

F—227

IONOSPHERIC DATA IN 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.	Midori-cho, Wakkanai-shi, Hokkaido
Akita	39°43.5'N.	140°08.2'E.	Tegata Sumiyoshi-cho, Akita-shi, Akita-ken
Kokubunji	35°42.4'N.	139°29.3'E.	Nukuikita-machi, Koganei-shi, Tokyo-to
Yamagawa	31°12.1'N.	130°37.1'E.	Yamagawa-machi, Ibusuki-gun, Kagoshima-ken

Solar radio emission and radio propagation conditions are observed at Hiraiso Branch.

	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 f_oF1 f_oE	}	The ordinary wave critical frequency for the $F2$, $F1$ and E layers, respectively.
f_oE_s		The ordinary wave top frequency corresponding to highest frequency at which a mainly continuous trace is observed.
f_oE_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

$ypF2$ wave branch at a frequency equal to $0.834f_0F2$.
 The semi-thickness of the $F2$ layer deduced from a parabolic fit to the "nose" of the electron density distribution with height and based on the observed $h'f$ trace. (The difference between $hpF2$ and the virtual height at $0.969f_0F2$).

a. Descriptive Letters

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

- A Measurement influenced by, or impossible because of, the presence of a lower thin layer, for example 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_oE_s and $h'E_s$. The slant trace is sometimes observed to start at f_oE 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 two parabolic reflectors : 10 meter for 200 Mc/s and 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 general, but to nearest a tenth minute for short intense occurrences or clear commencements.

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

Descriptive type is denoted by the following symbols:

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

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

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

C. RADIO PROPAGATION CONDITIONS

a. Field Intensities of WWV and WWVH

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

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

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

Transmitter

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

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

Receiver

Antenna	4.5 m vertical rod
Bandwidth	± 40 c/s for the upper side-band
Calibration	every half an hour

The meaning of *Descriptive symbols* is as follows:

- C: Measurement influenced by, or impossible because of, any non-propagational reasons.
- S: Measurement influenced by, or impossible because of, interferences or atmospherics.
- (): Inaccurate measurement influenced by interferences, atmospherics, or non-propagational reasons.
- <: Less than the following figure.

b. Radio Propagation Quality Figures

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

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

The tabulated circuits contain Hamburg (commercial circuit), WWV (10, 15 and 20 Mc/s frequencies broadcast from Fort Collins, Colorado), San Francisco (commercial circuit) and WWVH (10 and 15 Mc frequencies broadcast from Hawaii), which are received at Hiraiso Branch (Lat. 36°22' N, Long. 140°38' E).

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

- N=normal
- U=unstable
- W=disturbed

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

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

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

c. Sudden Ionospheric Disturbance (S. I. D.)

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

Circuits and Drop-out intensities

C OWWV 20, 15 and 10 Mc/s (Fort Collins, Colorado)
 S FVarious frequencies of commercial circuit (San Francisco)
 H AWWVH 15 and 10 Mc/s (Hawaii)
 T OJJY 15 and 10 Mc/s (Tokyo)
 S HBPV 15 and 10 Mc/s (Shanghai)
 H BVarious frequencies of commercial circuit (Hamburg)

Start-time and Duration

Types

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

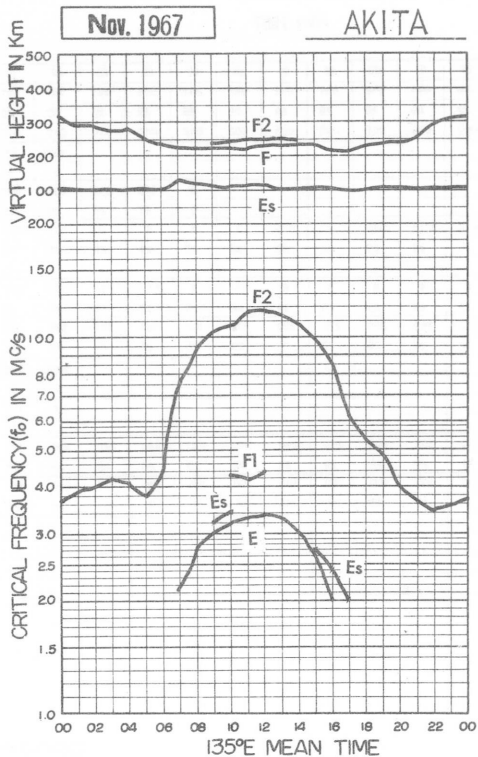
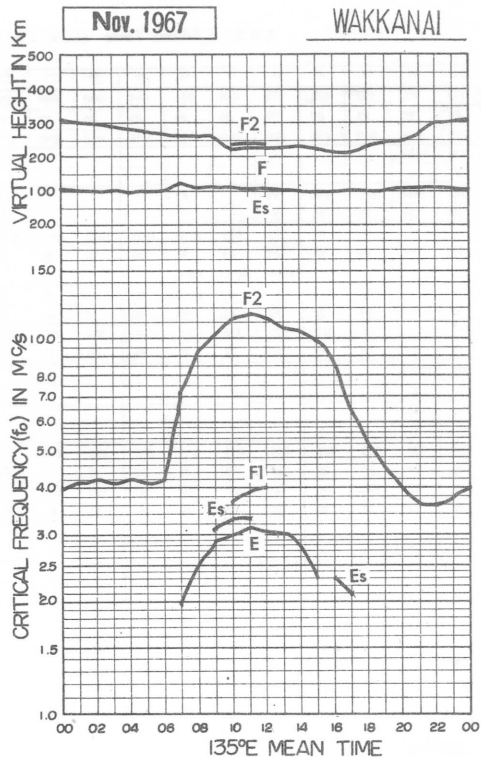
Importances

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

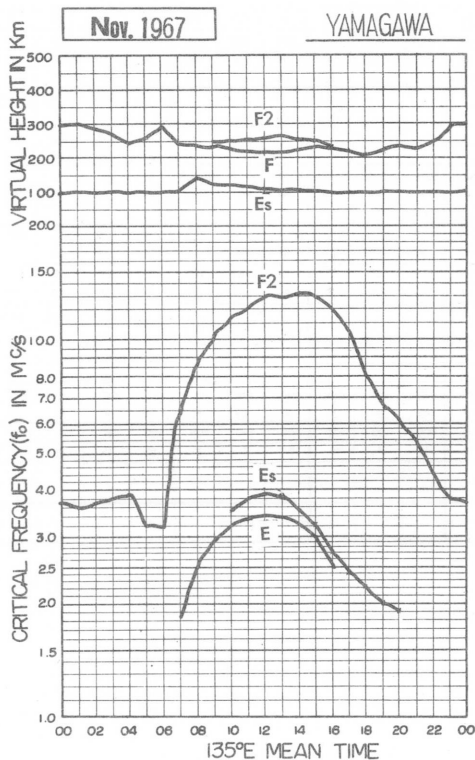
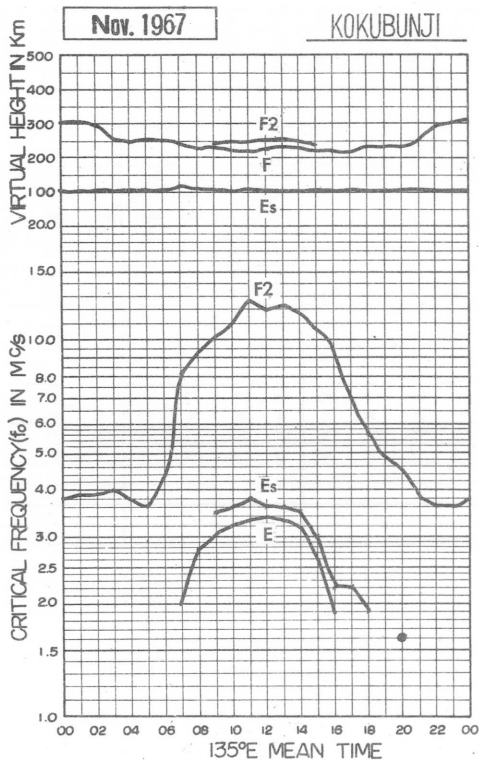
1-	1	1+
2-	2	2+
3-	3	3+

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

IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS



IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS



IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: WAKKANAI

Nov. 1967

135° E Mean Time (G. M. T. +9h)

Table with columns for time (00-23) and rows for ionospheric parameters: foF2, foF1, foE, foEs, fmin, M(3000)F2, M(3000)F1, h'F2, h'F, h'Es, hpF2, ypF2. Each parameter has MED and CNT values.

IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: AKITA

Nov. 1967

135° E Mean Time (G. M. T. +9h)

Table with columns for time (00-23) and rows for ionospheric parameters: foF2, foF1, foE, foEs, fmin, M(3000)F2, M(3000)F1, h'F2, h'F, h'Es, hpF2, ypF2. Each parameter has MED and CNT values.

Lat. 45° 23.6'N
Long. 141° 41.1'E

Wakkanai

IONOSPHERIC DATA

0.1Mc 135° E Mean Time (G. M. T. +9h)

foF2

Nov. 1967

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	043	042	042	045	044	041	057	083	101	110	130	123	I1210	118	113	114	101	080	066	050	044	044	045	043
2	043	042	043	043	043	041	052	093	106	106	116	120	121	110	110	114	101	086	072	057	053	052	053	051
3	050	047	045	047	048	047	059	0968	122	143	133	136	131	124	114	110	106	075	063	059	058	056	056	053
4	050	048	047	046	040	038	051	092	100	123	142	134	138	132	130	132	103	070	048	050	051	051	050	050
5	053	053	051	048	044	044	053	081	114	113	129	130	130	125	120	105	087	073	060	059	050	040	038	038
6	039	041	039	040	041	041	048	077	122	121	127	129	127	107	105	111	087	062	047	044	046	043	SF	043F
7	043	044	046	045	046	044	042	074	091	106	110	118	115	111	106	111	095	061	042	043	038	SF	040F	043F
8	039F	043F	037F	036F	F	SF	SF	082	093	093	108	116	122	110	106	112	086	046	043	045	043	044F	047F	048S
9	051S	SF	044F	046F	046F	SF	046F	070S	109	112	126	130	123	121	125	128	099	076	051	040	034	040F	F	040
10	040S	U040F	U045F	041F	043	U037F	F	070F	093	097	106	121	116	100	097	091	080	051	044	042S	U040F	U037F	F	U036F
11	F	U036F	U043F	041F	043	043	041	071	086	091	100	116	105	106	093	099	087	065	055	044	038	036	036	037F
12	U036F	041F	043F	041F	044F	041	064	064	092	113	123	113	111	105	106	097	096	070	061	051	047	039	F	SF
13	U040F	044F	I047S	U046F	045F	SF	U053F	063	SF	U053F	112F	127	121	110	114	115	096	063	F	F	F	F	F	F
14	F	F	U053F	F	F	U048F	048F	068	I087S	103	106	114	113	104	100	107	087	064	044	046	043S	033	036	040S
15	U042F	046	U046F	U046F	SF	052	053	071	093	090	105	108	111	093	094	098	080	060	054	047	041	036	036	039
16	043	041	041	039	040	041	045	078	091	089	113	119	113	103	098	097	073	063	053	044	045	042	046	046
17	047	047	046F	048	047	044	041	073	101	098	115	120	115	101	113	105	078	059	049	046	047	044	047	048
18	U053F	U055F	053F	U055F	U056F	054F	053F	083	096	097	105	111	119	101	096	100	076	065	051	042	035	032F	037	SF
19	040F	040F	043F	037F	040	033	068	082	082	097	095	116	100	098	094	091	076	063	055	040	032	030	I030A	033F
20	034	036S	036S	I036C	038	C	C	C	C	091	098	I110C	I106C	103	096	094	081	054	045	037	033	034	034	036
21	037F	038	038	038	041	038	033	066	I084C	C	I104C	108	I111C	116	107	088	075H	060	048	037	033	030	032	034
22	035	037	036	038	038	043	032	069	077	084	111	113	113	104	098	093	I085C	070	064	061	040	036	035	034
23	036	039	040	042	034	030	033	071	094	101	116H	107	112	110	106	103	090	059	043	036	033	034	033	I033S
24	035	037	039	041	042	041	040	069	090	C	C	C	106	114	103	102	084	068	055	046	036	033	036	038
25	040	039	037	036	036	036	040	073	104	104	122	124	115H	120	107	098	081	072	047	046	040	036	038	038
26	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	052	038S	034	033	032
27	033	034	034	036	035	036	033	060	084	I098R	I03R	110	103	100	097	094	073	060	036	034	031	033	033	033
28	034	036	037	036	035	033	037	070	095	098	106	107	098	102	104	099	077	060H	061	047	031	029	033	035
29	036	038	036	035	035	036	030	061H	073	101	111	117	103	U103R	093	I086C	066	061	056	050	038F	SF	SF	SF
30	036F	F	F	039F	U042F	036F	035	059	080	087	102	107	091	091	106	090	063	050	I040A	038	035	026	029	031
31																								
Count	27	26	28	28	26	25	26	28	27	27	28	28	29	29	29	29	29	29	29	29	29	27	24	26
Median	040	041	042	041	042	041	042	071	093	101	111	116	113	106	105	099	085	063	051	045	040	036	036	038
U. Q.	043	044	046	046	044	044	052	080	101	110	122	124	121	115	112	110	096	070	058	050	046	043	046	043
L. Q.	036	038	038	038	038	036	035	068	086	093	105	110	106	102	096	094	076	060	045	040	034	033	033	034
Q. R.	007	006	008	008	006	008	017	012	015	017	017	014	015	013	016	016	020	010	013	010	012	010	013	009

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

The Radio Research Laboratories, Japan

foF2

W 1

IONOSPHERIC DATA

Nov. 1967

f_oF₁

0.01Mc

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									370															
2																								
3																								
4																								
5													400											
6											L													
7									360L			400												
8													L											
9											440L													
10											L	400L												
11											U410L													
12													L											
13												340												
14													L	U360L										
15									370L	360L	370	360												
16											370		L											
17												380												
18											L	L												
19																								
20									350			C	C											
21													C											
22																								
23																								
24										C	C	C	390											
25												400	410											
26									C	C	C	C	C											
27																								
28																								
29																								
30																								
31																								
Count									3	5	6	4	2											
Median									360L	370L	390	400	U380L											
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

W2

IONOSPHERIC DATA

Lat. 45° 23.6'N
Long. 141° 41.1'E

Wakkanai

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

f_oE

Nov. 1967

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	210	270	270	I290A	I310A	320	315	290	250	A	A								
2						S	215	275	300	315	325	320	310	290	240	150	S								
3						S	210	A	A	A	A	325	305	285	I230A	A	A								
4						E	210	260	270	I280A	I300A	320	305	285	235	175	A								
5						S	210	255	290	290	310	310	300	285	230	A	A								
6						S	205	255	285	280	I305A	305	300	275	230	165	S								
7						E	190	260	300	I295A	305	300	300	270	230	S	S								
8						E	195	260	290	I300A	300	305	300	270	230	A	A								
9						S	185	250	270	I255A	I290A	I305A	I300A	A	A	A									
10						E	190	I235A	280	I300A	I300A	305	300	275	205	A	A								
11						E	200	245	280	300	315	310	300	280	230	A									
12						S	S	245	290	305	315	315	300	280	230	A									
13						E	155	245	I280A	300	305	300	300	255	220	S									
14							180	250	290	300	300	300	295	270	I215A	S									
15						S	210	I255A	290	I295A	I300A	305	I300A	A	A	A									
16						S	A	A	A	A	A	I300A	300	270	220	S									
17						E	200	245	290	300	315	310	300	270	210	A									
18							S	250	300	305	320	315	305	275	225	A									
19							S	245	290	305	315	320	300	280	225	A									
20						C	C	C	290	310	I315C	I315C	300	270	230	S	A								
21							S	230	290	300	300	I310C	305	285	235	S									
22							130	250	300	300	I310A	305	300	285	225	C									
23							S	240	290	310	315	310	300	270	230	S				E					
24						E	195	240	C	C	C	300	I280A	265	A	A									
25							200	265	I280A	I295A	305	300	290	270	225	S									
26						C	C	C	C	C	C	C	C	C	C	C	C								
27						E	A	215	280	I295A	300	305	300	270	I225A	A									
28							130	240	I285A	305	315	310	295	I270A	220	A									
29							170	240	290	300	305	305	300	270	C	S									
30							140	235	275	300	310	300	300	280	220	A									
31																									
Count						9	21	26	26	26	26	29	29	27	25	3									
Median						E	195	250	290	300	310	305	300	275	230	165				E					
U. Q.																									
L. Q.																									
Q. R.																									

The Radio Research Laboratories, Japan

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

f_oE

W3

Lat. 45° 23.6'N
Long. 141° 41.1'E

Wakkanai

IONOSPHERIC DATA

0.1Mc 135° E Mean Time (G.M.T. +9h)

foEs

Nov. 1967

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 022	E J023	E J021	E 017	E 016	E E	E 022	G	G 030	G 036	J040	J040	J030	J033	J027	J031	J023	J023	E 015S	J021	E 015S	E 015S	E	E 015S
2	E E	E E	E 015	E E	E 016	E E	E 013S	G	G 035	G 033	G 033	G 025G	G 025G	G 020G	G 023G	G 023G	G 013G	G 023	J023	J023	E 016S	E 015S	E	E
3	E E	E E	E E	E E	E E	E 018	G	G 023	J035	J053	J053	J044	G 025G	G 023G	G 023G	G 025	G 029	G 032	J025	J021	E 015S	J038	J030	E 012S
4	E 012S	E E	E E	E E	J023	J026	015	027	033	035	J043	J060	J060	031	J033	G	G 030	G 030	J023	E	E	E 014S	E 015S	E
5	E E	E E	E 015	J025	J023	E 012S	E 013S	G	G 031	G 032	034	G	G	G	G 021G	J031	J038	G 022	E 015S	E 015S	E	E	J033	E
6	E E	J023	018	J023	015	E E	E 015S	024	G	034	038	J058	030G	031	G	J028	G	E 012S	020	E	E 015S	E 015S	E	E 016S
7	E E	E E	E E	E E	E E	E E	E E	G	G	031	033	029G	G	G	018G	021G	G	E 015S	E 014S	023	E 015S	E	E	E
8	E E	016	J021	017	017	E E	E E	G	G	G	033	G	G	G	027G	G	G 024	G 023	E	E	E 016S	E	E	E 015S
9	E 013S	015	017	020	J023	E E	E 012S	G	G	032	030	051	042	045	031	034	J026	030	E	E	E 012S	E	E	E
10	J024	J023	J024	J021	019	020	E	G	025	026G	033	J036	J038	023G	020G	G	G 023	J023	E 017S	E 018S	E 015S	E 015S	E	E
11	E E	E E	J023	018	018	E E	E E	G	G	033	033	025G	026G	023G	G	G	G 020	G 025	024	E 016S	J030	J022	023	J025
12	J030	J025	E E	E E	J023	020	E 015S	E 021S	G	G	030G	G	024G	G	G	G	G 027	E 016S	E 018S	E 015S	E 016S	E 016S	E	J022
13	E 016S	021	E E	017	016	E 013S	E E	G	G	031	027G	J033	J033	J033	018G	G	E 017S	E 015S	E 012S	E	E	E 015S	018	J025
14	025	018	E E	E E	E E	E 015S	018	G	G	032	040	024G	025G	029G	G	G 025	E 017S	E	J054	E 016S	021	E 015S	E 017S	E
15	J020	021	017	018	E E	E 015S	E 015S	G	028	026G	J038	034	028G	030	030	032	043	J025	J024	020	E 016S	E 015S	E 016S	E 016S
16	020	J023	J030	E E	E E	E E	E 015S	023	030	030	J033	J043	031	G	G	G 021G	E 016S	025	E 014S	E 015S	E	E	024	022
17	E E	J022	J024	J023	016	015	E E	G	G	034	024G	022G	028G	026G	G	G	G 060	018	018	E	E 012S	020	E	017
18	E E	018	J023	J023	016	015	E E	G	G	G	G	G	G	G	024G	024G	016	020	E	E 015S	018	E	E	E
19	E E	E E	E E	E E	E E	E E	E E	G	027	025G	028G	020G	028G	G	G	J025	J023	J023	J021	E 015S	J021	J063	J040	J025
20	015	016	016	C	J023	C	C	C	C	037	G	G	C	C	024G	018G	015G	017S	E 015S	E	E	J025	E	E
21	E E	E E	E E	E E	E E	E E	E E	G	G	G	G	033	C	033	J030	020G	E 016S	E 017S	E	018	E	E 014S	E	E 013S
22	E E	E E	E E	E E	E E	E E	E E	G	G	G	048	033	G	G	017G	015G	C	E 015S	E 015S	E 018S	J023	020	J028	J024
23	018	J025	E E	J023	015	E E	E 015S	030	G	033	040	043	064	G	017G	032	G 025	J023	E	E 014S	018	J038	E 017S	E 016S
24	E 015S	E E	E E	E E	E E	E E	E E	G	G	C	C	C	036	J035	023G	J033	J031	J021	J025	E 016S	E	E	E	E
25	E 013S	E E	E E	E E	E E	E E	E 013S	023	031	031	033	034	G	G	030	024	E 017S	E 015S	E 016S	E 018S	J063	J066	J030	J025
26	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	J023	E 015S	023	E	E
27	E E	E E	J021	J020	E E	E E	E E	G	024	031	036M	033	G	033	G	G 026	018	E	E	E	E 015S	E	J033	022
28	E 016S	E 015S	E E	E E	J021	E E	E E	G	G	031	029G	G	G	027G	031	G	G 023	E	E 020S	E 018S	E	E	E	E 017S
29	E E	E E	E E	E E	E E	E E	E E	G	G	023G	027G	035	036	G	035	C	E 011S	E 013S	J023	E	019	E	E 012S	E 016S
30	E E	E E	J053	J024	J023	E E	E E	G	G	G	G	G	028G	028G	035	030	025	J032	J062	J043	030	E	J028	J022
31																								
Count	29	29	29	28	29	28	28	28	28	28	28	27	27	29	29	28	28	29	30	30	30	30	30	30
Median	E 012	E 015	015	E	015	E	E	G	G	031	033	033	G	G	G	G	G 023	021	E 018	E 015	E 015	E 015	E 016	
U. Q.	017	022	021	020	020	E 014	E 015	022	026	032	037	040	031	031	030	029	026	025	023	E 018	021	020	024	022
L. Q.	E	E	E	E	E	E	E	G	G	G	026	G	G	G	G	G	E 016	E 015	E 014	E	E	E	E	E
G. R.											011						J010	J010	D009					

The Radio Research Laboratories, Japan

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

foEs

IONOSPHERIC DATA

Lat. 45° 23.8'N
Long. 141° 41.1'E

Wakkanai

0.1Mc 135° E Mean Time (G. M. T. +9h)

fbEs

Nov. 1967

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	016	015	E			S			G	032	034	028G	027G	025G	022G	021	019	S	018	S	S	S	S	
2	S		012		E		S						024G	020G			G	S	016	S	017	S	S	S	
3						012		018	028	031	035	034	024G	020G	025	025	018	021	015	018	S	016	015	S	
4	S				012	023	G	G	G	G	035	038	024G	025	023		015	017	016			S	S	S	
5			012	017	016	S	S	S	G	G	G	G		020G	020	020	020	018	S	S			018		
6		015	015	015	012		S	G	G	G	037	025	028			015		S	S	S	S	S		S	
7									027	030	026G			018G	015G			S	S	016	S			S	
8		E	E	012	E						031		022G		020	019	016				S	S		S	
9	S	012	015	012	012		S		G	030	033	035	035	028	025	020	020	015			S			S	
10	015	015	018	014	014	E			025	026G	030	031	021G	018G			017	017	S	S	S	S	S	S	
11			015	E	012				025	024	023G	024	023G	021G	020G		018	018	017	S	S	S	S	E	
12	E	016			E	E	S	S		028G			020G				020	S	S	S	S	S		E	
13	S	S		012	E	S			028	023	025	025	018	016G			S	S	S			S	E	E	
14	S	016				S	015		024G	026	023G	022G	024G		025	S	S	020	020	S	017	S	S	S	
15	S	S	E	015		S	S		027	026G	030	030	026	030	028	026	022	022	017	015	S	S	S	S	
16	S	020	017				S	022	027	029	030	033	031		020G	020G	S	S	S	S			S	E	
17		018	019	016	E				022	022G	020G	020G	020G	020G			017	012	016		S	S	S	E	
18		012	018	017	012	012		020		021G	023G		021G	023G		016G	B016G	017		S	016				
19									020	024G	025G	019G	020G			018	018	018	S	S	014	025	A	018	
20	015	E	012	C	014	C	C	C	C	G	G	C	C	020G	018G	015G	S	016	S			017			
21										G	G	G	C	024	020	017G	S	S		016		S		S	
22										G	033			017G	015G	C	S	S	S	S	020	019	018	017	
23	012	020		012	E		S	G	020G	025	040	050		016G	020	020	020	017		S	016	018	S	S	
24	S									C	C	C	026	033	019G	023	018	016	020	S					
25	S						S	G	G	030	032	025G			021	016	S	S	S	S	028	020	020	016	
26	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	018	S	014			
27			014	E				021	G	018	030	025		020G		024	016			S	S		018	S	
28	S	S			E				030	026G			021G	027			017			S			S	S	
29									020G	025G	G	G	G	G	G	G	S	S	S	015	015		S	S	
30								G		020G	020G	G	G	G	G	G	023	030	A	020	016		019	017	
31																									
Count																									
Median																									
U. Q.																									
L. Q.																									
G. R.																									

IONOSPHERIC DATA

Nov. 1967

f-min

0.1Mc 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	E015S	E	E	E	E	E	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E	E	E015S	E	E015S	E015S	E	E015S
2	E012S	E	E	E	E	E	E013S	E013S	E013S	E013S	E013S	E013S	E013S	E013S	E013S	E013S	E	E	E013S	E	E013S	E013S	E	E013S
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	E012S	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	E012S	E013S	E013S	E013S	E013S	E013S	E013S	E013S	E013S	E013S	E013S	E	E	E013S	E	E013S	E013S	E	E013S
6	E	E	E	E	E	E	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E	E	E015S	E	E015S	E015S	E	E015S
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	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
9	E013S	E	E	E	E	E	E012S	E012S	E012S	E012S	E012S	E012S	E012S	E012S	E012S	E012S	E	E	E012S	E	E012S	E012S	E	E012S
10	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
11	E	E	E	E	E	E	E	E018S	E018S	E018S	E018S	E018S	E018S	E018S	E018S	E018S	E	E	E018S	E	E018S	E018S	E	E018S
12	E016S	E	E	E	E	E	E015S	E021S	E021S	E021S	E021S	E021S	E021S	E021S	E021S	E021S	E	E	E021S	E	E021S	E021S	E	E021S
13	E016S	E015S	E	E	E	E013S	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
14	E016S	E	E	E	E	E	E015S	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
15	E015S	E015S	E	E	E	E	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E	E	E015S	E	E015S	E015S	E	E015S
16	E015S	E	E	E	E	E	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E	E	E015S	E	E015S	E015S	E	E015S
17	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
18	E	E	E	E	E	E	E	E012S	E012S	E012S	E012S	E012S	E012S	E012S	E012S	E012S	E	E	E012S	E	E012S	E012S	E	E012S
19	E	E	E	E	E	E	E	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E	E	E015S	E	E015S	E015S	E	E015S
20	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
21	E	E	E	E	E	E	E	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E	E	E015S	E	E015S	E015S	E	E015S
22	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
23	E	E	E	E	E	E	E	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E	E	E015S	E	E015S	E015S	E	E015S
24	E015S	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
25	E013S	E	E	E	E	E	E013S	E013S	E013S	E013S	E013S	E013S	E013S	E013S	E013S	E013S	E	E	E013S	E	E013S	E013S	E	E013S
26	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
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	E016S	E015S	E	E	E	E	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E015S	E	E	E015S	E	E015S	E015S	E	E015S
29	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
30	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
31																								
Count	29	29	29	28	29	28	28	28	28	28	28	27	27	29	29	28	28	28	29	30	30	30	30	30
Median	E	E	E	E	E	E	E	E012	E012	E012	E012	E012	E012	E012	E012	E012	E	E	E012S	E	E012S	E	E	E
U. Q.																								
L. Q.																								
G. R.																								

Sweep 1.0 Mc to 20.0 Mc in 40 sec in automatic operation

The Radio Research Laboratories, Japan

f-min

IONOSPHERIC DATA

Lat. 45° 23.6'N
Long. 141° 41.1'E

Wakkanai

M(3000)F2 0.01 1 35° E Mean Time (G.M.T. +9h)

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	255	250	260	275	285	295	305	335	325	315	325	310	I310C	305	300	315	325	315	315	300	285	285	280	280
2	265	275	265	275	280	275	295	330	325	320	295	300	315	295	300	315	315	310	295	270	275	270	270	275
3	280	270	285	265	270	270	285	315S	300	320	325	315	305	315	315	300	305	295	290	290	300	275	270	275
4	260	240	250	255	230	240	285	325	315	310	330	315	305	305	310	320	320	320	270	285	290	280	270	260
5	255	260	280	270	275	280	305	325	335	320	300	315	315	320	320	325	320	295	290	295	305	280	275	275
6	255	270	255	260	265	275	305	310	345	345	330	310	320	305	310	330	325	325	305	295	305	295	SF	255F
7	270	275	280	290	290	305	310	340	340	345	325	330	320	325	325	315	320	330	300	300	290	SF	250F	275F
8	255F	280F	305F	280F	F	SF	SF	340	330	325	305	320	330	310	310	335	335	310	280	290	280	260F	255F	275F
9	265S	SF	270F	265F	300F	SF	285F	310S	340	305	315	320	315	305	320	330	325	340	300	310	290	265F	F	260
10	250S	2260F	2275F	295F	325	295F	F	330F	335	330	320	320	330	320	310	330	350	290	315	300S	2315F	2265F	F	2270F
11	F	2280F	2280F	270F	280	305	315	350	335	340	310	345	315	320	325	330	340	305	325	300	295	280	285	265F
12	2280F	270F	275F	270F	290F	330	295	295	330	325	330	320	335	315	315	330	335	300	310	320	305	310	F	SF
13	2275F	280F	265S	260F	265F	SF	2355F	320	SF	330F	320F	320	320	310	315	320	335	325	F	F	F	F	F	F
14	F	F	2265F	F	F	2300F	305F	340	I340S	330	320	320	325	310	320	340	345	325	325	305	300S	305	275	260S
15	2255F	265	2260F	2270F	SF	310	325	340	340	345	325	305	335	320	325	330	330	315	320	320	315	285	270	270
16	255	275	270	265	250	295	295	350	340	335	325	320	325	320	325	340	330	315	335	295	300	270	270	265
17	255	265	265F	275	280	285	315	340	330	325	320	330	330	325	335	345	335	295	305	305	300	290	275	270
18	2255F	2275F	285F	2275F	2275F	310F	300F	340	335	330	325	310	330	320	305	325	320	320	295	320	315	270F	270	SF
19	270F	265F	275F	265F	270F	320	310	350	335	330	320	315	320	325	320	320	315	300	325	325	315	275	I265A	260F
20	265	260S	260S	I265G	275	G	G	G	G	330	325	I325C	I315C	320	325	320	335	295	310	310	280	270	275	265
21	245F	265	265	280	295	340	280	350	2340C	G	I315C	315	I305C	315	310	330	305H	315	315	325	335	280	255	265
22	265	260	280	280	290	310	290	340	345	325	315	320	320	315	315	310	I310C	300	285	310	295	270	265	265
23	290	295	270	300	295	275	280	325	340	325	315H	320	305	310	320	320	315	305	300	290	280	270	275	I250S
24	255	265	265	250	260	280	305	320	G	G	G	G	290	315	320	320	325	280	290	290	300	255	260	245
25	250	270	265	260	260	270	275	315	325	325	320	305	305H	315	320	305	310	315	300	305	305	270	260	245
26	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	290S	300	280	275	275
27	260	265	260	265	265	285	265	330	I340R	320R	325	320	320	320	315	315	310	270	330	295	290	265	275	265
28	265	260	260	280	355	260	290	315	340	325	315	320	310	315	315	325	325	300H	315	340	325	260	260	250
29	250	265	260	265	270	285	300	310E	315	315	305	325	310	2330R	330	I335C	310	310	295	290F	SF	SF	SF	
30	270F	F	F	275F	285F	310F	315	320	330	325	315	335	320	305	330	340	325	300	I290A	305	315	310	255	250
31																								
Count	27	26	28	28	26	25	26	28	27	27	28	28	29	29	29	29	29	29	29	29	29	27	24	26
Median	255	265	265	270	280	295	300	330	335	325	320	320	315	315	320	325	325	310	305	300	300	275	270	265
U. Q.																								
L. Q.																								
G. R.																								

The Radio Research Laboratories, Japan

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

M(3000)F2

W 7

IONOSPHERIC DATA

Lat. 45° 23.6'N
Long. 141° 41.1'E

Wakkanai

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

Nov. 1967

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									415																
2																									
3																									
4														U400L											
5												400													
6										405L	L	405		L											
7																									
8													L												
9											395L														
10											L	375L	L												
11											U415L	*													
12													L												
13												410													
14													L	U390L											
15										405L	415L	410	415												
16											405		L												
17												410													
18												L													
19												L		L											
20										405		C	C												
21													C												
22																									
23																									
24										C	C	C	410												
25											400	400													
26										C	C	C	C	C											
27																									
28																									
29																									
30																									
31																									
Count									3	5	6	4	2												
Median								405L	415L	410	405	405	U395L												
U. G.																									
L. G.																									
Q. R.																									

The Radio Research Laboratories, Japan

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

M(3000)F1

W 8

IONOSPHERIC DATA

Lat. 45° 23.6'N
Long. 141° 41.1'E

Wakkanai

km 135° E Mean Time (G.M.T. +9h)

f_oF₂

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								240																
2																								
3														240										
4													235											
5														225										
6								240																
7								230				240												
8													245											
9											230	245	235											
10											225													
11																								
12													250											
13												245												
14													235	245										
15									215	230	225	240												
16											240		235											
17												240												
18											225	250												
19																								
20									230			C	C											
21													C											
22																								
23																								
24									C	C	C	C	225											
25											240	235												
26									C	C	C	C	C											
27																								
28																								
29																								
30																								
31																								
Count									3	8	7	9	4											
Median									230	235	240	235	240											
U. Q.																								
L. Q.																								
Q. R.																								

IONOSPHERIC DATA

Lat. 45° 23.6'N
Long. 141° 41.1'E

Wakkanai

135° E Mean Time (G. M. T. +9h)

f_oF

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	320	340	320	270	250	230	225	210	220	220	200	225	220	225	240	225	225	210	230	225	250	275	275	275
2	275	270	290	275	275	285	240	225	230	215	220	235	240	225	235	240	215	220	220	230	265	290	275	260
3	250	260	240	295	285	260	240	215	225	235	235	235	225	235	240	230	220	220	235	255	250	265	270	240
4	265	320	320	315	375	395	335	225	220	225	225	235	225	220	240	225	205	205	245	260	255	270	275	285
5	285	300	260	295	260	275	240	210	230	225	220	210	210	220	235	220	220	220	225	235	235	250	300	275
6	315	310	315	315	300	240	215	230	230	230	220	235	220	220	230	240	210	210	220	245	260	300	315	
7	305	285	275	255	250	220	200	210	220	195H	210	215E	225	220	220	220	220	205	240	260	250	305	310	275
8	300	275	225	270	265	250	230	220	230	220	225	225	240	240	235	225	205	205	265	260	260	310	300	290
9	275	290	295	275	240	190	280	230	220	225	210	230	240	245	245	240	210	210	235	245	245	295	305	305
10	325	315	280	260	220	225	250	215	225	220	215	210	235	230	235	230	215	205	235	250	250	265	325	295
11	290	300	290	270	260	250	210	210	220	215	210	240	220	245	235	240	210	215	220	245	250	265	265	320
12	315	310	285	275	260	220	245	245	220	225	220	220	220	215	235	220	215	205	230	225	240	240	290	265
13	275	295	275	310	290	245	220	200	210	210H	220	210	235	240	235	225	210	200	230	240	250	275	305	290
14	295	290	265	250	250	210	215	210	215	225	225	230	230	225	240	225	215	220	250	250	240	245	295	300
15	310	310	300	280	280	235	220	215	220	215	205	200	210	220	240	240	220	220	230	240	240	260	315	315
16	320	305	305	300	305	270	250	220	220	220H	205	230	225	235	240	225	215	215	225	250	250	270	295	285
17	310	310	300	290	285	245	230	215	215	220	220	220	235	220	240	235	210	210	240	240	235	260	270	265
18	290	275	260	260	265	235	220	220	215	215	190	225	240	230	225	235	210	235	215	240	250	300	310	310
19	300	290	295	275	275	240	205	220	220	240	225	235	225	240	235	225	210	220	220	240	250	A	A	345
20	325	300	310	1300C	290	C	C	C	C	210	225	1225G	1230C	240	240	240	220	200	245	250	250	305	300	305
21	325	310	300	285	260	215	225	220	220	230	235	240	1230C	240	225	225	210	240	220	245	250	270	345	315
22	310	305	300	275	260	225	195	220	215	220	230	220	240	230	245	240	1220C	225	260	245	260	325	320	330
23	340	350A	295	250	245	225	260	225	230	215	230	230	1245A	230	240	230	220	205	245	275	275	300	295	350
24	340	300	310	305	295	250	225	215	220	C	C	C	210	245	240	235	225	220	250	235	250	300	315	315
25	340	295	295	275	295	280	245	220	220	225	240	220	220	245	235	215	220	225	250	265	275	300	320	350
26	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	245	250	260	280	290
27	320	305	330	285	260	245	225	225	220	205	205	240	230	235	235	215	215	205	215	250	275	300	325	325
28	335	320	300	275	275	305	260	240	215	220	240	235	225	245	245	225	225	225	255	220	220	310	340	340
29	315	300	280	270	280	250	230	215	220	240	225	230	245	240	225	1220C	200	235	240	250	225	250	310	300
30	250	295	320	295	260	215	230	220	210	220	240	220	230	220	245	215	210	260A	A	260	250	240	370	360
31																								
Count	29	29	29	29	29	28	28	28	28	28	28	28	29	29	29	29	29	29	29	29	30	29	29	30
Median	310	300	295	275	265	240	230	220	220	220	220	230	230	230	235	225	215	215	235	245	250	270	300	300
U. Q.																								
L. Q.																								
G. R.																								

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

f_oF

The Radio Research Laboratories, Japan

W 10

IONOSPHERIC DATA

Lat. 45° 23.6'N
Long. 141° 41.1'E

Wakkanai

Jan 1 3.5° E Mean Time (G. M. T. +9h)

f'Es

Nov. 1967

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	100	100	100	E	E	100	G	G	110	105	105	105	105	100	100	100	100	S	100	S	S	E	S
2	S	E	100	E	100	E	S	G	G	G	G	G	105	105	G	G	100	100	100	100	110	S	S	E
3	E	E	E	E	E	100	G	110	110	105	105	105	105	G	105	100	105	100	100	100	S	110	110	S
4	S	E	E	E	100	155	140	125	115	115	110	105	105	100	100	G	100	100	100	E	E	S	S	E
5	E	E	100	100	100	S	S	G	115	120	110	G	G	G	100	100	100	100	S	S	E	E	105	E
6	E	100	100	100	100	E	S	120	G	120	110	105	105	100	G	100	G	S	100	E	S	S	E	S
7	E	E	E	E	E	E	E	G	G	110	110	110	G	G	100	100	G	S	S	115	S	E	E	E
8	E	100	100	100	100	E	E	G	G	G	110	G	G	105	G	105	105	100	E	E	S	S	E	S
9	S	100	100	100	100	E	S	G	G	125	110	105	105	100	100	100	100	100	E	E	S	E	E	E
10	100	100	100	100	100	100	E	G	110	105	105	105	100	100	105	G	100	100	S	S	S	S	S	E
11	E	E	100	100	100	E	E	G	G	110	G	105	105	105	105	G	100	105	105	S	110	110	105	110
12	105	105	E	E	105	100	S	S	G	G	110	G	100	G	G	G	105	S	S	S	S	S	E	100
13	S	100	E	100	100	S	E	G	G	110	105	100	100	100	100	G	S	S	S	E	E	S	105	105
14	100	105	E	E	E	S	100	G	G	160	105	105	100	105	G	105	S	E	110	S	110	S	S	E
15	105	105	100	100	E	S	S	G	105	105	105	105	100	100	100	100	100	100	100	100	S	S	S	S
16	105	100	100	E	E	E	S	110	105	105	105	105	100	G	G	100	S	100	S	S	E	E	100	100
17	E	100	100	100	100	E	E	G	G	105	105	105	100	100	G	G	100	100	100	E	S	105	E	105
18	E	100	100	100	100	100	E	125	G	G	G	G	105	100	G	100	100	100	E	S	100	E	E	E
19	E	E	E	E	E	E	E	G	110	105	105	100	100	G	G	100	100	100	100	S	105	105	100	110
20	105	100	100	C	100	C	C	C	C	115	G	C	C	105	105	105	S	100	S	E	E	110	E	E
21	E	E	E	E	E	E	E	G	G	G	G	110	C	105	100	100	S	S	E	100	S	S	E	S
22	E	E	E	E	E	E	E	G	G	G	115	110	G	G	100	100	C	S	S	110	120	125	120	120
23	115	110	E	110	110	E	S	150	G	125	100	140	115	G	100	140	145	100	E	S	140	110	S	S
24	S	E	E	E	E	E	E	G	G	C	C	C	105	100	105	100	100	100	100	S	E	E	E	E
25	S	E	E	E	E	E	S	155	150	110	110	145	G	G	105	105	S	S	S	110	110	110	105	105
26	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	100	S	E	E	E
27	E	E	100	100	E	E	E	115	150	105	105	105	G	120	G	100	105	E	E	S	S	E	110	100
28	S	S	E	E	140	E	E	G	G	110	110	G	G	105	100	G	100	E	S	S	E	E	E	S
29	E	E	E	E	E	E	E	G	G	110	110	140	125	G	125	C	S	S	105	E	125	E	S	S
30	E	E	110	110	105	E	E	175	G	G	G	G	105	105	145	140	115	110	105	105	110	E	S	110
31																								
Count	8	14	15	14	16	5	3	9	9	21	22	20	20	19	19	20	19	18	13	7	11	8	10	10
Median	105	100	100	100	100	100	100	125	110	110	110	105	105	105	100	100	100	100	100	100	110	110	110	105
U. O.																								
L. O.																								
Q. R.																								

The Radio Research Laboratories, Japan

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

f'Es

W11

IONOSPHERIC DATA

Lat. 45° 23.6'N
Long. 141° 41.1'E

Wakkanai

Types of Es
135° E Mean Time (G.M.T. +9h)

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	f	f3	f	f2		1				c	12	12	1	1	1	1	1	12		f2				
2			f		f								1	1			1	1	f	f	f			
3					f	f	1	1	1	12	12	12	1	1	1	1	1	12	f	f	f	f2	f	
4					f2	f5	h	h	c	c	1	12	1	1	1	1	1	1	f					
5			f	f2	f			c	c	c	c		1	1	1	1	1	1				f		
6		f	f	f2	f		c		c	c2	13	1	1	1	1	1			f					
7									1	1	1			1	1	1				f				
8			f	f	f					1	1	1		1	1	1	1	1						
9			f	f	f				c	1	12	12	12	12	12	1	1	f						
10		f	f	f2	f			1	1	1	1	12	1	1	1	1	1	f						
11			f	f	f				1	1	1	1	1	1	1	1	1	f	f	f	f	f	f	f
12			f	f	f					1	1	1	1	1	1		1							f
13			f	f	f				1	1	1	1	1	1	1								f2	f
14		f	f			f			h1	12	1	1	1	1	1	1		f	f					
15		f	f2	f					12	1	12	1	1	12	1	12	12	f2	f	f				
16		f	f2	f			12	12	1	1	12	12	12			1		f					f	f
17		f2	f2	f2	f				1	1	1	1	1	1	1	1	1	f	f			f		f
18		f	f2	f2	f	f	c			1	1	1	1	1	1	1	1	f	f			f	f3	f4
19									1	1	1	1	1	1	1	1	1	f2	f	f	f	f3	f4	f
20		f	f		f					c				1	1	1	1	1				f		
21											c			1	1	1	1			f				
22										c	1			1	1	1					f	f	f2	f2
23		f	f3	f2	f		h		c1	1	h1	h1	c21		1	h1	h	f			f	f2		
24									1	12	1	1	12	1	1	12	f	f						
25							h	h	h	1	1	h1		1	1	1			f		f2	f2	f2	f
26																			f					
27			f	f			1	h	h	1	1	1		c1		1	1					f	f	
28					f					1	1	1		1	1	1	1							
29										1	1	h	c		c				f		f			
30							h			1	1	h	1	1	h	h	1	f3	f2	f2	f			f2
31																								
Count																								
Median																								
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

Types of Es

W12

IONOSPHERIC DATA

Lat. 39° 43.5'N
Long. 140° 08.2'E

Akita

0.1Mc **foF2** 135° E Mean Time (G.M.T. +9h)

foF2

Nov. 1967

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	041	041	041	045	048	033	052	083	100	104	118	131	122	133	124	116	105	078	062	056	047	044	046	044
2	043	041	041	042	041	038	053	093	112	112	102	111	116	114	116	116	109	081	068	061	056	053	052	049
3	047	047	046	043	044	041	055	096	114	133	136	130	124	116	117	103	099	083	066	062	057	057	053	055
4	051	047	048	048	044	043	055	I092R	106	121	142	I143R	138	139	132	128	113	077	052	051	048	047	049	046
5	046	046	047	043	045	041	056	085	102	119	124	129	127	123	125	115	098	067	065	059	052	045	040	040
6	040	042	043	043	041	040	053	076	117	123	131	I1390	137	122	119	103	096	063	052	051	046	039	038	039
7	I041C	042	I044C	046	047	035	043	070	096	098	103	118	114	114	112	092	086	071	049	047	045	038	035	038
8	037	041	036	036	034	033	045	076	094	098R	094	116	117	125R	110	105	081	053	039	046	C	C	C	C
9	C	C	C	045	046	034	038	081	I102R	I011R	I177R	I31	129	127	I128R	I20R	106	070	058	051	I040R	I043R	I043R	I042R
10	040	I044R	I049R	046	049	034	043S	077	095R	091R	111R	I117R	I121R	111	I098R	098	077	J058R	046	043	035	I034R	I035R	036
11	037	038	040	042	043	039	043	070	086	088	093	I107R	I108R	099	I06R	100	090	059	054	047	041R	031	033	036
12	036	036	038R	039	043	036	041	066	103	108	106	111	102	106	116	104	I092R	072	060	050	041	040	034	FS
13	I037R	044	042	041	045	046	046	070	083	108R	I106R	126	126	113	I22R	I119R	098	061	052	053	046	049	048R	045F
14	043F	FS	046	045	FS	045	I052R	083	084	098	108	114	117	110R	I06R	096	095	054	059	048	039	036	031	034
15	036	036	040	044	045	J045R	053	075	085	I097C	101	106	104	103	095	093	097	061	053	051	039	036	036	036
16	042	040	039	043	044	045	049	084	I098R	092	097	114	120	107	094	094	085	065	052	043	044	042	045	046
17	046	046	045	046	046	044	047	078	091	096	122	123	115	116	102	105	080	055	052	048	043	036	036	038
18	040	042	042	046R	046	046	049	084	099	094	097	105	119	121	101	097	086	059	I055C	046	036	029	031	032
19	034	036	037	I038C	037	034	033	067	092	089	094	097	116	106	102	098	093	061	057	048	032	029	028	031
20	032	034	035	035	035	036	042	071	083	093	097	103	107	112	106	096	083	061	039	042R	036	034	034	034
21	036	036	037	036	041	039	037	070	082	093	104	108	108	114	117	096	087	054	041	043S	034	029	032F	034
22	034	034	036	037	041	034	034	I064C	I075C	082	095	119	119	113	106	I1036	099	076	061	063	041	I036C	033	035
23	036	037	040	046	035	032S	I036R	072	091	102	109	114	108	118	113	094	086	068	053	036	036	033	032	I036A
24	036	037	038	039	039	039	043	074	102	111	111	117	107	105	116	096	077	062	055	049	037	032	035	036
25	037	038	038	037	037	037	044	082	I106R	104	111	127	116	116	111	097	086	065	055	046	048	039	038	037
26	037	041	039	039	040	042	I046A	077	103	107	111	119	107	108	103	101	076	048	053	054	036	035	033	033
27	033	034	035	036	036	033	034	062	086	109	099	103	111	112	098	099	084	053	045	036	035	033	032	032
28	034	036	037	036	035	034	039	074	088	095	099	108	111	I100R	101	097	084	061	058	055	034	028	033	036
29	037	038	036	036	035	037	034	063	075	103	119	115	116	112	096	084	085	059	C	C	C	C	C	C
30	C	036	036	036	038	035	031	063	078	104	108	107	103	095	098	099	069	047	048	041	037	028	027	030
31																								
Count	28	28	30	30	29	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	28	28	28	27
Median	037	039	040	042	041	038	044	076	094	102	107	116	116	113	108	099	086	062	053	048	040	036	035	036
U. Q.	042	042	044	045	045	041	052	083	102	108	117	126	121	118	117	104	098	070	058	054	046	042	042	042
L. Q.	036	036	037	037	037	034	038	070	085	094	099	108	108	107	101	096	084	058	052	044	036	032	033	034
Q. R.	006	006	007	008	008	007	014	013	017	014	018	018	013	011	016	008	014	012	006	010	010	010	009	008

Sweep 1.0 Mc to 20.0 Mc in 15 sec in automatic operation

foF2

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

Lat. 39° 43.5' N
Long. 140° 08.2' E

Akita

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

Nov. 1967

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										430L	400	LH	L	L										
2										L	L	L	L	L	L									
3									L	L	480	L	420	L	L									
4										L	L	L	460L	L	L									
5										L	410	410	440	L	L									
6										L	440L	460L	450L	L	L									
7										440L	L	410	430L	420L										
8										L	450L	LH	LH	L	L	L								
9										L	L	L		L	L									
10										L	L	L	L	L	L									
11											430L	450L	L	R	L									
12										L	L	L	L	L	L									
13												450	L	L	L									
14										L		L	L	L	L									
15											500L	430	L	L	L									
16										L	L	420	LH	L	L									
17										L	L	L	L	L	L									
18										L	430L	L	L	L	L									
19										L	L	L	L	L	L									
20										340L	370	400	420	L	L									
21										L	L	L	470L	L	L									
22										C	L	L	L	L	L									
23										LH	L	L	L	L	L									
24											L	L	L	L	L									
25										L	L	440	L	430L										
26										L	L	420	L	380	L									
27										L	L	LH	L	L	L									
28										L	L	L	L	L	L									
29										L	L	L	L	L	L									
30										L	L	L	L	L	L									
31										L	L	L	L	L	L									
Count									1	3	9	10	6	3										
Median									340L	430L	430L	420	440L	420L										
U. Q.																								
L. Q.																								
Q. R.																								

The Radio Research Laboratories, Japan

Sweep 1.0 Mc to 20.0 Mc in 15 sec in automatic operation

foF1

A 2

IONOSPHERIC DATA

Lat. 39° 43.5'N
Long. 140° 08.2'E

Akita

135° E Mean Time (G.M.T. +9h)

0.01Mc

f_oE

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						B	220	295	330	340	350	350	350	320	285	A	A							
2						B	225	1285A	325	340	345	355	350	A	A	A	S							
3						B	220	275	1305A	335	340	345	345	320	275	A	B							
4						B	230	A	A	A	350	355	1345A	A	A	A	S							
5						B	225	1280A	1310A	335	340	340	330	305	265	B	B							
6						B	A	A	A	A	340	345	335	315	260	1210A	B							
7						S	215	1270A	1305A	325	335	340	330	310	270	A	S							
8						S	A	A	A	325R	1330R	335R	1325R	305	260	B	B							
9						B	225R	U260R	295R	320	325R	330R	320	R	A	B	B							
10						B	230	270	1290A	320	330R	1330A	1320A	290	A	B	B							
11						B	B	255	305A	320R	1330R	335R	1325A	305	260R	B	B							
12						B	R	270A	305R	1320A	335R	325	295	250	B									
13						B	B	265	300R	1325R	335R	1330R	320	280	A	A								
14						B	B	265	300	325	330R	1325A	320A	A	A	B								
15						B	190	245	290	310A	1325A	1330A	320	295	A	A								
16							215	A	A	A	320	1330A	1330A	A	A	B								
17							235	265	1305A	325	335	345	335	310	270	200								
18							1215A	260	320	330	335	1340A	1330A	310	255	B								
19							B	265	305	325	1330A	335	330	305	260	A								
20							210R	275	310	325	335	340	330	315	265	A								
21							220	1270A	325	335	1340A	340	335	310	245	B								
22							C	C	305	1320A	335	1330A	330	A	C	B								
23							205	265	300	320	325	335	330	300	250	A								
24							210	265	1295A	315	1330A	1335A	1330A	315	A	A								
25							200	265	1295A	1320A	330	330	320	300	245	1175B								
26							200	260	295	310	320	325	1310A	1290A	245	B								
27							185	1240A	305	315	325	330	325	280	240	190								
28							190	260	295	315	325	330	325	290	250	B								
29							190A	260	305	320	330	1330A	325	290	255	195								
30							A	255	295	310	330	335	1330A	1300A	245	A								
31																								
Count							21	25	26	27	30	30	30	24	20	6								
Median							215	265	305	320	330	335	330	305	260	200								
U. Q.																								
L. Q.																								
G. R.																								

IONOSPHERIC DATA

Lat. 39° 43.5'N
Long. 140° 08.2'E

Akita

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

foEs

Nov. 1967

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	E018B	E	J020	E	E	J017	E018B	G	031	G	035	G	G	G	G	030	J024	J019	J022	E018B	E018B	E018B	J034	E018B
2	E012S	E	E	E	E	E014S	E018B	G	030	G	J033G	G	J028G	J035	J034	J029	J025	J032	J033	J022	J025	J025	J034	J020
3	E020M	E013S	J020	E	E	E	E018B	G	G	035	J036	J034G	G	J031G	G	G	G	E018B	J020	E019B	E014S	E013S	E018B	E013S
4	J021	J025	E014S	J019	E014B	J017	E018B	G	J046	J046	J053	J051	J031G	J064	J063	J053	J045	J023	E014S	E018B	E013S	E013S	E018B	E014S
5	E018B	E	E012S	J029	E013S	J022	E016B	J043	029	034	G	G	G	G	J019G	G	J024	E018B	J022	E013S	J019	E018B	E013S	E014S
6	E018B	E012S	E013S	E	E	E014S	E018B	026	031	032	034	G	G	J028G	G	G	022	E016B	E018B	E018B	E012S	E014S	E019C	
7	E021C	E014S	C	E014S	E013S	E012S	E014S	G	030	032	G	031G	G	G	026G	023G	J034	J024	J021	E013S	J024	J016	E012S	E019C
8	J029	J019	E	J023	J028	E012S	E013S	021	028	030	G	G	G	G	G	G	J023	E017B	E017B	C	C	C	C	C
9	C	C	C	E016S	E015S	E015S	E018B	G	G	G	035	J038	G	022G	J025G	J036	J029	E020B	E021B	E020B	E020B	E020B	E020B	E020B
10	E020B	E015B	E013B	E015B	E011B	E022B	E020B	G	G	032	032G	G	J033	J037	025G	J030	J025	J025	E020B	E021B	E023B	J025	J043	E021B
11	E027M	J023	E013B	E019M	J020	017	E015B	E021B	G	037	028G	031G	029G	J060	029G	023G	E021B	J021	024M	E020B	E020B	E020B	E020B	E020B
12	E019B	E015B	E013B	E012B	E	E014S	E016B	G	033	033	040	J035	G	G	J078	G	J021	J023	E019B	022M	E014B	E019B	E020B	E020B
13	E021B	E013B	E012B	E012B	E014B	E013S	E018B	E021B	G	029G	033	G	G	G	G	029	J025	J042	J025	025M	J021	023M	E019B	E019B
14	J028	J028	J026	J023	022M	E015S	E020B	E021B	G	G	G	G	035	037	031	025	E020B	E019B	E017B	J030	E019B	E015B	E019B	J022
15	J018	J015	017	E012B	E013B	E013S	E019B	027M	025	J034	J037	J039	J032G	J029G	J033	J029	J026	J025	J022	023M	E018B	E020B	J020	J026
16	E020B	J016	E014S	E012S	E	E013S	E014S	G	J037	J032	J037	J035	J034	J042	J043	J034	J026	J029	E020B	E020B	E020B	E020B	E013S	E020B
17	E020B	J019	J019	E013S	E	E	E013S	025	J040	035	J028G	G	J034	G	025G	J024	J024	J024	J020	J028	J021	J023	E013S	E020B
18	E019B	E012S	J026	E012S	E013S	E	E016B	027	030	J036	G	G	J038	J034	J029G	J021G	J026	E019B	C	E020B	E020B	E022B	E019B	E021B
19	E017B	E012S	E012S	C	E012S	E013S	E014S	026	G	G	G	J034	G	G	G	G	J019	E014S	E014S	E013S	J020	E014S	E012S	E014S
20	E021B	E	E	E016B	E	E013S	E018B	G	G	G	034	J034	G	G	G	G	J029	J024	E021B	E023B	E019B	E024B	E022B	E018B
21	E014S	E013S	E012S	E014S	E012S	E012S	E012S	019G	J028	G	G	J054	G	G	025G	027	E021B	E016B	E016B	E016B	E019B	E016B	E016B	E012S
22	E018B	E013S	E	E	E013S	E	E016S	C	C	032	J044	040	039	J038	035	C	E020B	E018B	E017B	E019B	J020	C	J018	J046
23	J021	J023	J019	J014	J029	J021	J024	G	G	033	040	J051	J061	037	G	035	J023	J028	E016B	J021	J022	J033	J054	J062
24	J021	E012S	E013S	J011	E	E014S	E018B	G	J024G	035	038	042	037	038	029G	J030	J028	J017	E019B	E018B	E021B	J020	E013S	J021
25	E020B	020M	E012S	E012S	019M	E013S	E017B	G	G	033	J037	035	G	G	G	028	E020B	J020	J025	E014S	025M	J026	J024	E013S
26	J021	J022	E012S	J030	J039	J079	J068	G	G	J033	027G	039	J029G	035	033	J025	E019B	J024	J020	J020	E020B	E020B	E020B	E020B
27	E014S	E	E013S	E012S	E012S	E012S	E020B	G	031	J030G	030G	G	G	036	039	030	027	E018B	E019B	J020	J024	E013S	E021B	E021B
28	J020	J024	J021	J019	E012S	E013S	E020B	G	G	G	G	G	G	G	033	G	E021B	E013S	E018B	E013S	J018	E018B	E020B	E013S
29	J025	J023	E012S	E	E	E	J021	J023	G	G	036	J038	J039	033	G	J025G	J028	J026	C	C	C	C	C	C
30	C	E	E	E	E	E012S	E016B	J022	G	031	G	036	036	039	036	032	J030	J021	J019	E018B	E014S	E018B	E019B	J035
31																								
Count	28	29	29	29	30	30	30	29	29	30	30	30	30	30	30	29	30	30	28	29	28	27	28	28
Median	E020	E014	E013	E012	E012	E013S	E018B	G	G	032	034	G	G	G	G	027	J024	J020	E020	E020	E020	E020B	E019B	E020
U. Q.	021	021	018	018	E014	E016	E019	022	030	034	036	038	035	037	033	031	028	024	022	022	022	022	022	E020
L. Q.	E018	E012	E012	E	E	E012	E016	G	G	G	G	G	G	G	G	G	EC21	E018	E018	E018	E018	E016	EC14	E014
Q. R.	0003	0009	0006														0007	0006	0004	0004	0004	0006	0006	0006

Sweep 1.0 Mc to 20.0 Mc in 15 sec in automatic operation

foEs

The Radio Research Laboratories, Japan

Lat. 39° 43.5' N
Long. 140° 08.2' E

Akita

IONOSPHERIC DATA

0.1Mc 135° E Mean Time (G.M.T. +9h)

fbEs

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B		E			E	B		G		G					029	023	018	018	B	B	B	B	B
2	S					S	B		029			027G		025G	033	028	024	024	019	021	S	S	018	018
3	E	S	E				B		034	034	029	029G		024G				B	020	B	S	S	B	S
4	018	018	S	E	B	014	B		039	040	038	028	028G	034	033	030	027	021	S	B	S	S	S	S
5	B		S	015	S	E	B	020	029	033				019G		022	B	019	S	018	B	S	S	S
6	B	S	S			S	B	023	029	032R	034			028G		022	B	B	B	B	B	S	S	C
7	C	S	C	S	S	S	S		029	032		028G			023G	019	021	018	E	S	020	016	S	S
8	016	E		E	012	S	S	021	028	030						021	B	B	B	C	C	C	C	C
9	C	C	S	S	012	S	B				E035R	038		022G	023G	035	022	B	B	B	B	B	B	B
10	B	B	B	B	B	B	B			031	025		U033R	033	023G	027	021	023	B	B	B	017	027	B
11	021	016	B	014	015	015	B	B		035	027G	E031R	028G	043	023G	027	B	019	021	B	B	B	B	B
12	B	B	B	B	B	S	B	B	028	032	035	029		033		020	023	B	019	B	B	B	B	B
13	B	B	B	B	B	S	B	B		028G	022					028	024	040	019	020	021	019	B	B
14	020	020	019	020	015	S	B	B					035	035	032	025	B	B	B	020	B	B	B	E
15	U018R	S	S	B	B	S	B	G	023	022	027	035	037	027G	022G	027	020	E	021	E	B	B	018	020
16	B	014	S	S	S	S	S		030	031	036	028	034	037	032	034	024	021	B	B	020	B	S	S
17	B	013	014	S	S	S	S	G	027	035	028G			023	023G	023G	018	018	020	E	019	S	B	B
18	B	S	E	S	S	B	B	023	028	G		034	038	034	023G	020G	026	B	C	B	B	B	B	B
19	B	S	S	C	S	S	S	G								U019R	S	S	S	S	019	S	S	S
20	B			B	B	S	B				030	032				028	022	019	B	B	B	B	B	B
21	S	S	S	S	S	S	S	018G	028			036			025G	027	B	B	B	B	B	B	B	S
22	B	S		S	S	S	C	C	C	G	034	035	038	028	033	C	B	B	B	B	020	C	018	021
23	E	014S	E	E	016	013S	020		033	037	040	040	040	035	030	030	022	E	B	019	E	E	019	A
24	E	S	S	E		S	B		024G	032	038	U042R	036	038	028G	027	024	U017R	B	B	B	020	S	019
25	B	E	S	S	E	S	B			032	034	034				027	B	020	021	S	E	E	E	S
26	018	014	S	020	021	028	A		023	025G	034	034	026G	034	032	021	B	019	020	E	B	B	B	B
27	S		S	S	S	S	B		029	027G	029G			035	038	029	024	B	B	E	019	S	B	B
28	E	016	012	E	S	S	B							032	032		B	S	B	S	E	B	B	S
29	018	E	S				E	G			034	036	035	G	019G	018	018	C	C	C	C	C	C	C
30	C				S	S	B	021	031		034	034	036	036	032	G	023	021	018	B	S	B	B	021
31																								

Count
Median
U. Q.
L. Q.
Q. R.

Lat. 39° 43.5'N
Long. 140° 08.2'E

Akita

IONOSPHERIC DATA

0.1Mc 135° E Mean Time (G.M.T. +9h)

f-min

Nov. 1967

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	E018	E	E	E	E	E	E018	E018	019	019	020	019	018	018	019	013	012	E	E	E012S	018	018	018	018
2	E012S	E	E	E	E	E014S	E018	019	019	020	021	019	018	018	018	014	013	E012S	E014S	E014S	017	E012S	E014S	E013S
3	E018	E013S	E014S	E	E	E	E018	018	018	021	019	019	018	018	020	018	018	018	E014S	019	E014S	E013S	018	E013S
4	E013S	E012S	E014S	E	014	E	018	014	018	019	019	019	020	018	012	013	E	E013S	E014S	018	E013S	E013S	E013S	E014S
5	018	E	E012S	E	E013S	E	016	014	015	018	019	021	018	019	012	014	022	018	E013S	E014S	018	E013S	E014S	E014S
6	018	E012S	E013S	E	E	E014S	018	018	013	019	019	019	E022C	019	019	014	013	016	018	018	018	E012S	E014S	E019C
7	E021C	E014S	C	E014S	E013S	E012S	E014S	012	014	019	024	019	021	019	018	014	013	E014S	E013S	E013S	E012S	E012S	E012S	E015S
8	E012S	E	E	E	E	E012S	E013S	018	019	019	020	021	019	020	021	018	019	017	017	017	C	C	C	C
9	C	C	E016S	E015S	012	E015S	018	020	020	020	020	020	020	020	021	019	020	020	020	021	020	020	020	020
10	020	015	013	015	011	022	020	021	018	022	021	021	021	021	020	021	021	018	020	021	023	017	017	021
11	021	012	013	014	012	015	015	021	021	021	021	021	020	020	020	020	021	019	020	020	020	020	020	020
12	019	015	013	012	E	E014S	016	017	020	018	020	020	022	020	020	020	020	020	019	020	014	019	020	020
13	021	013	012	012	014	E013S	018	021	020	022	022	023	021	020	020	019	016	020	019	020	019	019	019	019
14	020	015	011	013	015	E015S	020	021	020	020	021	022	021	020	020	019	020	019	017	019	019	020	019	015
15	016	E013S	E012S	012	013	E013S	019	E016S	019	018	019	019	018	017	015	013	012	018	E012S	E014S	018	020	E012S	E013S
16	020	E	E014S	E012S	E	E013S	E014S	019	018	019	021	019	019	019	017	013	019	E014S	020	020	E013S	020	E013S	E013S
17	020	E	E	E013S	E	E	E013S	018	019	020	021	020	019	018	019	019	E013S	E012S	E013S	E014S	E013S	E014S	E013S	020
18	019	E012S	E012S	E012S	E013S	E	016	018	020	021	020	020	025	020	019	019	018	019	C	C	020	022	019	021
19	017	E012S	E012S	C	E012S	E013S	E014S	021	020	020	021	021	020	019	020	019	013	E014S	E014S	E013S	E014S	E014S	E012S	E014S
20	021	E	E	016	E	E013S	018	014	018	021	021	020	020	020	019	013	012	E012S	021	023	019	024	022	018
21	E014S	E013S	E012S	E014S	E012S	E012S	E012S	012	019	023	023	024	021	021	020	019	021	016	016	016	019	016	016	E012S
22	018	E013S	E	E	E013S	E	E016S	C	C	021	020	020	019	020	014	C	020	018	017	019	018	C	E013S	016
23	E014S	E	E	E	E	E	E013S	020	016	014	021	019	014	014	012	014	013	E014S	016	E012S	E013S	E014S	E012S	E014S
24	E012S	E012S	E013S	E	E	E014S	018	013	013	015	021	023	020	020	019	014	013	E012S	019	018	021	E013S	E013S	E012S
25	020	E014S	E012S	E012S	E013S	E013S	017	012	021	021	020	021	020	020	020	021	020	E012S	E014S	E014S	020	018	019	E013S
26	E014S	E	E012S	E013S	E	E012S	019	013	014	019	019	020	019	020	020	014	019	E014S	E013S	E014S	020	020	020	020
27	E014S	E	E013S	E012S	E012S	E012S	020	017	014	020	020	020	019	019	021	015	012	018	019	E013S	E014S	E013S	021	021
28	016	E	E	E013S	E012S	E013S	020	014	018	019	019	019	021	019	020	020	021	E013S	018	E013S	E012S	018	020	E013S
29	E012S	E	E012S	E	E	E	019	013	019	019	019	020	020	019	019	014	014	E013S	C	C	C	C	C	C
30	C	E	E	E	E	E	E012S	016	014	019	019	018	018	019	019	013	012	E012S	E012S	018	E014S	018	019	E014S
31																								
Count	28	29	29	29	30	30	30	29	29	30	30	30	30	30	30	29	30	30	28	29	28	27	28	28
Median	018	E012	E012	E012	E012	E012S	018	018	019	020	020	020	020	019	019	015	017	E015	017	018	018	018	018	E015S
U. Q.																								
L. Q.																								
Q. R.																								

The Radio Research Laboratories, Japan

Sweep 1.0 Mc to 20.0 Mc in 15 sec in automatic operation

f-min

IONOSPHERIC DATA

Akita

Lat. 39° 43.5' N
Long. 140° 08.2' E

0.01 M(3000) F2 1 35° E Mean Time (G.M.T. +9h)

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	255	250	250	290	315	295	305	340	325	315	305	305	290	300	305	300	325	310	305	305	300	285	285	295
2	280	275	275	290	285	290	290	325	330	330	305	300	305	300	330	305	320	310	300	295	285	285	285	285
3	280	275	295	280	285	255	280	325	315	315	310	310	310	310	310	310	315	315	300	295	305	300	285	290
4	260	250	250	255	240	240	295	1325R	320	320	315	1310R	300	300	305	305	320	320	300	295	290	290	290	285
5	265	270	300	280	295	290	310	340	315	325	325	310	310	310	315	315	315	300	295	305	310	295	285	270
6	255	265	265	270	260	275	310	330	325	340	320	1320C	320	320	310	315	330	335	300	295	305	280	270	255
7	1260C	270	1285C	305	320	305	325	340	340	330	325	325	320	315	315	335	320	325	320	300	310	305	255	265
8	275	280	305	300	305	290	310	335	335	330R	320	325	310	320R	310	330	345	340	280	305	C	C	C	C
9	C	C	285	280	325	330	285	330	1320R	320R	315R	310	310	315	1310R	325R	340	315	320	340	1320R	290R	1280R	1280R
10	275	280	285R	325	330	280	315S	345	345R	325R	330R	1325R	1325R	330	1330R	345	330	1325R	325	330	330	310	1285R	275R
11	275	280	285	305	310	315	325	355	360	345	335	1320R	1330R	320	330R	340	345	335	315	335	330R	315	295	290
12	290	290	290R	295	325	320	315	325	330	335	330	325	325	310	325	320	1330R	310	300R	320	310	315	290	FS
13	1290R	295	280	290	290	290	350	345	345	335R	1315R	320	320	310	320R	1340R	340	335	310	320	305	285	290R	280F
14	285F	FS	295	300	FS	300	1320R	355	355	335	325	310	320	310R	340R	330	345	330	325	325	320	325	295	280
15	275	280	275	285	300	3310R	330	345	345	1340C	315	310	325	310	315	325	350	320	310	315	315	285	280	280
16	255	265	275	280	270	270	310	335	1340R	335	335	325	325	320	320	325	330	315	315	305	300	275	275	285
17	275	275	270	275	285	280	320	335	345	330	335	335	325	320	315	325	335	320	310	315	305	280	280	290
18	285	290	280	290R	305	300	310	330	345	335	315	310	310	325	310	330	325	320	1320C	320	320	285	260	260
19	270	285	285	1290C	300	305	345	330	350	325	325	310	315	305	310	325	340	320	315	340	305	305	280	265
20	265	270	270	270	285	290	335	340	350	325	325	320	310	310	320	325	305	330	330	315R	300	295	275	275
21	275	285	285	285	305	310	320	345	345	335	325	315	315	310	320	325	345	310	315	320S	315	290	265F	265
22	270	285	270	285	305	315	315	1340C	1345C	320	305	320	315	310	315	1320C	320	315	285	310	295	1290C	280	270
23	270	265	280	305	315	270S	1290R	330	325	320	315	315	300	315	320	315	315	325	305	315	295	270	280	1380A
24	265	265	265	270	270	290	300	335	330	320	320	325	310	310	325	325	330	300	305	310	300	260	270	275
25	260	275	275	270	275	275	300	330	1340R	325	315	320	310	315	325	330	340	320	310	300	315	300	280	275
26	275	270	270	280	265	275	1300A	325	330	335	315	335	320	325	320	335	340	325	305	315	285	295	290	290
27	275	275	270	280	285	280	295	325	315	340	330	325	320	315	325	320	350	320	310	295	290	290	280	285
28	275	275	295	290	275	275	295	340	340	325	325	315	315	1320R	315	320	335	310	310	320	315	260	250	260
29	275	290	295	295	285	305	330	335	320	315	335	320	325	325	335	325	340	320	C	C	C	C	C	C
30	C	265	275	280	315	295	290	335	320	325	325	325	335	330	320	330	345	305	320	300	315	290	250	265
31																								
Count	28	28	30	30	29	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	28	28	28	27
Median	275	275	280	285	295	290	310	335	340	330	320	320	315	315	320	325	330	320	310	315	305	290	280	280
U. Q.																								
L. Q.																								
G. R.																								

The Radio Research Laboratories, Japan

Sweep 1.0 Mc to 20.0 Mc in 15 sec in automatic operation

M(3000) F2

IONOSPHERIC DATA

Lat. 39° 43.5'N
Long. 140° 08.2'E

Akita

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

Nov. 1967

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										395L	400	LH	L	L										
2										L	L	L	L	L	L									
3									L	L	355	L	395	L	L									
4										L	L	L	365L	L	L									
5										L	390	390	390	L	L									
6										L	375L	370L	380L	L	L									
7										385L	L	400	390L	380L										
8										L	375L	LH	LH	L	L									
9										L	L	L	L	L	L									
10										L	L	L	L	L	L									
11										L	370L	360L	L	R	L									
12										L	L	L	L	L	L									
13										L		375	L	L	L									
14										L		L	L	L	L									
15											375L	390	L	L	L									
16										L	L	390	LH	L	L									
17										L	L	L	L	L	L									
18										L	390L	L	L	L	L									
19										L	L	L	L	L	L									
20										385L	405	400	385	L	L									
21										L	L	L	385L	L	L									
22										C	L	L	L	L	L									
23										LH	L	L	L	L	L									
24										L	L	L	L	L	L									
25										L	L	370	L	380L										
26										L	L	385	L	395	L									
27										L	L	LH	L	L	L									
28										L	L	L	L	L	L									
29										L	L	L	L	L	L									
30										L	L	L	L	L	L									
31										L	L	L	L	L	L									
Count									1	3	.9	10	6	3										
Median									385L	395L	375L	385	390L	380L										
U. Q.																								
L. Q.																								
Q. R.																								

The Radio Research Laboratories, Japan

Sweep 1.0 Mc to 20.0 Mc in 15 sec in automatic operation

M(3000)F1

A 8

Lat. 39° 43.5' N
 Long. 140° 06.2' E

Akita

IONOSPHERIC DATA

km 1 35° E Mean Time (G.M.T. +9h)

h'F2

Nov. 1967

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										225	240	260	250	265												
2										230	230	240	255	255	250											
3									250	260	275	240	245	250	250											
4										245	260	245	250	250	240											
5										245	245	245	245	250	250											
6										240	235	230	245	250	250											
7										245	235	255	235	250												
8										230	240	255	260	255	235	230										
9										225	240	270		235	235											
10										230	245	235	245	245	235											
11											235	235	245	240	250											
12										235	220	245	245	250	240											
13												260	240	250												
14										240		240	245	240												
15											250	245	250	245												
16										235	245	235	250	250	250											
17										235	250	235	230	250	235											
18										230	230	250	260	250												
19										240	235	255	255	250												
20										220	225	230	250	250												
21											250	240	265	250	250											
22											230	245	250	255												
23										240	240	250	250	255												
24											230	245	255	245												
25											215	230	255	250	250											
26										225	245	240	230	230	250											
27										220	230	250	255	250												
28										225	250	250	250	255												
29										245	250	240	255	240												
30										240	245	230	245													
31																										
Count									3	27	28	30	29	28	15	1										
Median									240	235	240	250	250	250	250	230										
U. Q.																										
L. Q.																										
Q. R.																										

Sweep 1.0 Mc to 20.0 Mc in 15 sec in automatic operation

The Radio Research Laboratories, Japan

h'F2

A 9

Lat. 39° 43.5'N
Long. 140° 08.2'E

Akita

IONOSPHERIC DATA

km 1 35° E Mean Time (G. M. T. +9h)

f_oF

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	320	305	310	275	235	210	255	220	220	215	200	195H	230	235	240	230	225	215	230	240	245	280	280	260
2	255	260	265	260	255	270	265	225	235	230	230	230	225	230	240	240	225	220	250	245	265	280	280	255
3	270	255	270	270	270	240	265	230	240	230	230	230	215	225	230	235	225	220	245	250	225	245	270	245
4	255	315	315	290	350	340	235	220	240	1230A	240	225	230	235	230	230	225	210	220	265	255	270	255	290
5	290	280	245	255	255	240	240	220	225	230	220	210	220	225	230	230	225	205	250	235	240	250	255	290
6	320	290	290	285	280	255	240	230	240	230	225	225	220	240	230	225	220	205	240	245	240	260	290	330C
7	330C	300	1275C	250	230	225	225	215	225	225	220	190	225	225	235	225	225	215	220	245	250	250	340	335
8	315	275	245	255	245	280	240	220	230	230	215	210H	220H	245	235	240	210	210	275	270	C	C	C	C
9	C	C	280S	275S	230	SH	295	240	240	220	1210R	230	240	225	230	235	220	200	230	230	250	300	300	325
10	345	285	290	225	220	1210B	250	225	225	220	225	220	235	230	225	230	210	225	240	245	245	250	1290A	1330B
11	340	320	300	255	250	250	220	215	220	225	215	215	1240R	1235R	230	230	220	200	230	230	245	1250B	290	300
12	320	310	295	275	245	210S	255	240	230	225	220	225	230	235	245	225	220	220	240	230	245	250	280	1290B
13	305	275	285	290	275	250S	230	210	220	235	225	220	230	220	240	230	210	1210A	230	240	245	280	275	290
14	300	300	280	270	265	250	245	215	215	220	230	225	230	230	230	230	220	200	225	240	245	250	B	315
15	1330R	325	300	295	270	225	230	220	230	225	215	210	1210A	230	240	230	220	200	240	240	240	290	300	330
16	325	290	295	280	290	295	250	235	230	230	240	205	195H	230	230	235	225	225	225	250	260	280	290	275
17	280	285	290	285	255	260	230	215	220	220	240	220	230	230	230	235	205	220	240	235	240	275	290	300
18	290	270	250	270	255	240	240	220	220	225	220	230	240	240	240	230	220	200	1225C	235	225	300	340	355
19	320	290	280	1270C	265	220	220	220	225	220	230	230	210H	230	245	245	225	210	220	220	270	255	295	315
20	350	315	310	300	285	250	225	215	205	215	210	195	235	235	240	240	215	205	240	250	255	300	300	330
21	305	290	290	290	255	240	225	215	215	230	230	220	220	230	230	225	225	205	225	225	235	250	1330B	330
22	340	315	300	285	260	200	240	1225C	1220C	220	230	235	235	235	245	1240C	230	215	240	235	245	C	320	340
23	305	320	290	245	245	270S	280	225	200H	230	235	240	235	240	230	215	220	215	230	245	270	290	315	1315A
24	300	315	315	290	290	280	240	220	220	215	230	240	230	230	240	220	210	230	225	230	255	A	310	315
25	330	290	280	280	300	300	245	220	220	215	225	210	230	225	230	220	220	215	235	235	255	245	300	290
26	330	295	300	305	330	320	1260A	225	225	220	215	210	230	200	235	230	215	200	250	230	260	270	300	280
27	300	305	305	280	270	225	280	215	220	220	220	215H	230	245	235	225	205	215	235	250	255	270	300B	1320B
28	320	315	275	260	290	290	280	225	220	220	205H	210	230	230	235	225	215	220	240	230	215	B	340	335
29	315	250	240	240	280	240	230	220	220	230	250	240	245	240	220	220	225	215	C	C	C	C	C	C
30	C	295	295	290	245	215	240	220	220	230	230	230	230	230	245	230	205	240	245	240	235	255	B	370
31																								
Count	28	29	30	30	30	29	30	30	30	30	30	30	30	30	30	30	30	30	29	29	28	25	26	28
Median	320	295	290	275	260	250	240	220	220	225	225	220	230	230	235	230	220	215	235	240	245	260	300	315
U. Q.																								
L. Q.																								
Q. R.																								

f_oF

Sweep 1.0 Mc to 20.0 Mc in 15 sec in automatic operation

The Radio Research Laboratories, Japan
A 10

IONOSPHERIC DATA

Lat. 39° 43.5'N
Long. 140° 08.2'E

Akita

135° E Mean Time (G.M.T. +9h)

km
f'Es

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	E	100	E	E	100	B	G	140	G	125	G	G	G	G	155	105	105	150	115	B	B	B	B
2	S	E	E	E	E	S	B	G	120	G	G	110	G	105	105	100	105	115	110	B	105	105	105	100
3	105	S	100	E	E	E	B	G	G	115	110	105	G	105	G	G	G	B	105	B	S	S	B	S
4	105	105	S	100	B	105	B	G	120	115	115	110	105	100	100	100	100	100	S	B	S	S	S	S
5	B	E	S	110	S	125	B	100	130	120	G	G	G	G	100	G	115	B	100	S	100	B	S	S
6	B	S	S	E	E	S	B	130	120	125	115	G	G	105	G	G	110	B	B	B	B	S	S	C
7	C	S	C	S	S	S	S	G	120	120	G	110	G	G	105	105	105	100	100	S	120	120	S	S
8	105	105	E	100	100	S	S	130	130	125	G	G	G	G	G	G	110	B	B	B	C	C	C	C
9	C	C	S	S	100	S	B	G	G	130	125	G	G	100	100	100	100	B	B	B	B	B	B	B
10	B	B	B	B	B	B	B	G	G	115	100	G	105	105	105	110	105	110	B	B	B	110	105	B
11	110	110	B	105	100	100	B	B	G	125	110	105	100	100	100	100	B	100	100	B	B	B	B	B
12	B	B	B	B	E	S	B	G	130	125	120	115	G	G	115	G	100	100	B	105	B	B	B	B
13	B	B	B	B	B	S	B	B	G	120	110	G	G	G	G	110	110	105	110	110	105	110	B	B
14	110	105	100	100	100	S	B	B	G	G	G	G	G	G	G	110	110	105	110	110	105	110	B	B
15	105	100	100	B	B	S	B	115	105	105	105	105	105	100	105	100	100	120	110	110	B	B	B	105
16	B	105	S	S	E	S	S	G	110	110	105	105	105	100	100	100	100	100	B	B	B	B	S	S
17	B	110	105	S	E	E	S	165	G	105	165	105	G	100	G	110	100	105	105	110	110	105	S	B
18	B	S	120	S	S	E	B	130	130	125	G	G	110	110	105	105	110	B	C	B	B	B	B	B
19	B	S	S	C	S	S	S	130	G	G	G	105	G	G	G	105	105	S	S	S	110	S	S	S
20	B	E	E	B	E	S	B	B	G	G	110	110	G	G	G	155	100	100	B	B	B	B	B	B
21	S	S	S	S	S	S	S	120	115	G	G	120	G	G	G	160	B	B	B	B	B	B	B	S
22	B	S	E	E	S	E	S	C	C	125	120	125	150	105	130	C	B	B	B	B	115	C	120	110
23	115	115	120	120	110	110	105	G	G	165	150	135	130	150	G	145	100	100	B	145	130	115	110	110
24	110	S	S	110	E	S	B	G	115	120	120	115	115	110	110	100	105	100	B	B	B	115	S	115
25	B	105	S	S	110	S	B	G	G	120	115	145	G	G	G	140	B	100	105	S	140	115	120	S
26	115	115	S	115	115	110	110	G	G	105	105	140	105	125	115	100	B	100	100	S	B	B	B	B
27	S	E	S	S	S	S	B	G	160	115	105	G	G	150	140	145	140	B	B	100	B	B	B	B
28	110	105	105	100	S	S	B	G	G	G	G	G	G	145	G	140	B	B	100	140	S	B	B	B
29	110	110	S	E	E	E	105	160	G	G	150	130	120	140	G	105	110	105	C	C	C	C	C	C
30	C	E	E	E	E	S	B	105	G	150	G	155	150	140	135	140	105	105	100	B	S	B	B	110
31																								
Count	11	12	8	9	7	6	3	10	14	21	20	20	13	19	19	22	22	18	12	10	12	8	6	7
Median	110	105	100	105	100	110	105	130	120	120	115	110	110	105	105	110	105	100	105	110	110	110	110	110
U. Q.																								
L. Q.																								
Q. R.																								

The Radio Research Laboratories, Japan

Sweep 1.0 Mc to 20.0 Mc in 15 sec in automatic operation

f'Es

IONOSPHERIC DATA

Lat. 39° 43.5'N
Long. 140° 08.2'E

Akita

135° E Mean Time (G.M.T. +9h)

Types of Es

Nov. 1967

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			f			h		h				h	12	1	f	f	f					
2									e			1		1	12	13	13	f3f	f2		f2	f2		f	
3	f		f						e2	12	12			12				f							
4	f2		f			f			e3	e3	e3	12	1	13	13	13	12	1							
5			f			f			e2	e				1	1		c	f2			f				
6									e3	e	e2	-					1								
7									c	e2	12				12	12	1	1	f		f3	f2			
8	f2		f2		f				e2	h2							1								
9					f					h	h	h		1	1	12	1								
10									c	1	1	1	1	1	1	1	1	1			f	f2			
11	f	f2		f	f	f			h	c	1	1	1	1	1	1	1	1	f						
12									h	h	c	1			c		1	f		f					
13									1	1	1					13	1	f2	f2	f	f2	f			
14	f	f2	f2	f2	f					13h	13h2	13	c	h	h2	e2				f2				f	
15	f	f2	f					c	13	13	13h2	13	12	13	12	12	1	f	f	f			f2	f2	
16		f							12	13	13	12	12	13	13	12	12	f							
17		f	f					h	12h	h	h	12	1	1	12	12	1	f2	f	f	f2	f2			
18			f					c	h2	h			12	12	12	1	13								
19								c				12					1				f2				
20										12	1					h 1	12	f							
21								1	e2		c				1	h									
22									h	c	h	h	c	12	h2						f	f2	f2	f3	
23	f	f2	f	f	f3	f	f2		h	h	h3	h	h2	h212	h21	h21	12	f	f2	f2	f2	f2	f2	f3	
24	f			f					1	e2	e2	e	e2	e2	12	12	12	f			f2	f2	f2	f	
25		f			f					e2	e2	h 1			h		f	f			f	f	f	f	
26	f2	f		f2	f2	f4	f3			12	1	h	12	h 1	c2	1	f	f	f						
27									h212	12	12			h 12	h2	h212	h2			f	f				
28	f	f2	f								h			h	h						f				
29	f2	f				f		h		h	h2	c	h	h	1	1	1	f3							
30								12		h	h	h	h	h2	h2	h 12	13	f2	f					f3	
31																									
Count																									
Median																									
U. Q.																									
L. Q.																									
Q. R.																									

Sweep 1.0 Mc to 20.0 Mc in 15 sec in automatic operation

Types of Es

The Radio Research Laboratories, Japan

A 12

IONOSPHERIC DATA

Lat. 35° 42.4'N
Long. 139° 29.3'E

Kokubunji Tokyo

0.1Mc 135° E Mean Time (G.M.T. +9h)

foF2

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	C	C	C	C	C	C	C	C	C	U106R	122	135	132	138	137	125	112	083	063	061	050	046	046	046
2	043	043	041	043	036	035	051	092	108	109	110	111	118	123	120	117	111	081	065	065	059	052	052	049
3	045	045	044	045	040	036	052	093	107	121	133	137	118	116	115	100	096	090	067	067	064	050	047	U047R
4	046	046	048	050	047	043	058	089	J105R	112	137	153	141	149	142	132	117	085	068	048	046	048	048	046
5	043	046	043	040	041	038	051	087	097R	118	128	125	129	133	136	126	103R	076	062	060	054	047	039	038
6	040	041	042	042	038	040	056	083	110	127	142	148	137	146	135	121	098	076	051	050	047	039	036	037
7	038	039	043	048	043	029	042	073	083	1096C	114	107	125	123	122	102	076	073	056	051	052	040	033	034
8	036	038	038	040	033	028	044	084	091	097	110	109	117	133	122	J104R	081	058	039	046	045	043	043	043
9	045	044	044	045	039	034	039	086	107	101	U105R	119	133	136	123	110	108	070	056	048	041	039	038	040
10	039	042	045	045	043	030	043	079	090	095	115	116	117	124	108	094	082	071	046	046	035	034	031	U032R
11	035F	035	037	040	038	033	048	U077R	083	093	J102R	J103R	111	J106R	U103R	U100R	092	071	052	049	042	035	032	035
12	035	036	038	041	041	034	041	072	100	108	110	J102R	098	112	118	116	096	075	062	054	039	040	036	034
13	036	037	038	039	038	034	046	080	078R	U100R	109	118	129	120	124	121	096	069	047	047	044	038	042	046
14	047	049	051	J052F	U052F	F	058	087	092	087	111	124	119	117	R	089	098	072	062	046	037	034	034	034
15	035	035	036	039	042	043	049	U074R	088	098	098	113	102	108	107	J100R	C	C	C	049	C	036	036	035
16	035	C	C	C	C	C	038	C	C	112	098	118	111	114	U099R	099	094	061	049	039	040	041F	040	039
17	038	041	037	039	038	039	051	091	096	095	119	131	118	122	115	U105R	076	060	050	050	041	033	033	036
18	038	039	038F	041	039	036	046	087	099	098	108	113	122	135	122	108	J103R	069	059	057	046	035	030	032
19	032	034	036	036	038F	033	037	069	092	090	095	094	115	118	121	113	099	066	057	048	041	032	029	030
20	031	031	033	033	034	036	041	078	085	094	106	096	116	122	123	114	095	068	041	045	045	039	039	037
21	038	037	038	039	041	039	038	068	082	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	086	099	121	127	123	115	114	114	110	090	066	065	051	042	038	U040R
23	041	041	043	048	037	029	038	U075R	097	J106R	115	123	122	123	124	109R	088	078	063	045	036	034	036	036
24	035	037	036	039	036	038	045	U031R	J105R	114	110	116	123	118	116	109	084	063	057	056	037	033	035	038
25	038	040	041R	038	038	039	049	081	U100R	122	116	116	123	119	116	098S	089	068	056	048	048	045	038	037
26	039	040	040	040	040	041	047	U083R	097	119	113	125	123	116	114	117	091	063	051	059	050	035	033	032
27	031	032	033	033	033	031	036	073	085	112	J105R	094	117	126	116	U103R	098	056	049	049	041	034	033	034
28	034	036	039	034	035	035	040	083	082	098	098	105R	113	113	107	096	088	070	057	048	047	032	031	035
29	039	040	040	032	031	035	037	065	087	097	116	115	123	116	098	090	088	061	048	044	046	029	031	030
30	031F	033	036	036	036F	033	031	073R	084	J104R	112	120	109	108	093	092	085	051	047	042	035	026	025	029
31																								
Count	28	27	27	27	27	26	28	27	27	29	29	29	29	29	28	29	28	28	28	29	28	29	29	29
Median	038	039	039	040	038	036	044	081	092	101	110	116	119	122	117	106	096	070	056	049	045	038	036	036
U. Q.	040	042	043	043	041	039	050	087	100	112	116	124	126	130	123	116	101	076	062	056	049	042	040	040
L. Q.	035	036	037	038	036	033	038	073	085	096	105	108	116	116	111	100	088	064	049	046	040	034	032	034
Q. R.	005	006	006	005	005	006	012	014	015	016	011	016	010	014	012	016	013	012	013	010	009	008	008	006

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

foF2

The Radio Research Laboratories, Japan

K1

IONOSPHERIC DATA

Lat. 35° 42.4'N
Long. 139° 29.3'E

Kokubunji Tokyo

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

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									C	L	L	L	L	L	L									
2										L	L	L	L	L	L									
3										L	L	L	L	L	L									
4										L	L	L	L	L	L	L								
5									L	L	L	L	440L	L	L	L								
6										L	L	L	L	L	L	L								
7										L	L	400L	L	L	L	L								
8											L	L	U450L	L	L	L								
9										L	L	410L	L	L	L	L								
10										L	L	L	L	L	L	L								
11										360L	L	L	L	L	L	L								
12										L	L	L	L	L	L	L								
13										L	L	L	L	L	L	L								
14										L	L	L	L	L	L	L								
15									L		L	L	L	L	L	L	C							
16									C	L	L	L	L	L	A	A	A							
17										L	L	L	L	L	L	L								
18										L	L	L	L	L	L	L								
19										L	L	L	L	L	L	L								
20										L	L	L	L	L	L	L								
21										C	C	C	C	C	C	C	C							
22									C	L	L	L	L	L	L	L								
23									L	L	L	L	L	L	L	R								
24									L	L	L	L	L	L	L	L								
25									L	L	L	L	L	L	L	L								
26										L	L	L	A	L	L	L								
27										L	L	L	L	L	L	L								
28										L	L	L	L	L	L	L								
29										L	L	L	L	L	L	L								
30										L	L	L	L	L	L	L								
31										L	L	L	L	L	L	L								
Count									1	2	2	2	2	2	2	2								
Median									360L	400L	400L	400L	U440L											
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

foF1

K 2

IONOSPHERIC DATA

Lat. 35° 42.4'N
Long. 139° 28.3'E

Kokubunji Tokyo

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

f_oE

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						C	C	C	C	305	335	I345A	550	345	320	285	215	B						
2						B	R	A	A	315	330	350	350	340	A	290	A	A						
3						B	205	A	A	A	325	A	A	A	320	A	A	A						
4						B	210	275	305	330	330	A	A	A	310	A	205	B						
5						B	205	270	A	330	I350R	340	330	320	270	A	A	B						
6						B	A	A	A	A	A	340	335	320	265	A	A	B						
7						B	210	270	C	325	330	340	R	310	270	195	B							
8						B	230	250	A	A	A	330	A	310	245	180	B							
9						B	190	245	290	315	330	I330A	325	A	A	A	A	B						
10						B	210	275	A	A	A	A	A	A	A	A	A	B						
11						B	205	A	I300A	320	A	335	I330A	320	I250A	180	B							
12						B	215	270	305	A	A	A	A	A	A	195	B							
13						B	165	250	300	A	A	A	A	A	A	A	A	B						
14						B	200	270	305	320	330	A	325	A	255	200	B							
15						B	205	A	310	320	330	340	A	300	A	C	C							
16						B	C	C	A	A	A	A	A	A	A	A	A							
17						B	220	295	A	A	A	A	A	A	A	160								
18						B	A	A	A	A	A	A	A	340	A	255	B							
19						B	R	255	A	A	A	340	A	A	A	245	190							
20							205	275	A	A	A	A	A	A	A	255	A							
21							200	280	C	C	C	C	C	C	C	C	C							
22							C	C	A	A	A	A	A	A	A	A	150							
23							185	240	295	320	330	340	330	A	A	A	A							
24							185	260	A	A	A	A	A	A	A	A	A							
25							B	245	A	A	A	R	A	A	A	A	A							
26							175	245	295	320	A	A	A	A	A	A	A							
27							180	245	A	A	A	A	A	A	R	270	A							
28							165	240	A	310	A	325	315	300	R	B								
29							155	250	305	A	A	A	A	R	A	A								
30							180	240	300	325	335	A	330	315	R	180								
31																								
Count	1	22	21	13	14	9	13	11	11	12	11	12	11	11	12	11								
Median	E	200	255	305	320	330	340	330	320	260	190													
U. Q.																								
L. Q.																								
Q. R.																								

The Radio Research Laboratories, Japan

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

f_oE

K 3

IONOSPHERIC DATA

Lat. 35° 42.4' N
Long. 139° 28.3' E

Kokubunji Tokyo

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

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	C	C	C	C	C	C	C	C	C	033	g	039	g	g	g	032	025	J025	J026	E016S	E015S	E014B	E014B	E014B
2	E014B	E015S	E012B	E	E	E011B	E016B	0170	J036	034	g	031G	g	025G	035	020G	J038	J042	J018	E014B	J025	J016	E014B	E015S
3	E015S	E014B	J015	J015	E	E012B	E014B	024	035	035	037	038	J030G	043	034	035	J029	J026	J018	J026	J017	J016	E012B	E012B
4	E015S	J016	020	J015	E	J027	E014B	0200	032	036	043	J045	049	036	027G	J032	020G	020	E014B	J016	E014B	E016S	E014B	E014B
5	E015S	E012B	E	E	E	E014B	E015B	023	030	J036	031G	g	035	g	021G	J025G	J029	J018	J024	J015	J016	022	E016S	E015B
6	021	020	E	E	E	E	E015B	025	031	036	042	036	022G	024G	031G	021G	021	J026	J020	020	E016S	E016S	J023	E015B
7	020	E	J015	E	E012B	020	020	g	030	034	036	044	036	035	g	g	g	J017	E014B	E015S	J016	E011B	J016	J015
8	J017	J016	J015	E	E012B	E011B	E016B	g	g	g	g	g	035	038	J043	J030	g	023	J018	J016	019	E016S	E014B	E014B
9	E012B	E	E	J017	E012B	E011B	E016B	g	g	g	g	g	035	038	J043	J030	030	J029	J015	E015S	J022	J017	E013B	022
10	J016	J016	J014	E	E	E	E014B	g	g	035	J041	J041	J035	J042	035	J028	J028	J025	J025	J021	020	021	E014B	J042
11	J024	J024	J025	J015	J016	E012B	E014B	g	031	035	031G	J042	J030G	J038	030G	031	g	026	J015	J021	E015S	E016S	E014B	E016S
12	E016S	J015	E012B	E	J015	E	E016B	g	g	033	037	J038	042	J036	J033	J030	g	022	E012B	E014B	E013B	E012B	E016S	E016S
13	E014B	E	E	E	E	E014B	E014B	g	g	g	037	035	035	036	035	J037	J036	J025	J025	E013B	J016	J016	J018	020
14	E016S	E013B	J024	J014	J015	J015	020	034	g	033	036	038	036	g	035	029	g	025	J025	E013B	J026	J027	J024	020
15	E013B	J015	J016	J014	E015S	E015S	021	027	J042	J029G	J029G	J038	J038	J038	020G	J033	C	C	J023	E015S	C	024	J024	023
16	J019	C	C	C	C	C	E	C	C	036	039	J038	043	J054	J064	J053	J038	036	J027	E015S	E016S	E014B	E015S	E015S
17	E016S	E013B	J018	018	E	E	E014B	g	g	036	036	037	042	J037	J034	030	g	020	E013B	E012B	E014B	E016S	E015S	J033
18	E014B	E015S	E012B	E	E	E	E014B	024	J029	J037	J038	043	036	035	036	g	g	019	J020	J017	E014B	E014B	E015S	E014B
19	E014B	020	E012B	E015S	E	E011B	E015B	g	g	036	036	043	036	J044	035	g	g	023	J036	E015S	J021	J018	E016S	E012B
20	E015S	E	E013B	E	E	E013B	E014B	g	g	036	042	043	035	035	036	032	023	J036	E015S	E014B	J021	J018	E016S	E012B
21	021	020	E012B	E	E012B	E016S	E014B	g	g	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	035	036	J041	J041	J038	035	028	g	E015S	J021	E013B	J024	J036	J017	022
23	022	J024	J017	J028	J018	021	E015S	g	g	034	036	g	036	031G	035	032	031	E014B	E013B	J024	J028	J029	J025	J029
24	J055	E011B	E015S	E016S	E	E015S	E016S	g	031	J036	040	039	J042	038	J040	032	021	024	E015S	E015S	020	E012B	021	020
25	E016S	020	E011B	E014B	E011B	E014B	J015	E016B	g	036	J036	J037	g	J037	J043	J041	J052	J038	020	E014B	E015S	E016S	E013B	J025
26	021	J024	E	E	E	E011B	E014B	g	g	g	g	034	J055	036	J036	J036	J042	J027	J024	021	019	E012B	E015S	E011B
27	E014B	E011B	E014B	020	E	E014B	E014B	g	g	036	J038	J035	042	037	036	032	023	J016	J018	022	023	021	E	020
28	E013B	020	J016	J022	J015	J016	E013B	g	g	035	g	039	037	034	034	g	E015B	J018	021	021	E012B	E016S	E013B	E016S
29	E012B	J016	J015	E	021	E013B	E014B	g	g	g	036	039	039	J043	J038	032	024	E011B	020	E016S	E016S	E015S	E015S	E016S
30	E014B	E012B	E	E014B	E	E014B	E015S	g	028	020G	g	037	036	036	036	g	g	020	022	E015S	E013B	E015S	021	E014B
31																								
Count	28	27	27	27	27	27	28	27	27	28	29	29	29	29	29	29	28	28	28	29	28	29	29	29
Median	E015	E015	E014	E014	E	E014	E014B	g	g	035	036	038	036	036	035	030	022	J022	J019	E016	016	E016	E016	E016
U. Q.	020	020	016	015	015	E015	E016	g	031	036	038	041	042	038	036	032	030	026	023	021	020	020	018	021
L. Q.	E014	E012	E011	E	E	E011	E014	g	g	033	g	035	035	g	g	g	g	018	E015	E014	E014	E014	E014	E014
G. R.	DO06	DO08	DO05							003	006	007						008	DO08	DO07	DO06	DO06	DO04	DO07

The Radio Research Laboratories, Japan

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

foEs

K 4

IONOSPHERIC DATA

Lat. 35° 42.4'N
Long. 139° 29.3'E

Kokubunji Tokyo

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

fbEs

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	C	C	C	C	C	C	C	C	C	033		037				032	025	018	025	S	S	B	B	B	
2	B	S	B	E	B	B	B	017G	032	032		027G		025G	033	019G	036	040	016	B	046	E	B	S	
3	S	B	E	E	B	B	B	023	031	033	030	037	028G	040	026	027	027	025	015	017	016	E	B	B	
4	S	016	015	E	015	025	B	017G	029	035	039	044	045	034	026G	028	017G	017	B	016	B	B	S	B	
5	S	B	B	E	B	B	B	022	029	033	031G	026	026	018G	023G	026	026	016	019	013	015	016	S	S	
6	E	E	E	E	E	S	B	023	030	033	040	027	022G	024G	026G	020G	020	019	017	016	S	S	017	B	
7	E						B		028	C		027					016	B	S		E	B	E	E	
8	E	E	E		B	E	G		027	029	033	040	028	033		027		017	018	016	E	E	S	B	
9	B	B		E	B	B	B						033	037	033	028	023	020	E	S	E	016	B	016	
10	015	015	E				B			032	040	037	033	035	033	027	021	019	016	016	E	016	B	017	
11	017	015	020	013	012	B	B		028	032	026G	038	028G	037	020G	028		017	E	E	S	B	B	S	
12	S	E	B		E	B	B			032	030	037	039	033	032	030		016	B	B	B	B	S	S	
13	B	B				B	B				037	033	034	034	033	033	031	015	023	B	E	E	E	016	
14	S	B	015	E	E	E	G	022		033	036	037	036	033	028			B	B	S	017	016	015	E	
15	B	E	016	E	S	S	G	025	029	026G	024G	025	028	037	016G	029	C	C	C	019	C	019	016	E	
16	E	C	C	C	C	C		C	C	032	034	035	038	053	055	045	033	025	026	S	S	B	S	S	
17	S	B	016	E		B	B			033	033	037	036	037	033	027		E	B	B	B	S	S	016	
18	B	S	B			B	B	022	028	033	034	037	035	027	032		B	S	S		B	S	017	B	
19	B	E	B	S		B	B			034	036	036	036	036	032			016	017	016	B	B	S	B	
20	S		B			B	B			035	036	038	035	035	033	020	022	030	S	B	016	016	S	B	
21	E	E	B		B	S	B			C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
22	C	C	C	C	C	C	C	C	C	033	033	038	038	034	032	028		S	016	B	013	017	E	016	
23	E	015	E	018	017	E	S			033	036		027	026G	033	028	025	B	B	018	025	016	016	016	
24	026	B	S	S		S	S		028	032	037	037	040	038	040	028	017	016	S	S	E	B	016	E	
25	S	E	B	B	B	B	E	B		033	035	035		033	040	040	033	033	016	B	S	S	B	E	
26	016	015				B	B					034	034	033	030	030	037	025	020	017	E	B	S	B	
27	B	B	B	E		B	B			033	035	035	037	037	035	030	022	016	018	016	017		E	E	
28	B	E	014	018	E	E	B			033		037	037	034	025		B	016	018	E	B	S	B	S	
29	B	E	E		E	B	B				035	034	036	040	038	026	022	B	E	S	S	S	S	S	
30	B	B	B		B	B	S		028	016G		036	035	034	033			E	017	S	B	S	E	B	
31																									
Count																									
Median																									
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

fbEs

K 5

IONOSPHERIC DATA

Lat. 35° 42.4'N
Long. 139° 29.3'E

Kokubunji Tokyo

0.1Mc 1 3.5° E Mean Time (G.M.T. +9h)

f-min

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	014	E015S	012	010	010	011	016	015	016	016	016	017	025	019	019	018	012	015	014	E016S	E015S	014	014	014
3	E015S	014	011	010	010	013	014	016	015	016	017	016	017	016	015	015	013	012	014	E015S	E015S	014	013	012
4	E015S	010	010	012	014	011	014	014	013	013	016	015	025	016	019	014	013	015	014	012	013	014	E016S	014
5	E015S	012	010	010	010	014	015	016	013	013	016	016	018	015	013	013	013	015	013	012	012	014	E016S	E015S
6	014	013	012	013	E	E015S	015	013	015	015	015	020	017	017	014	013	013	012	012	E015S	E016S	014	011	011
7	E015S	010	010	010	010	010	015	013	013	C	016	016	016	027	017	016	013	013	014	E015S	E015S	011	010	013
8	011	014	011	010	012	014	014	015	015	015	016	017	016	016	014	014	015	016	013	E015S	014	014	E016S	014
9	012	010	010	010	012	011	016	015	015	012	015	015	015	019	014	012	011	016	014	E015S	013	011	013	E015S
10	012	010	012	010	010	010	014	012	014	012	014	015	017	016	015	015	014	015	014	012	014	012	011	014
11	014	013	010	010	010	012	014	015	014	015	016	027	016	014	013	016	016	015	013	012	E015S	E016S	014	E016S
12	E016S	014	012	010	010	010	016	014	015	015	015	016	015	015	014	016	013	012	012	014	013	012	E016S	E016S
13	014	010	010	010	010	014	014	012	012	014	013	013	018	017	016	013	014	014	014	013	014	013	E015S	014
14	E016S	013	010	010	010	011	014	014	014	012	012	014	016	016	015	015	013	013	011	E015S	013	012	011	014
15	013	014	010	013	E015S	E015S	015	012	012	011	012	014	013	013	010	011	C	C	C	010	C	E015S	E015S	E015S
16	E015S	C	C	C	C	C	010	C	C	015	016	016	014	014	013	013	015	016	015	E015S	E016S	014	E016S	E015S
17	E016S	013	010	012	010	010	014	015	013	012	016	015	016	016	014	015	015	014	013	E015S	E016S	014	E015S	E015S
18	014	010	012	E	010	010	014	013	012	012	017	015	018	017	016	013	016	014	013	012	014	E016S	E015S	012
19	014	013	012	E015S	010	011	015	012	014	014	017	016	016	017	016	016	016	E015S	014	E015S	014	014	E015S	014
20	E015S	010	013	010	010	013	014	015	013	016	017	017	016	017	015	013	012	012	013	E015S	014	013	014	E016S
21	013	014	012	010	012	E016S	014	015	015	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	011	016	017	018	016	016	013	011	E015S	014	013	011	014	012	E015S
23	014	010	012	010	010	010	E015S	015	013	014	015	016	015	013	014	012	012	014	013	E015S	014	E015S	013	014
24	E015S	011	E015S	E016S	010	E015S	E016S	012	015	012	014	015	017	014	017	015	014	014	013	E015S	013	012	014	014
25	E016S	011	011	014	011	014	013	016	014	015	015	017	015	016	015	014	012	014	014	E015S	014	E015S	013	014
26	014	011	010	010	010	011	014	012	012	016	016	017	017	016	014	012	014	E015S	E015S	E015S	013	012	E015S	011
27	014	011	014	010	E	014	014	013	012	013	015	017	015	017	017	012	015	E015S	E015S	E015S	013	012	E015S	010
28	013	014	011	010	013	013	013	015	015	014	015	017	014	016	015	016	015	E015S	E016S	014	012	E016S	013	E016S
29	012	010	010	010	012	013	014	013	016	015	016	016	016	017	015	015	015	011	011	E016S	E016S	013	E015S	E016S
30	014	012	010	014	010	014	E015S	015	013	011	016	016	017	018	016	017	016	014	013	E015S	013	E015S	014	014
31																								
Count	28	27	27	27	27	27	28	27	27	28	29	29	29	29	29	29	28	28	28	29	28	29	29	29
Median	013	012	011	010	010	012	014	014	014	014	016	016	016	016	015	014	014	014	014	014	014	013	012	013
U. Q.																								
L. Q.																								
G. R.																								

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

The Radio Research Laboratories, Japan

K6

f-min

IONOSPHERIC DATA

Lat. 35° 42.4'N
Long. 139° 29.3'E

Kokubunji Tokyo

M(3000)F2 0.01 1 35° E Mean Time (G.M.T. +9h)

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	C	C	C	C	C	C	C	C	C	U315R	305	310	295	295	300	300	320	325	305	305	320	275	285	300
2	300	290	280	300	325	260	330	335	325	320	305	285	300	300	305	310	325	315	285	295	290	300	300	280
3	290	295	285	305	295	260	330	335	300	310	315	305	300	300	305	305	305	320	305	310	320	300	290	U270R
4	280	265	265	280	250	255	320	J330R	300	300	300	295	295	295	305	305	315	305	325	300	290	295	300	290
5	290	290	285	280	295	310	335	325R	320	320	320	320	300	305	305	310	320R	310	300	315	310	310	295	270
6	270	275	275	285	285	280	315	330	320	320	315	300	305	300	305	330	335	330	305	310	325	305	265	260
7	265	275	290	330	350	285	320	355	335	I320C	330	310	320	310	310	335	330	315	305	305	320	320	280	255
8	260	275	290	305	340	285	300	350	330	325	330	315	305	310	320	J345R	335	320	260	285	295	290	270	280
9	285	285	280	280	330	290	320	320	310	325	U310R	305	310	320	320	320	340	315	305	310	295	285	275	280
10	255	285	280	315	335	270	305	340	340	320	315	325	315	320	330	345	335	350	320	325	295	310	275	U265R
11	265F	270	280	305	325	280	315	U340R	350	325	J345R	J320R	330	J315R	U325R	U355R	350	335	305	315	300	310	290	270
12*	275	270	275	295	325	300	295	325	335	350	335	J340R	305	310	310	330	320	315	315	330	300	300	280	275
13	260	275	275	275	295	275	310	325	330R	U325R	325	310	320	310	315	335	340	330	290	300	325	280	290	280
14	295	285	305	U310F	U310F	F	310	350	345	325	320	310	320	R	330	335	330	330	325	300	295	275	270	
15	275	275	270	295	270	300	325	U340R	350	335	335	345	315	315	320	J325R	C	C	C	345	C	310	280	270
16	285	C	C	C	C	C	240	C	C	340	320	320	305	320	U335R	315	330	355	310	335	300	260F	285	285
17	285	300	275	275	290	265	310	345	340	325	310	325	305	320	330	U330R	335	330	305	315	300	305	265	270
18	280	285	280F	290	290	285	300	345	340	325	305	325	300	315	315	325	J335R	315	310	320	305	305	265	265
19	270	280	280	305	305F	310	295	335	340	330	340	310	305	295	300	320	330	330	320	305	295	305	270	275
20	270	275	265	275	275	315	300	345	330	330	340	310	300	300	305	325	330	330	290	295	290	280	260	260
21	265	280	270	285	300	310	305	345	340	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	335	310	300	310	305	305	310	325	320	290	325	290	285	260	U260R
23	265	255	285	310	330	270	275	U325R	340	J320R	320	320	305	300	315	310R	330	315	325	300	275	270	285	285
24	265	260	260	265	285	270	300	U335R	J325R	330	330	310	315	305	315	335	330	300	300	320	290	275	250	265
25	270	280	280R	265	265	260	300	345	U340R	330	325	310	310	310	315	330S	335	310	315	300	300	310	290	270
26	265	275	270	275	275	280	290	U325R	330	325	315	320	305	305	315	330	330	320	300	320	330	305	295	290
27	265	265	265	270	285	260	290	330	350	330	J305R	305	315	310	330	U320R	340	325	300	310	300	290	275	270
28	275	270	285	280	280	275	290	345	355	340	315	305R	315	320	320	315	325	310	320	315	315	270	270	265
29	285	295	300	315	295	285	305	335	330	325	320	300	315	315	310	310	335	330	335	290	315	305	285	275
30	265F	270	260	290	310F	300	275	340R	330	J325R	320	325	325	325	310	340	340	320	305	325	305	280	250	260
31																								
Count	28	27	27	27	27	26	28	27	27	29	29	29	29	29	28	29	28	28	28	29	28	29	29	29
Median	270	275	280	290	295	280	300	335	335	325	320	310	305	310	315	325	330	320	305	310	300	300	280	270
U. Q.																								
L. Q.																								
G. R.																								

The Radio Research Laboratories, Japan

K 7

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

M(3000)F2

IONOSPHERIC DATA

Lat. 35° 42.4'N
Long. 139° 29.3'E

Kokubunji Tokyo

M(3000)F1 0.01 1 35° E Mean Time (G. M. T. +9h)

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									C	L	L	L	L	L	L									
2										L	L	L	L	L	L									
3										L	L	L	L	L	L									
4										L	L	L	L	L	L	L								
5									L	L	L	L	400L	L	L									
6										L	L	L	L	L	L	L								
7										L	L	400L	L	L	L	L								
8										L	L	L	U370L	L	L	L								
9										L	L	420L	L	L	L	L								
10										L	L	L	L	L	L	L								
11										385L	L	L	L	L	L									
12										L	L	L	L	L	L									
13										L	L	L	L	L	L									
14										L	L	L	L	L	L	L								
15									L	L	L	L	L	L	L	L	C							
16									C	L	L	L	L	A	A	A								
17										L	L	L	L	L	L									
18										L	L	L	L	L	L									
19										L	L	L	L	L	L	L								
20										L	L	L	L	L	L									
21										C	C	C	C	C	C	C	C							
22									C	L	L	L	L	L	L	L								
23									L	L	L	L	L	L	L	R								
24									L	L	L	L	L	L	L									
25									L	L	L	L	L	L	L									
26										L	L	L	A	L	L	L								
27										L	L	L	L	L	L									
28										L	L	L	L	L	L									
29										L	L	L	L	L	L									
30										L	L	L	L	L	L									
31										L	L	L	L	L	L									
Count									1		2	2												
Median									385L		410L	U380L												
U. Q.																								
L. Q.																								
G. R.																								

The Radio Research Laboratories, Japan

K 8

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

M(3000)F1

IONOSPHERIC DATA

Lat. 35° 42.4'N
Long. 139° 29.3'E

Kokubunji Tokyo

km 135° E Mean Time (G.M.T. +9h)

f_oF₂

Nov. 1967

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	235	260	260	275	265	255										
2										240	250	265	285	265	255										
3											250	250	245	255	260										
4										255	255	250		265	235	230									
5									235	245	250	250	235	255	255										
6										240	250	250	230	260	245	230									
7										1240C	245	230	255	245	250										
8											250	260	270	260	250	230									
9										270	270	250	265	255	240										
10										245	255	240	235	250	245	220									
11										230	250	275	250		255										
12										235	230	235	250	260	250										
13										245		255	255	250	240										
14										230	260	260	255			225									
15									225		240	250	240	255			C								
16									C	240	240	255	245	240	250	250									
17										265		245	240	245	240										
18										235	245	245	280	255											
19											240	230	270		260	235									
20										235	250	245	270	260											
21										C	C	C	C	C	C	C	C								
22											245	260		235	245	255									
23										235	255	250	265	255		225									
24										250	245	260	250	270											
25										235	250	250		245	250										
26												255	250	230	240										
27										250	215	230	255												
28										230	230	260		250	240										
29											260	250	255	260											
30										255	235	235	245	250	230										
31																									
Count									5	18	27	28	25	25	21	9									
Median									235	240	250	250	255	255	250	230									
U. Q.																									
L. Q.																									
G. R.																									

The Radio Research Laboratories, Japan

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

f_oF₂

K9

Lat. 35° 42.4'N
Long. 139° 28.3'E

Kokubunji Tokyo

IONOSPHERIC DATA

135° E Mean Time (G.M.T. +9h)

k m

f_oF

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	C	C	C	C	C	C	C	C	C	210	200H	225	240	240	235	225	225	215	240	230	225	275	270	235
2	260	275	260	255	225	290	260	230	230	230	225	210	225	235	240	235	230	230	225	230	255	250	230	260
3	295	255	250	250	225	275	275	235	235	235	215	220	220	230	230	225	230	230	225	250	235	245	240	250
4	265	310	310	260	340	380	235	210	230	230	230	250	245	235	225	230	210	210	215	230	250	275	270	255
5	270	265	255	225	255	245	250	225	230	230	220	220H	210	230	220	230	220	210	235	230	255	230	255	310
6	300	300	295	275	E250E	290	235	230	230	230	210	200	230	230	235	230	220	220	230	245	225	250	310	330
7	325	300	275	250	210	250	E20H	220	220	I210C	200	210	200H	220	210	220	240H	225	230	235	230	220	270	340
8	325	275	265	245	210	300	260	225	225	225	225	205	225	230	230	230	210	215	260	275	255	255	290	255
9	295	260	280	260	200	230	280	250	235	230	225	205	225	225	225	225	225	200	230	225	240	260	300	295
10	325	300	275	230	285	230	255	230	230	215	235	235	210	230	230	225	220	215	225	230	225	245	265	340
11	335	320	325	260	230	245	235	220	225	210	225	220	230	250	235	225	215	210	220	225	230	230	280	305
12	310	305	295	265	230	225	255	230	230	230	220	215	230	230	230	235	225	215	225	215	230	250	280	315
13	325	295	290	275	250	275	230	215	215	220	235	230	225	225	220	225	210	210	260	230	230	265	265	275
14	260	280	255	245	225	255	230	215	225	215	225	235	215	235	235	225	230	200	225	210	260	260	290	300
15	300	305	320	275	275	250	230	215	220	240	220	205	240	240	240	225	C	C	C	220	C	250	290	305
16	305	C	C	C	C	C	250	C	C	225	220	220	A	A	A	A	230	210	250	210	230	290	275	260
17	300	245	280	305	255	280	255	230	225	225	205H	235	220	230	215	225	210	215	230	225	225	235	290	315
18	280	255	280	E260E	230	255	255	230	225	230	225	215	205H	230	235	230	220	200	245	210	230	220	310	330
19	330	305	290	260	250	245	250	225	230	230	210	200	235	235	235	240	225	215	225	215	220	225	310	320
20	325	305	305	280	275	250	225	220	220	220	225	220	230	230	245	240	220	225	205	240	260	250	280	305
21	310	305	290	275	255	235	210	225	225	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	230	225	225	235	230	225	220H	230	215	230	225	230	265	275	325
23	310	320	290	250	230	275	275	230	220	235	250	225	250	240	240	230	220	220	215	230	E315A	295	300	280
24	E340A	315	330	300	250	290	240	230	230	225	215	225	230	235	240	225	215	230	225	230	215	275	350	315
25	305	280	275	300	300	310	255	210	225	235	220	220	240	210	240	225	225	250	230	230	255	230	265	305
26	315	310	290	285	285	260	250	230	230	225	230	220	230	225	210	235	210	220	255	235	220	265	270	255
27	290	315	310	275	E255E	305	250	230	220	230	225	215	230	250	235	225	225	205	260	230	230	260	275	315
28	315	310	270	260	280	295	280	225	215	225	210	235	250	230	230	235	220	230	225	230	230	250	325	330
29	280	255	240	225	270	255	230	230	230	235	250	225	250	250	225	220	220	205	230	235	235	255	275	305
30	360	310	300	280	250	235	240	230	220	230	230	230	230	240	225	225	220	210	245	220	225	245	355	360
31																								
Count	28	27	27	27	27	27	28	27	27	29	29	29	28	28	28	28	28	28	28	29	28	29	29	29
Median	310	300	290	260	250	255	250	230	225	230	225	220	225	230	230	225	220	215	230	230	230	250	280	305
U. Q.																								
L. Q.																								
G. R.																								

The Radio Research Laboratories, Japan

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

f_oF

K 10

IONOSPHERIC DATA

Lat. 35° 42.4'N
Long. 139° 29.3'E

Kokubunji Tokyo

135° E Mean Time (G.M.T. +9h)

Nov. 1967

135° E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	C	C	C	C	C	C	C	C	C	130	G	110	G	G	G	150	130	105	115	S	S	B	B	B
2	B	S	B	E	B	B	B	115	110	125	G	110	G	110	115	105	115	110	110	B	110	110	B	S
3	S	B	100	100	E	B	B	150	115	155	110	110	110	105	105	105	105	105	105	105	105	105	B	S
4	S	105	105	105	105	110	B	120	115	125	120	110	110	110	115	100	100	105	B	105	B	B	S	B
5	S	B	E	E	E	B	B	160	155	110	110	G	110	G	100	105	105	100	100	110	110	110	S	S
6	110	105	100	105	E	S	B	125	115	110	110	110	110	110	105	105	105	100	100	105	S	S	110	B
7	110	E	E	E	E	E	B	G	140	C	G	G	110	G	G	G	G	105	B	S	120	B	110	110
8	110	105	105	E	B	105	105	G	120	115	115	110	110	110	G	170	G	105	105	105	100	100	S	B
9	B	E	E	110	B	B	B	G	G	G	G	G	130	145	105	105	105	100	105	S	125	110	B	110
10	105	105	100	E	B	E	B	G	G	110	110	110	110	110	110	110	110	110	105	110	110	110	B	110
11	110	110	110	105	105	B	B	G	110	130	110	110	110	105	105	120	G	105	105	110	S	S	B	S
12	S	105	B	E	105	E	B	G	G	145	115	110	110	110	110	110	G	110	B	B	B	S	S	S
13	B	E	E	E	E	B	B	G	G	G	115	110	110	110	110	110	110	110	110	B	120	115	110	110
14	S	B	105	105	105	105	105	160	G	130	120	120	110	G	115	160	G	B	B	S	110	110	110	110
15	B	105	105	105	S	S	110	175	110	105	100	100	100	100	100	115	C	C	C	105	C	105	100	100
16	100	C	C	C	C	C	E	C	C	110	110	110	105	105	100	100	100	105	105	S	S	B	S	S
17	S	B	105	105	E	E	B	G	G	120	110	115	110	110	110	110	G	120	B	B	B	S	S	110
18	B	S	B	E	E	E	B	130	115	110	110	110	110	110	110	G	B	S	S	E	B	S	100	B
19	B	120	B	S	E	B	B	G	G	115	110	110	110	110	115	G	G	105	110	B	B	B	S	B
20	S	E	B	E	E	B	B	G	G	110	110	110	110	110	105	105	150	105	S	B	125	110	S	B
21	110	110	B	E	B	S	B	G	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	115	110	110	115	115	115	155	G	S	105	B	115	110	120	115
23	115	110	110	110	110	110	S	G	G	180	180	G	100	100	100	100	100	B	B	125	120	115	115	115
24	115	B	S	S	E	S	S	G	135	110	125	120	120	120	110	110	105	105	S	S	130	B	120	115
25	S	105	B	B	B	B	105	B	G	115	115	115	G	110	105	105	100	100	105	B	S	S	B	115
26	115	110	E	E	E	B	B	G	G	G	G	130	115	115	105	105	105	105	100	105	105	B	S	B
27	B	B	B	105	E	B	B	G	G	110	110	115	110	180	150	135	145	105	105	105	130	130	E	110
28	B	105	105	105	100	105	B	G	G	115	G	110	195	185	110	G	B	105	105	105	B	S	B	S
29	B	110	110	E	105	B	B	G	G	G	160	120	115	115	110	110	115	B	110	S	S	S	S	S
30	B	B	E	B	E	B	S	G	150	105	G	160	130	150	130	G	G	105	105	S	B	S	115	B
31																								
Count	10	14	12	11	7	5	4	8	12	24	22	25	26	25	26	24	17	23	19	13	15	13	10	12
Median	110	105	105	105	105	105	105	140	115	115	110	110	110	110	110	110	105	105	105	105	115	110	110	110
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

135° E

K 11

IONOSPHERIC DATA

Lat. 35° 42.4'N
Long. 139° 29.3'E

Kokubunji Tokyo

135° E Mean Time (G.M.T. +9h)

Nov. 1967

Types of Es

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1									h		l					h1	l	f2							
2							l	l2	h	h	l	l		l	c	l	l2	l6	f		f2	f			
3			f2	f			h	lh	h1	h1	l2	l2	l	l2	l	l	l2	l	f	f2	f				
4		f2	f	f	f	f6	l	c	h2	c	c3	c3	l3	l	l	l2	l2	l	f	f					
5							h	h2	c	l	l	l	l	l	l	l2	l2	l	f4	f	f				
6	f	f	f	f			h2	c2	c2	c2	l2	l	l	l	l	l2	l2	l4	f4	f		f2			
7	f						h		h			l					l				f	f2			
8	f	f	f				h	c	h	c	c2	l	l	l		h		l	f	f2	f				
9				f					h	h	h	h	h	h	l	l2	l2	l	f	f2	f	f2			
10	f3	f	f					c2	c2	c2	l2	l2	l	l	l2	l2	l2	l2	f2	f2	f	f2			
11	f2	f2	f3	f	f			l	h1	l	l2	l	l	l	l	l		l	f	f					
12		f							h	c2	l	l2	l2	l3	l2	l		l							
13									h	c2	l2	l	l2	l2	l3	l2	l3	l4	l	f3	f	f	f2	f	
14				f	f	f	l	h2	h	c2	c2	c2	c2		l	h					f4	f3	f2	f2	
15		f	f	f			l	h12	l2h	l2	l2	l	l2	l3	l3	c3			f3		f2	f2			
16	f								l2	l3	l2	l2	l2	l3	l3	l2	l3	f2							
17									c	c	c	l2	l	l	l	l	f							f2	
18								h2	l	l2	l	l2	l	l	l									f	
19		f							l	l	l	h12	l2	l	l			f	f	f					
20									c	l2	l2	l	l	l2	l2	l2	h1	f3		f2	f2				
21	f	f																							
22									c	l	l	l	l	lh	l2h	h1			f3		f	f2	f2	f2	
23	f2	f2	f	f3	f3	f2			h	h	h	h	l	l	l2	l2	l3		f2	f6	f2	f3	f2	f2	
24	f2								h	c	h2	c	c	e1	l2	l	l	f2	f					f2	
25		f								c	ch	lh		l	l2	l2	l2	f3						f	
26	f2	f2								h	h	h	e2	c	l2	l2	l3	f2	f3	f					
27				f					lh	lh	lh	l	l2	h1	h	h21	h1	f	f3	f	f			f	
28		f	f2	f2	f	f			l	l	h	h	h1	h	l		l	f	f						
29		f	f		f				h	h	c	c	e2	e2	l	l		f						f	
30									h	l	h	h1	h	h	h1			f							
31																									
Count																									
Median																									
U. Q.																									
L. Q.																									
Q. R.																									

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

The Radio Research Laboratories, Japan

K 12

Types of Es

IONOSPHERIC DATA

Lat. 35° 42.4'N
Long. 139° 28.3'E

Kokubunji Tokyo

135° E Mean Time (G.M.T. +9h)

km **hpf2**

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	C	C	C	C	C	C	C	C	C	U310R	320	310	335	340	325	320	300	290	315	320	295	370	345	325
2	330	345	350	325	275	400	315	280	280	285	285	320	365	330	320	305	285	295	350	335	350	340	345	340
3	345	335	345	320	330	400	340	285	285	330	315	305	310	325	325	310	300	290	320	320	295	340	U375R	
4	360	400	400	355	445	425	315	295	U280R	330	330	300	325	335	315	320	310	310	290	325	345	345	340	350
5	350	350	345	345	345	310	300	275	285R	305	305	315	330	325	320	310	285R	295	325	300	320	300	330	395
6	390	365	360	350	340	375	300	285	300	290	295	310	330	325	320	280	275	280	330	315	280	320	400	405
7	395	375	350	290	240	345	290	250	275	12800	280	305	285	310	295	275	270	290	305	320	295	300	355	405
8	405	355	335	305	290	355	320	255	270	280	280	315	315	310	285	U280R	275	275	355	350	340	350	325	350
9	340	350	360	350	265	295	350	295	305	285	U315R	325	315	300	295	300	280	295	310	305	335	345	320	365
10	405	360	350	295	280	375	315	275	265	290	325	285	305	290	285	260	275	260	300	295	310	300	355	U395R
11	390F	385	375	335	295	345	295	U270R	255	275	J275R	J305R	280	J310R	U295R	U275R	250	275	320	300	310	305	345	375
12	375	375	365	345	285	305	345	285	280	275	280	J280R	315	310	300	280	285	295	300	280	310	355	355	390
13	400	365	360	345	325	355	295	275	270R	U295R	285	310	295	305	300	280	265	280	340	325	295	345	345	355
14	345	360	335	J325F	U330F	F	305	250	260	280	300	315	315	295	R	280	275	275	290	295	325	325	360	380
15	375	375	390	340	365	325	290	U275R	250	270	280	290	300	300	300	J295R	G	G	G	G	G	295	350	340
16	355	G	G	G	G	G	440	G	G	270	290	295	315	290	U280R	300	280	245	300	275	320	395F	355	350
17	355	330	360	385	330	375	315	260	275	280	310	280	305	295	280	U285R	265	290	315	300	295	315	375	360
18	345	330	360F	340	295	340	325	255	270	280	295	285	325	310	295	285	J280R	295	310	300	315	300	380	400
19	400	360	360	335	315F	300	325	275	275	230	270	295	325	325	320	290	285	285	300	315	325	300	385	375
20	385	400	365	360	355	295	330	260	270	280	280	300	330	330	310	285	275	275	340	325	345	350	360	395
21	395	385	370	350	340	305	315	275	275	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
22	G	G	G	G	G	G	G	G	G	280	295	320	310	320	310	305	280	295	335	285	340	350	395	U400R
23	400	400	350	300	275	360	350	U290R	270	J290R	300	290	315	325	290	300R	270	300	290	300	355	370	355	340
24	375	400	400	375	340	370	320	U275R	J300R	280	285	325	300	320	310	275	280	325	295	330	335	355	425	390
25	390	360	355R	390	385	400	325	240	U275R	280	295	315	310	310	295	290S	270	305	300	325	335	310	345	390
26	395	395	390	395	385	375	345	U290R	280	280	280	295	310	315	305	280	270	290	340	295	275	310	330	345
27	395	395	390	365	340	400	330	285	255	285	J325R	310	295	315	280	U295R	270	290	330	300	305	340	375	390
28	390	390	340	345	360	375	350	260	250	275	290	320R	300	285	300	295	280	305	300	300	295	360	400	395
29	345	340	310	295	345	340	310	280	280	295	300	325	300	300	300	295	270	270	275	340	300	300	345	370
30	415F	390	395	335	310F	300	355	275R	275	J305R	295	280	290	280	280	290	265	295	330	285	300	360	435	430
31																								
Count	28	27	27	27	27	26	28	27	27	29	29	29	29	29	28	29	28	28	28	29	28	29	29	29
Median	390	365	360	345	330	355	320	275	275	280	295	305	310	310	300	290	275	290	315	300	310	335	355	375
U. Q.																								
L. Q.																								
G. R.																								

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

hpf2

The Radio Research Laboratories, Japan

K 13

IONOSPHERIC DATA

Lat. 35° 42.4'N
Long. 139° 29.3'E

Kokubunji Tokyo

km 1 35° E Mean Time (G.M.T. +9h)

ypF2

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	C	C	C	C	C	C	C	C	C	U065R	070	075	075	070	080	075	070	065	075	085	080	110	095	075
2	070	070	090	065	070	095	080	065	065	070	075	085	075	075	080	080	070	065	080	080	075	075	055	060
3	080	070	070	070	075	060	065	050	055	070	075	070	090	095	085	070	075	065	075	055	050	065	085	U105R
4	075	095	080	095	105	080	090	065	J065R	065	030	100	090	080	085	085	075	075	060	075	065	065	060	070
5	065	060	085	095	065	065	075	055	065R	060	065	070	070	075	065	080	075R	085	070	085	075	070	065	080
6	085	080	080	075	085	065	075	055	060	075	080	060	070	075	070	065	065	060	070	070	080	070	095	070
7	070	060	070	060	075	105	100	055	065	I065C	065	070	090	075	065	060	065	065	070	075	075	075	095	090
8	090	085	070	090	070	095	075	070	070	075	065	080	080	065	070	J065R	065	055	110	075	075	070	080	070
9	090	075	070	080	085	085	095	065	065	U080R	085	070	070	065	075	080	065	065	085	085	070	085	130	080
10	080	070	080	065	060	115	065	060	065	085	035	090	075	070	065	065	060	070	070	070	080	095	085	U075R
11	085F	065	060	065	065	080	075	U075R	065	085	J070R	J070R	075	J065R	U055R	U065R	070	055	085	090	070	085	070	090
12	070	070	070	085	075	085	060	060	060	050	055	J045R	070	080	085	070	075	080	085	070	065	070	095	060
13	070	110	090	085	100	100	085	080	080R	U070R	065	075	065	085	075	065	065	065	085	060	065	080	070	095
14	055	070	060	J070F	U070F	F	070	075	070	080	055	070	065	065	R	070	070	070	085	055	070	075	090	075
15	060	070	055	060	100	100	055	U070R	060	060	060	050	095	055	J055R	C	C	C	C	050	C	100	095	150
16	090	C	C	C	C	C	060	C	C	065	055	060	100	090	U065R	075	060	060	085	070	080	065F	085	060
17	070	095	075	070	060	065	070	065	050	065	070	065	085	080	080	U080R	065	055	080	080	055	090	100	070
18	065	065	070F	070	085	080	075	075	075	070	060	090	075	060	090	070	J065R	080	070	075	070	085	105	075
19	070	075	070	055	065F	075	075	070	060	055	065	080	080	105	095	085	065	055	070	070	075	095	105	080
20	065	075	080	080	085	065	075	070	065	060	065	075	085	080	080	080	070	070	110	085	090	100	085	080
21	065	075	075	085	070	085	070	055	065	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	060	080	080	075	080	095	095	080	070	090	075	095	090	080	U080R
23	085	100	090	085	055	095	085	U055R	060	J060R	080	070	075	100	085	110R	075	080	070	100	090	075	085	065
24	075	090	080	075	070	090	075	U065R	095	065	065	080	080	080	070	060	060	075	070	070	065	085	085	085
25	075	080	090R	070	075	090	075	080	U065R	105	070	095	075	070	060	066S	060	070	080	075	060	075	060	075
26	075	080	080	095	080	075	080	U065R	050	070	100	075	085	085	085	075	075	060	070	070	065	085	080	070
27	095	085	065	080	070	095	070	055	085	J145R	070	075	075	065	075	U080R	070	080	090	090	095	075	075	080
28	060	060	075	080	070	075	085	060	070	065	075	075R	090	085	060	065	100	065	070	080	100	070	075	075
29	080	075	090	075	080	085	080	050	080	065	070	090	085	080	070	125	075	075	070	090	080	095	085	080
30	070F	070	085	065	065F	080	070	055R	070	J060R	085	055	080	065	075	080	070	090	060	060	075	060	070	075
31																								
Count	28	27	27	27	27	26	28	27	27	29	29	29	29	29	28	29	28	28	28	29	28	29	29	29
Median	070	075	075	075	070	085	075	065	065	070	075	075	075	075	075	075	070	070	075	075	075	075	085	075
U. G.																								
L. G.																								
Q. R.																								

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

The Radio Research Laboratories, Japan

ypF2

K 14

Lat. 31° 12.1'N
Long. 130° 37.1'E

Y a m a g a w a

IONOSPHERIC DATA

0.1Mc 1 35° E Mean Time (G.M.T. +9h)

f_oF₂

Nov. 1967

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	051S	054S	047	048	043	025	030	071S	088	099S	125	J139S	137S	147S	146S	139S	135	108S	J096S	I082S	J079S	065S	097S	056S
2	053	050S	042	039	036	032	034	1075S	108	113	122	123	124	136	143	134	122	106	096S	092S	U085S	I073S	064S	055S
3	051	047	044	046	039	030	033	078S	101	118	146	142	133	126	126	116	106	097	092	082	071	054	046	042
4	043	041	040	044	036	037	042	072S	091	115S	J138S	148	150S	152S	158S	145	131	118	113	072S	062S	058	057	051
5	047	045	042	047	046	033	035S	1069S	090	107	126	133	133	140	147	155S	144	130	J105S	086S	084S	073S	046	035
6	036	037	037	040	036	033	037S	068S	095S	122	134S	149S	141R	D156S	D175R	S	U151S	122S	J101S	U068S	J052S	050S	040S	037S
7	040S	041	045	055S	058S	020H	025	061S	078S	090	110	112	121	J137S	142	142	131S	105S	J097S	J079S	U070S	064	035S	031
8	033	032S	032	038	044	023	026	U067S	085	087	112	114	109	128	136S	115	103	U077S	058	050S	055	054S	037S	038S
9	040	038	038	040	042	024	028S	I065S	081S	U155S	J094S	107	J140S	143	136S	115	117	110	U073S	057	055S	046S	J040S	J043S
10	039	039S	041	043	044	030	032	066S	081S	095S	112	130	113	132	124	116	098S	094S	066	051	054	048S	034	031
11	032	033	033	036	I035A	028	031	062S	077S	081	G	G	G	G	G	G	G	G	G	G	G	G	G	G
12	G	G	G	G	G	G	G	G	G	117	091	097	120	133	138	125	117	104	068S	054	042	039	032	
13	036S	036	036	038	041	033	034	J072S	078S	088	113	116	130	128	138	137	113	087	065	056	060	047	036H	038
14	040	040	041	042	046	031	034	067S	083	086	118	129	132	131	122	122	108	107	080S	066S	049	039S	035	035S
15	036	036	034	036	039	038	031	060S	079	103	113	108	107	107	125	131	101	091	065	055	062	057	047	040
16	035	034	035	033	032	033	036S	066S	105	114	119	120	118	123	121	116	106	085	064	052	052	051	045	J038S
17	036	041	035	032	035F	033S	035S	068	095S	096S	106	135	131	130	131	117	109	J087S	079	055	059	046S	040	036S
18	037	035S	036	038	044	028	029	062S	I093S	102	117S	127	130	147	U147S	142R	J144R	112S	087S	087S	I076S	J064S	051S	J040S
19	033S	033	035S	036S	038	029	029	058	082	096S	101	J102S	110	126	142	142R	J136S	121S	J081S	U066S	J078S	U071S	U043S	032
20	031	031	032	032	032	035	034S	058S	089S	I102C	104	113	121	128	139S	U145S	J139S	121S	J077S	I066S	I069S	J063S	059S	050S
21	J042S	J036S	035S	035	036	036	027	J053S	078	U090S	108	117	111	123S	131	130S	118S	J105S	J072S	066S	061S	060S	046	034
22	032	034	034S	034S	041	028	027	057	081	082	094S	119	123	116	122	127	125	114	U094S	080	067S	060S	J052S	044S
23	042	040	042	045	042	026	028S	058S	090S	102	109	124	131	133S	141	J136S	122	106	J099S	082	058S	J053S	048	041
24	034	033	034	J036S	042	032F	035S	I064S	089	115	105	116	132	128	129	135	111	088	081	077S	064S	050	041	044
25	045	044	044	035S	042S	039	040S	J066S	090S	112	122	122	134	124	128	116	102	086	076S	057	058S	060S	048	038
26	036	035	035S	037	037	037S	038S	064	106	125	122	129H	145	145	146	144	132	117	088S	078S	085S	062S	054	044
27	042	033S	033	031	033	031	030	U056S	094S	108S	106S	108V	126	139S	132R	125	116	092S	I073S	I071S	078	J054S	J042S	J037S
28	036S	036	040	035	036	035	U037S	I059S	081	097	105H	115	122	129R	114	112	115S	101S	079	063S	064S	J056S	044S	043S
29	047	047S	048S	J036S	031	J026S	030	U058S	I088S	I098S	113H	116S	J139R	118	120	111	102	084	061	050S	052	J054S	J044S	U041S
30	035	036	038	042	041	033	025S	U052S	080	106	122	122	124	105	100	098S	101	085	059	065S	059	039	031	029
31																								
Count	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28	29	29	29	29	29	29	29	29
Median	037	036	037	038	039	032	032	064S	088	102	113	120	130	129	133	130	117	105	080S	066S	062S	054S	044	038
U. Q.	042	041	042	042	042	034	035	068	094	114	122	130	133	140	142	140	132	116	096	080	074	062	050	044
L. Q.	035	034	034	035	036	028	028	058	081	092	106	114	120	124	124	116	106	088	069	056	055	049	040	035
G. R.	007	007	008	007	006	006	007	010	013	022	016	016	013	016	018	024	026	028	027	024	019	013	010	009

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

f_oF₂

The Radio Research Laboratories, Japan

Y1

IONOSPHERIC DATA

Lat. 31°12.1'N
Long. 130°37.1'E

Yamagawa

0.01Mc 135° E Mean Time (G.M.T. +9h)

f_oF₁

Nov. 1967

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	IH	U700L	IH	L	L	IH							
2										L	L	L	IH	L	IH	L	L							
3										L	L	L	IH	L	L	L	IH							
4										L	L	L	A	460L	LH	L	L							
5										L	L	L	480L	IH	IH	IH	IH							
6										L	IH	L	520L	IH	IH	IH	L							
7										IH	L	L	L	U570L	L	L	L							
8										L	L	L	410	L	440L	IH								
9										C	LH	LH	L	460L	L	L	L							
10										IH	L	IH	L	IH	L	L	L							
11										IH	C	C	C	C	C	C	C	C						
12									C	C	L	L	LH	LH	L	L	L							
13									330	370	L	L	460	LH	L	L	L	300L	210					
14										LH	L	L	IH	IH	LH	L								
15										L	L	L	IH	IH	IH	420H	L							
16										L	L	L	L	LH	LH	L	L							
17										L	IH	L	430L	L	460L	LH	LH							
18										370	LH	L	L	LH	L	L	LH							
19										L	L	L	LH	LH	L	L	L	L						
20										C	IH	U530L	IH	L	L	L	L							
21										L	L	L	LH	L	L	LH								
22										IH	LH	L	L	LH	LH	L	L							
23									300	L	L	420L	L	L	L	LH	LH	390						
24										L	L	LH	LH	L	L	L	L							
25										LH	L	L	LH	L	L	L	L							
26										L	L	L	L	L	L	L	L							
27										LH	LH	LH	L	L	L	LH								
28										280	LH	LH	LH	U470L	L	L	340							
29										L	L	L	LH	L	LH	LH	360L							
30										L	LH	L	L	L	L	L	380	310						
31																								
Count									4	2	1	5	4	4	4	3	3	3	1					
Median									290	370	420L	480L	450L	460L	460L	420	360	310	210					
U. Q.																								
L. Q.																								
Q. R.																								

f_oF₁

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

The Radio Research Laboratories, Japan

Y 2

Lat. 31° 12.1' N
 Long. 130° 37.1' E

Yamagawa

IONOSPHERIC DATA

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

f_oE

Nov. 1967

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							205	270	320	335	360	365	I355A	335	320	270	165							
2							200	260H	300	320	335	345	I345A	340	315	270	A							
3							195	270	290	320	345	360	I325A	305	260	A								
4							190	260H	300H	320	I335A	340	340	330	305	I260A	A							
5							200H	260	300	320	A	A	340	330	300	260	A							
6							170	250	285	305	I325A	340	340	330	I300A	I245A	A							
7							180	250H	295	320H	330	330	335	320	I295A	255	150							
8							185	260H	290H	310	320	340	I335A	320	285	I245A	A							
9							S	250H	I290C	310	320	320	I325A	I320A	A	A	A							
10							S	250	290	315	325	A	A	320	I290A	260	A							
11							140	250	290	C	C	C	C	C	C	C	C							
12							0	0	0	315	330	I335A	340	320	I300A	260	A							
13							170	260	300	320	325	330	A	A	300	I235A	A							
14							155	260	295	320	330	330	330	330	320	250	S							
15							165	240	I285A	315	320	335	320	315	300	240	A							
16							S	260	300	325	335	340	A	A	295	I260A	A							
17							190	260	300	320	340	345H	A	A	A	260	A							
18							S	250	300	I320A	A	A	A	A	A	I245A	S							
19							S	250	300	330	340	355	I350A	335R	I300A	260	A							
20							S	260	C	330	A	A	350	335	290	230H	A							
21							S	250	305	330	350R	I350A	I350A	330	300	250	S							
22							S	240	290	315	340	I350A	I345A	330H	310	260	A							
23							S	240	295	320	330	345	340	325	290	235	S							
24							S	235H	290	315	340	350	340	325	I290A	240H	S							
25							B	235H	290	315	330H	I340A	340	330	290	240	A							
26							S	220	290	315	330	335	325	320	280	240	A							
27							S	240	295	315	335	A	A	A	290H	250H	S							
28							S	215	285	320	I335A	345	340	315	285	240	S							
29							S	230	290	320	345	340	330	I315A	295H	250	A							
30							S	250	300	330	340	340	340	340	335	290	250	S						
31																								
Count							13	29	28	29	26	24	23	24	26	28	2							
Median							185	250	295	320	335	340	340	340	325	300	250	160						
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_oE

Y 3

IONOSPHERIC DATA

Lat. 31°12.1'N
Long. 130°37.1'E

Yamagawa

0.1Mc 135° E Mean Time (G. M. T. +9h)

fbEs

Nov. 1967

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	E	E	022	016	E	S		G	G	G	031G	032	036	041	034	020G	024	S	025	019	E	E	B
2	S	B	B	B		B	S		G	G	G	036	040	036	032G	025	026	020	022	015	S	S	S	S
3	S	S	B	B		B	S	G	G	037	G		029G	026	038	025	022	E020R	018	S	S	B	B	B
4	B	B	B	B		B	B		G	034	037	040	041	026G	022G	038	029	022	018	E	S	S	S	S
5	S	B	B	B		B	S		G		G	035	036	020G	020G			019	B	E	S	S	S	S
6	S	B	B	B		B	S	E020R	G	035	037	040	033	030	020G	033	031	025	E	E	S	S	S	S
7	S	B	B	B		B	S		G	G	G	037	G	G	G	030		C	C	S	S	S	S	S
8	E	E	015	B	B	B	E	G	G	034	036	043	G	043	026G	G	030	018	025	E	E	018	S	B
9	S	B	B	B		B	S	S	C			037	034	033	031	025	025	023	C	015	015	S	S	S
10	S	B	B		011		S	G	G	034	036	042	042	033	G	032	022	020	E	019	E	S	B	B
11	S	B	B	E	A	022	E	G		C	G	G	G	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	035	035	035			031	021	025	021	E	E	B	S	S
13	S	B	B			B	E		G	G	034	035	E035R	034	027	E024R	019	S	E	E	014	E	018	028
14	E	E	E	B		S	S	G	G	031	G	G	G	036	035	E033R	029	G	S	022	017	017	027	021
15	E	E	022	029	012	E	B	G	G	032	G	G	020G	G	020G	032	030	024	042	017	E	019	022	018
16	E	B	B	B	E	E	S	G	G	G	048	035	040	035	031	025	027	019	E	E	E	S	S	S
17	E	E	E	B	E	013	E		G	G	035	G	034	033	030	023G	018	S	E	S	S	B	B	B
18	B	B	B	B	E	E	S	S	G	G	035	036	036	037	040	034	026	G	S	S	B	S	B	B
19	B	B	B	B	B	B	S	S			036	036		036	043	033	G	020	E	E	S	S	S	S
20	S	B	B	B	B	B	E	S	C		037	037	036	032	029G	025	018G	015	025	S	S	S	S	S
21	S	B	B	B	014	E	S	G	G	G	036	G	038	036	036	022	018	G	S	S	S	S	017	S
22	B	B	B	B	011	015	S	S		030G	G	036	036	038	040	029	022	017	016	030	017	E	016	E
23	E	E	E	E	015	E	S	S			038	G	G	G	041		020G		S	S	018	E	015	E
24	E	B	B	B	B	B	E		G	G	036	G	G	G	029		020	S	S	S	S	E	E	016
25	B	B	B	B	015		E	017	G	G	G	036	032	029	023G	019	019	021	017	E	E	S	S	S
26	S	E	E	011	B	B	S	S			G	031	040	036	034	024G	017	018	025	E	E	S	S	S
27	S	S	S			E	S		G	G	035	035	032G	034	024G			G	016	B	S	S	S	S
28	B	B	B			B	E	S	G	G								S	E	E	E	S	S	S
29	S	B	B	S		B	S	S	G			037	038	036			022	023	024	019	E	S	S	S
30	B	B	B	B	B	B	E	G			042	037	G	025G			015G		S	E	E	B	B	S
31																								

Count
Median
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

fbEs

Y5

IONOSPHERIC DATA

Lat. 31°12.1'N
Long. 130°37.1'E

Yamagawa

0.1Mc
135° E Mean Time (G.M.T. +9h)

Nov. 1967

f-min

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	E015S	011	E	E	E	E016	E015S	E015S	012	015	015	018	017	016	015	015	017	E015S	E015S	E015S	014	E015S	E015S	012
2	E015S	014	012	011	E	015	E015S	013	014	015	015	018	021	022	022	018	015	012	012	012	E015S	E014S	E014S	E015S
3	E015S	E015S	011	011	E	011	E015S	E015S	012	014	015	015	016	016	015	015	011	E015S	E015S	E014S	E014S	011	012	012
4	E015S	012	011	011	E	011	013	014	014	015	017	015	022	018	016	015	012	015	E015S	E014S	E015S	E015S	E015S	E015S
5	E014S	011	E	011	E	011	E015S	012	012	015	015	015	016	017	015	017	015	015	011	E015S	E015S	E015S	E015S	E015S
6	E014S	015	013	014	E	012	E014S	E014S	015	014	015	017	018	018	015	015	012	011	E015S	E015S	E015S	E015S	E015S	E015S
7	E015S	014	011	014	E	E	E015S	012	012	015	015	017	023	018	018	017	015	014	E029C	E015S	E015S	E015S	E014S	E014S
8	E015S	E014S	011	014	012	012	E015S	E015S	015	015	019	016	018	017	015	014	015	013	E015S	E015S	E015S	E015S	E015S	012
9	E015S	015	011	016	E	012	E015S	E015S	012	E042C	015	015	017	015	017	012	012	012	E030C	012	013	E015S	E015S	E015S
10	E015S	012	E	E	E	E	E014S	E015S	015	012	013	014	017	015	016	014	012	012	E015S	012	E014S	E014S	015	014
11	E015S	013	E	E	E	E	E015S	012	012	012	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	C	C	C	C	C	C	C	C	C	C	015	015	017	016	015	015	012	012	012	012	E014S	012	E015S	E015S
13	E014S	015	011	E	E	014	E014S	E014S	012	011	015	017	015	015	015	016	014	012	E015S	E015S	011	E014S	E015S	E015S
14	E015S	E015S	E	014	E	E014S	E015S	012	012	012	013	014	016	016	015	014	013	E015S	E014S	E	E014S	011	E015S	012
15	E014S	014	E	014	E	015	012	E014S	012	013	015	015	014	015	015	015	014	014	E015S	E015S	011	E015S	E015S	E014S
16	E014S	012	011	013	E	013	E014S	E014S	015	013	015	014	015	015	014	012	012	012	E015S	E015S	E014S	E014S	E014S	E014S
17	E014S	015	014	013	E	E	E014S	E015S	E014S	015	015	018	017	022	015	015	015	015	012	E014S	E015S	E015S	014	012
18	014	014	E	011	011	014	E013S	E015S	012	E016C	015	018	017	017	016	015	015	E015S	E015S	E015S	015	E014S	017	015
19	016	014	016	015	013	013	E015S	E015S	012	012	017	017	017	016	015	015	015	015	012	E015S	E015S	E015S	E014S	E015S
20	E015S	014	013	015	012	015	E015S	E014S	015	0	016	017	017	015	016	014	012	012	012	E015S	E015S	E015S	E015S	E015S
21	E014S	015	015	015	E	014	E014S	E012S	012	015	015	017	015	018	018	015	012	E013S	E015S	E015S	E015S	E015S	E015S	E015S
22	015	014	012	014	E	012	E015S	E015S	013	013	015	018	015	018	017	014	012	012	E015S	E015S	016	E015S	013	E015S
23	E015S	011	015	E	E	012	E015S	E015S	012	014	015	016	018	017	016	018	015	015	E015S	E015S	E015S	016	E015S	013
24	E015S	015	014	016	012	011	E013S	E015S	012	012	013	015	017	014	016	014	012	012	E014S	E014S	E014S	E014S	E014S	E0133
25	012	012	011	E	E	E	E014S	012	012	015	015	017	016	015	015	015	012	012	011	E014S	E014S	E014S	E014S	E0133
26	E015S	012	E	E	011	014	E014S	E014S	012	014	015	016	015	016	017	016	011	011	012	E015S	E015S	E014S	E015S	E015S
27	E014S	E017S	E	E	E	E	E014S	E013S	013	015	015	017	017	016	018	015	012	E014S	014	017	E015S	E015S	E015S	E015S
28	015	015	E	E	E	015	E014S	E015S	E015S	013	015	017	017	018	016	016	012	012	E015S	E015S	E015S	E015S	E015S	E015S
29	E015S	014	E015S	E	E	013	E015S	E012S	E015S	016	017	017	018	017	017	015	015	015	012	E015S	E015S	E015S	E015S	E015S
30	014	015	015	011	014	013	E015S	E012S	013	014	015	018	016	024	022	015	012	012	E015S	E014S	E015S	012	015	E014S
31																								
Count	29	29	29	29	29	29	29	29	29	28	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Median	E015S	014	011	011	E	012	E015S	E014S	012	014	015	017	017	016	016	015	012	012	E015S	E015S	E015S	E015S	E015S	E015S
U. Q.																								
L. Q.																								
G. R.																								

The Radio Research Laboratories, Japan

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

f-min

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. 1967

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	270S	U275S	260	260	325	270	275	320S	335	310S	305	J210S	290S	290S	295S	295S	330	315S	J300S	I290S	J290S	285S	285S	275S	
2	300	305S	310	305	325	325	275	I315S	340	320	310	305	315	295	295	300	305	315	285S	U295S	U295S	I300S	295S	300S	
3	300	285	300	310	320	235	270	305S	335	305	310	310	310	285	295	310	310	315	305	305	305	315	300	285	
4	280	265	255	295	275	240	260	305S	315	295S	I305S	310	300S	295S	305S	300	305	300	325	300S	260S	285	295	285	
5	290	290	265	320	330	290	285S	I330S	335	320	315	315	310	290	300	300S	300	315	J295S	290S	285S	305S	305	255	
6	275	270	275	280	315	265	275S	325S	315S	330	315S	320S	290R	S	R	S	U295S	315S	J315S	U300S	J295S	290S	305S	270S	
7	270S	280	295	325S	380S	245H	290	350S	355S	340	325	315	315	J300S	310	315	320S	305S	J315S	J315S	U315S	335	310S	280	
8	280	295S	280	295	360	345	280	U340S	360	330	325	335	305	310	320S	325	330	U335S	325	275S	305	315S	285S	275S	
9	295	295	275	285	375	285	280S	I320S	320S	U295S	J330S	300	J310S	315	315S	300	305	315	U320S	310	305S	285S	J265S	J290S	
10	270	265S	285	310	340	310	285	335S	340S	330S	310	325	310	310	315	315	325S	340S	295	295	300	320S	280	265	
11	280	280	290	290	I310A	260	300	340S	340S	330	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
12	C	C	C	C	C	C	C	C	C	C	345	340	300	300	315	310	310	310	315	315S	315S	300	295	285	275
13	275S	265	275	280	320	275	280	J320S	335S	340	325	310	315	305	310	305	330	345	310	285	300	310	275H	275	
14	285	280	275	275	345	285	290	325S	340	315	305	320	310	320	310	320	315	320	330S	305S	325	285S	265	270S	
15	280	280	260	280	305	320	325	325S	330	340	325	330	300	280	320	325	335	325	330	300	300	335	300	275	
16	260	260	260	285	275	250	275S	320S	335	335	320	315	305	310	305	300	330	340	305	305	270	265	290	J275S	
17	250	300	310	280	270F	255S	270S	325	340S	325S	310	330	315	315	315	310	325	J325S	330	280	305	280S	250	300S	
18	295	285S	280	290	330	320	295	320S	I340S	330	320S	330	305	305	U300S	300R	J305R	310S	300S	310S	I305S	J305S	255S	J230S	
19	260S	275	290S	320S	315	295	295	325	340	335S	330	J315S	290	290	300	315R	J310S	J320S	J320S	U280S	J290S	U320S	U270S	275	
20	260	275	280	280	285	300	315S	345S	340S	I335C	325	320	305	295	300S	U305S	J310S	325S	J325S	I275S	I300S	J290S	305S	280S	
21	J260S	J275S	275S	285	305	330	350	J330S	335	U330S	325	320	295	295S	305	305S	305S	J335S	J320S	315S	275S	315S	295	275	
22	265	270	275S	275S	310	320	280	335	335	330	315S	310	305	300	295	310	320	330	U315S	300	315S	280S	J275S	265S	
23	270	270	285	320	345	260	285S	315S	340S	325	315	315	315	300S	305	330S	305	305	J315S	305	300S	J280S	285	305	
24	285	265	270	J280S	330	255F	300S	I320S	325	330	330	310	310	315	305	310	315	310	295	305S	295S	270	240	255	
25	270	275	295	285S	250S	260	285S	J310S	325S	330	325	305	305	300	310	310	320	320	320S	300	285S	305S	310	290	
26	275	255	270S	260	270	270S	270S	305	330	320	325	295H	310	295	310	300	310	315	305S	270S	310S	295S	280	290	
27	285	270S	275	285	275	265	295	U320S	340S	320S	305V	310	315S	310R	305	325	315S	315S	I300S	I300S	I325	J315S	J260S	J265S	
28	280S	275	305	320	280	270	U270S	I325S	325	340	325H	310	305	315R	305	310	315S	330S	330	285S	310S	J305S	265S	255S	
29	280	295S	345S	J305S	340	J230H	275	U320S	I320S	I325S	295H	310S	J300H	305	315	335	345	330	325	300S	295	J335S	J285S	U280S	
30	270	275	295	280	310	335	285S	U325S	335	320	330	335	330	335	330	305S	325	340	305	305S	355	305	290	250	
31																									
Count	29	29	29	29	29	29	29	29	29	29	29	29	29	28	28	28	29	29	29	29	29	29	29	29	
Median	275	275	280	285	315	270	285	325S	335	330	320	315	305	300	310	310	315	315	320	315S	300S	305S	285	275	
U. Q.																									
L. Q.																									
G. R.																									

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

M(3000)F2

The Radio Research Laboratories, Japan

Y7

Lat. 31°12.1'N
Long. 130°37.1'E

Y a m a g a w a

IONOSPHERIC DATA

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

Nov. 1967

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	LH	U370L	LH	L	L	LH							
2										L	L	L	LH	L	LH	L								
3										L	L	L	LH	LH	L	L	LH							
4										L	L	L	A	390L	LH	L								
5										L	L	395L	420L	LH	LH	LH								
6										L	LH	355L	LH	LH	LH	L								
7										LH	L	L	L	U350L	L	L								
8										L	L	L	415	L	380L	LH								
9										C	LH	LH	L	385L	L	L	L							
10										LH	L	LH	L	LH	L	L	L							
11										LH	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12									C	C	L	L	LH	LH	L	L								
13									405	405	L	395	LH	L	L	L	420L	405						
14										LH	L	LH	LH	LH	LH	L								
15										L	L	LH	LH	LH	LH	395H	L							
16										L	L	LH	L	LH	LH	L								
17										L	LH	395L	L	390L	LH	LH								
18									405	LH	L	LH	L	L	L	LH								
19										L	L	L	LH	LH	LH	L	L							
20									C	LH	U375L	LH	L	L	L	L								
21									L	L	L	L	LH	L	L	LH								
22									LH	LH	L	L	LH	LH	LH	L	L							
23									430	L	395L	L	L	L	L	LH	410							
24									L	L	LH	LH	LH	L	425	L								
25										LH	L	LH	L	L	L	L								
26										L	L	L	L	L	L	L								
27									430	LH	LH	LH	L	L	L	LH								
28									405	LH	LH	LH	U355L	L	L	410								
29										L	L	L	LH	L	LH	405L								
30										L	LH	L	L	L	L	420	445							
31																								
Count									4	2	1	5	4	4	3	3	3	1						
Median									420	405	395L	395L	390L	390L	395	410	420	405						
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

M(3000)F1

Y8

Lat. 31° 12.1' N
Long. 130° 37.1' E

Y a m a g a w a

IONOSPHERIC DATA

135° E Mean Time (G.M.T. +9h)

km

h'F2

Nov. 1967

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	275	255	290	270	265	250	250							
2										250	245	250	300	295	280	250								
3											265	250	250	300	270	245	250							
4											250	275	255	250	255	230								
5										260	250	250	250	280	270	250								
6										245	275	270	290L	280	260	230								
7										235	250	245	240	285	250	250								
8										250	255	250	240	275	255	250								
9										240	250	300	280	260	245	230	235							
10										250	255	255	245	275	250	245	225							
11										260	G	G	G	G	G	G	G	G	G	G	G	G	G	G
12										G	G	230	25L	285	255	250								
13										215	230	255	260	270	250	260	225	210						
14											250	275	260	280	270	245								
15										245	250	240	250	350L	270	250								
16										240	250	250	240	270	250	250								
17										250	250	250	250	250	255	250								
18										240	250	255	275	280	245	250								
19										250	250	245	300	300	260	250	245							
20										G	240	270	275	260	255	255								
21										250	250	255	300L	250	265	245								
22										245	255	255	280	290L	275	270	255							
23										245	250	260	270	255	255	245	230							
24										235	245	270	260	250	250	250								
25											250	280	265	250	265	235								
26											230	250	260	250	250	245								
27											250	250	255	260	245	275								
28										220	250	245	250	260	245	250								
29										230	250	250	255	245	260	240								
30										255	250	255	260	245	240	230	235							
31																								
Count									4	24	29	29	29	29	29	27	10	1						
Median									225	250	250	255	260	270	255	250	235	210						
U. Q.																								
L. Q.																								
G. R.																								

The Radio Research Laboratories, Japan

Y9

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

h'F2

Lat. 31° 12.1' N
Long. 130° 37.1' E

Yamagawa

IONOSPHERIC DATA

km 135° E Mean Time (G.M.T. +9h)

h'F

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	295	265	300	275	220	280	295	240	225	205	205H	205H	205H	200H	250	225	215H	220	220	230	235	225	260	255	
2	250	250	240	245	230	300	305	250	240	230	225	225	220H	210	225H	240	240	225	235	225	240	245	245	240	
3	250	255	250	245	220	255	320	245	245	235	235	225	205H	210H	225	225	230H	240	225	225	235	225	250	250	
4	275	275	310	250	270	365	265	225	225	240	1230A	A	200	220H	240	230	230	225	215	200	255	250	255	255	
5	250	250	250	250	225	225	265	240	225	220	225	230	200	205H	200H	200H	230	225	210	220	230	225	245	E320S	
6	310	300	275	290	240	275	255	230	225	235	225H	230	210H	200H	210H	225	210	210	215	225	225	250	255	290	
7	315	300	270	250	210	200	E300S	220	220	200H	225	220	210	210	225	230	230	210	225	220	230	230	235	300	
8	305	290	315	275	220	230	320	230	230	235	230	E250A	195	E250A	220H	205H	225	215	220	255	260	250	255	275	
9	275	255	305	300	200	280	E300S	250	240	1240G	210H	210H	245	225	230	205	230	225	210	230	245	250	290	290	
10	285	315	280	220	230	240	E295S	230	230	225H	220	215H	230	190H	225	230	225	225	205	250	230	225	250	300	
11	300	300	250	270	1250A	E350A	270	220	225	230	G	G	G	G	G	G	G	G	G	G	G	G	G	G	
12	G	G	G	G	G	G	G	G	G	230	230	220	200H	230H	225	230	225	225	220	205	240	225	250	285	
13	310	305	285	270	245	260	290	240	200	215	230	200	205H	230	230	240	215	230	200	250	245	225	270	E350A	
14	275	290	260	270	225	300	260	230	220	215H	230	230H	225H	220H	240	250	230	225	200	245	215	255	E350A	315	
15	300	300	E350A	E350A	250	250	210	230	225	230	215	215H	190H	210H	180H	240	225	240	225	245	230	225	250	295	
16	315	325	300	300	295	350	300	250	235	225	1225A	205H	225	180H	200H	225	235	220	200	230	225	250	260	275	
17	310	280	250	300	295	325	295	245	230	230	225H	200H	225	200	215H	225H	230	210	210	205	240	220	250	270	
18	270	265	265	255	240	245	275	245	230	205	200H	230	210H	205	230	220H	235	210	195	230	200	220	250	305	
19	335	315	300	260	250	220	E260S	230	225	230	225	220	205H	200H	230	250	230	210	195	210H	240H	220	245	300	
20	E340S	325	305	300	300	270	250	225	225	G	220H	220H	200H	230	240	240	230	220	200	E235H	225	250	250	255	
21	290	305	300	305	250	230	220	220	230	235	230	220	230H	240	230	210H	225	220	200	225	205H	225	255	300	
22	345	330	300	310	250	230	E290S	250	225	190H	220H	230	220	220H	220H	230	250	225	210	250	230	260	245	305	
23	305	300	285	240	240	250	320	250H	195	230	220	230	240	240	255	205H	215	215	215	210	240	250	270	260	
24	270	330	335	300	245	255	260	240	230	235	215	205H	200H	225	200	230	220	225	230	225	205	230	320	330	
25	295	265	250	300	325	295	250	235	230H	240	215H	215	225H	225	225	230	220	225	225	225	245	240	230	250	
26	300	310	300	305	300	290	270	255	245	230	230	225	230	225	225	240	225	210	205	250	230	220	240	245	
27	250	330	300	275	265	265	275	210H	225	240	225H	210H	245	225	235	230H	230	200	200	250	225	210	255	300	
28	295	300	250	240	280	300	300	240	245	215H	200H	200H	220	230	230	235	230	230	210	220	225	245	285	320	
29	295	250	240	220	220	230	310	295	240	225	220	240	E255H	235	215H	220	225	220	210	225	250	220	245	245	
30	320	305	275	305	250	215	300	250	240	230	230H	225	250	235	225	210	200	215	200	245	205	225	255	350	
31																									
Count	29	29	29	29	29	29	29	29	29	28	29	29	29	28	29	29	29	29	29	29	29	29	29	29	29
Median	295	300	280	270	245	260	280	240	230	230	225	220	220H	220	225	230	230	220	210	225	230	225	250	290	
U. Q.																									
L. Q.																									
G. R.																									

h'F

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

The Radio Research Laboratories, Japan

Y10

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. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	S	100	095	095	095	100	S	G	155	G	130	105	100	120	150	155	100	150	S	110	105	100	100	B
2	S	B	B	B	E	B	S	G	125	120	120	115	115	115	110	G	110	100	100	100	S	S	S	S
3	S	S	B	B	E	B	S	160	140	115	155	G	100	100	100	100	095	100	100	S	S	B	B	B
4	S	B	B	B	E	B	B	G	150	135	125	115	115	100	100	125	100	100	100	100	S	S	S	S
5	S	B	E	B	E	B	S	G	G	G	125	120	115	100	100	G	G	110	B	120	S	S	S	S
6	S	B	B	B	E	B	S	100	130	115	110	105	100	110	100	100	095	095	100	100	S	S	S	S
7	S	B	B	B	E	E	S	G	150	150	125	120	120	120	120	115	G	G	C	S	S	S	S	
8	100	100	100	B	B	B	105	100	145	120	120	115	120	105	105	150	100	100	100	100	100	095	S	B
9	S	B	B	B	E	B	S	105	G	G	G	G	125	115	120	125	100	100	100	100	100	S	S	S
10	S	B	E	E	100	E	S	100	160	G	125	115	105	105	170	100	100	100	100	100	100	S	B	B
11	S	B	E	105	100	100	100	100	G	G	G	G	G	G	G	G	G	G	C	C	C	C	C	C
12	C	C	G	C	C	C	C	C	C	C	125	115	110	G	G	100	100	100	100	100	100	B	S	S
13	S	B	B	E	E	B	110	G	G	125	130	120	120	105	100	100	105	105	S	100	100	110	100	100
14	100	100	100	B	E	S	S	100	125	125	120	140	135	125	125	150	115	150	S	145	130	110	105	100
15	100	100	100	100	100	100	B	165	130	140	125	120	100	120	100	125	115	105	105	105	105	100	100	100
16	100	B	B	B	100	100	S	170	150	125	125	130	120	105	105	100	100	100	100	100	100	S	S	B
17	110	100	100	B	E	100	100	G	G	130	125	130	G	115	110	105	105	100	S	100	S	S	B	B
18	B	B	E	B	100	100	S	S	125	120	110	110	100	100	100	100	100	095	S	S	B	S	B	B
19	B	B	B	100	B	B	S	S	G	G	G	150	G	100	140	150	150	100	100	120	S	S	S	S
20	S	B	B	B	B	B	100	S	G	C	110	105	105	100	100	100	100	100	100	S	S	S	S	S
21	S	B	B	B	100	100	S	100	G	175	155	145	110	150	155	105	100	100	S	S	S	S	120	S
22	B	B	B	B	100	100	S	S	G	G	105	155	155	145	120	105	105	100	100	100	100	100	100	100
23	115	110	100	105	105	105	S	105	G	G	G	160	E175G	E170G	140	G	110	G	S	S	110	110	110	095
24	100	B	B	B	B	B	105	G	G	G	120	115	120	120	G	115	G	100	S	S	S	120	115	110
25	B	B	B	100	100	E	100	100	G	G	145	130	110	110	105	105	100	100	100	100	100	095	S	S
26	S	105	105	105	B	B	S	100	G	G	G	G	135	120	120	115	100	100	100	100	100	095	S	S
27	S	S	E	E	E	E	100	100	G	G	110	110	175	105	100	105	G	095	095	B	S	S	S	S
28	B	B	E	E	E	B	100	095	100	165	G	105	105	G	G	G	G	100	100	100	100	S	S	S
29	S	B	S	E	E	B	S	100	180	G	G	G	120	110	140	G	100	100	100	100	100	S	S	S
30	B	B	B	B	B	B	B	105	100	G	G	G	150	150	165	105	100	G	S	100	100	B	B	S
31																								
Count	7	7	7	7	10	9	10	17	13	14	22	24	27	27	26	24	24	26	18	21	16	9	8	6
Median	100	100	100	100	100	100	100	100	145	125	125	120	115	110	110	105	100	100	100	100	100	100	100	100
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^oF₂

Y 11

IONOSPHERIC DATA

Lat. 31°12.1'N
Long. 130°37.1'E

Yamagawa

135° E Mean Time (G.M.T. +9h)

Types of Es

Nov. 1967

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1		f		f3	f	f			h		h12	1	12	c1	h1	h1	1	h		f3	f3	f2	f		
2									h		c	c1	e2	c	1	1	1	12	f2	f2					
3							h	h	h2	e2	h	h	1	13	13	12	12	1	1	f					
4							h	h	h2	h	h	e2	c2	1	1	h21	12	12	12	f					
5							h	h	h	h	c	c	c1	1	1	1	1	1	1	f					
6							1	1	h3	e2	c2	12	1	1	1	12	14	13	f						
7									h	h	h	c	c	c	c										
8	f	f	f2				f	1	h	c	c	e3	c	12	1	h12	14	12	f2	f	f2	f			
9							1	1	h	c	c	1	c	12	12	12	12	13	f	f	f	f			
10					f		f	1	h2		h2	c2	c3	12	h12	12h	1	12	f	f3	f				
11				f	f4	f3	f2	1																	
12											h2	c	c			12	12	13	f3	f	f2				
13							f		h21	h	h	c	c	1	12	12h	13	12	f	f	f4	f	f7	f3	
14	f	f2	f				1	h3	h3	e2	h	h	h1	h2	h2	h	e3	h2	f5	f2f	f2	f3	f3		
15	f2	f2	f3	f5	f2	f	h	h	h2	h2e2	h	c1	1	h2	1	h2	e4	14	f7	f5	f	f2	f4	f2	
16	f	f	f				h21	h3	h3	h2	h2	h	c	12	12	12	14	14	f	f	f				
17	f	f	f						h	h	h	h	c	c	c	12	12	12	f						
18									h3	c	c	c	1	12	13	13	1	1							
19				f							h	h	12	h2c	h12	h13	1	1	f	f					
20							f			c2	1	1	1	1	12	13	1	1	f						
21					f2	f	1		h	h	h	h	e2	h12	h1	12	12	1					f2		
22					f2	f			12	h1	h1	h1	h1	h	c1	1	12	13	f	f4	f2	f	f	f	
23	f	f	f	f2	f	f	1	1	h	h	h	h	h1	h	h2	1	1	1			f2	f	f	f2	
24	f						f			h2	c	c	c	c	c		1	1			f	f	f	f2	
25				f	f2		f	1	h	h	h	h	c2h	12	12	12	12	13	f2	f	f				
26							1	1			h2	h	h2	c	c	e4	1	12	f3	f	f				
27						f2	1	1		e2	1	h1	12	13	1	1	1	1	f						
28						f2	12	1	h		1	1						1	f	f	f				
29						1	h		h				c	c	h1		12	14	f4	f2	f				
30						f	1						h	h	h	1	1	1	f						
31																									
Count																									
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U. Q.																									
L. Q.																									
Q. R.																									

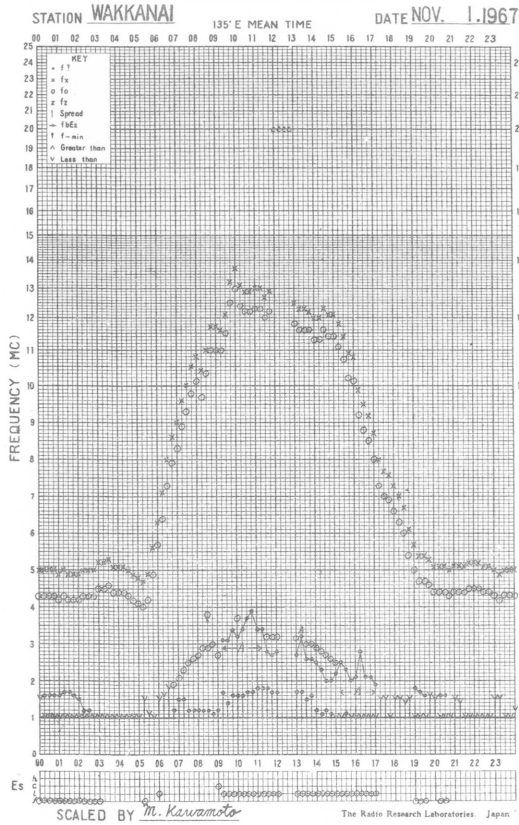
The Radio Research Laboratories, Japan

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

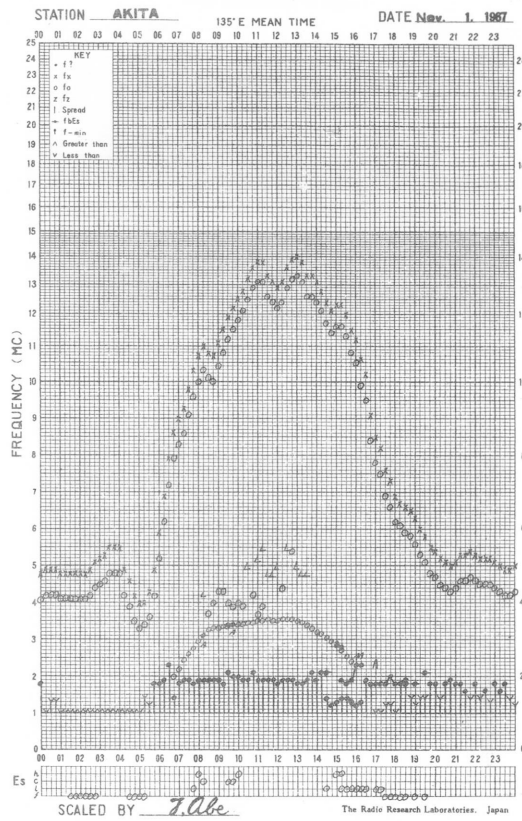
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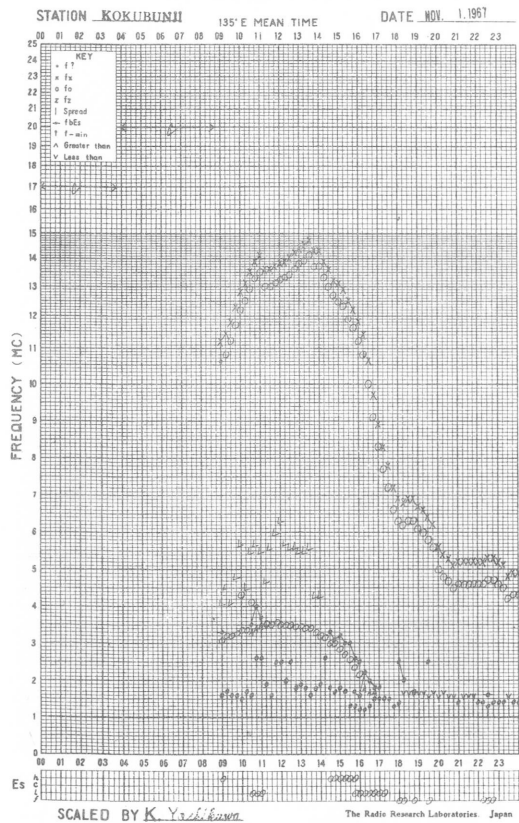
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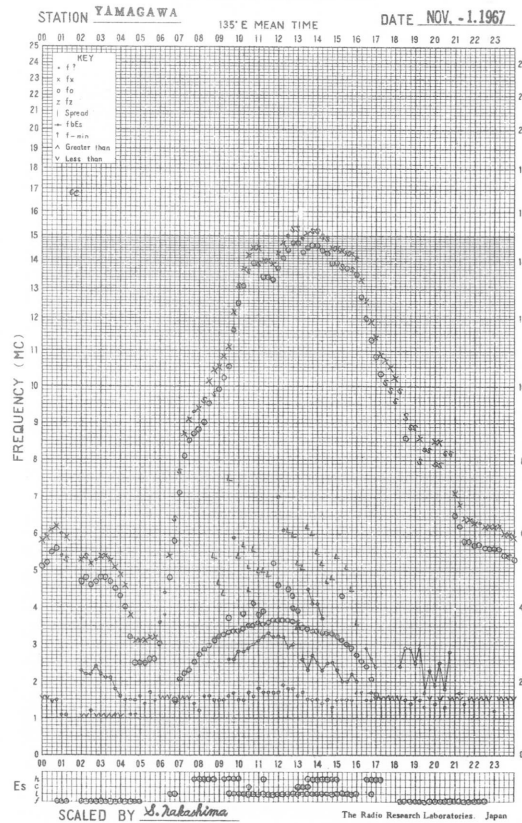
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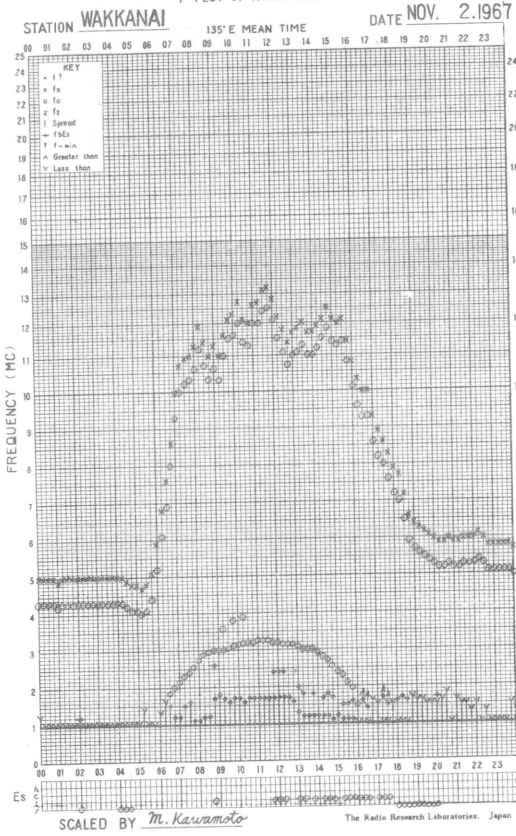
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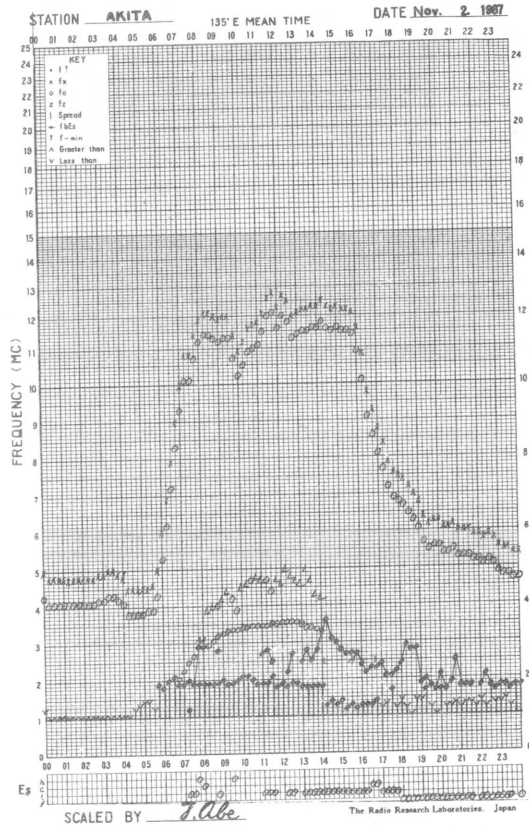
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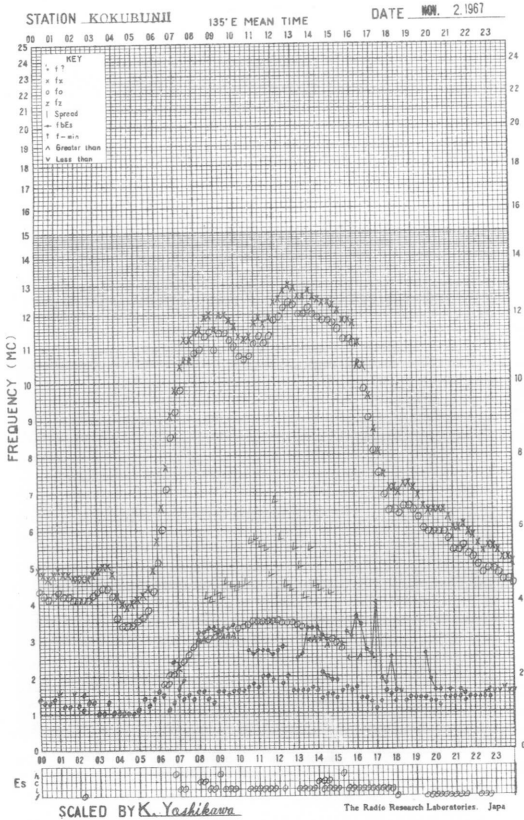
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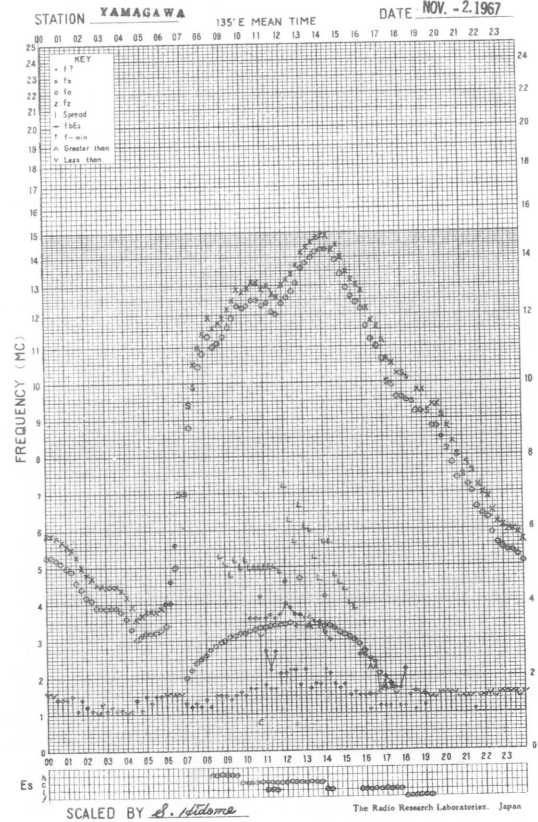
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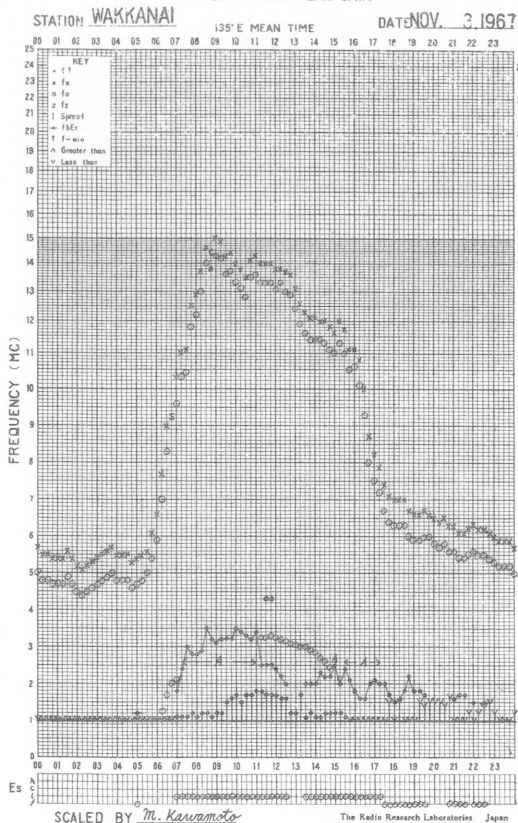
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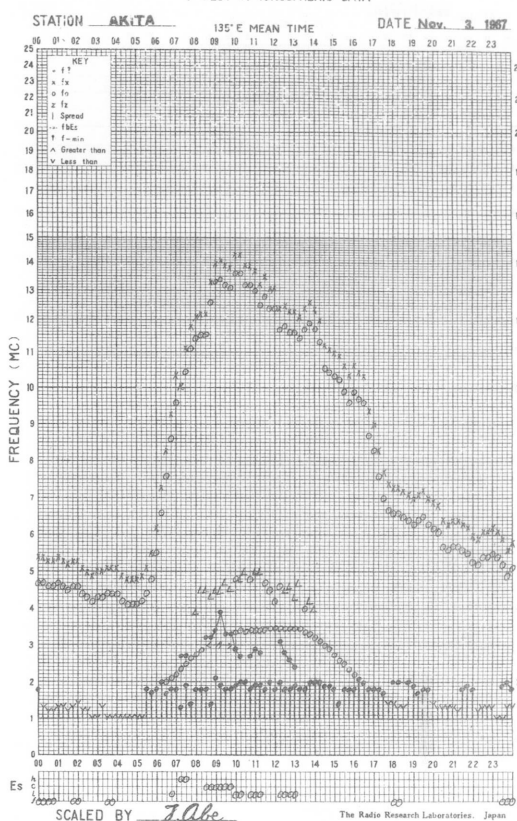
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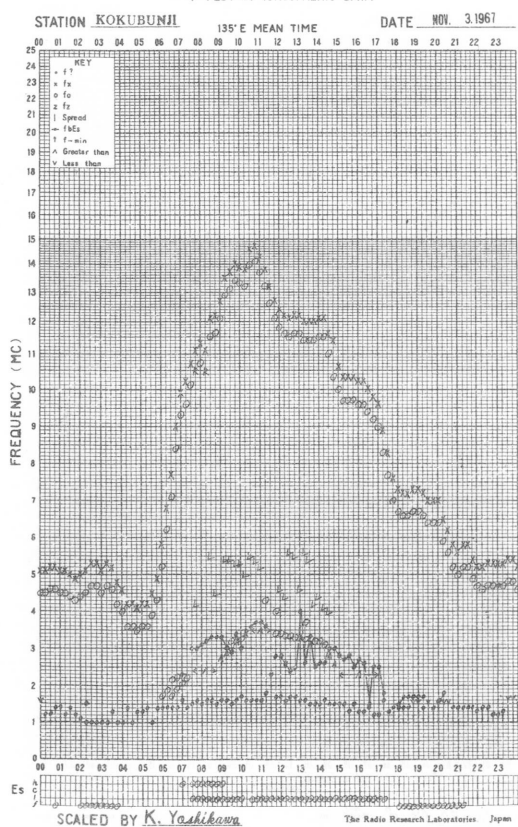
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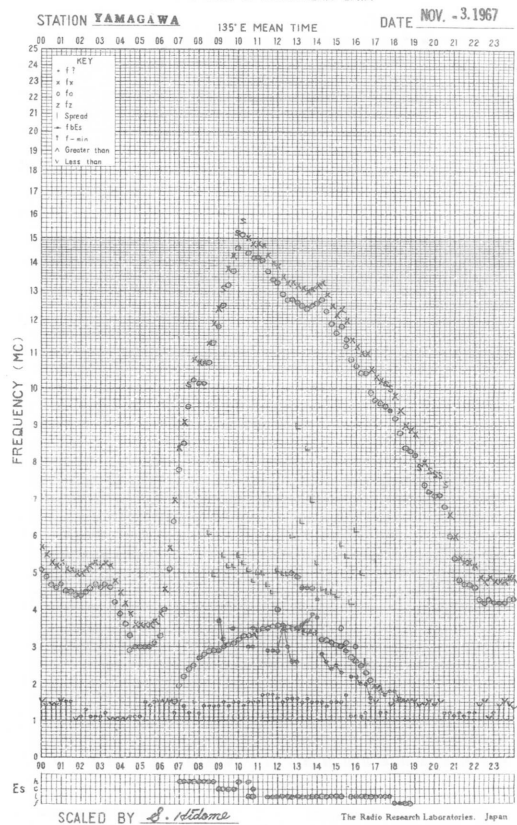
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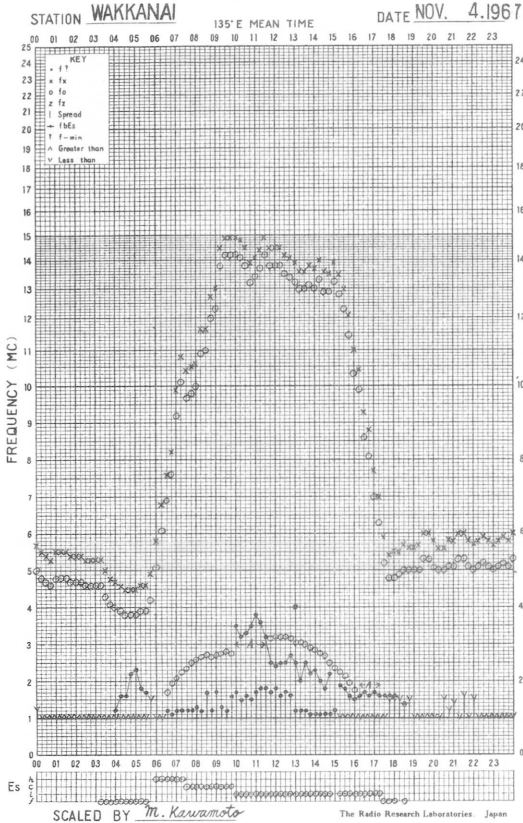
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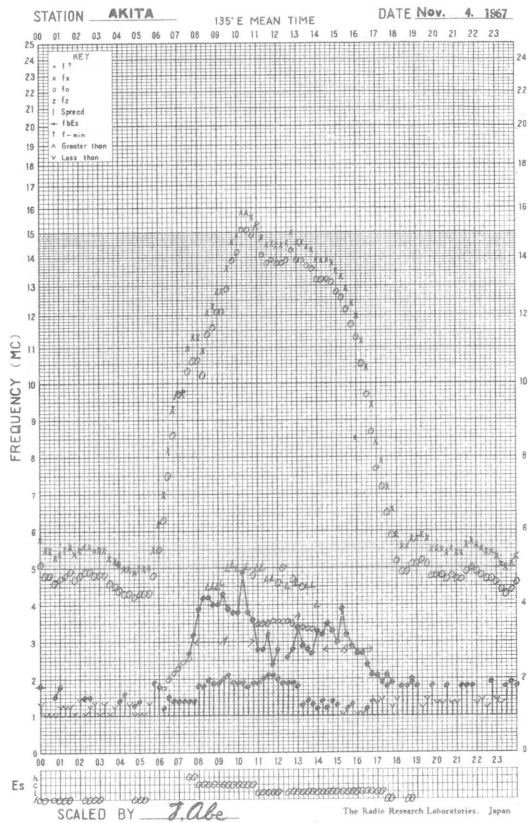
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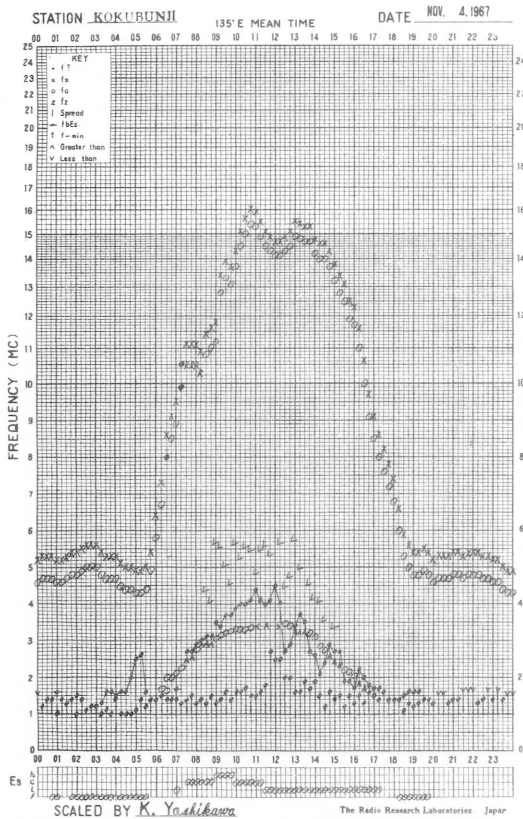
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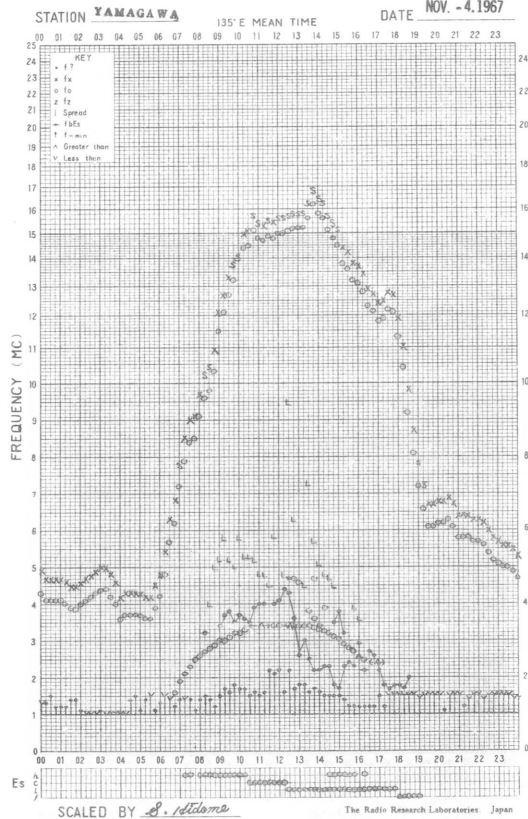
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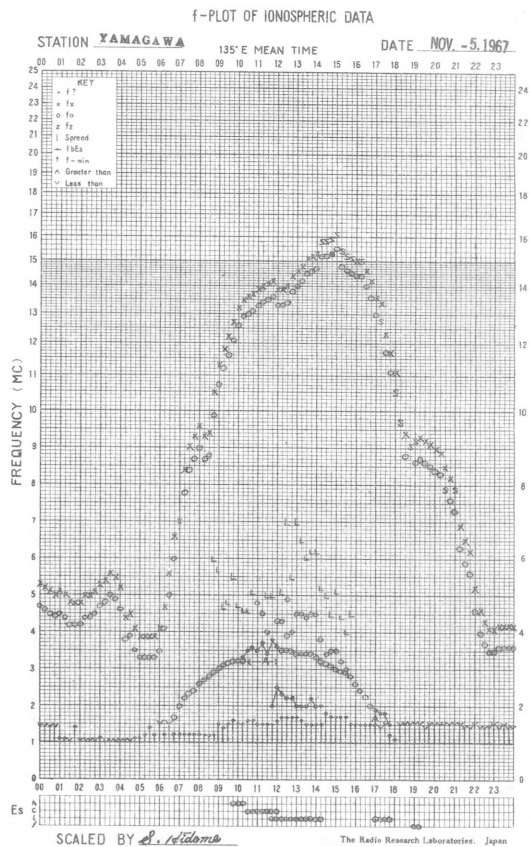
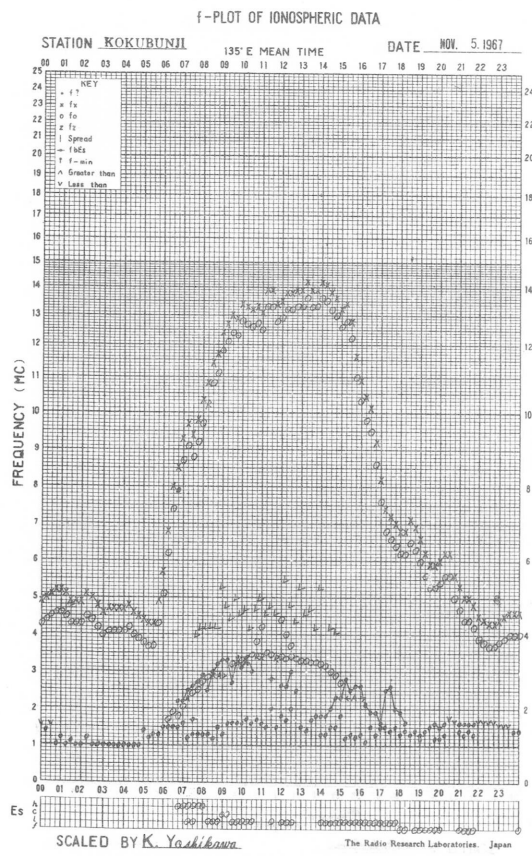
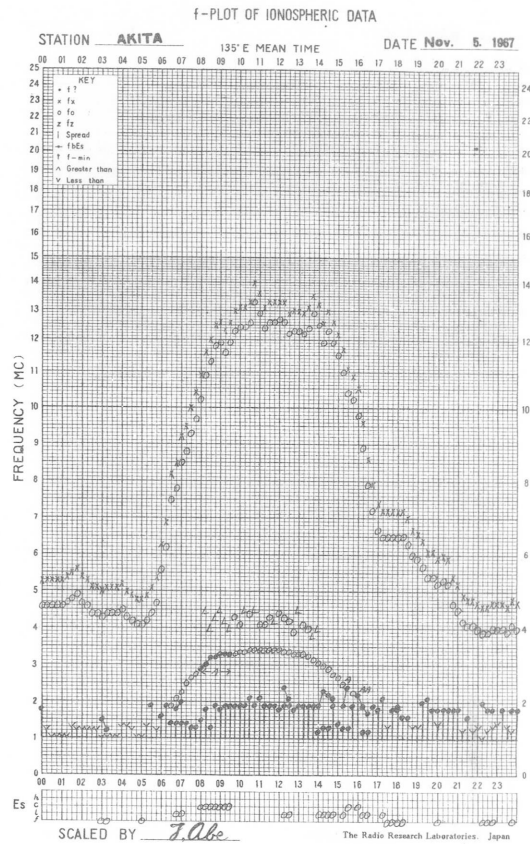
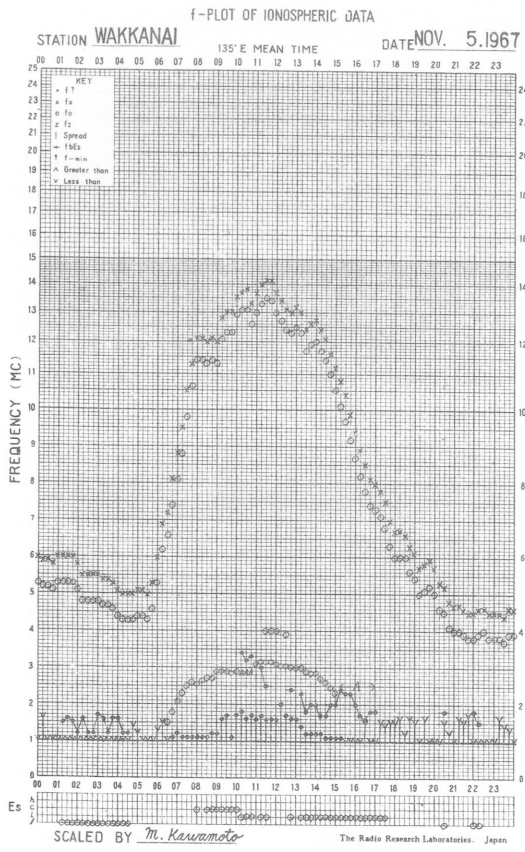


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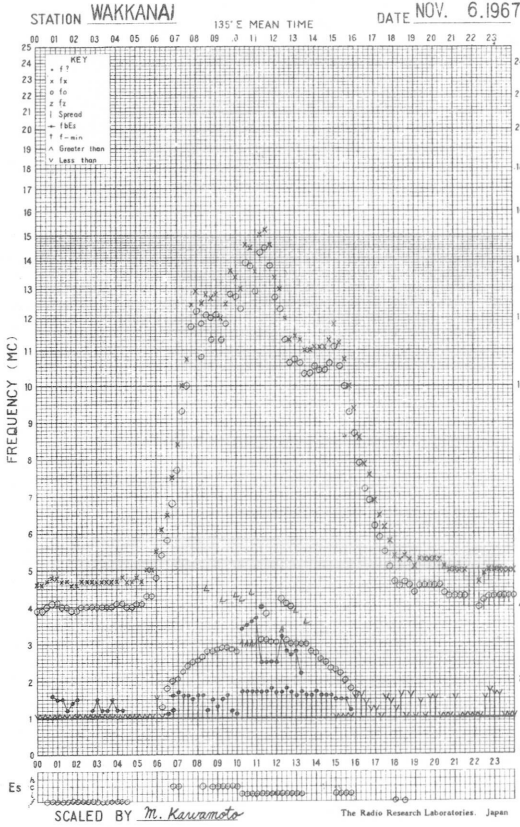


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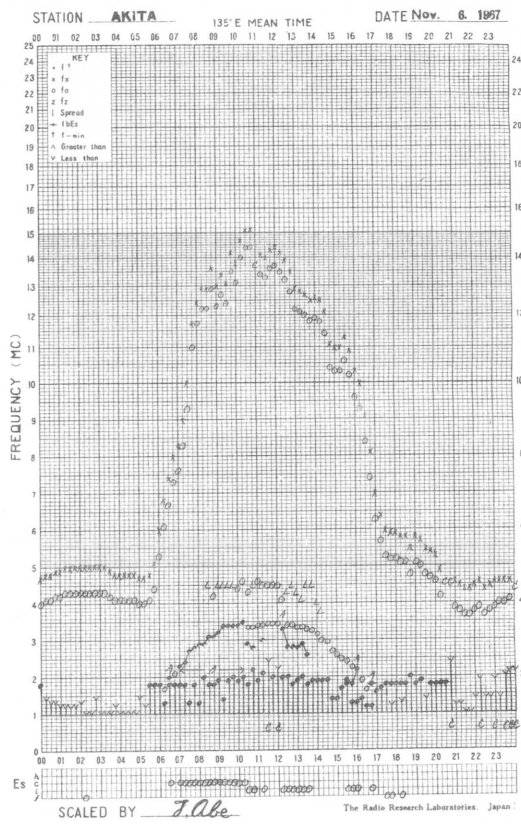




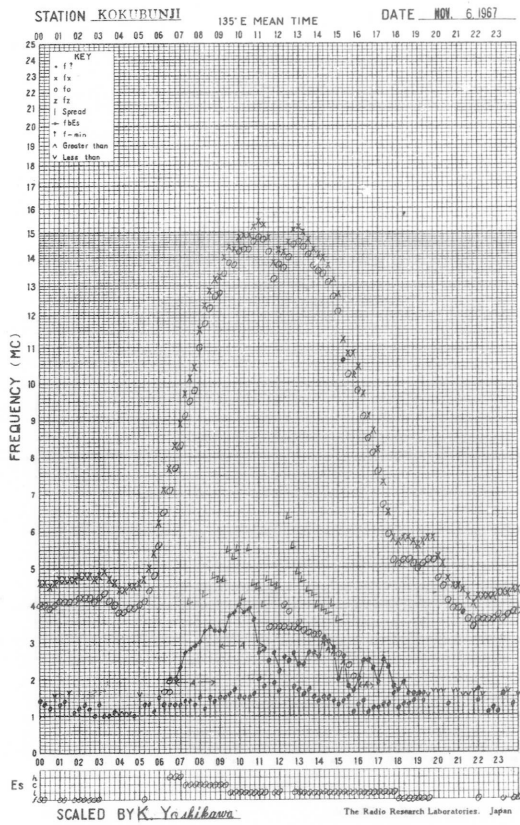
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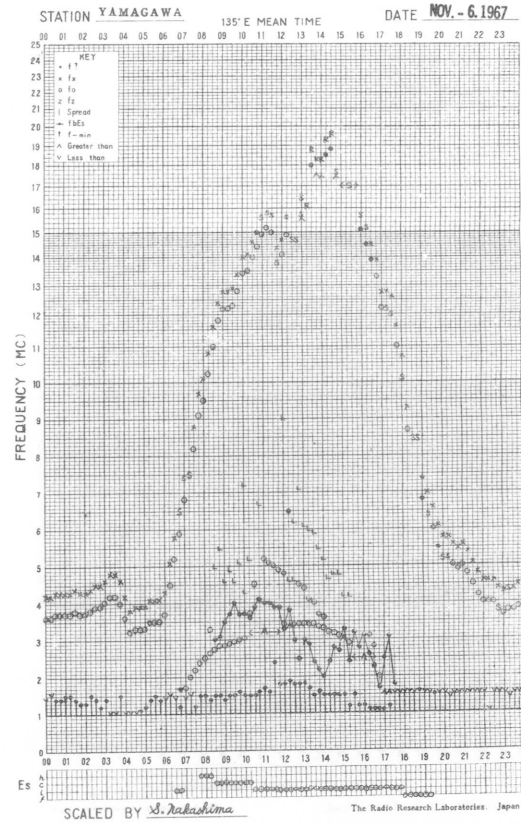
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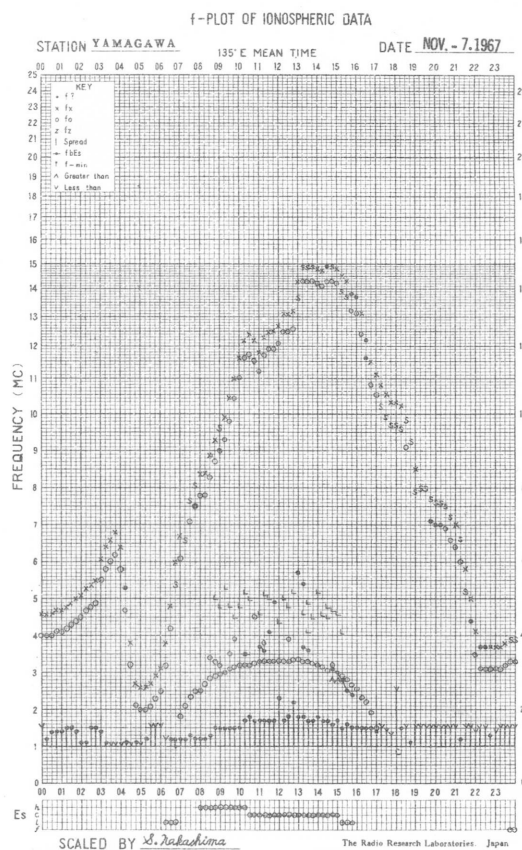
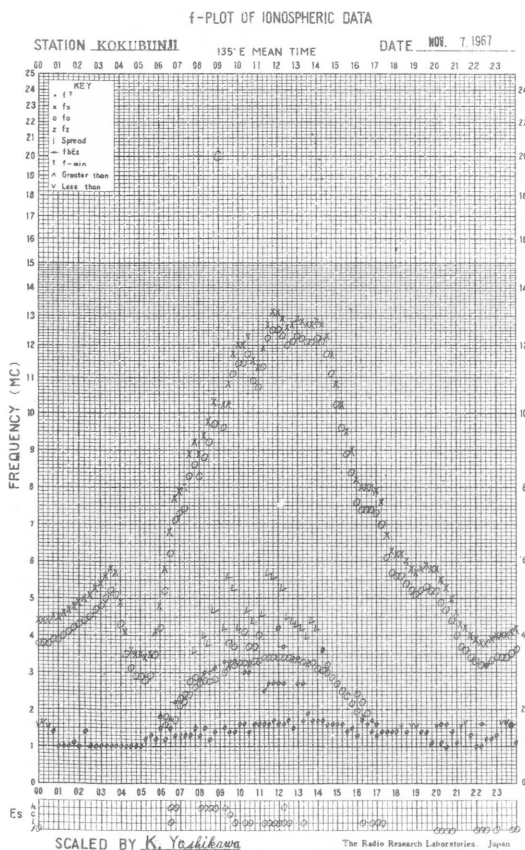
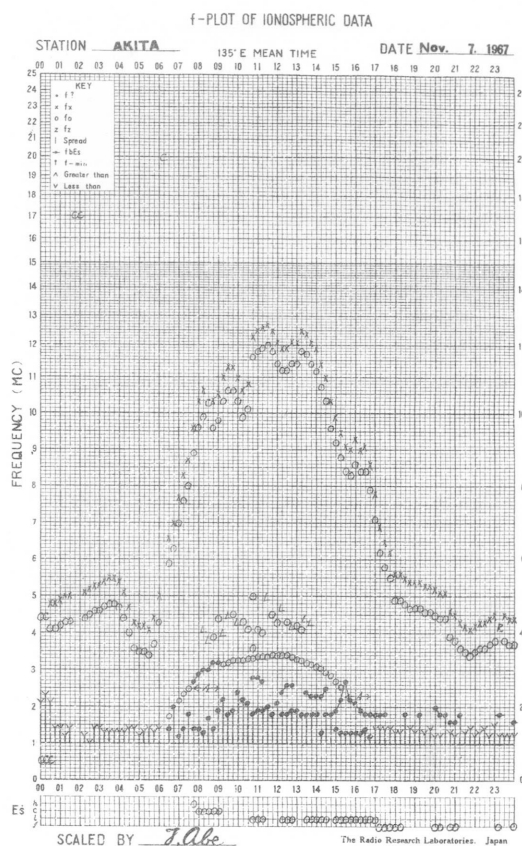
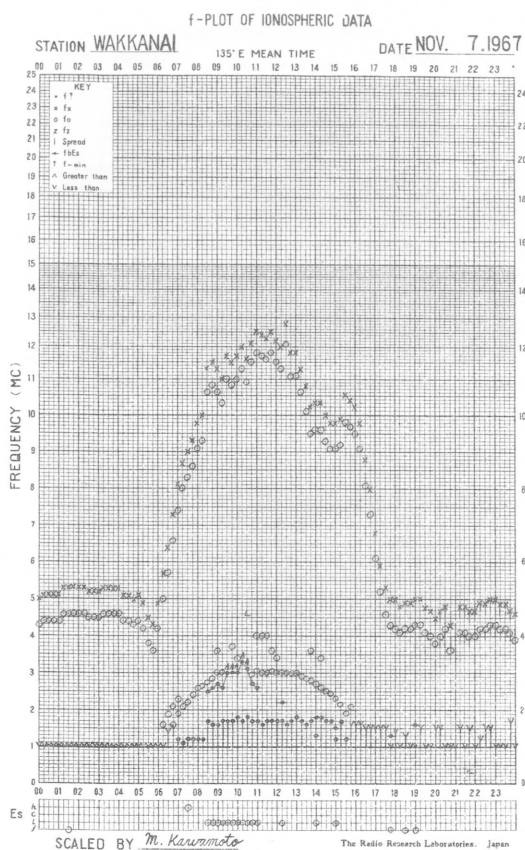


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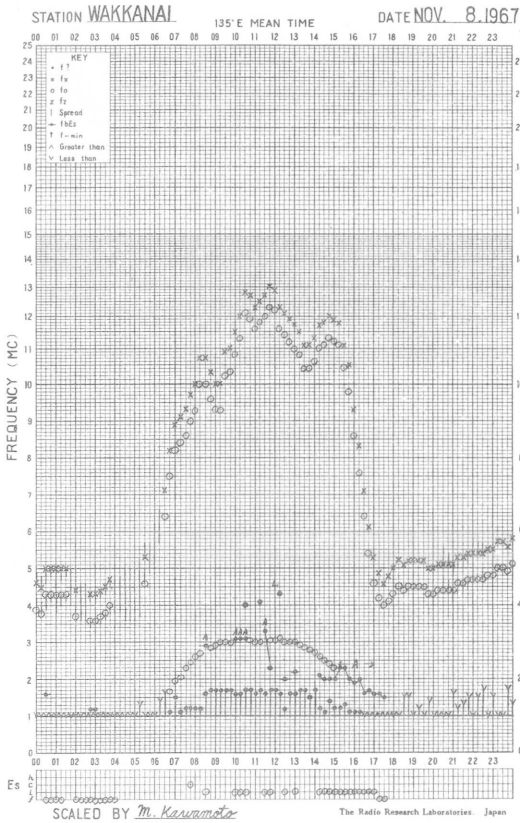


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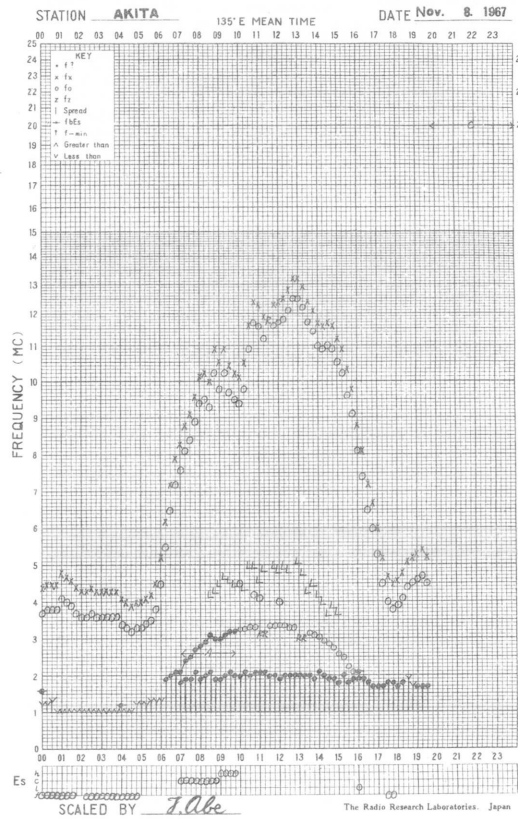




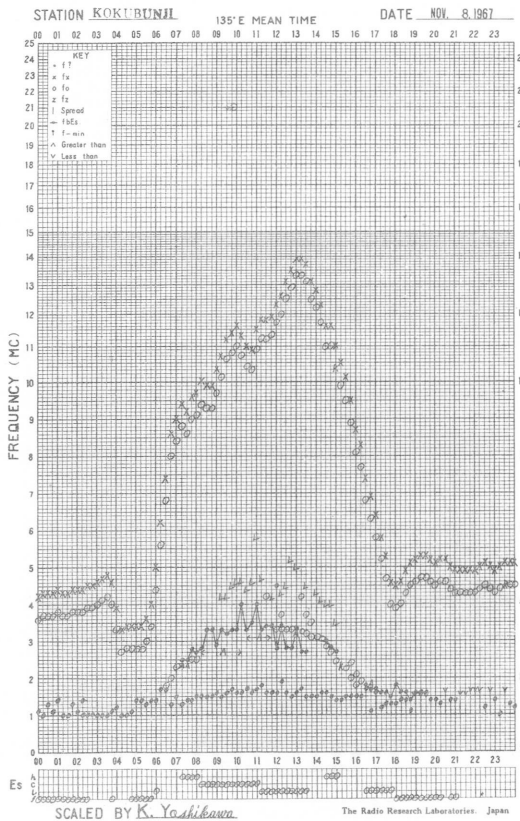
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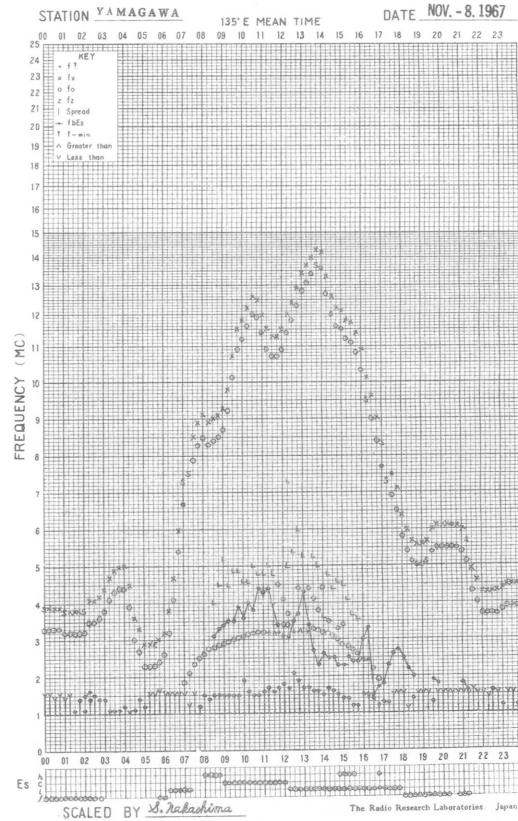
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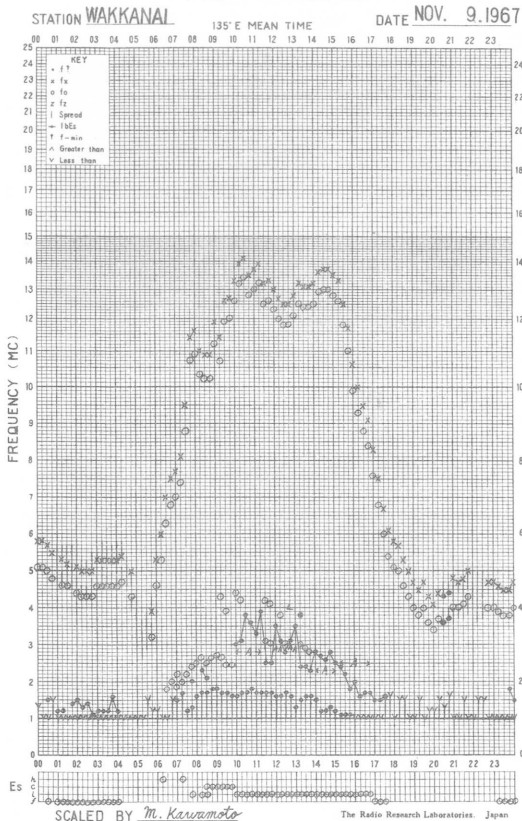
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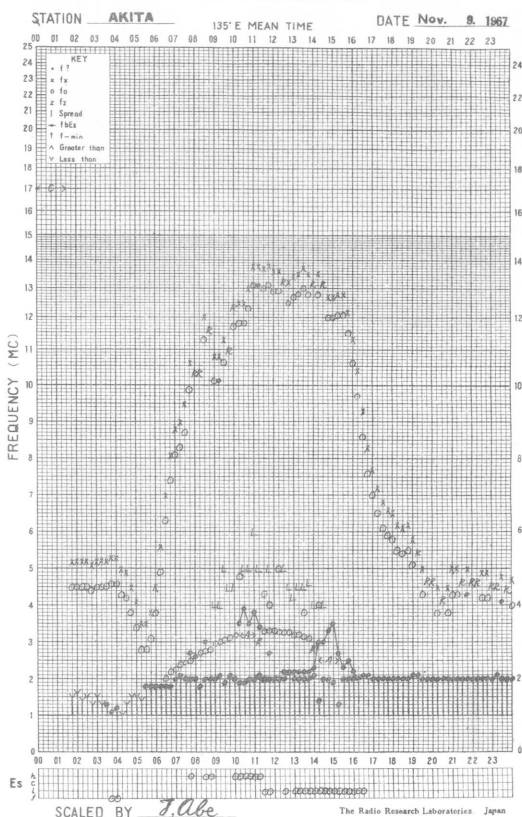
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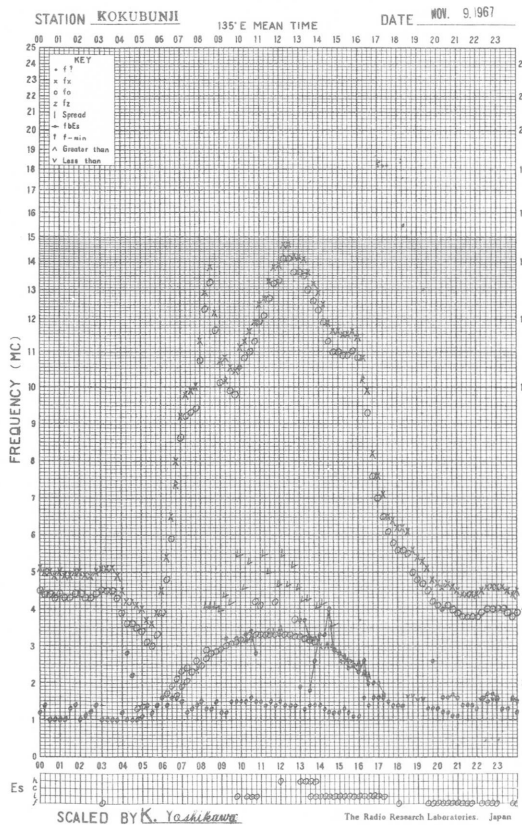
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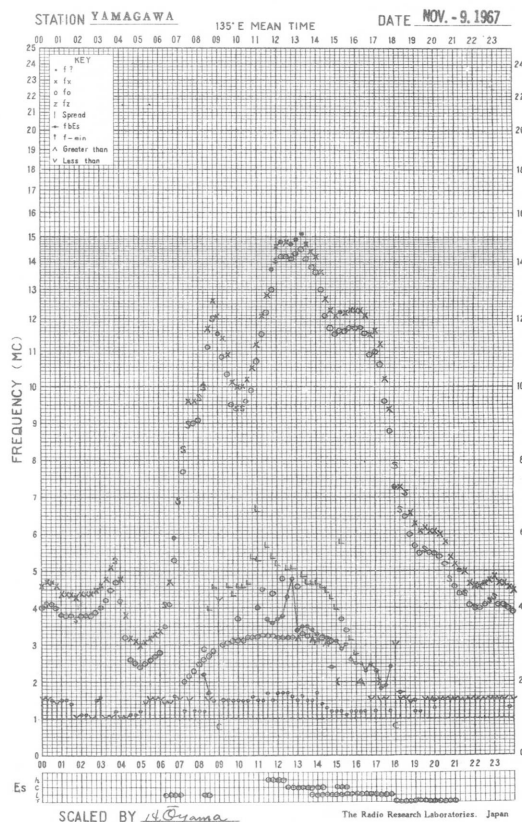
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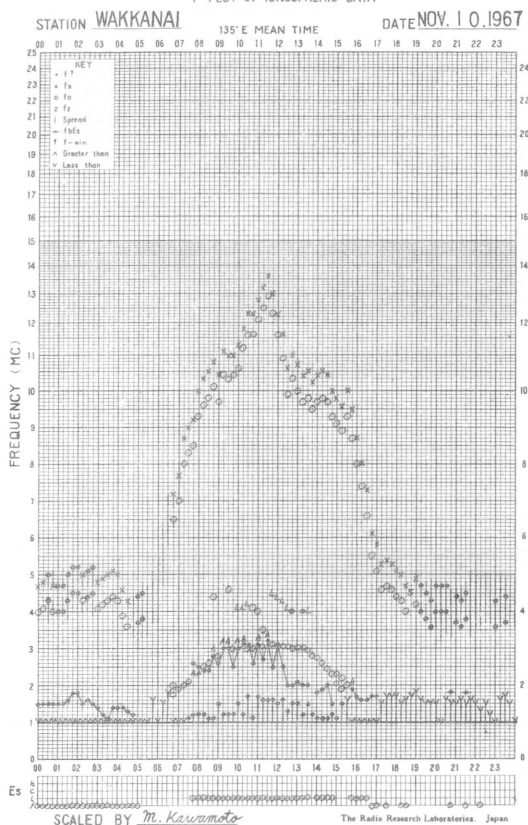
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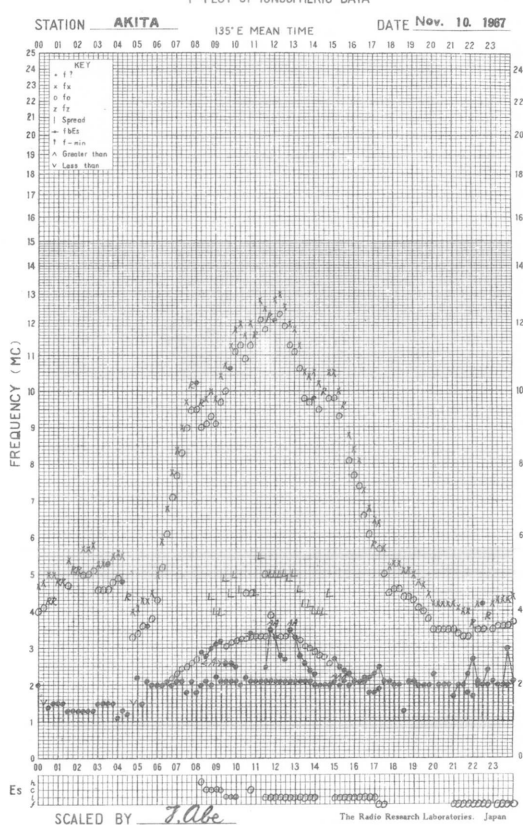
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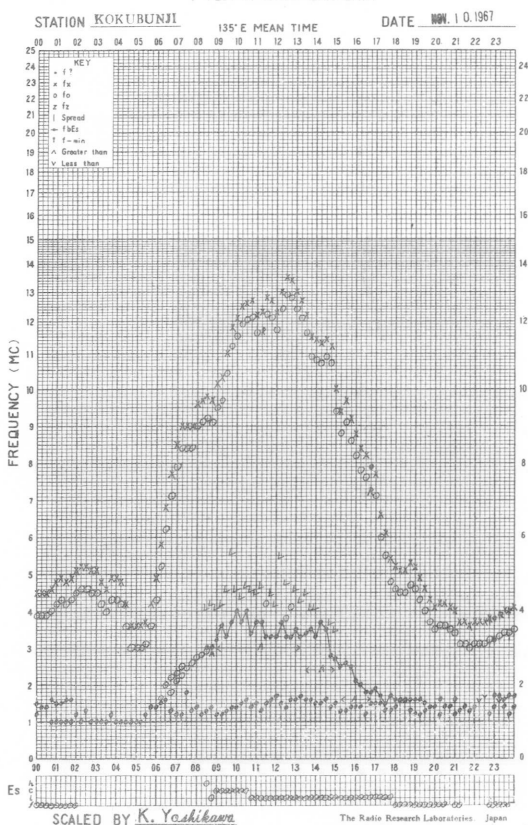
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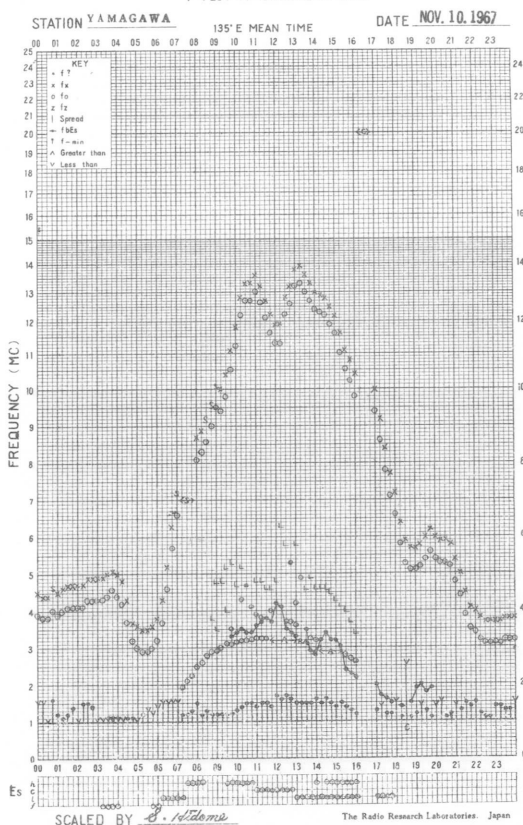
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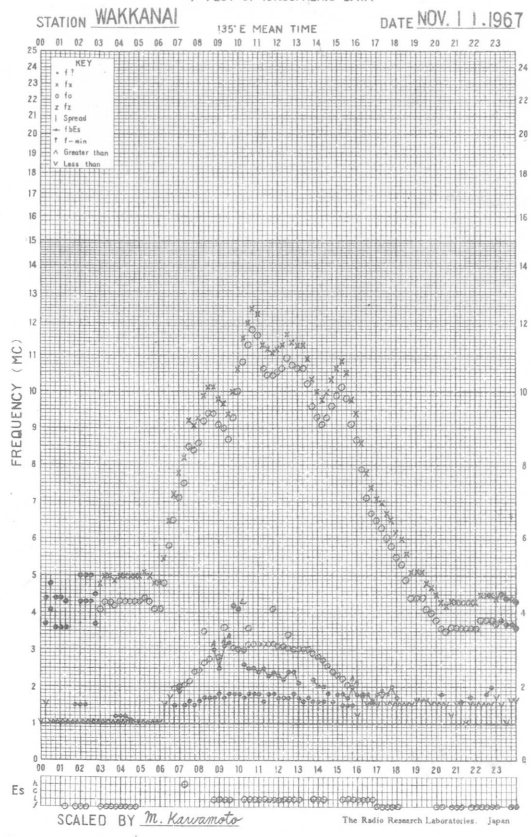
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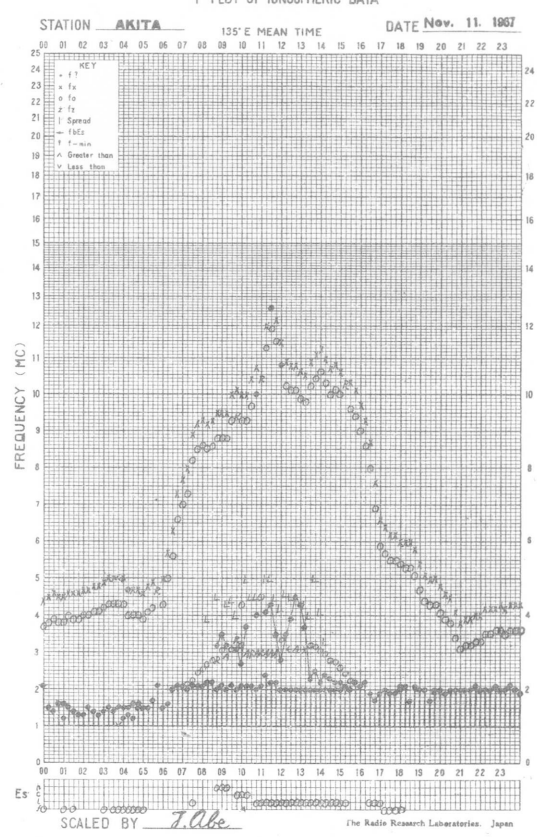
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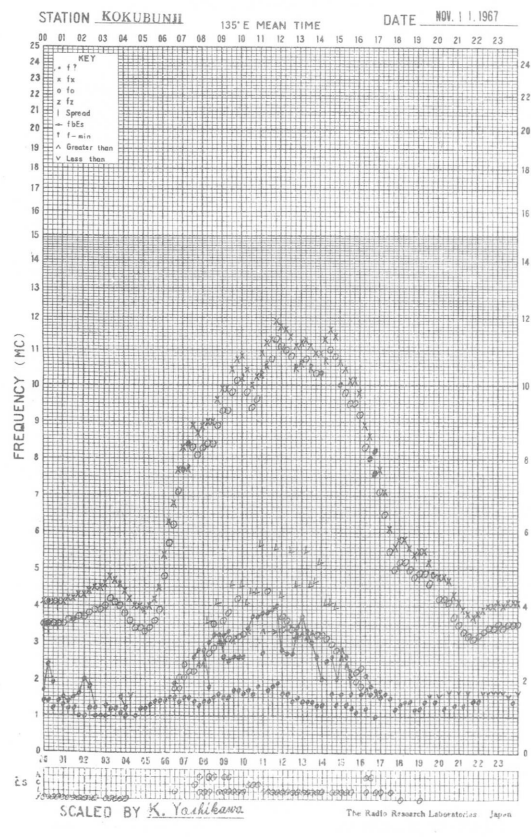
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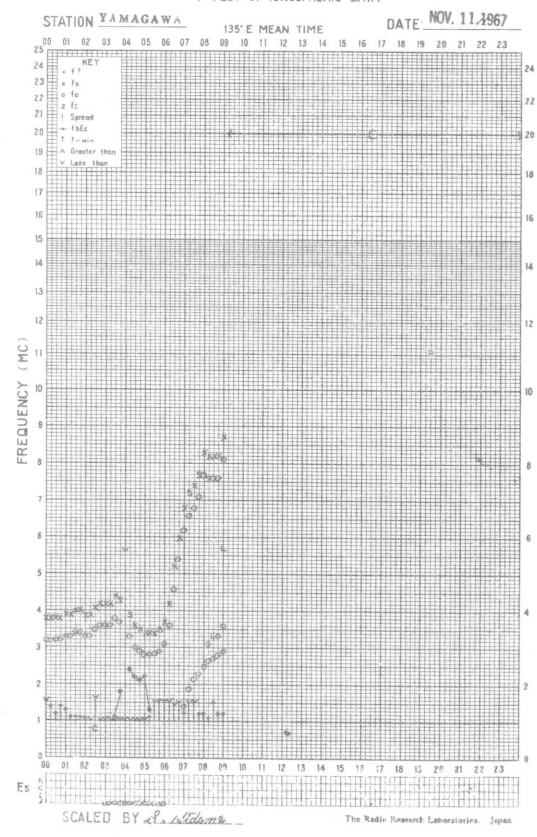
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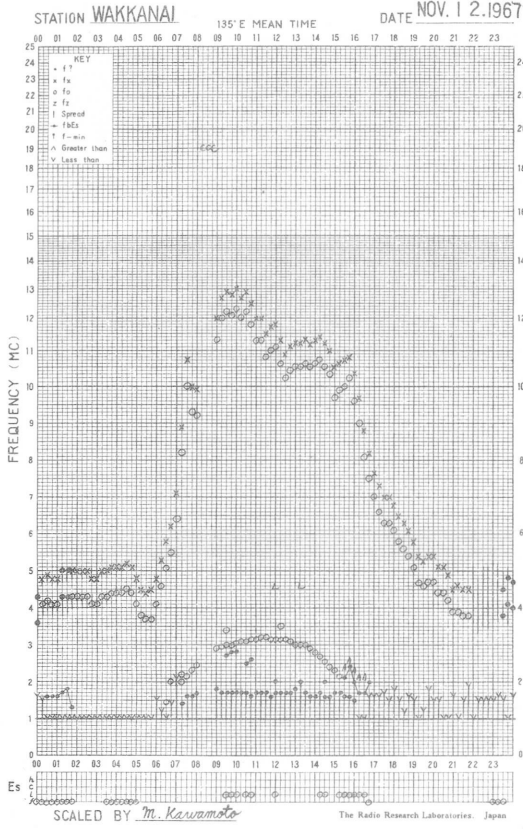
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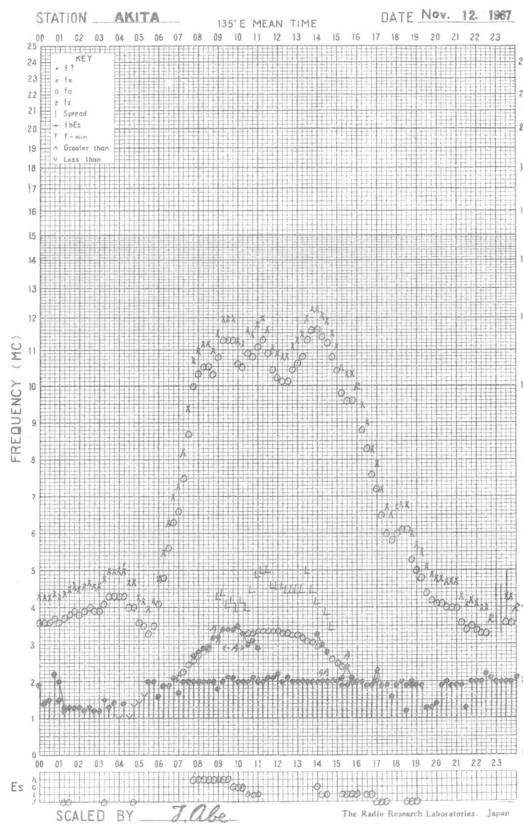
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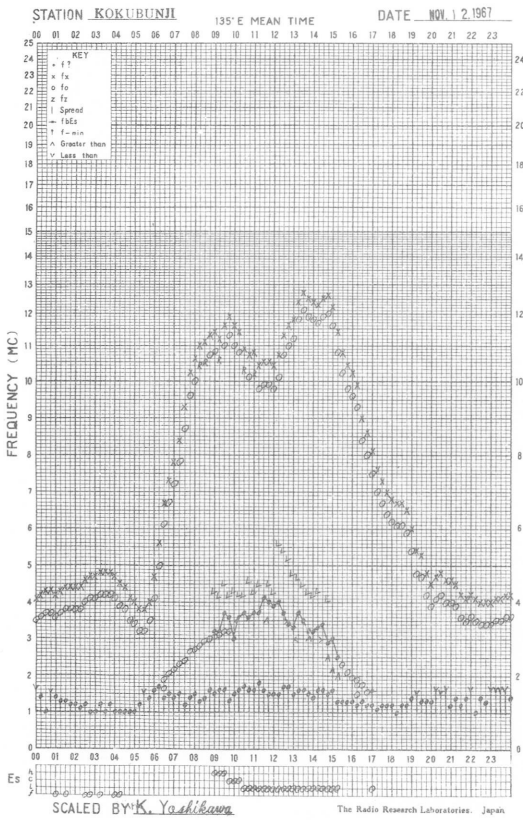
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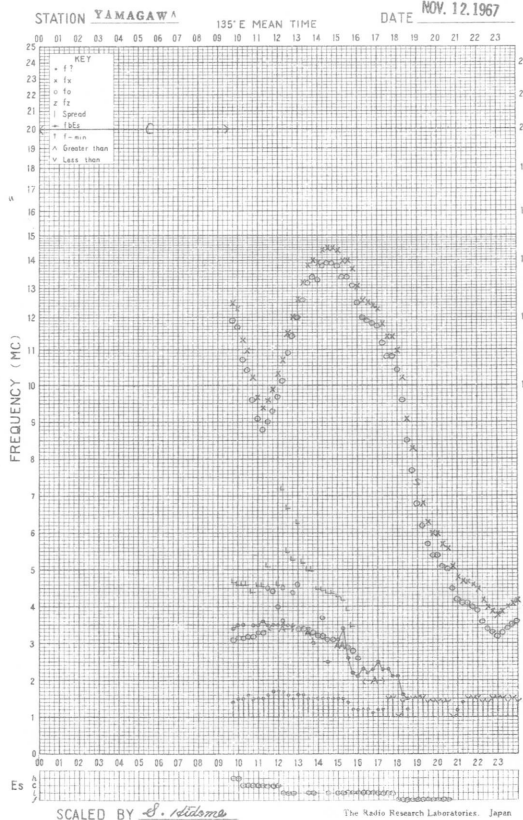
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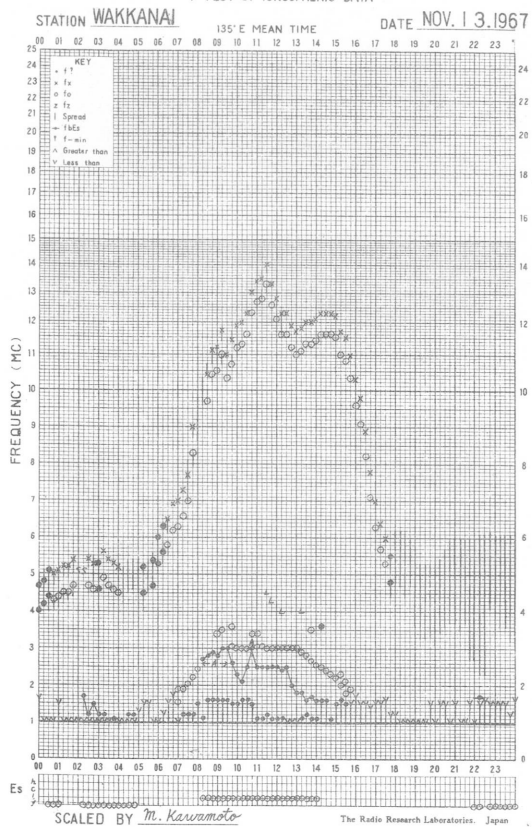
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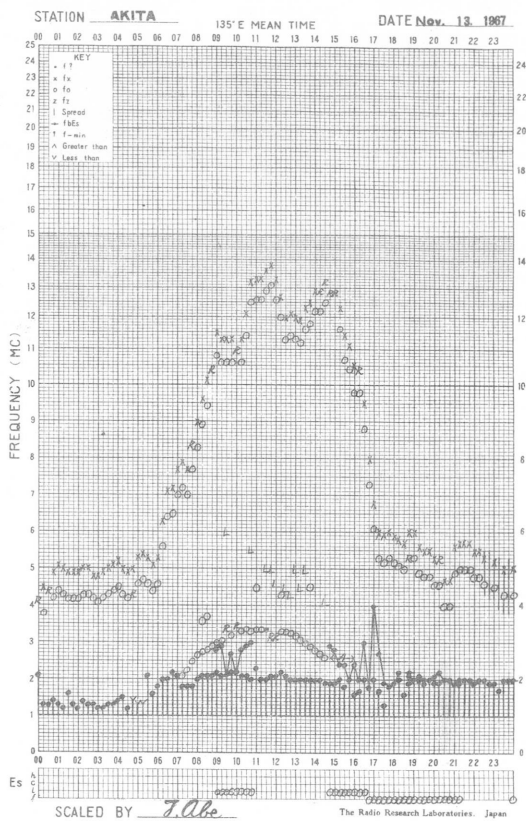
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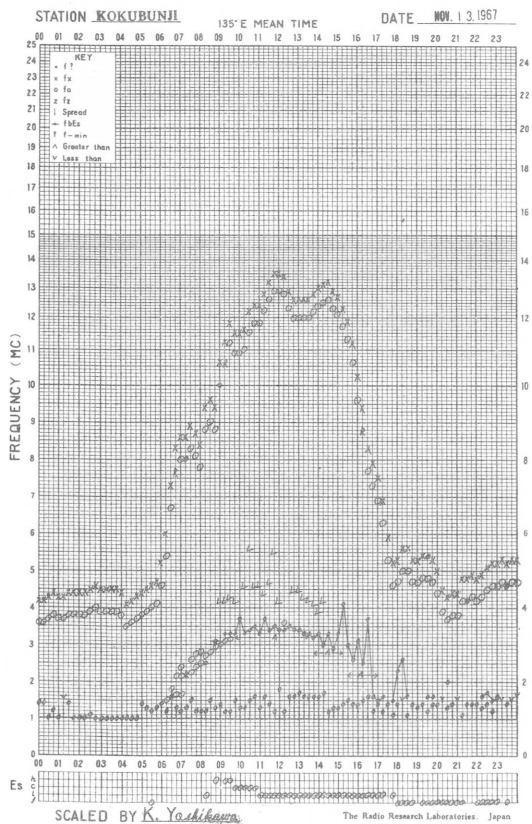
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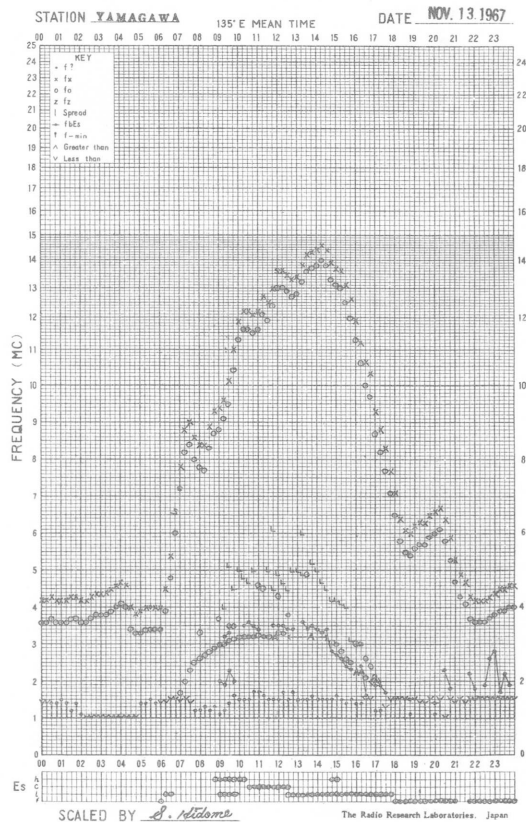
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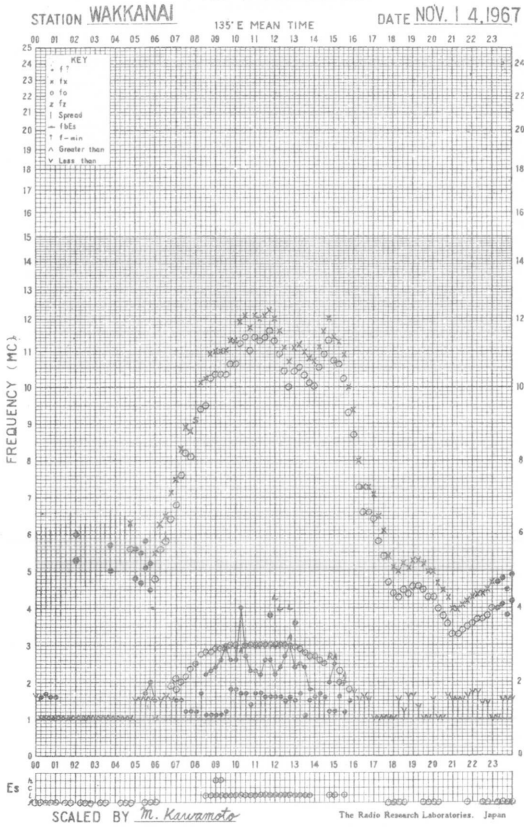
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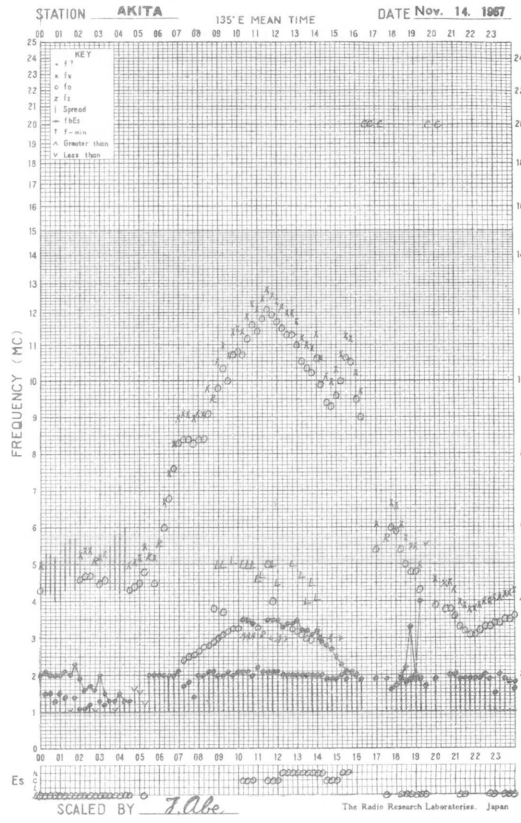
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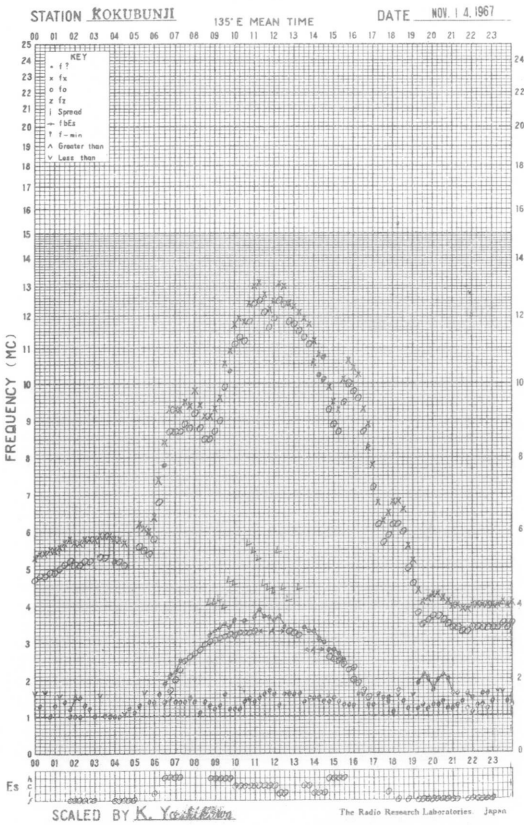
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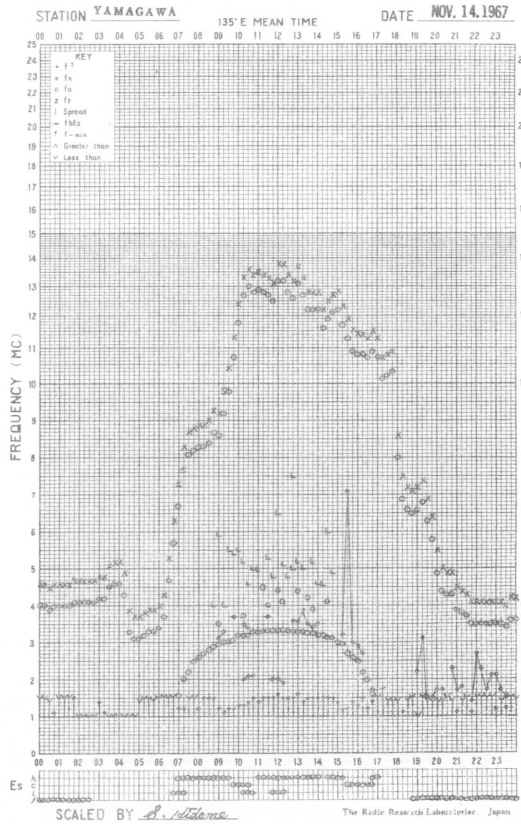
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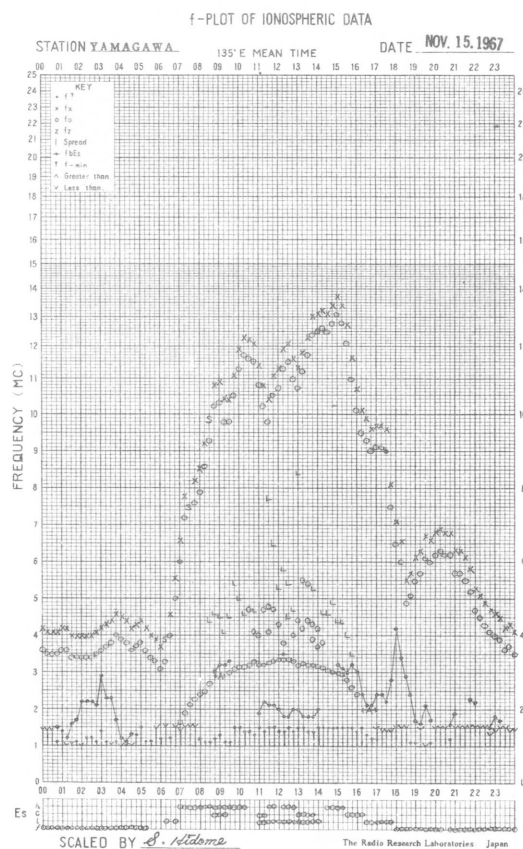
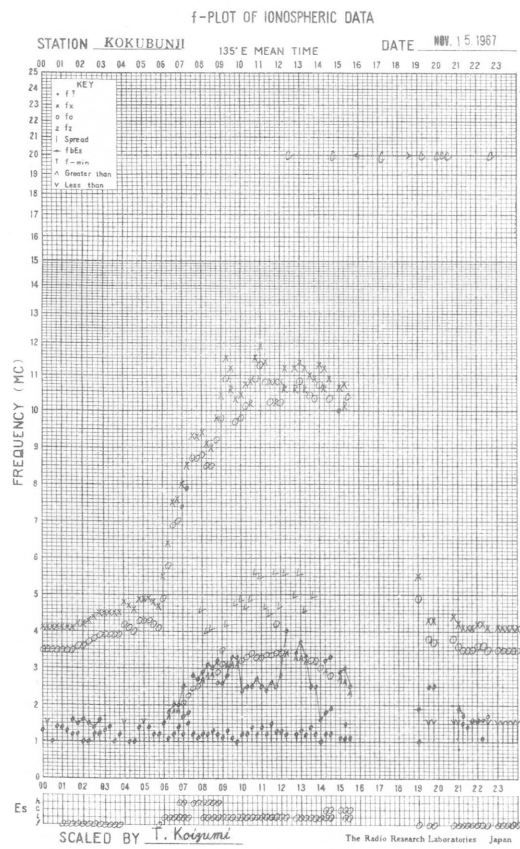
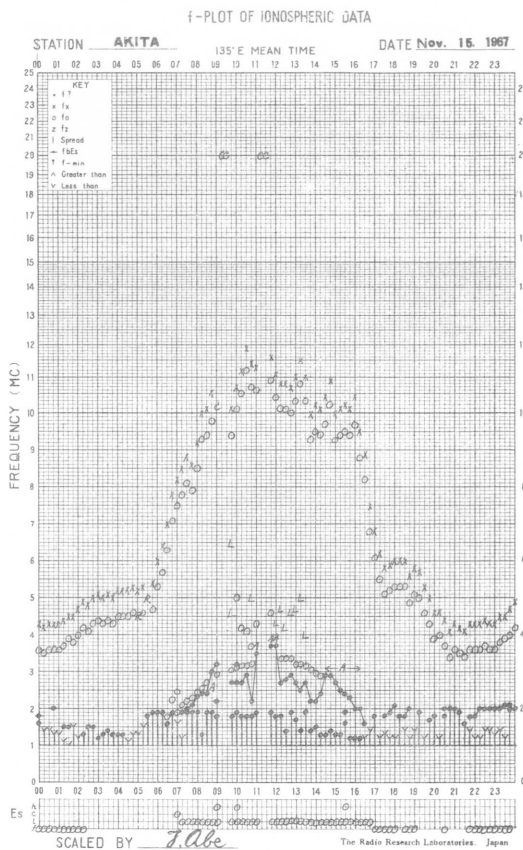
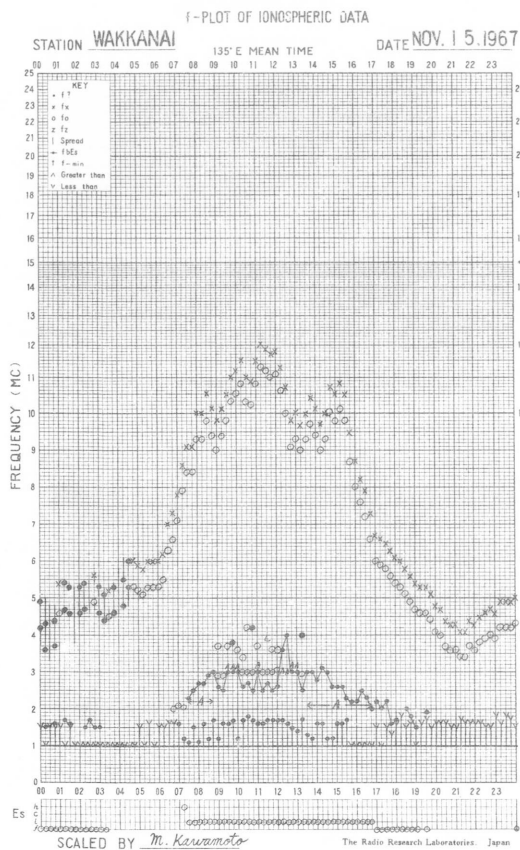


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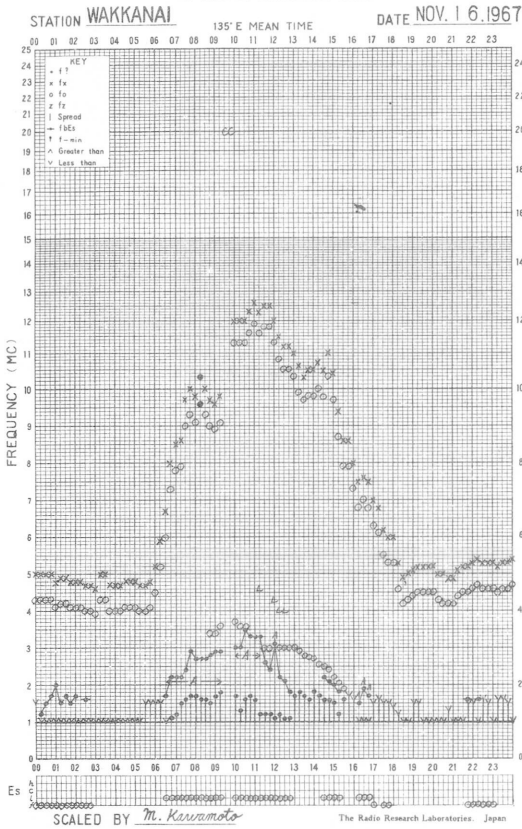


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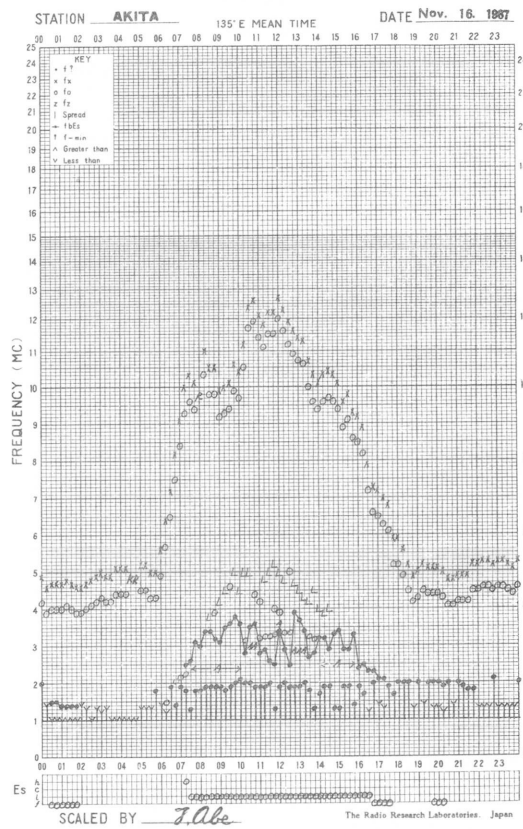




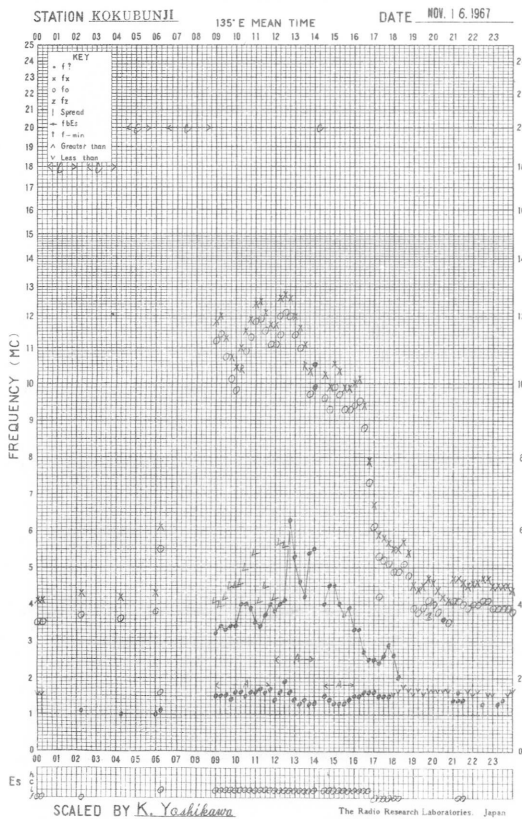
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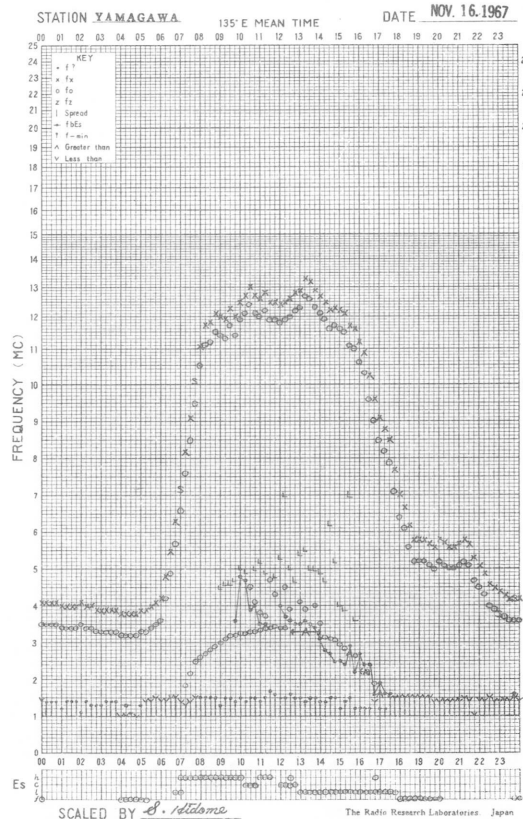
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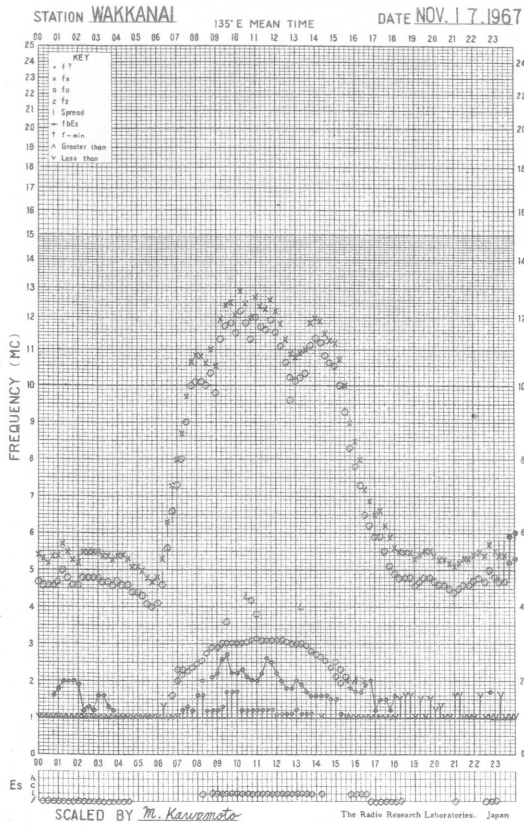
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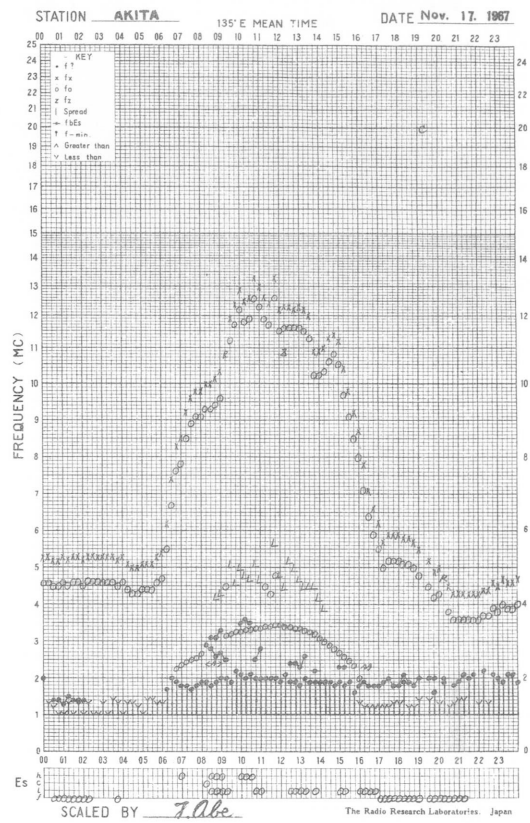
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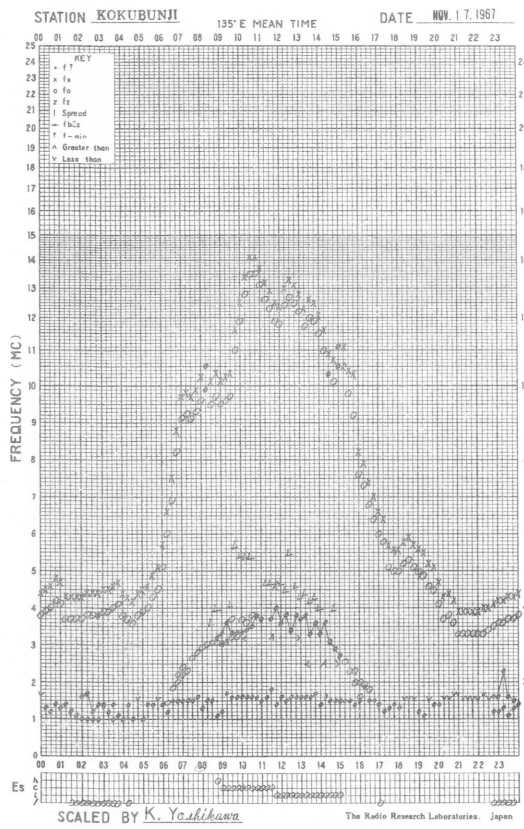
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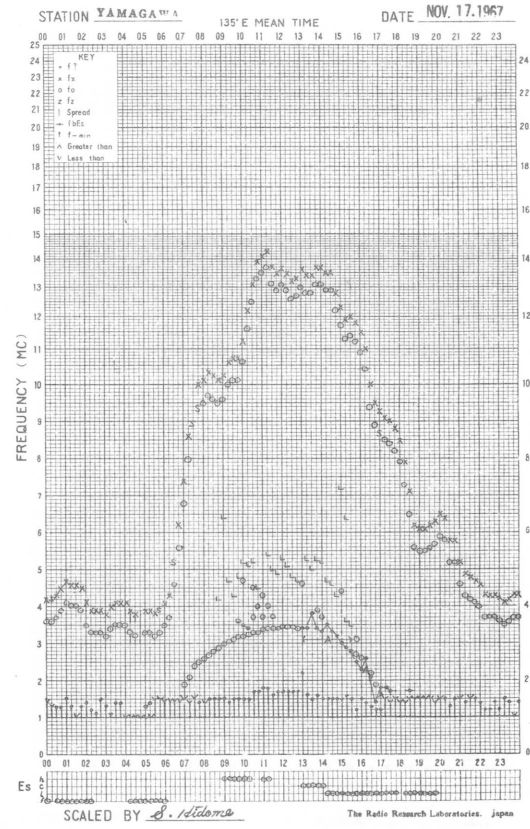
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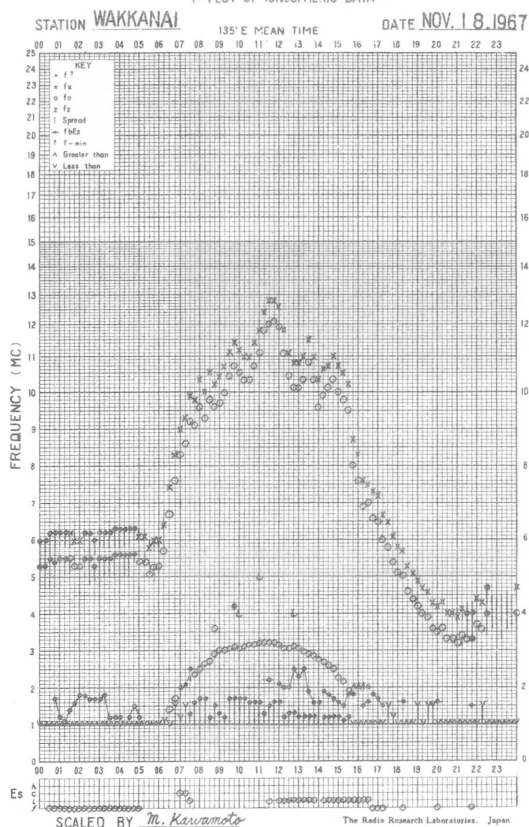
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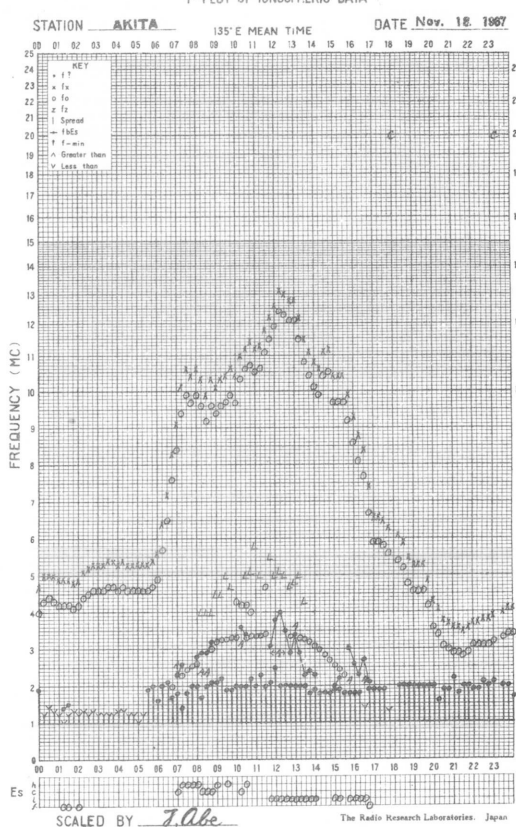
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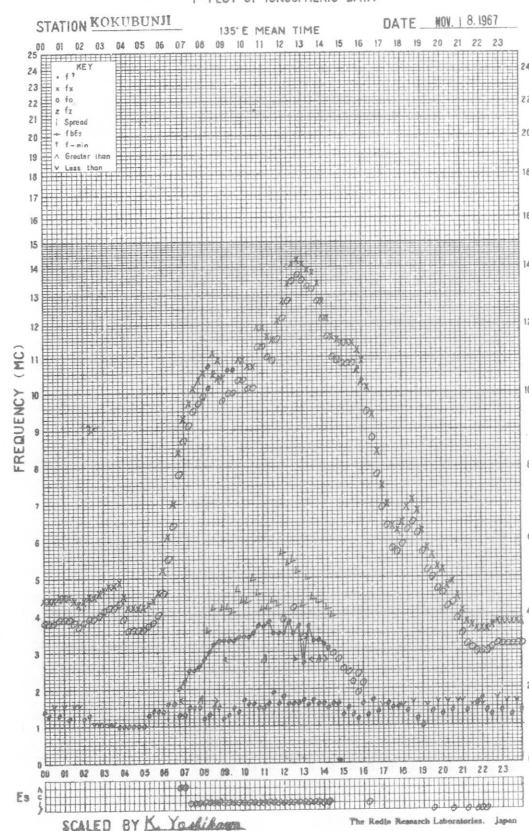
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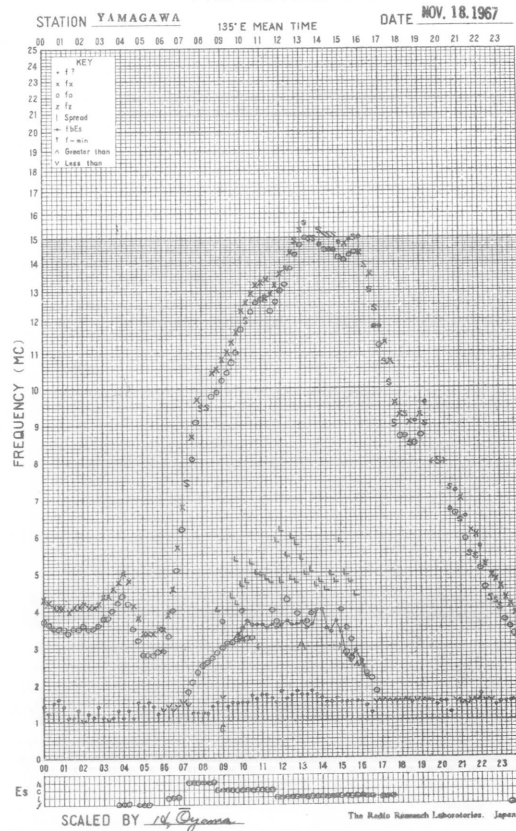
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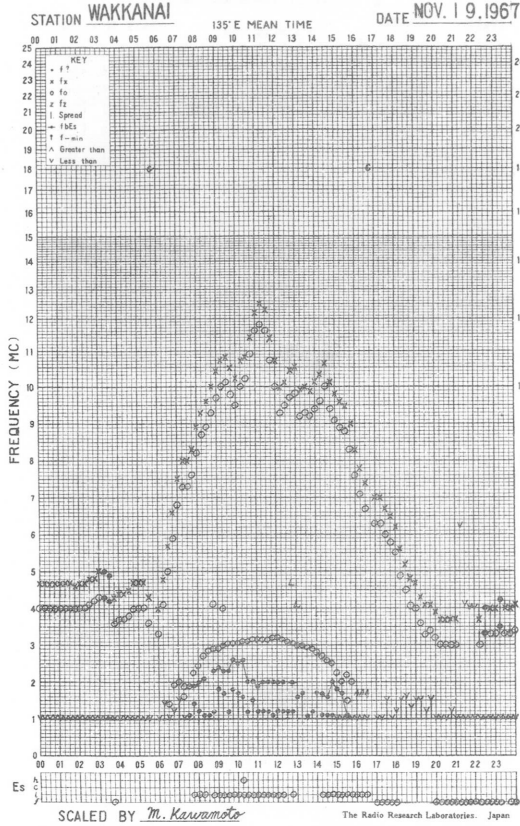
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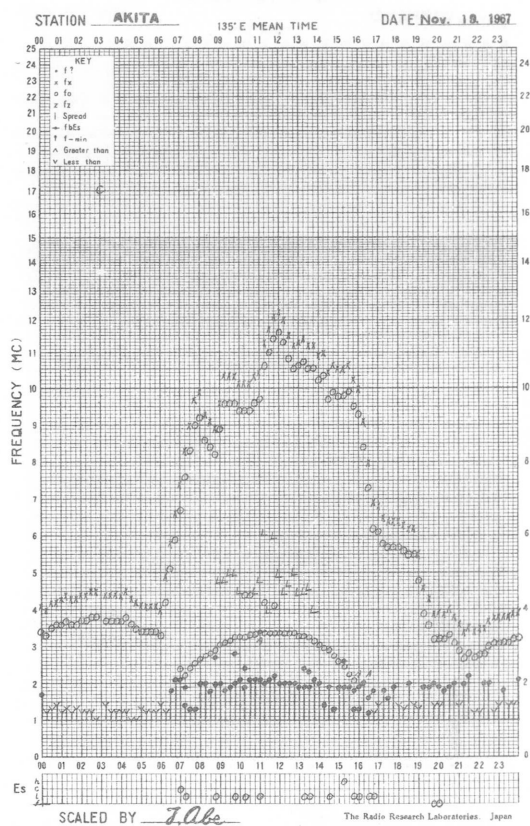
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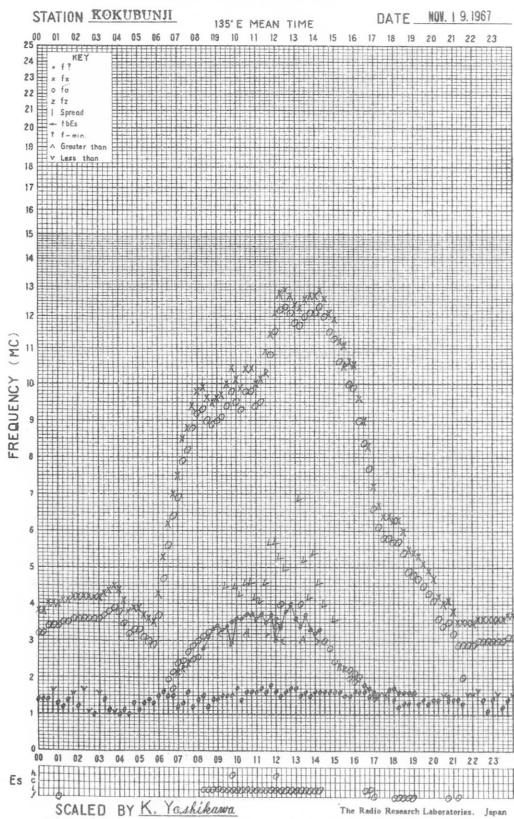
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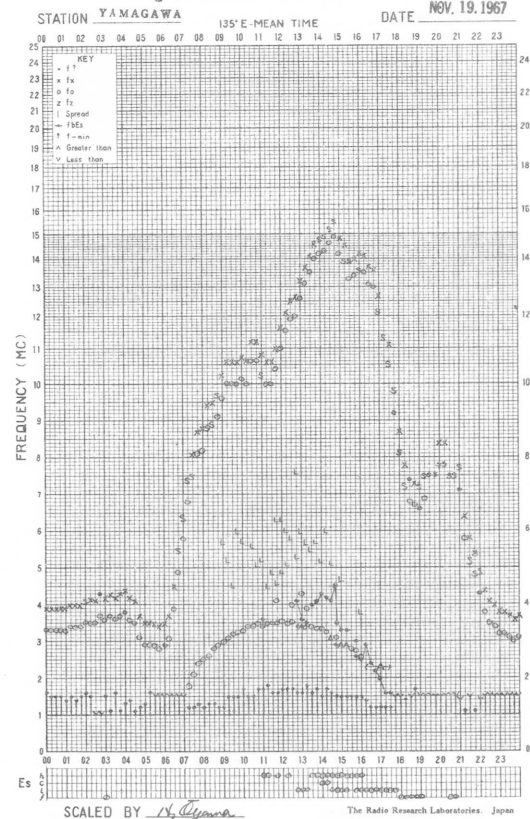
f-PLOT OF IONOSPHERIC DATA



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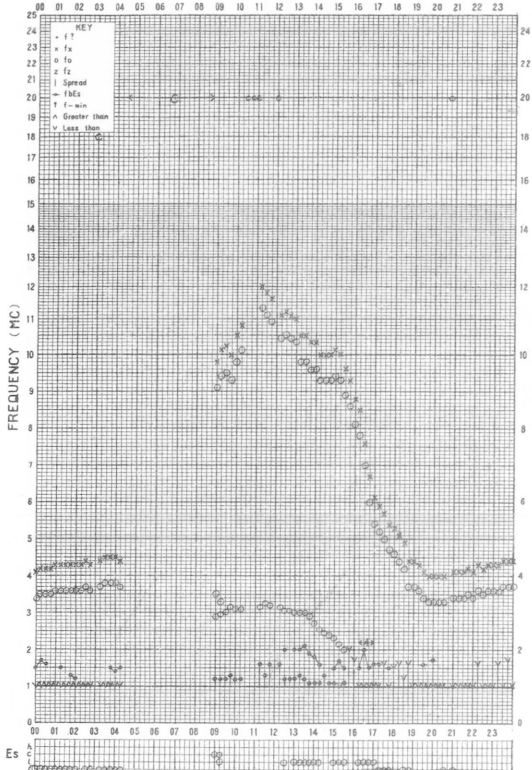


f-PLOT OF IONOSPHERIC DATA



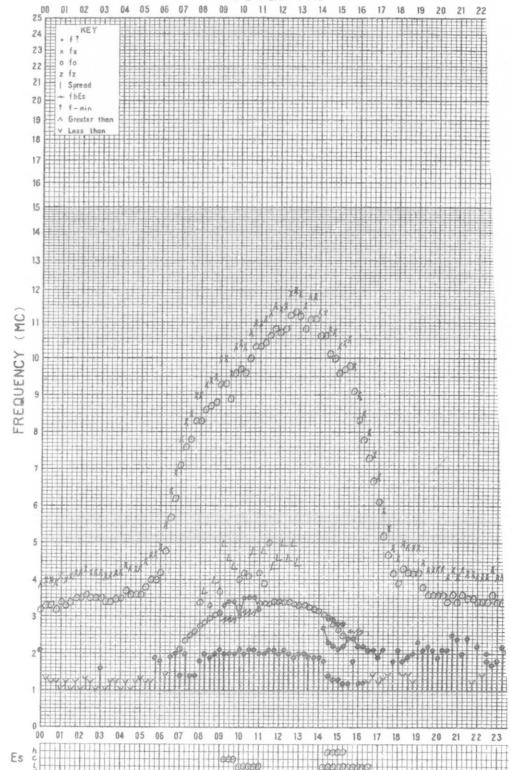
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STATION WAKKANAI 135°E MEAN TIME DATE NOV. 20. 1967



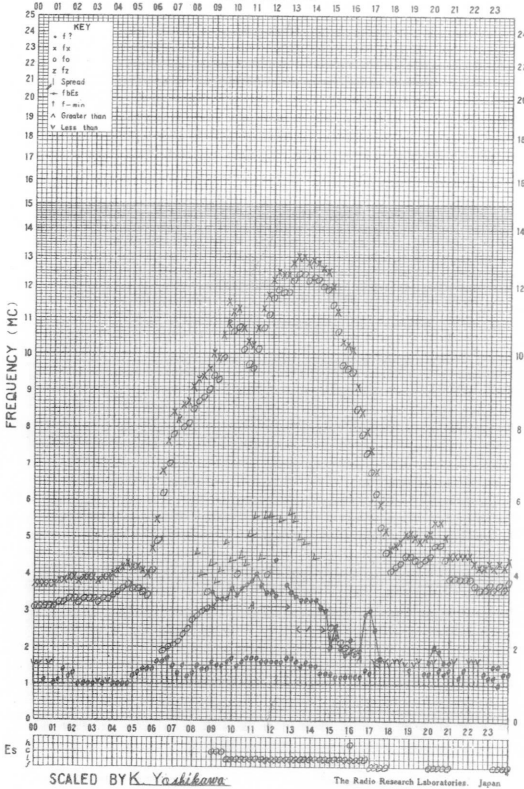
f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Nov. 20.



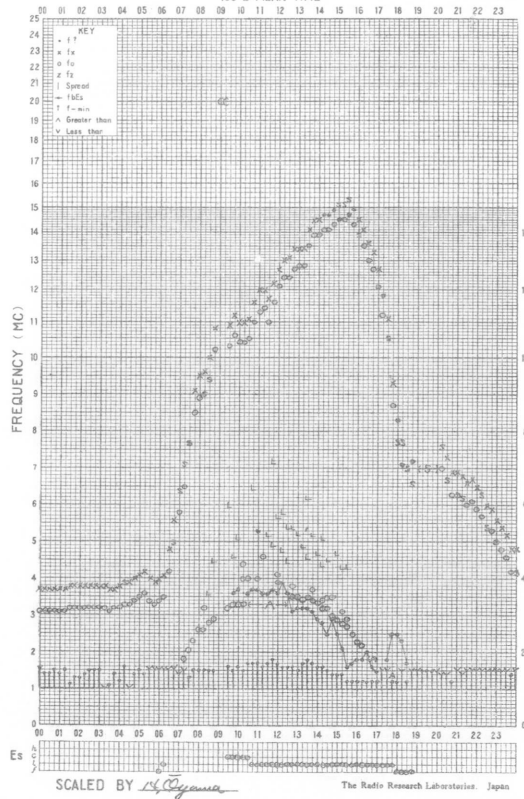
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STATION KOKUBUNJI 135°E MEAN TIME DATE NOV. 20. 1967

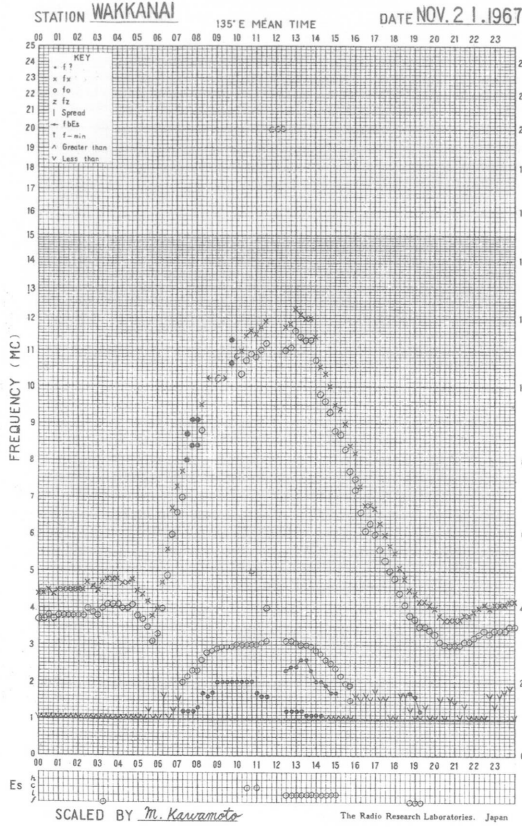


f-PLOT OF IONOSPHERIC DATA

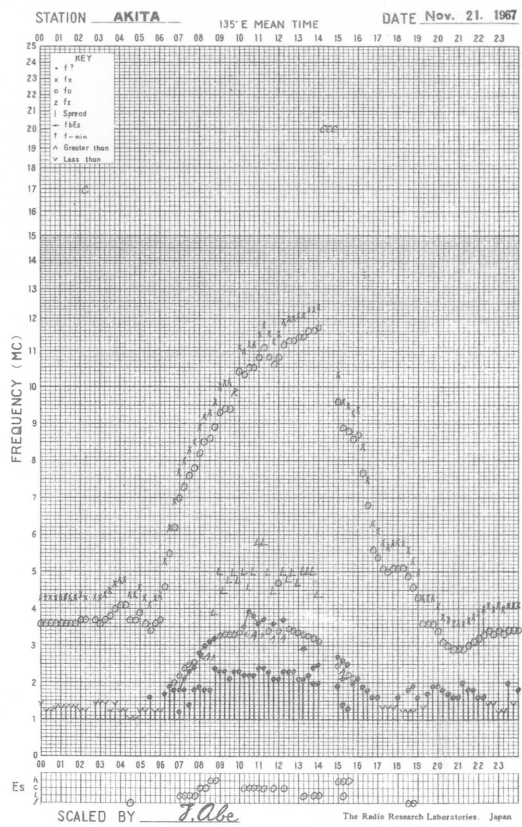
STATION YAMAGAWA 135°E MEAN TIME DATE NOV. 20. 1967



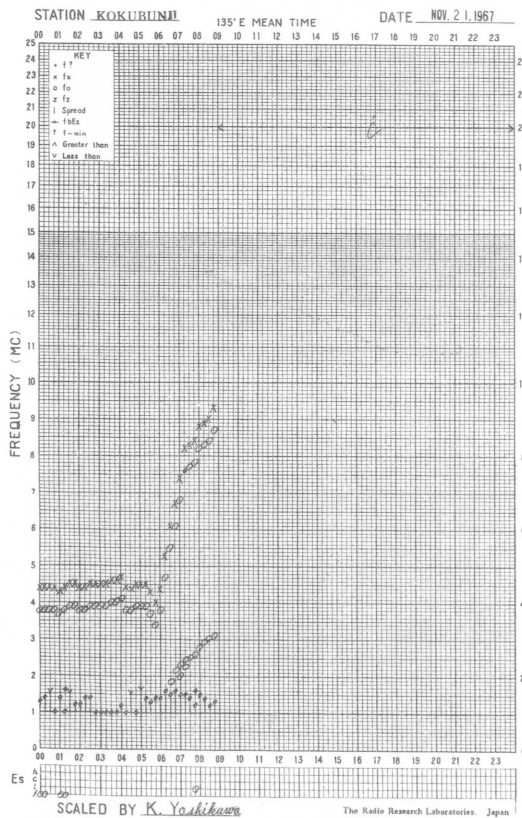
f- PLOT OF IONOSPHERIC DATA



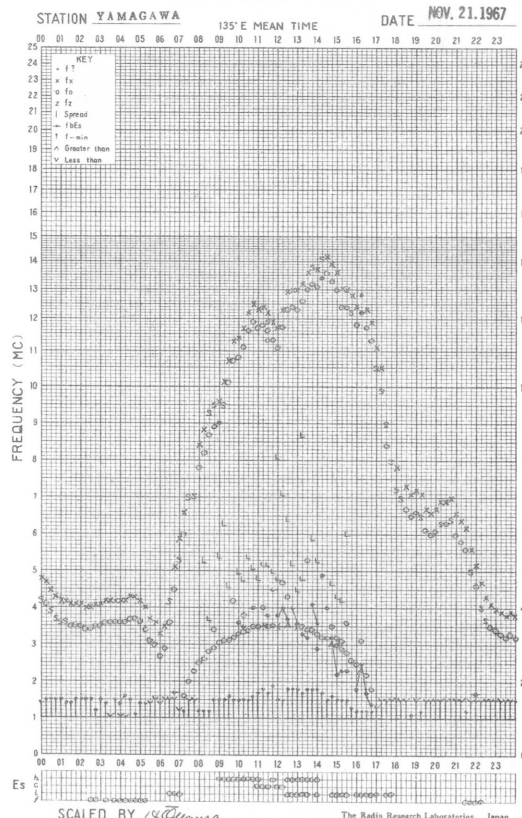
f- PLOT OF IONOSPHERIC DATA



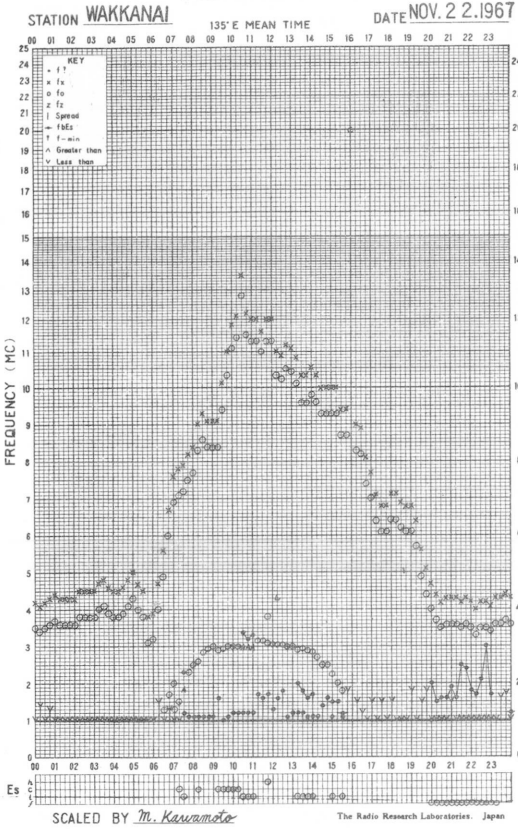
f- PLOT OF IONOSPHERIC DATA



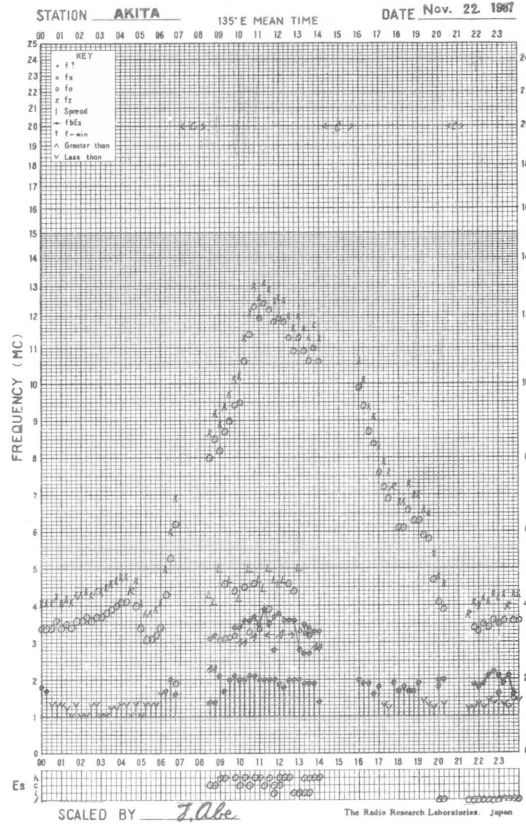
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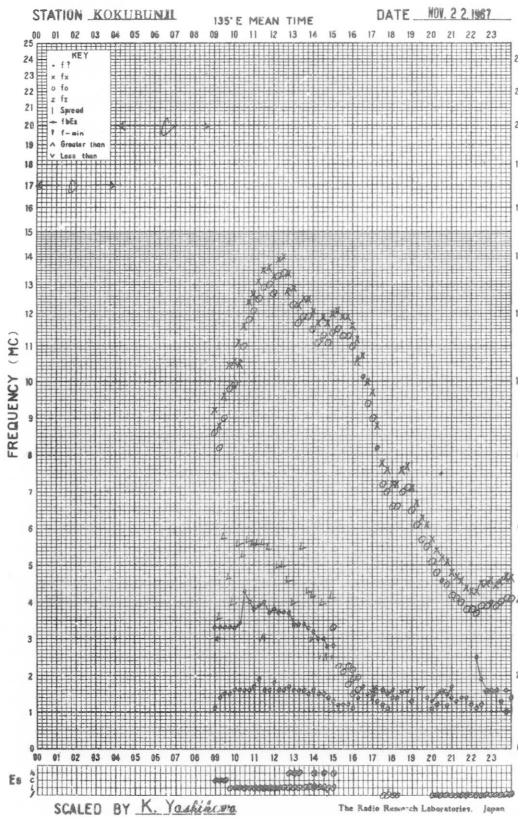
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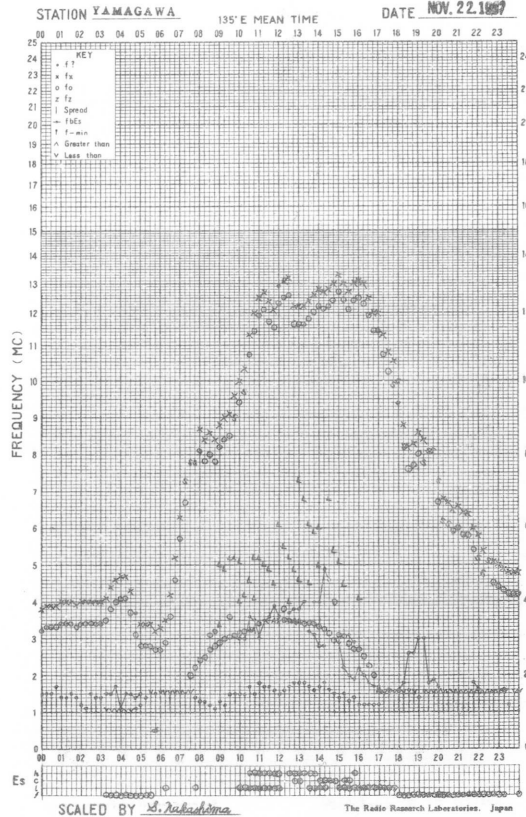
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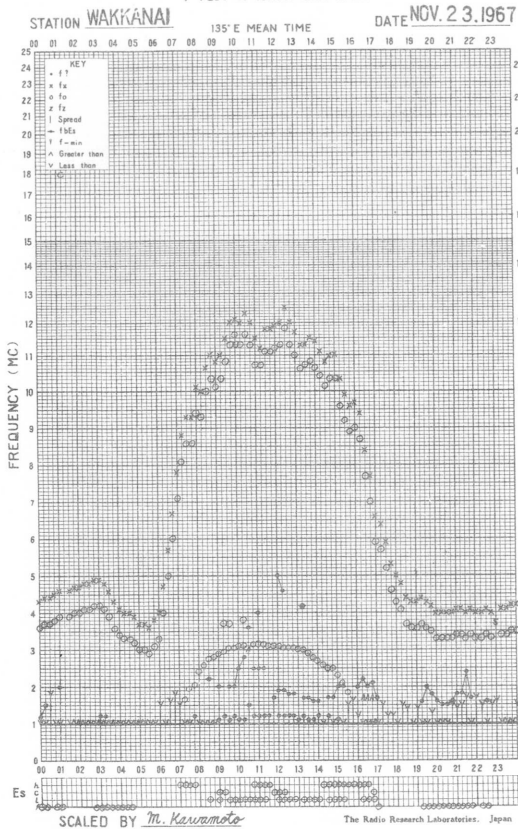
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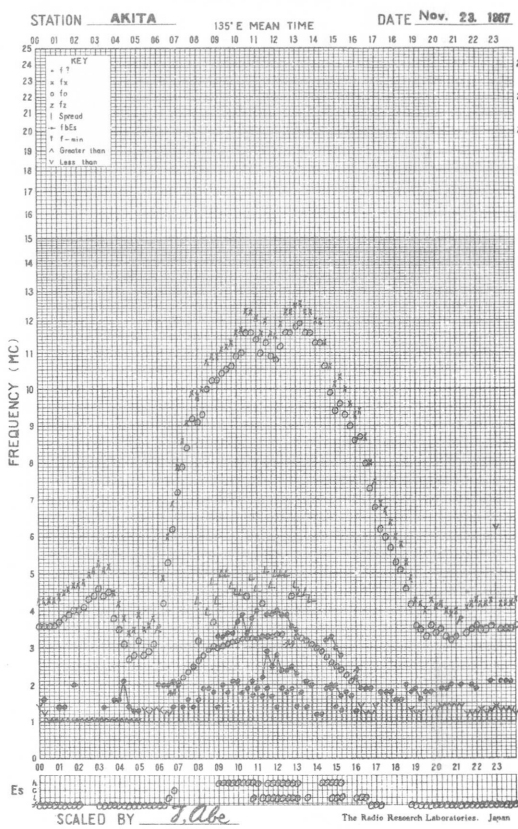
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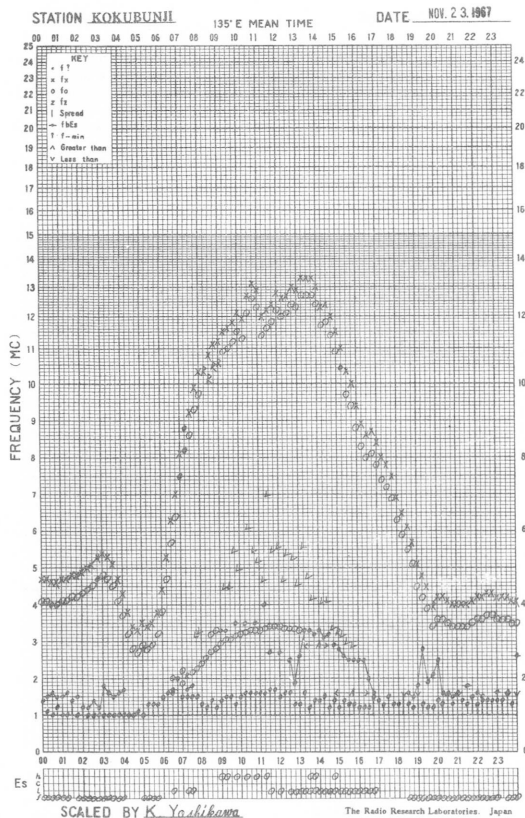
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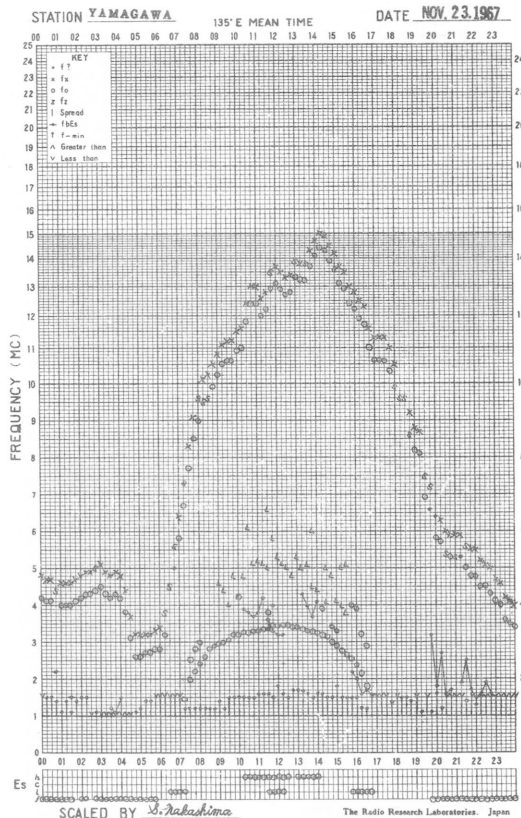
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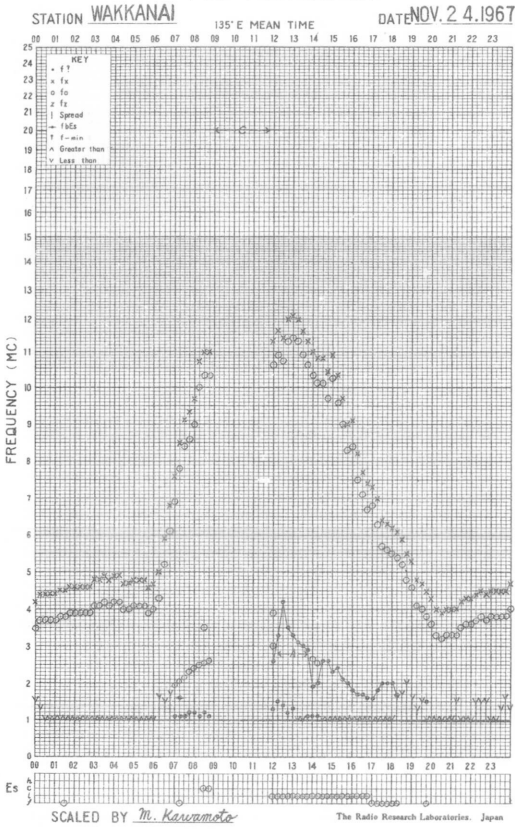
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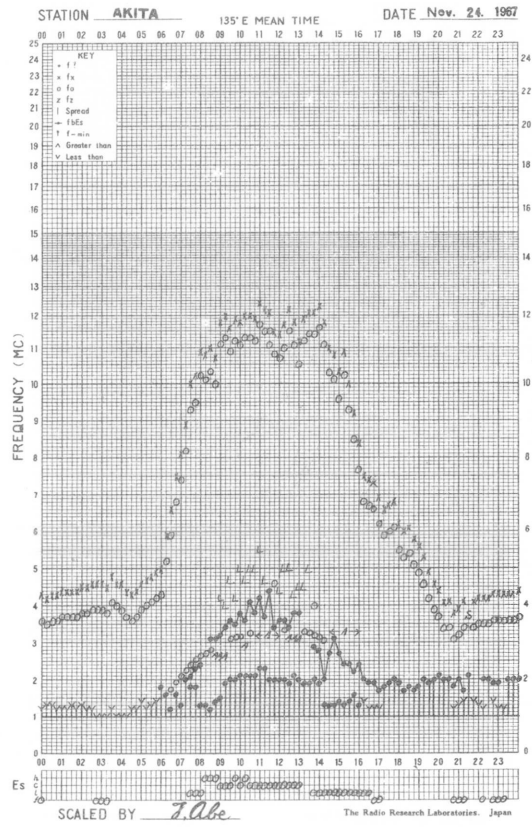
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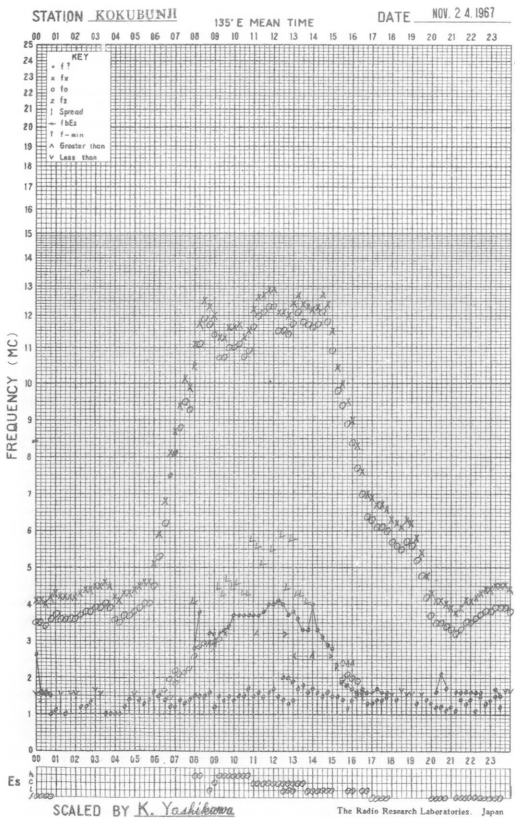
f-PLOT OF IONOSPHERIC DATA



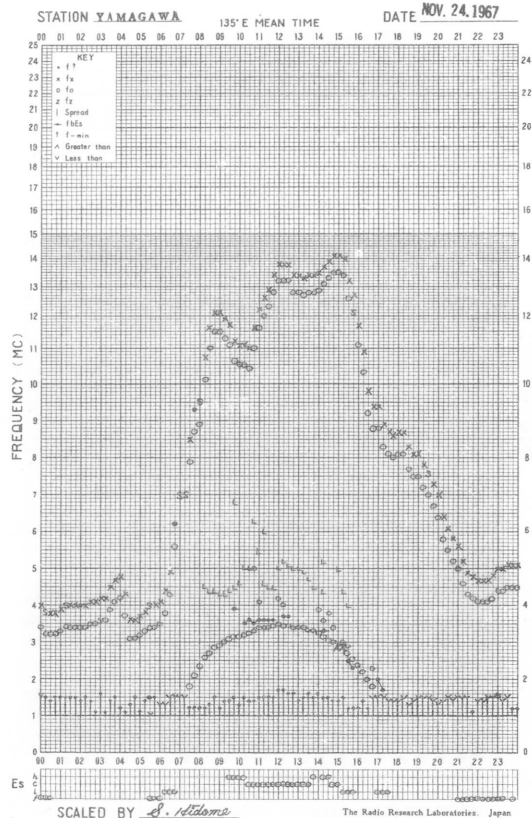
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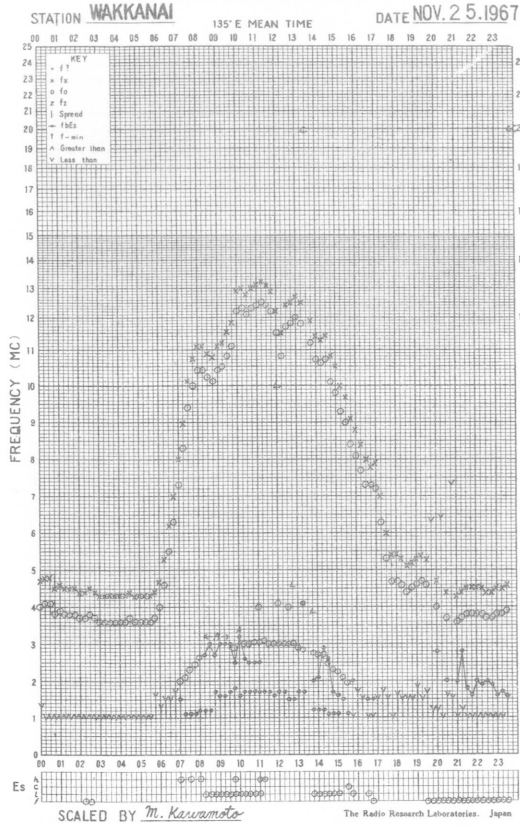
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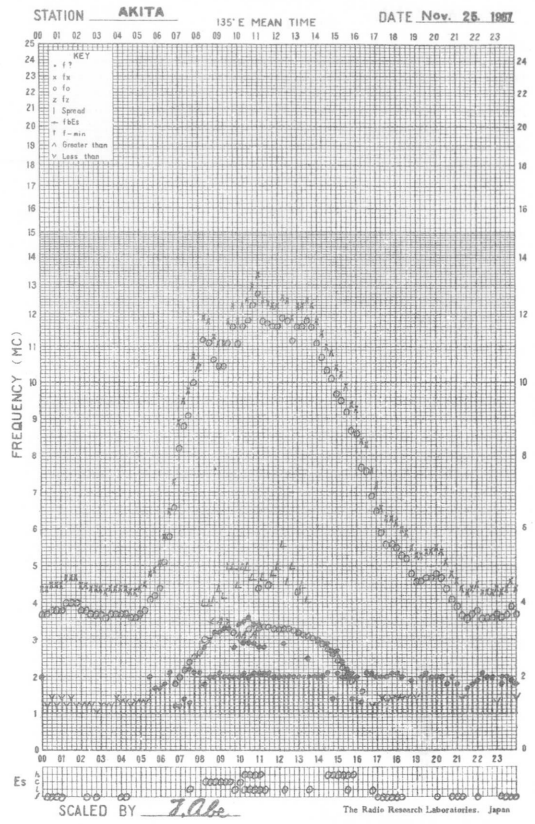
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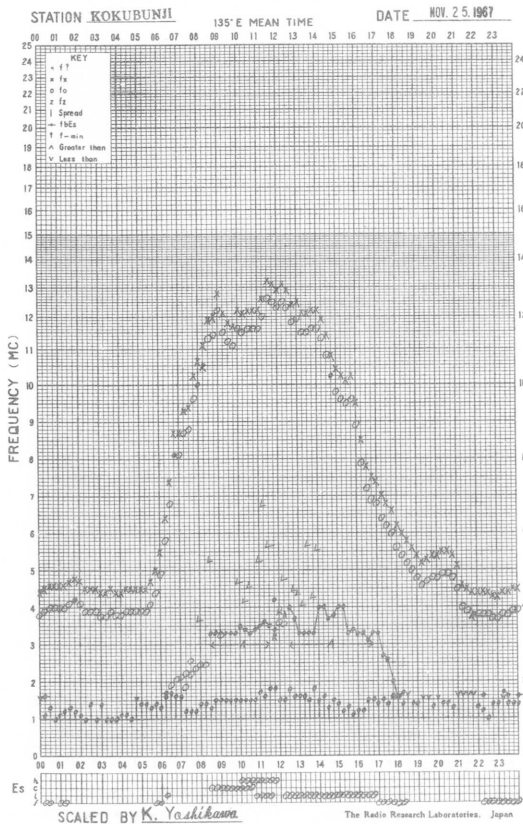
f-PLOT OF IONOSPHERIC DATA



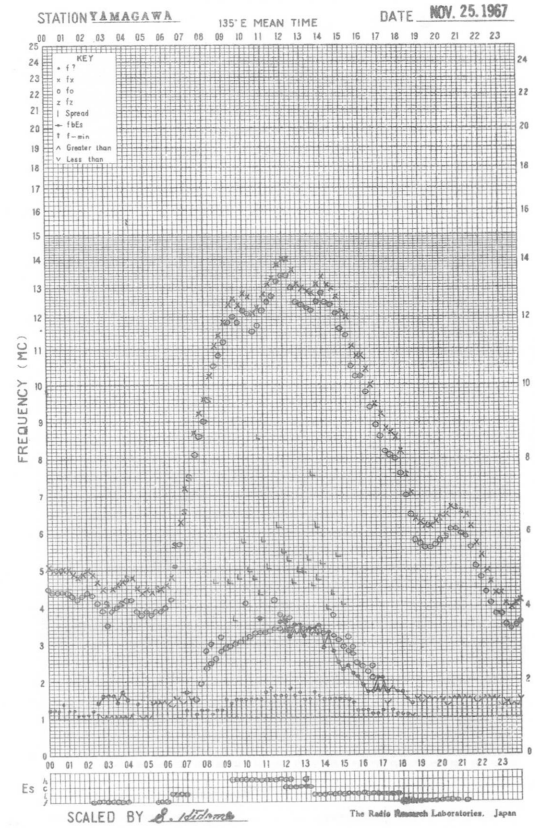
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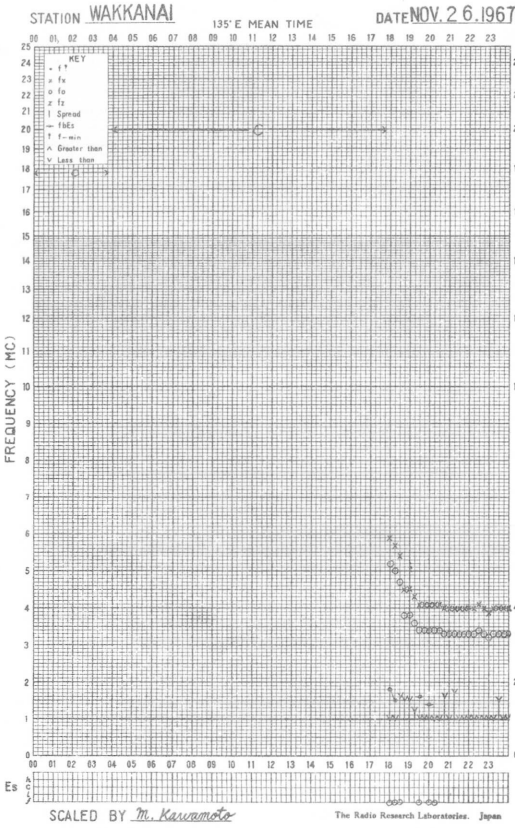
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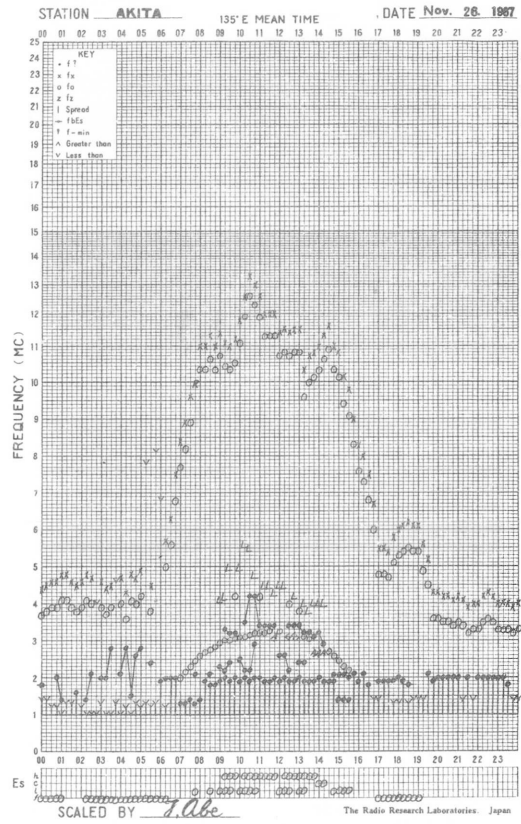
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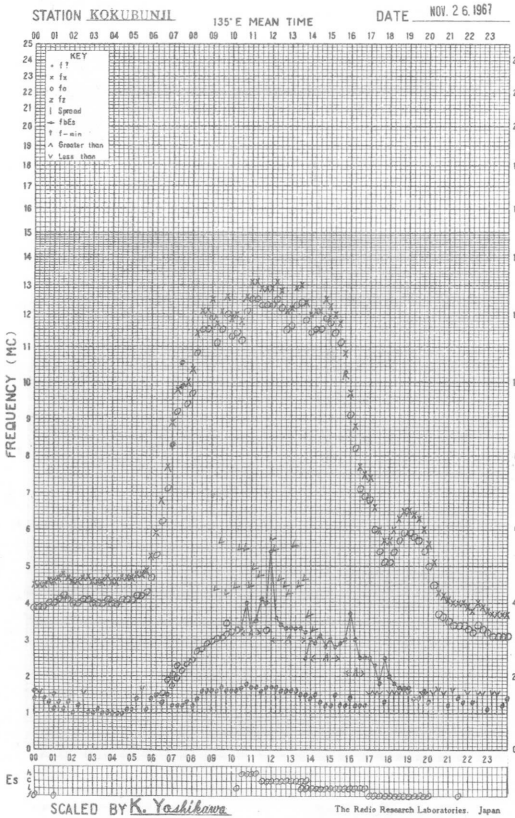
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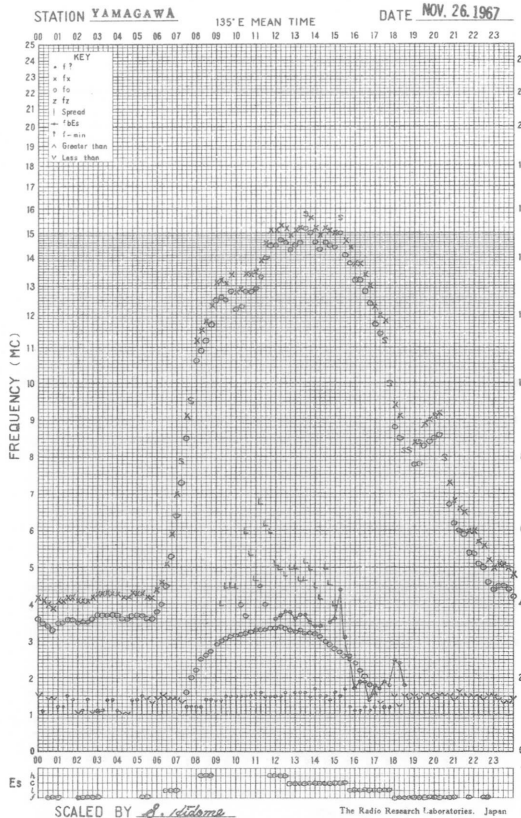
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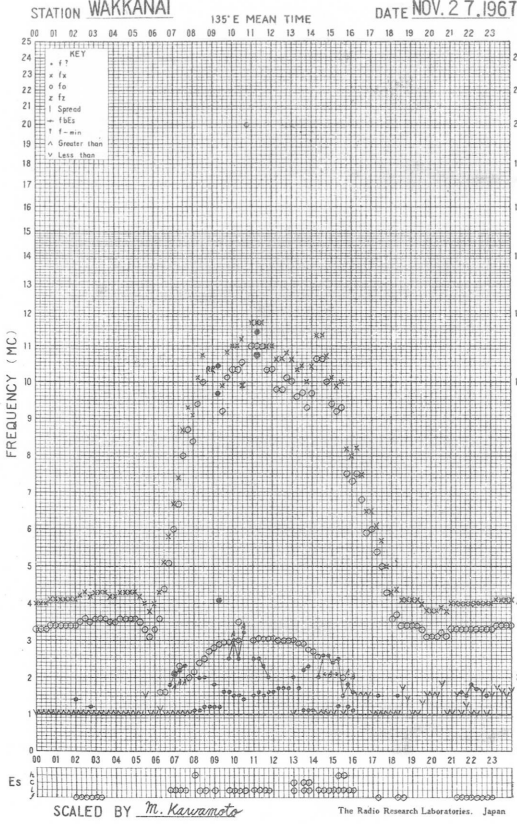
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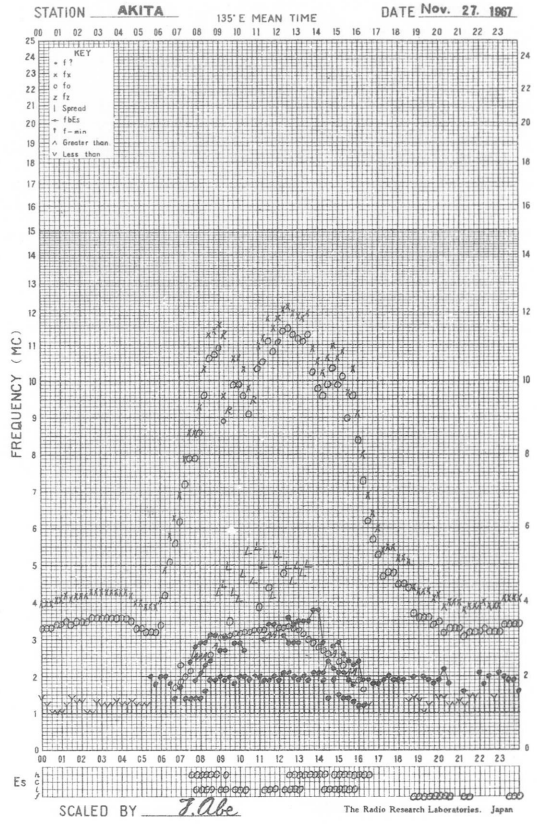
f-PLOT OF IONOSPHERIC DATA



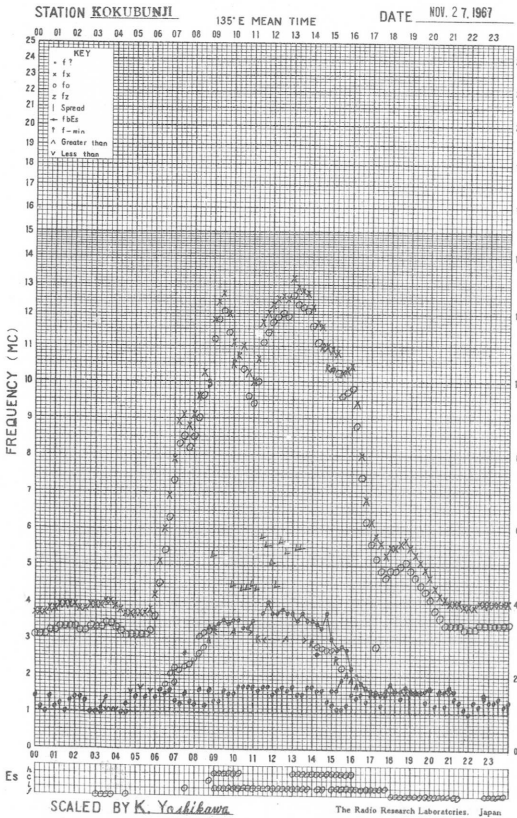
f- PLOT OF IONOSPHERIC DATA



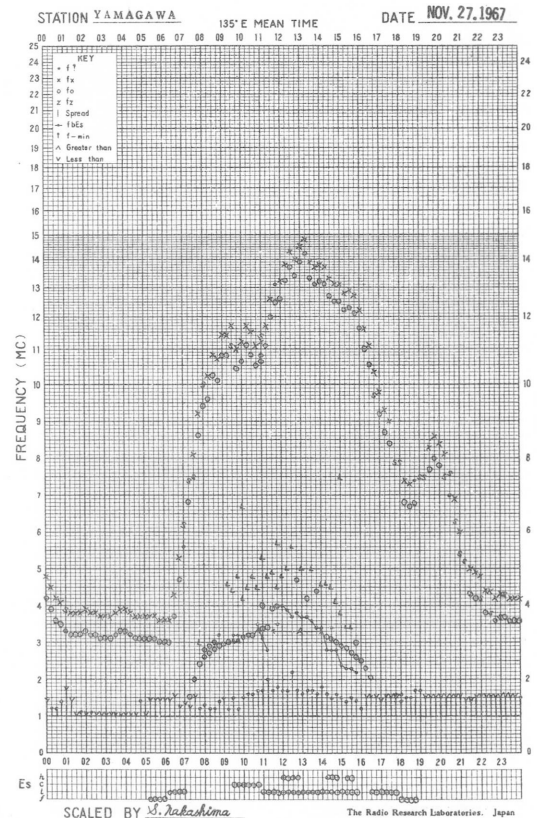
f- PLOT OF IONOSPHERIC DATA



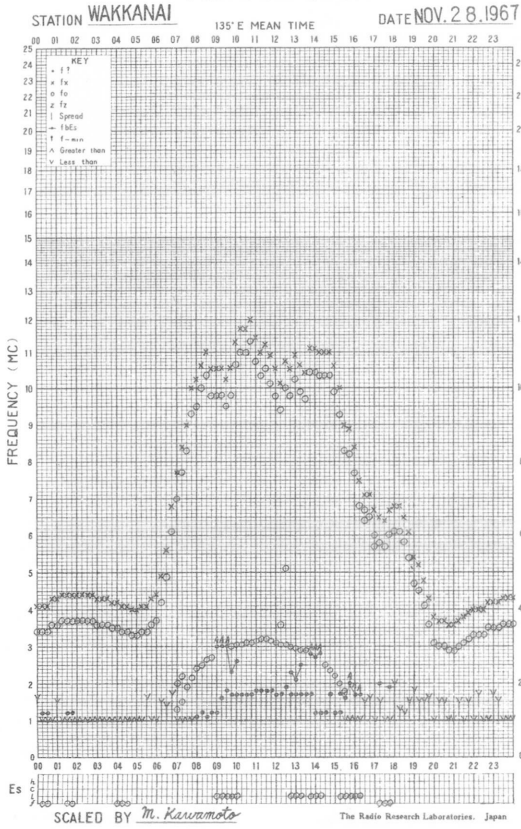
f- PLOT OF IONOSPHERIC DATA



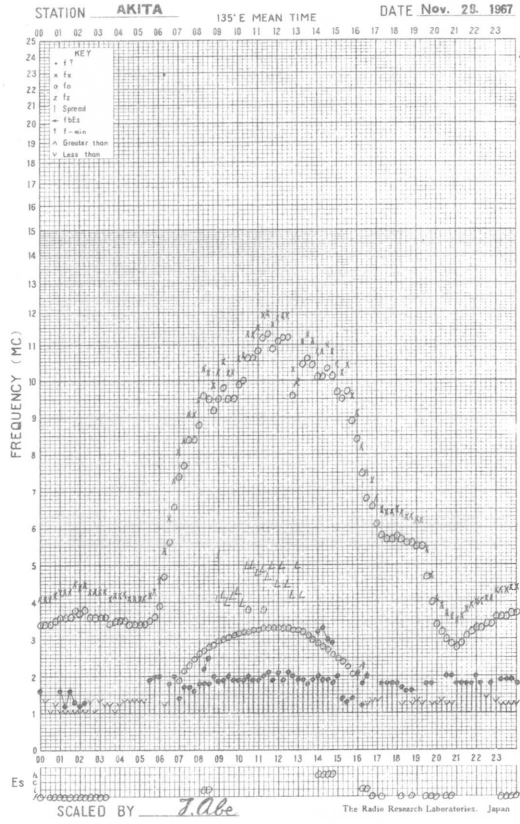
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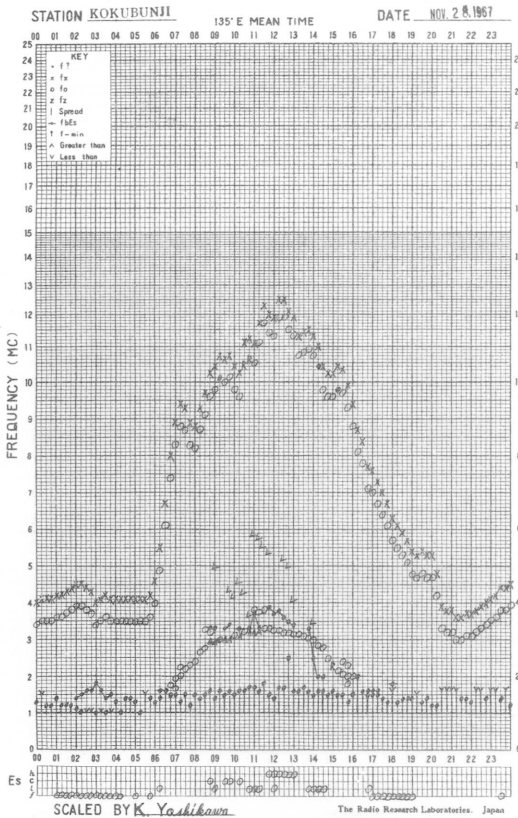
f-PLOT OF IONOSPHERIC DATA



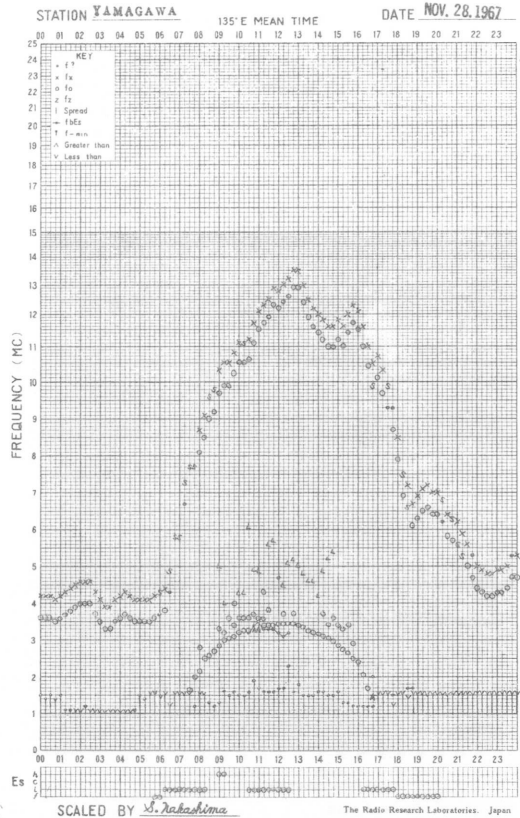
f-PLOT OF IONOSPHERIC DATA



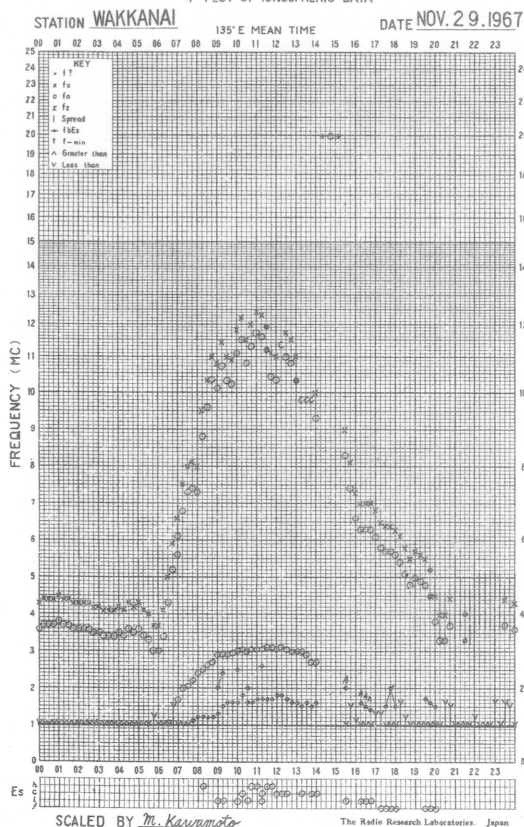
f-PLOT OF IONOSPHERIC DATA



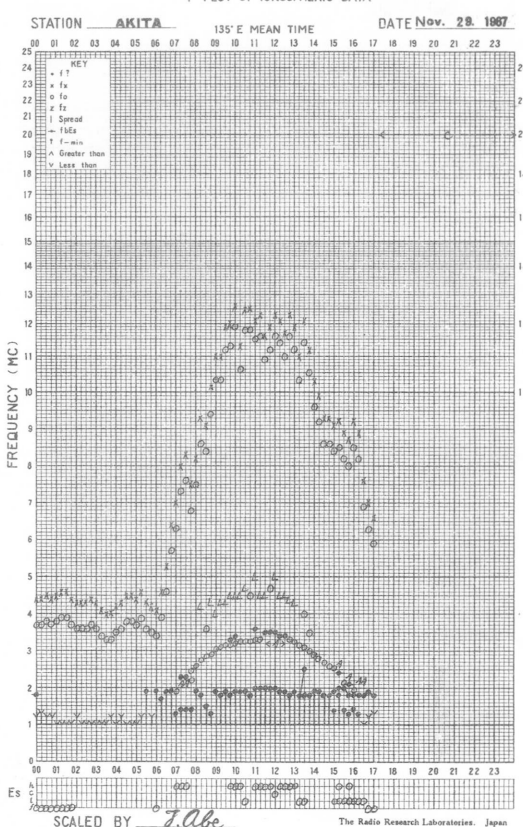
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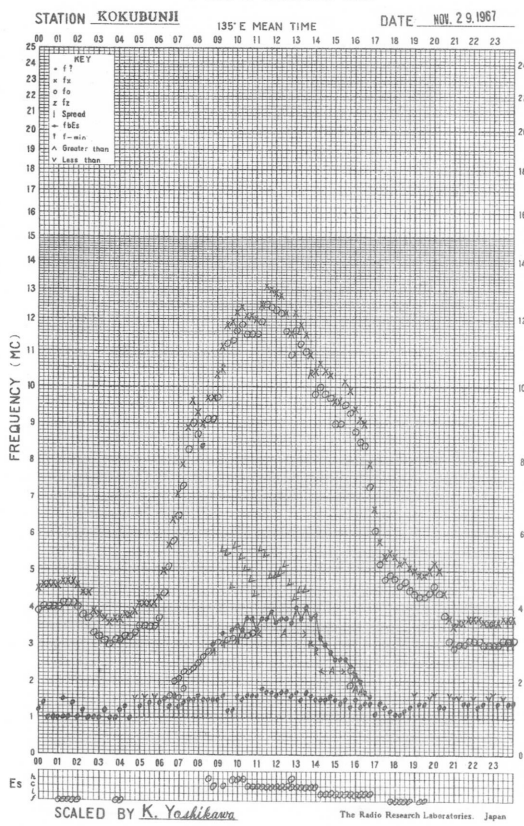
f-PLOT OF IONOSPHERIC DATA



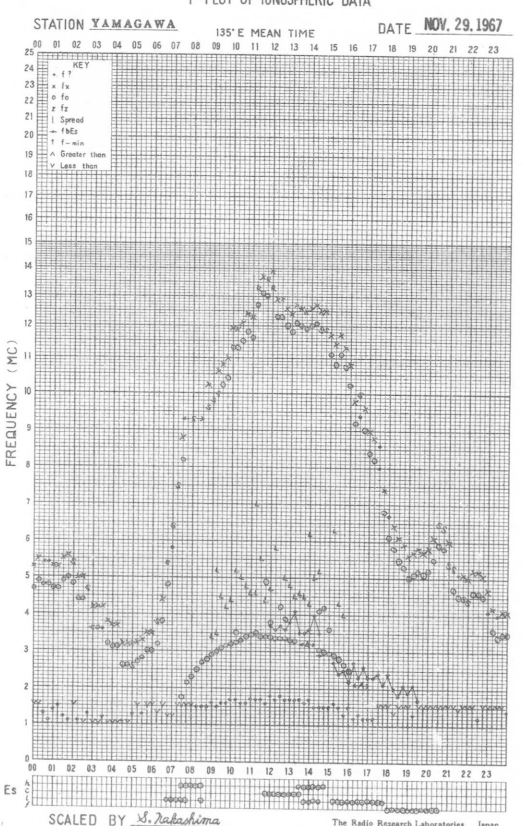
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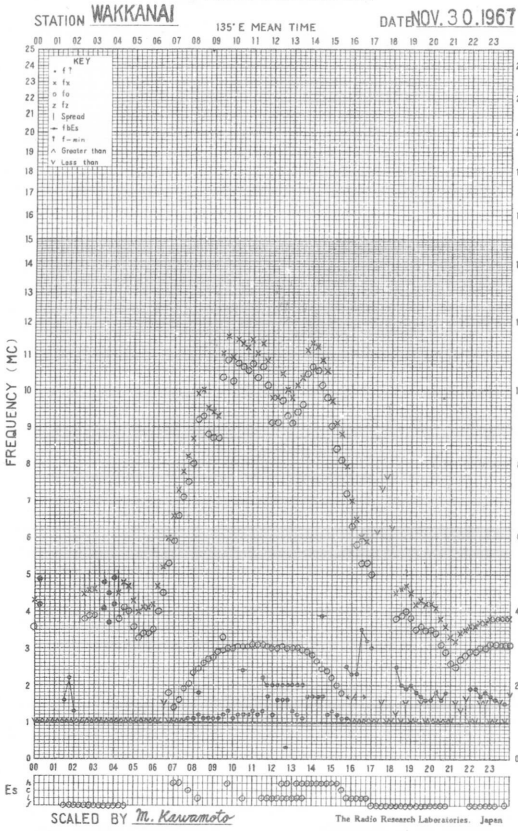
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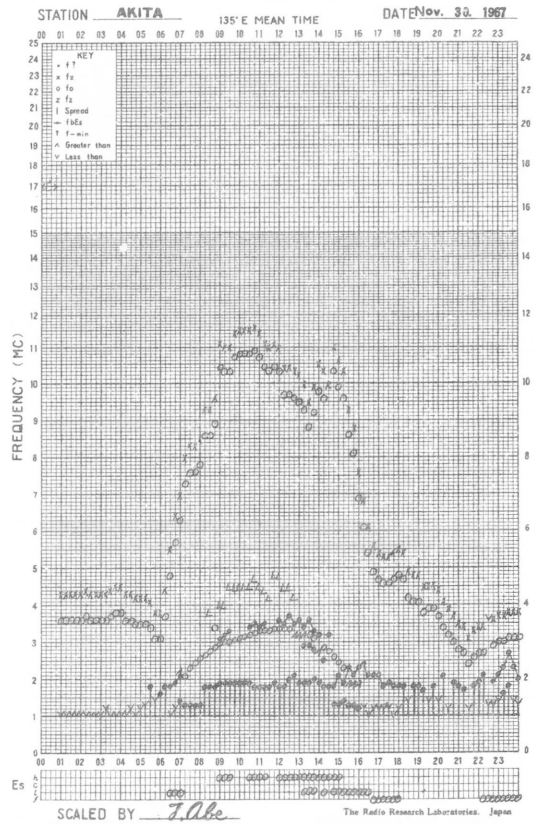
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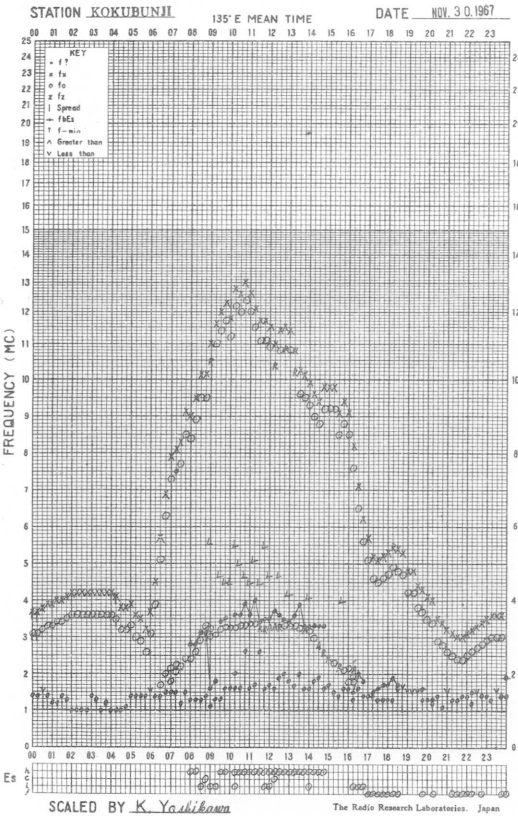
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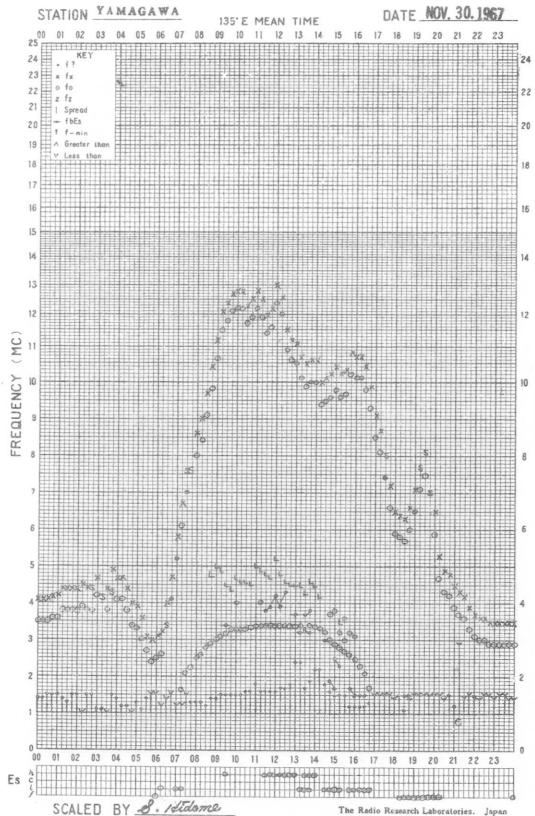
f- PLOT OF IONOSPHERIC DATA



f- PLOT OF IONOSPHERIC DATA



f- PLOT OF IONOSPHERIC DATA



Flux Density and Variability										
Month: November 1967						Frequency: 200 MHz				
Observing station: Hiraiso										
Flux density $10^{-22} W_m^{-2} (Hz)^{-1}$						Variability 0 to 3				
UT	00-03	03-06	06-09	21-24	Day	00-03	03-06	06-09	21-24	Day
Date										
1	11	9	-	(13)	10	2	1	-	(1)	2
2	10	9	(8)	-	10	1	1	(1)	-	1
3	7	7	(6)	-	7	0	1	(0)	-	0
4	6	7	(6)	-	6	0	0	(0)	-	0
5	8	8	(8)	6	8	1	1	(1)	1	1
6	7	7	(7)	(7)	7	0	0	(0)	(0)	0
7	7	7	-	(8)	7	1	0	-	(1)	0
8	8	-	-	(8)	(8)	1	-	-	(1)	(1)
9	8	8	-	(6)	8	1	1	-	(1)	1
10	7	6	(7)	(6)	7	1	0	(0)	(0)	1
11	(6)	6	(6)	-	6	(0)	0	(0)	-	0
12	-	-	-	-	-	-	-	-	-	-
13	(10)	10	(9)	(12)	10	(1)	1	(1)	(1)	1
14	10	8	(7)	-	9	1	0	(0)	-	1
15	9	10	(10)	-	10	2	1	(1)	-	1
16	12	10	(7)	-	10	2	2	(1)	-	2
17	8	8	(7)	7	8	1	0	(1)	0	1
18	8	8	(8)	(9)	8	0	0	(0)	(1)	0
19	8	9	(8)	-	9	1	1	(1)	-	1
20	-	19	(17)	(12)	(18)	-	1	(1)	(1)	(1)
21	11	11	(11)	(14)	11	1	1	(1)	(1)	1
22	22	12	(12)	-	20	1	1	(1)	-	1
23	11	11	(11)	-	11	1	1	(1)	-	1
24	19	14	(13)	-	16	1	0	(1)	-	1
25	10	10	(10)	(9)	10	1	1	(1)	(1)	1
26	10	7	(7)	-	9	2	1	(0)	-	1
27	15	16	(15)	-	15	1	2	(2)	-	2
28	11	11	(8)	(14)	11	1	1	(1)	(1)	1
29	11	7	(7)	(8)	10	1	0	(0)	(1)	1
30	9	10	(9)	(8)	10	1	1	(1)	(1)	1

Note No observations during the following periods:

1st 0440-	0730	11th 0100-	0300	21st 0500-	0600
2nd 0200-	0300	11th 2120-	13th 0200	21st 2120-	2300
2nd 2120-	2400	13th 2120-	2300	22nd 2120-	2400
3rd 2120-	2400	14th 2120-	2400	23rd 2120-	2400
4th 2120-	2400	15th 2120-	2400	24th 2120-	25th 0230
5th 2120-	2230	16th 2120-	2400	25th 2120-	2300
6th 2120-	2300	17th 2120-	2230	26th 2120-	2400
7th 0200-	0300	18th 2120-	2300	27th 2120-	2400
7th 0500-	2300	19th 2120-	20th 0400	28th 2120-	2300
8th 0200-	2300	20th 2120-	2300	29th 2120-	2300
9th 0500-	2300	21st 0200-	0300	30th 2200-	2300
10th 2120-	2300				

SOLAR RADIO EMISSION

<u>Flux Density</u>					
Month: November 1967					
Observing station: Hiraiso			Frequency: 500 MHz		
Flux density $10^{-22} W_m^{-2} (Hz)^{-1}$					
UT	00-03	03-06	06-09	21-24	Day
Date					
1	40	42	(42)	37	40
2	37	36	(34)	34	36
3	34	32	(34)	29	33
4	34	36	(36)	34	34
5	35	35	(34)	32	35
6	34	32	(29)	34	32
7	31	(30)	-	-	32
8	-	(29)	(29)	(28)	29
9	31	28	(33)	33	30
10	32	30	(30)	31	31
11	32	29	(29)	(34)	31
12	-	-	-	-	(34)
13	-	-	-	34	-
14	32	31	(30)	31	32
15	29	27	(27)	32	29
16	35	34	(36)	36	34
17	36	34	(33)	37	35
18	35	33	(36)	35	35
19	36	36	(38)	-	36
20	38	42	-	33	(40)
21	45	44	(41)	54	41
22	42	39	(37)	40	43
23	40	42	(42)	41	41
24	37	36	(34)	39	37
25	44	42	(41)	43	42
26	43	41	(39)	44	42
27	39	35	(37)	39	39
28	38	38	(38)	38	38
29	38	35	(35)	37	37
30	36	34	(35)	36	35

Note No observations during the following periods:

7th	0400-	8th	0500	20th	0500-	0730
8th	2120-		2300	21st	0000-	0100
12th	0000-	13th	0730	25th	0000-	0100
19th	2120-		2400			

Distinctive Events
(single-frequency observations)

Month: November 1967 Observing station: Hiraiso Normal observing period: 2120 - 0730 (sunrise to sunset)								
Date	Frequency	Starting time	Time of maximum	Duration	Type	Flux density $10^{-22} W_m^{-2} (Hz)^{-1}$		Remarks
	MHz	UT	UT	minutes		peak	mean	
5	200	0143.0	0143.1	3.0	C	20	7	
17	200	0232.3	0233.8	3.0	C	95	20	
25	200	0334.4	0334.5	1.0	C	280	65	
	500	0336.0	0336.1	1.0	C	40	20	
	200	0335.8	0336.2	1.5	C	400	85	
	200	0407.7	0408.5	2.0	C	150	20	
28	500	0640.4	0645.0	13.0	C	350	35	
30	500	0504.0	0507.7	28.0	C	130	25	

Measurement of H.F. Field Strength (Upper Side-band of WWV)
 Frequency: 15MHz, Bandwidth: 1.40 Hz, Receiving Antennas: Rod (4.5m)

Nov. 1967

Measured at Hiraio

Date	0015	0115	0215	0315	0415	0515	0615	0715	0815	0915	1015	1115	1215	1315	1415	1515	1615	1715	1815	1915	2015	2115	2215	2315
1	1	9	13	14	<-15s	<-15s	<-22s	<-20s	<-15s	<-5s	<-24s	<-2s	-16	<-20s	-16	<-13s	-20	<-32s	<-32s	<-32s	-4	7	10	12
2	11	14	17	17	18	<-12s	<-17s	<-2s	-3	<-2s	<-3s	<-5s	<-6s	<-6s	9	9	6	2	-8	-8	-2	7	7	8
3	9	9	11	16	15	7	<-7s	<-6s	<-5s	<-5s	<-6s	<-4s	22	<-4s	22	-16	-25	<-34s	<-34s	-1	7	7	9	11
4	9	16	14	18	18	-7	-6	-7	-11	<-6s	<-12s	<-2s	<-8s	<-8s	-12	-14	-17	-14	-26	<-35s	-4	6	6	8
5	6	6	9	17	<-5s	<-8s	<-14s	<-10s	<-16s	<-2s	<-8s	<-3s	<-9s	<-9s	-23	-26	-26	<-35s	-22	-29	-5	5	7	7
6	8	10	12	12	<-10s	<-11s	<-8s	<-7s	<-5s	<-9s	<-8s	<-8s	<-20s	<-30s	-15	<-34s	-25	-12	-12	-11	-3	4	5	6
7	10	9	11	-13	<-12s	<-16s	-13	<-7s	<-10s	<-10s	<-7s	<-21s	<-26s	<-31s	-16	-18	-11	<-32s	<-35s	<-35s	-3	14	1	< 6s
8	12	14	14	2	-3	-6	<-11s	<-12s	<-10s	<-25s	<-15s	<-5s	<-31s	<-31s	-19	-23	<-31s	-24	-3	5	11	11	1	< 6s
9	18	10	16	17	20	<-15s	<-5s	-6	-3	<-21s	<-6s	<-2s	<-31s	<-31s	-25	-7	5	2	6	-10	-9	11	11	13
10	14	13	17	16	15	20	<-8s	<-11s	<-7s	<-11s	<-8s	<-5s	<-22s	<-31s	<-31s	<-31s	<-31s	<-30s	<-30s	<-10	1	9	10	9
11	9	12	15	0	-10	<-8s	<-12s	<-11s	<-9s	<-9s	<-11s	<-17s	<-32s	<-32s	<-32s	<-32s	-8	<-32s	4	4	4	7	7	7
12	8	8	16	22	18	<-1s	<-1s	2	-3	<-1s	<-4s	<-7s	<-32s	<-32s	-23	-8	-8	-3	-13	-23	6	9	9	9
13	9	12	19	16	-10	<-7s	-7	<-9s	-8	<-6s	<-10s	<-20s	<-22s	<-34s	-19	-11	5	5	6	-10	2	8	5	13
14	11	17	16	< 4s	<-2s	<-15s	<-7s	<-10s	<-7s	<-2s	<-1s	<-6s	<-37s	<-37s	<-37s	<-37s	<-37s	<-37s	<-37s	<-37s	3	8	7	7
15	4	8	9	-13	<-11s	<-10s	<-7s	<-5s	<-10s	<-5s	<-7s	<-10s	<-24s	<-37s	<-37s	<-37s	<-37s	<-37s	<-37s	<-37s	-9	3	11	8
16	3	8	13	15	-9	<-6s	<-4s	<-5s	<-4s	<-3s	<-14s	<-19s	<-24s	<-37s	-24	-18	-20	<-37s	<-37s	<-37s	-19	8	1	4
17	9	9	18	4	<-6s	<-9s	-9	-4	<-9s	<-6s	<-6s	<-4s	<-11s	<-32s	-15	-9	4	-9	-7	-10	-6	1	3	3
18	8	8	0	0	<-6s	<-9s	<-6s	<-3s	<-7s	<-2s	<-6s	<-6s	<-21s	<-30s	<-30s	<-30s	<-30s	<-30s	<-30s	<-30s	4	4	7	7
19	11	13	16	0	-4	<-7s	<-8s	<-7s	<-5s	<-4s	<-3s	<-7s	-13	-25	-26	<-34s	<-34s	-21	<-34s	-8	7	13	10	10
20	14	19	22	17	<-2s	<-1s	<-3s	<-1s	<-5s	<-3s	<-7s	<-5s	<-16s	<-31s	-22	-18	-16	-19	-22	-11	3	10	16	14
21	16	15	15	13	<-3s	<-7s	<-3s	<-1s	<-1s	<-1s	<-13s	<-15s	<-17s	<-31s	<-31s	<-31s	<-25s	-22	-28	<-31s	-4	9	14	13
22	15	18	18	25	2	<-5s	<-1s	<-2s	<-3s	5	<-5s	<-7s	<-7s	<-27	-16	-10	-17	-22	-18	-27	-9	9	12	10
23	12	14	21	17	2	8	0	<-8s	<-2s	<-1s	<-7s	<-9s	<-7s	<-7s	-20	<-31s	<-31s	<-31s	<-31s	-20	8	8	9	9
24	10	15	15	17	4	4	-3	-1	<-1s	<-7s	<-6s	<-7s	<-25s	<-31s	-17	-19	-20	<-25s	<-25s	-11	16	19	22	22
25	26	26	26	26	10	<-1s	<-3s	<-4s	<-1s	<-1s	<-6s	<-4s	<-11s	<-19	<-30s	<-24s	<-24s	<-20s	-21	-21	7	16	16	13
26	16	20	17	26	<-2s	<-8s	<-11s	0	<-9s	<-9s	<-9s	<-3s	-14	-16	-26	<-26s	<-26s	<-26s	<-26s	-23	12	12	14	14
27	14	15	17	19	<-6s	-8	<-8s	<-6s	<-6s	<-6s	<-6s	<-25s	<-25s	<-25s	-20	-25	-23	<-25s	<-25s	<-25s	-25	9	11	8
28	12	8	16	11	<-6s	<-3s	<-0s	<-2s	<-2s	<-0s	8	<-5s	<-16s	<-31s	<-31s	-22	<-25s	-25	<-31s	-30	7	7	12	12
29	17	12	20	1	-2	<-2s	<-2s	<-0s	<-7s	<-4s	<-4s	<-1s	<-26s	<-31s	<-31s	<-30s	<-30s	-22	-16	-1	10	10	12	12
30	15	16	23	18	<-6s	<-3s	<-2s	<-2s	<-2s	<-2s	<-1s	<-3s	<-30s	<-30s	<-31s	<-32s	<-32s	<-32s	<-32s	<-32s	<-32s	10	17	12
Median	11	13	16	16	-3	<-6s	<-7s	<-5s	<-5s	<-3s	<-7s	<-5s	<-21s	<-32s	-23	<-24s	<-24s	-24	<-27s	<-27s	-4	8	10	9
Median Count	30	29	30	29	30	29	30	29	30	29	29	30	30	30	30	30	30	30	30	30	29	30	30	30
Upper decile	17	19	22	25	18	<-12s	<-0s	<-2s	<-3s	<-4s	<-1s	<-3s	<-7s	<-32s	-12	-8	5	2	-3	-1	3	12	16	14
Lower decile	4	8	< 0s	< 0s	<-11s	<-15s	<-13s	<-11s	<-11s	<-10s	<-15s	<-19s	<-32s	<-37s	<-37s	<-37s	<-37s	<-37s	<-37s	<-37s	-25	4	4	6

Measurement of H.F. Field Strength (Upper Side-band of WWV)
 Frequency: 15 MHz Bandwidth: ± 40 Hz, Receiving Antenna: Rod (4.5 m) Measured at Hiraitsu

Nov. 1967

Date	0045	0145	0245	0345	0445	0545	0645	0745	0845	0945	1045	1145	1245	1345	1445	1545	1645	1745	1845	1945	2045	2145	2245	2345	
1	-1	3	6	11	20	19	23	24	16	-4	-6	< 8	-12	< 8s	-14	<-20s	-23	<-32s	-4	8	6	6	3	6	6
2	0	6	7	12	22	25	24	22	9	< 1s	< 8s	< 18	< 2s	< 6s	<-11s	<-29s	<-29s	<-29s	-2	15	6	6	2	3	
3	4	4	11	8	22	22	< 25s	15	8	7	< 8s	-3	< 0s	< 25s	<-25s	<-34s	<-34s	<-34s	-4	10	10	10	1	4	
4	4	5	4	13	19	19	14	14	-2	< 2s	-8	< 6s	< 7s	< 7s	<-20s	<-26s	<-26s	<-26s	-6	2	2	2	6	6	
5	1	1	5	18	17	18	-3	23	13	-6	< 1s	< 3s	< 10s	-18	-26	<-35s	<-35s	<-35s	-4	34	8	8	2	4	
6	-1	7	7	12	20	23	25	24	-6	-10	-7	< 5s	-15	-21	-20	<-34s	<-30s	<-25	-7	9	6	6	2	6	
7	4	7	10	13	19	18	-4	-2	10	-2	-7	< 13s	-24	<-31s	<-31s	<-27s	-24	<-35	-24	8	<-24s	<-24s	-1	<-2s	
8	6	6	9	12	19	21	10	-4	-19	<-33s	-15	< 6s	-21	-29	<-27s	<-33s	<-33s	<-33s	1	8	8	8	1	<-2s	
9	10	5	14	16	20	24	21	22	-4	<-18s	<-12s	< 9s	< 31s	<-31s	<-31s	<-30s	<-30s	5	<-26s	9	7	7	4	8	
10	7	12	12	18	22	28	12	25	20	-8	< 3s	< 13s	< 31s	<-31s	<-31s	<-31s	<-31s	<-30s	-21	14	9	9	4	9	
11	6	4	10	16	19	12	9	16	-4	-10	<-16s	< 9s	-18	<-32s	<-32s	<-32s	<-32s	<-32s	-8	8	4	4	5	11	
12	6	5	12	26	23	27	28	31	-1	24	<-14s	< 8s	<-32s	<-32s	<-32s	<-32s	<-32s	<-32s	9	7	7	7	7	7	
13	6	8	10	15	23	20	24	6	-4	< 4s	-10	-7	-13	-23	<-34s	<-33s	<-33s	-15	<-20s	11	6	6	6	5	
14	9	9	14	19	19	7	9	26	15	<-9s	< 5s	<-28s	<-33s	<-33s	<-33s	<-33s	<-33s	<-33s	-1	11	8	8	6	6	
15	5	11	8	15	19	12	24	18	0	-8	< 5s	<-27s	<-24s	<-33s	<-33s	<-33s	<-33s	<-33s	-12	11	9	9	6	7	
16	4	8	11	16	28	23	26	18	-3	-13	-11	< 9	-12	-12	-24	<-29s	<-33s	<-33s	1	6	-15	2	4	4	
17	7	11	15	18	24	12	6	-3	<-5s	-4	< 5s	< 1s	-14	-23	<-24s	<-26s	<-26s	<-26s	-8	6	9	4	4	6	
18	6	11	11	17	26	3	8	15	14	-3	-8	< 6s	-17	<-30s	<-30s	<-30s	-29	<-30s	-16	7	11	8	8	8	
19	6	8	14	17	23	26	16	21	17	-7	-12	< 7s	-15	-22	<-34s	<-34s	<-34s	<-34s	0	10	6	7	7	5	
20	6	11	15	19	25	25	9	0	< 3s	-5	< 6s	< 8s	<-18s	<-23s	<-30s	<-31s	<-22	<-20	-8	7	7	6	6	7	
21	6	9	12	18	25	21	16	26	18	10	-7	-8	<-13s	<-31s	<-31s	<-31s	<-31s	<-25	6	6	10	8	8	5	
22	5	10	12	15	20	22	26	24	< 3s	11	< 3s	< 1s	-5	-12	-17	<-25s	-14	5	-13	9	7	8	8	6	
23	9	9	12	18	22	20	25	19	< 4s	-4	-7	< 5s	< 4s	-5	-18	-23	-27	<-31s	-27	3	7	7	8	8	
24	7	8	12	17	26	22	24	25	13	16	-2	< 7s	-16	-10	-19	-11	-11	-22	<-25s	8	13	10	8	8	
25	6	12	13	16	25	22	23	14	10	<-5s	< 2s	< 3s	-12	-23	<-30s	<-24s	<-24s	<-24	-5	12	11	11	9	9	
26	7	10	12	18	16	21	16	14	-4	-6	-3	< 2s	-8	-16	<-26s	<-26s	<-26s	23	10	11	11	6	5	6	
27	7	11	14	18	20	24	19	10	2	-4	-7	< 8s	-18	-18	-20	<-29s	-21	<-23	<-29s	9	10	10	5	6	
28	1	10	12	15	22	20	18	22	9	-5	-5	< 4s	-12	-19	-19	-17	-20	<-31s	-8	5	8	8	8	5	
29	8	7	13	16	22	26	12	12	< 6s	-12	< 7s	< 4s	-18	-22	<-31s	<-31s	<-30s	<-30s	<-30s	14	14	14	8	5	
30	7	10	18	18	16	19	24	18	<-5s	<-5s	< 1s	< 9s	<-30s	<-30s	<-32s	<-32s	<-32s	<-32s	<-32s	5	10	10	8	-1	
Median	6	9	12	17	22	21	< 20s	18	< 3s	< 3s	< 6s	< 7s	<-15s	<-23s	<-28s	<-30s	<-30s	<-28s	2	8	8	6	6	6	
Median Count	30	30	29	28	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Upper decile	9	11	15	19	26	25	26	26	17	11	< 1s	< 2s	< 7s	<-14s	-20	<-14s	-20	<-14s	2	14	11	11	8	9	
Lower decile	0	4	6	12	17	10	< 2s	-2	<-5s	<-13s	<-14s	<-31s	<-32s	<-33s	<-34s	<-34s	<-34s	<-34s	<-29s	5	1	1	1	3	

RADIO PROPAGATION QUALITY FIGURES

HIRAISO

Time in U.T.

Nov. 1967	Whole Day Index	H B			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	4o	(4)	4	4	4	4	3	4	(4)	4	4	4	4	4	4	-	4	N	N	N	N			
2	4o	4	4	4	4	5	4	4	4	4	4	4	4	4	4	-	4	N	N	N	N			
3	4o	4	4	4	4	4	3	4	4	4	4	4	4	4	4	-	4	N	N	N	N			
4	4+	(5)	5	5	4	(4)	3	4	4	4	4	4	4	4	4	-	4	N	N	N	N			
5	4o	4	4	4	4	4	4	4	4	4	4	4	4	4	4	-	4	N	N	N	N			
6	4-	(4)	4	(4)	4	3	3	4	4	(3)	C	4	4	3	-	4	N	N	N	N				
7	3+	3	3	4	3	3	4	4	3	3	4	(4)	(4)	4	-	4	N	N	N	N				
8	4o	4	4	(4)	3	4	4	4	4	4	4	4	4	3	-	4	N	N	N	N				
9	4+	(4)	4	5	5	4	4	4	4	4	4	4	4	4	-	4	N	N	N	N				
10	4o	4	5	4	4	(3)	3	4	4	4	4	4	4	3	-	4	N	N	N	N				
11	4-	4	4	(4)	4	3	3	4	4	4	4	4	4	3	-	4	N	N	N	N				
12	4-	3	3	3	4	4	4	4	(4)	4	4	4	C	4	3	-	4	N	N	N	N			
13	4o	5	4	3	4	4	5	4	4	4	4	4	4	4	-	4	N	N	N	N				
(14)	4o	(4)	4	4	4	3	4	4	4	4	4	4	4	4	-	4	N	N	N	N				
(15)	4-	4	3	4	(4)	3	3	4	4	4	4	(4)	(4)	4	-	4	N	N	N	N				
(16)	4o	5	4	(4)	4	3	4	(4)	4	4	4	(4)	4	4	-	(4)	N	N	N	N				
17	4o	4	4	3	4	4	5	4	4	4	4	4	4	4	-	4	N	N	N	N				
18	4-	4	4	(4)	(4)	3	3	4	4	4	4	4	4	4	-	4	N	N	N	N				
19	4o	4	(4)	4	4	4	4	4	4	4	4	(4)	4	4	-	4	N	N	N	N				
20	4-	4	3	3	4	4	3	4	4	4	4	(4)	4	4	-	4	N	N	N	N				
21	4-	4	3	(4)	4	3	3	4	4	4	4	4	4	4	-	4	N	N	N	N				
22	4o	4	4	4	4	4	5	4	4	4	4	4	4	4	-	4	N	N	N	N				
23	4o	4	4	4	4	4	4	4	4	4	4	C	4	4	-	4	N	N	N	N				
24	4o	4	3	4	4	5	4	4	(4)	4	4	(4)	4	4	-	4	N	N	N	N				
25	4o	4	4	4	4	4	4	4	4	4	4	C	4	4	-	4	N	N	N	N				
26	4-	3	3	(4)	4	3	4	4	C	4	4	(4)	4	4	-	4	N	N	N	N				
27	4o	4	4	(4)	4	4	4	4	4	4	4	4	4	4	-	4	N	N	N	N				
28	4-	4	4	4	4	4	3	4	4	4	4	(3)	4	4	-	4	N	N	N	N				
29	4o	4	4	4	4	4	4	4	(4)	4	4	C	4	3	-	4	N	N	N	N				
30	4o	4	4	4	4	4	4	4	3	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

- = impossible to evaluate

() = inaccurate

C = artificial accident

---- = continuing magnetic storm

IONOSPHERIC DATA IN JAPAN FOR NOVEMBER 1967

第 19 卷 第 11 号

1968年2月20日 印 刷
1968年2月25日 発 行 (不許複製非売品)

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