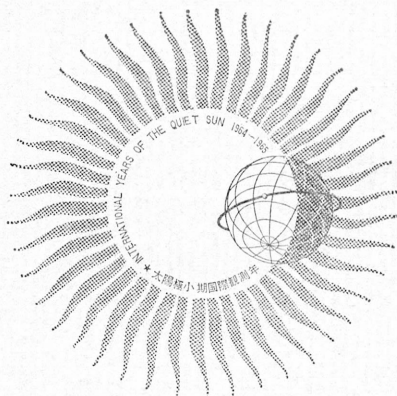


F—191

IONOSPHERIC DATA IN JAPAN

FOR NOVEMBER 1964

Vol. 16 No. 11



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THE RADIO RESEARCH LABORATORIES
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KOKUBUNJI, TOKYO, JAPAN

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FOR NOVEMBER 1964

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THE RADIO RESEARCH LABORATORIES

KOKUBUNJI, TOKYO, JAPAN

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SITE 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, 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, Ibaraki-ken

SYMBOLS AND TERMINOLOGY

A. IONOSPHERE

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

Terminology

f_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_bE_s	The lowest ordinary wave frequency at which the E_s layer begins to become transparent. This is usually determined from the minimum frequency at which reflections from layers at greater heights are observed.
f -min	The frequency below which no echoes are observed.
$M(3000)F2$	The maximum usable frequency factor for a path of 3000 km for transmission by $F2$ layer.
$M(3000)F1$	The maximum usable frequency factor for a path of 3000 km for transmission by $F1$ layer.
$h'F2$	The minimum virtual height, $h'F2$, refers to the highest, most stable stratification observed in the F region and can only be scaled when such stratification is present.
$h'F$	The natural and most significant F region virtual height parameter is that for lowest F region stratification. This will be denoted by $h'F$. Thus $h'F$ is identical with the current $h'F2$ when F region stratification is absent, e.g., at night, and with the current $h'F1$ when $F1$ stratification is present.
$h'E_s$	The lowest virtual height of the trace used to give the f_oE_s .
h_pF2	The virtual height of the $F2$ layer measured on the ordinary

$y_p F2$

wave branch at a frequency equal to $0.834f_0 F2$.

The semi-thickness of the $F2$ layer deduced from a parabolic fit to the "nose" of the electron density distribution with height and based on the observed $h'f$ trace. (The difference between $h_p F2$ and the virtual height at $0.969f_0 F2$).

a. Descriptive Letters

The following letters are entered after or used to replace a numerical value on the monthly tabulation sheets.

- A Measurement influenced by, or impossible because of, the presence of a lower thin layer, for example 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 of the layer is too small to enable it to be made accurately.
- H Measurement influenced by, or impossible because of, the presence of a stratification.
- L Measurement influenced or impossible because the trace has no sufficiently definite cusp between layers.
- M Interpretation of measurement questionable because the ordinary and extraordinary components are not distinguishable.
- N Conditions are such that the measurement cannot be interpreted.
- O Measurement refers to the ordinary component.
- R Measurement influenced by, or impossible because of, attenuation in the vicinity of a critical frequency.
- S Measurement influenced by, or impossible because of, interference or atmospherics.
- T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
- V Forked trace which may influence the measurement.
- W Measurement influenced or impossible because the echo lies outside the height range recorded.
- X Measurement refers to the extraordinary component.
- Y Intermittent trace.
- Z Third magneto-ionic component present.

b. Qualifying Letters

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

value on the monthly tabulation sheets.

D	greater than.
E	less than.
I	Missing value has been replaced by an interpolated value.
J	Ordinary component characteristic deduced from the extraordinary component.
O	Extraordinary component characteristic deduced from the ordinary component. (Used for x- characteristics only.)
T	Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
U	Uncertain or doubtful numerical value.
Z	Measurement deduced from the third magneto-ionic component.

c. Description of Standard Types of E_s

The eight standard types of E_s are identified by corresponding lower case letters: f , l , c , h , q , r , a , s . These letters suggest the names flat, low, cusp, high, equatorial, retardation, auroral and slant, respectively. It is strongly emphasized that these names are not restrictive. The letter 'n' is used to designate any E_s trace that does not correspond to any of the eight types.

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 .

l A flat E_s trace at or below the normal E layer minimum virtual height in the day or below the night E layer minimum virtual height at night.

c An E_s trace showing a relatively symmetrical cusp at or below f_0E . This is usually continuous with the normal E trace, although when the deviative absorption is large, part or all of the cusp may be missing. (Usually a daytime type.)

h An 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. (Usually a daytime type.)

q An E_s trace which is diffuse and non-blanketing over a wide frequency range. The spread is most pronounced at the upper edge of the trace. (This type is common in daytime in the vicinity of the magnetic equator.)

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

a An E_s having a well defined flat or gradually rising lower edge with stratified and diffuse (spread) traces present above it. These

sometimes extend over several hundred kilometers of virtual height.

s A diffuse E_s trace which rises steadily with frequency and usually emerges from another type E_s trace. The rising trace alone is classified as 's'; the horizontal trace is classified separately. At high latitudes the slant trace usually starts to rise from a horizontal E_s trace such as E_s-l or E_s-f , at frequencies which greatly exceed the E layer critical frequency, whereas at low latitudes it usually rises from E_s-q , E_s-c , or E_s-h at frequencies near the regular E critical frequency. Type s is never used to determine f_0E_s and $h'E_s$. The slant trace is sometimes observed to start at f_0E without echoes clearly identifiable as E_s echoes being seen.

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

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 observations are carried out on 200 and 500 Mc/s at Hiraiso Radio Wave Observatory.

Antennas are a broadside array of 6×4 doublets for 200 Mc/s and a parabolic reflector of 5 meter for 500 Mc/s, each having the total power receiver.

Observations are feasible almost from sunrise to sunset.

a. Time and Unit

The time is expressed as U.T.

The unit is $10^{-22} \text{ W} \cdot \text{m}^{-2} \cdot (\text{c/s})^{-1}$ for both components of polarization.

b. Daily Data

Flux density

The three-hourly and daily mean values are given.

Variability

The three-hourly and daily mean values are given at 200 Mc/s only.

Variability is expressed in the following four grades:

0=Quiet or no burst,

1=A few bursts,

2=Many bursts,

3=Very many bursts.

The number of bursts exceeding the flux level is counted.

c. Distinctive Events

The phenomena are picked up on the following criteria:

1. Distinct from the prevailing kind of activity,
2. Correlated with other known solar phenomena,
3. Remarkable change-over from one situation to another.

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

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

Descriptive type is denoted by the following symbols:

S=Simple rise and fall of intensity;

C=Complex variation of intensity,

C+=Prolonged broad-band enhancement of radiation, generally of spectral type IV;

F=Group of bursts: multiple peaks probably belonging to the same event, but separated by relatively short period of quietness;

RF=More or less irregular rise and fall of intensity, at metric or decimetric wavelengths;

e=Sudden beginning of burst with steep rise of intensity;

E=Steep rise of intensity of continuum background;

p.i.=post-burst increase;

onset storm=clear-cut beginning of a noise storm.

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

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

C. RADIO PROPAGATION CONDITIONS

a. 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 Disturbance (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

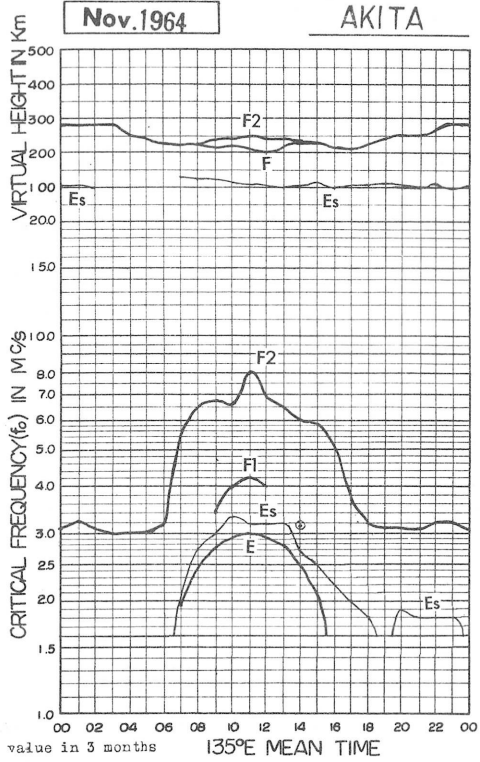
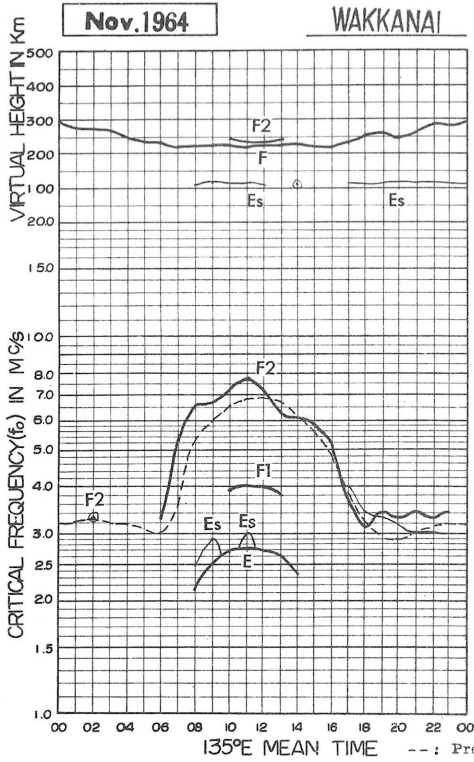
Importances

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

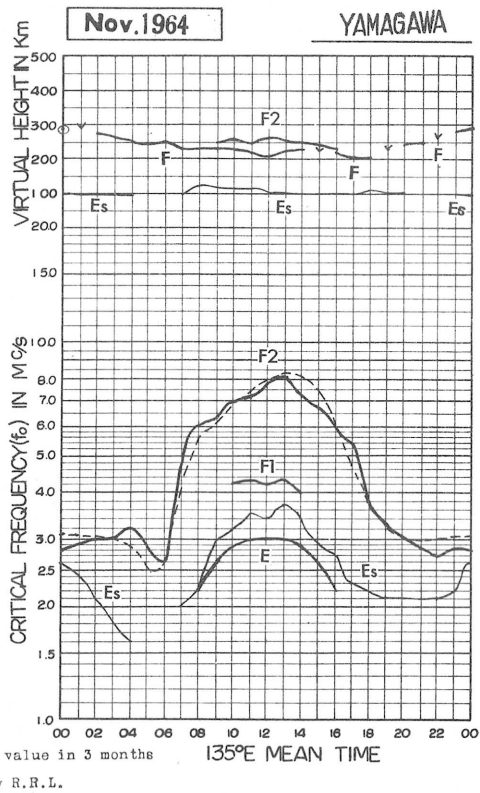
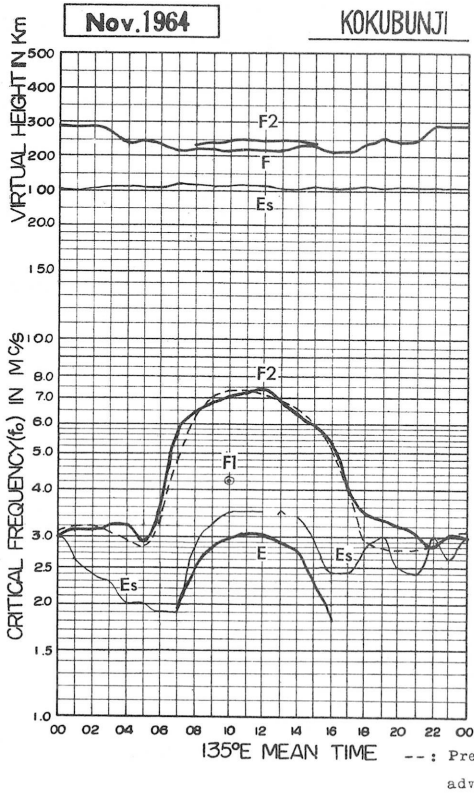
1-	1	1+
2-	2	2+
3-	3	3+

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



IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS



IONOSPHERIC DATA

Lat. 45° 23.6'N
Long. 141° 41.1'E

Wakkanai

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

foF2

Nov. 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	SF	SF	038F	SF	SF	SF	040S	055	063	060	071	076	071	061	U071S	063	052	044	041	036	040	038	033	SF
2	SF	SF	040F	SF	SF	SF	044S	070	069	071H	087	096	074	075	069	076	070	054	052	050F	050F	044F	SF	SF
3	SF	SF	SF	SF	SF	SF	SF	S	081	076	085	083	081	088	070	068	060	041	036	038	039	043	043	SF
4	SF	043F	040F	SF	SF	SF	043F	058	068	067	073	093	083	066	061	067	053	041	040	031	030F	033F	SF	SF
5	SF	SF	033F	SF	SF	SF	U042S	068S	U078S	075S	077	089	I080R	070	061	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	081	073	076H	065	065	065	057	035	036	036	036	039	SF	SF
7	SF	038F	SF	036F	SF	SF	033	053	065	067	072	081	076	060	056	061	050	033	030	031	028	027	028	030
8	031	031	031	031	030F	U031S	029	050	C	C	C	C	C	C	C	C	C	C	031	033	034	035	035	034
9	SF	SF	037F	SF	036F	SF	SF	061	091	065S	083	077	078	067	063	065	061	035	033	034	034	040F	SF	SF
10	SF	038F	030F	SF	SF	033	040S	I063S	090H	U077S	U103R	103	089	072	063	063	058	033	028	029	027	032	035S	036F
11	SF	035F	033F	SF	030F	027F	030	057	058	058	073	088	075	063	SF	065S	053	I039A	I028A	028	032	027	030	SF
12	SF	F	F	F	F	F	F	078	U073S	U066S	077H	080	081	071	I061S	057	043	I037A	I037A	038	036	A	A	F
13	F	F	031F	F	F	F	030F	050S	071	083	076	076	077	067	061	056	I051C	050	SF	FS	SF	SF	SF	SF*
14	SF	SF	SF	SF	SF	SF	030F	050	070	077	070	073	066	054	071	053	046	039	I036A	I037A	037	A	SF	SF
15	SF	SF	SF	F	F	033F	033	049	063	066	063	067	064	060	055	052	047	C	C	C	C	C	C	C
16	C	C	C	C	C	C	C	C	C	063	066	083	066	061	061	058	057	043F	SF	U043F	SF	SF	SF	SF
17	SF	035F	035F	SF	SF	SF	SF	A	069	075S	077	084	C	067	061	053	055F	045F	045	049F	055F	042F	047F	050F
18	049F	SF	SF	SF	SF	SF	033F	060	U074S	075	070	076	070	063	055	057	042	I036C	036	044	SF	SF	SF	SF
19	SF	SF	SF	SF	SF	SF	037F	058	066	072H	067	074	067	063H	058	059	037	035	025	028	028	026	030	030F
20	030F	SF	SF	SF	SF	SF	SF	053S	U059S	I062S	068	062	063	054	054	055	043	SF	028F	026F	SF	SF	SF	FS
21	FS	FS	F	SF	FS	FS	FS	053	052	052	058	061	061H	056H	055	046	I054S	029	FS	FS	033F	FS	FS	F
22	SF	F	F	F	FS	F	FS	C	C	C	C	C	C	C	C	C	C	034S	021	024	035F	033F	SF	SF
23	027F	SF	SF	SF	SF	SF	030F	045	054	058	061	084	071	060	060	060	043	036	031	031	032	036	037	037
24	SF	SF	SF	SF	SF	SF	033F	044	066	082	103	073	067	058	063	053	044	028	I027S	027	028	031F	SF	SF
25	SF	SF	SF	SF	SF	SF	SF	SF	059	070	U068S	068	064	058	056	056	043	SF	031F	036F	030F	SF	SF	040F
26	SF	SF	SF	SF	SF	027F	027S	046	052	063	073H	068	061	058	053	053	048	033S	027	028S	031	033	033	033
27	SF	SF	SF	SF	SF	SF	027	024	067	078S	U102S	090	064	060	061	061	046	031	036	038	SF	SF	SF	FS
28	027F	028F	SF	SF	SF	036F	041	050S	048	057	071	069	068	067	059	063	065	042	I037A	041	041	037	SF	SF
29	SF	FS	033F	F	SF	SF	SF	044	050	068	077	077	069	060	053	057	051	I028A	024	028	026	SF	F	F
30	030F	030F	030F	030F	027F	026F	023	041	050	053	058	057	076	056	053	054	043H	041	025	030	024	025	028	033
31																								
No.	6	8	12	3	7	8	19	24	26	27	28	28	27	28	27	27	27	25	25	26	23	18	11	9
Median	030	035	033	031	030	029	033	033	066	067	073	076	071	062	061	058	051	036	031	034	033	034	033	034
U. Q.	031	038	038	036	036	033	040	059	071	075	079	084	077	067	063	063	057	042	036	038	037	039	037	038
L. Q.	027	030	031	030	027	027	030	048	058	062	068	071	065	059	055	054	043	033	028	028	028	028	031	030
Q. R.	004	008	007	006	009	006	010	011	013	013	013	013	011	008	008	009	014	009	008	010	009	008	007	006

The Radio Research Laboratories, Japan

Sweep1.0 Mc to18.0Mc in 40 sec in automatic operation

foF2

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

Nov. 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											380L	410	390											
2											U420L	410	400	400H										
3											400L	400	U400L											
4											380L	410	400	380L										
5											380	400H	400	380	340L									
6											400	390												
7											400L	400L	400											
8									C	C	C	C	C	C	C									
9											380L	400L	400L	U380L										
10											I390A	410	400	380L										
11											380	400												
12											400	400L	400L	400H										
13											400L	410	380L											
14											370	400	400	390										
15											380													
16											350L	I370A	390L	380L										
17											360	400L	380	I390C										
18											U390L	400L												
19													390											
20											400L		370L	350L										
21												U390L												
22										C	C	C	C	C	C									
23											400	380L												
24											390L	380	U380L											
25										340L		400H	380L											
26												390L	380L											
27											400L	390L												
28												360												
29												390L												
30												390L												
31												400L												
No.									3	19	23	20	9	1										
Median									350	390	400	395	380	340										
U. Q.																								
L. Q.																								
Q. R.																								

foF1

IONOSPHERIC DATA

Lat. 45° 23.6'N
Long. 141° 41.1'E

Wakkanai

foE

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

Nov. 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	255	265	285	290	280	260	I220S	S							
2							S	S	210	235	260	I270A	275	270	260	215	S							
3							S	S	235	265	275	A	A	A	A	215	S							
4							S	S	210	I230A	I245A	I270A	295	280	250	S	S							
5							S	S	225	235	270	280	I280A	265	240	C	C	C						
6							C	C	C	I280A	I285A	290	275	255	S	S	S							
7							S	S	220	255	285	290	285	I270A	250	S	S							
8							S	S	C	C	C	C	C	C	C	C	C	C						
9							S	S	225	250	I250A	I255A	255	A	A	S	S							
10							S	S	210	A	A	A	A	A	A	S	S							
11							S	S	A	A	A	275	270	I265R	I240A	S	S	S						
12							S	S	215	I250A	270	290	295	265	245	A	S							
13							S	S	230	250	265	280	280	265	A	S	C	S						
14							S	S	A	A	A	A	280	260	A	S	S							
15							S	S	205	I250A	265	285	275	260	230	S	S	C						
16							C	C	C	A	A	A	270	255	240	S	S	S						
17							S	S	A	250	270	285	I275C	I260R	235	S	S							
18							S	S	215	250	I260A	I265A	270	255	215	200	S							
19							S	S	215	I235A	I260A	270	A	A	R	S	S	S						
20							S	S	A	A	275	275	270	255	235	S	S							
21							S	S	210	250	275	275	265	255	230	S	S							
22							S	C	C	C	C	C	C	C	C	C	C							
23							S	S	A	250	270	275	275	I250A	230	S	S							
24							S	S	225	I255A	270	270	270	245	I220A	S	S							
25							S	S	A	230	250	255	I250A	240	210	S	S							
26							S	S	A	A	235	270	265	245	A	A	S							
27							S	S	A	235	265	265	265	250	S	S	S							
28							S	S	B	230	250	250	I255A	245	215	S	S							
29							S	S	A	A	265	260	270	245	210	S	S							
30							S	S	S	230	265	265	250	245	B	S	S							
31																								
No.									15	20	24	24	25	24	19	4								
Median									215	250	265	270	270	260	235	215								
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

Lat. 45° 23.6'N
Long. 141° 41.1'E

Wakkanai

IONOSPHERIC DATA

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

foEs

Nov. 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	E	E	S	S	S	G	G	G	G	G	G	G	S	024	J025	J024	029	J030	J025	025	S
2	S	S	E	E	E	S	S	S	027	031	G	J055	G	G	033	G	S	S	J038	S	S	S	026	S
3	S	S	E	E	E	E	S	S	G	G	G	038	J050	040	033	G	S	S	S	S	S	S	031	S
4	S	J025	J033	028	020	S	S	S	033	028	030	J043	G	G	G	S	S	S	025	S	S	S	S	S
5	S	J030	022	E	E	E	S	S	G	031	G	023G	034	G	G	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	J033	J033	033	034	G	S	S	S	S	J043	J043	030	J033	J031
7	J043	J023	S	E	E	S	S	S	031	032	G	G	G	030	C	C	C	C	S	S	S	S	S	S
8	S	S	E	S	E	S	S	S	C	C	C	C	C	C	C	C	C	C	S	S	S	S	S	S
9	S	E	E	E	E	024	S	S	G	033	028	040	G	027	026	S	S	S	J030	J030	027	S	S	S
10	S	S	S	E	E	S	S	S	026	J033	J110	J063	030	J033	028	S	S	S	S	S	S	S	J033	S
11	S	E	S	E	E	E	S	S	027	J035	043	025G	035	025G	J028	024	S	J040	J053	J033	J040	J030	S	S
12	S	E	E	E	017	S	S	S	G	029	G	J033	G	G	G	J043	J043	J050	J053	J053	J030	J046	J043	030
13	S	S	E	E	E	E	S	S	G	036	035	G	G	G	032	S	C	S	S	S	S	S	S	S
14	S	E	E	E	E	S	S	S	J033	J050	J055	D	G	G	034	S	S	J040	J099	J063	J063	J111	024	J043
15	S	E	E	E	E	018	J030	J042	024	029	G	035	G	G	G	S	S	C	C	C	C	C	C	C
16	C	C	C	C	C	C	C	C	C	J033	J046	036	023G	G	G	024	S	J025	J025	J043	J033	J033	S	S
17	S	J024	J023	J018	S	S	S	S	025	033	J066	G	C	G	G	S	S	S	024	028	J033	J030	J031	S
18	S	S	E	E	E	S	S	S	G	G	J043	040	G	G	G	G	025	C	J053	J050	J050	J043	J033	J033
19	J033	S	E	E	E	E	S	S	G	025	030	G	J043	033	G	S	S	S	S	S	S	J033	J025	J025
20	J030	J025	E	E	E	E	S	S	030	J058	G	G	G	G	G	028	S	S	S	J043	027	S	S	030
21	J023	E	E	E	E	E	S	S	029	G	G	G	G	G	028	025	S	J050	J044	027	027	S	S	S
22	S	E	E	E	E	S	S	C	C	C	C	C	C	C	C	C	C	S	S	S	S	S	S	J024
23	S	S	E	E	E	E	S	S	J025	G	G	G	023G	031	G	S	S	S	S	027	S	S	S	S
24	S	E	E	E	J023	S	S	S	027	J053	023G	029	G	G	032	S	S	J022	024	S	S	027	J030	027
25	S	S	E	E	E	S	S	S	J033	030	G	033	J043	G	G	S	S	S	S	S	S	S	024	024
26	S	E	E	E	E	S	S	S	J025	028	024G	025G	G	G	029	J025	024	J048	J029	S	S	S	S	S
27	S	E	E	E	E	S	S	S	J026	029	G	028	033	G	S	S	S	S	S	S	S	S	S	S
28	S	S	E	S	E	S	S	S	B	029	G	031	032	G	G	S	S	J051	J080	J033	J030	J025	S	S
29	S	E	S	E	E	S	S	S	J023	025	G	J050	G	G	G	S	026	J051	S	S	S	S	S	S
30	S	E	E	E	E	S	S	S	S	G	G	G	G	G	B	S	S	026	S	S	S	S	024	S
31																								
No.	4	17	23	26	27	10	2	6	24	27	28	28	27	28	26	9	5	11	14	13	12	11	13	9
Median	032	E	E	E	E	E	030	026	025	029	G	030	G	G	G	024	025	040	034	033	032	030	030	030
U. Q.	038	024	E	E	E	E		042	028	033	034	039	033	026			034	050	053	046	042	043	033	032
L. Q.	026	E	E	E	E	E		025	G	025	G	G	G	G	G	G	024	025	025	028	028	027	024	025
Q. R.	012							017	008	008							010	025	028	018	014	016	009	007

foEs

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

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

Lat. 45° 23.8'N
Long. 141° 41.1'E

Wakkanai

0.1 Mc 135° E Mean Time (G.M.T. +9h)

Nov. 1964

f_oF₂

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	S	S				S	S	S								S	G	024	022	EO20S	024	020	EO20S	S	
2	S	S	S			S	S	G	G			030			G		S	S	026	S	S	S	EO20S	S	
3	S	S	S	017			S	S				030	032	030	025		S	S	S	S	S	S	S	020	S
4	S	020	016	017	015		S	S	G	028	030	030				S	S	S	020	S	S	S	S	S	
5	S	020	020				S	S	G			023	030			C	C	C	C	C	C	C	C	C	
6	C	C	C	C	C	C	C	C	C	C	030	028	025	022		S	S	S	S	020	021	EO20S	EO20S	EO20S	
7	024	020	S			S	S	S	G	G			028			S	S	S	S	S	S	S	S	S	
8	S	S	S	S		S	S	S	C	C	C	C	C	C		C	C	C	C	S	S	S	S	S	
9	S	S	S		EO16S	S	S	S	G	028	030	030	027	026	025	S	S	S	019	021	EO20S	S	S	S	
10	S	S	S		S	S	S	S	G	027	041	030	030	026	025	S	S	S	S	S	S	S	S	021	S
11	S	S	S			S	S	S	023	030	030	023	G	EO25R	026	G	S	A	A	EO19S	023	024	S	S	
12	S	S	S		017	S	S	S		026		020				027	034	A	A	A	021	025	A	A	EO20S
13	S	S	S			S	S	S	G	G	G				025	S	C	S	S	S	S	S	S	S	
14	S	S	S			S	S	S	030	030	030	030		027		S	S	030	A	A	A	030	A	EO20S	024
15	S	S	S			E	EO20S	030	G	027		G				S	S	C	C	C	C	C	C	C	
16	C	C	C	C	C	C	C	C	C	026	040	030	G			G	S	020	020	026	EO20S	021	S	S	
17	S	018	018	E	S	S	S	A	025	G	G		C		S	S	S	EO19S	023	023	025	EO20S	S	S	
18	S	S	S		S	S	S	S		030	030	029				020	C	020	EO20S	021	021	024	021	021	
19	023	S	S			S	S	S	025	030			029	030		S	S	S	S	S	S	EO20S	EO20S	EO20S	
20	020	018				S	S	S	022	030						020	S	S	S	EO20S	EO19S	S	S	EO20S	
21	EO20S					EO20S	S	S	G						G	G	S	020	EO19S	EO20S	EO20S	S	S	S	
22	S	S	S		S	S	C	C	C	C	C	C	C	C	C	C	C	C	S	S	S	S	S	EO19S	
23	S	S	S			S	S	S	025				020	027		S	S	S	S	EO19S	S	S	S	S	
24	S	S	S		E	S	S	G	G	027	G	G			023	S	S	020	S	S	S	S	EO20S	EO20S	
25	S	S	S			S	S	S	022	G		G	027			S	S	S	S	S	S	S	S	EO20S	
26	S	S	S			S	S	S	022	027	G	G			023	021	EO19S	020	020	S	S	S	S	S	
27	S	S	S			S	S	S	020	G		022	G		S	S	S	S	S	S	S	S	S	S	
28	S	S	S			S	S	S	B	G	G	G	026			S	S	021	A	020	020	021	S	S	
29	S	S	S			S	S	G	023	027	G				S	S	EO20S	A	S	S	S	S	S	S	
30	S	S	S			S	S	S	S					B		S	S	EO17S	S	S	S	S	S	EO20S	
31																									
No.																									
Median																									
U. Q.																									
L. Q.																									
Q. R.																									

The Radio Research Laboratories, Japan

Sweep 1.0 Mc to f_oF₂ in 40 sec in automatic operation

f_oF₂

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

Nov. 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	E018S	E015S	E	E	E	E015S	E020S	E020S	020	020	020	020	020	020	020	E022S	E019S	E019S	E019S	E020S	E018S	E018S	E020S	E020S
E020S	E017S	E016S	E	E	E	E019S	E020S	E020S	020	019	020	020	020	020	020	020	E020S	E020S	E020S	E019S	E020S	E019S	E020S	E020S
E019S	E012S	E	E	E	E	E	E020S	E020S	020	020	020	020	020	020	020	020	E019S	E019S	E020S	E019S	E020S	E020S	E019S	E018S
E020S	E017S	E	E	E	E	E	E020S	E020S	E020S	020	020	020	019	020	020	E023S	E020S	E020S	E019S	E020S	E020S	E018S	E020S	E020S
C	C	C	C	C	C	C	C	C	C	C	020	020	020	020	020	C	C	C	C	C	C	C	C	C
E020S	E	E015S	E	E	E	E020S	E020S	E020S	019	019	020	019	020	020	020	E021S	E019S	E020S	E018S	E020S	E020S	E020S	E020S	E020S
E020S	E019S	E	E013S	E	E	E019S	E020S	E020S	C	C	C	C	C	C	C	E021S	E020S	E020S	E020S	E020S	E020S	E020S	E020S	E020S
E019S	E	E	E	E	E	E016S	E020S	E020S	019	019	020	020	020	020	020	E018S	E019S	E018S	E018S	E020S	E020S	E020S	E020S	E020S
E020S	E014S	E013S	E	E	E	E017S	E020S	E020S	020	020	020	020	020	020	018	E020S	E019S	E018S	E020S	E020S	E020S	E020S	E020S	E020S
E019S	E	E019S	E	E	E	E	E019S	E020S	019	020	020	020	020	020	019	E020S	E019S	E018S	E020S	E020S	E020S	E018S	E020S	E020S
E019S	E	E	E	E	E	E	E018S	E020S	018	020	019	018	020	019	020	018	E019S	E017S	E017S	E020S	E016S	E019S	E016S	E020S
E019S	E012S	E	E	E	E	E	E019S	E020S	018	020	020	020	020	020	019	E021S	C	E018S	E020S	E020S	E019S	E020S	E020S	E020S
E020S	E	E	E	E	E	E	E018S	E020S	020	019	019	020	020	020	018	E020S	E019S	E017S	E020S	E020S	E020S	E020S	E020S	E020S
E020S	E	E	E	E	E	E	E020S	E019S	018	019	020	019	020	020	020	E021S	E020S	E020S	E020S	E020S	E020S	E020S	E020S	E020S
C	C	C	C	C	C	C	C	C	C	C	019	020	019	020	020	E020S	E020S	E020S	E020S	E020S	E020S	E020S	E020S	E020S
E020S	E017S	E	E	E	E	E017S	E019S	E019S	019	019	020	017	019	020	020	E020S	E017S	E017S	E018S	E020S	E020S	E019S	E020S	E019S
E020S	E017S	E	E	E	E	E015S	E019S	E019S	019	019	020	020	C	020	020	E021S	E018S	E016S	E019S	E019S	E020S	E020S	E020S	E020S
E020S	E017S	E	E	E	E	E	E017S	E019S	019	020	019	020	020	020	019	E019S	E018S	C	E018S	E020S	E020S	E019S	E020S	E020S
E018S	E017S	E	E	E	E	E	E020S	E020S	019	019	020	020	020	020	020	E021S	E020S	E016S	E018S	E020S	E021S	E020S	E020S	E020S
E018S	E	E	E	E	E	E	E019S	E020S	018	020	020	019	020	020	020	E019S	E020S	E020S	E020S	E020S	E019S	E020S	E020S	E020S
E020S	E	E	E	E	E	E	E020S	E020S	019	019	020	020	020	020	019	E020S	E019S	E019S	E019S	E020S	E020S	E020S	E020S	E020S
E020S	E	E	E	E	E	E	E017S	E020S	C	C	C	C	C	C	C	E020S	E020S	E017S	E018S	E020S	E019S	E018S	E020S	E019S
E019S	E015S	E	E	E	E	E	E017S	E019S	016	019	019	018	017	018	018	E020S	E018S	E018S	E019S	E019S	E020S	E020S	E020S	E020S
E020S	E	E	E	E	E	E	E017S	E017S	019	018	019	020	020	020	018	E020S	E019S	E015S	E019S	E019S	E020S	E020S	E020S	E020S
E019S	E017S	E	E	E	E	E	E020S	E018S	018	017	019	018	018	020	020	E021S	E017S	E018S	E019S	E020S	E020S	E020S	E020S	E020S
E019S	E	E	E	E	E	E	E016S	E018S	018	017	019	018	018	020	018	E017S	E019S	E018S	E018S	E020S	E019S	E020S	E019S	E020S
E018S	E	E	E	E	E	E	E017S	E019S	018	018	019	019	020	020	E023S	E020S	E020S	E020S	E020S	E020S	E020S	E020S	E020S	E020S
E020S	E019S	E	E	E	E	E	E017S	E020S	024	020	020	020	020	020	020	E021S	E020S	E017S	E019S	E019S	E020S	E020S	E020S	E020S
E020S	E	E017S	E	E	E	E	E019S	E019S	020	019	020	020	020	020	020	E021S	E020S	E017S	E019S	E020S	E020S	E020S	E020S	E020S
E020S	E	E	E	E	E	E	E016S	E020S	E020S	019	020	020	020	020	020	E020S	E021S	E017S	E019S	E020S	E020S	E020S	E020S	E020S
31															026	E020S	E021S	E017S	E019S	E020S	E020S	E020S	E020S	E020S
No.	28	15	23	26	27	28	28	27	24	28	28	28	27	28	27	27	26	26	28	28	28	28	28	28
Median	E020	E	E	E	E	E016	E019	E020	019	019	020	020	020	020	020	E020	E019	E018	E019	E020	E020	E020	E020	E020
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-min

W 6

IONOSPHERIC DATA

Lat. 45° 23.6'N
Long. 141° 41.1'E

Wakkanai

135° E Mean Time (G. M. T. + 9h)

M(3000)F2 0.01

Nov. 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	SF	SF	320F	SF	SF	SF	350S	365	355	365	340	345	350	330	U335S	355	365	320	325	320	320	345	325	SF	
2	SF	SF	325F	SF	SF	SF	335S	355	350	310H	310	340	345	335	335	335	345	325	325	315F	340F	335F	SF	SF	
3	SF	SF	SF	SF	SF	SF	S	S	345	345	335	340	345	345	335	370	365	350	335	315	295	330	300	SF	
4	SF	300F	300F	SF	SF	SF	350F	360	355	355	330	350	350	345	360	360	370	345	355	325	335F	335F	SF	SF	
5	SF	SF	305F	FS	FS	FS	U310S	355S	U360S	345S	350	350	U355R	345	350	C	C	C	C	C	C	C	C	C	
6	C	C	C	C	C	C	C	C	C	C	360	365	355H	355	355	370	370	330	330	340	315	335	SF	SF	
7	SF	315F	SF	330F	SF	335	350	350	355	345	340	350	355	350	355	360	365	365	325	325	320	310	320	295	
8	295	295	295	300	315F	U360S	340	360	C	C	C	C	C	C	C	C	C	C	C	325	330	325	315	320	
9	SF	SF	325F	SF	SF	SF	355	355	355	375S	335	360	345	350	350	355	365	330	310	325	320	295F	SF	SF	
10	SF	340F	300F	SF	SF	SF	315	325S	350H	U350S	U325R	340	360	355	360	365	355	350	320	350	320	290	310S	305F	
11	SF	320F	305F	SF	300F	335	365	365	360	355	340	360	345	350	SF	355S	355	U355A	I305A	325	330	315	295	SF	
12	SF	F	FS	F	F	FS	345	345	U355S	U350S	345H	340	360	350	I360S	375	355	I335A	I330A	340	345	A	A	F	
13	F	F	315F	F	F	F	335F	355S	340	335	340	345	365	360	330	365	U355C	340	SF	FS	SF	SF	SF	SF	
14	SF	SF	SF	SF	SF	SF	315F	345	350	350	345	360	355	375	365	380	350	360	I385A	I315A	325	A	SF	SF	
15	SF	SF	SF	F	F	F	320F	340	345	365	350	355	365	350	365	375	380	C	C	C	C	C	C	C	
16	C	C	C	C	C	C	C	C	C	350	335	340	360	360	355	360	350	300F	SF	U325F	SF	SF	SF	SF	
17	SF	290F	285F	SF	SF	SF	SF	A	340	345S	340	365	U350C	360	360	345	350F	345F	310	310F	330F	345F	315F	300F	
18	305F	SF	SF	SF	SF	SF	335F	365	U350S	360	345	355	360	365	365	355	340	I325C	320	320	SF	SF	SF	SF	
19	SF	SF	SF	SF	SF	SF	325F	340	340	355H	350	375	365	335H	370	360	380	345	310	320	330	310	310	305F	
20	325F	SF	SF	SF	SF	SF	SF	SF	U350S	I345S	355	350	350	365	365	365	370	SF	320F	310F	SF	SF	SF	FS	
21	FS	FS	F	FS	FS	FS	FS	375	370	380	345	360	360H	365H	345	350	U350S	345	SF	FS	350F	FS	FS	F	
22	SF	F	F	F	F	F	FS	C	C	C	C	C	C	C	C	C	C	355S	325	315	335F	275F	SF	SF	
23	310F	SF	SF	SF	SF	SF	335F	380	360	360	330	350	350	365	335	350	345	315	325	305	290	305	295	325	
24	SF	SF	SF	SF	SF	SF	SF	345F	340	335	315	335	360	350	315	365	360	355	I330S	315	320	285F	SF	SF	
25	SF	SF	SF	SF	SF	SF	SF	SF	375	365	U370S	360	365	360	365	360	365	SF	335F	335F	335F	SF	SF	315F	
26	SF	SF	SF	SF	SF	SF	325F	295S	350	370	350	355	370	360	360	375	350	295S	330	320S	295	305	285	295	
27	SF	SF	SF	SF	SF	SF	345	335	345	355S	U345S	360	365	365	365	365	350	330	335	345	SF	SF	SF	SF	
28	350F	320F	SF	SF	SF	SF	335	365S	360	370	350	350	355	375	380	350	340	360	I350A	340	340	325	SF	SF	
29	SF	FS	305F	F	SF	SF	SF	365	365	370	345	365	350	365	360	370	370	I340A	325	340	310	SF	F	F	
30	285F	290F	295F	285F	295F	310F	350	365	375	360	335	350	340	365	365	355	310H	375	310	345	305	320	310	285	
31																									
No.	6	8	12	3	7	8	19	24	26	27	28	28	28	28	27	27	27	25	25	26	23	18	11	9	
Median	310	310	305	300	315	330	335	355	355	350	345	350	355	360	360	360	360	355	345	325	320	325	320	310	305
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

Sep. 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	380	I380A	I375A	375	350	I360A	A						
2								370	365	I375A	400	I365A	380	395	365	360	I370A	I365A						
3							C	C	C	390	400	405	370	395	380	340	340	345						
4								405	385	390H	390	390	380	405	365H	375	370							
5									365	390	I380A	385	380	375	375	375								
6								380	385	400H	400		375	360	360	370	370L							
7							355	380	360	375	I390A	I370A	370	365	375	I375A	360L							
8								375	395	370	395	370	360	390	380	370	360L							
9								370	390	375H	385	405	370	375	395	375	385L							
10								355	390	385	405	380	375	380	385	375	370L							
11									375	385	I380A	375	370	370	375	370								
12									400	400	395	400	390	380H	385	380	400L							
13									410L	C	C	C	C	C	C	C	C							
14									395	380	385	390	370	370	395	360								
15								415	380	390	390	400	380	370		375								
16									375L	410	410	375	395L	420	365	375	A							
17								390	375L	A	A	A	A	400	375	370	A							
18									380	I395A	I385A	380	400	365	I385A	A								
19									375	380	385	390	395	390	375									
20									395	I380C	410	395H	390	380	400	390								
21									395	395	380	400	390	405	380H									
22									390H	385	400	360	380	380	345H	360								
23									395L	I385A	400	I375A	I390A	385	375									
24									A	A	A	380	I365A	380	380	380								
25									I390C	390	425	400	380	380	375	A	A							
26									375	380	395	395	390	365										
27										400	390H	405	380	385	380									
28									395L	380	390	380	380	375H	370									
29									370	I380A	I375A	395	I380A	365	375									
30									A	390	385	395	380	385										
31																								
No.							1	9	25	26	26	27	28	29	26	19	10	2						
Median							355	380	385	385	390	390	380	380	375	375	370	U355						
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

Nov. 1964

R'F2

km

IONOSPHERIC DATA

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											250	245	245												
2											260	235	235	260											
3											245	240	240												
4											250	245	245	245											
5											245	245	230	235	235										
6									C		245	240													
7											240	230	235												
8									C		C	C	C	C	C										
9											260	225	245	250											
10											250	240	225	230											
11											255	245													
12											230	230	255												
13											235	240	245												
14											240	240	245	225											
15											240														
16											235	240	250	245											
17											230	250	240	I240C											
18											235	250													
19																									
20											245		230	240	235										
21												245													
22											C	C	C	C	C	C									
23												250	235												
24											240	235	240												
25										225		235	225												
26												235	225												
27											235	235													
28													235												
29												240													
30													250												
31																									
No.										3	19	23	20	9	1										
Median										230	245	240	240	245	235										
U. Q.																									
L. Q.																									
Q. R.																									

R'F2

Lat. 45° 23.6'N
Long. 141° 41.1'E

Wakkanai

IONOSPHERIC DATA

135° E Mean Time (G. M. T. +9h)

km **R'F**

Nov. 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	265	250	250	245	220	230	210	225	215	200	220	220	225H	240	215H	215	240	250	250	275	250	250	275	
2	290	290	290	290	285	225	205	210	220	250H	235	215	210	215H	245	250	220	220	245	240	225	235	250	270	
3	275	265	275	260	235	205	220	220	220H	215H	220	220	230	230	220H	225	210	215	235	250	280	250	255	285	
4	275	250	265	265	260	215	225	210	225	210H	205	240	210	215	240	240	210	225	220	270	250	250	320	310	
5	295	300	285	250	245	250	250	235	220H	220	210	200H	225	215	215	C	C	C	C	C	C	C	C	C	
6	C	C	C	C	C	C	C	C	C	C	210	210	215H	225	235	220	210	220	250	260	280	245	250	260	
7	310A	265	290	250	250	250	225	225	215H	220	215	230	220H	225	225	225	215	215	250	250	255	E300S	290A	300	
8	300	280A	255	290	265	210	245	220	C	C	C	C	C	C	C	C	C	C	250	280	260	250	260	260	
9	305	250	250	250	235	230	260	245	230H	210	210	215	230	230	240	235	210	230	270	285	290	280	350	260	
10	250	225	275	270	280	250	255	225	245H	220H	I230A	235	230	220	225H	225	210	210	270	230	E300S	300	300	290	
11	305	280	300S	270	260	230	250	210	215	210	210	240	230	235	230	225	220	I230A	A	260	260	E300A	285	300	
12	320	305	245	295	265	240	210	210	200H	210H	240H	215	240	200H	220	220	240A	I265A	I265A	235	245	A	A	300	
13	335	285	250	280	250	245	230	215	225	235H	220	230	225H	220	225	220	I215G	215	220	230	215	250	250	285	
14	260	270	250	250	260	250	250	220	240A	230	210	225	240	220	230	215	210	A	A	A	A	A	I275A	280	
15	285	285	290	280	275	250	240	225	200H	225H	200	235	240	210H	230H	220	210	C	C	C	C	C	C	C	
16	C	C	C	C	C	C	C	C	C	220	I225A	225	225	200H	230	220	220	240	275	280	225	250	275	265	
17	295	300	300	280	250	215	240	I220A	225	225	225	215	I210C	180H	225	220	220	220	260	255	I240A	225	260	270	
18	275	275	260	255	225	230	260	225	235	225	215	250	215H	225H	220	215	210	I300C	260	260	250	250	260	290	
19	305	260	245	250	255	230	250	220	215H	225H	210H	230	225	225H	215	220	200	235	E270S	275	250	E300S	285	290	
20	280	285	285	260	250	240	225	220	225	230H	205	205H	225	220	230	225	215	E280S	U275S	295	245	275	315	310	
21	300	250	280	270	250	250	225	220	210	200H	235H	235	220H	230H	245	225	205	230	290	275	245	215	300	265	
22	280	285	280	255	260	245	240	C	C	C	C	C	C	C	C	C	C	205	E300S	E300S	250	315	295	270	
23	275	290	290	275	275	250	230	210	220H	230	245	250	235	225	245	235	215	250	245	275	295	300	305	250	
24	300	300	300	290	295	280	250	225	215	245	240	225	240	225H	220	210	210	245	I280A	U290S	275	325	290	305	
25	280	275	240	250	250	255	235	220	225	210	220	200H	210	190H	230	225	215	240	250	250	245	265	285	215	
26	260	290	310	280	250	225	345	220	215	225	235H	225	215	230	225	210	215	325	300	275	285	295	300	310	
27	295	300	300	285	250	225	275	220	240	225	230	225	215	200H	225	225	215	250	250	245	275	275	270	265	
28	E260S	300	280	260	240	250	225	210	210	215	200H	210H	225	225	215	245	220	210	A	240	235	250	285	275	
29	300	265	275	280	260	245	220	220	210	235	245	230	210H	225H	200	220	210	I235A	E285S	260	295S	290	275	300	
30	300	285	280	275	250	250	E235S	220	200H	220	230	230	245	230	225	210	230	210	E300S	240	S	E325S	310	305	
31																									
No.	28	28	28	28	28	28	28	27	26	27	28	28	28	28	28	28	27	27	25	21	26	25	23	27	28
Median	295	280	280	270	250	240	240	220	220	220	220	225	225	220	225	220	215	230	230	250	260	250	260	285	280
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

R'F

W 10

IONOSPHERIC DATA

Nov. 1964

f_oF₂

km

Wakkanai

135° E Mean Time (G.M.T. +9h)

Lat. 45° 23.6'N
Long. 141° 41.1'E

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

f_oF₂

IONOSPHERIC DATA

Lat. 45° 23.6'N
Long. 141° 41.1'E

Wakkanai

135° E Mean Time (G.M.T. +9h)

Types of Es

Nov. 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																									
2								h	c	c		1			1			f2	f2	f	f3	f2	f		
3								c	c	1	1	12	12	12	1				f					f	
4		f2	f2	f2	f			c	c	1	1	1	1							f2	f2	f	f	f	
5		f	f							1	1	1	1	1						f2	f2	f	f	f	
6									c	c				1											
7	f2	f							c	c				1											
8						f			c	1	1	1		1	1				f	f					
9									c	1	12	12	1	1	1										
10									1	12	1	1	c1	1	1	h			14	f4	f	f3	f2	f5	f
11									1	1	1	1			1		13		f3	f2	f	f2	f2	f	
12									c	c					1										
13									1	12	1	1			1										
14									h	h1															
15						f			h	1															
16									1	12	12	1	1			h			12	f	f2	f2	f	f	
17									1	1	c														
18									1	12	1														
19	f2								1	12	1		1	1											
20	f2	f							1	12															
21	f								1	12															
22									1				1	12											
23									1	12	1	1			1										
24					f				1	1	1	1	12	12											
25									1	1	1	1			1	1	1								
26									1	c	1	1	1												
27									1	h	1	1	1												
28									1	1	1	1	1												
29									1	1	1	1													
30									1	1	1	1													
31									1	1	1	1													
No.																									
Median																									
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

Types of Es

IONOSPHERIC DATA

Lat. 39° 43.5'N
Long. 140° 08.2'E

Akita

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

foF2

Nov. 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	FS	FS	FS	FS	FS	034S	041S	058	068	067	061	079	069	061	070	071	058	I047A	A	A	A	040S	039	036	
2	039	039F	040S	F	FS	FS	FS	059	066	060	085	102	I088R	064	067	073	073	056	038S	044	038S	036S	036S	036	
3	038	041	I043R	045	050	039S	036	061	I073R	084	075S	088	073	069	073	071	063	043	032	033	033	036	034	033	
4	033	035	034	035	037S	033	037	060	065	070	069	088	090	073	068	061	055	039	037	031	I030A	031S	I032R	I033R	
5	033S	033S	034S	032	032	033	038R	068	I076R	068	069	081	083	079	064	060	056	043	I033A	033S	034	FS	FS	FS	
6	FS	037F	034F	FS	037S	025	033	065	083	068	078	077	078	075	071	065	I054R	036	034	035	I035R	FS	038S	035S	
7	036S	036	I035R	034	036	030	033	059	072	078R	062	081	065V	076R	060	060	053	038	029	027	028	030	I030R	030	
8	031	030	030	030	030	029	030	059S	059	072	063H	073	060	063	058	055	048	037	036	035	035	032	033	035R	036
9	035	036	035	036	035	033	034R	I063R	090	073	060	075	075	072	065	062R	065	035	035	035	036	035	035	036S	FS
10	038S	035	030	030	029	030	044R	069S	I076R	084R	078H	109	090	076S	073	059	061	035	028	033	030	033	036S	FS	
11	FS	FS	032F	030S	029R	029	027	050	065	061	065	080	086R	066	063R	058	058	043	033	031	026	026	028	030	
12	031F	029	030S	FS	F	027	036Z	050	072	I076R	058H	086R	067H	I077R	073S	062S	048S	035	SH	FS	031F	FS	026S	RS	
13	FS	FS	027	026	029F	025	030	051	056	072	082	094	074	067	065	058	046	035	FS	FS	FS	FS	FS	FS	
14	034F	FS	FS	FS	FS	035F	030S	054S	071	076R	067	073	065	062	058	069	046S	035	035S	028S	031	034S	032F	031	
15	033	032	031	030S	029	029	031	058	057	064R	067	066	065	060	060	056	049	032	030	030	032	030	028	028	
16	029	029R	030	027	025	026	036	056	068	061	063H	081	072	063	058	060	058	050	044S	I045R	I048R	I039R	036S	I039R	
17	043S	I043R	J038R	036	037	036	029	054	059	074	081	087	071	069	060S	053	051S	041	042S	044S	FS	A	FS	FS	
18	FS	040Z	F	038Z	FS	027	032	061	068	I072C	066	070	067	066	I058R	053	046	034	032	036R	032	032	032F	032F	
19	031	033	032	030	030	FS	031	060S	073R	062	065	078	065	065	054	064	045	I036R	037	025	030	028	027	I029R	
20	031	031	031	030	032R	028	032	053R	060	J062R	062	065	060	054	053	052	049	033	024	027	031R	031	028	FS	
21	029	FS	030S	030	I030S	031	028	051R	056	055	053	062	060	063R	053	049	045R	034	024	026	032	028	FS	027F	
22	028	I026R	FS	J033R	029S	026	026S	046R	051	055	049	I063R	066	058	054	053S	042	033	030	024	I030S	I030R	024S	FS	
23	RS	FS	FS	FS	FS	FS	026S	049	050	052	058	078	077	060	055	060	056	036	038	026	028	030	033R	035	
24	029	028	031	033F	FS	032F	030S	054	068	074	101	084	069	064	058	060	046	034	028	026	031	029	030	031	
25	029	029	028	028	025F	027F	FS	037R	038	065H	C	C	C	C	C	059	045	027	027	030	032F	F	FS	FS	
26	028F	028R	F	026F	028	024	024	047	054	052	066	080	067	056	058	049	050	035	030	030	031	032F	033S	033	
27	031	031	032	F	033R	031	024	050	058	077	110	098R	066	056	058	054	057	038	031	041S	031S	FS	FS	FS	
28	F	F	F	F	F	F	033F	050	058	056	075R	074	064	059V	064	051S	063	046R	030	036	033	U033F	F	030	
29	030	032	030	029	031	035S	042	048	056	051	076	087	075R	065	057	048	051	029	030	026	027R	025	FS	028	
30	029	029	028	028	029	024	025	041	056V	051	I058R	074H	063R	068	059	050	044	038	029S	027	029	023	029	030	
31																									
No.	23	23	24	22	22	26	28	30	30	30	29	29	29	29	29	30	30	30	27	27	27	23	22	20	
Median	031	032	031	030	030	030	032	055	065	068	066	080	069	065	060	059	051	036	032	031	031	031	032	032	
U. Q.	035	036	034	034	035	033	036	060	072	074	077	087	076	070	066	062	058	041	036	035	033	034	036	035	
L. Q.	029	029	030	029	029	027	028	050	056	060	062	074	065	060	058	053	046	034	029	027	030	029	028	030	
Q. R.	006	007	004	005	006	006	008	010	016	014	015	013	011	010	008	009	012	007	007	008	003	005	008	005	

The Radio Research Laboratories, Japan

Sweep 1.6 Mc to 20.0 Mc in 20 sec in automatic operation

foF2

A 1

Nov. 1964

foF1

0.01 Mc

135° E Mean Time (G. M. T. +9h)

Akita

Lat. 39° 43.5'N
Long. 146° 08.2'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L	L	400L	L	LH	L	L	L								
2									L	L	450L	LH	L	L	L	L								
3									L	LH	L	420L	410L	L	A	L								
4									L	L	L	420L	L	400L	L	L								
5								L	L	390L	410	I420A	L	L	370L	L	L							
6									L	LH	400L	L	420L	410L	L									
7									L	L	400L	LH	410L	L	LH	260								
8									310L	LH	L	L	L	L	LH	L								
9									L	L	L	420L	LH	L	L									
10									L	L	LH	430L	LH	L	370L	L								
11									L	390L	L	420L	L	L	L									
12									L	L	L	LH	L		L									
13									L	A	L	L	400L	L	L									
14									L	L	L	L	L	L	L	L								
15									L	LH	LH	L	L	L	L	250								
16									L	L	400L	410L	LH	L	L									
17									L	A	410L	380L	L	L	L	L								
18									L	C	L	L	L	L	L	L								
19									L	L	L	420	400L	L	270									
20									L	L	LH	410L	390	L	310									
21									L	L	LH	L	400L	L	L									
22									300	L	L	L	LH	L	L									
23									L	L	400L	L	LH	330	L	240								
24									L	L	I400A	L	L	LH	310L	L								
25									L	L	C	C	C	C	C									
26									L	340L	390L	LH	L	L	L	L								
27										L	L	L	L	350L	320L									
28									270	320L	L	L	410L	L	L	250								
29										L	L	L	L	L	L									
30									L	320	L	L	380L	L	L									
31																								
No.									3	5	10	10	9	4	4	6	4							
Median									300	340	400	420	400	375	315	250								
U. Q.																								
L. Q.																								
Q. R.																								

foF1

Sweep 1.6 Mc to 20.0Mc in 20 sec in automatic operation

The Radio Research Laboratories, Japan

A 2

IONOSPHERIC DATA

Lat. 39° 43.5'N
Long. 140° 08.2'E

Akita

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

foE

Nov. 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								220	260	A	A	300	300	290	265	235H	A							
2								210	I255A	I275A	295	305	305	295	265	245	A							
3								200	255	I280A	290	I300A	300	A	A	A	A							
4								205	A	A	A	A	A	A	A	A	E							
5								210	250	I290A	I300A	I300A	I300A	290	270	230	B							
6								200S	A	275	295	I300A	305	290	A	A	A							
7								A	A	A	A	A	300	290	265	220	180							
8								A	A	I270A	290	300	I300A	290	260	225	A							
9								200S	245	A	A	A	300R	I285A	265	230	B							
10								200	250A	I270A	290	305	300	I285A	A	A	B							
11								A	250A	275A	295	305	300	290A	I260A	I210A	E							
12								195S	245	270A	A	A	A	A	A	A	E							
13								190	240	A	A	A	295	280	250	A	B							
14								A	A	275	A	A	A	A	A	A	E							
15								A	A	A	270	300	A	A	A	A	A							
16								B	I240A	275A	290	300	295	280	270	225	E							
17								A	245	I275A	I290A	A	A	A	A	210	E							
18								A	I220A	I260C	280	290	I285A	I270A	255	220	B							
19								190	I230A	275	A	A	A	A	A	A	A							
20								190	245	I275A	295	I300A	I295A	I285A	250	A	E							
21								E	230	275	290R	300	290	270	245	A	E							
22								E	245A	A	A	285	290	280	I250A	205	E							
23								A	225	260	285	290	280	260	235	205	E							
24								185	A	A	A	290R	290R	275R	I250A	215	A							
25								A	235S	A	C	C	C	C	C	210A	E							
26								B	I230A	260S	I280A	290R	285R	270	235	210A	E							
27								A	A	A	A	280	I280A	260	235	185	E							
28								180	215	245	I260A	280	285	255	225	200	A							
29								E	A	245	265	280A	280A	I270A	250	210	E							
30								A	A	250	275	285	280	260S	225	A	E							
31																								
No.								17	20	20	18	21	23	22	20	18	16							
Median								195	245	275	290	300	295	280	250	210	E							
U. Q.																								
L. Q.																								
Q. R.																								

Sweep 1.6 Mc to 20.0Mc in 20 sec in automatic operation

foE

The Radio Research Laboratories, Japan
A 3

Nov. 1964

foEs

0.1 Mc

135° E Mean Time (G. M. T. +9h)

IONOSPHERIC DATA

Akita

Lat. 39° 43.5'N
Long. 140° 08.2'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	J020	J019	E	J018	E	E	E	024	029	J035	J038	J032	J032	G	025G	025	J030	J090	J087	J062	J074	J038	E	J025
2	J025	J034	J018	J018	J020	E	E	G	029	028	J031	J034	G	J060	J037	G	023	J023	J024	J051	J043	J042	J020	J024
3	E	E	E	E	S	E	E	G	G	J041	J050Y	J053	J033	J051	J053	J043	J036	J029	J032	J029	J021	J018	J028	J028
4	J020	J028	J017	E	J024	E	J025	J020G	J032	J043	J043	J043	J038	J035	J033	026	018	E	J021	J021	J029	E	E	J020
5	J018	E	J018	E	E	E	E	G	J026G	J026G	J033	J051	J053	J023G	G	G	B	J027	J035	E	E	E	E	E
6	E	E	J020	E	E	E	E	024S	J026	G	033	J035	J030	J030	J032	J035	J063	J030	J021	J021	J041	J051	J029	J029
7	J029	J050	J020	J018	E	E	E	J022	J028	J035	J032	J036	J042	J035	G	J023	J017	J017	E	E	J050S	J036	J038	J021
8	E	E	E	E	E	E	E	J025	J029	J030	J029	J032	J031	G	024G	G	J029	E	E	E	E	E	E	E
9	E	E	E	E	E	E	E	E	J025	J029	032	033	029G	030	J032	J027	B	E	J018	E	E	E	E	J028
10	E	E	E	E	E	E	E	023	027	J033	G	G	G	J035	J035	J028	B	J018	E	E	E	E	E	E
11	E	E	E	E	E	E	E	J017	025	J032	033	G	032	J038	030	025	E	J029	E	E	E	E	E	J018
12	J020	E	J018	E	J020	E	E	E	G	030	J078	J038	J033	J046	J033	027	J020	E	E	E	J025	J020	J043	J038
13	J027	E	E	E	E	E	E	G	G	J048	036	039	G	G	G	032	G	021	J025	J020	E	E	J018	J020
14	E	E	J026	E	E	024	E	J019	J028	032	J078	J038	J036	J056	J044	J033	J023S	J021	J021	E	J018	J021	E	J063
15	J032	J032	E	E	J023	E	E	J028	J032	030	G	G	J033	J043	J033	J029	J029	J028	B	E	J025	J028	J035	E
16	E	E	E	E	E	E	E	025	J034	028	G	G	J027G	G	J020G	J028	J023	J021	J018	J030	J031	J038	J025	J024
17	J019	J019	J018	J018	E	E	E	023	J028	J060	J044	J037	J043	J050	J035	J026	022	J036	J051	J025	J050	J058	J033	J018
18	J026	J019	J020	J017	E	E	E	J028	027	C	J034	030	J039	J035	027	023	B	E	J051	J023	J040	J060	J021	E
19	E	J024	E	E	E	E	E	020	J027	026G	J028	J031	032	032	J029	J024	J020	J029	J020	J017	E	E	E	E
20	E	J026	J025	J025	J018	E	E	G	J025	027	J023G	J051	J050	J050	J029	025	022	J018	J018	J024	J020	J032	J018	J017
21	J023	E	E	E	E	E	E	J018	J027	J028	G	J027G	G	031	027	029	E	E	E	J021	J024	J041	J018	E
22	E	E	E	E	E	E	E	E	J030	031	J059	J029	G	G	026	G	E	E	E	E	J018	E	E	E
23	E	E	E	J019	J021	E	E	J020	G	J028	J036	036	G	G	G	G	E	J041	J030	J021	E	J017	E	E
24	E	E	E	E	E	E	E	023	J038	J029	J066	G	G	019G	J025	025S	J023	J025	E	E	J022	J028	J023	J031
25	E	E	J020	E	E	E	E	J017	025	G	028	C	C	C	C	024	J017	E	J018	E	E	E	J027	E
26	J024	J018	E	E	E	E	E	E	024	G	J041	J033	J027G	019G	026	022	022	E	E	J023	E	E	J020	E
27	E	J024	E	E	E	E	E	023	J025	J035	J031	027G	J029	J032	G	021	018	J019	E	E	E	E	E	E
28	E	E	E	E	E	E	E	G	023	G	033	G	025G	G	027	G	021	E	J024	E	E	E	J019	J018
29	E	E	E	J019	E	E	E	018	023	033	032	030	030	032	G	G	022	J023	J038	J017	J023	J028	J028	E
30	J025	E	E	E	E	E	E	020	024	027	030	G	G	G	028	024	J022	E	E	E	E	E	E	E
31																								
No.	30	30	30	30	29	30	30	30	30	29	29	29	29	29	29	30	26	30	29	30	30	30	30	30
Median	E	E	E	E	E	E	E	E	E	020	027	030	033	032	027	025	022	020	018	E	019	018	018	018
U. Q.	023	019	018	E	E	E	E	024	029	034	042	038	034	040	033	028	023	028	028	023	029	036	027	024
L. Q.	E	E	E	E	E	S	E	G	024	028	030	G	G	G	G	021	017	E	E	E	E	E	E	E
Q. R.									005	006	012				007	006								

The Radio Research Laboratories, Japan

Sweep 1.6 Mc to 20.0 Mc in 20 sec in automatic operation

foEs

IONOSPHERIC DATA

Lat. 39° 43.5'N
Long. 140° 08.2'E

Akita

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

fbEs

Nov. 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				023	G	032	032	026	027		025G	025	024	A	A	A	A	017		E	
2	018	018	E	017	E				028	028	025	023	024	023	023	022	018	E	040S	E	018	E	E	E	
3					S				028	028	025	032	020	032	052	027	022	E	025	021	018	E	020S	E	
4	E	E	E	E	E		017	E	030	029	030	034	031	032	027	025	018			E	A			019S	
5	E	E	E	E					020	025G	031	043	036	020G			B	019	A						
6			E	E				E	025	025	032	032	027	024	029	029	035S	025	E	017	018	E	E	E	
7	019	023	E	E				020	025	029	029	030	028	025	E	E	E	E		E	E	E	E	E	
8								024	026	028	023	027	031	022G		020									
9								G	G	029	030	032	G	030	025	019	B		018					E	
10								G	G	031			031	027	017	B	E								
11							E	021	026	G	033		031	030	028	024		E						E	
12	E	E	E	E	E				028	032	032	032	031	029	031	025	017				E	E	018	E	
13	E	E							048	030	033				029	029		019	E	E			E	E	
14			017					018	025	G	034	031	030	028	027	028	E	020	E	E	E	E	E	E	
15	E	018			018			019	024	028			029	034	027	022	024	E	B	B	E	018	E	E	
16								018	024	G			020G		018G	019	018	017	E	020	017	020	020S	018	
17	E	E	E	E				022	020	045	034	030	032	030	029	017	020	018	028	018	040	A	020	E	
18	018	E	018	E				020	025	026	026	030	036	032	026	019	B		E	018	027	E	E	E	
19		E						018	024	024G	018	030	030	031	027	022	019	017	E	E					
20		E	E	E	E			E	E	027	020G	034	034	030	020	025	E	018	E	E	E	017	E	E	
21	E							E	E	023	018G		030	030	026	025				E	E	019	E		
22								E	E	029	035	021			025						E				
23				E	E			020		E	018	035						E	017	E		E			
24								G	023	025	052			017G	025	E	E	024			019	025	E	020	
25			E				E	018	028	028	C	C	C	C	C	023	E		018						
26	E	E						023	023	030	023	023	025G	019G	026	022	E			E					
27		018						021	023	027	028	021G	028	018	027	021	E	017							
28								G	G	032	032	024G	027		020	020			E				017	E	
29			E					018	022	033	032	030	029	031	E	E	020	E	E	E	E	020	020		
30	E							019	023	026	030				028	023	E								
31																									
No.																									
Median																									
U. Q.																									
L. Q.																									
Q. R.																									

The Radio Research Laboratories, Japan

Sweep 1.6 Mc to 20.0 Mc in 20 sec in automatic operation

fbEs

A 5

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

Nov. 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	E	E	017	E	E	E	E	E	E
2	E	E	E	E	E	E	E	E	E	E	E	017	017	017	017	017	E	E	E	E	E	E	E	E
3	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
4	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
5	E	E	E	E	E	E	E	E	E	E	017	017	017	017	E	E	017	E	E	E	E	E	E	E
6	E	E	E	E	E	E	E	E	E	E	E	017	E	E	E	E	E	E	E	E	E	E	E	E
7	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
8	E	E	E	E	E	E	E	E	017	E	E	017	E	017	E	E	E	E	E	E	E	E	E	E
9	E	E	E	E	E	E	E	E	E	E	E	017	017	017	E	E	018	E	018	E	E	E	E	E
10	E	E	E	E	E	E	E	E	E	E	E	017	017	017	017	E	017	E	E	E	E	E	E	E
11	E	E	E	E	E	E	E	E	E	017	E	017	017	017	E	E	E	E	E	E	E	E	E	E
12	E	E	E	E	E	E	E	E	E	E	E	017	E	017	E	E	E	E	E	E	E	E	E	E
13	E	E	E	E	E	E	E	E	E	017	017	E	017	017	E	E	017	E	E	E	E	E	E	E
14	E	E	E	E	E	E	E	E	E	E	E	017	017	017	E	E	E	E	E	E	E	E	E	E
15	E	E	E	E	E	E	E	E	E	017	E	017	017	017	017	E	E	E	E	E	E	E	E	E
16	E	E	E	E	E	E	E	E	E	017	E	017	E	017	017	E	E	E	E	E	E	E	E	E
17	E	E	E	E	E	E	E	E	E	E	E	E	017	E	E	017	E	017	017	017	E	E	E	E
18	E	E	E	E	E	E	E	E	017	IO17C	E	018	017	017	E	E	017	E	E	E	E	E	E	E
19	E	E	E	E	E	E	E	E	E	E	E	018	017	E	E	E	E	E	E	E	E	E	E	E
20	E	E	E	E	E	E	E	E	E	E	E	E	017	E	E	E	E	E	E	E	E	E	E	E
21	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
22	E	E	E	E	E	E	E	E	E	017	E	E	E	017	E	E	E	E	E	E	E	E	E	E
23	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
24	E	E	E	E	E	E	E	E	E	017	E	E	E	E	E	E	E	E	E	E	E	E	E	E
25	E	E	E	E	E	E	E	E	E	E	C	C	C	C	C	E	E	E	E	E	E	E	E	E
26	E	E	E	E	E	E	E	E	E	E	E	017	E	E	E	E	E	E	E	E	E	E	E	E
27	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
28	E	E	E	E	E	E	E	E	017	017	E	017	E	E	017	017	E	E	E	E	E	E	E	E
29	E	E	E	E	E	E	E	E	E	017	017	017	E	017	017	E	E	E	E	E	E	E	E	E
30	E	E	E	E	E	E	E	E	E	017	017	017	E	017S	017	017	E	E	E	E	E	E	E	E
31																								
No.	30	30	30	30	30	30	30	30	30	30	29	29	29	29	29	30	30	30	30	30	30	30	30	30
Median	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
U. Q.																								
L. Q.																								
Q. R.																								

Sweep 1.6 Mc to 20.0Mc in 20 sec in automatic operation

f-min

The Radio Research Laboratories, Japan

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)F2

Nov. 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	FS	FS	FS	FS	FS	340S	350S	360	360	380	350	335	355	355	350	360	365	I330A	A	A	A	325S	325	310
2	300	300F	315S	F	FS	FS	FS	370	350	350	305	315	I350R	345	345	345	365	355	330S	320	325S	315S	330S	310
3	305	310	U305R	310	340	370S	355	355	U360R	355	340S	355	330	335	345	350	365	350	315	305	315	335	310	320
4	310	315	310	300	350S	340	340	355	360	360	320	340	345	350	355	370	365	340	325	340	I305A	300S	I305R	I305R
5	305S	305S	320S	320	340	330R	355	I365R	370	345	330	345	360	375	375	365	360	355	I330A	335S	325	FS	FS	FS
6	FS	315F	320F	FS	350S	330	335	350	365	355	365	360	350	365	365	380	I370R	335	320	335	I330R	FS	330S	305S
7	310S	310	I310R	310	345	315	330	360	365	385R	360	370	330V	345R	370	350	375	355	325	315	325	335	U300R	315
8	320	310	300	300	315	350	335	375S	375	355	320H	360	340	350	350	360	365	335	335	325	340	320	315R	335
9	310	320	300	310	330	335	350R	U390R	350	375	350	350	345	355	355	355R	380	345	305	315	335	315	315S	FS
10	320S	345	305	300	320	305	320R	355S	I370R	320R	310H	340	350	350S	370	390	350	370	320	325	330	335	295S	FS
11	FS	FS	285F	305S	320R	340	370	365	375	370	370	345	360R	370	365R	365	355	360	335	350	340	325	325	320
12	300F	300	300S	FS	F	345	380Z	380	360	I375R	365H	360R	320H	I350R	360S	380S	360S	350	SH	FS	335F	FS	300S	RS
13	FS	FS	305	290	315F	330	355	390	350	340	345	350	350	355	360	360	390	325	FS	FS	FS	FS	FS	FS
14	280F	FS	FS	FS	FS	315F	335S	355S	345	345R	355	350	375	365	345	375	390S	360	350S	355S	330	355S	345F	325
15	305	315	315	300S	320	330	330	375	375	360R	375	365	360	360	350	375	375	365	345	335	335	335	355	320
16	310	305R	300	290	280	305	340	360	370	350	320H	345	355	375	365	365	345	345	320S	I325R	I325R	I325R	340S	I310R
17	305S	I295R	J305R	305	315	335	365	350	355	330	340	355	355	365	340S	350S	355S	345	325S	330S	FS	A	FS	FS
18	FS	290Z	F	290Z	FS	340	320	350	375	I340C	365	360	360	355	I350R	380	370	325	335	320	335R	345	335	290F
19	325	305	335	305	315	FS	325	365S	385R	365	365	360	355	370	345	380	380	I330R	355	360	335	340	305	U315R
20	310	320	315	305	320R	360	320	380R	370	J355R	375	360	350	370	380	355	370	305	335	335	330R	345	285	FS
21	305	FS	315S	315	U335S	380	355	375R	375	380	350	345	350	355R	350	375	380R	355	315	325	340	355	FS	275F
22	315	U310R	FS	J320R	325S	325	360S	390R	385	365	355	I345R	360	345	365	375S	365	335	350	340	I330S	I340R	300S	FS
23	RS	FS	FS	FS	FS	FS	340S	355	370	350	345	345	370	360	335	360	360	350	370	330	295	300	310R	315
24	310	285	320	305F	FS	315F	350S	355	355	330	345	355	360	375	375	470	350	355	360	305	325	310	300	295
25	310	310	315	320	330F	335F	FS	370R	380	360H	C	C	C	C	C	375	380	350	335	325	330F	F	FS	FS
26	340F	315R	F	305F	330	310	365	370	385	365	350	370	375	375	380	380	360	350	350	325	320	280F	310S	310
27	305	295	300	F	335R	325	315	355	345	325	340	355R	375	365	350	345	375	345	320	345S	365S	FS	FS	FS
28	F	F	310F	F	F	F	335F	360	390	385	375R	340	375	340V	355	345S	360	350R	335	335	340	U295F	F	305
29	310	330	305	295	310	315S	355	360	355	375	345	355	345R	370	355	350	370	350	355	310	370R	300	FS	285
30	305	315	305	320	325	320	330	365	375V	380	I365R	355H	350R	370	375	360	345	335	350S	335	375	290	295	300
31																								
No.	23	24	22	*	22	26	28	30	30	30	29	29	29	29	29	30	30	30	27	27	27	23	22	20
Median	310	310	305	305	325	330	340	360	370	360	350	355	355	355	355	365	365	350	335	330	330	325	310	310
U. Q.																								
L. Q.																								
Q. R.																								

The Radio Research Laboratories, Japan

Sweep 1.6 Mc to 20.0Mc in 20 sec in automatic operation

M(3000)F2

A 7

Lat. 39° 43.5'N
Long. 140° 08.2'E

Akita

IONOSPHERIC DATA

0.01 135° E Mean Time (G. M. T. + 9h)

M(3000)F1

Nov. 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	395L	L	LH	L	L	L								
2									L	L	355L	LH	L	L	L	L								
3									L	LH	L	360L	390L	L	A	L								
4									L	L	L	360L	L	380L	L	L								
5								L	L	390L	395	1370A	L	L	385L	L								
6									L	LH	375L	L	360L	345L	L	L								
7									L	L	400L	LH	390L	L	LH	420								
8									420L	LH	L	L	L	L	LH	L								
9									L	L	L	375L	LH	L	L									
10									L	L	LH	350L	LH	L	355L	L								
11									L	385L	L	365L	L	L	L									
12									L	L	L	LH	L	L	L									
13									L	A	L	L	400L	L	L									
14									L	L	L	L	L	L	L	L								
15									L	LH	LH	L	L	L	L	460								
16									L	L	400L	365L	LH	L	L	L								
17									L	A	370L	390L	L	L	L	L								
18									L	C	L	L	L	L	L	L								
19									L	L	L	355	375L	L	1435A									
20									L	L	L	LH	370L	405	L	425								
21									L	L	LH	L	355L	L	L									
22									435	L	L	L	LH	L	L									
23									L	L	365L	L	LH	415	L	415								
24									L	L	1355A	L	L	LH	420L	L								
25									L	L	C	C	C	C	C									
26									L	415L	375L	LH	L	L	L	L								
27									L	L	L	L	L	410L	385L									
28									430	410L	L	L	365L	L	L	430								
29									L	L	L	LH	LH	L	L									
30									L	420	L	LH	380L	L	L									
31																								
No.									3	5	10	10	9	4	6	4								
Median									430	410	375	365	380	395	400	425								
U. Q.																								
L. Q.																								
Q. R.																								

Sweep 1.6 Mc to 20.0Mc in 20 sec in automatic operation

The Radio Research Laboratories, Japan

A 8

M(3000)F1

Lat. 39° 43.5'N
 Long. 140° 08.2'E

Akita

IONOSPHERIC DATA

135° E Mean Time (G. M. T. + 9h)

km

R'F2

Nov. 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									235	240	250	250	250	250	250	245								
2										230	300	250	240	240	250	250								
3									225	245	240	240	245	250	250	240								
4									225	240	245	260	245	245	250	225								
5								230	220	220	235	255	240	230	230	225	215							
6									240	225	235	235	250	250	230									
7									235	230	230	240	235	260	230	230								
8									210	240	230H	230	245	250	245	230								
9									230	230	240	250	255	240	240									
10									215	225	250	250	235	240	240	215								
11									220	245	245	265	240	245	245									
12									245	205	230L	245	225	245	245									
13									230	245	250	240	230	245	245									
14									240	225	240	250	240	245	230	225								
15									215	240	245	240	245	240	245	225								
16									235	240	245H	255	250	230	230	230								
17									230	255	245	240	245	245	245	230								
18									220	1245C	220	245	250	245	235	225								
19								240	215	230	245	250	230	230	230									
20									245	250	235	255	260	240	240									
21									220	225	240	250	250	235	230									
22									220	240	245	290	245	245	245									
23									240	240	270	250	240	245	235	245								
24									250	250	250	240	240	240	230	225								
25									220	230	C	C	C	C	C									
26									205	235	245	240	240	245	225	215								
27										250	250	235	230	245	245									
28									210	220	225	250	245	230	225	220								
29										240	260	240	235	240	220									
30									220	225	235L	250	250	235	225									
31																								
No.								2	26	30	29	29	28	29	16									
Median								235	220	240	245	250	245	245	240	225								
U. Q.																								
L. Q.																								
Q. R.																								

Lat. 39° 43.5'N
Long. 140° 08.2'E

Akita

IONOSPHERIC DATA

135° E Mean Time (G. M. T. + 9h)

km

R'F

Nov. 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	290	275	255	240	235	215	230	225	220	210	200	195	195H	195H	230	245	215	I230A	A	A	A	250	230	250
2	255	290	245	270	290	235	200	210	230	225	220	200H	200	230	235	245	220	210	220	I250A	225	275S	245	255
3	255	275	265	255	225	205	225	215	220	200H	225	220	205	215	I225A	I235A	205	250	I255A	I260A	260	245	255	270
4	280	275	280	265	240	215	225	215	225	210	205	220	230	225	230	235	215	210	225	230	I260A	275	295	305S
5	295	295	275	250	250	250	245	225	200	200	205	I200A	I220A	215H	205	220	220	210	I240A	230	245	255	250	300
6	270	275	255	260	230	250	235	230	225	210	225	225	200	205	230	225	205	I220A	250	245	255	265S	245	280
7	280	I270A	290	280	240	255	245	225	230	230	205	200H	205	205	195H	220	205	210	225	245	255	250	280	280
8	255	270	295	300	280	220	245	215	200	200H	215	210	200	205	200H	230	205	205	235	250	220	250	250	250
9	260	265	275	260	240	245	230	235	220	210	200	205	200H	215	235	235	205	200	250	255	250	255	250	320
10	235	235	275	290	300	275	245	225	220	220	190H	200	195H	225	200	220	195H	200	250	245	255	245	280	300
11	290	295	295	280	250	245	200	220	220	190	245	215	245	235	220	230	210*	200	230	230	230	250	245	280
12	305	305	300	305	300	230	210	200	230	200	210	190H	200	240	245	220	200	205	225	245	220	E250E	A	290
13	290	300	280	295	255	245	220	200	220	I240A	235	235	220	205	210	230	200	230	220	240	215	245	265	280
14	295	285	305	260	250	245	245	225	230	215	220	230	230	200	200	I230A	205	210	215	225	240	230	235	280
15	295	300	295	300	295	245	240	210	205	200H	195H	200	225	230	225	195	205	200	250	245	250	235	280	300
16	295	300	295	310	340	295	230	200H	220	215	215	205	195H	230	230	225	210	210	235	235	220	235	245	260
17	275	295	280	295	270	210	210	210	225	I215A	220	220	220	235	220	215	210	220	I255A	240	I230A	A	A	250
18	290	290	285	275	245	210	255	240	220	I215C	210	205	I205A	245	210	220	220	245	240	I255A	220	245	325	325
19	275	280	255	265	285	250	250	235	215	200	200	200	195	240	I190A	225	210	225	230	220	250	235	295	275
20	280	265	275	290	250	230	250	220	205	200	180H	230	200	225	200	230	205	230	235	250	255	225	E295E	300
21	295	290	275	295	265	220	230	200H	205	200	190H	230	200	240	230	220	205	240	E245E	250	250	235	280	300
22	280	275S	275	275	255	250	205	200	190	220	220	195	195H	200H	200H	225	210	220	220	250	255	220	E300E	E295E
23	280	E295E	E310E	290	290	245	235	225	205	210	220	250	185H	200	230	205	215	230	220	275	295	290	270	250
24	270	340	270	300	275	295	225	235	235	240	I230A	215	220	210H	220	225	220	250	E295E	275	I280A	295	310	310
25	295	290	280	275	260	250	250	225	220	225	C	C	C	C	C	230	205	200	245	240	250	280	255	255
26	250	275	320	305	250	280	215	210	220	200	200	200H	240	220	225	215	210	210	230	255	275	300	270	275
27	285	305	300	300	250	215	270	230	230	235	245	230	220	210	200	230	210	205	245	220	200	E295E	E275E	275
28	280	280	285	250	230	245	240	220	200	195	245	180H	200H	220	225	200	220	200	220	245	225	290	300	300
29	295	255	280	300	290	255	230	205	220	230	250	225H	205H	225	225	225	210	240	220	250	200	A	330S	280
30	300	280	290	280	250	250	250	205	225	205	215	200H	200	245	240	225	205	220	205	250	215	325	300	290
31																								
No.	30	29	29	30	30	30	30	30	30	30	29	29	29	29	29	30	30	30	28	28	29	27	25	29
Median	280	280	280	280	250	245	230	220	220	210	215	205	200	220	225	225	210	210	230	245	250	250	265	280
U. Q.																								
L. Q.																								
Q. R.																								

Sweep 1.6 Mc to 20.0Mc in 20 sec in automatic operation

The Radio Research Laboratories, Japan

R'F

A 10

IONOSPHERIC DATA

Lat. 39° 43.5'N
Long. 140° 08.2'E

Akita

135° E Mean Time (G. M. T. + 9h)

RES

Nov. 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	100	105	E	100	E	E	E	155	145	120	110	110	105	G	105	150	120	110	105	100	100	100	E	100	
2	100	100	100	100	100	E	E	G	135	120	105	105	G	105	100	G	125	115	110	105	105	105	100	100	
3	E	E	E	E	S	E	E	G	G	105	105	100	100	100	100	100	100	100	100	100	100	100	100	100	
4	100	100	100	E	100	E	105	105	120	115	115	110	110	110	100	125	115	E	E	110	105	E	E	105	
5	105	E	100	E	E	E	E	G	115	110	105	105	100	100	G	G	B	110	105	E	E	E	E	E	
6	E	E	105	E	E	E	E	105	120	G	150	105	105	100	100	100	100	110	110	105	110	110	105	105	
7	100	100	100	100	E	E	E	120	120	110	110	105	105	100	G	100	105	100	E	E	110	110	100	105	
8	E	E	E	E	E	E	E	120	115	110	105	105	105	G	105	G	110	E	E	E	E	E	E	E	
9	E	E	E	E	E	E	E	G	120	125	125	120	115	110	110	110	B	E	110	E	E	E	E	100	
10	E	E	E	E	E	E	E	125	125	120	G	G	100	100	100	105	B	100	E	E	E	E	E	100	
11	E	E	E	E	E	E	105	140	140	140	155	G	130	120	120	120	E	135	E	E	E	E	E	110	
12	110	E	110	E	100	E	E	E	G	130	120	115	115	120	110	165	110	E	E	E	110	105	105	105	
13	110	E	E	E	E	E	E	G	G	130	125	115	G	G	G	110	G	140	120	105	E	E	100	100	
14	E	E	105	E	E	105	E	130	130	130	110	110	110	105	105	110	100	115	105	E	105	100	E	100	
15	110	110	E	E	E	105	E	110	110	115	G	G	100	100	100	100	100	100	B	E	110	105	105	E	
16	E	E	E	E	E	E	E	130	105	160	G	G	100	G	100	100	100	100	100	110	105	105	100	100	
17	100	100	100	100	E	E	E	145	115	105	105	100	100	100	100	100	150	105	105	105	100	100	105	105	
18	100	105	100	100	E	E	E	105	110	C	105	150	105	100	455	110	B	E	130	105	120	100	100	E	
19	E	115	E	E	E	E	E	125	125	115	110	110	105	110	110	105	105	105	100	100	100	E	E	E	
20	E	105	105	105	E	E	E	G	105	130	105	100	100	100	100	130	100	100	100	110	110	105	100	100	
21	105	E	E	E	E	E	E	140	110	110	G	100	G	160	E170G	130	E	E	E	150	140	100	100	E	
22	E	E	E	E	E	E	E	E	105	120	100	105	G	G	G	G	E	E	E	E	145	E	E	E	
23	E	E	E	E	100	E	E	100	G	105	115	155	G	G	G	G	E	110	110	110	E	105	E	E	
24	E	E	E	E	E	E	E	130	120	110	105	G	G	100	100	100	100	100	100	E	110	105	105	105	
25	E	E	100	E	E	E	115	110	G	155	C	C	C	C	C	155	100	E	100	E	E	E	110	E	
26	105	100	E	E	E	E	E	E	110	G	105	105	105	100	155	150	100	E	E	120	E	E	110	E	
27	E	105	E	E	E	E	E	150	115	110	105	105	105	100	G	160	170	100	E	E	E	E	E	E	
28	E	E	E	E	E	E	E	G	125	G	165	G	105	G	155	G	150	E	105	E	E	E	E	100	
29	E	E	100	E	E	E	E	120	150	150	150	150	150	120	G	G	100	100	120	110	105	100	105	E	
30	105	E	E	E	E	E	E	150	150	150G	160	G	G	G	160	150	100	E	E	E	E	E	E	E	
31																									
No.	13	11	12	7	6	1	3	20	25	25	25	22	21	21	22	23	21	19	17	15	17	16	17	16	
Median	105	105	100	100	100	105	105	125	120	120	110	105	105	100	105	110	100	105	105	105	105	100	105	100	
U. Q.																									
L. Q.																									
Q. R.																									

Sweep 1.6 Mc to 20.0Mc in .20 sec in automatic operation

RES

The Radio Research Laboratories, Japan

A 11

Lat. 39° 43.5'N
Long. 140° 08.2'E

Akita

IONOSPHERIC DATA

135° E Mean Time (G. M. T. +9h)

Types of Es

Nov. 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	f2	f2		f2				h2	h	h3	e2 h	12 h	12		12	h2	h3	f3	f3	f3	f3	f2		f2	
2	f2	f2	f	f2	f2				h2	h2	12	12	12	12	12	h2	h3	f5	f8	f3	f2	f4	f2	f4	
3										13	12	12	1	12	13	13	13	f4	f2	f3	f3	f2	f3	f2	
4	f2	f	f		f	f2		1	h4	h2	h2	c3	e2	e2	1	h2 1	1		f4	f5				f3	
5	f	f	f						1	12	13	14	14	12				f3	f7						
6			f3					1	h		h2 13	13 h	12	13	13	13	15	f3	f3	f3	f4	f2	f2	f2	
7	f2	f3	f2	f2				e2	h3	e2	e2	13	12	12	1	1	1	f		f3	f3	f2	f2	f2	
8								c3	e2	e2	1	13	13		12	1 h3									
9								c	h2	h2	h2	h2	e2	c3	13	13		f						f2	
10								c	h	h2				13	12	1 h		f							
11									h2	h	h2		h	h2	h2	h3		f						f	
12	f2				f5				h	h	h2	h2	h2	h2	c4	h2 e3	1			f2	f	f4	f2	f2	
13	f2								h4	h2	h2	h2			c5			f2	f			f	f	f	
14			f2			f		h	h	h	e2	c2	12	12	14	1	1	f2	f2		f3	f2		f2	
15	f4		f3					12	13	13			12	12	13	13	13	f3			f2	f3	f2		
16								h	12 h	h			12	12	1	1 h	1 h	f	f	f4	f2	f3	f3	f3	
17	f2	f2	f2	f2				h3	1	14	14	12	12	12	13	1	h2 1	f2	f4	f2	f3	f4	f3	f2	
18	f2	f2	f2	f2				12	12	12	12	h 12	12	12	h	12 h			f f	f2	f2 f4	f			
19	f	f						h	h2	12	12	e2	c2	c3	13	13	12	f3	f	f					
20	f2	f2	f2	f2	f2			1	1	h	12	14	12	12	12	h3	1	f2	f2	f2	f2	f3	f	f	
21	f							h	12	12	1	1		h	h	h2				f	f	f2	f2		
22									1 h2	h3	14	12			h						f				
23				f2	f			1		13	12	h3						f2	f	f3	f2				
24								h	c4	14	13			1	1	1	12	f3		f2	f3	f2	f2	f4	
25										h2 12					h2	1	1	f				f			
26	f2	f2						h2	12	13	13	12	13	12	h	h2	1		f2				f		
27	f2	f2						h2	c3	13	13	12	12	1	h	h	h	f2							
28								c	c	h 12		1	1	h	h	h	h	f					f2	f	
29			f					c	c2	h	h2 1	h	h 12	h3			1	f f	f	f	f	f3	f2		
30	f2							h2	h	h	h				h2	h	1								
31																									
No.																									
Median																									
U. Q.																									
L. Q.																									
Q. R.																									

Sweep 1.6 Mc to 20.0 Mc in 20 sec in automatic operation

Types of Es

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

Nov. 1964

foF2

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

Kokubunji Tokyo

Lat. 35° 42.4'N
Long. 139° 29.3'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	031	A	F	F	039F	029F	038	066	I068C	068	070	067	074	I071C	071	069	058	A	040	044	035	034	038	037
2	038	038F	040	039	035F	034F	042	039	060	I059C	076S	111	104	069	069	070	J080S	064	A	038	I036A	033	038	036
3	036	036	036	039	045	025	036	038	077S	030	031	082	073	074	078	077	060	045	030	033	034	034	034	034F
4	033	033	032	033	033	029	036	060	065	074	076	073	092	082	072	062	057	043	035	033	I029A	030	I029A	032
5	033F	034	F	033	033	030F	034S	066	031S	077	J073R	071	082	085	071	064	056	045	034	034F	034	034	F	030F
6	F	I034F	034	033	F	030	034	064	088	032R	078	074	075	J081R	075S	064	053	042	032	034	034	F	035F	034F
7	030F	032	F	033F	034F	025F	036	067	070	078S	073	066	073	072	078	060	056	040	I030A	029	032	030	029	030F
8	031	030	030F	031	029	029	036	061	063	038	072	069	067	063	061	057	056	040	034	035	029	031	035	038
9	034	036	034	036	034	033	036	063	074	070	066	062	069	083	063	062	057	041	031	036	038	034	036	038
10	039	033	031	032	030	030	037	066S	J073S	033	035	091	094	094	J076S	064	053	045	A	031	035	030	030	F
11	I030F	029F	F	030	030	027	030	052	073	060	062	067	088	083	065	063	054	045	032	030	026	027S	028	030
12	031F	029	030	F	F	030F	030	064	059	036	071	076	080	082	079R	065	051	034	034	029F	F	027F	028	I026F
13	029F	029F	030F	J032F	030	030	033	050	058	073	084	J101R	089	080	073	061	056	036	035	034	J030A	I026A	025	023
14	030	031	032	F	F	F	034	053	067	063	079R	086	066	058	061	067	055	037	034	030	029	026	028	029
15	031	032	J032F	031	029F	029	032	058	070	073	069	066	063	069	066	062	052	052	037	028	031	033	030	027
16	029	029	029	029	F	029F	038	039	060	064R	069	088	078	068	059	060	053	054	038	F	F	S	F	F
17	041	F	F	040F	035F	038	036	052	065	073	090	084	075	062	064	059	053	043	046	040	A	A	A	029F
18	033F	033F	032	032	035	028	030	058	081	072	079	068	071	069	065	054	048	038	I035A	033	034	029	024	I030A
19	030	033	031	030	030	030	032	063	079R	063	066	079	075	067	061	058	046	042	033	033	I040S	026	I030C	027
20	030	031	030	032	033	028	030	056	063	057	063	062	060	060	054	I054C	056	034	I028A	026	028	032	025	029
21	029	029F	F	030F	029F	034	029	051	062	060	056	064	063	060	059	057	042	036	036	026	026	027	025F	025
22	028	028	028	028F	031	030	030S	047	055	051	053	065	066	070	062	054	045	031	038	FS	025	028	023	F
23	F	028F	026F	F	F	024F	027	051	054	053	053	075S	081	068	063	056	067	042	039	025	028	030	034	033
24	030	029	033	031	031	032	039	058	072	033	099	091	035	073	057	051	048	041	032	A	034	030	030F	F
25	030F	032F	032F	032F	032F	027F	024	056	070	060	065	067	066	059	064	059	053	033	026	029	J023S	F	029F	F
26	028F	027F	025	028F	028F	I029F	033	046	056	055	063	072	065	065	061	054	045	039	034	034	032F	029F	F	F
27	I030F	032F	032F	029F	F	028F	032	051	060	071	106	113	074	074	057	059	C	C	C	C	C	C	C	C
28	C	C	C	C	C	C	C	C	C	059	065	070	064	060	063	060	066	057	032	034	032	025	023F	029
29	029	030	028	028	029	030	039	053	057	060	060	094	089	063	057	052V	049	039	026	029	023	022	026	029
30	028	030	027	028	034	021	024	049	054	062	061	068	070	065	056	054	052	039	043	030	031	024	027	029
31																								
No.	27	27	23	25	23	28	29	29	30	30	30	30	30	30	30	29	29	28	27	26	26	25	25	23
Median	030	031	031	032	032	029	034	058	065	068	070	072	074	069	064	060	053	040	034	033	032	030	028	030
U. Q.	033	033	033	033	034	030	036	063	073	074	079	086	082	080	071	064	056	044	036	034	034	032	034	034
L. Q.	029	029	029	030	030	028	030	052	060	060	063	067	067	063	059	055	050	037	031	029	028	027	026	029
Q. R.	004	004	004	003	004	002	006	011	013	014	016	019	015	017	012	009	006	007	005	005	006	005	008	005

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

The Radio Research Laboratories, Japan

foF2

K 1

IONOSPHERIC DATA

Lat. 35° 42.4'N
Long. 139° 29.3'E

Kokubunji Tokyo

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

foF1

Nov. 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									C	A	420L	U430L	L	L	L	L								
2										C	U460L	LH	LH	L	L	L								
3									L	L	L	L	L	L	L	L								
4									L	A	L	L	L	L	L	L								
5									L	L	410L	420L	L	L	L	L								
6										L	L	L	L	L	L	L								
7									L	L	L	L	L	L	L	L								
8									L	L	L	L	L	L	L	L								
9									L	L	U420L	L	L	L	L	L								
10									A	L	L	L	L	L	L	L								
11									L	L	L	L	L	L	L	L								
12									L	L	L	460L	450L	L	L	L								
13									L	L	L	A	L	A	A	L								
14									L	L	L	L	L	L	L	L								
15								L	L	L	LH	L	L	L	L	L								
16									L	L	L	L	L	L	L	L								
17									L	L	A	L	L	L	L	L								
18									L	L	U420L	L	L	L	L	L								
19								L	L	L	L	L	L	L	L	L								
20								L	L	L	L	L	L	LH	L	C								
21								L	L	L	L	L	L	L	L	L								
22									L	L	L	A	L	L	LH	L								
23									330L	L	L	A	L	L	L	L								
24								L	L	L	U400L	A	420	L	A	L								
25									A	370L	LH	L	L	L	L	L								
26									L	L	L	L	L	L	A	L	L							
27									L	L	L	L	L	L	L	L	C							
28								C	C	340	L	L	L	L	L	L	C							
29										LH	L	L	L	L	L	U300L								
30										L	L	L	L	L	L	L								
31																								
No.								1	2	355	U420	U425	2	1		1								
Median								330				440	450			U300								
U. Q.																								
L. Q.																								
Q. R.																								

The Radio Research Laboratories, Japan

K 2

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

foF1

IONOSPHERIC DATA

Lat. 35° 42.4'N
Long. 139° 23.3'E

Kokubunji Tokyo

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

foE

Nov. 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	220	I260C	A	A	A	A	A	A	250	A	A						
2							140	190	I230C	305	320	315	300	I280A	250	190								
3							B	215	265R	280	A	A	A	I280A	A	A								
4							B	220	A	A	A	A	A	A	A	A								
5							B	I210A	250	280	I300A	I310A	I310A	310	290	I250A	190							
6							E	200	A	A	300	325	A	A	A	A	A							
7							S	A	A	A	A	A	A	A	A	235	A							
8							B	210	A	290	295	I310A	I310A	300	280	240	A							
9							B	190	245	280	I285A	A	A	A	A	A	A							
10							B	210	A	A	A	305	305	290	I265A	225	A							
11							B	I200A	250	275	295	305	310	R	A	A	I200A							
12							E	130	255	295	300	A	A	A	A	A	175							
13							S	I190A	260	280	I300A	300	A	A	A	A	175							
14							S	A	A	A	A	A	A	A	A	A	A							
15							S	A	A	A	290	295	300	285	A	A	A							
16							B	190	245	280	300	310	310	295	280	235	180							
17							S	A	260R	I275A	A	A	A	A	275	I240A	A							
18							S	190	250	I280A	295	310	300	285	A	A	A							
19							S	A	A	I290A	300	A	A	A	A	A	I160B							
20							S	175	240	280	295	305	310	300	275	I235C	A							
21							S	250	280	290	290	305	305	290	265	210	I170A							
22							185	250	265	I280A	I295A	300	I285A	I260A	I230A	170								
23							205	250	I265A	295	I300A	290	A	A	225	180								
24							A	A	A	A	A	295	280	A	A	A	A							
25							A	A	265	I290A	I295A	280	250	225	B									
26							A	I230A	A	A	A	A	A	I260A	A	A								
27							175	I240A	A	A	A	A	A	A	C	C								
28							C	C	270	280	290	290	280	275	220	185								
29							B	220	270R	230	290	295	285	255	I215A	160								
30							B	225	270	285	295	295	280	250	230	A								
31																								
No.							3	18	19	20	20	18	17	16	15	16	12							
Median							E	195	250	280	295	305	300	290	275	230	180							
U. Q.																								
L. Q.																								
Q. R.																								

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

Nov. 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	J031	J034	J043	J033	J020	J020	J019	J024	C	J047	J042	J043	J043	J035G	J041	J028	J039	069	J038	J035	036M	J035	J033	032M
2	027	030M	024	036M	026	020	019	J032	G	C	G	J026G	J029G	J025G	J034	J037	J041	J041	044M	J037	J050	J058	034M	J025
3	032	024	025	018	J024	019	J018	020G	G	J026G	J044	J038	044	036M	036	035	J050	050M	036M	032M	030M	J032	030M	029
4	024	J024	031M	J025	018	J019	019	024	J028	048M	J033	J043	042	J038	036	J030	024	J023	J020	035M	047M	030M	044M	031M
5	J024	022	024	025	J029	J020	B	023	025	032M	036M	044	030	036	034M	J027	020	S	J028	030M	J025	023	019S	019
6	025	B	J019	J018	019	J020	J018	J018G	032	037	035	J031G	036	049M	037	J043	J027	J025	029M	025	J030	049M	J118	J061
7	J024	J034	036	J030	J031	021M	019	J026	J041	048	J042	J034	036	048M	034	018G	019G	025	J034	J030	J030	023	024	032M
8	034M	J028	J024	020	J019	021M	B	G	J030	035M	035	J040	J044	036M	022G	021G	J035	016	025	S	B	E	S	E
9	E	B	019M	E	E	018	B	G	023G	G	033	033	031	032	J029	034	033	J032	032	032	022	021	030M	B
10	018	019	J030	J027	J018	J020	B	G	J042	042	032	033	031	032	J029	034	033	030	032M	020	023	020	E	E
11	E	E	E	J018	J020	020	B	025	032	032	034	033	J030G	G	032	026	021	023	020	E	E	036	S	B
12	020	024	023	025	J026	025	024	023G	G	G	G	J043	J043	049M	060	026	016G	019	017	J023	022	021	J025	024
13	J053	E	E	E	018	B	J015S	019	024G	037	037	061	J051	078M	049M	031	G	018	J045	J038	034	J044	J032	J034
14	024	024	J037	023	020	E	S	J023	J031	J035	J043	039	J038	036	050	036	021	B	019	B	019	019	024	024
15	J019	J031	J023	019	021	J024S	020	J023	032M	J030	G	J026G	023G	019G	036M	032	029	022	019	S	J014	J030	J029	J026
16	J042	019	J029	031	E	E	J013B	G	G	G	G	G	G	G	G	029	G	S	S	033M	J079	033	J036	J025
17	J030	J032	021	E	019	022	023	J029	G	033	J033	J062	050	049	J023G	036	J038	037	034	J068	058M	060	J061	J025
18	030M	J029	J024	J024	019	018	S	G	G	J032	022G	G	J028G	J029G	044	J042	029M	028M	035M	022	020	020	069M	046
19	J030	J037	J034	J031	024	J032	024	J025	J028	030	029G	J030	034	J039	J030	J027	G	030M	028	022	019	C	S	S
20	S	B	019	J025	025	021	S	G	G	G	G	G	G	G	G	C	J025	019	034	021	049M	J024	019	E
21	019	S	B	019	019	019	E	G	G	031	018G	G	035	032	033	031	019	017	J016	023	024	023M	024	J030
22	E	024	J020	J020	E	J019	S	G	J031	033	036	J060	036	038	034	026	G	S	J019	J029	020	S	019	022M
23	S	022M	J042	J031	021	018	019	G	G	J039	040	J042	035M	J040	J030	019G	023	J017	J044	J036	025	J025	019	J027
24	J019	022	J028	027	025M	031M	023M	J024	033M	028	036	J092	034	024G	J043	J034	J053	J025	J019	058M	J038	J044	034M	J032
25	J026	J030	032M	022	J020	S	J019	038	J039	030	G	037	J042	034M	J026G	G	020	024	024	020	J029	019	J033	J033
26	025	J029	J034	020	022	018	019	J026	031M	J030	036	J036	J043	050	J042	J030	021	J014	S	021	025	024M	024	024
27	J034	J032	029M	024	023	024	021	024	J038	J042	J038	J041	034	J036	033M	C	C	C	C	C	C	C	C	C
28	C	C	C	C	C	C	C	C	C	035	035	025G	034	J027G	034	029	J026	S	020	019	E	S	B	E
29	S	B	E	019	J020	019	S	G	025G	025G	021G	034	033	G	018G	J024	020G	025	021	J025	022	020	S	J024
30	J032	J032	J033	020	E	B	J013	G	030	024G	J026G	025G	033	G	023G	019G	J025	J024	S	S	E	S	B	S
31																								

No.	26	24	28	29	29	26	19	29	28	29	30	30	30	30	30	28	29	24	26	24	28	25	23	25
Median	030	026	024	023	020	020	019	019	028	032	035	035	035	035	034	029	024	024	028	030	025	024	030	026
U. Q.	051	032	032	027	024	021	024	024	032	037	038	043	043	039	041	034	034	030	034	035	035	036	036	032
L. Q.	019	022	020	019	018	019	015	G	G	G	G	G	G	G	029	026	G	019	020	022	021	020	024	023
Q. R.	012	010	012	008	006	002	009					012	012	008	012	008	011	014	014	013	014	016	012	009

The Radio Research Laboratories, Japan

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

foEs

K 4

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)

f_oE_s

Nov. 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	017	A	018	019	E	E	S	024	C	040	034	033	035	D0350	032	026	027	A	015	016	019	025	016	020
2	016	018	014	015	015	E		018		C		0250	0250	0220	027	034	034	029	A	025	A	024	022	015
3	022	015	014	E	E	E	G	018G	0250	0250	036	035	035	0260	030	026	027	035	026	026	023	024	022	020
4	015	015	015	E	E	E	G	015	026	040	036	033	034	035	033	028	021	017	S	025	A	022	A	016
5	E	E	014	E	E	014	B	021	024	026	031	037	033	027	025	026	020	S	018	017	015	E	E	E
6	017	B	E	E	E	E	G	018G	030	033	034	0260	032	037	030	034	019	015	020	017	019	017	019	015
7	015	017	023	020	016	E	S	021	034	037	033	032	032	034	028	0170	0170	019	A	024	014	E	018	015
8	017	E	E	E	E	E	B		028	023	028	034	033	027	0220	0200	033	015	017	S	B		S	
9		B	E			E	B		0230		031	031	031	031	029	026	018	022	S	S	016	015	017	B
10	E	E	017	016	E	E	B		040	032	030	0260	0250	0320	028	025	025	020	A	E	015	E		
11				E	E	E	B	021	031	G	033	032	0240		032	025	021	016	S		019	S	B	
12	S	E	015	E	014	014	015	014G				038	033	038	029	026	0160	S	014	S	S	E	S	015
13	015				E	B	S	019	0230	030	034	046	035	033	039	025		016	015	024	A	A	017	016
14	S	E	018	015	E		S	021	025	028	040	031	035	029	032	026	020	B	S	B	S	E	015	S
15	S	E	E	E	E	E	S	019	025	028		0250	0200	0180	026	025	021	015	S	S	E	019	015	019
16	016	E	015	E			B								028	028	021	S	S	025	022	022	024	017
17	016	015	E	E	E	E	017	022	028	044	036	038	038	030	0220	027	029	025	025	027	A	A	A	016
18	020	022	016	014	E	E	S		029	0220	0220	024	0260	035	033	033	021	020	A	022	014	S	017	A
19	S	025	018	015	015	014	S	020	026	029	0280	03030R	033	036	027	024		020	016	S	S	C	S	S
20	S	B	S	E	014	S	S									C	020	S	A	015	015	017	E	
21	S	S	B	E	E	E			030	0170		035	032	030	030	025	018	015	015	S	016	S	014	017
22	015	E	E	E	E	E	S		028	033	035	044	034	033	028	025		S	E	S	S	S	S	S
23	S	E	E	014	E	E	E		024	039	030	030	025	026	025	0190	022	015	029	021	015	017	E	S
24	S	016	014	024	016	017	S	020	025	028	026	074	025	0220	035	030	035	018	017	A	028	021	019	018
25	016	018	022	E	E	S	S	035	040	029		032	033	025	0180		019	S	S	S	S	S	014	017
26	E	017	016	E	E	E	S	022	026	030	030	033	033	041	025	023	023	S	S	S	016	S	S	015
27	017	016	016	015	015	015	S	022	032	028	029	030	030	028	026	C	C	C	C	C	C	C	C	C
28	C	C	C	C	C	C	C	C	C	G	033	0230	033	0240	032	027	020	S	S	E		S	B	
29	S	B		E	E	E	S		0200	0250	0210	033	032	0170	023	023	G	019	S	S	S	S	S	021
30	016	020	014	E		B	S		028	0210	0260	0230	024		0220	0190	017	S	S	S	S	S	B	S
31																								
No.																								
Median																								
U. Q.																								
L. Q.																								
Q. R.																								

The Radio Research Laboratories, Japan

K 5

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

f_oE_s

IONOSPHERIC DATA

Kokubunji Tokyo

Lat. 35° 42.4'N
Long. 139° 29.3'E

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

f-min

Nov. 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	011	E015S	011	010	013	013	E014S	012	E027C	014	014	015	015	020	015	016	013	012	013	013	012	013	012	014	
2	013	011	E	010	011	012	010	011	012	C	014	015	014	014	015	013	013	013	011	011	014	012	013	012	
3	011	010	010	011	011	012	013	013	016	014	015	015	014	014	014	014	014	011	011	010	011	012	013	010	
4	012	013	012	013	012	013	014	012	012	014	013	015	014	014	016	015	014	E015S	E015S	013	014	012	014	014	
5	012	012	E	011	013	011	013	013	014	014	016	017	015	016	015	014	013	E015S	E015S	011	014	010	013	012	
6	014	012	011	013	011	011	010	013	014	014	014	015	014	015	014	014	013	010	011	010	010	012	013	012	
7	010	010	010	E	011	013	E014S	011	014	015	015	015	014	014	013	013	014	E015S	013	013	012	014	013	010	
8	011	012	014	014	011	013	014	014	013	014	014	013	015	012	014	014	011	011	010	E015S	013	010	E015S	010	
9	010	014	010	010	010	011	014	012	015	014	015	014	015	016	014	014	013	E014S	E014S	E015S	011	011	012	012	
10	011	014	010	010	012	012	014	012	014	015	015	015	014	015	013	014	013	010	010	014	011	014	010	011	
11	010	010	010	013	011	010	015	012	014	012	014	014	016	015	015	013	012	E014S	E014S	010	010	011	E014S	013	
12	E014S	011	E	011	010	011	010	011	014	014	014	015	015	015	014	014	014	014	E015S	010	E014S	012	E015S	011	
13	011	010	010	010	010	013	E013S	010	014	012	013	014	015	014	014	014	014	011	011	011	011	E015S	010	010	
14	E015S	012	010	010	010	013	010	E015S	011	012	015	014	015	016	014	014	013	013	E014S	013	E014S	013	013	E015S	
15	E015S	013	011	010	010	011	E015S	011	014	014	014	014	015	014	014	013	011	E014S	E015S	E014S	011	011	010	012	
16	012	011	010	010	010	010	014	012	014	014	016	016	016	016	014	013	015	E015S	E015S	011	011	012	E015S	010	
17	010	011	011	010	011	012	E015S	E015S	014	014	014	015	015	015	013	012	011	E015S	E014S	E015S	012	E014S	012	010	
18	012	012	010	011	010	013	E015S	013	014	014	016	015	016	015	015	014	013	E015S	013	012	010	E014S	012	010	
19	E015S	010	010	010	010	011	E014S	014	013	014	014	014	016	015	014	013	016	010	E015S	E014S	E015S	C	E015S	E014S	
20	E014S	012	E014S	013	011	E015S	E013S	014	013	014	015	015	015	016	014	C	010	E015S	E015S	010	010	E015S	013	010	
21	E014S	E015S	014	011	010	012	011	E015S	013	013	014	015	014	014	014	014	013	013	012	011	E015S	013	E014S	012	012
22	010	012	010	010	010	010	E015S	013	013	014	014	015	013	014	014	015	016	E015S	010	E014S	E015S	E015S	E015S	E015S	
23	E015S	011	012	010	010	014	010	E015S	014	013	013	013	013	014	011	013	012	011	E013S	010	010	E015S	010	E015S	
24	E015S	E014S	010	010	011	010	E015S	011	012	013	013	014	014	014	012	012	012	E014S	E014S	E016S	010	010	E015S	012	
25	E015S	011	010	010	010	E014S	E015S	012	013	015	014	014	014	015	014	014	016	E015S	E015S	E015S	E014S	E015S	012	E015S	
26	012	010	010	012	011	012	E015S	014	014	012	014	014	015	015	013	011	012	E014S	E014S	E015S	013	E014S	E014S	012	
27	E015S	012	010	E	010	012	E015S	014	013	014	015	014	014	014	C	C	C	C	C	C	C	C	C	C	
28	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
29	E014S	013	010	012	014	014	E014S	015	012	014	015	014	015	014	014	014	015	010	E015S	E015S	E015S	E015S	E015S	012	
30	013	011	011	015	010	015	E013S	015	014	014	014	015	014	015	014	014	010	E015S	E015S	E014S	010	E015S	012	E015S	
31																									
No.	18	26	28	29	29	27	29	26	28	29	30	30	30	30	30	28	29	29	29	16	23	16	20	23	
Median	011	012	010	010	011	012	E014	012	014	014	014	015	015	015	014	014	013	E014	E014	012	011	012	012	012	
U. Q.																									
L. Q.																									
Q. R.																									

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

The Radio Research Laboratories, Japan

f-min

K 6

IONOSPHERIC DATA

Kokubunji Tokyo

Lat. 35° 42.4'N
Long. 139° 29.3'E

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

Nov. 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	305	A	F	F	355F	310F	335	375	I355C	355	360	330	350	I335C	340	360	360	A	310	320	315	295	315	295
2	310	295F	300	310	285F	325F	335	360	365	I355C	290S	325	335	350	335	325	J345S	350	A	315	I295A	285	285	305
3	305	290	295	310	355	320	345	345S	335	345S	345	350	325	335	330	350	350	355	330	300	300	295	305	295F
4	305	305	290	300	335	340	330	365	355	335	365	355	340	335	345	355	365	340	340	335	I320A	315	I295A	315
5	300F	295	F	335	335	300F	315S	350	345S	350	J360R	345	340	330	350	370	325F	335	350	325F	320	325	F	315F
6	F	U310F	325	305	F	330	335	350	350	345R	345	340	350	J345R	375S	360	350	355	325	325	320	F	310F	325F
7	315F	310	F	300F	350F	315F	335	365	360	355S	360	335	345	325	360	365	370	350	I330A	315	315	335	295	295F
8	320	295	295F	310	310	310	335	375	370	345	360	350	355	335	360	355	370	345	320	340	365	295	315	325
9	295	320	305	305	325	305	335	355	330	355	350	340	325	340	350	355	340	340	290	305	325	305	305	290
10	325	305	305	300	295	295	325	360S	J355S	350	340	320	340	350	J355S	355	360	355	A	320	330	330	330	F
11	U285F	295F	F	305	335	305	330	360	355	365	340	325	340	335	370	365	370	335	345	355	305	315S	320	300
12	290F	275	285	F	F	335F	345	360	345	360	340	355	340	340	345R	370	370	355	355	285F	F	305F	285	U310F
13	295F	275F	285F	J290F	330	330	335	340	370	335	330	335	J335R	360	350	360	370	370	365	315	350	A	A	285
14	300	310	295	F	F	F	325	360	370	355	355R	350	355	330	355	345	370	350	325	345	345	345	285	310
15	290	300	J295F	295	310F	310	315	360	370	340	350	355	365	350	365	355	365	350	290	325	335	335	295	285S
16	285	295	275	280	F	275F	340	375	350	345R	320	345	345	365	355	350	345	335	315	F	F	S	F	F
17	295	F	F	280F	315F	355	335	345	350	315	355	355	345	355	345	355	355	330	325	335	A	A	A	285F
18	300F	290F	295	305	330	320	325	340	345	335	355	355	355	345	370	350	355	335	I330A	335	320	360	300	I320A
19	295	290	320	315	320	330	310	350	355R	350	340	340	360	335	360	365	350	355	315	U390S	295	I330C	295	300
20	300	320	305	310	330	325	320	355	350	335	350	350	350	335	345	I360C	330	335	I350A	305	320	315	305	300
21	280	280F	F	300F	315F	350	340	370	355	365	365	345	350	350	360	360	365	335	330	340	340	320	300F	300
22	285	300	290F	295	330	335S	335	355	365	365	345	370	340	345	355	370	360	325	340	FS	355	330	280	F
23	F	290F	275F	F	F	315F	300	370	370	360	330	335S	345	350	350	340	355	350	340	355	280	295	295	330
24	320	260	300	285	285	295	330	355	330	340	335	350	340	370	350	355	340	325	340	A	320	300	295F	F
25	315F	300F	305F	315F	320F	295F	320	345	360	370	370	360	365	350	355	370	355	340	330	315	J330S	F	275F	F
26	320F	295F	295	270F	320F	U310F	335	365	365	355	350	340	340	355	375	360	360	345	325	330	340F	285F	F	F
27	U295F	280F	280F	290F	F	315F	320	350	350	310	340	365	350	350	350	C	C	C	C	C	C	C	C	C
28	C	C	C	C	C	C	C	C	C	375	350	355	365	345	335	365	360	380	320	325	330	300	270F	275
29	295	325	320	305	295	295	335	365	365	365	315	350	360	365	370	350V	345	335	335	360	320	295	290	295
30	290	295	295	320	355	320	315	365	360	370	345	345	345	340	360	360	365	315	345	320	325	290	285	295
31																								
No.	27	27	25	25	23	28	29	29	29	30	30	30	30	30	30	29	29	28	27	26	25	24	25	23
Median	300	295	295	305	325	315	330	360	355	350	345	345	345	345	355	360	360	340	330	325	320	310	295	300
U. Q.																								
L. Q.																								
Q. R.																								

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

M(3000)F2

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

M(3000)F1 0.01

135° E Mean Time (G.M.T. +9h)

Kokubunji Tokyo

Lat. 35° 42.4'N
Long. 139° 29.3'E

Nov. 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									C	A	380L	U390L	L	L	L	L								
2									L	C	U365L	LH	LH	L	L	L		A						
3									L	L	L	L	L	L	L	L								
4									L	A	L	L	L	L	L	L								
5										L	370L	385L	L	L	L	L								
6										L	L	L	L	L	L	L								
7									L	L	L	L	L	L	L	L								
8									L	L	L	L	L	L	L	L								
9									L	L	U380L	L	L	L	L	L								
10									A	L	L	L	L	L	L	L								
11										L	L	L	L	L	L	L								
12										L	L	L	365L	360L	L	L								
13										L	L	A	L	A	A									
14									L	L	L	L	L	L	L	L								
15								L	L	L	LH	L	L	L	L	L								
16										L	L	L	L	L	L	L								
17									L	L	A	L	L	L	L	L								
18									L	L	U380L	L	L	L	L	L								
19								L	L	L	L	L	L	L	L	L								
20								L	L	L	L	L	L	L	L	L								
21									L	L	L	L	L	LH	L	C								
22										L	L	L	L	L	L	L								
23									400L		L	A	L	L	L	LH								
24									L	L	U370L	A	360	L	A									
25									A	400L	LH	L	L	L	L									
26									L	L	L	L	L	L	L	L								
27										L	L	L	L	L	L	L								
28									C	395	L	L	L	L	L	L								
29										LH	L	L	L	L	L	L								
30										L	L	L	L	L	L	L								
31																								
No.									1	2	6	2	2	1		1								
Median									400	400	U375	U390	360	360		U400								
U. Q.																								
L. Q.																								
Q. R.																								

IONOSPHERIC DATA

Lat. 35° 42.4'N
Long. 139° 29.3'E

Kokubunji Tokyo

R'F2

Nov. 1964

135° E Mean Time (G. M. T. +9h)

km

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

R'F2

K 9

Nov. 1964

K'F

km

135° E Mean Time (G. M. T. + 9h)

Kokubunji Tokyo

Lat. 35° 42.4'N
Long. 139° 28.3'E

42

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	300	I290A	E340A	230	200	250	240	220	I220C	I225A	210	205	245	220	245	220	220	I235A	250	250	250	E320A	260	300
2	280	260	250	255	310	220	205	220	I220C	I220C	230	200H	200H	230	230	255	230	230	A	280	A	E340A	310	255
3	290	295	290	255	210	200	220	210	205	220	240	225	230	195	240	240	220	210	E300A	E320A	280	290	310	300
4	270	280	300	270	230	210	240	220	225	I240A	250A	205	230	240	240	240	220	210	210	250	I230A	290	I310A	290
5	340	300	260	240	240	260	255	210	230	220	210	210	205	230	225	240	220	205	240	270	245	250	245	255
6	280	295	255	245	210	240	240	240	240	230	230	210	210	E250A	240	210	205	200	250	250	250	260	250	250
7	250	260	E340A	295	240	255	245	245	240	245	210	200	220	210	240	200	220	205	I240A	E290A	250	240	255	310
8	270	270	305	280	255	250	230	210	210	205	245	225	210	225	210	230	225	225	240	230	200	255	255	250
9	250	255	250	255	230	250	230	240	220	220	205	220	205	245	230	235	210	230	250	260	250	255	300	290
10	240	240	290	290	270	290	245	240	I235A	220	200	250	245	240	220	210	210	210	A	250	240	220	245	295
11	300	300	290	260	230	250	255	210	240	225	225	225	225	225	230	225	210	200	210	200	230	260	250	280
12	300	310	300	305	255	240	240	230	220	245	205	245	210	245	210	225	210	200	205	290	250	250	300	290
13	290	310	280	270	240	230	210	210	250A	230	240	A	245	A	A	220	210	200	250	240	A	A	300	320
14	305	270	310	300	240	245	240	220	220	I220A	210	220	205	205	220	220	210	205	210	220	210	230	250	260
15	300	290	290	300	255	220	245	210	210	200	195H	210	200	240	230	210	210	220	255	240	230	250	290	345
16	310	290	310	290	305	290	240	210	225	210	210	195	205	210	205	230	220	220	205	260	250	230	260	290
17	270	295	295	290	240	210	210	225	225	210	I230A	250	E250A	220	205	235	210	240	250	250A	A	A	A	305
18	310	310	300	280	225	250	250	225	245	230	200	225	250	205	245	230	210	250	I250A	250	230	210	300	I255A
19	290	E340A	250	270	255	250	255	230	230	205	200	200	245	245A	200	240	210	220	250	205	300	I240C	270	290
20	270	250	250	260	250	250	220	220	200	205	205	225	220	195H	230	I235C	210	205	I240A	300	250	240	255	290
21	300	310	280	295	245	210	210	210	245	230	220	200	240	240	230	210	200	225	240	220	245	245	270	310
22	290	290	290	270	245	210	210	210	225	225	220	I225A	225	250	200H	225	210	210	245	220	220	230	E345S	300
23	300	260	300	300	300	260	240	220	200	250A	I255A	200	210	210	210	240	240	210	250A	E250A	300	310	275	250
24	250	345	295	E350A	305	305	250	240	240	230	205	200	245	245A	200	240	245	225	230	I260A	E300A	300A	300A	300
25	290	295	295	245	245	250	260	E250A	I240A	200	200H	220	225	200	245	240	220	205	240	240	245	300	340	270
26	250	305	320	305	270	255	220	210	210	230	200	220	225	I240A	230	210	205	220	225	250	250	310	300	250
27	300	300	300	310	240	250	250	240	240A	245	220	245	215	220	200	C	C	C	C	C	C	C	C	C
28	C	C	C	C	C	C	C	C	C	200	210	230	205	205	245	230	230	200	230	230	210	E255S	305	310
29	290	260	225	260	260	255	225	210	225	200H	230	240	205	205	220	205	220	210	220	210	245	E300S	310	310
30	300	300	290	255	220	E305B	255	210	240	225	200	220	190	240	210	225	210	230	205	200	240	E295S	310	300
31																								
No.	29	28	27	28	29	28	29	28	29	30	30	29	29	28	29	29	29	29	26	27	25	22	27	29
Median	290	290	290	270	245	250	240	220	225	220	210	220	220	220	230	230	210	210	240	250	245	250	290	290
U. Q.																								
L. Q.																								
Q. R.																								

K'F

Sweep 1.0 Mc to 20.0Mc 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

135° E Mean Time (G. M. T. + 9h)

km
f'Es

Nov. 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	105	105	105	105	105	105	105	E175G	C	115	115	110	110	110	110	135	115	110	115	105	105	105	105	105	
2	100	100	100	100	100	100	100	G	G	C	G	105	105	105	105	130	120	110	110	110	105	100	100	105	
3	100	100	100	100	100	100	105	115	G	110	110	105	100	105	105	105	105	105	105	105	105	100	100	100	
4	100	100	100	100	100	105	110	110	125	115	115	115	115	115	115	115	115	115	100	110	105	110	105	105	
5	105	105	100	105	105	105	B	120	110	110	110	110	105	105	105	105	125	S	105	105	105	105	110	105	
6	105	B	105	105	105	110	110	120	155	115	150	110	115	115	115	115	115	110	110	105	105	105	120	105	
7	105	100	100	105	100	105	110	120	115	110	110	110	105	105	105	100	100	100	110	115	120	110	110	105	
8	105	105	105	110	105	105	B	G	125	115	110	105	100	100	100	100	100	125	100	S	B	E	S	E	
9	E	B	105	E	E	105	B	G	120	G	110	115	115	115	110	110	110	110	105	S	105	110	105	B	
10	100	100	100	100	105	110	B	G	115	110	110	105	105	105	100	145	100	100	100	100	100	100	E	E	
11	E	E	E	110	105	105	B	145	130	135	140	150	110	G	115	120	140	110	110	E	E	120	S	B	
12	105	115	110	110	105	105	100	105	G	G	G	120	105	115	110	110	110	110	125	115	115	115	110	105	
13	105	E	E	E	105	B	110	120	115	170	120	115	115	115	115	110	G	130	125	110	105	100	100	100	
14	105	100	105	105	110	E	S	120	115	110	110	110	110	110	110	110	110	B	110	B	110	110	105	105	
15	105	110	110	115	110	120	120	115	120	115	G	110	100	105	100	100	100	100	100	S	S	115	110	110	
16	110	110	110	105	E	E	B	G	G	G	G	G	G	G	G	E175G	G	S	S	110	105	105	100	100	
17	100	105	105	E	105	105	150	105	G	110	105	105	105	100	100	100	115	110	105	105	105	100	100	105	
18	105	100	105	105	105	105	S	G	G	110	105	G	110	110	105	105	105	105	105	100	100	100	100	105	
19	120	110	110	105	105	105	105	115	110	115	110	110	110	110	105	105	G	G	105	100	100	C	S	S	
20	S	B	110	110	105	105	S	G	G	G	G	G	G	G	G	C	100	100	110	105	105	105	105	E	
21	110	S	B	105	105	105	E	G	G	175	105	G	165	E170G	130	115	135	155	150	135	110	105	105	100	
22	E	100	100	100	E	110	S	G	105	130	120	105	130	120	100	115	G	S	150	145	130	S	110	105	
23	S	115	100	100	100	100	100	G	G	110	160	110	110	105	105	105	155	110	110	110	105	105	105	100	
24	105	100	110	110	120	115	120	115	110	115	105	100	100	105	100	100	100	150	145	110	110	110	110	105	
25	105	105	105	105	100	S	120	110	110	150	G	105	105	105	100	G	100	100	100	100	110	110	110	105	
26	110	105	105	105	110	105	110	110	110	110	110	110	105	100	100	125	125	S	S	110	105	100	105	105	
27	105	100	105	105	105	100	155	130	120	110	105	105	105	105	105	C	C	C	C	C	C	C	C	C	
28	C	C	C	C	C	C	C	C	C	110	155	105	150	105	160	150	105	105	S	100	100	E	S	B	E
29	S	B	E	100	100	100	S	G	110	110	100	150	150	G	100	100	100	100	100	100	100	100	100	S	100
30	100	100	100	105	E	B	B	G	150	110	105	105	105	G	100	105	100	105	S	S	E	S	B	S	
31																									
No.	23	22	25	26	25	24	15	17	19	25	24	26	28	24	28	26	25	23	26	23	24	24	22	21	
Median	105	100	105	105	105	105	110	115	115	110	110	110	110	105	105	110	110	110	110	105	105	105	105	105	
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'Es

K 11

IONOSPHERIC DATA

Nov. 1964

Types of Es

135° E Mean Time (G. M. T. + 9h)

Kokubunji Tokyo

Lat. 35° 42.4'N
Long. 139° 29.3'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	f3	f2	f3	f4	f	f	1	h		c2	c2	12	12	1	13	h1	c3	14	f2	f4	f4	f4	f3	f3
2	f4	f3	f2	f4	f2	f	1	1				1	1	1	12	h21	c4	f4	f5	f5	f6	f4	f4	f3
3	f5	f2	f2	f	f	f	1	13	1	1	13	13	13	12	12	12	13	f4	f4	f5	f4	f3	f3	f3
4	f2	f2	f2	f	f2	f	12	12	c212	c3	c2	c2	c2	c2	c3	c3	c2	f3	f	f4	f4	f4	f4	f3
5	f2	f2	f3	f2	f2	f3	c3	c3	12	12	12	12	12	12	13	13	h	f4	f4	f2	f4	f2	f	f
6	f2	f	f	f	f	f	1	12	h212	ch	h1	1	12	13	12	14	13	f2	f4	f5	f4	f4	f2f4	f4
7	f2	f3	f3	f4	f3	f2	1	c2	13	12	12	12	12	13	12	1	1	f2	f4	f3	f3	f2	f3	f3
8	f4	f	f2	f2	f2	f		c	12	1	1	12	12	12	12	12	14	f	f2					
9			f	f					1	1	1	c2	c2	c2	12	12	13	f3	f3			f2	f	f3
10	f	f	f4	f3	f	f			c2	12	1	1	1	1	12	h1	13	f3	f4			f2	f2	
11									h21	h	h2	h	1	1	c3	c2	h212	f	f			f3		
12	f	f	f2	f2	f2	f3	13	1		h	h2	h	1	c2	12	13	1	f	f	f	f2	f	f	f2
13	f3				f		1	1	12	h	h	c313	c212	c3	c2	12		f2	f4f	f4	f4	f5	f3	f2
14	f2	f2	f3	f3	f2		c3	c3	c3	c21	c3	c2	c2	c2	c3	c2	c3		f	f	f	f	f2	f2
15	f	f	f	f	f2	f	c	c2	c21	c2	1	1	1	1	12	13	14	f3	f			f	f3	f2
16	f2	f	f3	f3			1								h					f5	f3	f3	f4	f2
17	f3	f3	f2	f2	f	f2	h	12h2		c21	12	12	13	12	12	13	c21	f3	f3	f4	f4	f4	f3	f3
18	f3	f5	f2	f2	f4	f2f			13	1	1	1	1	1	14	14	14	f3	f4	f5	f2	f	f2	f3
19	f2f	f5	f4	f5	f4	f4	12	13	1	c2	1	12	12	13	12	12		f4	f2	f	f	f	f	
20			f	f2	f2	f											12e	f	f4	f3	f3	f2	f	
21	f			f2	f	f			h12	1	1		h	h	h212	c2	12	f	f	f2	f2	f2	f2	f2
22		f2	f	f	f	f			1h	h212	c2	13	h212	c2	12	c2			f	f4	f2	f	f	f
23		f	f	f2	f2	f	f		1	h21	12	12	12	12	12	12	h212	f	f4	f2	f3	f2	f2	f2
24	f2	f2	f3	f6	f3	f3	f	13	13	12	12	13	12	12	12	14	13	f2f2	f3	f5	f4	f4	f3	f3
25	f3	f4	f4	f2	f		f2	15	13	h12	12	12	12	12	1		1	f	f2	f	f2	f	f3	f3
26	f3	f3	f3	f	f	f2	f	13	12	12	12	12	14	13	13	c21	c21	f		f2	f3	f2	f	f2
27	f3	f2	f2	f3	f4	f3	f	h3	c3	12	12	12	12	1	12									
28									1h	h1	h1	1	h1	1	h2	h212	1h2		f	f				
29									12	12	1	h2	h2		12	12h	1	f3	f	f2	f			f3
30	f2	f2	f2	f	f	f			h2	1	12	12	12	12	12	12	1c	f						
31																								
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

Lat. 35° 42.4'N
Long. 139° 29.3'E

Kokubunji Tokyo

IONOSPHERIC DATA

135° E Mean Time (G. M. T. + 9h)

km **hP_F2**

Sep. 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	290F	295	300	290	305F	295	A	255	A	A	A	A	310S	R	R	275	350	310	J295S	S	S	A	A	305F
2	300S	F	F	300	F	310	G	G	G	G	330	300	270	350	315	I330A	R	295S	R	S	J220S	A	C	G
3	C	C	C	C	C	C	C	C	C	250R	255	300	G	R	G	A	300	A	300	250	S	265F	I290A	300
4	I300A	F	300	295	290	280	295	280	260S	250R	295	300	G	305	G	R	280	255	295	305	290	245	305F	340
5	325	300	295	295	260	295	A	C	C	R	R	R	G	G	G	R	280	275	310	A	S	300	320	I310A
6	325	U325S	340	310	330	330	260S	245	255	J260R	G	280R	300	290	305	325	300	295	260	250S	240	295	F	295
7	260	330F	320	290	290	A	A	A	295V	A	295	350	I320S	R	I295R	300	290	295	305	295S	285	J380F	J330F	F
8	F	J260R	J250S	300	305	300	260	250R	A	I305R	295	310	300	280	290	280	300	250	295	300	325	305	340	295
9	C	C	C	C	C	C	C	C	C	265	280	G	330	295	300	290R	C	250S	245	295	345S	S	350	360
10	300	295	300	295	320	300	265S	C	C	255S	260R	R	295R	300	295	280	280	260R	250	260	S	S	355	S
11	S	340	F	305F	300	280	250	I230S	250	I260R	290	300	I310R	310	R	R	J265R	290R	R	J280S	295	I340S	U315S	I310A
12	C	C	F	270R	280	230	310	245	255	245R	R	U310R	R	R	R	R	290R	R	240R	R	S	S	I340R	I335S
13	I355S	F	F	I320S	315	F	C	C	C	R	R	R	R	R	R	U255R	290	250	255	U265S	I280S	J315S	U300S	S
14	S	F	C	C	C	C	C	C	C	R	R	R	280R	I310R	255	270	260	270	260	250	255	300	300	295
15	230	I300A	310	305	350	300	260	R	225	255	K	R	280R	I310R	255	270	260	270	260	250	255	300	300	295
16	300	295	260	285	310	305	J255R	225S	245	255	270R	295	275	300	275	A	A	260	I265A	I240S	S	310	355F	F
17	345F	F	F	315	250	300	250	J250R	A	265	280R	J260R	315	R	315	J280S	250	250	250	290	305S	350S	F	F
18	F	F	F	F	320	300S	275	250	250	A	275	290R	260R	300	300	295	270	250	260	290S	I295A	350	F	F
19	290F	295	300	295	295F	305F	290	255	245	250	250	275	260	285	275	260	250	250	250	250	250	305	300	290
20	295	300	290	290	300F	F	255	225	240	310	280	280	300	310	280	295	255	255	250	255	305	305	F	295
21	305	300	295	255	295R	295	245	J240R	260	255	230	275	305R	295	230	J295R	300	260	250S	230S	250	300	F	F
22	325	320F	300	250	225	305	250	J255R	255	G	290	310	330	340	S	250S	S	250	S	240	310	330	345F	310
23	J310R	300	270	290	310	310	250	255	J255R	270	R	270	250	280	270	275	250	250	260S	S	300S	F	A	A
24	300F	300	300	260	290F	245F	250	255	255	300	260	U305R	255	260R	300	300	260R	250	240	A	330F	F	F	300F
25	I295A	290	290	F	290	295F	255S	255	245R	J250R	C	C	C	C	C	280R	255	240	245	I260A	F	F	F	F
26	260	300	290	250	300	300	250	250	240	260	280R	I260R	300	300	265	285	I260R	J240S	240	240	340	310F	310	315
27	290S	290	290	295	295	290	J225R	240	240	255	290	310	275R	I280R	275	300	270	260	A	A	A	250	290	305
28	550F	310F	305	310	310	310F	240	245R	225R	250	295R	280	J285R	R	R	R	260	R	260	300	F	R	I300S	I290S
29	295	340	350	340	320	260S	230	R	I250R	260	C	C	C	C	C	260	255	255	260	270	S	A	F	F
30	320	300F	300	290	295F	310	250	250	J245R	C	280	265	265R	260	250	295	J260S	260S	295S	U270S	J280R	255S	340	I320A
31																								
No.	23	21	21	25	26	25	23	20	20	22	20	21	22	19	19	23	26	26	27	22	19	19	18	18
Median	300	300	300	295	300	300	250	250	250	255	280	290	300	300	280	290	270	255	260	260	295	305	310	305
U. Q.																								
L. Q.																								
Q. R.																								

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

The Radio Research Laboratories, Japan

K 13

hP_F2

Lat. 35° 42.4'N
Long. 139° 29.3'E

Kokubunji Tokyo

IONOSPHERIC DATA

135° E Mean Time (G. M. T. + 9h)

km

ypF2

Nov. 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	060	A	F	F	055F	055F	060	020	1040C	035	030	050	040	1045C	045	040	045	A	085	055	055	055	050	075	
2	070	060F	090	090	065F	055F	055	045	040	1035C	0508	045	060	045	040	060	10508A	045	A	090	1055A	060	060	055	
3	075	050	045	050	040	060	060	045	0408	055	045	060	050	045	030	045	040	045	A	075	050	085	070	080F	
4	090	070	075	065	050	055	060	040	045	030	050	060	040	040	045	040	040	045	045	045	1080A	065	1080A	085	
5	055F	055	F	050	045	085F	0508	045	0508	035	1045R	050	045	045	040	025	045	050	055	045F	055	050	F	055	
6	F	1045F	050	055	F	085	050	045	050	045R	045	035	040	1045R	0208	050	050	055	055	060	055	F	060F	050F	
7	065F	090	F	075F	050F	085F	045	035	045	045R	030	045	045	050	035	030	030	060	1060A	065	050	070	050	050F	
8	050	080	050F	080	055	050	045	030	040	040	040	045	040	030	045	045	020	045	060	040	060	085	055	060	
9	085	050	075	050	055	090	030	040	045	045	045	065	050	045	040	045	055	055	075	050	050	070	045	065	
10	050	085	085	080	080	080	055	0408	10508	045	050	065	035	050	10408	050	045	055	A	050	060	060	050	F	
11	1065F	065F	F	080	070	055	060	040	045	030	040	050	040	045	075	030	040	050	055	055	055	095	0608	060	090
12	095F	080	050	F	F	065F	035	045	050	030	060	045	025	020	050R	025	050	050	055	095F	F	095F	065	1090F	
13	065F	085F	060F	1055F	065	055	045	050	050	035	050	1050R	045	040	040	040	035	045	060	050	A	A	075	055	
14	070	060	055	F	F	F	050	040	025	035	040R	040	045	040	040	035	040	045	070	055	050	060	090	085	
15	070	055	1060F	050	085F	095	060	040	030	060	050	040	025	045	045	045	060	050	105	060	070	060	100	0908	
16	085	055	085	095	F	090F	050	035	045	040R	050	030	030	040	045	050	060	070	085	F	F	S	F	F	
17	060	F	F	095F	060F	035	050	045	045	055	050	045	045	060	040	050	055	075	055	055	A	A	A	095F	
18	055F	060F	065	075	070	070	055	070	045	080	040	050	045	040	040	030	045	065	1050A	070	060	050	085	1070A	
19	060	055	050	085	055	050	085	040	040R	050	030	040	045	045	045	030	055	050	055	10508	060	1055C	090	080	
20	080	055	080	085	050	055	060	045	050	030	080	045	040	045	050	1045C	070	060	1065A	085	060	055	080	060	
21	090	060F	F	080F	060F	055	055	040	040	045	035	035	045	045	045	040	050	040	030	F	050	050	090F	065	
22	095	080	055F	060	055	0508	060	040	025	045	030	040	035	040	045	025	060	065	065	FS	050	060	060	F	
23	F	080F	095F	F	F	060F	095	035	025	040	045	0358	040	045	040	075	040	030	045	050	080	050	065	045	
24	055	065	070	055	065	050	070	040	045	055	055	060	025	040	045	040	050	065	045	A	055	085	085F	F	
25	085F	085F	085F	090F	055F	065F	045	045	040	040	040	025	035	025	010	045	050	050	050	10658	F	10658	F	F	
26	050F	060F	055	080F	085F	1085F	055	070	040	045	030	025	050	040	035	045	055	045	055	050	050F	045F	F	F	
27	1060F	065F	085F	090F	F	065F	060	040	050	065	045	035	040	050	050	C	C	C	C	C	C	C	C	C	
28	C	C	C	C	C	C	C	C	C	045	040	045	030	030	055	030	040	045	060	065	060	090	085F	085	
29	060	050	070	085	085	090	060	055	025	030	065	040	035	025	030	050V	055	070	060	055	060	055	055	050	
30	060	070	070	055	045	055	065	055	040	030	035	035	045	045	045	040	040	060	050	065	060	095	085	055	
31																									
No.	27	27	23	25	23	28	29	29	29	30	30	30	30	30	30	29	29	28	26	26	25	24	25	23	
Median	065	060	070	075	055	060	055	040	045	045	045	045	040	045	040	045	050	050	055	055	060	060	065	065	
U. Q.																									
L. Q.																									
Q. R.																									

ypF2

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

The Radio Research Laboratories, Japan

K 14

IONOSPHERIC DATA

Lat. 31° 12' N
Long. 130° 37' E

Yamagawa

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

foF2

Nov. 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	032	033	J031S	I033S	J037S	026S	024	054	060H	065	I075S	068	076	S	084	J081S	065	056	J046S	034	035	029	J033S	J033S
2	033	I034S	035	034	031	032S	027	049S	053S	061S	085	109	108	083	070S	082	084	078	I049C	031	J033S	033S	035S	036S
3	J033S	035	036	039	050	I022S	022	J051S	J064S	I073S	081	086	082	085	I089S	087	072S	057	S	A	031	031S	032	J034S
4	033S	J033S	032	J034S	038S	027	021	048S	J065S	065	I075S	091S	088	101	J098S	067	J065S	056	040	025	031S	031S	034	I034S
5	033	J035S	I036S	J037S	038	030	028	J049S	U074S	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	S	031	028S	I031S	I030S	025	052S	I068C	084	067	J067S	085	093	090	077S	059	056	038	037	033S	028	028	031
7	I030A	026	I027A	028	032	025	026	051S	I064S	072	071S	069S	067	084	108	082	070	052S	036	031	J035S	I034S	031	028
8	030	025	025	027	030	028	030	054	058	060	067	067	065	075S	068	072S	060	051	036	028	031	026S	030	032S
9	I033S	032	U034S	030	J031S	I029S	031	056	067	070S	071	070	062S	088	U096S	J079S	068	054	035	037	040	029	034	I035S
10	030	024	024	I026C	I030C	I026C	I029C	I050C	I059C	C	C	082	080	I096S	I096S	068	064	055	035	029	037	033S	024S	023S
11	024	027	027	027	035	022	026	048	060	058H	065	071S	068	092S	088	J078S	057	060S	039	025H	026	026	025S	025S
12	026	027	027	029	032	031	022	044S	J063S	053	074	094	084	J083S	097S	092	J062S	048S	034	026	027	027	028	030
13	031	030S	029S	026	F	031	024	042H	062S	J063S	073S	084	085	091	086S	076S	061S	052	031	032	033	027	024	027S
14	028	030	031	031	031	028	028	060S	060	I069S	076	U087S	072	076	064	061S	058	049S	034	033	031	027	027	027
15	028	029S	030	J029S	031	032	031	050	065	061S	061	070	057	061S	070	058	060S	055	035	031	036	029	025	028
16	028	030	028	030	030	031	I036S	042	054	063	068	087	080	072	065	062	056	056	J051S	036	036	030	024	024
17	I026A	I029S	I031S	033	045S	024	J026S	043	067	U081S	086	073	080S	069	065	067	052H	048S	043	039	024	I028C	027	030
18	032	U033S	034	034S	036	031	025	U047S	065H	J075S	067	082S	080	077	070	059	055	050S	U041S	036	029	027	026	024
19	029	029	029	031	031	031	032	J047S	I070S	064	072S	090	J078S	084	J078S	J064S	062H	054S	U045S	035	030S	025	J027S	029
20	028	030	031	030	030	027S	024	043S	060S	065	064S	066S	060	J062S	066	058	058	053	033	027	027	025	026S	026
21	026	I027S	028	I030S	035S	S	023	042S	054	065	067	066	065	J076S	072	066S	054	044	I042S	037S	030	028	025	023
22	023	027	027	028	028S	035S	020S	038	051H	059	049	059	J077S	084	078	064	053	048	I033C	033	039	031S	022	022
23	025S	028	027S	027	028	030	022	038	062S	054	049	U070S	072	086	J080S	J077S	I067S	057	I043C	034	029S	I033S	038	027
24	I030S	032	035S	037	039S	038S	I046S	055S	J066S	I088C	I100S	U096S	108	106	082	056	056	055S	042	040	034	032	030	I029A
25	I027A	I029A	029S	J031S	032	J026S	024	041S	068	058	057	069	A	066S	J063S	061S	057	047S	032S	024	027	I023S	025S	028
26	026	027S	028	027	027	028	029	040	054H	052	059	070S	082	078	069	060	054	042	034	036S	033	032S	032S	032S
27	032	I032S	032	032S	J035S	030	032S	045	J064S	072S	103S	114	087S	J079S	069	I067S	061	055	044	036	027	023	021	025S
28	I027S	027S	029S	030S	036	024	022	043	061S	059	058	I060S	067	071	I068S	068	063H	061	040	I026C	031	I030S	022	024
29	026	029	031	028	027	027	027	042	054	J065S	064S	077	104	070S	064	057	052	049	031	026	027	026	029	029S
30	028	I028S	028S	028	032	I030S	020	039S	053H	052	072	U066S	064	077	060	064S	055S	047S	I046S	040	027	028	028S	029S
31																								
No.	29	29	30	30	29	29	30	30	30	28	28	29	28	28	29	29	29	29	28	28	28	29	29	29
Median	028	029	030	030	032	029	026	047	062	064	070	071	078	081	072	067	060	054	038	033	031	028	027	028
U. Q.	032	032	032	033	036	031	029	051	065	071	075	087	084	087	088	078	064	056	043	036	034	031	032	032
L. Q.	026	027	028	028	030	026	023	042	058	059	064	068	066	074	066	061	056	048	034	028	027	026	025	025
Q. R.	006	005	004	005	006	005	006	009	007	012	011	019	018	013	022	017	008	008	009	008	007	005	007	007

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

The Radio Research Laboratories, Japan

foF2

Y 1

Lat. 31° 12.1'N
Long. 130° 37.1'E

Yamagawa

IONOSPHERIC DATA

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

foF1

Nov. 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	450	450H	L	L	L	A	L						
2									LH	LH	LH	450H	1440A	LH	L	L	A	A						
3								L	L	L	L	L	L	LH	LH	L	L	L						
4								L	LH	L	LH	L	460	450	L	L	A	A						
5								C	C	C	C	C	C	C	C	C	C	C						
6								C	LH	L	L	460	LH	440	L	LH	L	L						
7							L	L	L	L	420L	L	430	430	400	L	L	L						
8							L	L	L	L	450H	L	430	430	410L	LH	L	L						
9							L	L	L	L	420	430	L	430	400	L	L	L						
10							C	C	C	C	C	420	380	430	420L	LH	L	L						
11									L	L	L	440	430L	410	L	L	L	L						
12									420	430	A	440	420	420	L	L	LH	210						
13							L	L	L	L	420	450	430	420	L	L	L	L						
14							L	L	L	L	440	420	420	430	L	L	A	A						
15							L	L	L	L	450	420	420	LH	400H	L	L	L						
16									L	L	450	430	LH	LH	L	L	260	L						
17							L	L	L	L	430	430	LH	420	400	350	L	L						
18							360	L	L	L	440H	420H	420H	420H	380	L	L	L						
19							L	L	L	L	410	430	420	430H	L	L	L	L						
20							L	L	L	L	400	420H	420A	450	L	L	L	L						
21							400L	420	430	420	430	420	430	400	370	L	L	L						
22							L	L	L	L	450	440	420	410L	330H	L	L	L						
23									L	L	420	430	L	L	L	L	L	L						
24							C	390	L	L	4400A	450	420	L	A	L	A	L						
25							L	L	L	L	420H	420A	420	400	L	L	L	L						
26							L	L	L	L	400	420L	420	420	380L	L	L	L						
27							L	L	L	L	420	430	420	LH	420	LH	L	L						
28									L	L	420	410	420	420L	L	L	L	L						
29									L	L	430H	370	380	L	L	L	L	L						
30									420L	370S	450H	L	L	L	L	L	L	L						
31																								
No.							2	13	24	24	24	21	15	3	1	1								
Median							380	420	430	420	430	400	350	260	210									
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

foF1

Y 2

Lat. 31° 12.1'N
Long. 130° 37.1'E

Yamagawa

IONOSPHERIC DATA

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

foE

Sep. 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	220	I250A	270	280	A	A	A	310	300	290	245	190					
2					S	S	220	I260A	A	C	A	A	310	I325A	315	310	290	240	S					
3						S	S	A	A	A	A	A	A	A	A	A	290	260	S					
4						C	C	C	250	280	290	300	310	330	320	305	290	240	170					
5						S	S	C	C	C	C	C	C	C	A	300	C	C	170					
6						S	S	210	250	280	280	A	A	330	320	310	290	250	S					
7						S	S	210	250	275	295	300	300	310	310	305	280	240	S					
8						S	S	215	260	285	I295A	310	I325R	330	320	300	270	230	S					
9						S	S	200	260	300	300	310R	325	320	340	305	270	220	S					
10						S	S	200	260	280	300	R	R	320	320	300	270	230	S					
11						S	S	200	240	275	290	305	310	315	A	A	A	240	S					
12						S	S	210	260	285	305	315	310	I310R	310	305	275	C	C					
13						S	S	205	260	I300A	300	I310R	I300R	I305R	320R	305	280	230	S					
14						S	S	190	235	A	A	330	330	A	A	A	A	A	A					
15						S	S	210	260	300	305R	310	320	320	I310R	295	260	220	S					
16						S	S	A	A	A	310	320	330	330	320	305	270	220	S					
17						S	S	210	A	A	A	310	R	R	310	300	265	230	S					
18						S	S	205	260	285	305	A	A	A	A	A	A	A	S					
19						S	S	A	A	290	300	310	320	320	310	I285A	260	A	S					
20						S	S	220	250	290	305	315	320	320R	330	300	270	210	S					
21						S	S	215	I260A	290	A	R	R	R	310	300	260	210	S					
22						S	S	220	I260R	280	305	300	315	I310A	I310R	A	265	210	S					
23						S	S	175	230	A	A	A	C	A	R	A	A	210	S					
24						S	S	215	260	270	285	A	R	I320R	320	C	C	C	C					
25						C	C	C	C	C	280	290	A	A	R	300	260	225	S					
26						S	S	I210A	260	300	310	315	325	320	310	I290C	I260C	220	S					
27						S	S	190	250	290	305	315	310	310	280	260	210	S						
28						S	S	200	260H	270	295	305	R	A	A	A	A	A	S					
29						S	S	200	250	270	A	R	R	R	R	I285A	250	200	S					
30						S	S	190	260	285	I310R	R	R	R	R	A	C	C	215	S				
31																								
No.								24	24	23	22	18	16	18	20	21	22	23	3					
Median								210	260	285	300	310	320	320	310	300	270	225	170					
U. Q.																								
L. Q.																								
Q. R.																								

IONOSPHERIC DATA

Lat. 31° 12.1'N
Long. 130° 37.1'E

Yamagawa

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

foEs

Sep. 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	J030	J032	J025	J024	J018	J027	J018	025	J033	030	036	035	035	033	G	J023G	030	035	J033	J024	J024	J024	J036	J024
2	J051	J051	J051	J029	E	J015S	025	028	J036	035	036	J036	039	J071	037	034	037	035	J053	J052	J051	J027	J029	J034
3	J022	J018	S	S	S	J036	J051	J029	J036	J051	J045	J037	J045	J042	J035	034	035	036	J034	J061	C	J036	J032	J026
4	J051	J025	J023	J015	J024	J023	C	C	030	032	032	034	033	033	G	035	030	029	022	S	J030	020	S	S
5	S	S	S	E	J013	016	J016S	C	G	J044	C	C	C	J054	J071	J032	C	C	034	J036	J062	J051	J025	J018S
6	J051	J037	J031	J031	J030	J024	J016S	029	036	033	033	J034	037	030G	023G	G	030	029	024	J023	J030	J036	J019	J018S
7	J018	J024	J019	J020	E	S	J026	028	J050	041	043	J048	042	041	041	051	J063	J058	J041	J037	J030	J035	J033	J033
8	J024	J017	S	S	S	024	S	023	029	032	J041	033	025G	G	036	G	G	G	S	S	S	S	J026	S
9	S	S	S	S	S	S	J018S	029	030	036	035	036	035	G	036	038	042	026	018	018	021	024	S	S
10	S	S	S	J015S	S	J015S	J016S	030	033	035	G	023G	022G	022G	G	G	033	029	027	019	S	S	S	J016S
11	S	S	S	S	E	S	S	026	028	031	033	034	035	035	035	J045	J032	J051	J064	J082	J083	J051	S	J033
12	S	J032	J026	030M	J029	J025	J016S	030	038	038	038	036	037	037	J053	038	042	C	C	J036	J051	J051	J030	J021
13	S	S	S	S	S	S	S	023	030	030	029G	030G	029G	024G	038	035	034	J036	025	J030	J024	021	S	J020
14	J018	J016S	S	E	S	J017S	S	030	035	068	042	035	030G	044	J051	J035	044	J055	J030	J052	J032	J032	S	S
15	J020	J018	J017	E	J017	J020	J029	J024	028	G	G	G	036	037	G	038	038	036	J064	J025	J026	J026	S	S
16	S	S	J014S	J017S	E	S	S	028	028	J036	040	038	040	037	J055	050	J058	J045	J054	J054	J051	J051	J052	J018
17	S	J017S	S	J014S	E	S	S	051	030	030	030	033	G	023G	037	033	J061	J055	J037	J024	S	J015S	J017	J026
18	J019	J018	J017	J019	J029	J028	021	040	J054	054	057	044	060	050	040	033	032	028	J034	J020	J030	J033	J017	J024
19	S	S	S	E	E	S	S	026	030	034	G	024G	G	G	027G	030	G	J026	J025	J024	J017	J016S	S	S
20	J020	J018S	J020	J017S	J016	S	S	G	058	J069	042	J051	041	G	035	032	J043	033	J030	J015S	S	S	S	S
21	S	S	S	S	S	S	S	024	031	031	030	G	G	G	035	G	G	025	J018S	S	S	S	S	S
22	S	S	S	S	S	S	S	026	029	032	031	031	033	033	033	029	032	J036	J034	J026	J032	J030	S	J021
23	J030	J029	J021	J019	J017	J014S	S	025	J051	J036	034	033	C	034	030G	038	J029	025	J018	J016S	023	J033	J030	J034
24	J019	S	J017	S	E	S	S	J021	J035	J036	034	J035	J031G	G	G	C	C	C	C	C	C	C	C	C
25	G	C	C	C	C	C	C	C	C	C	J036	035	J037	J036	025G	G	033	J036	J030	J026	J024	J023	J024	J025
26	J025	S	S	S	S	J016S	S	025	026	030G	025G	G	G	G	G	G	C	031	020	J024	S	J020	J027	J024
27	J021	J014S	S	S	S	S	S	028	035	036	J047	J054	038	020G	033	G	029	J036	J037	J036	J052	J052	J016S	J023
28	J020	S	S	S	J017	J017S	J015S	025	039	044	J050	J046	032G	046	039	J035	J033	035	036	J051	J051	J029	S	S
29	S	S	J015S	S	J015S	S	S	026	040	037	030	030G	030G	031G	030G	030	030	J036	024	J024	J025	J026	J021	J017S
30	S	S	S	C	S	S	S	021	025G	030	028G	030G	025G	027G	031	C	C	024	S	020	S	S	J024	J026
31																								
No.	16	15	14	14	20	14	14	27	28	29	29	29	28	30	30	27	26	27	26	26	21	24	17	20
Median	022	018	020	018	016	018	020	026	033	035	034	034	034	033	035	033	033	035	032	026	030	030	027	024
U. Q.	030	032	025	024	021	025	025	029	037	040	042	036	038	037	038	038	042	036	037	037	051	036	032	026
L. Q.	020	017	017	014	E	016	016	025	030	031	030	G	G	G	G	G	030	028	024	024	023	024	022	020
Q. R.	010	015	008	010	009	009	004	007	009	012	012	012	012	012	012	012	012	008	013	014	027	014	012	006

Sweep 0.55 Mc to 17.9 Mc in 20 sec in automatic operation

The Radio Research Laboratories, Japan

foEs

IONOSPHERIC DATA

Yamagawa

Lat. 31° 12.1'N
Long. 130° 37.1'E

0.1 Mc 135° E Mean Time (G.M.T. +9h)

fbEs

Sep. 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	021	028	020	020	017	E	E	025	028	030	034	033	035	033		023G	G	034	029	019	021	A	A	A
2	A	A	022	014		S	S	025	034	035	036	036	039	062	034	033	037	033	E053S	052	A	021	020	A
3	022	E	S	S	S	016	A	025	036	046	041	037	039	038	035	033	032	036	034	050	C	A	A	E026S
4	A	020	018	014	E024S	019	C	G	G	032	G	E034G	E033C	031		033	G	026	020	S	019	E	S	S
5	S	S	S		013	016	S	C	C	037	C	C	C	054	A	028	C	G	032	028	028	A	018	020
6	A	A	A	020	A	020	S	028	034	033	033	E340R	G	029G	E023R		G	G	023	019	E	020	019	S
7	E	E	E	020	S	024	S	027	047	039	042	047	E042R	037	039	047	A	055	041	036	029	028	019	020
8	E	E	S	S	016	S	G	G	029	032	033	033	E025R		035			S	S	S	S	S	019	S
9	S	S	S	S	S	S	S	S	G	034	034	035	E035R		036	036	036	G	018	017	E	020	S	S
10	S	S	S	S	S	S	S	S	033	G	G	023G	E022R	E022R			031	028	027	019	S	S	S	S
11	S	S	S	S	S	S	S	S	028	030	G	G	G	G	E035S	043	028	042	063	A	A	026	S	019
12	S	028	019	023	021	019	S	S	037	037	G	G	035	034	041	038	038	G	E036S	034	021	019	019	019
13	S	S	S	S	S	S	S	G	G	E030R	029G	E030R	029G	E024R	037	032	030	030	023	020	018	E	S	019
14	E	S	S		S	S	S	S	034	A	040	G	028G	038	034	035	044	A	020	E052S	032	018	S	S
15	E	017	017		016	019	E029S	018	G				035	036		037	037	034	A	E	019	017	S	S
16	S	S	S	S		S	S	S	028	031	039	036	038	037	050	040	054	044	053	046	050	A	A	018
17	S	S	S	S		S	S	S	028	G	E030R	G		023G	037	033	041	055	037	020	S	S	E	022
18	019	018	016	016	021	A	016	E040S	053	045	054	043	060	048	039	031	030	020	033	019	028	E033S	E	019
19	S	S	S	S		S	S	S	028	G		023G			024G	030		025	022	022	017	S	S	S
20	E	S	020	S	S	E	S	S	045	050	039	039	040		035	G	042	033	U030A	S	S	S	S	S
21	S	S	S	S	S	S	S	G	G	G	G				G			G	S	S	S	S	S	S
22	S	S	S	S	S	S	S	G	G	032	G	G	G	E033R		E029R	032	033	032	025	019	E020S	S	020
23	021	E029S	020	017	016	S	S	S	036	035	034	033	C	034	E030R	035	028	025	018	S	020	024	021	031
24	E	S	017	S		S	S	G	033	033	G	035	E031R			C	C	C	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	036	035	036	035	E025R		033	035	030	E026S	E	E	020	E
26	021	S	S	S	S	S	S	S	025	027G	022G					C	C	028	020	021	S	E	023	018
27	019	S	S	S	S	S	S	S	031	033	046	039	036	E020R	G		G	031	036	033	A	A	S	019
28	018	S	S	S	017	S	S	G	037	044	049	044	E032R	044	038	034	031	026	033	035	022	021	S	S
29	S	S	S	S	S	S	S	S	036	E030R	E030R	E030R	G	E030R	G	G	G	030	021	020	025	022	017	S
30	S	S	S	C	S	S	S	G	G	G	022G	E030R	025G	E027R	E031R	C	C	G	S	E020S	S	S	020	021
31																								

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

fbEs

Y 5

IONOSPHERIC DATA

Lat. 31° 12.1'N
Long. 130° 37.1'E

Yamagawa

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

f-min

Sep. 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	E016S	E016S	E016S	008	007	E015S	E016S	013	016	016	016	016	016	016	016	016	016	015	E016S	E016S	E016S	E016S	E016S	E016S
2	E016S	E016S	E016S	008	010	E016S	E016S	012	014	016	016	016	016	E021S	016	016	016	016	E016S	E017S	E016S	E016S	E016S	E016S
3	E016S	E015S	E016S	E016S	E015S	E014S	E015S	013	014	016	016	017	016	016	016	016	016	016	E016S	E017S	E016S	E016S	E016S	E016S
4	E016S	E014S	009	009	009	E014S	C	C	015	016	016	016	016	016	016	016	C	C	E015S	E016S	E016S	E016S	E016S	E016S
5	E014S	E015S	E015S	013	008	E014S	E015S	C	C	016	C	C	C	018	018	016	C	C	E016S	E016S	E016S	E016S	E016S	E016S
6	E016S	E016S	009	009	008	E014S	E017S	016	016	015	019	017	016	019	019	016	016	E016S	E016S	E016S	E016S	E016S	E016S	E016S
7	E016S	E017S	E015S	009	009	E016S	E016S	015	015	015	016	018	018	018	017	018	018	E016S	E016S	E016S	E016S	E016S	E017S	E016S
8	E016S	E015S	E015S	E014S	009	E017S	E016S	016	014	016	016	018	018	025	020	019	017	E016S	E017S	E016S	E016S	E017S	E016S	E015S
9	E016S	E016S	E016S	E018S	E014S	E015S	E016S	016	016	017	018	016	016	019	020	019	017	015	E016S	E016S	E017S	E019S	E019S	E018S
10	E018S	E016S	E016S	E015S	E018S	E015S	E016S	013	014	015	017	018	016	016	019	017	016	E016S	E016S	E016S	E015S	E016S	E016S	E018S
11	E017S	E016S	E016S	E014S	011	E016S	E016S	016	015	016	E018S	020	019	018	019	016	017	016	E016S	E016S	E016S	E016S	E016S	E016S
12	E016S	E016S	E016S	E016S	008	E016S	E016S	016	016	016	017	019	018	018	018	017	014	C	C	E016S	E016S	E016S	E016S	E016S
13	E016S	E015S	E017S	E017S	E015S	E015S	E016S	014	016	016	019	020	019	019	019	019	016	E015S	E016S	E016S	E016S	E016S	E017S	E016S
14	E016S	E016S	E016S	013	E016S	E015S	E016S	016	016	016	019	018	021	020	019	016	014	016	E016S	E016S	E016S	E017S	E018S	E019S
15	E016S	E016S	E016S	008	009	E016S	E016S	016	016	016	016	020	018	021	016	016	016	E016S	E016S	E016S	E016S	E016S	E016S	E016S
16	E017S	E015S	E015S	E014S	012	E015S	E016S	016	016	016	016	019	019	018	016	016	018	E016S	E016S	E016S	E016S	E016S	E016S	E016S
17	E016S	E017S	E017S	E014S	014	E016S	E017S	014	016	016	016	017	018	019	016	014	014	016	E016S	E016S	E016S	E016S	E015S	E016S
18	E016S	E016S	E015S	008	E016S	E015S	E015S	016	017	E020S	020	021	021	020	019	016	016	E016S	E016S	E016S	E016S	E016S	E015S	E016S
19	E016S	E015S	E015S	E014S	012	E015S	E017S	016	016	016	016	017	020	021	019	016	014	E016S	E016S	E016S	E016S	E016S	E017S	E020S
20	E017S	E017S	E017S	E017S	E015S	E015S	E016S	016	016	019	017	019	018	016	016	020	016	E017S	E016S	E016S	E016S	E018S	E017S	E019S
21	E016S	E016S	E017S	E017S	E016S	E016S	E016S	E016S	015	016	017	E020S	016	021	021	018	020	E016S	E019S	E017S	E019S	E018S	E019S	E019S
22	E019S	E017S	E016S	E018S	E014S	E018S	E019S	016	016	017	018	020	018	017	016	016	016	E016S	E016S	E016S	E016S	E016S	E019S	E017S
23	E016S	E016S	E016S	E016S	011	E019S	E016S	016	017	014	016	020	C	E026S	022	018	016	E017S	E016S	E016S	E016S	E016S	E019S	E017S
24	E015S	E016S	E016S	E016S	013	E019S	E016S	016	016	016	016	020	020	018	018	C	016	E017S	E016S	E017S	E016S	E016S	E016S	E016S
25	C	C	C	C	C	C	C	C	C	C	E022C	E021C	022	018	016	E029C	016	E017S	E016S	E016S	E016S	E016S	E016S	E017S
26	E016S	E016S	E017S	E016S	E015S	E017S	E017S	017	016	018	018	018	018	018	018	C	C	E017S	E017S	E017S	E016S	E016S	E017S	E017S
27	E017S	E016S	E017S	E017S	E017S	E016S	E018S	016	016	018	016	018	018	016	022	016	016	E016S	E016S	E016S	E016S	E016S	E017S	E016S
28	E015S	E017S	E017S	E016S	014	E016S	E016S	016	016	016	018	021	022	025	021	016	016	E016S	E016S	E016S	E016S	E017S	E017S	E017S
29	E016S	E016S	E016S	E017S	E017S	E017S	E017S	016	016	018	022	021	025	023	022	021	016	E016S	E016S	E016S	E016S	E016S	E016S	E017S
30	E017S	E016S	E016S	E016S	C	E016S	E017S	017	016	017	017	018	018	017	016	C	C	E017S	E018S	E017S	E016S	E016S	E017S	E020S
31																								
No.	29	29	29	28	16	29	28	27	28	28	27	27	28	28	30	26	26	27	28	29	28	29	29	29
Median	E016	E016	E016	E014	010	E016	E016	016	016	016	016	018	018	018	018	016	016	016	E016	E016	E016	E016	E016	E016
U. Q.																								
L. Q.																								
Q. R.																								

IONOSPHERIC DATA

Lat. 31° 12.1' N
Long. 130° 37.1' E

Yamagawa

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

Nov. 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	325	J325S	I200S	J380S	310S	330	365	370H	340	I355S	325	315	S	J360S	360	355	J355S	310	345	285	J290S	J315S	295S	
2	305	I310S	330	340	305	315S	335	360S	360S	320S	300	315	330	330	325S	345	345	I365S	285	J305S	320S	305S	295S		
3	J305S	290	305	335	380	I340S	295	J355S	J355S	I350S	330	335	330	320	I330S	355	360S	370	S	315	295S	315	J295S		
4	305S	J290S	315	J325S	360S	370	335	375S	J370S	330	I330S	340S	330	325	J320S	355	J355S	380	355	335	285S	295S	295	I290S	
5	310	J290S	I300S	J350S	340	325	300	J345S	U365S	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
6	C	S	305	255S	I320S	I315S	320	340S	I305S	370	360	J330S	340	335	340	365S	355	375	330	325	320S	320	315	315	
7	I330A	290	I305A	305	340	305	310	350S	I360S	360	350S	350S	325	310	350	340	370	365S	340	305	J315S	I330S	330	315	
8	335	290	280	295	335	325	340	375	380	340	345	345	J340S	310S	340	350S	365	355	345	305	325	290S	300	290S	
9	I300S	305	U330S	285	J350S	I310S	295	375	360	355S	350	355	325	325	U335S	J355S	355	365	315	300	335	300	270	I320S	
10	335	335	305	I305S	I325S	I310S	I310Q	I360Q	I355Q	C	C	330	330	I330S	I360S	370	360	370	325	305	335	365S	325S	320S	
11	305	295	305	305	335	325	310	355	365	335H	340	350S	325	350S	350	J365S	370	365S	375	295H	320	315	320S	290S	
12	310	295	285	295	345	305	355	360S	J365S	325	310	370	350	J325S	335S	360	J385S	380S	355	270	305	280	295	295	
13	310	275S	310S	310	F	335	390	345H	370S	J335S	340S	335	320	340	335S	370S	375S	385	305	320	340	335	290	280S	
14	285	300	315	295	325	295	300	335S	365	I340S	330	U370S	360	355	360	360S	380	365S	340	320	340	335	305	315	
15	305	305S	320	J320S	315	345	315	340	380	375S	345	355	370	335S	355	360	385S	380	360	305	330	345	290	285	
16	295	290	295	300	305	295	I335S	370	355	345	325	335	365	345	355	370	375	J370S	305	325	350	330	290	290	
17	I280A	I290S	I290S	305	355S	335	J345S	330	345	J340S	360	345	355S	350	340	390	365H	335S	370	380	340	I310Q	300	315	
18	295	U305S	305	295S	360	355	320	U320S	355H	U345S	350	355S	340	350	355	355	345	360S	U345S	340	345	335	310	315	
19	315	310	310	315	325	315	325	J345S	I370S	345	320S	350	J335S	350	J355S	J360S	370H	370S	U375S	325	335S	300	J330S	310	
20	305	315	325	335	345	355S	315	365S	385S	385	360S	365S	335	J325S	365	345	360	380	365	335	335	300	345S	310	
21	290	I300S	3 00	I300S	335S	S	315	355S	370	350	360	350	340	J340S	345	350S	370	375	I360S	355S	335	330	365	310	
22	305	295	295	300	350S	370S	300S	365	360H	370	365	305	J325S	335	360	375	365	375	I360C	315	345	360S	365	275	
23	295S	305	300S	295	305	345	320	360	355S	385	365	U345S	335	340	J325S	J350S	I350S	370	I345C	355	285S	I290S	340	335	
24	I290S	285	290S	290	295S	300S	I320S	345S	J320S	I325C	I340S	U315S	335	360	355	355	330	340S	325	330	340	340	315	I325A	
25	I335A	I310A	310S	J285S	345	J345S	335	345S	375	360	360	370	A	335S	J350S	375S	355	360S	375S	325	335	I330S	295S	335	
26	310	300S	305	335	325	330	345	365	370H	355	345	370S	345	360	365	350	390	370	370	325	340S	335	320S	315S	305S
27	285	I300S	315	315S	J315S	300	320S	355	J360S	305S	320S	350	345S	J355S	350	I375S	360	365	365	365	350	340	305	280S	
28	I260S	290S	315S	310S	360	335	305	350	385S	355	360	I360S	330	350	I345S	355	360H	360	375	I315C	325	I360S	275	290	
29	275	290	325	325	300	300	300	365	370	J340S	375S	330	355	375S	360	365	405	370	370	310	320	365	285	310S	
30	315	I315S	320S	325	345	I360S	310	360S	370H	360	360	U360S	330	345	365	375S	370S	360S	I340S	355	300	320	310S	300S	
31																									
No.	29	29	30	30	29	29	30	30	30	28	28	29	28	28	29	29	29	29	28	28	29	29	29	29	29
Median	305	300	305	305	335	325	320	355	365	345	350	350	335	340	350	360	365	365	355	320	335	320	310	310	
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

M(3000)F2

Y 7

Nov. 1964

M(3000)F1

0.01

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										L	L	395	380H	L	L	L	A	L						
2											LH	375H	I380A	LH	L	L	A	A						
3										L	L	L	L	LH	LH	L	L	L						
4										L	LH	L	370	365	L	L	A							
5										C	C	C	C	C	C	C	C	C						
6									C	LH	L	360	LH	370	L	LH	L							
7									L	L	380L	L	385	370	375	L	L							
8										L	350H	L	380	375	365L	LH	L							
9										L	385	375	L	360	375	L	L							
10									C	C	C	380	420	350	370L	LH	L							
11										L	L	L	365	355L	365	A	L							
12											360	370	A	A	365	L	LH	430						
13										L	380	380	375	360	L	L								
14										L	L	365	385	365	L	L	A							
15										L	L	375	405	LH	375H	L								
16										L	L	375	395	LH		L	405							
17									L	L	370	395	LH	355	375	400								
18										405	L	370H	405H	380H	445									
19									L	L	390	370	390	385H	L	L								
20										L	375	370H	I390A	365	L	L								
21										370L	370	370	380	370	A	385								
22										L	L	355	3	360	375L	425H								
23											L	380	375	L	L	L								
24										C	385	I395A	340	365	L	A								
25										L	L	355H	I380A	380	375	L								
26										L	375	370L	390	375	395L	L								
27										L	355	370	385	LH	355	LH								
28											L	390	390	355	380L									
29											L	365H	380	420	L	L								
30											370L	405S	355H	L	L	L								
31																								
No.										2	13	24	24	20	14	3	1	1						
Median										390	375	370	380	365	375	400	405	420						
U. Q.																								
L. Q.																								
Q. R.																								

The Radio Research Laboratories, Japan

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

M(3000)F1

IONOSPHERIC DATA

Lat. 31° 12.1'N
Long. 130° 37.1'E

Yamagawa

Nov. 1964

R'F2 km

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										250	255	280	280	265	250	245	240	225						
2										250	300	265	235	255	255	255	245	230						
3										250	270	260	260	290	260	245	240							
4										250	275	265	260	255	250	240	240							
5										G	G	G	G	G	G	G	G	G						
6									G	230	245	300	260	255	250	240	225							
7									245	245	240	255	275	275	250	230	230							
8										250	270	240	250	265	260	245	230							
9										245	250	250	305	280	250	245	245							
10									G	G	G	275	255	280	245	235	235							
11											260	250	290	250	245	240	225							
12											295	235	275	245	250	240	225	205						
13										255	260	245	265	255	250	230								
14										255	275	250	245	250	250	250	215							
15										245	250	250	245	275	250	235								
16											285	255	245	255		240	230							
17									255	250	250	245	250	255	250	230								
18										250	255	250	265	250	250									
19									235	250	280	250	265	260	245	245								
20										240	250	255	E3000A	305	250	250								
21										275	250	260	275	255	250	260								
22										235	250	335	270	250	245	240								
23											250	275	280	250	250	250								
24										I250G	255	240	250	240	240	225								
25										240	250	245	I250A	255	250	240								
26										240	265	245	255	250	245	250								
27										275	270	245	240	250	255	245								
28											240	245	250	250	255									
29											250	290	250	245	250	245								
30											250	230	295	250	235	240								
31																								
No.									3	20	28	29	28	29	28	27	13	3						
Median									245	250	255	250	260	255	250	240	230	225						
U. Q.																								
L. Q.																								
Q. R.																								

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

R'F2

The Radio Research Laboratories, Japan

Y 9

Lat. 31° 12' N
Long. 130° 37' E

Yamagawa

IONOSPHERIC DATA

135° E Mean Time (G. M. T. + 9h)

km

R'F

Nov. 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	250	265	E300S	230	275	E280A	225	225H	205	220	205	190H	250	E250A	A	A	A	215	E230S	230	E300S	300	290
2	285	275	245	240	275	280	E230S	220	225	235	240H	220H	I235A	210H	240	250	A	A	I200C	E310S	270	260	260	280
3	295	E380A	290	250	220	S	E330S	235	230	230	240	200	200H	210H	245	230	230	E240A	A	A	280	E290A	300	290
4	300	290	275	255	225	205	E270S	230	240	210	200H	210	200	225	I215A	235	I220A	210	240	E250A	E350A	295	A	
5	290	300	275	240	240	250	300	235	225	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
6	C	300	260	290	280	205	E255S	245	I215C	210H	230	230	220H	210	210	195H	225	215	205	225	245	250	255	255
7	I250A	E275A	A	275	245	E275S	280	245	230	230	225	E235A	205	E235A	200	235	235	205	205	275	250	I255A	225	275
8	245	E310S	E310A	300	250	245	240	210	215	225	210H	220	205	195	200	200H	230	215	210	E250S	240	E285S	280	300
9	280	280	240	250	240	255	260	230	225	210	220	200	200	200	240	230	240	230	215	255	E350S	250	270	260
10	245	250	E295S	C	I250C	C	I240C	I220C	I230C	I230C	200	195	220	230	230	195H	225	210	205	E270S	245	225	E260S	E250S
11	E300S	305	280	295	225	E255S	E280S	230	225	230H	225	245	220	E240A	230	A	220	220	200	E240A	255	E270A	E290S	
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13	295	300	280	300	265	245	225	215H	230	250	220	215	200	225	260	255	225	205	E300A	E290A	230	240	E295S	325
14	315	300	295	255	250	E300A	295	230	230	230	E350A	225	205	E245A	225	240	A	205	230	230	235	270	E265S	270
15	275	275	270	260	280	230	250	235	230	200	200	230	195	205H	180H	225	220	210	205	270	245	220	E275S	E300A
16	E305A	290	E305A	300	265	300	245	200	230	200	255	230	210	200H	250	225	205	230	205	E250S	250	230	E260S	E300S
17	A	325	310	300	230	E230S	230	245	245	250	230	220	200H	230	225	210	230H	215	E240A	225	E230S	C	E290S	290
18	300	300	290	260	240	230	260	250	235H	E225A	205	220H	195H	195H	195	240	240	225	230	230	240	240	250	E300S
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20	290	275	255	250	220	230	290	240	230	235	205	195H	I230A	240	250	230	225	205	205	265	255	E250S	255	255
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31																								
No.	19	25	25	27	30	23	19	30	30	29	28	27	28	26	28	26	26	26	26	15	25	21	20	19
Median	290	E295	280	260	250	245	250	230	230	230	230	220	205	220	230	E235	225	210	205	E230	245	250	E260	280
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

R'F

Y 10

IONOSPHERIC DATA

Lat. 31° 12.1'N
Long. 130° 37.1'E

Yamagawa

135° E Mean Time (G. M. T. + 9h)

km **f_oF₂**

Nov. 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
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2	S	100	100	S	B	100	S	145	E145G	130	125	120	100	100	105	135	120	110	G	110	S	S	100	100
3	100	100	100	S	100	S	S	S	145	145	100	100	105	105	100	100	100	120	110	110	110	105	100	100
4	100	S	100	100	100	S	S	150	G	120	120	120	110	110	110	115	115	110	G	G	G	105	105	100
5	100	S	100	B	B	S	S	S	145	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	G	S	S	S	S	S	S	S	G	E155G	G	115	G	G	115	G	G	S	S	S	S	S	S	105
7	105	105	105	105	100	S	S	100	125	120	120	115	105	105	100	105	105	100	100	100	100	105	S	S
8	S	S	100	100	B	S	100	100	120	115	115	110	G	G	100	100	100	100	100	S	S	S	S	S
9	S	S	S	B	B	S	S	G	G	G	140	G	125	110	110	105	105	105	105	100	100	S	S	S
10	S	S	S	C	C	C	C	C	C	C	C	125	130	115	110	110	G	100	S	S	S	S	S	S
11	S	S	B	100	B	S	S	G	150	100	150	125	130	125	120	115	115	110	105	105	105	S	100	115
12	S	S	100	S	100	S	S	100	G	180	170	130	115	105	105	105	105	105	155	145	100	S	S	105
13	100	105	105	100	S	S	S	125	170	E180G	150	150	G	120	105	105	105	160	105	105	S	S	S	S
14	S	S	S	B	S	100	S	S	125	120	110	105	105	105	105	105	105	105	105	105	S	S	100	S
15	S	S	S	100	100	S	S	S	G	G	G	120	G	G	100	100	100	S	S	S	S	S	S	110
16	105	105	105	105	105	S	S	S	125	125	130	130	145	G	125	120	120	S	S	S	S	S	S	100
17	100	100	100	S	105	S	S	S	105	105	100	G	105	105	115	110	110	105	105	100	100	C	S	S
18	100	100	100	100	S	S	S	100	100	100	100	100	100	100	100	E140G	120	150	100	135	100	S	S	S
19	S	S	S	S	115	105	S	110	110	100	100	100	105	105	105	105	G	120	S	S	S	S	S	S
20	S	S	S	S	B	S	105	105	G	150	G	100	100	100	160	175	175	160	S	150	135	S	100	S
21	S	S	S	S	B	S	S	S	160	150	150	175	180	155	165	180	160	S	150	145	125	S	S	S
22	S	S	S	B	S	S	S	S	105	150	150	125	100	100	120	125	185	155	G	140	130	S	S	S
23	S	S	S	B	B	S	S	S	G	130	160	120	105	130	160	175	150	155	G	S	S	140	140	135
24	125	115	S	S	B	S	S	S	110	C	100	100	100	100	100	105	100	100	100	130	105	100	100	100
25	100	105	100	100	100	S	S	S	110	105	100	100	100	100	100	100	100	100	100	100	S	S	S	S
26	S	100	S	100	B	S	S	S	115	105	105	155	G	G	105	105	110	S	S	S	S	S	S	100
27	100	100	100	S	100	100	S	100	G	150	G	105	105	100	100	100	100	100	100	100	S	S	S	S
28	S	S	B	B	B	S	S	S	G	G	150	150	100	100	G	100	100	S	100	G	100	S	S	S
29	S	S	S	B	B	S	S	S	G	150	145	150	150	100	100	100	100	100	100	S	S	S	S	S
30	S	S	100	100	S	100	S	S	G	E170G	105	105	105	100	100	E155G	100	100	100	100	100	S	S	S
31																								
No.	12	11	15	12	12	6	3	10	17	21	24	27	24	24	28	26	26	23	19	17	15	7	7	11
Median	100	100	100	100	100	100	100	100	125	120	120	120	105	105	105	105	105	105	105	110	105	105	100	100
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

f_oF₂

Y 11

Lat. 31° 12.1'N
Long. 130° 37.1'E

Yamagawa

IONOSPHERIC DATA

135° E Mean Time (G.M.T. +9h)

Types of Es

Nov. 1964

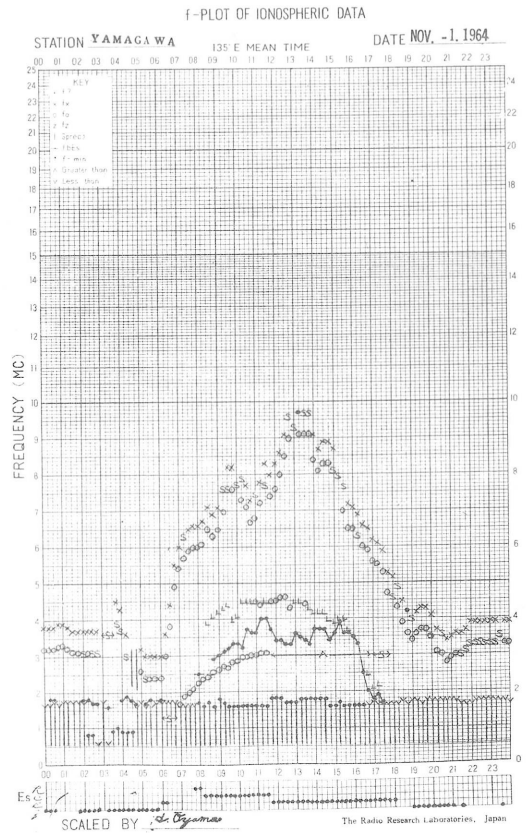
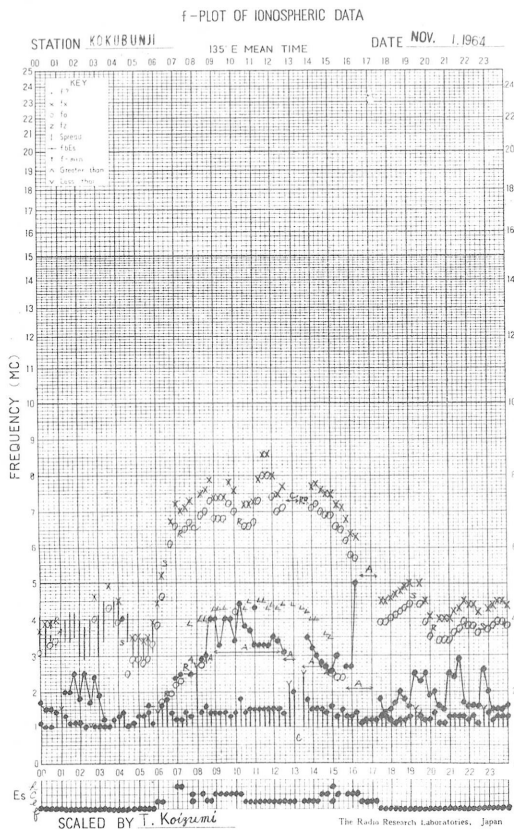
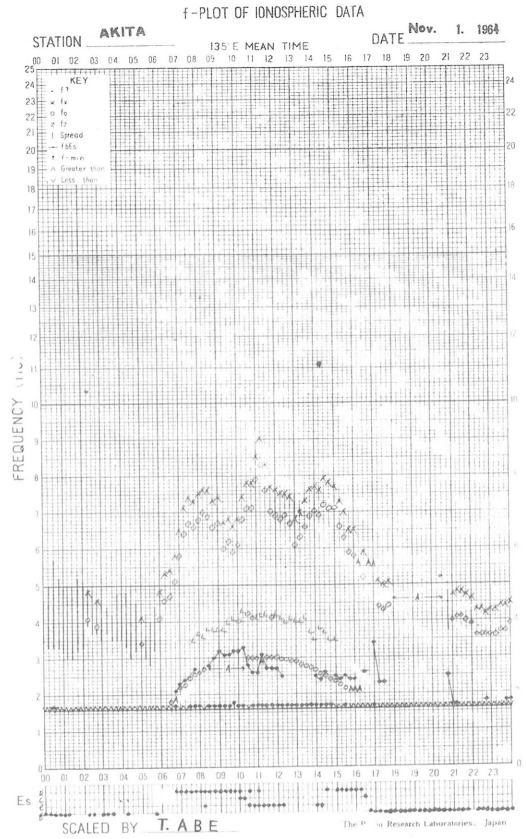
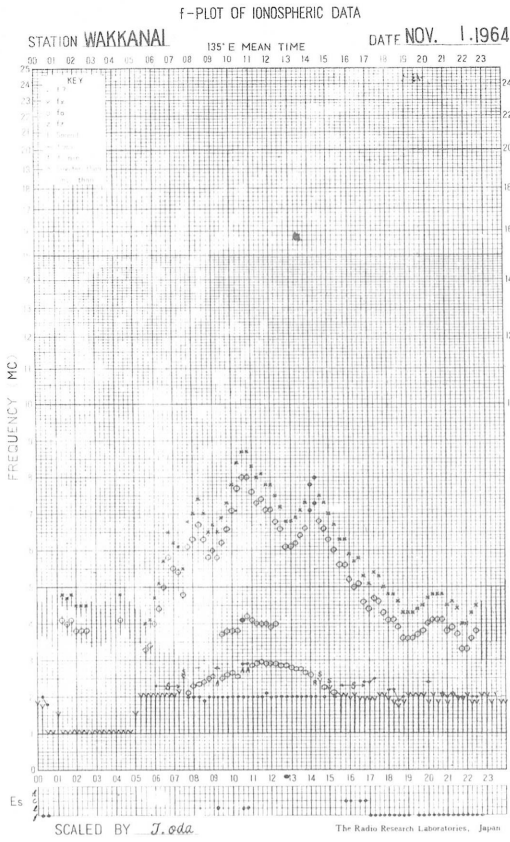
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3	f2	f2	f3		f2				b2	h 12	12	1	1	1	1	1	12	e21	f3	f2	f2	f	f	f2	
4	f2	f	f		f		h			c	h	h	1	1	e2	e	e2	e3	f3	f2	f2	f4	f2	f3	
5	f2		f2				h																		
6										h 1		c 1			1			c						f2	
7	f2	f2	f2	f	f2	f	1	12	b21	h 1	e	e2	1	12	12	12	12	12	12	f2	f	f2	f	f	
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9		f	f							h			h 1	e2	1	1	12	1	f3	f3					
10												c 12	c 1	c 1	1	1		1							
11				f					h	1	h	b2	h	h	e	e3	e2	12	f2	f2			f	f	
12			f		f		1	1		h 1	b2	h	e2	12	1	12	12	1	f f	f f			f	f2	
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14			f		f2				c	c	e2	c	12	12	12	12	13	12	f			f2			
15				f	f	1	1	1		h	c	c			12	1	1 h							f	
16	f2	f2	f2	f	f				e2	h	h	h	h	h	h	h	e							f2	
17	f2	f2	f		f				12	12	12		12	1	1	1	12	1	f6	f3			f		
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19				f	f2	f2	12	13	12	13	14	12	1	12	12	1		1	f	f					
20						12	1	1		h	1	1	13	12	h 1	h 1	h	h	f	f		f	f		
21									h	h	h	h 12	h	h 1	h 12	h 13	h 14		f2	f2	f	f			
22									1	h 12	h 12	h 1	12	12	c 1	c 1	h3	b31		f2	f2	f			
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24	f5	f2							1		12	12	12	12	12	e21	12	12	f2	f f2	f2	f2	f	f3	
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27	f3	f2	f2		f	1	12			h		12	12	12	13	1	13	16	f3	f2	f		f		
28										h	h	h	1	1	1	1	1	1	f2	f	f2	f	f	f	
29									b2	h	h	h 1	h 12	12	12	12	12	13	f	f					
30			f	f	f	1	1	1	h 1	1	1	1	1	12	1	h 12	12h	1	f2	f	f				
31																									
No.																									
Median																									
U. Q.																									
L. Q.																									
Q. R.																									

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

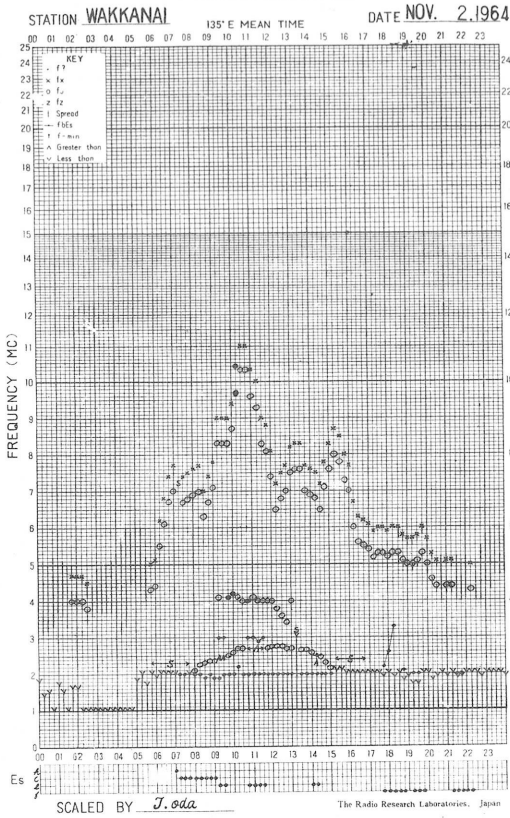
The Radio Research Laboratories, Japan

Types of Es

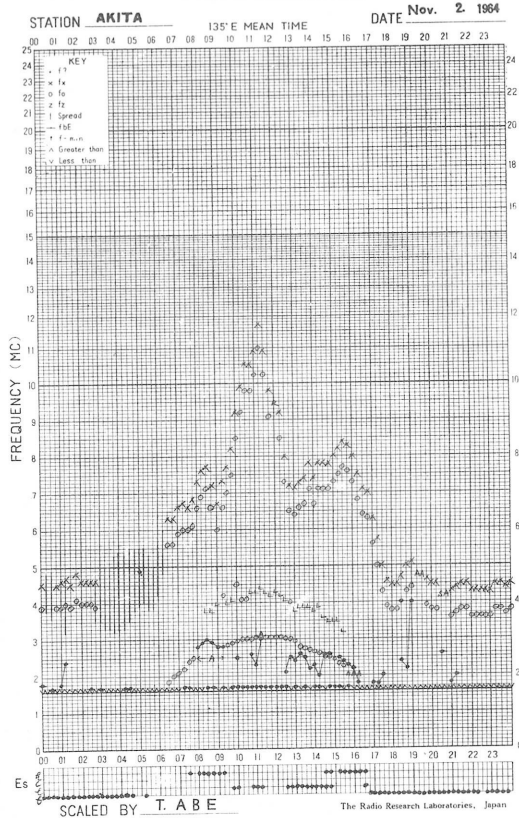
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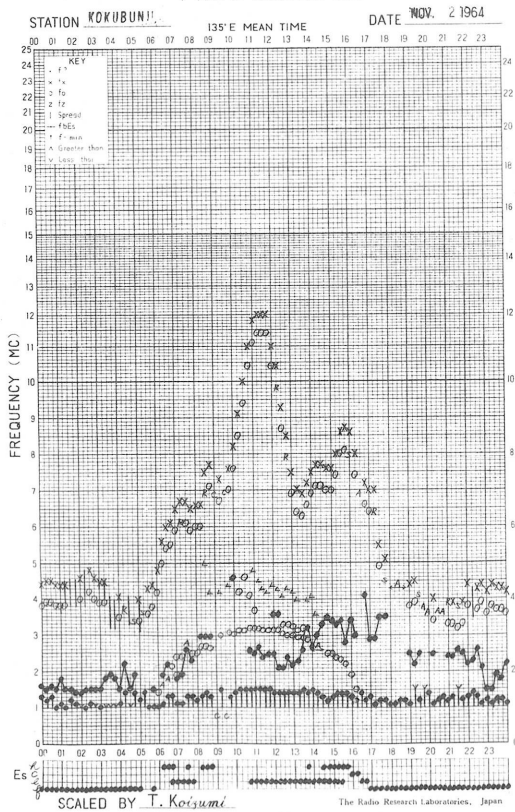
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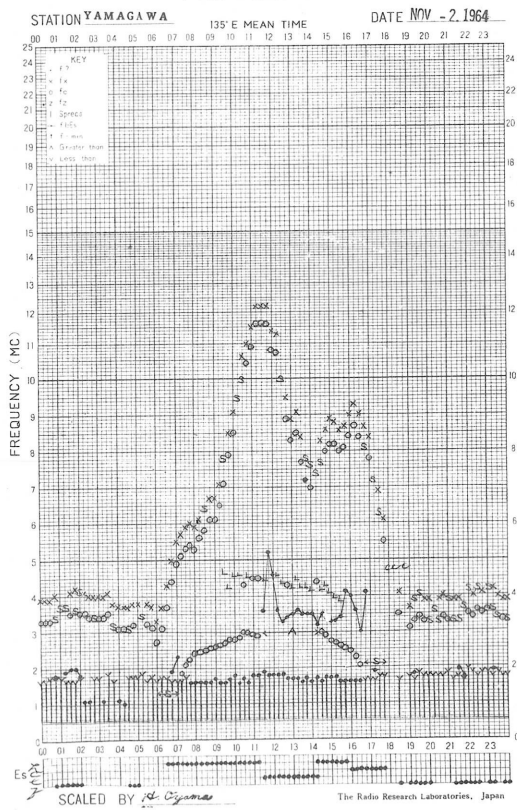
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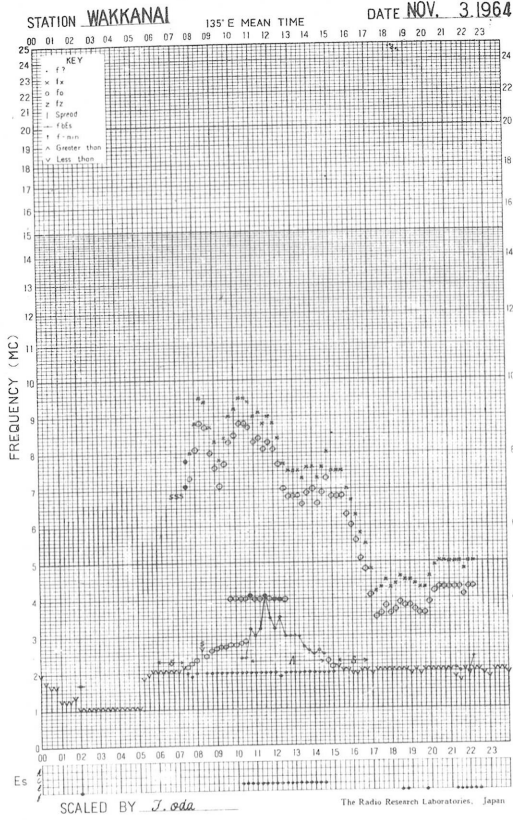
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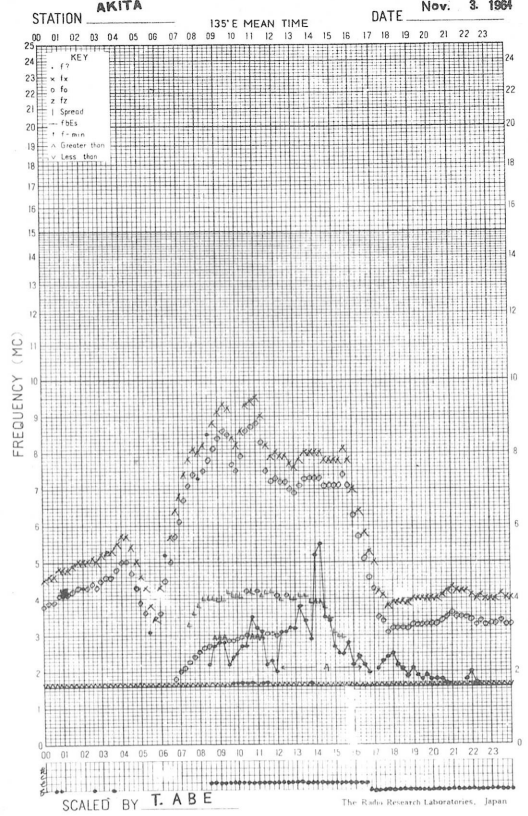
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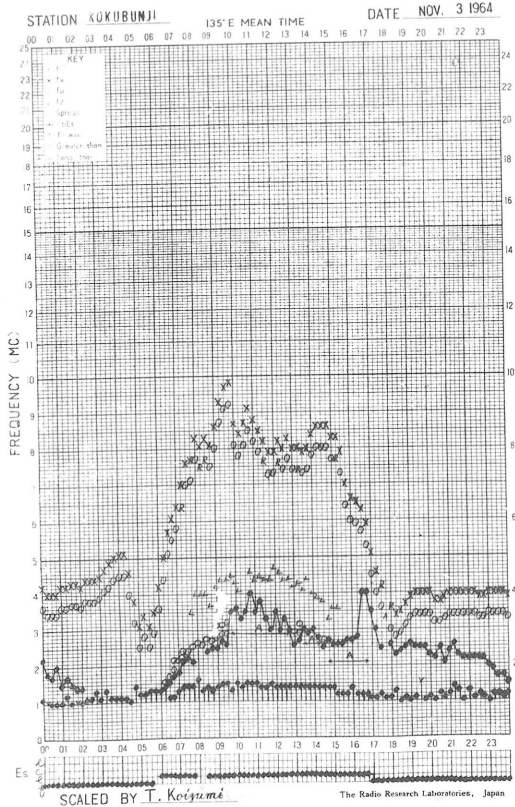
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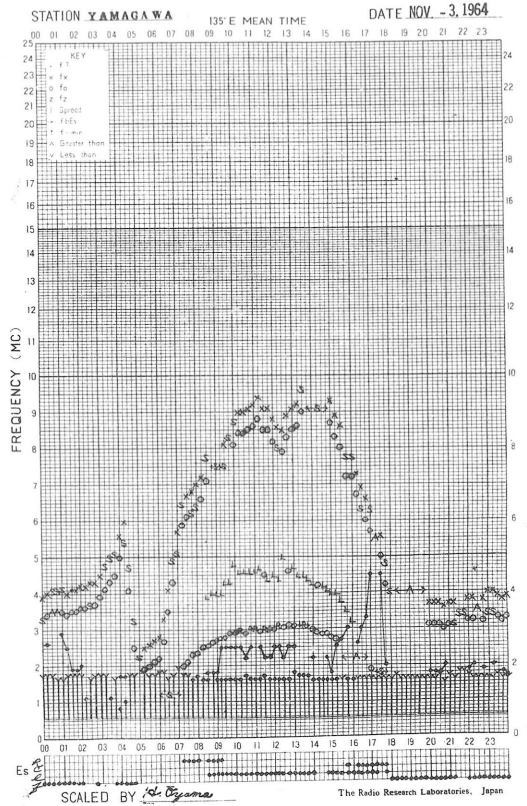
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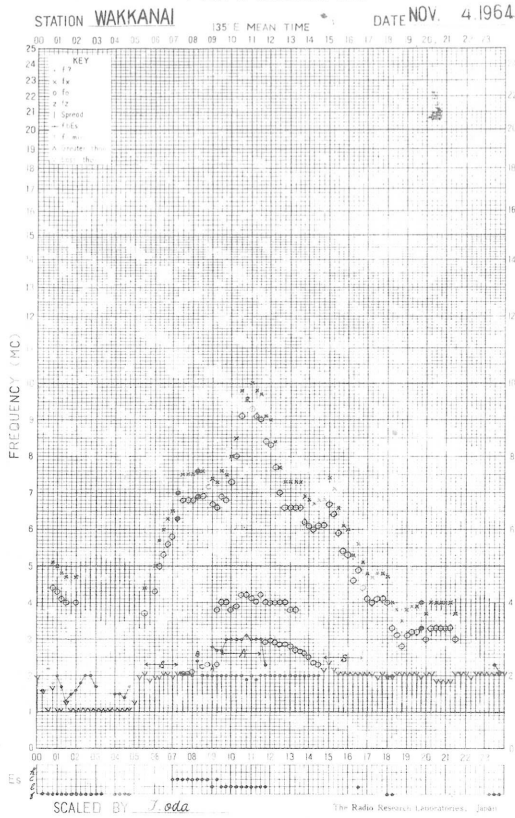
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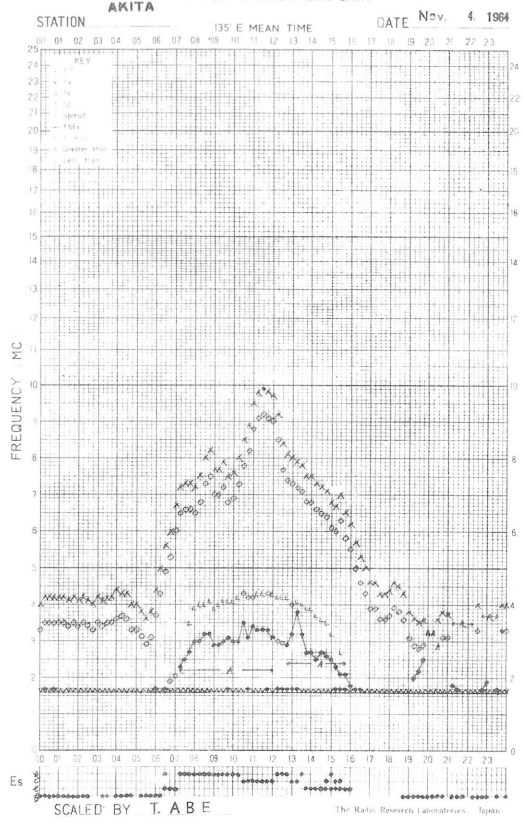
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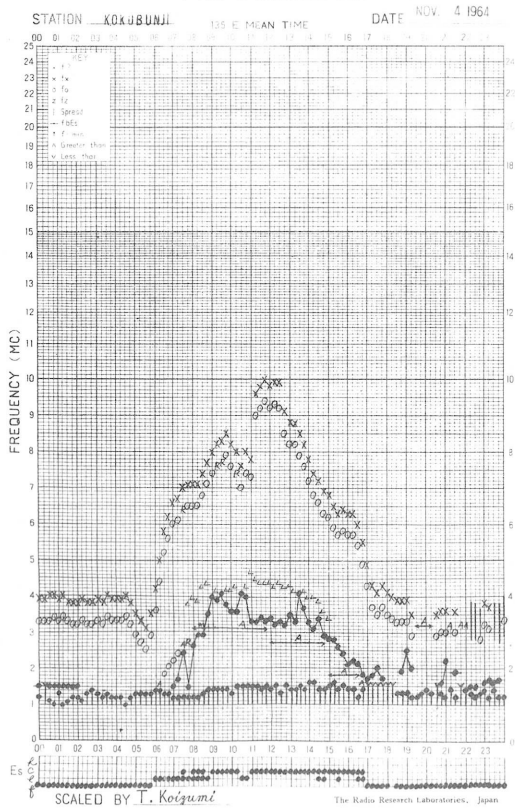
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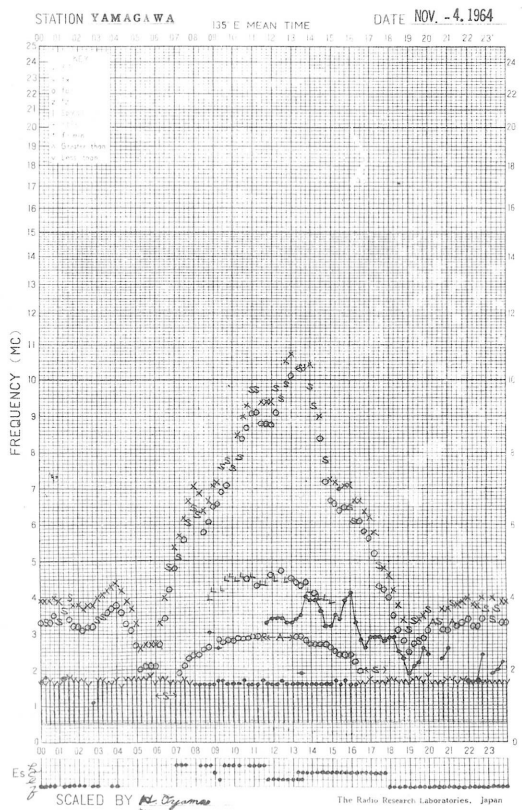
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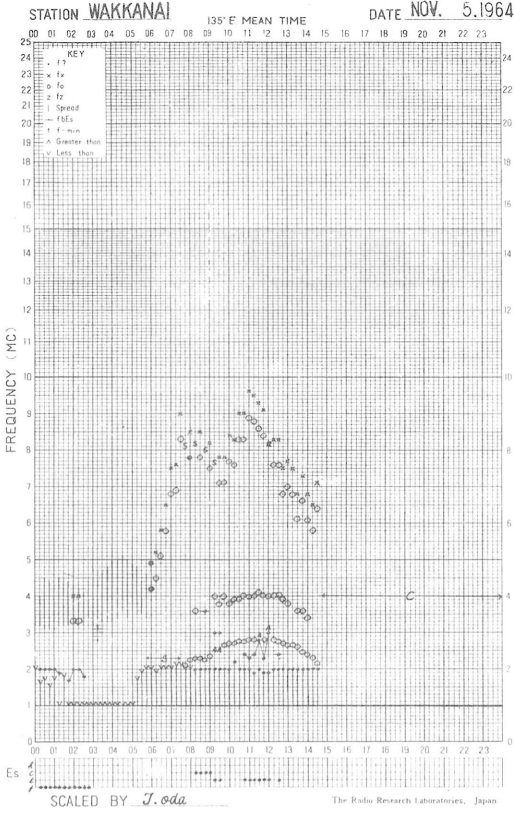
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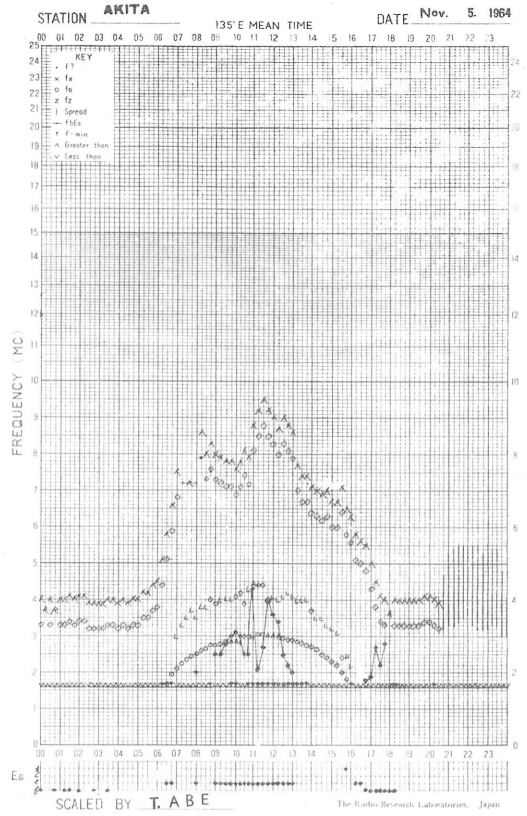
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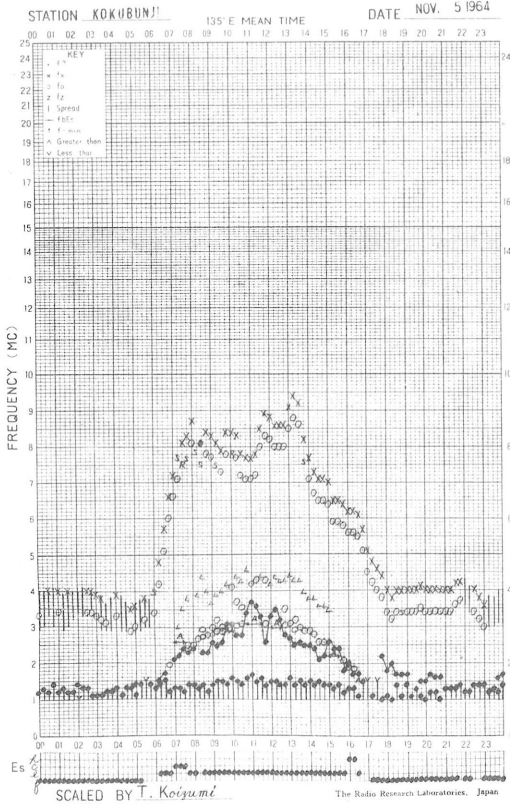
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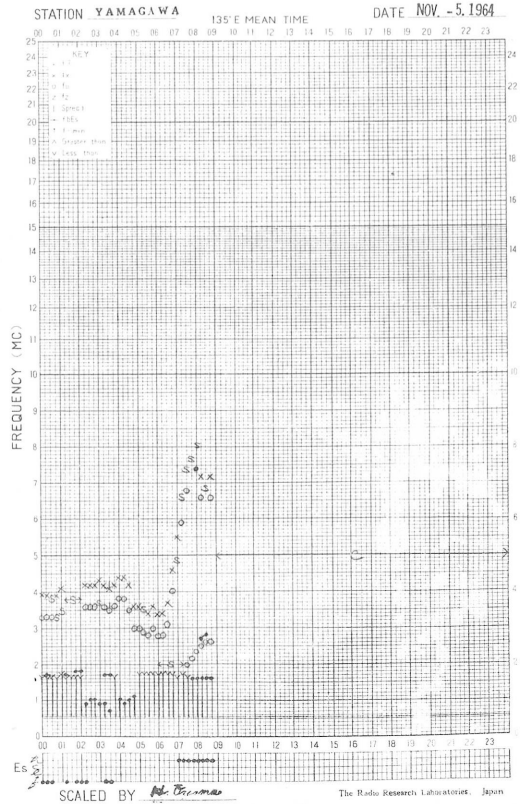
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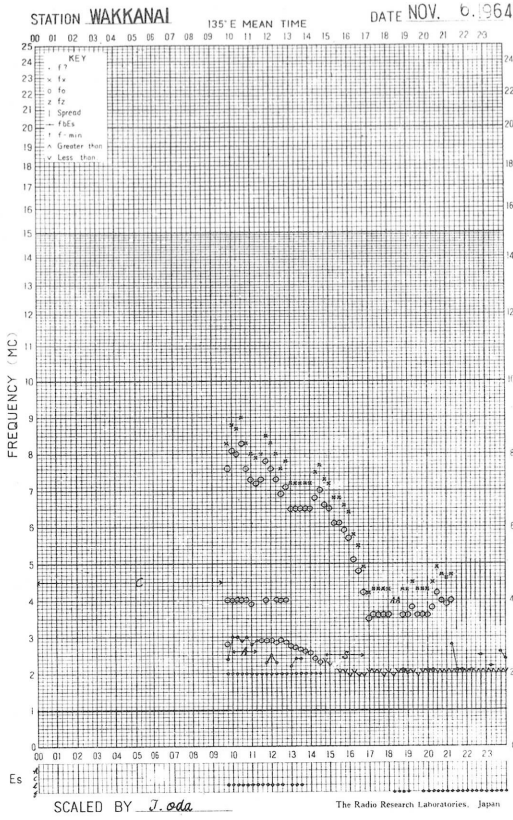
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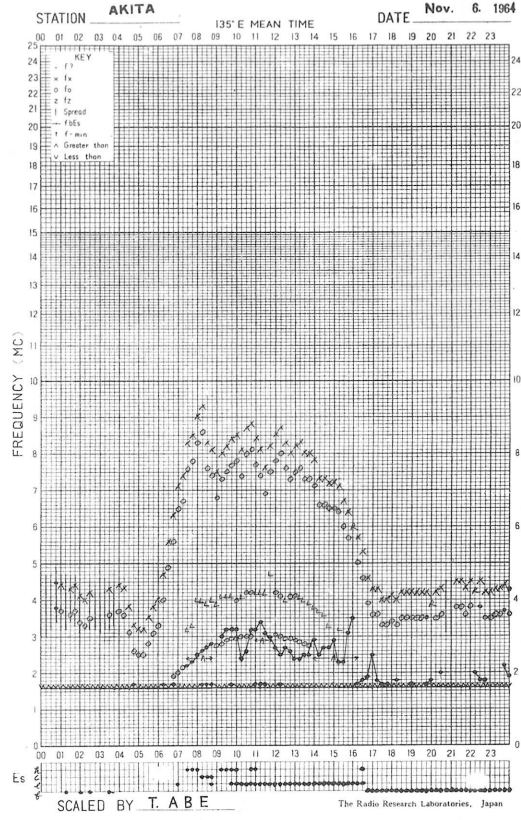
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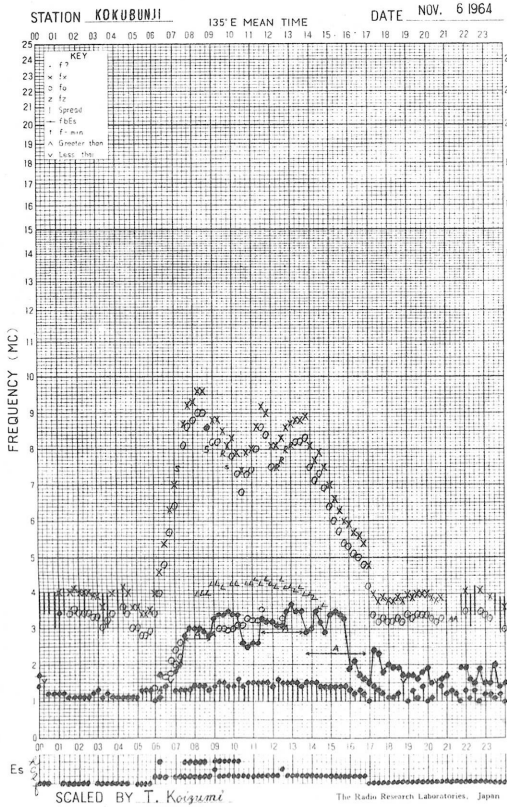
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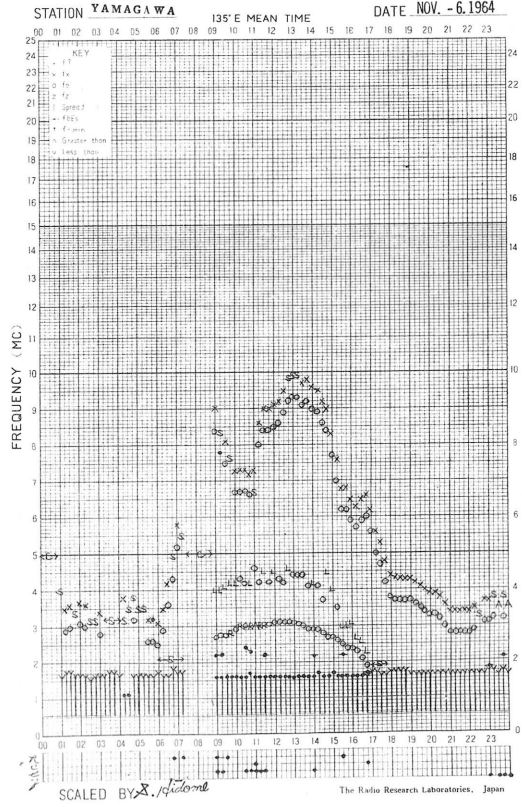
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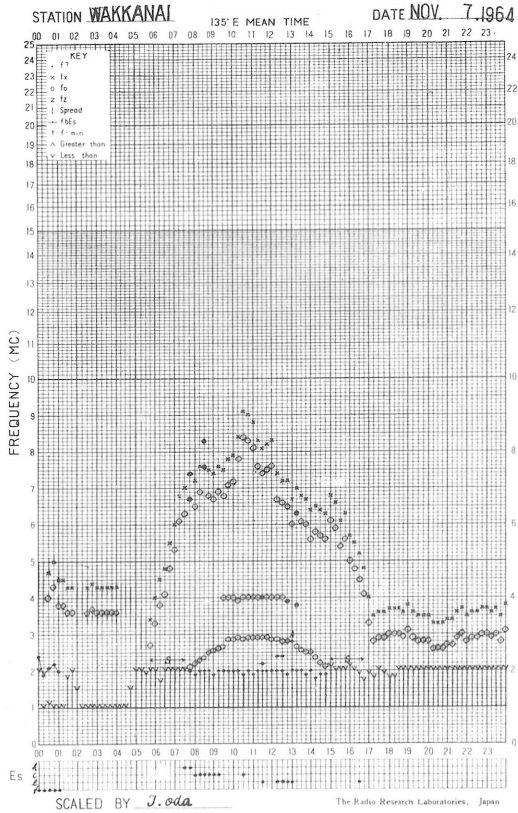
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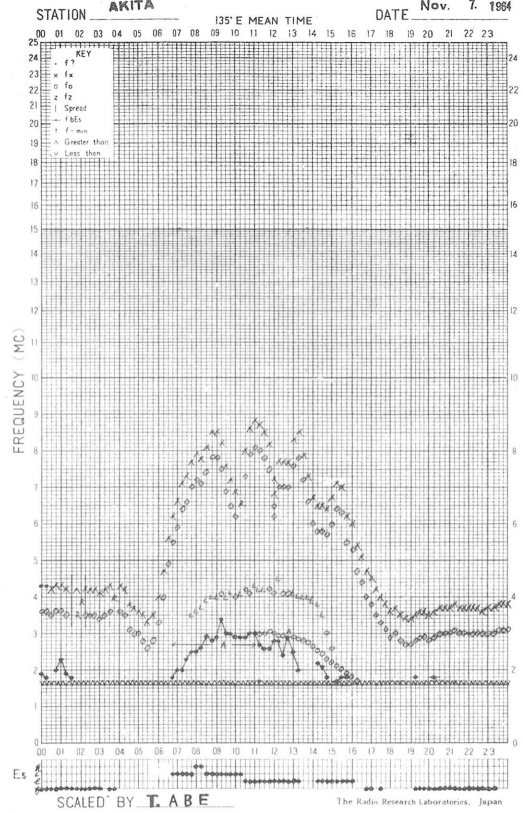
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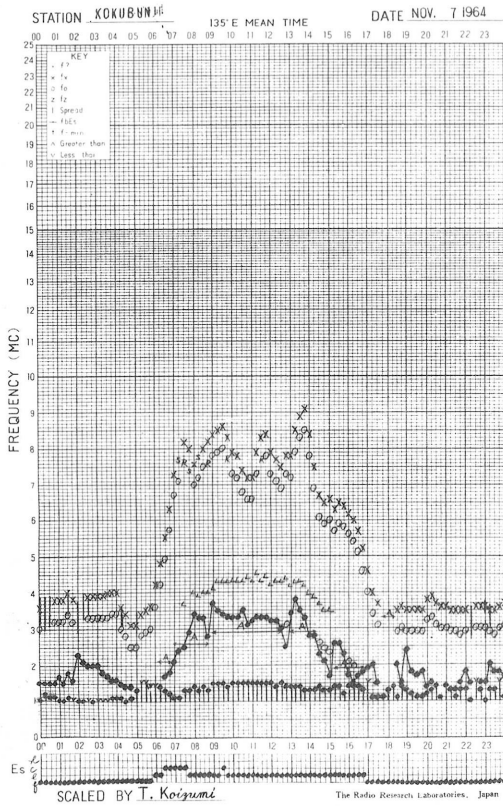
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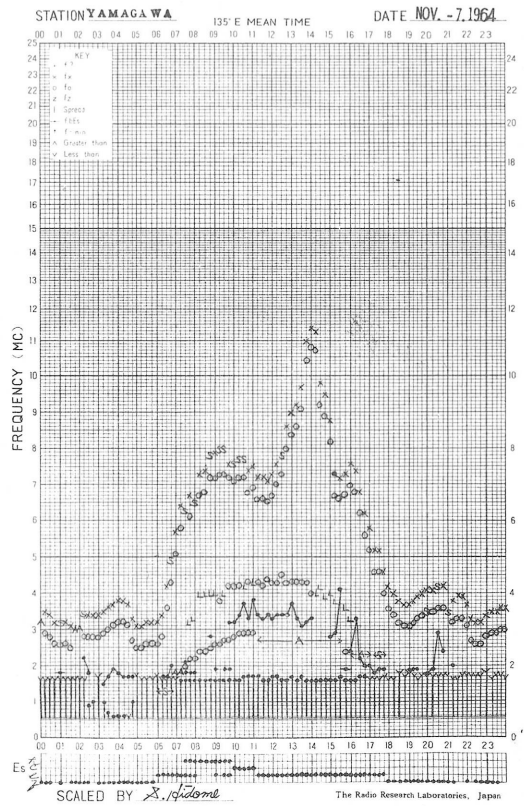
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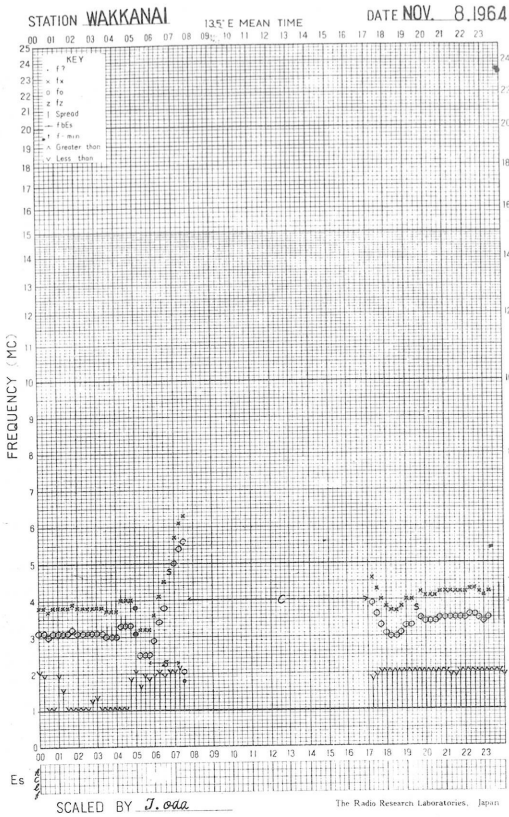
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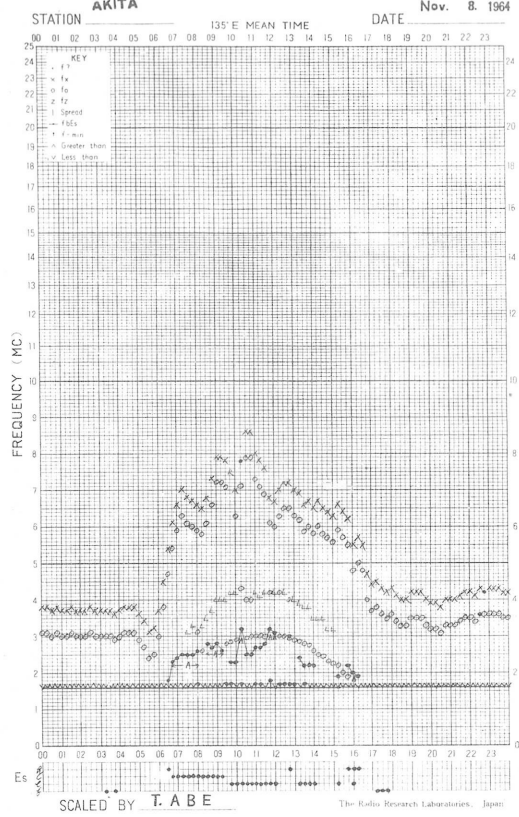
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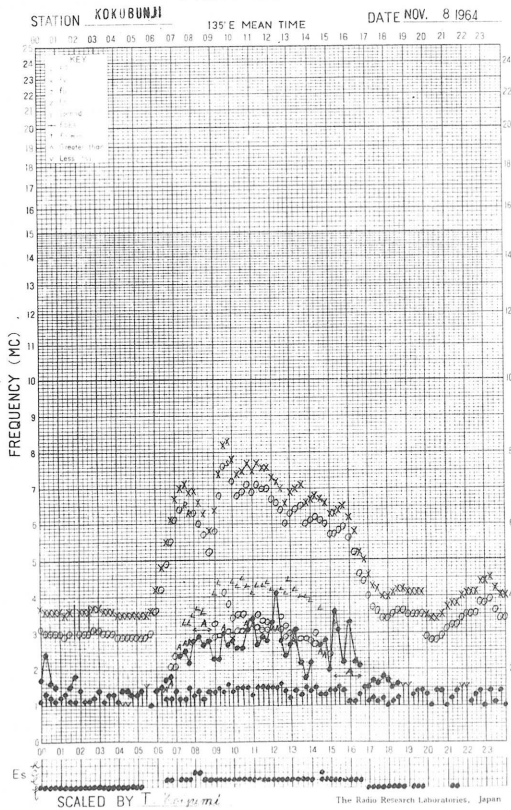
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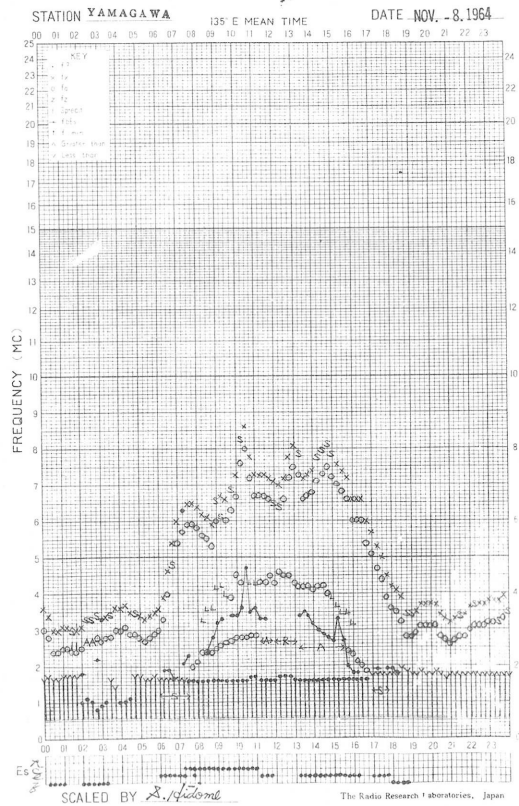
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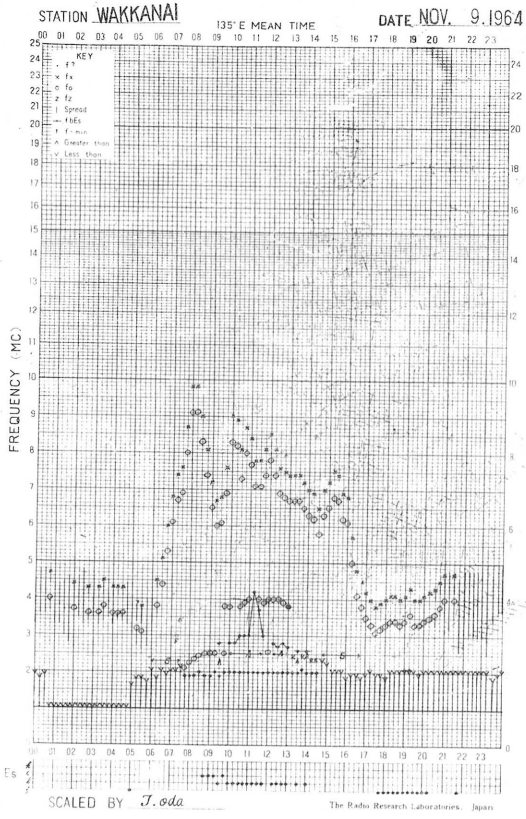
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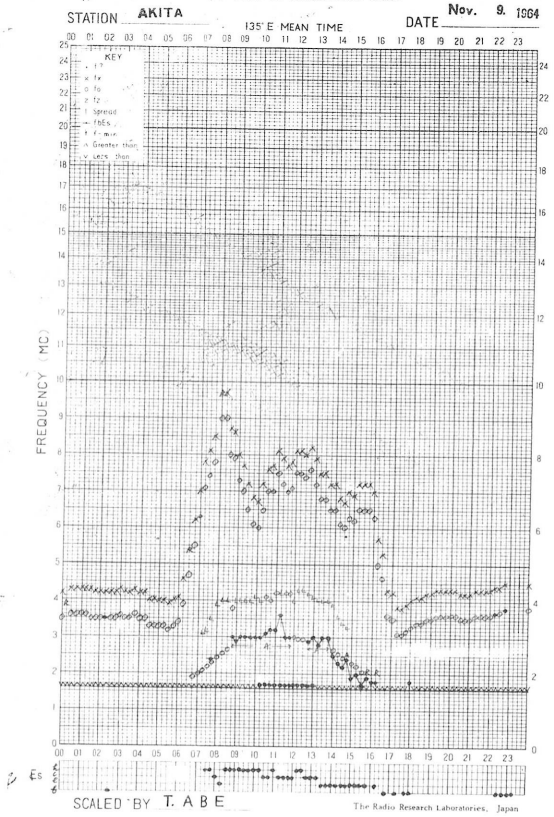
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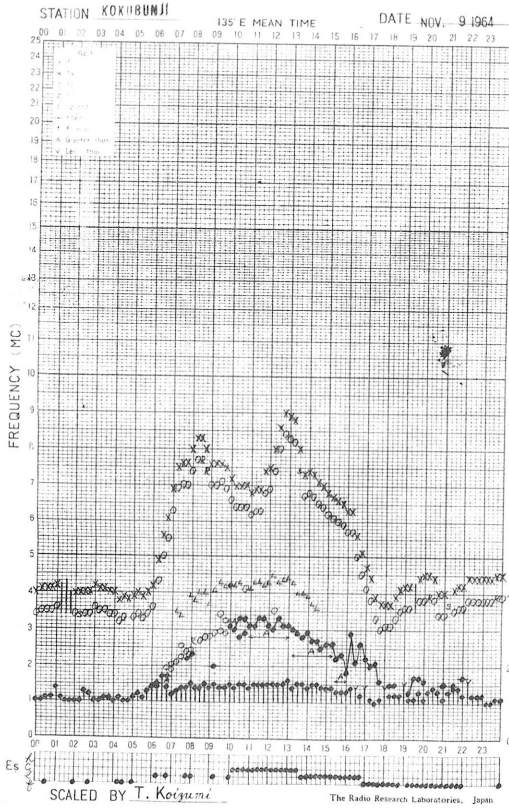
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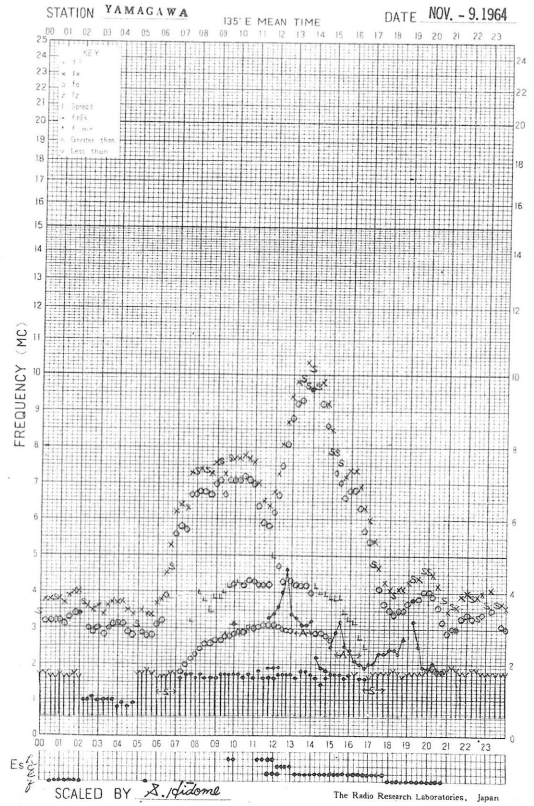
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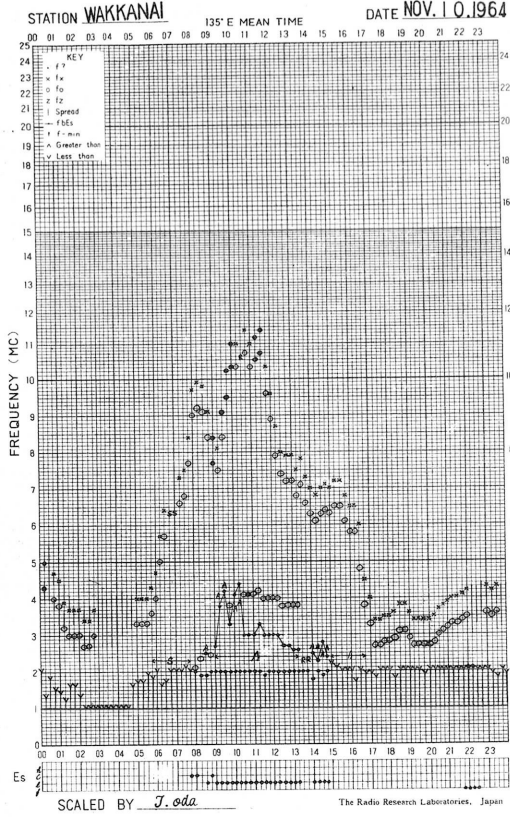
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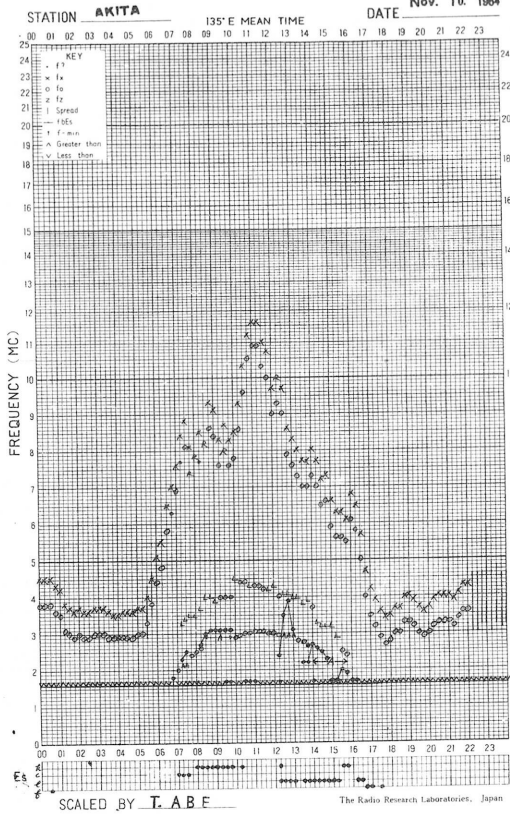
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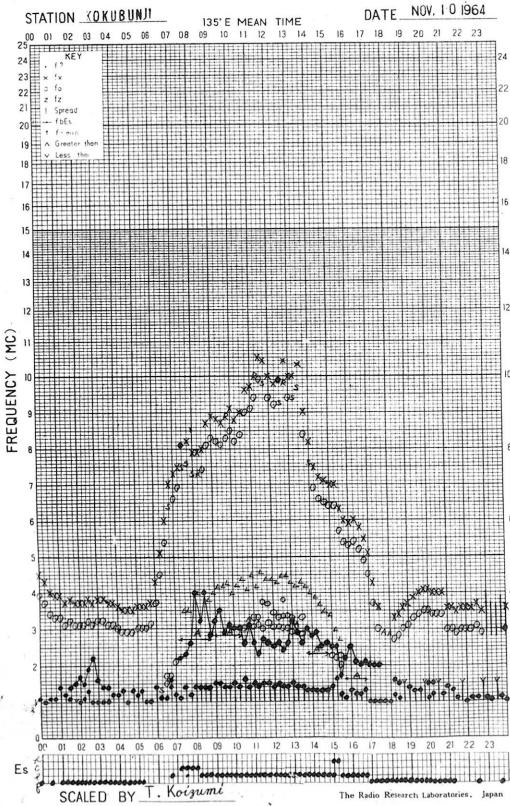
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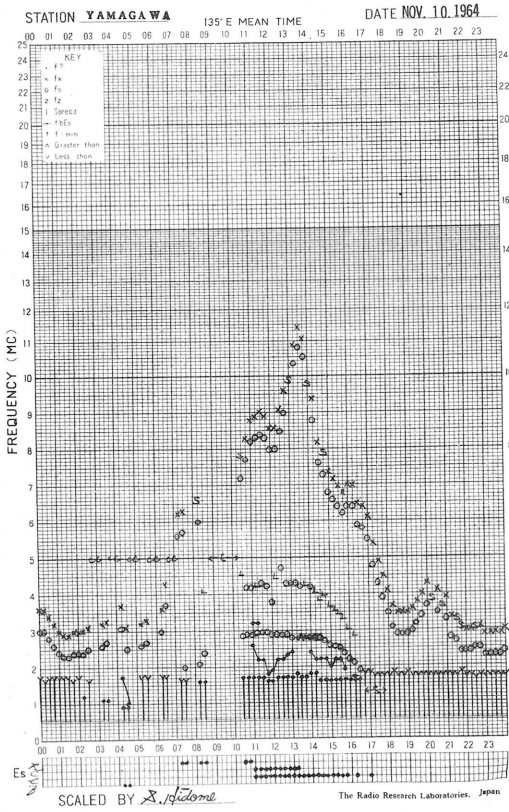
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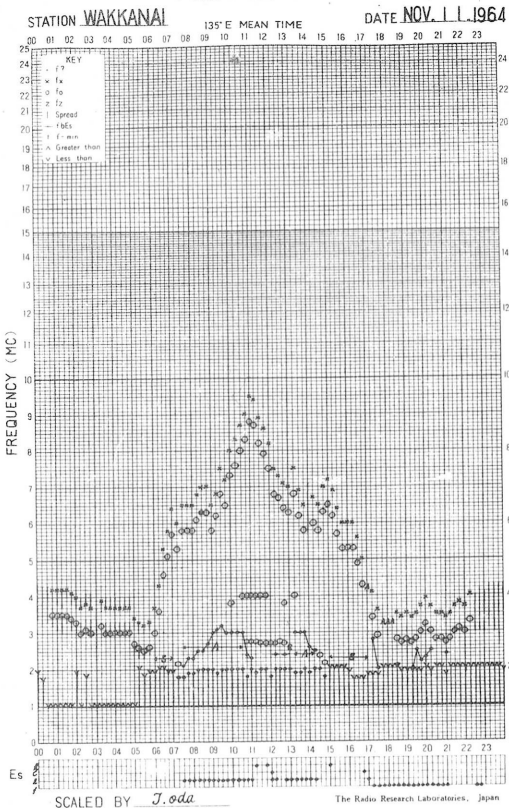
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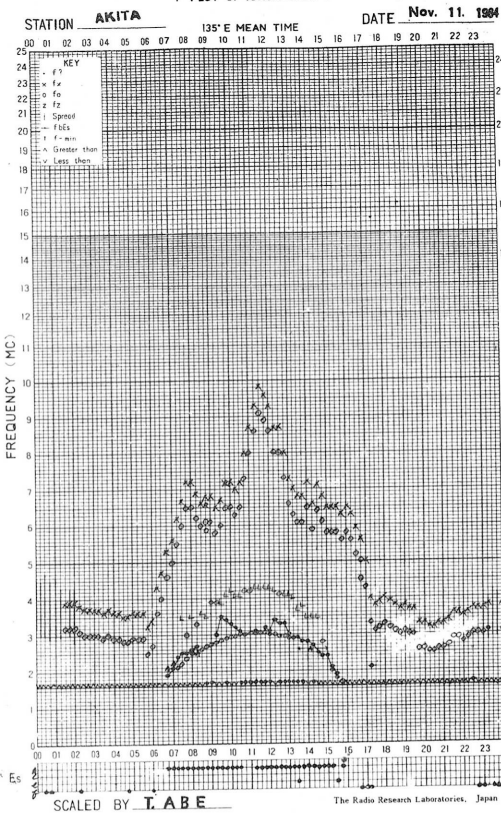
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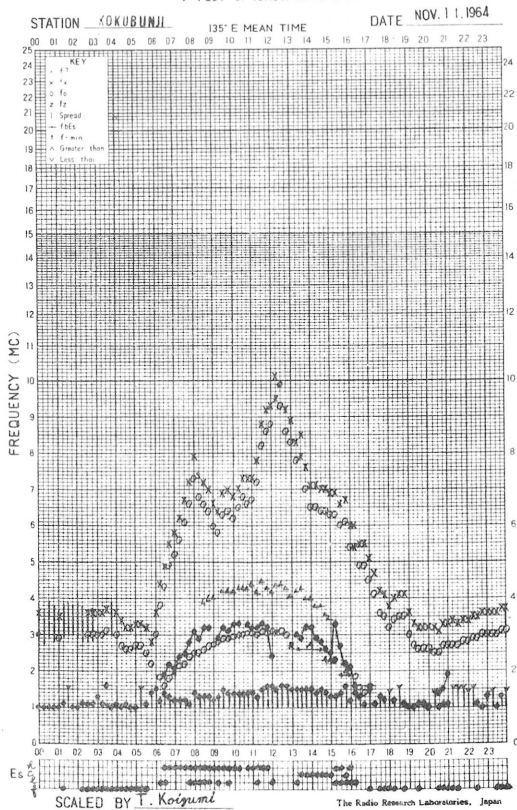
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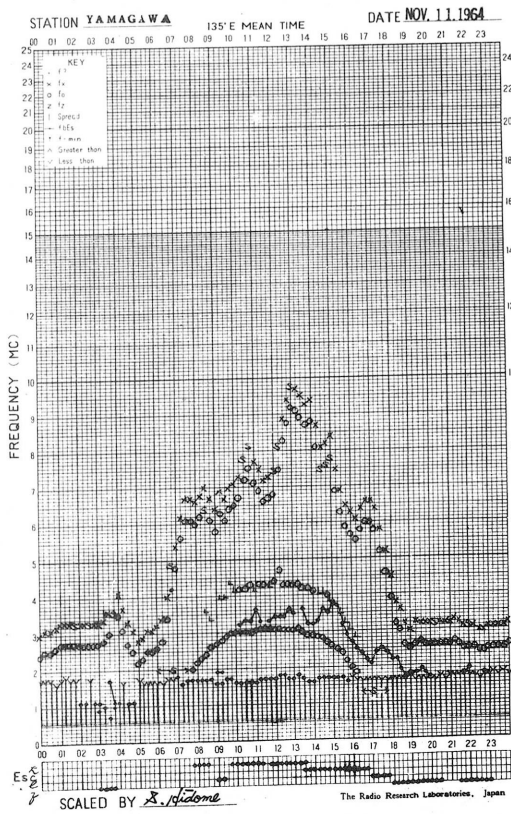
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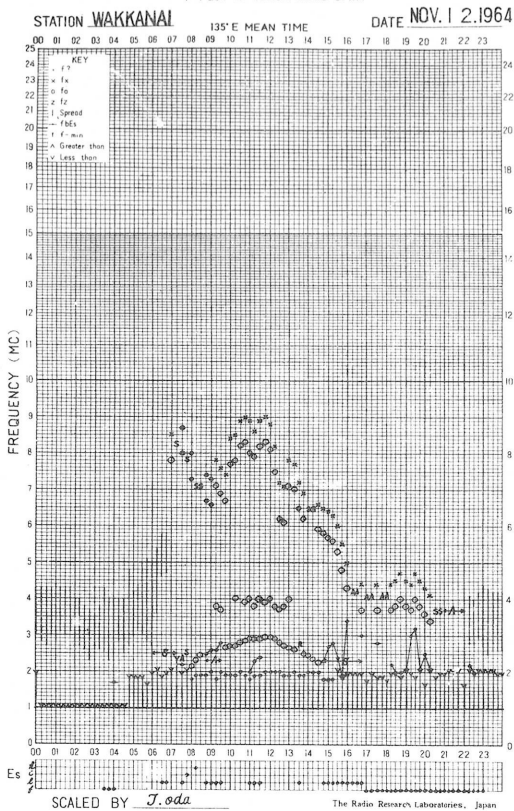
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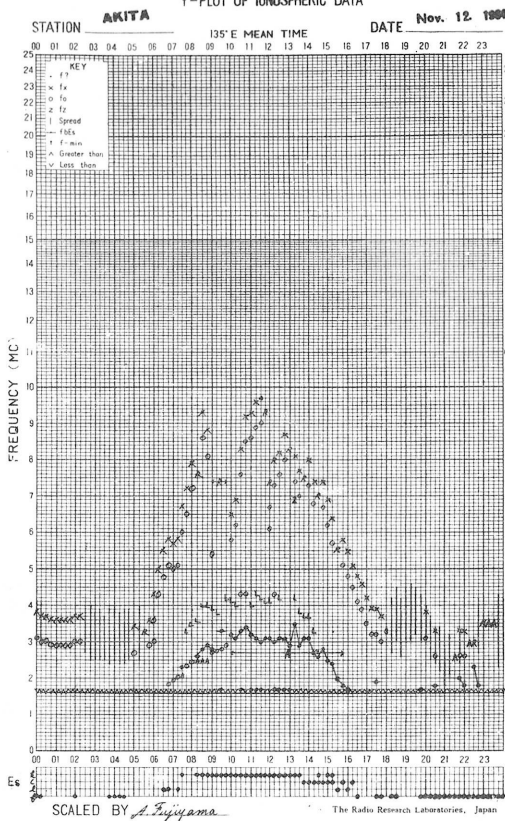
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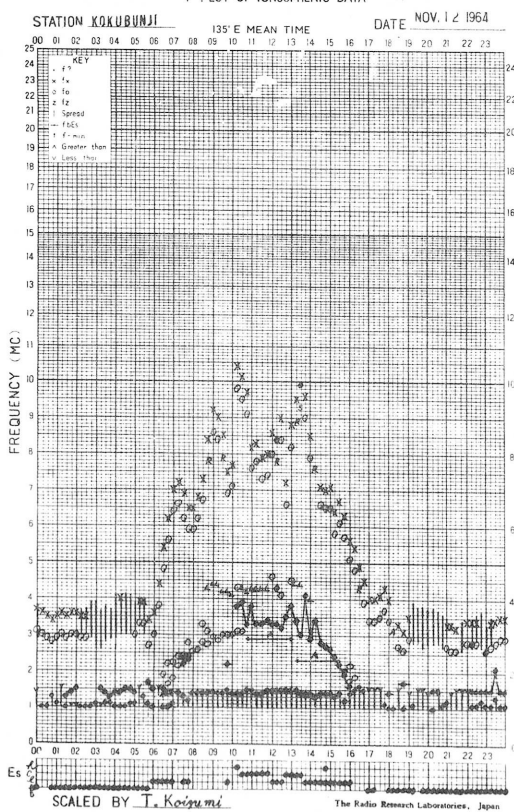
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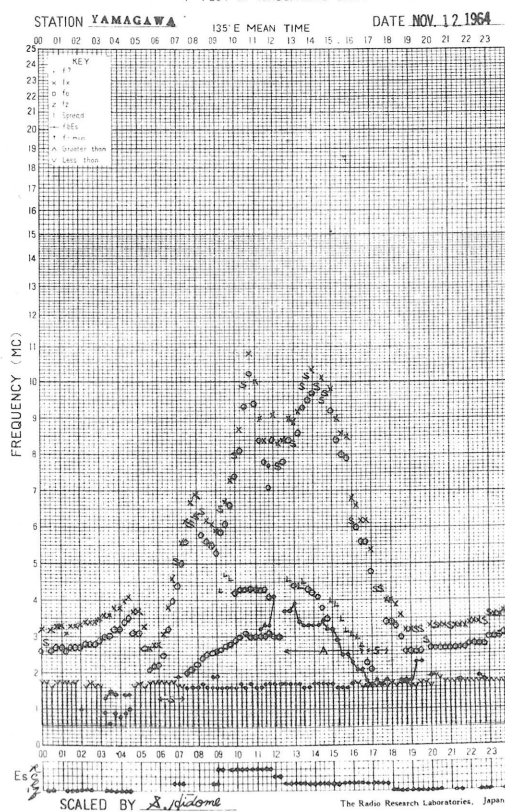
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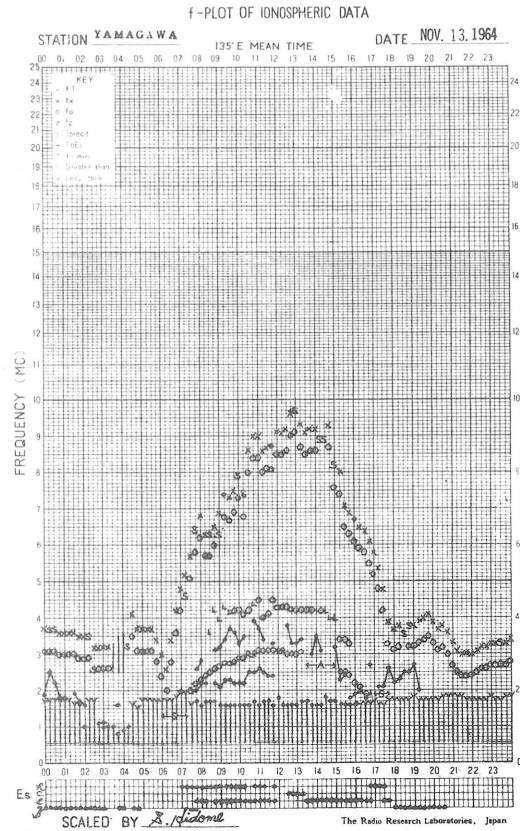
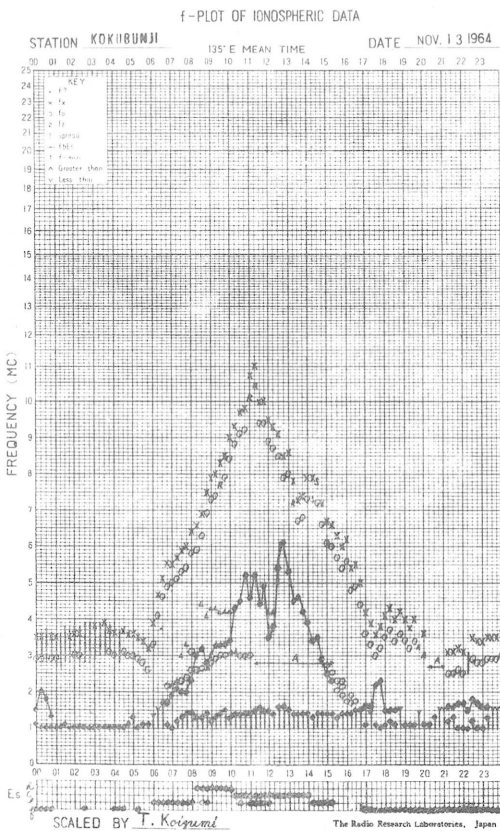
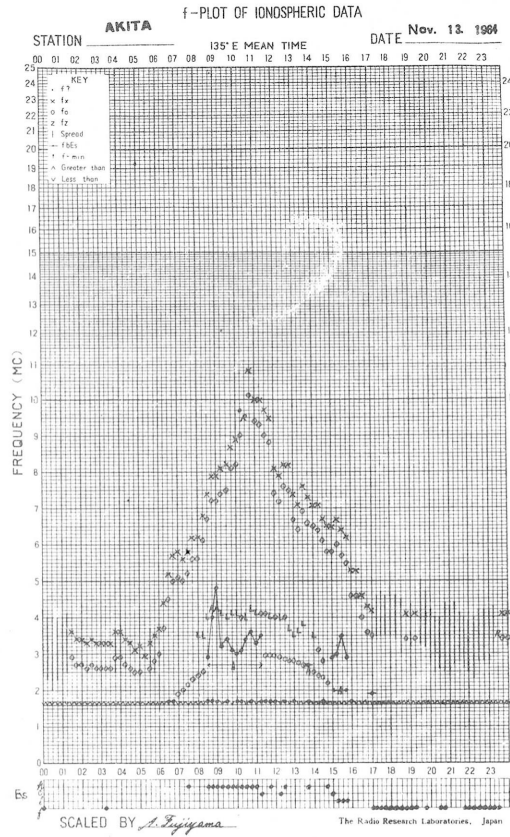
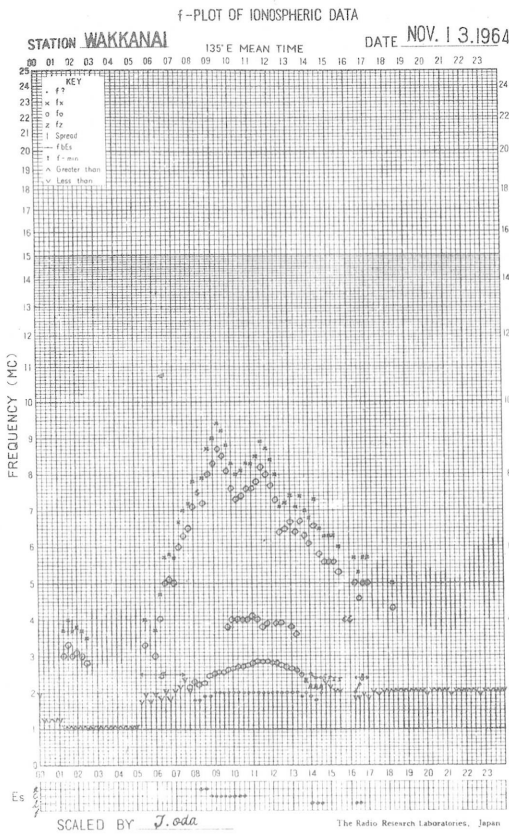


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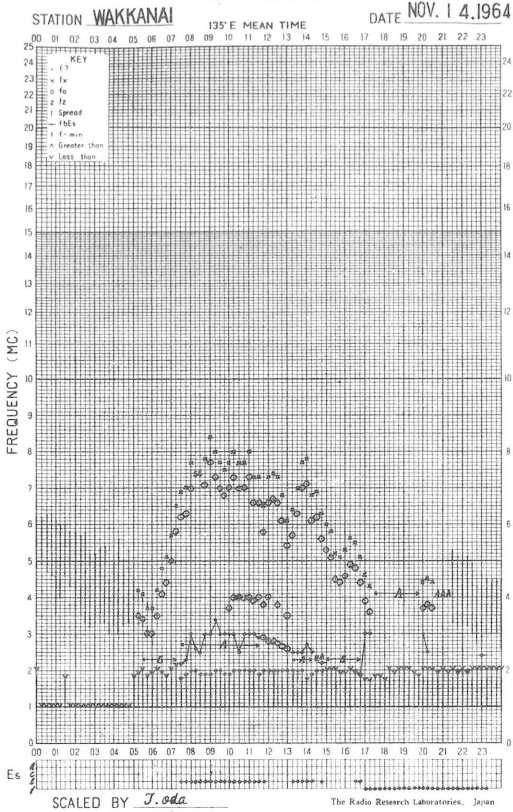


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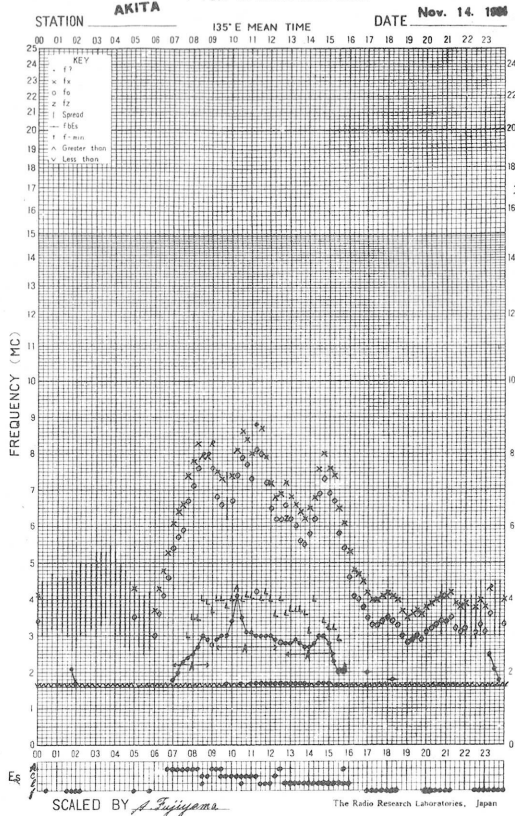




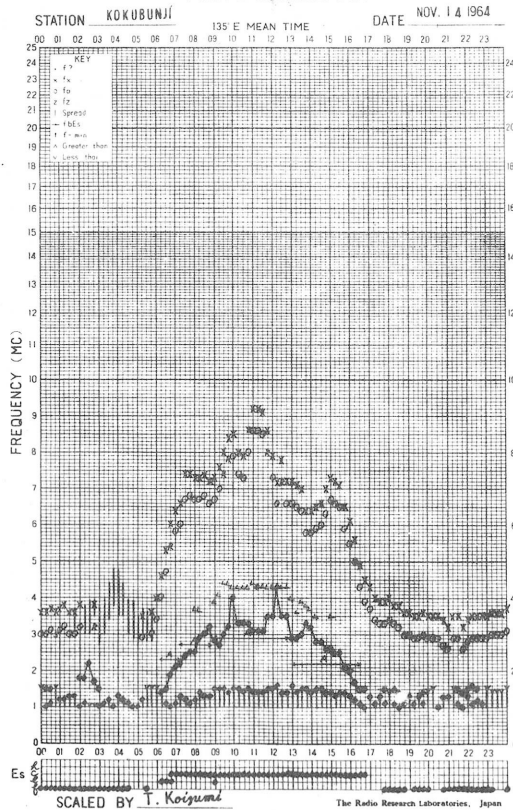
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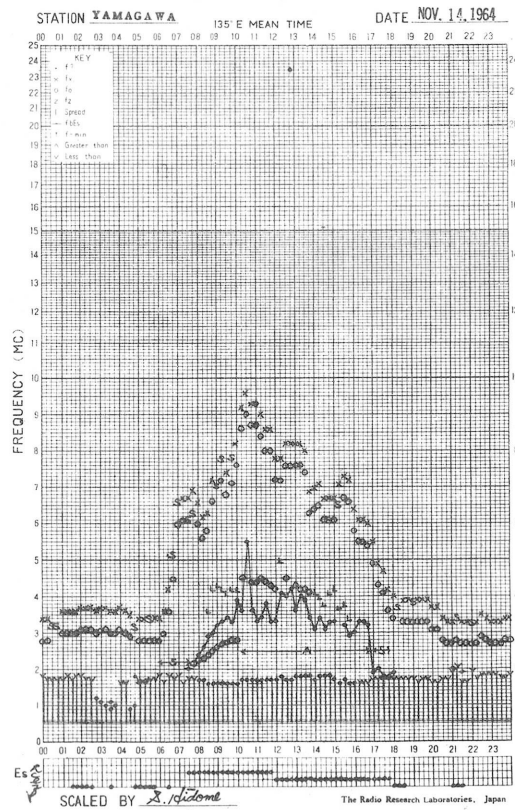
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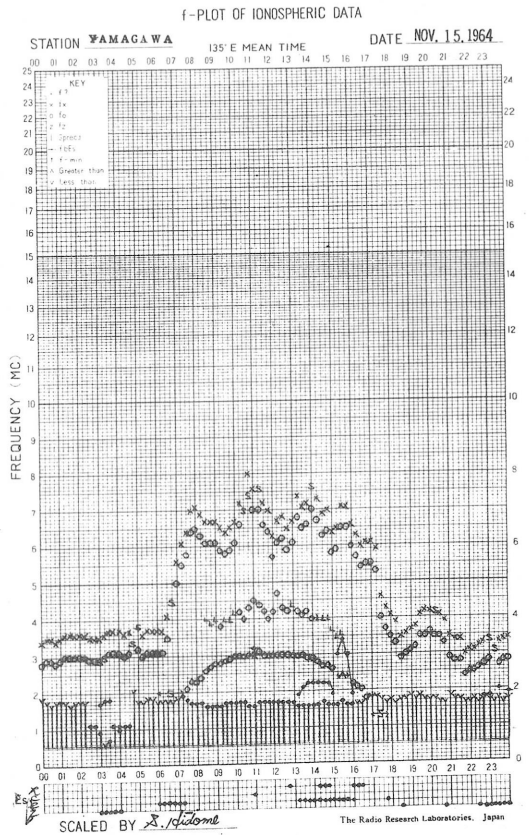
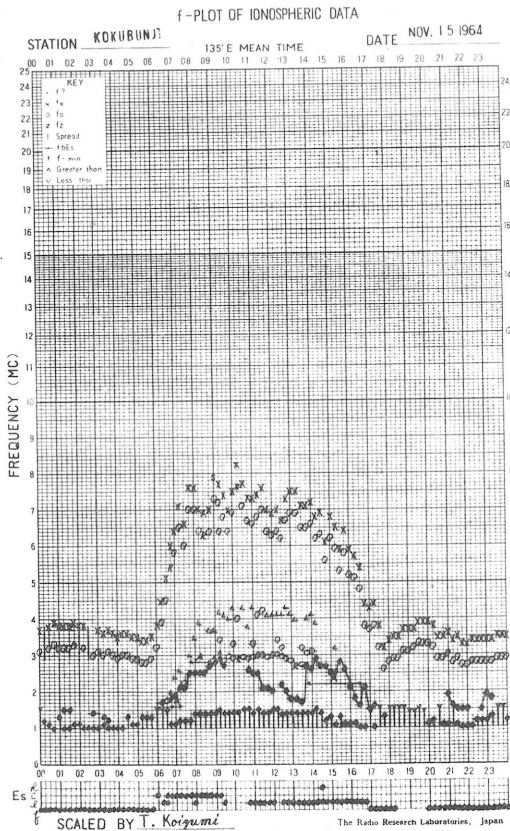
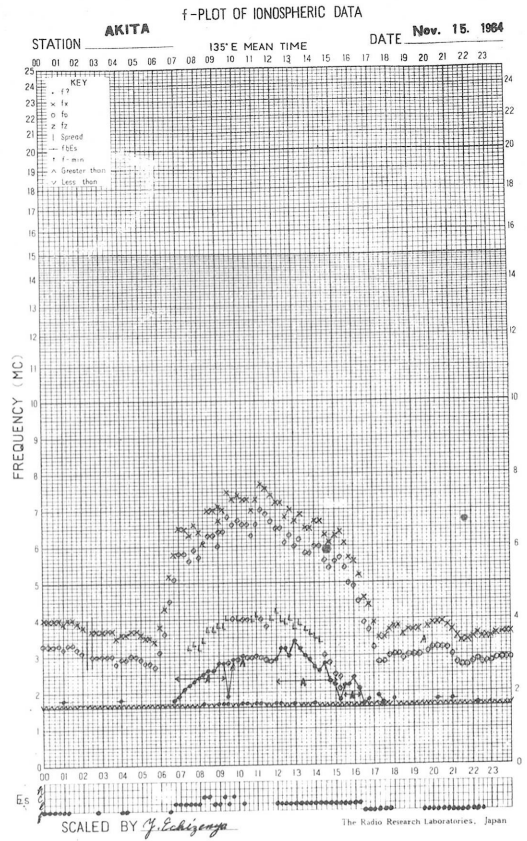
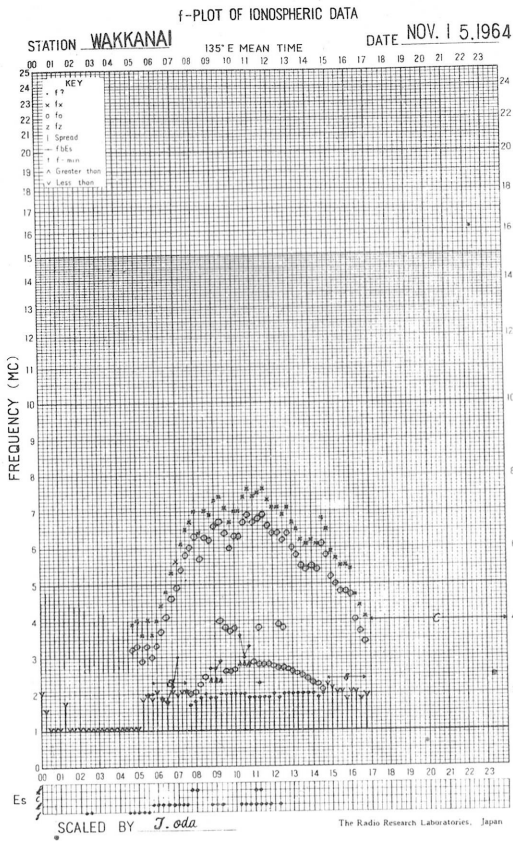


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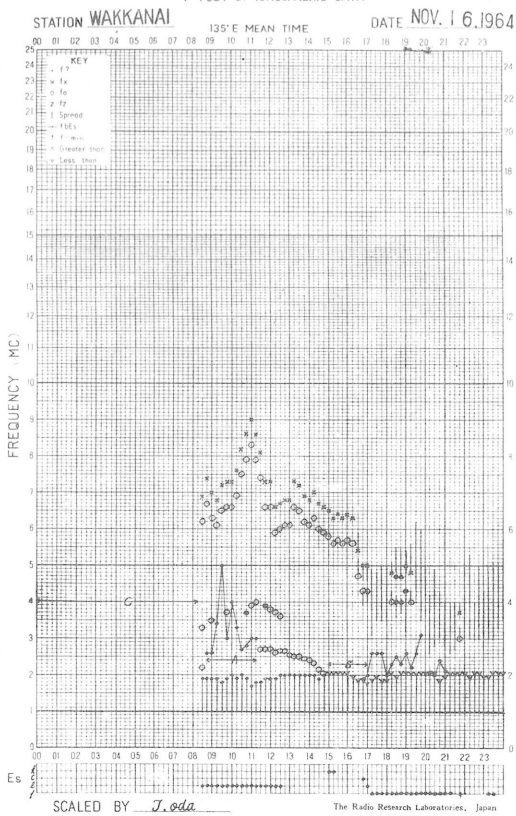


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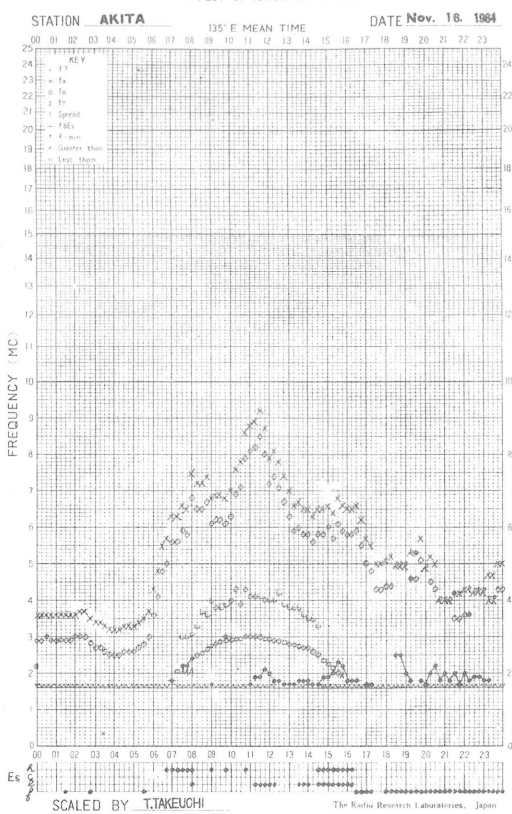




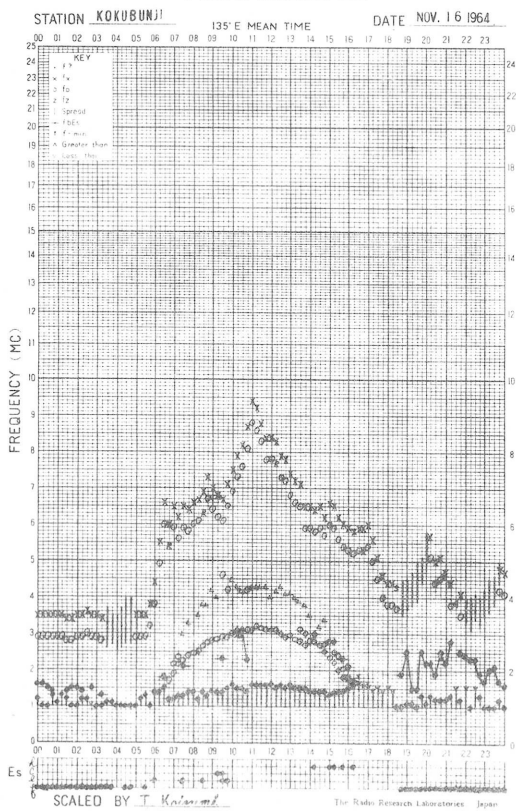
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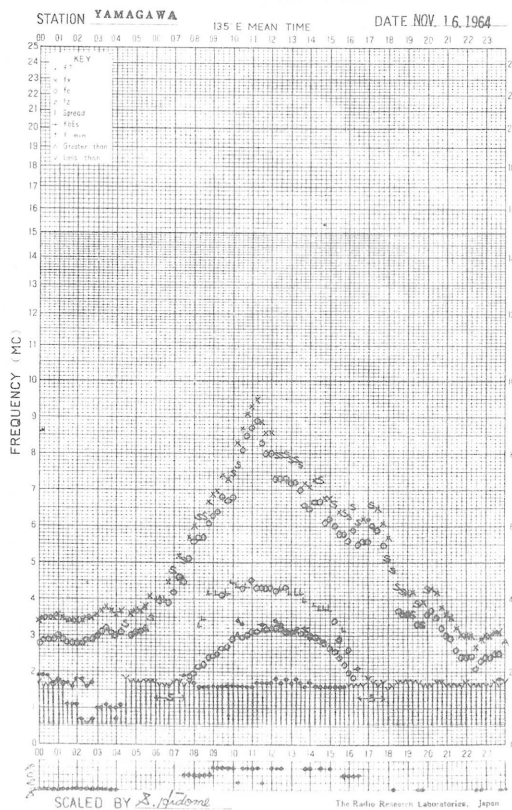
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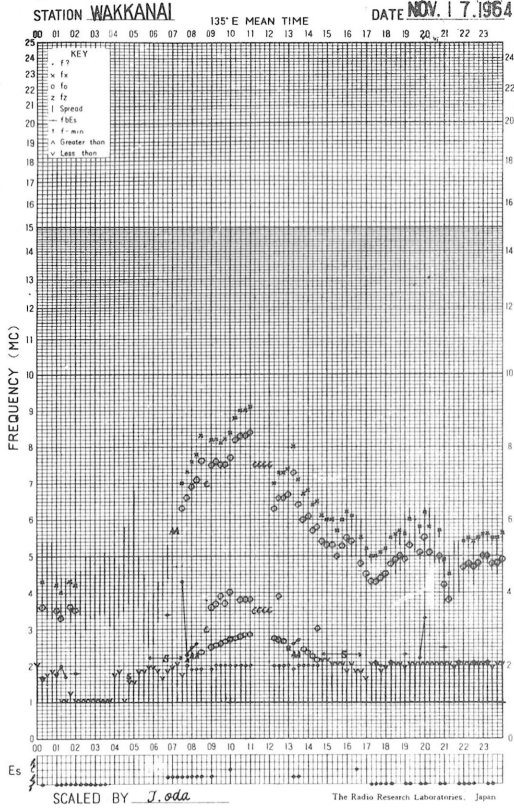
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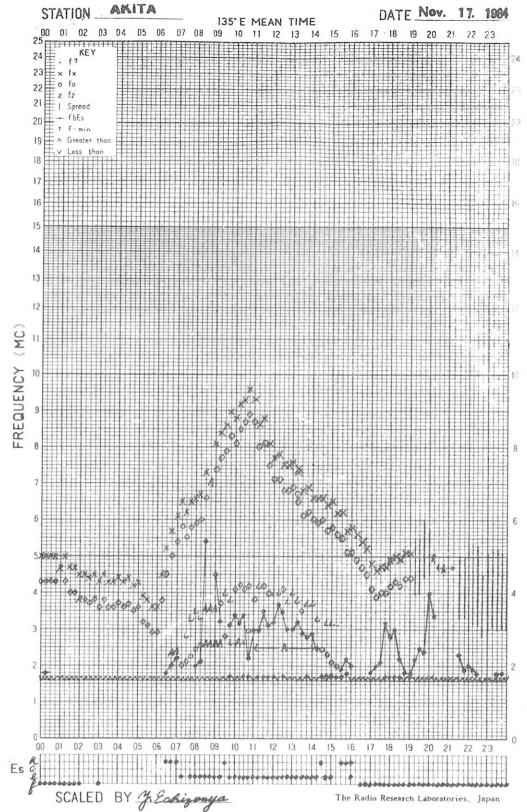
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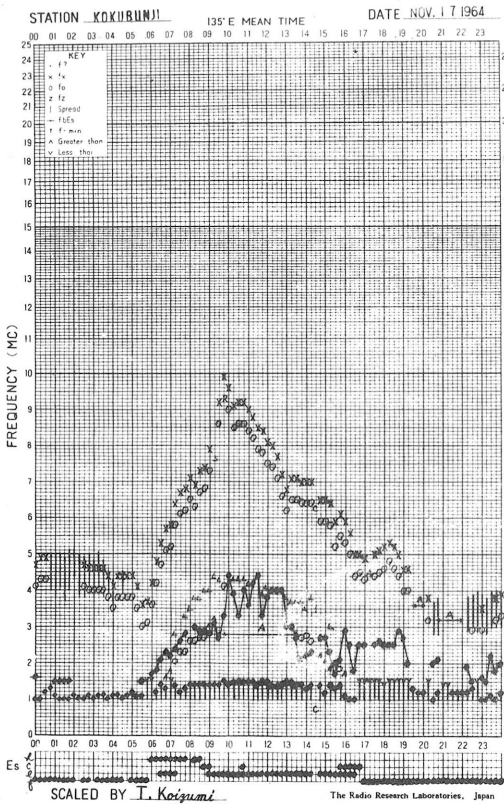
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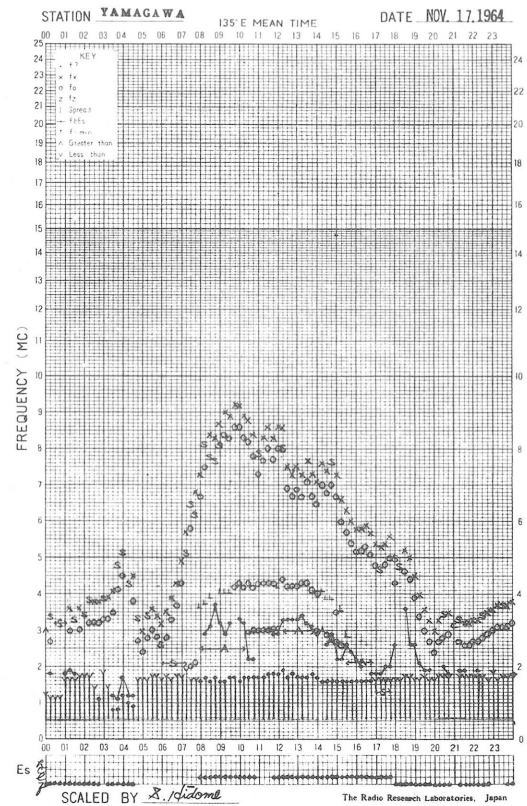
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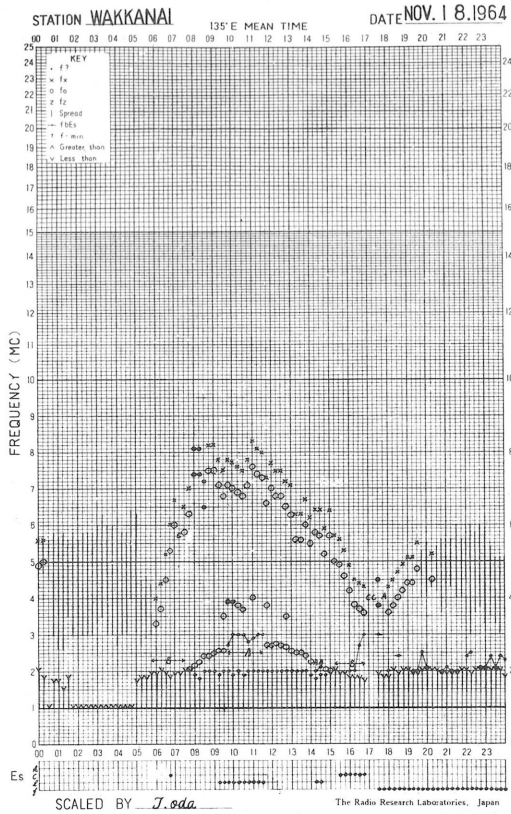
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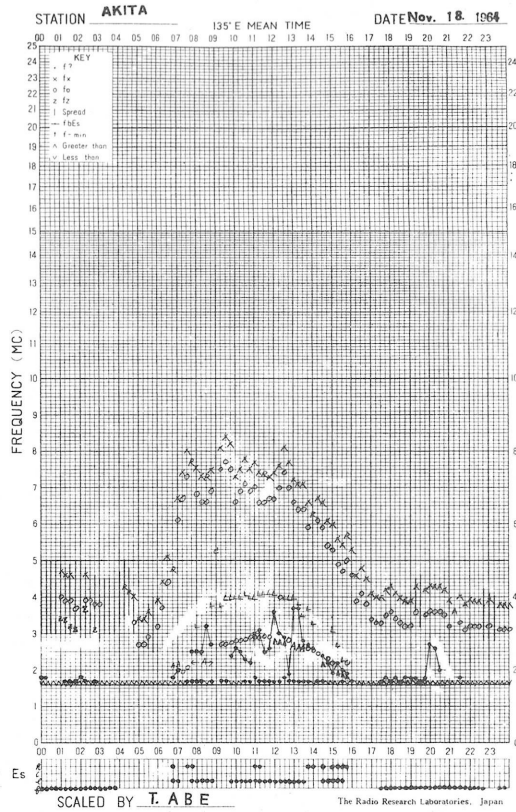
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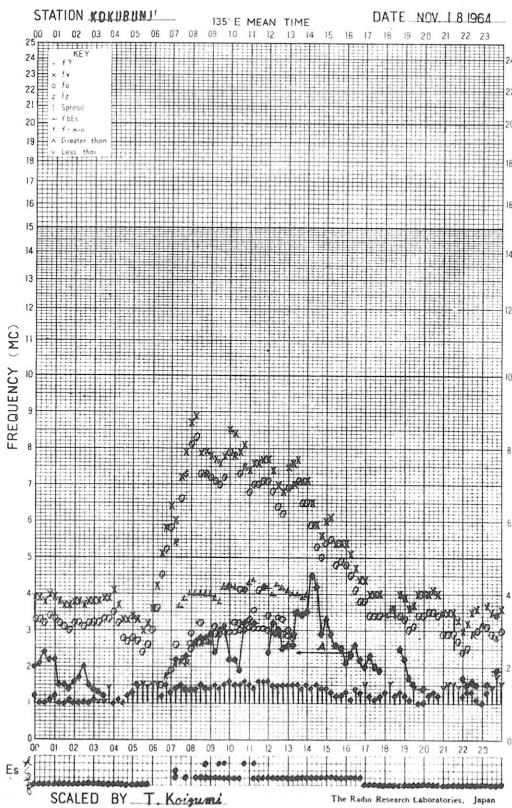
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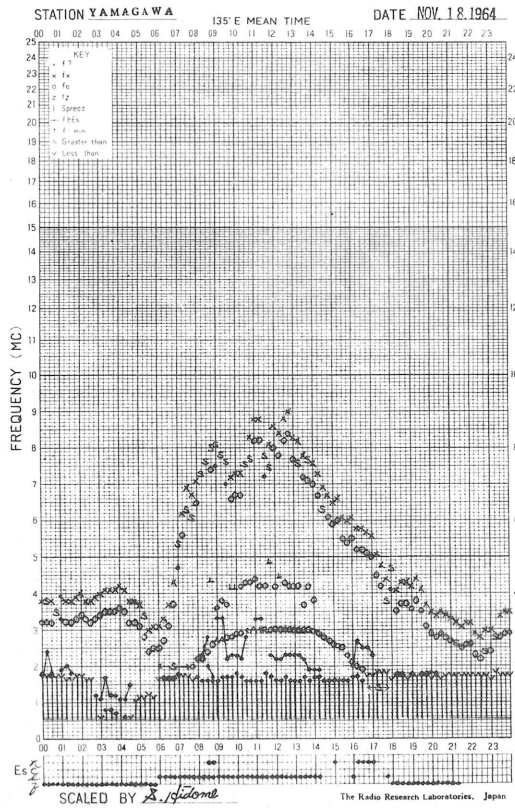
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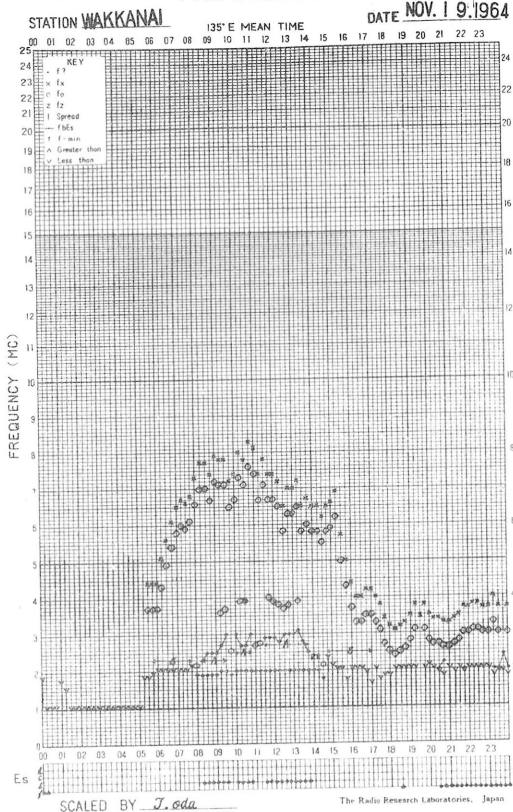
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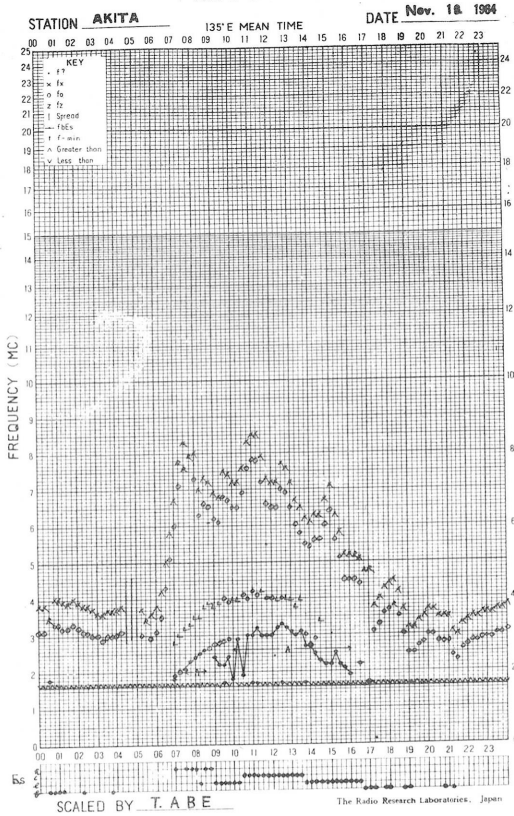
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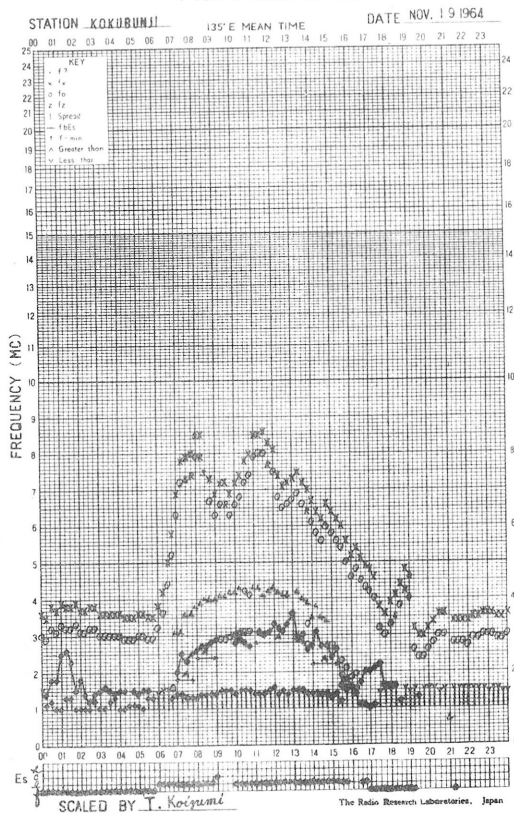
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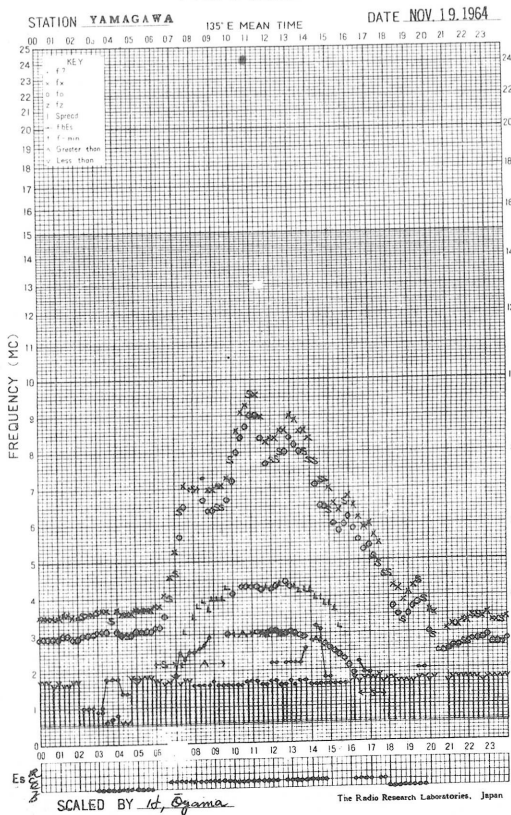
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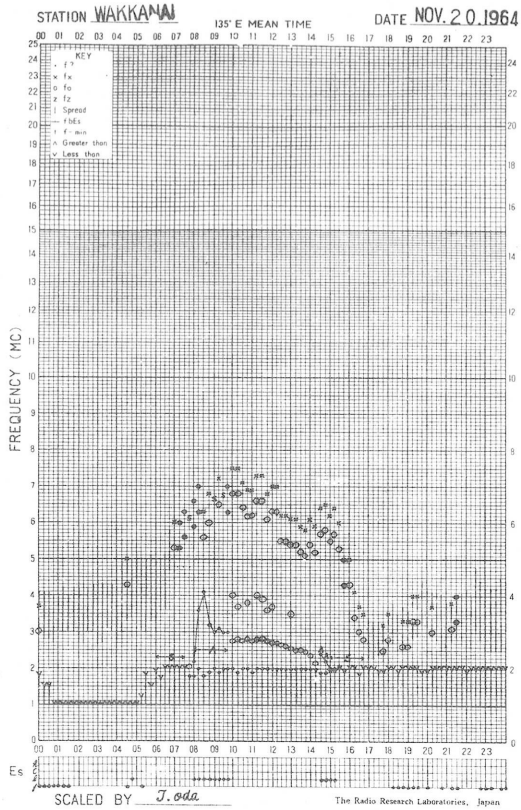
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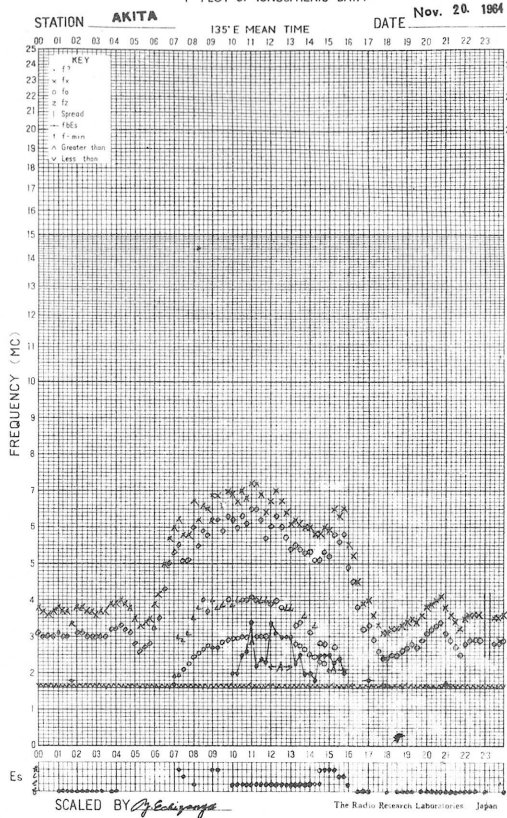
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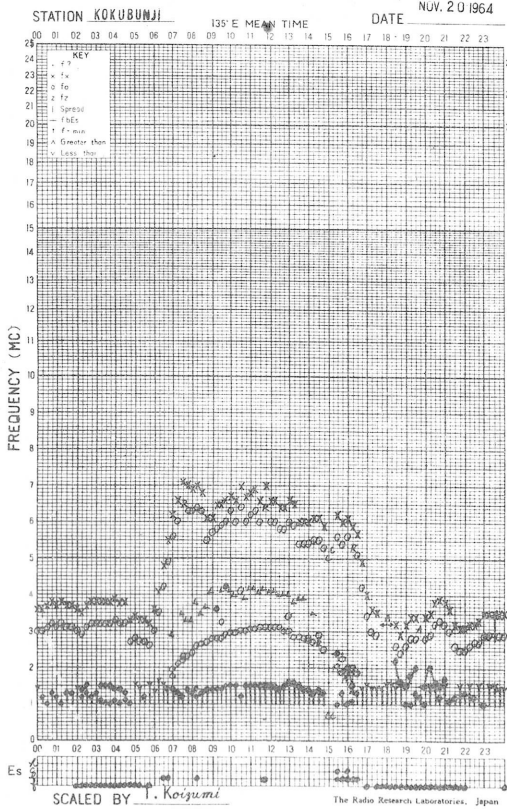
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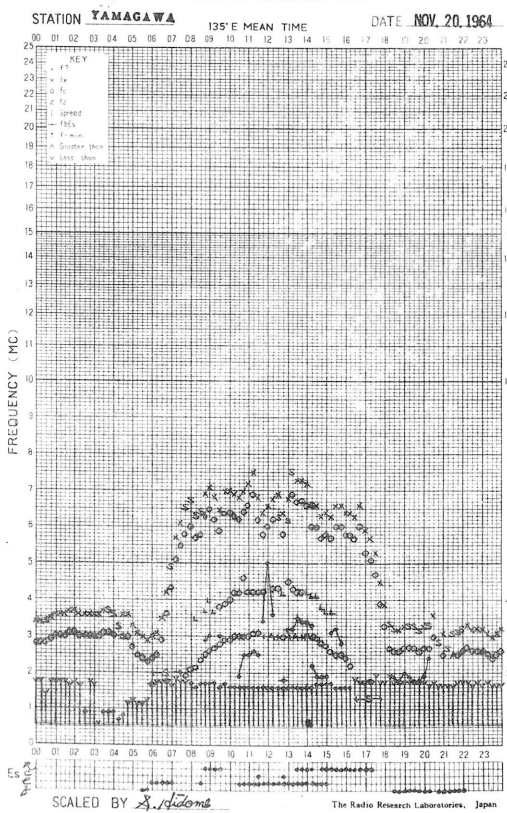
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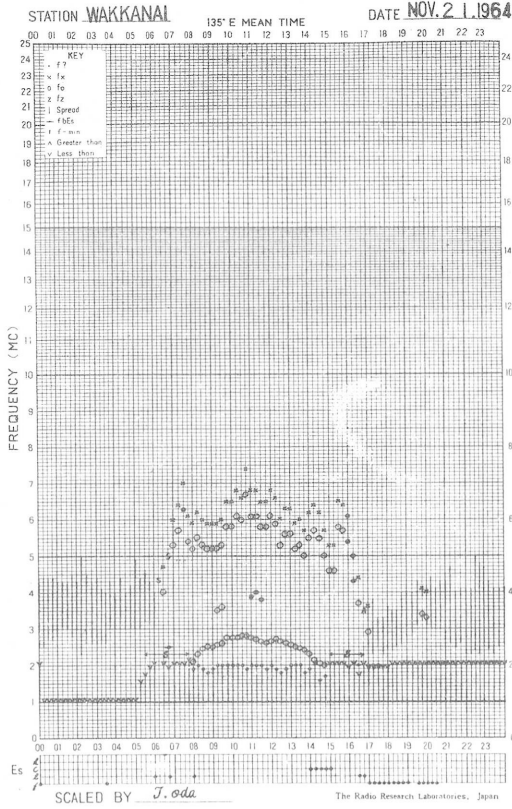
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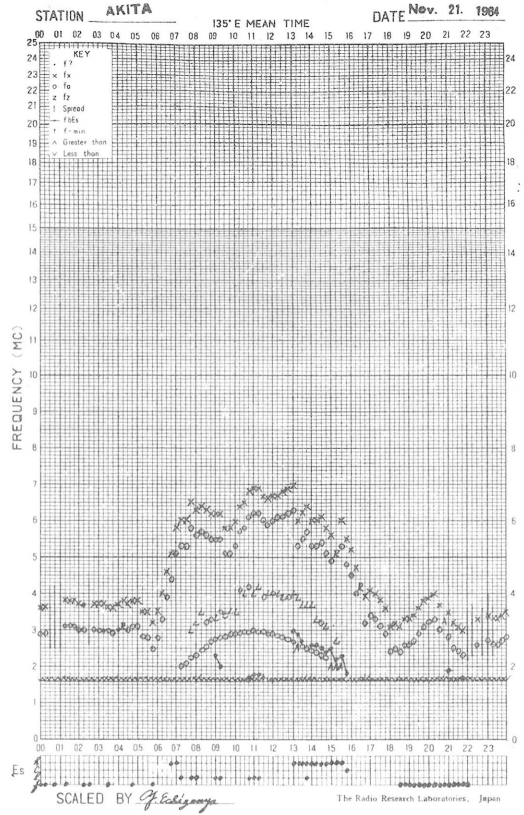
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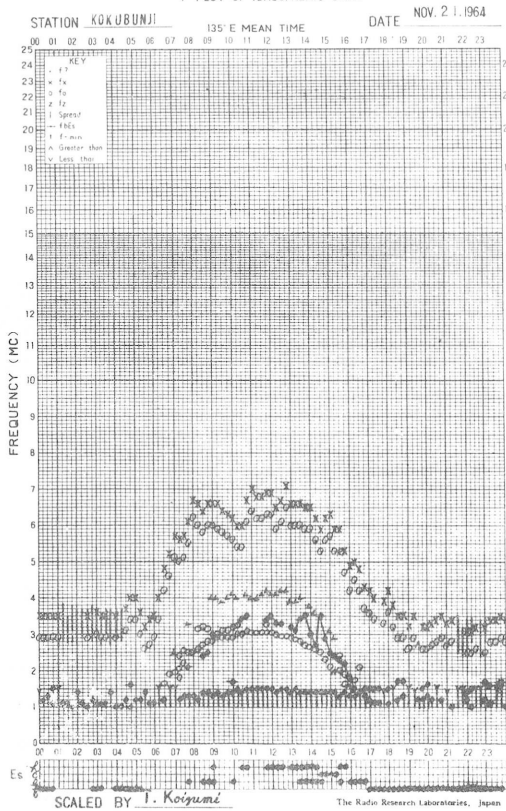
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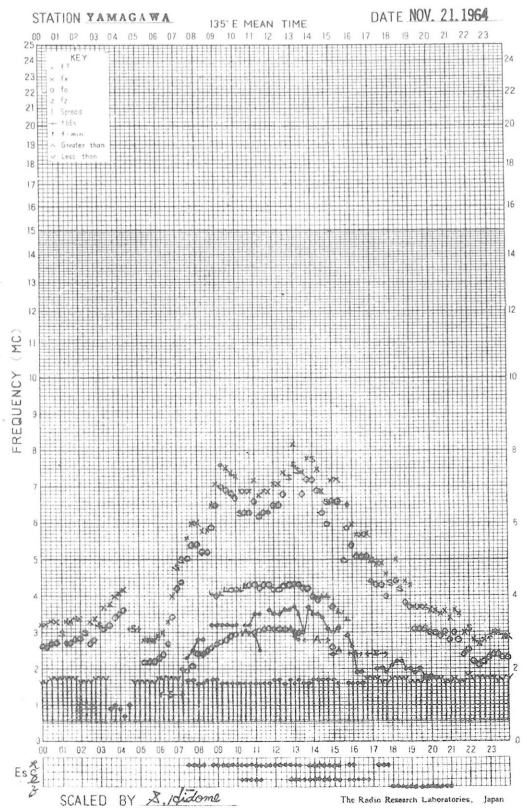
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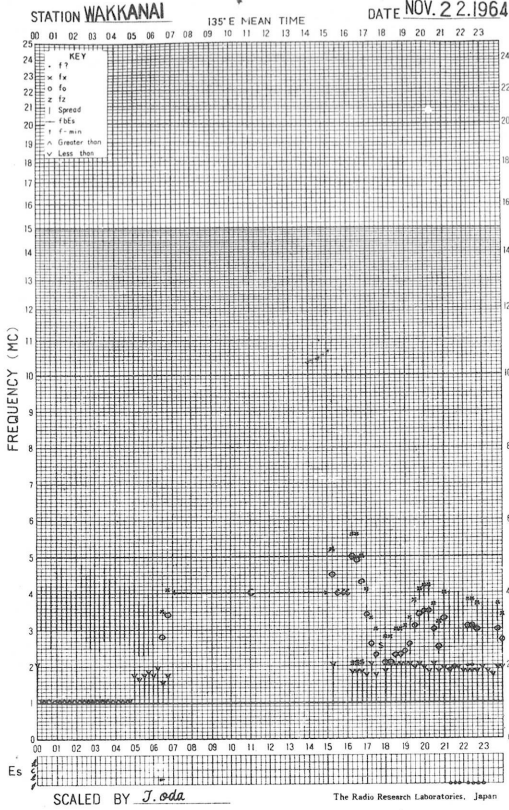
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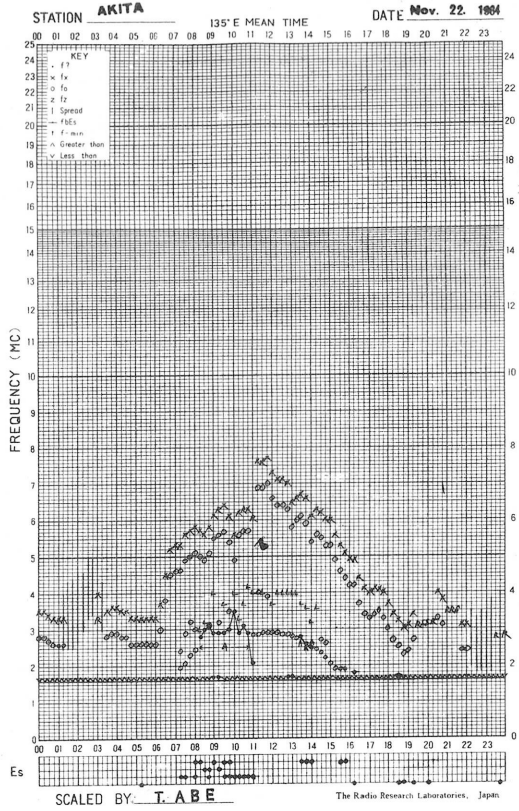
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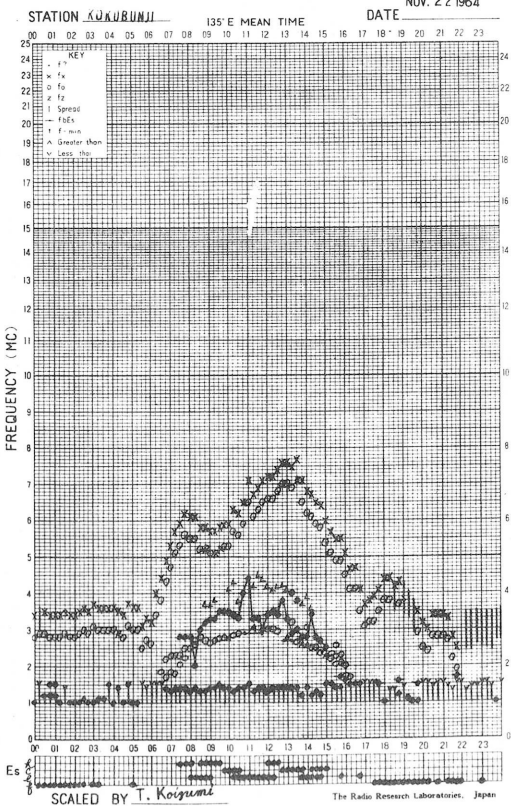
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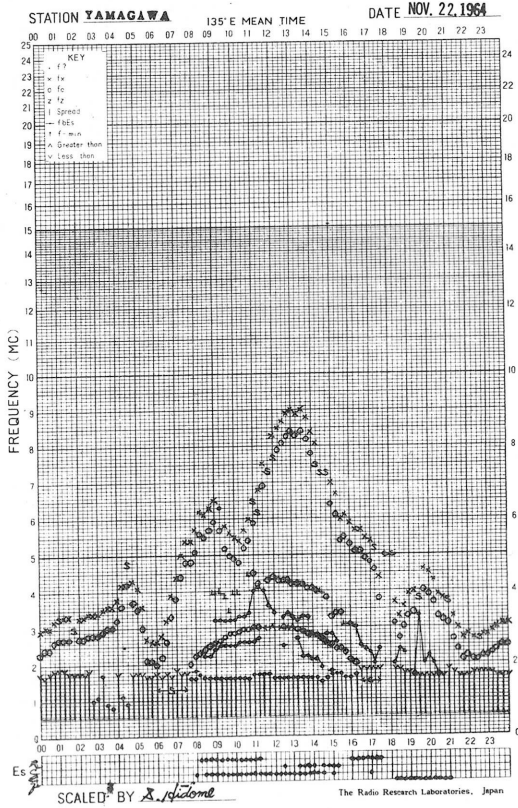
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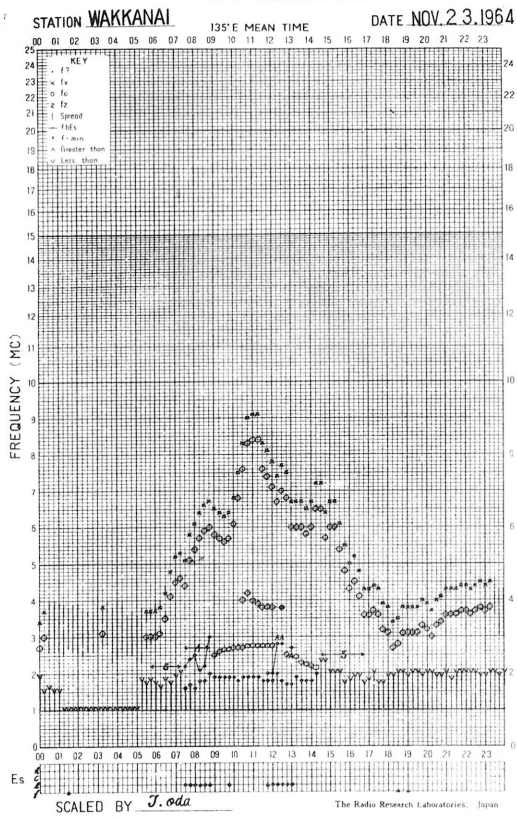
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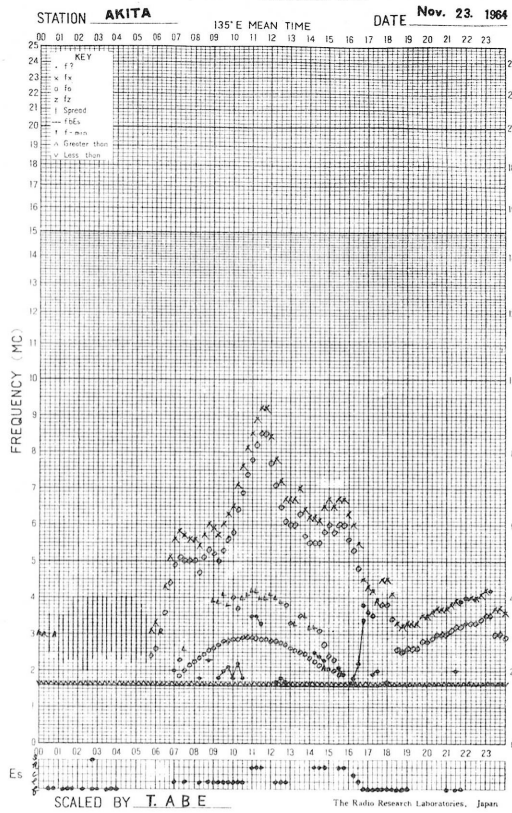
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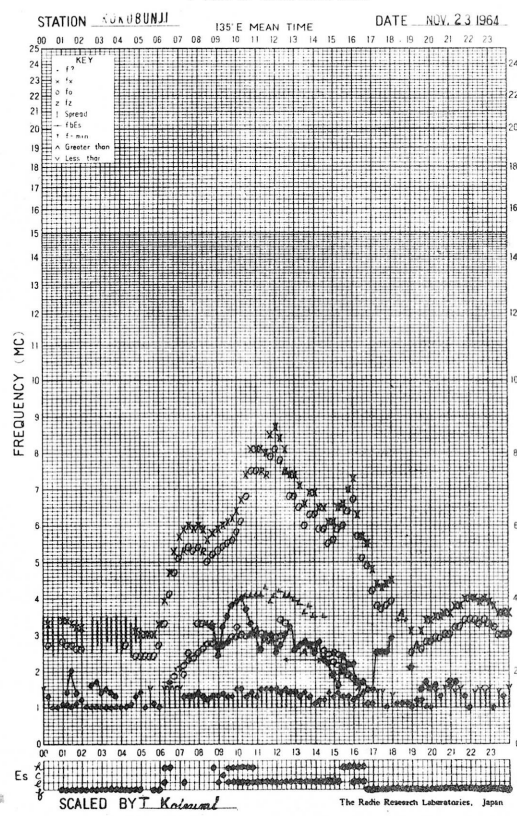
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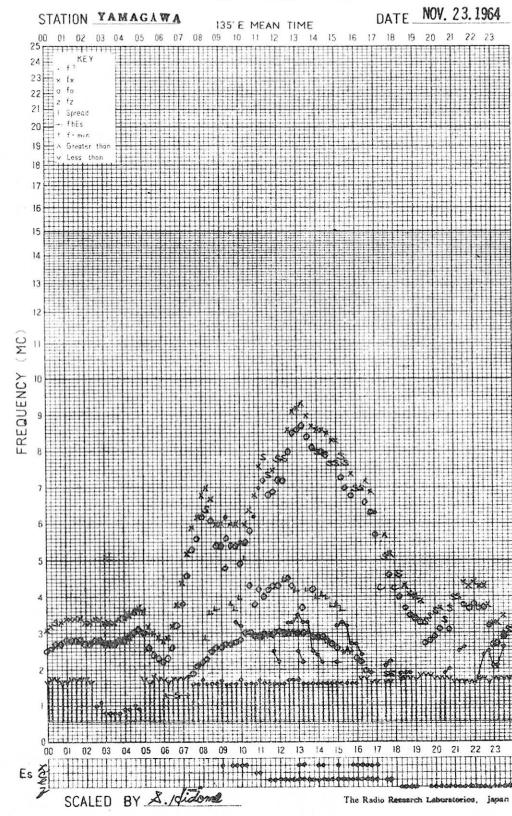
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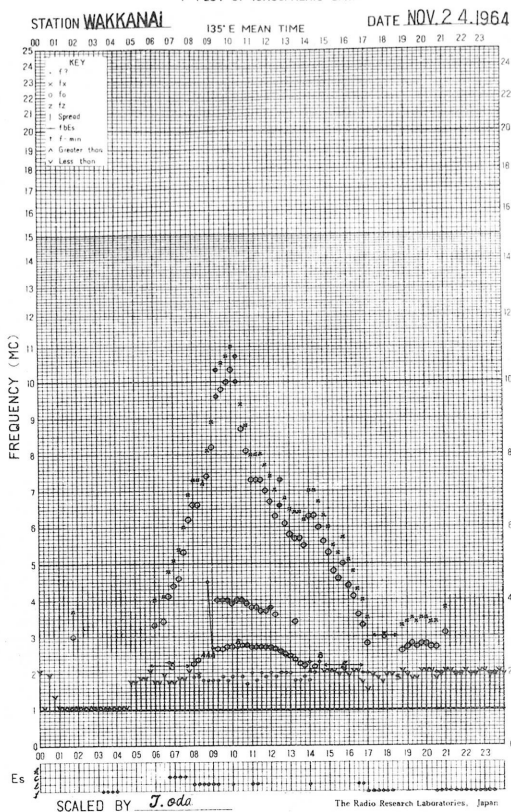
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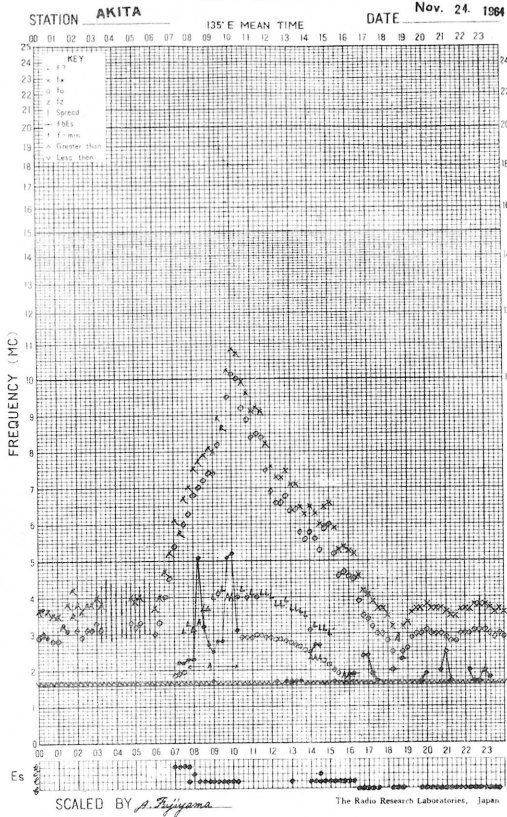
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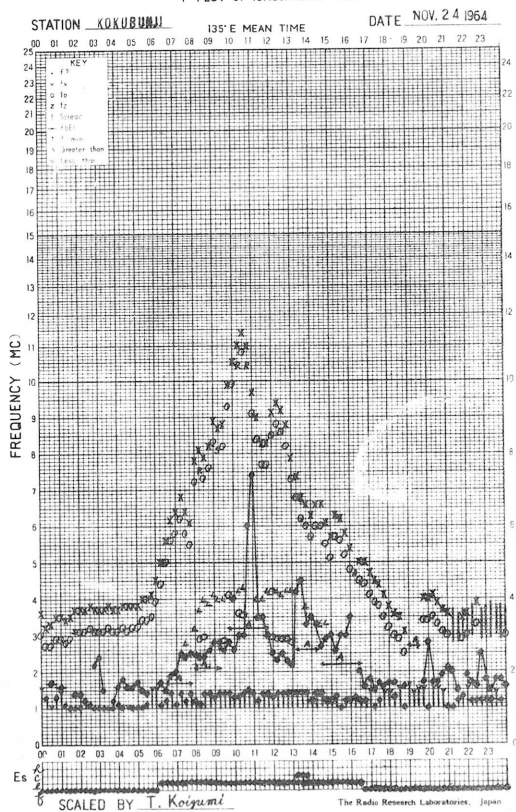
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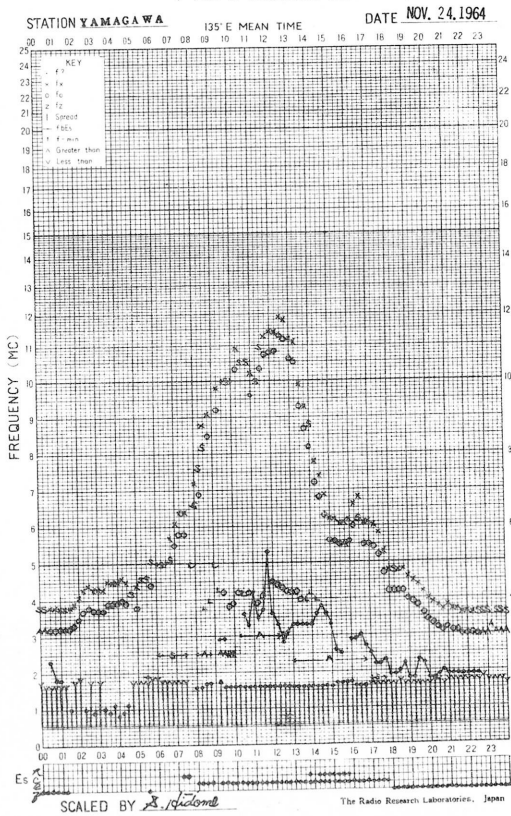
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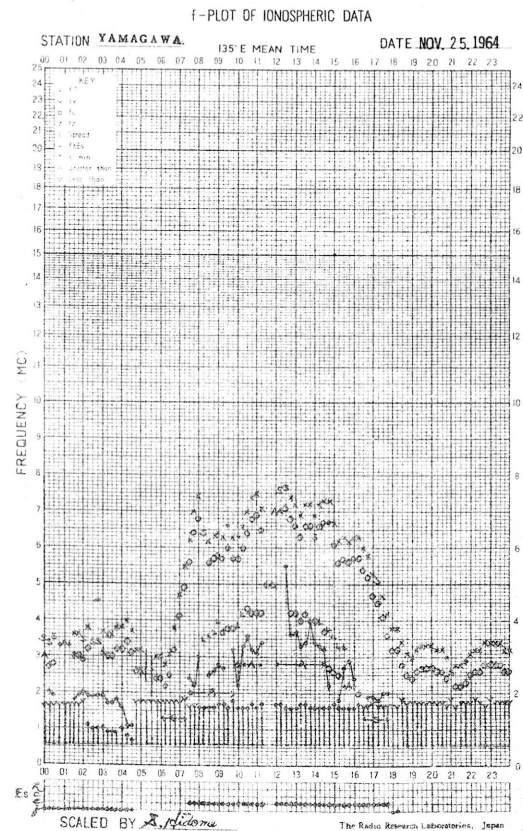
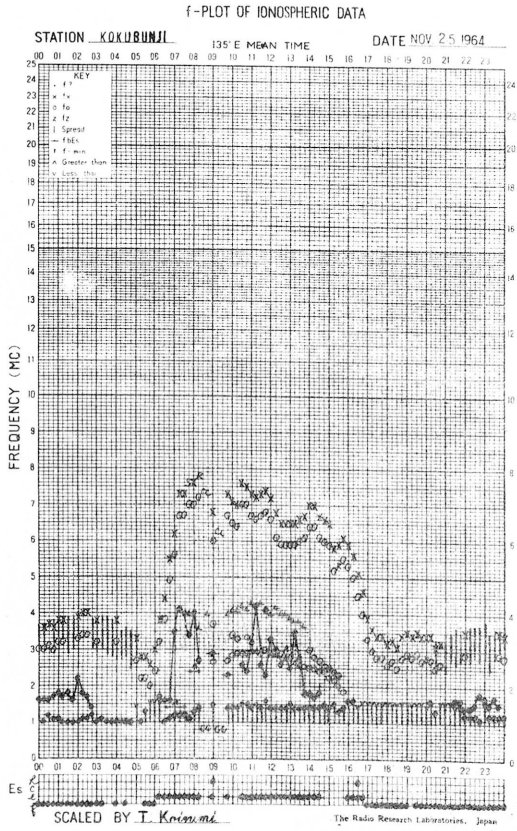
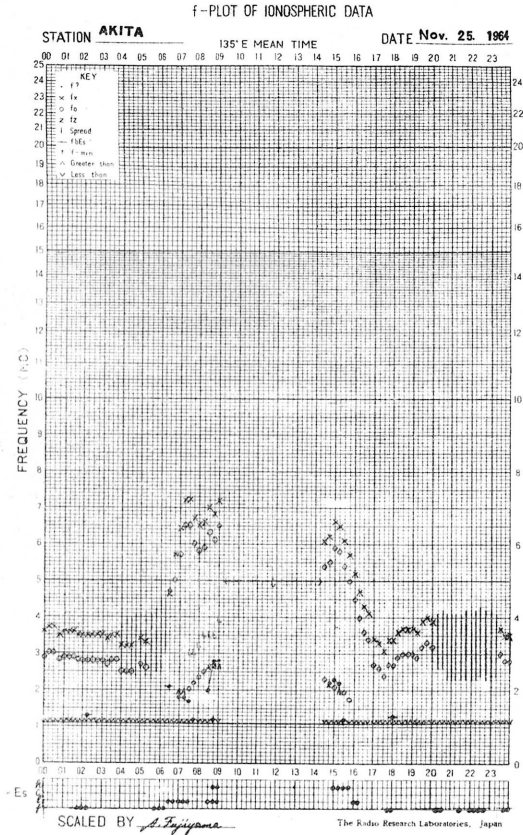
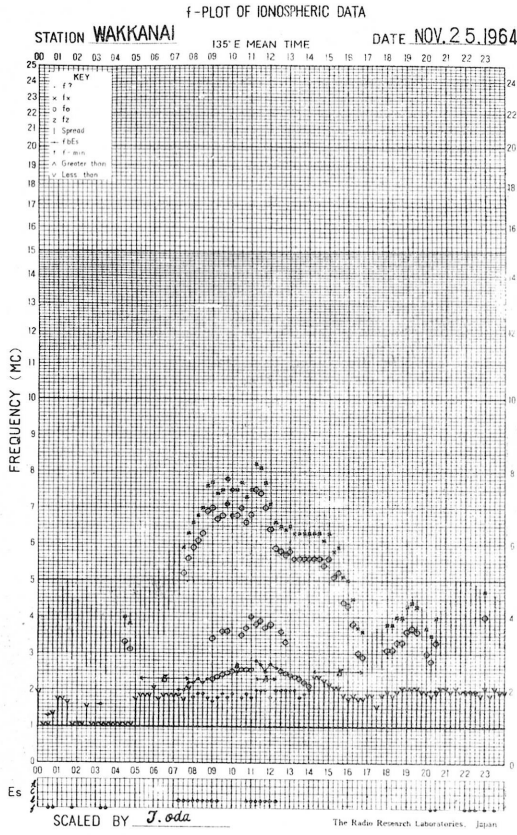


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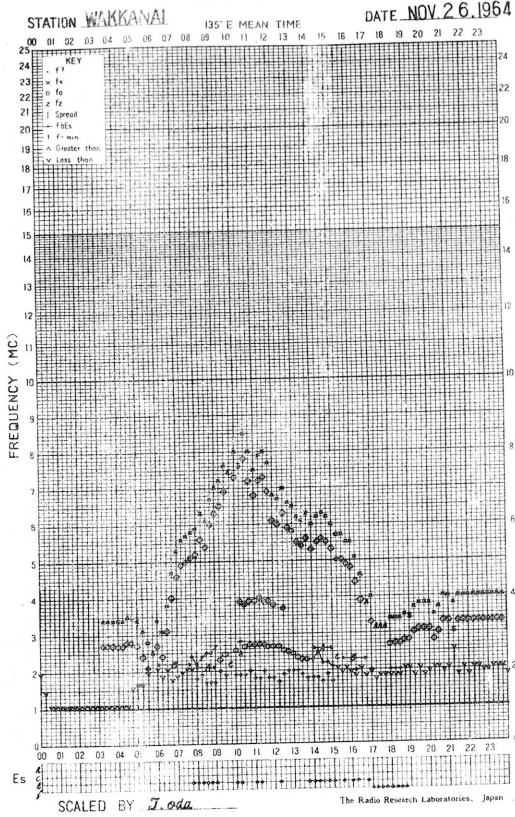


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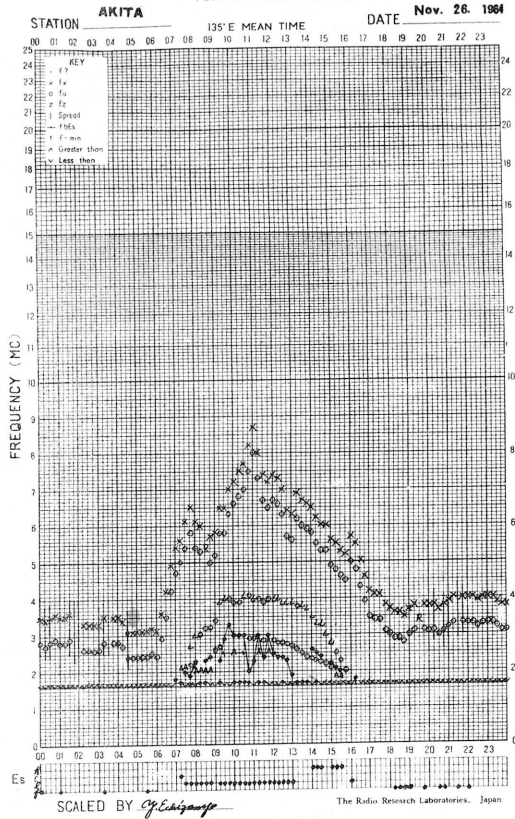




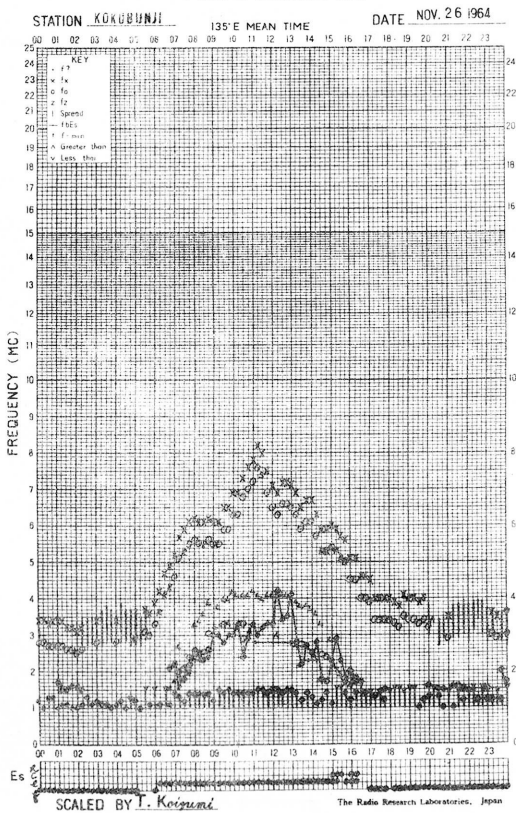
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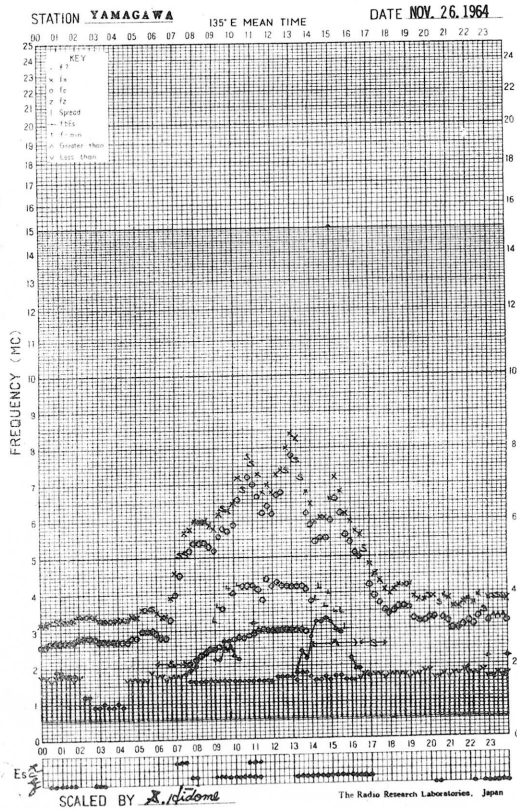
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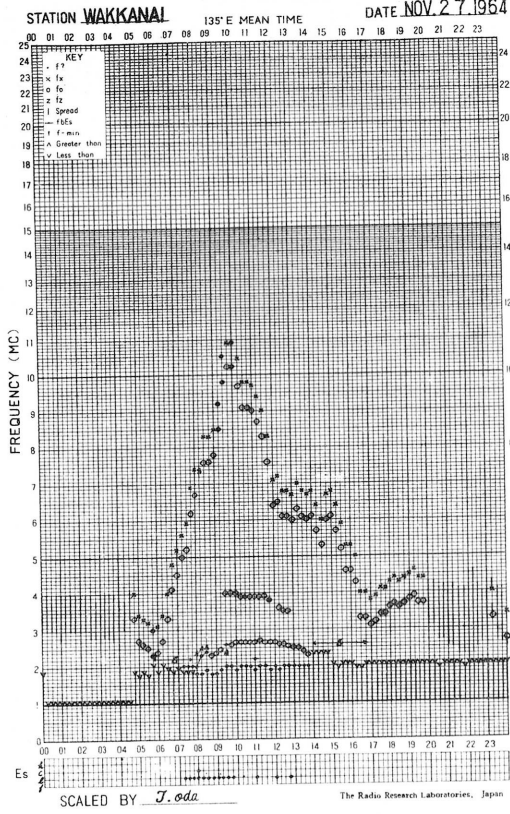
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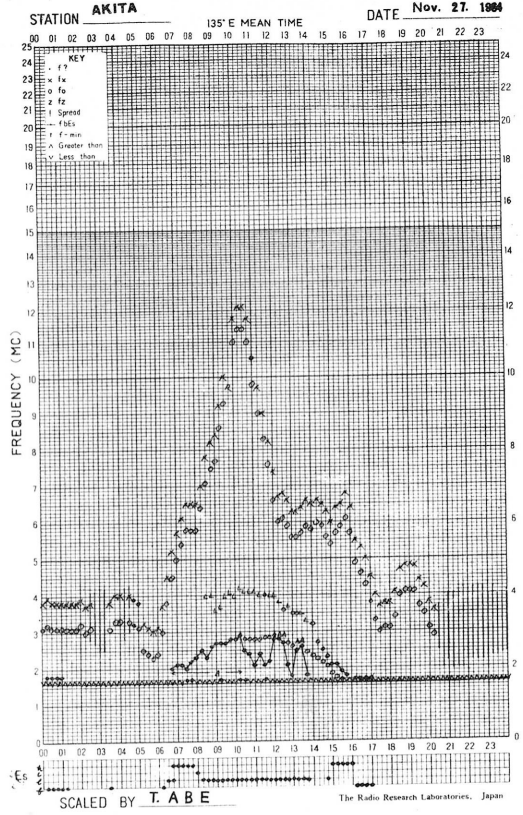
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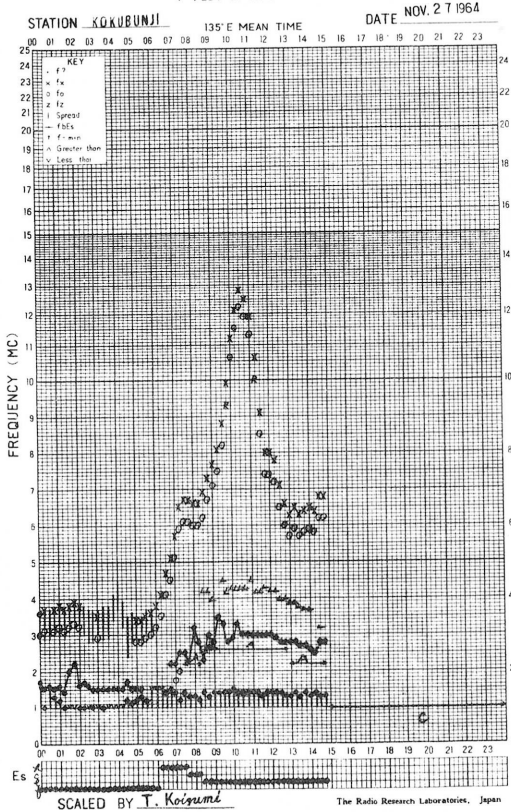
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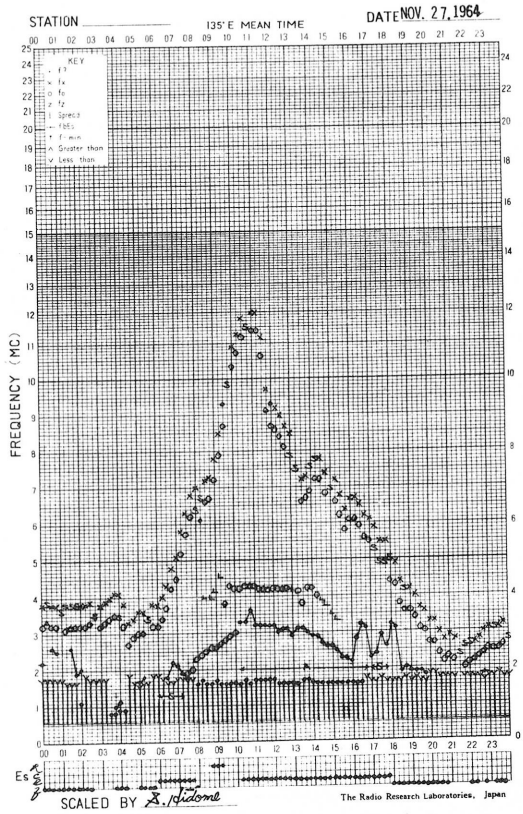
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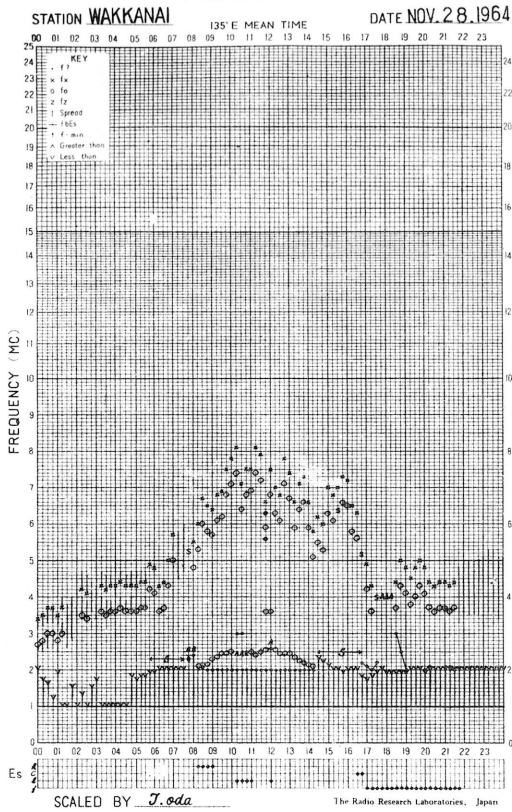
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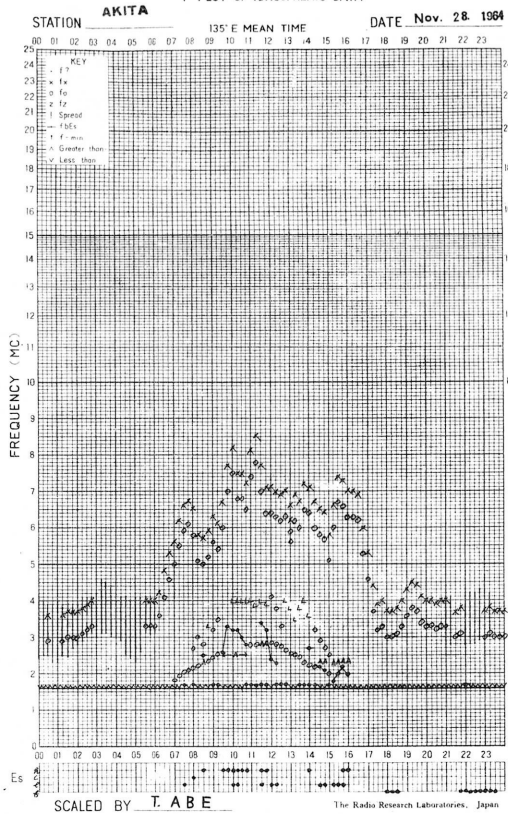
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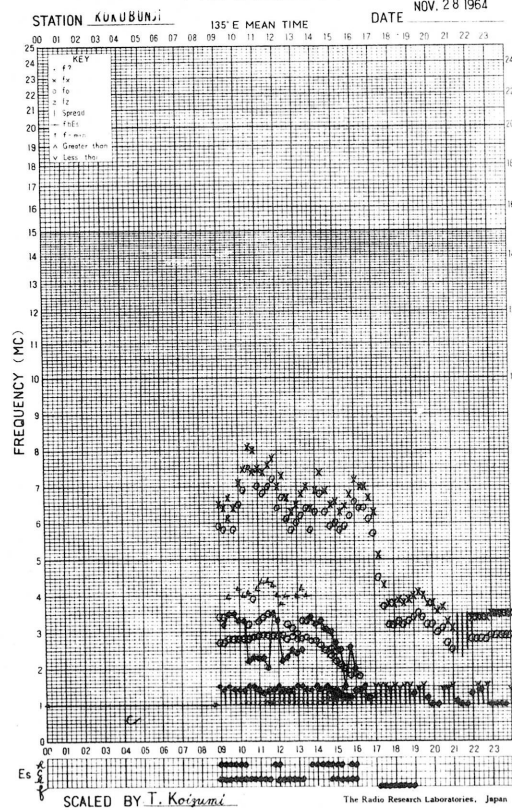
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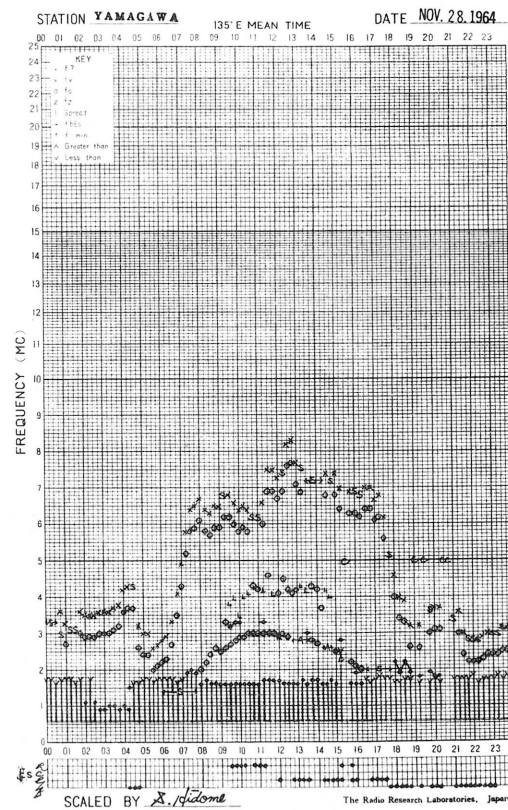
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f-PLOT OF IONOSPHERIC DATA



f-PLOT OF IONOSPHERIC DATA



Lat. 45° 23.6'N
Long. 141° 41.1'E

Wakkanai

IONOSPHERIC DATA

135° E Mean Time (G. M. T. + 9h)

M(3000)F2 0.01

Nov. 1964

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5	SF	SF	305F	FS	FS	FS	U130S	355S	U360S	345S	350	350	I355R	345	350	C	C	C	C	C	C	C	C	C	
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7	SF	315F	SF	330F	315F	SF	335	350	355	345	340	350	355	350	355	360	365	365	325	325	320	310	320	295	
8	295	295	295	300	315F	U360S	340	360	C	C	C	C	C	C	C	C	C	C	C	305	330	325	315	320	
9	SF	SF	325F	SF	SF	SF	SF	SF	355	375S	335	360	345	350	350	355	365	330	310	325	320	295F	SF	SF	
10	SF	340F	300F	SF	SF	SF	315	325S	350H	U350S	U325R	340	360	355	360	365	355	350	330	350	320	290	310S	305F	
11	SF	320F	305F	SF	300F	360F	335	365	360	355	340	360	345	350	SF	355S	365	I355A	I305A	325	330	315	295	SF	
12	SF	F	FS	F	F	FS	SF	345	U355S	U350S	345H	340	360	350	I360S	375	355	I335A	I330A	340	345	A	A	F	
13	F	I	315F	F	F	F	335F	355S	340	335	340	345	365	360	330	365	I355C	340	SF	FS	SF	SF	SF	SF	
14	SF	SF	SF	SF	SF	SF	SF	315F	350	350	345	360	355	375	365	380	350	360	I365A	I315A	325	A	SF	SF	
15	SF	SF	SF	F	F	F	320F	340	360	365	350	355	365	350	365	375	380	C	C	C	C	C	C	C	
16	C	C	C	C	C	C	C	C	350	335	340	360	360	360	360	365	360	350F	345F	SF	U325F	SF	SF	SF	
17	SF	290F	285F	SF	SF	SF	SF	A	340	345S	340	365	I350C	360	360	345	350F	345F	310	310F	330F	345F	315F	300F	
18	305F	SF	SF	SF	SF	SF	335F	365	U350S	360	345	355	360	365	365	355	340	I325C	320	330	SF	SF	SF	SF	
19	SF	SF	SF	SF	SF	SF	325F	375	340	355H	350	375	365	355H	370	360	380	345	310	320	330	310	310	305F	
20	325F	SF	SF	SF	SF	SF	SF	355S	U350S	I345S	355	350	350	365	365	365	370	SF	320F	310F	SF	SF	SF	FS	
21	FS	FS	F	FS	FS	FS	SF	375	370	380	345	360	360H	365H	345	350	U350S	345	SF	FS	350F	FS	FS	F	
22	SF	F	F	F	F	F	FS	C	C	C	C	C	C	C	C	C	C	355S	325	315	315F	275F	SF	SF	
23	310F	SF	SF	SF	SF	SF	335F	380	360	360	330	350	350	365	335	350	345	315	325	305	290	305	295	325	
24	SF	SF	SF	SF	SF	SF	SF	345F	340	335	315	355	360	350	315	365	360	355	I330S	315	320	285F	SF	SF	
25	SF	SF	SF	SF	SF	SF	SF	SF	375	365	U370S	360	365	360	365	360	365	SF	325F	335F	335F	SF	SF	315F	
26	SF	SF	SF	SF	SF	SF	325F	345F	370	350	345H	355	370	360	360	375	350	295S	330	320S	295	305	285	295	
27	SF	SF	SF	SF	SF	SF	345	335	345	335S	U345S	360	365	365	365	365	350	330	335	345	340	SF	SF	FS	
28	350F	320F	SF	SF	SF	SF	335	365S	360	370	350	350	355	375	380	350	340	360	I350A	340	340	325	SF	SF	
29	SF	FS	305F	F	SF	SF	SF	365	365	370	345	365	350	365	360	370	370	I340A	325	340	310	SF	F	F	
30	285F	290F	295F	285F	295F	310F	350	365	375	360	335	350	340	365	365	355	310H	375	310	345	305	320	310	285	
31																									
No.	6	8	12	3	7	8	19	24	26	27	28	28	28	28	27	27	27	25	25	26	23	18	11	9	
Median	310	310	305	300	315	330	335	355	355	350	345	350	355	360	360	360	360	345	345	325	330	325	320	310	305
U. Q.																									
L. Q.																									
Q. R.																									

M(3000)F2

Lat. 45° 23.6'N
Long. 141° 41.1'E

Wakkanai

IONOSPHERIC DATA

135° E Mean Time (G. M. T. +9h)

0.01

M(3000)F1

Nov. 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											400L	390	395											
2											U380L	385	395	395H										
3											400L	400	U400L											
4											395L	390	400	415L										
5											400	400H	400	395	410L									
6										C	385	385												
7											400L	400L	400											
8										C	C	C	C	C	C									
9											395L	400L	400L	U410L										
10											I390A	390	395	410L										
11											395	395												
12											400	400L	400L	375H										
13											400L	390		380L										
14											405	380	395	400										
15											395													
16											405L	I385A	385L	395L										
17											415	380L	395L	I400C										
18												U410L	375L											
19													410											
20												375L		385L										
21												U385L												
22											C	C	C	C	C									
23												375	395L											
24												385L	395	U410L										
25											395L		395H	410L										
26												400L	390L											
27												380L	385L											
28													410											
29												385L												
30													390L											
31																								
No.										3	19	23	20	9	1									
Median										405	395	390	400	395	410									
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

IONOSPHERIC DATA

Lat. 35° 42.4'N
Long. 139° 29.3'E

Kokubunji Tokyo

135° E Mean Time (G. M. T. + 9h)

km

fpF2

Nov. 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	330	A	F	F	240F	300F	270	240	1255C	255	250	290	255	I280C	260	250	245	A	305	290	290	340	300	320
2	320	340F	310	300	375F	295F	270	250	250	I290C	355S	300	290	255	290	290	J255S	250	A	305	I330A	345	345	300
3	310	340	345	305	250	290	280	255	260S	290	260	280	300	290	290	255	250	245	A	320	300	310	325	320F
4	305	310	350	320	270	255	260	250	250	285	250	260	285	290	255	250	250	255	255	260	I280A	305	I325A	310
5	340F	340	F	275	280	310F	305S	255	250S	255	J250R	260	265	295	255	250	250	250	250	300F	290	290	F	300F
6	F	U315F	300	305	F	260	270	260	255	255R	255	275	255	J260R	250S	245	250	240	290	290	290	F	295F	300F
7	300F	305	F	320F	250F	305F	260	255	250	250S	250	280	255	295	250	250	240	240	I270A	295	300	280	340	355F
8	310	320	355F	315	305	300	260	230	240	260	250	255	255	295	255	250	245	265	290	230	240	310	295	290
9	310	300	305	310	290	305	280	255	255	250	255	260	300	265	260	250	255	250	325	310	300	310	315	340
10	290	310	310	320	320	320	290	250S	J250S	260	260	295	275	250	J250S	250	250	240	A	300	280	290	300	F
11	U340F	340F	F	315	270	300	290	250	250	250	270	295	270	270	250	250	245	245	250	240	300	295S	300	310
12	345F	360	350	F	F	285F	270	250	250	260	270	250	290	295	255R	245	220	245	245	350F	F	300F	345	U350F
13	335F	355F	345F	J345F	290	290	260	255	250	290	J290R	250	260	290	250	250	245	225	290	250	A	A	325	355
14	330	310	345	F	F	F	290	250	245	260	255R	260	250	280	255	260	240	250	270	255	250	290	320	310
15	330	345	J340F	350	310F	300	295	255	245	255	255	255	255	255	255	250	240	250	340	295	270	290	345	360S
16	360	345	360	350	F	360F	290	240	255	265R	300	270	270	250	250	250	250	250	270	280	F	S	F	F
17	340	F	F	350F	295F	250	260	255	255	300	250	250	255	265	250	250	245	270	290	250	A	A	A	350F
18	340F	340F	330	325	270	290	300	270	255	260	255	250	250	275	250	260	250	280	I280A	270	290	250	315	I300A
19	340	345	300	310	300	300	310	260	250R	255	285	270	255	280	250	250	240	250	300	U245S	345	I290C	315	320
20	320	300	315	310	295	290	295	255	255	260	255	260	255	275	265	1250C	275	250	I260A	310	295	300	320	340
21	360	355F	F	315F	300F	245	250	240	255	255	255	275	250	260	260	250	240	260	280	250	250	300	310F	335
22	350	315	345F	340	295	250S	250	250	240	250	280	255	280	260	250	245	235	290	280	FS	250	230	390	F
23	F	320F	360F	F	F	300F	300	245	245	260	295	275S	265	255	270	270	250	250	260	250	370	350	350	295
24	295	390	325	355	360	350	280	255	295	270	290	255	290	250	255	255	250	230	270	A	305	315	310F	F
25	310F	310F	310F	305F	295F	340F	305	260	245	250	250	290	250	260	250	240	250	250	295	J295S	F	J295S	F	F
26	300F	345F	345	360F	310F	U310F	260	290	250	250	270	290	270	250	250	250	240	255	290	260	295F	355F	F	F
27	U340F	350F	360F	360F	F	305F	295	260	255	300	295	250	255	250	255	C	C	C	C	C	C	C	C	C
28	C	C	C	C	C	C	C	C	C	230	260	250	250	280	270	250	255	280	290	230	285	310	360F	360
29	340	300	290	310	310	310	260	240	250	250	310	260	260	250	240	250V	260	250	250	240	290	290	345	350
30	345	340	330	305	245	345	290	240	250	240	270	270	255	260	250	250	250	295	250	250	290	350	360	345
31																								
No.	27	27	23	25	23	23	29	29	29	30	30	30	30	30	30	29	29	28	26	26	25	24	25	23
Median	330	340	340	315	295	300	280	250	250	260	260	260	260	260	255	250	250	250	280	285	290	300	325	320
U. Q.																								
L. Q.																								
Q. R.																								

The Radio Research Laboratories, Japan

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

fpF2

Lat. 35° 42.4'N
Long. 139° 29.3'E

Kokubunji Tokyo

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

km
YPF2

Nov. 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	060	A	F	F	055F	055F	060	020	I040C	035	030	050	040	I045C	045	040	045	A	085	055	055	055	050	075
2	070	060F	090	090	065F	055F	055	045	040	I035C	045	045	060	045	060	060	J050S	045	A	090	I055A	060	060	055
3	075	050	045	050	040	060	060	045	040S	035	045	060	050	045	030	045	050	045	A	075	050	085	070	080F
4	090	070	075	065	050	055	060	040	045	040	050	060	040	040	045	040	040	055	045	045	I080A	065	I080A	085
5	055F	055	F	050	045	085F	050S	045	050S	035	J045R	050	045	045	040	025	045	050	055	045F	055	050	F	055
6	F	I045F	050	055	F	035	050	045	050	045R	045	035	040	J045R	020S	050	050	055	055	060	055	F	060F	050F
7	065F	090	F	075F	050F	085F	045	035	045	045S	030	045	045	050	035	030	030	060	I060A	065	050	070	050	050F
8	050	080	050F	030	055	050	045	030	040	040	040	045	040	030	045	045	020	045	060	040	060	085	055	060
9	085	050	075	050	055	090	030	040	045	045	045	065	050	045	040	045	055	055	075	050	050	070	045	065
10	050	085	085	080	080	080	055	040S	J050S	045	050	065	035	050	J040S	050	045	055	A	050	060	060	050	F
11	I065F	065F	F	080	070	055	060	040	045	045	030	040	050	045	030	040	050	055	055	055	095	060S	060	090
12	095F	080	050	F	F	055F	035	045	050	030	060	045	025	020	050R	025	050	050	055	095F	F	095F	065	I050F
13	065F	085F	060F	J055F	065	055	045	050	050	035	050	J050R	045	040	040	040	035	045	060	050	A	A	075	055
14	070	060	055	F	F	F	050	040	025	035	040R	040	045	040	040	035	040	045	070	055	050	060	090	085
15	070	055	J060F	050	085F	095	060	040	030	060	050	040	025	045	035	045	060	050	105	060	070	060	100	090S
16	085	055	085	095	F	090F	050	035	045	040R	050	030	030	040	045	050	060	070	085	F	F	S	F	F
17	060	F	F	095F	060F	035	050	045	045	035	050	045	045	060	040	050	055	075	055	055	A	A	A	095F
18	055F	060F	065	075	070	070	055	070	045	080	040	050	045	040	030	050	045	065	I050A	070	060	050	085	I070A
19	060	055	050	085	055	050	085	040	040R	050	030	040	045	045	030	030	055	050	055	I050S	060	I055C	090	080
20	080	055	080	085	050	055	060	045	050	080	045	040	045	050	I045C	070	060	060	I065A	085	060	055	080	060
21	090	060F	F	080F	060F	055	055	040	040	045	035	035	045	045	045	040	050	040	030	050	050	050	090F	065
22	095	080	055F	060	055	050S	060	040	025	045	030	040	035	040	045	025	060	065	065	F	F	050	060	F
23	F	080F	095F	F	F	060F	095	035	025	040	045	035S	040	045	040	075	040	050	045	050	080	050	065	045
24	055	065	070	055	065	050	070	040	045	055	055	060	025	040	045	040	050	065	045	A	055	085	035F	F
25	085F	085F	085F	050F	055F	065F	045	045	040	040	025	035	025	040	045	050	050	050	050	060	J065S	F	065F	F
26	050F	060F	055	080F	085F	I085F	055	070	040	045	030	025	050	040	035	045	055	045	055	050	050F	045F	F	F
27	I060F	065F	085F	090F	F	065F	060	040	050	065	045	035	040	050	050	C	C	C	C	C	C	C	C	C
28	C	C	C	C	C	C	C	C	C	C	045	040	030	030	030	055	040	045	060	065	060	090	085F	085
29	060	050	070	085	085	090	060	055	025	030	065	040	035	030	030	050V	055	070	060	055	060	055	055	050
30	060	070	070	055	045	055	065	055	040	030	035	035	045	045	045	040	040	060	050	065	060	095	085	055
31																								
No.	27	27	23	25	23	28	29	29	29	30	30	30	30	30	30	29	29	28	26	26	25	24	25	23
Median	065	060	070	075	055	060	055	040	045	045	045	045	040	045	040	045	050	050	055	055	060	060	065	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

IONOSPHERIC DATA

Yamagawa
 Lat. 31° 12' N
 Long. 130° 37' E

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

foE

Nov. 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	170	225	260	285	300	A	A	A	A	A	A	A	A	A	A	S						
2		S	S	240	260	280	295	A	A	A	A	A	A	A	A	A	245	S						
3		S	S	235H	270	290	I295R	300R	310	300	275	I235A	190											
4		S	S	240	I270A	280	290	I290A	270	260	240	S												
5		S	S	235	C	C	C	C	C	C	C	C												
6		S	S	C	270	290	I300A	310	310	290	270	240	S											
7		S	S	A	220	260	280	290	A	A	A	A	A											
8		S	S	215	250	280	285	R	R	A	A	230	S											
9		S	S	230H	270H	285	300R	310	295	I290A	270	A	S											
10		C	C	I205G	I205G	I275G	290	290	280	280	260	220	S											
11		S	S	220	270	300	305	310	305	290	260	200	S											
12		S	S	225	260	290	300	300	A	A	A	A	S											
13		S	S	230	270H	290	I305R	300	I285A	I255A	220	S												
14		S	S	225	260	280	A	A	A	A	A	A	S											
15		S	S	230H	280	300	I305R	300	300	290	260	220	S											
16		S	S	195	245	290	310	320	310	300	265	200	S											
17		S	S	A	A	A	300	305	I300A	300	270	A	S											
18		S	S	220	I265A	290	I300A	300	300	295	260	210	S											
19		S	S	A	A	I300A	I305A	310	305	280	260	210	S											
20		S	S	210	260	290	300	I305A	I300A	I300R	275	240	S											
21		S	S	240	270	295	300	310	300	I285A	260	A	S											
22		S	S	220	260	285	300	I300A	I295A	I280A	250	210	S											
23		S	S	220	260	280	290	305	300	290	260	230	S											
24		S	S	A	C	R	A	A	A	A	A	A	S											
25		S	S	A	A	280	A	A	A	A	260	I215A	S											
26		S	S	220	250	275	290R	300	300	A	A	A	S											
27		S	S	230	260	300	A	A	A	A	A	A	S											
28		S	S	200	250	290	300	I300R	I285A	270	250	210	S											
29		S	S	200	250	270	290	290	A	A	A	A	S											
30		S	S	210	260	280	I295R	300	I290A	I280A	250	220	S											
31																								
No.			1	25	25	27	25	21	19	18	20	18	1											
Median			170	220	260	285	300	300	300	290	260	220	190											
U. Q.																								
L. Q.																								
Q. R.																								

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

Nov. 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	023M	S	021	S	J021	J022	021M	S	026	030	034	J038	J053	043M	099	J037	J051	030M	021	023M	022	021	S	S
2	S	J018	022	S	B	020	S	024	026	028	032	034	J052	J038	J037	033	043	J037	C	J020	J015S	S	021M	020M
3	023M	J033	J021	S	J018	S	S	S	027	028	J032	029G	027G	028G	028G	021G	J024	J053	J038	084	043M	023M	021M	J026
4	J022	S	022	021	021	S	S	020	G	031	031	030	J051	033	J039	035	J042	030	J029	J033	J025	J032	J018	J032
5	J018	S	J020	B	B	S	S	J017S	026	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	S	S	S	S	S	S	S	C	028	G	032	G	G	J051	G	G	J015S	S	S	S	S	S	J021
7	J052	J021	J037	J020	J019	J017S	J017S	024	J026	030	J037	J051	J051	J053	J039	029	030	J024	J020	021	021	J031	J015S	J016S
8	S	J015S	J030	022M	B	S	J020	J020	026	035	036	J037	G	G	J051	029	021G	021	J024	S	S	S	S	S
9	S	J015S	J015S	B	B	S	S	G	G	G	031	G	036	J038	034	027	026	J022	J024	J030	J024	S	S	S
10	S	S	S	C	C	C	C	C	C	C	C	032	031	032	029	027	G	023	S	S	S	S	S	S
11	S	S	B	J015	B	S	S	G	024	020G	032	038	036	037	034	038	028	022	J023	J020	J017S	S	J021	021
12	S	S	J015	S	J014	S	S	J020	G	032	035	034	J041	J047	J033	J037	J036	J023	023	021	J021	S	S	J031
13	J036	J023	J018	J015	J015S	S	S	021	029	033	036	038	G	J038	J035	J033	021G	026	J024	J030	J015S	S	S	S
14	S	S	J015S	B	S	021	S	S	028	032	J042	J061	J051	J054	038	044M	J038	J031	J022	S	S	J021	S	S
15	S	S	S	J019	J015	S	J015S	J015S	G	G	G	J051	G	G	030M	021G	J031	S	S	S	S	S	S	024
16	J024	J026	021	J018	012	S	S	S	022	028	031	034	034	G	033	028	023	S	S	S	S	S	S	022M
17	J032	J024	022M	S	020M	S	S	S	J026	J053	J037	G	J033	J037	030G	030	024	019	J032	J027	J020	C	J015S	S
18	J022	030	021	020M	J014	J014S	J016S	024	021G	J036	J032	J037	J033	031	021G	027	021	024	021	J021	J019	J016S	S	S
19	S	S	S	J015	J020	J019	S	022	033	J031	J038	J037	028G	029G	J032	027	G	021	J016S	J018S	S	S	S	S
20	S	S	S	S	B	S	S	024M	G	030	G	J030	J053	032	034	030	027	021	S	021	J022	J016S	021	S
21	S	S	S	S	B	S	S	S	028	032	032	035	036	038	036	030	027	S	021	J021	024	J018S	S	S
22	S	S	S	B	B	S	S	S	019G	033	033	043	J038	J038	030	029	031	027	C	J022	J024	J015S	S	S
23	S	S	S	B	B	S	S	S	G	027	033	031	027G	037	032	033	030	021	C	J015S	J022	022	024	024
24	J029	J021	S	S	B	S	S	S	022	C	023G	J052	J053	J051	J036	J042	J035	J027	J024	021	J032	J032	J022	J032
25	J030	043M	J022	J023	J016	S	S	S	031	028	J032	J037	J066	J051	J039	021G	J029	J022	J020	S	S	S	S	S
26	S	J026	S	J017	B	S	S	J015S	022G	026	030	033	G	G	031	J035	022	J015S	S	S	S	S	S	J022
27	J032	J030	J020	S	J015	J021	J015S	J022	G	029	G	J038	J037	J032	037	J029	J027	J032	J032	J020	J015S	S	J015S	S
28	S	S	B	B	B	S	S	S	G	G	035	035	029G	029	G	024G	022	J016S	J022	C	J021	J016S	J014S	J014S
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30	S	S	J018	J016	J016S	J026	J015S	J015S	G	028	031	027G	027G	J032	031	028	028	J019	J018	J021	021	S	S	S
31																								
No.	12	13	17	12	14	8	8	16	28	27	28	29	29	29	29	29	29	26	20	20	19	12	11	13
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U. Q.	032	030	022	020	020	022	020	022	026	032	035	038	051	040	038	035	032	027	024	025	024	027	021	028
L. Q.	022	020	018	016	015	018	015	015	G	028	031	032	G	G	030	027	022	021	020	020	017	016	015	020
Q. R.	010	010	004	004	005	004	005	007	004	004	004	006			008	008	010	006	004	005	007	011	006	008

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

foEs

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

Yamagawa

Lat. 31° 12.1'N
Long. 130° 37.1'E

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

f_oF₂

Nov. 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
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2	S	E	018	S	B	E	S	023	G	G	G	G	046	035	035	033	040	E037S	C	E020S	S	S	E	E
3	E	029	020	S	017	S	S	S	G	G	025	E029R	025G	025G	022G	018G	G	045	E038S	A	018	E	019	E
4	017	S	E	E	E	S	S	G		E031R	E031R	G	034	033	039	032	041	029	029	019	024	026	017	E032S
5	E	S	018	B	B	S	S	S	G	G	G	G	C	C	C	C	C	C	C	C	C	C	C	C
6	C	S	S	S	S	S	S	S	C	G	E032R				022			S	S	S	S	S	S	018
7	A	018	A	E	018	S	S	E024S	G	G	032	038	033	037	033	028	024	020	E	019	018	E031S	S	S
8	S	S	018	S	B	S	E	G	G	032	034	036			032	027	018G	G	019	S	S	S	S	S
9	S	S	S	B	B	S	S	S	G		G		034	034	032	025	024	020	024	E030S	019	S	S	S
10	S	S	S	C	C	C	C	C	C	C	C	032	G	G	024	020		G	S	S	S	S	S	S
11	S	S	B	011	B	S	S	S	G	019G	G	036	034	035	032	038	027	021	022	018	017	S	019	E
12	S	S	S	S	S	S	S	019	G	G	G	G	041	039	033	032	023	017	E	018	019	S	S	E
13	019	018	016	011	S	S	S	020	028	032	033	037		033	035	032	019G	G	022	027	S	S	S	S
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15	S	S	S	017	011	S	S	S	G	G	G	032			022	019G	019	S	S	S	S	S	S	018
16	019	018	018	E	010	S	S	S	G	G	G	G	G	G	G	G	G	S	S	S	S	S	S	E
17	A	018	E	S	017	S	S	S	G	032	033		029	033	029G	022	022	018	026	026	E	C	S	S
18	018	019	E	011	E	S	S	018	G	033	023	033	022	023	019G	G	020	023	E	E	018	S	S	S
19	S	S	S	E	018	018	S	019	025	029	032	032	022G	022G	023	018		019	S	S	S	S	S	S
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21	S	S	S	S	B	S	S	S	028	032	032	035	035	037	035	030	026	S	021	020	018	S	S	S
22	S	S	S	B	S	S	S	S	018G	032	032	040	034	033	G	028	031	023	C	E022S	022	S	S	S
23	S	S	S	B	B	S	S	S	G	G	032	G	022G	035	G	032	027	G	C	S	S	E022S	E	021
24	E029S	018	S	S	B	S	S	S	G	C	E023R	042	036	033	033	033	029	025	019	018	018	019	019	A
25	A	A	020	019	016	S	S	S	030	028	022	031	A	037	034	G	024	019	E	S	S	S	S	S
26	S	019	S	S	B	S	S	S	020G	022	023	032			028	032	022	S	S	S	S	S	S	022
27	022	E030S	020	S	011	017	S	021	G			032	032	029	029	026	022	023	032	019	S	S	S	S
28	S	S	B	B	B	S	S	S			033	G	G	G	G	G	019	S	022	C	018	S	S	S
29	S	S	S	B	B	S	S	S	029	032	032	032	032	033	032	031	031	023	018	S	S	S	S	S
30	S	S	017	016	S	E026S	S	S	G	022	E027R	022G	G	031	028	028	019	018	018	018	E	S	S	S
31																								

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

The Radio Research Laboratories, Japan

Y 5

f_oF₂

No.
Median
U. Q.
L. Q.
Q. R.

IONOSPHERIC DATA

Lat. 31° 12' 17N
Long. 130° 37' 17E

Yamagawa

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

f-min

Nov. 1964

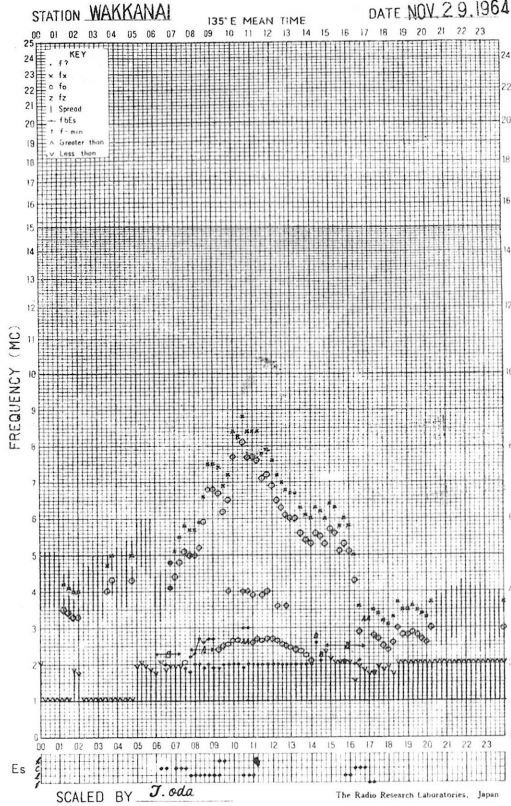
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4	E016S	E016S	E017S	E017S	E017S	E017S	E016S	E016S	016	016	016	016	016	016	016	016	016	E017S	E017S	E018S	E017S	E016S	E016S	E016S
5	E016S	E017S	E016S	009	030	E017S	E017S	E016S	016	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	E016S	E016S	E016S	E016S	E016S	E017S	E017S	C	016	016	016	016	016	016	017	016	E017S	E017S	E016S	E016S	E016S	E017S	E017S
7	E016S	E016S	E016S	E017S	006	E017S	E017S	E016S	016	016	016	017	017	017	016	016	016	E016S	E016S	E018S	E017S	E017S	E017S	E018S
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9	E017S	E017S	E016S	010	008	E017S	E016S	E017S	016	016	017	016	016	017	017	017	017	E016S	E017S	E018S	E018S	E017S	E017S	E017S
10	E017S	E017S	E017S	C	C	C	C	C	C	C	C	017	016	017	018	016	016	E018S	E017S	E018S	E017S	E017S	E017S	E017S
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12	E017S	E017S	010	E016S	008	E017S	E017S	E016S	016	016	016	016	017	017	017	017	017	E016S	E017S	E016S	E017S	E017S	E017S	E017S
13	E017S	E017S	010	010	009	E017S	E017S	E019S	016	016	016	016	018	016	016	017	016	E017S	E017S	E018S	E017S	E018S	E017S	E018S
14	E018S	E017S	E018S	011	E016S	E016S	E018S	E018S	017	016	016	017	017	018	017	017	016	E017S	E017S	E017S	E016S	E019S	E017S	E018S
15	E018S	E017S	E017S	009	010	E017S	E017S	E018S	017	016	016	016	017	017	016	016	016	E018S	E017S	E018S	E017S	E018S	E016S	E017S
16	E017S	E017S	011	010	007	E017S	E017S	E017S	017	016	016	016	017	017	017	016	016	E018S	E015S	E017S	E016S	E016S	E017S	E016S
17	E017S	E016S	E017S	E018S	012	E016S	E016S	E017S	016	016	016	017	018	017	017	016	016	E016S	E016S	E016S	E016S	C	E017S	E018S
18	E017S	E017S	E017S	E	011	E016S	E016S	E017S	017	016	018	016	016	016	017	016	017	E017S	E016S	E017S	E016S	E017S	E017S	E016S
19	E017S	E017S	E017S	009	008	E017S	E017S	E018S	016	017	016	016	016	017	016	016	016	E017S	E017S	E016S	E016S	E016S	E017S	E017S
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21	E016S	E017S	E016S	E017S	009	E016S	E017S	E017S	016	017	016	016	017	016	017	017	016	E017S	E017S	E016S	E016S	E016S	E018S	E017S
22	E017S	E018S	E017S	011	E017S	E017S	E017S	E018S	016	016	016	017	016	016	016	016	016	E018S	C	E017S	E016S	E018S	E016S	E017S
23	E016S	E016S	E017S	008	009	E017S	E017S	E017S	017	017	017	017	016	016	016	016	016	E017S	E016S	E016S	E016S	E017S	E016S	E017S
24	E016S	E016S	E018S	E017S	008	E017S	E018S	E017S	016	C	016	016	016	016	016	016	016	E017S	E016S	E016S	E016S	E017S	E016S	E017S
25	E016S	E016S	E017S	010	010	E017S	E017S	E017S	016	017	016	016	017	016	016	016	016	E017S	E016S	E016S	E017S	E016S	E017S	E018S
26	E017S	E017S	E017S	009	010	E016S	E017S	E017S	016	016	016	016	016	017	017	016	016	E017S	E017S	E016S	E016S	E016S	E017S	E016S
27	E017S	E017S	011	E017S	009	E015S	E018S	E017S	016	017	016	016	016	016	016	016	016	E016S	E016S	E016S	E016S	E018S	E017S	E016S
28	E017S	E017S	011	009	010	E017S	017	017	016	016	016	016	017	016	017	016	016	E017S	E016S	E016S	C	E017S	E017S	E018S
29	E018S	E016S	E017S	009	008	E016S	E017S	E017S	017	016	017	016	016	016	016	016	016	E017S	E017S	E017S	E017S	E016S	E018S	E017S
30	E017S	E018S	E016S	006	E015S	E016S	E017S	E019S	017	017	016	017	017	017	016	016	016	E017S	E017S	E016S	E016S	E017S	E018S	E018S
31																								
No.	29	30	30	17	24	28	29	29	28	27	28	29	29	29	29	29	29							
Median	E017	E017	E017	009	009	E017	E017	E017	016	016	016	016	017	017	016	016	016	E017	E017	E017	E017	E017	E017	E017
U. Q.																								
L. Q.																								
Q. R.																								

The Radio Research Laboratories, Japan

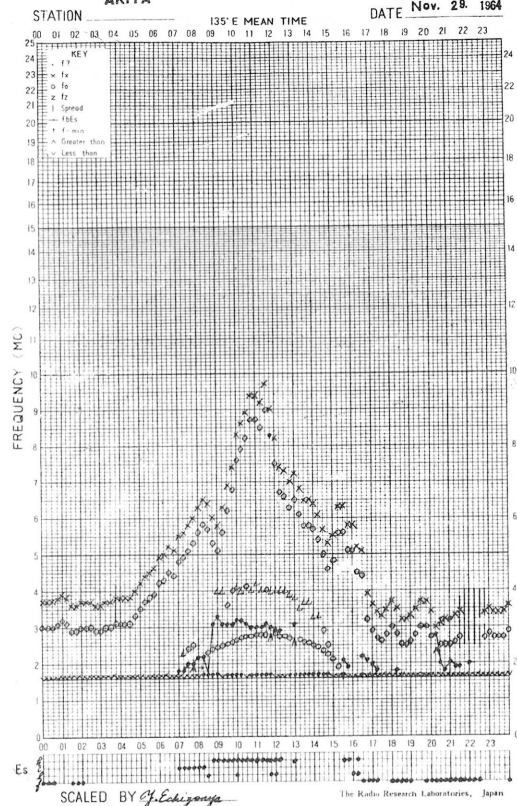
Sweep 0.55 Mc to 17.9 Mc in 20 sec in automatic operation

f-min

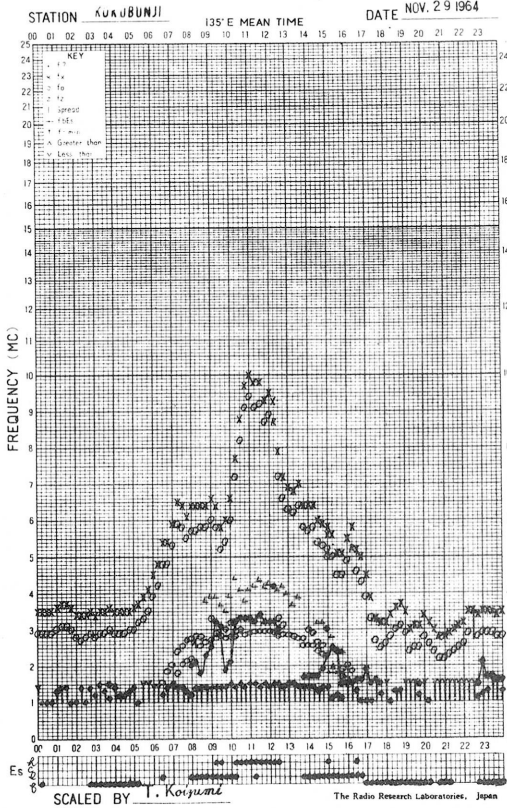
f-PLOT OF IONOSPHERIC DATA



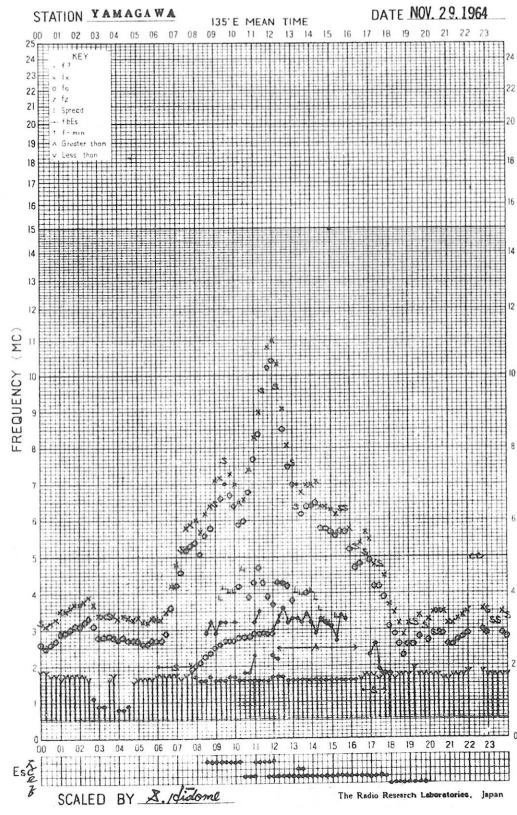
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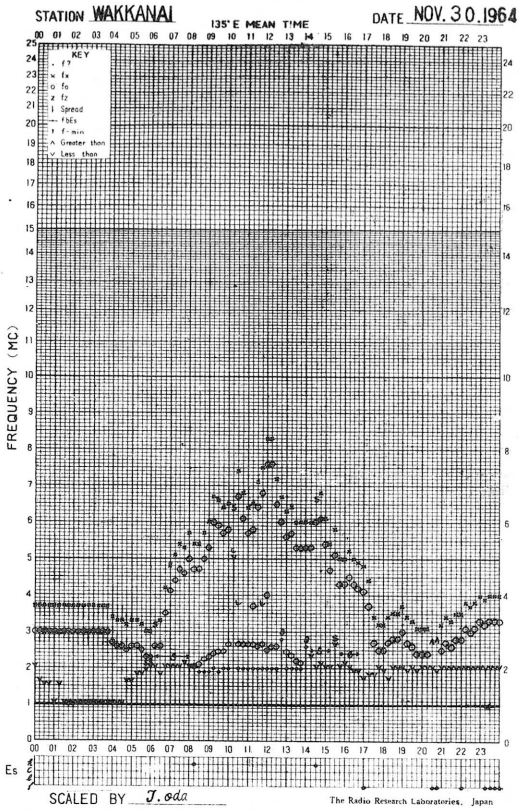
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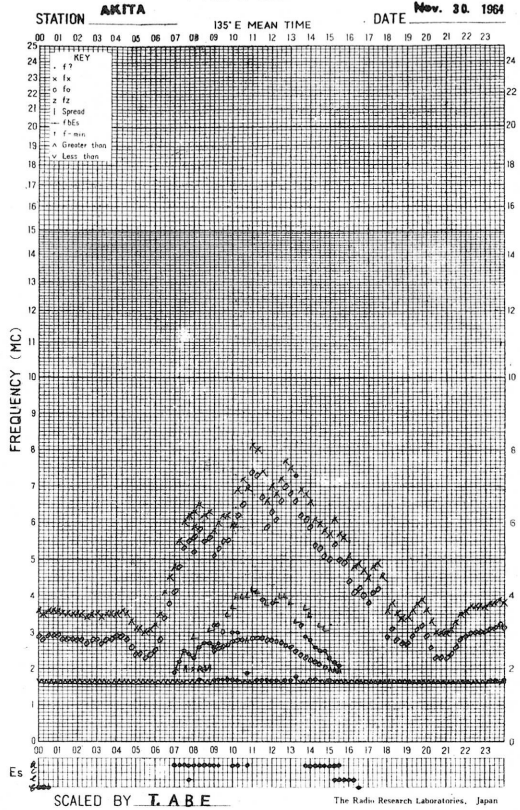
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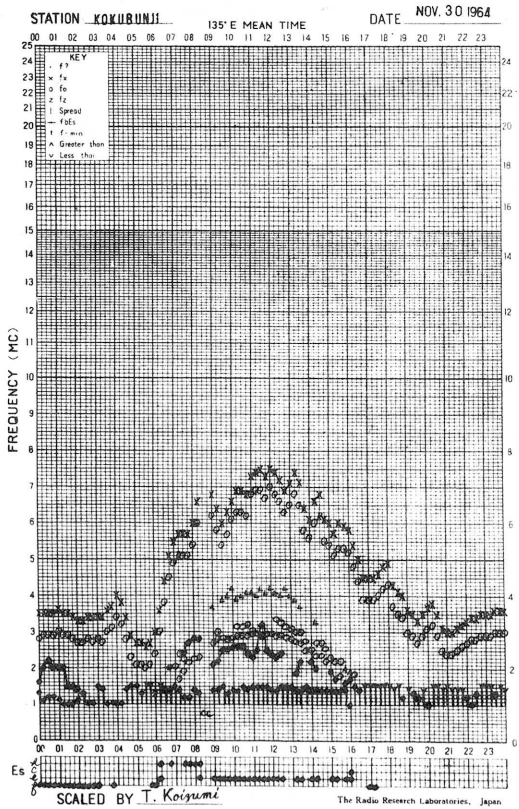
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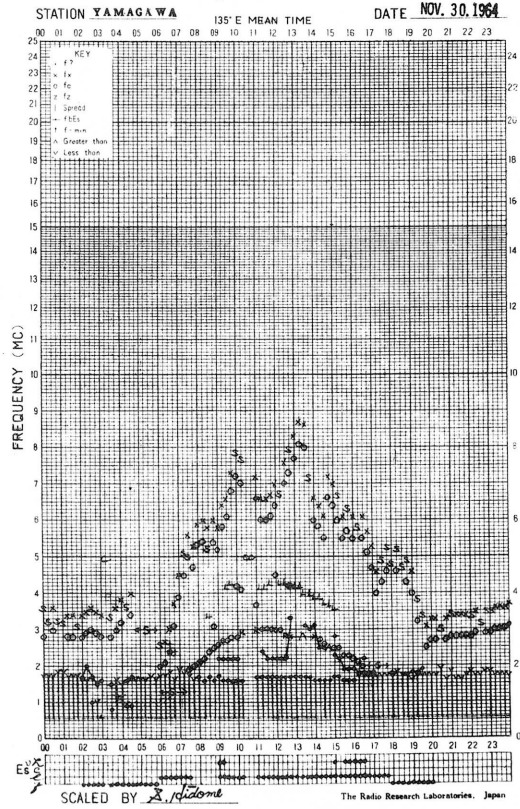
f-PLOT OF IONOSPHERIC DATA



f-PLOT OF IONOSPHERIC DATA



f-PLOT OF IONOSPHERIC DATA



SOLAR RADIO EMISSION

<u>Flux Density and Variability</u>										
Month: November 1964.						Frequency: 200 Mc/s				
Observing Station: Hiraiso										
Flux density $10^{-22} W_m^{-2} (c/s)^{-1}$						Variability 0 to 3				
UT	00-03	03-06	06-09	21-24	Day	00-03	03-06	06-09	21-24	Day
Date										
1	6	7	(6)	(6)	6	0	0	(0)	(0)	0
2	6	7	(7)	(7)	6	0	0	(0)	(0)	0
3	6	6	(5)	(6)	6	0	0	(0)	(0)	0
4	6	6	(6)	(6)	6	0	0	(0)	(0)	0
5	6	6	-	(6)	6	0	0	-	(0)	0
6	6	6	(5)	(6)	6	0	0	(0)	(0)	0
7	6	6	(6)	(5)	6	0	0	(0)	(0)	0
8	6	6	(6)	-	6	0	0	(0)	-	0
9	6	6	-	-	6	0	0	-	-	0
10	8	7	(6)	(6)	7	0	0	(0)	(1)	0
11	6	7	(6)	-	6	0	0	(0)	-	0
12	6	7	(6)	(6)	7	0	0	(0)	(0)	0
13	6	7	(7)	(6)	7	0	0	(0)	(0)	0
14	6	7	(6)	(8)	7	0	0	(0)	(1)	0
15	8	8	(7)	(8)	8	0	1	(1)	(0)	1
16	8	8	(8)	(8)	8	1	0	(0)	(0)	0
17	8	7	(7)	(6)	8	1	1	(0)	(0)	1
18	6	6	(5)	(6)	6	1	0	(0)	(0)	0
19	7	8	(7)	(8)	7	0	0	(0)	(0)	0
20	7	9	(6)	(7)	8	0	0	(0)	(0)	0
21	7	7	(7)	(7)	7	0	0	(0)	(0)	0
22	7	6	(6)	(7)	7	0	0	(0)	(0)	0
23	7	7	(6)	-	7	0	0	(0)	-	0
24	7	7	(7)	(12)	7	0	1	(0)	(1)	0
25	10	8	(7)	(9)	9	0	0	(0)	(0)	0
26	9	8	(5)	(8)	8	0	0	(0)	(0)	0
27	8	8	(8)	(8)	8	0	0	(0)	(0)	0
28	8	7	(6)	(8)	7	0	0	(0)	(0)	0
29	8	7	(6)	(7)	7	0	0	(0)	(0)	0
30	8	9	(8)	(8)	8	0	0	(0)	(0)	0

Note No observations during the following periods:

5th	0500-	0730	11th	2120-	12th	0040	
8th	2120-	9th	0100	23rd	2120-	24th	0040
9th	0500-	10th	0040	25th	0050-	0130	

SOLAR RADIO EMISSION

Flux Density					
Month: November 1964.					
Observing Station: Hiraïso			Frequency: 500 Mc/s		
Flux density $10^{-22} \text{Wm}^{-2} (\text{c/s})^{-1}$					
UT	00-03	03-06	06-09	21-24	Day
Date					
1	18	17	(16)	19	17
2	19	19	(18)	19	19
3	18	16	(14)	18	17
4	20	20	(20)	21	19
5	20	20	(18)	23	20
6	21	21	(19)	22	21
7	22	22	(18)	21	21
8	20	20	(19)	21	20
9	(20)	-	-	-	(21)
10	-	-	-	-	-
11	-	(16)	(17)	17	(17)
12	19	19	(18)	21	18
13	25	19	(15)	20	19
14	19	18	(15)	19	19
15	20	18	(17)	19	19
16	19	20	(16)	19	19
17	20	19	(17)	20	19
18	20	19	(16)	21	19
19	19	20	(15)	21	19
20	21	21	(16)	20	20
21	20	19	(16)	21	20
22	19	19	(16)	22	19
23	20	19	(19)	21	20
24	18	17	(17)	19	18
25	19	20	(17)	20	19
26	20	19	(17)	19	19
27	21	20	(17)	21	20
28	20	19	(17)	21	19
29	19	19	(15)	19	19
30	20	20	(15)	20	19

Note No observations during the following periods:

1st	0000-	0100
9th	0100-	11th 0500
13th	0000-	0100

Distinctive Events

(single-frequency observations)

Month: November 1964.

Observing Station: Hiraiso

Normal observing period: 2100 - 0700 (sunrise to sunset)

Date	Frequency	Starting time	Time of Maximum	Duration	Type	Flux density		Remarks
						$10^{-22} W_m^{-2} (c/s)^{-1}$		
	Mc/s	UT	UT	minutes		peak	mean	
10	200	2155	2155.5	1	C	400	60	
14	200	2308.5	2309.0	2	C	270	75	
	500	2308.5	2308.8	0.5	C	41	15	
15	200	0425.5	0426.0	2	C	130	50	
	200	0428.5	0428.5	1.5	C	95	35	
	200	0516.5	0517.5	2.5	C	200	60	
	500	0517	0517.5	0.5	C	24	11	
	200	0534.5	0535.7	1.5	C	140	70	
	200	0600.8	0601	4	C	175	40	
	500	0601.3	0601.3	0.5	C	11	2	
	200	0609	0610.5	3	C	130	40	
16	200	0203.3	0604.7	2	C	185	80	
	200	0212.7	0213.2	2	C	185	44	
17	200	0015	0015.5	1	C	163	38	
	200	0507	0507.3	1.5	C	150	40	
18	200	0006	0006.7	1	C	280	60	
	500	0006	0006.4	0.7	C	6	2	
24	200	0324.5	0326	3	C	160	45	
	200	0338	0339.5	2	C	150	25	
	200	2342.5	2351	8.5	C	1100	105	

RADIO PROPAGATION QUALITY FIGURES

HIRAISO

Time in U.T.

Nov. 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+	5	4	4	(4)	-	(4)	5	4	5	4	5	3	4	(4)	4	N	N	N	N			
2	5-	5	4	5	(4)	-	(5)	5	5	5	5	5	5	5	(5)	5	N	N	N	N			
3	4+	4	5	5	-	-	(4)	5	4	5	4	4	4	4	(4)	4	N	N	N	N			
4	4-	3	4	4	-	-	-	4	3	4	4	4	5	3	-	4	N	N	N	N			
5	4o	3	4	4	(5)	-	-	4	4	5	5	3	4	3	-	3	N	N	N	N			
6	4+	5	5	4	(4)	-	-	3	4	5	5	3	4	5	-	4	N	N	N	N			
7	4-	3	C	C	-	-	-	5	3	4	4	4	4	3	-	4	N	N	N	N			
8	4-	3	(3)	5	-	-	-	4	3	4	4	4	4	4	-	4	N	N	N	N			
9	4-	3	3	4	-	-	-	(4)	4	3	4	5	4	3	-	4	N	N	U	U			
10	4o	3	4	4	(5)	-	-	4	4	4	4	3	4	3	-	4	U	N	N	N			
11	5-	4	4	4	-	-	-	4	5	5	5	5	4	(4)	-	5	N	N	N	N			
12	4o	2	3	4	-	-	-	4	4	5	4	5	5	4	-	4	N	N	N	N			
13	4o	4	4	4	-	-	-	4	4	4	5	4	4	4	-	4	N	N	N	N			
14	4o	4	(4)	4	-	-	-	4	3	(4)	5	C	4	4	-	4	N	N	N	N			
15	4+	C	C	C	-	-	-	5	(4)	4	5	4	4	4	-	4	N	N	N	N			
16	5-	4	5	4	(5)	5	-	5	5	5	5	5	4	5	-	5	N	N	N	N			
(17)	5-	5	4	5	(5)	-	(5)	4	5	5	5	4	4	4	-	5	N	N	N	N			
(18)	4o	4	4	3	-	-	-	4	3	4	5	(4)	4	5	-	4	N	N	N	N			
(19)	4-	2	3	3	-	-	-	4	4	4	5	4	4	4	-	4	N	N	N	N			
20	4-	3	3	4	-	-	-	5	3	3	4	5	4	4	-	5	N	N	N	N			
21	4-	3	3	4	-	-	-	4	3	4	4	4	4	5	-	4	N	N	N	N			
22	4o	3	3	4	-	-	-	5	5	4	4	4	4	5	(5)	5	N	N	N	N			
23	4+	3	4	4	(5)	-	-	C	5	4	5	4	4	5	(5)	4	N	N	U	U			
24	5-	4	4	4	-	-	-	4	5	5	5	5	4	(4)	-	5	N	N	N	N			
25	4-	3	4	4	-	-	-	3	4	4	4	3	4	5	-	4	N	N	N	N			
26	4o	4	4	4	-	-	-	4	3	4	4	5	4	4	-	5	N	N	N	N			
27	4+	5	4	(4)	-	-	-	4	4	5	5	3	4	(4)	-	4	N	N	N	N			
28	4+	4	5	4	-	-	-	4	3	5	5	4	4	(3)	-	4	N	N	N	N			
29	4-	4	3	4	-	-	-	4	3	4	4	3	4	3	-	4	N	N	N	N			
30	4o	4	3	4	-	-	-	5	4	4	4	4	4	4	-	4	N	N	N	N			

IQSY GEOALERT and ADALERT (Western Pacific Region)

* = MAGSTORM

o = MAGCALME

Δ = COSMIC EVENT

() = Regular World Day

C = artificial accident

- = impossible to evaluate

--- = continuing magnetic storm

() = inaccurate

SUDDEN IONOSPHERIC DISTURBANCES (S.I.D.)

HIRAISO

No Sudden Ionospheric Disturbance was observed during November, 1964.

IONOSPHERIC DATA IN JAPAN FOR NOVEMBER 1964

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編 集 兼
發 行 人

糟 谷 績

東京都小金井市貫井北町4の573

發 行 所

郵 政 省 電 波 研 究 所

東京都小金井市貫井北町4の573
電 話 國分寺 (0423) (2) 1211 (代)

印 刷 所

山 内 欧 文 社 印 刷 株 式 會 社

東京都豊島区日ノ出町2の2 28
電 話 (971) 9341
