1.8	1.9	1.8	S	S	Z.4	3.5	3.5	S	S	3.2	S	S	S	S	S	S	S	S	S	S
24	S	S	S	S	S	S	S	S	S	S	S	S	S	S	E2.3 ^s	S	S	Z.0	S	S	S	S	S	S
25	S	S	S	S	S	S	S	S	S	S	3.2	S	C	B	3.1	S	S	S	S	S	S	S	S	S
26	S	S	S	S	S	S	S	S	S	S	S	S	3.2	S	B	E2.4 ^R	S	1.9	S	S	S	S	S	S
27	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	E	S	S	S
28	S	S	S	S	S	S	S	S	S	S	S	S	S	3.2	S	C	S	S	S	S	S	S	S	S
29	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	B	S	S	S	S	E	S	S	S
30	Z.1	1.9	1.9			S	S	S	S	S	B	B	B	B	B	B	S	3.0	A	Z.8	1.9	Z.2	Z.0	A
31	Z.0	Z.1		1.8		S	S	B	S	3.2	S	B	S	S	S	B	B	Z.1	S	1.9	Z.1	Z.0	Z.0	Z.0
No.																								
Median																								

Sweep 1.0 Mc to 2.0 Mc in 2.0 ^{min}/_{sec} in automatic operation.

The Radio Research Laboratories, Japan.

fbEs

IONOSPHERIC DATA

Lat. $35^{\circ}42.4'N$
Long. $139^{\circ}20.3'E$

Kokubunji Tokyo

135° E Mean Time (GMT.+9h.)

M(3000)F2

Dec. 1962

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	3.65	3.70	3.75	3.80	3.85	3.90	3.95	4.00	4.05	4.10	4.15	4.20	4.25	4.30	4.35	4.40	4.45	4.50	4.55	4.60	4.65	4.70	4.75	4.80
2	S	3.25	3.30	3.35	3.40	3.45	3.50	3.55	3.60	3.65	3.70	3.75	3.80	3.85	3.90	3.95	4.00	4.05	4.10	4.15	4.20	4.25	4.30	4.35
3	2.85	2.85	3.05	3.05	3.40	3.25	3.50	3.65	3.90	3.55	3.40	3.25	3.10	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
4	3.00	3.05	3.10	3.20	3.35	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
5	S	2.85	2.80	2.85	2.75	3.20	3.55	3.65	3.40	3.55	3.70	3.75	3.45	3.50	3.50	3.55	3.55	3.55	3.55	3.55	3.55	3.55	3.55	3.55
6	C	C	C	C	C	C	C	C	C	C	C	C	3.35	3.50	3.70	3.60	3.55	3.55	3.55	3.55	3.55	3.55	3.55	3.55
7	2.85	3.05	2.95	3.05	C	C	C	C	C	C	C	3.30	3.55	3.35	3.05	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40
8	3.00	2.95	3.00	3.05	3.45	3.10	3.00	3.30	3.45	3.40	3.20	3.45	3.35	3.40	3.50	3.40	3.65	3.60	3.60	3.60	3.60	3.60	3.60	3.60
9	C	C	C	C	C	C	C	C	C	C	C	C	3.40	3.35	3.50	3.30	3.65	3.50	3.50	3.50	3.50	3.50	3.50	3.50
10	3.00	3.00	3.05	3.15	2.95	3.15	3.25	3.35	3.55	3.40	3.35	3.50	3.40	3.30	3.50	3.55	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
11	2.95	C	3.05	3.00	3.00	3.15	3.30	3.70	3.40	3.20	3.35	3.25	3.25	3.55	3.25	3.50	3.65	3.50	3.30	3.50	3.80	3.60	3.25	
12	2.75	3.00	2.85	2.95	3.20	3.20	3.50	3.55	3.25	3.50	C	R	3.45	3.60	3.50	3.20	3.55	3.60	3.25	3.05	A	A	A	3.20
13	2.95	3.00	2.95	3.00	3.10	3.50	3.30	3.40	3.70	3.35	3.15	3.25	3.25	3.25	3.55	3.45	3.35	3.25	3.25	3.30	A	A	A	2.80
14	3.25	2.90	3.05	3.15	3.00	3.05	2.95	3.50	3.35	3.30	3.30	3.55	3.55	3.20	3.60	3.30	3.40	3.30	3.30	3.55	3.55	A	A	2.95
15	2.95	3.50	3.00	3.30	3.30	3.00	A	3.50	3.60	3.45	3.15	3.25	3.25	3.25	3.25	3.45	3.55	3.25	3.25	3.30	3.25	S	S	S
16	S	3.05	3.05	3.00	3.25	3.00	S	3.40	3.45	3.35	3.25	3.20	3.30	3.10	3.60	3.20	3.75	3.60	3.45	3.55	3.50	3.40	R	3.10
17	3.05	2.95	3.00	3.20	3.15	3.05	3.30	3.50	3.45	C	3.60	C	3.40	3.20	3.30	3.65	3.55	3.55	3.20	3.30	3.55	R	3.50	3.00
18	3.00	3.00	3.05	3.05	2.95	2.70	3.05	3.55	3.45	3.15	3.35	3.50	3.00	3.30	3.25	3.15	3.55	3.35	3.05	3.00	3.40	3.30	3.25	2.95
19	4.28	3.30	2.80	3.00	3.30	2.80	3.20	3.25	3.40	3.40	3.35	3.30	3.20	S	3.35	3.20	3.55	3.35	3.25	3.25	3.25	3.25	3.25	2.90
20	3.15	3.30	3.40	3.00	3.20	3.00	2.95	3.40	3.20	3.40	3.55	3.35	3.55	C	3.60	3.35	3.40	3.40	3.30	3.25	2.95	2.95	3.10	3.20
21	2.95	2.85	3.00	3.00	3.00	3.00	3.10	3.45	3.35	3.05	3.25	3.50	3.30	3.75	3.55	3.35	3.60	3.45	3.25	3.25	3.00	3.25	3.10	2.95
22	2.90	3.00	2.90	3.40	A	2.80	3.25	3.60	3.50	3.55	3.55	3.50	3.55	3.75	3.50	3.60	3.40	3.40	S	3.25	3.25	3.25	2.75	3.00
23	3.05	3.05	3.00	3.20	3.50	3.05	3.50	3.60	3.45	3.55	3.40	3.55	3.65	3.30	3.55	3.90	3.50	3.50	3.25	3.05	3.35	3.05	2.90	R
24	2.85	3.10	3.05	3.30	3.50	3.30	3.00	3.50	3.30	3.55	3.25	3.55	3.50	3.85	3.45	3.65	3.35	3.35	3.45	3.25	3.60	3.55	S	S
25	S	3.05	3.05	3.55	3.45	S	2.90	3.55	3.50	3.40	3.45	3.45	3.20	3.20	3.30	3.50	3.65	3.40	3.40	3.40	3.40	3.40	3.40	3.40
26	3.10	2.90	3.15	3.10	3.10	2.95	3.25	3.45	3.40	3.30	3.40	3.30	C	3.55	3.50	3.60	3.60	3.50	3.40	3.65	3.70	S	2.85	2.95
27	2.95	3.05	3.50	3.10	3.20	2.95	3.20	3.55	3.30	3.30	3.60	3.55	3.45	3.35	3.50	3.35	3.40	3.25	3.60	3.55	3.50	3.25	S	2.70
28	2.80	2.95	3.00	3.30	3.70	3.30	3.55	3.60	3.55	3.25	3.25	3.45	3.50	3.20	3.35	C	3.70	3.50	3.35	3.25	3.20	S	2.90	3.30
29	3.30	2.75	2.80	3.20	3.35	S	3.10	3.50	3.40	3.40	3.35	3.60	3.55	3.45	3.50	3.55	3.70	3.15	3.70	3.65	S	3.25	R	
30	3.05	3.00	3.25	3.20	3.05	3.30	3.20	3.55	3.55	R	3.30	3.35	3.20	3.75	A	3.55	3.75	A	3.55	3.20	A	3.20	A	3.20
31	3.25	3.05	2.95	3.20	3.05	3.10	3.55	3.55	3.55	3.25	3.45	3.50	3.30	3.30	3.30	3.25	3.80	3.60	3.40	3.35	3.30	2.75	2.95	3.55
No.	25	28	29	27	28	27	28	28	28	30	28	30	29	30	30	30	28	30	30	23	28	20	21	23
Median	3.00	3.00	3.00	3.15	3.20	3.10	3.25	3.50	3.45	3.40	3.30	3.45	3.40	3.40	3.50	3.50	3.60	3.50	3.30	3.30	3.30	3.25	3.00	3.00

Sweep 1.0 Mc to 2.00 Mc in 20 ^{micro}sec in automatic operation.

The Radio Research Laboratories, Japan.

IONOSPHERIC DATA

Dec. 1962

M(3000)F1

135° E Mean Time (GMT.+9h.)

Kokubunji Tokyo

Lat. 35° 42.4' N
Long. 139° 29.3' E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L	A	A	L	S											
2									L	L	L	A	A	L	L	L								
3									L	L	L	S	L	B	L	L								
4									L	L	L	L	L	S	L	L								
5									L	L	L	L	L	L	L	L								
6									C	L	L	L	L	400 ^L	L	L								
7									C	C	L	L	L	L	L	L								
8									L	L	S	L	L	S	L	L								
9									L	L	L	L	L	L	L	L								
10									L	L	L	L	L	L	L	L								
11									L	L	L	L	L	L	L	L								
12									L	L	C	L	L	L	L	L								
13									L	S	S	L	L	L	L	L								
14											S	S	B	L	L	L								
15										S	S	S	S	L	L	L								
16											S	L	S	L	L	L								
17											L	L	L	L	L	L								
18											L	L	L	L	L	L								
19											L	L	L	L	L	L								
20									L	S	S	L	L	L	L	L								
21									L	L	L	L	3.65 ^L	L	L	L								
22									L	L	L	L	S	L	L	L								
23									L	L	L	L	L	L	L	L								
24									L	L	L	L	S	L	L	L								
25									L	L	L	L	L	L	L	L								
26										L	L	L	L	L	L	L								
27									L	L	L	L	L	L	L	L								
28										L	L	L	L	L	L	L								
29										4.55 ^L	L	L	S	L	L	L								
30									L	L	L	L	L	L	L	L								
31									L	L	L	L	4.75 ^L	L	L	L								
N.O.																								
Median										4.55	4.355	4.370	4.00											

Sweep 1.0 Mc to 2.0 Mc in 2.0 sec in automatic operation.

M(3000)F1

The Radio Research Laboratories, Japan.
K 8

IONOSPHERIC DATA

Lat. 35° 42.4' N
 Long. 139° 29.3' E

Kokubunji Tokyo

R'F2

Dec. 1962

135° E Mean Time (GM.T. + 9h.)

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									230	250	245	240	250												
2									240	235	A		250	240	240										
3									210	250	245	245	255	250 ^B		230									
4									220	250	260	255	240	250 ^C		250									
5									240	240	255	240	240	245	230										
6									C	225	230	230	230	250	235	225									
7									C	C	265	255	230	245											
8									215	255	275	240	240	250 ^D	255	230									
9									230	240	280A	275	250	240											
10									260	255	260	255	270	260	235	235	C								
11									225	235		275	255	250											
12										C	250	240	230			255									
13									235	285	255		245	270	240										
14											265	245	260												
15											260	270	255	240	235										
16											250	C	260	250											
17									230		275	230	230	245	250										
18											255		280	250	225										
19									255	245	260	250	250	230	C										
20									255	295		250	240	240	245										
21										225		240	250	250		230									
22										260	255	230	230	250											
23										255	250	255	255	225											
24									250	255	230	235		260	255										
25											250	255	C												
26										240	245	230	250	250	250	255									
27												250	270		C										
28											295	255	250		265										
29											280	240		250											
30											250	245	275	250											
31																									
No.									2	10	13	21	26	25	25	17	8								
Median									230	230	245	260	250	250	250	240	230								

R'F2

IONOSPHERIC DATA

Lat. 35° 42.4' N
Long. 139° 29.3' E

Kokubunji Tokyo

135° E Mean Time (GMT.+9h.)

k'F

Dec. 1962

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	310	270	300	250	260	310	300	250	230	A	A	225	220 ^S	250	240	240	225	210	245	290 ^S	290 ^S	260	300	265 ^A
2	295	290 ^A	290	275	270	260	255	220	220	230	230	240 ^A	220	230	230	220	210 ^A	250 ^A	A	250 ^A	A	250 ^A	S	345
3	345	350	275	250	245	260	250	225	210	240	245	220 ^S	240	220 ^S	245	230	210	205	220	A	310 ^A	300	330 ^S	300
4	305	300	295	280	230	280	260	225	210	200	220	215	225	220 ^S	245	225	225	210	215	260	255	305	310	250
5	355 ^A	350 ^A	350	355 ^A	350	305	220	215	220	250 ^A	245	220	210	220	205	220	210	215	250	245	250	250	265	C
6	350 ^A	310	320	270	C	C	C	C	C	C	215	215	225	210	245	250	240	215	200	C	C	C	C	C
7	310	295	305	220	240	205 ^A	305	225	225	245	220 ^S	225	250 ^A	S	250 ^S	240	215	200	C	C	C	C	C	C
8	310	295	305	220	240	205 ^A	305	225	225	245	220 ^S	225	250 ^A	S	250 ^S	240	215	200	C	C	C	C	C	C
9	C	C	C	C	C	C	C	245	220	210	230	270 ^A	245	205	245	225	220	210	210	210	210	225	240	225
10	300	265	290	255	230	260	260	210	220	245	265	260	245	230	265	245	220	275	275	275	240	300	305	310
11	305	300 ^A	275	270	275	290	225	210	220	250	250 ^A	250 ^S	230	230	225	240	225	220	230	230	205	210	310	280 ^S
12	345	330	305	305	260	270	255	230	210	245	245	255	245	210	230	245	210	210	255	290 ^A	A	A	A	290
13	295	295	310	255	255	240	250	245	230	220	235	275	245	250	245	245	215	255	230	225	A	AS	350	305
14	250	310	270	295	255	260	255	225	240 ^S	245	250	230	210 ^S	225	225	230	210	205	245	210	250 ^A	A	A	310 ^A
15	305	255	300	255	240	310	260 ^A	230	210	230	245	245	240	250	245	215	250	270	245	250	S	S	S	335
16	245	300	275	255	255	265	230 ^S	245	245	230	230	260	255	230	225	240	225	210	245	245	225	245	255	300
17	280	325	300	255	250	285	250	230	215	215	210	215	210	230 ^S	245	230	210	210	255	240	225	250 ^S	245	300 ^S
18	300	295	260	310	300	390 ^S	300 ^A	210	255	245	245	235	230	220	255	230	210	220	255	250	270	240	265	295
19	285	255	300	275	245	285	255	255	250	230	230	245	210	250	205	230	215	230	245	255	255	230	245	310
20	275	225	225	275	230	305	270	225	225	255	205	250	230	240	230	225	220	215	230	295	325	300	230	255
21	295	330	295	275	300 ^A	355	275	220	220	230	230	255 ^A	210	230	225	230	230	210	210	250	300 ^S	250	260	350 ^S
22	310	300	295	245	220 ^A	350 ^S	300 ^S	225	225	230	225	245	230	205	220	221	210	210	230	260	250	250	350 ^S	310
23	270	300	290	270	260	350 ^A	245	230	220	225	250 ^A	230	235	220	210	245	215	210	250	310	250	300 ^S	350 ^S	345
24	310	300	260	250	205	305	310	230	225	230	245	250 ^S	240	225	215	230	210	225	250	260	225	250 ^S	S	450 ^S
25	S	345	305	210	205	400 ^S	395	215	250 ^S	235	230	235	225	240	245	230	210	210	285	255	245	255	320	330
26	305	310	260	260	260	305	255	220	225	240 ^S	255	210	205	240	250	230	215	245	245	210	200	S	350 ^S	310
27	340	300	245	255	250	310	255	225	240	245	250 ^S	205	220	225	230	250 ^S	230	230	225	215	250	270	265	350 ^S
28	340	345	275	250	210	260	250 ^S	230	210	230	255	250	235	240	260	230	225	225	215	255	250	S	310	250
29	275	345	275	250	215	230 ^S	260	215	235	230	215	250 ^S	245	230	250 ^S	220	205	200	290 ^S	210	225	280 ^S	310	340 ^A
30	355	320	300 ^A	250	225	290 ^S	255	225	210	225	225	235	230	245	255	220	220	290 ^A	240 ^A	250 ^A	260	240 ^A	300	270 ^A
31	290 ^A	330 ^A	300	250 ^A	260	245	230	210	210	250	235	225	225	225	230	230	220	210	230	245	230	345	300	235
No.	27	26	29	28	27	22	26	28	28	26	25	22	27	29	27	29	31	28	24	23	25	20	21	21
Median	300	300	295	255	250	275	255	225	220	230	230	230	225	230	230	230	215	210	240	245	250	250	250	300

Sweep 1.0 Mc to 2.0 Mc in 2.0 ^{min} 2.0 ^{sec} in automatic operation.

k'F

IONOSPHERIC DATA

Lat. 35° 42.4' N
Long. 139° 23.3' E

Kokubunji Tokyo

135° E Mean Time (GMT. + 9h.)

f^oEs

Dec. 1962

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	105	110	100	E	S	S	S	G	105	105	105	S	155	G	S	130	105	S	S	S	S	S	115
2	S	115	S	E	E	110	S	S	G	G	S	110	S	105	G	100	100	100	S	S	S	S	S	S
3	S	S	E	E	E	S	S	S	G	E ¹⁸⁰	G	S	S	S	S	B	100	S	S	115	S	S	S	S
4	S	S	E	E	E	S	S	S	G	G	G	S	S	S	S	S	S	S	S	115	S	S	S	S
5	110	105	E	105	105	S	S	S	115	C	G	G	G	G	G	150	130	S	S	S	S	S	S	S
6	C	S	C	C	C	C	C	C	C	C	C	115	S	S	S	S	S	S	S	S	S	S	S	E
7	110	S	S	E	E	C	C	C	C	C	C	115	S	S	S	S	S	S	S	S	S	S	S	E
8	S	S	C	E	E	C	S	S	G	110	S	105	S	E ¹⁵⁵	G	E ¹⁵⁵	130	S	S	S	S	S	S	C
9	S	S	C	C	C	S	S	S	G	105	105	S	S	E ¹⁵⁵	G	S	130	S	S	S	S	S	S	C
10	S	S	C	C	C	S	S	S	110	S	110	S	S	S	S	S	S	S	S	S	S	S	S	S
11	S	S	C	E	E	S	S	S	120	G	G	S	S	S	S	140	S	S	S	S	S	S	S	S
12	S	S	E	E	E	S	S	S	110	G	G	S	S	S	S	125	115	115	S	S	110	105	100	S
13	S	S	E	E	E	S	S	S	110	G	G	S	S	S	S	125	115	115	S	S	105	105	105	S
14	S	S	E	E	E	S	S	S	110	S	S	B	S	S	S	S	S	S	S	S	105	100	105	S
15	S	S	S	115	120	S	105	110	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	100
16	S	S	S	S	E	S	S	S	115	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
17	S	S	S	E	E	S	S	S	115	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
18	S	S	S	E	E	S	S	S	145	120	S	S	S	S	S	S	S	S	S	S	S	S	S	E
19	S	S	E	110	E	S	S	S	115	115	S	S	S	S	S	S	S	S	S	S	S	S	S	E
20	S	S	S	115	E	S	S	S	115	115	S	S	S	S	S	S	S	S	S	S	S	S	S	E
21	120	110	115	120	110	S	S	S	115	115	S	S	S	S	S	S	S	S	S	S	S	S	S	S
22	S	S	E	E	105	S	S	S	G	G	S	110	B	105	S	S	S	S	S	S	S	S	S	S
23	S	S	E	E	105	S	S	S	G	G	S	110	S	110	S	S	S	S	S	S	S	S	S	S
24	S	S	E	E	100	S	S	S	E ¹⁸⁰	110	S	100	S	B	100	S	S	S	S	S	S	S	S	S
25	S	S	S	E	E	S	S	S	E ¹⁶⁵	G	S	155	S	S	S	S	S	S	S	S	S	S	S	S
26	S	S	S	E	E	S	S	S	S	G	S	155	C	B	150	S	S	S	S	S	S	S	S	S
27	S	S	E	E	120	S	S	S	S	G	S	155	C	B	150	S	S	S	S	S	S	S	S	S
28	S	S	E	E	E	S	S	S	S	G	S	155	C	B	150	S	S	S	S	S	S	S	S	S
29	S	S	E	E	E	S	S	S	S	G	S	155	C	B	150	S	S	S	S	S	S	S	S	S
30	105	105	100	E	E	S	S	S	S	S	B	S	S	110	S	S	S	S	S	S	110	S	S	105
31	100	100	E	100	E	S	S	S	S	170	S	S	S	S	B	110	110	110	100	100	105	105	100	100
No.	5	6	5	7	7	4	1	3	6	7	7	8	3	7	7	3	6	11	3	5	8	6	7	5
Median	110	105	115	105	110	110	105	115	110	110	110	110	105	110	130	105	130	100	110	115	105	105	100	105

The Radio Research Laboratories, Japan.

Sweep f^o Mc to z^o Mc in z^o sec in automatic operation.

f^oEs

K 11

IONOSPHERIC DATA

Lat. 35° 42.4' N
Long. 139° 29.3' E

Kokubunji Tokyo

Types of Es

135° E Mean Time (GMT. + 9h.)

Dec. 1962

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1		f ₂	f	f ₂						h ₂	h ₂	l	h ₂	h ₂			h	f						f	
2		f ₂	f ₂			f				h ₂	l	h ₂	h ₂	l			h ₂	f ₂	f ₂						
3										h								f		f ₂					
4																									
5	f	f	f	f	f ₂				l								h ₂								
6												l					h ₂								
7	f									h ₂	l	l	h ₂	h ₂			h	f							f
8										l	l			h ₂			h								
9										l	l			h ₂			h								
10												l					h								
11						f		l				l					h	f	f ₂	f ₃					
12						f						l					h				f ₃	f ₂	f ₂	f	
13						f						l					h				f ₂	f ₂	f ₂	f	
14						f						l					h				f ₂	f ₂	f ₂	f	
15						f		f ₂	l			l					h				f ₂	f ₂	f ₂	f ₂	
16								l				l					h								
17										h	l	l					h								
18										h	l	l					h								
19										l	l	l					h	f							
20										l	l	l					h								
21	f	f ₃	f ₂	f ₂	f ₂					h	h	l					h								
22										h	h	l					h								
23										h	h	l					h								
24										h	h	l					h								
25											h	l					h								
26											h	l					h								
27											h	l					h								
28											h	l					h								
29											h	l					h								
30	f	f	f ₂	f						h		l					h								
31	f	f	f	f						h		l					h								
No.																									
Median																									

The Radio Research Laboratories, Japan.

Sweep 1.0 Mc to 20.0 Mc in 2.0 ^{micro}sec in automatic operation.

Types of Es

K 12

IONOSPHERIC DATA

Lat. 35° 42.4' N
Long. 139° 29.3' E

Kokubunji Tokyo

135° E Mean Time (GMT.+9h.)

Dec. 1962

f_oF₂

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	340 ^F	300	350	290	295	350 ^S	300 ^S	270 ^S	255	260	250	255	275	305	255	255	255 ^K	230	260	310	305	295	315	A	
2	S	300	300	300	300	290 ^S	280	245	250 ^A	255	255	A	270 ^K	255 ^A	250	230	A	260 ^K	A	260 ^K	230	S	S	355	
3	355	360 ^F	305 ^F	305 ^F	255	280	255	240	220	255	250 ^K	280	260	290	250	225	230	250	A	A	325	305	355	340 ^K	
4	320	310	305	300	250	300	280 ^S	230 ^S	240 ^S	255	285	290	255	260 ^S	S	275 ^A	240	220 ^K	265	260	320	310	320	170	
5	S	365	380	355	380	305	280	235	255	290	260 ^K	290	255	255	250 ^S	240	R	250 ^K	280	C	280 ^K	280	290	C	
6	C	C	C	C	C	C	C	C	C	250	300	250	250	250	250	240 ^K	250 ^K	250 ^K	255	290	290 ^K	290 ^K	260 ^K	R	355
7	355	330 ^K	330 ^K	310	C	C	C	C	C	295	260 ^S	245	255	295	260 ^S	260 ^S	275 ^K	295 ^K	S	270 ^K	295	365	340 ^K	370 ^S	
8	345	330	345	340	245	300 ^K	335	270 ^S	245	280 ^K	300 ^K	255	280	260	250 ^K	250 ^K	230	230	C	C	C	C	C	C	
9	C	C	C	C	C	C	255	260	250	255	300	300	255	260 ^K	265	240	240	240	S	270 ^K	260	255	340	340	
10	305	305	315	300	330	300	290 ^K	C	250	260 ^S	275	260 ^S	250	275	265	245	C	300	S	230	240	305	C	325	
11	325	C	325	350 ^S	350	320	265	230 ^S	255	290	270	300	280	255	280	255	250	250	280	255	220	230 ^K	340	300	
12	380	355	360	350	300	295	255 ^K	255	280	255	C	R	255	250	255	285	245	240	290	300	A	A	A	300	
13	340	320	340 ^K	300	300	250	290	260 ^S	250	255	295	295	270	280 ^K	245	255	250	295	265	255	A	AS	440	385	
14	275	355	315	315	350 ^S	340	265	260 ^S	S	260	270	250	290	245	275	255	255	275	280	240	255	A	A	340	
15	340	240	330	280 ^K	270	345	A	255	240	265	285	295	270	S	270	255	230	285	S	270 ^K	300	S	S	S	
16	S	345	330	310	295	325	S	255	255	260	290	300	290	290	245	280	245	250	260	255	250	270	R	320	
17	310	340 ^K	340 ^K	300 ^K	300 ^K	305	280 ^K	250 ^K	250	C	250	C	280	305	280 ^K	250	250	245	290	270	250	R	250	4340	
18	310	315	300	345	330	400	305	250	260	295	255	245	315	265	280	285	230	255	310 ^S	340	255	295	355	355	
19	350	285	375	350	300	375	355	285	285	270 ^K	260 ^K	260 ^K	295	S	255	280	230	245	280	295	270	275	360	390	
20	325	270	270	350	300	345	335	250	275	255	260	255	255	245	C	245	255	255	270	350	315	345	305	280	
21	350	365	335	350	325	405	300	245	250	330	295	260	260	245	255	255	250	250	290	290	330	290	305	350	
22	4350 ^K	325	340	260	A	390	300	250	255	250 ^S	245	255	255	255	230 ^K	255	240	250	S	4300 ^K	290	280	390	340	
23	300	300	315	300	260	350	255	240	250	250	260	260	250	240	280	260	225	255	290	310	270	305	360	R	
24	350	310	300	280 ^K	235	305	310 ^K	255	270	260 ^K	280	255	278	260	230	255	240	260	260	295	250	250	S	S	
25	S	350	325	230	230	S	395	250	250	255	245	245	275	265	260	245	225	255	325	270	255	260	345	395	
26	325	375	305	310	310	350	295	245	255	260	260	260	C	250 ^K	255	250	255	255	260	240	270 ^K	S	360	340	
27	340 ^K	330	260	300	280	320	300 ^K	250 ^K	280	300	250 ^K	250 ^K	255	260	260 ^K	275	255	290	250	2260	270	295	S	335	
28	380 ^K	350	320	280	240	290	250	250	250	265	270	260	260	260	275	260	C	230	255	260	295	S	355	270	
29	285	400 ^K	385	300	255	S	300	255	250	240	300	270	255	260	280	240	240	210	305	230	240	S	350	R	
30	355	345	305	295	305	300	300	250	240	R	300	250	250	250	275	290	230	A	A	250	290	A	300	A	
31	300 ^K	340	340	290	310	290	255	240	240	250	270 ^K	255	250	280 ^K	260	260	235	250	260	270	260	350	350	255	
No.	25	28	29	29	27	26	27	28	28	28	30	28	30	29	29	30	28	30	28	30	28	20	21	23	
Median	340	330	325	300	300	310	290	250	250	260	270	260	260	260	260	255	240	250	270	270	270	290	345	340	

Sweep / ϕ Mc to 2.0 Mc in 2.0 μ sec in automatic operation.

The Radio Research Laboratories, Japan.

Lat. 35° 42.4' N
Long. 139° 23.3' E

Kokubunji Tokyo

IONOSPHERIC DATA

135° E Mean Time (GMT.+9h.)

ypF2

Dec. 1962

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	60 ^F	55	60	65	60	70 ^R	50 ^R	50 ^R	55	55	55	50	80	95	90	50	78 ^R	70	85	85	80	70	75	A	
2	S	55	60	55	60	70 ^S	70 ^S	55	50 ^R	65	85	A	70 ^R	50 ^R	55	60	A	85 ^R	A	55 ^R	65	S	S	90	
3	85	70	95 ^F	90	70	75 ^S	50	70 ^S	40	45	70 ^F	75 ^R	60	65	75	50	50	70	60	80	75	50 ^S	85	60 ^R	
4	70	80	65	60	55	50	70 ^S	60 ^R	60 ^R	50 ^R	60	60	85	80 ^R	75	50 ^R	60	60 ^R	50 ^S	80	80	80	75	80	
5	S	75	75	85	80	55	50	55	65	70 ^R	85 ^R	65	60	50	50 ^R	60	R	60 ^R	80	C	75 ^R	75	65	C	
6	C	C	C	C	C	C	C	C	C	55	55	50	75	55 ^R	30	65 ^R	50 ^R	55 ^R	55	60	70 ^R	80 ^R	R	50	
7	55	60 ^R	70 ^R	80	C	C	C	C	C	C	45 ^R	55 ^R	55	80	90 ^R	60 ^S	90	45 ^R	S	74 ^S	50 ^S	60 ^S	35 ^F	80 ^S	
8	55 ^S	70	50	55	105	80 ^F	55 ^S	80 ^S	85	74 ^S	55 ^R	70 ^R	55	65	50	70 ^Z	60	70	C	C	C	C	C	C	
9	C	C	C	C	C	78 ^S	105	90 ^S	50	65 ^R	45	30 ^Z	50	45 ^R	90	55	50 ^R	70	S	80 ^S	80	90	65	60	
10	90	90	80	65	85	65	76 ^S	C	50	70 ^S	60 ^S	45 ^S	80	70 ^S	45	60	C	65	S	55	40	70 ^S	C	60	
11	80 ^S	C	60 ^S	50 ^S	55	55	85	50 ^S	80	75	60	50	65	50	55	70	30	60	60 ^S	60	50	70 ^S	70 ^S	50	
12	75	55	70	65	60	75	75 ^R	45	75	50	C	R	60	50	55	75	55	65	65	95	A	A	A	65	
13	70	80	75 ^R	100	80	60	60	70 ^R	30	75 ^R	70	55 ^R	80	70 ^R	55	76 ^R	90 ^R	55 ^R	85 ^R	95 ^S	A	AS	60 ^F	65 ^S	
14	75 ^S	65	70 ^S	55	55 ^S	60	45 ^S	90 ^S	S	85	70	50	50	70 ^R	90 ^R	50	70 ^R	70	70	60	55	A	A	65	
15	60	110	70	60 ^R	75	55	A	55	55 ^R	50 ^S	110 ^S	60 ^S	80 ^S	S	85	60 ^S	70	70 ^S	S	90 ^S	50 ^S	S	S	S	
16	S	55 ^S	60	90	60 ^S	75 ^S	S	95 ^S	160	80	60	60	55	85	50	85	30	55 ^R	55 ^R	50	70 ^S	55 ^R	R	70	
17	75	65 ^R	70 ^R	55 ^R	60 ^R	90	70 ^R	60 ^R	55	C	45	C	45	35	76 ^R	30	50 ^S	65 ^R	75 ^R	75 ^R	50	R	75 ^R	60 ^S	
18	90	80	80	55	75	90	90	50	60	75 ^R	95	60 ^R	90	90 ^R	70	90	75	95	80 ^S	65 ^R	95	55 ^S	75 ^S	55	
19	110 ^S	65	75 ^R	55	45	80	95 ^R	75 ^S	65	55 ^R	90 ^R	100 ^R	65	S	95	115	80	75 ^S	70 ^S	70	85 ^S	75 ^S	65 ^S	85	
20	45	80 ^S	55	50	60	60 ^S	75	75	50	60 ^S	45	95 ^S	50	110	C	55	95	70 ^S	80 ^S	95	95	60 ^S	95 ^S	85 ^S	
21	55 ^S	75	65 ^S	55	75 ^S	55 ^S	80	85 ^S	100 ^S	60	55 ^R	50	85	30	45	90	45	70 ^S	60	60 ^R	65 ^R	65	90	60 ^R	
22	70 ^R	75 ^R	80	65	A	55 ^S	50 ^S	45	60	75 ^S	55	50 ^R	45	45	40 ^R	50	55	75	S	50 ^S	60 ^S	70	75 ^S	55 ^R	
23	90	110	85	50	75 ^R	50	55 ^R	60	76 ^S	55	50	76 ^R	50	50 ^R	60	45	35 ^R	65	76 ^R	85	70 ^R	70 ^R	80	R	
24	90 ^R	85	80	65 ^R	65 ^R	50	90 ^R	55	75	45 ^R	70	45 ^R	76 ^S	50	25	60 ^R	50	80 ^R	60 ^R	55	55 ^R	50 ^R	S	S	
25	S	55	75	60	70	S	30 ^R	65	76 ^R	75 ^S	85 ^R	105	105 ^R	75	45	85 ^S	65	95 ^S	65 ^S	50	70 ^S	55	55	55 ^S	
26	60	55	65	65	70	65	55 ^S	75	95 ^S	90 ^R	65	85	C	75 ^R	55	50 ^R	55	55 ^R	80	55	70 ^R	S	80	65	
27	65 ^R	60	55	95	75	80	55 ^R	55 ^R	60	40	74 ^R	50 ^R	55 ^R	70	50 ^R	55	65	60 ^R	50	74 ^S	40	75 ^R	S	75 ^S	
28	76 ^R	76 ^R	60 ^R	80	60	50 ^R	75 ^R	50 ^R	50	85	80	55	50 ^R	85 ^S	85	C	50 ^R	55	90 ^S	76 ^S	60 ^S	S	65 ^S	80	
29	60 ^S	65 ^S	70 ^S	65	95 ^S	S	75 ^S	60 ^S	85	55	40	60	45	45	40	65 ^R	60	80	60	50	50	S	75 ^R	R	
30	40	55	45	70	90	50	55	50	60	R	45	50	75 ^R	50 ^R	76 ^S	65	45	A	A	45	65	A	55	A	
31	75 ^R	55	60	70	80	105	50	60	60	50	80 ^R	65	60	65 ^R	100	80	25	50	70	85	90	75	65	45	
No.	25	28	29	29	27	26	27	28	28	28	30	28	30	29	29	30	28	28	30	23	28	20	21	23	
Median	70	65	70	65	70	60	55	60	60	60	60	55	60	65	55	60	55	70	65	60	65	70	65	60	

Sweep ... Mc to ... Mc in ... Sec in automatic operation.

The Radio Research Laboratories, Japan.

IONOSPHERIC DATA

Yamagawa

Lat. 31° 12.5' N
Long. 130° 37.7' E

Dec. 1962

f_oF₂

135° E Mean Time (GMT.+9h.)

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	J3.5S	J3.5S	J3.3S	J3.3	J3.3	J3.1S	J3.0	I4.5S	I7.5S	I8.8SH	9.0S	7.3	6.8	6.6	J7.0S	I7.2S	I7.8S	I5.9S	I3.7S	I2.7S	J3.5S	J3.1	2.9S	I2.6A
2	I2.7A	I2.8S	J3.0S	J2.9	J3.6S	s	J2.3	I4.5S	6.6S	I6.9S	7.0S	J7.6S	8.4	10.3	9.2	7.2H	J6.7S	I1.7S	J3.6S	I3.5S	I3.5S	J3.2S	2.6	J2.9S
3	J2.9S	I3.7H	I4.2S	I4.9S	5.9	I4.7S	J3.3S	I4.2S	5.7	6.0S	6.7H	I8.4S	7.5S	9.0S	I8.1S	8.6S	I7.3S	J5.2S	I3.5S	I2.7A	J3.2	J3.1	J4.5S	J3.3S
4	J3.4S	J3.2S	J3.3	J3.3S	J3.8S	J3.0S	J3.0	J4.1S	5.7H	J6.4SH	7.0SH	J3.3S	8.2	J6.4S	7.0	6.2S	I6.7S	5.6	J4.4S	J3.7S	s	s	J4.2S	J3.3S
5	J3.0S	I2.6S	J2.7	J2.9	J2.9S	J3.3	J3.5S	I4.6S	I6.3S	I7.6SH	I0.5CH	I1.1S	I9.6S	J7.3S	I8.1SH	I6.2S	I7.0H	6.4	4.8	J3.7S	I3.3S	I3.3S	J3.2S	J2.5S
6	J2.5S	J2.5S	J2.6S	J2.9	I3.5S	J2.5	J2.8	I4.0S	J6.3S	I6.2SH	I6.6SH	6.8	I7.7S	J7.4H	7.0S	6.6S	7.1	5.7	I4.1S	J2.6S	J2.8S	I3.6S	J3.3	J2.6S
7	J2.7	J2.8	I2.9S	J2.9	J3.1	I3.3S	J2.8	I4.0S	5.6	J6.2SH	6.8H	J6.7S	7.0	I6.5S	I7.1S	J8.4H	J6.7S	6.0S	s	s	I3.4S	I3.3S	J3.0S	J2.9
8	I2.7S	J2.9	J3.0	I3.0S	J3.3S	J2.4	J2.1	I4.2S	6.0S	I6.0SH	I7.2S	I8.1S	7.2S	J8.1S	I9.2S	9.2H	I7.7S	5.6	J3.7S	I3.3S	J3.2	s	s	J2.5S
9	J2.5S	J2.7	J2.7	J3.0S	J3.3S	J2.5	J2.7S	J3.6S	5.6H	I5.9S	I6.8S	7.7S	J10.0S	8.9	8.2	6.7H	I6.5S	5.5	I3.4S	I3.6S	J3.4S	J3.0	J2.4S	J2.7S
10	J3.1	J3.0	J3.2	J3.0	J2.9	J2.9	I3.0S	I4.2S	5.6H	5.7H	I6.2SH	7.0S	6.1	6.4	7.0	6.5	6.3	I5.6S	J3.7S	I3.6S	J2.9S	I2.8S	I2.6S	J2.4
11	J2.7S	J2.9S	J2.9	I3.3S	J3.4S	I3.2S	J3.3	I4.2S	5.1	5.8H	I5.9S	J7.6S	I7.6S	J7.3S	6.1	6.8	I6.6S	J5.5S	I4.4S	5.2	J3.5S	J3.1S	I2.6S	I2.8S
12	J3.0S	I3.3S	I3.3S	J3.2S	I4.0S	I4.1S	J3.0	I3.9S	5.2S	5.7H	I8.1S	I1.1	I1.2S	7.9	7.2H	7.0H	J6.5S	5.4	J3.7S	I3.5S	J3.2	J2.7S	J3.0A	
13	J2.7	J2.8	J2.8S	J2.9S	J3.2S	J3.1S	J2.5S	I4.4S	5.9	5.3H	I5.6S	8.1	9.1	8.2	J6.9H	7.0H	J6.2S	J5.2S	I4.0S	I4.1S	I2.9S	J2.5S	A	S
14	J3.5S	J3.1	J3.3	J3.1	J3.4S	I2.5S	J2.5S	4.0S	I6.2S	I6.8SH	7.4SH	9.0	J7.3S	6.2	J6.7SH	I6.8H	6.4	6.1S	I4.3S	J3.8S	J3.1	J3.1	I2.6S	J2.6S
15	J2.6S	I2.7S	J2.4	J2.4	J3.1S	I2.5S	J2.2	J3.6S	J6.3S	6.9	9.0S	J6.8S	6.2	7.7	J7.4S	J7.7S	6.6	J5.5S	I3.6S	J3.2	I3.2S	I3.0S	J3.0S	J2.9S
16	J2.9	J3.0S	J3.0	I3.0S	J2.8	J2.3	I2.1S	J3.4	J5.0	6.1H	7.2	J7.5S	8.3	9.1	9.3	I8.0S	5.8	5.8	J4.0S	J2.9	J3.5S	J2.9S	J2.6S	J2.2
17	J2.4	J2.7	J2.9	J2.9	J2.8	J2.7	J2.7S	I3.6S	I5.6S	J6.2S	5.9	I6.7S	6.7H	9.3S	6.0SH	6.7H	6.1	J6.2S	5.0S	J3.8S	I3.7S	I3.5S	I3.2S	J2.6S
18	J2.2S	J2.5S	J2.7S	J2.4	J2.7S	I2.6S	J2.7S	J3.7	5.1S	J7.3S	I0.3S	6.9	7.0	7.0	J7.2S	I7.0S	J6.3S	5.9S	J3.8S	I4.0S	I3.7S	J3.2	J2.5S	J2.5S
19	J2.6S	J3.2S	I3.1S	I2.8S	J2.8S	J2.7	J2.6S	I3.7S	I6.5S	I6.8H	7.8H	J6.6S	J7.9S	I0.1S	I7.4S	6.2	6.5	5.5	I4.8S	I3.4S	I3.8S	I3.5S	J2.2S	s
20	s	J3.3S	J3.2S	J2.4S	J2.3	I2.4S	J2.7S	J3.9	J6.1S	I6.6S	7.5H	8.7	8.5S	7.8S	I8.1S	6.8H	6.1H	J5.1S	J2.6S	I3.0S	J3.1S	s	s	J2.5S
21	J2.3	J2.9S	J2.6S	J2.7S	J2.5S	J2.6S	J2.3S	I4.0S	I5.2S	5.6H	I7.8S	8.2	9.4	J7.3S	7.1	I7.0S	I6.3C	I5.0C	I3.0C	I3.5C	I3.3C	I2.9C	I3.1C	I2.6C
22	I2.4C	I2.7C	I3.0C	I3.0C	I2.6C	I2.0C	I2.1C	I3.3C	J5.2S	J6.1S	6.6S	6.1S	7.2S	8.5	6.6	J6.1S	6.9S	5.8	4.4S	3.0S	2.9S	3.1	J2.7S	I2.4S
23	J2.6S	J2.8	J2.7	I2.9S	J2.6	J3.0S	J2.0	J3.1	5.5H	5.1H	5.7H	7.0	J7.9S	6.6	6.9S	6.2SH	J6.4S	5.2	4.1	2.7	3.2	2.5	J2.6S	J2.6S
24	J2.9S	J3.0	J3.1	J2.7S	J3.1	J2.4	J2.0S	I3.0S	J5.4S	5.7H	5.5H	5.5	8.5	I9.0S	5.9	6.0	5.8	J5.4S	J3.5S	I3.2S	I3.4S	J3.9S	s	s
25	s	J2.6S	J2.7	J3.3	I2.9S	I2.0S	J2.0S	J3.1	J5.2H	J5.8H	6.0	J7.5S	6.2V	J7.0S	J7.2S	6.8	5.6H	4.4	3.2	2.9	I2.8S	J2.0S	J2.2	J2.5
26	J2.6S	I2.6S	J2.7	J2.8	J2.9S	J2.6	J2.2	J3.3	4.9H	5.5H	J7.3S	6.5	J6.5	6.4S	J6.1S	5.6	J6.1S	4.8	4.4S	3.8S	I3.1S	J3.0S	I2.4S	J2.3S
27	J2.6	J2.8	I3.1S	J2.9S	I3.0S	J2.4S	J3.0	J3.3S	5.0H	7.8S	J8.4S	6.8	7.1	7.2	6.7H	I7.6S	I6.6S	5.7	J3.7S	I3.1S	J2.7S	s	s	s
28	I3.0S	s	s	J2.8S	s	s	J2.3	J3.0	4.9	5.5H	5.0H	6.6	J7.3S	J6.7S	7.1	6.2	6.3	5.5	4.4	I3.6S	J2.5S	J2.7S	I2.6S	I2.4S
29	I2.5S	J2.6S	I2.9S	I3.4S	I3.3S	J2.5	J2.1S	I3.2S	4.7	5.0	6.1H	5.7H	5.7	J7.0S	6.1	5.7	5.4H	5.6	3.3S	4.0S	I3.0S	2.3	I2.2S	2.4
30	I2.4A	J2.5S	J2.4S	J2.8	I3.0S	I2.9S	J2.3S	J2.6S	5.6	6.0	6.7	8.5	J8.1S	J8.2S	7.0	6.0	6.0	4.8	J3.7S	I3.4S	J3.0	J2.5S	I2.2S	2.6
31	J2.5S	J2.5	J2.7	J2.8	J2.9	J2.8	J2.8S	J2.9S	4.7	J5.5H	5.6	6.5	I7.0S	6.6	5.7	6.1S	6.5	I4.5A	J3.8S	I3.5S	J3.3S	2.9	J3.1S	J2.7
No.	29	30	30	31	30	29	31	31	31	31	31	31	31	31	31	31	31	31	30	29	30	28	26	27
Median	J2.7	J2.8	J2.9	J2.9	J3.1	J2.6	J2.6	J3.7	5.6	6.0	6.8	7.5	7.5	7.3	7.1	6.7	6.5	5.5	3.8	J3.5	J3.2	3.0	J2.6	J2.6
U. Q.	J3.0	J3.0	J3.1	J3.1	J3.3	J3.0	J3.0	4.2	6.1	6.8	7.8	8.4	8.4	8.5	7.4	7.2	6.7	5.8	4.4	3.8	3.5	3.2	3.1	J2.8
L. Q.	J2.5	J2.6	J2.7	J2.8	J2.9	J2.4	J2.2	J3.3	5.1	5.6	5.9	6.8	7.0	6.6	6.7	6.2	6.1	5.2	3.5	3.0	3.1	2.8	J2.6	J2.5
Q. R.	0.5	0.4	0.4	0.3	0.4	0.6	0.8	0.9	1.0	1.2	1.9	1.6	1.4	1.9	0.7	1.0	0.6	0.6	0.9	0.8	0.4	0.4	0.5	0.3

Sweep 1.0 Mc to 20.0 Mc in 20 sec in automatic operation.

The Radio Research Laboratories, Japan. Y 1

f_oF₂

IONOSPHERIC DATA

Lat. 31° 12.5' N
Long. 130° 37.7' E

Yamagawa

foF1

135° E Mean Time (GMT. + 9h.)

Dec. 1962

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	4.1	4.1	A	L											
2										L	L	L	L	L	4.2										
3										L	LH	LH	L	L	L	L									
4										L	L	4.3	4.3	L	L	L									
5										L	L	L	L	L	L										
6											4.2 ^L	4.5 ^L	4.5 ^L	4.5 ^L											
7										L	L	L	L	L	4.3 ^L										
8										L	4.1	L	4.2	L	L										
9										L	4.4	4.3	4.3	4.4 ^L	4.3 ^L										
10										LH	4.3 ^{LH}	4.0	L	L	4.0										
11										LH	L	L	4.2 ^L	L	L	L									
12										L	4.3	4.4 ^L	4.3 ^L												
13										4.5	L	L	L												
14										L	4.2 ^H	4.2 ^H	4.0												
15										L	L	L	4.5 ^L	LH											
16										L	L	4.6	4.2 ^H	4.0 ^L	L	L									
17									L	L	LH	4.3 ^H	4.2 ^L												
18									L	L	A	L	L	L	L										
19										L	4.2 ^L	L	3.6	L	L	L									
20										L	L	L	4.2 ^L	L	L										
21										LH	LH	L	L	L	L	C	C								
22										L	L	L	L	L	L										
23										4.2 ^L	4.3	L	L	L	L										
24										L	4.4 ^L	4.0	L	L	L	L									
25										4.3	L	4.3	L	L	3.3 ^H										
26										L	LH	L	L	L											
27										L	L	L	L	4.3											
28										L	4.3 ^H	4.2 ^L	L	L	L	L	L								
29										L	4.3 ^L	4.2 ^L	L	L	L	L									
30										4.1	4.3	4.3	4.2 ^H	4.1	L	L	L								
31										LH	L	L	L	4.0	3.7										
No.										2	10	14	17	8	2										
Median										4.3	4.2	4.3	4.2	4.2	3.5										

Sweep 1.0 Mc to 20.0 Mc in 20 ^{min} sec in automatic operation.

foF1

The Radio Research Laboratories, Japan.

Y 2

IONOSPHERIC DATA

Lat. 31° 12.5' N
Long. 130° 37.7' E

Yamagawa

foE

135° E Mean Time (GMT. + 9h.)

Dec. 1962

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	2.10	2.60	A	A	3.10	3.00 ^A	2.85	3.50 ^A	2.20	S						
2								S	2.10	2.55	2.90	3.05 ^H	3.05	A	A	A	A	S						
3								S	2.25	2.70	2.80	3.00	3.10	3.05	2.95	2.65	2.15	S						
4								S	2.25 ^H	2.70	3.00	3.10 ^A	3.10	3.10	2.90	2.70	2.40	S						
5								S	2.05	2.60	2.80	3.00	3.05	3.00 ^A	2.90 ^A	2.70	2.30	S						
6								S	2.20	2.50	2.80 ^A	3.00 ^G	3.15	3.05	2.80	2.55	2.15	S						
7								S	2.10	2.60	2.80	A	A	3.00	2.90	2.50	A	S						
8								S	1.90	2.55 ^H	2.85	3.10	3.10	3.00	2.80	2.60	2.25	S						
9								S	A	A	A	A	A	3.00 ^A	2.80 ^A	2.60	2.30	S						
10								S	S	A	A	A	A	3.00	2.85	2.60	1.95	S						
11								S	S	2.45	2.80	3.00	3.10	3.00	2.80	2.60	2.15	S						
12								S	S	2.40	2.80	3.00	3.00	3.00	2.90 ^A	2.80	2.60	2.40 ^H	S					
13								S	S	2.30	2.80	2.95	3.05	3.00	2.80	2.50	2.05 ^S	S						
14								S	2.00	2.50	2.70 ^A	2.85	3.00	2.90	2.75	2.50	2.00	S						
15								S	1.90	2.50	2.85	A	A	A	2.80	2.50	2.15	S						
16								S	2.00	2.65	2.90	3.00	3.10	2.95	2.80	2.50	2.30	S						
17								S	1.90	2.60	2.90	A	A	A	2.95 ^A	2.60	2.15	S						
18								S	S	2.45	2.80	3.00	3.00	3.05	2.90	2.70	2.20	S						
19								S	1.90	2.60	2.80 ^A	3.00	3.00	3.00	2.90	2.70	A	A						
20								S	2.20	2.60 ^H	2.85	3.00	2.95	3.00	2.80 ^A	2.90	2.65	2.30	S					
21								S	S	2.50	2.80	2.90	3.00	3.00	2.90	2.65	2.30 ^G	C						
22								G	1.90	2.35	2.65	2.75	2.75	3.00 ^A	2.80	2.65	2.25	S						
23								S	1.90	2.40	2.80	2.90	3.00	3.00	2.90	2.70 ^A	2.30	S						
24								S	S	2.40 ^H	2.80 ^H	3.00	3.10	3.05	2.90	2.60	2.25	S						
25								S	2.00	2.40 ^A	2.70	2.85 ^A	3.00	3.00	2.80	2.50	2.30 ^H	S						
26								S	S	2.35 ^H	2.70 ^A	3.00	3.10	3.00	2.85	2.60	2.30	S						
27								S	S	A	2.95	2.90	A	A	A	A	A	S						
28								S	S	2.35	2.85 ^H	2.90	3.00	3.00	2.85 ^A	2.70 ^A	A	S						
29								S	1.85	2.50	2.80	3.00	3.10	2.95	2.55 ^A	2.15 ^A	S							
30								S	S	2.60 ^H	2.75 ^A	3.00	3.00	A	A	A	A	A						
31								S	S	2.40	2.75	2.90	3.10	2.90	2.70	2.70	2.15	S						
N.o.									18	28	28	25	25	26	28	28	25							
Median									2.00	2.50	2.80	3.00	3.05	3.00	2.85	2.60	2.25							

foE

Sweep 1.0 Mc to 20.0 Mc in $\frac{1}{10}$ sec in automatic operation.

The Radio Research Laboratories, Japan.

IONOSPHERIC DATA

Lat. 31° 12.5' N
Long. 130° 37.7' E

Yamagawa

135° E Mean Time (GMT.+9h.)

foEs

Dec. 1962

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	2.9	3.2 ^M	2.8	2.3	J2.4	S	2.9	S	G	G	3.1	4.0 ^M	2.9 ^G	J5.4	2.8 ^G	2.6	3.0	J2.3	2.4	J2.2	2.4	2.7	S	2.8 ^M
2	J3.9	S	S	S	S	S	S	S	G	G	G	G	2.8 ^G	3.9	J3.2	J5.2	3.8 ^M	3.2	2.9	J2.5	2.9 ^M	3.0	S	S
3	S	S	S	E	S	S	S	S	G	G	3.2	3.3	G	G	2.8 ^G	3.2	2.8	S	S	3.6 ^M	2.9	S	2.3 ^M	2.7 ^M
4	2.3	2.8	2.3 ^M	S	S	S	S	S	2.6	G	3.8	3.5	3.1 ^G	G	2.3 ^G	G	J2.3 ^G	J1.8 ^S	2.2	3.1 ^M	S	S	S	S
5	S	S	S	S	S	S	S	S	G	G	G	G	3.4	3.2	3.0	G	G	S	S	S	S	S	S	S
6	S	S	S	S	S	S	S	S	G	G	3.0	2.7 ^G	3.4	3.7	J2.2 ^G	3.0	2.3	S	S	S	S	S	S	S
7	S	S	S	S	S	S	S	S	G	G	3.0	3.1	3.1	G	G	3.0	3.7	2.0	S	S	S	S	S	S
8	S	S	S	S	E	S	S	S	G	G	3.6	4.1	G	G	3.1	3.0	3.1	2.3	S	S	2.4	S	S	S
9	S	S	S	S	S	S	2.4 ^M	S	2.0	2.9	3.1	3.2	3.2	3.1	J3.5	J2.3 ^G	2.5	S	S	S	2.4	2.5	S	2.7
10	3.0 ^M	2.1	2.7	S	S	S	S	S	2.1	2.8	3.0	3.3	3.3	G	G	G	G	S	S	2.6	S	S	J2.4	J2.2
11	S	S	S	S	S	S	S	S	G	G	3.3	3.5	3.8	4.0	2.9	3.1	G	G	S	S	S	S	S	S
12	S	S	S	S	S	S	S	S	G	G	3.6	G	3.3	J5.1	3.0	2.9	3.0	2.8	J2.4	J2.4	2.4	J3.4	2.7	5.7
13	S	S	S	S	S	S	S	S	G	G	3.4	G	G	G	G	G	G	2.1	S	S	S	S	5.9 ^M	J3.0
14	2.8	S	S	S	S	S	S	S	G	J4.8	5.9 ^M	G	G	2.4 ^G	G	G	G	S	S	S	S	S	S	S
15	S	J2.4	J2.1	2.8 ^M	2.8 ^M	S	3.0	S	G	G	G	4.1	3.5	3.3	G	G	G	S	S	S	S	S	S	S
16	S	S	S	S	E	S	S	S	2.5	3.0	J3.7	3.1	G	G	G	G	G	2.0	S	S	S	S	3.1	S
17	S	S	S	E	E	S	S	S	2.2	3.0	3.3	3.3	3.1	J3.4	3.1	G	G	S	S	S	S	S	S	S
18	S	S	S	S	S	S	S	S	G	G	3.9	J5.4	G	G	G	G	G	S	S	S	S	S	S	S
19	S	S	S	S	E	S	S	S	G	G	3.0	3.8	3.3	4.5	3.0	4.8 ^M	J3.6	J2.3	3.1 ^M	S	2.1	2.2	2.8	S
20	S	2.2	2.8	S	2.1 ^M	S	2.2	S	2.4	2.8	3.1	3.8	3.5	3.2	J3.4	J2.4 ^G	G	S	S	S	S	S	S	S
21	S	S	S	S	S	S	S	S	G	G	3.2	3.6	J5.1	3.2	J3.2	G	G	G	G	G	G	G	G	G
22	G	G	G	G	G	G	G	G	G	2.8	3.0	3.7	4.7 ^M	J5.4	G	G	2.9	S	2.1 ^M	S	S	S	S	S
23	S	S	S	S	E	S	S	S	G	G	2.8 ^G	J3.3	G	G	G	J2.9	J2.4	J2.5	2.3	S	S	S	S	2.8 ^M
24	2.2	3.0	2.4	S	1.3	2.2	S	S	G	G	3.7	3.4	3.4	3.0 ^G	2.3 ^G	G	G	S	S	S	S	S	S	S
25	S	S	S	S	S	S	S	S	G	J2.8	G	4.9	G	2.4 ^G	G	3.0	2.5	S	2.4	S	S	S	S	S
26	S	S	S	S	E	S	S	S	G	G	3.4	G	G	G	3.1	2.5	2.1	S	S	S	S	S	S	S
27	S	S	S	E	E	S	S	S	G	2.8	3.0	3.4	J5.1	J4.1	4.8 ^M	J3.3	J3.8	S	2.4	S	S	S	S	S
28	S	S	S	E	2.2	S	S	S	G	2.9	G	3.3	3.2	G	3.4	J3.6	J3.0	2.7	J3.0	J3.2	2.4	S	S	S
29	S	2.1	2.3	S	S	S	S	S	G	2.9	3.1	3.4	G	3.7	G	3.3	2.3	S	S	S	2.6	S	S	3.0
30	3.2	2.3	S	2.0	S	2.5	S	S	G	G	3.4	3.5	2.9 ^G	J3.8	3.1	3.4	2.7	2.9	3.1	3.1	2.7	S	S	S
31	S	S	S	S	S	S	S	S	G	2.6	3.1	3.1	G	3.0	2.9	2.7 ^G	G	J5.0	2.9	2.8	2.3	J2.4	2.3 ^M	S
N.O.	7	8	7	7	12	2	4	1	29	31	30	31	31	31	31	30	30	15	14	8	11	7	7	8
Median	2.9	2.4	2.4	E	E	2.4	2.6	1.8	G	G	3.1	3.3	3.1	3.1	G	2.8	2.4	2.3	2.4	3.0	2.4	2.7	2.4	2.8
U.O.	3.2	2.9	2.8	2.3	2.2		3.0		G	2.8	3.4	3.7	3.4	3.8	3.1	3.1	3.0	2.8	2.9	3.2	2.7	3.1	2.8	3.0
L.Q.	2.3	2.2	2.3	E	E		2.3		G	G	3.1	G	G	G	G	G	G	2.0	2.3	2.4	2.4	2.4	2.3	2.7
Q.R.	0.9	0.7	0.5				0.7				0.6							0.8	0.6	0.8	0.3	0.7	0.5	0.3

Sweep 1.0 Mc to 20.0 Mc in 20 ^{min} sec in automatic operation.

foEs

The Radio Research Laboratories, Japan. **Y 4**

IONOSPHERIC DATA

Lat. 31° 12.5' N
Long. 130° 37.7' E

Yamagawa

135° E Mean Time (G.M.T. + 9h.)

fbEs

Dec. 1962

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	2.0	2.6	2.0	E	S	S	2.0	S			3.0	3.2	2.9G	4.5	G	E _{2.6} R	2.9	2.2	2.4	A	E	2.1	S	A	
2	A	S	S	S	S	S	S	S					2.8G	3.8	3.2	2.9	2.5	2.0	1.8	A	2.6	2.1	S	S	
3	S	S	S	S	S	S	S	S			3.1	G		2.4G	3.1	3.1	G	S	A	A	2.3	S	2.0	E	
4	E	2.2	E	S	S	S	S	S	G		2.4	3.4	2.9G		2.2G		2.1G	S	E	A	S	S	S	S	
5	S	S	S	S	S	S	S	S			G		3.3	3.1	3.0			S	S	S	S	S	S	S	
6	S	S	S	S	S	S	S	S			E _{3.0} R	E _{2.7} C	3.4	3.7	2.2G	3.0	G	S	S	S	S	S	S	S	
7	S	S	S	S	S	S	S	S		2.4	E _{3.1} R	E _{3.1} R				2.2	E _{3.7} S	1.9	S	S	S	S	S	S	
8	S	S	S	S	S	S	S	S			3.6	4.0				G	2.9	2.3	S	S	E	S	S	S	
9	S	S	S	S	S	S	2.0	S	G	G	3.0	E _{3.2} R	E _{3.2} R	E _{3.1} R	E _{3.5}	2.0G	G	S	S	S	E	1.9	S	1.9	
10	2.0	2.0	1.9	S	S	S	S	S	G	2.6	3.0	3.2	3.2					S	E	S	S	S	A	1.9	
11	S	S	S	S	S	S	S	S			G	3.4	3.8	3.8	2.7	G			S	S	S	S	S	S	
12	S	S	S	S	S	S	S	S			3.6		G	3.8	2.6	2.1	3.0	2.6	2.0	E	E	2.3	E	A	
13	S	S	S	S	S	S	S	S			3.3							2.0	S	S	S	S	A	A	
14	E	S	S	S	S	S	S	S		2.2	3.4			2.2G				S	S	S	S	S	S	S	
15	S	E	E	1.9	E	S	E	S				3.9	3.4	3.2				S	S	S	S	S	S	S	
16	S	S	S	S	S	S	S	S			G	3.1	G					G	S	S	S	E	S	S	
17	S	S	S	S	S	S	S	S			G	3.1	3.1	3.1	3.0			S	S	S	S	S	S	S	
18	S	S	S	S	S	S	S	S			3.3	2.6						S	S	S	S	S	S	S	
19	S	S	S	S	S	S	S	S			2.9	3.3	G	2.8	2.5	2.2	2.5	1.9	2.6	S	2.0	1.9	2.4	S	
20	S	1.8	E	S	1.4	S	E	S	2.3	2.8	G	3.7	G	E _{3.2} R	2.3	2.2G		S	E	S	S	S	S	S	
21	S	S	S	S	S	S	S	S			G	3.3	G	G	2.2	G	G	G	C	C	C	C	C	C	
22	C	C	C	C	C	C	C	C			G	3.5	3.5	4.0			2.8	S	1.8	S	S	S	S	S	
23	S	S	S	S	S	S	S	S			2.7G	2.4				2.9	2.0	2.2	1.9	S	S	S	S	1.8	
24	2.0	E	E	S	1.1	1.8	S	S			3.7	3.4	3.4	2.2G	2.0G			S	S	S	S	S	S	S	
25	S	S	S	S	S	S	S	S		2.5		3.4		2.5G		G	G	S	E	S	S	S	S	S	
26	S	S	S	S	S	S	S	S			3.0					3.1	G	1.9	S	S	S	S	S	S	
27	S	S	S	S	S	S	S	S		2.4	2.2	3.4	3.5	3.0	3.4	2.9	2.6	S	2.1	S	S	S	S	S	
28	S	S	S	S	E	S	S	S			G	3.3	2.5	3.1	A	2.5	G	2.7	A	2.0	S	S	S	S	
29	S	2.0	1.9	S	S	S	S	S		2.4	G	G		3.4	3.1	3.1	2.3	S	S	S	2.0	S	S	2.1	
30	A	E	S	1.9	S	2.2	S	S			3.4	3.4	2.6G	3.2	E _{3.1} R	3.4	2.5	2.5	2.2	2.6	2.0	S	S	S	
31	S	S	S	S	S	S	S	S		G	G	G		G	G	2.5G		A	1.9	E	2.1	2.3	A	S	
N.O.																									
Median																									

Sweep 1.0 Mc to 20.0 Mc in 20 ^{sec} in automatic operation.

The Radio Research Laboratories, Japan.

fbEs

Y

IONOSPHERIC DATA

Lat. 31° 12.5' N
Long. 130° 37.7' E

Yamagawa

135° E Mean Time (GMT. + 9h.)

M(3000)F1

Dec. 1962

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	3.90	3.80	A	L										
2											L	L	L	L	3.80									
3											L	LH	LH	L	L	L								
4											L	3.70	4.10	L	L	L								
5											L	L	L	L										
6											4.05 ^L	3.70 ^L												
7										L	L	L	L	3.60 ^L										
8										L	3.95	L	3.80	L										
9										L	3.65	R	A	L										
10											3.70 ^H	4.00	L	3.75										
11										LH	L	L	3.80 ^L	L	L									
12										L	3.55	3.70 ^H	3.70 ^L											
13										3.50	L	L	L	L										
14											3.85 ^H	3.95 ^H	4.10											
15										L	L	L	3.60 ^L	LH										
16										L	L	3.55	3.70 ^H	3.75 ^L	L									
17										L	LH	3.95 ^H	3.65 ^L											
18										L	A	L	L	L										
19											4.00 ^L	L	4.15	L	L									
20											L	L	3.75 ^L	L										
21											LH	LH	L	L	C	C	C							
22												L	L	L	L	L								
23											3.85 ^L	3.75	L	L	L	L								
24											3.60 ^L	4.10	L	L	L									
25											3.75	L	3.85	L	4.00 ^H									
26											L	LH	L	L	L									
27											L	L	L	L	3.70									
28											L	3.65 ^H	3.70 ^L	L	L	L								
29											3.70 ^L	3.65 ^L	L	L	L									
30											3.65	3.55	3.75	3.80 ^H	3.70	L	L							
31											LH	L	L	3.85	3.85									
No.										2	10	13	16	7	2									
Median										3.60	3.80	3.75	3.80	3.75	3.90									

Sweep 1.0 Mc to 20.0 Mc in 20 ^{min} sec in automatic operation.

The Radio Research Laboratories, Japan.

Y 8

M(3000)F1

IONOSPHERIC DATA

Lat. 31° 12.5' N
Long. 130° 37.7' E

Yamagawa

Dec. 1962

R'F2

135° E Mean Time (G.M.T. + 9h.)

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										235		235	245	275	255									
2												245	290	250	240									
3												240	275	280	250	245								
4												255	250	240	250	255								
5												255	245											
6												240	255H											
7												245	250	270	270									
8										230		275	255	280	255									
9										285		275	255	240										
10												260	250	275	275									
11										300		235	250	240	265	250								
12										330		270	250	245										
13										300		295	275	270										
14												235	250	250										
15										240		240	250	285	240									
16												255	255	295	260	240	240							
17										240		235	290H	250										
18												245	230	245	270	255								
19												235	275	260	240	240								
20												260	260	250	255									
21												245	245	265	270	I ₂₅₀₀ C	C	C						
22												245	240	255	250	230								
23												250	250	260	250									
24													250	240	255	255								
25												240	285	305	255	250								
26												245	260	260	255									
27												245	290	250	295									
28												255	290	275	260	250	245							
29													265	260	255	235								
30												280	260	255	250	255	255							
31												285	250	275	260	250								
No.										1	12	26	31	31	25	13	2							
Median										240	250	245	255	260	255	250	250							

Sweep 1.0 Mc to 20.0 Mc in 20 ^{min} sec in automatic operation.

R'F2

IONOSPHERIC DATA

Lat. 31° 12.5' N
Long. 130° 37.7' E

Yamagawa

135° E Mean Time (GMT.+9h.)

Dec. 1962

R'F

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	310	310	280	275	290	330	315	260	240	230 ^H	220	225	205	A	240	245 ^H	230	225	210	A	290	250	255	290 ^A	
2	I ₃₄₀ ^A	320	305	315	245	195	335	250	230	230	240	235	210	E ₂₅₀ ^A	210	225 ^H	230	220	205	A	275	250	305	330	
3	335	305 ^H	280	255	235	245	210	240	225	235	205 ^H	205	210 ^H	200 ^H	245	255	230	200	225	A	260	280	280	290	
4	300	325	300	285	255	250	270	250	205 ^H	205 ^H	240 ^H	205	220	205	230	200	240	210	215	205	A	260	270	235	250
5	300	330	E ₃₇₀ ^S	360	370	305	250	240	240	210 ^H	255 ^H	250 ^H	220	225	205 ^H	220	200 ^H	225	210	230	I ₂₈₀ ^S	255	230	305	
6	300	315	345	325	240	E ₂₂₀ ^S	S	240	240	200 ^H	230 ^H	250	210	240	240	240 ^H	240	225	210	E ₂₃₀ ^S	275	260	240	E ₃₂₅ ^S	
7	320	340	320	300	340	235	270	240	230	240	250 ^H	225	220	255	195	240 ^H	235	210	200	255	255	295	275	300	
8	S	325	305	305	255	E ₂₅₅ ^S	E ₃₀₀ ^S	245	240	220 ^H	220	220	255	240	240	250 ^H	240	220	200	300	300	250	I ₂₅₀ ^S	E ₂₆₀ ^S	
9	E ₃₀₀ ^S	340	E ₃₅₀ ^S	320	260	E ₂₄₅ ^S	E ₂₅₅ ^A	250	220 ^H	260	250	240	I ₂₅₀ ^A	I ₂₄₅ ^A	255	230 ^H	235	220	235	250	240	240	E ₃₃₀ ^S	335	
10	310	300	305	275	300	290	270	240	225 ^H	205 ^H	200 ^H	200 ^H	200	205	195	240	245	230	220	250	240	S	A	E ₃₅₀ ^A	
11	325	305	310	I ₂₈₀ ^S	275	250	240	250	220	220 ^H	200 ^H	230	250	I ₂₄₀ ^A	220	240	245	225	250	240	220	250	325	I ₃₂₅ ^S	
12	330	340	350	350	275	240	255	250	225	220 ^H	270	250	240	I ₂₄₅ ^A	210 ^H	245 ^H	245	210	220	250	300	260	255	I ₃₀₀ ^A	
13	315	330	315	300	I ₂₇₀ ^S	230	E ₃₃₅ ^S	240	225	195 ^H	225	205	250	205	240 ^H	250 ^H	240	215	250	230	240	S	A	A	
14	260	310	305	260	255	290	E ₃₂₀ ^S	250	245	240 ^H	E ₂₄₀ ^{AH}	220 ^H	200 ^H	210	250 ^H	250 ^H	240	225	210	250	240	280	E ₂₇₅ ^S	305	
15	285	300	E ₂₇₅ ^S	E ₂₂₀ ^A	260	240	E ₂₇₅ ^S	240	240	255	250	I ₂₂₅ ^A	240	210	220 ^H	250	240	225	225	245	250	310	270	320	
16	250	320	275	300	225	220	S	285	230	240 ^H	235	210	220	195 ^H	220	240	225	210	230	300	245	250	245	E ₃₅₀ ^S	
17	E ₃₅₀ ^S	330	320	315	305	300	E ₂₆₀ ^S	230	240	210	230	200 ^H	190 ^H	205	215 ^H	235 ^H	235	245	220	245	220	250	225	340	
18	375	325	290	E ₃₆₀ ^S	350	I ₃₅₅ ^S	340	205	230	270	245	A	220	210	240	250	230	230	225	255	240	255	E ₃₀₀ ^S	250	
19	325	265	325	310	270	265	E ₂₈₀ ^S	255	250	225 ^H	205 ^H	235	220	205	225	225	240	235	225	270	240	255	E ₂₇₅ ^A	E ₃₈₀ ^S	
20	295	275	240	E ₂₉₀ ^S	265	355	350	250	240	245 ^H	240 ^H	E ₂₅₀ ^A	230	225	230	235 ^H	225 ^H	230	215	245	315	290	240	E ₂₇₀ ^S	
21	340	350	305	270	300	295	340	270	230	200 ^H	230 ^H	230 ^H	225 ^H	225	225	I ₂₀₅ ^G	I ₂₃₀ ^G	I ₂₃₀ ^G	I ₂₅₅ ^G	I ₂₅₅ ^G	I ₂₄₀ ^G	I ₂₆₀ ^G	I ₂₄₅ ^G	G	
22	G	G	I ₂₉₀ ^G	I ₂₅₅ ^G	I ₂₄₀ ^G	G	G	I ₂₅₀ ^G	230	240	240	230	225	I ₂₂₅ ^A	220	225	240	235	220	245	305	260	255	270	
23	E ₃₀₀ ^S	E ₃₀₀ ^S	310	305	220	240	320	250	235 ^H	210 ^H	220 ^H	245	205	225	215	205 ^H	230	235	220	255	250	355	S	325	
24	325	330	255	250	240	225	I ₂₇₅ ^S	290	230	220 ^H	200 ^H	245	250	210	205	210	230	225	240	I ₂₈₀ ^S	250	220	S	S	
25	390	355	305	255	205	S	S	255	200	195 ^H	200 ^H	250	200	200	245	195 ^H	225 ^H	225	210	275	250	250	250	E ₃₃₀ ^S	
26	S	340	320	320	255	250	E ₃₄₅ ^S	250	190 ^H	195 ^H	240	240	205 ^H	245	235	250	240	225	220	240	235	250	S	E ₄₀₀ ^S	
27	350	320	275	270	240	E ₃₇₀ ^S	325	250	245	260 ^H	245	245	230	200	220	230 ^H	255	235	220	240	220	245	S	S	
28	I ₃₇₀ ^S	365	345	275	220	200	E ₃₃₀ ^S	255	235	230 ^H	240	245	190 ^H	250	250	225 ^A	E ₂₄₀ ^A	225	255	A	E ₃₀₀ ^A	E ₂₉₀ ^S	S	S	
29	I ₃₅₀ ^S	E ₃₄₀ ^A	300	245	275	205	295	250	215	230	245 ^H	235 ^H	240	255	235	235	215 ^H	230	240	230	225	225	S	E ₃₈₅ ^A	
30	A	355	340	305	235	200	S	295	235	255	250	240	250	225 ^H	E ₂₅₅ ^R	250	240	220	225	280	210	E ₃₀₀ ^S	I ₃₅₀ ^S	310	
31	270	300	315	270	275	230	250	255	240	230 ^H	250	205 ^H	215	220	220	210	240	I ₂₂₅ ^A	230	250	250	250	E ₂₉₅ ^A	I ₂₈₀ ^A	255
No.	26	29	29	29	31	27	19	31	31	31	31	29	31	29	30	31	31	31	31	26	30	26	19	19	
Median	320	325	305	E ₂₉₀	260	E ₂₄₅	270	250	230	230	240	235	220	225	230	235	E ₂₄₀	225	220	250	250	255	255	300	

Sweep 1.0 Mc to 20.0 Mc in 20 ^{micro}sec in automatic operation.

The Radio Research Laboratories, Japan.

Y 10

R'F

IONOSPHERIC DATA

Lat. 31° 12.5' N
Long. 130° 37.7' E

Yamagawa

135° E Mean Time (GMT. + 9h.)

f^oF₂S

Dec. 1962

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	115	S	S	105	130	S	120	S	G	G	110	110	120	110	110	105	150	105	130	125	125	120	S	105
2	105	S	S	S	S	S	S	S	G	G	G	G	105	110	110	110	105	105	105	105	105	100	S	S
3	S	S	S	E	S	S	S	S	G	G	140	145	G	G	105	155	170	S	S	125	110	S	110	105
4	115	105	105	S	S	S	S	S	160	G	105	120	105	G	105	G	105	S	105	120	S	S	S	S
5	S	S	S	S	S	S	S	S	G	G	G	G	115	110	105	G	G	S	S	S	S	S	S	S
6	S	S	S	S	S	S	S	S	G	G	110	110	155	155	105	155	155	S	S	S	S	S	S	S
7	S	S	S	S	S	S	S	S	G	120	G	120	120	G	G	105	100	145	S	S	S	S	S	S
8	S	S	S	S	E	S	S	S	G	G	G	145	135	G	E ₁₈₀ G	165	150	140	S	S	120	S	S	S
9	S	S	S	S	S	S	125	S	125	125	120	120	120	115	105	105	155	S	S	S	140	125	S	110
10	105	105	105	S	S	S	S	S	125	125	120	120	120	G	G	G	G	S	135	S	S	S	110	120
11	S	S	S	S	S	S	S	S	G	G	165	155	150	140	105	160	G	G	S	S	S	S	S	S
12	S	S	S	S	S	S	S	S	G	G	185	G	180	110	110	110	140	140	125	125	120	110	110	110
13	S	S	S	S	S	S	S	S	G	G	170	G	G	G	G	G	G	145	S	S	S	S	105	100
14	105	S	S	S	S	S	S	S	G	120	115	G	G	110	G	G	G	S	S	S	S	S	S	S
15	S	110	110	110	125	S	120	S	G	G	G	125	120	115	G	G	G	S	S	S	S	S	S	S
16	S	S	S	S	E	S	S	S	170	185	120	160	G	G	G	G	G	150	S	S	S	125	S	S
17	S	S	S	E	E	S	S	S	135	140	140	125	125	120	120	G	G	S	S	S	S	S	S	S
18	S	S	S	S	S	S	S	S	G	G	130	120	G	G	G	G	G	S	S	S	S	S	S	S
19	S	S	S	S	E	S	S	S	G	G	125	125	130	120	110	110	105	105	105	105	105	100	120	S
20	S	120	115	S	110	S	115	S	155	150	145	130	130	120	105	105	G	S	105	S	S	S	S	S
21	S	S	S	S	S	S	S	S	G	G	175	145	140	155	110	G	G	G	G	G	G	G	G	G
22	G	G	G	G	G	G	G	G	G	160	150	125	120	115	G	G	125	S	105	S	S	S	S	S
23	S	S	S	S	E	S	S	S	G	G	120	120	G	G	G	105	105	105	105	S	S	S	S	110
24	110	105	110	S	105	105	S	S	G	G	G	150	150	105	105	G	G	S	S	S	S	S	S	S
25	S	S	S	S	S	S	S	S	G	125	G	110	G	110	G	105	E ₁₇₀ G	S	105	S	S	S	E	S
26	S	S	S	S	E	S	S	S	S	G	120	G	G	G	G	105	170	140	S	S	S	S	S	S
27	S	S	S	E	E	S	S	S	G	125	120	155	110	110	110	105	105	S	105	S	S	S	S	S
28	S	S	S	E	115	S	S	S	S	170	G	140	120	G	120	120	110	105	105	105	105	S	S	S
29	S	125	120	S	S	S	S	S	G	125	140	130	G	125	G	120	120	S	S	S	115	S	S	105
30	110	110	S	125	S	105	S	S	G	G	155	150	120	110	110	110	110	105	105	105	105	S	S	S
31	S	S	S	S	S	S	S	S	G	155	145	140	G	140	130	105	G	110	120	125	110	105	100	S
No.	7	8	7	3	5	2	4		6	13	23	25	21	20	18	19	17	13	14	8	11	7	6	8
Median	110	110	110	110	115	105	120		145	125	130	125	120	115	110	110	120	110	105	120	110	110	110	110

Sweep 1.0 Mc to 20.0 Mc in 20 ^{min} sec in automatic operation.

The Radio Research Laboratories, Japan.

f^oF₂S

Y 11

IONOSPHERIC DATA

Lat. 31° 12.5' N
Long. 130° 37.7' E

Yamagawa

135° E Mean Time (GMT. + 9h.)

Dec. 1962

Types of Es

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	f	f2	f2	f2	f		f2				12	12	1	13	12	1	h1	12h2	f	f2	f	f		f	
2	f3												12	12	12	12	12	12	f2	f2	f	f2			
3											h	h			1	h1	h1				f2	f	f	f	
4	f	f2	f						h		1	1	13		1	1	1	1	f	f2					
5												12	12	12	12										
6											12	1	h12	h1	1	h	h								
7									1		1	1	1	1	1	13	13	h2							
8											h	h	h	h	h	h	h2	h2		f					
9							f2		1	12	1	1	1	1	12	12	1	h1		f	f			f2	
10	f	f	f						1	12	1	1	1						f		f	f3	f		
11										h	h	h	h	h	12	h									
12										h	h	h	h	12	12	12	h2	h4	f	f	f	f	f	f2	
13										h	h	h						h						f2	
14	f								1	1	1			1											
15		f	f	f	f	f					1	1	1	1											
16									h	h	12h	h1						h				f			
17								h	h	h	h	1	1	1	1										
18										h3	12														
19									h	h	1	e	h	12	12	12	13	1	f2		f	f	f		
20					f		f		h	h	h212	h	h	h	12	12			f						
21										h	h	h	h	h1	1										
22										h	h	h	e2	12			e3		f						
23									h	1	1	1	h	1	1	1	1	1	1	f				f	
24	f	f	f		f2	f				12	h	h	h	1	1	1	h2								
25												12	12	1					f						
26										1	1				h	h	h	h							
27									12	12	12	h1	12	12	14	12	12		f						
28					f				h2	h2	h2		1	1	12	13	13	1	f4	f2	f				
29		f	f2						1	h	1		e2	12	12	12	12		f	f	f			f	
30	f	f	f	f		f			h1	h	h	h	1	1	1	1	1	12	f2	f2	f				
31									h	h	h	h1	h	h	h	12	1313	f	f	f	f	f4	f		
No.																									
Median																									

Sweep 1.0 Mc to 20.0 Mc in 20 ^{min} sec in automatic operation.

Types of Es

The Radio Research Laboratories, Japan.

Y 12

SOLAR RADIO EMISSION 200 Mc/s

Flux in 10^{-22} w.m. $^{-2}$ (c/s) $^{-1}$, 2 polarizations

HIRAISO

Time in U.T.

Dec. 1962	Steady Flux					Variability				
	00-03	03-06	06-09	21-24	mean	00-03	03-06	06-09	21-24	mean
1	8	7	7	(8)	7	0	0	0	(0)	0
2	8	8	8	-	8	0	0	0	-	0
3	7	-	-	-	(7)	0	-	-	-	(0)
4	8	7	7	-	7	0	0	0	-	0
5	8	8	8	-	8	0	0	0	-	0
6	8	9	9	-	8	0	0	0	-	0
7	(8)	8	8	-	8	(0)	0	0	-	0
8	8	-	(6)	-	7	0	-	(0)	-	0
9	-	8	(9)	-	8	-	0	(0)	-	0
10	-	-	-	-	-	-	-	-	-	-
11	-	-	-	(6)	-	-	-	-	(0)	-
12	6	6	6	-	6	0	0	0	-	0
13	6	6	6	-	6	0	0	0	-	0
14	6	6	6	-	6	0	0	0	-	0
15	6	6	6	-	6	0	0	0	-	0
16	-	-	-	(6)	-	-	-	-	(0)	-
17	6	7	7	-	6	0	0	0	-	0
18	6	6	6	7	6	0	0	0	0	0
19	6	7	7	-	7	0	0	0	-	0
20	7	7	7	(8)	7	0	0	0	(0)	0
21	8	(6)	-	-	8	0	(0)	-	-	0
22	6	7	7	-	6	0	0	0	-	0
23	6	6	6	-	6	0	0	0	-	0
24	6	6	6	(6)	6	0	0	0	(0)	0
25	6	6	6	-	6	0	0	0	-	0
26	6	6	6	-	6	0	0	0	-	0
27	6	6	6	-	6	0	0	0	-	0
28	6	6	6	-	6	0	0	0	-	0
29	7	7	7	(6)	7	0	0	0	(0)	0
30	6	7	7	-	6	0	0	0	-	0
31	6	7	7	(6)	7	0	0	0	(0)	0

Note No observations during the following periods:

2nd	2130-	2400	21st	0600-0730
3rd	0330-	0730	21st	2140-2400
8th	0300-	0600	22nd	2140-2400
8th	2130-	9th 0100	23rd	2140-2400
10th	0100-	11th 0720	24th	0000-0100
15th	2140-	16th 0300	28th	2150-2400
19th	2140-	20th 0100		

Outstanding Occurrences

No Outstanding Occurrence was observed during December, 1962.

RADIO PROPAGATION QUALITY FIGURES

HIRAISO

Time in U.T.

Dec. 1962	Whole Day Index	L. N.				W W V				S. F.				W W V H				Warning				Principal magnetic storms		
		06 12 18 24	06 12 18 24	00 06 12 18	00 06 12 18	06 12 18 24	06 12 18 24	00 06 12 18	00 06 12 18	06 12 18 24	06 12 18 24	00 06 12 18	00 06 12 18	06 12 18 24	06 12 18 24	06 12 18 24	06 12 18 24	Start	End	ΔH				
1	4o	5	4	C	-	-	-	3	4	5	4	3	4	4	(4)	5	U	N	N	N	0334	2400	105 ^Y	
2	4o	4	4	C	-	-	-	4	3	4	(4)	4	5	4	-	4	N	N	N	N				
3	4-	4	4	(3)	-	-	-	4	5	5	5	4	4	4	-	4	N	N	N	N				
4	3o	4	2	3	-	-	-	2	4	4	3	3	4	4	-	4	N	N	U	U				
5	4+	5	5	5	-	-	-	4	3	5	4	4	5	5	-	3	U	N	N	N				
6	4o	4	4	C	-	-	-	4	4	5	4	(4)	5	4	-	4	N	N	N	N				
7	4o	4	4	5	-	-	-	4	3	4	4	3	4	3	-	3	N	N	N	N				
8	4o	4	4	4	-	-	-	5	4	4	4	4	5	4	-	5	N	N	N	N				
9	4o	4	5	4	-	-	-	5	4	4	4	(3)	4	3	-	3	N	N	N	N				
10	4+	5	5	3	-	-	-	5	4	4	5	4	4	4	-	4	N	N	N	N				
11	4-	4	3	4	-	-	-	4	4	4	3	3	4	4	-	4	N	N	N	N				
12	5-	4	4	4	-	-	-	5	5	5	5	4	5	5	-	5	N	N	N	N				
13	4-	4	4	3	-	-	-	5	5	5	4	4	5	4	-	5	N	N	N	N				
14	3+	3	3	2	-	-	-	4	4	4	4	3	4	4	-	4	N	N	N	N				
15	3+	3	3	3	-	-	-	(4)	3	3	4	5	3	3	-	4	N	N	N	N				
16	3+	3	3	3	-	-	-	2	4	4	4	3	4	3	-	3	N	N	N	N				
17	3o	3	3	3	-	-	-	2	4	4	4	3	4	3	-	3	N	N	N	U				
(18)*	3+	3	2	2	-	-	-	4	4	4	4	5	4	4	(4)	5	U	U	U	U				
(19)*	3+	3	3	2	-	-	-	3	4	4	4	3	5	4	-	3	U	U	U	U				
(20)*	3+	3	2	2	-	-	-	4	4	4	4	3	4	C	-	3	U	U	U	U				
21*	3+	3	3	2	-	-	-	3	4	4	4	3	3	3	-	3	U	U	U	U				
22	3o	3	2	4	-	-	-	3	3	3	4	3	4	3	-	3	U	U	U	U				
23	3o	3	3	3	-	-	-	4	3	3	3	2	3	3	-	3	U	U	U	U				
24	5-	3	2	(4)	-	-	-	(4)	2	3	3	2	4	3	-	4	U	U	U	U				
25	3+	3	4	4	-	-	-	3	3	4	4	3	4	C	-	4	U	U	N	N				
26	4-	4	2	4	-	-	-	4	3	4	5	4	4	C	-	4	N	N	N	N				
27	4o	4	5	5	-	-	-	4	4	4	4	3	5	4	-	4	N	N	N	N				
28	4-	4	4	5	-	-	-	2	3	5	4	2	4	4	-	4	N	N	N	N				
29	3+	4	2	4	-	-	-	3	2	4	4	3	4	4	-	4	N	N	N	N				
30	4o	4	4	4	-	-	-	5	3	4	(4)	C	4	(3)	-	3	N	N	N	N				
31	3+	4	3	4	-	-	-	3	3	4	4	3	3	4	-	4	N	N	N	N				

* = day of Special World Interval

() = inaccurate

() = Regular World Day

C = artificial accident

- = impossible to evaluate

--- = continuing magnetic storm

IONOSPHERIC DATA IN JAPAN FOR DECEMBER 1962

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