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# IONOSPHERIC DATA IN JAPAN

FOR JANUARY 1964

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THE RADIO RESEARCH LABORATORIES  
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KOKUBUNJI, TOKYO, JAPAN

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## SITES OF THE RADIO WAVE OBSERVATORIES

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

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

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

	Latitude	Longitude	Site
Hiraiso	36°22.0'N.	140°37.5'E.	Isozaki-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

$f_oF2$	} The ordinary-wave critical frequency for the $F2$ , $F1$ and $E$ layers respectively.
$f_oF1$	
$f_oE$	
$f_oE_s$	The ordinary wave top frequency corresponding to highest frequency at which a mainly continuous trace is observed.
$f_oE_s$	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 normal frequency range. Used in a qualifying sense, see below.
- E Measurement influenced by, or impossible because of, the lower limit of the normal frequency range. Used in a qualifying sense, see below.
- F Measurement influenced by, or impossible because of, the presence of spread echoes.
- G Measurement influenced or impossible because the ionization density is too small compared with that of a lower thick layer.
- H Measurement influenced by, or impossible because of, the presence of a stratification.
- L Measurement influenced by, or impossible because the trace has no sufficiently definite cusp between layers.
- M Measurement questionable because the ordinary and extraordinary components are not distinguishable.
- N Conditions are such that the measurement cannot readily be interpreted, for example, in the presence of oblique echoes.
- O Measurement refers to the ordinary component.
- R Measurement influenced by, or impossible because of, absorption in the vicinity of a critical frequency.
- S Measurement influenced by, or impossible because of, interference or atmospherics.
- V Forked trace which may influence the measurement.
- W Measurement influenced by, or impossible because the echo lies outside the height range recorded.
- X Measurement refers to the extraordinary component.
- Y Intermittent trace.
- Z Third magneto-ionic component present.

#### b. Qualifying Symbols

Used as a preceding symbol on monthly tabulation sheets.

D	<i>greater than.....</i>
E	<i>less than.....</i>
I	Missing value has been replaced by an interpolated value.
J	Ordinary component characteristic deduced from the extraordinary component.
T	Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
U	Uncertain or doubtful numerical value.
Z	Measurement deduced from the third magneto-ionic 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* A 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.
- n* 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*  $\mathcal{N}$  An  $E_s$  trace which is diffuse and non-blanketing over a wide frequency range. The spread is most pronounced at the upper edge of the trace. (This type is common in daytime in the vicinity of the magnetic equator.)
- r* An  $E_s$  trace which is non-blanketing over part or all of its frequency range showing an increase in virtual height at the high frequency end similar to group retardation. This is distinguished at present from true group retardation (a blanketing thick layer included in the  $E$  layer tables:  $f_0E, h'E$ ) by the lack of group retardation in the  $F$  traces at corresponding frequencies.
- a* An  $E_s$  pattern having a well defined flat or gradually rising lower edge with stratified and diffuse (spread) traces present above it. These sometimes exceed over several hundred kilometers of virtual height.
- s* A diffuse  $E_s$  trace which rises steadily with frequency. This usually emerges from another  $E_s$  trace which should be classified separately. At high latitudes the slant trace usually starts to rise from a horizontal  $E_s$  trace, *l, h* or *f*, and frequencies which greatly exceed the  $E$  layer critical frequency (e.g. about 6 Mc/s) whereas at low latitudes it usually rises from equatorial type  $E_s$ , *q*, at frequencies near the  $E$  region critical frequency.
- f* An  $E_s$  trace which shows no appreciable increase of height with

frequency. The trace is usually relatively solid at most latitudes. This classification may only be used at night; apparently flat  $E_s$  traces observed in the daytime are classified according to their virtual height:  $h$  or  $l$ .

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

**d. Multiple Reflections from  $E_s$**

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

## B. SOLAR RADIO EMISSION

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

**a. Daily Data**

*Steady flux*

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

*Variability*

Variability is expressed in four grades as follows:

0=no burst

1=a few bursts

2=many bursts

3=exceptionally many bursts

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

**b. Outstanding occurrences**

*Starting time*

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

*Maximum time*

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

*Time of end*

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

*Type*

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

S: simple rise and fall of intensity

C: complex variation of intensity

A: appears to be part of general activity

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

activity

M: multiple peaks separated by relatively long period of quietness

F: multiple peaks separated by relatively short period of quietness

E: sudden commencement or rise of activity

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

*Maximum intensity*

Instantaneous: The highest value above the base level.

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

### C. RADIO PROPAGATION CONDITIONS

#### a. Radio Propagation Quality Figures

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

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

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

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

N=normal  
U=unstable  
W=disturbed

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

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

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

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

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

*Circuits and Drop-out intensity*

WS.....WWV 20 Mc, 15 Mc and 10 Mc (Washington)  
 SF.....Various commercial circuits (San Francisco)  
 HA.....WWVH 15 Mc and 10 Mc (Hawaii)  
 TO.....JJY 15 Mc and 10 Mc (Tokyo)  
 SH.....BPV 15 Mc and 10 Mc (Shanghai)  
 LN.....Various commercial circuits (London)

Start-time and Duration, Types and Importances are described from the data of a circuit whose Drop-out Intensity is underlined. Drop-out Intensities of 10 Mc ('), 15 Mc (none) and 20 Mc ('').

*Start-times and Durations**Types*

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

*Importances*

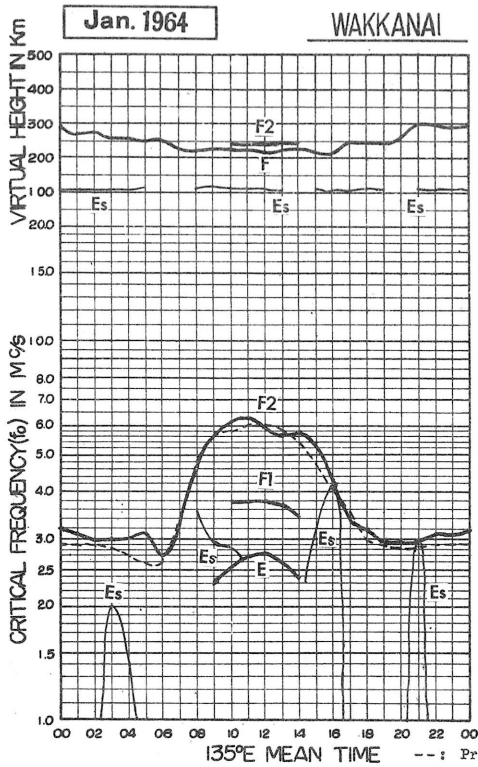
Degrees of SWF are classified into 9 grades according to the amplitude of fade-out;

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

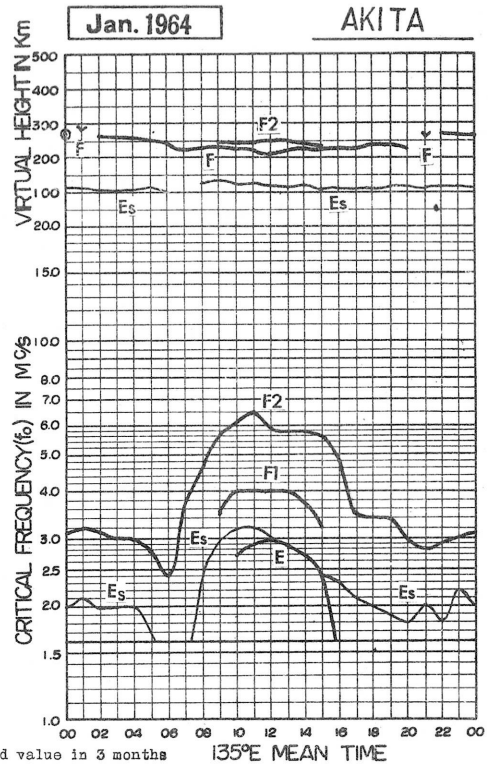
Besides, the time associated phenomena of SID's, that is, solar flare, solar radio noise outburst and crochet (solar flare effect in magnetic record) are given in this table from interchange messages or measurements at Hiraiso.



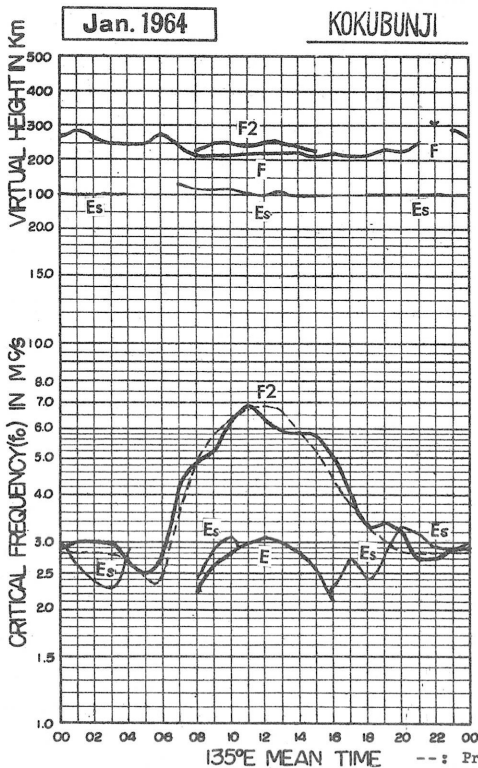
IONOSPHERIC DATA  
MONTHLY MEDIAN CHARACTERISTICS



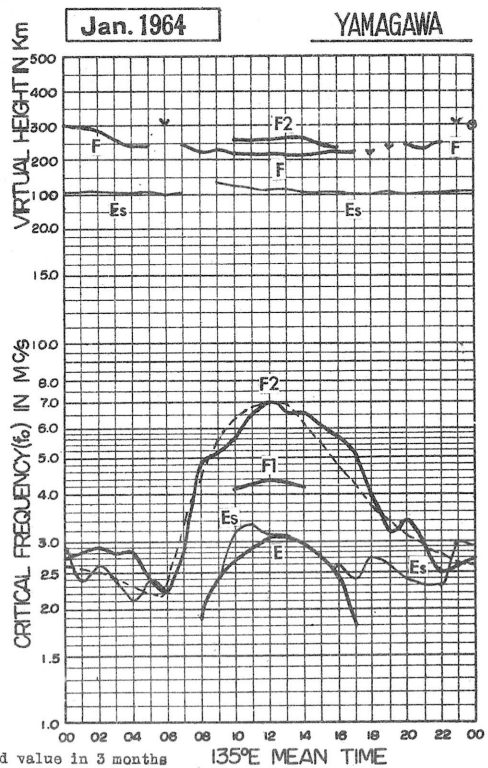
advance by R.R.L.



IONOSPHERIC DATA  
MONTHLY MEDIAN CHARACTERISTICS



advance by R.R.L.



Lat. 45°23.6' N  
Long. 141°41.1' E

Wakkanai

IONOSPHERIC DATA

0.1 Mc 135° E Mean Time (G.M.T. +9h)

foF2

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	030F	SF	SF	SF	SF	SF	U047S	033S	043	056	U058R	057	051	054	077H	056	043	036	036	074	SF	FS	SF	SF
2	SF	SF	SF	SF	SF	027	025	028	048	053	056	063	062H	066	073	055	049S	045S	047	026	031	033	030	035
3	028	026	026	024	028	035	029	032	059	075H	057	073	073	064	064	068	041	029	028	029S	028	028	028	030
4	I028A	030	I024A	024	027	033	022	032	050	063	063	074	058	057	062	065	039	035	027	I027A	027	I026S	I027A	025
5	029	SF	SF	SF	030	031	022	032	043	064	070	063	065	067	058	051	038	I030A	029	030	027	I030A	A	SF
6	SF	FS	FS	FS	S	S	S	S	051	063	073	067	063	067	067	048	040	030	I025S	028	I026A	I027A	030	SF
7	SF	SF	SF	SF	SF	030F	027	030	045	051	057	072	060	059	053	048	034	025	030	032	027	026	028	028
8	028	031	030	030	033	025	033	033	055	063	063	061	056	065	064	054	I041A	I036A	I033A	I025A	I024S	023	I026S	028
9	SF	031	031	028	030	031S	024	036	048	053	057	061	062	054	052	049	053	035	029S	026	025	I027A	030S	031
10	036	SF	SF	SF	FS	041	031	033H	054	064H	070	063	059	057	066	057	047H	048	030	033	028	033	SF	032
11	035	033	034	030	FS	033	029	033	030	071	065	061	058H	062	064	048	040	A	A	A	A	027	029	030
12	030	031	030	030	031	030	023	030	049	058	061	061	055	056	048H	053	047	034	037	029	I028A	036S	SF	SF
13	SF	SF	SF	SF	SF	SF	029	033	051	053	054	059	052	057H	061	054	037	032	033	028	025	A	A	SF
14	032F	031	028	028	026	SF	I026A	033	044	056	055	056	055	052	053H	I050C	I041A	038	036	I026A	031	SF	SF	SF
15	SF	030	SF	024	032	034	029	040	043	055	058	051	051	053	061	054	040	040	040	023S	029	033	SF	SF
16	SF	035	033S	030	030	029F	022S	035S	047	054	064	058	051H	058	058	046	040	043	028	I026S	031	032	030	031
17	032	024	025F	027	I027A	I029A	I026A	033	051	057	061	057	056	057	056	050	038	026	I030A	028	030	I031A	032	031
18	I032A	028	028	028	030	028	I033A	032	053	057	071	063	057	046	055	050	045	030	033	028	027	031	I033S	I034A
19	031	035F	SF	030F	FS	FS	U023F	034	049	052	057	060	061	060	063H	054	040	I029A	028	035	033	032	036	FS
20	SF	SF	SF	040S	SF	SF	SF	SF	069S	054	055	071	070	067	055	049	046	038	033	028	025	I026A	031	SF
21	SF	SF	SF	SF	SF	SF	030S	038S	057	068	056	054	059	053	053	056	042	034	035	040	036	035S	SF	SF
22	SF	036	SF	SF	SF	U043S	U026S	034	042	054	061	063	056	053	053	056	047	038	040	034	031	030	034	037S
23	SF	040F	035F	SF	SF	F	029	038	053	066	063	055	053	048	060	058	044	028	027	031	030	033	033	033
24	033	036	036	035	036	SF	I035S	036S	041	060	063	060	057	052	059	065	041	040	040	027	027	030	033	031
25	030	030	031	SF	SF	031	U023S	034	054	062	068H	073H	077	055	056H	053	043	033	041	034	033	032	035S	SF
26	035	035F	SF	SF	SF	SF	S	043	065	U071S	093	067	067	061	051H	053	053	033	035	034	029	034	S	SF
27	SF	SF	SF	SF	SF	SF	030	044	049H	050	065	064	056	059	054H	054	046	036	033	033	S	S	S	S
28	S	SF	SF	SF	SF	SF	S	S	S	F	064	055	057	064	054	049	043	047	038	036	I034S	035S	039S	SF
29	SF	SF	SF	043F	035	038S	027	043	063S	050H	053	063	060	053	065	061	044	036	027	031	038	SF	036S	036
30	036	034	038	042	027	027	028	038S	050	059	066	070	066	063	050	051	048	028	027	I027A	029	030	031	031
31	033	031	027	025	028	023	020	033	043	045	062	063	061	051	051H	055	043	033	I026S	I027A	030	FS	032	031
No.	17	19	16	19	16	20	27	29	30	30	31	31	31	31	31	31	31	30	30	30	28	24	21	17
Median	032	031	030	030	030	031	027	033	050	057	062	063	059	057	058	054	043	034	032	029	029	030	031	031
U.Q.	034	035	034	035	032	034	029	037	054	063	065	067	063	063	064	056	046	038	036	033	031	033	034	034
L.Q.	030	030	028	027	028	028	023	032	045	053	057	058	056	053	053	050	040	030	028	027	027	027	030	030
Q.R.	004	005	006	008	004	006	006	005	009	010	008	009	007	010	011	006	006	008	008	006	004	006	004	004

Sweep 4.0 Mc to 18.0 Mc in 40 sec in automatic operation

foF2

The Radio Research Laboratories, Japan

W 1

Lat. 45°23.6' N  
Long. 141°41.1' E

Wakkanai

IONOSPHERIC DATA

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

foF1

Jan. 1964

Day	00	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	360L												
2												380H	380L	380L	350L									
3											350	370	360	360										
4										A		380H	U360L											
5											380L	380	380L	370L										
6											U380A	380H	U380A	380	330									
7												390	390	350										
8												380L	370											
9											350L	380L												
10											A	380	360											
11										U350L	370	370												
12											380L	370		350										
13											380	370L			360									
14												380L		360L										
15											370L		380L											
16											380H	390			L									
17																								
18											A	A	380											
19												400	390L	370										
20											380	360	400	380										
21												380L	390											
22											380	390	380	350										
23											380	380	380	380										
24											380	390	400											
25													380	370	340									
26										400	370	390	390											
27												390	380	360										
28											380H	410	380	380L										
29												390	360											
30										380L	380L	400	390	390L	350L									
31										380L	390	390	380L											
No.									3	16	25	24	16	7										
Median									380	380	380	380	375	350										
U.Q.																								
L.Q.																								
Q.R.																								

Sweep 1.0 Mc to 18.0 Mc in 40 sec in automatic operation

foF1

The Radio Research Laboratories, Japan

W 2

Jan. 1964

foE

0.01 Mc 135° E Mean Time (G.M.T. +9h)

Wakkanai

Lat. 45°23.6 N  
Long. 141°41.1 E

IONOSPHERIC DATA

Day	00	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	I230A	I240A	250	245	220	S	S	S							
2								S	S	S	A	255	255	250	S	S	S							
3				E			S	S	S	S	250	I260A	250	245	225	S	S							
4			E				S	A	A	A	255	260	260	250	A	S	S							
5							S	S	A	A	A	A	A	A	A	A	S							
6							S	A	A	A	A	A	A	A	A	A	S							
7							S	A	A	A	A	S	A	S	S	S	S							
8							S	S	A	A	A	A	A	A	A	A	S							
9							S	S	S	220	I230S	250	270	250	B	S	S							
10							S	S	A	A	A	A	I250A	250	220	S	S							
11							S	S	A	A	245	B	A	A	A	A	S							
12							S	S	S	B	A	265	275	265	B	B	S							
13							S	S	S	A	235	250	270	I260R	235	S	S							
14							S	D	225	260	270	I270A	250	A	C	S								
15							S	S	S	230	250	260	255	250	I240A	A	S							
16							S	S	S	A	260	275	275	I255S	I240S	S	S							
17							S	S	B	B	B	B	B	B	B	B	S							
18							S	S	A	A	A	B	B	B	B	B	S							
19							S	S	S	S	245	270	270	270	250	B	S							
20							S	S	S	220	270	290	290	270	245	B	S							
21							S	S	A	A	265	280	285	I270A	250	S	S							
22							S	S	A	A	250	270	I275A	250	235	S	S							
23							S	S	S	235	280	285	285	275	255	S	S							
24							S	S	S	230	250	270	275	270	250	S	S							
25							S	S	S	235	270	275	I285A	265	S	S	S							
26							S	S	S	230	255	270	275	260	I240S	S	S							
27							S	S	S	235	I255S	280	280	275	240	S	S							
28							S	S	S	235	265	275	280	275	250	B	S							
29							S	S	S	230	I260B	I280B	285	I275B	I260B	B	S							
30							S	S	S	235	265	270	270	255	I230B	210	S							
31							S	S	S	I230B	250	270	A	A	R	B	S							
No.			2	1						14	22	23	23	23	16	1								
Median			E	E						230	255	270	275	260	240	210								
U.Q.																								
L.Q.																								
Q.R.																								

foE

Sweep 1.0 Mc to 18.0 Mc in 40 sec in automatic operation

The Radio Research Laboratories, Japan

W 3

IONOSPHERIC DATA

0.1 Mc 135°E Mean Time (G.M.T. +9h)

foEs

Jan. 1964

Day	00	01	02	08	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E	028	036	E	E	E	E	S	S	033	058	033	027	G	S	S	032	E	E	E	E	036	J062	025
2	030	024	025	E	E	027	E	S	J040	026	028	G	G	G	S	S	S	E	E	E	E	E	E	E
3	E	E	E	E	E	021	S	S	S	029	G	034	G	G	G	S	S	031	031	E	E	043	E	033
4	036	036	042	E	E	E	E	S	036	053	G	G	G	G	034	030	S	E	037	051	037	032	039	J043
5	E	E	030	021	023	027	E	S	S	044	J052	J040	J051	048M	040	042	J043	040	E	E	E	041	J073	053
6	E	032	032	022	023	030	E	S	J105	050	073	046	J051	057	047	038	042	E	S	038	J053	050	J051	042
7	032	033	E	024	J023	E	E	S	S	034	029	030	S	031	S	S	S	E	E	E	E	E	E	E
8	E	E	E	E	024	023	E	S	S	J053	J060	048	040	032	042	051	050	049	042	040	S	E	S	J043
9	030	034	038M	031	029	E	S	S	S	028	J053	G	G	G	B	029	030	030	J044	J043	J051	J064	036	030
10	029	038	J041	028	013	E	E	032	034	042	J110	027	033	G	G	S	028	E	E	E	E	025	030	E
11	E	032	E	E	E	E	E	S	S	032	G	B	029	061	030	034	041	J063	J051	J051	043	042	E	E
12	032	031	031	036	028	E	E	S	S	B	028	G	G	G	B	B	S	E	032	E	040	030	E	024
13	E	E	E	J020	034	028	S	027	S	036	033	G	G	G	G	S	S	E	E	E	E	049	040	E
14	E	E	023	J035	J024	J050	037	S	030	G	029	032	038	040	037	C	050M	030	043	033	032	030	030	E
15	E	E	E	015	016	022	028	029	035	G	G	029	031	030	029	042	051	038	E	028	E	E	E	E
16	E	E	E	E	E	E	E	S	S	043	G	G	G	G	S	S	S	027	030	S	E	030	028	E
17	E	E	E	020	034	036	040	S	S	B	B	B	B	B	B	B	S	S	E	J043	E	045	030	038
18	046	038	028	E	E	042	033	J076	042	J070	058	B	B	B	B	B	S	030	E	E	E	030	E	052
19	J051	037	036	036	035	030	E	S	S	S	029	G	G	G	G	B	S	030	E	E	E	E	E	E
20	J043	035	030	034	028	E	E	031	025	025	G	G	033	G	G	B	S	E	E	E	E	050	030	039
21	033	039	027	037	030	E	E	S	044	048	G	G	G	056	G	S	034	E	E	E	E	035	030	E
22	E	E	E	E	014	E	E	S	030	032	029	032	040	G	G	S	S	E	E	E	E	030	E	030
23	028	E	E	028	E	E	E	S	S	G	G	G	G	G	G	S	S	E	E	E	E	E	E	E
24	E	E	E	025	021	E	E	S	S	G	G	G	G	G	G	S	S	E	E	E	E	E	E	E
25	E	025	E	E	E	E	E	S	025	G	G	G	034	G	S	028	S	E	J050	E	051	024	E	E
26	032	E	E	E	E	E	E	S	S	G	G	G	G	G	S	S	S	E	E	E	E	E	E	E
27	E	E	E	E	E	E	E	S	S	029	S	040	G	G	G	S	S	E	E	E	E	E	E	E
28	E	E	E	020	024	E	E	S	S	G	G	G	G	G	G	B	S	E	E	E	E	E	E	E
29	E	E	022	023	E	E	E	S	S	G	B	B	G	B	B	B	S	E	E	E	E	E	E	E
30	E	E	E	E	E	E	E	S	S	G	029	G	G	035	B	023	S	E	E	J043	E	E	E	E
31	E	E	E	E	E	E	E	S	S	028	028	G	029	028	G	B	S	E	E	S	040	E	E	E
No.	31	31	31	31	31	31	30	4	12	28	28	28	28	27	19	10	10	31	29	30	30	31	30	31
Median	E	E	E	020	014	E	E	032	036	029	028	G	G	G	G	032	042	E	E	E	E	030	E	E
U.Q.	032	033	030	028	024	023	E	032	042	042	046	032	033	032	034	042	050	030	034	038	E	041	030	033
L.Q.	E	E	E	E	E	E	E	030	040	G	G	G	G	G	G	029	032	E	E	E	E	E	E	E
Q.R.								002	012							013	018							

The Itadio Research Laboratories, Japan

Sweep 1.0 Mc to 48.0 Mc in 40 sec in automatic operation

foEs

Jan. 1964

fbES

IONOSPHERIC DATA

Wakkanai

Lat. 45°23.6' N  
Long. 141°41.1' E

0.1 Mc  
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	E	E					S	S	0.25	0.43	G	G		S	0.29	G				E	E	E	E	
2	E	E	E		E			S	0.32	G	0.28				S	S	S								
3					E		S	S	S	G		0.26				S	S	E	E						
4	A	E	A		E		S	S	0.21	0.41					0.24	0.20	S				E	E	E	E	
5		E	E	E	E	E	S	S	0.31	0.28	0.26	0.28	0.28	0.27	0.25	0.26	0.22	A	S	E	A	A	A	E	
6		E	E	E	E	E	S	0.24	0.25	0.39	0.25	0.40	0.27	0.29	0.27	0.27	0.24							E	
7	E	E	E	E	E	E	S	S	0.24	0.28	0.30	S	0.30	S	S	S	S							E	
8		E	E	E	E	E	S	S	S	0.26	0.36	0.33	0.27	0.30	0.30	0.30	A	A	A	A	S			E	
9		E	E	E	E	E	S	S	S	G	G				B	G	G	E	E	E	A	E	E	E	
10		E	E	E	E	E	G	G	0.33	0.51	0.27	0.30				S	G				E	E	E	E	
11		E					S	S	S	0.25		B	0.27	0.35	0.30	0.30	0.31	A	A	A	A	E	E	E	
12		E	E	E	E	E	S	S	S	B	0.26				B	B	S		E		A	E		E	
13							E	S	0.21	0.27						S	S								
14					E	E	E	A	S	G	G		0.30	0.24	0.28	C	A	E	E	A	E	A	A	E	
15					E	E	E	E	G	0.23		G	G	G	0.26	0.32	0.36	0.24						E	
16							S	S	S	0.26				S	S	S	S	E	E	S				E	
17				E	A	A	A	S	B	B	B	B	B	B	B	B	S		A	E				E	
18	A	0.22	E		E	E	A	0.22	0.35	0.33	0.47	0.50	B	B	B	B	S	E			A	E	0.25	E	
19	E	E	E	0.23	E	E	E	S	S	S	G					B	S	E			E	E	A		
20	E	E	E	E	E	E	E	G	G	G						B	S	A							
21	E	E	E	E	E	E	S	S	0.30	0.25						B	S				A	E	E	E	
22					E		S	S	0.23	0.27	G	0.25	0.30	0.37		S	0.25				E	E	E	E	
23							S	S	S							S	S				E	E		E	
24							S	S	S							S	S								
25							S	S	G				0.29		S	G	S								
26	E						S	S	S						S	S	S	E	E		E	E			
27							S	S	S	G	S	G			S	S	S								
28				E	E		S	S	S						B	B	S								
29			E	E			S	S	S	B	B			B	B	B	S								
30							S	S	S	G				G	B	G	S								
31							S	S	G	G		B0.29R	0.27			B	S	S	A						
No.																									
Median																									
U.Q.																									
L.Q.																									
Q.R.																									

Lat. 45°23.6' N  
Long. 141°41.1' E

Wakkanai

IONOSPHERIC DATA

0.1 Mc 135° E Mean Time (G.M.T. + 9h)

f-min

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E019S	E015S	E016S	E015S	E	E012S	E018S	E018S	E020S	E020	E020	E020	E020	E020	E025S	E020S	E020S	E020S	E017S	E020S	E019S	E020S	E020S	E020S
2	E019S	E015S	E	E	E	E016S	E017S	E019S	E020S	E020S	E020	E020	E020	E020	E023S	E020S	E020S	E020S	E020S	E020S	E020S	E020S	E020S	E020S
3	E020S	E016S	E014S	E	E	E016S	E019S	E020S	E020S	E020	E020	E020	E020	E020	E020	E019S	E020S	E020S	E020S	E020S	E019S	E020S	E020S	E019S
4	E018S	E	E	E	E	E	E018S	E019S	E019	E018	E020	E020	E020	E020	E020	E019S	E020S	E020S	E020S	E019S	E020S	E020S	E020S	E019S
5	E019S	E015S	E	E	E	E	E016S	E018S	E021S	E020	E020	E020	E020	E020	E019	E020	E020S	E020S	E019S	E020S	E020S	E020S	E020S	E020S
6	E020S	E012S	E	E	E	E	E019S	E018S	E018	E020	E020	E020	E020	E020	E020	E020	E020S	E019S	S	E019S	E020S	E020S	E020S	E020S
7	E018S	E017S	E	E	E	E	E017S	E019S	E022S	E021	E021	E021	E020	E020	E025S	E021S	E020S	E020S	E020S	E020S	E020S	E020S	E020S	E019S
8	E020S	E016S	E	E	E	E	E016S	E018S	E020S	E021	E021	E020	E020	E020	E020	E020	E020S	E017S	E020S	E019S	S	E019S	S	E020S
9	E020S	E	E	E	E	E	E012S	E018S	E020S	E020	E020	E020	E020	E020	E025	E020S	E020S	E020S	E018S	E020S	E020S	E020S	E020S	E019S
10	E019S	E015S	E	E	E	E	E018S	E017S	E020S	E020	E021	E020	E020	E020	E020	E024S	E020S	E018S	E020S	E020S	E020S	E020S	E020S	E020S
11	E020S	E015S	E	E	E	E	E	E019S	E020S	E020	E022	E026	E025	E021	E024	E021	E020S	E020S	E020S	E020S	E020S	E020S	E020S	E020S
12	E020S	E	E	E	E	E	E	E019S	E020S	E020	E020	E020	E020	E020	E025	E024	E021S	E020S	E020S	E020S	E020S	E020S	E020S	E019S
13	E019S	E	E	E	E	E	E	E019S	E020S	E020	E021	E022	E020	E020	E020	E020S	E020S	E018S	E020S	E020S	E019S	E020S	E020S	E019S
14	E020S	E012S	E	E	E	E	E015S	E018S	E020S	E020	E020	E020	E019	E020	E020	C	E020S	E020S	E020S	E020S	E020S	E020S	E020S	E020S
15	E020S	E016S	E	E	E	E	E	E018S	E020S	E020	E021	E020	E020	E020	E020	E021	E020S	E019S	E020S	E020S	E020S	E020S	E020S	E020S
16	E020S	E017S	E016S	E	E	E	E	E019S	E020S	E020	E020	E023	E021	E020S	E026S	E021S	E020S	E020S	E020S	E019S	S	E020S	E020S	E020S
17	E019S	E019S	E015S	E	E	E	E	E020S	E020S	E022	E024	E030	E035	E043	E035	E027	E020S	E019S	E020S	E020S	E020S	E020S	E020S	E020S
18	E020S	E012S	E	E	E	E	E015S	E020S	E020	E024	E025	E030	E034	E030	E029	E023	E020S	E020S	E020S	E020S	E020S	E020S	E020S	E020S
19	E020S	E015S	E	E	E	E	E	E018S	E021S	E027S	E020	E020	E022	E020	E020	E024	E020S	E020S	E020S	E020S	E020S	E020S	E020S	E020S
20	E019S	E016S	E	E	E	E	E	E015S	E019S	E020S	E019	E020	E020	E020	E020	E023	E020S	E020S	E020S	E020S	E020S	E020S	E020S	E020S
21	E020S	E012S	E	E	E	E	E	E019S	E020S	E020	E020	E021	E020	E020	E020	E024S	E020S	E020S	E019S	E020S	E020S	E020S	E020S	E020S
22	E020S	E015S	E012S	E	E	E	E015S	E020S	E018	E018	E020	E020	E020	E020	E021	E023S	E020S	E020S	E019S	E020S	E020S	E020S	E020S	E020S
23	E019S	E019S	E	E	E	E	E	E016S	E020S	E020S	E020	E020	E020	E020	E020	E024S	E020S	E019S	E019S	E020S	E020S	E020S	E020S	E020S
24	E020S	E	E	E	E	E	E	E019S	E020S	E021S	E020	E022	E020	E020	E020	E024S	E020S	E019S	E020S	E020S	E019S	E020S	E020S	E020S
25	E020S	E017S	E020S	E	E	E	E	E019S	E020S	E020S	E020	E020	E020	E020	E026S	E020S	E020S	E019S	E020S	E020S	E020S	E020S	E020S	E020S
26	E018S	E	E015S	E	E	E	E	E020S	E019S	E020S	E020	E020	E020	E020	E023S	E022S	E020S	E020S	E020S	E019S	E020S	E020S	E020S	E019S
27	E020S	E015S	E	E	E	E	E	E020S	E020S	E020S	E020	E020	E020	E020	E022	E023S	E020S	E019S	E020S	E020S	E020S	E020S	E020S	E020S
28	E020S	E017S	E	E	E	E	E015S	E019S	E020S	E021S	E020	E021	E025	E021	E022	E022	E021S	E018S	E019S	E020S	E020S	E020S	E020S	E020S
29	E019S	E012S	E	E	E	E	E	E019S	E019S	E020S	E026	E035	E026	E035	E027	E025	E020S	E020S	E020S	E020S	E020S	E020S	E020S	E020S
30	E020S	E017S	E017S	E	E	E	E017S	E020S	E022S	E020	E020	E020	E020	E020	E020	E020	E021S	E019S	E020S	E020S	E020S	E020S	E020S	E020S
31	E020S	E016S	E018S	E	E	E	E	E018S	E020S	E022S	E022	E021	E025	E023	E021	E023	E020S	E020S	S	E020S	E020S	E020S	E020S	E020S
No.	31	31	22	30	31	18	31	31	31	30	29	31	30	30	25	30	31	31	29	30	30	31	30	31
Median	E020	E015	E	E	E	E	E019	E019	E020	E020	E020	E020	E020	E020	E022	E022	E020	E020	E020	E020	E020	E020	E020	E020
U.Q.																								
L.Q.																								
Q.R.																								

Sweep 1.0 Mc to 18.0 Mc in 40 sec in automatic operation

f-min

The Radio Research Laboratories, Japan

# IONOSPHERIC DATA

Jan. 1964

M(3000)F2

0.01

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	28
1	305F	SF	SF	SF	SF	SF	U340S	365S	335	355	U350R	355	355	335	340H	375	335	310	340	355	SF	FS	SF	SF	SF
2	SF	SF	SF	SF	SF	SF	330	355	335	375	355	330	340H	340	350	365	325S	305S	340	310	295	280	275	310	
3	305	310	310	285	300	325	340	315	340	335H	360	340	345	330	350	375	375	345	320	310S	325	285	295	305	
4	1315A	335	1305A	300	310	335	320	340	365	365	350	365	360	335	340	355	355	320	335	1335A	335	300S	1235A	325	
5	305	SF	SF	SF	315	300	325	345	330	360	355	370	370	360	360	370	345	1325A	345	335	330	1310A	A	SF	
6	SF	FS	FS	FS	S	S	S	S	350	355	370	340	335	345	365	395	385	345	1320S	330	1315A	1320A	325	SF	
7	SF	SF	SF	SF	SF	SF	325F	370	345	355	355	365	365	375	395	355	375	320	315	325	320	310	285	295	
8	305	325	315	335	335	310	315	365	320	365	355	375	355	355	365	400	1365A	1350A	1350A	1330A	1325S	295	1300S	295	
9	SF	290	305	330	300	305S	335	340	355	360	355	360	355	335	365	350	360	315	330	370	300	1300A	300S	315	
10	295	SF	SF	FS	FS	FS	320	375	315H	345	330H	365	365	365	365	350	295H	335	300	335	295	290	SF	280	
11	315	310	325	300	300	335	330	335	340	355	370	330	345H	340	360	360	340	A	A	A	A	305	295	300	
12	300	290	325	320	300	335	340	325	345	360	365	365	360	370	375H	365	360	305	335	330	1310A	305S	SF	SF	
13	SF	SF	SF	SF	SF	SF	345	345	365	345	350	355	365	335H	355	365	355	320	340	340	310	A	A	SF	
14	280F	325	320	320	310	SF	1335A	350	355	325	325	355	360	340	365H	1360C	1345A	335	335	1330A	295	SF	SF	SF	
15	SF	305	SF	295	320	340	325	350	360	350	360	375	375	340	350	370	375	360	305S	310	335	SF	SF	SF	
16	SF	320	305S	305	305	305F	285S	345S	360	375	360	350	335H	330	335	370	345	345	305	305	305	280	295	300	
17	315	320	290F	305	1300A	1315A	1330A	345	370	385	360	355	345	355	355	365	370	315	1320A	335	305	1285A	315	305	
18	1335A	295	295	300	305	320	1290A	345	345	345	350	365	350	355	365	360	355	305	310	310	305	295	1305S	1310A	
19	315	285F	SF	305F	FS	FS	U305F	355	350	365	330	340	375	350	350H	370	375	1335A	330	335	325	305	295	FS	
20	SF	SF	295F	305S	SF	SF	SF	SF	350S	370	400	350	355	360	345	370	365	340	340	345	350	1300A	290	SF	
21	SF	SF	SF	SF	SF	SF	335S	335S	355	355	355	390	370	360	345	365	355	325	325	330	330	285S	SF	SF	
22	SF	315	SF	SF	SF	325	U350S	U325S	325	370	360	350	380	360	360	370	345	330	350	355	325	310	325	295S	
23	SF	315F	315F	SF	SF	F	315	365	345	360	370	360	370	375	345	355	375	345	305	350	310	320	320	325	
24	305	315	330	305	315	SF	1350S	345	360	365	335	360	340	345	335	355	390	310	330	335	300	295	295	325	
25	305	285	290	SF	SF	365	U315S	330	335	365	330H	350H	360	365	350H	360	375	310	325	330	320	305	285S	SF	
26	295	305F	SF	SF	SF	SF	S	335	340	U315S	355	375	315	375	350H	340	360	345	325	335	310	295	S	SF	
27	SF	SF	SF	SF	SF	SF	345	300	365H	320	355	345	360	375	320H	355	370	335	355	350	S	S	S	SF	
28	S	SF	SF	SF	SF	SF	S	S	S	F	360	350	370	340	375	355	370	340	335	335	1315S	305S	315S	SF	
29	SF	SF	SF	SF	SF	SF	320S	310	345	360S	360	370	350	325	355	375	365	315	300	290	300	SF	290S	285	
30	330	305	310	310	350	295	300	340S	345	340	335	345	365	365	380	375	375	320	305	1335A	290	325	330	290	
31	325	325	335	310	320	320	330	335	330	350	360	350	360	340	320H	365	365	340	330S	1330A	300	FS	280	295	
No.	17	19	16	19	16	20	27	29	30	30	31	31	31	31	31	31	31	30	30	30	28	24	21	17	
Median	305	310	310	305	310	325	330	345	350	360	355	355	360	350	350	365	365	330	330	335	310	300	295	300	
U.Q.																									
L.Q.																									
Q.R.																									

Sweep 1.0 Mc to 18.0 Mc in 40 sec in automatic operation

The Radio Research Laboratories, Japan

M(3000)F2

W 7



Lat. 45°23.6' N  
Long. 141°41.1' E

Wakkanai

IONOSPHERIC DATA

135° E Mean Time (G.M.T. +9h)

M(3000)F1

0.01

Jan. 1964

Day	00	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	405L													
2											410	375H	395L	395L	400L										
3											410	400H	U415L	390											
4										A	395L	415	405L	370L											
5											I400A	375H	I385A	375	395										
6												385	385	405											
7												I405A	405												
8											405L	400L													
9											A	395	415												
10											U370L	405	405												
11											385L	405		400											
12												395	405L	375											
13												400L	405L	405L											
14												400L	400L												
15											400L	395H	390												
16												A	B												
17											A	A													
18												375	385L	405											
19											420	415	400	395											
20												420L	395												
21											405	390	415	395											
22											395	400	405	415											
23											370	385	385												
24												395	385	440											
25											360	380	405	385											
26												380	380	380	395										
27												390H	390	400	410										
28													385	390	390										
29											370L	395L	375	385	390L	415L									
30											395L	370	400	395L											
31											3	16	25	23	16	7									
No.											370	395	395	395	395	395									
Median																									
U.Q.																									
L.Q.																									
Q.R.																									

Sweep 1.0 Mc to 18.0 Mc in 40 sec in automatic operation

M(3000)F1

The Radio Research Laboratories, Japan

W 8

Jan. 1964

R'F2

1 km

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											230	240													
2											240	250	240	245	240										
3												250	260	260											
4										225		225	220												
5											240	230	240	245											
6											225	235	260	250	235										
7												230	245	225											
8												215	245												
9											245	230													
10											245	230	230												
11										235	225	250													
12											245	225		235											
13												235	230		250										
14												250													
15											245		230												
16											240	245			250										
17																									
18											245	250	245												
19												265	230	245											
20											215	235	245	240											
21												225	240												
22											225	245	220	245											
23											225	240	240	225											
24											265	250	265												
25													240	245	220										
26										305	240	230	250												
27												240	240	250											
28											245	270	240	245	250										
29												275	250	250											
30										260	255	250	240	245	225										
31											250	235	235	250											
No.										4	19	26	24	16	8										
Median										250	240	240	240	245	245										
U.Q.																									
L.Q.																									
Q.R.																									

R'F2

Sweep 1.0 Mc to 18.0 Mc in 40 sec in automatic operation

The Radio Research Laboratories, Japan

W 9

Lat. 45°23.6' N  
Long. 141°41.1' E

Wakkanai

IONOSPHERIC DATA

1 km 135° E Mean Time (G.M.T. +9h)

f<sub>o</sub>F

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	275	275	300	270	260	250	220	205	205	225	I225A	225	200H	240	235H	215	210	250	230	220	265	250	270	250
2	260	285	275	230	265	250	250	220	250	220	225	200H	220	225	235	225	250	265	235	300	290	325	380	285
3	300	270	300	320	305	250	250	260	255	230H	230	210	210	215	225	220	205	250	260	280	260	310	310	300
4	I295A	265	I270A	285	255	235	275	240	220	I230A	225	220	210	200H	240	230	210	255	265	I270A	270	325	I315A	270
5	300	270	295	260	240	240	275	240	225	235	I230A	210	240	220	230	220	220	I270A	240	250	240	I300A	I270A	230
6	235	230	225	250	250	240	235	240	240A	240	I220A	190	I235A	220	225	220	205	235	I280S	270	I270A	I300A	270	310
7	280	235	240	290	300	240	220	235	220	225A	240	240	225	235	215	220	210	300	280	240	260	310	325	315
8	315	270	250	235	245	290	285	225	230	235	I235A	210	210	245	250	215	A	A	A	A	I290S	360	I320S	315
9	335	305	270	250	260	250	290	235	225	225	235	230	210H	235	225	230	220	275	270	245	300	I300A	320	275
10	300	295	300	255	255	250	215	225	230	250H	I240A	225	210	225H	240	245	215	230	260	245	300	305	300	330
11	285	250	250	275	245	245	245	240	230	240	215	200	205H	250A	230	220	A	A	A	A	A	310	325	305
12	305	300	280	275	260	235	275	260	225	230H	225	205	220H	230	225H	220	215	255	250	260	I270A	300	295	285
13	285	260	270	230	220	260	245	230	220	230	240	210	210	225H	240	220	200	250	245	250	260	I315A	I315A	315
14	300	250	275	250	270	265	I290A	225	205	245	240	240	235	220	235H	I230C	I235A	245	230	A	300	285	300	300
15	300	255	285	270	250	220	255	230	210	245	235	225	220	225	245H	I230A	A	230	290	285	250	285	300	300
16	295	260	285	250	245	260	350	230	220	220	190H	210	195H	245	240	210H	220	220	285	S	270	350	300	290
17	250	275	300	350	I350A	A	I250A	240	230	220	235H	250	270B	245	235	230	210	260	A	260	285	I345A	270	310A
18	A	325	310	280	260	250	I265A	250	245A	240	A	A	B	245	240	240	215	260	250	270	300	300	280	I275A
19	275	310	305	330	270	250	285	225	215	220	245	230	240	240	240H	220	215	A	275	260	255	290	300	265
20	285	295	285	280	255	210	320	250	245	230	215	195	245	220	200H	225	220	240	235	250	245	I330A	310	300
21	290	315	295	260	250	250	250	210	235A	230H	215	215	215	245A	225	225	220	250	250	235	250	295	285	280
22	275	255	260	240	240	210	250	220	205	225	235	225	215	190	240H	230	220	250	235	215	250	300	270	280
23	300	260	290	255	260	225	210	225	225	230	230	210	210	205	210H	230	210	240	305	240	260	265	275	250
24	310	260	250	250	255	220	225	220	220	215	200	230	200	200H	215H	230	205	250	250	240	295	310	300	270
25	300	300	305	260	245	200	280	250	250	230	235H	220H	220	215	200	230	215	250	250	255	250	275	300	300
26	280	250	260	240	260	250	255	230	235	220	205	240	210	230H	205H	215	225	220	260	235	265	280	280	290
27	295	255	250	255	240	210	280	210	200H	220	235	245H	230	225	200	220H	210	225	230	240	280	270	260	260
28	260	285	260	230	225	220	240	220	215	200	205H	220	215	225	225H	205H	225	220	240	240	250	290	250	260
29	300	280	275	240	250	225	280	230	220H	195H	190H	240	245	245B	230	220	210	250	300	325	250	300	305	305
30	255	270	275	240	220	250	300	225	250	250	245	230	240	235	210	220	225	250	300	I275A	315	270	270	320
31	280	235	280	270	250	250	280	230	235	225	250	225	245	215	210H	210H	210	230	I255S	I275A	300	320	325	300
No.	30	31	31	31	31	30	31	31	31	31	30	30	30	31	31	31	31	28	28	27	30	31	31	31
Median	295	270	275	255	255	250	255	230	225	230	230	225	220	225	230	220	215	250	250	250	270	300	300	290
U.Q.																								
L.Q.																								
Q.R.																								

The Radio Research Laboratories, Japan

Sweep 1.0 Mc to 18.0 Mc in 40 sec in automatic operation

f<sub>o</sub>F

W 10

# IONOSPHERIC DATA

Jan. 1964

f<sup>o</sup>F<sub>2</sub>

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

Lat. 45°23.6' N  
Long. 141°41.1' E

Wakkanai

IONOSPHERIC DATA

135° E Mean Time (G.M.T. +9h)

Types of Es

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1		f	f2							1	12	c	c				c					f	f2	f	
2	f2	f	f			f2			c2	c	1								f	f2	f		f	f	
3						f			1	12		1			1	1			f	f2	f		f	f	
4	f2	f2	f2						1	12	1	1	12	1	1	1	1		f	f2	f		f	f2	
5						f			12	12	12	1	12	1	1	1	1			f2	f2	f	f	f	
6						f			1	1	1	1	1	1	1	1	1								
7	f	f2				f			1	1	1	1	1	1	1	12	12	f2	f	f				f	
8						f			1	1	1	1	1	1	1	c	1	1	f	f	f		f6	f2	
9	f	f	f			f			c	c	c						c					f	f	f	
10	f	f2	f2			f			c	1	12	1	1				c					f	f	f	
11									1	1	1	1	1	1	1	1	1	f4	f2	f2	f2	f		f	
12	f	f	f							1									f			f		f	
13						f			1	1												f2	f		
14						f			1	h	h	h	1	1	c	1	12	f	f	f	f	f	f		
15						f			1	h	h	h	c	c	1	1	12	f	f	f					
16										1									f	f2		f2	f		
17						f													f3	f		f	f	f2	
18	f2	f	f			f			1	1	1	1							f			f		f	
19	f	f	f2			f2			h	h	h								f			f		f	
20	f2	f2	f			f			h	h	h	h										f	f	f	
21	f	f3	f			f2			1	1	h	1	1	12			1					f	f	f	
22									1	1	h	1	1									f	f	f	
23	f					f																			
24						f			h													f			
25									h				1			h		f2				f			
26	f									h		1													
27																									
28						f																			
29			f			f					1			c		c						f			
30													1	1	1							f			
31																						f			
No.																									
Median																									
U.Q.																									
L.Q.																									
Q.R.																									

Types of Es

Sweep 1.0 Mc to 18.0 Mc in 40 sec in automatic operation  
The Radio Research Laboratories, Japan

W 12

Lat. 39 43.5 N  
Long. 140 08.2 E

Akita

IONOSPHERIC DATA  
0.1 Mc 135° E Mean Time (G.M.T. +9h)

f<sub>o</sub>F<sub>2</sub>

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	I028F	029F	F	F	F	029F	036	036	043	047H	062	073	077	052	064	058	042	036	041	033	028F	026S	F	F
2	F	F	F	F	F	F	F	036S	042S	057	060	059	074R	064	064	064	043	051	050	038	038	036S	039	041
3	034	036	026S	026	031	030	044S	095	065	086	079	056	066	066	065	067	045	030	033	034F	035	I026F	I027F	027S
4	029	025	026	022	024F	025S	020S	036S	057	051	073	I074R	062	I064H	060	066	055	034	035	A	A	A	F	A
5	F	A	F	F	F	F	F	023F	035S	044	060	072	084	069	068	055	048	027	030	025	029	027	F	A
6	A	F	F	F	F	F	F	066	I082R	067	060	071	069	062	049	043	043	029	030	030	F	F	F	F
7	F	F	A	A	025S	024F	I024F	036S	045	047	061	I072R	069	069	053	049	042	032	030	033	030	025	I026F	I026F
8	029F	033	026	026	026F	024F	021S	040	048	061	071	068	068	058H	067	I063C	048	031	035	036	I025R	022S	026	F
9	F	F	032F	028	027	I026R	025	037S	047S	054	065	066	057	059	060H	051	050	046	035	030	026	028	I050F	I032F
10	I032F	034	034	033	034	033	032	037S	I047S	063	076S	072	089	061	051	061	046S	047	035	033	027	027S	028F	I028F
11	029F	031	I028F	I031F	I034F	I034R	033	039S	053	065	064	064	051	064	070	057	043	042R	043	J031R	028	I029R	029	030
12	032	031	032	029	030	025	023R	036S	046	063	072	062R	055	063	053	048	048	035S	037	037R	035R	024R	028	030
13	031F	030F	029	029	FS	FS	FS	038R	046R	058	060	063	051	052	062	056	046	030	031R	032	027	023	026	028
14	029	030	029	I027S	021	022F	021F	I037S	046R	052	056	057	055R	050	060	049	047S	034	033	034R	A	A	RS	RS
15	F	FS	F	024F	F	F	023S	035S	050S	051	056	J058R	052	049	054	062	I048R	I035A	I032A	I027A	029	I024R	028	I031F
16	I031F	031F	032R	026F	I026F	024F	J035R	050R	056	066	067	072R	037	050	058	060	046	039	037	034	FS	F	F	030
17	028	027	026	026	028	029	A	A	058	056	057	060	058	056	052	054	049	031S	027	040S	RS	F	F	035
18	033	I030R	029F	030	031F	031	026F	037S	048	060	075	065	063	056	053	053	050	034	034	030	034	030	I030F	029F
19	I030R	032F	032F	I030F	027F	I024F	I024F	I039S	046	046	050	061	063	078	I061R	065	044R	030	024	031R	034R	031	I030F	032F
20	031R	032S	035R	033R	031F	F	FS	040R	I046R	I062R	052R	069R	059R	070R	061	055	048	J041R	040S	034S	030R	I029A	029	030S
21	I032F	I034F	033F	031F	031F	031F	032F	040S	044R	064R	061	064	055	054	054R	050R	046	033	032	036	I040R	027	RS	FS
22	FS	FS	FS	FS	S	FS	023F	037S	042R	056H	057	074	062	050	I052R	053	048	042	044	036	028	024	034	030
23	033F	I034F	035F	034	I030F	032	I032R	041	051	060	062	065	062	054	053	054	051	034	024	029	033	029S	032S	034
24	034	036F	F	F	F	F	032S	040S	I046S	050H	055	070	061	054	053	064	055	032	035	038	029	027	032	033
25	031	032	030	032	031	024	022S	036	046	059	060	061	I067R	059	056	049	I045R	040	035	037	034	I028F	I031F	034F
26	I034F	034F	033F	031F	030F	I030F	029F	044	049	064	065	069	059	056	053	058	052	043S	031	035	I032F	I029F	029	031F
27	029	I031F	I031F	032	034F	FS	FS	047S	I045S	049	055H	059H	071	061	056	058	051S	041	030	026	026	026	028	I030F
28	I029F	F	F	F	F	F	F	FS	S	045H	060	065	053R	I056R	056	053R	050S	044R	050R	I040R	033S	036	I034R	033R
29	FS	FS	FS	F	042R	I036F	038R	050S	I048R	050	048	062R	058	056H	063	064R	047R	035R	034R	030R	I040R	036F	036	036
30	040	037	036R	J037S	033	028R	I029R	J035R	I048R	057	070	091	059	062	061	051	043	038	031	035	036	030F	I033F	033
31	036S	030	030	026S	025	I022F	I020F	040	048S	I052C	061	071	061	052R	J053R	051R	048R	038	027	028	029	028S	028	028
No.	23	22	21	22	22	21	24	28	30	31	31	31	31	31	31	31	31	31	31	30	26	26	23	24
Median	031	032	031	030	030	028	024	038	047	057	061	065	059	058	058	056	048	035	034	034	030	030	028	030
U.Q.	033	034	033	032	031	031	032	040	049	062	072	072	063	064	063	062	050	041	037	036	034	029	032	033
L.Q.	029	030	028	026	026	024	023	036	046	051	057	062	055	053	053	051	045	032	030	030	026	026	028	030
Q.R.	004	004	005	006	005	007	009	004	003	011	015	010	008	011	010	011	005	009	007	006	006	006	003	004

The Radio Research Laboratories, Japan

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

f<sub>o</sub>F<sub>2</sub>

Lat. 39 43.5 N  
 Long. 140 08.2 E

Akita

IONOSPHERIC DATA

foF1 0.01 Mc 135° E Mean Time (G.M.T. +9h)

Jan. 1964

Day	00	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	I390L	I360L	IH	L									
2										L	L	350L	400L	400L	L	L								
3										L	L	L	L	L	L									
4										L	A	A	A	A	A	A								
5										L	L	L	L	L	L									
6										L	L	400L	I420L	L	L	L								
7										L	LH	I390L	400L	L	L	L								
8										L	L	I400L	410L	L	L	C								
9										L	L	L	400L	L	L									
10										L	L	400L	400	I330L	I310L									
11										L	I390R	I400L	I410A	L	L	L								
12										L	L	I400L	400L	400L	L	L								
13										L	I400L	400L	400L	I380L	380L	L								
14										L	L	400L	I390L	380L	I320L									
15										L	L	410L	400L	400L	400L	L								
16										380L	410	400	400L	I400L	L	L								
17										L	L	L	L	L	L									
18										L	I400L	I400L	I380L	L	L									
19										L	L	410L	410L	400L	I370S	L					L			
20										I360L	390L	I400L	410L	I400S	I380L	I310L								
21									260	I330L	400L	410L	400L	L	L	I320L								
22										L	R	410	I400L	380	I360L									
23										L	L	L	I400L	L	L	L								
24										I400L	380L	410	400	360L										
25										L	L	400L	400	360	370H	300								
26										L	LH	400	410L	390	L	L								
27									L	L	I370L	I400L	360	400	I350L	I290L								
28									L	310	420	410L	400L	400L	I360L	I320L					L			
29									L	I350L	410L	410L	400L	420L	400L	LH					L			
30										400	420L	420H	420	400	I380L	330L	260							
31										I350C	I420L	420	420L	I400L	450	IH								
No.									1	7	10	23	27	20	14	7	1							
Median									260	I350	I400	400	400	400	I375	I320	260							
U.Q.																								
L.Q.																								
Q.R.																								

The Radio Research Laboratories, Japan

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

foF1

A 2

Lat. 39°43.5' N  
 Long. 140°08.2' E

Akita

IONOSPHERIC DATA

0.01 Mc 135° E Mean Time (G.M.T. +9h)

foE

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1									A	A	A	A	A	275	1250A	230									
2									A	A	A	275	285	1270A	260H	1230A	E								
3			E						A	A	A	A	A	A	A	A	E								
4									A	1240A	1260A	A	A	A	A	A	E								
5									A	A	A	A	A	A	A	A	A								
6									A	A	A	A	A	A	A	A	E								
7									A	A	A	A	A	280	260	A	A								
8									A	A	A	A	290	285	270	C	E								
9									210	A	A	A	A	A	A	A	E								
10									A	A	A	A	A	280	260	225	E								
11									205	A	A	A	A	A	A	A	E								
12									A	A	A	A	A	A	A	A	B								
13									RS	A	A	295R	290	285R	R	R	E								
14									A	A	A	A	A	A	A	A	A								
15									A	A	A	A	A	A	A	A	A								
16									B	A	A	A	295	1280R	1260R	RS	A								
17									A	245	270	285	290	280	260	230	S								
18									A	A	A	A	285	1290A	270	245	R								
19									A	A	A	A	A	R	S	A	A								
20									A	A	A	A	RS	300S	S	R	RS	A							
21									S	A	A	A	300R	1290A	1275A	RS	B								
22									S	A	A	270	290	280	265	240	E								
23									E	RS	A	1280A	295	300	295	270	245	B							
24									E	RS	A	280	285	300	290	275	245	A							
25									E	A	A	A	290	300	280	1225A	A								
26									A	A	A	A	A	285	265	R	A								
27									E	A	A	A	295	290	275	250	205								
28									E	A	265	A	A	295R	275	R	R								
29									220R	260R	R	A	R	A	R	R	B								
30									RS	R	RS	300	300	290	275	240	A								
31									RS	C	A	295	300	295	1280A	R	A								
No.			1						7	3	4	5	12	15	19	18	11								
Median			E						E	210	250	270	290	295	285	270	240								
U.Q.																									
L.Q.																									
Q.R.																									

foE

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

The Radio Research Laboratories, Japan

A 3



Lat. 39°43.5' N  
Long. 140°08.2' E

Akita

IONOSPHERIC DATA

0.1 Mc 135° E Mean Time (G.M.T. +9h)

foEs

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	J018	E	022	E	022	J018	022	J018	J023	032	032	030	029	G	027	G	J030Y	E	E	E	E	E	E	S	
2	J038	J020	E	J019	E	E	E	E	026	030	035	J028	031	J038	G	023	019	J019	023	J020	E	E	E	J021	
3	E	E	024	J024	J034	J020	E	E	028	J028	J043	J033	030	J029	031	027	G	E	E	E	J020	J022	J018	020	
4	E	E	E	J018	E	022	J018	023	J025	030	030	J129	J084	J091	J042	J061	J033	E	020	J063	J045	J035	J020	J062	
5	J028	J036	J019	J028	J020	J019	020	S	024	J031	J039	J040	J044	J029	J029	J041	J033	J020	J018	J020	J018	J025	J025	J049	
6	J053	J029	J033	J028	J029	J038	E	S	024	J038	J038	J033	J034	J033	J041	J030	J038	J020	020	022	J020	J028	J033	J039	
7	J025	J029	J035	J029	J020	J018	E	E	023	026	028	J036	J033	030	G	J033	J033	J025	E	E	E	E	E	E	
8	E	J022	J023	J018	J019	E	J018	E	J023	032	J034	J084	0236	J033	J032	C	J025	J028	J023	E	E	E	E	E	
9	J020	J022	J030	J021	020	J018	022	J019	G	028	035	J040	J061	J033	J040	J036	J043	J048	J033	J031	J023	J025	J025	J040	
10	J038	J033	J044	J023	E	E	E	E	J036	J034	037	030	J033	G	G	G	G	E	E	022	J019	E	J018	E	J022
11	J033	J019	J031	J018	022	E	E	E	G	J033	030	029	J050	J048	030	028	020	J022	J021	020	J020	E	023	J020S	
12	023	J021	J030	J028	J030	J023	E	E	J030	J030	029	032	032	028	032	024	J026	J027	E	E	E	023S	J018	E	
13	E	018	019	J020	022S	022	023	S	G	030	030	J037	J0236	G	G	G	G	023	023	020	019	020	E	E	
14	E	E	E	022	019	023S	J030	J020	J025	J035	J026	035	035	033	028	025	J023	J025	J025	J058	J036	J048	J030	J030	
15	E	J018	023	021	021	J018	E	S	028	030	J040	037	037	038	J036	J033	J050	J060	J038	J041	J022	021	023	E	
16	E	023	J020	023	023	E	021	022S	029	J028	029	030	J0236	J0266	J0216	J025	021	023	023	J021	J026	J033	J031	J028	
17	J022	022	019	020	J022	J020	J049	J039	J033	025	G	0226	0246	G	G	G	G	J024	E	J045	J038	E	J028	J037	
18	J023	J025	E	E	E	E	E	E	J041	J055	032	G	0286	029	0236	J025	024	E	E	E	E	E	E	J026	
19	J051	022	J030	J033	J027	J017	020	S	J032	J029	032	032	030	030	S	J034	J021	E	E	E	023	J021	021	022	
20	020	022	E	020S	023	E	E	023	028	J030	J029	J0246	G	S	028	022S	J035	E	023	J026	J030	J025	J040	J040	
21	J024	J034	J022	020	021	E	E	S	030	J033	J030	J033	0236	J0266	J058	J027	J021	J025	J028	J024	J020	J031	J038	J025	
22	J023	J025	023	E	S	023	J017	027S	029	030	0246	032	0296	G	G	G	J020	J022	E	E	E	022	J025	J028	
23	J024	J023	E	J020	E	J024	E	G	G	033	035	J0276	G	J030	G	G	021	E	E	E	E	E	E	E	
24	E	J019	022	J019	022	E	E	S	G	034	J035	032	J033	J0266	027	028	023	J028	022	E	E	E	E	E	
25	E	020	E	E	E	E	E	E	030	J029	J033	G	G	G	G	024	J021	E	E	E	023	J020	J025	J040	E
26	J018	E	J018	E	E	E	E	E	J025	034	J030	030	J033	G	G	028	023	J018	E	E	E	E	E	E	
27	022	020	E	E	J019	E	E	S	026	029	030	G	G	G	G	J0256	G	J029	022	E	E	E	E	E	
28	E	021	E	J018	E	E	J020	S	027	G	030	032	031	G	G	G	G	E	J018	E	E	E	E	E	
29	E	E	020	E	E	E	E	E	023	G	034	033	033	029	G	G	023S	023	E	E	E	E	E	E	
30	E	E	E	020	E	E	E	S	G	030	G	0216	G	G	G	J0226	J030	J021	J020	020	E	J033	J027	J028	
31	022	J018	021	J019	J019	J021	E	S	G	C	037	G	G	G	029	0226	J025	E	J021	J019	023	E	E	022	
No.	31	31	31	31	30	31	31	20	31	30	31	31	31	30	30	30	31	31	31	31	31	31	31	30	
Median	020	021	020	020	020	017	E	E	025	030	032	032	030	028	G	024	023	021	020	019	018	020	018	022	
U.Q.	024	023	024	023	022	021	020	021	029	033	035	035	033	033	031	028	033	025	023	023	023	025	025	028	
L.Q.	E	018	E	018	E	E	E	E	023	029	029	G	G	G	G	G	020	E	E	E	E	E	E	E	
Q.R.	005			005					006	004	006						013								

The Radio Research Laboratories, Japan

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

foEs

Lat. 39°43.5' N  
Long. 140°08.2' E

Akita

IONOSPHERIC DATA

0.1 Mc

135° E Mean Time (G.M.T. +9h)

fbEs

Jan. 1964

Day	00	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	020	030	030	030	029	026	026	020	018	E	E	E				S	
2	E	E	E	E	018	E			024	U030R	031	020	030	030	022	022	018	E	E	E	E			E	
3									020	027	030	029	028	028	025	023					E	E	E	E	
4									024	030	030	041	049	A	035	038	018		E	A	A	A	E	A	
5	E	A	E	E	E	E	E	S	022	029	030	030	029	027	028	035	025	018	E	E	E	E	020	A	
6	A	017	018	017	E	E	E	S	023	031	035	030	030	028	035	025	020	E	E	E	E	019	E	018	
7	E	019	A	A	E	E	E		023	U026R	028	030	028	020	025	021	021	E							
8			018	E	E	E	E		023	027	030	033	019G	021	020	C	018	E	018						
9	E	E	018	E	E	E	E	E	028	030	030	030	030	029	027	025	020	023	020	E	018	E	E	E	
10	E	E	E	E	E	E	E	E	024	027	028	028	029							E	E	E	E	E	
11	017	E	E	E	E	E	E		025	027	028	028	038	030	029	026	020	019	E	E	E	E	E	E	
12	E	017	E	017	E	E	E		024	027	028	029	029	028	027	023	020	017			E	E	017	E	
13									027	029	029	027G	018G						017	E	017	E	E		
14									021	027	017G	034	033	030	028	025	020	E	E	E	028	A	A	019S	
15									028	030	017G	035	027	032	033	029	023	A	A	A	A	017	017	017	
16	E	E	017	E	E	E	E	017	027	026	029	029	019G	019G	017G	017G	021	018	E	E	E	E	E	023	
17	E	E	E	E	E	E	A	A	024	019		020G	020G				E	E			E	E	E	E	
18	E	019							039	022	032		026G	U029R	020G	018	018							E	
19	E	E	021	022	E	E	E	S	025	024	032	031	030	U030R	S	029	020				E	017	017	017	
20	E	017							024	029	029	024G		S	028	018G	020		E	017	020	A	018	018	
21	017	018	018	E	E	E		S	021	028	029	020G	020G	020G	030	017G	019	017	020	017	E	E	019	017	
22	E	017	E	E	S	E	E	018	027	030	020G	032	020G				018	E						E	
23	E	E	E	E	E	E	E		027	029	019G			022		020	020							E	
24								S	027	020	031	018	018G	018	027	022	022	E	E					E	
25									025	028	029				024	021	021			E	E	E	020	E	
26	E		E						023	026	028	030	030			028	021	E						E	
27	E	E	E		E			S	022	026	029				018G			E	E						
28									024	030	032	030							E						
29			E						017G	034	033	033	U029R			018	017								
30				E				S	030		019G				017G	018	018	017	020	E	E	E	E	E	
31	E	E	E	E	E	E	E	S	C	035				029	017G	020	020	018	018	018	017			017	
No.																									
Median																									
U.Q.																									
L.Q.																									
Q.R.																									

fbEs

Lat. 39°43.5' N  
Long. 140°08.2' E

Akita

IONOSPHERIC DATA

0.1 Mc 135° E Mean Time (G.M.T. +9h)

f-min

Jan. 1964

Day	00	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	017	017	017	017	017	017	017	017	E	E	E	E	E	E	E	E
2	E	E	E	E	E	E	E	E	017	017	017	017	017	017	017	017	E	E	E	E	E	E	E	E
3	E	E	E	E	E	E	E	E	E	017	017	017	017	017	017	017	017	E	E	E	E	E	E	E
4	E	E	E	E	E	E	E	E	017	017	017	017	017	017	017	017	017	E	E	E	E	E	E	E
5	E	E	E	E	E	E	E	E	017	017	017	017	017	017	017	017	017	E	E	E	E	E	E	E
6	E	E	E	E	E	E	E	E	017	017	017	017	017	017	017	017	017	E	E	E	E	E	E	E
7	E	E	E	E	E	E	E	E	017	017	017	017	017	017	017	017	017	E	E	E	E	E	E	E
8	E	E	E	E	E	E	E	E	017	017	017	017	017	017	017	IO17C	017	E	E	E	E	E	E	E
9	E	E	E	E	E	E	E	E	017	017	017	017	017	017	017	017	E	E	E	E	E	E	E	E
10	E	E	E	E	E	E	E	E	017	017	017	017	017	017	017	017	017	E	E	E	E	E	E	E
11	E	E	E	E	E	E	E	E	017	017	017	017	018	017	017	017	017	E	E	E	E	E	E	E
12	E	017	E	E	E	E	017	017	017	017	017	017	017	017	E	017	017	017	E	E	E	E	017	017
13	E	E	017	E	E	E	017	018S	017S	017	017	017	017	017	017	E	017	017	E	E	E	E	017	017
14	017	E	E	017	E	E	E	017	E	E	017	017	017	017	E	E	017	017	E	E	E	E	017	017
15	E	E	E	E	017	E	E	017	017	017	E	E	E	017	E	017	017	017	E	E	E	E	017	017
16	017	E	E	E	E	017	017	017	017	E	017	E	017	E	E	017	017	017	E	E	E	E	E	E
17	E	E	E	E	E	E	E	E	017	017	017	018	018	020	018	019	019	019	E	E	E	E	E	E
18	E	E	E	E	E	E	E	E	017	017	019	025	020	020	017	017	017	017	E	E	E	E	E	E
19	E	E	E	E	E	E	E	E	017	017	E	E	E	017	EO35S	017	E	E	E	E	E	E	017	017
20	E	017	017	017	017	E	018S	E	017	017	017	017S	EO20S	EO45S	017	017	017	E	E	E	E	017	017	
21	017	E	017	E	E	E	E	EO18S	017	017	017	017	017	E	E	017	017	017	E	017	E	E	E	
22	E	E	E	E	S	E	E	018	017	017	017	018	017	017	017	017	017	E	E	E	E	E	E	
23	E	E	E	E	E	E	E	E	017	017	017	017	017	017	017	017	017	E	E	E	E	E	E	E
24	E	E	E	E	E	E	E	E	017	017	017	017	017	017	017	017	017	E	E	E	E	E	E	E
25	E	E	E	E	E	E	E	E	017	017	017	017	017	017	017	017	017	017	E	E	E	E	E	E
26	E	E	E	E	E	E	E	E	017	017	017	017	017	017	017	017	017	017	E	E	E	E	E	E
27	E	E	E	E	E	E	E	E	EO19S	017	017	017	017	017	017	017	017	017	E	E	E	E	E	E
28	E	E	E	E	E	E	E	E	017	017	017	017	017	017	017	017	017	017	E	E	E	E	E	E
29	E	E	E	E	E	E	E	E	017	017	017	018	018	018	017	017	E	017	017	E	E	E	E	E
30	E	017	017	E	E	018	017	018S	E	017	017	017	017	017	017	017	E	E	E	E	E	E	E	E
31	E	E	E	E	E	E	E	017	017	IO17C	017	018	017	017	017	017	017	017	E	E	E	E	017	017
No.	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
Median	E	E	E	E	E	E	E	E	017	017	017	017	017	017	017	017	017	017	E	E	E	E	E	E
U.Q.																								
L.Q.																								
Q.R.																								

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

The Radio Research Laboratories, Japan

f-min

Lat. 39°43.5' N  
Long. 140°08.2' E

# IONOSPHERIC DATA

## Akita

135° E Mean Time (G.M.T. +9h)

M(3000)F2 0.01

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	I300F	295F	F	F	F	F30F	380	390	375	330H	360	370	370	350	340	370	365	315	345	350	325F	325S	F	F	
2	F	F	F	F	F	F	F	365S	375S	320	365	350	340R	350	365	380	340	315	340	355	280	285S	260	310	
3	305	315	280S	270	270	310	335	340S	325	345	365	365	355	350	345	370	360	320	335	305F	1330F	1270F	285S		
4	340	300	355	280	300F	345S	330S	335S	350	355	355	1370R	365	1350A	340	355	365	310	345	A	A	A	F	A	
5	F	A	F	F	F	F	320F	345S	370	350	355	370	305	360	355	330	380	360	345	325	340	335	F	A	
6	A	F	F	F	F	F	F	S	330	365	1350R	380	325	355	370	370	375	335	335	335	F	F	F	F	
7	F	F	A	A	300S	320F	1320F	350S	360	340	350	1360R	375	380	390	370	360	335	315	340	335	355	1305F	1310F	
8	290F	295	340	355	320F	295F	300S	360	350	340	370	340	380	325H	370	1355C	380	360	315	340	1320R	300S	310	F	
9	F	F	F	330F	325	320	1320R	330	355S	370S	340	375	365	370	345	340H	340	325	350	335	330	305	1310S	1300F	
10	I305F	310	325	300	330	325	350	370S	1370S	350	360S	365	370	320	355	370	325S	325	320	340	350	280S	280F	1280F	
11	290F	320	1310F	1300F	1315F	1355R	325	340S	350	340	360	395	370	370	370	370	350	340R	330	1330R	315	1310R	310	300	
12	310	325	330	340	330	330	310R	350S	370	365	360	395R	350	360	375	355	380	330S	330	340R	355R	310R	310	325	
13	305F	305F	310	350	FS	FS	FS	370R	350R	345	365	380	360	310	355	375	390	340	340R	345	370	295	290	285	
14	315	315	345	1360S	335	330F	325F	1370S	390R	335	340	370	380R	370	360	390	380S	340	365	340R	A	A	RS	RS	
15	F	FS	F	F	F	F	F	350S	340S	360	340	J360R	350	350	320	355	1375R	1355A	1360A	1355A	360	1310R	315	1300F	
16	1305F	305F	310R	315F	1330F	310F	1335F	J360R	345R	375	345	355R	370	345	345	385	350	345	345	330	FS	F	F	305	
17	325	320	295	290	280	280	A	A	350	365	335	355	350	335	350	375	370	350S	280	335S	RS	F	F	295	
18	310	1320R	295F	305	330F	330	310F	330S	330	350	360	360	360	365	345	390	365	350	325	335	325	335	1330F	345F	
19	1315R	310F	310F	1320F	350F	1330F	1325F	1350S	380	370	355	360	355	370	1350R	375	385R	365	290	325R	330R	350	1315F	310F	
20	325R	310S	315R	310R	350F	F	FS	355R	1370R	1375R	365R	375R	320R	340R	370	365	375	J340R	290S	360S	340R	1315A	310	310S	
21	1310F	1310F	305F	330F	325F	330F	370F	360S	390R	375R	360	375	335	350	355R	360R	365	335	320	310	1355R	335	RS	FS	
22	FS	FS	FS	FS	S	FS	350F	350S	380R	315H	345	355	375	350	1350R	360	355	335	340	350	340	300	330	295	
23	315F	1305F	310F	325	1320F	320	1365R	350	365	365	360	380	370	370	330	390	365	355	330	310	345	320S	320S	325	
24	330	285F	F	F	F	F	335S	350S	1360S	310H	360	350	370	360	345	390	365	360	325	340	320	295	300	310	
25	295	305	305	325	330	300	300S	345	350	330	340	350	1360R	375	360	355	1350R	335	315	330	345	1355F	1290F	300F	
26	1310F	305F	320F	325F	315F	1325F	320F	345	350	335	340	365	385	365	370	320	360	355S	300	335	1330F	1325F	315	300F	
27	330	1305F	1305F	320	340F	FS	FS	360S	1360S	345	315H	355H	365	370	370	330	375S	355	340	335	315	300	295	1310F	
28	1315F	F	F	F	F	F	F	FS	S	355H	335	385	360R	1370R	355	380R	380S	320R	330R	1350R	335S	320	1315R	310R	
29	FS	FS	FS	F	F	1335F	340R	360S	1370R	365	335	360R	355	340H	365	380R	390R	320R	330R	275R	1345R	295F	290	300	
30	315	300	330R	J365S	365	290R	1300R	J335R	1350R	335	345	365	355	365	385	370	365	345	315	320	345	295F	1295F	315	
31	340S	325	325	315S	340	1310F	1310F	350	360S	1350C	355	355	345	350R	J325R	375R	365R	365	320	345	315	290S	280	280	
No.	23	22	21	22	22	21	24	28	30	31	31	31	31	31	31	31	31	31	31	31	30	26	23	24	
Median	310	310	310	320	330	325	330	350	360	350	355	370	365	340	330	335	340	330	340	330	335	340	310	310	300
U.Q.																									
L.Q.																									
Q.R.																									

The Radio Research Laboratories, Japan

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

M(3000)F2

Lat. 39°43.5' N  
Long. 140°08.2' E

Akita

IONOSPHERIC DATA

135° E Mean Time (G.M.T. +9h)

0.01

M(3000)F1

Jan. 1964

Day	00	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	I385L	I405L	I405L	LH	L								
2										L	L	420L	355L	380L	L	L								
3										L	L	L	L	L	L	L								
4										L	L	A	A	A	A	A								
5										L	L	L	L	L	L	L								
6										L	L	385L	I390L		L	L								
7										L	LH	I380L	380L	L	L	L								
8										L	L	I380L	370L	L	L	C								
9										L	L	L	385L	L	L									
10										L	L	380L	390	I430L	I420L									
11										L	I365R	I365L	I370A	L	L	L								
12										L	L	I375L	375L	350L	L	L								
13										L	I380L	350L	380L	I360L	370L	L								
14										L	L	L	375L	I390L	370L	I420L								
15										L	L	365L	390L	375L	355L	L								
16										335L	365	380	360L	I390L	L	L								
17										L	L	L	L	L	L									
18										L	L	I380L	I385L	I395L	L									
19											355L	355L	365L	I370S	L	L					L			
20										I385L	390L	I375L	370L	I355S	I370L	I395L								
21									435	I400L	375L	380L	375L	L	L	I400L								
22										L	R	375	I375L	400	I400L									
23										L	L	L	I400L	L	L	L								
24										I370L	390L	385	380	410L	410L									
25										L	L	375L	380	405	420H	420								
26										L	LH	380	385L	395	L	L								
27										L	L	I395L	I390L	425	425	I420L								
28										L	450	350	355L	410L	390L	I400L	I410L	L						
29										L	I400L	360L	370L	355L	375L	LH	L							
30										355	360L	365H	395	380	I385L	405L	410							
31										I400C	I370L	360	365L	I380L	350	LH								
No.									1	7	10	23	27	20	14	7	1							
Median									435	I4400	I3370	375	380	385	I380	I410	410							
U.Q.																								
L.Q.																								
Q.R.																								

The Radio Research Laboratories, Japan

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

M(3000)F1

Jan. 1964

1 km

f'F2

IONOSPHERIC DATA

Akita

Lat. 39°43.5' N  
Long. 140°08.2' E

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											255	250	245	245	260	220								
3											245	250	270	250	240	230								
4											245	245	245	260	250									
5											270	230	I245A	I245A	245	245								
6											265	245	255	245	245									
7											250	240	300		230	230								
8									240	245	245	240	245	245	230	230								
9									245	245	265	240	250		C									
10										245	250	245	250	245										
11									275	240	240	235	250	245										
12									260	240	215	235	240	240	240									
13									255	235	230	250	260	260	240	230								
14									245	250	240	245	I265L	260	230									
15										240	240	245	240	250	220									
16											250	270	255	275L	300	240								
17									240	275	245	250	245L	290	235									
18										250	250	275	255	245										
19										245	250	250	255	250	255									
20											265	270	240	255	235		220							
21									240	230	240	260	230	240	245									
22								200	230	245	245	270L	250	245	235									
23									260	245	245	245	240	245H										
24									250	250	245	245	250	270	240									
25										245	265	245	250	250										
26									280	255	255	265	250	245	235									
27									270	245	245	240	245	250	265									
28									225	245	245	255	250	245	250									
29									225	210	280	240	230	235	255	230	220							
30									210	240	250	260	290	240	220	210								
31									290	275	245	250	250	235	245	220								
									I250G	275	245	290	255	325	230									
No.									4	18	29	31	30	30	22	4								
Median									220	250	245	250	250	245	235	220								
U.Q.																								
L.Q.																								
Q.R.																								

f'F2

Sweep 1.60\_Mc to 20.0 Mc in 20\_\_sec in automatic operation

The Radio Research Laboratories, Japan

Lat. 39°43.5' N  
Long. 140°08.2' E

Akita

IONOSPHERIC DATA

1 km 135° E Mean Time (G. M. T. +9h)

R'F

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	270	E295E	E295E	290	290	245	215	200	205	230	245	250	230	210	195H	230	210	230	230	220	240	260	240	240
2	260	270	255	285	250	250	200	210	205	255	245	195	225	220	235	240	205	240	220	240	290	305	E330E	255
3	265	260	E310E	A	A	275	240	220	240	245	240	245	220	215	205	230	210	225	240	240	220	E255E	E330E	E305E
4	240	275	245	E330E	E305E	250	E260E	225	220	220	250	A	A	A	A	225	240	240	230	A	A	E290E	I260A	
5	E290E	A	280	255	255	290	250	230	230	240	230	240	205	245	240	210	210	210	225	255	225	240	A	A
6	I225A	245	240	220	240	250	230	205	220	260	I230A	225	195	240	I240A	235	210	210	240	245	210	A	E300E	270
7	E295E	A	A	A	E290E	270	270	230	225	215	200H	235	240	200	200	200	230	240	250	240	240	240	E300E	E310E
8	E310E	290	240	220	275	E295E	E290E	225	230	235	245	225	240	205	245	I220C	205	230	280	220	230	E305E	280	290
9	E290E	E320E	255	245	255	230	245	240	220	245	245	230	220	225	205	230	290	225	245A	245	250	260	260	E280E
10	E295E	280	260	290	245	245	220	220	230	250	240	205	205	200	205	245	230	240	230	225	215	E300E	E305E	E325E
11	E305E	270	E280E	E290E	270	215	245	240	240	220	200	210H	I205A	235	245	230	210	240	245	225	275	290	270	300
12	275	260	260	250	250	250	295	230	220	240	225	210	200	195H	230	215	215	220	250	230	225	E295E	270	275
13	285	270	275	230	275	250	225	210	210	225	190H	210	200H	200	230	230	220	230	245	235	215	330	315	310
14	280	260	245	230	265	280S	295	230	210	345	230	240	225	220	205	210	220	230	230	255A	A	A	320	320
15	300	280	290	290	300	255	250	245	230	240	225	240	I230A	210	210	240	210	I235A	I225A	I245A	245	E270S	280	300
16	300	295	265	290	255	300	255	225	230	210H	200	190	185H	230	250	240	230	225	230	245	245	E305E	E290E	A
17	245	245	E295E	305	A	E305E	A	A	245	230	210	220	245	235	225	245	235	245	E300E	240	I215A	E280E	270	265
18	250	I275A	E290E	285	245	240	250	230	I225A	245	245	210	205	240	225	245	230	220	245	235	245	245	240	240
19	E305E	E280E	I280A	I255A	235	245	260	210	220	220	245	225	240H	250	I225S	I230A	225	220	300	255	245	245	260	280
20	255	285	275	260	250	250	250S	225	225	240A	200	230	200	I250S	230	205	225	225	225	220	245	I280A	280	285
21	310	300	295	260	265	265	220	205	190	230	220	220	205	225	240	220	225	220	250	270	230	250	305S	310
22	260	310	275	250	I235S	200	250	210	210	220	205	230	200	205	200	240	240	225	225	215	220	270	240	270
23	270	280	270	250	280	265	200	230	220	235	215	245	210	205	205	230	225	210	240	250	225	245	245	245
24	240	260	E295E	245	275	245	220	205	230	215	205	220	210	200	195	250	235	205	245	240	240	E295E	280	255
25	275	280	290	255	240	E295E	E260E	245	245	250	220	205	220	205H	195H	195	240	225	255	240	200	I230A	E310E	270
26	290	265	245	245	255	250	245	230	245	220	205H	220	225	205	235	250	225	210	250	235	225	240	250	260
27	250	E290E	290	255	240	240	220	220	205	195	200	245	195	235	200	200	220H	230	220	235	240	275	E295E	280
28	270	290	260	230	220	230	205	205	220	190	250	235	205	200H	180H	225	220	245	210	215	220	240	260	265
29	295	300	295	250	235	255	245	220	210	190H	240	250	240	225	240	225H	220	225	245	E300E	230	280	300	295
30	275	280	255	225	225	E295S	300	250	240	240	230	200H	215	210	240	205	200	210	270A	240	225	E300E	E290E	250
31	235	255	245	280	255	E300E	E280E	220	240	I220C	I220A	225	200	225	215	190H	225	220	240A	245	270	305	340	330
No.	24	26	24	27	27	26	30	31	31	31	31	30	30	30	30	31	31	31	31	30	29	20	20	25
Median	270	E280	260	255	255	250	245	225	225	230	225	225	210	220	225	230	225	225	240	240	230	E260	270	270
U.Q.																								
L.Q.																								
Q.R.																								

The Radio Research Laboratories, Japan

A 10

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

R'F

Lat. 39°43.5'N  
Long. 140°08.2'E

IONOSPHERIC DATA

Akita

1 km  
RES

Jan. 1964

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

Sweep 1.60\_Mc to 20.0\_Mc in 20\_\_sec in automatic operation

The Radio Research Laboratories, Japan

RES

A 11



IONOSPHERIC DATA

Akita

Lat. 39°43.5' N  
Long. 140°08.2' E

Types of Es

Jan. 1964

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	f	f	f		f	f2	f2	f	c	h	h h	h	h	h3	h	1	1	f	f						
2	f2	f	h	f6	f2	f	f f2	f	h	h213	h 13	1 h	h2	h	h	1	h2	f	f	f	f	f2	f	f2	
3				f					h	h	h2	h2	h	h	h	h				f5	f4	f2	f2	f3	
4				f			f f2	f	e2	h 1	h212	13	13	13	14	12	1	f	f2	f2	f2	f2	f3	f2	
5	f2	f3	f2	f2	f2	f2	f	f	h	e3	13	13	12	1	12	12	13	f	f2	f2	f	f2	f2	f2	
6	f3	f2	f2	f3	f2	f2	f2	f2	e2	e4	13	14	14	13	13	12	12	f	f	f	f	f2	f2	f2	
7	f2	f2	f2	f2	f	f	f	f	h2	h	h2	c	12	1	12	1	1	f	f						
8	f	f	f2	f	f	f	f	f	h	h2	h	h	1	12	12	1	f2	f2	f2						
9	f	f	f2	f2	f	f2	f2	f	h	h2	h	h	h	h	12	1	f3	f4	f3f	f3	f2	f	f	f2	
10	f2	f2	f3	f2					h	h	h	h	h	h	12	1	f2	f	f	f	f2	f2	f2	f2	
11	f2	f2	f2	f	f	f2	f2	f	h2	12	c	e2	12	12	h 1	h 1	h	f2	f2	f	f	f	f	f	
12	f	f	f2	f2	f2	f2	f	f	h2	h	h2	c	h2	e2	h	h	12	f	f	f	f2	f	f	f	
13	f	f	f2	f2	f2	f	f	f	h h	h 13	12	1	1	1	h213	h212	1	f	f	f3	f3	f3	f3	f2	
14				f	f	f2	f2	f2	12	13h3	12h	h312	h213	e212	c3	e4	f4	f2	f2	f3	f	f	f	f	
15	f	f	f	f	f	f	f	f	h21	h 1	13h	h 13	h212	e212	c3	1	h	f	f	f	f2	f2	f2	f3	
16	f2	f2	f2	f	f	f	f	c	h4e2	e2h2	h 1	h 1	1	1	1	1	h	f	f	f	f2	f2	f	f2	
17	f2	f	f	f	f4	f2	f4	f4	12	1	1	1	1	1	1	1	1	f	f	f	f	f	f	f	
18	f	f	f	f3	f2	f2	f	f	12	1 h	1 h	1	1	h	1	1	1 h2				f	f	f	f	
19	f f	f	f3	f3	f2	f2	f	f	e3	12	h2	h 1	h 1	h 1	h	1	13	f	f	f	f2	f3	f2	f2	
20	f	f	f	f	f	f	f	f	h2	e2	c	1	1	1	1	1	13				f2	f3	f2	f2	
21	f	f2	f2	f	f	f	f	h	c	12	12	12	12	12h	12	1	12h	f2	f2	f	f	f2	f2	f	
22	f	f2	f	f	f	f	f2	h	h	h c3	12	h h	1	1	1	1	1	f			f	f	f	f	
23	f2	f2	f2	f	f	f	f		h	h	h	1	1	12			h2				f	f	f	f	
24	f	f	f2	f	f	f	f		h	h	1	h21	1	1	1	h 1	h2	f2	f						
25									h	c	c					h	h			f	f	f3	f2		
26	f		f2						e2	h	h	c	c2	h	h	h	h21	f							
27	f	f			f				h	h	h	h	12	12				f	f						
28				f			f		h	h	h	h 12	h 12					f	f						
29									1	h	h	h	h	h	1	1	1	f							
30				f					h	h	h	1						f	f						
31	f	f	f	f	f	f	f	f	h	h2				h	h	1	1	f	f2	f2	f	f2	f2	f2	
No.																									
Median																									
U.Q.																									
L.Q.																									
Q.R.																									

Types of Es

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

The Radio Research Laboratories, Japan

Lat. 35° 42.4' N  
Long. 139° 29.3' E

Kokubunji Tokyo

IONOSPHERIC DATA

foF2

Jan. 1964

0.1 Mc 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	027	028	F	F	J043S	J035R	J041S	S	S	048	057	070	071S	064	049	062	049	035	J038S	S	J030S	031	F	029F
2	034	034	F	F	J043S	J035R	J041S	S	J051R	045	066	064	070	071	067	062	050	049	J035S	J035R	037	035S	I036S	F
3	F	040	I037A	033	F	031	030	044	054	061	J079S	I074S	068	064	064	I063R	049	R	031	I036S	035	J029S	024F	F
4	029F	023	026	033	025	025	024	J041S	I051S	033R	039	072	059	068	064	067	054	034	036	031	A	A	A	A
5	024F	I027C	026	026	I024A	023	027	S	051	054	062	080	J079S	074S	064	I060C	055	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	084	J071S	052	J074S	074S	060	045	I029C	025	032	F	A	025	I029A
7	A	A	A	A	025	021	C	C	C	049	I063R	J074S	070	067	J053S	051	044	J040S	027	J026R	030	I024S	J024R	J024R
8	024F	028	036	023	021	I021S	020	043	049	056	069	J031S	081S	069	067	063R	J023S	036	031	I040S	038	I024S	I025A	028
9	F	F	032F	030	028	028	025	033S	050	049	061	069	057	059	060	053R	047S	032	032	029	029	I028S	I029A	032
10	028F	035	036	033	033	027S	031S	J045S	049	054	085	074	062R	053	064	056	046	040S	I045S	031	085	024S	027	F
11	028	031F	025	027	026	031F	031	I042S	057	I068R	I069R	I062R	057	J064R	061	069	052R	039R	041S	S	034	032	I032A	I034A
12	I034R	034	I037S	031	025	023	024	039S	053	058	J084R	066	053	057	064	050	048	J043S	038	I040S	031	023	025	029
13	030	030	029	J029R	025	028F	024	I042S	050	I060S	063R	J062R	I054R	053	064R	060	050	034	028	034	034	024	025	028
14	028	030	035	J021R	019	020	J020R	J042S	049	047	064R	058R	I058R	053R	J025S	060	044	038	034	033	025	022R	F	F
15	C	F	023	025	I023A	025	C	C	C	047	059	I067R	057	I054A	I058A	066	J056R	I038A	I034A	027	026	025	026	028
16	029S	029F	029	F	025F	F	I022A	J043C	054	061	078S	S	J064S	053	054S	067	049	I040R	I037S	I036A	033F	026	F	031
17	027	026	024S	027	I027A	J026S	030	A	058	062	I058S	068	058	060	056	J052R	048R	031	024	033	I038S	FS	027F	I030A
18	033	030	030	031	030	028	029	J044S	055	I061R	I070R	069	C	055	060	055	048	044S	030	J040S	J041S	031	030	029
19	029	030	035	033R	027	022	024	J047S	046R	049	054	060	063	I078R	061	062	051	035	025	029	034	034	028	I030C
20	034	032	033	033	029	025	028	J043S	053R	055	S	066R	I065R	066	J033S	I058R	052R	I046A	I043S	A	I027A	026	030	030
21	029	029F	F	023F	F	F	034	044	I048S	050	063	J064R	058	057S	I058R	052	I050A	A	031	033	I039S	031S	A	A
22	031	028F	028	028	027	023	025	J039R	I053R	I050R	I062R	064R	071	056H	050R	054S	050	045	I044S	I046S	030	023	026S	029
23	029	027S	030	030	029	029	030	044	049S	052	I063R	I070R	060	J057R	I050R	056	J053R	042S	027	026	030	026	028	030
24	033	026	I028S	028	028	029	032	J041S	I046S	045	053	I063R	J081S	J056R	J053S	J055S	059S	J042S	I031S	I037S	036	025	028	029
25	030	030	I029S	033S	025	024	J024S	J042S	050R	045S	J066R	069	067	061	I059R	048	048	043S	033	I034S	I043S	025	028	F
26	030	030	029S	030	030	026S	028	I048S	053R	063	J083S	091S	074S	I051R	J056R	055	065	049S	035	I037S	032	030	027	028
27	029	029	F	029	I033R	I024S	025	J045S	049	043R	J053R	058	061	I064R	059R	053	057	041S	033	029	026R	028	025	028
28	028	032	029	F	J031S	035	F	J030F	S	049	J054R	053R	J073S	063R	053	I032S	060	049	034	I048S	I040S	026	028	028S
29	030S	029	029	031	024	031S	J033S	J035R	048R	050	051	061	062	J064R	J063R	058R	052	037S	037	034S	037S	036	035	I034S
30	J037S	035S	I041S	032S	024	024	021	J041S	J056R	J063R	I074R	087	063	062	059	053	047	039	029	034S	I037S	026F	027	032
31	I023S	027	030	023	024	022	J020S	J039S	I047S	049	054R	071	063R	053	059	051	I051C	I045S	029S	028	027	J027S	029	029
No.	26	27	26	26	28	27	28	24	27	30	30	30	30	31	31	31	31	28	30	28	27	27	25	23
Median	029	030	030	030	027	025	023	042	050	052	063	069	063	060	059	058	050	040	033	034	033	027	027	029
U.Q.	031	032	035	031	030	029	030	044	054	060	070	073	070	066	064	062	053	043	038	038	037	031	028	030
L.Q.	028	028	028	027	025	023	024	041	049	049	058	064	058	054	055	053	043	035	029	030	029	025	025	028
Q.R.	003	004	007	004	005	006	003	005	011	012	012	009	012	012	009	009	005	008	009	008	008	006	003	002

The Radio Research Laboratories, Japan

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

foF2

K 1

Lat. 35°42.4'N  
Long. 139°29.3'E

Kokubunji Tokyo

IONOSPHERIC DATA

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

foF1

Jan. 1964

Day	00	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								L	L	L	L	L	L	L	L	L								
3								A	A	A	A	A	A	L	L	L								
4								L	L	L	L	L	A	L	L	L								
5								L	L	L	L	L	U420L	L	L	C	C							
6								C	C	L	L	L	L	L	L									
7								C	C	L	L	L	L	L	L									
8								L	L	L	L	L	L	L	L	L								
9								L	L	L	L	L	L	A	A	L								
10								L	L	L	L	L	L	L	L									
11								L	L	L	B	L	L	S	L									
12								L	L	L	L	L	L	L	L									
13								L	L	L	L	L	L	L	L	L								
14								L	L	L	L	L	L	L	L	L								
15								C	C	L	L	U420L	A	A	A		A							
16								L	A	L	A	L	L	A	L									
17								A	L	L	L	420L	L	L	S	B								
18								L	L	L	L	L	C	L	L									
19								L	L	L	L	L	L	L	L	L								
20								L	L	L	L	L	L	B	L	L	A	A						
21								L	L	L	L	L	L	L	L									
22								L	L	L	L	400	L	L	L	L								
23								L	L	L	L	L	L	L	B	L								
24								L	L	L	L	L	L	L	L	L								
25								L	L	L	L	L	L	L	L	L								
26								L	S	L	L	L	L	L	L	S								
27								L	L	L	L	L	L	L	L	L								
28								L	S	L	L	L	L	L	L	L								
29								L	L	B	410L	L	L	U420L	L	L								
30								L	L	L	L	L	L	L	L	S	L							
31								L	L	L	L	L	L	L	B	L	C							
No.								4	4	1	1	1	1	1	1									
Median								415	415	U420	U420	U420	U420	U420	U420									
U.Q.																								
L.Q.																								
Q.R.																								

The Radio Research Laboratories, Japan

Sweep 1.0 Mc to 20.0Mc in 20\_sec in automatic operation

foF1

K 2

Jan. 1964

foE

0.01 Mc 135° E Mean Time (G.M.T. +9h)

IONOSPHERIC DATA

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							C	B	215	265	I270A	300	305	300	250R	230	B	B						
2							B	B	205	I250A	I270R	I300A	I300R	I290R	I255A	255	B	S						
3							B	B	240	I270A	260	A	A	I290R	I275R	I240A	B	B						
4							C	B	A	A	280	I280R	A	A	A	250	I205B	B						
5							B	B	A	A	A	A	A	A	A	C	A	C						
6							C	C	C	A	A	A	A	A	A	A	A	C						
7							C	C	C	A	A	A	A	A	R	S	B	B						
8							S	B	240	A	B	A	A	275R	I280S	I255R	205R	C						
9							C	B	205	260	A	A	A	A	A	A	210	B						
10							B	B	I210A	250	275	290	A	A	R	I240R	B	B						
11							B	B	R	I240R	I280R	I300B	305	295	B	A	B	B						
12							B	B	I230A	I260A	300	A	A	A	I250R	210	B							
13							C	B	U230F	270	R	R	310	R	R	R	215	B						
14							C	B	225	260	300	I305R	315	I295A	285	I255S	A	B						
15							C	C	C	260	300	I310A	I300R	I295A	A	A	A	B						
16							B	B	A	A	A	A	A	A	280	270R	B	B						
17							B	B	A	A	A	R	B	B	280S	B	B							
18							B	B	A	270	B	B	C	A	B	A	210R	B						
19							B	B	A	A	S	S	U300S	I305S	I300R	260S	B	B						
20							B	B	A	A	A	A	B	I300B	I290B	265	B	B						
21							B	B	A	260	I275A	I295R	U310R	R	R	A	A	B						
22							B	B	215	A	A	R	S	B	R	S	B	B						
23							B	B	230	A	A	I305R	I315B	B	R	R	A	B						
24							B	B	225	I260A	I280R	300	310	I300A	I290A	I260R	I215B	B						
25							B	B	230	S	A	305	305	I300R	I280R	I250S	210	B						
26							B	200	240	I270A	310	A	S	I300R	280	245	B	B						
27							C	B	220	260	I280R	I290B	I295R	I300R	I285R	285	205	B						
28							C	180	215	I240S	I280R	310	300R	300	290	265	B	B						
29							B	B	I220B	260	I300B	310R	315	I305A	I280R	260	R	B						
30							B	B	245	270	285	300	310	I300R	275	265	A	B						
31							S	B	215	260	280	A	R	B	S	A	C	R						
No.								2	19	19	17	15	15	16	16	13	9							
Median								190	225	260	280	U300	305	U300	U280	255	210							
U.Q.																								
L.Q.																								
Q.R.																								

Note: Parameters reduced to lower frequency range are affected by defects of the ionosonde.

foE

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

The Radio Research Laboratories, Japan

K 3

Lat. 35° 42.4' N  
Long. 139° 29.3' E

Kokubunji Tokyo

IONOSPHERIC DATA

0.1 Mc 135° E Mean Time (G.M.T. +9h)

foEs

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	035M	B	C	C	C	J029	021	B	025	030	030	027G	029G	024G	G	G	B	B	022	B	B	B	B	B	
2	B	S	C	C	C	B	B	B	G	032	032	030	029G	G	026	021G	B	020	J025	041M	C	C	C	C	
3	B	B	J049	049M	J042	035M	B	B	G	027	047M	049	031	G	G	025	B	B	B	021	B	B	B	B	
4	J029	B	J027	C	B	C	C	B	029	025	035	G	043	036	J051	G	B	B	B	J025	J079	J071	032M	030	
5	024	C	031	023	032M	023	J028	022	J027	031	J046	047	032	049M	J030	C	051M	C	C	C	C	C	C	C	
6	C	C	C	C	C	C	C	C	C	C	042	031	038	035	035	034	034	C	023	B	J023	J034	J030	033M	
7	032M	032M	034M	030M	024	B	C	C	C	029	031	030	034	024G	S	S	B	B	S	S	B	B	S	B	
8	B	022	B	B	B	S	S	B	G	029	B	033Y	030	J022G	G	025G	G	017	C	B	B	023	029M	031M	
9	029M	J024	J023	019S	026M	B	C	B	G	G	034	J044	033	J070	091M	034	G	B	B	B	J040	032M	033M	019	
10	J048	033M	023	B	B	S	021	B	J024	030	033	033	035	033	025G	G	B	B	B	B	B	B	B	C	
11	B	J030	J023	J023	020	020	B	B	G	G	G	B	G	024G	031	029	B	B	J024	J029	J025	033M	032M	029M	
12	029M	021	J024	J020	C	B	B	B	024	025	029G	032	031	031	030	G	G	B	C	B	B	B	B	B	
13	B	B	B	B	B	C	C	B	026	033	G	G	G	G	G	G	024	B	024M	B	B	019	030M	J028S	J024
14	B	B	B	B	C	C	C	B	G	029	G	G	G	029	G	G	024	B	024M	B	019	030M	030M	026M	020
15	C	B	B	J030	032M	032M	C	C	C	034	038	039	036Y	038M	J080	048M	032	J070	038M	B	033M	030M	026M	020	
16	J025	025M	J024	J019	C	J023	029M	B	034	034	077M	034	033	J059	G	030	025	032	021	032M	033	J033Y	J025	029M	
17	B	B	021	J020	039M	B	024	J046	039M	J046Y	030	G	B	B	032	B	B	B	C	027M	J058	B	049M	048M	
18	033M	B	C	C	C	C	B	025	029	033	B	B	C	031	B	025	G	B	S	033M	J024	030M	029M	C	
19	B	B	B	028M	032M	B	J022	B	024	027	034	G	G	G	G	G	B	B	024	B	B	B	B	C	
20	B	B	B	B	C	C	B	B	026	035	041Y	039M	B	B	B	G	B	B	044M	087M	J058	035	J029	J027	
21	034M	J029	031M	B	B	B	B	J023S	025	024G	029	027G	033	029G	G	033	049	033	026	B	B	J043Y	048M	034Y	
22	032M	J043	031M	E	024	J024	022	019	027	031	034	G	G	B	G	030	B	B	B	J023	B	S	B	J024	
23	J026	028M	B	B	C	C	B	B	025	028	031	G	B	G	G	026G	026	J025	B	B	B	B	C	B	
24	B	B	B	B	B	B	B	B	G	027	026G	G	G	033M	031	025	023	B	B	B	019	S	J028	C	
25	C	B	B	B	C	C	B	B	G	S	031	G	G	025G	G	G	024	B	B	B	B	B	B	J028Y	
26	026M	J024	B	024	B	C	B	027	G	046Y	G	031	G	G	033	G	025	B	B	C	B	B	S	B	
27	B	B	B	B	B	S	C	B	G	G	G	B	G	G	G	G	023	B	B	C	B	J024S	B	B	
28	C	B	B	B	B	C	C	C	G	S	G	G	G	024G	G	030	G	B	B	B	C	C	B	B	
29	C	B	B	C	B	B	B	B	G	G	B	G	G	029	G	G	G	B	B	B	B	B	B	B	
30	B	C	B	B	S	C	B	B	027	G	G	G	G	023G	G	J022	032	B	J025	B	C	C	C	031M	
31	031M	021	020	020	C	C	S	G	G	031	034	034	G	B	G	034S	C	G	B	B	B	C	C	B	
No.	14	12	13	12	10	7	8	8	27	28	28	28	27	26	29	28	19	9	11	10	11	12	13	14	
Median	030M	026	024	023	029M	024	023	022	024	029	031	G	G	G	G	G	023	027	024	023M	033	032	029M	029M	
U.Q.	033	031	031	029	032	032	026	026	026	032	034	034	033	034	031	030	026	032	026	033	038	039	048	034	
L.Q.	026	023	023	020	024	023	022	G	G	025	G	G	G	G	G	G	G	018	023	025	023	030	028	024	
Q.R.	007	008	008	009	008	009	004			007								014	003	008	035	009	020	010	

Note: Parameters reduced to lower frequency range are affected by defects of the ionosonde.

foEs

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

The Radio Research Laboratories, Japan

K 4

IONOSPHERIC DATA

Lat. 35° 42.4' N  
Long. 139° 29.3' E

Kokubunji Tokyo

0.1 Mc 135° E Mean Time (G.M.T. +9h)

f<sub>o</sub>F<sub>2</sub>

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	B	B	C	C	C	C	017	B	025	029	030	027G	026G	023G			B	B	B	B	B	B	B	B	B
2	B	S	C	C	C	C	018	B	025	032	031	029	E029R	E026R	E026R	021G	B	019	018	036	C	C	C	C	C
3	B	B	A	B	B	B	017	B	027	027	043	040	031			025	B	B	B	B	B	B	B	B	B
4	E015C	B	B	C	C	C	C	B	026	E025R	031	040	034	038	038		B	B	B	B	B	B	B	B	B
5	B	C	019	E015C	A	B	B	B	026	026	037	038	031	035	E030R	C	036	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	035	E031S	038	035	030	034	033	C	B	B	B	B	B	B	A
7	A	A	A	A	B	B	C	C	C	029	E031S	E030S	032	E034S	E024R	S	B	B	S	S	B	B	S	S	B
8	B	B	B	B	B	S	S	B	029	029	B	033	E030R	022G		024G		017	C	B	B	B	019	A	B
9	019	B	E015C	B	018	B	C	B								026		B	B	B	B	020	020	A	B
10	E015C	026	B	B	B	S	C	B	024	029	032	033	U035S	033	E025R		B	B	B	B	B	B	B	B	C
11	B	019	020	B	B	E015C	B	B			B		024G	E031S	E029S		B	B	020	B	B	B	021	A	A
12	B	019	B	B	C	B	B	B	024	025	024G	032	031	031	E030S			B	C	B	B	B	B	B	B
13	B	B	B	B	B	B	C	B	G	031								020	B	B	B	B	C	C	C
14	B	B	B	B	C	C	C	B	029	029			E029R						B	B	B	B	B	B	B
15	C	B	B	017	A	018	C	C	C	034	035	037	043	A	A	036	028	A	A	A	B	017	B	B	B
16	B	B	B	B	C	E015C	A	B	031	028	051	E034S	032	038		E030R	025	028	B	A	020	021	B	B	B
17	B	B	020	B	A	B	B	A	042	038	029		B	B	E032S	B	B	B	C	B	026	B	019	A	A
18	B	B	C	C	C	C	B	019	029	033	B	B	C	E031R	B	E025S		B	S	024	B	022	019	C	C
19	B	B	B	B	020	B	019	B	023	027	E034S						B	B	B	B	B	B	B	B	C
20	B	B	B	B	C	C	C	B	025	028	039	038	B	B	B		B	B	A	019	A	A	B	B	B
21	E015C	019	B	B	B	B	B	B	025	024G	E029R	027G	028G	E029R		E033S	A	A	B	B	B	020	A	A	A
22	016	020	B	C	B	B	019	019	027	030	E034S		B	B	030		B	B	B	B	B	S	B	B	020
23	B	B	B	B	C	C	B	B	025	028	030		B	B	E025R	026	020	020	B	B	B	B	C	B	B
24	B	B	B	B	B	B	B	B	027	E026R			U033S	E031S	020		022	B	B	B	B	B	S	E015C	C
25	C	B	B	B	B	C	B	B	S	031			E025R			E024R	B	B	B	B	B	B	B	B	B
26	018	B	B	B	B	C	B	G		033		031		E033G		025	B	B	C	B	B	B	S	B	B
27	B	B	B	B	B	S	C	B			B					023	B	B	C	B	B	B	B	B	B
28	C	B	B	B	B	C	C	C	S				024G		E030S		B	B	B	B	C	C	B	B	B
29	C	B	B	C	B	B	B	B	B		B							B	B	B	B	B	B	B	B
30	B	C	B	B	S	C	B	B	026					023G		022	025	B	021	B	B	C	C	C	021
31	021	B	B	B	C	C	S		031	031	E034S		B		E034S	C				B	B	C	C	C	B
No.																									
Median																									
U.Q.																									
L.Q.																									
Q.R.																									

f<sub>o</sub>F<sub>2</sub>

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

IONOSPHERIC DATA

Lat. 35° 42.4' N  
Long. 139° 29.3' E

Kokubunji Tokyo

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

f-min

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	016	016	E0150	E0150	E0150	016	E0150	018	016	020	019	021	022	019	022	019	021	017	016	016	016	017	017	016
2	017	E0178	E0150	E0150	E0150	016	016	019	017	017	021	019	019	020	017	017	020	E0165	E0165	E0150	E0150	E0150	E0150	E0150
3	016	016	E0150	016	E0150	E0150	017	017	017	021	021	021	021	021	019	023	019	018	016	016	016	017	E0150	016
4	E0150	017	017	E0150	016	E0150	E0150	019	017	017	021	019	020	019	018	018	026	018	016	016	016	016	E0150	017
5	016	E0180	017	E0150	016	016	016	017	016	018	018	017	019	018	021	C	018	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	019	021	018	019	017	017	C	017	016	016	016	016	016
7	016	016	017	017	017	016	C	C	C	021	025	027	021	021	020	E0308	022	020	E0178	E0208	016	016	S	017
8	017	016	017	016	016	E0198	E0168	019	019	022	034	021	021	021	020	021	018	E0150	E0150	016	016	017	016	016
9	016	016	E0150	016	016	016	E0150	016	018	021	020	021	023	021	020	017	018	018	017	016	016	016	016	016
10	E0150	017	016	016	016	E0188	016	017	017	018	020	021	021	021	021	018	021	017	016	016	017	016	016	E0150
11	016	016	E0150	016	E0150	E0150	017	018	018	019	022	045	024	021	028	022	027	018	017	016	017	016	016	016
12	017	016	016	016	E0150	016	016	018	017	018	020	021	021	021	021	017	017	016	E0150	018	016	015	016	016
13	016	016	016	016	016	016	E0150	018	016	017	021	022	022	021	021	022	018	016	016	016	016	016	E0150	E0150
14	016	016	016	016	E0150	E0150	E0150	018	017	020	020	019	019	022	020	021	017	017	016	016	016	017	016	016
15	C	016	016	016	016	016	C	C	C	019	020	020	021	022	020	021	017	016	016	016	016	016	016	016
16	016	016	016	016	E0150	E0150	017	018	017	019	018	018	020	019	020	021	017	016	017	016	017	017	018	017
17	018	017	018	016	013	017	019	018	018	020	020	027	040	032	022	039	023	019	E0150	016	017	018	016	017
18	016	017	E0150	E0150	E0150	E0150	016	016	020	021	038	038	C	021	038	022	017	019	E0198	016	017	017	016	E0150
19	017	018	017	018	016	016	016	019	017	020	020	021	021	027	021	021	021	018	018	017	017	017	017	C
20	016	016	016	016	E0150	E0150	018	019	019	019	021	019	040	041	039	021	021	018	017	017	017	017	016	017
21	E0150	E0150	016	016	016	016	016	018	016	013	017	020	022	020	021	021	020	019	017	016	017	E0150	E0150	016
22	E0150	016	016	E0150	016	016	017	017	018	020	019	021	026	031	021	E0288	025	018	018	018	018	E0188	016	017
23	016	019	017	017	E0150	E0150	016	018	017	019	021	021	038	041	022	019	017	016	017	017	018	016	E0150	016
24	016	016	016	016	016	016	017	018	017	020	020	021	026	019	017	017	020	017	017	017	017	E0178	E0150	E0150
25	E0150	017	016	016	017	E0150	019	019	017	013	020	021	021	021	021	020	019	019	016	017	017	016	016	016
26	016	016	016	017	017	E0150	016	018	018	019	019	021	021	020	019	020	021	017	017	E0150	017	017	E0188	017
27	016	016	017	017	016	E0188	E0150	017	017	020	019	037	022	021	021	021	018	017	016	E0150	016	017	016	016
28	E0150	017	016	016	016	E0150	E0150	016	013	E0308	020	021	022	020	021	019	019	016	016	016	E0150	E0150	016	016
29	E0150	016	016	E0150	016	016	016	017	023	021	038	020	022	020	020	020	017	013	017	016	016	016	016	016
30	016	E0150	016	016	E0168	E0150	016	013	016	020	019	023	021	020	020	020	017	017	016	016	016	E0150	E0150	017
31	016	016	016	016	E0150	E0150	E0188	016	017	018	020	021	022	042	021	018	C	017	017	016	016	E0150	E0150	016
No.	29	28	30	30	30	30	27	28	28	29	31	31	30	31	31	28	30	29	28	29	30	28	28	29
Median	016	016	016	016	016	016	016	018	017	019	020	021	021	021	021	020	019	017	016	016	016	016	016	015
U.Q.																								
L.Q.																								
Q.R.																								

The Radio Research Laboratories, Japan

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

f-min

Note: Parameters reduced to lower frequency range are affected by defects of the ionosonde.

K 6

Lat. 35° 42.4' N  
Long. 139° 29.3' E

Kokubunji Tokyo

IONOSPHERIC DATA

135° E Mean Time (G.M.T. + 9h)

M(3000)F2 0.01

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	295	290	285	F	305	310	340F	S	S	355	315	330	365S	360	365	355	340	325	J315S	S	J355E	345	F	310F	
2	295	295	F	F	J220S	335	J305R	J340S	J370R	355	350	345	365	355	330	355	360	335	J340S	J355R	290	295S	I290S	F	
3	F	300	I300A	300	F	295	335	340	355	345	J340S	I345S	345	330	345	I345R	355	R	305	I345S	335	J340S	230F	F	
4	305F	315	310	280	355	315	335	J355S	U360S	360R	330	365	325	335	340	340	355	325	305	335	A	A	A	A	
5	290F	I320C	310	340	I320A	280	330	S	360	350	340	340	J360S	335S	360	I360C	380	C	C	C	C	C	C	C	
6	A	A	C	C	C	C	C	C	C	C	370	J365S	325	J350S	U355S	365	375	I360C	325	315	F	A	A	320	I350A
7	A	A	A	A	360	290	C	C	C	355	U335R	J355S	375	360	J370S	355	365	U330S	300	J205R	325R	325	I290S	J290R	
8	275F	230	335	345	290	I290S	300	345	365	340	360	J345S	355S	320	355	365R	J365S	335	310	U330S	325	I315S	I300A	285	
9	F	F	F	310F	330	305	285	320	340S	360	365	360	350	340	335	330R	340S	340	345	315	325	U320S	I300A	310	
10	285F	285	320	300	335	330S	320S	J340S	355	330	340	355	360R	350	335	335	360	320S	U355S	325	325	295S	295	F	
11	270	325F	305	295	305	345F	295	I340S	350	I250R	U350R	U350R	345	J310R	330	365	340R	325R	315S	S	345	315	I315A	I310A	
12	I295R	325	I330S	325	315	305	310	335S	355	330	J355R	365	355	330	360	380	340	J225S	305	I330S	335	305	280	285	
13	300	300	315	J330R	320	320F	310	U355S	370	U350S	365R	J340R	I345R	315	345R	355	360	325	290	335	325	290	300	285	
14	345	330	345	J330R	315	295	J300R	J340S	385	370	345R	360R	U350R	360R	J325S	365	355	345	325	335	325	275R	F	F	
15	C	F	295	315	A	I275C	C	C	C	365	340	U355R	345	I255A	I340A	350	J355R	I360A	I340A	355	315	320	305	285	
16	280S	295F	295	F	320F	F	I315A	C	350	330	335S	S	J225S	340	335S	360	365	I335R	I330S	I320A	315F	290	F	295	
17	310	305	310S	295	I275A	J290S	330	A	325	355	I335S	350	360	350	340	J355R	355R	355	265	315	I320S	FS	295F	I325A	
18	295	300	300	300	330	305	300	J335S	345	U345R	U340R	360	C	360	365	345	350	350S	300	J320S	J340S	350	300	310	
19	280	300	315	340R	330	315	300	J360S	363R	350	330	330	325	U330R	360	355	370	345	325	295	325	350	310	I310C	
20	295	300	305	320	295	320	320	J340S	360R	335	S	360R	U345R	330	J350S	U360R	360R	345	I220A	U340S	A	I205A	305	305	
21	290	285F	F	315F	F	F	350	365	I370S	340	350	J345R	345	350S	I350R	340	I340A	A	315	305	I330S	360S	A	A	
22	310	290F	305	320	330	305	325	J355R	U365R	I370R	U355R	330R	355	325H	350R	350S	360	330	I330S	I350S	315	295	305S	295	
23	290	295S	305	325	310	315	315	365	365S	350	I345R	U355R	335	J340R	U360R	345	J330R	340S	315	325	325	310	320	315	
24	330	305	U305S	320	305	305	325	J345S	I370S	345	320	I335R	J355S	J350R	J330S	J340S	370S	J355S	U320S	U325S	360	285	300	310	
25	305	315	U310S	340S	325	295	J315S	J345S	360R	355S	J345R	360	335	360	I330R	370	355	335S	315	S	S	S	305	285	
26	300	315	310S	335	330	310S	290	U340S	315R	315	J320S	360S	365S	U350R	J335R	345	370	340S	330	I225S	325	330	295	285	
27	290	285	305	305	U340R	S	310	J340S	355	355R	J340R	310	325	U330R	340R	340	360	340S	330	315	330R	300	280	285	
28	290	295	F	J320S	345	F	J305F	S	350	J345R	305R	J345S	355R	345	U345S	350	365	340	U320S	I335S	330	320	285S	285	
29	290S	305	280	310	340	320S	J315S	J345R	350R	340	335	330	345	J330R	J350R	365R	350	340S	320	320S	310S	305	280	U275S	
30	J295S	290S	U320S	345S	305	290	280	J340S	J320R	J330R	U333R	355	350	355	340	340	355	315	290	320S	U350S	270F	285	300	
31	U320S	310	330	320	330	280	J320S	J330S	U345S	345	310R	345	340R	340	335	360	I345C	U335S	315S	320	330	285	J265S	295	
No.	26	27	26	26	27	26	28	25	27	30	30	30	31	31	31	31	31	31	28	30	27	26	27	25	23
Median	295	300	310	320	320	305	315	340	360	350	340	350	345	340	345	355	355	340	320	325	325	325	305	295	295
U.Q.																									
L.Q.																									
Q.R.																									

M(3000)F2



Lat. 35° 42.4 N  
Long. 139° 29.3 E

Kokubunji Tokyo

IONOSPHERIC DATA

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

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											L	L	L											
2									L		L	L	L	L		L								
3										A	A	A	L	L	L	L								
4										L	L	L	A	L	L	L								
5										L	L	L	U380L	L	L	L	C		C					
6									C	C	L	L		L	L									
7									C	C	L	L	L	L	L									
8										L	L	L	L	L	L									
9										L	L	L	L	A	A	L								
10										L	L	L	L	L	L									
11									L	L	L	B	L	L	S	L								
12									L	L	L	L	L	L	L									
13									L	L	L	L	L	L	L									
14										L	L	L	L	L	L	L								
15									C	C	L	L	U370L	A	A	A	L							
16										L	A	L	L	A	L	L								
17									A	A	L	L	380L	L	L	S	B							
18											L	L	L	C	L	L								
19										L	L	L	L	L	L	L	L							
20									L	L	L	L	L	B	B	L	L							
21										L	L	L	L	L	L	L	A	A						
22										L	L	S	L	L	L	L								
23										L	L	L	L	B	L	L								
24											L	L	L	L	L	L								
25									L			L	L	L	L	L								
26										L	S	L	L	L	L	S								
27										L	L	L	L	L	L	L								
28										L	S	L	L	L	L	L								
29									L	L	B	340L	L	U355L	L	L								
30									L	L	L	L	L	L	L	S	L							
31									L	L	L	L	L	L	B	L	C							
No.									3	1	1	1												
Median									370	U380	U355													
U.Q.																								
L.Q.																								
Q.R.																								

Sweep 1.0 Mc to 20.0 Mc in 20 sec in automatic operation The Radio Research Laboratories, Japan K 8

Jan. 1964

1 km

RF2

IONOSPHERIC DATA

Kokubunji Tokyo

Lat. 35°42.4'N  
Long. 139°29.3'E

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											230	270	245											
2									205		250	290	275	250		225								
3											250	245	250	255	250	225								
4										220	260	240	240	255		240								
5										250	250	250	230	260	230	C								
6							C	C	C	C	230	210		240	240									
7							C	C	C		260	240	230	225										
8										260	245	245	245	250	240									
9											250	240	250	E260A	260	240								
10										255	250	220			250									
11									225	240	240	240	240	295	250									
12										260	225	225	240	275	240									
13									260	225	250	250	250		250									
14										250	245	240				220								
15							C	C	C		270	250	230	A	A									
16										255	250	240	255	250	260									
17								A	E250A		240	250	255	250	245	225								
18											260	240	C		255									
19										240	275	275	260	245	225	230								
20									225	250	225	230	245	290	245	225								
21										240	240	250	250	245			A	A						
22											250	275	240											
23										240	245	245	250	255		230								
24												250	230	230										
25									205			255	240	260	240	220								
26										230	255	240	240	240	290									
27											260	300	290	240	250	250								
28										230	310	245	240	255										
29									225	240	250	295	250	290	245									
30									260	235	245	240	250	250	245	250								
31											280	250	255	270	240		C							
No.									6	16	29	31	28	23	19	12								
Median									225	250	250	245	250	250	245	230								
U.Q.																								
L.Q.																								
Q.R.																								

RF2

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

The Radio Research Laboratories, Japan

Lat. 35° 42' 4" N  
Long. 139° 29' 3" E

IONOSPHERIC DATA

Kokubunji Tokyo

135° E Mean Time (G.M.T. + 9h)

1 km

R'F

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E300A	300	300	300	250	250	220	200	210	200	210	E250S	E250A	210	205	230	205	210	230	200	205	210	300	270
2	260	275	250	250	230	230	200	205	180	205	210	E260R	220	230	230	205	220	225	225	250A	285	290	290	250
3	230	300	I290A	250	250	280	210	210	230	I230A	I230A	205	210	205	210	210	210	210	260	225	230	245	340	340
4	270	230	260	305	255	250	245	205	210	190	205	210	I230A	230	230	230	210	210	225	230	A	A	A	A
5	300	260	300	225	I255A	310	240	210	225	210	E245A	E250A	210	230	210	I230C	210	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	220	205	E245A	E245A	220	215	210	I250C	250	250	250	I265A	300A	I260A
7	A	A	A	A	250	300	C	C	C	210	E250S	225	210	210	210	220	210	E280S	260	230	210	210	S	310
8	315	310	230	210	310	310	300	225	220	200	220	230	210	240	205	225	210	210	250	225	210	345	I260A	295
9	260	300	250	220	260	300	250	230	220	225	205	240	210	A	A	210	230	220	200	250	250	300A	I290A	260
10	310	310A	250	295	215	E230S	240	205	210	205	220	210	210	205	200	230	205	230	200	225	220	300	310	300
11	310	250	E230A	290	260	230	250	230	200	205	225	I210B	180	I200S	210	225	210	210	250A	210	210	260	I260A	I265A
12	260	250	225	225	250	300	250	210	225	210	220	210	200	200	E245S	205	210	200	250	210	205	255	305	260
13	255	280	250	230	260	250	250	225	210	225	210	210	210	225	210	230	210	210	205	260	230	210	300	310
14	275	240	210	200	310	340	300	230	210	210	210	210	210	210	210	205	210	200	220	210	210	350	350	300
15	I300C	300	260	270	I310A	300A	C	C	C	230	245	245	I245A	A	A	240A	210	I215A	I220A	210	260	250	260	300
16	295	280	260	260	250	300	I260A	210	220	200	A	240S	230	A	190	230	220	220	210	I240A	260	E350A	305	280
17	255	300	310	305	I350A	320	225	A	I250A	230	210	E250S	E250B	205	I220S	I220B	210	210	340	250	250A	255	290	I250A
18	260	255	275	255	230	255	250	225	225	210	E250B	245	C	240	245	220	210	210	E300S	250A	220	240	295	245
19	260	295	250	210	245	255	E290A	200	190	190	E245S	E245S	E250S	E250S	210	210	210	200	255	275	245	225	250	I270C
20	260	275	260	245	245	245	250	210	225	210	240A	220	B	B	E245S	205	210	210	I230A	200	A	I270A	280	260
21	310	310	350	275	260	250	200	200	200	190	205	230	210	210	245	210	A	A	260	250	220	210	A	I335A
22	250	310	270	290	245	290	260	200	210	210	225	E260S	220	230H	230	225	220	210	240	205	210	E300S	280	300
23	310	260	280	225	260	260	250	200	210	205	200	E245S	245	I230B	210	220	225	200	230	260	230	245	250	255
24	220	295	300	230	270	260	225	200	195	205	210	E245S	E250S	210	245	E245S	210	200	270	230	205	E310S	270	300
25	260	270	260	230	225	270	260	225	220	E245S	220	E250S	240	230	210	190	220	210	225	225	200	250	290	310
26	290	255	260	230	205	300	255	225	230	225	I210S	210	245	210	I230S	240	225	210	220	225	230	240	E300S	300
27	300	300	270	260	210	E290S	260	225	225	225	230	250B	260	E245S	E245S	205	230	210	210	250	250	255	310	260
28	280	235	260	230	205	245	245	210	210	220	I220S	230	220	225	E245S	240	210	200	240	200	250	250	300	295
29	300	300	300	250	215	255	225	210	210	185	I245B	210	225	220	E250S	210	210	215	230	240	255	255	300	305
30	300	290	230	210	E260S	310	E360B	240	230	225	210	220	220	220	I215S	205	210	250A	290	250	210	290	305	280A
31	260	250	225	255	240	310	E300S	225	230	210	205	E250S	220	I230B	220S	E245S	I225C	200	255	220	250	310	345	310
No.	28	29	28	29	29	29	25	27	28	29	26	22	23	24	24	29	30	29	28	30	28	26	27	29
Median	270	235	260	250	250	230	250	210	215	210	215	220	220	220	210	220	210	210	235	230	230	255	E300	295
U.Q.																								
L.Q.																								
G.R.																								

R'F

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

The Radio Research Laboratories, Japan

K 10

# IONOSPHERIC DATA

Lat. 35° 42.4' N  
Long. 139° 29.3' E

Kokubunji Tokyo

1 km 135° E Mean Time (G.M.T. +9h)

Jan. 1964

f<sub>o</sub>F<sub>2</sub>S

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	100	B	C	C	C	100	100	B	E1753	175	110	110	105	105	G	G	B	B	100	B	B	B	B	B
2	B	S	C	C	C	B	B	B	G	170	150	105	110	G	105	100	B	110	110	105	C	C	C	C
3	B	B	100	125	125	100	B	B	G	110	110	105	105	G	G	100	B	B	B	100	B	B	C	B
4	100	B	100	C	B	C	C	B	110	110	150	G	100	100	100	G	B	B	B	100	100	100	100	100
5	100	C	100	125	100	100	100	100	105	105	100	100	100	100	100	C	100	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	100	100	100	100	095	100	095	C	095	B	105	100	100	100
7	100	095	100	100	100	B	C	C	C	110	110	105	100	100	S	S	B	B	S	S	B	S	B	
8	B	105	B	B	B	S	S	B	G	115	105	105	100	105	G	100	G	100	C	B	B	B	120	100
9	100	100	100	100	100	B	C	B	G	G	110	110	105	105	100	100	G	B	B	B	100	110	105	105
10	105	100	100	B	B	S	100	B	110	125	120	110	110	110	100	G	B	B	B	B	B	B	B	C
11	B	100	110	105	100	100	B	B	G	G	G	B	G	100	140	115	B	B	100	100	100	100	100	100
12	100	100	100	100	C	B	B	B	115	105	110	110	110	105	100	G	G	B	C	B	B	B	B	B
13	B	B	B	B	B	B	C	B	140	150	G	G	G	G	G	G	G	100	100	B	B	C	C	C
14	B	B	B	B	B	C	C	B	G	160	G	G	G	110	G	G	095	B	100	B	095	100	105	100
15	C	B	B	100	100	100	C	C	C	145	125	120	110	110	105	100	100	100	100	100	100	100	100	100
16	100	100	100	115	C	105	105	B	100	100	100	100	100	100	G	150	130	115	110	105	100	100	105	100
17	B	B	125	115	115	B	125	105	100	100	105	G	B	B	125	B	B	B	C	105	100	100	100	100
18	100	B	C	C	C	C	C	B	130	120	B	B	C	145	B	115	G	B	S	100	100	100	100	100
19	B	B	B	100	100	B	100	B	110	105	150	G	G	G	G	G	B	B	100	B	B	B	B	C
20	B	B	B	B	C	C	C	B	125	105	100	100	B	B	B	G	B	B	105	100	100	100	100	100
21	100	100	100	B	B	B	B	B	105	105	105	100	100	100	G	095	095	090	100	B	B	100	100	100
22	100	100	100	C	100	100	100	150	155	105	100	G	G	B	G	165	B	B	B	100	B	S	B	100
23	100	100	B	B	C	C	C	B	175	105	105	G	B	B	G	095	090	090	B	B	B	C	C	B
24	B	B	B	B	B	B	B	B	G	110	105	G	G	100	095	090	130	B	B	B	100	S	100	C
25	C	B	B	B	100	C	C	B	G	S	105	G	G	100	G	G	150	B	B	B	S	B	B	100
26	100	100	B	100	B	C	C	B	155	G	110	G	G	G	160	G	150	B	B	C	B	B	S	100
27	B	B	B	B	B	S	C	B	G	G	G	B	G	G	G	G	140	B	B	C	B	110	B	B
28	C	B	B	B	B	C	C	C	G	S	G	G	G	105	G	155	G	B	B	B	C	C	B	B
29	C	B	B	C	B	B	B	B	B	G	B	G	G	110	G	G	G	B	B	B	B	B	B	B
30	B	C	B	B	S	C	C	B	130	G	G	G	G	G	100	G	100	100	B	110	E	C	C	105
31	100	105	100	100	C	C	C	S	G	160	125	110	G	B	G	100	C	G	B	B	B	C	C	B
No.	14	12	13	12	10	7	8	6	14	23	21	16	14	19	14	15	12	8	11	10	11	12	13	14
Median	100	100	100	100	100	100	100	130	110	110	110	105	100	105	100	100	100	100	100	100	100	100	100	100
U.Q.																								
L.Q.																								
Q.R.																								

Note: Parameters reduced to lower frequency range are affected by defects of the ionosonde.

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

The Radio Research Laboratories, Japan

K 11

IONOSPHERIC DATA

Kokubunji Tokyo

Types of Es

Jan. 1964

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	f2					f2	l		h	lh	l	l	l	l	l	l	l	l	f					
2										lh	lh	l	l	l	l	l	l	l	f	f3				
3			f3	f2	f	f			l	l	h	l	l2	l	l	l	l	l	f	f2	f3	f3	f2	f2
4	f	f	f	f	f2	f	l2	l	l	l	l	l	l	l	l	l	l	l						
5	f2	f2	f2	f	f2	f	l2	l	l	l	l	l	l	l	l	l	l2	l	f	f2	f2	f2	f2	f2
6											l	l	l	l	l	l	l2	l	f					
7	f2	f2	f2	f2	f				l	l	l	l	l	l	l	l	l	l						
8		f							l	l	l	l	l	l	l	l	l	l			f	f2	f2	f
9	f2	f2	f	f	f				l	l	l	l	l	l2	l2	l	l	l			f2	f2	f3	f
10	f2	f3	f			l			l	h	e	l	l	l	l	l	l	l	f	f	f	f2	f2	f2
11									l	l	l	l	l	l	h	l	l	l	f	f	f	f2	f2	f2
12	f	f2	f2	f					l	l	l	l	l	l	l	l	l	l	f	f	f	f	f	f2
13									h	h	h	h	h	l	l	l	l	l	f	f	f	f	f	f2
14							l		h	h	h	h	h	l	l	l2	l	l	f	f	f	f	f	f
15				f	f2	f2			h	h	h	h	e	l2	l2	l2	l	l	f2	f2	f	f	f	f
16	f	f2	f	f	f	f	l2		l2	l	l2	l	l	l	h	h	h	h	f2	f2	f2	f2	f2	f2
17			f	f	f4	l	l	l3	l2	l	l	l	l	h	h	l	l	l	f	f	f2	f2	f2	f3
18	f							h	h	h	h	h	h	h	l	l	l	l	f2	f2	f2	f2	f2	f2
19				f	f2	l			l	l	h	l	l	l	l	l	l	l	f	f	f2	f2	f	f
20									h	l	l	l	l	l	l	l	l	l	f3	f2	f2	f2	f	f
21	f2	f2	f2					l	l	l	l	l	l	l	l	l	l	l	f	f	f	f	f2	f2
22	f	f2	f		f	f	l	h	h	l	l	l	l	l	h	h	h	h	f	f	f	f	f	f
23	f	f	f						h	l	l	l	l	l	l	l	l	l2	l					
24									l	l	l	l	l	l	l	l	h	h		f	f	f	f	f
25									l	l	l	l	l	l	l	l	h	h						f2
26	f2	f		f	f			h	l2	l2	l	l	l	l	hl	hl	h	h			f			
27														l	l	h	h	h						
28														l	l	h	h	h						
29														l	l	h	h	h						
30									h	h	h	h	h	l	l	l	l	l						f2
31	f4	f	f	f						h	h	l	l	l	l	l	l	l2	f					
No.																								
Median																								
U.Q.																								
L.Q.																								
Q.R.																								

Types of Es

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

The Radio Research Laboratories, Japan  
K 12

IONOSPHERIC DATA

Kokubunji Tokyo

Lat. 35° 42.4' N  
Long. 139° 29.3' E

135° E Mean Time (G.M.T. +9h)

1 km  
f<sub>o</sub>F<sub>2</sub>

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	320	350	350	F	300	290	250F	S	S	250	300	290	250S	230	240	250	250	275	J280S	S	J250S	250	F	305F
2	305	305	F	F	J295S	260	J230R	J250S	J220R	245	255	255	300	255	280	245	230	270	J260S	J250R	340	325S	I345S	F
3	F	335	I330A	330	F	320	250	280	J260S	255	280	255	255	280	255	255	230	R	300	1260S	260	J255S	370F	F
4	330F	305	305	355	285	300	260	J245S	U230S	245R	285	245	280	280	255	260	235	260	260	245	A	A	A	A
5	320F	I300C	300	260	I300A	345	275	S	245	250	260	260	J250S	285S	250	I245C	225	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	240	J220S	275	J250S	U250S	240	220	I250C	300	295	F	A	300	I265A
7	A	A	A	A	250	320	C	C	C	250	U270R	J250S	245	235	J230S	245	235	J260S	305	J310R	280R	250	S	J325R
8	400F	360	260	245	320	I360S	340	250	250	270	250	J260S	250S	275	250	250R	J230S	255	305	U270S	290	S	I310A	330
9	F	F	300F	260	310	350	290	270S	245	250	250	250	250	260	A	260R	260S	260	240	300	290	U330S	I310A	305
10	350F	350	285	350	260	300S	290S	J245S	240	230	260	230	250R	250	270	250	230	300S	U240S	270	260	325S	370	F
11	370	290F	325	320	320	275F	320	I265S	250	I245R	U250R	U250R	250	J310R	285	240	260R	280R	300S	S	250	300	I300A	I310A
12	I310R	300	I270S	260	300	310	310	250S	250	295	J240R	240	250	295	250	230	250	J250S	310	I250S	250	310	350	350
13	300	310	295	J260R	300	300F	300	U250S	250R	J270R	I255R	290	250R	250	250	250	240	260	325	265	260	310	335	350
14	310	260	250	J300R	325	360	J320R	J255S	225	230	250R	250R	U250R	245R	J290S	250	245	240	270	255	290	380R	F	F
15	C	F	310	300	A	U350C	C	C	C	245	270	U255R	250	I250A	A	255	J230R	I250A	I250A	250	295	290	295	350
16	350S	305F	310	F	300F	F	I300A	C	250	270	260S	S	J290S	255	285S	250	245	I270R	I270S	I260A	300F	350	F	325
17	305	310	330S	345	I370A	J355S	270	A	295	250	I265S	255	255	250	255	J250R	245R	240	390	290	I290S	RS	310F	I265A
18	310	305	310	310	280	300	300	260S	250	U250R	U260R	250	C	245	260	250	245	250S	305	J290S	J270S	245	310	300
19	330	315	295	255R	290	395	305	J240S	230R	250	290	295	295	U250R	245	250	230	240	290	310	295	260	305	I310C
20	305	320	305	300	280	290	290	295	J260S	240R	260	S	245R	U255R	295	J250S	U240R	230R	245	I280A	U255S	A	I305A	310
21	350	355F	F	305F	F	F	240	220	I215S	250	250	J255R	255	250S	I250R	245	I270A	A	300	305	I265S	230S	A	A
22	300	350F	305	290	280	310	300	J230R	U230R	I230R	U250R	230R	250	280H	245R	250S	250	260	I270S	I245S	250	310	305S	330
23	350	315S	300	290	300	300	290	220	220S	250	I265R	U250R	260	J260R	U245R	250	J255R	250S	260	300	260	290	295	295
24	270	320	U340S	310	310	305	280	J245S	I225S	245	295	I295R	J250S	J250R	J255S	J260S	240S	J230S	U300S	U270S	240	345	310	330
25	310	300	U300S	255S	280	310	J300S	J250S	245R	255S	J255R	250	270	245	I220R	230	245	255S	295	S	S	295	350	F
26	325	295	300S	260	270	315S	310	U260S	270R	300	J290S	245S	250S	U250R	J300R	260	240	260S	260	I250S	290	280	320	355
27	350	340	300	310	U250R	S	300	J245S	245	245R	J280R	310	295	I290R	260R	260	250	260S	280	300	295R	310	350	330
28	325	330	F	J295S	250	F	J305F	S	245	J250R	310R	J250S	250R	255	U255S	250	230	250	U290S	I255S	290	300	340S	340
29	360S	350	355	300	260	300S	J245R	240R	250	280	300	300	250	J300R	J255R	230R	240	250S	290	280S	310S	320	370	U380S
30	J340S	340S	U295S	240S	360	350	J260S	J300R	J295R	U270R	250	260	260	250	260	260	240	285	330	295S	U245S	390F	360	310
31	U310S	310	280	300	290	360	S	J250S	U250S	260	300R	250	270R	290	260	250	I260C	U240S	300S	290	290	355	J395S	350
No.	26	27	26	26	27	26	27	23	27	30	30	30	30	31	29	31	31	28	30	27	26	26	24	23
Median	320	315	300	300	295	310	300	250	245	250	260	250	250	255	255	250	240	255	290	270	285	310	315	325
U.Q.																								
L.Q.																								
Q.R.																								

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

The Radio Research Laboratories, Japan

f<sub>o</sub>F<sub>2</sub>

K 13

Lat. 35°42.4'N  
Long. 139°29.3'E

Kokubunji Tokyo

IONOSPHERIC DATA

135° E Mean Time (G.M.T. +9h)

1 km

ypF2

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	080	090	055	F	055	055	055F	S	S	050	045	060	030S	060	035	045	055	070	J070S	S	J060S	050	F	065F
2	090	090	F	F	J060S	050	J070R	J050S	J050R	055	045	050	045	045	045	050	050	070	J050S	J050R	060	070S	I055S	F
3	F	060	I050A	065	F	070	060	055	050	025	J050S	I045S	045	065	050	I050R	065	R	055	I050S	070	J050S	075F	F
4	070F	090	090	115	035	060	080	J055S	I065S	050R	060	035	070	040	050	050	060	080	030	060	A	A	A	A
5	080F	I055C	050	050	I050A	075	075	S	050	060	060	055	J045S	035S	045	I040C	035	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	040	060S	080	J050S	045	I045C	050	050	I045C	050	065	F	A	055	I050A
7	A	A	A	A	050	080	C	C	C	050	I055R	J045S	025	035	J045S	050	055	J085S	090	J085R	030R	060	S	J070R
8	045F	085	050	060	085	I065S	070	050	045	045	040	J045S	045S	075	050	045R	065S	060	055	070S	060	S	I070A	075
9	F	F	F	060F	090	085	065	060	055S	045	045	040	050	045	A	055R	055S	055	065	065	060	060	I065S	I080A
10	060F	060	060	060	060	045S	060S	J055S	045	065	055	065	030R	055	040	070	050S	050S	0660S	075	080	075S	070	F
11	075	035F	085	030	070	040F	075	I060S	045	I060R	I050R	I060R	050	J065R	040	050	045R	065R	050S	S	050	055	I050A	I060A
12	I080R	050	I070S	065	060	090	080	060S	050	040	J050R	035	050	050	040	030	055	J050S	085	I060S	060	085	095	075
13	095	085	060	J055R	055	055F	095	I050S	050	I030S	030R	J040R	I050R	070	055R	035	055	085	075	055	065	100	065	060
14	060	085	050	J050R	075	085	J080R	J060S	035	065	055R	045R	045R	050R	J055S	045	050	060	075	055	060	065R	F	F
15	C	F	090	095	A	I070C	C	C	C	035	045	I040R	045	I045A	A	050	J065R	I055A	I070A	040	050	060	055	060
16	055S	060F	085	F	055F	F	I050A	C	050	060	050S	S	J055S	050	035S	030	035	I060R	I060S	I055A	050F	050	F	070
17	055	085	060S	055	I065A	J060S	075	A	050	045	I060S	045	040	050	055	J045R	050R	055	060	055	I055S	FS	085F	I060A
18	085	090	080	050	070	060	065	J055S	055	I075R	I050R	050	C	035	050	055	050	050S	090	J070S	J045S	050	035	055
19	030	080	060	055R	060	050	055	J055S	065R	055	055	050	055	I060R	055	045	065	065	055	085	050	065	090	I060C
20	095	075	F	055	045	065	055	J065S	040R	S	060R	I080R	025	J055S	I060R	065R	065R	065	I065A	I085S	A	I080A	085	095
21	060	090F	F	085F	F	F	065	075	I060S	055	050	J050R	055	045S	I050R	055	I060A	A	090	085	I060S	065S	A	A
22	055	060F	050	065	060	085	060	J065R	I050R	I050R	I045R	050R	050	060H	065R	055S	045	060	I065S	I050S	050	085	090S	080
23	050	085S	095	060	060	055	055	075	075S	050	I050R	I050R	055	J050R	I055R	030	J060R	065S	085	050	060	070	055	055
24	070	075	I055S	050	070	085	065	J055S	I070S	060	060	I040R	J045S	J050R	J055S	J055S	045S	J070S	I045S	I080S	055	065	090	065
25	085	055	I055S	055S	065	085	I050S	J060S	050R	055S	J050R	040	050	050	I040R	065	055	055S	060	S	S	060	070	F
26	070	055	055S	050	075	050S	095	I055S	040R	065	J065S	045S	045S	I065R	J025R	030	055	080S	055	I090S	055	065	080	090
27	050	070	095	085	I060R	S	060	J055S	055	035R	J060R	050	030	I050R	060R	085	030	065S	065	055	050R	085	095	080
28	075	070	F	J055S	055	F	J090F	S	055	J055R	060R	J055S	045R	060	I050S	050	060	055	I055S	I075S	055	095	065S	060
29	080S	065	090	050	050	050S	095S	J055R	060R	060	035	025	055	J045R	J055R	060R	060	060S	060	075S	085S	070	070	I070S
30	J070S	065S	I055S	065S	090	080	065	J050S	J060R	J050R	I060R	040	050	035	050	080	060	060	075	065S	I060S	055F	085	090
31	I085S	085	065	055	060	085	S	J055S	I050S	050	090R	060	040R	055	050	045	I050C	I070S	050S	060	055	035	J065S	055
No.	26	27	26	26	27	26	27	23	27	30	30	30	30	31	29	31	31	28	30	27	26	26	24	23
Median	070	070	060	060	065	065	055	055	050	050	050	050	050	050	050	050	050	060	060	060	060	065	070	065
U.Q.																								
L.Q.																								
Q.R.																								

The Radio Research Laboratories, Japan

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

ypF2

Lat. 31°12.1'N  
Long. 130°37.1'E

Yamagawa

IONOSPHERIC DATA

0.1 Mc 135° E Mean Time (G.M.T. + 9h)

foF2

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	024	025	026	027	026	I031S	019	J029S	I048H	J050H	048	054	I076S	I075S	059	055	054	I051C	035	I035S	J028S	025S	019	022
2	024	026	026S	028	030S	024S	021	027	046S	046	055	J061S	I064C	063	C	C	C	C	C	C	029	I037S	044	I051S
3	I054S	I047S	I035S	S	F	F	F	030	050S	I060S	063S	I070S	I071S	J075S	J077S	068S	I066S	J051S	031	034S	I034S	021	021	F
4	026S	025	025	021	022	021	I021S	028	J048S	055	054S	I068S	071S	087	090	089S	I072A	I065S	046	032	028H	025	J025S	A
5	A	I025A	030	021	025S	021	I022A	027	049	051S	060	065S	087	I091S	I078S	J077S	I066S	051	028	027	I031S	031	022	F
6	F	J027S	I028A	I022A	I022A	I019A	021	029S	J054S	057H	J062S	I065A	063S	I064S	J061S	I066A	061	048S	029	030	028	028	030	I026A
7	021	A	A	I025A	I024S	S	A	028	048	051	051	066S	068S	J063S	J065S	055	049	051	037	028	034S	032	022	023
8	025	025	028	030	I024S	022	020	J026S	051	055H	060S	J079S	085	J070S	I067S	I071S	I066S	049	041S	038S	I039S	035	025	025
9	J028S	I029S	028S	029	030	028	025S	J026S	053S	051S	054	I066S	J063S	J064S	I068S	038	049	056	J045S	025S	I028S	029	028	025S
10	027S	028S	I030S	J029S	I030S	021	J024S	030S	044S	J051S	I074S	J101S	I076S	056	I068S	I076S	J062S	054	055S	J041S	I038S	023	024	027S
11	030	J028S	030S	028	024S	026S	023	J028S	J052S	J062H	J062S	J084S	J074S	J063S	066	I075S	J084S	053H	I046S	J092S	J063S	035	032	032
12	I030S	031S	J033S	033S	030	021	022	029	J048S	I052C	J065S	I074S	067	067	067S	059	051S	047H	045	I048S	J051S	025	025	027
13	027S	027	030	028	026	023	025	027S	056	J063S	056	067	068S	J079S	J063S	J065S	057	048	034	033S	I036S	035	026S	J027S
14	031S	030S	035S	024	021	019	J017S	025	J050S	052H	052	070S	065	060	057	054	054H	049H	040S	037S	038S	021	022	026
15	029	028	030S	030	027	I023S	I019A	026S	049	053	052	061	070S	062S	058	054	058	057	035	031	025	J027S	I019S	I024S
16	025S	028	J026S	J024S	027	J018S	022	J025S	J050H	J055H	059	J084S	J079S	I070S	067Z	I068S	I056S	J051S	I048A	I052A	I050S	042S	034	044S
17	I033A	I036S	I034S	029S	026S	C	C	C	C	C	C	J083S	080	I064C	061S	056	052	050	I037S	I034A	030	I029A	025S	I026A
18	029	031	030	029	031	024	025	031	057	J062S	057S	J078S	090	J079S	J082S	J078S	053	050	031S	032	I036S	I037S	030S	J026S
19	027	028S	029	030	J029S	025	027	031	S	045S	050	061	068S	I075S	J078S	I064S	050H	050H	031	023	025	029	025S	025
20	026	028S	027	028	028	022S	022	031	056	058	062	J062S	I076S	J082S	085	J082S	059	054	S	S	S	I032S	026	025S
21	027S	030S	030S	028	030	I035S	025	028	I049S	J056H	050H	062S	066	J081S	065S	056	057H	052S	038	029	034S	035S	J028S	023
22	I025S	028	026S	027	028H	I025S	024	J026S	043	048	J048H	068	088	067	058	059S	050	053S	J041S	I042S	036	024	021S	023S
23	025	028	027	029	027	025	027	032S	I046S	J045S	054	065S	J064S	J063S	038	056	054	053H	038	025	028S	024S	024	J026S
24	J026S	J026S	J027S	027S	J029S	028	028S	030S	I046S	044H	044H	058	I074S	065S	059	052	061	053S	047S	033	I036S	028	I024S	027S
25	028	030S	I029S	030H	I031S	I023S	021	I028S	046	045	054	063S	I066S	069S	057	049	051	052	J045S	029	I034S	031S	I023S	024S
26	027	029	026	028	032S	I026S	021	031S	055	J064S	I075S	084	I069S	055	062	072S	J087S	070S	057	035	I040S	J037S	I035S	032
27	032	I034S	I034S	033S	I036S	027S	022	031	046S	051H	054H	056	058	I061C	I070S	061	I066S	057	J039S	027	030	026	J028S	025S
28	026	026S	027S	027	029S	026	018S	027S	051S	053	060S	058	063S	056	053	060	I057C	055	034	I047S	034S	I030S	022	024S
29	I026S	027	027S	028	030	027	J027S	030	047H	048	053	055	J064S	056	I075S	059	050H	J048S	J042S	032	031	033	032	031
30	031	032S	I042S	026	J018S	019S	022	025S	J051S	068S	I073S	068	C	C	C	C	C	J044S	030	036	028	023	027	027
31	J027S	028	I029S	026	025	022	020	I030S	I044S	052	I063S	069S	I079S	068S	I069S	061S	054	049S	J041S	024	031	I027S	J026S	026S
No.	29	29	30	30	30	28	28	30	29	30	30	31	30	30	29	29	29	29	29	29	29	30	31	28
Median	027	028	029	028	028	024	022	028	049	052	056	066	070	066	066	061	057	051	040	032	034	029	025	026
U.Q.	030	030	030	029	030	026	025	030	052	057	062	074	076	075	072	072	064	054	045	038	038	035	028	027
L.Q.	026	026	027	027	025	021	021	027	046	050	052	061	065	063	059	056	052	050	034	028	029	025	022	024
Q.R.	004	004	003	002	005	005	004	003	006	007	010	013	011	012	013	016	012	004	011	010	009	010	006	003

The Radio Research Laboratories, Japan

Sweep 0.55 Mc to 17.0 Mc in 20 sec in automatic operation

foF2



Lat. 31°12'N  
Long. 130°37'E

Yamagawa

IONOSPHERIC DATA

0.01 Mc 135° E Mean Time (G.M.T. +9h)

foF1

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											LH	420	420	420	L	L	L	C						
2										L	420	1400G	L	C	L	C	C	C						
3										L	A	430	430	430	L	L	L							
4										L	L	440	L	410	L	A	A							
5										L	L	430	430	430	400L	LH	L							
6										L	1410A	430	L	L	L	A	L							
7										L	370	A	L	A	L	L	L							
8										LH	L	420	1420A	400	L	L	L	230						
9										L	S	L	430	L	L	L								
10										L	420L	430	L	L	L	LH	L							
11										L	LH	420	L	L	400	L	L							
12									C	L	420	430H	L	L	L	L	L							
13									L	L	400	LH	420	410	L	L	L	220						
14										L	L	L	420L	430L	L	L								
15										L	A	430	420	420	L	L								
16										420H	420H	1420A	430	L	A	L	L							
17									G	C	C	1420A	L	C	L	L	L							
18										L	1430R	440L	L	420	390L	L								
19										LH	430	430H	430	420	L	L								
20										420	1440A	450	430	420	L	L	A							
21											L	430	420	420	L	L								
22											1430A	L	L	420	L	L	L							
23										C	L	410	430H	430	420L	380	L							
24											1430S	L	430H	420H	L	L	L							
25										L	410	420	420	L	L	LH	L							
26										L	410	430	LH	430	420	L	L							
27											LH	420	1420C	420L	LH	L	L							
28											410L	420	420	430	420	390	1310C							
29										L	420	420	L	420H	390									
30										L	400	430	C	C	C	C	C							
31										L	LH	430L	1430A	A	A	A								
No.										5	20	23	18	17	4	1	2							
Median										410	420	430	430	420	390	U910	225							
U.Q.																								
L.Q.																								
Q.R.																								

foF1

Sweep 0.55 Mc to 17.0 Mc in 20 sec in automatic operation

The Radio Research Laboratories, Japan

Y 2

# IONOSPHERIC DATA

Lat. 31°12.1' N  
Long. 130°37.1' E

Yamagawa

0.01 Mc **foE** 135° E Mean Time (G.M.T. +9h)

**foE**

Jan. 1964

Day	00	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	230	260	270	275	I285A	290	270	235	C						
2								S	S	230	265H	290H	I285C	295	C	C	C							
3								S	S	235	265H	285H	290	I295A	285	265	225	S						
4								S	S	190	230	285	300	310	300	A	A	S						
5								S	S	A	A	A	A	300	290	270	230	S						
6								S	S	185	250	260	I270A	I285A	I290R	A	A	S						
7								S	S	200	250	270	I270A	A	A	A	A	A						
8								S	S	235	265	280	270	I275A	I285A	270	240	S						
9								S	S	230	280H	290H	A	A	A	270	240	180						
10								S	S	180	245	265	300	305	280H	270	230	S						
11								S	S	235H	260H	270	290H	305	290	270	240	S						
12								S	S	I235C	290	I295A	I310A	I305A	300	285	240H	S						
13								S	S	190	255	270	305	320	310	305	230	S						
14								S	S	180	240	270H	295H	300	305	285	265	230	S					
15								S	S	250	285	300	310	I295A	I265A	I225A	S							
16								S	S	180	260H	265	I295A	290	300	A	A	S						
17								C	C	C	C	A	310	I305C	I290A	I275A	230	S						
18								S	S	175	245H	280	310R	310	305	300	270	A	S					
19								S	S	S	240H	280	I300A	310	I310A	300	I285A	250	S					
20								S	S	210	245	260	A	A	A	300	I275A	I250A	S					
21								S	S	I190A	250	I290A	310	310	305	300	280	255	A					
22								S	S	S	240	270	I285A	305	310	300	280	250	S					
23								S	S	S	I230C	260	I295A	305	305	295	275	250	S					
24								S	S	180	250	270	290	295	310	295	240	175						
25								S	S	S	240	270	285	310	310	305	285	240	185					
26								S	S	A	250	270	290	305	310	300	280	250	S					
27								S	S	190	250	275	285	I290R	I300C	295	275	255	205					
28								S	S	190	250H	285	305	310	305	290	I240C	S						
29								S	S	S	250H	280	310R	305	I290A	300	280	245	180					
30								S	S	180	250	280	300	C	C	C	C	S						
31								S	S	190	260	280	280	A	A	A	260	180						
No.										15	29	29	28	25	26	23	24	24	6					
Median										190	245	270	290	305	305	295	275	240	180					
U.Q.																								
L.Q.																								
Q.R.																								

The Radio Research Laboratories, Japan

Sweep 0.55 Mc to 17.0 Mc in 20 sec in automatic operation

**foE**

Lat. 31°12.1'N  
Long. 130°37.1'E

Yamagawa

IONOSPHERIC DATA

0.1 Mc 135° E Mean Time (G.M.T. +9h)

foEs

Jan. 1964

Day	00	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	020M	022M	011	S	S	S	G	G	033	031	037	038	G	031	G	C	S	S	S	S	S	S
2	S	S	021	S	021M	S	022M	S	G	021G	032	035	C	031L	C	C	G	C	C	C	S	S	S	S
3	S	J023	J021	026M	031M	S	S	S	024	035	036	J064	034	030	G	J053	J083	J051S	J029	027M	021M	S	J029	067M
4	S	S	S	E	E	S	S	S	024	029	G	G	G	G	J061	J053	G	J025	024M	E	023	023M	023M	S
5	067M	035M	035M	021M	J030	021	J024	020	G	031	038	J032	J049	038	031	G	G	031M	S	S	S	S	J027	057M
6	S	S	S	037M	J026	024	022	024	022	022G	031	072M	058M	035	050M	070M	J037	031M	S	S	S	S	S	S
7	029M	028M	032M	027M	031M	S	027	S	G	028	038	J043	058	038	070M	031	J032	031	031M	032M	022	S	S	S
8	S	S	025	J029	J026	030M	024	024	G	G	031	033	038	059M	J032	024G	027	021	024	023	022	S	J021	S
9	S	S	S	024M	023M	S	J024	020	G	G	031	041	033	J053	J053	031	027	020	S	S	S	S	025	J024
10	J052	S	J026	026M	E	S	S	S	S	G	035	G	G	G	030G	G	023	J026	023M	S	S	S	S	S
11	S	S	S	030M	031M	022M	S	S	S	G	029	029	G	G	G	G	G	019	S	J024	032M	025M	021	031M
12	028M	031M	S	S	S	S	S	S	G	C	038	031	031	037	027G	027G	025	025	033	S	S	S	S	S
13	S	S	S	S	E	S	S	S	G	030	033	031	031G	G	027G	J024G	G	020	J021	023M	S	021	S	S
14	S	S	S	E	021M	S	020	G	G	G	031	039	G	028G	031	030	024	020	S	J017S	S	022	021	022
15	S	S	S	E	027M	S	028	020	G	029	037	044	034	034	035	036	048	J025	J026	027	024	022	S	S
16	S	S	S	E	E	S	S	S	G	G	028	035	042	039	059	057M	058M	032M	108	059M	057M	040M	031M	030M
17	038M	024M	029M	028	027M	C	C	C	C	C	C	J065	027G	G	J038	J030	030	033M	J023	036	030M	032M	030M	037M
18	S	022M	030M	031M	027M	031M	032	035M	021	034	038	038	G	G	G	021G	030	J032	J049	024	S	S	S	S
19	S	S	S	E	E	S	S	S	G	028	032	030	030G	038	027G	030	J030	020	036M	026M	030M	026M	022	021
20	021	023	027	024	021M	024	S	023	G	027	048	068M	050	031	029G	030	J054	J052	J050	035M	035M	023	021	S
21	S	S	S	032M	030M	031M	S	S	021	028	031	029G	026G	030G	027G	024G	G	J024	038M	030M	035M	024M	S	S
22	S	031M	024M	026M	E	024	021	S	G	028	033	J054	026G	022G	022G	027G	030	031	027	S	021	S	S	S
23	S	S	027M	029M	E	E	S	S	S	C	031	031	031	031	027G	G	G	019	S	S	S	S	S	S
24	S	S	S	S	E	022	S	S	G	021G	031	031	031	025G	G	G	G	021	023	S	S	S	S	022
25	S	S	S	E	E	S	S	S	S	G	029	032	G	G	G	G	G	030	S	S	S	S	S	S
26	S	021	S	S	028M	026M	S	S	J024	028	030	031	G	029G	027G	G	029	J024	S	S	S	S	S	S
27	S	S	S	S	S	S	S	S	G	G	G	030	029G	C	023G	021G	021G	G	S	S	S	J018	S	023
28	J030	022M	024M	023M	S	S	S	S	G	029	038	038	034	033	029G	G	C	G	S	S	S	S	S	S
29	S	S	S	E	018M	S	S	S	G	G	034	037	038	032	031	G	G	G	S	S	S	021	017	S
30	026	S	S	E	E	S	S	S	G	G	G	027G	C	C	C	C	J024	S	S	S	S	S	S	S
31	029M	024M	S	E	E	S	S	S	G	G	033	035	J084	J054	J060	J057	046M	G	S	S	S	S	S	S
No.	9	11	13	24	28	11	9	8	26	28	30	31	29	28	29	29	28	29	17	14	13	14	11	11
Median	029	024	026	024	021	024	024	022	G	G	032	033	031	031	G	G	026	024	027	026	024	023	023	030
U.Q.	045	031	030	028	027	030	028	024	G	028	036	041	038	038	036	031	031	031	037	032	034	025	029	037
L.Q.	027	022	022	E	E	022	022	020	G	G	031	031	G	G	G	G	G	020	023	023	022	021	021	022
Q.R.	018	009	008			008	006	004			005	010					011	014	009	012	012	004	008	015

The Radio Research Laboratories, Japan

Sweep 0.55 Mc to 17.0 Mc in 20 sec in automatic operation

foEs

# IONOSPHERIC DATA

Yamagawa

Lat. 31°12' N  
Long. 130°37' E

0.1 Mc 135° E Mean Time (G.M.T. +9h)

**fbEs**

**Jan. 1964**

Day	00	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	E	018	E011S	S	S	S			033	E031R	034	033		020		C	S	S	S	S	S	S	
2	S	S	017	S	E	S	E	S		021G	032	G	E031R	C	C	C	C	C	C	C	S	S	S	S	
3	S	020	018	019	018	S	S	S	024	035	036	A	034	E030R			021	020	018	S	S	S	S	S	
4	S	S	S			S	S	S	024	028					033	030	A	022	019	E	E	S	S	S	
5	A	A	026	017	E	E	A	G		030	032	032	036	022	019		020	020	019	E	E	S	020	A	
6	S	S	S	A	A	A	E	020	G	021G	031	A	037	035	031	A	032	030	S	S	S	S	E	A	
7	E	A	A	A	019	S	A	S		028	036	035	042	037	045	031	029	020	022	023	021	S	S	S	
8	S	S	019	019	021	E	E	017			031	033	035	045	032	021G	023	019	E	E	017	S	021	S	
9	S	S	S	017	017	S	S	019	G		031	E041S	E033R	033	033	020	026	020	S	S	S	S	019	020	
10	020	S	019	017		S	S	S	S		033		029G				G	018	018	S	S	S	S	022	
11	S	S	S	019	019	018	S	S	S		G	G						018	S	023	027	020	E	023	
12	A	020	S	S	S	S	S	S		C	033	E031R	E031R	032	025G	022G	G	G	029	S	S	S	S	S	
13	S	S	S	S		S	S	S		028	030	022	027G		024G	018G		019	018	E	E	S	S	S	
14	S	S	S		011	S	S	G			031	034		025G	E031R	G	022	G	S	S	S	E	E	S	
15	S	S	S		017	S	A	017		029	037	043	033	033	033	033	028	018	018	E	E	E	S	S	
16	S	S	S	S		S	S	S			G	033	041	037	034	040	027	020	A	A	021	023	020	022	
17	A	017	018	020	019	C	C	C	C	C	G	053	025G	C	032	E030R	G	022	020	A	019	A	019	A	
18	S	021	018	020	018	020	022	E	G	034	034	E036R				020G	027	032	026	019	S	S	S	S	
19	S	S	S			S	S	S		G	032	E030R	028G	035	026G	E030R	020	G	019	E	018	019	E	E	
20	E	018	019	017	018	E	S	019		026	039	046	034	E031R	022G	E030R	052	038	A	A	019	019	019	S	
21	S	S	S	022	020	023	S	S	G	G	E031R	022G	025G	022G	022G	021G		022	033	022	022	019	S	S	
22	S	E	018	018		A	020	S		028	033	052	025G	022G	020G	020G	018	026	022	S	E	E	S	S	
23	S	S	E	024		S	S	S	S	C	030	E031R	028G	027G	021G			019	S	S	S	S	S	S	
24	S	S	S	S		E	S	S		020G	029	031	E031R	022G			G	019	S	S	S	S	S	S	
25	S	S	S			S	S	S	S		029	032						G	S	S	S	S	S	E	
26	S	E	S	S	018	A	S	S	018	G	G	G		028G	023G			G	S	S	S	S	S	S	
27	S	S	S	S	S	S	S	S			E030R	E029R	G	022G	019G		G	020	S	S	S	S	S	S	
28	017	E	019	017	S	S	S	S		G	033	034	033	032	027G		G		S	S	S	018	S	017	
29	S	S	S		E	S	S	S			034	035	037	E032R	027				S	S	S	S	S	S	
30	017	S	S		S	S	S	S			027G	C	C	C	C		C	023	S	S	E	017	S	019	
31	019	018	S		S	S	S	S		032	035	A	047	057	055	022			S	S	S	S	S	S	
No.																									
Median																									
U.Q.																									
L.Q.																									
G.R.																									

Sweep 0.55 Mc to 17.0 Mc in 20 sec in automatic operation

**fbEs**

The Radio Research Laboratories, Japan

Lat. 31°12.1'N  
Long. 130°37.1'E

Yamagawa

IONOSPHERIC DATA

0.1 Mc 135°E Mean Time (G.M.T. +9h)

f-min

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	E017S	E017S	E017S	E	E	E017S	E017S	E017S	E017S	017	017	019	018	018	017	017	017	C	E017S	E018S	E017S	E017S	E017S	E018S	
2	E017S	E017S	011	E017S	009	E017S	E017S	E017S	E017S	017	017	017	018	017	018	018	017	C	C	0	E017S	E017S	E019S	E017S	
3	E017S	E016S	E017S	E017S	010	E018S	E016S	E017S	018	017	017	018	020	018	017	018	017	017	E016S	E016S	E017S	E016S	E016S	E017S	
4	E017S	E017S	E017S	011	012	E017S	S	E017S	017	018	017	018	018	019	018	017	016	016	E017S	E017S	E017S	E017S	E017S	E017S	
5	E017S	E016S	E017S	010	010	E016S	E016S	E017S	017	017	016	017	018	017	017	018	018	018	017	017	E018S	E017S	E017S	E017S	
6	E017S	E017S	E017S	010	010	E018S	E017S	E016S	016	018	017	018	019	017	018	019	018	017	E019S	E019S	E020S	E017S	E018S		
7	E019S	E016S	E017S	011	010	S	E017S	E019S	018	018	018	018	018	020	018	019	018	018	E018S	E018S	E018S	E018S	E017S	E018S	
8	E017S	E017S	E018S	011	010	E017S	E017S	E016S	017	017	017	018	019	018	017	018	017	E017S	E017S	E017S	E016S	E017S	E017S	E016S	
9	E018S	E017S	E017S	009	009	E017S	E016S	E018S	017	017	018	019	018	018	017	018	017	E017S	E018S	E018S	E018S	E017S	E017S	E017S	
10	E017S	E017S	E017S	009	011	E018S	E017S	E017S	E016S	017	017	018	018	018	018	017	017	E017S	E017S	E017S	E017S	E016S	E017S	E018S	
11	E017S	E018S	E018S	E	009	E016S	E017S	E018S	019	017	018	018	018	018	020	017	017	017	E016S	E018S	E017S	E016S	E017S	E017S	
12	E018S	E017S	E018S	E019S	E019S	E017S	E017S	E017S	E016S	C	018	018	018	018	018	017	017	018	E017S	019	E017S	E018S	E018S	E018S	
13	E018S	E018S	E018S	E019S	011	E017S	E017S	E017S	E016S	016	017	017	018	019	017	016	E016S	E016S	E016S	E016S	E018S	E018S	E018S	E017S	
14	E017S	E017S	E016S	010	007	E017S	E018S	E017S	E016S	017	015	017	017	019	016	018	017	017	E016S	E017S	E017S	E018S	E018S	E017S	
15	E017S	E016S	E018S	010	009	E017S	E017S	E016S	E017S	017	017	017	018	017	017	017	015	E017S	E016S	E017S	E017S	E016S	E018S	E018S	
16	E017S	E017S	E016S	E016S	009	E017S	E017S	E017S	E016S	016	016	018	018	019	017	017	E016S	E016S	E016S	E016S	E016S	E017S	E016S	E016S	
17	E016S	E016S	E016S	009	017	C	C	C	C	C	C	018	018	C	018	017	018	018	018	019	E017S	E016S	E017S	E017S	
18	E018S	E018S	E017S	017	009	E017S	E017S	E017S	E016S	019	019	022	022	022	020	019	018	E017S	E016S	E018S	E018S	E016S	E018S	E018S	
19	E018S	E017S	E017S	018	018	E017S	E017S	E019S	E017S	018	017	018	019	020	020	018	018	017	E017S	E018S	E017S	E019S	E017S	E017S	
20	E017S	E016S	011	009	010	E019S	E020S	E016S	018	018	019	019	018	019	018	018	018	017	E017S	E017S	E017S	E016S	E017S	E017S	
21	E018S	E016S	E018S	E017S	010	E016S	E017S	E017S	E016S	017	019	018	018	018	018	018	018	018	E017S	E017S	E017S	E020S	E018S	E018S	
22	S	E017S	010	009	009	E017S	E017S	E017S	E017S	017	017	018	020	019	018	017	017	E017S	E017S	E017S	E017S	E018S	E017S	E017S	
23	E017S	E017S	E018S	E017S	017	014	E017S	E017S	E021S	E042C	018	018	020	019	018	018	018	018	E017S	E017S	E017S	E016S	E018S	E017S	
24	E016S	E017S	E017S	E017S	010	E015S	E017S	E016S	E016S	017	017	017	017	018	018	018	017	E016S	E018S	E017S	E017S	E018S	S	E017S	
25	E017S	E017S	E017S	010	010	S	E017S	E017S	E018S	017	017	018	018	019	017	017	017	017	E017S	E018S	E017S	S	E018S	E018S	
26	E017S	E017S	E020S	E016S	E	E016S	E018S	E017S	E016S	017	016	017	018	018	019	018	018	018	E017S	E020S	E016S	E018S	E017S	E017S	
27	E018S	E018S	E017S	E018S	E017S	E016S	E017S	E017S	E017S	017	017	018	020	C	017	016	016	E016S	E017S	E017S	E017S	E017S	E016S	E016S	
28	E016S	E016S	E016S	010	E017S	E017S	E016S	E017S	E017S	016	016	017	018	017	018	017	C	E018S	E017S	E017S	E018S	E017S	E018S	E018S	
29	E018S	E017S	E016S	010	008	E016S	E018S	E016S	E017S	017	017	017	018	018	018	017	017	E016S	E017S	E017S	E017S	E016S	E016S	E017S	
30	E016S	E016S	E016S	009	009	E017S	E017S	E017S	016	016	016	017	C	C	C	C	C	C	E016S	E017S	E017S	E019S	E017S	E017S	
31	E017S	E017S	S	010	010	E017S	E018S	E017S	E017S	017	017	018	018	019	017	017	017	E016S	E018S	E018S	E019S	E018S	E018S	E018S	
No.	30	31	30	21	28	28	29	30	30	28	30	31	29	28	29	29	28	29	30	30	28	29	31	28	31
Median	E017	E017	E017	010	010	E017	E017	E017	E017	017	017	018	018	018	018	017	017	E017	E017	E017	E017	E017	E017	E018	E017
U.Q.																									
L.Q.																									
Q.R.																									

f-min

Y 6

The Radio Research Laboratories, Japan

Sweep 0.55 Mc to 17.0 Mc in 20 sec in automatic operation

Lat. 31°12.1' N  
Long. 130°37.1' E

Yamagawa

IONOSPHERIC DATA

135° E Mean Time (G.M.T. +9h)

M(3000)F2 0.01

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	315	500	310	305	325	I385S	320	J345S	I360H	J380H	340	325	I340S	I360S	340	365	350	I3600	330	I355S	J355S	370S	295	320
2	290	345	315S	310	345S	375S	315	335	370S	370	345	J345S	I360C	335	C	C	C	C	C	C	275	I295S	315	I300S
3	I310S	I325S	I310S	S	F	F	F	355	355S	I350S	340S	I330S	I330S	J325S	J350S	330S	I350S	J355S	360	310S	I350S	380	315	F
4	310S	320	320	310	300	350	I310S	335	J360S	365	355S	I345S	330S	335	320	350S	I345A	I360S	370	330	285H	355	J360S	A
5	A	I315A	320	360	320S	325	I320A	370	365	385S	335	330S	340	I335S	I340S	J350S	I365S	380	360	320	I340S	385	320	F
6	F	F	J340S	I385A	I365A	I305A	315	345S	J365S	370H	J355S	I360A	350S	J350S	J345S	I355A	375	360S	380	345	315	335	365	I340A
7	315	A	A	I310A	I330S	S	A	350	370	355	370	360S	J345S	J370S	370	370	350	360	350	310	330S	365	360	290
8	310	295	305	355	I340S	335	300	J325S	355	350H	335S	J340S	350	J370S	I355S	I345S	360	340S	320	310S	I340S	345	290	315
9	J325S	I310S	300S	310	330	335	310S	J320S	370S	370S	360	I350S	J335S	I360S	360	360	345	340	J375S	365S	I315S	330	315	285S
10	295S	300S	I290S	J310S	I345S	335	J330S	350S	370S	J345S	I320S	J365S	I370S	360	I325S	I355S	J350S	325	325S	J335S	I350S	350	290	295S
11	315	J315S	325S	345	335S	340S	335	J325S	I365S	J370H	J330S	J345S	J370S	J345S	350	I340S	J355S	365H	I310S	J325S	J350S	345	325	325
12	I315S	295S	J345S	335S	365	300	320	345	J375S	I350C	J355S	I360S	345	330	360S	355	375S	360H	340	I320S	J335S	360	320	295
13	320S	320	315	330	360	310	350	335S	355	J365S	340	340	370S	J360S	J335S	J355S	355	375	355	305S	I330S	345	310S	J335S
14	305S	J325S	345S	360	305	290	J320S	335	J380S	360H	355	345S	365	365	355	355	375H	365H	350S	330S	340S	370	280	310
15	325S	305	320S	350	375	I260S	I320A	345S	370	355	330	330	345S	370S	345	355	360	385	345	385	310	J360S	I335S	I315S
16	350S	355	J360S	J355S	365	J300S	300	J330S	J375H	J350H	315	J340S	J340S	I330S	315Z	I345S	I380S	J380S	I340A	I305A	I350S	305S	280	315S
17	I310A	I305S	I335S	305S	285S	C	C	C	C	C	C	C	J340S	350	I340C	350S	360	360	I350S	I345A	380	I340A	310S	I290A
18	305	270	325	340	340	295	305	335	370	J385S	340S	J325S	340	J310S	J310S	J345S	365	370	350S	325	I340S	I365S	295S	J310S
19	295	300S	310	315	J360S	340	335	325	S	365S	310	330	335S	I330S	J360S	I355S	360H	360H	360	350	320	340	330S	310
20	290	295S	315	325	350	320S	320	340	375	380	370	J340S	I325S	J330S	330	J360S	355	350	S	S	S	I330S	300	295S
21	315S	295S	305S	320	315	U340S	350	350	I375S	J365H	355H	335S	335	J345S	340S	355	350H	350S	340	310	320S	345S	J355S	305
22	I300S	310	315S	320	355H	I990S	335	J330S	390	365	J350H	345	340	360	330	355S	330	350S	J355S	I340S	355	340	325S	290S
23	300	295	290	295	290	325	325	375S	I380S	J375S	335	350S	J335S	J350S	345	345	370	345H	370	355	325S	335S	320	J325S
24	J320S	J345S	J315S	315S	315S	320	320S	365S	I380S	365H	375H	310	I360S	355S	340	325	345	355S	355S	305	I350S	335	I290S	295S
25	320	310S	I320S	335H	I380S	I310S	315	I340S	390	360	335S	355S	I340S	375S	370	365	345	340	J360S	310	I325S	340S	I310S	275S
26	320	310	315	345	395S	I345S	305	330S	345	J345S	I350S	370	I360S	380	325	315S	J340S	355S	340	335	I310S	J355S	I340S	305
27	310	U905S	I315S	325S	I345S	355S	325	355	390S	370H	320H	355	345	I315C	I350S	340	I360S	370	J360S	315	315	320	J335S	290S
28	300	310S	325S	320	350S	375	310S	320S	360S	375	370S	360	350S	360	335	335	I350C	380	320	I330S	315S	I350S	290	295S
29	I310S	295	300S	320	315	325	J335S	335	375H	355	355	330	J350S	340	I360S	375	360H	J350S	J340S	365	300	325	310	280
30	275	295S	I355S	375	J375S	290S	285	320S	J335S	350S	I350S	370	C	C	C	C	C	S	J385S	295	315	315	295	295
31	J335S	320	I345S	325	325	300	I340S	325S	I355S	385	I340S	325S	I345S	350S	I360S	360S	350	355S	J365S	365	325	I320S	J290S	280S
No.	29	29	30	30	30	28	28	30	29	30	30	31	30	30	29	29	29	29	29	29	30	31	31	28
Median	310	310	315	325	340	325	320	340	370	365	340	345	345	345	345	355	355	360	350	330	330	345	315	300
U.Q.																								
L.Q.																								
Q.R.																								

M(3000)F2

IONOSPHERIC DATA

Lat. 31°12' N  
Long. 130°37' E

Yamagawa

135° E Mean Time (G.M.T. +9h)

0.01

M(3000)F1

Jan. 1964

Day	00	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	LH 375	360	380	L	L	L	C						
2												L 375C			C	C	C	C						
3											L	A 365	385	355	L	L	L	L						
4											L	L 385	L	L	375	L	A	A						
5											L	L 360	355	400L	LH	L	L	L						
6											L	L 1990A	385	L	L	A	L	L						
7											L	L 415	A	L	A	L	L	L						
8											LH	L 375	1380A	375	L	L	L	435						
9											L	S	L 365	L	L	L	L	L						
10											L	L 385L	385	L	L	LH	L	L						
11											L	LH 380	380	L	380	L	L	L						
12										C	L 380	380H	L	L	L	L	L	L						
13										L	L 400	LH 375	395	L	L	L	L	435						
14											L	L 375L	380L	L	L	L	L	L						
15											L	L 370	380	400	L	L	L	L						
16											380H	385H	A	395	L	A	L	L						
17									C	C	L 1370A	L	C	L	L	L	L	L						
18											L	L 1365R	365L	L	370	370L	L	L						
19											LH 355	370H	365	365	L	L	L	L						
20											A	L 1390A	365	370	365	L	A	L						
21											L	L 375	365	375	L	L	L	L						
22											L 1370A	L	L	380	L	L	L	L						
23										C	L 390	375H	365	380L	395	L	L	L						
24											L 1380S	L	375H	380H	L	L	L	L						
25											L	L 375	375	380	L	LH	L	L						
26										L	380	390	LH 395	400	L	L	L	L						
27											LH 385	1380C	360L	LH	L	L	L	L						
28											375L	385	400	375	385	390	1420C	L						
29											L	L 375	375	L	355H	400	L	L						
30										L	L 395	390	C	C	C	C	C	C						
31										L	LH 375L	A	A	A	A	A	A	A						
No.										4	20	21	18	17	4	1	2							
Median										380	360	375	375	380	390	U420	435							
U.Q.																								
L.Q.																								
Q.R.																								

Sweep 0.55 Mc to 17.0 Mc in 20 sec in automatic operation

The Radio Research Laboratories, Japan

M(3000)F1

Jan. 1964

R'F2

1 km

135° E Mean Time (G.M.T. +9h)

Yamagawa

Lat. 31°12'1"N  
Long. 130°37'1"E

### IONOSPHERIC DATA

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1												305	280	240	260	240	240	C						
2											260	280	I255C	290	C	C	C	C						
3												I260A	270	290	250	260	235							
4											250	255	260	255	260	240	I255A							
5											285	260	270	260	250	250	240							
6											250	I245A	260	260	275	I250A	235							
7											255	255	275	270	245	235	240							
8											275	260	250	255	255	255	240	215						
9											250	250	260	280	250	245								
10											300	240	230	250	285	245	245							
11											280	245	240	255	270	255	240							
12									C		250	240	260	280	250	240	230							
13									240		250	265	240	240	265	255	245	210						
14											245	255	250	255	260	245								
15											300L	290	255	250	260	245								
16											305	260	240	260	280	255	230							
17									C		C	C	250	I265C	255	245	245							
18											255	290	255	250	280	245	240							
19											315L	300	280	275	250 <sup>3</sup>	245								
20											230	270	290	255	260	245	255							
21												290	280	265	275	255								
22												255	245	240	280	255	240							
23										C	290	260	265	265	270	250	235							
24												325	250	250	275	255	255							
25												290	255	260	240	235	240							
26											255	255	240	240	300	290	250							
27												275	285	I300C	255	275	235							
28											245	260	255	260	285	270	I245C							
29											260	295	260	285	250	230								
30											250	255	240	C	C	C	C							
31											250	290	275	I265A	260	270	E260A							
No.											4	24	31	30	29	28	22	2						
Median											250	260	260	260	260	250	240	210						
U.Q.																								
L.Q.																								
G.R.																								

R'F2

Sweep 0.55 Mc to 17.0 Mc in 20 sec in automatic operation

The Radio Research Laboratories, Japan

Y 9



# IONOSPHERIC DATA

Lat. 31°12.1' N  
Long. 130°37.1' E

Yamagawa

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

f<sub>o</sub>F

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	280	305	300	315	280	205	E300S	250	195H	195H	230	200H	245	240	210	205	200	1220C	215	210	220	220	S	E300S
2	355	270	300	290	250	210	E305S	255	225	240	240	240	1250C	210	C	C	C	C	C	C	255	310	250	300
3	240	240	250	280	300F	300F	255	225	240	255	250	1260A	245	230	220	210	230	230	220	260	225	220	325	E350S
4	300	255	280	275	300	E260S	S	250	230	240	210	240	205	255	225	240	1240A	225	210	230	E250S	230	E250A	A
5	A	I345A	E310A	255	270	E290S	A	225	235	230	225	205	230	250	200	195H	225	215	240	270	245	210	E300S	250
6	320	280	255	1235A	1245A	A	E305S	255	240	210H	240	1225A	225	260	210	1210A	1235A	225	205	250	270	250	240	A
7	E240S	A	A	A	300	S	A	250	220	235	240	220	1235A	260	1220A	230	220	225	230	310	260	220	250	360
8	300	340	295	245	275	E275S	E345S	275	230	195H	230H	200	240	1235A	205	210	240	215	210	235	235	230	E360A	260
9	275	295	300	295	255	255	E290A	275	230	230	225	1230A	200	200	230	225	225	240	200	225	245	250	E250A	E390A
10	E295A	325	310	315	230	E300S	E280S	225	225	240	240	230	220	195	190	205H	210	230	235	220	220	255	E340S	320
11	260	E295S	260	250	E290A	250	285	265	230	210H	200	185H	245	210	205	240	235	205H	255	245	210	235	270	260
12	A	300	300	250	235	E350S	E310S	250	225	1230C	240	220	195H	190	240	220	220	210H	250	240	220	235	E280S	300
13	E260S	300	270	255	240	E300S	260	260	240	225	200	190	200H	220	200	215	210	200	230	270	250	220	290	295
14	280	270	225	200	240	S	S	265	220	190H	210	250	210	215	200	220	205H	210H	210	240	210	E250S	E350S	300
15	270	295	255	210	225	375	A	255	225	230	E250A	1230A	225	210	200	220	250	215	225	205	E275S	245	S	300
16	315	245	250	E240S	225	S	E300S	270	220H	225H	190H	185H	1240A	225	200	1245A	1230A	225	A	A	225	250	340	260
17	1295A	300	255	300	345	C	C	C	C	C	C	1225A	195	1210C	230	230	225	230	210	1235A	230	A	E300A	A
18	305	355	280	280	240	E325A	E345A	255	230	230	205	1210A	220	215	220	210	240	230	E220A	270	250	225	255	280
19	320	300	295	250	235	245	255	250	210	210	200H	245	210H	210	225	225	205H	205H	220	250	290	260	250	E300S
20	340	310	300	260	230	E300S	E300S	250	230	230	E230A	A	195	250	225	240	1220A	240	A	A	220	250	E290A	305
21	290	280	290	300	280	240	245	240	215	205H	200H	205	195	200	220	220	200H	230	E280A	E300A	260	220	240	E320S
22	S	300	295	280	210H	1260A	E310A	E245S	210	235	200H	1220A	210	215	225	230	215	240	220	225	210	245	E325S	E325S
23	305	305	E320S	E340A	305	270	270	210	220	1210C	225	205	190H	240	210	205	210	200H	205	230	240	250	270	290
24	295	255	285	E290S	250	E260S	255	240	215	205H	190H	195	195	190H	180H	205	235	230	225	E240S	225	230	S	E310S
25	285	290	290	240H	210	S	340	250	235	230	205	225	230	220	205	190H	215	240	210	260	245	225	S	E350S
26	300	295	300	260	200	A	E340S	250	250	245	235	205	205H	205	185	255	245	230	210	225	255	230	245	285
27	300	290	290	270	240	210	E290S	240	215	240H	200H	195H	200	1205C	220	200H	230	230	215	260	260	270	250	310
28	320	290	290	275	245	210	E350S	255	235	235	240	215	205	210	200	195	1190C	220	220	240	230	210	E300S	E320S
29	330	310	305	280	255	255	E250S	250	190H	240	250	240	250	225	200H	215	200H	230	220	210	300	255	270	315
30	330	315	230	200	225	E390S	E350S	E285S	240	240	210	225	C	C	C	C	C	240	210	E255S	255	E250S	E320S	290
31	300	290	1240S	250	245	E270S	E360S	255	225	220	230H	215	A	A	A	A	240	225	205	220	255	E285S	E300S	E350S
No.	27	30	28	28	30	13	25	29	30	30	28	30	29	29	28	28	29	30	27	26	29	27	16	20
Median	300	295	290	260	245	245	E300	250	225	230	225	220	210	215	210	220	225	225	E220	E240	245	235	230	E300
U.Q.																								
L.Q.																								
Q.R.																								

Sweep 0.55 Mc to 17.0 Mc in 20 sec in automatic operation

f<sub>o</sub>F

The Radio Research Laboratories, Japan

Y 10

Lat. 31°12.1' N  
Long. 130°37.1' E

Yamagawa

IONOSPHERIC DATA

1 km 135° E Mean Time (G.M.T. +9h)

h'ES

Jan. 1964

Day	00	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	100	100	S	S	S	G	G	175	115	110	110	G	105	G	C	S	S	S	S	S	S
2	S	S	S	105	S	S	105	S	G	110	155	155	C	130	C	C	C	C	C	C	S	S	S	S
3	S	S	130	160	155	S	S	S	150	140	140	120	120	110	G	G	105	105	105	S	S	S	S	S
4	S	S	S	E	E	S	S	S	155	155	G	G	G	G	105	105	100	105	105	105	100	S	S	105
5	110	100	100	100	100	100	100	105	G	155	110	105	100	100	100	G	G	100	100	E	100	100	100	S
6	S	S	S	105	105	105	105	105	165	110	110	105	105	155	100	105	105	100	S	S	S	S	S	105
7	105	100	100	100	100	S	100	S	G	120	110	110	105	105	100	100	100	100	100	100	S	S	S	S
8	S	S	S	110	105	105	100	100	G	G	170	120	110	105	105	105	105	105	100	100	095	S	S	120
9	S	S	S	105	105	S	100	100	G	G	145	120	120	110	110	110	145	130	S	S	S	110	105	105
10	110	S	S	105	105	E	S	S	S	G	125	G	G	110	G	G	105	100	100	S	S	S	S	S
11	S	S	S	100	100	105	S	S	S	G	140	125	G	G	G	G	G	130	S	140	100	100	100	100
12	100	100	S	S	S	S	S	S	G	C	120	110	110	110	110	105	140	100	115	S	S	S	S	S
13	S	S	S	S	E	S	S	S	G	125	120	110	110	G	110	100	G	100	100	100	S	100	S	S
14	S	S	S	E	105	S	S	105	G	G	160	125	G	110	120	120	110	135	S	S	S	105	100	100
15	S	S	S	E	100	S	100	100	G	145	130	125	120	110	115	110	105	105	110	105	105	110	S	S
16	S	S	S	S	E	S	S	S	G	G	120	120	110	115	110	105	100	100	105	105	105	100	100	100
17	100	100	100	110	110	C	C	C	C	C	C	105	105	G	105	100	100	100	105	105	100	100	100	100
18	S	105	100	105	105	105	105	105	105	145	135	135	G	G	G	110	105	105	105	105	100	100	105	105
19	S	S	S	E	E	S	S	S	G	175	160	110	110	110	110	105	105	105	105	105	105	100	105	105
20	100	105	105	105	100	100	S	100	G	130	110	110	110	105	105	100	100	100	100	100	105	105	100	S
21	S	S	S	105	100	100	S	S	120	110	110	105	105	105	105	105	G	100	100	100	100	100	S	S
22	S	105	105	105	E	100	100	S	G	160	125	110	110	110	100	100	100	095	095	S	100	105	S	S
23	S	S	S	105	100	E	F	S	S	C	115	110	110	105	100	G	G	120	S	S	S	S	S	S
24	S	S	S	S	E	105	S	S	G	110	120	120	120	110	G	G	G	100	095	S	J	S	S	105
25	S	S	S	E	E	S	S	S	S	G	130	120	G	G	G	G	G	145	S	S	S	S	S	S
26	S	100	S	S	100	100	S	S	110	150	150	150	G	105	105	G	150	100	S	S	S	S	S	S
27	S	S	S	S	S	S	S	S	G	G	G	125	110	G	105	100	100	G	S	S	S	S	S	S
28	105	105	100	100	S	S	S	S	G	165	125	125	120	120	110	G	C	G	S	S	S	S	S	110
29	S	S	S	E	105	S	S	S	G	G	160	145	115	110	110	G	G	G	S	S	S	105	130	S
30	110	S	S	E	E	S	S	S	G	G	G	105	C	C	C	G	C	095	S	S	S	S	S	S
31	105	105	S	E	E	S	S	S	G	C	120	110	110	105	100	100	100	G	S	S	S	S	S	S
No.	9	11	13	16	17	10	9	8	6	16	27	29	22	23	22	19	19	25	17	12	13	14	11	11
Median	105	105	105	105	105	100	100	100	135	140	125	120	110	110	105	105	105	105	100	100	105	100	100	105
U.Q.																								
L.Q.																								
Q.R.																								

The Radio Research Laboratories, Japan

Sweep 0.55 Mc to 17.0 Mc in 20 sec in automatic operation

h'ES

Lat. 31°12'N  
Long. 130°37'E

Yamagawa

IONOSPHERIC DATA

135° E Mean Time (G. M. T. +9h)

Types of Es

Jan. 1964

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1			f	f	f					h	h	h	c	l2		l2									
2			f	f	f	f				h	h	h	h12												
3		f2	ff	f	f				h3	h2	h2	h4	h	l	l2	l2	l	l	f	f	f	f2	ff2		
4									h2	h1							l4	l3	f2	f	f	f	f		
5	f2f3	f2	f2	f	f2	f	f2	l	h212	l212	l2	l2	l2	l2	l	l3	l3	l2	l	f	f2	f2	f2		
6			f2	f2	f2	f	f	l2	h2	l	c	l3	l2	h1	l	l3	l3	l2	l	f	f2	f2	f2		
7	f	f2	f	f3	f3	f	f		c	e2	c	e2	l2	l2	l2	l	l	l	f	f2	f2				
8			f	f2	f2	f	f	l	h	h	h	h	e1	e21	l2	l	l	l	f	f	f		f3		
9				f	f	f	f2	l	h2	h2	h2	h	h	c	c	l	h	h	h		f	f2	f2		
10	f2		f2	f2					h	h	h	h	l	l	l	l	l	l2	f						
11				f2	f2	f			h	h	h	h	l	e1	l	l2	h	h	f5	f3	f3	f	f	f3	
12	f	f2							h	h	h	l	l	l	l	l	h	l	l2	f2	f				
13								l	h3	h	h	h	l	l	h1	e2	l2	h	l2	f	f	f	f	f2	
14								l	h	h	h	h	h	l	h1	e2	l2	h	l2	f	f	f	f	f2	
15								l	h2	h2	h	h	h	c	c	e2	l2	l	l	f	f	f	f	f2	
16								l	h	h	h	h	h	h	h	h	l2	l	l	f3	f3	f4	f2	f2	
17	f3	f2	f2	f2	f				h	h	h	h	l3	l	l	l	l	l	f	f3	f2	f2	f	f	
18		f	f	f	f2	f3	f3	l2	l	h	h	h	h		l	l	l2	l4	f2	f	f	f	f	f	
19								l	h	h	h	h	l	l	l	l	l	l	f	f	f	f	f	f	
20	f	f	f2	f2	f	f		l	h2	e2	l2	l	l	l	l	l2	l2	l2	f	f2	f2	f	f	f	
21									l	l	l	l	l	l	l	l	l	l	f2	f3	f2	f	f	f	
22		f2	f	f	f	f2			h	h2	e2	l	l	l	l	l	l	l	f						
23			f	f					h	c	l	l	l2	l	l	l	l	l	f						
24									l	h	h	h	h	l	l	l	l	l	f2					f	
25									h	h	h	h	h	h	h	h	h	h	h						
26			f		f	f			l	h1	h1	h1	h1	l	l	l	h	lh						f2	
27									h2	h1	h1	h	h	l	l	l	l	l	f		f				
28	f2	f	f	f					h2	h1	h1	h	h	h	l	l	l	l							
29									h	h	h	h	h2	l	l	l	l	l						f	
30	f								l	h2	h	h	l	l	l	l	l2	l2							
31	f	f2							h2	c	l3	l3	l3	l3	l4	l4	l2	l2							
No.																									
Median																									
U.Q.																									
L.Q.																									
Q.R.																									

Sweep 0.55 Mc to 17.0 Mc in 20 sec in automatic operation

The Radio Research Laboratories, Japan

Types of Es

Y 12

## SOLAR RADIO EMISSION 200 Mc/s

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

HIRAISO

Time in U.T.

Jan. 1964	Steady Flux					Variability				
	00-03	03-06	06-09	21-24	mean	00-03	03-06	06-09	21-24	mean
1	7	6	(6)	-	7	0	0	(0)	-	0
2	-	6	(7)	-	6	-	0	(0)	-	0
3	6	7	(6)	(6)	7	0	0	(0)	(0)	0
4	7	6	(6)	(6)	6	0	0	(0)	(0)	0
5	7	7	(6)	(6)	7	0	0	(0)	(0)	0
6	6	6	(6)	(7)	6	0	0	(0)	(0)	0
7	7	6	6	-	7	0	0	0	-	0
8	7	7	6	(6)	7	0	0	0	(0)	0
9	6	7	7	(6)	7	0	0	0	(0)	0
10	10	6	6	-	6	0	0	0	-	0
11	8	6	6	(6)	7	0	0	0	(0)	0
12	6	5	-	-	6	0	0	-	-	0
13	-	-	-	-	-	-	-	-	-	-
14	-	6	6	(6)	6	-	0	0	(0)	0
15	6	6	-	(6)	6	0	0	-	(0)	0
16	6	6	5	-	6	0	0	0	-	0
17	-	-	-	(6)	-	-	-	-	(0)	-
18	6	(5)	-	-	6	0	(0)	-	-	0
19	6	6	(5)	-	6	0	0	(0)	-	0
20	7	7	6	-	6	0	0	0	-	0
21	8	(6)	-	-	6	0	(0)	-	-	0
22	7	(7)	6	(6)	6	0	(0)	0	(0)	0
23	7	6	6	-	6	0	0	0	-	0
24	6	(5)	-	(6)	6	0	(0)	-	(0)	0
25	6	(6)	-	(6)	6	0	(0)	-	(0)	0
26	6	(6)	-	(6)	6	0	(0)	-	(0)	0
27	6	(6)	-	-	6	0	(0)	-	-	0
28	-	-	-	(5)	-	-	-	-	(0)	-
29	6	8	7	(9)	6	0	0	0	(1)	0
30	14	-	-	(6)	(12)	1	-	-	(0)	(1)
31	5	6	6	(6)	6	0	0	0	(0)	0

Note No observations during the following periods:

1st 2150-	2nd 0310	18th 2140-	19th 0100
2nd 2150-	2300	19th 2140-	20th 0010
12th 0500-	0740	21st 0400-	0740
12th 2150-	14th 0200	21st 2140-	22nd 0100
15th 0500-	0740	23rd 0120-	24th 0100
16th 2140-	17th 0740	27th 2140-	28th 0740
18th 0350-	0740	30th 0210-	0740

Observations were much affected by frequent man-made noise.  
Data may contain small uncertainties.

## SOLAR RADIO EMISSION 500 Mc/s

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

HIRAISO

Time in U.T.

Jan. 1964	Steady Flux				
	00-03	03-06	06-09	21-24	mean
1	(20)	20	-	(18)	20
2	19	19	-	(21)	19
3	20	-	-	-	20
4	19	21	(19)	(21)	20
5	18	19	-	(20)	19
6	19	20	(19)	(17)	20
7	20	19	(19)	(19)	20
8	19	19	-	(16)	19
9	19	20	-	(18)	18
10	18	19	(19)	(18)	19
11	21	22	(20)	(23)	21
12	21	22	(23)	-	22
13	(23)	(23)	-	(19)	(23)
14	22	-	-	-	22
15	-	22	(20)	(21)	21
16	21	25	(22)	(22)	23
17	23	23	(24)	(23)	23
18	25	24	(21)	(22)	23
19	23	23	(24)	(24)	23
20	22	25	(26)	(27)	24
21	26	24	-	(25)	25
22	25	(23)	-	(23)	24
23	24	23	(21)	-	23
24	20	24	-	-	22
25	24	23	(21)	(19)	23
26	-	-	-	(21)	(19)
27	22	(21)	-	(22)	22
28	24	24	(21)	(24)	24
29	24	25	(24)	(23)	25
30	24	24	(24)	22	24
31	23	25	(24)	(25)	24

Note No observations during the following periods:

3rd	0300-	0750	23rd	0135-	0400		
3rd	2150-	4th	0100	23rd	2150-	24th	0105
12th	2150-	13th	0100	24th	0555-	0750	
14th	0130-	0750	24th	2150-	25th	0050	
14th	2150-	15th	0230	25th	2330-	26th	0750
21st	0600-	0700	26th	2325-	27th	0100	
21st	2320-	22nd	0105	30th	0118-	0210	
22nd	0400-	0620					

### Outstanding Occurrences

No Outstanding Occurrence was observed during January, 1964.

RADIO PROPAGATION QUALITY FIGURES

HIRAISO

Time in U.T.

Jan. 1964	Whole Day Index	L. N.			W W V				S. F.				W W V H				Warning				Principal magnetic storms			
		06	12	18	00	06	12	18	00	06	12	18	00	06	12	18	00	06	12	18	Start	End	ΔH	
		12	18	24	06	12	18	24	06	12	18	24	06	12	18	24	06	12	18	24				
1	4-	C	C	C	-	-	-	3	3	4	4	4	4	4	4	4	N	N	N	N	01.4	---	189 <sup>y</sup>	
2	3-				-	-	-	1	3	3	3	3	3	5	5	(4)	5	N	U	U	U	---	---	
3*	3o				-	-	-	2	3	4	3	3	4	4	4	-	4	U	U	N	N	---	---	
4	4-				-	-	-	(4)	3	4	4	4	4	4	4	-	4	N	N	N	N	---	---	
5	4-				-	-	-	2	5	(4)	4	4	4	5	5	-	4	N	N	N	N	---	24xx	
6	3o				-	-	-	(1)	4	3	4	3	3	4	4	-	4	N	N	N	N			
7	3+				-	-	-	3	3	4	4	3	3	3	3	-	4	N	N	N	N			
8	4-				-	-	-	4	3	4	4	3	3	4	4	-	4	N	N	N	N			
9	4+				-	-	-	4	4	5	4	4	4	4	4	-	4	N	N	N	N			
10	4+				-	-	-	5	4	5	4	4	4	4	5	-	4	N	N	N	N			
11	3+				-	-	-	3	4	3	4	C	3	3	4	-	4	N	N	N	N			
12	4o				-	-	-	3	C	4	5	(4)	4	3	4	-	5	N	N	N	N			
13	4-				-	-	-	4	C	3	4	4	4	5	4	-	5	N	N	N	N			
(14)	4+				-	-	-	4	(4)	4	5	5	5	5	4	-	5	N	N	N	N			
(15)	5-				-	-	-	5	4	5	5	4	4	4	4	-	4	N	N	N	N			
(16)	3+				-	-	-	3	3	4	3	(4)	3	5	5	5	5	N	N	U	U	00.7	---	140 <sup>y</sup>
17	3+				-	-	-	(2)	4	4	4	3	3	4	4	-	5	N	N	N	N	---	17xx	
18	3+				-	-	-	1	3	4	4	4	4	5	5	4	4	N	N	N	N			
19	4-				-	-	-	3	3	4	4	4	4	5	5	(4)	5	N	N	N	N			
20	3+				-	-	-	2	(4)	4	4	(3)	(4)	(4)	4	-	4	N	N	N	N			
21	3+				-	-	-	3	3	3	4	3	3	4	5	4	5	N	N	N	N			
22	4-				-	-	-	3	3	4	4	4	4	3	3	-	4	N	N	N	N			
23	4o				-	-	-	4	4	4	4	4	4	3	3	-	4	N	N	N	N			
24	4-				-	-	-	3	4	4	4	4	4	4	3	-	4	N	N	N	N			
25	4+				-	-	-	5	4	4	4	(4)	(4)	4	4	-	3	N	N	N	N			
26 <sup>Δ</sup>	4-				-	-	-	3	C	4	4	(4)	4	4	3	-	4	N	N	N	N			
27	4o				-	-	-	4	4	4	4	(4)	4	(4)	-	4	4	N	N	N	N			
28	4o				-	-	-	5	3	4	4	(4)	4	4	-	5	4	N	N	N	N	1922	---	88 <sup>y</sup>
29	3+				-	-	-	2	4	3	4	3	3	5	5	-	4	N	U	U	U	---	23xx	
30	3+				-	-	-	(3)	3	4	3	3	3	3	4	-	3	N	N	N	N			
31	4-				-	-	-	(3)	4	4	3	4	4	4	3	-	4	N	N	U	U			

IQSY GEOALERT and ADALERT (Western Pacific Region)

\* = MAGSTORM

o = MAGCALME

Δ = COSMIC EVENT

( ) = Regular World Day

- = impossible to evaluate

( ) = inaccurate

C = artificial accident

--- = continuing magnetic storm

SUDDEN IONOSPHERIC DISTURBANCES (S.I.D.)

HIRAISO

No Sudden Ionospheric Disturbance was observed during January, 1964.



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IONOSPHERIC DATA IN JAPAN FOR JANUARY 1964

第 16 卷 第 1 号

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1964年3月20日 印 刷  
1964年3月25日 發 行 (不許複製非売品)

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發 行 人

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