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IONOSPHERIC DATA IN JAPAN

FOR DECEMBER 1961

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THE RADIO RESEARCH LABORATORIES

MINISTRY OF POSTS AND TELECOMMUNICATIONS

KOKUBUNJI, TOKYO, JAPAN

F—156

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THE RADIO RESEARCH LABORATORIES

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CONTENTS

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°03.2′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_bE_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.

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

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

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

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

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

$hpF2$ The virtual height of the $F2$ layer measured on the ordinary-wave branch at a frequency equal to 0.834 f_0F2.

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

a. Descriptive 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 nomal 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 atmospherics.

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 preceeding symbol on monthly tabulation sheets.

D *greater than.....*

E *less than.....*

I Missing value has been replaced by an interpolated value.

J Ordinary component characteristic deduced from the extraordinary component.

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 thich 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.

n 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. 0234x)

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

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

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 preparated 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 recoverly

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

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

Importances

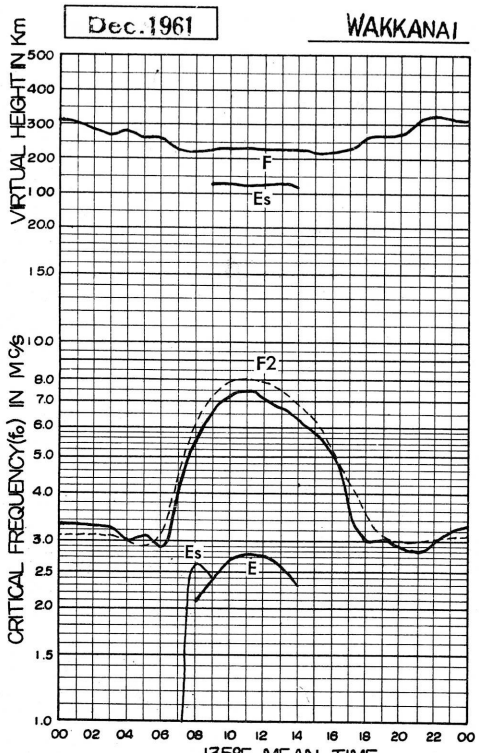
Degrees of SWF are classified into 9 grades according to the amplitude of fade-out ;

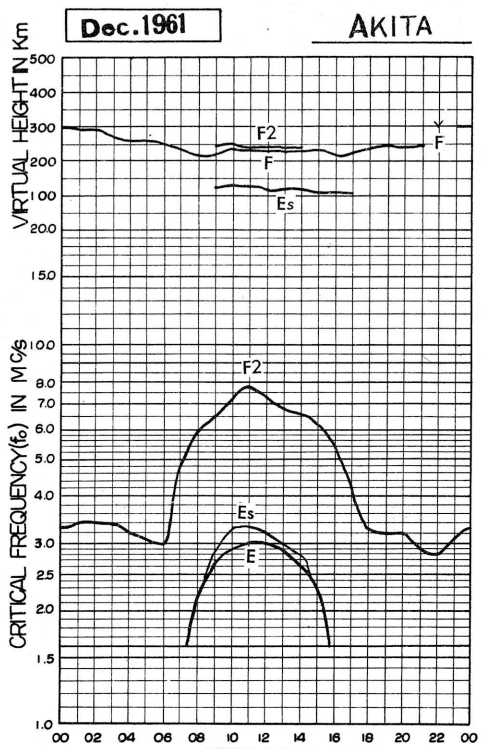
1−	1	1+
2−	2	2+
3−	3	3+

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.

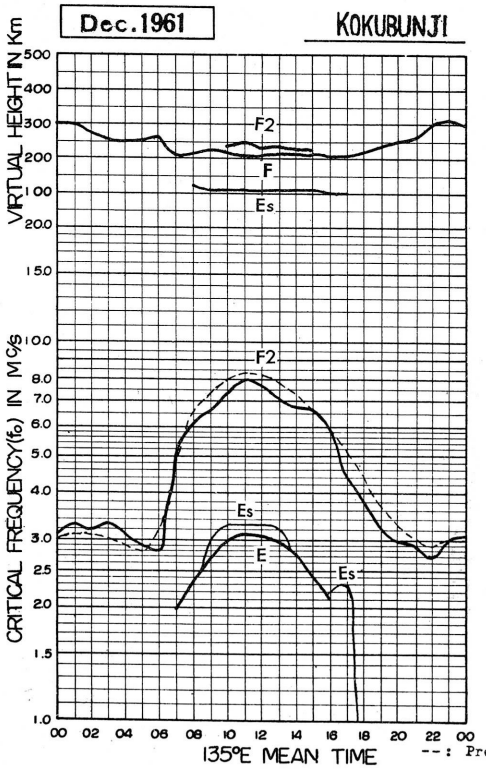
IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS

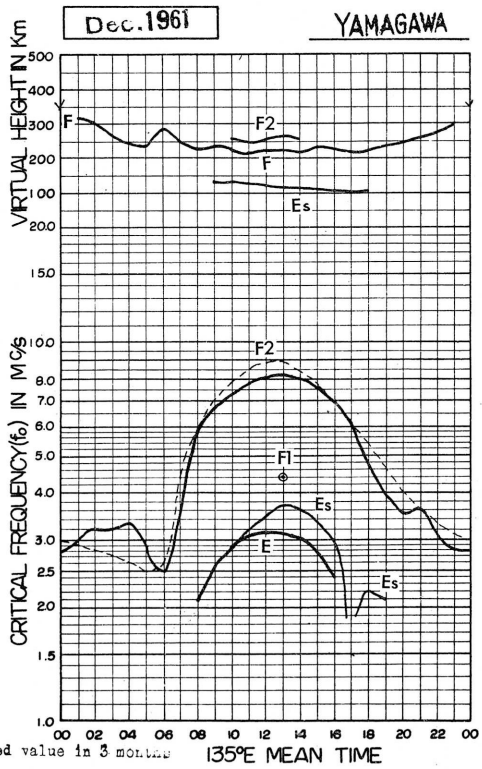




--: Predicted value in 3 months advance by R.R.L.

IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS





--: Predicted value in 3 months advance by R.R.L.

IONOSPHERIC DATA

Wakkanai

Lat. 45° 23.6' N
Long. 141° 41.1' E

Dec. 1961

foF2

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	3.6	3.6	3.9	4.0	I4.2SF	I3.8S	3.3	5.5	5.9	6.6	8.2	7.3	8.0	7.6	7.2H	6.1	6.0	4.4	3.1	3.1	3.9	3.5,	3.6	3.4
2	2.8	2.7	2.8	3.5	I2.4A	I2.3A	2.2	4.2	7.2	11.5H	14.6H	11.7	9.0H	7.0	7.8	6.9	6.1	5.3	4.3	3.7	2.7	2.6	3.0	3.0
3	3.4	I2.8S	2.5	2.6	2.5	2.3	I2.7A	3.3	3.9	5.0	5.2	5.4F	5.2H	5.7	6.3	6.2	5.3	5.0	3.9	4.3	3.4	3.6	I3.8FS	I4.1F
4	3.9	4.0	3.9	3.6	2.8	2.3	2.6	5.3	7.3	8.3	11.1H	8.5	8.1	7.6	9.5	7.8	5.6	5.7	I3.6A	3.8	3.9	2.9	I3.0A	3.2
5	3.3	3.3	3.6F	3.5F	I3.6F	U3.7S	3.3	5.0	6.6	6.7	8.7H	I8.8C	8.5	7.2	7.3	6.5	5.1	4.3	3.8	3.4	2.5	F	F	F
6	F	F	3.2	3.1	3.2F	3.5F	3.4	5.8	6.3	U7.3S	7.6	7.8	7.5H	8.0	7.0	8.1	6.3	5.0	3.9	3.6	4.3	U4.2S	U4.3S	U4.4S
7	U4.6S	I4.5F	F	F	F	4.3	4.1	4.7Z	6.5	7.4	8.4	9.3	7.8H	7.4	7.2	6.1	6.0	4.7	3.3	3.3	3.3	3.6	3.9	4.0
8	4.1	F	F	F	3.5F	3.4	3.6	5.0	I6.6S	7.3	I8.0S	7.2	6.7	7.0	6.5	5.6	U5.0S	3.8	3.5	3.0	3.2	3.3F	I3.6SF	3.7F
9	3.6	3.4	3.5	3.6	3.5	3.6	3.3	5.0	5.7H	7.1	I6.8HR	7.1	6.3	8.3H	6.3H	6.3	4.4	3.1	3.0	3.0	2.9	3.0	3.5	3.7
10	4.0	3.8	4.0	4.0	3.8	4.3	3.5	4.3	5.3	6.3	7.1	7.8H	7.6	6.8	6.4	6.0	5.0	4.1	3.3	3.3	3.2	3.0	3.5	3.6
11	3.7	4.0	3.6	3.5	3.5	3.4	3.2	5.6	7.0	7.6H	6.8	7.5	6.6	7.1	7.1	6.0	5.1	4.4	3.6	3.8	4.0	2.6	3.5	3.3
12	3.6	3.6	3.7	3.5	3.6	3.6	U4.0S	3.8	C	C	C	8.1	7.5	8.0	7.0	5.6	5.6	2.8	2.7	3.0	3.4	3.2	3.3	3.5
13	3.3	3.4	3.6	3.4	3.2	3.3	2.9	4.3	5.5	6.3	8.3	6.7	6.7	7.0	5.7	5.6	3.8	3.8	2.6	2.7	2.7	2.6	2.8	I2.9F
14	3.0	3.0	I2.8F	2.8F	3.0F	2.9	J2.0S	4.2	5.0	5.5	7.0H	6.7H	7.0	6.1	6.8H	5.4H	4.6	3.7	2.7	I2.8A	2.9	2.6	2.6	3.0
15	3.0	3.0F	3.1	3.1	3.1	2.6	2.5	4.0	5.6	6.0	7.5	I7.6C	I7.4C	6.7	5.9	5.8	4.3	4.6	2.7	2.6	2.9	J2.6S	2.9	I3.0F
16	U3.3F	U3.2F	3.2F	3.3F	3.0	2.9	2.5	U3.8S	5.2	6.8	7.1H	8.0	7.0H	U6.6S	5.8	5.6	5.1	3.5	3.7	3.3	2.4	2.2	2.6	2.8
17	3.0	3.0	3.0	3.0	3.0	3.0	2.7	3.7	5.9	U6.5SH	7.3	8.2H	6.1H	6.0H	5.6	5.5H	5.6	3.0	I2.6S	2.7	2.5	2.9	2.8F	2.9
18	2.9	2.9	3.0	3.0	3.0	3.0	3.0	3.9	5.4H	5.6	6.6	6.0	6.4	6.0	5.8	5.8	4.1	3.4	2.4	2.5	2.5	2.4	F	F
19	F	3.1	2.9F	3.0	3.0	3.2	3.0	4.1	5.1	5.2	6.0	6.8H	5.6H	6.3	5.7	4.6V	3.9	I3.0S	3.1	2.6	2.6	2.7	3.0	3.2
20	I3.2F	U3.1F	3.3F	2.9	3.0	3.0	2.7	3.9	5.6	5.6H	6.2H	8.5	6.9	5.7	5.5	5.3	4.0	3.0	2.6	2.6	2.6	2.6	2.6	3.0
21	3.2	3.0	3.1	3.0	3.0	2.8	2.6	3.8	5.2	6.0	6.4	6.0V	7.0H	5.4H	I6.0A	5.9	4.3	3.6	3.0	I3.2SF	2.9F	3.6	4.0	3.6
22	3.6	3.9	3.8	4.3	F	F	S	U4.3S	5.0	6.5H	6.7	7.1	5.6	7.7H	5.5	5.0	5.0	3.6	3.0	2.6	2.6	2.8	2.8	3.0
23	3.0	3.3	3.3	I3.4F	3.6	3.7	3.3	I4.2S	5.8	6.3	7.5H	6.1	7.1	6.5	6.1	5.3	5.3	4.3	3.5	3.6	4.3	3.0	3.6	3.9
24	4.0	4.3	4.3	3.9	3.8	3.8	3.6	4.6	5.8	5.7	7.7	8.1	6.3	6.3	6.0	5.0	6.4	4.6	2.5	2.4	2.6	2.8	3.3	3.2
25	3.0F	3.0F	3.0	3.1	I2.8F	2.7F	U2.8S	4.3	6.3	6.8	8.0	8.3	7.6H	5.9	6.8	6.0	5.0	3.3	2.9	3.0	2.6	2.6	2.6	3.0
26	2.9	3.1	3.1	3.1	3.0	3.0	2.8	4.0	5.3	6.1	6.8	6.6	6.3	7.0	5.1	5.6	6.0	4.2	2.6	3.0	2.6	2.8	2.8	3.0
27	3.2	3.3	3.3	3.1	3.1	3.2	3.1	4.2	5.1	6.6	7.2H	7.9	7.0	6.7H	7.1H	6.1	5.0	3.1	2.9	3.0	3.4	FS	F	F
28	3.4	3.5	3.8	3.4	2.5	2.8	2.6	4.3	6.0	7.0	7.2	7.4	I7.7R	6.6	7.0	5.8	5.3	3.3	2.9	2.7	2.6	I2.8S	3.0	3.3
29	3.3	3.0	U3.0S	3.0	3.0	3.0	2.9	3.1	5.6	6.8	7.3	7.3	8.6	6.7	6.7	6.6	5.0	3.0	2.3	2.8	J2.3S	I2.3S	2.6	2.7
30	2.7	2.6	2.6	2.7	2.6	2.3	I2.3S	3.5	4.9	6.1	8.8H	7.5H	7.0H	7.3	6.2	5.6	6.3	3.3	2.4	3.0	3.3	3.1	3.0	3.3
31	3.4	3.5	3.5	3.4	3.5	3.5	2.7	3.6	5.3	6.1	7.5H	7.5H	9.0H	6.5H	6.0	6.2	6.5	3.3	3.0	2.6	2.5	2.5	2.6	2.7
No.	29	29	29	29	29	30	30	31	30	30	30	31	31	31	31	31	31	31	31	31	31	29	28	28
Median	3.3	3.3	3.3	3.3	3.0	3.1	2.9	4.2	5.6	6.5	7.3	7.5	7.0	6.7	6.3	5.8	5.1	3.7	3.0	3.0	2.9	2.8	3.0	3.2
U. Q	3.6	3.6	3.6	3.5	3.5	3.6	3.3	4.7	6.3	7.0	8.0	8.1	7.7	7.3	7.0	6.2	6.0	4.4	3.5	3.3	3.4	3.2	3.6	3.6
L. Q	3.0	3.0	3.0	3.0	3.0	2.8	2.6	3.8	5.2	6.0	6.8	6.8	6.4	6.3	5.8	5.6	4.6	3.3	2.6	2.7	2.6	2.6	2.8	3.0
Q. R	0.6	0.6	0.6	0.5	0.5	0.8	0.7	0.9	1.1	1.0	1.2	1.3	1.3	1.0	1.2	0.6	1.4	1.1	0.9	0.6	0.8	0.6	0.8	0.6

The Radio Research Laboratories, Japan.

foF2

Sweep 1.0 Mc to 18.0 Mc in 1 min/~~sec~~ in automatic operation.

W 1

9

IONOSPHERIC DATA

Dec. 1961 | foF1 | 135° E Mean Time (G.M.T. + 9h.) | Wakkanai | Lat. 45° 23.6' N, Long. 141° 41.1' 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													
2												L												
3									3.3	3.7	3.7	4.0												
4																								
5												C												
6																								
7																								
8																								
9												U 3.8 L												
10																								
11																								
12									C	C	C		L											
13																								
14																								
15												C	C											
16																								
17											L													
18																								
19																								
20																								
21																								
22												L												
23																								
24																								
25																								
26																								
27																								
28																								
29																								
30																								
31																								
No.									1	1	1	2												
Median									3.3	3.7	3.7	3.9												

foF1

Sweep 1.0 Mc to 15.0 Mc in 1 min ~~sec~~ in automatic operation.

The Radio Research Laboratories, Japan.

W 2

IONOSPHERIC DATA

Dec. 1961 | foE | 135° E Mean Time (G.M.T. + 9h.) | Wakkanai | Lat. 45° 23.6' N | Long. 141° 41.1' 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								S	2.15	A	A	A	A	2.85	2.40	S								
2									S	A	2.60	I 2.55 A	I 2.65 A	2.65	2.25	S	S							
3									S	S	2.55	2.70	2.75	2.50	2.35	S								
4								S	2.20	2.30	2.60	2.70	2.75	2.45	S	S								
5								S	2.15	I 2.25 A	2.40	I 2.90 C	2.80	2.55	2.35	S								
6								S	2.05	2.45	2.60	2.65	2.40	2.50	2.20	S								
7									S	2.30	2.50	2.60	2.45	2.50	2.25	S								
8								S	S	2.45	3.05	2.80	2.85	2.55	B	S								
9								S	S	2.50	2.50	I 2.50 B	I 2.75 A	R	B	B								
10								S	S	I 2.60 B	2.80	I 2.80 B	2.90	B	B	S	S							
11								S	2.10	2.45	B	B	B	B	B	B								
12									C	C	C	B	2.50	I 2.45 B	I 2.20 A	S								
13								S	S	I 2.40 A	I 2.65 B	I 2.75 B	2.65	I 2.60 B	B	S								
14									S	2.25	2.35	2.65	2.75	2.60	2.15	S								
15									2.10	I 2.40 A	2.65	I 2.75 C	I 2.70 C	2.65	2.20	S								
16									S	A	2.65	2.65	2.60	I 2.40 A	2.10	S	S							
17									A	2.40	2.60	2.85	2.70	2.35	2.15									
18								S	S	2.35	2.75	2.70	2.75	2.50	2.05	S								
19								S	S	2.30	I 2.55 A	2.70	2.75	2.50	2.30	S								
20								S	S	2.40	2.75	3.00	2.70	2.50	2.25	S								
21								S	S	2.50	2.65	2.85	2.80	A	A	A								
22									S	2.35	A	A	A	2.50	A	A								
23									S	2.30	2.80	I 2.95 A	I 2.80 A	2.65	B	S								
24								S	S	2.50	2.90	2.90	2.90	2.85	I 2.55 R	2.15								
25									S	2.30	2.75	2.95	3.00	2.85	S	S								
26									2.05	2.35	2.70	2.90	2.80	2.65	2.30	S	S							
27								S	S	2.30	2.60	2.70	2.80	2.65	2.45	S								
28								S	S	2.50	2.70	2.85	2.95	2.70	2.30	S	S							
29									S	2.25	2.60	2.75	2.75	2.65	2.30	S	S							
30									S	2.30	2.70	2.75	2.50	2.35	S	S	S							
31									S	2.40	I 2.55 A	2.65	2.90	2.75	2.30	S	S							
No.									7	26	27	27	28	27	20	1								
Median									2.10	2.40	2.65	2.75	2.75	2.55	2.30	2.15								

foE

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

The Radio Research Laboratories, Japan.

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IONOSPHERIC DATA

Dec. 1961 | foEs | 135° E Mean Time (G.M.T. + 9h.) | Wakkanai | Lat. 45° 23.6' N, Long. 141° 41.1' 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	E	E	E	E	E	E	E	S	2.8	3.0	3.3	3.6	4.3	G	G	S	E	E	E	E	E	E	E	E
2	E	E	E	E	3.1	2.5	E	E	2.5	2.7	3.0	3.2	3.3	G	G	S	S	E	E	E	E	E	E	E
3	E	S	E	E	1.4	2.5	3.0M	2.8	3.3	3.3	G	G	G	G	G	S	E	E	E	E	E	E	E	E
4	E	E	E	E	E	E	E	S	G	3.0	3.6	3.2	3.0	G	2.5	S	E	3.3	4.3	3.0	3.0	4.0	3.3	2.9
5	2.8	E	E	E	2.3	E	E	S	G	3.3	3.0	C	G	G	G	S	E	E	E	E	E	E	E	E
6	E	E	E	E	E	E	E	S	3.1	3.2	3.3	3.4	4.0	3.2	G	S	E	E	2.7	E	E	3.0	E	E
7	E	E	E	E	E	E	E	E	3.4	3.2	3.3	4.1	3.3	3.1	G	S	E	2.8	E	E	E	E	2.6	E
8	E	E	E	E	E	4.3	2.8	S	S	G	4.0	2.5G	2.6G	G	B	S	3.0	E	E	E	E	E	E	E
9	E	E	2.1	E	E	E	E	S	S	G	G	B	3.3	G	B	B	E	E	E	E	E	E	2.6	E
10	E	E	E	E	E	E	E	S	S	B	G	B	G	B	2.4	S	S	E	E	E	E	E	E	E
11	E	E	E	E	E	E	E	S	G	G	B	B	B	B	B	B	E	E	E	E	E	2.6	E	E
12	E	E	E	E	E	2.4	2.5	3.3	C	C	C	B	G	B	2.5	2.5	E	2.8	E	E	E	E	E	E
13	E	E	E	E	E	E	E	S	S	2.9	B	B	G	B	B	S	E	E	E	E	E	E	E	E
14	E	E	E	E	E	E	E	E	S	G	G	G	G	G	G	S	E	E	2.3	3.0	3.0	E	E	E
15	E	E	E	E	2.3	E	E	E	2.8	3.3	G	C	C	G	G	S	E	E	E	E	E	E	E	E
16	E	E	E	E	E	E	E	E	S	2.4	G	G	3.2	3.1	2.6	S	S	E	E	3.0	E	2.5	E	E
17	E	E	E	E	E	E	E	E	4.3	3.0	3.2	G	G	G	G	E	E	E	S	E	E	E	E	E
18	E	E	2.0	E	E	E	E	S	S	G	G	G	3.2	3.0	2.7	S	E	2.4	2.5	E	E	E	E	E
19	E	E	E	E	E	E	E	S	S	2.6	3.2	G	G	G	G	S	E	S	E	E	E	E	E	E
20	E	E	1.5	2.3	E	E	3.0	S	S	3.2	G	2.6G	3.1	G	G	S	E	E	E	E	E	E	E	E
21	E	E	E	E	E	E	E	S	S	G	G	3.6	3.5	5.3	8.3	5.3	E	E	E	E	E	E	E	E
22	E	E	E	E	E	E	E	E	S	G	3.4	3.1	3.0	G	3.3	S	E	E	E	E	E	E	E	E
23	E	E	E	E	E	E	E	E	S	G	3.0	3.0	4.2	G	B	S	E	E	E	E	E	E	E	E
24	E	E	E	E	E	E	E	S	S	3.0	G	G	G	G	G	G	S	E	E	E	E	E	E	E
25	E	E	E	1.6	E	E	E	E	S	G	G	G	G	G	S	S	E	E	E	E	E	E	E	E
26	E	E	E	E	E	E	E	E	G	G	G	G	G	G	G	S	S	E	E	E	E	E	E	E
27	E	E	E	E	E	E	E	S	S	G	G	3.0	G	3.0	G	S	E	E	E	E	E	E	E	E
28	E	E	E	E	3.6	E	E	S	S	G	3.4	G	G	G	G	S	S	E	E	E	E	S	E	E
29	E	E	E	E	E	E	E	E	S	G	3.0	G	G	G	3.1	2.3	S	E	E	E	E	S	E	E
30	E	E	E	E	E	E	S	E	2.5	3.2	G	3.4	3.3	5.0	3.0	S	S	E	E	E	E	E	E	E
31	E	E	E	E	E	E	E	E	S	G	3.5	3.1	G	G	G	S	S	E	E	E	E	E	E	E
No.	31	31	31	31	31	31	30	15	12	29	28	24	29	27	25	5	22	30	30	31	31	29	31	31
Median	E	E	E	E	E	E	E	E	2.6	2.4	G	G	G	G	G	2.3	E	E	E	E	E	E	E	E
U.Q	E	E	E	E	E	E	E	E	3.2	3.1	3.3	3.2	3.3	3.0	2.6	3.9	E	E	E	E	E	E	E	E
L.Q	E	E	E	E	E	E	E	E	G	G	G	G	G	G	G	G	E	E	E	E	E	E	E	E
Q R																								

foEs

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

The Radio Research Laboratories, Japan.

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IONOSPHERIC DATA

Wakkanai

Lat. 45° 23.6' N
Long. 141° 41.1' E

Dec. 1961

f_bE_s

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	G	2.7	3.2	3.1	3.3			S								
2					A	A			G	2.5	G	3.0	3.0			S	S							
3		S			E	E	A	E	G	3.0						S		E	A	E	E	E	A	E
4								S		G	G	G	G		G	S								
5	E				E			S		2.6	G	C				S								
6								S	G	G	G	G	G	G		S			E			E		
7									G	G	G	G	G	G		S		E					E	
8						E	E	S	S		G	2.5	2.4		B	S	E							
9			E					S	S			B	3.1		B	B							E	
10								S	S	B		B		B	G	S	S							
11								S			B	B	B	B	B	B						E		
12						E	E	2.7	C	C	C	B		B	2.2	G		E						
13								S	S	2.5	B	B		B	B	S								
14									S							S			E	A	E			
15					E				G	2.5		C	C			S								
16									S	2.4			G	2.6	G	S	S			E		E		
17									2.3	G	G								S					
18			E					6	S				G	G	G	S		E	E					
19								S	S	G	2.8					S		S						
20			E	E			E	S	S	G		G	G			S								
21								S	S			G	G	3.1	A	4.6								
22									S		2.9	2.8	2.9		2.2	S								
23									S		G	3.0	3.5		B	S								
24								S	S	G							S							
25				E					S						S	S								
26																S	S							
27								S	S			G		G		S								
28					E			S	S		G					S	S					S		
29									S		G				G	G	S					S		
30							S		G	G		G	G	4.1	G	S	S							
31									S		2.8	G				S	S							
No.	1		3	2	5	4	4	2	8	15	14	13	14	7	9	3	1	4	4	3	2	4	3	1
Median	E		E	E	E	E	E	E	G	G	G	G	G	G	G	G	E	E	E	E	E	E	E	E

f_bE_s

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

The Radio Research Laboratories, Japan.

W 5

IONOSPHERIC DATA

Dec. 1961 | f-min | 135° E Mean Time (G.M.T. + 9h.) | Wakkanai | Lat. 45° 23.6' N | Long. 141° 41.1' 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	E2.00$	E	E	E1.90$	E	E1.60$	E2.00$	E1.95$	E1.95$	2.00	2.00	2.00	2.00	2.00	2.00	E2.10$	E2.00$	E1.90$	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$
2	E2.00$	E2.00$	E2.00$	E2.00$	E	E	E1.85$	E2.00$	E1.90$	1.95	2.00	2.00	2.00	2.00	2.00	E2.05$	E1.90$	E1.90$	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$
3	E2.00$	S	E1.70$	E1.95$	E	E	E1.85$	E1.90$	E1.90$	2.00	2.00	2.00	1.90	1.90	2.00	E2.00$	E2.00$	E2.00$	E2.00$	E1.90$	E2.00$	E2.00$	E2.00$	E2.00$
4	E2.00$	E2.00$	E2.00$	E	E	E1.80$	E1.90$	E2.00$	2.00	2.00	2.00	2.00	2.00	2.00	E2.00$	E2.00$	E2.00$	E2.00$	E1.90$	E1.90$	E1.90$	E1.90$	E1.90$	E2.00$
5	E2.00$	E1.70$	E2.00$	E1.80$	E	E1.70$	E1.90$	E2.00$	2.00	2.00	2.00	I2.00C	2.00	2.00	2.00	E2.00$	E2.00$	E2.00$	E2.00$	E1.90$	E1.90$	E1.90$	E1.95$	E1.90$
6	E2.00$	E1.90$	E1.85$	E1.90$	E1.90$	E1.50$	E2.00$	E1.90$	2.00	2.00	2.00	2.00	2.00	2.00	2.00	E2.10$	E2.00$	E2.00$	E2.00$	E2.00$	E1.95$	E2.00$	E2.00$	E1.90$
7	E2.00$	E2.00$	E2.00$	E	E	E1.20$	E2.00$	E2.00$	E2.00$	2.00	2.00	2.00	2.00	2.00	2.00	E2.10$	E2.00$	E1.90$	E2.00$	E2.00$	E2.00$	E2.00$	E1.90$	E1.90$
8	E2.00$	E1.80$	E	E	E	E1.20$	E1.90$	E2.00$	2.20	2.00	2.40	2.00	2.00	2.10	2.50	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$
9	E2.00$	E1.80$	E1.90$	E	E	E1.60$	E2.00$	E2.00$	E2.20$	1.95	2.30	3.00	2.05	2.00	2.70	2.10	E2.00$	E2.00$	E2.00$	E2.00$	E2.10$	E2.00$	E2.00$	E2.00$
10	E2.00$	E2.00$	E2.00$	E2.00$	E	E1.80$	E2.00$	E2.00$	E2.30$	2.80	2.15	3.00	2.00	3.00	2.05	E2.20$	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$
11	E2.00$	E	E2.00$	E2.00$	E	E1.80$	E2.00$	E2.00$	2.00	2.00	3.50	3.30	3.00	3.30	2.70	2.10	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$	E1.90$	E2.00$	E2.00$
12	E2.00$	E2.00$	E	E	E	E1.70$	E1.70$	E2.00$	C	C	C	3.00	2.10	3.00	2.00	E1.90$	E2.00$	E1.90$	E1.80$	E2.00$	E2.00$	E1.90$	E2.00$	E2.00$
13	E1.90$	E2.00$	E	E	E	E1.20$	E1.90$	E1.90$	E2.15$	2.00	3.00	3.00	2.00	4.00	2.50	E2.10$	E2.00$	E1.85$	E1.90$	E1.80$	E1.90$	E1.90$	E2.00$	E2.00$
14	E2.00$	E	E	E	E	E1.70$	E2.00$	E2.00$	E2.00$	2.00	2.00	2.00	2.00	2.00	2.00	E2.00$	E2.00$	E1.95$	E1.80$	E1.80$	E1.85$	E1.90$	E1.90$	E2.00$
15	E1.70$	E	E	E	E	E1.60$	E2.00$	E2.00$	1.90	1.80	1.90	I1.90C	I2.00C	2.00	2.00	E2.00$	E1.90$	E1.90$	E1.70$	E1.70$	E2.00$	E1.80$	E1.90$	E2.00$
16	E2.00$	E	E	E	E	E1.50$	E1.50$	E2.00$	E2.10$	1.90	2.00	2.00	2.00	1.90	2.00	E2.05$	E1.90$	E2.00$	E2.00$	E1.90$	E1.90$	E2.00$	E1.80$	E2.00$
17	E2.00$	E	E	E	E	E1.50$	E1.90$	E1.90$	2.00	2.00	2.00	2.00	2.00	1.90	2.00	E2.00$	E2.00$	E1.50$	S	E2.00$	E2.00$	E2.00$	E2.00$	E1.70$
18	E1.85$	E	E	E	E	E	E1.90$	E1.80$	E2.00$	1.90	2.00	2.00	2.00	2.00	2.00	E2.00$	E2.00$	E1.70$	E2.00$	E2.00$	E2.00$	E2.00$	E1.90$	E1.80$
19	E2.00$	E	E	E	E	E	E1.90$	E1.90$	E2.00$	1.75	2.00	2.00	2.00	2.00	1.95	E2.20$	E2.00$	S	E2.00$	E2.00$	E2.00$	E2.00$	E2.10$	E1.90$
20	E2.00$	E	E	E	E	E1.40$	E1.60$	E1.80$	E2.15$	2.00	2.00	2.00	1.90	2.00	2.00	E2.10$	E2.00$	E2.00$	E1.90$	E2.00$	E2.00$	E2.00$	E2.00$	E1.85$
21	E2.00$	E2.00$	E	E	E	E1.60$	E1.80$	E1.90$	E2.00$	2.00	2.00	2.00	2.00	2.00	2.00	1.85	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$
22	E1.90$	E	E	E	E	E	E1.80$	E2.00$	E2.10$	2.00	2.00	2.15	2.00	2.00	2.00	E2.10$	E2.00$	E1.90$	E1.85$	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$
23	E2.00$	E2.00$	E2.00$	E	E	E	E2.00$	E2.00$	2.05	2.00	2.00	2.00	2.00	2.25	2.70	E2.00$	E2.00$	E1.80$	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$
24	E2.00$	E	E2.00$	E	E	E	E1.90$	E1.90$	E2.10$	2.00	2.05	2.00	2.10	2.00	2.00	1.95	E2.00$	E2.00$	E2.00$	E1.80$	E2.10$	E2.00$	E2.00$	E2.00$
25	E2.00$	E	E	E	E	E1.20$	E1.90$	E2.00$	E2.00$	2.00	2.00	2.30	2.05	2.10	E2.50$	E2.20$	E1.90$	E1.90$	E2.00$	E1.90$	E2.00$	E2.00$	E2.00$	E2.00$
26	E1.80$	E2.00$	E2.00$	E	E2.00$	E	E1.80$	E1.90$	1.80	2.00	2.00	2.00	2.00	2.00	2.00	E2.30$	E2.00$	E1.80$	E1.90$	E1.90$	E2.00$	E2.00$	E2.00$	E2.00$
27	E1.90$	E2.00$	E	E	E1.50$	E1.70$	E1.90$	E1.85$	E2.10$	1.85	2.00	2.00	2.00	2.00	2.00	E2.10$	E2.00$	E1.90$	E1.90$	E2.10$	E2.00$	E2.00$	E2.00$	E1.90$
28	E1.70$	E1.60$	E	E	E	E1.70$	E1.90$	E1.85$	E2.00$	2.00	2.00	2.00	2.00	2.00	2.00	E2.00$	E2.00$	E1.90$	E2.00$	E2.00$	E2.00$	S	E2.00$	E2.00$
29	E2.00$	E1.50$	E2.00$	E	E	E1.80$	E1.60$	E1.90$	E2.00$	2.00	2.00	2.00	2.00	2.00	2.00	E1.90$	E1.85$	E1.90$	E1.90$	E2.00$	E2.10$	S	E2.00$	E1.90$
30	E2.00$	E	E	E	E	E1.80$	S	E2.00$	E2.00$	2.00	2.00	2.00	2.00	2.00	2.00	E2.05$	E2.00$	E2.00$	E1.80$	E2.00$	E2.00$	E2.00$	E2.00$	E1.90$
31	E2.00$	E	E	E	E	E1.20$	E2.00$	E1.90$	E2.00$	2.00	2.00	2.00	2.00	2.10	2.05	E2.05$	E2.00$	E1.90$	E2.00$	E2.00$	E2.00$	E2.00$	E2.00$	E1.90$
No.	31	31	18	24	28	31	30	31	30	30	30	31	31	31	30	31	31	30	30	31	31	29	31	31
Median	E2.00	E1.50	E	E	E	E1.50	E1.90	E2.00	E2.00	2.00	2.00	2.00	2.00	2.00	2.00	E2.05	E2.00	E1.90	E2.00	E2.00	E2.00	E2.00	E2.00	E2.00

f-min

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

The Radio Research Laboratories, Japan.

W 6

IONOSPHERIC DATA

Wakkanai

Lat. 45° 23.6' N
Long. 141° 41.1' E

Dec. 1961

M(3000)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	2.85	3.05	2.95	3.10	I3.15 SF	I3.20 S	3.25	3.65	3.60	3.65	3.50	3.50	3.55	3.60	3.35 H	3.60	3.30	3.40	2.95	2.75	3.15	2.65	2.70	2.65
2	2.55	2.60	2.55	3.45	I3.15 A	I2.95 A	2.75	2.80	2.80	3.00 H	3.15 H	3.25	3.45 H	3.45	3.35	3.50	3.25	3.15	3.00	3.40	3.20	2.70	2.65	2.75
3	2.95	I2.90 S	2.50	2.70	2.50	3.05	I2.85 A	2.75	2.40	3.00	3.25	2.95 F	3.00 H	3.20	3.20	3.40	3.15	3.25	2.70	3.25	2.65	3.05	I2.70 FS	2.75
4	2.80	2.85	3.00	3.40	2.95	3.05	3.10	3.30	3.35	3.35	3.50 H	3.30	3.60	3.40	3.45	3.45	3.45	3.35	I3.05 A	3.20	3.20	3.15	I2.90 A	I 2.75 F
5	2.90	2.95	2.90 F	2.85 F	I3.05 F	U3.25 S	3.35	3.45	3.80	3.35	3.35 H	I3.30 C	3.75	3.45	3.35	3.50	3.35	3.40	3.40	3.25	3.20	F	F	F
6	F	F	2.85	2.75	2.80 F	2.95 F	2.95	3.45	3.50	U3.45 S	3.55	3.35	3.35 H	3.55	3.45	3.45	3.35	3.60	3.35	3.20	3.30	U3.00 S	U2.80 S	U2.75 S
7	U2.70 S	I2.85 F	F	F	F	3.10	3.40	3.10 X	3.55	3.25	3.40	3.45	3.40 H	3.40	3.40	3.50	3.25	3.50	3.35	3.05	3.05	280	2.85	3.05
8	2.85	F	F	F	2.85 F	2.95	3.10	3.40	I3.50 S	3.25	I3.50 S	3.45	3.45	3.45	3.55	3.55	U3.40 S	3.15	3.45	3.15	3.15	3.05 F	I2.95 SF	3.05 F
9	3.05	2.95	3.00	3.05	2.80	3.10	3.35	3.55	3.45 H	3.70	I3.45 RH	3.50	3.65	3.60 H	3.20 H	3.65	3.25	3.55	3.10	3.05	3.05	2.95	2.75	2.85
10	2.85	3.05	2.95	3.15	3.00	3.05	3.75	3.55	3.60	3.70	3.40	3.45 H	3.65	3.60	3.45	3.45	3.40	3.45	3.05	3.35	3.15	2.85	2.85	2.90
11	2.95	3.15	3.10	2.90	2.85	3.05	3.05	3.25	3.55	3.40 H	3.55	3.45	3.65	3.45	3.40	3.50	3.35	3.25	3.15	3.25	3.20	3.10	2.80	2.95
12	2.90	2.95	2.95	2.80	2.85	3.05	U3.30 S	2.95	C	C	C	3.45	3.30	3.40	3.45	3.40	3.35	3.15	3.05	2.75	3.20	2.80	2.85	2.85
13	2.95	2.95	3.15	2.95	2.95	3.10	3.30	3.40	3.40	3.50	3.60	3.65	3.55	3.45	3.50	3.45	3.15	3.40	3.45	3.05	3.35	3.10	2.85	I2.80 F
14	2.75	3.00	I2.95 F	2.95 F	3.25 F	3.15	I3.40 S	3.35	3.80	3.65	3.35 H	3.45 H	3.50	3.50	3.55 H	3.50 H	3.25	3.25	3.05	I3.10 A	3.15	3.20	3.00	2.95
15	3.00	3.25 F	2.90	2.90	3.15	3.25	3.30	3.25	3.55	3.50	3.35	3.65	I3.55 C	3.65	3.75	3.80	3.25	3.35	3.25	3.15	3.20	I3.10 S	2.90	I2.75 F
16	U2.55 F	U2.50 F	2.90 F	3.05 F	3.05	3.15	3.10	U3.15 S	3.65	3.45	3.40 H	3.70	3.30 H	U3.65 S	3.80	3.40	3.55	3.15	3.45	3.35	3.35	3.10	2.90	2.95
17	3.00	3.00	2.90	3.00	2.95	3.00	3.25	3.70	3.40	U3.45 SH	3.45	3.40 H	3.50 H	3.50 H	3.50	3.10 H	3.60	3.35	I3.15 S	3.35	3.30	2.95	2.80 F	2.95
18	3.00	2.95	2.80	2.95	2.90	3.00	3.25	3.60	3.60 H	3.55	3.55	3.40	3.70	3.65	3.55	3.65	3.15	3.45	3.35	3.20	3.30	3.35	F	F
19	F	2.90	2.95 F	2.95	3.00	3.15	3.15	3.40	3.65	3.65	3.50	3.70 H	3.90 H	3.75	3.55	3.50 V	3.60	I3.45 S	3.35	3.45	3.20	2.95	3.00	2.80
20	2.85	U2.90 F	3.05 F	3.00	3.05	3.45	3.35	3.30	3.55	3.15 H	3.40 H	3.55	3.25	3.85	3.40	3.50	3.35	3.35	3.25	3.40	3.20	3.15	3.00	2.75
21	2.85	2.95	3.00	3.00	3.10	3.20	3.25	3.40	3.60	3.45	3.45	3.45 V	3.55 H	3.45 H	I3.60 A	3.65	3.55	3.30	3.35	I3.20 SF	3.05 F	3.10	2.95	3.00
22	3.05	3.05	2.95	3.15	F	F	S	U3.30 S	3.60	3.25 H	3.50	3.65	3.65	3.65 H	3.70	3.35	3.45	3.55	3.25	3.45	3.45	3.10	2.85	2.95
23	2.90	2.90	3.05	I2.90 F	3.05	3.25	3.10	I3.30 S	3.60	3.65	3.55 H	3.30	3.50	3.40	3.60	3.60	3.30	3.25	3.15	3.35	3.35	3.35	2.65	2.80
24	2.95	2.85	3.00	3.20	2.95	3.15	3.15	3.50	3.45	3.50	3.30	3.45	3.50	3.60	3.55	3.25	3.75	3.60	2.50	3.15	2.90	2.85	2.65	2.70
25	2.95 F	3.00 F	2.90	3.00	I2.85 F	2.95 F	U2.95 S	3.45	3.55	3.45	3.30	3.60	3.40 H	3.55	3.45	3.35	3.45	3.05	3.20	3.05	3.10	3.00	3.10	2.95
26	2.85	2.85	2.90	2.90	2.95	3.00	3.20	3.35	3.60	3.55	3.45	3.45	3.50	3.55	3.90	3.30	3.55	3.35	3.05	3.25	3.25	3.05	2.95	2.90
27	2.85	2.90	2.90	3.00	2.85	2.95	3.25	3.45	3.55	3.65	3.25 H	3.60	3.45	3.25 H	3.50 H	3.45	3.20	3.30	3.00	3.05	3.05	F-S	F	F
28	2.90	2.90	3.05	3.50	3.05	3.05	3.10	3.35	3.70	3.45	3.45	3.35	I3.25 R	3.30	3.50	3.50	3.50	3.40	3.10	3.20	3.10	I2.80 S	2.70	2.65
29	3.05	2.75	U2.85 S	2.70	2.65	3.00	3.20	3.25	3.55	3.55	3.20	3.55	3.50	3.45	3.60	3.80	3.35	3.35	3.05	3.20	I3.10 S	I2.95 S	2.80	2.95
30	2.95	3.10	3.00	3.00	3.30	3.15	I3.10 S	3.30	3.45	3.60	3.50 H	3.20 H	3.40 H	3.40	3.40	3.40	3.55	3.80	3.15	3.05	3.25	2.85	2.90	2.95
31	2.95	2.90	2.95	2.85	2.85	3.25	3.10	3.35	3.35	3.30	3.35 H	3.35 H	3.60 H	3.75 H	3.40	3.45	3.55	3.40	3.25	3.15	3.05	2.90	3.10	2.95
No.	29	29	29	29	29	30	30	31	30	30	30	31	31	31	31	31	31	31	31	31	31	29	28	28
Median	2.90	2.95	2.95	3.00	2.95	3.10	3.20	3.35	3.55	3.45	3.45	3.45	3.50	3.50	3.50	3.50	3.35	3.35	3.15	3.20	3.20	3.00	2.85	2.90

M(3000)F2

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

The Radio Research Laboratories, Japan.

W 7

15

IONOSPHERIC DATA

Dec. 1961 | M(3000)F1 | 135° E Mean Time (G.M.T. + 9h.) | **Wakkanai** | Lat. 45° 23.6' N, Long. 141° 41.1' 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													
2												L												
3									3.05	3.10	3.40	3.35												
4																								
5												C												
6																								
7																								
8																								
9												U4.15L												
10																								
11																								
12									C	C	C		L											
13																								
14																								
15												C	C											
16																								
17											L													
18																								
19																								
20																								
21																								
22												L												
23																								
24																								
25																								
26																								
27																								
28																								
29																								
30																								
31																								
No.									1.	1	1	2												
Median									3.05	3.10	3.40	3.75												

M(3000)F1 | Sweep 1.0 Mc to 18.0 Mc in 1 ~~sec~~ min in automatic operation.

The Radio Research Laboratories, Japan.

IONOSPHERIC DATA

Dec. 1961 | h'F2 | 135° E Mean Time (G.M.T. + 9h.) | **Wakkanai** | Lat. 45° 23.6' N, Long. 141° 41.1' 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											245													
2												230												
3									520	360	320	320												
4																								
5												C												
6																								
7																								
8																								
9												260												
10																								
11																								
12									C	C	C		245											
13																								
14																								
15												C	C											
16																								
17											255													
18																								
19																								
20																								
21																								
22												235												
23																								
24																								
25																								
26																								
27																								
28																								
29																								
30																								
31																								
No.									1	1	3	4	1											
Median									520	360	255	250	245											

h'F2 | Sweep 1.0 Mc to 18.0 Mc in 1 ~~sec~~ min in automatic operation.

The Radio Research Laboratories, Japan.

W 9

IONOSPHERIC DATA

Dec. 1961 | h'F | 135° E Mean Time (G.M.T. + 9h.)

Wakkanai

Lat. 45° 23.6' N
Long. 141° 41.1' 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	325	290	270	260	230	225	250	210	210	220	240	225	235	240	230H	220	220	230	265	360	250	330	350	360
2	460	430	415	250	I325A	I360A	400	275	240	220H	250H	220	225H	225	235H	220	230	240	250	250	275	415	385	360
3	310	I305S	405	400	405	350	I315A	335	270	290	260	260	250H	265	260	240	235	230	300	260	360	275	310	330
4	290	305	280	230	250	330	290	335	220	230	250H	220	225	220	240	225	225	245	I245A	265	250	295	I350A	350
5	320	300	320	325	310	250	245	225	210	190H	245H	I230C	220	220	230	220	215	220	240	225	290	330	335	330
6	335	305	310	335	330	280	270	220	220	220	230	240	245H	240	230	230	210	230	250	255	235	260	295	310
7	310	300	330	290	295	250	240	250	220	235	230	230	220H	230H	230	220	230	215	245	270	275	310	315	310
8	300	295	285	275	265	290	275	225	220	220	235	230	220	230	225	220	220	255	235	270	280	295	310	275
9	280	270	300	260	300	260	250	220	210	225	220H	200	225	230H	230H	220	215	220	285	270	315	310	330	335
10	310	305	295	270	260	260	210	225	220	220	235	225H	215H	230	230H	225	220	225	255	250	255	325	330	315
11	300	255	275	310	300	290	280	245	215	215	225	240	225	250	245	220	220	235	265	250	265	280	340	310
12	310	305	290	310	300	280	220	315	C	C	C	240	210	245	230H	230	220	265	270	290	260	315	315	300
13	275	310	270	260	265	260	245	220	220	220	230	230	210H	245	225	220	220	225	235	280	260	285	340	335
14	335	290	300	260	235	265	260	230	210	200H	245H	240H	240	230	230H	210H	235	240	300	I285A	270	310	350	310
15	300	260	270	280	260	250	260	225	210	225	225	I220C	I210C	230	225	215	220	240	250	280	250	320	330	345
16	345	305	285	260	250	250	270	250	210	230	220H	230H	220H	220H	215	220	220	280	250	235	240	325	350	320
17	305	285	285	260	270	270	260	215	220	230H	220	220H	220H	210H	215	215H	220	230	I280S	250	255	300	360	310
18	305	290	305	280	280	260	255	205	225	230	235	225	230	230	230	225	220	220	270	265	270	280	350	310
19	300	305	285	290	280	260	265	220	215	215	225	220H	220H	225	225	220	210	I235S	250	275	260	320	310	315
20	320	300	265	290	260	215	255	230	225	220H	230H	245	235	225	225	235	220	250	265	260	260	270	350	340
21	305	320	275	275	255	265	270	225	220	220	220	235	220H	230H	I230A	X220A	220	235	250	250	280	275	285	275
22	285	270	285	255	250	230	210	220	210	230H	230	230	220	235H	220	220	225	210	260	260	250	285	365	315
23	330	310	300	260	265	235	260	235	210	225	230H	210H	240	230	225	215	250	230	250	250	240	250	355	300
24	290	280	265	225	260	250	265	205	225	230	250	230	220H	240	230	215	220	220	400	300	310	370	330	340
25	310	290	280	270	300	290	265	240	215	225	220	230H	220H	210H	210H	235	210	270	270	260	280	330	335	300
26	330	320	310	290	300	250	260	220	210	205H	230	240	230	215H	210H	240	215	235	310	270	285	310	305	320
27	310	305	270	265	310	280	255	230	205	215	230H	235	235H	225H	230H	220	220	240	270	310	295	285	300	335
28	305	320	265	220	320	285	295	225	215	230	235	225	235	225	245	225	215	220	250	280	325	I360S	360	350
29	300	305	305	310	310	270	260	230	220	225	240	225H	255H	220H	225	215	220	220	315	280	300	I345S	355	335
30	330	270	300	270	225	280	I320S	235	215	230	250H	230H	220H	245	235	230	230	210	320	295	265	315	335	320
31	305	300	290	280	280	250	250	240	225	240	235H	230H	245H	225H	210H	210H	230	230	260	300	290	300	335	330
No.	31	31	31	31	31	31	31	31	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31
Median	310	300	285	270	280	260	260	225	220	225	230	230	225	230	230	220	220	230	260	270	270	310	335	320

h'F

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

The Radio Research Laboratories, Japan.

IONOSPHERIC DATA

Dec. 1961 | h'Es | 135° E Mean Time (G.M.T. + 9h.) | Wakkanai | Lat. 45° 23.6' N, Long. 141° 41.1' 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	E	E	E	E	E	E	E	S	135	120	115	110	110	G	G	S	E	E	E	E	E	E	E	E
2	E	E	E	E	130	125	E	E	125	125	125	115	115	G	G	S	S	E	E	E	E	E	E	E
3	E	S	E	E	120	115	115	120	115	110	G	G	G	G	G	S	E	E	E	E	E	E	E	E
4	E	E	E	E	E	E	E	S	G	145	135	130	125	G	120	S	E	110	110	110	105	105	105	120
5	120	E	E	E	110	E	E	S	G	115	125	C	G	G	G	S	E	E	E	E	E	E	E	E
6	E	E	E	E	E	E	E	S	135	125	120	120	115	125	G	S	E	E	115	E	E	120	E	E
7	E	E	E	E	E	E	E	E	130	125	120	125	125	125	G	S	E	125	E	E	E	E	115	E
8	E	E	E	E	E	125	115	S	S	G	140	115	110	G	B	S	105	E	E	E	E	E	E	E
9	E	E	110	E	E	E	E	S	S	G	G	B	105	G	B	B	E	E	E	E	E	E	110	E
10	E	E	E	E	E	E	E	S	S	B	G	B	G	B	125	S	S	E	E	E	E	E	E	E
11	E	E	E	E	E	E	E	S	G	G	B	B	B	B	B	B	E	E	E	E	E	105	E	E
12	E	E	E	E	E	125	120	110	C	C	C	B	G	B	105	130	E	120	E	E	E	E	E	E
13	E	E	E	E	E	E	E	S	S	110	B	B	G	B	B	S	E	E	E	E	E	E	E	E
14	E	E	E	E	E	E	E	E	S	G	G	G	G	G	G	S	E	E	110	105	110	E	E	E
15	E	E	E	E	110	E	E	E	135	120	G	C	C	G	G	S	E	E	E	E	E	E	E	E
16	E	E	E	E	E	E	E	E	S	130	G	G	120	125	120	S	S	E	E	115	E	120	E	E
17	E	E	E	E	E	E	E	E	105	160	130	G	G	G	G	E	E	E	S	E	E	E	E	E
18	E	E	105	E	E	E	E	S	S	G	G	G	130	125	120	S	E	110	110	E	E	E	E	E
19	E	E	E	E	E	E	E	S	S	125	115	G	G	G	G	S	E	S	E	E	E	E	E	E
20	E	E	115	115	E	E	120	S	S	170	G	105	155	G	G	S	E	E	E	E	E	E	E	E
21	E	E	E	E	E	E	E	S	S	G	G	150	140	125	115	115	E	E	E	E	E	E	E	E
22	E	E	E	E	E	E	E	E	S	G	115	120	115	G	110	S	E	E	E	E	E	E	E	E
23	E	E	E	E	E	E	E	E	S	G	110	105	105	G	B	S	E	E	E	E	E	E	E	E
24	E	E	E	E	E	E	E	S	S	150	G	G	G	G	G	G	S	E	E	E	E	E	E	E
25	E	E	E	110	E	E	E	E	S	G	G	G	G	G	S	S	E	E	E	E	E	E	E	E
26	E	E	E	E	E	E	E	E	G	G	G	G	G	G	G	S	S	E	E	E	E	E	E	E
27	E	E	E	E	E	E	E	S	S	G	G	130	G	125	G	S	E	E	E	E	E	E	E	E
28	E	E	E	E	105	E	E	S	S	G	125	G	G	G	G	S	S	E	E	E	E	S	E	E
29	E	E	E	E	E	E	E	E	S	G	125	G	G	G	125	125	S	E	E	E	E	S	E	E
30	E	E	E	E	E	E	S	E	160	150	G	135	125	110	115	S	S	E	E	E	E	E	E	E
31	E	E	E	E	E	E	E	E	S	G	125	125	G	G	G	S	S	E	E	E	E	E	E	E
No.	1		3	2	5	4	4	2	8	15	14	13	14	7	9	3	1	4	4	3	2	4	3	1
Median	120		110	110	110	125	120	115	130	125	125	120	120	125	120	125	105	115	110	110	110	110	110	120

h'Es

Sweep 1.0 Mc to 18.0 Mc in 1 min (~~sec~~) in automatic operation.

The Radio Research Laboratories, Japan.

W 11

IONOSPHERIC DATA

Wakkanai

Lat. 45° 23.6' N
Long. 141° 41.1' E

20

Dec. 1961

Types of Es

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									c	ℓ	ℓ	ℓ	ℓ											
2					f4	f			c	ℓ	c	ℓ	ℓ											
3					f	f2	f	f2	c2	ℓ2								f	f3	f2	f	f	f	f
4										h	h	c	c		c									
5	f				f					ℓ	c													
6									h	c	c	c	c	c					f			f		
7									c	c	c	c	c	c				f					f2	
8						f	f				h	ℓ	ℓ				f						f	
9			f										ℓ											
10															c									
11																						f		
12						f	f	f2							ℓ	c		f						
13										ℓ									f	f2	f			
14																								
15					f				c	ℓ										f		f		
16										ℓ			c	c.ℓ	c									
17									ℓ	h	c													
18			f										c	c	c			f	f					
19										c	ℓ													
20			f	f			f			h		ℓ	h.ℓ											
21												h	h	ℓ	ℓ2	ℓ2								
22											ℓ	ℓ	ℓ		ℓ									
23											ℓ	ℓ	ℓ											
24										h														
25				f																				
26																								
27												c		c										
28					f						c													
29											c				c	c								
30									h	h		h	c	c2	c									
31											e	c												
No.																								
Median																								

The Radio Research Laboratories, Japan.

Types of Es

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

W 12

IONOSPHERIC DATA

Dec. 1961 | foF2 | 135° E Mean Time (G.M.T. + 9h.) | Akita | Lat. 39° 43.5' N | Long. 140° 08.2' 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	3.4	3.5	3.6^{S}	3.5	3.3	2.8	2.7	5.5	6.7	7.1	7.1	I 9.2^{R}	6.8	7.3	7.0	6.9	5.3	4.9	3.9	3.1	I 3.9^{S}	3.5	3.2^{S}	I 3.6^{S}
2	I 3.4^{S}	I 3.2^{S}	3.2	I 4.6^{R}	2.6	3.4	I 4.4$^{S}_{S}$	6.2	I 9.4^{R}	I 12.2^{R}	14.5	I 14.0^{R}	9.8^{R}	7.8	7.1	7.5	5.6	5.6	5.5	4.8^{S}	2.6	2.6	2.8^{S}	3.1
3	3.0	3.6	2.4	2.5	2.4	2.2	2.5	4.3	6.7	6.9	8.3	7.4	6.8	7.3	8.2	8.1	7.1^{S}	5.3^{S}	5.2	RF	F	F	F	S
4	4.1^{S}	4.0^{S}	5.0^{R}	2.4	2.1	2.0	2.5	6.1	7.8	7.8^{R}	I 9.2^{R}	9.3^{R}	8.1	7.9	7.0	8.7	7.3	I 4.8^{A}	4.9	3.9	4.3	2.6	2.5	2.7
5	2.9	3.0	I 2.8$^{A}_{S}$	3.0	3.2	3.3	I 4.0$^{R}_{S}$	5.7	7.5^{S}	6.9	7.5^{H}	9.0	8.2	7.6	6.9	7.4	5.6	I 4.1^{A}	S	F	FS	A	F	F
6	F	F	2.9^{F}	I 3.2^{F}	F	F	3.5^{S}	6.1	I 6.4^{C}	7.6	8.5	7.6	7.5^{H}	7.9	7.1	I 7.2^{C}	6.5	4.5	I 4.0^{R}	3.5	3.4^{S}	3.3	F	F
7	F	F	F	F	F	4.2	3.1^{S}	4.9	7.7	8.5^{R}	8.9	8.1	8.9	7.7	7.7	6.6	5.5	5.3	4.1	3.4	3.6	A	F	F
8	A	A	A	F	F	F	F	5.8^{S}	6.6	7.1	I 8.1$^{R}_{H}$	8.6	7.0	7.1	6.6^{H}	6.1	I 5.2^{S}	I 3.8^{C}	I 3.9^{R}	3.9^{S}	3.5^{S}	F	F	F
9	F	I 3.4^{F}	I 3.6^{F}	I 3.6$^{E}_{S}$	I 3.8^{S}	3.7^{S}	4.0	5.1^{S}	5.9	6.0	7.4$^{R}_{H}$	6.3	7.0	6.8	6.8	6.9	5.6	4.1	2.9	3.4	3.2	3.1	3.1^{S}	3.4
10	3.5	3.7	I 3.8$^{E}_{S}$	3.9	3.9^{S}	3.7	3.0	4.9	6.0	7.1	7.1	7.4	6.9	7.6	6.7	6.5	5.4	4.3	2.8	3.6	3.1	2.6	3.0	I 3.2^{S}
11	3.3	3.5	3.6	3.4	I 3.3^{F}	3.4^{S}	I 3.8$^{R}_{S}$	5.7^{S}	6.0	6.8	7.8	7.5	7.0	6.6	6.8	7.3	5.1	4.2	3.7	4.0	3.2	3.1	2.8	3.1
12	3.3	3.4	3.5	3.4	3.4	3.4	3.6^{S}	I 4.2$^{R}_{S}$	I 5.8$^{R}_{H}$	7.4^{R}	8.7	c	C	C	C	6.1	I 5.2^{C}	4.0^{S}	2.9	3.3	3.8	3.2	2.9	I 3.2^{F}
13	3.3	3.3^{F}	3.4^{F}	3.5	3.0	2.9	2.9^{S}	5.2^{S}	5.6	6.5	7.4	7.8	6.5	7.1	6.5	5.6	C	C	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	6.6	6.6	6.6	7.0	4.9	4.2	3.3	3.2	2.6	2.9	2.8^{S}	I 3.0^{F}
15	3.1	2.9	3.3	3.2	3.0	3.0	2.4	4.4	C	C	C	C	C	C	C	C	5.7	3.9	4.9	3.1	2.9	2.3^{S}	2.8^{F}	2.9^{F}
16	3.3^{F}	I 3.4^{F}	3.4	3.4	3.6	3.0	2.7	4.4	6.4	5.6	7.3	8.3	7.3	6.8	5.6	5.7^{H}	5.7	4.2	3.7	4.3	3.3	2.1^{S}	2.5^{S}	2.8^{F}
17	2.9	2.9	3.0	3.0	2.8	2.8	2.7^{S}	4.7^{S}	6.3	6.0	6.1^{H}	7.4^{H}	7.9	6.5	5.5	5.9	5.2	4.4	3.1	I 2.5^{A}	2.8^{S}	2.4^{S}	I 2.4^{S}	2.9
18	3.0	3.0	3.0	3.1	3.2	3.0	2.6	4.4	5.5	5.3	6.1	6.7	6.9	5.3	5.8	6.2	5.2	3.2	I 3.0^{C}	2.7	2.7	2.7	I 2.8^{A}	2.9^{F}
19	I 2.9^{S}	3.0	3.1	I 3.4$^{E}_{S}$	I 3.0^{F}	3.0	3.3^{S}	4.4	5.3	6.2	5.7	7.0	5.7	5.8	6.4	6.3	5.6	I 3.5^{A}	3.4	3.3^{S}	2.9	F	F	F^{S}
20	F	I 3.0^{F}	3.3	3.3	2.8^{S}	3.3^{S}	2.6	I 4.3$^{R}_{S}$	5.2	5.5	5.6	6.7	7.6	6.1	5.8	5.8	4.7	3.6	3.5	2.9	3.0	2.5	2.6	2.9
21	3.3	3.4	3.3	3.3	3.3^{F}	2.9	2.8	4.8^{S}	5.5	5.7	6.6	8.0	7.0	6.4	6.5	5.7^{H}	5.0	3.1	3.1	3.0	3.1	3.0	F	F^{S}
22	F^{S}	3.5^{S}	3.4^{S}	I 3.6^{E}	3.6^{F}	4.1$^{E}_{S}$	I 3.9^{F}	4.8	5.5	5.7	6.9^{H}	8.2	6.7	6.7	6.5	5.3	4.9	4.4	2.6	2.8	2.7^{S}	2.3	2.6	2.6
23	2.8	3.1	3.2	3.3	3.4	3.6	3.8^{F}	4.8^{S}	5.6^{H}	5.9	7.4	7.0	7.1	6.7	6.0	5.4	4.8	4.8	3.6	4.2^{S}	3.6	3.1	I 3.0^{F}	3.4^{S}
24	3.7^{S}	3.6	I 4.1$^{E}_{S}$	I 3.6$^{R}_{F}$	3.4^{S}	I 3.4^{F}	3.3^{S}	5.4^{S}	6.2	6.5	7.3	8.6	7.4	6.6	6.2	5.4	5.6	4.8	3.2	3.0	3.1	2.6	3.1	3.4
25	3.4^{S}	3.4	3.4	3.4	3.2	I 2.8^{F}	I 3.7^{E}	4.8^{S}	7.1	7.6	8.2	7.1	7.6	6.6	7.0	6.2	5.9^{H}	3.5	3.1	3.0	3.6	I 3.0$^{E}_{S}$	2.3	F
26	F	2.9	3.0	2.8	2.8	2.8	3.0	4.6	5.6	5.8	7.4	7.7	I 7.5$^{E}_{F}$	6.0	6.1	5.6	5.3	5.2	3.1	3.0	3.3	3.0	3.1	3.2
27	3.3^{S}	I 3.4$^{E}_{S}$	I 3.4^{C}	3.5	3.3	3.3	3.7^{S}	5.2	6.0	5.8	6.9	8.7	7.5	6.4	6.0^{H}	6.9^{H}	6.1	4.1	3.2	3.1	3.4	3.3	3.0	3.2
28	3.3	3.4	3.6	3.9^{F}	2.6^{S}	2.6	2.7	4.9	5.7	6.5	7.3	7.8	7.9	7.8^{R}	6.8	7.0	5.3	4.6	3.2	3.0	3.0	3.1	3.3	3.3
29	3.5	3.4	3.2	2.9	3.0	3.2	2.7^{S}	4.9	6.5	7.2	8.3	9.1^{R}	6.6^{H}	8.7	6.8	5.9	5.2	4.1	2.7	3.0	3.0	2.3	2.6	2.8
30	2.8^{F}	3.0	3.0	2.8	3.0	2.3	2.4	4.1	5.3	6.1	7.6	9.1	7.8	6.6	6.3	5.8	5.9	4.7	2.9	2.6	3.3	3.4	3.3^{F}	3.4
31	3.5^{S}	3.6	3.6	3.5	3.4	3.3	2.6^{S}	4.4	5.6	6.5	8.0	8.8	7.8	7.6	6.7	6.9	5.9	5.1	3.6	3.3^{H}	3.5	2.9	I 3.0$^{E}_{S}$	2.9
No.	23	27	28	28	27	28	29	30	29	29	29	28	29	29	29	30	30	30	29	28	28	25	23	22
Median	3.3	3.4	3.4	3.4	3.2	3.1	3.0	4.8	6.0	6.5	7.4	7.9	7.3	6.8	6.6	6.2	5.4	4.2	3.3	3.2	3.2	2.9	2.8	3.1
U.Q	3.4	3.5	3.6	3.5	3.4	3.4	3.6	5.4	6.6	7.2	8.2	8.8	7.8	7.6	7.0	7.0	5.7	4.8	3.9	3.6	3.5	3.1	3.1	3.3
L.Q	3.0	3.0	3.0	3.0	2.8	2.8	2.6	4.4	5.6	5.8	7.0	7.4	6.8	6.6	6.2	5.8	5.2	4.0	3.0	3.0	3.0	2.6	2.6	2.9
Q.R	0.4	0.5	0.6	0.5	0.6	0.6	1.0	1.0	1.0	1.4	1.2	1.4	1.0	1.0	0.8	1.2	0.5	0.8	0.9	0.6	0.5	0.5	0.5	0.4

foF2

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

The Radio Research Laboratories, Japan.

A 1

21

IONOSPHERIC DATA

Dec. 1961 | foF1 | 135° E Mean Time (G.M.T. + 9h.) | Akita | Lat. 39° 43.5' N | Long. 140° 08.2' E

22

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1												L		L										
2										L	3.6 L		L	L	L									
3										I 4.0 L	4.3 H	3.8 L	L	L										
4											A	A												
5										L		L H												
6										L		L	L											
7										L			L											
8												L	L											
9																								
10											L	L	L											
11												L												
12										L	L	C	C	C	C									
13										L	L H	C	I 3.3 L	I 3.1 L	L H									
14										C	C	C	L		A									
15										C	C	C	C	C	C	C								
16										L H	L	L	L	L										
17											L		I 3.7 L	3.4	3.0									
18													A											
19										3.2 L		I 3.6 L	3.8 L											
20														L	L									
21											3.8 L	L		3.6										
22										L		L	L	L										
23												L		3.5										
24											L	L		L										
25											L	L	L	L										
26										L	L	L	L	L	L									
27											L	L	L	L										
28										L		L	L	L	3.4									
29												L	L											
30													L			2.9								
31											L	L	L H	L	L									
No.										2	3	2	3	4	2	1								
Median										u 3.6	3.8	u 3.7	u 3.7	3.4	3.2	2.9								

foF1

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

The Radio Research Laboratories, Japan.

A 2

IONOSPHERIC DATA

Dec. 1961 | foE | 135° E Mean Time (G.M.T. + 9h.) | Akita | Lat. 39° 43.5' N | Long. 140° 08.2' 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								A	245	I275A	I290A	A	A	A	R	220								
2								A	A	A	A	305	I300A	I280A	255	A								
3								E	A	A	290	A	A	A	255	215								
4								R	240	265	I280A	I290A	305	290	I265A	A								
5								E	A	A	A	300	305	295	270	A								
6								R	C	A	A	A	I300A	290	255	C								
7								R	A	A	A	I300A	305	A	A	A	A							
8									A	A	295	300	300	I280A	I255A	A	E							
9									220	270	285	295	295	285	265	A	A							
10								1.75	R	R	I290A	I295A	I300A	285	255	230	E							
11									210	I260A	I285A	300	300	285	260	I215R								
12								A	A	A	A	C	C	C	C	A								
13								E	I215R	260	275	I300C	295	275	250	205								
14								C	C	C	C	C	300	290	A	A								
15								B	C	C	C	C	C	C	C	C								
16									225	I260R	I285R	295	I290A	I280A	260	205	E							
17									225	I265A	300R	I305A	I300R	I280R	250	215								
18									210	270	295	A	A	A	A	240	A							
19									205	A	A	A	A	A	A	R								
20								A	A	270	I285A	300	305	I290A	I260A	I220A	B							
21									R S	275	285	300	300	300	275	235	E							
22									220	280	295	300	305	A	A	235	E							
23									230	270	I285A	300	I300R	I285A	265	I225A	E							
24									220	270	I290A	I300A	305	I295R	270	235	E							
25								E	R	A	A	A	305	295	260	230	E							
26								E	R	270	I290A	305	I310R	300	I270R	240	E							
27									215	I260R	300	305	I305A	I295A	I270R	230	E							
28									225H	260	290	300	305	A	A	245H	E							
29									I220R	260	285	300	305	290	A	A	E							
30									I215R	260	I290A	I305R	I300A	290	270	I240R	E							
31									230	270	A	A	305	290	265	220	E							
No.								6	17	19	21	21	25	22	21	19	14							
Median								E	220	270	290	300	300	290	260	230	E							

foE

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

The Radio Research Laboratories, Japan.

IONOSPHERIC DATA

Dec. 1961 | foEs | 135° E Mean Time (G.M.T. + 9h.) | Akita | Lat. 39° 43.5' N | Long. 140° 08.2' 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	E	E	E	E	E	E	E	2.3	G	3.1	3.3	3.4	3.2	3.6	G	G	E	E	E	E	E	E	E	E
2	E	E	E	E	E	E	J1.8	2.2	J2.9	3.5	J2.9	G	3.4	J2.8	G	2.5	J5.5	J2.8	E	E	E	E	E	E
3	E	E	E	E	E	E	E	G	3.0	3.1	3.4	3.0	J3.3	J3.5	G	J2.4	E	E	E	E	E	E	E	E
4	E	E	E	E	E	E	E	G	2.3G	3.6	J7.7	9.0	4.1	4.9	J3.3	J5.6	J4.0	J6.0	J2.9	J2.1	J1.8	E	E	E
5	E	J2.4	J3.7	J2.3	E	E	E	G	J2.9	J3.6	J3.8	G	2.8G	3.6	J2.8	J2.9	J3.1	J8.4	J2.3	E	J2.8	J3.0	J2.3	J2.3
6	E	E	E	E	J1.8	E	J1.8	G	C	J4.2	3.6	3.0	3.0	G	J3.4	C	E	E	E	E	E	J1.8	E	E
7	J1.7	E	E	E	E	E	E	G	J2.5	3.1	3.7	J3.8	G	3.4	J5.1	2.5	2.4	E	J1.9	E	J2.4	J3.6	J2.8	J2.9
8	J5.2	J6.3	J6.3	J2.5	E	E	E	E	J2.8	J6.0	G	G	J3.0G	J5.0Y	J2.8	J2.9	S	C	E	E	E	E	E	E
9	E	E	E	E	E	E	E	E	G	2.8	G	G	3.5	G	2.4G	J2.7	J2.9	E	E	E	E	E	E	E
10	J1.9	E	E	E	E	E	E	G	G	G	3.2	3.6	J3.8	G	2.9	G	E	E	J1.7S	E	E	E	E	E
11	E	E	E	E	E	E	E	E	G	2.8	J5.1Y	G	2.9G	2.9	2.6G	G	C	J2.5	J3.0	E	E	E	E	E
12	E	E	J2.3	E	E	E	E	J2.4	J2.9	J3.4	3.6	C	C	C	C	3.5	C	E	J2.3	E	E	E	J2.6	E
13	E	E	E	E	E	E	E	G	G	G	G	C	G	G	2.9	G	C	C	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	3.2	G	3.9	J2.8	E	J2.4	E	E	E	E	E	E
15	E	E	E	E	E	E	E	G	C	C	C	C	C	C	C	C	J2.0	J1.9	E	E	E	E	E	E
16	E	E	E	E	E	E	E	E	G	G	3.2	3.3	3.5	J3.5	2.7	2.5	G	E	E	E	E	J1.8	E	E
17	E	E	E	E	E	E	E	E	G	3.0	3.5	3.7	G	G	G	G	J2.8	J2.8	E	J2.8	J2.0	E	E	E
18	E	E	E	E	E	E	E	E	G	G	3.5	3.3	4.5	J4.5	3.5	2.9	J2.4	J1.8	C	E	E	J2.5	J5.1	E
19	S	E	E	E	E	E	E	E	G	3.0	3.3	J3.3	J3.2	J4.2	J2.8	G	J1.8	J5.0	E	E	E	E	E	E
20	E	E	E	J2.8	E	J1.9	E	2.2	3.1	G	J4.1	3.5	G	3.0	2.8	J2.3	G	J1.9	3.1	E	J1.8	E	J2.8	J2.6
21	J2.5	J2.4	J1.8	J1.9	J1.9	E	E	E	G	G	G	3.4	3.3	G	G	G	G	E	E	E	J2.1	J1.9	J2.6	J2.9
22	J1.7	J1.9	E	E	E	E	E	E	G	G	3.2	3.7	3.5	3.1	3.1	G	G	E	E	E	E	E	E	E
23	E	E	E	E	E	E	E	E	G	G	3.2	3.5	3.5	3.3	3.1	2.8	G	E	E	E	J2.3	E	E	E
24	E	E	E	E	E	E	E	E	G	3.1	3.5	3.7	G	G	G	G	G	E	E	E	E	E	E	E
25	E	E	E	E	E	E	E	G	G	3.3	J3.0	3.2	3.1	G	G	G	G	E	E	E	E	E	E	E
26	E	E	E	E	E	E	E	G	G	G	3.5	G	G	G	G	G	G	E	E	E	E	E	°E	E
27	E	E	C	E	E	E	E	E	G	G	G	4.0	3.4	3.2	G	G	G	E	E	E	E	E	E	E
28	E	E	E	E	E	E	E	E	G	G	G	3.6	3.6	3.8	3.1	G	2.1	E	E	E	E	E	E	E
29	E	E	E	E	E	E	E	E	G	G	3.3	3.2	G	3.2	3.1	2.5	G	E	J2.5	J2.4	J2.0	E	E	E
30	E	E	E	E	E	E	E	E	G	G	3.5	G	3.4	G	G	G	G	E	E	E	E	E	E	E
31	E	E	E	E	E	E	E	E	G	G	J3.6	3.5	G	G	G	G	G	E	E	E	E	E	E	E
No.	29	30	29	30	30	30	30	30	28	29	29	27	29	29	29	29	29	29	29	30	30	30	30	30
Median	E	E	E	E	E	E	E	E	G	2.8	3.3	3.3	3.2	3.0	2.8	G	G	E	E	E	E	E	E	E
U. Q	E	E	E	E	E	E	E	G	2.4	3.2	3.6	3.6	3.5	3.6	3.1	2.8	2.4	2.2	1.8	E	1.8	E	E	E
L. Q	E	E	E	E	E	E	E	E	G	G	3.0	G	G	G	G	G	G	E	E	E	E	E	E	E
Q. R											0.6													

foEs

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

IONOSPHERIC DATA

Dec. 1961 | f_bE_s | 135° E Mean Time (G.M.T. + 9h.) | **Akita** | Lat. 39° 43.5' N | Long. 140° 08.2' 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								1.9		3.0	3.2	3.3	3.2	3.5										
2							E	1.9	2.6	2.8	2.9		3.1	2.8		2.5	2.7	1.8						
3									2.5	3.1	3.0	3.0	3.2	2.9		1.7								
4									E	3.1	5.5	7.6	3.4	U 4.9 R	3.1	2.6	3.8	A	E	2.0	E			
5		E	1.8	E					2.5	2.8	3.5		2.3 G	G	2.2	2.5	3.1	A	E		E	A	E	E
6					E		E		C	2.8	2.9	3.0	3.0		G	C						E		
7	E								2.5	2.9	3.4	3.8		3.0	2.8	2.3	1.8		E		2.3	A	2.0	1.9
8	A	A	A	1.7					2.3	3.0			2.1 G	3.1	2.8	2.4	S	C						
9										G			3.5		2.2 G	2.7	2.5							
10	E										3.1	3.2	3.2		2.9				E					
11										2.7	2.9		2.3 G	2.6	2.3 G		C	2.3	2.2					
12			E					2.0	2.8	3.1	3.3	C	C	C	C	2.7	C		E			2.1		
13												C			2.9		C	C	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	3.2		3.7	2.4		2.4						
15									C	C	C	C	C	C	C	C	E	E						
16											3.1	3.3	3.4	3.0	2.4	2.0						E		
17										2.9	3.4	3.5					2.1	1.8		A	2.0			
18											3.4	3.2	4.3	4.5	3.0	2.1	2.2	1.7	C			2.0	A	
19	S									2.7	3.1	3.3	3.0	3.0	2.8		1.7	A						
20				2.1		E		1.8	2.8		3.1	3.3		3.0	2.7	2.3		E	2.8		1.7		E	1.7
21	1.7	E	1.8	1.9	E							3.3	3.3								E	E	E	E
22	E	E									3.2	3.5	3.3	3.0	2.8									
23											3.0	3.4	3.3	3.1	3.0	2.7					E			
24										G	3.1	3.1												
25										2.8	3.0	3.0	2.8											
26											3.0													
27			C									4.0	3.2	3.0										
28												3.3	3.2	3.5	2.9		1.9							
29											3.1	G		3.0	2.8	2.5			E	1.8	E			
30											3.3		3.3											
31											3.1	3.2												
No.	5	4	4	4	2	1	2	4	8	15	23	20	21	17	18	14	10	10	8	3	8	6	6	4
Median	E	E	1.8	1.8	E	E	E	1.9	2.5	2.8	3.1	3.3	3.2	3.0	2.8	2.4	2.2	2.0	E	2.0	E	E	E	E

f_bE_s

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

The Radio Research Laboratories, Japan.

A 5

25

IONOSPHERIC DATA

Dec. 1961 | f-min | 135° E Mean Time (G.M.T. + 9h.) | Akita | Lat. 39° 43.5' N | Long. 140° 08.2' 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	E	E	E	E	E	E	E	E	1.70	1.90	1.75	1.75	1.75	1.75	1.75	1.65	1.65	E	E	E	E	E	E	E
2	E	E	E	E	E	E	E	E	1.65	1.65	1.70	1.70	1.70	1.65	1.65	1.70	E	E	E	E	E	E	E	E
3	E	E	E	E	E	E	E	E	1.70	1.65	1.70	1.65	1.65	1.70	1.65	1.65	E	E	E	E	E	E	E	E
4	E	E	E	E	E	E	E	E	E	1.70	1.70	1.70	1.70	1.70	1.70	1.70	E	E	E	E	E	E	E	E
5	E	E	E	E	E	E	E	1.75	E	1.65	1.70	1.70	1.80	1.70	1.70	1.70	E	E	E	E	E	E	E	E
6	E	E	E	E	E	E	E	E	C	1.65	1.70	1.70	1.70	1.70	E	C	E	E	E	E	E	E	E	E
7	E	E	E	E	E	E	E	E	E	1.75	1.70	1.70	1.80	1.70	1.70	1.75	E	E	E	E	E	E	E	E
8	E	E	E	E	E	E	E	E	1.70	1.75	1.65	1.75	1.70	1.70	1.70	1.70	E 1.75 S	C	E	E	E	E	E	E
9	E	E	E	E	E	E	E	E	1.70	1.70	1.90	1.80	1.85	1.65	1.65	1.70	E	E	E	E	E	E	E	E
10	E	E	E	E	E	E	E	E	1.70	1.70	1.80	1.90	1.90	1.80	1.75	1.75	1.75	E	E	E	E	E	E	E
11	E	E	E	E	E	E	E	E	1.70	2.00	1.75	1.80	1.90	1.70	1.80	1.65	E 2.20 C	E	E	E	E	E	E	E
12	E	E	E	E	E	E	E	E	E	1.70	1.80	C	C	C	C	1.75	C	E	E	E	E	E	E	E
13	E	E	E	E	E	E	E	1.70	1.65	1.70	1.70	E 4.00 C	1.70	1.80	1.75	E	C	C	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	1.85	1.75	1.80	1.75	E	E	E	E	E	E	E	E
15	E	C	C	C	C	C	C	1.75	C	C	C	C	C	C	C	C	E	E	E	E	E	E	E	E
16	E	E	E	E	E	E	E	E	1.75	1.70	1.80	1.80	1.75	1.85	1.90	1.75	1.75	E	E	E	E	E	E	E
17	E	E	E	E	E	E	E	E	1.70	1.70	1.70	1.75	1.90	1.75	1.75	1.70	1.70	E	E	E	E	1.85	1.80	E
18	E	E	E	E	E	E	E	E	E	1.80	1.70	1.75	1.80	1.75	1.85	1.70	1.70	E	C	E	E	E	E	E
19	S	E	E	E	E	E	E	E	1.70	1.65	1.75	1.75	1.65	1.70	1.70	E	E	E	E	E	E	E	E	E
20	E	E	E	E	E	E	E	E	1.65	1.65	1.75	1.70	1.75	1.80	1.75	1.70	1.75	E	E	E	E	E	E	E
21	E	E	E	E	E	E	E	E	1.70	1.65	1.75	1.70	1.75	1.75	1.65	1.65	E	E	E	E	E	E	E	E
22	E	E	E	E	E	E	E	E	1.70	1.65	1.70	1.75	1.75	1.95	1.75	1.75	1.65	E	E	E	E	E	E	E
23	E	E	E	E	E	E	E	E	1.70	1.75	2.05	2.00	2.20	1.95	1.65	1.75	E	E	E	E	E	E	E	E
24	E	E	E	E	E	E	E	E	E	1.70	1.75	1.70	1.70	1.80	1.80	1.65	1.70	E	E	E	E	E	E	E
25	E	E	E	E	E	E	E	1.75	1.70	1.70	1.75	1.70	1.70	1.80	1.80	1.65	E	E	E	E	E	E	E	E
26	E	E	E	E	E	E	E	1.75	1.70	1.70	1.70	1.70	1.70	1.75	1.70	1.70	E	E	E	E	E	E	E	E
27	E	E	E	E	E	E	E	E	1.65	1.65	1.65	1.65	1.70	1.80	1.70	1.65	1.85	E	E	E	E	E	E	E
28	E	E	E	E	E	E	E	E	1.65	1.70	1.65	1.65	1.70	1.70	1.70	1.65	1.65	E	E	E	E	E	E	E
29	E	E	E	E	E	E	E	E	1.70	1.65	1.70	1.70	1.75	1.75	1.75	1.65	1.80	E	E	E	E	E	E	E
30	E	E	E	E	E	E	E	E	1.65	1.70	1.65	1.75	1.80	1.65	1.80	1.75	1.90	E	E	E	E	E	E	E
31	E	E	E	E	E	E	E	E	1.70	1.75	1.70	1.75	1.70	1.70	1.70	1.65	1.90	E	E	E	E	E	E	E
No.	29	29	29	29	29	29	29	30	28	29	29	27	29	29	29	29	27	29	29	30	30	30	30	30
Median	E	E	E	E	E	E	E	E	1.70	1.70	1.70	1.70	1.75	1.75	1.70	1.70	E	E	E	E	E	E	E	E

f-min

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

IONOSPHERIC DATA

Dec. 1961 | M(3000)F2 | 135° E Mean Time (G.M.T. + 9h.) | **Akita** | Lat. 39° 43.5' N | Long. 140° 08.2' 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	275	280	305^{S}	325	335	310	320	350	365	350	320	I 350^{R}	330	350	350	365	340	310	310	265	I 310^{S}	290	260^{S}	I 280^{S}
2	I 260^{S}	I 245^{S}	230	I 350^{R}	235	250	I 275$^{R}_{S}$	290	I 300^{R}	I 310^{R}	310	I 330^{R}	340^{R}	360	350	350	330	310	330	345^{S}	310	255	255^{S}	295
3	270	365	240	250	240	240	245	300	295	300	315	355	360	320	340	340	345^{S}	305^{S}	305	R^{F}	F	F	F	S
4	280^{S}	280^{S}	320^{R}	360	290	300	285	360	340	335^{R}	I 355^{R}	355^{R}	360	355	360	340	360	I 330^{A}	325	325	335	325	280	270
5	295	270	I 280$^{A}_{S}$	275	295	315	I 330$^{R}_{S}$	350	350^{S}	365	345^{H}	340	350	360	350	355	350	I 345^{A}	S	F	F^{S}	A	F	F
6	F	F	295^{F}	I 285^{F}	F	F	320^{S}	340	I 365^{C}	355	350	350	335^{H}	335	340	I 355^{C}	350	320	I 325^{R}	345	320^{S}	320	F	F
7	F	F	F	F	F	315	330^{S}	330	340	345^{R}	345	350	350	340	340	365	340	330	340	340	305	A	F	F
8	A	A	A	F	F	F	F	345^{S}	360	365	I 350$^{R}_{H}$	370	360	350	340^{H}	370	I 350^{S}	I 320^{C}	I 330^{R}	340^{S}	320^{S}	F	F	F
9	F	I 310^{F}	I 290^{F}	I 315$^{E}_{S}$	I 300^{S}	300^{S}	320	345^{S}	370	350	345$^{R}_{H}$	370	335	335	350	365	340	345	345	300	330	310	295^{S}	280
10	295	300	I 300$^{E}_{S}$	310	300^{S}	315	325	340	355	365	355	345	335	350	350	365	355	350	310	320	325	275	270	I 285^{S}
11	290	310	310	310	I 275^{F}	300^{S}	I 320$^{R}_{S}$	325^{S}	395	340	345	355	345	340	340	370	345	325	325	330	305	340	255	280
12	280	275	270	275	280	305	335^{S}	I 350$^{R}_{S}$	I 355$^{R}_{H}$	345^{R}	345	C	C	C	C	385	I 345^{C}	350^{S}	305	310	320	315	280	I 285^{F}
13	300	295^{F}	285^{F}	320	305	305	315^{S}	350^{S}	355	355	340	360	340	365	350	365	C	C	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	350	365	350	370	350	320	335	330	285	315	250^{S}	I 285^{F}
15	290	295	285	305	300	320	310	330	C	C	C	C	C	C	C	C	355	305	355	345	305	315^{S}	305^{F}	290^{F}
16	275^{F}	I 280^{F}	280	300	315	335	300	330	365	355	325	355	350	360	370	315^{H}	360	330	325	350	340	315^{S}	265^{S}	310^{F}
17	280	295	300	305	300	290	305^{S}	350^{S}	370	355	335^{H}	330^{H}	360	355	330	350	340	340	340	I 315^{A}	320^{S}	265^{S}	I 270^{S}	270
18	285	280	285	280	310	320	320	340	360	375	360	360	370	350	350	360	350	305	I 340^{C}	340	320	335	I 285^{A}	275^{F}
19	I 295^{S}	290	295	I 300$^{E}_{S}$	I 295^{F}	305	300^{S}	330	365	375	330	360	335	360	345	360	375	I 345^{A}	325	335^{S}	335	F	F	F^{S}
20	F	I 280^{F}	300	325	295^{S}	340^{S}	290	I 330$^{R}_{S}$	365	365	350	345	345	350	360	350	355	335	340	305	345	305	275	275
21	295	320	285	295	305^{F}	280	295	340^{S}	370	370	355	350	360	350	365	350^{H}	355	320	345	335	315	280	F	F^{S}
22	F^{S}	290^{S}	285^{S}	I 290$^{E}_{S}$	300^{F}	360$^{R}_{S}$	I 330^{F}	355	365	360	320^{H}	360	350	350	365	360	350	345	350	305	335^{S}	320	270	270
23	275	280	290	305	300	310	320^{F}	335^{S}	365^{H}	310	350	360	360	360	360	350	340	315	335	335^{S}	340	330	I 255^{F}	275^{S}
24	280^{S}	295	I 310$^{R}_{S}$	I 325$^{R}_{F}$	300^{S}	I 295^{F}	310^{S}	345^{S}	365	320	350	345	365	350	370	350	345	315	360	305	315	280	280	295
25	300^{S}	300	300	300	290	I 285^{F}	I 295$^{E}_{S}$	320^{S}	370	365	345	350	340	355	365	370	340^{H}	320	330	310	350	I 340$^{R}_{S}$	285	F
26	F	285	275	310	310	305	335	350	370	355	345	365	I 360$^{R}_{F}$	370	355	365	345	340	335	320	305	310	295	265
27	285^{S}	I 280$^{R}_{S}$	I 295^{C}	290	295	295	305^{S}	340	370	360	335	350	350	360	320^{H}	310^{H}	360	325	315	300	300	320	305	290
28	275	270	290	320^{F}	305^{S}	290	305	350	370	345	360	335	325	340^{R}	325	355	325	340	340	325	280	290	280	275
29	290	280	280	260	270	305	320^{S}	340	365	350	340	340^{R}	355^{H}	355	360	340	360	325	320	300	325	280	275	270
30	260^{F}	285	305	320	305	320	315	350	345	350	340	345	335	360	345	330	350	345	335	280	270	290	305^{F}	275
31	285^{S}	285	290	290	280	305	310^{S}	325	350	370	340	355	325	340	365	360	325	345	340	330^{H}	320	330	I 290$^{E}_{S}$	265
No.	23	27	28	28	27	28	29	30	29	29	29	28	29	29	29	30	30	30	29	28	28	25	23	22
Median	285	285	290	305	300	305	315	340	365	355	345	350	350	350	350	355	350	330	335	325	320	315	280	280

M(3000)F2 Sweep 1.60 Mc to 20.0 Mc in 20 sec in automatic operation.

The Radio Research Laboratories, Japan.

IONOSPHERIC DATA

Dec. 1961

M(3000)F1

135° E Mean Time (G.M.T. + 9h.)

Akita

Lat. 39° 43.5' N
Long. 140° 08.2' 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		L										
2										L	4.00L		L	L	L									
3										I 3.60L	3.50H	4.10L	L	L										
4											A	A												
5										L		L H												
6										L		L	L											
7										L			L											
8												L	L											
9																								
10											L	L	L											
11												L												
12										L	L	C	C	C	C									
13										L	L H	C	I 4.25L	I 4.30L	L									
14										C	C	C	L		A									
15										C	C	C	C	C	C	C								
16										L H	L	L	L	L										
17											L		I 3.85L	4.10	4.35									
18													A											
19										4.10L		I 4.25L	4.05L											
20														L	L									
21											4.10L	L		4.10										
22										L		L	L	L										
23												L		4.10										
24											L	L		L										
25											L	L	L	L										
26										L	L	L	L	L	L									
27											L	L	L	L										
28										L		L	L	L	4.20									
29												L	L											
30													L			4.05								
31											L	L	L H	L	L									
No.										2	3	2	3	4	2	1								
Median										U 3.85	4.00	U 4.20	U 4.05	4.10	4.30	4.05								

M(3000)F1

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

IONOSPHERIC DATA

Akita

Lat. 39° 43.5' N
Long. 140° 08.2' E

Dec. 1961

h'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												245		245										
2										255	255		230	245	240									
3										310	290	250	245	250										
4											245	I 250 A												
5										235		240												
6										245		240	245											
7										245			250											
8												230	245											
9																								
10											245	245	245											
11												245												
12										255	250	C	C	C	C									
13										245	250	235	235	255	250									
14										C	C	C	245		240									
15										C	C	C	C	C	C	C								
16										250	250 L	250	245	245										
17											275		245	245	245									
18													245											
19										245		245	240											
20														250	245									
21											250	250		245										
22										240		250	245	250										
23												250		250										
24											255	250		250										
25											250	245	250	245										
26										240	270	245	255	230	245									
27											255	260	245	245										
28										245		250	285	245	245									
29												250	245											
30													255			245								
31											260	245	250	250	245									
No.										12	14	21	20	16	8	1								
Median										245	250	245	245	245	245	245								

h'F2

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

The Radio Research Laboratories, Japan.

A 9

29

IONOSPHERIC DATA

Dec. 1961 | h'F | 135° E Mean Time (G.M.T. + 9h.) | Akita | Lat. 39° 43.5' N | Long. 140° 08.2' 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	325	300	265	245	215	215	250	240	230	230	220	245	220	210	235	230	205	220	245	300	245	290	350	350
2	E 290 E	350	340	220	E 405 E	340	340	260	245	220	205	245	205	205	205	240	205	245	240	205	250	E 350 E	355	290
3	310	230	E 400 E	350	E 405 E	405	355	250	255	285	240 H	200	240	230	245	240	220	205	245	255	250	250	300	315
4	295	295	240	205	E 300 E	E 330 E	305	245	235	220	I 245 A	I 240 A	240	245	220	240	225	I 240 A	225	250	245	240	E 300 E	E 310 E
5	280	305	I 320 A	300	295	240	220	210	220	210	220 H	200 H	245 H	245 H	220	230	210	I 240 A	210	225	E 245 E	I 295 A	E 345 E	300
6	300	310	305	290	280	210	245	230	I 225 C	220	245	205	205	245	240	I 240 C	205	205	230	220	245	240	270	285
7	300	305	300	300	300	245	220	245	245	210	245	245	205	240	240	230 H	210	235	235	240	I 265 A	I 290 A	I 290 A	I 300 A
8	A	A	A	255	275	265	255	245	220	225	230 H	225	205	245	230	220	220	I 230 C	245	235	240	285	275	290
9	260	255	290	255	270	245	245	205	205	225	195 H	220	245 H	245 H	240	245	230	205	240	260	245	245	295	295
10	295	290	270	255	255	250	210	230	235	245	240	225	205	245	235	240	220	200	245	245	245	E 295 E	E 320 E	295
11	300	275	255	255	300	270	245	210	200	190 H	245	210	245	245	230	240	220	245	270	245	250	220	E 340 E	300
12	300	300	315	315	310	280	225	205	220	245	250	C	C	C	C	225	I 210 C	220	250	255	245	240	I 275 A	E 300 E
13	295	295	300	250	260	280	245	225	200	200	195 H	I 210 C	220	200	200 H	225	C	C	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	230	245	I 240 A	240	210 H	255	225	220	255	245	E 295 E	310
15	295	290	295	260	255	250	250	245	C	C	C	C	C	C	C	C	220	255	230	230	260	250	300	335
16	315	330	310	280	245	245	290	250	220	205 H	225	245	240	210	220	245	240	230	245	210	235	E 290 E	E 355 E	E 310 E
17	295	295	295	295	260	295	265	230	240	245 H	245	245 H	245	205	195	240	235	230	225	I 245 A	255 A	E 345 E	E 345 E	345
18	300	300	305	305	255	255	255	235	230	215	245	245	I 245 A	245 A	245	245	215	230	I 240 C	245	250	I 255 A	I 300 A	325
19	I 290 S	295	300	295	245	275	245	240	225	210	230	215	200	240	245	245	225	I 225 A	240	240	215	265	305	290
20	305	300	290	255	260	215	255	240	215	225	245	250	255	215	205	240 H	220	215	260 A	245	235	245	305	305
21	285	260	295	295	255	270	260	245	210	215	200	245	245	200	250	220	210	220	230	245	255	255	300	265
22	280	295	295	295	255	205	250	225	205	220	235 H	245 H	235	240	245	230	235	210	240	255	220	200	300	340
23	340	305	300	255	285	250	235	230	210	205	245	240	245	205	245	230	220	245	245	240	230	230	345	310
24	300	290	245	230	245	270	260	245	240	245	205	245	245	235	240	245	240	200	205	260	245	E 290 E	300	290
25	290	280	265	285	300	310	285	245	245	240	230	200	205	230	245	215	240	245	245	250	240	220	E 295 E	E 300 E
26	300	305	305	255	255	265	245	230	220	200	210	245	240	205	205	230	230	210	230	255	245	250	255	310
27	300	295	I 280 C	280	280	295	250	240	210	210	230	I 240 A	235	225	215	235 H	230	245	245	285	260	250	255	295
28	325	315	280	255	250	290	260	235	215	210	245	215	245	240	200	245	220	230	225	245	300	290	300	320
29	295	295	305	350	325	275	245	245	245	245	245	245	210	245	245	205 H	220	210	240	295 A	245	E 290 E	290	330
30	340	305	295	250	260	240	290	215	220	245	250	250	245	230	245	205	235	215	215	280	270	280	250	300
31	290	300	295	290	295	255	245	245	230	245	250	240	200 H	215	240	240	240	210	220	245	245	245	290	310
No.	28	29	28	30	27	29	30	30	29	29	29	28	29	29	29	30	30	30	30	30	30	24	25	28
Median	300	295	295	270	260	265	250	240	220	220	240	240	240	235	240	240	220	230	240	245	245	250	E 300	300

h'F | Sweep 160 Mc to 200 Mc in 20 sec in automatic operation.

IONOSPHERIC DATA

Dec. 1961 | f'Es | 135° E Mean Time (G.M.T. + 9h.) | **Akita** | Lat. 39° 43.5' N | Long. 140° 08.2' 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	E	E	E	E	E	E	E	105	G	125	125	120	120	110	G	G	E	E	E	E	E	E	E	E
2	E	E	E	E	E	E	135	125	125	120	105	G	110	110	G	105	105	105	E	E	E	E	E	E
3	E	E	E	E	E	E	E	G	130	125	130	120	105	105	G	100	E	E	E	E	E	E	E	E
4	E	E	E	E	E	E	E	G	105	145	125	125	135	120	140	110	105	105	105	105	100	E	E	E
5	E	105	105	105	E	E	E	G	125	110	105	G	105	145	100	105	105	105	105	E	105	100	100	115
6	E	E	E	E	110	E	155	G	C	105	130	110	120	G	100	C	E	E	E	E	E	100	E	E
7	110	E	E	E	E	E	E	G	145	135	120	115	G	125	115	105	105	E	105	E	105	105	105	105
8	125	110	105	105	E	E	E	E	120	120	G	G	105	100	100	100	S	C	E	E	E	E	E	E
9	E	E	E	E	E	E	E	E	G	155	G	G	145	G	100	100	100	E	E	E	E	E	E	E
10	125	E	E	E	E	E	E	G	G	G	130	115	110	G	155	G	E	E	105	E	E	E	E	E
11	E	E	E	E	E	E	E	E	G	130	125	G	105	105	105	G	C	100	105	E	E	E	E	E
12	E	E	105	E	E	E	E	110	110	105	110	C	C	C	C	130	C	E	105	E	E	E	105	E
13	E	E	E	E	E	E	E	G	G	G	G	C	G	G	155	G	C	C	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	145	G	130	135	E	105	E	E	E	E	E	E
15	E	E	E	E	E	E	E	G	C	C	C	C	C	C	C	C	105	105	E	E	E	E	E	E
16	E	E	E	E	E	E	E	E	G	G	145	135	115	115	110	105	G	E	E	E	E	110	E	E
17	E	E	E	E	E	E	E	E	G	135	145	120	G	G	G	G	105	105	E	120	110	E	E	E
18	E	E	E	E	E	E	E	E	G	G	145	145	130	110	120	105	105	105	C	E	E	110	105	E
19	S	E	E	E	E	E	E	E	G	115	130	110	110	105	105	G	110	105	E	E	E	E	E	E
20	E	E	E	115	E	115	E	105	115	G	110	150	G	140	130	105	G	110	105	E	110	E	105	105
21	105	100	105	100	105	E	E	E	G	G	G	160	155	G	G	G	G	E	E	E	105	105	110	110
22	105	105	E	E	E	E	E	E	G	G	145	130	125	135	135	G	G	E	E	E	E	E	E	E
23	E	E	E	E	E	E	E	E	G	G	140	145	140	140	145	130	G	E	E	E	115	E	E	E
24	E	E	E	E	E	E	E	E	G	130	135	135	G	G	G	G	G	E	E	E	E	E	E	E
25	E	E	E	E	E	E	E	G	G	130	110	110	105	G	G	G	G	E	E	E	E	E	E	E
26	E	E	E	E	E	E	E	G	G	G	140	G	G	G	G	G	G	E	E	E	E	E	E	E
27	E	E	C	E	E	E	E	E	G	G	G	130	130	135	G	G	G	E	E	E	E	E	E	E
28	E	E	E	E	E	E	E	E	G	G	G	145	145	120	120	G	145	E	E	E	E	E	E	E
29	E	E	E	E	E	E	E	E	G	G	140	145	G	145	130	125	G	E	105	105	105	E	E	E
30	E	E	E	E	E	E	E	E	G	G	145	G	120	G	G	G	G	E	E	E	E	E	E	E
31	E	E	E	E	E	E	E	E	G	G	135	130	G	G	G	G	G	E	E	E	E	E	E	E
No.	5	4	4	4	2	1	2	4	8	15	23	20	21	17	18	14	10	10	8	3	8	6	6	4
Median	110	105	105	105	110	115	145	110	120	125	130	130	120	120	120	105	105	105	105	105	105	105	105	110

f'Es

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

The Radio Research Laboratories, Japan.

IONOSPHERIC DATA

Dec. 1961 | Types of Es | 135° E Mean Time (G.M.T. + 9h.) | Akita | Lat. 39° 43.5' N | Long. 140° 08.2' 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		h2	h2	h2	h	c2										
2							f	c2	h3	c	l		c2	l		l2	f2	f3						
3									h2	h2	h2	h	l2	l2		l								
4									l	h3	h2	h4	h2	c4	h2	c3	f3	f2	f2	f2	f			
5		f	f	f3					h2	l2	l2		l	h	l	l	f3	f3	f		f2	f2	f	f
6					f		h			l2	h	l2	c		l							f		
7	f								h	h2	h2	c2		h2	c2	l2	l		f		f2	f3	f	f2
8	f	f	f3	f2					l	c2			l	l2	l	l								
9										h			h		l	l3	l2							
10	f										h	c2	l2		h				f					
11										h	c		l	l2	l			f3	f3					
12			f2					l2	l3	l2	l2					h2			f				f	
13															h									
14													h		h2	h		f2						
15																	f	f						
16											h2	h	c2	l	l	l						f		
17										h	h	c2					f2	f2		f2	f			
18											h2	h	h3	c3	c	l2	l	f				f	f4	
19										c2	h2	c2	l	l	l		c	f3						
20				f2		f		l	c		l2	h		h	h	l		f	f2		f		f	f
21	f	f	f	f	f							h	h								f	f	f2	f
22	f	f									h2	h2	c2	h	h									
23											h	h	h	h	h	h2					f			
24										h	h	h												
25										h2	l2	l	l											
26											h													
27												h2	h	h										
28												h2	h	c2	c2		h							
29											h2	h		h	h	c2			f	f	f			
30											h		c2											
31											h2	h												
No.																								
Median																								

Types of Es | Sweep 1.60 Mc to 20.0 Mc in 20 ~~min~~ sec in automatic operation.

IONOSPHERIC DATA

Dec. 1961 | foF2 | 135° E Mean Time (G.M.T. + 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	3.1	3.3	3.4	3.9	3.1	2.5	2.7	5.0	6.9	7.6	8.6	8.3	8.6	6.6	7.4	6.8	5.9	4.9	4.8	3.4	4.0	3.4	3.1	3.4
2	3.3	3.7	3.7	5.8	4.2	4.2	5.6	6.8	11.3	11.9	13.4	14.1	12.0	7.9	7.3	7.6	6.8	5.8	6.2	4.9	2.6	2.8	3.1	4.0
3	3.0	3.4	2.4	2.3	2.3	2.4	3.0	6.6	8.4	11.4	11.9	8.2	7.4	8.3	9.0	8.8	7.4	5.3	5.2	5.0	4.4	4.4	3.4	3.6
4	3.9	3.9	5.9	2.2	1.9	2.3	2.5	6.8	8.6	9.1	9.2	9.7	8.0	8.4	7.5	8.3	8.0	4.6	4.6	3.9	3.8	2.9	2.5	2.7
5	3.0	3.0	3.0	3.0	3.0	3.4	3.0	6.0	7.4	8.6	7.9	8.1	8.3	8.3	7.5	7.4	7.8	4.0	4.3	2.9	2.9	2.9	3.0	3.1
6	3.2	3.3	3.2	3.0	3.0	3.0	2.9	6.0	7.4	7.9	8.7	8.0	7.5	8.3	7.2	6.7	6.9	5.5	4.0	3.1	3.0	3.2	3.2	3.4
7	3.3	3.5	3.6	3.3	3.3	3.8	2.6	5.4	7.2	9.7	10.5	9.1	8.8	8.7	8.0	7.7	6.0	4.3	4.9	3.7	3.0	3.1	3.1	3.3
8	3.9	3.6	3.4	3.3	3.0	3.2	3.4	6.0	7.6	7.2	7.9	7.6	8.6	7.1	7.2	6.6	5.4	4.2	3.4	4.4	3.3	2.7	3.1	3.1
9	3.4	3.3	3.4	3.4	3.8	3.6	3.9	5.6	5.6	6.1	7.4	7.1	6.7	6.9	7.8	6.0	6.4	4.7	3.0	3.0	3.5	3.0	3.0	3.2
10	3.4	3.6	3.6	3.9	4.2	3.5	3.4	5.7	6.6	6.7	7.5	7.4	6.8	7.9	7.9	6.9	6.4	4.2	3.0	3.0	3.4	2.7	2.6	3.1
11	3.3	3.4	3.5	3.3	3.3	3.4	3.3	6.6	6.0	6.6	8.1	8.4	8.6	7.1	7.4	7.4	5.9	4.4	4.1	4.0	3.0	3.5	2.5	3.1
12	3.2	3.3	3.4	3.4	3.3	3.3	3.4	4.4	5.8	6.6	8.9	9.5	10.2	6.6	7.3	7.0	5.0	4.9	3.4	3.1	3.7	3.4	2.7	2.9
13	3.1	3.1	3.0	3.4	2.8	2.8	2.5	5.6	6.4	6.7	8.5	7.9	7.4	7.1	5.7	6.5	5.4	4.0	2.9	2.9	2.9	2.4	2.4	2.9
14	2.8	3.1	2.8	2.9	2.9	2.6	2.4	4.8	6.0	6.2	5.9	6.6	7.6	6.7	6.3	7.1	5.6	3.9	3.9	3.2	2.4	2.8	2.9	3.0
15	3.0	3.1	3.2	3.4	3.3	3.0	2.6	4.5	6.3	6.8	6.3	7.0	9.4	6.4	6.2	6.5	5.6	3.6	4.5	4.2	2.6	2.4	2.7	3.0
16	3.1	3.1	3.3	3.4	3.5	2.5	2.6	4.3	7.1	6.7	7.6	9.1	7.8	7.8	6.8	5.9	6.4	4.2	3.8	3.8	2.8	2.7	2.3	2.6
17	2.9	2.9	3.0	2.9	2.8	2.7	2.8	5.3	5.6	5.8	5.8	8.1	8.3	6.7	5.8	6.0	5.1	5.0	3.7	2.4	2.5	2.5	2.2	2.6
18	2.8	2.9	3.0	3.1	3.1	2.9	2.4	4.6	6.0	6.0	6.1	7.4	6.6	6.0	5.9	6.0	6.0	4.0	3.2	3.4	2.8	2.4	2.4	2.6
19	3.0	2.9	3.1	3.3	3.3	2.9	3.0	4.9	4.6	6.3	6.1	6.6	7.2	6.5	5.1	6.4	5.8	4.6	3.2	2.9	2.8	2.5	2.4	2.8
20	2.9	3.1	3.0	3.4	3.8	2.7	2.6	4.4	5.2	5.5	5.5	6.4	7.6	6.9	6.6	5.9	5.6	3.4	3.2	3.3	3.4	3.2	2.4	2.5
21	3.1	3.3	3.2	3.2	3.1	2.5	2.8	5.0	6.2	5.5	6.0	7.0	7.6	6.3	5.5	7.0	5.8	3.7	3.4	2.9	2.8	2.9	2.9	3.1
22	3.2	3.4	3.5	3.5	3.4	3.8	2.6	5.0	5.9	5.4	6.4	7.8	7.9	7.2	6.8	5.8	4.8	4.8	2.8	3.0	3.4	2.3	2.4	2.6
23	2.8	2.9	3.0	3.4	3.4	3.1	3.1	5.1	5.5	5.9	6.8	8.7	6.6	5.5	6.0	6.2	5.1	4.8	4.2	3.9	3.0	3.0	2.5	3.0
24	3.1	3.5	4.1	3.4	3.0	2.6	3.0	5.2	6.4	6.6	7.2	7.6	7.6	6.4	5.9	6.5	5.7	4.1	4.8	3.2	3.8	2.9	2.7	3.1
25	3.0	3.1	3.0	3.0	2.9	2.4	3.0	4.2	7.6	7.7	8.0	7.2	7.3	8.2	6.6	6.9	5.8	4.2	3.3	3.0	3.6	2.9	2.4	2.6
26	2.8	2.9	3.0	2.9	2.8	2.8	2.8	5.2	6.0	6.2	6.4	8.0	6.7	6.6	6.5	6.0	5.9	4.9	4.1	2.8	3.3	3.2	2.9	3.1
27	3.0	3.2	3.4	3.4	3.4	3.0	3.1	5.4	6.2	6.3	6.4	8.4	8.4	6.2	6.4	6.8	5.9	4.4	3.4	3.2	3.3	3.4	3.2	3.0
28	3.0	3.1	3.5	3.4	3.4	2.8	2.8	4.8	5.4	6.6	7.7	8.6	8.1	7.8	6.8	6.4	6.1	4.8	4.0	3.0	3.0	3.2	3.1	3.3
29	3.3	3.5	3.1	3.2	3.3	3.2	3.0	5.3	6.9	7.7	9.4	9.0	7.3	8.5	6.9	6.2	6.0	4.4	3.3	2.4	3.6	2.4	2.5	2.8
30	2.7	3.0	3.2	2.7	2.9	2.5	2.5	4.4	5.9	6.2	7.1	8.5	7.4	8.0	6.4	7.0	5.9	4.4	3.4	2.8	2.7	3.2	3.4	3.0
31	3.2	3.4	3.3	3.3	3.0	3.1	2.8	4.8	6.4	6.9	6.4	7.8	6.6	8.8	8.4	6.8	5.5	5.5	4.5	3.6	3.6	3.4	2.8	3.1
No.	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
Median	3.1	3.3	3.2	3.3	3.1	2.9	2.8	5.1	6.3	6.6	7.5	8.0	7.6	7.1	6.8	6.7	5.9	4.4	3.8	3.2	3.0	2.9	2.7	3.0
U. Q.	3.3	3.4	3.5	3.4	3.4	3.3	3.1	5.7	7.2	7.7	8.6	8.6	8.4	8.2	7.4	7.0	6.4	4.9	4.5	3.8	3.6	3.2	3.1	3.1
L. Q.	3.0	3.1	3.0	3.0	2.9	2.6	2.6	4.8	5.9	6.2	6.4	7.4	7.3	6.6	6.2	6.2	5.6	4.1	3.3	2.9	2.8	2.7	2.4	2.8
Q. R.	0.3	0.3	0.5	0.4	0.5	0.7	0.5	0.9	1.3	1.5	2.2	1.2	1.1	1.6	1.2	0.8	0.8	0.8	1.2	0.9	0.8	0.5	0.7	0.3

foF2

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

The Radio Research Laboratories, Japan.

K 1

IONOSPHERIC DATA

Dec. 1961 | foF1 | 135° E Mean Time (G.M.T. + 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		L	L	L									
2									L	L	L	L			L									
3										L	L		L	L										
4																								
5													L											
6												L	L	L	C									
7											L			L										
8																								
9												L	L	L										
10											L		L	L	L									
11											L	L		L										
12												L		L	L									
13											L	L	L	L	L									
14												L	LH	L		L								
15											L	L	L											
16										L	L	L	L	L										
17												L	L	L		A								
18											L		L	L										
19												L	L											
20								L		L		L	L		L									
21											L	L	L		L									
22											L	L	L	L										
23									L		L	3.9	L	L	L	L								
24									L		L	L	L											
25											L	L	L											
26												LH	L	LH	L									
27											L	L	L	L	L									
28											L		L	L										
29												L	L	L	L									
30												L	L	L	L	L								
31												L		"3.5" L	L	L								
No.												1		1										
Median												3.9		"3.5										

foF1

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

The Radio Research Laboratories, Japan.

K 2

IONOSPHERIC DATA

Dec. 1961 | foE | 135° E Mean Time (G.M.T. + 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								S	2.60	3.05	3.00	3.10	I 3.00 A I	2.90 A I	2.65 A	2.20	S							
2							S	S	A	A	A	A	I 3.10 A I	3.00 A I	2.70 A	A	B							
3								S	I 2.75 S	2.70	2.90	A	A	A	2.75	2.40	B							
4								S	2.40	2.80	I 3.00 R U	3.10 R	3.15	3.00	I 2.80 A	2.40	S							
5								2.05	A	A	A	A	A	A	A	A	S							
6								S	I 2.40 A	A	A	2.95	I 3.10 A	3.10	I 2.75 C	2.30	S							
7								S	R	I 2.80 A	3.05	I 3.10 A	I 3.10 A	2.95	A	A	S							
8								S	A	A	A	3.15	I 3.05 A I	2.95 A	2.75	I 2.15 B	S							
9								S	2.35	2.60	3.10	3.10	I 3.10 R	3.10	I 2.80 R	I 2.40 B	U 2.15 R							
10							B	1.90	2.55	2.80	3.00	A	A	A	2.70	2.45	B							
11							S	2.05	2.40	2.75	3.00	3.10	3.10	2.90	A	A	S							
12							S	S	2.30	2.75 A I	3.00 A	3.15	I 2.85 A I	2.80 A I	2.65 R	I 2.35 S	B							
13								S	2.35	I 2.70 A I	2.90 A	2.95	2.90	2.90	2.70	2.40	S							
14								S	2.25	2.75	2.90	I 3.00 A	3.00	I 2.90 A	2.60	2.25	S							
15								S	U 2.25 S	2.55	3.00 R	3.10	3.05	2.85	I 2.50 A	A	A							
16								S	A	2.70	A	A	3.05	I 2.85 A	2.70	2.35	2.05							
17								S	A	2.70	2.95	3.00 A	3.10	A	A	A	S							
18								S	2.20	2.60	3.00	I 3.00 A	3.00	I 3.00 A I	2.70 A	2.25	S							
19								2.00 S U	2.25 R	2.70	2.90	A	A	A	A	2.40 A	A							
20								S	A	I 2.60 A	3.05	3.20	3.05	I 3.00 A	2.55	I 2.30 A	S							
21								S	2.50	2.60	3.00	3.10	3.05	3.00	2.90	2.70	I 1.90 S							
22								S	2.50	2.80	3.00	3.00	3.15	3.00	I 2.80 A	2.40	S							
23								I 1.70 S	2.25	2.85	2.95	3.20	3.10	2.90	2.75	2.45	A							
24								S	2.40	I 2.80 A	3.20	I 3.10 A I	2.85 A U	3.05 R	2.80	2.40	S							
25								S	S	I 2.70 A	3.00	3.15	3.15	3.00	2.95	2.50	U 2.10 R							
26								S	2.30	U 2.70 R	3.00	3.10	3.05	3.05	2.75	2.45	2.10							
27								S	2.15	2.60	I 3.15 A U	3.10 A	3.05	I 3.10 A	2.85	2.50	2.10							
28								S	U 2.15 R	2.55	2.95	I 3.15 R	3.10	I 3.05 A	3.00	2.30 A	I 1.90 B							
29								S	2.30	2.80	3.00	3.20	3.20	3.00	2.75	2.50	S							
30								S	2.35	2.70	3.05	3.20	I 3.10 A	3.00	2.75	2.40	B							
31								U 2.00 S	2.40	I 2.80 A	A	A	A	3.05	2.80	2.40	U 1.95 R							
No.								6	23	27	25	24	26	26	26	25	8							
Median								2.00	2.35	2.70	3.00	3.10	3.10	3.00	2.75	2.40	U 2.10							

foE

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

The Radio Research Laboratories, Japan.

K 3

IONOSPHERIC DATA

Kokubunji Tokyo

Lat. 35° 42.4' N
Long. 139° 29.3' E

Dec. 1961

foEs

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	E	S	C	E	S	S	S	S	G	G	3.9	3.9	3.7	) 3.6	) 3.3	2.5	S	2.1M	S	E	S	S	S	S
2	S	S	E	E	E	S	2.2	S	3.0	) 3.8	3.4	3.8S	3.2	3.0	2.9	4.2	B	S	E	S	S	S	E	E
3	E	E	E	E	E	S	S	S	S	2.8	3.5	3.3	) 3.3	3.0	G	G	B	S	S	E	E	E	E	E
4	E	2.8M	E	E	E	2.2	S	G	2.8	) 3.9	G	3.7	4.5	4.4	3.5	G	S	) 2.5	) 2.2	) 2.5	S	1.9	S	E
5	E	E	S	E	E	E	S	G	2.5	2.9	) 3.5	4.7	) 5.0	) 4.0	) 4.0	) 4.2S	3.2	S	S	E	E	E	E	S
6	) 3.2	2.9M	E	S	S	E	S	S	) 3.0	4.0	) 4.1	) 3.1	3.1	G	C	2.6	S	2.3	2.4S	E	E	E	) 4.3	S
7	S	S	E	E	E	S	S	S	G	3.0	3.3	) 3.3	3.4	3.4	3.4	) 3.0	S	S	E	E	S	S	E	E
8	E	3.7M	E	) 2.4	E	S	E	S	2.6	) 4.2	) 3.9	3.5	) 3.9	) 3.6	2.7G	G	S	) 2.3S	E	S	E	E	S	E
9	E	E	E	S	E	S	S	S	G	3.2	3.3	G	G	G	G	B	G	S	S	S	S	S	E	E
10	E	E	E	E	) 1.6Y	S	B	G	2.4G	) 2.8G	G	) 3.8	3.8	) 3.9	G	G	B	S	S	E	E	S	S	E
11	E	E	E	S	E	E	S	G	G	3.3	) 3.1	G	G	2.3G	) 3.9	) 4.0	3.9	) 5.7	E	S	2.7	S	S	E
12	S	S	E	E	E	S	S	S	2.7	3.5	3.5	3.7	3.5	3.4	2.9	S	B	S	E	2.4	E	E	E	) 2.4
13	) 2.6	E	E	E	E	E	E	S	G	) 3.3	3.2	3.2	3.2	G	G	3.0	S	S	S	E	E	S	E	E
14	E	S	E	E	E	S	S	S	2.5	G	3.4	3.2	3.2	3.0	G	G	S	S	S	E	E	S	E	E
15	S	E	S	E	E	E	S	S	2.5	) 3.1	3.5	3.4	3.3	3.3	) 3.7	2.7	) 2.8	) 2.6	2.4	2.3	S	S	S	S
16	S	S	S	S	S	S	2.3	S	2.7	3.2	) 3.4	3.2	G	2.8	2.6G	2.8M	G	S	E	) 1.9	E	S	E	E
17	E	E	E	E	2.4	E	E	S	) 2.3	G	G	3.5	3.8	3.9	4.6M	4.4	3.4	) 2.4	2.5M	S	E	S	E	S
18	S	E	E	E	E	E	S	S	2.9	2.8	3.3	4.0S	3.7	3.6	3.4	3.0M	S	) 2.4	S	) 2.4	3.2	2.4	2.4	4.1
19	E	E	E	E	S	E	S	G	2.5	3.0	3.4	3.2	) 4.1	) 3.4	2.6	2.8	) 4.0	) 3.9	2.3M	S	S	S	E	E
20	S	2.5M) 3.4S		2.1	S	2.2	) 2.5	) 2.4Y	3.2M	3.7M	3.4	2.7G	) 3.4	3.0	3.2	2.4	2.2	S	E	E	E	E	S	E
21	E	E	E	2.0M	2.0M	S	S	S	3.0M)	3.0	) 3.7	G	G	G	3.4	G	S	E	1.6	S	E	E	E	E
22	E	S	E	E	E	S	S	S	) 2.4G	G	G	3.7	3.3	3.5	2.9	G	S	S	E	E	E	E	S	E
23	S	E	E	E	E	S	S	S	G	G	3.2	G	G	2.4G	G	G	3.0Y	1.7	S	E	E	E	E	E
24	E	S	E	E	E	S	E	S	G	3.0	3.0G	3.9	3.2	) 3.2S	G	G	S	E	E	S	E	E	E	E
25	E	E	S	S	S	E	S	S	G	) 3.0	G	G	G	G	G	G	G	S	E	E	E	E	E	E
26	S	E	E	E	E	S	S	S	G	G	3.2	G	G	G	G	G	G	S	E	S	E	E	E	E
27	E	E	E	E	E	S	S	S	G	G	3.1	3.6	2.8G	3.2	2.7G	G	G	E	E	E	E	E	E	E
28	E	E	E	E	E	S	E	S	G	G	G	3.2G	3.6	) 3.3	G	3.0	2.2	S	S	E	E	S	E	E
29	E	E	S	S	E	S	S	S	G	G	3.4	G	G	G	G	2.3G	S	S	S	E	E	3.1M	E	2.7M
30	E	E	E	E	E	S	S	S	G	G	G	G	3.2	2.6G	G	G	B	S	S	E	E	E	E	E
31	E	E	E	E	E	E	S	G	G	) 2.8	) 3.7	) 3.8	) 3.4	G	G	G	G	S	E	E	E	E	E	E
No.	22	23	25	25	25	12	8	7	30	31	31	31	31	31	30	29	14	13	19	22	24	18	22	26
Median	E	E	E	E	E	E	E	G	G	3.0	3.3	3.3	3.3	3.0	G	G	2.2	2.3	E	E	E	E	E	E
U.Q.	E	E	E	E	E	E	2.2	G	2.7	3.3	3.5	3.7	3.7	3.5	3.4	3.0	3.2	2.6	2.2	E	E	E	E	E
L.Q.							E		G	G	G	G	G	G	G	G	G	E	E					
Q.R.																								

foEs

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

The Radio Research Laboratories, Japan.

K 4

IONOSPHERIC DATA

Dec. 1961 | foEs | 135° E Mean Time (G.M.T. + 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		S	C		S	S	S	S			3.8	3.9	3.5	3.4	3.0	2.4	S	E	S		S	S	S	S
2	S	S				S	2.0	S	2.5	3.4	3.2	3.3	3.2	3.0	2.5	3.4	B	S		S	S	S		
3						S	S	S	S	2.8	3.4	3.2	3.1	3.0			B	S	S					
4		2.6				E	S		2.6	3.4		3.3	4.5	4.4	3.3		S	2.5	2.0	2.5	S	1.8	S	
5			S				S		2.5	2.9	3.1	4.4	3.7	4.0	3.1	3.9	S	S	S					S
6	E	2.0		S	S		S	S	2.3	2.7	3.5	2.7[sporadic]	3.1		C	2.6	S	E	E				A	S
7	S	S				S	S	S		2.9	3.2	3.3	3.3	3.2	3.0	2.4	S	S			S	S		
8		1.8		1.9		S		S	2.6	3.2	3.2	3.2	3.8	3.5	2.3[sporadic]		S	S		S			S	
9				S		S	S	S		3.0	3.3					B	G	S	S	S	S	S		
10					1.4	S	B		2.3[sporadic]	2.3[sporadic]		3.4	3.5	3.4			B	S	S			S	S	
11				S			S			3.3	2.6[sporadic]			2.2[sporadic]	3.2	3.3	3.3	A		S	E	S	S	
12	S	S				S	S	S	2.6	3.5	3.5	3.3	3.4	3.3	2.9	S	B	S		E				E
13	1.8							S		3.2	3.2	3.2	3.1			G	S	S	S			S	S	
14		S				S	S	S	G		3.3	3.2	3.1	3.0			S	S	S			S		
15	S		S				S	S	2.4	2.8	3.1	3.2	3.1	3.2	3.2	2.6	2.3	2.2	2.1	E	S	S	S	S
16	S	S	S	S	S	S	E	S	2.6	G	3.3	3.1		2.8	2.6[sporadic]	2.2[sporadic]		S		1.8		S		
17					E			S	2.0[sporadic]			3.4	3.7	3.2	3.6	3.9	2.9	2.0	E	S		S		S
18	S						S	S	2.7	2.8	3.3	4.0	3.2	3.2	2.9	2.6	S	E	S	2.0	1.9	1.7	E	A
19					S		S		G	2.9	3.1	3.1	3.2	3.3	2.6	2.7	3.0	2.9	E	S	S	S		
20	S	1.7	A	E	S	2.1	S	2.3	2.5	3.3	3.4	2.5[sporadic]	2.3[sporadic]	E 3.0[S]	2.9	2.3	E 2.2[R]	S					S	
21				E	E	S	S	S	2.2[sporadic]	G	3.4				G		S		1.5	S				
22		S				S	S	S	2.1[sporadic]			3.4	3.3	3.3	2.9		S	S					S	
23	S					S	S	S			3.2			2.4[sporadic]			2.6	1.5	S					
24		S				S		S		2.8[sporadic]	2.7[sporadic]	3.3	3.2	2.8[sporadic]			S			S				
25			S	S	S		S	S		3.0								S						
26	S					S	S	S			3.2							S		S				
27						S	S	S			3.1	3.3	2.7[sporadic]	3.1	2.7[sporadic]									
28						S		S		G	G	E 3.2[R]	3.4	3.2	G	2.9	2.2	S	S			S		
29			S	S		S	S	S		G	3.3	G	G	G	G	2.3[sporadic]	S	S	S			E		2.0
30						S	S	S					3.2	2.6[sporadic]			B	S	S					
31							S			2.8	3.3	3.5	3.4					S						
No.	2	4	1	3	3	2	2	1	16	23	25	24	24	24	19	15	8	9	6	5	2	3	2	3
Median	E	1.9	A	E	E	E	E	2.3	2.4	2.9	3.2	3.3	3.2	3.2	2.9	2.6	2.4	2.0	E	1.8	E	1.7	E	2.0

foEs

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

IONOSPHERIC DATA

Dec. 1961 | f-min | 135° E Mean Time (G.M.T. + 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	1.30	E 1.50 S	C	E	E 1.50 S	E 1.50 S	E 1.50 S	E 2.10 S	1.65	2.10	2.05	2.20	2.30	2.10	1.90	1.80	E 1.90 S	E 1.70 S	E 1.80 S	1.30	E 1.50 S	E 1.70 S	E 1.95 S	E 1.50 S
2	E 1.80 S	E 1.60 S	1.20	1.00	1.00	E 1.50 S	1.40	E 1.90 S	1.60	2.30	1.90	2.10	2.20	1.95	2.10	1.90	2.40	E 1.50 S	1.40	E 1.80 S	E 1.70 S	E 1.80 S	1.50	1.50
3	1.50	1.60	1.40	1.50	1.40	S	S	E 2.30 S	E 2.60 S	2.10	1.90	2.10	1.85	1.80	2.10	1.80	2.05	E 1.80 S	E 1.50 S	1.30	1.10	1.20	1.50	1.40
4	1.20	E 1.50 S	1.20	1.40	1.40	E 1.50 S	E 1.60 S	E 1.75 S	1.80	2.15	1.90	2.20	2.40	2.40	2.25	1.80	E 2.60 S	E 1.50 S	E 1.60 S	E 1.70 S	E 1.80 S	E 1.50 S	E 1.50 S	1.40
5	1.50	1.50	E 1.50 S	1.20	1.10	1.20	E 1.80 S	E 1.80 S	1.90	1.90	2.10	2.10	1.90	1.90	2.25	1.95	E 2.50 S	E 1.90 S	E 1.80 S	1.50	1.20	1.50	1.50	E 1.50 S
6	1.20	E 1.70 S	1.10	E 1.50 S	E 1.80 S	1.40	E 1.50 S	E 2.10 S	2.10	2.10	2.20	2.10	2.20	2.20	C	1.90	E 1.90 S	E 1.75 S	E 1.80 S	1.20	1.10	1.40	E 1.75 S	E 1.70 S
7	E 1.80 S	E 1.80 S	1.10	1.20	1.20	E 1.80 S	E 1.50 S	E 2.30 S	1.80	2.10	1.90	2.20	2.20	2.10	2.20	1.90	E 2.00 S	E 1.50 S	1.20	1.40	E 1.85 S	E 2.00 S	1.50	1.40
8	1.40	E 1.70 S	1.00	E	E	E 1.80 S	1.30	E 2.10 S	1.95	2.00	1.90	2.00	2.00	2.00	2.00	2.25	E 2.00 S	E 1.50 S	1.40	E 1.90 S	1.40	1.40	E 1.70 S	1.30
9	1.30	1.40	1.30	E 1.70 S	E	E 1.50 S	E 1.50 S	E 1.80 S	2.10	2.30	2.50	2.30	2.10	2.30	2.40	2.25	2.00	E 1.70 S	E 1.70 S	E 1.70 S	E 1.90 S	E 1.70 S	1.10	1.40
10	1.50	1.40	1.20	1.10	1.00	E 1.50 S	1.40	1.40	1.80	2.00	1.90	2.00	2.35	2.10	2.10	1.80	2.45	E 1.50 S	E 1.80 S	1.40	1.40	E 2.00 S	E 1.95 S	1.50
11	1.70	1.50	1.40	E 1.50 S	1.00	1.30	E 1.50 S	1.80	1.80	2.20	2.20	2.20	2.15	2.00	2.10	1.90	E 2.00 S	E 1.75 S	1.45	E 1.70 S	1.40	E 1.70 S	E 1.70 S	1.50
12	E 1.80 S	E 1.80 S	1.60	1.10	1.00	E 1.60 S	E 1.50 S	E 2.30 S	1.90	2.05	2.10	2.60	2.70	2.00	2.00	E 2.40 S	1.95	E 1.50 S	1.30	1.40	1.40	1.50	1.50	E 1.60 S
13	E 1.60 S	1.20	1.30	1.20	1.20	1.40	1.30	E 1.90 S	1.90	1.90	2.00	1.90	2.00	1.90	1.90	1.85	E 2.20 S	E 1.70 S	E 1.70 S	1.20	1.40	E 1.95 S	E 1.50 S	1.40
14	1.40	E 1.70 S	1.40	1.50	1.10	E 1.50 S	E 1.70 S	E 2.00 S	2.00	1.90	2.00	2.00	2.00	2.00	2.20	1.75	E 1.80 S	E 1.70 S	E 1.95 S	1.30	1.50	E 1.90 S	1.50	1.30
15	E 1.70 S	1.30	E 1.80 S	1.50	1.40	1.40	E 1.50 S	E 2.00 S	1.80	1.95	2.00	2.25	2.20	1.95	1.80	1.90	1.80	1.70	E 2.05 S	E 1.80 S	E 1.90 S	E 1.80 S	E 1.90 S	E 1.80 S
16	E 1.70 S	E 1.80 S	E 1.60 S	E 2.00 S	E 1.80 S	E 1.95 S	E 2.00 S	E 2.00 S	1.80	1.90	2.00	2.20	2.10	1.90	2.00	1.90	E 1.60 S	E 1.70 S	1.20	E 1.60 S	1.40	E 1.90 S	1.40	1.40
17	1.45	1.40	1.20	1.30	1.40	1.40	1.40	E 1.95 S	1.70	2.25	2.10	2.15	1.80	1.80	2.00	1.90	E 1.80 S	E 1.40 S	E 1.70 S	E 1.85 S	1.40	E 1.70 S	1.40	S
18	E 1.80 S	1.30	1.10	1.00	1.40	1.40	E 1.60 S	E 1.90 S	1.90	1.90	1.90	1.90	1.80	1.80	1.80	1.90	E 1.95 S	E 1.60 S	E 1.60 S	E 1.70 S	E 1.50 S	1.50	E 1.50 S	E 1.50 S
19	1.40	1.40	1.10	1.20	E 1.70 S	1.10	E 1.80 S	E 1.60 S	E 1.90 S	1.80	2.00	1.90	2.00	2.10	1.90	1.50	1.50	E 1.60 S	E 1.50 S	E 1.60 S	E 1.80 S	E 1.60 S	1.40	1.20
20	E 1.50 S	1.40	1.40	1.30	E 1.90 S	E 1.70 S	E 1.70 S	E 1.90 S	E 1.90 S	1.90	1.90	1.90	1.90	2.20	1.80	1.80	E 1.85 S	E 1.90 S	E 1.60 S	1.50	1.20	1.50	E 1.90 S	E 1.65 S
21	E 1.50 S	1.50	1.35	E 1.50 S	1.10	E 1.50 S	E 1.70 S	E 1.85 S	1.80	E 1.95 S	1.95	2.10	2.10	2.25	2.00	2.00	E 1.95 S	1.40	1.40	E 1.50 S	1.50	1.50	1.50	1.50
22	1.40	E 1.60 S	1.40	1.10	1.00	E 1.70 S	E 1.70 S	E 2.20 S	1.80	2.00	1.95	2.00	2.15	2.10	1.90	1.90	E 1.80 S	E 1.50 S	1.40	1.40	1.40	1.40	E 1.90 S	1.50
23	E 1.80 S	1.40	1.30	1.40	1.00	E 1.95 S	E 1.60 S	E 1.80 S	E 1.90 S	2.00	2.35	2.25	2.20	2.20	2.15	2.00	1.90	1.10	E 1.80 S	1.50	1.40	1.40	1.40	1.40
24	1.30	E 1.80 S	1.40	1.40	1.40	E 1.50 S	1.40	E 1.75 S	1.70	2.20	2.00	2.20	2.10	2.10	2.10	1.80	E 1.80 S	1.30	1.40	E 1.80 S	1.20	1.20	1.50	1.30
25	1.40	1.20	E 1.70 S	E 1.80 S	E 1.60 S	1.40	E 1.70 S	E 2.10 S	2.10	2.00	2.00	2.00	2.30	2.25	2.20	2.10	E 1.80 S	E 1.80 S	1.20	1.40	1.30	1.40	1.50	1.40
26	E 1.50 S	1.50	1.40	1.10	1.10	E 1.60 S	E 1.50 S	E 2.10 S	1.80	1.80	2.10	1.90	2.00	2.00	2.10	1.90	1.50	E 1.60 S	1.40	E 2.00 S	1.20	1.40	1.40	1.50
27	1.40	1.40	1.50	1.40	1.20	E 1.50 S	E 1.50 S	E 2.00 S	E 2.00 S	1.70	2.00	1.85	2.00	2.30	2.10	2.10	E 1.90 S	1.40	1.40	1.20	1.40	1.30	1.20	1.30
28	1.40	1.40	1.10	1.00	1.10	E 1.80 S	1.40	E 1.80 S	1.95	2.10	2.10	2.20	2.00	1.90	2.10	1.70	1.80	E 1.70 S	E 1.50 S	1.40	1.40	E 1.80 S	1.20	1.40
29	1.10	1.40	E 1.60 S	E 1.60 S	E	E 1.70 S	E 1.60 S	E 2.00 S	1.80	2.10	2.00	2.00	2.20	2.30	2.20	1.80	E 2.00 S	E 1.50 S	E 1.50 S	1.40	1.30	E 1.70 S	1.30	E 1.60 S
30	1.40	1.40	1.40	1.00	1.00	E 1.60 S	E 1.50 S	E 1.80 S	E 1.80 S	2.15	2.00	2.20	2.10	2.10	2.20	2.15	2.45	E 1.70 S	E 1.80 S	1.40	1.50	1.40	1.10	1.30
31	1.40	1.50	1.20	1.20	1.10	1.40	E 1.50 S	E 1.70 S	1.90	2.00	1.90	1.90	1.90	2.00	1.80	1.95	1.50	E 1.50 S	1.40	1.40	1.40	1.50	1.40	1.40
No.	20	20	25	24	25	30	30	31	26	31	31	31	31	31	30	30	31	31	31	18	23	16	20	22
Median	1.40	1.40	1.30	1.20	1.10	E 1.50 S	E 1.50 S	E 1.90 S	1.80	2.00	2.00	2.10	2.10	2.10	2.10	1.90	E 1.90 S	E 1.60 S	E 1.50 S	1.40	1.40	1.40	1.40	1.40

f-min

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

The Radio Research Laboratories, Japan.

K 6

IONOSPHERIC DATA

Dec. 1961 | M(3000)F2 | 135° E Mean Time (G.M.T. + 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	2.85	2.75	I 3.00C	3.10	3.25	3.20	2.95	I 3.30S	3.50	3.40	3.60	J 3.35S	3.75	3.40	3.40	3.55	3.40	3.25	3.35	3.05S	3.00S	J 2.95S	J 2.60S	2.65
2	2.70	2.55	2.45S	3.10	2.45	I 2.65S	2.70	J 3.10S	J 3.00R	3.25F	3.15R	J 3.55R	3.40	3.40	3.30	3.40	3.40	3.25	3.20	3.45	3.25	2.65	2.55	3.25
3	2.95	I 3.15S	2.45	2.75	2.50	I 2.50S	I 2.85S	3.30	2.85	3.15	3.15	3.55R	3.40	3.15R	3.35	3.50	3.40	3.10	3.05	3.00	3.25	2.95S	2.45	2.75
4	2.80	2.85	I 3.40SU	2.75R	J 2.40S	2.65U	2.70S	3.35S	3.60	3.45	J 3.40S	3.50	3.50	J 3.55R	3.20	J 3.25R	U 3.75R	3.50	3.30	3.35	3.10	3.45	2.95	J 2.70R
5	2.75	2.80	2.80	2.85	2.95	3.20	3.30	3.35S	3.55	J 3.60R	3.40R	J 3.20R	3.35	3.35	3.45	I 3.40S	3.45	3.25	3.45R	3.30	2.80	U 2.75F	2.60	J 2.75F
6	2.80	2.70	2.80	3.00	2.65S	3.35	2.95	I 3.40SU	3.50SU	J 3.30S	3.45	3.50	3.05	J 3.15SI	3.30C	3.45	3.50	J 3.45S	3.25	3.30	3.00	J 3.00SI	2.90AJ	2.70F
7	J 2.70S	2.60	2.75	2.80	2.75	2.95S	3.25	I 3.30S	3.35SU	3.40SI	3.45R	J 3.40S	3.50	J 3.55R	3.40	3.40	U 3.65S	3.10	3.25	3.45	2.75	2.75	2.90F	2.65
8	3.05	3.10	J 2.90S	3.05S	2.95	3.05	2.90	3.35	I 3.50S	3.45	J 3.40R	3.40	3.60	3.25	3.45	3.50R	3.55	3.30	3.10	I 3.40S	3.35	3.05	2.75	2.80
9	2.80	2.85	2.95	2.95	2.95	3.05	2.85	3.55S	3.75S	3.60	3.55	3.80	3.30	3.60	3.35	3.50	3.45	3.55	3.10	2.95	3.10	2.85	2.70	2.80
10	2.70	2.80	3.05	3.10	3.30	3.10	2.95	3.15	3.50	3.60	3.35	3.25	3.40	3.30	J 3.30R	3.50	3.60	3.15	3.30	3.30	J 3.55R	2.95	2.70	2.65
11	2.75	2.90	3.10	3.00	2.75	3.05	3.05R	I 3.40S	I 3.50S	3.35	3.35	3.45	3.40	3.40	3.40	3.50	3.70	I 3.20A	3.25	3.25	3.00	3.40	2.80	2.60
12	2.80	2.75	2.85	2.90	2.75	2.95S	3.45SI	3.30S	I 3.65S	3.35	I 3.40SJ	J 3.35R	J 3.40R	3.35	3.30	3.55	3.40	3.45	3.25	3.20	3.20	3.25S	2.80	2.65
13	2.85	2.90	2.80	3.20	2.95	2.85	2.90	J 3.30S	J 3.45S	3.30RJ	3.65R	J 3.40R	3.40	3.40	J 3.30S	3.50	J 3.50S	3.35	3.15	3.10	3.00	U 2.90F	2.75S	
14	2.80	J 2.85SJ	2.85SJ	3.05R	J 3.10S	3.45	J 2.95R	I 3.45SI	I 3.55S	3.70	J 3.55S	3.35	3.45	3.25	J 3.50R	3.65S	J 3.40S	3.30	3.30	3.10	2.95	J 3.00R	2.90	2.65
15	J 3.00S	2.90	2.90	3.05S	3.05	3.15	2.90	3.35	SU 3.50S	3.65	3.40	3.30	3.50S	3.60	3.25S	3.50	3.40	3.60	3.30	3.40S	3.05	3.40	3.00	3.00
16	3.05	2.95	2.80	3.20S	3.20S	2.95	2.90	3.30S	3.30SJ	3.60R	3.30	3.30	J 3.45R	3.70	3.55	3.20	3.60	3.10	3.15	3.30	3.05	3.25R	2.85	2.70
17	2.75	2.80	2.95	3.10	J 3.05S	2.95	2.80	3.40	3.55	3.60	J 3.60SJ	3.60R	3.75	3.45	3.60	3.35	3.50	3.40	3.35	U 3.35R	3.20	3.10	2.75	I 2.80S
18	I 2.75S	2.75	2.85	2.85	3.20	3.10	2.90	3.50S	3.50	I 3.55R	3.10	3.55	3.60	J 3.55SI	3.40RI	3.45SU	3.50SJ	3.70S	3.10	3.25	3.20	2.95	2.90	I 2.80A
19	2.95	2.75	2.90	3.05	J 3.05S	3.10	2.95R	3.65	J 3.65S	3.65SJ	3.75S	3.15	3.50R	J 3.40SU	3.45S	3.40RU	3.60RI	3.20S	3.10	3.10	3.20	3.10	2.70	2.80
20	3.05	3.20	I 2.80AJ	3.20SI	3.30SI	3.40SI	3.10SI	3.30S	I 3.60SU	3.45S	3.45	3.30	3.35	3.35	3.50	3.55	3.40	3.20	3.05	3.05	3.25	3.45	2.70R	2.80R
21	2.90	3.05	2.80	3.10	3.05U	2.85S	2.90	J 3.60S	3.70	J 3.45SJ	3.35S	3.25	J 3.55R	3.65	3.45	3.45	3.45	3.25	3.50	3.10	2.90	2.85	3.05	2.60
22	2.80	2.90	2.85	3.15	2.95	J 3.40S	3.05	I 3.40S	3.40	3.70S	3.40	3.35	3.50	3.45	3.55	J 3.60SU	3.50R	3.30	3.20	J 3.30R	3.20	3.00	3.20	2.70
23	2.60R	2.75	2.75	2.95	2.95	3.05	3.20	J 3.55S	J 3.45S	3.55R	3.25	3.70	3.60	3.45	3.30	3.40	3.35	3.15	3.55	3.30	3.35	2.80	2.60	2.55
24	2.90	J 2.90S	J 2.95S	3.25	3.00	J 2.80R	2.65	J 3.35S	3.60	3.45	3.45	3.30	3.40	3.60	3.40	3.50	3.50	3.20S	3.15	3.05	3.15	3.05	2.65	2.85
25	3.00	2.95	3.00S	2.85	2.85	2.85	2.85	I 3.40SU	U 3.55S	3.50	3.65	3.65	3.30	3.55	3.50	3.60	3.30	J 2.25S	3.05	3.00	3.35	3.45	2.90	2.65
26	2.70	2.75	2.85	3.05S	3.05	U 2.85S	J 3.15R	U 3.40S	3.35SJ	3.55R	3.60	3.65	3.75	3.30	3.40	J 3.55S	3.25	3.30	3.40	I 3.30S	3.40	3.10	2.95R	2.90
27	2.85	J 2.80S	2.95	3.00	3.10	2.80S	2.90	I 3.50S	I 3.50S	J 3.40RJ	3.60S	3.55	3.45	3.55	3.45	3.35	3.40	3.40	3.10	3.00	3.05	3.25S	2.95	2.70
28	2.65	2.90	2.85	3.05	2.95	2.90	3.05	3.40	3.35	3.50	3.20	3.50	3.45	3.45	3.40	3.35	3.45	3.30	3.45	3.05	2.95	U 2.90S	2.85	2.90
29	2.75R	2.85	2.85S	J 2.55S	2.75	U 3.00S	3.05	3.25	J 3.60R	J 3.40RU	3.30R	3.20	3.45	3.30	3.55	3.45	3.50	3.40	3.35	3.05	J 3.20RI	3.10A	2.85R	2.55
30	2.65	2.70	2.95	2.95	3.10	2.70	J 3.10R	J 3.40S	U 3.55S	3.40	3.10H	J 3.55R	3.40	3.50	3.45	3.45	3.55	3.20	3.40	3.35	2.95	2.80	3.30	2.65
31	2.80	2.70	2.85	J 2.75S	2.75	2.90	J 2.90R	3.50	3.45R	3.50	J 3.60R	3.45	3.30	J 3.50R	3.45	3.55	3.55	3.25	3.40RJ	3.05R	J 3.10R	2.80	2.85	2.75
No.	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
Median	2.80	2.85	2.85	3.05	2.95	2.95	2.95	3.40	3.50	3.45	3.40	3.40	3.45	3.45	3.40	3.50	3.50	3.25	3.25	3.25	3.10	3.00	2.85	2.90

M(3000)F2

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

The Radio Research Laboratories, Japan.

K 7

IONOSPHERIC DATA

Dec. 1961 | M(3000)F1 | 135° E Mean Time (G.M.T. + 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		L	L	L									
2									L	L	L	L			L									
3										L	L		L	L										
4																								
5													L											
6												L	L	L	C									
7											L			L										
8																								
9												L	L	L										
10											L		L	L	L									
11											L	L		L										
12												L		L	L									
13											L	L	L	L	L									
14												L	LH	L		L								
15											L	L	L											
16										L	L	L	L	L										
17												L	L	L		A								
18											L		L	L										
19												L	L											
20								L		L		L	L		L									
21											L	L	L		L									
22											L	L	L	L										
23									L		L	4.10	L	L	L	L								
24									L		L	L	L											
25											L	L	L											
26												LH	L	LH	L									
27											L	L	L	L	L									
28											L		L	L										
29												L	L	L	L									
30												L	L	L	L	L								
31												L		"4.25	L	L								
No.												1		1										
Median												4.10		"4.25										

M(3000)F1

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

The Radio Research Laboratories, Japan.

K 8

IONOSPHERIC DATA

Dec. 1961 | h'F2 | 135° E Mean Time (G.M.T. + 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											z50		z40	z25	z40									
2									z60	z35	z40	z50			z30									
3										z75	z50		z30	z60										
4																								
5													z40											
6												z30	z30	z40	C									
7											z40			z40										
8																								
9												z30	z50	z25										
10											z40		z40	z50	z40									
11											z50	z40		z45										
12												z65		z30	z40									
13											z25	z50	z40	z30	z10									
14												z50	z50	z40		z25								
15											z30	z45	z45											
16										z15	z60	z55	z40	z40										
17												z40	z05	z40		z45								
18											z60		z15	z40										
19												z40	z50											
20								z15		z30		z40	z60		z40									
21											z50	z65	z40		z15									
22											z40	z50	z40	z40										
23									z15		z55	z50	z40	z30	z30	z20								
24									z25		z35	z50	z40											
25											z40	z30	z55											
26												z40	z25	z40	z35									
27											z40	z55	z40	z40	z25									
28											z60		z45	z40										
29												z50	z20	z60	z15									
30												z25	z45	z40	z50	z50								
31												z40		z50	z25	z25								
No.								1	3	4	17	22	24	21	13	5								
Median								z15	z25	z30	z40	z50	z40	z40	z30	z25								

h'F2

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

The Radio Research Laboratories, Japan.

IONOSPHERIC DATA

Dec. 1961 | h'F | 135° E Mean Time (G.M.T. + 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	310	300	I300C	250	210	250	290	210	230	230	220	240	205	200	200	225	205	220	220	240	250	295	355	355
2	355	355	400	250	380	300	345	255	245	230	200	220	230	200	200	220	210	210	210	200	245	E325S	360	250
3	260	255	400	350	405	I420S	I350S	245	240	245	240	220	200	200	225	225	205	200	255	245	220	255	260	330
4	300	300A	200	295	355	310	325	210	220	220	220	220	210	205	210	230	210	205	210	250A	245	205	295	290
5	295	260	300	295	280	245	285	205	205	220	205	220	210	245	220	210	205	205	220	210	260	300	320	310
6	305	305	260	290	325	210	250	205	210	220	220	200	200	205	I215C	220	210	200	230	205	250	255	I270A	310
7	310	340	260	300	280	255	250	230	230	225	205	205	210	200	220	215	200	225	205	200	280AE	300S	300	305
8	250	250	250	250	250	260	245	210	225	220	220	220	240	205	225	210	205	205	250	250	240	240	300	305
9	255	260	255	255	245	250	250	200	205	210	230	200	190	210	240	210	210	200	295	255	245	290	290	305
10	300	295	260	255	245	210	245	210	210	215	220	240	205	240	205	215	205	200	245	230	200	E300S	E350S	325
11	300	250	210	255	290	250	280	200	200	240	200	205	240	205	240	245	205	I240A	210	245	250	245	330	315
12	315	310	300	295	295	300	210	205	205	240E	255S	210	245	215	200	215	205	205	210	250	245	210	260	320
13	305	255	305	250	225	255	300	225	220	230	210	200	205	210	200	210	205	215	210	235	300	E305S	300	310
14	305	295	295	285	250	205	300	205	210	220	210	205	190H	210	230	200	200	205	230	210	260	260	260	300
15	295	295	295	250	240	240	255	205	215	230	205	200	245	210	220	225	210	205	245	205E	280S	230	295	300
16	295	300	300	270	240	E295SE	330S	225	240	225	205	205	200	195	240	205	215	200	215	210	210	245	325	315
17	310	300	250	305	250	265	260	230	210	205	205	E250A	245	240	240	I240A	210	205	200	245	250	255	300	I305S
18	285	295	265	290	250	220	300	215	220	210	205	E245A	210	210	210	240	205	200	250	230	250	260A	305	I310A
19	265	310	260	245	255	250	260	210	205	240	215	190	190	240	190	230	210	210	255	205	250	290	330	310
20	260	300	I310A	250	215	240	I250S	175	215	220	220	205	195	230	200	210	205	200	255	245	245	200	E350SE	315S
21	295	255	275	260	250	250	275	210	205	205	200	200	200	215	205	240	200	205	210	245	300	260	250	310
22	300	295	260	250	205	200	260	245	205	205	225	210	205	205	210	210	205	200	205	210	225	300	E350S	305
23	E345S	305	295	260	245	255	210	205	200	240	245	200	205	205	205	200	210	210	205	210	200	205	350	345
24	260	265	220	215	245	310	265	245	230	240	230	205	215	235	230	220	205	200	250	300	250	255	345	300
25	260	255	255	280	290	310	255	250	220	220	200	200	190	240	230	215	210	245	245	250	210	215	300	355
26	350	310	300	245	245	255	250	210	210	220	240	205H	195	190H	230	210	210	215	210	E245S	245	255	290	295
27	300	305	290	255	250	290	265	240	205	220	205	240	200	210	205	240	210	200	240	240	250	240	240	290
28	325	305	290	250	250	255	250	210	200	225	240	245	225	205	235	215	210	210	210	245	260	280	290	280
29	290	290	305	300	295	290	250	245	225	230	240	245	205	240	210	210	215	200	210	250	240	I270A	300	355
30	320	305	255	240	245	250	255	210	210	245	210H	240	210	200	210	205	225	205	210	290	290	290	245	345
31	305	310	270	295	260	290	255	240	240	235	220	205	205	190	240	210	205	240	215	250	250	250	300	290
No.	30	31	31	31	31	30	30	31	31	31	30	29	31	31	31	31	31	31	31	30	30	27	28	30
Median	300	300	275	255	250	255	260	210	210	225	220	205	205	210	215	215	205	205	215	240	250	255	300	310

h'F

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

The Radio Research Laboratories, Japan.

K 10

IONOSPHERIC DATA

Dec. 1961 | h'Es | 135° E Mean Time (G.M.T. + 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	E	S	C	E	S	S	S	S	G	G	110	110	105	105	105	150	S	100	S	E	S	S	S	S
2	S	S	E	E	E	S	130	S	110	110	105	105	105	105	105	100	B	S	E	S	S	S	E	E
3	E	E	E	E	E	S	S	S	S	150	115	105	105	100	G	G	B	S	S	E	E	E	E	E
4	E	100	E	E	E	125	S	G	140	110	G	125	110	110	105	G	S	100	100	100	S	100	S	E
5	E	E	S	E	E	E	S	G	110	105	105	100	100	100	105	100	105	S	S	E	E	E	E	S
6	105	105	E	S	S	E	S	S	110	105	105	105	105	G	C	E 160 G	S	100	100	E	E	E	100	S
7	S	S	E	E	E	S	S	S	G	115	160	110	115	110	105	105	S	S	E	E	S	S	E	E
8	E	110	E	100	E	S	E	S	130	110	110	140	100	100	100	G	S	100	E	S	E	E	S	E
9	E	E	E	S	E	S	S	S	G	160	150	G	G	G	G	B	G	S	S	S	S	S	E	E
10	E	E	E	E	100	S	B	G	120	110	G	110	105	100	G	G	B	S	S	E	E	S	S	E
11	E	E	E	S	E	E	S	G	G	160	110	G	G	100	100	100	100	100	E	S	100	S	S	E
12	S	S	E	E	E	S	S	S	175	150	130	130	110	110	115	S	B	S	E	100	E	E	E	105
13	100	E	E	E	E	E	E	S	G	105	105	150	155	G	G	115	S	S	S	E	E	S	S	E
14	E	S	E	E	E	S	S	S	150	G	110	120	120	110	G	G	S	S	S	E	E	S	E	E
15	S	E	S	E	E	E	S	S	150	130	110	105	110	100	105	145	100	100	105	115	S	S	S	S
16	S	S	S	S	S	S	105	S	145	115	115	105	G	105	100	100	G	S	E	110	E	S	E	E
17	E	E	E	E	100	E	E	S	110	G	G	110	115	100	100	100	100	100	100	S	E	S	E	S
18	S	E	E	E	E	E	S	S	150	150	150	115	110	100	100	100	S	100	S	105	100	105	105	100
19	E	E	E	E	S	E	S	G	115	E 195 G	110	105	105	100	100	155	100	100	100	S	S	S	E	E
20	S	100	100	100	S	105	100	100	100	100	150	100	100	110	110	105	105	S	E	E	E	E	S	E
21	E	E	E	100	100	S	S	S	110	110	110	G	G	G	130	G	S	E	115	S	E	E	E	E
22	E	S	E	E	E	S	S	S	110	G	G	110	115	110	110	G	S	S	E	E	E	E	S	E
23	S	E	E	E	E	S	S	S	G	G	E 180 G	G	G	100	G	G	100	110	S	E	E	E	E	E
24	E	S	E	E	E	S	E	S	G	105	105	105	105	105	G	G	S	E	E	S	E	E	E	E
25	E	E	S	S	S	E	S	S	G	105	G	G	G	G	G	G	G	S	E	E	E	E	E	E
26	S	E	E	E	E	S	S	S	G	G	180	G	G	G	G	G	G	S	E	S	E	E	E	E
27	E	E	E	E	E	S	S	S	G	G	105	110	105	105	105	G	G	E	E	E	E	E	E	E
28	E	E	E	E	E	S	E	S	G	G	G	110	110	110	G	145	145	S	S	E	E	S	E	E
29	E	E	S	S	E	S	S	S	G	G	110	G	G	G	G	110	S	S	S	E	E	100	E	100
30	E	E	E	E	E	S	S	S	G	G	G	G	110	100	G	G	B	S	S	E	E	E	E	E
31	E	E	E	E	E	E	S	G	G	110	110	105	105	G	G	G	G	S	E	E	E	E	E	E
No.	2	4	1	3	3	2	3	1	16	20	23	23	23	23	17	14	8	10	6	5	2	3	2	3
Median	100	100	100	100	100	115	105	100	120	110	110	110	105	105	105	105	100	100	100	105	100	100	100	100

h'Es

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

The Radio Research Laboratories, Japan.

IONOSPHERIC DATA

Dec. 1961

Types of Es

135° E Mean Time (G.M.T. + 9h.)

Kokubunji Tokyo

Lat. 35° 42.4' N
Long. 139° 29.3' E

44

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 z	l z	l z	l	h		f						
2							l		l	l	l	l	l	l	l	l 3								
3										h	C	l	l	l										
4		f				f			h	C		h	C	C	l			f	f z	f z		f		
5									l	l z	l	l z	l z	l z	l	l	l							
6	f z	f z							l	l	l z	l	l			h		f	f				f z	
7										l	h	l	l	C	l	l								
8		f z		f z					h	l	l	h	l z	l z	l			f						
9										h	h													
10					f				l	l		l	l	l										
11										h	l			l	l z	l	l z	f			f			
12									h	h l	h	h	l	l	C					f				f
13	f									l h	l	h	h			C								
14									h		C z	l	C	l										
15									h	h	C	C	C	C	l z	h	l	f	f	f				
16							f		h	C	l z	l		l	l z	l				f				
17					f z				l			l h	C l	l 3	l z	l 3	l 3	f	f					
18									h z	h	h l	l z	C	l z	l z	l h		f		f	f z	f z	f	f 3
19									C	h	C	l	l	l z	l	h l	l z	f z	f					
20		f z	f z	f		f	f z	l	l 2 h	l h	h	l	l	l	C z	l	l							
21				f	f				l	C	C				h				f					
22									l			C	C	C z	C l									
23											h			l			l	f						
24										l	l	l	l	l										
25										l														
26											h l													
27											l	C	l	l	l									
28												l	C	l		h l	h							
29											C					l						f		f z
30													l	l										
31										l	l	l	l											
No.																								
Median																								

The Radio Research Laboratories, Japan.

Types of Es

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

K 12

IONOSPHERIC DATA

Dec. 1961 | hpF2 | 135° E Mean Time (G.M.T. + 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	360	350	I320C	290	250	255	310	I290S	250	250	250	J260S	250	250	260	250	250	265	255	290S	300S	J295S	J400S	395
2	405	420	460S	305	450	I400S	400	J305SJ	J300R	300F	305R	J295R	260	250	265	255	255	280	290	255	255	380	420	295
3	310	I290S	420	375	445	I455SI	385S	280	350	300	300	250R	250	300R	275	255	255	290	305	305	255	320S	410	390
4	350	345	I260SU	325RJ	355S	350	U350S	275S	250	250	J255S	250	255	J245R	290	J295RU	235R	245	245	255	300	250	310	J350R
5	350	345	350	350	335	300	285	250S	255	J250R	250RJ	J285R	255	255	250	I255S	250	260	250R	250	345	U350F	380	J375F
6	355	355	350	310	400S	255	300	I255SU	250SJ	280S	250	255	305	J295SI	270C	250	250	J245S	270	250	300	J300SI	325RJ	355F
7	J355S	395	350	355	355	310S	295	I295S	280SU	255SI	255RJ	255S	260	J255R	255	255	U245R	300	270	245	350	345	350F	390
8	305	300	J305S	300S	310	310	330	255	I250S	250	J260R	250	245	260	250S	250R	220	255	305	I260S	260	280	355	365
9	340	345	315	300	300	305	315	240S	210S	250	250	230	280	240	255	250	250	245	305	315	255	325	355	355
10	355	350	320	300	280	300	300	260	250	250	255	295	250	280	J260R	250	245	270	265	280	J240R	315	355	380
11	350	325	300	310	350	300	285RI	255SI	250S	280	260	255	260	255	255	255	245	I280A	265	280	300	280	355	395
12	365	355	355	350	350	330S	250SI	275SI	I240S	250	I265SJ	J285R	J255R	250	260	250	250	250	265	295	290	255S	305	395
13	350	315	355	300	290	305	320J	J260SJ	J255S	285RJ	J250RJ	260R	250	250	J250S	250	J250S	270	255	300	300	310U	320F	360S
14	355	J370SJ	350SJ	305RJ	300S	335	J300RI	250SI	250S	245	J250S	290	255	255	J255R	250SJ	245S	250	265	295	300	J300R	330	360
15	J305S	330	330	300S	300	295	315	250SU	250S	230	250	275	245S	230	255S	235	245	210	255	235S	300	230	310	310
16	305	345	360	295S	265S	300	330	265S	255SJ	245R	280	280	J255R	245	255	290	245	295	300	255	295	260R	365	365
17	350	345	315	305	J300S	300	320	255	250	260	J235SJ	250R	245	250	250	260	250	250	250U	250R	280	300	350I	350S
18	I340S	350	335	345	295	300	330	250S	250I	250R	300	250	250	J250SI	250RI	255SU	250SJ	220S	300	255	290	300	340I	345A
19	305	350	330	300	J300S	295	315R	240	J230S	250SJ	245S	285	255RJ	250SU	250S	260RU	230RI	270S	300	255	260	305	355	375
20	315	350	I340AJ	295SI	270SI	240SI	265SI	255SI	250SU	250S	250	260	275	255	250	250	245	255	300	280	280	250	355R	355R
21	335	300	350	300	295U	305S	305	J245S	245	J245SJ	255S	295	J250R	250	255	250	240	255	255	290	330	330	300	390
22	370	345	335	300	300	J240S	305I	270S	250	225S	260	255	250	250	250	J250SU	240R	260	255	J250R	265	335	355	365
23	390R	370	350	305	305	300	260	J245SJ	J250S	250R	290	255	245	245	275	250	250	275	250	250	245	340	405	405
24	345	320	J290S	255	300	J350R	355	J255S	250	250	250	275	250	240	255	250	250	260S	290	335	295	300	365	350
25	305	305	300U	340	340	350	330I	270SU	250S	250	250	240	280	255	250	250	255	305S	300	300	255	250	330	400
26	390	360	345	300S	300	U305SJ	285RU	250S	250SJ	250R	250	250	230	255	250	J245S	250	265	255	I265S	265	305	310R	345
27	350	J360S	330	300	300	345	315	I260SI	250SJ	255RJ	250S	255	250	245	250	255	255	250	275	305	300	275S	305	355
28	395	345	330	305	300	305	300	250	255	245	305	260	255	255	250	260	250	255	250	300	310U	335S	345	340
29	350R	330	350SJ	400S	355	U310S	300	280	J245RJ	255RU	265R	290	250	290	250	250	250	250	245	295	J265RI	290A	340R	390
30	390	355	310	300	290	295	J300RJ	250S	U250S	255	310RJ	250R	250	250	255	255	250	280	255	310	330	335	300	380
31	355	375	345	J355S	355	310	J315R	255	250R	250	J250R	250	260	J255R	250	250	225	260	250RJ	295FJ	J300F	330	350	380
No.	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
Median	350	345	335	305	300	305	310	255	250	250	255	255	250	250	255	250	250	260	265	280	295	300	350	365

hpF2 Sweep 1.0 Mc to 20.0 Mc in 20 min/sec in automatic operation.

The Radio Research Laboratories, Japan.

IONOSPHERIC DATA

Dec. 1961 | upF2 | 135° E Mean Time (G.M.T. + 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	40	95	I 65C	60	60	90	85	I 40S	50	55	50	J 45S	30	50	65	45	65	70	50	105S	55S	J 100S	J 55S	60
2	75	80	75S	90	65	I 70S	55	J 45S	J 90R	95F	50R	J 20R	45	55	80	45	50	65	60	70	90	75	75	60
3	85	I 80S	85	70	50	I 50S	I 50S	35	95	90	95	45R	55	55R	55	50	90	115	75	90	90	85S	120	60
4	95	100	I 55SU	80RJ	50S	100U	105S	35S	45	50	J 55S	50	45	J 50R	60	J 50RU	35R	55	100	70	85	50	90	J 95R
5	95	60	65	65	65	50	65	60S	45	J 45R	55R	J 65R	70	45	55	I 50S	55	135	50R	60	100U	95F	75	J 70F
6	100	95	95	85	95S	90	100	I 55SU	45SJ	60S	50	45	90	J 55S	I 50C	50	50	J 55S	75	105	95	J 95S	I 80A	J 95R
7	J 95S	100	100	80	90	90S	55	I 40S	35SU	90SI	60R	J 90S	40	J 40R	45	50	U 50S	60	75	65	95	100	95F	100
8	80	90	J 95S	65S	90	85	75	75	I 40S	45	J 50R	50	35	70	50S	55R	50	90	85	I 55S	60	75	95	45
9	105	100	90	95	100	95	130	60S	45S	40	50	25	60	50	75	50	45	125	90	85	55	120	100	95
10	100	95	75	90	65	95	95	90	45	25	60	55	50	65	J 85R	50	40	85	130	65	J 55R	90	95	110
11	95	80	90	85	90	95	70RI	60SI	50S	30	60	45	70	50	65	50	50	I 60A	85	70	95	35	60	100
12	80	95	90	55	95	70S	50SI	70SI	30S	55	I 70S	J 35R	J 55R	95	80	45	60	90	80	55	65	95S	105	100
13	55	85	90	90	105	110	85	J 70S	J 45S	65RJ	40R	J 40R	55	50	J 75S	50	J 45S	60	90	95	95	85	U 85F	85S
14	90	J 75SJ	70SJ	90RJ	55S	65	J 95RI	65SI	50S	50	J 45S	20	45	95	J 50R	25SJ	55S	80	80	100	100	J 95R	70	90
15	J 90S	65	70	95S	55	55	100	50SU	50S	60	75	55	100S	65	65S	65	75	90	85	70S	80	70	85	85
16	80	55	65	80S	85C	100	70	85S	95SJ	45R	30	55	J 90R	60	40	60	50	85	95	95	100	85R	80	85
17	45	60	85	60	J 50S	100	85	55	45	45	J 65SJ	40R	35	45	45	55	45	50	100U	60R	110	95	95	I 75S
18	I 80S	65	65	55	55	95	70	50S	50I	50R	55	50	45	J 55SI	55RI	45SU	50SJ	35S	55	100	60	95	65	I 60A
19	95	95	70	90	J 95S	100	80R	55	J 65S	25SJ	25S	70	45RJ	55SU	55S	50RU	65RI	60S	90	90	95	90	95	80
20	80	50	I 95AJ	60SI	70SI	85SI	80SI	65SI	50SU	50S	50	85	40	60	30	45	55	90	95	75	65	95	100R	90R
21	65	95	95	90	55	U 95S	95	J 45S	25	J 50SJ	55S	45	J 45R	40	45	50	65	95	50	95	75	70	95	105
22	75	70	70	65	105	J 65S	90	I 65S	55	30S	75	60	50	45	50	J 45SU	60R	75	95	J 95R	90	60	90	90
23	100R	80	95	90	100	55	90	J 45S	J 50S	45R	50	40	50	55	70	55	95	80	95	95	60	105	50	95
24	55	85	J 105SU	90	90	J 95R	95	J 45S	45	50	50	75	90	50	50	45	95	90S	60	60	100	90	90	95
25	90	90	95S	100	70	95	85	I 65SU	45S	50	30	40	50	45	50	45	75	45S	95	95	90	60	70	95
26	60	85	60	90S	90	U 95SJ	65RU	50S	55SJ	50R	50	45	25	90	50	J 50S	100	65	45	I 70S	75	90	85R	55
27	55	J 65S	65	90	55	100S	85	I 30SI	40SJ	50RJ	45S	50	55	40	55	55	55	55	120	95	90	70S	95	95
28	100	60	70	85	90	90	90	70	50	55	50	40	50	40	55	70	70	65	50	55	85U	70S	60	65
29	95R	75	55SJ	95S	90U	80S	55	60	J 45RJ	55RU	65R	60	50	50	50	55	55	55	60	100	75RI	90A	65R	105
30	100	100	85	90	105	60	J 55RJ	50SU	50S	50	65AJ	45R	55	40	45	45	45	65	50	90	70	70	90	70
31	85	80	65	J 90S	90	90	J 85R	45	50R	45	J 40R	55	85	J 45R	55	50	75	45	50RJ	55F	J 55R	70	55	65
No.	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
Median	85	80	75	90	90	90	85	55	50	50	50	45	50	50	55	50	55	65	80	85	85	90	85	90

upF2

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

The Radio Research Laboratories, Japan.

K 14

IONOSPHERIC DATA

Dec. 1961 | foF2 | 135° E Mean Time (G.M.T. + 9h.) | Yamagawa | Lat. 31° 12.5' N | Long. 130° 37.7' 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	3.0	3.1	3.2	3.4	3.5	2.1	1.9	3.8	6.5	7.0	8.9	8.9	8.4	7.7	7.0	7.6	6.6	5.2	5.2	4.6	4.4	4.5	3.7	3.4
2	3.8	3.8	4.5	5.3	6.1	S	S	S	F	11.5	13.3	14.1	11.7	9.5	8.3	7.9	7.2	6.3	6.9	5.9	4.4	4.0	3.6	4.6
3	3.1	3.2	2.6	2.8	2.7	2.7	2.5	5.0	7.1	12.5	13.9	11.8	7.6	9.7	11.3	9.8	7.1	7.3	6.6	5.0	5.5	3.6	3.8	3.6
4	3.7	4.5	5.0	1.9	1.5	1.5	1.7	4.3	8.4	9.0	8.1	10.3	9.8	8.0	7.1	8.9	9.3	8.2	4.9	4.3	3.8	3.6	3.2	2.5
5	2.6	2.8	2.9	3.1	3.2	2.7	2.3	4.0	S	8.9	8.6	7.5	8.3	8.5	9.0	7.5	8.3	6.7	4.3	4.3	3.4	3.0	2.6	2.3
6	2.6	2.7	2.8	2.9	3.0	2.9	2.5	3.9	6.4	7.7	8.8	8.9	8.2	8.1	8.0	7.5	8.7	6.0	4.6	3.6	3.6	3.0	3.3	2.9
7	3.0	3.2	3.4	3.4	3.7	3.0	2.5	4.1	6.7	9.5	10.4	9.0	8.4	9.1	10.2	8.7	7.0	5.0	4.4	5.1	3.2	3.1	3.1	2.9
8	3.0	3.5	3.0	2.3	2.6	2.6	2.5	4.1	S	7.2	9.3	9.2	8.5	7.5	8.1	8.1	7.9	5.7	4.1	4.6	3.7	3.0	2.6	2.3
9	2.7	3.0	3.0	3.2	3.3	3.0	2.5	4.2	5.5	5.7	7.2	8.0	7.3	6.2	6.8	7.8	7.9	6.5	5.1	3.8	3.2	3.2	3.1	2.9
10	2.8	3.1	3.2	3.6	3.8	3.3	2.6	4.1	6.4	6.8	7.1	7.5	8.2	9.1	9.0	10.0	8.0	5.6	4.3	3.6	3.4	3.8	2.7	2.7
11	3.1	3.3	3.6	3.2	3.1	3.2	3.5	4.2	5.7	5.9	6.8	9.4	9.9	8.2	7.9	8.6	6.7	5.1	5.6	4.6	3.7	4.2	3.6	2.9
12	3.1	3.2	3.5	3.7	3.7	3.2	3.3	4.7	5.1	6.8	8.1	10.0	12.2	8.8	7.0	7.3	6.5	5.8	5.8	3.6	3.9	3.6	2.3	2.2
13	2.4	2.7	2.7	2.9	3.1	1.8	2.0	3.3	6.5	7.5	7.6	7.8	7.7	7.8	7.0	6.5	6.6	5.8	3.6	3.1	3.1	2.7	2.6	2.6
14	2.8	2.8	2.9	2.8	2.9	3.0	2.3	3.3	6.4	6.6	6.9	7.1	6.6	7.9	6.9	7.6	8.3	6.7	4.7	3.4	3.3	3.5	3.2	3.0
15	3.0	3.0	3.1	3.2	3.3	3.0	2.6	3.9	6.0	6.8	7.4	7.2	8.1	8.2	6.7	7.5	7.2	6.6	5.6	4.9	3.9	3.0	3.2	3.1
16	3.0	3.1	3.2	3.5	3.6	2.9	2.6	3.5	6.5	6.8	6.6	7.4	7.7	7.3	S	S	6.7	6.5	4.7	4.4	3.7	3.1	2.7	2.3
17	2.6	3.0	3.1	3.0	3.7	3.1	2.3	3.4	5.3	6.7	7.2	7.2	8.3	S	6.3	6.6	6.2	6.2	5.1	3.7	2.9	2.8	2.6	2.5
18	2.6	2.9	3.0	3.0	2.7	2.7	2.2	3.4	5.7	6.5	5.9	7.4	7.3	7.0	6.4	6.5	7.0	5.8	3.8	3.5	3.3	2.7	2.3	2.6
19	2.7	2.9	3.2	3.1	3.3	2.8	2.5	3.3	5.9	6.1	6.2	6.2	6.1	6.1	5.7	6.8	6.3	6.6	3.2	3.0	3.1	3.2	2.8	2.2
20	F	2.5	2.7	3.0	4.0	2.6	2.2	3.2	5.2	5.6	6.4	5.6	7.4	7.8	7.6	7.7	7.3	6.2	5.5	3.4	3.9	3.7	3.1	2.5
21	2.7	3.0	3.3	3.1	3.1	2.7	2.6	3.5	5.8	6.1	6.5	6.7	7.7	7.4	8.2	S	6.2	4.9	4.0	3.3	3.2	2.8	2.8	2.8
22	3.0	3.2	3.5	3.5	3.8	3.1	2.2	3.2	5.6	6.2	7.7	6.5	8.0	10.2	10.7	10.3	7.7	5.8	5.3	3.9	4.0	3.8	2.5	2.4
23	2.5	2.8	3.0	3.3	3.5	2.7	2.7	3.7	5.6	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	8.0	7.1	7.1	7.1	8.7	6.9	7.6	7.2	5.4	4.8	4.5	4.3	3.6	3.3	3.0
25	3.3	3.6	3.9	3.3	3.4	2.9	2.6	3.3	6.3	8.1	9.1	7.3	6.5	8.1	8.7	8.5	6.1	6.4	4.2	4.2	3.3	3.6	3.6	2.8
26	2.5	2.7	2.9	2.9	3.1	2.8	2.3	3.2	5.7	6.4	6.9	8.3	6.5	7.8	8.3	7.2	6.7	6.6	6.1	3.8	3.1	3.5	3.3	3.0
27	2.8	3.1	3.0	3.3	3.8	2.8	2.4	3.4	6.2	7.7	6.8	6.9	8.9	9.4	8.4	7.2	6.6	6.5	5.4	3.9	3.3	3.5	3.6	3.1
28	2.8	3.0	3.2	3.3	3.1	3.0	3.0	3.3	5.4	6.6	6.7	7.7	9.4	9.2	7.3	6.8	6.8	6.4	4.7	3.3	4.3	3.6	3.6	3.5
29	3.3	3.1	3.3	3.2	3.3	3.2	2.8	3.2	6.4	7.9	8.3	11.1	8.3	7.0	7.9	7.4	7.5	6.6	4.7	4.0	3.8	3.2	2.5	2.5
30	2.7	2.7	2.8	2.7	3.0	2.6	2.4	3.2	5.6	5.7	8.1	8.9	C	7.0	8.6	8.1	7.2	5.3	4.7	3.4	3.1	3.1	3.6	3.3
31	3.1	3.4	3.4	3.5	3.3	3.2	3.2	3.6	6.7	8.2	7.8	7.9	6.6	9.0	9.5	9.7	6.9	6.7	8.1	5.0	3.8	3.9	3.0	3.1
No.	29	30	30	30	30	29	29	29	27	30	30	30	29	29	29	28	30	30	30	30	30	30	30	30
Median	2.8	3.0	3.2	3.2	3.3	2.9	2.5	3.5	6.0	6.8	7.4	7.8	8.1	8.1	8.0	7.6	7.0	6.2	4.7	3.9	3.5	3.6	3.1	2.8
U.Q	3.1	3.2	3.4	3.4	3.7	3.0	2.6	4.1	6.5	8.0	8.6	9.0	8.4	9.0	8.8	8.6	7.7	6.6	5.4	4.6	3.9	3.6	3.6	3.1
L.Q	2.6	2.8	2.9	2.9	3.1	2.7	2.3	3.3	5.6	6.4	6.8	7.2	7.3	7.4	7.0	7.2	6.6	5.7	4.3	3.5	3.2	3.0	2.6	2.5
Q.R	0.5	0.4	0.5	0.5	0.6	0.3	0.3	0.8	0.9	1.6	1.8	1.8	1.1	1.6	1.8	1.4	1.1	0.9	1.1	1.1	0.7	0.6	1.0	0.6

foF2

Sweep 1.0 Mc to 20.0 Mc in 30 min/sec in automatic operation.

The Radio Research Laboratories, Japan.

Y 1

IONOSPHERIC DATA

Dec. 1961 | foF1 | 135° E Mean Time (G.M.T. + 9h.) | Yamagawa | Lat. 31° 12.5' N, Long. 130° 37.7' 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	L	L	L	L									
2																								
3																								
4																								
5												L		L										
6																								
7												L	L	4.5L										
8											L	L	L H											
9												L H												
10												L	L	4.4										
11																								
12												A	L	L	L	L								
13													L	L	L	L								
14												L												
15																								
16																								
17												L	L											
18												L	L	I 4.3L	L									
19																								
20													L	4.5L	L									
21													L	L	L									
22											L	L	4.4L	L										
23										C	C	C	C	C	C	C	C	C						
24								C	C		L	L	4.3L											
25												4.4	4.2L											
26											L H	L	L											
27												L	L	L	L									
28																								
29													L	I 4.4L	4.2L									
30													L	L										
31												4.3	L	L	4.3L									
No.												2	3	5	2									
Median												4.4	4.3	4.4	4.2									

foF1

Sweep 1.0 Mc to 20.0 Mc in 30 ~~min~~ sec in automatic operation.

The Radio Research Laboratories, Japan.

Y 2

IONOSPHERIC DATA

Dec. 1961 | foE | 135° E Mean Time (G.M.T. + 9h.) | **Yamagawa** | Lat. 31° 12.5' N, Long. 130° 37.7' 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								S	1.95	2.80	3.00	3.10	3.30	3.10	3.10	2.80	2.50	S						
2								S	2.20	2.90	3.00	3.20	I 3.15 A	I 3.20 R	3.10	I 2.60 A	2.20	S						
3								S	2.30	2.60	3.00	3.10 H	3.00	I 3.05 A	3.10	I 2.80 A	2.35	A						
4								S	2.20	2.80	3.00	3.15	3.20	3.15	2.85	I 2.70 A	2.50	S						
5								S	2.10	2.60	2.90	3.20	A	A	A	A	A	S						
6								S	2.20	I 2.95 A	3.05	A	A	A	A	A	A	A						
7								S	A	2.55	2.90	2.95	3.15	I 3.15 A	I 3.05 A	2.80	2.30	S						
8								S	2.10	2.70	3.00	3.15	3.30 H	3.15	3.05 H	2.70	A	S						
9								S	2.05	2.60	2.90	I 3.10 A	3.15	3.10	3.00	2.80	2.20	S						
10								S	2.00	2.60	2.90	I 3.25 A	I 3.20 A	I 3.10 A	I 2.95 A	I 2.75 A	2.30	A						
11								S	2.00	2.60	I 2.95 A	3.10	3.20	3.20	I 3.00 A	2.70	A	A						
12								S	2.00	2.50	2.90	2.90	3.00	3.00	2.80	2.60	A	A						
13								S	2.10	2.60	A	A	3.10	I 3.10 A	3.00	2.70	2.20	S						
14								S	2.10	2.60	2.90	3.10	3.15	3.10	2.75	A	A	S						
15								S	2.05	2.60	2.90	3.00	3.00	I 2.95 A	2.90	A	A	A						
16								S	2.20	2.50	2.80	3.00	2.80	A	A	2.70 H	2.35	S						
17								S	1.90	2.60	2.90 H	I 3.00 R	3.15	3.10	2.95	2.70	2.40	S						
18								S	S	2.50	2.80 H	3.05	3.20	3.10	I 2.80 A	I 2.65 A	I 2.35 A	S						
19								S	1.80	2.60	2.80	3.00	2.90	A	A	A	A	A						
20								S	I 1.85 S	2.50	2.80	3.10	3.20	3.10 R	3.15	2.70	2.50	A						
21								S	2.10	2.65	2.90	3.10	I 3.15 A	3.20	3.10	2.85	2.40	S						
22								S	2.10	I 2.70 A	3.10	3.25	3.10	3.10	3.10	2.75	2.35 H	S						
23								S	2.20	C	C	C	C	C	C	C	C	C						
24								C	C	2.70	3.00 H	A	A	3.20	3.10	2.75	2.35	A						
25								S	2.10 H	2.60	3.00	3.20	3.20	3.20	3.15	2.80	2.30	S						
26								S	2.00	2.65	3.05	3.15	3.20	3.15	3.10	2.90	2.40	S						
27								S	1.90	2.60 H	3.00	I 3.20 A	3.30	3.25	3.10	2.75	2.45 H	S						
28								S	1.90	2.50	3.10	3.30	3.20 R	I 3.10 A	3.00 H	2.90	2.60	S						
29								S	1.90	2.50	3.00	3.15	I 3.15 A	3.20	3.05	2.90	2.50 H	A						
30								S	2.10	2.50	2.80	3.15	3.10	I 3.10 A	3.10 H	2.90	2.45	A						
31								S	1.80	2.50	2.85	3.00	I 3.05 A	3.10	3.20	2.80	2.50	S						
No.									28	30	29	27	27	26	26	25	22							
Median									2.10	2.60	2.90	3.10	3.15	3.10	3.05	2.75	2.40							

foE

Sweep 1.0 Mc to 20.0 Mc in 30 ~~min~~ sec in automatic operation.

The Radio Research Laboratories, Japan.

Y 3

IONOSPHERIC DATA

Yamagawa

Lat. 31° 12.5' N
Long. 130° 37.7' E

Dec. 1961

foEs

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	S	S	E	E	E	S	S	2.7	3.2	4.0	4.1	3.8	3.5	3.1	2.6G	G	S	S	S	S	S	S	S
2	S	S	S	E	E	J2.0	S	S	G	J3.4	3.7	J5.7	5.5	3.1G	2.8G	2.8	1.8G	S	S	S	S	S	S	S
3	S	S	S	E	E	S	S	S	G	2.9	3.1	3.6	3.8	3.3	2.9G	J3.8	J2.5	3.3	2.1	2.4	S	S	S	S
4	S	S	E	E	E	S	S	S	2.4	3.2	3.3	3.7	4.5	J4.4	3.7	D9.0S	D9.0S	S	S	2.9	S	S	S	S
5	S	S	J2.1	J2.3	1.7	3.1	3.2	2.1	G	3.0	3.1	G	3.7	J4.3	J4.8	J3.8	J5.1	S	J2.1	S	S	S	S	S
6	S	3.2	2.0	E	J2.3	3.9M	S	J2.2	2.3	6.1	3.7	J3.8	6.0M	5.9M	J5.5	3.9	3.1	3.2	J4.7	3.1	3.0	J2.5	J2.2	S
7	J2.6	4.5M	J3.9	3.2M	2.9M	J2.1	2.7	S	J2.4	3.1	3.4	3.6	3.7	3.8	J4.6	2.5G	G	S	S	S	S	S	S	S
8	S	S	E	E	E	S	S	S	G	3.0	3.3	G	G	2.7G	J2.7G	3.3	4.0	J2.1	S	S	S	S	S	S
9	S	S	S	E	E	S	S	S	G	2.9	3.2	3.3	3.1G	G	G	G	G	S	J2.1	S	S	S	S	S
10	S	S	S	E	E	E	S	2.0	G	G	3.4	3.8	3.3	3.9	J3.9	3.1	G	2.2	S	S	S	S	S	S
11	S	S	E	E	E	S	S	S	G	G	3.6	G	3.3	3.0G	J4.2	2.6G	3.1	1.9	2.6	S	S	S	S	S
12	S	S	S	1.2	E	S	S	S	G	G	3.1	6.0	3.6	3.7	3.5	3.2	3.0	J3.5	3.2	J5.2	1.8	S	S	S
13	S	S	J2.3	J2.1	J2.0	S	S	S	G	3.2	4.6	3.3	3.5	3.6	2.6G	G	G	G	S	S	S	S	S	S
14	S	S	S	E	E	S	S	S	G	G	G	3.3	3.7	4.2	3.7	3.0	J3.0	S	S	S	S	S	S	S
15	S	S	S	E	E	E	S	S	G	3.0	3.2	3.9	3.3	3.2	4.0	4.9M	J3.4	1.8	S	S	S	S	S	S
16	S	S	E	E	E	E	S	S	G	3.2	4.3	3.7	3.7	J4.0	J3.6	G	G	S	S	S	J2.1	S	S	S
17	S	S	E	1.2	E	S	S	S	G	G	3.4	3.5	3.9	3.3	3.4	G	G	G	S	S	2.2	S	S	S
18	S	2.6	S	E	E	S	S	S	G	G	3.3	4.1	3.8	3.9	J4.1	J4.9	2.9	J2.3	1.9	2.4	S	S	S	S
19	S	S	E	E	E	S	S	S	J2.3	G	G	3.3	3.9	3.6	3.5	3.4	2.9	J3.2	J2.6	J2.4	S	J3.2	3.1	S
20	S	S	S	E	E	S	S	S	G	3.2	3.5	3.5	3.8	3.6	G	3.1	2.2G	J2.5	J1.9S	S	S	S	S	S
21	S	S	E	2.7	1.5	S	2.1	S	G	G	G	G	J3.9	G	G	G	G	G	E	E	S	S	S	S
22	S	S	S	E	1.1	E	S	S	G	3.1	3.6	3.5	3.5	3.8	G	G	G	S	S	S	S	S	S	S
23	S	S	S	E	E	S	S	S	G	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	G	3.2	J4.2	3.2	G	G	G	2.8	J2.5	J2.3	S	S	S	S	S
25	S	S	E	E	E	S	S	S	G	2.5G	G	G	G	G	G	G	G	S	S	S	S	S	S	S
26	S	S	E	E	E	E	S	S	G	G	2.8G	3.0G	3.4	3.1G	2.2G	G	G	G	S	S	S	S	S	S
27	S	S	S	E	E	S	S	S	G	G	3.2	J3.5	G	2.8G	G	G	G	G	S	S	S	2.2	S	S
28	S	S	S	E	E	S	S	S	G	G	G	3.7	3.7	4.2	3.6	3.1	J2.3G	G	S	S	S	S	S	S
29	S	S	S	E	E	S	S	S	G	G	3.2	3.1G	J4.3	3.7	3.7	J3.2	G	J2.3	S	S	S	S	S	S
30	S	S	S	1.4	J1.7	S	S	S	G	3.0	3.2	3.9	3.5	3.5	2.7G	G	2.8	J2.2	S	J2.6	3.0	S	S	J2.2
31	S	S	S	E	E	S	S	S	G	G	3.1	3.2	4.5	5.2	3.8	3.3	G	S	S	S	S	S	S	S
No.	1	3	13	30	30	10	3	3	30	30	30	30	30	30	30	30	30	19	11	8	5	3	2	1
Median	2.6	3.2	E	E	E	E	2.7	2.1	G	G	3.2	3.5	3.7	3.6	3.4	2.9	G	2.2	2.1	2.5	2.2	2.5	2.6	2.2
U.Q		3.8	2.0	E	E	2.1	3.0	2.2	G	3.1	3.5	3.8	3.9	3.9	3.8	3.3	3.0	2.5	2.6	3.0	3.0	2.6		
L.Q		2.9	E	E	E	E	2.4	2.0	G	G	3.1	3.2	3.3	G	G	G	G	G	1.9	2.4	2.0	2.4		
Q.R		0.7					0.6	0.2			0.4	0.6	0.6						0.7	0.6	1.0	0.2		

foEs

Sweep 1.0 Mc to 20.0 Mc in 30 ~~min~~ sec in automatic operation.

The Radio Research Laboratories, Japan.

Y 4

IONOSPHERIC DATA

Dec. 1961 | foEs | 135° E Mean Time (G.M.T. + 9h.) | Yamagawa | Lat. 31° 12.5' N, Long. 130° 37.7' 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	S	S	S				S	S	G	G	3.9	3.7	3.7	G	3.0	2.6^{G}		S	S	S	S	S	S	S
2	S	S	S			2.0	S	S		G	3.4	4.3	4.2	3.0^{G}	2.7^{G}	G	1.8^{G}	S	S	S	S	S	S	S
3	S	S	S			S	S	S		G	G	3.6	3.7	3.3	2.9^{G}	3.5	2.2	2.5	2.0	2.1	S	S	S	S
4	S	S				S	S	S	G	G	3.3	3.5	3.9	G	3.3	5.4	G	S	S	2.3	S	S	S	S
5	S	S	2.0	2.0	1.4	A	A	G		3.0	E3.1^{R}		3.5	3.5	3.5	3.3	4.0	S	E	S	S	S	S	S
6	S	A	1.6		2.3	A	S	2.0	2.0	3.1	2.3	G	4.1	4.6	3.4	G	2.8	A	A	2.8	2.8	2.0	2.1	S
7	2.0	A	2.6	2.0	2.0	1.8	1.9	S	G	G	3.4	3.4	3.4	3.4	4.3	2.5^{G}		S	S	S	S	S	S	S
8	S	S				S	S	S		2.9	3.2			2.4^{G}	2.6^{G}	2.3	3.4	G	S	S	S	S	S	S
9	S	S	S			S	S	S		G	G	G	2.8^{G}					S	E	S	S	S	S	S
10	S	S	S				S	G			3.3	G	G	3.4	3.4	3.0		1.9	S	S	S	S	S	S
11	S	S				S	S	S			G		2.9	2.5^{G}	3.3	2.5^{G}	E3.1^{R}	G	2.3	S	S	S	S	S
12	S	S	S	E1.2^{R}		S	S	S			G	E6.0^{S}	3.5	3.6	3.3	3.1	2.8	2.3	3.0	A	1.5	S	S	S
13	S	S	A	1.9	1.7	S	S	S		G	3.3	3.3	G	3.4	2.5^{G}				S	S	S	S	S	S
14	S	S	S			S	S	S				G	3.4	3.9	3.6	2.9	2.8	S	S	S	S	S	S	S
15	S	S	S				S	S		2.2	3.2	3.9	3.3	G	3.2	3.1	2.6	1.8	S	S	S	S	S	S
16	S	S					S	S		G	3.4	3.4	3.6	3.4	3.5			S	S	S	1.7	S	S	S
17	S	S		1.1		S	S	S			G	3.4	3.7	G	3.4				S	S	2.0	S	S	S
18	S	2.0	S			S	S	S			3.3	4.1	3.5	3.9	3.9	4.0	2.8	2.3	1.9	E	S	S	S	S
19	S	S				S	S	S	G			G	3.9	3.5	3.4	3.4	2.6	2.3	2.3	E	S	A	A	S
20	S	S	S			S	S	S		3.2	3.2	3.4	3.5	3.4		G	2.1^{G}	2.0	S	S	S	S	S	S
21	S	S		2.0	1.4	S	2.0	S					3.4								S	S	S	S
22	S	S	S		E		S	S		2.7	3.3	G	3.4	3.4				S	S	S	S	S	S	S
23	S	S	S			S	S	S		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		G	3.6	G				G	2.3	2.3	S	S	S	S	S
25	S	S				S	S	S		2.3^{G}								S	S	S	S	S	S	S
26	S	S					S	S			2.7^{G}	3.0^{G}	G	3.0^{G}	2.1^{G}				S	S	S	S	S	S
27	S	S	S			S	S	S			G	G		2.7^{G}					S	S	S	2.1	S	S
28	S	S	S			S	S	S				3.6	3.7	3.5	3.5	G	2.0^{G}		S	S	S	S	S	S
29	S	S	S			S	S	S			G	3.0^{G}	3.5	3.7	G	2.5		2.0	S	S	S	S	S	S
30	S	S	S	1.2	E	S	S	S		G	G	3.7	G	3.3	2.7^{G}		G	2.2	S	2.5	2.8	S	S	E2.2^{S}
31	S	S	S			S	S	S			G	G	3.4	G	G	2.0		S	S	S	S	S	S	S
No.	1	3	4	7	7	4	3	3	5	16	24	24	27	26	23	19	15	13	9	7	5	3	2	1
Median	2.0	A	2.3	1.9	1.4	A	2.0	G	G	G	G	3.4	3.5	3.4	3.3	G	2.6	2.2	2.3	2.3	2.0	2.1	A	E2.2

foEs

Sweep 1.0 Mc to 20.0 Mc in 30 sec in automatic operation.

The Radio Research Laboratories, Japan.

IONOSPHERIC DATA

Dec. 1961 | f-min | 135° E Mean Time (G.M.T. + 9h.)

Yamagawa | Lat. 31° 12.5' N | Long. 130° 37.7' E

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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	E1.60	E1.60	E1.30	E	E	E	E1.90	E1.70	E1.60	1.60	1.80	1.90	2.00	2.10	2.00	1.90	E1.80	E1.90	E1.80	E1.80	E1.90	E1.80	E2.00	E1.90
2	E2.00	E1.80	E1.60	E	E	E1.80	E2.00	E1.50	E1.60	1.60	1.60	1.90	2.10	1.60	1.90	2.00	1.40	E1.90	E1.60	E1.70	E2.00	E1.50	E2.50	E2.00
3	E1.90	E2.00	E1.60	1.30	E	E1.60	E2.00	E1.80	E1.70	1.60	1.70	1.80	2.00	2.00	2.00	1.25	1.20	1.10	E1.80	E2.00	E1.50	E1.90	E1.50	E2.50
4	E1.60	E2.00	1.10	E	E	E1.75	S	E1.60	1.30	2.00	1.90	2.20	2.25	2.00	2.00	1.50	1.40	E1.70	E1.70	E1.70	E1.95	E1.90	E1.90	E2.10
5	E2.00	E1.90	E	E	E	1.10	E1.50	E1.50	E1.70	1.40	1.70	2.00	1.80	2.00	1.70	1.85	E1.70	E1.80	E1.60	E1.90	E2.00	E1.95	E1.90	E1.90
6	E1.90	E1.95	E1.50	1.10	E	1.30	E1.70	E1.50	E1.90	1.90	1.75	1.95	2.00	2.00	2.20	E1.80	1.30	1.20	E1.70	E1.60	1.10	E1.40	E1.90	E1.80
7	E1.80	1.30	E	E	E	E1.50	E1.40	E1.60	1.40	1.60	1.80	2.00	2.00	1.95	1.85	1.95	E1.60	E1.90	E2.10	E1.85	E2.00	E1.70	E1.80	E1.90
8	E2.20	E2.05	1.00	1.00	E	E2.00	E2.00	E1.70	E1.90	1.90	2.00	2.00	1.95	2.00	1.70	1.60	E1.50	E1.90	E1.80	E1.90	E1.90	E1.90	E2.00	E2.10
9	E1.95	E1.60	E1.70	E	E	E1.70	E1.90	E1.50	E1.50	1.45	1.90	2.00	2.20	2.10	2.20	1.95	E1.80	E2.00	E1.60	E2.00	E1.90	E1.80	E2.00	E1.90
10	E2.15	E2.00	E1.90	E	1.40	1.10	E1.90	E1.60	1.70	1.80	1.65	1.90	2.00	1.90	2.00	1.90	E1.70	1.35	E1.70	E1.90	E1.90	E1.90	E1.70	E1.80
11	E1.70	E2.00	1.20	E	E	E1.40	E1.80	E1.40	E1.50	1.70	1.65	1.60	1.90	2.00	2.00	1.80	E1.60	E1.45	1.90	E1.40	E2.00	E1.60	E1.60	E2.00
12	E1.90	E1.40	E1.90	E	1.40	E2.00	E1.40	E1.60	E1.55	1.40	1.45	1.95	2.00	1.40	2.00	1.90	E1.60	E1.60	E1.50	E1.70	1.30	E1.95	E1.50	E2.00
13	S	E1.90	E	E	1.00	E2.10	E2.00	E1.60	E1.50	1.40	1.40	1.70	1.95	1.70	1.95	1.95	E1.50	E1.50	E1.40	E1.90	E1.30	E1.40	E1.90	S
14	S	E1.75	E1.40	E	E	E1.40	E1.80	E1.50	E1.60	E1.60	1.70	1.90	1.90	1.95	2.00	1.60	E1.80	E2.00	E1.90	E1.50	E1.80	E1.75	E2.10	E2.05
15	E1.90	E1.80	E1.70	E	E	1.20	E1.50	E2.10	E1.60	1.50	1.95	2.00	2.00	2.05	1.60	1.60	E1.50	E1.30	E2.00	E2.00	E1.80	E2.00	E1.90	E1.90
16	E1.90	E1.90	1.40	E	E	1.15	E1.50	E1.50	E1.60	1.50	1.85	1.80	1.95	2.00	2.00	1.50	E1.70	E1.80	E1.90	E2.05	E1.40	E2.00	E2.00	E1.80
17	E2.00	E2.00	1.50	E	1.35	E1.50	E2.00	E1.60	1.15	1.80	1.60	2.00	2.00	1.90	1.60	1.70	1.45	E1.60	E2.00	E1.50	E1.60	E2.00	E1.60	E1.90
18	E2.00	E1.90	E1.50	E	E	E1.50	E2.00	E1.70	E2.00	1.50	1.50	1.60	2.00	2.00	1.60	1.60	2.00	E1.50	E1.70	E2.00	E1.90	E2.00	E1.80	E2.00
19	E2.00	E1.90	1.05	E	E	E1.80	E2.00	E2.00	E1.50	1.70	2.00	2.05	1.90	1.90	1.80	1.95	1.20	E1.55	E1.60	E1.40	E2.00	E1.60	E2.00	E1.60
20	E1.70	E2.10	E1.30	E	E	E1.60	E1.90	1.10	E1.80	1.10	1.60	2.00	2.00	1.60	1.55	1.70	E1.65	E1.70	E1.70	E1.90	E2.05	E2.10	E2.00	E2.10
21	E1.80	E2.10	E	E	E	E1.50	E1.40	E1.80	1.30	E1.60	1.50	2.00	1.90	2.05	2.05	1.60	1.70	E1.50	1.20	1.20	E1.95	E1.40	E2.00	E2.00
22	E1.80	E1.85	E1.80	E	E	1.35	E1.50	E1.60	E1.60	E1.60	1.60	2.00	1.70	1.90	2.05	1.90	2.00	E1.80	E1.60	E2.00	E1.70	E2.00	E1.90	E2.10
23	E2.00	E2.10	E1.70	1.30	E	E1.40	E1.70	E1.50	E1.60	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	1.95	1.95	2.20	2.20	2.10	2.00	1.80	E1.70	1.25	E1.50	E2.00	E2.00	E2.00	E2.10	E1.90
25	E2.10	E2.10	1.20	E	E	E1.30	E1.85	E1.70	1.00	1.60	1.60	2.00	2.00	2.00	2.00	2.00	1.75	E2.00	E1.40	E1.50	E1.50	E1.80	E1.90	E1.70
26	E1.90	E1.70	E	E	E	E	E1.70	E1.40	1.30	1.80	1.65	1.20	2.00	2.00	1.70	1.90	1.90	E1.50	E1.40	E1.50	E1.80	E1.50	E2.10	E1.95
27	E2.10	E2.20	E2.00	E	E	E2.00	E1.60	E1.60	E1.60	1.60	1.60	2.00	2.00	1.95	1.65	1.70	E1.60	E1.60	E1.60	E2.00	E1.70	E1.80	E1.90	E2.05
28	E2.00	E2.00	E1.40	E	E	E2.00	E2.00	E1.50	1.20	1.50	1.60	1.70	2.00	1.95	1.60	1.40	1.00	E1.60	E1.70	E1.50	E2.00	E1.30	E2.10	E2.10
29	E2.10	E2.10	E1.60	E	E	E1.70	E1.95	E2.00	E1.60	1.75	1.80	1.90	1.80	1.95	1.70	1.50	1.40	E1.80	E1.60	E1.55	E1.90	E1.90	E2.10	E2.00
30	E1.95	E1.50	E1.80	E	1.30	E1.40	E1.80	E1.50	E1.70	1.60	1.80	1.60	2.05	1.95	1.85	1.60	1.95	E1.55	E2.00	E1.50	E1.75	E2.00	E2.00	E1.40
31	E1.70	E2.10	E1.80	E	E	E1.80	E1.60	E1.90	E1.50	1.50	1.60	1.50	1.75	1.60	1.30	1.50	E1.50	E2.10	E1.55	E2.00	E2.60	E1.90	E1.90	E1.70
No.	28	30	30	30	30	30	29	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	29
Median	E1.90	E1.90	E1.45	E	E	E1.50	E1.80	E1.60	E1.60	1.60	1.70	1.95	2.00	2.00	1.90	1.70	E1.60	E1.60	E1.70	E1.80	E1.90	E1.90	E1.90	E1.95

f-min

Sweep 1.0 Mc to 20.0 Mc in 30 ~~min~~ sec in automatic operation.

The Radio Research Laboratories, Japan.

Y 6

IONOSPHERIC DATA

Dec. 1961

M(3000)F2

135° E Mean Time (G.M.T. + 9h.)

Yamagawa

Lat. 31° 12.5' N
Long. 130° 37.7' 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	2.60	2.75	2.80	3.10	3.50	3.55	3.05	3.20	3.55	3.30	3.45	3.55	3.55	3.55	3.35	3.45	3.50	3.35	3.45	3.25	2.95	3.00	2.85	2.65
2	2.65	2.65	2.65	2.70	2.50	S	S	S	FS	3.15	3.25	3.30	3.25	3.40	3.25	3.30	3.35	3.35	3.20	3.30	3.40	2.60	2.50	3.05
3	3.40	2.70	2.55	2.60	2.55	2.45	2.55	3.20	3.00	3.20	3.40	3.55	3.50	3.20	3.30	3.45	3.60	3.30	3.25	3.00	3.50	2.80	2.95	2.80
4	2.80	3.05	3.70	3.65	3.00	2.65	2.90	3.20	3.35	3.35	3.20	3.30	3.50	3.40	3.30	3.15	3.45	3.45	3.45	3.30	3.10	3.20	3.05	2.95
5	2.90	2.85	2.85	2.85	3.30	3.40	3.00	3.20	S	3.60	3.75	3.50	3.35	3.30	3.40	3.30	3.60	3.75	3.35	3.45	3.00	2.85	3.20	2.85
6	2.70	2.80	2.85	3.10	2.65	3.15	3.20	3.10	3.40	3.40	3.40	3.50	3.30	3.25	3.40	3.30	3.55	3.50	3.40	3.05	3.35	3.25	3.05	3.10
7	2.90	2.80	2.95	2.90	3.40	3.05	2.85	3.45	3.20	3.40	3.45	3.30	3.25	3.15	3.40	3.55	3.45	3.60	3.05	3.55	3.35	2.75	3.25	2.85
8	2.85	2.95	3.70	3.00	3.00	2.75	2.85	3.15	S	3.30	3.55	3.35	3.40	3.35	3.55	3.50	3.55	3.70	3.05	3.25	3.45	3.25	3.10	2.80
9	2.70	2.85	2.85	2.95	3.35	3.35	2.95	3.35	3.45	3.55	3.40	3.60	3.30	3.40	3.30	3.35	3.45	3.55	3.65	3.15	2.80	3.05	3.15	3.00
10	2.75	2.80	3.00	3.20	3.40	3.65	3.10	3.05	3.45	3.40	3.50	3.40	3.30	3.30	3.25	3.40	3.75	3.65	3.30	3.10	2.95	3.35	2.85	2.60
11	2.85	3.05	3.35	2.95	3.05	3.00	3.45	3.25	3.75	3.50	3.15	3.40	3.35	3.10	3.30	3.35	3.60	3.30	3.40	3.40	3.30	3.00	3.35	2.60
12	2.70	2.85	2.80	2.95	3.05	2.95	3.20	3.60	3.60	3.30	3.20	3.10	3.40	3.65	3.15	3.40	3.35	3.45	3.55	3.30	3.15	3.15	3.50	2.75
13	2.80	2.95	3.00	3.15	3.60	2.90	3.00	3.20	3.45	3.60	3.30	3.55	3.25	3.55	3.55	3.50	3.50	3.60	3.15	3.05	3.30	3.25	3.20	3.00
14	3.00	2.90	2.90	3.00	3.05	3.45	3.35	3.10	3.70	3.35	3.60	3.65	3.40	3.35	3.45	3.40	3.50	3.55	3.30	3.25	3.05	3.15	3.15	3.05
15	2.80	2.95	2.90	3.00	3.05	3.35	3.10	3.25	3.50	3.60	3.45	3.55	3.15	3.45	3.45	3.30	3.45	3.45	3.25	3.35	3.10	3.00	3.00	3.25
16	2.95	2.90	3.05	3.05	3.35	3.10	3.10	3.00	3.55	3.70	3.50	3.40	3.45	3.40	S	S	3.35	3.50	3.20	3.30	3.30	3.30	3.35	2.85
17	2.75	2.85	3.05	2.95	3.05	3.70	2.95	3.20	3.55	3.50	3.60	3.30	3.60	S	3.45	3.45	3.50	3.55	3.45	3.60	3.10	3.05	3.10	3.10
18	2.85	2.95	3.00	2.85	3.15	3.50	2.95	3.20	3.55	3.55	3.50	3.65	3.30	3.40	3.60	3.55	3.40	3.50	3.55	2.95	3.25	3.20	3.15	2.70
19	2.80	2.95	2.85	3.05	3.35	3.45	3.05	3.25	3.70	3.65	3.50	3.70	3.45	3.60	3.70	3.35	3.50	3.60	3.15	2.85	2.95	3.40	3.30	3.20
20	F	3.20	2.90	3.00	3.50	3.20	3.20	3.20	3.60	3.50	3.60	3.30	3.40	3.15	3.40	3.20	3.45	3.65	3.30	2.95	3.20	3.50	3.55	3.00
21	2.80	2.90	3.15	2.90	3.05	2.95	3.05	3.15	3.60	3.60	3.40	3.45	3.35	3.40	3.30	S	3.40	3.35	3.40	3.20	3.30	3.00	2.95	2.75
22	2.85	2.75	2.85	3.15	3.40	3.75	3.00	3.25	3.45	3.55	3.50	3.40	2.95	3.25	3.15	3.20	3.15	3.40	3.25	3.10	3.05	3.30	3.60	2.90
23	2.65	2.90	2.85	3.10	3.35	3.35	2.95	3.25	3.40	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	3.50	3.55	3.35	3.10	3.45	3.20	3.75	3.45	3.50	3.05	3.20	3.25	3.20	3.20	2.85
25	2.75	2.90	3.10	2.75	2.95	2.95	2.85	3.05	3.60	3.70	3.65	3.60	3.25	3.30	3.20	3.60	3.40	3.45	3.35	3.35	3.35	3.20	3.05	3.20
26	2.85	2.70	2.80	2.95	3.25	3.30	3.10	3.15	3.45	3.45	3.45	3.65	3.50	3.20	3.25	3.45	3.30	3.40	3.45	3.25	2.95	3.00	3.15	3.10
27	2.65	2.65	2.85	2.90	3.40	3.20	2.75	3.10	3.55	3.60	3.35	3.30	3.35	3.30	3.30	3.45	3.05	3.30	3.35	3.15	3.20	2.80	3.10	2.95
28	2.70	2.85	3.10	3.15	3.15	2.90	3.20	3.30	3.40	3.45	3.30	3.30	3.40	3.60	3.25	3.30	3.45	3.45	3.35	3.10	3.35	2.90	2.80	3.15
29	2.90	2.70	2.70	2.70	2.95	2.80	2.90	2.95	3.40	3.35	3.35	3.35	3.30	3.15	3.35	3.40	3.35	3.60	3.40	3.30	3.30	3.05	3.25	2.70
30	2.65	2.80	3.05	2.80	2.95	3.15	3.10	3.10	3.45	3.50	3.35	3.70	C	3.50	3.15	3.30	3.60	3.40	3.40	3.25	2.90	2.95	3.20	3.05
31	2.70	2.70	2.80	2.95	2.90	2.80	3.15	3.05	3.30	3.55	3.60	3.40	3.45	3.25	3.45	3.45	3.40	3.30	3.40	3.90	3.00	3.15	3.15	3.05
No.	29	30	30	30	30	29	29	29	27	30	30	30	29	29	29	28	30	30	30	30	30	30	30	30
Median	2.80	2.85	2.90	2.95	3.10	3.15	3.05	3.20	3.45	3.50	3.45	3.40	3.35	3.35	3.30	3.40	3.45	3.50	3.35	3.25	3.20	3.10	3.15	2.95

M(3000)F2

Sweep 1.0 Mc to 20.0 Mc in 30 min/sec in automatic operation.

The Radio Research Laboratories, Japan.

IONOSPHERIC DATA

Dec. 1961 | M(3000)F1 | 135° E Mean Time (G.M.T. + 9h.) | Yamagawa | Lat. 31° 12.5' N | Long. 130° 37.7' 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	L	L	L	L									
2																								
3																								
4																								
5												L		L										
6																								
7												L	L	3.85 L										
8											L	L	L H											
9												L H												
10												L	L	3.70										
11																								
12												A	L	L	L	L								
13													L	L	L	L								
14												L												
15																								
16																								
17												L	L											
18												L	L	I 3.80 L	L									
19																								
20													L	3.70 L	L									
21													L	L	L									
22											L	L	3.80 L	L										
23										C	C	C	C	C	C	C	C	C						
24								C	C		L	L	4.00 L											
25												3.95	4.05 E											
26											L H	L	L											
27												L	L	L	L									
28																								
29													L	I 3.95 L	3.85 L									
30													L	L										
31												3.85	L	L	3.75 L									
No.												2	3	5	2									
Median												3.90	4.00	3.80	3.80									

M(3000)F1 Sweep 10 Mc to 20.0 Mc in 30 ~~min~~ sec in automatic operation.

The Radio Research Laboratories, Japan.

Y 8

IONOSPHERIC DATA

Dec. 1961 | h'F2 | 135° E Mean Time (G.M.T. + 9h.) | Yamagawa | Lat. 31° 12.5' N, Long. 130° 37.7' 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											255	250	250	240	250									
2																								
3																								
4																								
5												240		255										
6																								
7												250	255	280										
8											250	240	240											
9												255												
10												275	280	280										
11																								
12												280	260	240	255	250								
13													250	250	245	240								
14												235												
15																								
16																								
17												245	255											
18												250	260	270	240									
19																								
20													275	280	260									
21													270	260	280									
22											255	255	270"	270										
23										C	C	C	C	C	C	C	C	C						
24								C	C		245	255	245											
25												230	245											
26											255	240	235											
27												275	270	255	260									
28																								
29													240	255	250									
30													255	255										
31												240	240	275	255									
No.											5	16	18	14	9	2								
Median											255	250	255	260	255	245								

h'F2

Sweep 1.0 Mc to 20.0 Mc in 30 ~~min~~ sec in automatic operation.

The Radio Research Laboratories, Japan.

Y 9

IONOSPHERIC DATA

Dec. 1961 | h'F | 135° E Mean Time (G.M.T. + 9h.) | Yamagawa | Lat. 31° 12.5' N, Long. 130° 37.7' 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	355	315	300	250	220	210	S	255	235	240	255	240	230	230	205	240H	230	220	225	245	270	220	275	390
2	365	400	305	335	260H	320	365	270	250	240	240	I240H	I240AH	230	205H	200H	200H	230	250	230	225	275	E400S	285
3	225	340	E350S	355	360	400	S	245	255	255	230	235H	230	240H	230H	240	230	250	245	245	240	325	265	E350S
4	340	280	220	200	255	S	S	260	245	230	225	225H	245	230H	235	I250AH	250	230	210	250	265	250	255	350
5	350	320	335	330	255	A	A	250	235	250	230	205	205H	200	250	230	235	215	215	230	250	270	275	355
6	E340S	A	320	255	375	I265A	260	265	235	240	210H	225H	E250AH	I250AH	225H	220H	240	205A	A	300	270	255	295	250
7	320	A	350	325	250	260	E315A	275	230	250	240	210	225	205	I230AH	240	230	210	250	240	240	315	270	310
8	E350S	280	215	250	280	E350S	E350S	250	240	240	230	230	205H	205H	190H	225H	240	215	220	250	230	245	E300S	E400S
9	355	310	315	265	230	240	E320S	235	200H	190H	240	205H	190H	200H	220H	200H	240	225	210	250	250	250	280	305
10	E370S	350	300	250	240	215	295	250	230	240	240	210	190	205	240H	250H	220	205	205	240	275	245	270	370
11	320	290	240	255	265	260	255	225H	220	205H	180H	190H	235H	225H	220H	200H	225	220	240	230	245	265	230	320
12	355	325	320	290	265	290	255H	230	230	245	230H	I260A	225	240	220	235	230	240	230	A	255	250	240	E425S
13	S	315	I300A	280	230	I270S	I340S	270	240	240	225H	200H	230	225	220	205	240	225	205	290	240	240	275	I300S
14	I310S	300	300	275	290	240	255	250	230	240	230	230	225H	250H	240H	240H	235	220	220	200	250	255	250	295
15	340	300	305	265	240	230	270	240	230	235	220H	240	200H	205H	220H	240	230	220	220	230	230	285	290	255
16	300	320	290	260	235	250	280	270	235	230	220H	190H	250	230H	240H	230H	245	215	220	240	230	240	255	E330S
17	350	340	290	275	250	220	E350S	250	230	240	220H	240	255	210H	220H	200H	190H	230	230	205	220	300	270	E310S
18	E350S	340	290	285	250	210	E350S	255	240	240	240	I240A	220	255	A	255	260	210	210	255	240	260	330	E350S
19	350	300	280	255	240	240	E290S	250	230	205H	205H	200H	I220A	235H	200H	255	220H	220	E270A	255	265	A	A	305
20	350	305	315	290	230	200	S	240	225	240	240H	205H	270	235	210	240H	225	220	210	290	260	245	260	E350S
21	340	335	250	330	275	235	305	255	225	200H	200H	200H	230	205	200	230	215H	210	205	210	255	250	300	E300S
22	305	320	300	250	230	200	255	245	240	230	240	230	220	205	210H	240H	220H	215H	205	255	240	250	S	S
23	400	360	330	260	240	230	260	240	230	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	250	240	240	210	205H	235H	235	235	210	255	225	250	220	275	325
25	350	305	250	280	265	220	340	270	230	200H	230H	210	195	195H	230H	200H	215	220	210	230	230H	230	255	255
26	355	345	300	260	245	220	300	260	205H	245	220H	200	210	190H	190H	235	240	230	205	200	280	250	255	285
27	E360S	E360S	310	285	245	255	305	270	240	240	225	220	230	225	210	200H	230	230	240	205	250	310	250	285
28	340	300	275	240	245	300	255	220	240	245	230	230H	250H	230H	240	230H	235	230	210	220	240	275	300	290
29	275	350	315	305	265	275	305	300	245	235	205H	205H	240	225	205	210H	240	225	220	225	215	270	300	E350S
30	350	320	300	255	260	255	290	250	230	240	250H	240	215	210	190H	240	230	220	235	250	E360A	300	275	320
31	350	340	330	275H	270	305	270	280	255	240	230H	210	205	190	235	245H	225	230	215	200	300	255	280	270
No.	27	27	29	30	30	27	19	30	30	30	30	30	29	30	29	30	30	30	28	29	29	29	26	21
Median	E350	320	300	270	250	240	280	250	230	240	230	220	225	225	220	235	230	220	220	240	250	255	270	300

h'F

Sweep 1.0 Mc to 20.0 Mc in 30 min/sec in automatic operation.

The Radio Research Laboratories, Japan.

Y 10

IONOSPHERIC DATA

Dec. 1961 | h'Es | 135° E Mean Time (G.M.T. + 9h.) | Yamagawa | Lat. 31° 12.5' N, Long. 130° 37.7' 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	S	S	S	E	E	E	S	S	130	140	135	130	130	130	120	115	G	S	S	S	S	S	S	S
2	S	S	S	E	E	155	S	S	G	130	130	120	115	115	120	120	105	S	S	S	S	S	S	S
3	S	S	S	E	E	S	S	S	G	160	155	130	120	110	105	100	100	100	100	100	S	S	S	S
4	S	S	E	E	E	S	S	S	150	140	145	140	130	125	120	110	120	S	S	110	S	S	S	S
5	S	S	105	125	115	110	105	110	G	145	135	G	120	120	120	120	110	S	105	S.	S	S	S	S
6	S	115	120	E	110	105	S	120	120	120	120	120	110	110	110	110	105	105	105	105	105	105	105	S
7	120	115	110	110	110	105	110	S	125	155	130	130	130	120	115	120	G	S	S	S	S	S	S	S
8	S	S	E	E	E	S	S	S	G	140	140	G	G	105	105	105	100	110	S	S	S	S	S	S
9	S	S	S	E	E	S	S	S	G	140	130	120	125	G	G	G	G	S	120	S	S	S	S	S
10	S	S	S	E	E	E	S	105	G	G	170	120	120	115	115	110	G	105	S	S	S	S	S	S
11	S	S	E	E	E	S	S	S	G	G	180	G	110	110	110	110	110	115	115	S	S	S	S	S
12	S	S	S	100	E	S	S	S	G	G	140	125	125	125	125	125	120	115	115	110	110	S	S	S
13	S	S	110	105	105	S	S	S	G	140	120	120	155	120	120	G	G	G	S	S	S	S	S	S
14	S	S	S	E	E	S	S	S	G	G	G	150	135	125	120	115	105	S	S	S	S	S	S	S
15	S	S	S	E	E	E	S	S	G	115	150	120	125	115	130	105	100	100	S	S	S	S	S	S
16	S	S	E	E	E	E	S	S	G	135	125	125	120	110	110	G	G	S	S	S	130	S	S	S
17	S	S	E	105	E	S	S	S	G	G	170	170	150	155	150	G	G	G	S	S	100	S	S	S
18	S	115	S	E	E	S	S	S	G	G	155	130	130	120	115	120	130	105	105	110	S	S	S	S
19	S	S	E	E	E	S	S	S	125	G	G	130	170	120	115	110	110	105	135	105	S	105	105	S
20	S	S	S	E	E	S	S	S	G	180	170	155	140	130	G	130	110	105	S	S	S	S	S	S
21	S	S	E	105	105	S	105	S	G	G	G	G	120	G	G	G	G	G	E	E	S	S	S	S
22	S	S	S	E	105	E	S	S	G	120	130	130	130	120	G	G	G	S	S	S	S	S	S	S
23	S	S	S	E	E	S	S	S	G	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	G	180	120	115	G	G	G	180	100	105	S	S	S	S	S
25	S	S	E	E	E	S	S	S	G	115	G	G	G	G	G	G	G	S	S	S	S	S	S	S
26	S	S	E	E	E	E	S	S	G	G	120	110	150	110	105	G	G	G	S	S	S	S	S	S
27	S	S	S	E	E	S	S	S	G	G	150	120	G	115	G	G	G	G	S	S	S	120	S	S
28	S	S	S	E	E	S	S	S	G	G	G	165	150	110	180	155	105	G	S	S	S	S	S	S
29	S	S	S	E	E	S	S	S	G	G	140	110	110	130	130	105	G	105	S	S	S	S	S	S
30	S	S	S	120	110	S	S	S	G	175	160	130	125	120	110	G	105	100	S	110	110	S	S	110
31	S	S	S	E	E	S	S	S	G	G	165	140	110	135	105	105	G	S	S	S	S	S	S	S
No.	1	3	4	7	7	4	3	3	5	16	25	25	27	26	23	19	16	13	9	7	5	3	2	1
Median	120	115	110	105	110	110	105	110	125	140	140	130	125	120	115	110	110	105	105	110	110	105	105	110

h'Es

Sweep 1.0 Mc to 20.0 Mc in 30 min/sec in automatic operation.

The Radio Research Laboratories, Japan.

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IONOSPHERIC DATA

Dec. 1961 | **Types of Es** | 135° E Mean Time (G.M.T. + 9h.) | **Yamagawa** | Lat. 31° 12.5' N, Long. 130° 37.7' 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									h2	h	h2	h2	h	h	l	l								
2						f				h	h	C2	l2	l	l2	l	l							
3										h	h	h	h2	l2	l2	l3	l2	l2	f	f				
4									h	h	h	h2	h2	h	C2	l3	h,l			f				
5			f	f	f2	f2	f3	l		h2	h		l	l2	l2	l3	l3		f					
6		f3	f		f3	f2		l	l	l2	l2	l2	l2	l3	l2	l2	l3	l2	f3	f3	f4	f2	f	
7	f2	f3	f3	f3	f2	f	f3		l	h	h	h	h	l	l3	l								
8										h2	h2			l	l2	l3	l2	l						
9										h2	h	l	l						f					
10								l			h	l	l	l	l2	l2		l						
11											h,l		l	l	l2	l2	l2	l	f					
12				f							h,l	C2	C2	C,l	C	C2	l4	l3	f3	f2	f			
13			f2	f2	f2					h	l,h	l	h	l	l									
14												h,l	h	h2	C3	l2	l3							
15										l	h	h2	h	l	h,l2	l3	l2	l						
16										h2	h2	C2	C2	l3	l3						f			
17				f							h	h	h	h	h						f			
18		f									h	h2	h	h2	l2	l2	l2	l	f	f				
19									l			h	h,C	l	l3	l,h	l2	l	f	f2		f2	f2	
20										h2	h2	h	h	h,l		h,l2	l2	l2	f					
21				f3	f2		f						l											
22					f					l	h,l	h	h	C										
23																								
24											h	l2	l				h2	l2	f					
25										l														
26											l2	l2	h	l2	l									
27											h	l		l								f		
28												h,l	h2	l	h,l2	h,l	l							
29											h	l	l2	h2,l2	h,l	l2		l						
30				f3	f					h	h	h3	h	l2	l		l	l		f3	f3			f2
31											h	h	l2	h,l2	l2	l								
No.																								
Median																								

Types of Es | Sweep 1.0 Mc to 20.0 Mc in 30 sec in automatic operation.

The Radio Research Laboratories, Japan.

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SOLAR RADIO EMISSION 200 Mc/s

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

HIRAISO

Time in U.T.

Dec. 1961	Steady Flux					Variability				
	00-03	03-06	06-09	21-24	mean	00-03	03-06	06-09	21-24	mean
1	6	7	7	(8)	7	0	0	0	(0)	0
2	8	8	(8)	(6)	8	0	0	(0)	(0)	0
3	8	10	6	(9)	8	0	0	0	(0)	0
4	9	9	9	-	9	0	0	0	-	0
5	7	6	7	-	7	0	0	0	-	0
6	9	9	9	(9)	9	0	1	1	(0)	0
7	(9)	9	9	(6)	9	(0)	0	0	(0)	0
8	9	9	9	(6)	9	0	0	0	(0)	0
9	11	7	8	-	8	0	0	0	-	0
10	7	6	(6)	(8)	6	0	0	(0)	(0)	0
11	6	8	9	(8)	8	0	0	0	(0)	0
12	7	8	7	(8)	8	0	0	0	(0)	0
13	8	8	9	(9)	8	0	0	0	(0)	0
14	9	9	8	(7)	9	0	0	0	(0)	0
15	7	8	8	-	8	0	0	0	-	0
16	8	10	9	-	9	0	0	0	-	0
17	6	11	11	-	9	0	0	0	-	0
18	6	7	8	-	7	0	0	0	-	0
19	10	10	10	-	10	0	0	0	-	0
20	9	9	9	-	9	0	0	0	-	0
21	9	9	9	-	9	0	0	0	-	0
22	10	10	9	-	10	0	0	0	-	0
23	9	10	10	(14)	9	0	0	0	(1)	0
24	15	14	9	-	13	0	0	0	-	0
25	(9)	(8)	-	-	(8)	(0)	(0)	-	-	(0)
26	8	8	8	-	8	0	0	0	-	0
27	9	9	9	-	9	0	0	0	-	0
28	8	8	9	-	8	0	0	0	-	0
29	9	9	9	-	9	0	0	0	-	0
30	8	8	9	-	8	0	0	0	-	0
31	9	8	9	-	8	0	0	0	-	0

RADIO PROPAGATION QUALITY FIGURES

HIRAISO — Time in U.T.

Dec. 1961	Whole Day Index	L. N. 06 12 18 / 12 18 24	W W V 00 06 12 18 / 06 12 18 24	S. F. 00 06 12 18 / 06 12 18 24	W W V H 00 06 12 18 / 06 12 18 24	Warning 00 06 12 18 / 06 12 18 24	Principal magnetic storms Start	End	ΔH
1*	4o	4 4 5	- - - 4	3 4 4 3	4 5 4 4	N N U U	03.1	---	175γ
2*	3+	4 4 3	4 - - 2	3 3 3 3	4 4 3 4	U U U U	---	---	
3*	3+	3 4 4	2 - - 4	3 4 4 3	5 5 3 4	U U U U	---	24xx	
4	4o	4 4 3	- - - 3	4 5 5 5	5 4 4 4	N N N N			
5	4o	4 3 4	- - - 4	4 5 4 4	4 4 5 4	N N N N			
6	4+	5 4 4	4 - - 4	5 5 4 5	4 4 3 4	N N N N			
7	4+	5 5 4	5 - - 5	3 4 4 3	4 4 4 4	N N N N			
8	4o	5 5 5	4 - - 4	3 4 4 3	4 4 4 4	N N N N			
9	4o	5 5 5	- - - 4	3 3 4 4	5 4 5 5	N N N N			
10	4o	4 4 4	- - - 5	3 (3) 4 (4)	5 4 3 4	N N N N			
11	3+	4 (3 3)	- - - 3	3 4 4 4	4 4 4 4	N N N N			
12	3+	3 3 3	- - - 3	4 4 4 3	4 4 3 4	N N N N			
13	4o	3 4 4	- - - 4	4 5 4 4	4 3 3 4	N N N N			
14	4o	3 3 3	- - - 5	4 5 5 5	4 4 4 4	N N N N			
15	4+	3 3 4	- - - 4	5 5 5 5	4 3 5 4	N N N N			
16	4+	4 4 4	- - - 5	4 4 5 4	5 4 4 4	N N N N			
17	4-	4 (3 3)	5 - - 4	3 4 4 4	5 4 4 4	N N N N			
18	4o	3 3 4	- - - 4	4 5 4 4	4 4 5 4	N N N N			
(19)	4+	3 4 4	- - - 4	5 5 5 5	4 4 3 4	N N N N			
(20)	5-	4 4 4	- - - 4	5 5 5 5	4 4 5 4	N N N N			
(21)	4+	4 (4) 4	4 - 5 4	4 5 5 5	5 4 5 4	N N N N			
22	4+	3 4 4	- - - 4	4 5 5 5	4 4 4 4	N N N N			
23	4+	4 5 4	- - - 4	4 5 5 4	4 4 5 4	N N N N			
24	4o	4 (3) 4	- - - 4	4 4 4 4	4 4 3 4	N N N N			
25	4+	4 4 5	- - - 4	4 5 5 4	5 5 4 4	N N N N			
26	4o	4 3 4	- - - 4	4 5 5 4	4 4 4 4	N N N N			
27	4o	3 4 4	- - - 5	4 4 4 (3)	5 5 5 4	N U U U			
28	4o	3 4 3	- - - (4)	(4) 5 5 (4)	5 5 (4 4)	U U U U			
29	4-	3 4 3	- - - 5	3 4 4 (4)	4 4 3 4	U N N N			
30	4-	3 3 3	- - - 4	(4) 4 4 (4)	4 4 4 4	N N N N			
31	4-	3 4 3	- - - 4	(4) 4 4 (4)	4 4 4 4	N N N N			

* = day of Special World Interval
( ) = Regular World Day
\- = impossible to evaluate
( ) = inaccurate
C = artificial accident
--- = continuing magnetic storm

SUDDEN IONOSPHERIC DISTURBANCES

(S.I.D.)

HIRAISO

Time in U.T.

Dec. 1961	S W F										S E A			Correspondence		
	Drop-out Intensities (db)						Start-time	Dura-tion	Type	Imp.	Start-time	Dura-tion	Imp.	Flare	Solar Noise	Mag.
	WS	SF	HA	TO	LN	SH										
	None															

IONOSPHERIC DATA IN JAPAN FOR DECEMBER 1961
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