F—230

IONOSPHERIC DATA IN JAPAN

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KOKUBUNJI, TOKYO, JAPAN

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RADIO RESEARCH LABORATORIES

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CONTENTS

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_0F2, f_0F1, f_0E — The ordinary wave critical frequency for the $F2$, $F1$ and E layers, respectively.

f_0E_s — The ordinary wave top frequency corresponding to highest frequency at which a mainly continuous trace is observed.

f_bE_s — The 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_0E_s.

$hpF2$ — The virtual height of the $F2$ layer measured on the ordinary

wave branch at a frequency equal to $0.834 f_0F2$.

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

a. Descriptive 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 hight: *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 grealy exceed the E layer critical frequency, whereas at low latitudes it usually rises from E_s-*q*, E_s-*c*, or E_s-*h* at frequencies near the regular E critical frequency. Type *s* is never used to determine f_0E_s and $h'E_s$. The slant trace is sometimes observed to start at f_0E without echoes clearly identifiable as E_s echoes being seen.

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

d. Multiple Reflections from E_s

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

B. SOLAR RADIO EMISSION

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

Antennas are 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} $W \cdot m^{-2} \cdot (c/s)^{-1}$ 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)
2=poor (disturbed)
3=rather poor (unstable)
4=normal
5=good

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 O .....WWV 20, 15 and 10 Mc/s (Fort Collins, Colorado)
S F .....Various frequencies of commercial circuit (San Francisco)
H A .....WWVH 15 and 10 Mc/s (Hawaii)
T O .....JJY 15 and 10 Mc/s (Tokyo)
S H .....BPV 15 and 10 Mc/s (Shanghai)
H B .....Various 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

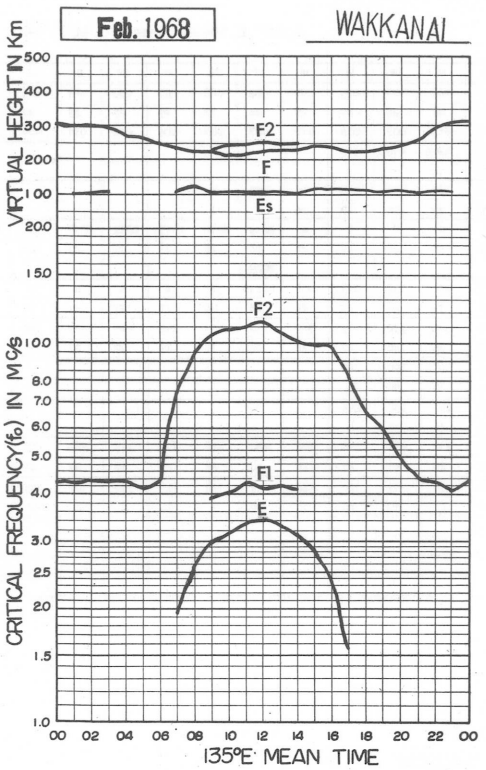
Importances

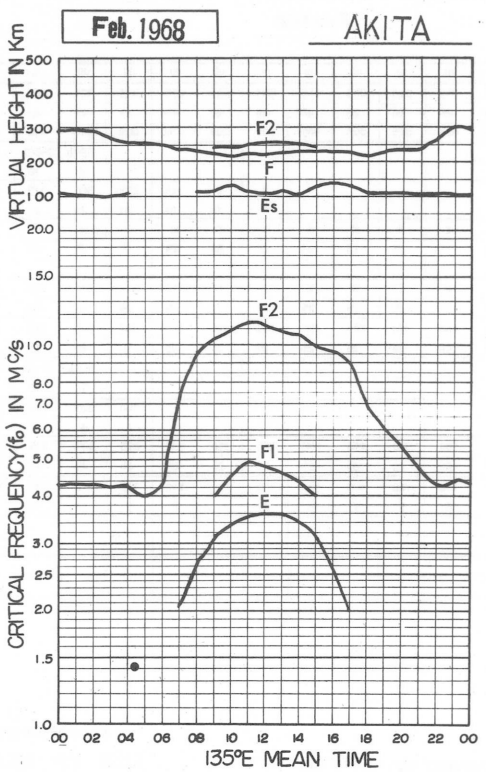
Degrees of SWF are classified into 9 grades according to the amplitude of fade-out;

1−	1	1+
2−	2	2+
3−	3	3+

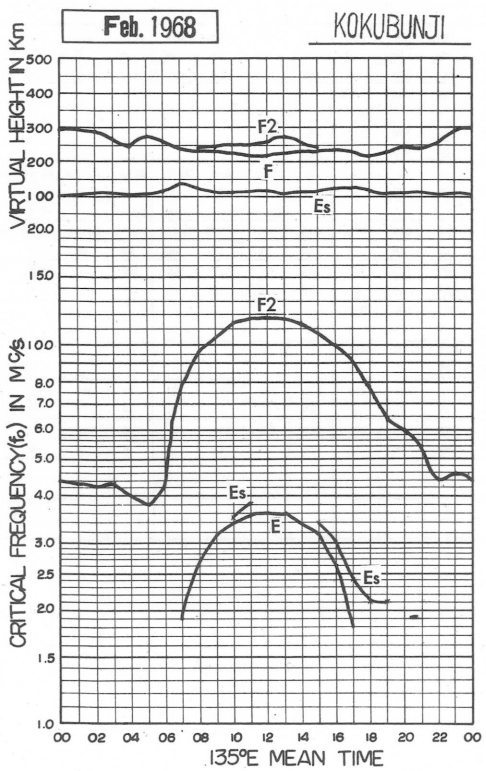
Besides, the time associated phenomena with SID's, that is, solar flare, solar radio noise outburst and crochet (solar flare effect in magnetic record), are given in this table from interchange messages of IUWDS or measurements at Hiraiso.

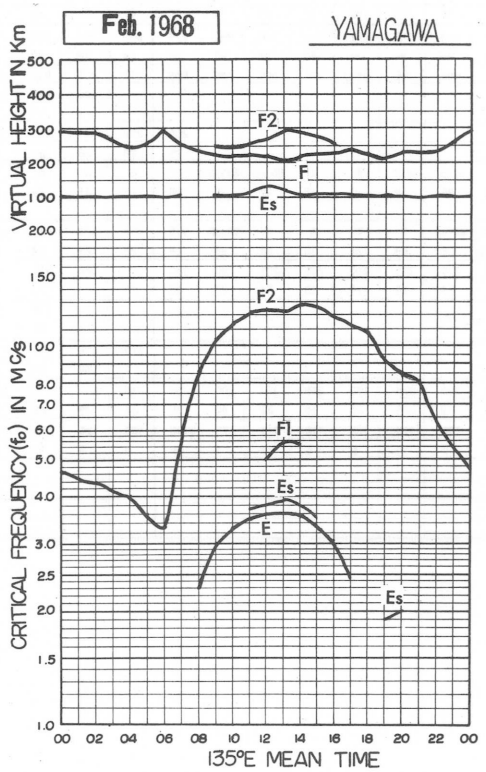
IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS





IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS





IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: WAKKANAI

Feb. 1968

135° E Mean Time (G.M.T. +9h)

CHAR	HR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
foF2	MED	043	043	043	043	043	041	043	073	095	104	108	110	113	106	101	099	098	082	066	060	050	044	043	041
	CNT	27	26	26	26	26	26	26	25	24	25	25	25	25	26	26	27	28	28	28	27	27	27	27	27
	Q R	005	003	005	005	005	007	009	010	009	014	012	010	010	012	007	008	012	007	007	006	010	011	007	006
foF1	MED										390L	U400L	430	410	420L	410L	390								
	CNT										7	10	9	13	10	10	3								
foE	MED						E	E	195	255	300	315	335	340	330	315	285	235	155	E					
	CNT						1	18	16	23	24	25	25	25	26	26	27	26	6	2					
foEs	MED	E	E	E	E	E	E	E	G	G	G	G	G	G	G	G	G	G	E019	E012	E015	E012	E014	E	E015
	CNT	26	26	26	26	26	26	26	24	24	24	25	24	24	25	26	27	28	28	28	27	27	27	27	27
	Q R																		D009						
f-min	MED	E	E	E	E	E	E	E	E012	012	016	016	017	018	017	017	015	012	E013S	E	E	E	E	E	E
	CNT	26	26	26	26	26	26	26	24	24	24	25	24	24	25	26	27	28	28	28	27	27	27	27	27
M (3000) F2	MED	260	260	260	265	275	270	290	320	330	325	315	300	310	305	310	305	310	310	295	295	295	275	265	260
	CNT	27	26	26	26	26	26	26	25	24	25	25	25	25	26	26	27	28	28	28	27	27	27	27	27
M (3000) F1	MED										400L	U410L	405	405	390L	390L	385								
	CNT										7	10	9	13	10	10	3								
h'F2	MED									240	225	240	245	250	245	250	245								
	CNT									2	9	15	15	18	14	14	4								
h'F	MED	310	300	300	290	270	265	250	230	220	225	215	220	220	230	230	240	240	220	220	235	245	260	295	305
	CNT	27	26	26	26	26	26	26	25	24	25	25	25	25	26	26	27	28	28	28	27	27	27	27	27
h'Es	MED	105	100	100	105	100	100		110	125	110	110	110	110	110	105	120	120	115	110	105	110	100	105	110
	CNT	4	8	6	9	4	2		8	9	11	10	10	10	8	10	10	14	14	9	10	9	8	9	8
hpF2	MED																								
	CNT																								
ypF2	MED																								
	CNT																								

IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: AKITA

Feb. 1968

135° E Mean Time (G.M.T. +9h)

CHAR	HR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
foF2	MED	043	043	043	042	043	040	042	074	096	103	108	114	111	108	106	099	096	089	069	060	054	047	042	044
	CNT	29	29	29	28	28	28	28	28	28	29	29	29	29	29	29	29	28	28	28	28	27	28	28	28
	Q R	006	006	006	007	006	007	010	009	012	015	018	015	016	012	011	008	012	009	008	011	012	013	008	007
foF1	MED										400	450	490	480	460	440	400L								
	CNT										5	11	15	15	9	6	5								
foE	MED								205	270	315	335	350	360	360	340	310	260	200						
	CNT								25	28	28	27	26	25	27	29	28	26	6						
foEs	MED	E018	E013	E012	E	E	E012	E013S	G	G	G	G	G	G	G	G	G	G	023	E018	E018	E016	E015S	E014S	E014S
	CNT	29	28	29	27	28	28	28	28	28	29	29	29	28	27	28	28	28	26	27	26	27	28	27	28
	Q R	D009																	D004	D009	D009	D008		D007	
f-min	MED	E013S	E012S	E	E	E	E	E013S	018	018	020	021	021	021	022	020	019	019	016	E013S	E013S	E013S	E013S	E013S	E013S
	CNT	29	28	29	27	28	28	28	28	28	29	29	29	28	27	28	28	28	26	27	26	27	28	27	28
M (3000) F2	MED	275	270	275	280	285	275	290	330	325	320	315	310	310	305	305	305	315	320	310	300	300	300	280	275
	CNT	29	29	29	28	28	28	28	28	28	29	29	29	29	29	29	29	28	28	28	28	27	28	28	28
M (3000) F1	MED										400	390	380	380	375	380	395L								
	CNT										5	11	15	15	9	6	5								
h'F2	MED									245	240	245	250	255	255	250	245								
	CNT									1	20	29	29	29	29	29	11								
h'F	MED	290	290	285	270	255	260	250	230	230	225	215	220	220	230	230	230	230	225	215	230	240	240	270	300
	CNT	29	29	29	28	28	27	28	28	28	29	29	29	29	29	29	29	28	28	28	28	28	29	28	28
h'Es	MED	105	100	100	100	110	110	115	U140	120	120	135	120	115	115	105	130	140	130	110	110	110	110	110	105
	CNT	9	7	10	6	5	4	1	4	9	8	12	15	14	10	11	12	14	18	12	9	8	6	9	6
hpF2	MED																								
	CNT																								
ypF2	MED																								
	CNT																								

IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: KOKUBUNJI

Feb. 1968

135° E Mean Time (G. M. T. +9h)

CHAR \ HR		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
foF2	MED	044	043	042	043	040	038	042	078	096	104	114	116	116	116	114	107	100	093	078	063	060	054	044	046
	CNT	29	29	29	29	29	28	28	28	28	28	28	28	28	27	28	28	28	28	28	27	29	28	29	29
	Q R	010	010	006	005	006	005	008	011	014	016	016	020	017	014	014	011	012	014	012	009	010	013	010	012
foF1	MED										400L		450L	U550L	U600L	U500L									
	CNT										1		1	4	3	1									
foE	MED								190	270	315	340	355	360	360	345	315	260	180						
	CNT								23	28	27	25	26	23	23	25	25	25	9						
foEs	MED	E015	E014	E012	E011	E011	E013	E014B	G	G	G	035	038	G	G	G	034	030	024	021	021	E016	016	E016	019
	CNT	29	29	29	29	29	28	28	28	28	28	28	28	28	27	28	28	28	28	28	28	29	29	29	29
	Q R	D006	D010																007	D009	D010	D008	D008	D005	D007
f-min	MED	013	012	011	010	010	010	012	015	015	015	016	016	018	018	016	016	015	014	012	012	014	012	012	013
	CNT	29	29	29	29	29	28	28	28	28	28	28	28	28	27	28	28	28	28	28	28	29	29	29	29
M (3000) F2	MED	275	275	280	285	290	280	290	335	335	320	320	305	300	295	300	305	310	320	320	300	300	300	285	275
	CNT	29	29	29	29	29	28	28	28	28	28	28	28	28	27	28	28	28	28	28	27	29	28	29	29
M (3000) F1	MED										400L		395L	U365L	U355L	U340L									
	CNT										1		1	4	3	1									
h'F2	MED									240	240	250	250	260	275	255	245	245							
	CNT									7	20	28	28	26	25	25	15	3							
h'F	MED	290	290	285	270	245	275	260	240	230	230	225	215	220	225	230	235	235	230	215	230	245	240	255	290
	CNT	29	29	29	29	29	28	28	28	28	28	28	28	28	27	28	28	28	28	28	27	29	29	29	29
h'Es	MED	105	105	110	110	105	105	110	140	125	110	115	115	115	110	115	115	125	115	110	105	105	110	105	110
	CNT	10	12	9	8	11	8	6	9	10	17	20	21	17	18	18	22	20	22	20	19	14	15	14	18
hpF2	MED	375	380	370	355	345	360	345	275	275	295	300	310	320	330	315	305	305	290	290	335	325	320	350	380
	CNT	29	29	29	29	29	28	28	28	28	28	28	28	28	27	28	28	28	28	28	27	29	28	29	29
ypF2	MED	080	075	075	075	080	085	080	060	065	070	075	080	080	080	085	085	080	075	075	085	075	075	085	080
	CNT	29	29	29	29	29	28	28	28	28	28	28	28	28	27	28	28	28	28	28	27	29	28	29	29

IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: YAMAGAWA

Feb. 1968

135° E Mean Time (G. M. T. +9h)

CHAR \ HR		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
foF2	MED	047	045	044	041	040	036	033S	056S	086	104	114	122	123	121	128	126	119	112	108	091	083S	081S	064S	053
	CNT	28	29	28	29	29	29	29	28	28	29	29	29	29	29	29	29	29	29	29	29	27	27	26	27
	Q R	009	014	008	008	009	006	006	008	011	013	017	024	022	016	016	018	018	015	018	018	021	015	016	012
foF1	MED									280	370L	U510L	530L	500L	560	550L	470L	380	300						
	CNT									3	1	1	3	10	10	5	1	4	2						
foE	MED								160	230	300	330	350	360	360	355	335	305	245						
	CNT								2	28	29	29	29	29	29	28	27	27	26						
foEs	MED	E015	E015B	E015B	E014B	E014B	E015B	E015S	E015S	G	G	G	037	038	039	038	035	G	G	E017B	019	020	E015B	E015B	E015B
	CNT	29	29	29	29	28	29	29	28	28	29	27	29	29	29	29	29	29	29	28	28	28	28	28	27
	Q R																			D004	D006	D006			
f-min	MED	014	015	015	014	012	014	E015S	E015S	015	015	016	018	022	022	022	018	015	015	015	015	014	015	015	015
	CNT	29	29	29	29	28	29	29	28	28	29	27	29	29	29	29	29	29	29	28	28	28	28	28	27
M (3000) F2	MED	275	275	275	280	300	280	270S	305S	330	320	310	310	300	290	290	290	295	300	300	295	285S	295S	295S	275
	CNT	28	28	27	28	28	28	28	27	27	28	28	29	28	28	28	28	28	28	28	28	26	26	26	27
M (3000) F1	MED									425	410L	U370L	365L	375L	355	360L	380L	400	400						
	CNT									3	1	1	3	10	9	5	1	4	2						
h'F2	MED									230	250	250	260	270	290	280	275	250	230						
	CNT									4	23	28	29	28	28	28	28	24	5						
h'F	MED	290	280	290	275	250	255	300	255	230	225	225	225	220	205H	220H	225	225	240	225	215	235	230	230	255
	CNT	28	28	28	28	28	28	28	27	27	28	28	29	29	28	29	29	29	29	29	29	28	27	27	26
h'Es	MED	105	105	105	100	100	100	100	110		105	105	110	130	120	110	110	110	110	105	100	100	100	105	100
	CNT	5	4	4	4	5	4	6	3		13	18	26	22	25	24	24	19	18	13	16	15	5	5	4
hpF2	MED																								
	CNT																								
ypF2	MED																								
	CNT																								

IONOSPHERIC DATA

Feb. 1968 | foF2 | 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	041	043	043	044	044	043	040	063	087	096	108	110	116	096	100	094	096	069	063	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	098	086H	075	069	061	054	053	055	052
3	050	050	050	048	046F	044F	U049F	073	092H	103	113	131	116H	114	105	103	097	082	067	063	058	048	050	052
4	048	046	045	045	046	046	043	I064C	096	110	120	128	118	118H	117	109H	111	091	083	070	053	053	050	058
5	054	050	046	048	043	043	043	078	C	C	C	C	C	120	110	108	101	078	065	059	048	041	043	040
6	040	038	038	038	041	036	038	077	100	116	113	114	123	108H	103	105	103	086	073	061	050	035	038	038
7	041	043	041	040	039	036	040	067	100	110	110	109	111	102	088	098	093	069	066	058	043	041	039	041
8	041	043	038	040	038	038	041	073	098	105	105	105	111	110	105	098	103	080	065	060	050	051	047	044
9	044	044	045	046	044	038	036	070	091	113	114	110	121	114	112	109	106	083	070	061	044	044	046	044
10	045	049	048	042	038	034	036	071	100	104	111	122	I119C	I115C	111	103	101	078	073	057	049	042	040	041
11	043	043	041	036	033F	033F	031	C	C	C	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	C	110	109	102	101	099	100	084	063	060	057	036	040	041S
13	043	044	044	040F	U040F	046	045	073	089	107	088	C	C	C	C	C	086	092	063	053	048	035	034	033
14	034	038	037	035	039F	038	043	075	095	099	096H	I107C	103	094	099	098	088	080	054	053	053	046S	046	044
15	043	042	041	043	043S	044	044	075	090	093	093	105	110	104	101	101	094	078	070	063	051	047	045	045
16	I046C	043	047	045	041	041	043	066	097	117	107	115	117	094	103	093	091	073	056	055	042	033	035	034
17	036	C	C	C	C	C	C	C	C	104	096	109	105	094	096	092H	076	080	064	057	041	037	036	036
18	036	038	039	037	036	035	038	066	089	104	100	107	105	095	093	088	103	080	070	059	044	041	040	034
19	034	035	037	037	035	034	041	069	100	116	103	103	113	109	098	092	093	088	059	058	043	040	042	040
20	038S	039	040	041	043	041	043	076	088	I096C	108	104	114	118	100	093	095H	087	063	063	053	045	044	039
21	042	043	043	043	044	043	050	080	096	114	114	119	113	110	100	098	095	086	063	050	045	035	035	037
22	040	039	036	036	036	035	043	068	093	086H	113	120	118	103	100	097	106	086	070	063	050	042	041	041
23	043	044	043	043	043	041	045	071	089	094	103	110	114	111	103	097	087	082	065	055	050	041	042	041
24	041	042	041	041	042	040	048	075	087	091	100	106	106H	104	088	101	108	083	066	058	053	044	043	041
25	041	043	043	043	043	043	051	078	091	086	103	108	098	102	098	100	092	080	070	066	059	054	044	044
26	044	045	044	045	046	045	054	078	098	106	118	109	106	102	098	107	102	086	070	063	055	047	044	044
27	044	043	043	045	043	043	054	087	104	108	107	113	113	105	103	100	105	091	078	070	060	055	052	051
28	051	050	052	055	055	045	050	080	095	107	126	113	124	116	117	109	104	098	086	076	063	054	053	052
29	051S	054F	050F	048F	046	043	050	081	103	103	117	121	123	113	114	117	105	092	076	071	066	060	058	058F
30																								
31																								
Count	27	26	26	26	26	26	26	25	24	25	25	25	25	26	26	27	28	28	28	27	27	27	27	27
Median	043	043	043	043	043	041	043	073	095	104	108	110	113	106	101	099	098	082	066	060	050	044	043	041
U.Q.	045	045	045	045	044	043	049	078	099	110	114	117	118	114	105	105	104	086	070	063	055	051	047	045
L.Q.	040	042	040	040	039	036	040	068	090	096	102	107	108	102	098	097	092	079	063	057	045	040	040	039
Q.R.	005	003	005	005	005	007	009	010	009	014	012	010	010	012	007	008	012	007	007	006	010	011	007	006

The Radio Research Laboratories, Japan

foF2 | Sweep 1.0 Mc to 20.0 Mc in 20 sec in automatic operation | W1

IONOSPHERIC DATA

Feb. 1968 | foF1 | 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																								
2									C	C	C	C	C	C	C									
3													430	460H										
4											390		410L											
5									C	C	C	C	C											
6														L										
7													420											
8											U420L	420			390L									
9										U420L	400		400L	U410L										
10											400		C	C	C									
11									C	C	C	C	C	C	C	C								
12									C	C	C	L	U420L	400	U460L									
13										350	370	C	C	C	C	C								
14										360		I430C	L	U420L										
15										360	400	U430L	410	400	440									
16											L													
17									C		U500L	U470L		L	410	390								
18											U440L	410	L	U420L	L									
19													450	U470L	U430L									
20										C	L	L	L	L	L									
21											A	L	440L	420L	410	350								
22											L		A	A	400L									
23										400L	L	420	400											
24											U400L	L			L									
25										390L		450L	410		490									
26										L		L	410	450										
27										L		L	U480L		410	L								
28									L	410L		U460L	U410L		410L									
29									L		U440L	440	L	440L		U400L								
30																								
31																								
Count										7	10	9	13	10	10	3								
Median										390L	U400L	430	410	420L	410L	390								
U.Q.																								
L.Q.																								
Q.R.																								

foF1 | Sweep 1.0 Mc to 20.0 Mc in 20 sec in automatic operation

The Radio Research Laboratories, Japan

W2

IONOSPHERIC DATA

Feb. 1968 | foE | 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								S	220	300	305	325	340	330	310	280	225	S						
2						C	C	C	C	C	C	C	C	C	C	290	A	S						
3							E	A	225	295	310	325	340	330	320	285	A	S						
4							E	C	240	295	315	340	335	335	315	275	200	S						
5							E	200	C	C	C	C	C	330	315	280	220	E						
6							E	150	255	300	320	340	345	325	315	290	235	A						
7							S	135	250	300	320	335	340	330	305	265	225	S						
8							S	S	255	300	320	330	335	325	305	270	215	S						
9							E	150	240	300	315	340	335	I315A	300	255	175	S						
10							E	S	240	300	305	320	I320C	I315C	310	275	210	S						
11							E	C	C	C	C	C	C	C	C	C	C	C	C					
12						C	C	C	C	C	C	330	330	325	315	280	220	S						
13							E	A	A	A	305	C	C	C	C	C	245	S						
14							E	215	250	285	305	I320C	325	315	305	280	220H	S						
15							E	180	250	295	320	335	340	325	300	I285A	215	S						
16							E	S	260	I290A	305	325	340	325	I300A	280	235	E						
17						C	C	C	C	295	320	335	340	335	315	280	220	S						
18							E	180	I245A	295	315	325	330	315	300	285	230	S						
19							S	190	270	300	310	330	330	330	310	280	235	A						
20							E	S	245	I295C	315	335	330	330	325	300	240	S						
21							E	185	260	300	300	I300A	300	I310A	310	295	245	150						
22							E	210	280	300	305	305	I305A	I325A	325	300	245	A						
23							E	A	265	290	315	335	330	340	320	300	235	A						
24							E	200	280	295	315	355	340	340	320	295	255	A						
25							S	200	285	305	315	335	345	350	320	300	270	S						
26							S	210	260	315	335	355	355	350	340	305	250	185						
27							S	190	280	300	325	350	350	345	330	295	250	S						
28							E	200	280	305	330	335	345	335	325	290	260	160	E					
29						E	S	215	285	300	320	340	350	335	325	290	260	170	E					
30																								
31																								
Count						1	18	16	23	24	25	25	25	26	26	27	26	6	2					
Median						E	E	195	255	300	315	335	340	330	315	285	235	155	E					
U.Q.																								
L.Q.																								
Q.R.																								

foE

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

The Radio Research Laboratories, Japan

W3

IONOSPHERIC DATA

Feb. 1968 | foEs | 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	E	E	E	E	E	E	E	G	G	G	G	G	017G	G	G	G	G	E014S	E	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C.	C	C	033	029	E013S	E016S	E	E	E	015	E
3	E	E	E	E	E	E	E	021	G	G	G	G	G	G	G	G	030	E013S	E	E	E	E016S	E015S	E
4	E	E	E	E	E	E	E	C	029	033	G	G	G	G	G	G	023	E015S	E	015	J029	J023	E	E018S
5	E	E	E	E	E	E	E	G	C	C	C	C	C	G	G	034	G	018	E	E015S	E015S	E016S	J026	J021
6	J023	J020	014	014	E	E	E	G	032	034	G	G	045	G	037	G	033	J030	020	J053	J033	J033	J033	J030
7	J043	J023	J030	J021	E	E	E015S	G	032	034	030G	G	G	G	G	G	G	E014S	E012S	E	E	E016S	E	E016S
8	E	E	E	E	E	E	E015S	023	032	G	G	G	G	G	G	G	G	E014S	E	E	E	E	E	E
9	E015S	E	E	E	E	E	E	G	G	033	G	G	G	033	033	033	024	E016S	J033	J029	J032	018	040	E
10	E	015	J020	E	E	E	E	E018S	025	032	G	025G	C	C	G	G	024	E015S	E	J025	J023	J023	J024	J035
11	J033	J022	E	J022	E	E	E	C	C	C	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	C	G	G	G	019G	G	028	043	013	E	E	E	E015S	E
13	E012S	E	E	E	E	E	E	020	J043	J038	033	C	C	C	C	C	040	025	E016S	E015S	J030	J022	016	023M
14	E015S	E	E	E	E	E	E	025	033	037	038	C	G	G	G	035	031	J044	J025	J025	020	E	E	E
15	E	E	E	E	E	E	E	G	G	G	G	J041	029G	040	G	J032	025	G	J025	E	E015S	E	E	E
16	C	E	E	E	E	E	E	G	G	032	G	G	G	031G	031	031	027	J036	J028	J028	E	E015S	E	E
17	E	C	C	C	C	C	C	C	C	025G	038	046	G	G	G	G	G	020	J021	E	E	E	E	E
18	E017S	E	E	014	016	E	E	015G	030	024G	032	G	G	G	035	G	G	021	E014S	024	E	015	018	E
19	E016S	J031	J025	015	J020	015	E017S	G	G	G	G	G	025G	G	025G	018G	018G	J030	E012S	E015S	E013S	E016S	E	E
20	E016S	E	E	E	E	E	E	G	G	C	037	039	G	037	G	G	G	020	E015S	E	E	E014S	E	E015S
21	E	E	E	E	E	E014S	E	G	G	G	J080	J051	042	033	G	G	G	020	E012S	J025	J044	J023	J030	015
22	E015S	E	E	013	E	E	E	025	038	J054	039	035	J065	J049	046	030G	030	J026	020	J025	J024	J022	J025	E016S
23	E	018	016	018	E	E	E	025	G	G	G	034	032G	026G	G	G	G	021	E	E	E	E012S	E	019
24	027	016	J023	J030	J024	018	E	G	G	G	G	034G	G	028G	025G	035	031	J021	E	E015S	E016S	E	E	E015S
25	E016S	014	E	015	E	E	E015S	G	G	G	G	033G	033G	G	053	G	G	E020S	E	E	E012S	E	E	J023
26	E	E	E	E	E	E	E015S	024	G	G	034	030G	030G	G	G	G	G	G	J024	E016S	E	E	E	E
27	E	E	E	E	E	E	E013S	3	G	G	028G	G	G	G	G	037	G	G	E016S	017	019	E013S	E	J021
28	E017S	E	E	E	J021	E	G	G	G	G	G	G	G	G	G	G	G	G	E	E	E	E	E	E015S
29	E	E	E	E	E	E	E016S	G	G	G	G	G	032G	G	025G	G	G	G	E	E	E	E	E	E
30																								
31																								
Count	26	26	26	26	26	26	26	24	24	24	25	24	24	25	26	27	28	28	28	27	27	27	27	27
Median	E	E	E	E	E	E	E	G	G	G	G	G	G	G	G	G	G	E019	E012	E015	E012	E014	E	E015
U.Q.	E016	015	E	014	E	E	E013	020	031	033	034	034	G	G	G	G	028	023	020	025	023	018	018	019
L.Q.	E	E	E	E	E	E	E	G	G	G	G	G	G	G	G	G	G	E014	E	E	E	E	E	E
Q.R.																		D009						

foEs

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

The Radio Research Laboratories, Japan

W4

IONOSPHERIC DATA

Feb. 1968 | f_bEs | 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													017G					S		C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	G	023	S	S				015	
3								018									023	S				S	S	
4								C	G	G							G	S		013	025	012		S
5									C	C	C	C	C			G		G		S	S	S	016	E
6	015	E	E	E					020	020			G		G		020	015	012	028	012	016	021	020
7	S	020	018	012			S		020	020	020G							S	S			S		S
8							S	G	G									S						
9	S									G				032	G	G	G	S	025	020	024	018	016	
10		E	E					S	020	025		024G	C	C			G	S		012	012	S	020	020
11	018	011		011				C	C	C	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	C				018G		G	023	012				S	
13	S							020	026	030	023	C	C	C	C	C	021	G	S	S	025	020	015	E
14	S							G	G	G	G	C				035	G	040	022	019	016			
15												G	025G	G		029	G		012		S			
16	C									031				030G	031	G	G	030	025	020		S		
17		C	C	C	C	C	C	C	C	023G	G	040						G	E					
18	S			012	E			015G	027	022G	020				G			G	S	S		015	E	
19	S	013	E	E	E	012	S						025G		023G	017G	018G	018	S	S	S	S		
20	S									C	G	G		G				G	S			S		S
21						S					044	040	041	033				G	S	E	028	021	020	015
22	S			E				G	G	042	G	G	046	047	025	022G	021	022	017	020	020	020	012	S
23		E	E	011				022				030	027G	025G				018				S		E
24	E	E	E	E	012	013						030G		025G	024G	G	G	018		S	S			S
25	S	E		E			S					031G	031G		029			S			S			017
26							S	020			030	030G	030G						E	S				
27							S				028G					G			S	014	016	S		E
28	S				E																			S
29							S						030G		024G									
30																								
31																								
Count																								
Median																								
U.Q.																								
L.Q.																								
Q.R.																								

f_bEs

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

The Radio Research Laboratories, Japan

W5

IONOSPHERIC DATA

Feb. 1968 | 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	E	E	E	E	E	E	E	E015S	011	017	016	016	012	017	016	012	011	E014S	E	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	016	013	E013S	E016S	E	E	E	E	E
3	E	E	E	E	E	E	E	E	012	017	018	019	018	019	020	012	011	E013S	E	E	E	E016S	E015S	E
4	E	E	E	E	E	E	E	C	017	018	020	020	020	020	020	016	012	E015S	E	E	E	E	E	E018S
5	E	E	E	E	E	E	E	012	C	C	C	C	C	018	017	017	012	E	E	E015S	E015S	E016S	E	E
6	E	E	E	E	E	E	E	E	012	017	017	015	018	020	017	015	E	E	E	E	E	E	E	E
7	E016S	E	E	E	E	E	E015S	E	E	E	016	020	017	017	016	015	011	E014S	E012S	E	E	E016S	E	E016S
8	E	E	E	E	E	E	E015S	E015S	014	014	015	012	018	017	015	012	012	E014S	E	E	E	E	E	E
9	E015S	E	E	E	E	E	E	012	015	016	017	017	018	018	017	012	012	E016S	E	E	E	E	E	E
10	E	E	E	E	E	E	E	E018S	E	011	012	017	C	C	011	E	012	E015S	E	E	E	E014S	E	E
11	E	E	E	E	E	E	E	C	C	C	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	C	013	011	017	012	017	015	E012S	E	E	E	E	E015S	E
13	E012S	E	E	E	E	E	E	E	011	011	012	C	C	C	C	C	011	E013S	E016S	E015S	E	E	E	E015S
14	E015S	E	E	E	E	E	E	017	015	016	017	C	017	019	017	015	016	E013S	E	E	E	E	E	E
15	E	E	E	E	E	E	E	013	012	012	015	017	018	015	017	012	E	E012S	E	E	E015S	E	E	E
16	C	E	E	E	E	E	E	E015S	016	017	018	017	018	017	017	015	012	E	E	E	E	E015S	E	E
17	E	C	C	C	C	C	C	C	C	016	012	017	019	017	017	011	012	E012S	E	E	E	E	E	E
18	E017S	E	E	E	E	E	E	E	012	015	E	016	017	014	011	011	011	E014S	E014S	E015S	E	E	E	E
19	E016S	E	E	E	E	E	E017S	E	013	014	015	012	017	017	013	E	E	E	E012S	E015S	E013S	E016S	E	E
20	E016S	E	E	E	E	E	E	E016S	017	C	017	017	017	019	021	017	016	E015S	E015S	E	E	E014S	E	E015S
21	E	E	E	E	E	E014S	E	012	017	018	020	020	020	018	019	015	017	011	E012S	E	E015S	E	E	E
22	E015S	E	E	E	E	E	E	013	012	016	017	018	018	017	015	012	E	012	E	E	E	E	E	E016S
23	E	E	E	E	E	E	E	E	011	012	016	017	017	017	017	012	011	E	E	E	E	E012S	E	E
24	E	E	E	E	E	E	E	012	011	013	012	016	017	018	016	011	011	E	E	E015S	E016S	E	E	E015S
25	E016S	E	E	E	E	E	E015S	015	016	016	016	017	017	021	017	017	017	E020S	E	E	E012S	E	E	E
26	E	E	E	E	E	E	E015S	013	016	016	016	017	020	017	016	017	015	015	E016S	E016S	E	E	E	E
27	E	E	E	E	E	E	E013S	015	013	016	018	019	017	018	017	017	015	E014S	E016S	E	E	E013S	E	E013S
28	E017S	E	E	E	E	E	E	E	011	015	016	017	016	017	017	017	012	012	E	E	E	E	E	E015S
29	E	E	E	E	E	E	E016S	013	012	017	018	018	018	018	018	016	017	012	E	E	E	E	E	E
30																								
31																								
Count	26	26	26	26	26	26	26	24	24	24	25	24	24	25	26	27	28	28	28	27	27	27	27	27
Median	E	E	E	E	E	E	E	E012	012	016	016	017	018	017	017	015	012	E013S	E	E	E	E	E	E
U.Q.																								
L.Q.																								
Q.R.																								

f-min Sweep 1.0 Mc to 20.0 Mc in 20 sec in automatic operation

The Radio Research Laboratories, Japan

W6

IONOSPHERIC DATA

Feb. 1968 | M(3000) F2 0.01 | **135° E Mean Time** (G. M. T. +9h) | Wakkanai | Lat. 45° 23.6'N | Long. 141° 41.1'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	270	260	260	275	270	295	300	315	340	320	315	300	325	300	300	300	320	290	285	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	310	305H	290	280	290	295	265	260	255
3	260	245	250	260	265F	275F	U285F	310	315H	310	310	300	300H	315	310	300	310	305	285	310	295	270	270	270
4	270	245	245	250	275	260	315	I320C	330	310	305	300	310	290H	300	295H	310	285	295	285	275	245	245	275
5	280	270	250	270	255	275	290	320	C	C	C	C	C	300	310	295	315	320	290	295	305	270	275	275
6	260	260	265	280	275	300	280	325	325	310	320	300	295	280H	315	305	310	300	300	310	320	265	265	265
7	270	275	280	280	280	250	295	315	360	340	315	305	310	315	320	325	310	300	315	330	310	295	265	260
8	270	280	290	270	290	265	295	315	320	325	300	305	295	295	305	295	315	315	290	305	280	285	290	275
9	255	260	260	265	290	275	285	315	340	335	335	300	305	295	295	300	305	315	290	295	280	255	265	255
10	250	265	290	300	265	260	270	310	325	325	310	310	I310C	I305C	325	310	315	295	300	285	305	285	275	275
11	275	275	285	250	250F	235F	260	C	C	C	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	C	345	325	315	315	325	320	325	315	295	315	280	250	270S
13	255	260	275	275F	U275F	295	300	335	340	345	325	C	C	C	C	C	300	315	325	290	310	310	270	260
14	255	260	255	245	255F	270	280	335	340	340	300H	I305C	295	300	305	340	330	340	275	270	285	285S	285	280
15	265	270	270	265	280S	300	295	335	345	325	310	290	310	315	325	320	330	310	300	315	270	285	265	250
16	I250C	260	260	285	255	250	265	320	330	335	315	285	330	320	320	325	330	330	290	305	310	275	255	255
17	265	C	C	C	C	C	C	C	C	330	335	315	325	315	325	315H	340	315	315	320	300	270	265	250
18	255	245	280	280	280	285	280	320	325	335	330	320	310	315	320	330	310	300	310	295	295	275	275	260
19	245	255	255	280	270	265	275	320	315	345	330	285	320	305	325	305	305	330	290	300	300	275	275	265
20	275S	265	270	270	280	295	300	345	330	I340C	335	290	315	340	315	300	315H	335	285	295	285	275	260	250
21	245	245	260	245	255	260	285	315	315	325	300	310	315	320	300	310	320	315	325	300	300	270	245	250
22	260	265	260	250	280	265	300	325	340	300H	325	310	345	310	295	310	305	315	290	290	280	275	255	250
23	260	275	260	260	275	270	295	330	320	320	325	300	295	295	300	330	310	300	310	275	295	270	265	270
24	260	270	260	255	270	280	300	340	335	325	305	320	310H	315	295	300	315	315	310	285	290	280	275	255
25	260	255	255	265	275	270	280	345	330	325	305	315	310	315	325	300	315	305	300	300	280	290	280	270
26	255	250	255	265	270	260	295	320	320	315	320	300	300	300	280	305	315	305	290	285	275	285	265	270
27	265	265	265	265	280	275	295	325	310	300	310	305	315	295	300	300	305	310	295	295	270	275	270	260
28	255	255	260	280	290	325	290	325	315	305	300	290	300	285	290	295	300	310	295	305	285	265	245	235
29	235S	245F	270F	245F	265	240	265	305	320	310	280	290	310	290	285	295	305	305	285	265	290	270	255	245F
30																								
31																								
Count	27	26	26	26	26	26	26	25	24	25	25	25	25	26	26	27	28	28	28	27	27	27	27	27
Median	260	260	260	265	275	270	290	320	330	325	315	300	310	305	310	305	310	310	295	295	295	275	265	260
U. Q.																								
L. Q.																								
Q. R.																								

M(3000) F2 Sweep 1.0 Mc to 20.0 Mc in 20 sec in automatic operation

The Radio Research Laboratories, Japan

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IONOSPHERIC DATA

Feb. 1968 | M(3000) F1 | 0.01 | **135° E Mean Time** (G. M. T. +9h) | Wakkanai | Lat. 45° 23.6'N | Long. 141° 41.1'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1																								
2									C	C	C	C	C	C	C									
3													405	395H										
4											395		395L											
5									C	C	C	C	C											
6														L										
7													405											
8											U405L	405			385L									
9										U390L	420		405L	U435L										
10											400		C	C	C									
11									C	C	C	C	C	C	C	C								
12									C	C	C	L	U405L	370	U390L									
13										400	410	C	C	C	C	C								
14										400		I400C	L	U390L										
15										410	405	U395L	395	395	365									
16											L													
17									C		U400L	U385L		L	385	380								
18											U410L	410	L	U380L	L									
19													385	U385L	U390L									
20										C	L	L	L	L	L									
21											A	L	410L	380L	415	385								
22											L		A	A	400L									
23										400L	L	430	400											
24											U425L	L			L									
25										400L		405L	415		370									
26										L		L	415	390										
27										L		L	U395L		415	L								
28									L	410L		U395L	U415L		380L									
29									L		U410L	410	L	370L		U395L								
30																								
31																								
Count										7	10	9	13	10	10	3								
Median										400L	U410L	405	405	390L	390L	385								
U. Q.																								
L. Q.																								
Q. R.																								

M(3000) F1 Sweep 1.0 Mc to 20.0 Mc in 20 sec in automatic operation

IONOSPHERIC DATA

Feb. 1968 | h'F2 km | **135° E Mean Time** (G.M.T. +9h) | Wakkanai | Lat. 45° 23.6'N | Long. 141° 41.1'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1																								
2									C	C	C	C	C	C	C									
3													235H	235										
4											240		245											
5									C	C	C	C	C											
6														225H										
7													250											
8											225	235			245									
9										245	235		245	245										
10											225		C	C	260									
11									C	C	C	C	C	C	C	C								
12									C	C	C	245	235	240	240									
13										240	230	C	C	C	C	C								
14										225		I250C	240	240										
15										230	230	240	250	260	260									
16											240													
17									C		265	260		245	260	235								
18											225H	245	260	240	250									
19													260	250	250									
20										C	235	245	260	260	245									
21											250	255	245	250	240	250								
22											270		255	260	245									
23										225	245	245	245											
24											245	250			245									
25										225		250	240		265									
26										225		240	245	245										
27										225		245	250		250	240								
28									240	240		240	250		250									
29									245		250	260	250	250		260								
30																								
31																								
Count									2	9	15	15	18	14	14	4								
Median									240	225	240	245	250	245	250	245								
U.Q.																								
L.Q.																								
Q.R.																								

h'F2 Sweep 1.0 Mc to 20.0 Mc in 20 sec in automatic operation

The Radio Research Laboratories, Japan

W9

IONOSPHERIC DATA

Feb. 1968 | h'F km | 135° E Mean Time (G.M.T. +9h) | Wakkanai | Lat. 45° 23.6'N | Long. 141° 41.1'E

22

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	295	300	300	280	275	240	235	220	210	215	240	235	240	235	235	240	245	210	245	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	230	220	205	245	230	250	275	295	280
3	300	310	310	270	270	245	260	235	210	220	230	225	210	210H	235	240	235	215	210	245	245	270	275	275
4	265	325	350	325	265	250	225	I230C	220	225	205	220	220	235H	240	225H	245	220	220	230	265	290	300	295
5	250	245	300	275	245	295	250	240	C	C	C	C	C	240	235	240	225	210	220	240	250	265	300	285
6	300	325	310	275	275	260	285	245	220	225	210	235	240	210	240	240	240	215	225	250A	245	260	325	340
7	300	305	295	265	255	290	260	225	225	240	220	225	215	230	230	245	220	200	250	210	240	275	295	320
8	305	265	250	290	250	305	250	250	215	225	210	210	215H	240	240	240	240	210	220	230	265	260	250	295
9	325	300	300	265	255	250	235	235	230	235	210	215	225	215	240	245	245	220	260	250	280	310	305	300
10	340	285	255	225	250	300	290	240	215	230	205	245	I235C	I225C	215	240	240	210	215	205	225	245	300	310
11	300	295	250	295	360	385	340	C	C	C	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	C	230	220	220	225	240	240	210	225	245	225	245	340	300
13	305	300	275	250	285	250	220	220	225	215H	200	C	C	C	C	C	225	225	200	230	250A	250	305	350
14	360	310	300	335	305	275	225	235	225	220	225	I200C	225	210H	240H	245	225	I225A	240	275	250	260	270	265
15	275	275	280	280	280	250	230	220	225	215	205	210	200	205	215	245	225	225	215	225	290	255	275	305
16	I320C	280	300	250	285	310	275	235	240	220H	225	220	245	220	195H	245	225	215A	260	250	230	290	320	330
17	300	C	C	C	C	C	C	C	C	225	215	235	230	225	220	215	220	240	220	215	240	275	285	335
18	350	345	280	255	255	250	260	230	220	210H	200H	220	225	235	225	235	260	235	230	215	255	295	265	280
19	350	320	295	295	310	300	275	240	225	240	225	225	210	250	240	235	240	220	225	225	245	285	280	290
20	305	300	295	285	265	250	225	225	215	I220C	220	220	220	240	240	235	220H	220	245	255	225	255	310	370
21	350	345	310	325	295	275	250	240	240	235	I225A	I210A	240	240	220	240	240	225	210	245	275A	315	390	340
22	325	295	305	330	275	250	250	220	245	235A	200H	240	I230A	I220A	225	240	250	220	215	250	230	275	320	315
23	325	295	285	300	270	245	250	220	220	220	210	195	215	245	240	245	225	210	205	225	225	270	300	295
24	310	295	275	310	290	260	250	220	220H	205H	195	240	210H	200H	225	250	245	220	200	250	240	255	295	300
25	320	320	300	295	270	275	255	215	220	210	190H	210	200	250	225	240	240	220	230	250	225	245	255	305
26	310	325	305	290	275	270	255	210	230	240	225H	225	210	215	230	245	245	220	210	220	245	245	275	300
27	300	300	300	295	280	295	250	240	225	230	220	215H	235	230	220	225	245	220	215	235	240	245	265	305
28	315	310	300	250	235	215	255	230	220	210	220H	225	210	230	245	245	245	245	215	230	230	260	320	390
29	375	345	260	305	250	340	265	235	240	235	215	210	200H	210	245	240	240	240	220	270	245	260	280	320
30																								
31																								
Count	27	26	26	26	26	26	26	25	24	25	25	25	25	26	26	27	28	28	28	27	27	27	27	27
Median	310	300	300	290	270	265	250	230	220	225	215	220	220	230	230	240	240	220	220	235	245	260	295	305
U.Q.																								
L.Q.																								
Q.R.																								

h'F

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

The Radio Research Laboratories, Japan

W10

IONOSPHERIC DATA

Feb. 1968 | **h'Es** km | **135° E Mean Time** (G.M.T. +9h) | Wakkanai | Lat. 45° 23.6'N, Long. 141° 41.1'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E	E	E	E	E	E	E	G	G	G	G	G	100	G	G	G	G	S	E	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	120	110	S	S	E	E	E	100	E
3	E	E	E	E	E	E	E	105	G	G	G	G	G	G	G	G	110	S	E	E	E	S	S	E
4	E	E	E	E	E	E	E	C	175	150	G	G	G	G	G	G	160	S	E	110	105	105	E	S
5	E	E	E	E	E	E	E	G	C	C	C	C	C	G	G	120	G	150	E	S	S	S	105	105
6	100	100	100	110	E	E	E	G	105	110	G	G	120	G	145	G	110	110	110	105	105	105	100	100
7	100	100	100	100	E	E	S	G	135	100	105	G	G	G	G	G	G	S	S	E	E	S	E	S
8	E	E	E	E	E	E	S	150	140	G	G	G	G	G	G	G	G	S	E	E	E	E	E	E
9	S	E	E	E	E	E	E	G	G	150	G	G	G	110	115	115	115	S	110	100	100	100	120	E
10	E	100	100	E	E	E	E	S	110	110	G	105	C	C	G	G	160	S	E	105	110	100	105	105
11	110	110	E	110	E	E	E	C	C	C	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	C	G	G	G	100	G	150	100	110	E	E	E	S	E
13	S	E	E	E	E	E	E	105	105	105	110	C	C	C	C	C	110	140	S	S	115	110	115	150
14	S	E	E	E	E	E	E	150	145	125	115	C	G	G	G	145	125	115	115	110	115	E	E	E
15	E	E	E	E	E	E	E	G	G	G	G	120	105	120	G	110	150	G	120	E	S	E	E	E
16	C	E	E	E	E	E	E	G	G	110	G	G	G	110	105	150	140	110	110	110	E	S	E	E
17	E	C	C	C	C	C	C	C	C	105	145	125	G	G	G	G	G	165	105	E	E	E	E	E
18	S	E	E	110	105	E	E	105	100	105	100	G	G	G	150	G	G	120	S	105	E	100	105	E
19	S	110	105	100	100	100	S	G	G	G	G	G	105	G	100	105	100	100	S	S	S	S	E	E
20	S	E	E	E	E	E	E	G	G	C	150	140	G	165	G	G	G	195	S	E	E	S	E	S
21	E	E	E	E	E	S	E	G	G	G	110	110	110	110	G	G	G	125	S	110	110	110	110	110
22	S	E	E	105	E	E	E	140	125	115	110	115	105	105	100	105	110	105	105	100	100	100	110	S
23	E	105	105	100	E	E	E	110	G	G	G	115	110	110	G	G	G	115	E	E	E	S	E	105
24	110	105	105	100	100	100	E	G	G	G	G	110	G	105	105	150	135	100	E	S	S	E	E	S
25	S	100	E	105	E	E	S	G	G	G	G	110	110	G	110	G	G	S	E	E	S	E	E	110
26	E	E	E	E	E	E	S	115	G	G	110	105	110	G	G	G	G	G	105	S	E	E	E	E
27	E	E	E	E	E	E	S	G	G	G	110	G	G	G	G	105	G	G	S	105	115	S	E	115
28	S	E	E	E	110	E	G	G	G	G	G	G	G	G	G	G	G	G	E	E	E	E	E	S
29	E	E	E	E	E	E	S	G	G	G	G	G	110	G	105	G	G	G	E	E	E	E	E	E
30																								
31																								
Count	4	8	6	9	4	2		8	9	11	10	10	10	8	10	10	14	14	9	10	9	8	9	8
Median	105	100	100	105	100	100		110	125	110	110	110	110	110	105	120	120	115	110	105	110	100	105	110
U.Q.																								
L.Q.																								
Q.R.																								

h'Es Sweep 1.0 Mc to 20.0 Mc in 20 sec in automatic operation

The Radio Research Laboratories, Japan

W11

IONOSPHERIC DATA

Feb. 1968 | Types of Es | 135° E Mean Time (G.M.T. +9h) | Wakkanai | Lat. 45° 23.6'N | Long. 141° 41.1'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1													1											
2																c	1						f	
3								1									1							
4									h	h							h			f	f2	f		
5																c		h					f2	f
6	f	f	f	f					1	1			c		h		1 h	1	f	f2	f	f2	f3	f3
7	f	f	f2	f					c 1	1	1													
8								h	h															
9										h				1	c	c	c		f2	f2	f3	f	f	
10		f	f2						1	1		1					h			f	f	f	f2	f2
11	f	f		f2																				
12															1		h	1 c	f					
13								1	12	12	1						1 h	c			f4	f2	f2	f
14								c	h	c	c					h 1	c	c2	f4	f2	f			
15												c	1	c 1		1	h 1		f					
16										1				1	1	h	h	c3	f4	f2				
17										1	h 1	c 1						h	f					
18				f	f2			1	13	1	1				h			c		f		f	f	
19		f2	f2	f2	f	f							1		1	1	1	1						
20											h	h		h				h						
21											c2	12	c	1				c		f	f4	f2	f3	f
22				f				h	c	c2	c	c	12	12	1	1	1	1	f2	f2	f2	f2	f	
23		f	f	f				1				1 1	1	1				1						f
24	f	f2	f	f2	f2	f						1		1	1	h 1	h 1	1						
25		f		f								1	1		1									f2
26								1			1	1	1						f					
27											1					1				f	f			f
28					f																			
29													1		1									
30																								
31																								
Count																								
Median																								
U.Q.																								
L.Q.																								
Q.R.																								

Types of Es

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

The Radio Research Laboratories, Japan

W12

IONOSPHERIC DATA

Feb. 1968 | foF2 | 0.1Mc | 135° E Mean Time (G.M.T. +9h) | Akita | Lat. 39° 43.5'N | Long. 140° 08.2'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	041	040	040	041	041	042	036	068	092	103	104	106	108	112	096	096	089	086	056	066	054	034	033	033
2	034	036	036	C	C	C	C	C	C	096	102	121	111	098	092	096	085	081	065	064	061	051	051	051
3	046	044	046	051	044	043	040	073	104	108	119	118	126	105	104	102	093	083	057	061	063	059	049	050
4	048	046	048	049	050	042	043	071	095	111	122	119	117	116	116	107	109	096	083	I074C	063	054	052	056
5	057	053	050	I051C	048	047	049	082	111	111	116	126	133	129	119	105	096	086	072	065	057	055	046	047
6	044	041	040	042	040	036	037	074	106	116	116	114	I114C	I117C	114	099	101	093	072	064	058	043	040	043
7	044	046	046	042	043	038	038	077	096	103	116	114	103	101	100	085	095	080	058	063	054	041	039	039
8	040	041	041	039	042	034	037	068	I102R	111	108	117	106	114	106	101	096	091	076	056	049	047	048	046
9	043	042	044	046	047	038	040	068	088	098	110	106	108	111	114	106	096	091	066	066	049	045	046	046
10	046	046	047	045	035	036	038	078	093	096	103	119	123	119	106	102	105	096	069	066	057	047	041	039
11	041	I039C	041	036	035	033	036	089	077	081	109	136	135	126	123	104	104	I095C	090	083	078	069	065	053
12	066	061	064	060	066	068	081	086	116	123	I136R	116	098	094	104	099	096	089	069	055	052	040	037	042
13	042	042	043	045	044	043	037	067	097	089	102	099	103	119	108	104	097	089	072	057	046	039	031	031
14	036	036	036	033	034	035	041	072	088	096	094	096	106	105	098	097	091	086	057	051	056	045	042	040S
15	039	041	041	042	042	039	041	074	084	090	096	094	109	096	106	099	093	089	068	060	052	053	044	043
16	043	044	043	049	043	040	043	086	094	115	118	129	118	108	086	096	099	083	057	051	051	036	034	033
17	035	036	036	037	038	034	038	069	101	118	100	096	103	103	093	086	079	080	067	055	041	036	035	033
18	035	036	037	039	037	035	036	073	091	102	095	088	096	102	102	094	080	085	077	068	047	047	042	032
19	035	033	036	036	035	034	038	072	100	109	101	112	118	104	105	093	092	088	067	059	047	038	042	042
20	040	040	040	040	041	041	043	070	084	087	097	108	105	109	112	100	089	093	063	063	062	052	036	036
21	040	041	043	041	043	043	049	074	098	107	126	125	127	112	106	099	104	087	073	052	047	041	040	044
22	043	043	041	040	041	036	043	073	091	097	112	125	131	106	103	096	097	099	073	055	054	047	042	042
23	044	046	044	043	044	041	044	073	091	096	102	108	116	119	109	096	095	082	069	053	051	047	042	044
24	044	044	043	041	042	040	048	079	093	098	089	100	113	103	108	095	103	096	071	052	056	052	043	045
25	044	044	045	046	046	043	048	083	085	098	090	109	104	106	106	096	099	084	069	058	062	059	047	044
26	045	045	045	045	047	043	051	081	098	111	110	116	108	105	104	104	104	091	080	059	055	056	I050C	046
27	046	046	046	045	046	045	053	081	108	106	095	113	102	108	106	101	C	C	C	C	C	056	051	049
28	049	051	050	053	056	036	043	077	104	106	108	121	115	116	118	120	105	100	091	072	064	055	054	049
29	I051R	054	055	048	051	042	052	087	115	114	I117R	130	131	I126C	I120C	I119C	106	I090C	I076C	I065C	C	C	C	C
30																								
31																								
Count	29	29	29	28	28	28	28	28	28	29	29	29	29	29	29	29	28	28	28	28	27	28	28	28
Median	043	043	043	042	043	040	042	074	096	103	108	114	111	108	106	099	096	089	069	060	054	047	042	044
U.Q.	046	046	046	047	046	043	048	081	103	111	116	121	120	116	113	104	104	093	074	066	061	054	048	046
L.Q.	040	040	040	040	040	036	038	072	091	096	098	106	104	104	102	096	092	084	066	055	049	041	040	039
Q.R.	006	006	006	007	006	007	010	009	012	015	018	015	016	012	011	008	012	009	008	011	012	013	008	007

foF2

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

The Radio Research Laboratories, Japan

A1

IONOSPHERIC DATA

Feb. 1968 | foF1 | 0.01Mc | 135° E Mean Time (G.M.T. +9h) | Akita | Lat. 39° 43.5'N | Long. 140° 08.2'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											L	LH	L	L	L									
2											L	L	720	460	L									
3											600	500L	L	L	L									
4											L	L	L	L	L									
5											L	L	L	L	L									
6										L	L	700H	I520C	C	L									
7										L	L	420	450	L	L									
8											L	L	550	410	L									
9											L	L	480L	L	L									
10										400	420	L	L	L	L									
11										400	L	490	L	L	L									
12											L	L	L	L	L									
13											L	L	L	L	L									
14										L	400	440	480	L	L	L								
15										L	480L	L	500	L	440									
16										L	L	500L	440L	L	440	400L								
17										420L	L	460	520	L	L	360L								
18										L	440	400	400	480	L									
19										L	460L	460	L	L	L									
20										L	410	L	LH	L	L	L								
21										L	500	500L	480	460L	LH	400								
22										400	430	520	470	460	L	400								
23										L	L	L	L	460	420	L								
24										L	450	460	L	L	L									
25										420	LH	540	440	620	L									
26										L	L	500	L	L	430	L								
27										L	LH	490	L	L	460L	410L								
28										L	480H	L	500L	410	L	L								
29									L	L	LH	L	490	I460C	I440C	C								
30																								
31																								
Count										5	11	15	15	9	6	5								
Median										400	450	490	480	460	440	400L								
U.Q.																								
L.Q.																								
Q.R.																								

foF1

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

The Radio Research Laboratories, Japan

A2

IONOSPHERIC DATA

Feb. 1968 | foE | 0.01Mc | 135° E Mean Time (G.M.T. +9h) | Akita | Lat. 39° 43.5'N | Long. 140° 08.2'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								195	265	305	335	350	360	355	330	305	260	B						
2								C	C	A	335	350	370	360	345	325	250	A						
3								210	280	I315A	330	355	365	350	340	315	260	A						
4								185	260	315	340	355	370	365	350	300	250	B						
5								190	270	310	330	355	365	360	340	310	265	B						
6								200	275	315	340	355	C	C	340	310	260	A						
7								205	265	320	345	355	360	355	340	305	260	B						
8								200	265	320	345	360	360	355	340	305	250	B						
9								I200A	275	315	335	I345A	I360A	365	340	A	A	A						
10								B	265	305	335	I340A	355	360	340	300	260	180						
11								205	265	315	335	350	355	360	345	320	250	C						
12								A	265	320	340	A	A	365	350	310	260	B						
13								I200B	265	315	340	355	360	355	330	300	250	B						
14								200	260	315	330	345	I350A	345	315	290	235	B						
15								210	I260A	315	340	350	355	355	335	300	250	B						
16								200R	265	315	335	350	360	I350R	325	295	250	A						
17								205	265	315	335	355	I360A	355	340	305	250	A						
18								200	270	315	340	350	355	355	325	285	245	200						
19								210	280	320	335	345	I350A	355	345	310	260	190						
20								210	265	315	330	340	350	360	335	315	275	200						
21								205	I270A	315	A	A	A	A	335	310	265	A						
22								225	285	315	A	A	A	345	335	320	285	A						
23								215	270	315	335	345	355	355	345	320	A	A						
24								I210B	275	320	335	I345A	355	360	350	325	270	200						
25								225	I280A	I320A	335	I345A	355	I360A	345	315	270	A						
26								225	285	320	340	355	365	365	360	325	285	210						
27								220	275	315	335	I350A	I355A	365	350	320	C	C						
28								220	280	320	340	355	365	360	345	315	285	B	B					
29								B	280	320	I340A	355	365	I360C	I350C	I325C	295	C	B					
30																								
31																								
Count								25	28	28	27	26	25	27	29	28	26	6						
Median								205	270	315	335	350	360	360	340	310	260	200						
U.Q.																								
L.Q.																								
Q.R.																								

foE

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

The Radio Research Laboratories, Japan

A3

IONOSPHERIC DATA

Feb. 1968 | foEs | 0.1Mc | 135° E Mean Time (G.M.T. +9h) | Akita | Lat. 39° 43.5'N | Long. 140° 08.2'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E017B	E014S	E014S	E012S	E012S	E013S	E017B	G	G	G	G	G	G	G	G	G	G	E022B	E013S	E012S	E017B	E014S	E012S	J021
2	E016B	E014S	J020	C	C	C	C	C	C	J045	038	042	G	G	G	035	029	026	E014S	E021B	E013S	E013S	J020	J026
3	J019	E014S	E012S	E	E	E012S	E014S	G	G	035	G	G	G	039	G	G	028	J029	E016B	E013S	J018	J016	E013S	E021B
4	E012S	E012S	E	E012S	E	E012S	E013S	G	G	G	036	G	G	G	G	031	G	E021B	E016B	C	E021B	E021B	J024	E013S
5	E013S	E012S	E016B	C	J025	E013S	E020B	G	G	G	G	G	G	G	037	G	G	022	E013S	023M	J023	J026	E014S	J044
6	J029	J022	J025	J020	J020	019M	E013S	G	G	G	045	038	C	C	J035	J028G	026G	024	J030	J054	J024	E019B	J029	E012S
7	E013S	E013S	E012S	E	E	E	J020	G	G	G	G	G	J038	J043	G	G	G	E020B	E014S	E017B	021M	E013S	E014S	E013S
8	E014S	E013S	E	E	E	E	E012S	J033	029	G	G	038	G	G	G	G	G	E022B	E014S	E013S	E013S	E013S	E013S	E013S
9	E013S	E	E	E	E	E012S	E012S	021	J025G	031G	G	039	038	041	G	032	J032	J020	J025	E013S	E013S	J023	J019	J021
10	J024	J030	018M	E	E013S	E013S	E012S	E019B	G	G	G	037	G	G	G	G	G	G	J020	E020B	E012S	E013S	E012S	E014S
11	J034	C	E	E012S	E	E013S	E013S	G	J028	G	G	G	036	G	G	G	G	C	E014S	E013S	E013S	E013S	E012S	E013S
12	E020B	E	E013S	E	E	E	E012S	J024	G	G	036	J074	J059	045	G	041	036	026	J042	E013S	E013S	E012S	E012S	E013S
13	E014S	E013S	018M	E	E	E012S	E	E021B	J024G	034	036	J054	G	038	037	033	028	024	J020	E013S	E013S	E019B	J025	J023
14	E012S	E013S	E	J017	J013	E013S	E020B	G	G	G	G	033G	J040	G	G	032	033	023	J024	022M	J016	E012S	J026	E012S
15	E013S	E	E	E	E	E	E012S	G	027	033	036	G	G	G	J074	G	G	020	E012S	E020B	E017B	E012S	E012S	E013S
16	E018B	E	E	J013	E	E012S	E013S	G	G	031G	G	G	G	034G	030G	028G	028	021	J019	E012S	E016B	E014S	E014S	E014S
17	JC20	E	E	E	E	E	E012S	G	G	G	G	G	038	G	G	G	G	029	J023	J020	E012S	E013S	E014S	E013S
18	E013S	E	E	E	E	E	E012S	G	G	G	G	G	G	038	039	035	029	J023	E012S	J029	J023	E012S	E013S	E013S
19	E012S	017M	J020	J020	J018	J018	E014S	G	G	G	G	G	036	G	J033	G	028	G	E013S	E015B	E012S	E013S	E019B	E013S
20	E013S	E012S	E	E	E	J020	E	G	G	G	G	039	039	G	J029G	G	G	G	E018B	E014S	E013S	E012S	E012S	E014S
21	E014S	E012S	E	E	E	E	E012S	G	030	G	J048	JC40	J061	J046	J043	G	J034	J029	J030	J030	J044	J036	J039	J023
22	J023	J038	J023	E	E	E013S	E013S	G	G	035	J059	J057	037	G	G	034	G	J026	J019	022M	E017B	J021	J023	E018B
23	J032	J028	J029	J049	J030	J015	E013S	G	G	G	G	040	J035G	G	G	G	030	J024	E013S	J026	E013S	E018B	E018B	E018B
24	J030	E	E	E012S	E	E	E013S	EC23B	G	G	035	J046	041	031G	038	023G	031	023	J023	J019	024M	E017B	E014S	E018B
25	E018B	E	J016	E	E	E	E018B	G	029	034	G	037	J038	J039	032G	J029G	031	022	E017B	E014S	E018B	E018B	E013S	E013S
26	EC20B	019M	J018	E	E	E	E013S	026	032	G	037	G	G	G	G	G	G	J025	J022	E013S	E014S	E018B	C	E020B
27	EC2CB	E	E	E	E	E	E014S	G	026G	G	036	J046	J043	G	G	G	C	C	C	C	C	J023	J020	E019B
28	JC29	J025	J018	JC16	E	E	E012S	G	G	G	G	G	G	G	G	G	G	E023B	E020B	E019B	E018B	E019B	E02UB	E024B
29	E020B	E013S	E013S	E012S	E013S	E019B	E020B	E024B	G	G	J037	G	G	C	C	C	G	C	C	C	C	C	C	C
30																								
31																								
Count	29	28	29	27	28	28	28	28	28	29	29	29	28	27	28	28	28	26	27	26	27	28	27	28
Median	E018	E013	E012	E	E	E012	E013S	G	G	G	G	G	G	G	G	G	G	023	E018	E018	E016	E015S	E014S	E014S
U.Q.	022	016	018	E012	E012	E013	E014	E020	G	G	036	040	038	038	034	032	030	025	023	022	021	E019	020	E021
L.Q.	E013	E	E	E	E	E	E012	G	G	G	G	G	G	G	G	G	G	E021	E014	E013	E013	E013	E013	E013
Q.R.	D009																	D004	D009	D009	D008		D007	

foEs

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

The Radio Research Laboratories, Japan

A4

IONOSPHERIC DATA

Feb. 1968 | f_bEs | 135° E Mean Time (G.M.T. +9h) | Akita | Lat. 39° 43.5'N | Long. 140° 08.2'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	S	S	S	S	S	B											B	S	S	B	S	S	018
2	B	S	020	C	C	C	C	C	C	034	038	040				035	028	026	S	B	S	S	019	016
3	018	S	S			S	S			034				G			028	020	B	S	016	E	S	B
4	S	S		S		S	S				036					G		B	B	C	B	B	017	S
5	S	S	B		E	S	B								G			022	S	E	021	020	S	019
6	023	014	019	018	013	E	S				043	G	C	C	025	024G	022G	019	019	021	E	B	021	S
7	S	S	S				015						029	025				B	S	B	E	S	S	S
8	S	S					S	014	029			037						B	S	S	S	S	S	S
9	S					S	S	021	023G	029G		037	038	G		032	027	020	019	S	S	020	017	018
10	E	021	E		S	S	S	B				037							E	B	S	S	S	S
11	023	C		S		S	S		023				G					C	S	S	S	S	S	S
12	B		S				S	023			G	039	037	039		033	029	024	026	S	S	S	S	S
13	S	S	E			S		B	023G	033	036	028		038	036	033	027	021	019	S	S	B	020	E
14	S	S		013	E	S	B					032G	036			032	032	022	023	E	016	S	016	S
15	S						S		027	G	G				023			020	S	B	B	S	S	S
16	B			E		S	S			030G				034G	029G	024G	028	021	016	S	B	S	S	S
17	016						S						037					025	020	015	S	S	S	S
18	S						S							037	037	033	027	021	S	E	021	S	S	S
19	S	E	E	014	012	014	S						036		024G		028		S	B	S	S	B	S
20	S	S				E						038	038		026G				B	S	S	S	S	S
21	S	S					S		028		036	036	038	037	028		025	024	022	027	020	022	022	020
22	020	028	015			S	S			G	034	043	037			033		021	E	E	B	020	020	B
23	021	015	015	030	014	014	S					040	032G				030	022	S	018	S	B	B	B
24	E			S			S	B			035	037	041	026G	038	022G	031	023	020	019	E	B	S	B
25	B		014				B		029	033		037	034	038	030G	027G	031	021	B	S	B	B	S	S
26	B	E	E				S	025	032		037							019	020	S	S	B	C	B
27	B						S		025G		036	040	038				C	C	C	C	C	020	E	B
28	020	015	015	E			S											B	B	B	B	B	B	B
29	S	S	S	S	S	B	B	B			036			C	C	C		C	C	C	C	C	C	C
30																								
31																								
Count																								
Median																								
U.Q.																								
L.Q.																								
Q.R.																								

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

The Radio Research Laboratories, Japan

A5

IONOSPHERIC DATA

Feb. 1968 | f-min | 0.1Mc | 135° E Mean Time (G.M.T. +9h) | Akita | Lat. 39° 43.5'N | Long. 140° 08.2'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	017	E014S	E014S	E012S	E012S	E013S	017	016	018	018	019	023	024	024	022	018	023	022	E013S	E012S	017	E014S	E012S	E012S
2	016	E014S	E	C	C	C	C	C	C	019	022	024	028	023	023	023	020	017	E014S	021	E013S	E013S	E012S	E013S
3	E013S	E014S	E012S	E	E	E012S	E014S	014	018	021	025	027	024	023	020	021	020	013	016	E013S	E013S	E	E013S	021
4	E012S	E012S	E	E012S	E	E012S	E013S	013	019	023	025	025	025	026	023	022	021	021	016	C	021	021	E012S	E013S
5	E013S	E012S	016	C	E	E013S	020	014	018	021	021	021	024	023	020	020	021	018	E013S	E013S	E012S	E012S	E014S	E013S
6	E012S	E	E	E	E	E012S	E013S	012	020	021	023	023	C	C	020	019	018	E013S	E012S	E012S	E013S	019	E012S	E012S
7	E013S	E013S	E012S	E	E	E	E012S	018	018	021	021	021	021	019	021	019	013	020	E014S	017	E013S	E013S	E014S	E013S
8	E014S	E013S	E	E	E	E	E012S	014	019	021	018	019	021	023	020	019	019	022	E014S	E013S	E013S	E013S	E013S	E013S
9	E013S	E	E	E	E	E012S	E012S	014	013	018	020	021	019	023	019	021	021	012	E012S	E013S	E013S	E012S	E012S	E012S
10	E014S	E012S	E	E	E013S	E013S	E012S	019	018	020	021	019	021	020	020	020	013	014	E014S	020	E012S	E013S	E012S	E014S
11	E013S	C	E	E012S	E	E013S	E013S	018	013	013	018	021	020	024	021	019	017	C	E014S	E013S	E013S	E013S	E012S	E013S
12	020	E	E013S	E	E	E	E012S	018	014	014	021	021	019	021	021	021	018	021	E013S	E013S	E013S	E012S	E012S	E013S
13	E014S	E013S	E012S	E	E	E012S	E	021	016	018	021	020	021	021	019	019	019	019	E012S	E013S	E013S	019	E013S	E014S
14	E012S	E013S	E	E	E	E013S	020	014	013	019	021	021	021	021	020	019	021	018	E012S	E014S	E012S	E012S	E012S	E012S
15	E013S	E	E	E	E	E	E012S	018	018	018	021	021	023	023	021	020	020	017	E012S	020	017	E012S	E012S	E013S
16	018	E	E	E	E	E012S	E013S	018	020	021	021	022	023	024	020	019	017	014	E012S	E012S	016	E014S	E014S	E014S
17	E	E	E	E	E	E	E012S	018	020	017	020	021	024	021	021	018	020	013	E014S	E012S	E012S	E013S	E014S	E013S
18	E013S	E	E	E	E	E	E012S	016	014	020	021	021	020	021	019	019	019	014	E012S	E012S	E012S	E012S	E013S	E013S
19	E012S	E	E	E	E	E	E014S	017	015	020	020	020	021	021	019	019	013	012	E013S	015	E012S	E013S	019	E013S
20	E013S	E012S	E	E	E	E012S	E	020	020	020	020	020	021	019	020	021	020	019	018	E014S	E013S	E012S	E012S	E014S
21	E014S	E012S	E	E	E	E	E012S	018	021	021	020	020	019	020	018	019	019	014	E012S	E012S	E012S	E012S	E012S	E013S
22	E	E013S	E	E	E	E013S	E013S	017	020	020	022	020	023	024	023	019	019	013	E013S	E013S	017	020	018	018
23	E012S	E	E	E	E	E	E013S	020	021	018	020	020	020	020	020	020	019	013	E013S	E013S	E013S	018	018	018
24	E014S	E	E	E012S	E	E	E013S	023	020	020	018	020	020	020	020	017	014	013	E014S	E012S	020	017	E014S	018
25	018	E	E	E	E	E	018	020	018	020	021	024	020	025	022	019	020	018	017	E014S	018	018	E013S	E013S
26	020	E013S	E	E	E	E	E013S	018	020	018	022	024	024	022	020	019	019	013	E012S	E013S	E014S	018	C	020
27	020	E	E	E	E	E	E014S	020	020	020	023	020	020	023	020	019	C	C	C	C	C	018	E012S	019
28	E012S	E	E	E	E	E	E012S	012	019	020	020	020	020	021	020	020	019	023	020	019	018	019	020	024
29	020	E013S	E013S	E012S	E013S	019	020	024	019	020	023	020	025	C	C	C	020	C	C	C	C	C	C	C
30																								
31																								
Count	29	28	29	27	28	28	28	28	28	29	29	29	28	27	28	28	28	26	27	26	27	28	27	28
Median	E013S	E012S	E	E	E	E	E013S	018	018	020	021	021	021	022	020	019	019	016	E013S	E013S	E013S	E013S	E013S	E013S
U.Q.																								
L.Q.																								
Q.R.																								

f-min | Sweep 1.0 Mc to 20.0 Mc in 15 sec in automatic operation

The Radio Research Laboratories, Japan

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IONOSPHERIC DATA

Feb. 1968 | M(3000) F2 | 0.01 | 135° E Mean Time (G.M.T. +9h) | Akita | Lat. 39° 43.5'N | Long. 140° 08.2'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	275	270	275	275	290	305	325	330	335	320	320	300	315	315	305	305	315	315	300	315	320	315	275	250
2	265	270	285	C	C	C	C	C	C	305	315	305	295	305	295	310	330	310	295	295	295	280	275	275
3	275	270	260	295	275	275	270	315	325	330	320	290	310	295	290	305	310	305	295	280	295	305	280	290
4	285	265	260	245	275	280	290	325	335	315	310	310	290	295	295	290	300	305	290	I300C	280	265	270	270
5	290	285	265	I270C	270	275	290	315	285	320	295	300	300	295	300	290	315	310	305	305	300	325	285	295
6	275	270	270	290	275	285	285	315	335	325	320	300	I295C	I300C	305	315	315	315	305	315	300	290	265	280
7	275	285	285	275	285	275	290	330	330	310	315	315	310	295	315	310	315	325	295	315	330	295	285	280
8	280	290	285	280	310	265	295	325	I320R	325	315	325	300	305	300	305	315	320	315	290	300	285	295	285
9	280	280	270	285	295	290	290	335	320	325	325	310	295	300	295	300	315	320	295	305	290	265	275	275
10	265	285	290	305	290	270	280	320	325	325	310	305	310	310	305	305	305	325	290	320	315	305	285	285
11	285	I290C	285	285	250	250	280	350	345	325	310	325	315	295	300	300	300	I305C	290	300	280	260	280	285
12	275	275	280	265	265	270	300	325	320	310	I320R	320	325	320	305	325	315	330	305	315	300	305	265	265
13	275	275	285	290	295	300	310	330	340	330	325	315	300	320	315	320	315	315	325	320	300	295	290	260
14	255	265	290	265	270	280	295	335	340	320	315	315	325	310	325	325	320	325	335	280	305	310	290	300S
15	275	275	285	290	300	300	295	345	350	340	335	310	320	315	320	320	315	345	325	300	290	300	295	260
16	250	280	275	310	280	265	280	330	320	315	315	325	305	315	315	320	325	350	345	300	315	300	285	275
17	270	270	280	290	290	275	290	335	330	345	330	320	320	310	325	305	315	330	335	320	315	295	290	275
18	265	255	285	290	305	290	290	330	325	320	325	300	310	310	330	330	315	330	310	325	300	300	280	265
19	275	265	290	290	285	265	290	335	320	325	320	305	320	315	310	305	320	320	350	305	300	295	285	285
20	280	275	275	275	295	295	310	340	345	335	315	335	290	305	310	320	325	325	315	295	310	310	260	250
21	265	255	265	260	270	275	285	330	335	305	315	315	315	310	295	310	315	320	315	305	300	270	255	270
22	265	280	265	265	275	285	305	335	325	320	315	310	320	310	300	315	310	325	315	290	295	300	280	260
23	270	275	275	270	295	295	305	330	330	320	310	315	305	310	305	305	315	305	320	300	295	305	280	275
24	275	285	280	275	285	280	305	340	325	320	315	310	320	290	320	300	300	325	310	285	305	310	280	265
25	275	270	275	275	290	270	290	315	340	325	330	320	305	300	310	295	325	335	315	295	290	300	315	275
26	265	260	260	270	285	265	295	330	320	315	320	310	310	305	300	300	310	310	315	290	290	300	I280C	275
27	275	265	275	280	275	270	305	335	325	335	305	310	275	305	290	305	C	C	C	C	C	290	275	275
28	265	265	260	295	325	325	290	315	325	315	295	300	280	285	295	300	295	310	310	295	305	295	275	260
29	I250R	260	290	260	280	255	290	315	320	300	I295R	300	290	I295C	I285C	I300C	310	I300C	I290C	I290C	C	C	C	C
30																								
31																								
Count	29	29	29	28	28	28	28	28	28	29	29	29	29	29	29	29	28	28	28	28	27	28	28	28
Median	275	270	275	280	285	275	290	330	325	320	315	310	310	305	305	305	315	320	310	300	300	300	280	275
U.Q.																								
L.Q.																								
Q.R.																								

M(3000) F2 Sweep 1.0 Mc to 20.0 Mc in 15 sec in automatic operation

The Radio Research Laboratories, Japan

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IONOSPHERIC DATA

Feb. 1968 | M(3000) F1 0.01 | 135° E Mean Time (G.M.T. +9h) | Akita | Lat. 39° 43.5'N | Long. 140° 08.2'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											L	LH	L	L	L									
2											L	L	350	375	L									
3											375	380L	L	L	L									
4											L	L	L	L	L									
5											L	L	L	L	L									
6										L	L	355H	I360C	C	L									
7										L	L	405	380	L	L									
8											L	L	365	390	L									
9											L	L	385L	L	L									
10										400	390	L	L	L	L									
11										395	L	370	L	L	L									
12											L	L	L	L	L									
13											L	L	L	L	L									
14										L	400	410	375	L	L	L								
15										L	360L	L	360	L	370									
16										L	L	360L	400L	L	390	375L								
17										385L	L	385	375	L	L	420L								
18										L	390	415	420	355	L									
19										L	395L	375	L	L	L									
20										L	400	L	LH	L	L	L								
21										L	360	360L	375	370L	LH	395								
22										400	400	365	385	390	L	395								
23										L	L	L	L	375	390	L								
24										L	400	395	L	L	L									
25										405	LH	355	390	355	L									
26										L	L	380	L	L	380	L								
27										L	LH	390	L	L	375L	390L								
28										L	375H	L	380L	395	L	L								
29									L	L	LH	L	390	I370C	I380C	C								
30																								
31																								
Count										5	11	15	15	9	6	5								
Median										400	390	380	380	375	380	395L								
U.Q.																								
L.Q.																								
Q.R.																								

M(3000) F1 Sweep 1.0 Mc to 20.0 Mc in 15 sec in automatic operation

IONOSPHERIC DATA

Feb. 1968 | h'F2 km | 135° E Mean Time (G.M.T. +9h) | Akita | Lat. 39° 43.5'N | Long. 140° 08.2'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											235	270	255	250	250									
2											250	280	300	250	250									
3											275	255	260	250	230									
4											250	250	250	290	250									
5											260	255	270	260	250									
6										250	255	290	I255C	I280C	250									
7										245	240	220	240	250	255									
8											245	240	295	255	255									
9											250	240	255	255	250									
10										230	240	265	275	250	270									
11										240	265	260	240	255	260									
12											240	235	230	240	255									
13											245	245	265	260	250									
14										230	240	240	250	255	255	245								
15										230	250	240	260	245	265									
16										240	235	260	250	240	240	250								
17										245	230	245	255	240	230	230								
18										240	240	225	240	265	245									
19										245	240	255	250	260	250									
20										225	235	235	260	275	250	235								
21										245	270	250	245	250	270	240								
22										230	245	280	255	240	250	235								
23										245	255	245	265	260	255	235								
24										240	230	235	270	265	250									
25										235	245	290	250	310	260									
26										240	235	275	255	250	265	255								
27										235	235	255	240	255	245	255								
28										240	245	255	265	235	270	265								
29									245	265	265	250	250	I255C	I260C	I245C								
30																								
31																								
Count									1	20	29	29	29	29	29	11								
Median									245	240	245	250	255	255	250	245								
U.Q.																								
L.Q.																								
Q.R.																								

h'F2 | Sweep 1.0 Mc to 20.0 Mc in 15 sec in automatic operation

The Radio Research Laboratories, Japan

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IONOSPHERIC DATA

Feb. 1968 | h'F | km | 135° E Mean Time (G.M.T. +9h) | Akita | Lat. 39° 43.5'N | Long. 140° 08.2'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	280	280	290	280	265	240	235	230	225	230	220	210H	215	235	230	230	230	220	215	235	220	220	285	I310A
2	330B	315	300	C	C	C	C	C	C	230	235	230	220	215	230	235	230	230	230	250	235	250	280	290
3	290	305	315	255	245	260	235	255	230	225	215	230	230	230	230	235	235	215	195	250	255	235	255	280
4	255	300	305	335	255	260	235	230	230	230	230	230	230	220	230	230	245	230	215	I245C	250	275	270	300
5	265	265	280	I270C	280	280	255	240	240	230	215	230	230	230	225	230	220	220	230	240	240	230	255	280
6	290	295	315	270	275	265	270	240	265	225	230	210H	I210C	I230C	230	230	235	220	215	230	225	240	295	295
7	290	280	265	235	250	265	240	240	220	220	225	190	190	230	235	225	230	225	205	240	225	240	250	300
8	290	280	255	265	240	310	250	230	235	225	230	230	215	210	230	230	235	230	215	210	235	255	255	265
9	270	290	290	275	245	240	240	230	215	230	220	205	220	235	230	230	230	225	215	230	225	280A	295	300
10	290	270	245	240	240	310	290	240	215	205	205	230	230	230	225	230	235	220	200	235	225	230	245	255
11	295	I250C	250	250	350	365	290	215	205	205	215	220	230	230	230	225	240	I235C	250	245	265	210	240	240
12	290	255	260	265	295	280	240	215	230	215	215	230	225	230	230	230	225	220	250	215	235	215	295	305
13	285	280	275	255	255	250	205	225	220	215	230	220	215	240	230	235	225	220	205	230	225	250	270	350
14	340	320	280	300	310	280	265	225	220	210	200	190	195	210	230	230	225	225	205	250	250	210	255	250
15	280	290	275	270	255	235	240	220	215	220	210	200	215	230	230	230	225	220	210	235	240	240	240	300
16	330	275	295	250	255	300	300	240	225	235	230	205	215	230	210	190	235	215	210	240	230	240	290	295
17	310	290	280	275	255	260	265	230	235	220	220	210	220	230	215	210	225	220	220	230	215	255	245	315
18	305	325	285	255	240	245	260	240	220	230	205	200	195	225	245	230	225	230	230	225	240	245	250	240
19	290	315	305	290	285	310	280	225	230	225	210	185	230	225	230	230	230	230	205	225	220	240	280	265
20	280	275	280	280	270	240	225	220	215	205	180	230	200H	230	225	225	225	235	220	250	240	220	290	325
21	340	335	305	310	290	280	230	220	230	225	210	225	230	220	210H	200	235	220	220	230	260	285	340	330
22	300	320	295	290	270	280	250	215	230	215	200	230	215	220	220	215	240	230	205	210	255	245	290	330
23	315	290	290	330	260	240	245	225	230	215	225	235	240	210	220	225	235	220	220	230	240	240	280	305
24	290	270	250	290	260	250	255	230	225	230	205	195	240	215	240	230	240	225	205	225	240	240	260	305
25	305	300	300	270	245	255	275	225	215	205	200H	195	195	230	240	230	245	220	220	230	250	230	230	260
26	315	310	300	290	255	260	265	225	230	225	230	220	230	235	210	235	235	225	220	215	240	250	I265C	295
27	300	290	280	275	270	265	255	225	230	230	210H	195	220	230	215	220	C	C	C	C	C	240	250	290
28	310	300	305	265	230	195	250	235	240	220	200H	230	220	210	230	245	240	235	220	220	240	245	305	360
29	360	340	270	265	255	B	225	230	220	220	195H	230	205	I200C	I220C	I230C	230	I225C	I230C	I260C	I255C	I255C	C	C
30																								
31																								
Count	29	29	29	28	28	27	28	28	28	29	29	29	29	29	29	29	28	28	28	28	28	29	28	28
Median	290	290	285	270	255	260	250	230	230	225	215	220	220	230	230	230	230	225	215	230	240	240	270	300
U.Q.																								
L.Q.																								
Q.R.																								

h'F Sweep 1.0 Mc to 20.0 Mc in 15 sec in automatic operation

The Radio Research Laboratories, Japan

A10

IONOSPHERIC DATA

Feb. 1968 | h'Es km | 135° E Mean Time (G.M.T. +9h) | Akita | Lat. 39° 43.5'N Long. 140° 08.2'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	S	S	S	S	S	B	G	G	G	G	G	G	G	G	G	G	B	S	S	B	S	S	100
2	B	S	115	C	C	C	C	C	C	115	145	135	G	G	G	160	155	140	S	B	S	S	120	120
3	115	S	S	E	E	S	S	G	G	130	G	G	G	125	G	G	155	115	B	S	140	110	S	B
4	S	S	E	S	E	S	S	G	G	G	130	G	G	G	G	125	G	B	B	C	B	B	110	S
5	S	S	B	C	115	S	B	G	G	G	G	G	G	G	140	G	G	160	S	140	130	120	S	100
6	100	100	115	100	100	110	S	G	G	G	135	140	C	C	100	100	105	140	115	105	110	B	105	S
7	S	S	S	E	E	E	115	G	G	G	G	G	100	100	G	G	G	B	S	B	100	S	S	S
8	S	S	E	E	E	E	S	100	150	G	G	140	G	G	G	G	G	B	S	S	S	S	S	S
9	S	E	E	E	E	S	S	150	120	115	G	125	125	125	G	125	120	115	110	S	S	105	100	100
10	120	100	100	E	S	S	S	B	G	G	G	135	G	G	G	G	G	G	110	B	S	S	S	S
11	105	C	E	S	E	S	S	G	110	G	G	G	140	G	G	G	G	C	S	S	S	S	S	S
12	B	E	S	E	E	E	S	150	G	G	140	120	120	125	G	145	140	130	115	S	S	S	S	S
13	S	S	100	E	E	S	E	B	105	140	E165G	105	G	E170G	155	E170G	E175G	140	120	S	S	B	105	125
14	S	S	E	105	115	S	B	G	G	G	G	110	105	G	G	160	140	130	110	110	110	S	105	S
15	S	E	E	E	E	E	S	G	135	150	140	G	G	G	100	G	G	140	S	B	B	S	S	S
16	B	E	E	130	E	S	S	G	G	115	G	G	G	110	105	105	140	120	115	S	B	S	S	S
17	110	E	E	E	E	E	S	G	G	G	G	G	125	G	G	G	G	155	140	135	S	S	S	S
18	S	E	E	E	E	E	S	G	G	G	G	G	G	150	140	140	150	140	S	110	105	S	S	S
19	S	105	105	105	105	105	S	G	G	G	G	G	115	G	105	G	145	G	S	B	S	S	B	S
20	S	S	E	E	E	105	E	G	G	G	G	140	140	G	105	G	G	G	B	S	S	S	S	S
21	S	S	E	E	E	E	S	G	115	G	110	110	105	105	105	G	105	105	105	115	110	110	110	110
22	105	105	105	E	E	S	S	G	G	130	110	110	115	G	G	130	G	110	105	105	B	105	110	B
23	105	105	105	100	110	110	S	G	G	G	G	170	105	G	G	G	155	110	S	110	S	B	B	B
24	105	E	E	S	E	E	S	B	G	G	140	110	170	105	165	100	150	140	100	100	100	B	S	B
25	B	E	100	E	E	E	B	G	120	115	G	110	105	105	105	105	145	120	B	S	B	B	S	S
26	B	100	100	E	E	E	S	E175G	E175G	G	E170G	G	G	G	G	G	G	100	100	S	S	B	C	B
27	B	E	E	E	E	E	S	G	110	G	140	110	110	G	G	G	C	C	C	C	C	105	110	B
28	100	100	100	100	E	E	S	G	G	G	G	G	G	G	G	G	G	B	B	B	B	B	B	B
29	B	S	S	S	S	B	B	B	G	G	120	G	G	C	C	C	G	C	C	C	C	C	C	C
30																								
31																								
Count	9	7	10	6	5	4	1	4	9	8	12	15	14	10	11	12	14	18	12	9	8	6	9	6
Median	105	100	100	100	110	110	115	U140	120	120	135	120	115	115	105	130	140	130	110	110	110	110	110	105
U.Q.																								
L.Q.																								
Q.R.																								

h'Es | Sweep 1.0 Mc to 20.0 Mc in 15 sec in automatic operation

The Radio Research Laboratories, Japan

A11

IONOSPHERIC DATA

Feb. 1968 | Types of Es | 135° E Mean Time (G.M.T. +9h) | Akita | Lat. 39° 43.5'N | Long. 140° 08.2'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1																								f
2			f2							c	h2	h2				h	h	h2					f2	f2
3	f2									h				h			h	c			f2	f		
4											h					h							f	
5					f										h			h2		f	f	f		f2
6	f2	f2	f f	f2	f	f					h	h			12	12	12	h2	f	f2	f		f2	
7							f						12	1 h							f			
8								1 h	h2			h												
9								h	1	1		h2	h	h		h2	c	c	f2			f4	f2	f2
10	f	f2	f									h							f					
11	f3								1				h											
12								h			h	c	c	h2		h	h2	c	f5					
13			f						1	h	h	12		h	h	h	h	h2	f				f2	f
14				f	f							1	12			h	h2	h	f	f	f		f2	
15									h	h	h				1			h						
16				f						1				1	12	12	h 1	c	f					
17	f2												h					h21	f f	f				
18														h	h	h	h2	h		f	f2			
19		f	f	f2	f3	f2							c		1		h							
20						f						h	h2		1									
21									c		1	1	1	12	1		1	12	f	f2	f2	f2	f2	f2
22	f2	f3	f2							h	1	12	c			h 12		1	f	f		f	f	
23	f2	f2	f2	f3	f	f						h	1				h2	13		f				
24	f										h	1	h 1	1	h	1	h 1	h 1	f	f	f			
25			f						c	c2		12	12	12	12	12	h	c						
26		f	f					h	h		h							1	f					
27									1		h	1	1									f2	f	
28	f	f	f	f																				
29											c													
30																								
31																								
Count																								
Median																								
U.Q.																								
L.Q.																								
Q.R.																								

Types of Es | Sweep 1.0 Mc to 20.0 Mc in 15 sec in automatic operation

The Radio Research Laboratories, Japan

A 12

IONOSPHERIC DATA

Feb. 1968 | foF2 | 0.1Mc | 135° E Mean Time (G.M.T. +9h) | Kokubunji Tokyo | Lat. 35° 42.4'N | Long. 139° 29.3'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	040	037	040	038	041	037	034	068	093	107	117	U105R	110	C	C	C	094	U098S	070	064	065	040	036	034
2	036	037	038	037	033	031	033	U071S	087	097	108	126	127	108	099	095	090	086S	069	064	064S	056	051	047
3	044	041	043	048	040	037	037	U073S	112	121	122	115	125	110H	112	U103R	100	092	067	057	066	062	047	050
4	052	044	043	041	043	039	042	U083S	U103R	114	123	128	123	121	126	118	110	U105R	U085S	075S	069S	058	059	052
5	058	054	046	048	045	046	051	088	107	114	121	133H	136	142	133	119	108	090	080S	066	062	057	U047S	U048S
6	045	045	042	045	040	037	037	I076S	112	104	120	116	123	125	126	106	102R	094	U080S	066	060	051	042	046
7	048	048	044	044	040	C	C	C	C	U103R	127	124	U106R	U102R	106	101	079	090	063	058	058	045	044	044
8	042	042	U041S	040	038	031	035	068	095	116	118	124	117	119	117	110	U103R	093	081	056	055	048	048	050
9	044	042	041	043	046	037	040	070	089	098	126	113	106H	119	120	120	097	093	075	063	056	047	U047S	049S
10	048	049	042	042	031	034	039	U080S	099	095	106	115	120	130	110	112	U104R	098	071S	066	060	055	044	036
11	038	038	037	039	033	U033S	039	083	083	076	121	143	135	120	117	107	105R	104	091	089	U083S	S	066	058
12	060	061	057	057	059	061	070	097	114	120	123	128	115	098	097	U104R	093	093	079	056	I048A	047	041	043
13	045	043	042	045	047	038	038	074S	096	095	116	119	113	123	126	118	111	109	085	063	051	044	038	034
14	035	035	039	034F	035	040	042	067	090	094	111	095	101	114	098	101	089	081	069	050	053	055	039	038
15	039	039	039	042	041	036	039	072	084	089	091	097	104	103	108	113	098	089	072	057	058	053	043	042
16	043	044	043	049	041	038	042	085	104	116	137	134	130	120	113	095	111	110	070	055	063	046	038	038
17	036	034	038	038	038	034	037	079	099	107	110	103	101	115	106	089	093	083	070	054	048	041	037	032
18	034	034	036	041	038	032	036	078	087	099	105	093	098	101	117	111	100	084	085	J080R	068	060	047	033
19	035	034	035	038	036	036	039	078	089	101	112	117	128	109	107	102	096	087	081	057	053	044	044	044
20	042	039	039	040	040	039	043	069	095	093H	098	110	113	114	116H	112	098	085	073	064	065	062	031H	034
21	037	037	039	039	039	042	050	078	095	C	C	C	C	C	111	109	J108R	094	080	056	047	044	044	047
22	045	048	I045A	044	040	040	042	074	093	109	114	111	123	120	114	107	099	J105R	090	A	057	057	049	046
23	045	048	045	043	042	039	043	074S	089	095	105R	117	120V	126	129	113	J107R	084	071	064	058	053	044	046
24	046	045	043	041	040	040	046	078	096	J106R	109	102	107	111	117	J107R	095	J104R	082	059	057	054	044	043
25	044	043	044	044	043	039	045	U081S	I098R	093	J102R	097	107	102H	112	097	095	100	069	061	067	064	052	044
26	047	045	045	045	046	043	049	088	095	112	115	108	115	116	113	105	103	106	083	070	065	062	056	049
27	047	045	045	045	043	042	048	085	J104R	102	099	108	110	111H	112	107	J107R	096	J086R	067	067	058	052	051
28	052	050	051	055	059	032H	043	074	108	J105R	098	127	118	127	127	123	C	C	C	C	070	064	060	056
29	057	057	060	052	054	048	060	090	J107R	110	128	133	130	127	126H	128	110	092	078	066	U075S	060	057	054
30																								
31																								
Count	29	29	29	29	29	28	28	28	28	28	28	28	28	27	28	28	28	28	28	27	29	28	29	29
Median	044	043	042	043	040	038	042	078	096	104	114	116	116	116	114	107	100	093	078	063	060	054	044	046
U.Q.	048	048	045	045	044	040	046	083	104	111	122	126	124	123	123	113	107	102	082	066	066	059	052	050
L.Q.	038	038	039	040	038	035	038	072	090	095	106	106	107	109	109	102	095	088	070	057	056	046	042	038
Q.R.	010	010	006	005	006	005	008	011	014	016	016	020	017	014	014	011	012	014	012	009	010	013	010	012

foF2

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

The Radio Research Laboratories, Japan

K1

IONOSPHERIC DATA

Feb. 1968 | foF1 | 0.01Mc | 135° E Mean Time (G.M.T. +9h) | Kokubunji Tokyo | Lat. 35° 42.4'N | Long. 139° 29.3'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L	L	L	L	C	C	C								
2										L	L	L	L	L	L									
3											L	L	L	L	L	L								
4											L	L	L	L	L									
5										L	L	L	L	L	L	L								
6											L	L	460L	L	L									
7									C	L	L	L	L	L	L	L								
8										L	L	L	L	L	L	L								
9										L	L	L	L	L	L	L								
10									L	L	L	L	L	L	L	L								
11										L	L	450L	L	L	L									
12										L	L	L	L		L									
13											L	L	L	L	L									
14											L	L		L										
15										L	L	L	L	L	L									
16										L	L	L	L	L	L									
17									L	L	L	L		L	L	L	L							
18									L	L	L	L	L	L	U500L	L								
19										L	L	L	L	L	L	L								
20											L	L	L	L	L	L								
21										C	C	C	C	C	L	L								
22									L		L	L	L	L	L	L								
23										L	L	L	U550L	L	L	L								
24										L	L	L	L	U530L	L									
25									L	L	L	L	U550L	L	L									
26									L	L	L	L	L	L		L								
27											L	L	U600L		L	L	L							
28										L	L	L	L	U600L	L		C							
29									L	400L	L	L	L	U620L			L							
30																								
31																								
Count										1		1	4	3	1									
Median										400L		450L	U550L	U600L	U500L									
U.Q.																								
L.Q.																								
Q.R.																								

foF1

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

The Radio Research Laboratories, Japan

K2

IONOSPHERIC DATA

Feb. 1968 | foE | 0.01Mc | 135° E Mean Time (G.M.T. +9h) | Kokubunji Tokyo | Lat. 35° 42.4'N | Long. 139° 29.3'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								B	265	315	340	355	R	C	C	C	270	160						
2								B	260	320	I335A	355	375	370	355	340	I255R	B						
3								200	270	320	340	I355R	I360R	I355R	350	I330R	260	A						
4								B	275	310	345	360	380	375	355	I315R	I260A	B						
5								B	260	I315R	345	375	I370R	I365R	350	315	260	B						
6								195	275	315	340	365	380	360	345	320	I260R	A						
7								C	C	315	340	355	I360R	360	345	I310A	255	205						
8								210	280	315	340	360	360	355	I340R	305	245	B						
9								A	255	315	330	355	365	360	A	A	A	B						
10								180	270	315	330	340	A	A	340	A	A	A						
11								185	265	A	A	360	I360A	350	I340A	I310A	250	160						
12								190	265	I310A	I350R	360	I360A	I360A	350	I315A	I260R	185						
13								190	255	325	335	360	360	355	350	320	255R	B						
14								190	260	310	330	345	I350A	355	335	305	250	B						
15								190	270	315	I340A	350	360	350	325	300	250	A						
16								170	270	320	350	I340A	I350A	350	330	300	260	A						
17								200	260	315	I330A	365	360	360	340	300	280	A						
18								170	I270A	320	340	355	360	355	335	300	255	180						
19								200	280	I320A	340	340	345	350	340	305	285	155						
20								185	270	320	330	350	360	355	350	325	280	180						
21								185	270	C	C	C	C	C	330	330	A	B						
22								215	285	I310A	A	I345A	365	I355A	345	330	270	A						
23								200	270	290	330	340	350	360	I335A	325	285	170						
24								190	I290A	330	340	355	A	A	A	I315A	280	A						
25								170	290	320	350	A	A	375	365	325	280	A						
26								185	270	325	350	365R	365	I365A	360	I330A	I285A	A						
27								190	290	I325A	I350A	360	I355A	A	A	A	I280A	A						
28							B	210	280	I325A	I350A	I365A	370	365	355	320	C	C						
29							B	200	285	320	A	A	A	A	I345A	320	270	200						
30																								
31																								
Count								23	28	27	25	26	23	23	25	25	25	9						
Median								190	270	315	340	355	360	360	345	315	260	180						
U.Q.																								
L.Q.																								
Q.R.																								

foE

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

The Radio Research Laboratories, Japan

K3

IONOSPHERIC DATA

Feb. 1968 | foEs | 0.1Mc | 135° E Mean Time (G.M.T. +9h) | Kokubunji Tokyo | Lat. 35° 42.4'N | Long. 139° 29.3'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E012B	E013B	E013B	019	E	E012B	020	E015B	G	024G	035	024G	031G	C	C	C	G	G	J021	021	020	J017	J017	020
2	E015S	021	E011B	E011B	E	E014B	E016S	E016B	G	028G	J038	043	045	031G	J029G	G	029	033	E013B	019	E014B	J024	E	019
3	E015S	E013B	J016	E011B	E011B	E015S	E014B	G	033	036	G	G	G	043	039	G	G	023	021	J024	E014B	E014B	E015S	J026
4	021	E014B	E015S	E013B	E	E014B	E012B	025	G	G	G	G	G	G	G	G	030	G	E012B	E013B	E012B	E014B	E014B	E012B
5	E014B	E013B	J022	E011B	E	E014B	E013B	E015B	G	025G	024G	G	G	G	G	021G	G	E015B	E014B	E011B	E016S	J017	E015S	022
6	020	E016S	E011B	J016	JG	020	E014B	J024	033	G	041	043	G	G	038	G	022G	J024	J036	J029	J024	022	E015S	E013B
7	E011B	J027	E011B	E011B	J016	C	C	C	C	G	G	G	G	G	G	036	030	027	021	E014B	E014B	E012B	E014B	E014B
8	E015S	E013B	E012B	E013B	E011B	E	E013B	G	G	G	037	039	G	G	G	G	G	E018B	E013B	E015S	E014B	E013B	E016S	E013B
9	E016S	E	E	E	E	E013B	E014B	021	030	036	036	G	G	G	J038	J037	033	021	J019	J025	J087	E013B	E015S	J025
10	J026	021	E013B	E014B	J018	E016S	E013B	G	G	G	G	037	044	038	G	036	032	023	J021	J017	022	E012B	E015S	E016S
11	E015S	E014B	E	J029	E011B	E011B	E014B	G	G	035	037	030G	040	039	037	035	G	G	E011B	E014B	E015S	E015S	022	021
12	E015S	E011B	018	E	E	E013B	020	G	G	035	G	G	J050	044	G	036	G	023	023	J029	J054	J024	J026	023
13	024	022	E016S	021	020	E	E012B	G	032	G	036	G	J030G	J029G	038	J025G	025G	024	J018	J025	E016S	019M	E015S	E015S
14	020M	024	020M	018	018M	E	J016	023	G	J030G	J030G	029G	043	032G	029G	033	032	025	023	E012B	020M	030M	020M	E014B
15	022M	017	E	E	E	E	E013B	G	G	034	J038	039	023G	G	G	031	030	025	023	E013B	020	019	E015S	020
16	E013B	J022	E	E	E	019	E012B	G	G	034	G	039	038	032G	G	033	034	056M	060M	J029	020M	022	020M	020
17	E014B	035M	020M	E	E	J020	E013B	019G	029	021G	035	039	G	J029G	039	034	021G	023	J016	022	021	E014B	E015S	019
18	E012B	E	E012B	E	019	E	E012B	023	035	G	G	024G	G	042	038	041	034	025	E012B	E012B	017	017	018	J019
19	E014B	019	018	J017	018M	020	E012B	G	G	035	G	030G	042	G	J026G	024G	G	026	017	E012B	E014B	E014B	018	018
20	021M	019	E014B	E	E	020M	E012B	G	030	G	J028G	041	044	042	039	J039	032	020	E013B	021M	E014B	022	021	021
21	E014B	E	E	E	E	E	E011B	G	032	C	C	C	C	C	J043	043	J037	J030	J019	021	J038	099M	J058	030
22	036	J039	046	J032	019	018	013	G	G	J038	038	J042	G	044	031G	J052	034	051	082	J071	J029	022	J022	023
23	020	J037	J023	021	020	E	030	G	G	J029G	039	039	J030G	035G	043	036	036	028	022	021M	E011B	E012B	023	E012B
24	E013B	E	E	E	E	021M	E014B	G	J030	G	037	042	J038	J043	044	038	J038	043	J029	023	E011B	E015S	E012B	E015S
25	E015S	E015S	E011B	E	E011B	E012B	020M	025	G	J028G	J029G	J038	042	033G	030G	039	035	027	J021	021M	E012B	E012B	021	019
26	E012B	E	E	E	018	J018	E014B	025	G	G	J028G	040	039	038	G	J033G	J029	J026	J029	021	021	E011B	E015S	J018
27	032	E013B	022M	E	E	E	E014B	G	G	035	036	J032G	044	044	044	J037	032	023	J023	J029	031	020	J018	E015S
28	E015S	E	E	E	E	E012B	E012B	J025	J028G	J037	038	038	G	G	G	020G	C	C	C	C	E014B	E014B	E013B	E013B
29	E013B	E012B	E	E011B	020	E	E015B	G	G	G	J037	J038	J043	J038	J035	G	G	G	E013B	018	E013B	J016	019	018
30																								
31																								
Count	29	29	29	29	29	28	28	28	28	28	28	28	28	27	28	28	28	28	28	28	29	29	29	29
Median	E015	E014	E012	E011	E011	E013	E014B	G	G	G	035	038	G	G	G	034	030	024	021	021	E016	016	E016	019
U.Q.	020	022	018	016	018	018	E014	022	030	035	037	039	042	042	038	037	034	027	023	024	022	022	020	021
L.Q.	E014	E012	E	E	E	E	E012	G	G	G	G	G	G	G	G	G	G	020	E014	E014	E014	E014	E015	E014
Q.R.	D006	D010																007	D009	D010	D008	D008	D005	D007

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

The Radio Research Laboratories, Japan

K4

IONOSPHERIC DATA

Feb. 1968 | foEs | 0.1Mc | 135° E Mean Time (G.M.T. +9h) | Kokubunji Tokyo | Lat. 35° 42.4'N | Long. 139° 29.3'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	B	B	E		B	016	B		022G	035	E024R	026G	C	C	C			016	E	E	015	E	E
2	S	E	B	B		B	S	B		026G	038	041	044	027G	027G		029	022	B	E	B	015		E
3	S	B	015	B	B	S	B		030	034				042	039			021	E	018	B	B	S	015
4	016	B	S	B		B	B	022									028		B	B	B	B	B	B
5	B	B	015	B		B	B	B		024G	023G					020G		B	B	B	S	014	S	016
6	E	S	B	012	E	E	B	017	029		040	039			037		020G	021	019	016	020	E	S	B
7	B	013	B	B	011	C	C	C	C							033	028	026	E	B	B	B	B	B
8	S	B	B	B	B		B				036	038						B	B	S	B	B	S	B
9	S					B	B	020	030	033	035				037	034	033	020	012	025	045	B	S	016
10	020	E	B	B	015	S	B					037	040	036		032	026	021	E	015	E	B	S	S
11	S	B		017	B	B	B			033	036	026G	040	039	036	031			B	B	S	S	E	E
12	S	B	E			B	E			032			040	040		033		021	020	018	A	015	025	016
13	E	E	S	E	E		B		031		036		029G	026G	036	025G	022G	023	015	016	S	E	S	S
14	E	E	E	E	E		E	016		026G	026G	029G	040	029G	029G	032	030	025	019	B	E	020	E	B
15	E	E					B			033	036	037	022G			025	029	019	E	B	E	E	S	E
16	B	E				E	B			033		037	036	032G		032	033	045	050	019	015	E	E	E
17	B	025	E			E	B	G	029	020G	035	037		018G	038	033	020G	022	016	015	E	B	S	E
18	B		B		E		B	023	029			022G		040	037	037	033	022	B	B	E	E	E	E
19	B	E	E	E	E	E	B			033		026G	042		026G	023G		025	016	B	B	B	E	E
20	E	016	B			E	B		030		028G	039	040	039	038	034	029	017	B	E	B	016	E	E
21	B						B		032	C	C	C	C	C	035	036	030	026	016	016	018	015	030	021
22	017	032	A	025	015	E	012			033	035	038		040	029G	038	029	051	080	A	025	E	017	E
23	E	016	013	016	E		016			026G	037	037	028G	033G	042	029	034	026	017	017	B	B	E	B
24	B					E	B		029		036	040	038	040	038	037	035	031	019	016	B	S	B	S
25	S	S	B		B	B	E	025		026G	027G	038	039	032G	026G	037	031	022	018	E	B	B	E	E
26	B				E	016	B	025			026G	040	039	E038R		033G	029	025	017	E	E	B	S	E
27	020	B	E				B			035	036	026G	040	040	037	033	030	022	018	025	019	E	E	S
28	S					B	B	020	026G	034	036	037				020G	C	C	C	C	B	B	B	B
29	B	B		B	E		B				037	038	040	037	035				B	E	B	E	E	E
30																								
31																								
Count																								
Median																								
U.Q.																								
L.Q.																								
Q.R.																								

foEs

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

The Radio Research Laboratories, Japan

K5

IONOSPHERIC DATA

Feb. 1968 | f-min | 0.1Mc | 135° E Mean Time (G.M.T. +9h) | Kokubunji Tokyo | Lat. 35° 42.4'N | Long. 139° 29.3'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	012	013	013	011	E	012	E015S	015	016	015	016	017	017	C	C	C	016	013	014	014	013	011	014	014
2	E015S	014	011	011	010	014	E016S	016	015	015	017	019	027	017	016	025	015	016	013	014	014	012	010	011
3	E015S	013	011	011	011	E015S	014	015	013	017	020	026	026	026	026	016	014	011	013	011	014	014	E015S	010
4	014	014	E015S	013	010	014	012	016	011	017	025	026	026	026	025	016	013	015	012	013	012	014	014	012
5	014	013	011	011	E	014	013	015	014	015	017	025	025	025	025	015	015	015	014	011	E016S	011	E015S	014
6	014	E016S	011	011	010	014	014	016	014	014	018	025	025	018	016	015	012	011	011	E015S	014	014	E015S	013
7	011	011	011	011	010	C	C	C	C	014	016	017	025	025	017	016	014	015	014	014	014	012	014	014
8	E015S	013	012	013	011	010	013	015	013	011	017	017	016	016	016	016	016	018	013	E015S	014	013	E016S	013
9	E016S	010	010	E	E	013	014	015	012	011	015	025	018	026	017	015	015	014	011	012	E015S	013	E015S	014
10	014	014	013	014	011	E016S	013	014	014	016	016	017	016	018	016	017	014	012	011	011	014	012	E015S	E016S
11	E015S	014	E	012	011	011	014	015	012	014	016	015	019	026	016	016	015	014	011	014	E015S	E015S	014	013
12	E015S	011	011	010	E	013	014	015	015	013	016	016	016	025	015	017	017	015	E016S	011	013	012	E015S	012
13	014	014	E016S	014	011	010	012	015	016	015	015	015	016	015	016	015	016	015	012	013	E016S	012	E015S	E015S
14	E015S	E015S	014	011	010	010	012	014	014	014	015	015	018	016	014	016	016	015	014	012	011	012	014	014
15	011	014	010	E	E	010	013	014	016	016	018	016	016	016	018	016	016	014	016	013	E015S	012	E015S	E015S
16	013	E015S	010	E	E	010	012	016	014	017	016	018	016	022	016	016	015	012	013	012	014	014	014	013
17	014	014	010	010	010	010	013	013	015	015	015	016	025	016	016	015	014	011	012	012	012	014	E015S	012
18	012	010	012	010	010	010	012	014	015	016	014	015	016	016	015	014	015	016	012	012	014	013	013	E015S
19	014	014	010	010	011	011	012	015	015	014	015	015	015	025	014	014	014	013	012	012	014	014	013	013
20	012	013	014	010	010	010	012	016	015	015	016	016	016	016	024	014	013	012	013	014	014	010	013	014
21	014	010	010	010	010	010	011	014	015	C	C	C	C	C	016	015	015	014	012	012	012	013	014	014
22	013	012	E	012	012	013	010	014	015	016	015	016	024	025	026	016	014	012	013	012	E015S	014	E015S	E015S
23	013	010	012	010	012	010	011	015	015	013	016	016	017	015	016	015	015	015	013	E015S	011	012	E015S	012
24	013	010	010	010	010	011	014	014	015	015	016	016	016	016	016	016	013	012	010	012	011	E015S	012	E015S
25	E015S	E015S	011	010	011	012	E015S	014	014	014	016	017	019	026	018	014	015	012	012	014	012	012	013	E015S
26	012	010	E	E	E	012	014	015	014	018	015	015	018	018	026	013	013	011	E015S	E015S	E015S	011	E015S	012
27	013	013	012	E	010	010	014	016	016	017	016	016	018	016	019	015	015	013	012	010	013	014	010	E015S
28	E015S	010	010	010	010	012	012	014	014	014	016	018	019	025	019	015	C	C	C	C	014	014	013	013
29	013	012	010	011	010	010	015	012	015	015	016	019	018	020	018	016	012	012	013	013	013	E015S	012	013
30																								
31																								
Count	29	29	29	29	29	28	28	28	28	28	28	28	28	27	28	28	28	28	28	28	29	29	29	29
Median	013	012	011	010	010	010	012	015	015	015	016	016	018	018	016	016	015	014	012	012	014	012	012	013
U.Q.																								
L.Q.																								
Q.R.																								

f-min

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

The Radio Research Laboratories, Japan

K6

IONOSPHERIC DATA

Feb. 1968 | M(3000) F2 0.01 | 135° E Mean Time (G.M.T. +9h) | Kokubunji Tokyo | Lat. 35° 42.4'N Long. 139° 29.3'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	280	275	275	275	300	295	300	335	330	320	320	U305R	295	C	C	C	295	U320S	330	305	325	305	270	265
2	260	270	285	275	280	260	290	U350S	335	305	315	300	290	305	295	280	305	300S	290	285	300S	300	280	275
3	275	270	255	295	275	250	275	U315S	325	320	325	290	295	285H	295	U300R	290	310	310	275	290	325	280	285
4	285	270	255	250	270	260	285	U330S	U340R	310	305	295	290	280	280	285	290	U305R	U295S	295S	290S	270	285	260
5	285	295	290	265	280	280	295	330	335	315	300	290H	290	285	285	305	305	300	310S	305	290	300	U300S	U290S
6	280	285	265	290	285	280	280	I310S	330	295	310	295	290	290	295	300	315R	310	U325S	310	305	325	270	280
7	275	290	280	290	305	C	C	C	C	U315R	320	320	U320R	U295R	300	315	290	325	315	300	310	305	290	280
8	280	285	U285S	285	315	255	275	325	320	325	315	300	310	285	290	300	U305R	300	300	295	295	280	280	290
9	285	270	265	280	310	275	275	330	335	310	320	300	290H	290	285	300	295	315	320	305	295	280	U270S	275S
10	275	290	295	290	325	255	260	U330S	330	315	305	300	295	310	300	310	U300R	305	325S	300	305	315	300	260
11	275	295	295	310	250	U250S	285	335	350	295	290	300	300	280	290	290	285R	290	290	295	U275S	S	285	260
12	270	275	265	260	260	280	300	325	325	315	330	320	320	305	315	U325R	315	315	315	320	I290A	300	265	270
13	270	285	280	285	315	280	285	335S	335	325	345	320	300	300	315	300	315	330	320	315	310	295	310	250
14	245	265	300	260F	255	290	300	325	345	330	335	325	310	325	325	315	325	325	330	295	300	325	285	280
15	275	270	280	300	340	290	295	335	345	325	310	320	315	310	305	320	335	335	330	300	300	290	295	260
16	260	280	265	305	300	260	275	330	345	310	320	315	320	310	325	305	325	335	330	285	320	320	285	255
17	260	275	265	285	290	270	285	335	335	325	330	340	300	315	320	315	330	335	330	330	315	305	295	265
18	265	255	275	295	330	285	300	320	340	320	325	310	315	315	320	325	340	315	315	J325R	320	315	300	275
19	270	255	270	280	280	260	285	340	335	320	320	305	320	310	310	315	325	330	330	290	305	300	295	295
20	285	285	285	290	300	305	330	360	345	325H	315	325	320	300	300H	340	325	330	335	295	310	340	245H	250
21	255	255	260	265	265	275	300	335	315	C	C	C	C	C	300	310	J315R	320	325	315	285	275	275	265
22	280	270	I280A	285	290	285	300	350	345	330	325	295	300	310	300	315	305	J325R	I330A	A	280	300	285	275
23	280	280	290	280	295	285	295	340S	325	315	305R	310	305V	295	320	310	J315R	335	305	315	310	305	275	275
24	280	290	300	275	285	280	305	335	345	J320R	340	325	300	305	315	J305R	295	J330R	315	305	305	300	295	265
25	275	270	275	295	305	260	285	U335S	I345R	310	J330R	320	310	275H	310	320	315	340	320	295	300	325	300	270
26	270	270	280	280	300	265	290	340	325	310	315	315	305	295	300	295	300	320	310	290	295	305	300	285
27	275	280	285	285	280	280	310	340	J330R	325	320	305	310	290H	305	300	J315R	300	J310R	295	305	295	275	275
28	275	280	275	310	360	285H	280	325	325	J320R	305	300	290	290	290	290	C	C	C	C	300	295	275	245
29	250	245	280	270	270	250	305	320	J320R	300	305	300	290	290	295H	295	305	310	305	275	U310S	280	280	275
30																								
31																								
Count	29	29	29	29	29	28	28	28	28	28	28	28	28	27	28	28	28	28	28	27	29	28	29	29
Median	275	275	280	285	290	280	290	335	335	320	320	305	300	295	300	305	310	320	320	300	300	300	285	275
U.Q.																								
L.Q.																								
Q.R.																								

M(3000) F2

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

The Radio Research Laboratories, Japan

K7

IONOSPHERIC DATA

Feb. 1968 | M(3000)F1 | 0.01 | 135° E Mean Time (G.M.T. +9h) | Kokubunji Tokyo | Lat. 35° 42.4'N | Long. 139° 29.3'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L	L	L	L	C	C	C								
2										L	L	L	L	L	L									
3											L	L	L	L	L	L								
4											L	L	L	L	L									
5										L	L	L	L	L	L	L								
6											L	L	410L	L	L									
7									C	L	L	L	L	L	L	L								
8										L	L	L	L	L	L	L								
9										L	L	L	L	L	L	L								
10									L	L	L	L	L	L	L	L								
11										L	L	395L	L	L	L									
12										L	L	L	L		L									
13											L	L	L	L	L									
14											L	L		L										
15										L	L	L	L	L	L									
16										L	L	L	L	L	L									
17									L	L	L	L		L	L	L	L							
18									L	L	L	L	L	L	U340L	L								
19										L	L	L	L	L	L	L								
20											L	L	L	L	L	L								
21										C	C	C	C	C	L	L								
22									L		L	L	L	L	L	L								
23										L	L	L	U360L	L	L	L								
24										L	L	L	L	U360L	L									
25									L	L	L	L	U365L	L	L									
26									L	L	L	L	L	L		L								
27											L	L	U365L		L	L	L							
28										L	L	L	L	U350L	L		C							
29									L	400L	L	L	L	U355L			L							
30																								
31																								
Count										1		1	4	3	1									
Median										400L		395L	U365L	U355L	U340L									
U.Q.																								
L.Q.																								
Q.R.																								

M(3000)F1 Sweep 1.0 Mc to 20.0 Mc in 20 sec in automatic operation

The Radio Research Laboratories, Japan

K8

IONOSPHERIC DATA

Feb. 1968 | h'F2 km | 135° E Mean Time (G.M.T. +9h) | Kokubunji Tokyo | Lat. 35° 42.4'N | Long. 139° 29.3'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										235	230	230	270	C	C	C								
2										265	270	275	250	275	280									
3											255	280	285	230H	260	245								
4											240	260	265	315	270									
5										235	265	235H	275	280	250	245								
6											255	230	260	275	275									
7									C	235	270	255	235	245	280	240								
8										255	250	245	275	305	250	260								
9										245	270	240	245	300	260	260								
10									245	230	255	250	260	275	250	260								
11										230	285	260	250	250	260									
12										230	215	260	260		260									
13											250	250	250	290	255									
14											250	230		275										
15										240	240	240	250	260	260									
16										255	255	255	250	240	250									
17									240	240	250	245		250	240	240	250							
18									220	240	240	240	280	255	270	245								
19										245	245	260	255	250	255	260								
20											240	255	260	280	250H	235								
21										C	C	C	C	C	240	250								
22									240		250	240	250	255	250	240								
23										240	260	255	270	260	255	240								
24										245	240	255	280	290	255									
25									240	250	240	250	260	240H	290									
26									240	255	255	250	275	290		255								
27											240	255	295		245	260	245							
28										240	240	280	250	310	280		C							
29									240	240	260	255	240	305			230							
30																								
31																								
Count									7	20	28	28	26	25	25	15	3							
Median									240	240	250	250	260	275	255	245	245							
U.Q.																								
L.Q.																								
Q.R.																								

h'F2

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

The Radio Research Laboratories, Japan

K9

IONOSPHERIC DATA

Feb. 1968 | h'F km | 135° E Mean Time (G.M.T. +9h) | Kokubunji Tokyo | Lat. 35° 42.4'N | Long. 139° 29.3'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	275	300	300	285	E265E	250	230	230	225	225	225	215	225	C	C	C	225	250	210	250	230	210	275	315
2	340	315	275	275	230	350	290	220	225	235	230	230	240	225	210H	230	240	230	215	235	250	245	255	275
3	290	315	340	255	235	300	280	260	235	235	230	230	255	230	230	220	235	230	205	285	260	230	260	275
4	265	285	325	355	260	295	260	245	230	230	230	215	225	230	230	230	230	235	215	250	235	260	255	280
5	280	265	265	300	E260E	290	260	240	235	230	230	215	235	235	225	230	230	225	230	230	240	235	250	260
6	290	280	300	270	245	250	275	255	235	220	230	215	190	230	235	245	230	230	220	235	250	230	275	295
7	280	265	250	260	240	C	C	C	C	220	245	230	220	220	230	230	210	230	215	245	250	210	255	300
8	280	265	270	265	230	310	275	230	230	230	230	225	205	230	235	240	230	225	220	210	250	250	255	280
9	275	260	295	E275E	E250E	275	280	225	225	230	225	225	215	225	230	245	230	230	215	E275A	I260A	260	295	295
10	310	255	235	250	235	350	300	240	230	230	230	230	235	220	235	225	245	225	205	230	230	230	240	270
11	285	250	E250E	250	380	380	250	230	220	230	240	210	225	245	245	245	235	250	240	260	270	220	260	265
12	280	280	270	290	E325E	275	235	235	235	225	225	225	235	245	235	235	230	240	215	235	I260A	255	330	320
13	275	270	280	275	250	235	230	235	230	230	240	225	210	205H	230	240	240	240	200	205	210	250	255	345
14	355	320	275	310	340	270	225	210	230	230	195H	205	220	200	230	235	225	225	205	225	240	245	245	260
15	295	305	295	E255E	E230E	240	260	220	220	210	205	205	200	200H	240	245	230	220	210	210	250	240	245	315
16	325	280	305	E255E	E245E	295	305	245	230	230	205	230	210H	220	200	240	245	220	E250A	245	245	220	275	295
17	320	E340A	280	265	250	260	280	245	225	230	205	245	230	225	230	205	240H	225	205	205	225	240	250	315
18	325	345	305	255	230	275	260	230	220	220	230	210	205	245	240	245	235	220	230	230	230	230	240	255
19	305	340	310	280	280	320	290	225	230	210	215	190H	250A	240	245	210H	235	225	215	220	210	255	250	260
20	260	270	290	275	250	250	230	225	235	205H	190H	230	205	200	230	240	230	220	210	250	245	215	255H	345
21	360	350	315	305	280	280	250	210	230	C	C	C	C	C	210	205	245	230	210	220	260	255	350A	330
22	290	E350A	I345A	310	255	260	240	225	225	210H	210	195	210H	205H	220	220	240	240A	I245A	A	280	240	260	290
23	295	290	250	290	250	255	255	240	225	230	220	205	205	225	255	220	240	210	220	240	240	240	260	295
24	290	255	245	275	255	260	255	240	235	225	205H	210	210	210	230	245	240	240	210	210	245	240	245	290
25	295	300	300	260	240	255	290	240	210	210H	200H	220	220	220	225	240	240	230	205	220	255	220	240	280
26	305	305	E290E	E290E	E240E	290	290	240	220	235	225	225	215	205	240	210H	240	240	210	220	240	255	250	260
27	310	295	290	E260E	255	250	260	240	240	210	205	195H	210	230H	220	225	240	225	225	250	250	220	245	295
28	305	295	290	255	205	190H	275	240	240	225	205H	205	225	210	225	240	C	C	C	C	245	245	285	350
29	345	345	275	255	270	280	250	240	210	200	240	200H	225	205	240H	240	235	225	240	230	245	240	250	275
30																								
31																								
Count	29	29	29	29	29	28	28	28	28	28	28	28	28	27	28	28	28	28	28	27	29	29	29	29
Median	295	290	290	270	245	275	260	240	230	230	225	215	220	225	230	235	235	230	215	230	245	240	255	290
U.Q.																								
L.Q.																								
Q.R.																								

h'F

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

The Radio Research Laboratories, Japan

K 10

IONOSPHERIC DATA

Feb. 1968 | h'Es km | 135° E Mean Time (G.M.T. +9h) | Kokubunji Tokyo | Lat. 35° 42.4'N Long. 139° 29.3'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	B	B	125	E	B	115	B	G	110	110	100	105	C	C	C	G	G	105	105	100	130	130	130
2	S	125	B	B	E	B	S	B	G	110	110	150	130	110	110	G	150	175	B	105	B	110	E	105
3	S	B	125	B	B	S	B	G	155	130	G	G	G	145	145	G	G	105	105	110	B	B	S	105
4	105	B	S	B	E	B	B	155	G	G	G	G	G	G	G	G	115	G	B	B	B	B	B	B
5	B	B	110	B	E	B	B	B	G	110	105	G	G	G	G	105	G	B	B	B	S	130	S	110
6	105	S	B	110	110	110	B	105	140	G	145	135	G	G	160	G	110	105	105	110	100	105	S	B
7	B	115	B	B	110	C	C	C	C	G	G	G	G	G	G	110	125	155	110	B	B	B	B	B
8	S	B	B	B	B	E	B	G	G	G	150	135	G	G	G	G	G	B	B	S	B	B	S	B
9	S	E	E	E	E	B	B	155	155	140	130	G	G	G	115	115	115	115	115	110	110	B	S	105
10	100	100	B	B	105	S	B	G	G	G	G	140	110	115	G	115	115	110	105	105	105	B	S	S
11	S	B	E	110	B	B	B	G	G	115	120	115	125	130	125	115	G	G	B	B	S	S	130	130
12	S	B	150	E	E	B	130	G	G	110	G	G	120	135	G	115	G	150	155	130	125	115	105	105
13	115	105	S	105	105	E	B	G	130	G	170	G	105	105	170	105	110	145	125	100	S	140	S	S
14	110	105	105	110	105	E	100	105	G	105	105	105	105	110	105	E195G	140	130	115	B	110	105	100	B
15	105	100	E	E	E	E	B	G	G	170	110	130	105	G	G	105	155	130	125	B	100	105	S	115
16	B	105	E	E	E	105	B	G	G	150	G	120	120	105	G	175	125	115	110	105	100	105	105	110
17	B	110	110	E	E	120	B	105	120	105	115	170	G	105	140	145	105	100	105	120	115	B	S	115
18	B	E	B	E	120	E	B	140	115	G	G	105	G	155	155	135	135	145	B	B	110	140	150	150
19	B	105	105	105	105	105	B	G	G	120	G	105	155	G	105	100	G	120	115	B	B	B	105	100
20	105	100	B	E	E	105	B	G	120	G	105	145	140	140	140	100	130	100	B	100	B	110	110	105
21	B	E	E	E	E	E	B	G	180	C	C	C	C	C	115	145	105	115	110	110	115	125	105	105
22	105	105	105	105	100	100	145	G	G	115	110	105	G	115	110	125	125	110	110	105	100	105	105	105
23	110	110	110	100	100	E	105	G	G	110	120	115	105	105	120	100	170	150	120	100	B	B	100	B
24	B	E	E	E	E	105	B	G	115	G	145	125	115	105	105	145	135	100	100	100	B	S	B	S
25	S	S	B	E	B	B	105	155	G	110	110	115	105	105	105	150	150	125	110	100	B	B	135	115
26	B	E	E	E	105	100	B	175	G	G	105	155	130	120	G	125	115	100	100	100	100	B	S	100
27	105	B	100	E	E	E	B	G	G	110	115	105	120	115	110	115	110	110	105	105	105	100	100	S
28	S	E	E	E	E	B	B	115	110	115	115	115	G	G	G	100	C	C	C	C	B	B	B	B
29	B	B	E	B	105	E	B	G	G	G	115	110	110	110	110	G	G	G	B	105	B	125	120	110
30																								
31																								
Count	10	12	9	8	11	8	6	9	10	17	20	21	17	18	18	22	20	22	20	19	14	15	14	18
Median	105	105	110	110	105	105	110	140	125	110	115	115	115	110	115	115	125	115	110	105	105	110	105	110
U.Q.																								
L.Q.																								
Q.R.																								

h'Es

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

The Radio Research Laboratories, Japan

K11

IONOSPHERIC DATA

Feb. 1968 | Types of Es | 135° E Mean Time (G.M.T. +9h) | Kokubunji Tokyo | Lat. 35° 42.4'N | Long. 139° 29.3'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1				f			f			l	l	l	l						f2	f2	f	f	f	f
2		f								l	l2	hl	h	l	l		h	h		f2		f2		f
3			f						h	h				h	h			l	f	f				f2
4	f2							h2									l							
5			f							l	l					l						f		f
6	f			f	f	f		l	hl		h	h			h		l2	l2h	f2	f2	f3	f		
7		f			f											l	h2	h	f					
8											h	h												
9								hh	h	h	h				c	l	l2	l	f	f5	f4			f2
10	f5	f			f							h	l2	l		l	lh	lh2	f	f2	f			
11				f5						c	c	l	h	h	h	l							f	f
12			f				f			c			c	h		l		h	f	f4	f3	f2	f4	f2
13	f	f		f	f				h2		h		l2	l	h	l	l	h2	f	f		f		
14	f	f2	f	f	f		f	l		l	l	l	l2	l	l	h	h	h2	f2		f	f4	f	
15	f	f								h	l	hl	l			l	h	h	f		f	f		f
16		ff				f				hl		c	c2	l		hl	c21	c414	f4	f2	ff	f2	f2	f
17		f3	f			f		l	c21	l	c	h		l	h	h	l2	l3	f	f3	f			f
18					f			h2	c			l		h	h	h2	h2	h2			f	f	f	f
19		f	f	f	f2	f				c		l	h2		l	l2		c2	ff				f	f
20	f2	f				f			c		l	h	h	hl	hl	l2h	h212	l		f		f	f2	f
21									hl						cl	hl	l2	l2	f	f2	f3	f2f3	f4	f5
22	f2	f4	f4	f4	f	f	f			c	c2	l2		l	l	h212	h12	l4	f3	f4	f4	f	f2	f
23	f	f2	f	f	f		f3			l	c	c	l	l	cl	l2	h	h	f	ff2			f2	
24						f			l		h	h	c	l	l2	hc12	h212	l3	f3	f2				
25							f	h		l	l	c2	l	l	l2	hl	h	c21	f3	f			f	f
26					f	f		h			l	hl	hl	c		cl	c21	l2	f2	f	f			f
27	f3		f							l2	c	l	c	c	l	l	l	l2	f3	f4	f3	f	f	
28								l	l	c2	c	c				l								
29					f						c2	c	l	l	l2					f		f	f	f
30																								
31																								
Count																								
Median																								
U.Q.																								
L.Q.																								
Q.R.																								

Types of Es

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

The Radio Research Laboratories, Japan

K12

IONOSPHERIC DATA

Feb. 1968 | hpF2 km | 135° E Mean Time (G.M.T. +9h) | Kokubunji Tokyo | Lat. 35° 42.4'N | Long. 139° 29.3'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	365	385	375	370	345	330	330	275	275	295	295	U340R	340	C	C	C	325	U295S	295	340	290	300	360	400
2	400	395	355	355	345	410	355	U265S	275	325	320	330	340	320	335	355	310	320S	345	350	335S	335	365	370
3	370	400	430	345	360	410	355	U315S	295	290	290	360	335	370H	335	U320R	335	300	300	340	345	295	345	355
4	355	385	410	450	360	400	350	U280S	U275R	315	315	335	345	375	365	360	350	U325R	U330S	355S	345S	395	350	415
5	360	350	335	400	375	365	345	285	280	295	315	355H	355	345	345	305	325	325	310S	325	340	335	U330S	U345S
6	360	360	400	345	350	345	345	I315S	275	310	300	345	345	345	335	315	310R	300	U295S	320	320	295	365	365
7	370	350	350	350	320	C	C	C	C	U285R	295	295	U285R	U330R	315	295	335	290	300	345	315	315	350	365
8	355	355	U355S	350	300	415	355	295	295	280	300	330	305	360	345	325	U305R	315	315	330	345	355	355	350
9	350	385	400	370	310	360	360	275	270	305	300	320	345H	345	350	320	335	300	295	340	345	350	U390S	385S
10	390	345	345	345	295	425	370	U290S	285	300	325	315	335	315	315	310	U310R	305	275S	335	330	305	320	370
11	360	335	330	315	455	U445S	345	280	260	330	345	315	320	370	350	350	350R	335	330	335	U365S	S	355	400
12	400	370	400	410	430	365	345	290	280	295	270	300	300	315	295	U285R	300	300	285	300	I350A	335	390	395
13	375	350	365	350	305	335	345	275S	275	275	260	290	305	325	300	305	285	285	280	295	305	325	305	425
14	445	395	340	390F	415	360	305	280	250	275	280	270	305	290	290	300	270	280	270	335	320	280	335	355
15	365	375	360	335	270	320	330	260	250	280	305	290	305	315	325	300	255	255	275	335	320	340	335	400
16	405	380	395	320	315	410	380	285	255	300	290	300	300	320	290	320	290	260	270	345	300	290	350	380
17	400	355	370	350	325	375	345	270	270	285	285	255	325	300	300	295	275	270	285	270	300	305	320	390
18	405	420	380	330	275	350	340	270	250	290	280	300	300	300	300	290	280	290	290	J285R	295	300	320	345
19	385	425	390	360	355	400	355	250	280	295	290	310	295	305	305	305	290	270	280	345	310	325	340	340
20	350	355	350	350	340	330	285	240	260	295H	300	295	300	340	305H	270	295	280	260	350	320	270	460H	430
21	430	435	405	395	380	360	325	255	290	C	C	C	C	C	320	305	J305R	290	290	300	350	360	380	390
22	380	390	I370A	360	355	350	320	255	260	290	295	325	305	305	305	300	305	J290R	I275A	A	345	310	345	380
23	370	360	340	355	340	345	325	260S	275	290	315R	305	315V	325	300	305	J300R	260	315	305	310	310	370	390
24	370	340	320	380	350	360	320	260	260	J300R	270	290	325	315	305	J305R	330	J280R	290	305	325	315	340	390
25	370	385	385	355	310	390	355	U260S	I255R	305	J290R	295	300	370H	310	290	300	270	290	340	335	290	305	380
26	390	390	380	380	320	400	345	255	280	295	300	300	310	340	315	320	320	290	295	340	330	330	340	355
27	375	365	360	355	350	355	315	260	J280R	290	295	315	320	355H	330	315	J300R	305	J300R	325	310	330	360	385
28	380	380	385	320	250	340H	370	295	290	J300R	305	320	345	350	340	335	C	C	C	C	340	340	390	460
29	450	440	370	390	390	440	320	290	J280R	310	310	305	345	345	345H	320	305	300	320	370	U300S	355	355	375
30																								
31																								
Count	29	29	29	29	29	28	28	28	28	28	28	28	28	27	28	28	28	28	28	27	29	28	29	29
Median	375	380	370	355	345	360	345	275	275	295	300	310	320	330	315	305	305	290	290	335	325	320	350	380
U.Q.																								
L.Q.																								
Q.R.																								

hpF2

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

The Radio Research Laboratories, Japan

K13

IONOSPHERIC DATA

Feb. 1968 | ypF2 km | 135° E Mean Time (G.M.T. +9h) | Kokubunji Tokyo | Lat. 35° 42.4'N | Long. 139° 29.3'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	080	065	070	080	085	065	065	065	070	065	080	U070R	070	C	C	C	085	U080S	050	055	060	100	075	075
2	070	055	070	080	080	090	075	U060S	060	050	070	065	105	060	080	075	085	075S	080	090	065S	065	095	080
3	075	075	070	060	085	075	085	U060S	060	085	070	050	090	075H	090	U080R	085	075	075	075	080	070	080	075
4	075	085	090	075	095	095	090	U075S	U065R	080	090	070	085	085	075	090	100	U080R	U070S	055S	075S	075	095	095
5	080	075	070	085	075	080	080	060	055	085	095	070H	065	105	085	105	075	075	080S	070	085	060	U070S	U065S
6	070	070	070	065	075	070	070	I060S	080	100	095	075	085	075	080	095	075R	070	U065S	070	075	070	095	075
7	085	075	085	070	075	C	C	C	C	U095R	060	080	U075R	U075R	050	075	075	065	090	055	070	070	080	070
8	090	075	U075S	075	075	085	085	060	065	090	075	080	080	070	085	105	U090R	080	080	095	060	085	095	095
9	075	080	080	080	075	085	085	070	065	070	060	090	090H	080	095	095	080	075	070	055	100	080	U080S	075S
10	070	065	075	055	100	085	085	U065S	060	065	080	100	080	070	100	080	U085R	080	060S	060	065	060	080	090
11	070	065	060	065	080	U060S	055	065	050	100	080	085	080	085	090	090	090R	090	090	070	U100S	S	080	105
12	095	090	100	095	070	085	080	065	070	095	080	055	065	065	060	U070R	070	070	060	060	I080A	065	085	065
13	085	080	080	075	070	090	080	065S	060	055	075	110	080	070	080	095	080	055	110	100	095	090	090	075
14	060	065	055	080F	080	085	090	075	070	075	070	105	075	075	070	070	070	070	085	080	075	075	065	090
15	080	080	065	060	045	095	070	070	070	070	090	070	080	080	075	085	105	080	080	110	080	100	090	095
16	095	070	090	050	085	090	085	060	055	070	050	075	060	080	065	080	070	090	075	105	065	065	095	090
17	095	095	090	095	075	085	065	050	075	060	065	070	070	095	070	065	070	070	065	095	070	090	080	080
18	085	075	070	065	065	075	060	080	075	075	070	085	075	085	060	085	060	080	070	J070R	060	095	080	105
19	065	070	060	085	090	095	090	065	060	060	105	100	065	090	110	080	080	075	070	100	090	075	075	075
20	095	075	070	095	065	070	065	050	055	060H	070	055	070	070	110H	075	060	070	085	095	075	075	090H	070
21	075	075	085	075	080	085	075	070	065	C	C	C	C	C	090	095	J095R	065	055	095	095	085	090	080
22	080	070	I080A	085	090	095	080	045	055	055	065	100	095	090	105	095	065	J080R	I070A	A	100	090	100	080
23	080	085	075	090	065	055	080	050S	075	060	085R	090	085V	080	060	090	J065R	085	080	085	085	090	070	070
24	085	060	080	070	100	090	085	050	070	J050R	075	080	115	075	090	J095R	110	J070R	070	080	075	095	105	090
25	085	075	075	090	080	100	100	U055S	I060R	090	J055R	075	095	130H	085	070	055	080	105	105	065	075	080	080
26	100	070	080	065	090	095	080	055	065	050	075	100	105	085	100	090	075	065	100	100	070	070	070	090
27	075	080	085	090	095	090	065	060	J065R	060	055	085	075	090H	090	080	J095R	090	J095R	115	085	080	120	095
28	080	070	075	070	045	105H	090	060	070	J095R	095	080	110	090	080	110	C	C	C	C	105	070	100	090
29	095	105	080	100	070	070	080	080	J060R	100	080	090	075	085	100H	080	105	095	075	095	U050S	095	095	095
30																								
31																								
Count	29	29	29	29	29	28	28	28	28	28	28	28	28	27	28	28	28	28	28	27	29	28	29	29
Median	080	075	075	075	080	085	080	060	065	070	075	080	080	080	085	085	080	075	075	085	075	075	085	080
U. Q.																								
L. Q.																								
Q. R.																								

ypF2

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

The Radio Research Laboratories, Japan

K14

IONOSPHERIC DATA

Feb. 1968 | foF2 | 0.1Mc | 135° E Mean Time (G.M.T. +9h) | Yamagawa | Lat. 31° 12.1'N | Long. 130° 37.1'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	048	042	042	038	J040S	034	033S	U048S	084	104	117	118	124	130	137	138	127	116	115	086S	085	084	J069S	054
2	047	045	045	046	039	031	029S	061S	084	085	113	140	141V	120	114	119	119H	107	I095C	I087C	C	C	C	C
3	047	043	042S	046	034	032	033S	056S	097S	121	118	117H	127	130	127	129	119	112	099	068S	077S	084	056	039S
4	J046S	043S	F	038S	J041S	036	034	056S	097S	111	126	134	132	131	146	J147S	132	123	118	J101S	087	086S	I078S	055
5	055	055	053	047	041	037	039S	062S	099S	110	127	J137S	145	144R	146	143R	130	115	110	J102S	U084S	081	U064S	051S
6	047S	049	044	046	048S	036	030	051S	I092S	107	114	123	133R	136S	140	125	111	106	J097S	081	079S	J079S	J066S	J063S
7	061	052	045	042	040	034	U033S	055	091S	113	120	129	117S	108	120	113	097S	091	090	U072S	J064S	080S	J080S	J054S
8	045S	042	040S	037S	038	027	029S	049	084	107	121	126	129	126	125	120	115H	104	098	084	068S	072S	063	053S
9	051S	050	046	041	042	036	036S	J054S	085	086	118	134	114	115	130	134	118	110	109	091S	083	U075S	055	055
10	055	052	047	038	035	030	031	054S	093S	099	106	122	123	129	129	136	122	118	116	097	082	065	057	055
11	037	037	038	036	031	032	033F	C	C	085	110	154R	137	114	124	125	124	121	108	104	108	109	071S	059
12	062	057	053S	054	053	056	053S	065S	102	116	131	132	108	113	122	108	097	098S	106	076	058	060S	054S	048
13	048	048	045	047	055	041	033	050S	082	U092S	114	134	J137S	140	144	157S	U153S	U152S	144R	111	U068S	068S	057	048
14	J045S	046	043	037	038	044	032	046	085	105	J104S	121	098	106	111	103	104S	104	103S	089R	U066S	U067S	052	041
15	042	038	039	039	040	034	033S	049S	077	087	098S	104	118H	110	122	131	119	109H	093S	084	I074S	077S	063	045
16	044	042	042	045	038	036	U037S	057S	084S	107	146	145	140	139	138	138	143	149S	146R	120S	I114S	112S	I071S	044
17	036	036S	037	038	044	030	032	J055S	083	105	109	111	110	114	114	111	102	101	092S	070S	J060S	J065S	050S	031
18	032	033	034	037	043	033H	035S	056S	074	089	113	102	093	102	119	126	116	101	100	J100S	099S	084	053	I041C
19	035	036	036	038	I036C	036	I038S	062S	I089C	106	I136C	131R	125	121	129R	122S	113	099	U096S	084R	J077S	J079S	064	056
20	046	036	035	036	037	037	040	058S	I079C	094	096	103	111	105	122	127	133	114	108	I096S	J090S	U092S	046	038
21	035S	036	036	038	I040S	038	032S	057S	087	104	128	140	132	120	130	125	117	112	116	085	061	U068S	J064S	053S
22	048S	038S	J041S	041	038	035	032S	056S	083	104	112	113	119	124	138	143	141	138	136	120	R	R	S	063
23	054	054S	051	045	046	038	036S	056S	080	097	105	120	127	121	133	137	115	102	090	085	085	071S	054	052
24	051	052	045	036	037	035	033	055S	085	107	113	108	102	116	130	126	111	118	113	100S	087S	089	062	044
25	040S	042	040	041	044	033	U035S	064S	U098S	093	097	110	101	112	117	112	110	112	106	J099S	J078S	084	073S	054
26	051	049	048	048	049	039	041	062	090	104	118	115	110	125R	126	122S	130R	J126S	U119R	104R	U094S	J099S	C	C
27	S	U060S	054	051	049	046	I042S	066S	088R	102	I108C	104	111	123	126	127R	119S	109	109	U093S	U089S	U088S	I079S	I065S
28	059S	059	J056S	056S	J065S	029	026	056	J098S	101	J097S	106	121	127	128	120	116	117	106R	089R	085	082	068S	061S
29	061	060S	064	059S	058	054	J053S	I076S	J098S	111	128	137	141	138	142	147	132	120	114	105	J102S	086	074S	065S
30																								
31																								
Count	28	29	28	29	29	29	29	28	28	29	29	29	29	29	29	29	29	29	29	29	27	27	26	27
Median	047	045	044	041	040	036	033S	056S	086	104	114	122	123	121	128	126	119	112	108	091	083S	081S	064S	053
U.Q.	052	052	048	046	047	038	038	062	095	107	124	134	132	130	138	138	130	119	116	102	089	086	071	056
L.Q.	043	038	040	038	038	032	032	054	084	094	107	110	110	114	122	120	112	104	098	084	068	071	055	044
Q.R.	009	014	008	008	009	006	006	008	011	013	017	024	022	016	016	018	018	015	018	018	021	015	016	012

foF2

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

The Radio Research Laboratories, Japan

Y1

IONOSPHERIC DATA

Feb. 1968 | foF1 | 0.01Mc | 135° E Mean Time (G.M.T. +9h) | Yamagawa | Lat. 31° 12.1'N, Long. 130° 37.1'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L	L	L	U620L	LH	LH	L								
2										L	LH	L	460	L	LH	LH	340							
3										LH	L	L	LH	LH	LH	L		310						
4										L	L	LH	LH	LH	L	LH	L							
5										L	U510L	LH	U600L	LH	LH	L	LH							
6											L	LH	L	U620L	590L	LH	L							
7										LH	L	L	L	U630L	560L	LH	L							
8											L	L	L	LH	LH	L								
9											L	LH	L	580H	LH	L	L							
10										L	L	LH	460L	L	L	L								
11									C		LH	L	500L	LH	LH	L	LH							
12										L	L	L	LH	L	L	L	390							
13											L	560L	520L	460L	L	470L	L							
14									280	L	L	510L	LH	480	LH	L	L							
15										370L	LH	L	530H	480	550	L	L							
16										L	LH	L	L	LH	LH	LH	L							
17										LH	L	L	L	L	L	LH	L							
18										L	LH	L	U500L	LH	U500L	L	L	LH						
19										LH	C	L	500L	480	L	LH	L							
20									260	LH	LH	L	U510L	LH	520L	L	L							
21										L	LH	LH	L	LH	LH	L	LH							
22										LH	LH	L	LH	L	L	L	L	L						
23									L	LH	LH	L	L	L	LH	LH	360	280						
24										LH	LH	L	LH	600H	L	L	L							
25										L	LH	L	L	550H	LH	LH	L							
26										LH	L	530L	L	LH	L	LH	LH							
27										L	C	L	L	L	LH	LH	U450L							
28									310	LH	L	LH	LH	560L	LH	L	L	L						
29										L	LH	L	L	L	LH	LH	L							
30																								
31																								
Count									3	1	1	3	10	10	5	1	4	2						
Median									280	370L	U510L	530L	500L	560	550L	470L	380	300						
U.Q.																								
L.Q.																								
Q.R.																								

foF1

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

The Radio Research Laboratories, Japan

Y 2

IONOSPHERIC DATA

Feb. 1968 | foE | 0.01Mc | 135° E Mean Time (G.M.T. +9h) | Yamagawa | Lat. 31°12.1'N | Long. 130°37.1'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								S	240	305	340	360	370	380	370	345	310	240	B					
2								S	230	305	340	365	I380B	380	370	345	I295A	I225A	C					
3								S	220	290	340	360	360	365	360	340	310	240	B					
4								S	240	305	I335A	I360A	I370A	370	360	340	310	240	B					
5								S	220	290	I330A	345	370	370	365	335	295	205	A					
6								S	220	310	350	355	365	355	340H	I330A	320	260	B					
7								S	235	290	325	350	370	370	I350A	330	300	260	B					
8								S	230	300	325	345	360	365	345	330	I290A	230	B					
9								S	230	295	330	350	360	360	345	A	A	A	B					
10								S	240	290	330	350	360	365	I365A	I340A	A	A	A					
11								C	C	300	I320A	355	360	365	350	335	290	230	B					
12								S	230H	300	340	350	360	I360A	I355A	I330A	300	220	B					
13								S	235	300	340	350	365	I360A	355	325	290	215	B					
14								S	230	290	325	350	360	360	355	330	295	225	B					
15								S	230H	300H	325	350	350	360	350	330H	300H	250	B					
16								S	230	295H	325	340	350	350	340	335H	300	240	B					
17								S	220	275	330	345	355	360	355	330	305	250	B					
18								S	230	285	315	340	350	I345A	340	330	300	240	B					
19								S	I230C	300	I325C	350	345R	I350A	I345A	340	310	240	B					
20								S	250H	300	330	345	350	355	360	345	310	260	B					
21								S	240H	300H	330	340	350	I350A	350	340	300	250	B					
22								S	255	300	330	340	350	350	A	A	320	260	B					
23								S	240	300	330	350	355	345	350	320	300	260	B					
24								S	260	320	340	350	350	355	360	350	315	270	B					
25								S	230	300	340	355	370	380R	360	335	305	260H	B					
26								S	260H	310	340	355	370	380	370	I345A	320	270	B					
27								150	240	305	I340C	360H	365R	370H	380	360	320	A	B					
28								S	235	305	345	350	360	360	360	345	I320A	265H	B					
29								165	255	315	340	I360R	360	350	I340A	I340A	310	260	B					
30																								
31																								
Count								2	28	29	29	29	29	29	28	27	27	26						
Median								160	230	300	330	350	360	360	355	335	305	245						
U.Q.																								
L.Q.																								
Q.R.																								

foE

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

The Radio Research Laboratories, Japan

Y3

IONOSPHERIC DATA

Feb. 1968 | foEs | 0.1Mc | 135° E Mean Time (G.M.T. +9h) | Yamagawa | Lat. 31° 12.1'N | Long. 130° 37.1'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	E015B	E013B	E015B	E	E015B	E011B	E015S	020	G	G	024G	024G	027G	039	025G	J033G	G	G	E015B	E015S	E015B	E015B	E015B	E012B
2	E014B	E014B	E014B	E014B	E014B	E012B	E015S	E014S	G	G	037	043	E040B	044	043	039	033	J037	C	C	C	C	C	C
3	E015S	E015B	E015B	E015B	E	E	E015S	E015S	G	025G	024G	038	G	028G	G	G	G	G	020	E015S	E015S	E015S	J019	E015B
4	E014S	E015B	E013B	E	020	020	020	020	G	G	035	J058	J051	028G	034G	024G	G	G	E014B	019	022	E015B	E014S	E014B
5	E015B	E014B	E	E014B	E015B	E014B	E015S	E014S	G	J034	J037	038	036G	G	G	G	G	020G	J019	022	021	E015S	E015B	E015S
6	E015S	E012S	E015B	E018B	E011B	E011B	E015S	E015S	G	032	037	037	040	041	048	036	037	019G	020	021	020	E015B	E016B	E015S
7	E015B	E016B	E	021	020	E014B	E015S	E015S	G	G	G	031G	041	034G	J038	033	029G	J026G	017	021	024	E015B	E015S	E015S
8	E015S	E015B	E012B	E	E	E015B	E012S	E012S	G	021G	040	026G	038	025G	024G	035	030	026	021	J020	021	E015S	E015S	E015S
9	E015S	E011B	E011B	E013B	E014B	E	E014S	E015S	G	G	G	040	039	045	040	J056	J042	J028	J029	J030	J025	022	020	E015S
10	E015S	E015B	E014B	E014B	E	E	E012S	E015S	G	030	037	G	043	040	037	J044	J054	J041	J019	018	E015S	020	E015S	E015B
11	E015S	E011B	E015B	E	E011B	E014B	E015S	C	C	032	J044	037	G	G	020G	G	G	025	E016B	E015B	E015B	E011S	E012S	E015S
12	E015S	E014B	E014B	E011B	E015B	E015B	E013S	E015S	G	G	G	039	038	J062	041	035	J025G	G	023	J026	037M	J026	J026	J029
13	J024	020	020	020	E011B	E015B	020	E012S	G	J035	G	037	G	J041	G	G	030	027	E016B	E015B	E012B	E015B	E016B	E015S
14	020	E015B	E015B	E015B	E015B	E015B	018	E015S	G	G	G	036	038	G	J045	037	035	030	J026	019	E015S	E015S	E015S	E015S
15	J027	021	021	E	E011B	E018B	020	E015S	G	036	035	038	038	046	025G	042	033	027	J026	E015B	020	021	E015B	E015B
16	E015B	E014B	E015B	E011B	018	020	019	E015S	G	G	030G	029G	027G	025G	G	G	G	G	E015B	E015B	E019B	E015B	E015B	020
17	022	E014B	E014B	E	E015B	E015B	E015S	E015S	G	G	G	037	038	043	041	025G	G	G	E017B	E015S	J032	E015B	E015B	J022
18	020	020	E011B	E015B	E015B	E013B	E012S	E014S	G	030	033	036	037	036	033G	039	033	029	E016B	020	020	E015S	E014S	C
19	E014B	E014B	E015B	E015B	C	E015B	E015S	E015S	E055C	029G	C	034G	034G	039	J038	J060	020G	030	018	E015B	E015S	E015S	E015S	E015B
20	E015B	E015B	E016B	E015B	E	E014B	E015S	021	G	025G	030G	J034G	038	038	038	037	020G	017G	E015B	021	E015B	E015B	E015B	021
21	E014S	E015B	E015B	020	019	025	E012S	E015S	G	G	028G	G	G	037	025G	033G	026G	G	E016B	E015B	E015B	J026	E015B	E015B
22	E014B	E012B	J032	J021	021	J030	024	E013S	G	G	G	030G	041	043	042	037	035	G	E017B	J021	E015S	E015B	E015B	E015B
23	E015B	E015B	E015B	E011B	E	E011B	E012S	E012S	G	G	027G	038	038	037	044	034	032	G	E014B	E015B	022	E015B	E015B	E015S
24	E014B	020	E011B	E	E011B	E011B	E014S	E014S	G	G	G	040	G	037	G	038	G	G	E015B	E014B	J020	E015B	E015B	E015B
25	E014B	E015B	E015B	E015B	E015B	E015B	E015S	E012S	G	029G	031G	033G	041	046	038	035	G	023G	E016B	E015B	E015B	E015B	E015B	E015B
26	E015B	E015B	E011B	E	E011B	E015B	E013S	E015S	G	G	039	040	052	J044	038	038	G	G	E017B	021	020	E016B	E016B	E015B
27	E015B	E016B	020	E017B	E015B	E016B	E015S	G	G	G	C	J042	040	042	040	040	036	J040	J029	J032	020	E015B	020	E018B
28	E015S	E016B	E015B	E015B	E011B	E015B	E015S	E015S	G	G	G	036	G	G	031G	034G	036	033	021	J023	020	E015B	E022B	E017B
29	E015B	E015B	E015B	E017B	E015B	E016B	E015S	G	G	030G	032G	G	038	040	038	J052	022G	018G	E016B	020	E015B	E016B	J028	E015B
30																								
31																								
Count	29	29	29	29	28	29	29	28	28	29	27	29	29	29	29	29	29	29	28	28	28	28	28	27
Median	E015	E015B	E015B	E014B	E014B	E015B	E015S	E015S	G	G	G	037	038	039	038	035	G	G	E017B	019	020	E015B	E015B	E015B
U.Q.	E015	E016	E015	E016	E015	E016	E015	E015	G	G	037	038	040	043	040	039	034	028	020	021	021	E016	E016	E015
L.Q.	E014	E014	E012	E	E011	E012	E014	E014	G	G	G	G	G	G	G	G	G	G	E016	E015	E015	E015	E015	E015
Q.R.																			D004	D006	D006			

foEs

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

The Radio Research Laboratories, Japan

Y4

IONOSPHERIC DATA

Feb. 1968 | f_bEs | 0.1Mc | 135° E Mean Time (G.M.T. +9h) | Yamagawa | Lat. 31° 12.1'N | Long. 130° 37.1'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	B	B	B		B	B	S	S			024G	024G	025G	025G	024G	024G			B	S	B	B	B	B
2	B	B	B	B	B	B	S	S			027G	040	B	042	042	031G	032	035	C	C	C	C	C	C
3	S	B	B	B			S	S		025G	024G	030G		027G					G	S	S	S	014	B
4	S	B	B		E	E	E	S			035	037	042	028G	033G	024G			B	E	E	B	S	B
5	B	B		B	B	B	S	S		031	035	038	034G					016G	016	017	018	S	B	S
6	S	S	B	B	B	B	S	S		022	034	G	G	039	042	035	030G	018G	G	E	E	B	B	S
7	B	B		014	015	B	S	S				031G	029G	034G	036	031	027G	022G	E017R	E	016	B	S	S
8	S	B	B			B	S	S		021G	035	025G	025G	025G	024G	019G	030	G	G	018	015	S	S	S
9	S	B	B	B	B		S	S				G	G	038	039	035	041	025	025	029	024	E	E	S
10	S	B	B	B			S	S		028	G		G	G	037	034	030	026	018	E	S	E	S	B
11	S	B	B		B	B	S	C	C	G	035	026G			020G			G	B	B	B	S	S	S
12	S	B	B	B	B	B	S	S				038	038	045	040	035	024G		023	024	030	026	024	018
13	E	E	E	E	B	B	E	S		025		G		037			G	G	B	B	B	B	B	S
14	E	B	B	B	B	B	E	S				029	G		033	023G	035	G	024	017	S	S	S	S
15	017	E	E		B	B	E	S		G	G	G	033G	045	025G	038	G	G	022	B	019	E	B	B
16	B	B	B	B	E	E	E	S			030G	029G	027G	025G					B	B	B	B	B	016
17	016	B	B		B	B	S	S				G	032G	038	038	025G			B	S	030	B	B	E
18	E	E	B	B	B	B	S	S		G	G	G	037	E036R	032G	024G	016G	029	B	E	E	S	S	C
19	B	B	B	B	C	B	S	S	C	029G	C	033G	034G	039	E038R	024	020G	029	G	B	S	S	S	B
20	B	B	B	B		B	S	S		025G	029G	031G	G	G	G	036	018G	016G	B	E	B	B	B	E
21	S	B	B	E	E	016	S	S			028G			037	025G	031G	025G		B	B	B	E	B	B
22	B	B	029	015	E	023	E	S				030G	041	041	041	036	030		B	E	S	B	B	B
23	B	B	B	B		B	S	S			027G	G	E038R	E037R	042	024G	G		B	B	E	B	B	S
24	B	E	B		B	B	S	S				033		030G		038			B	B	E	B	B	B
25	B	B	B	B	B	B	S	S		027G	030G	033G	041	044	G	G		022G	B	B	B	B	B	B
26	B	B	B		B	B	S	S			037	039	049	G	E038R	038			B	E	E	B	B	B
27	B	B	E	B	B	B	S				C	034	040	040	039	038	G	039	027	025	019	B	E	B
28	S	B	B	B	B	B	S	S				E036R			031G	029G	036	032	021	019	E	B	B	B
29	B	B	B	B	B	B	S			028G	030G		G	039	037	043	022G	018G	B	E	B	B	023	B
30																								
31																								
Count																								
Median																								
U.Q.																								
L.Q.																								
Q.R.																								

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

The Radio Research Laboratories, Japan

Y5

IONOSPHERIC DATA

Feb. 1968 | f-min | 0.1Mc | 135° E Mean Time (G.M.T. +9h) | Yamagawa | Lat. 31° 12.1'N | Long. 130° 37.1'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	015	013	015	E	015	011	E015S	E015S	015	015	016	022	021	019	017	015	015	012	015	E015S	015	015	015	012
2	014	014	014	014	014	012	E015S	E014S	013	E020C	015	023	040	023	025	022	015	012	C	C	C	C	C	C
3	E015S	015	015	015	E	E	E015S	E015S	013	015	018	018	022	023	023	022	014	015	016	E015S	E015S	E015S	011	015
4	E014S	015	013	E	011	013	E015S	E014S	015	016	018	023	023	025	022	022	015	015	014	014	015	015	E014S	014
5	015	014	E	014	015	014	E015S	E014S	015	017	016	025	023	023	023	019	018	012	E	E015S	E015S	E015S	015	E015S
6	E015S	E012S	015	018	011	011	E015S	E015S	015	016	019	017	022	018	017	016	015	E015S	015	E015S	E015S	015	016	E015S
7	015	016	E	E	E	014	E015S	E015S	013	015	018	019	017	023	019	018	015	012	015	E015S	015	015	E015S	E015S
8	E015S	015	012	E	E	015	E012S	E012S	012	015	015	018	017	022	016	015	014	E015S	017	E015S	E014S	E015S	E015S	E015S
9	E015S	011	011	013	014	E	E014S	E015S	012	015	015	016	021	022	018	015	015	015	015	015	E013S	E015S	E015S	E015S
10	E015S	015	014	014	E	E	E012S	E015S	016	015	015	017	018	022	022	016	016	012	012	015	E015S	E015S	E015S	015
11	E015S	011	015	E	011	014	E015S	C	C	015	017	017	018	022	016	022	017	012	016	015	015	E011S	E012S	E015S
12	E015S	014	014	011	015	015	E013S	E015S	015	015	016	018	019	023	018	017	015	E015S	015	015	013	E015S	E015S	E015S
13	015	015	012	017	011	015	E015S	E012S	015	015	015	015	018	018	016	017	015	012	016	015	012	015	016	E015S
14	015	015	015	015	015	015	E015S	E015S	E015S	015	017	017	015	017	016	017	015	012	015	014	E015S	E015S	E015S	E015S
15	E015S	015	015	E	011	018	E012S	E015S	E015S	015	018	018	022	022	022	017	019	015	013	015	014	E012S	015	015
16	015	014	015	011	012	014	E015S	E015S	015	015	015	018	023	023	022	019	017	015	015	015	019	015	015	015
17	015	014	014	E	015	015	E015S	E015S	015	015	015	016	024	016	019	023	015	015	017	E015S	E015S	015	015	015
18	014	E015S	011	015	015	013	E012S	E014S	015	015	015	017	016	016	017	015	013	015	016	E015S	E015S	E015S	E014S	C
19	014	014	015	015	C	015	E015S	E015S	E055C	016	C	018	018	025	022	016	015	015	016	015	E015S	E015S	E015S	015
20	015	015	016	015	E	014	E015S	E016S	015	015	016	016	018	017	022	019	015	013	015	E015S	015	015	015	E012S
21	E014S	015	015	014	017	E	E012S	E015S	015	016	014	016	022	022	017	022	017	017	016	015	015	015	015	015
22	014	012	014	012	015	E	E013S	E013S	018	016	015	022	022	023	022	017	015	015	017	015	E015S	015	015	015
23	015	015	015	011	E	011	E012S	E012S	014	015	015	015	022	018	022	015	018	014	014	015	015	015	015	E015S
24	014	015	011	E	011	011	E014S	E014S	015	015	016	018	023	018	022	014	016	015	015	014	E015S	015	015	015
25	014	015	015	015	015	015	E015S	E012S	015	015	015	022	022	025	023	023	016	015	016	015	015	015	015	015
26	015	015	011	E	011	015	E013S	E015S	014	015	017	023	024	023	025	022	022	016	017	E015S	016	016	016	015
27	015	016	015	017	015	016	E015S	E012S	016	017	C	022	022	023	023	019	022	017	016	015	017	015	015	018
28	E015S	016	015	015	011	015	E015S	E015S	016	016	018	023	023	023	025	019	016	012	015	017	016	015	022	017
29	015	015	015	017	015	016	E015S	E015S	016	015	019	022	023	023	024	022	016	016	016	015	015	016	015	015
30																								
31																								
Count	29	29	29	29	28	29	29	28	28	29	27	29	29	29	29	29	29	29	28	28	28	28	28	27
Median	014	015	015	014	012	014	E015S	E015S	015	015	016	018	022	022	022	018	015	015	015	015	014	015	015	015
U.Q.																								
L.Q.																								
Q.R.																								

f-min | Sweep 1.0 Mc to 20.0 Mc in 20 sec in automatic operation

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

Feb. 1968 | M(3000) F2 | 0.01 | 135° E Mean Time (G.M.T. +9h) | Yamagawa | Lat. 31° 12.1'N | Long. 130° 37.1'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	290	280	280	275	J300S	305	305S	U290S	335	330	310	305	290	275	275	285	285	295	320	310S	295	310	J305S	245
2	250	250	275	275	320	260	260S	315S	340	340	295	300	290V	290	270	275	275H	295	I295C	I280C	C	C	C	C
3	255	240	265S	285	300	240	270S	275S	320S	330	305	315H	285	285	275	280	280	295	300	270S	275S	310	320	265S
4	J260S	275S	F	245S	J285S	260	260	290S	330S	315	305	300	295	270	275	J285S	280	280	290	J280S	275	280S	I290S	255
5	275	280	290	280	295	270	260S	285S	330S	310	305	J295S	295	280R	280	280R	285	290	300	J305S	U300S	305	U315S	290S
6	275S	280	275	275	320S	310	265	295S	I335S	315	320	300	295R	290S	290	290	295	300	J305S	295	295S	J290S	J310S	J285S
7	305	305	290	285	300	265	U275S	300	330S	335	310	320	315S	290	300	305	305S	305	315	U310S	J280S	305S	J305S	J305S
8	275S	290	295S	315S	320	305	260S	295	320	320	315	300	300	295	285	275	280H	290	295	300	280S	280S	285	285S
9	275S	270	265	280	310	265	235S	J300S	330	315	305	315	300	275	290	290	290	285	305	295S	280	U295S	275	275
10	275	310	320	290	325	245	245	310S	315S	330	305	305	295	295	280	290	295	295	315	300	280	305	315	315
11	270	275	290	315	230	230	235F	C	C	320	265	310R	315	275	280	280	275	280	290	280	280	305	290S	260
12	265	285	275S	280	270	300	300S	310S	345	310	320	330	305	300	315	310	320	310S	330	335	285	295S	275S	270
13	290	290	290	290	335	360	305	320S	340	U325S	305	320	J305S	305	295	305S	U305S	U305S	310R	320	U295S	305S	300	275
14	J255S	275	315	270	260	285	335	305	335	335	J320S	330	305	300	310	315	305S	305	315S	320R	U300S	U310S	325	295
15	280	290	290	310	315	295	285S	310S	335	335	285S	310	300H	300	295	305	305	310H	310S	300	I295S	280S	305	260
16	260	270	270	290	295	255	U275S	300S	320S	290	320	305	305	300	290	290	285	310S	315R	300S	I280S	305S	I300S	275
17	260	265S	270	280	325	265	265	J310S	335	335	320	325	315	305	305	305	310	325	325S	295S	J295S	J310S	290S	250
18	250	265	270	275	300	275H	275S	320S	340	315	325	325	325	285	305	315	320	310	300	J290S	305S	310	285	I275C
19	265	255	260	270	I280C	255	I255S	305S	I320C	300	I320C	325R	310	295	300R	305S	310	310	U310S	305R	J285S	J295S	305	320
20	320	305	275	275	305	310	310	325S	I350C	335	315	305	320	295	305	310	310	300	295	I290S	J290S	U325S	315	250
21	255S	250	255	265	I280S	290	280S	310S	320	305	305	305	305	285	290	290	295	300	310	315	275	U290S	J280S	285S
22	290S	265S	J250S	270	290	285	280S	315S	320	320	320	320	280	280	290	285	280	290	300	290	R	R	S	280
23	275	280S	310	280	300	305	280S	305S	335	320	305	310	315	285	295	300	295	305	300	295	305	295S	270	275
24	295	310	340	280	275	285	275	310S	330	335	320	310	285	315	305	300	290	295	305	290S	280S	285	295	275
25	270S	275	275	280	320	250	U250S	285S	U330S	315	305	320	310	295	285	295	300	305	295	J305S	J270S	290	290S	280
26	275	265	270	275	305	250	255	315	335	315	315	320	C	C	C	C	C	C	C	C	C	C	C	C
27	S	C	C	C	C	C	C	C	C	C	C	335	300	285	285	290R	300S	290	300	U290S	U275S	U295S	I295S	I285S
28	280S	280	J275S	295S	J350S	305	265	305	J325S	325	J315S	285	290	295	290	285	290	300	300R	290R	285	295	295S	250S
29	245	255S	270	285S	270	280	J270S	I300S	J320S	305	300	285	285	280	280	280	280	275	285	275	J285S	280	265S	280S
30																								
31																								
Count	28	28	27	28	28	28	28	27	27	28	28	29	28	28	28	28	28	28	28	28	26	26	26	27
Median	275	275	275	280	300	280	270S	305S	330	320	310	310	300	290	290	290	295	300	300	295	285S	295S	295S	275
U.Q.																								
L.Q.																								
Q.R.																								

M(3000) F2 Sweep 1.0 Mc to 20.0 Mc in 20 sec in automatic operation

The Radio Research Laboratories, Japan

Y7

IONOSPHERIC DATA

Feb. 1968 | M(3000) F1 0.01 | 135° E Mean Time (G.M.T. +9h) | Yamagawa | Lat. 31° 12.1'N Long. 130° 37.1'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L	L	L	U325L	LH	LH	L								
2										L	LH	L	400	L	LH	LH	405							
3										LH	L	L	LH	LH	LH	L		405						
4										L	L	LH	LH	LH	L	LH	L							
5										L	U370L	LH	U370L	LH	LH	L	LH							
6											L	LH	L	U345L	345L	LH	L							
7										LH	L	L	L	U355L	360L	LH	L							
8											L	L	L	LH	LH	L								
9											L	LH	L	345H	LH	L	L							
10										L	L	LH	400L	L	L	L								
11									C		LH	L	400L	LH	LH	L	LH							
12										L	L	L	LH	L	L	L	415							
13											L	355L	365L	400L	L	380L	L							
14									430	L	L	365L	LH	415	LH	L	L							
15										410L	LH	L	360H	A	365	L	L							
16										L	LH	L	L	LH	LH	LH	L							
17										LH	L	L	L	L	L	LH	L							
18										L	LH	L	U380L	LH	U360L	L	L	LH						
19										LH	C	L	390L	415	L	LH	L							
20									425	LH	LH	L	U370L	LH	360L	L	L							
21										L	LH	LH	L	LH	LH	L	LH							
22										LH	LH	L	LH	L	L	L	L	L						
23									L	LH	LH	L	L	L	LH	LH	400	400						
24										LH	LH	L	LH	335H	L	L	L							
25										L	LH	L	L	400H	LH	LH	L							
26										LH	L	370L	L	LH	L	LH	LH							
27										L	C	L	L	L	LH	LH	U380L							
28									425	LH	L	LH	LH	355L	LH	L	L	L						
29										L	LH	L	L	L	LH	LH	L							
30																								
31																								
Count									3	1	1	3	10	9	5	1	4	2						
Median									425	410L	U370L	365L	375L	355	360L	380L	400	400						
U.Q.																								
L.Q.																								
Q.R.																								

M(3000) F1 Sweep 1.0 Mc to 20.0 Mc in 20 sec in automatic operation

The Radio Research Laboratories, Japan

Y8

IONOSPHERIC DATA

Feb. 1968 | h'F2 km | 135° E Mean Time (G.M.T. +9h) | Yamagawa | Lat. 31° 12.1'N | Long. 130° 37.1'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										240	245	250	305	300	300	260								
2										260	275	270	255	255	325	325	250							
3										255	245	235	300	300	320	250		240						
4										250	250	280	275	280	310	280	260							
5										245	250	265	280	300	300	280	245							
6											240	275	280	280	300	300	230							
7										240	250	260	245	300	300	290	235							
8											275	255	280	305	280	295								
9											280	260	250	325	295	275	250							
10										250	255	280	250	290	255	250								
11									C		350	260	240	305	280	275	280							
12										250	245	255	290	280	255	240	230							
13											250	285	275	255	275	265	250							
14									250	250	250	270	305	275	270	265	250							
15										230	300	250	285	270	305	280	250							
16										270	275	245	255	290	265	280	255							
17										260	255	250	270	260	260	260	240							
18										235	250	240	255	305	285	270	255	225						
19										280	I260C	240	255	250	270	275	240							
20									220	250	250	250	260	300	290	290	255							
21										245	275	275	255	250	280	250	250							
22										250	250	255	310	255	280	275	250	230						
23									225	260	275	270	265	270	280	280	235	230						
24										250	270	250	245	325	280	270	240							
25										230	310	275	295	310	250	275	270							
26										270	250	260	C	C	C	C	C							
27										C	C	270	305	295	300	280	250							
28									240	240	240	305	280	300	300	280	290	265						
29										275	290	255	255	280	300	295	240							
30																								
31																								
Count									4	23	28	29	28	28	28	28	24	5						
Median									230	250	250	260	270	290	280	275	250	230						
U.Q.																								
L.Q.																								
Q.R.																								

h'F2 | Sweep 1.0 Mc to 20.0 Mc in 20 sec in automatic operation

The Radio Research Laboratories, Japan

Y9

IONOSPHERIC DATA

Feb. 1968 | h'F km | 135° E Mean Time (G.M.T. +9h) | Yamagawa | Lat. 31° 12.1' N | Long. 130° 37.1' 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	270	280	290	285	265	230	250	260	230	230	230	220	200H	225H	230H	250	240	235	230	200	270	220	225	250
2	300	315	280	275	220	300	350	255	225	230	230H	240	225	225	205H	220H	225	245	I230C	I230C	C	C	C	C
3	300	350	330	250	225	315	300	280	245	225H	240	230	225H	230H	225H	225	220	225	220	200H	280	235	225	245
4	280	300	355	350	280	250	300	275	230	225	225	200H	220H	200H	230	230H	225	245	240	215	250	255	235	200
5	300	275	250	250	240	300	300	275	230	240	215	215H	220	205H	220H	220	210H	230H	225	240	225	235	220	235
6	300	270	280	260	240	210	305	275	225	220	220	210H	220	205H	215	225H	225	240	220	205	240	225	250	245
7	255	250	245	275	255	300	320	260	220	215H	225	220	230	205H	205H	220H	215	240	220	215	230	245	220	240
8	290	275	255	245	240	250	330	270	235	230	240	230	215	205H	225H	225	230	230	225	220	255	230	250	245
9	285	270	235	250	250	295	340	255	225	225	225	230H	225	200H	200H	245	I240A	230	230	240	240	240	245	285
10	280	255	230	260	225	300	350	260	230	240	230	225H	220	220	225	230	235	235	235	205	225	230	240	230
11	250	255	250	230	E355B	420	310	C	C	245	235H	230	210	210H	210H	235	225H	250	235	260	275	215	220	270
12	260	255	275	275	290	270	250	250	245	220	240	235	215H	E250A	245	235	220	250	230	220	E250A	270	280	300
13	290	275	260	285	245	220	260	245	240	225	235	215H	205	205	220	200	225	230	220	200	205	220	240	275
14	320	295	250	300	335	255	210	260	200	205	235	230	220H	200	215H	220	220	240	225	210	215	235	230	265
15	305	290	300	255	250	250	260	230	230	220	215H	225	185H	A	225	225	235	230	220	220	245	225	235	300
16	305	300	290	255	255	320	300	275	230	225	220H	230	205	200H	215H	215H	245	245	215	200	215	230	225	250
17	310	315	310	290	240	E320B	330	250	230	225H	225	225	225	220	225	200H	225	230	220	195	245	225	220	E300B
18	E350B	345	315	300	250	270	290	250	220	225	200H	225	215	205H	180H	230	225	225H	225	230	230	225	230	C
19	330	320	350	300	I295C	350	335	260	250	205H	I205C	230	205H	200	240	210H	220	220	230	205	240	225	240	230
20	245	245	295	300	255	255	250	230	215	205H	195H	220	220	220H	215	220	230	225	220	215	250	225	215	320
21	375	350	345	320	290	250	255	250	215	235	230H	235H	230	205H	195H	225	225H	240	235	200	220	250	240	270
22	250	260	I310A	320	270	275	275	245	230	230H	225H	215	205H	245	250	225	225	240	225	205	200H	250	225	250
23	280	275	250	270	250	225	260	250	235	205H	225H	220	235	225	220H	225H	205	230	220	230	230	225	240	290
24	275	255	225	250	280	240	270	255	230	225H	200H	225	225H	195H	250	230	220	240	230	200	225	225	230	275
25	300	285	300	290	250	E250B	E345S	270	230	215	200H	225	230	215H	180H	200H	240	240	225	220	215	250	225	255
26	300	300	295	275	235	E245B	320	255	230	220H	230	220	E250A	200H	230C	225H	200H	240C	230C	220C	230C	C	C	C
27	C	C	C	C	C	C	C	C	C	C	C	220	215	200	220H	235H	225	240	240	230	245	240	225	265
28	290	280	295	275	220	200	305	255	200	200H	225	205H	205H	200	200H	230	235	245	225	220	255	250	250	305
29	355	325	300	255	290	255	300	230	230	240	230H	230	230	205	210H	245H	225	235	235	240	235	230	265	250
30																								
31																								
Count	28	28	28	28	28	28	28	27	27	28	28	29	29	28	29	29	29	29	29	29	28	27	27	26
Median	290	280	290	275	250	255	300	255	230	225	225	225	220	205H	220H	225	225	240	225	215	235	230	230	255
U.Q.																								
L.Q.																								
Q.R.																								

h'F | Sweep 1.0 Mc to 20.0 Mc in 20 sec in automatic operation

The Radio Research Laboratories, Japan

Y 10

60

IONOSPHERIC DATA

Feb. 1968 | h'Es km | 135° E Mean Time (G.M.T. +9h) | Yamagawa | Lat. 31° 12.1'N, Long. 130° 37.1'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	B	B	B	E	B	B	S	105	G	G	100	100	100	E150G	100	100	G	G	B	S	B	B	B	B
2	B	B	B	B	B	B	S	S	G	G	160	130	B	125	125	120	110	100	C	C	C	C	C	C
3	S	B	B	B	E	E	S	S	G	105	100	165	G	100	G	G	G	G	100	S	S	S	100	B
4	S	B	B	E	100	100	100	110	G	G	105	100	100	100	100	100	G	G	B	105	105	B	S	B
5	B	B	E	B	B	B	S	S	G	110	105	110	105	G	G	G	G	100	100	100	095	S	B	S
6	S	S	B	B	B	B	S	S	G	105	105	120	120	115	105	105	155	105	105	100	100	B	B	S
7	B	B	E	100	100	B	S	S	G	G	G	105	155	105	105	105	105	100	100	100	105	B	S	S
8	S	B	B	E	E	B	S	S	G	105	125	100	140	100	100	130	115	140	095	095	095	S	S	S
9	S	B	B	B	B	E	S	S	G	G	G	125	130	120	115	110	105	105	105	100	100	100	095	S
10	S	B	B	B	E	E	S	S	G	120	120	G	130	125	115	105	100	100	100	100	S	100	S	B
11	S	B	B	E	B	B	S	C	C	155	110	125	G	G	100	G	G	130	B	B	B	S	S	S
12	S	B	B	B	B	B	S	S	G	G	G	160	130	110	155	105	105	G	145	120	110	100	105	105
13	105	100	105	105	B	B	100	S	G	105	G	120	G	100	G	G	E160G	150	B	B	B	B	B	S
14	120	B	B	B	B	B	140	S	G	G	G	105	150	G	100	150	145	140	120	100	S	S	S	S
15	100	105	100	E	B	B	100	S	G	140	125	150	150	170	100	140	150	E175G	125	B	105	100	B	B
16	B	B	B	B	120	115	115	S	G	G	105	105	105	100	G	G	G	G	B	B	B	B	B	100
17	105	B	B	E	B	B	S	S	G	G	G	155	150	130	130	105	G	G	B	S	110	B	B	110
18	105	105	B	B	B	B	S	S	G	125	125	120	120	105	105	140	135	125	B	100	100	S	S	C
19	B	B	B	B	C	B	S	S	C	105	C	105	105	100	100	100	100	145	155	B	S	S	S	B
20	B	B	B	B	E	B	S	110	G	105	105	105	150	145	140	130	095	095	B	095	B	B	B	100
21	S	B	B	100	100	100	S	S	G	G	100	G	G	115	100	110	105	G	B	B	B	100	B	B
22	B	B	105	105	105	105	105	S	G	G	G	105	E170G	150	160	105	110	G	B	100	S	B	B	B
23	B	B	B	B	E	B	S	S	G	G	105	130	130	125	145	130	125	G	B	B	095	B	B	S
24	B	105	B	E	B	B	S	S	G	G	G	105	G	145	G	150	G	G	B	B	115	B	B	B
25	B	B	B	B	B	B	S	S	G	105	105	105	155	125	130	125	G	110	B	B	B	B	B	B
26	B	B	B	E	B	B	S	S	G	G	150	150	125C	120C	120C	110C	G	G	B	100	100	B	B	B
27	B	B	105	B	B	B	S	G	G	G	C	105	135	125	135	150	125	110	105	100	100	B	105	B
28	S	B	B	B	B	B	S	S	G	G	G	115	G	G	100	100	135	120	115	100	100	B	B	B
29	B	B	B	B	B	B	S	G	G	105	105	G	135	115	110	100	105	100	B	100	B	B	110	B
30																								
31																								
Count	5	4	4	4	5	4	6	3		13	18	26	22	25	24	24	19	18	13	16	15	5	5	4
Median	105	105	105	100	100	100	100	110		105	105	110	130	120	110	110	110	110	105	100	100	100	105	100
U.Q.																								
L.Q.																								
Q.R.																								

h'Es

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

The Radio Research Laboratories, Japan

Y11

IONOSPHERIC DATA

Feb. 1968 | Types of Es | 135° E Mean Time (G.M.T. +9h) | Yamagawa | Lat. 31° 12.1'N Long. 130° 37.1'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								1			1	1	1	h 1	1	1								
2											h 1	h 1		h	c 1	c 1	c2	13						
3										1	1	h 1		1					1				f2	
4					f	f	f	1			1	1	12	1	1	1				f	f			
5										c	1	c	1					1	1	f2	f2			
6										1	1	c	c	c	c	1	h 12	1	1	f	f			
7				f	f							1	h 1	1	1	1	12	12	1	f	f			
8										1	h	1	h 1	1	1	h 1	c2	h21	1	f2	f2			
9												h	h	h	c2	c2	13	13	12	f3	f3	f	f	
10										c	c2		h	h	c	12	13	14	1	f		f		
11										h	c	h 1			1			h						
12												h	h	c2	h c	1	1		h	f2	f2	f2	f f2	f2
13	f2	f	f	f			f			1		c		12			h	h						
14	f						f					1	h		12	h 1	h	h	c	f f				
15	f	f	f				f			h	h	h	h 1	h 1	1	h 1	h	h	h		f2	f		
16					f	f	f				1	1	1	1										f2
17	f2											h	h 1	h 1	h	1					f5			f2
18	f	f								h	h	h	c	1	1	h 1	h 1	h3		f	f			
19										12		1	1	1	12	1	1	h	h					
20								1		1	1	12	h	h	h	h 1	1	1		f				f
21				f	f	f2					1			c 1	1	1	1					f		
22			f4	f2	f	f	f					1	h h	h h	h 12	12	121			f				
23											1	h	h 1	h 1	h c 1	h 1	h				f			
24		f2										1		h 1		h 1					f			
25										1	1	1	h	h	h	h		1						
26											h	h	h2	c	c	c				f	f			
27			f									1 h	h	h	h 1	h	h	13	12	f3	f		f	
28												c			1	12	h213	h21	c	f	f			
29										1	1		h	c	c	12	1	1		f			f3	
30																								
31																								
Count																								
Median																								
U.Q.																								
L.Q.																								
Q.R.																								

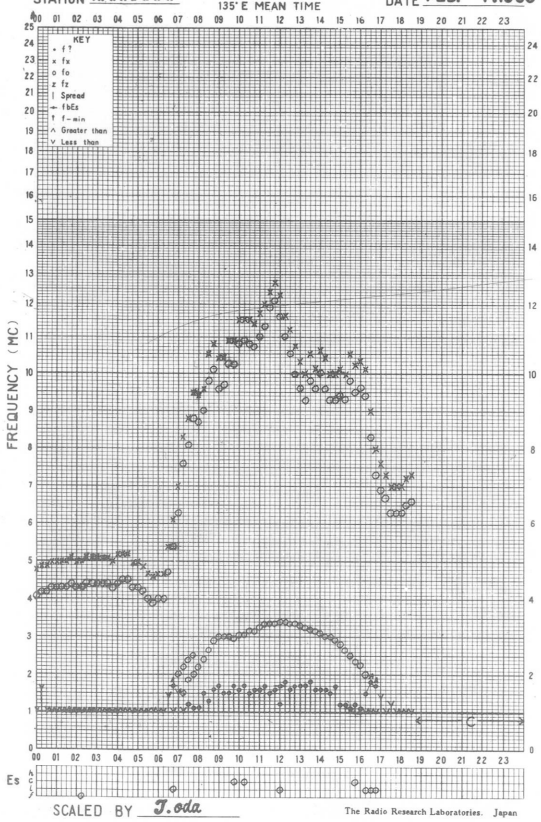
Types of Es | Sweep 1.0 Mc to 20.0 Mc in 20 sec in automatic operation

The Radio Research Laboratories, Japan

Y12

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE FEB. 1.1968

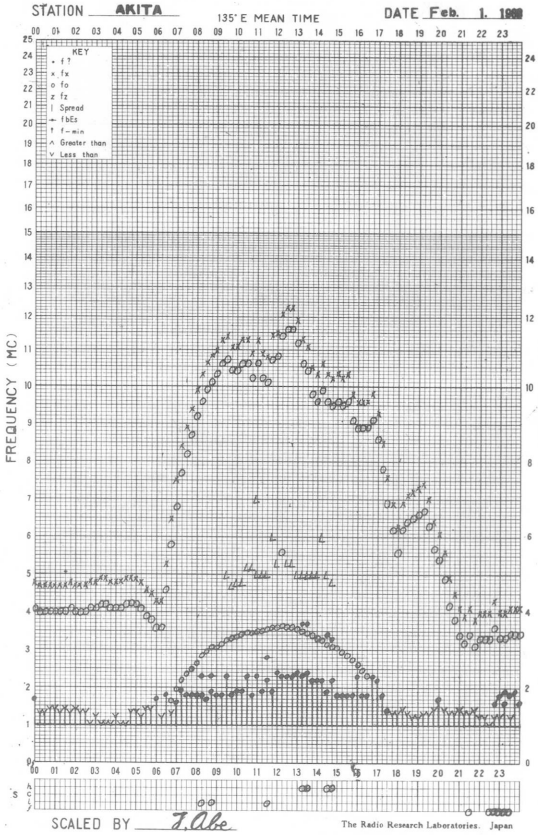


SCALED BY T. oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Feb. 1. 1968



SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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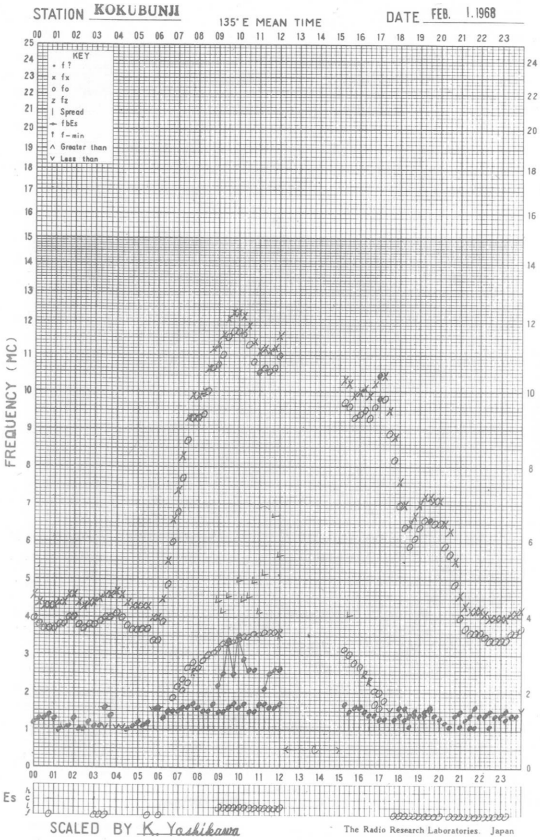
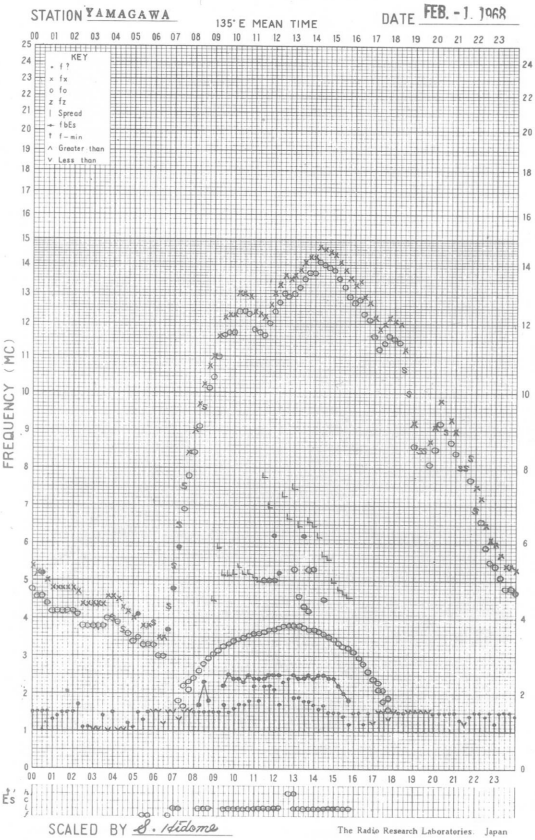


SCALED BY K. Yoshikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE FEB. -1. 1968

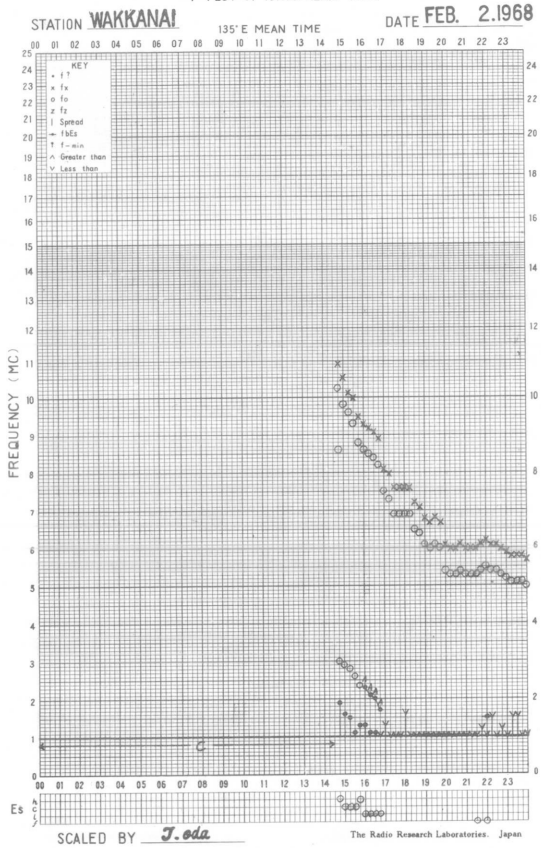


SCALED BY S. Iidoma

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135° E MEAN TIME DATE FEB. 2.1968



SCALED BY T. oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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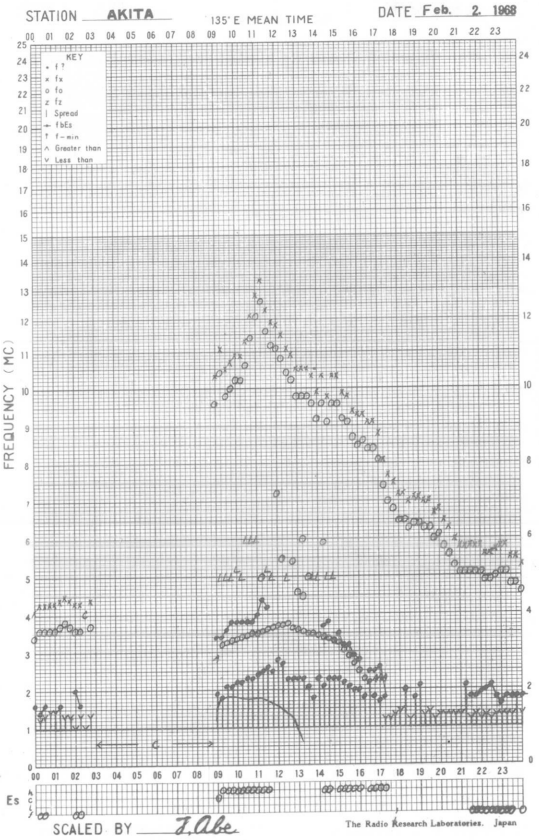
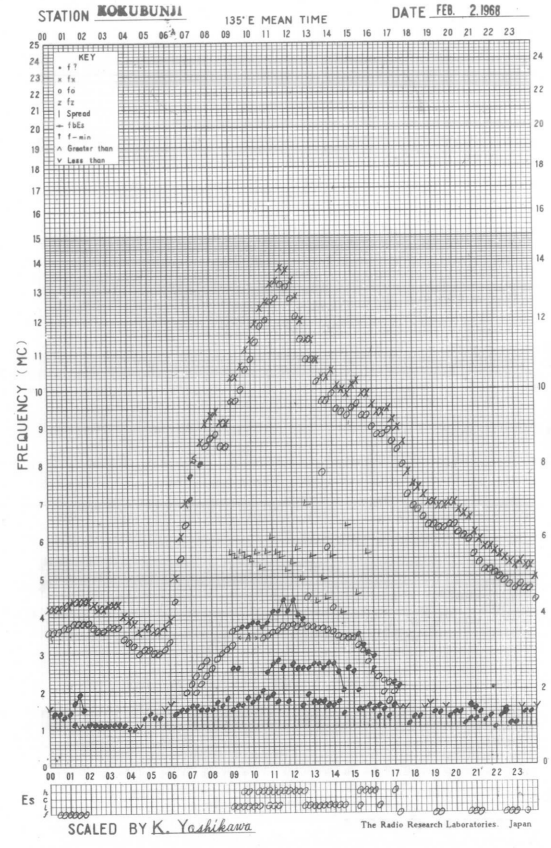


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135° E MEAN TIME DATE FEB. 2.1968



SCALED BY K. Yashikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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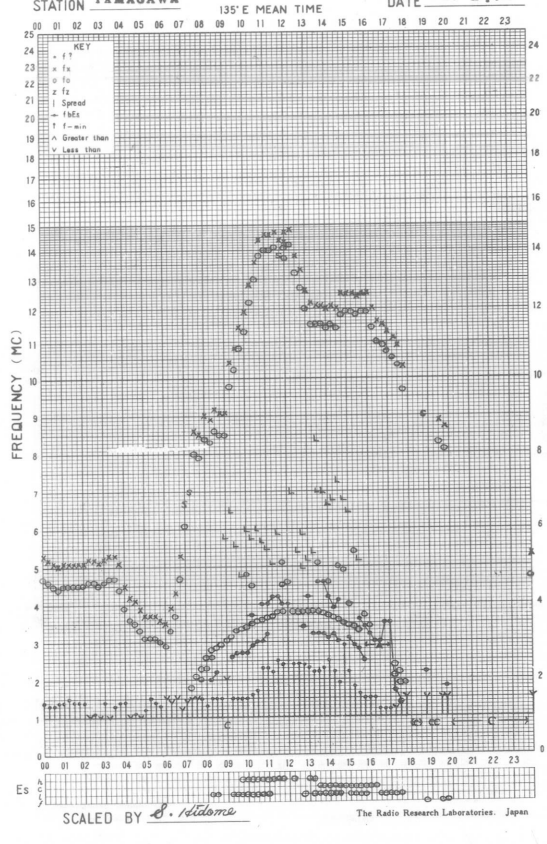
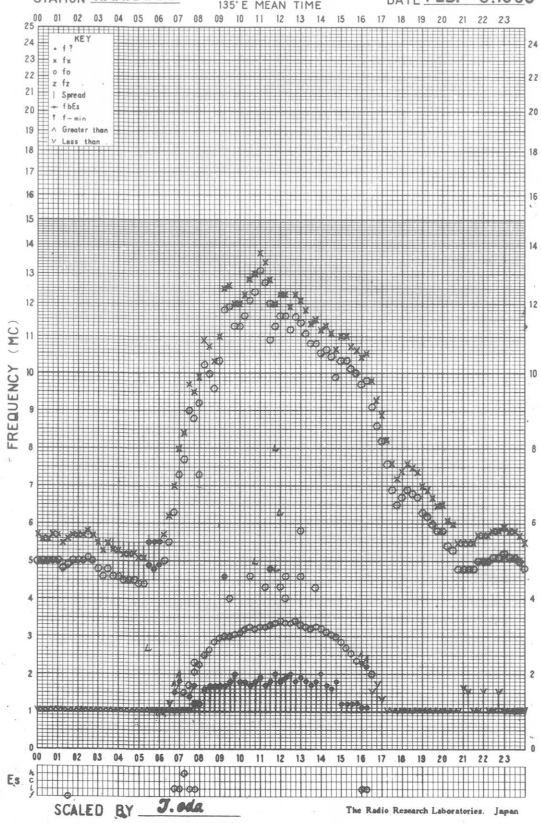


SCALED BY S. Hitomi

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE FEB. 3.1968



SCALED BY T.oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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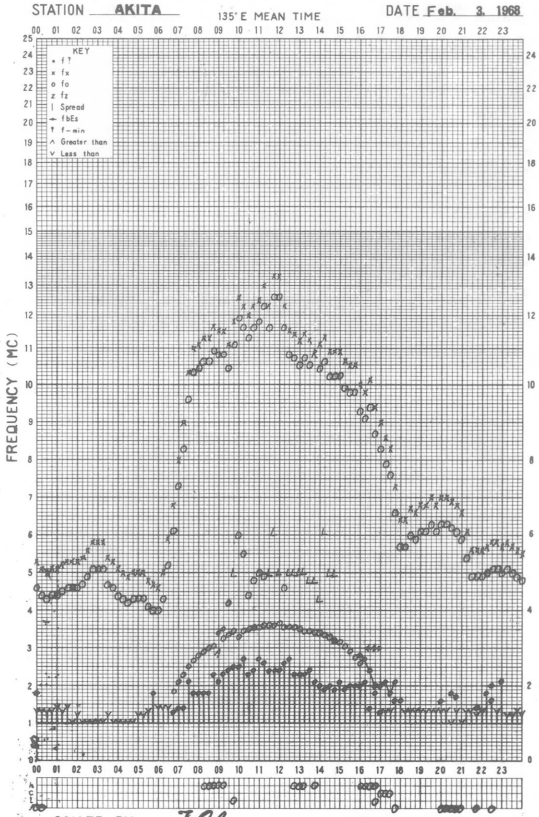
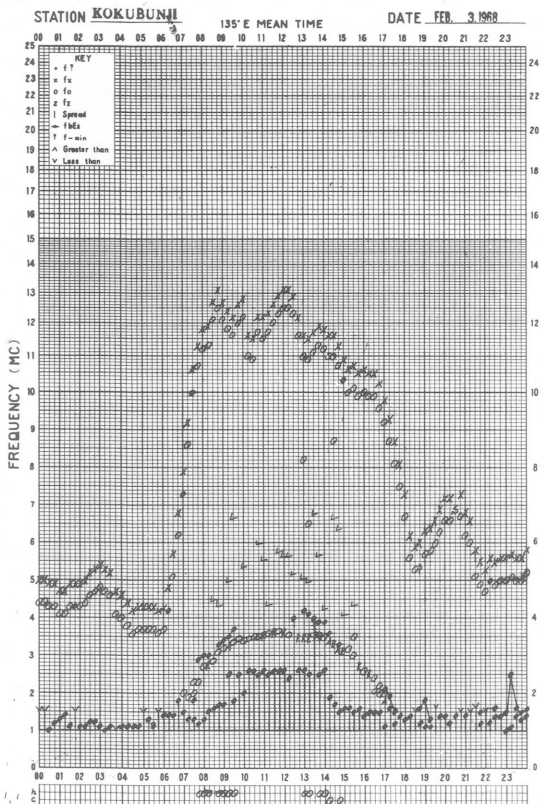


SCALED BY T.Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE FEB. 3.1968

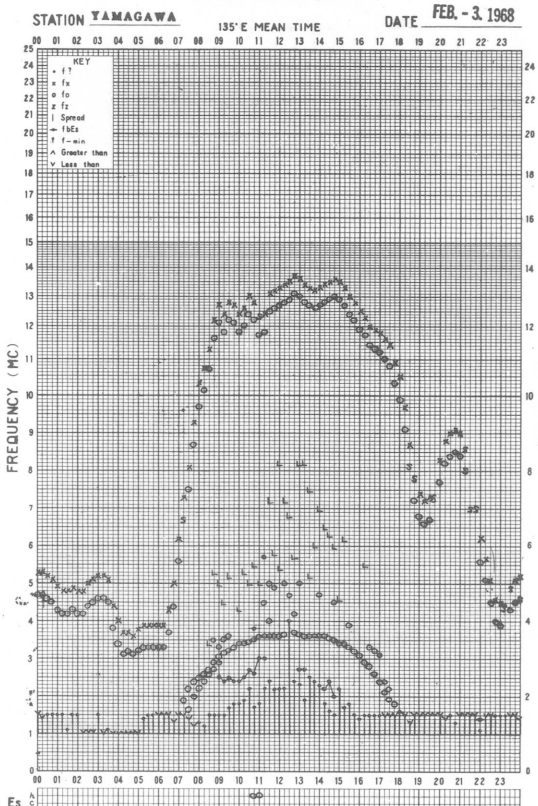


SCALED BY K. Yashikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE FEB. - 3. 1968



SCALED BY S. Kitdoma

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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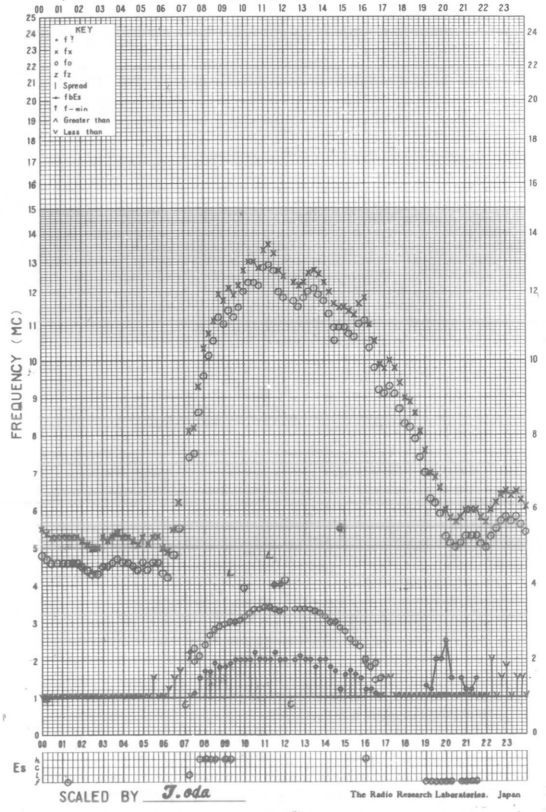

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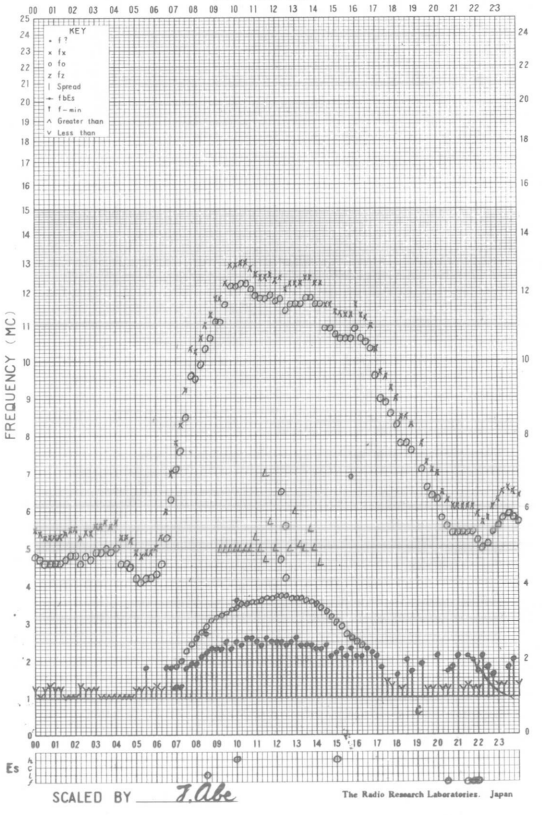

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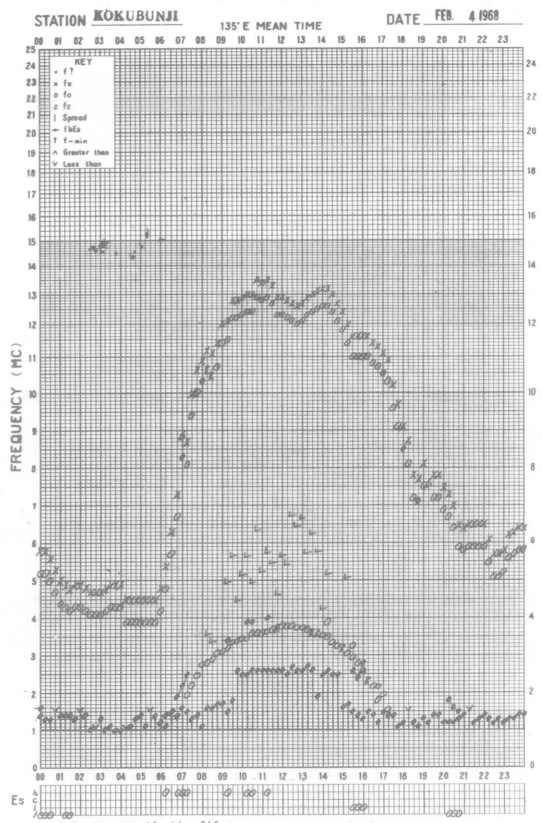

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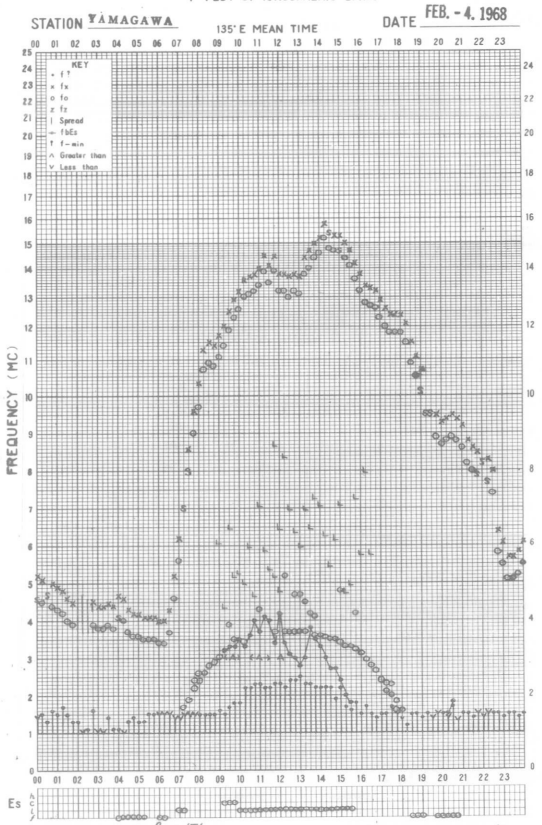

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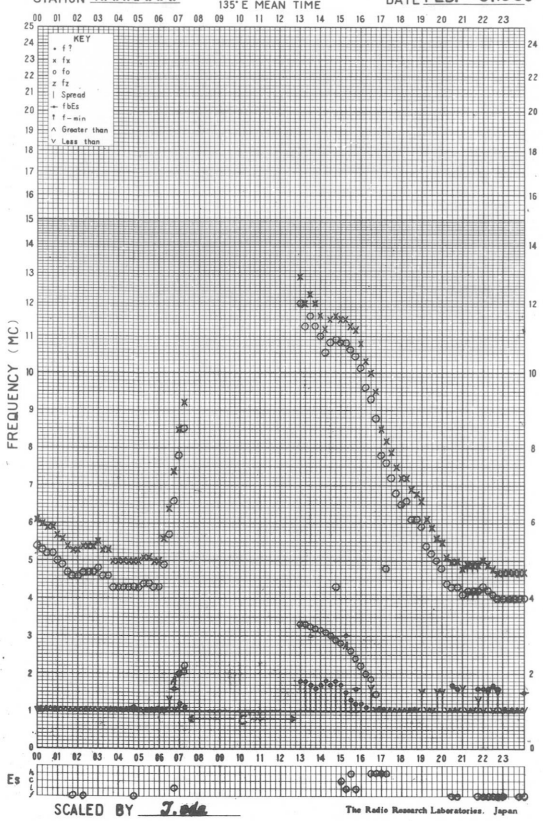

SCALED BY T. eda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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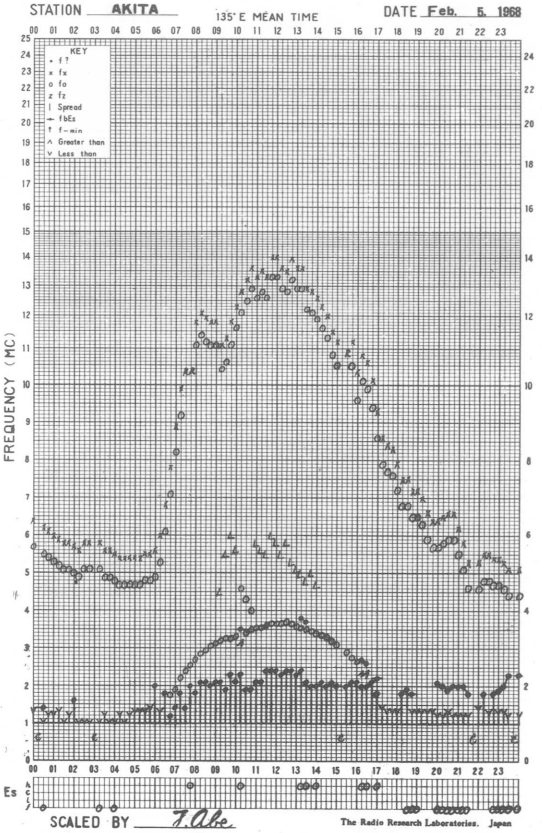

SCALED BY T. Abe

The Radio Research Laboratories. Japan

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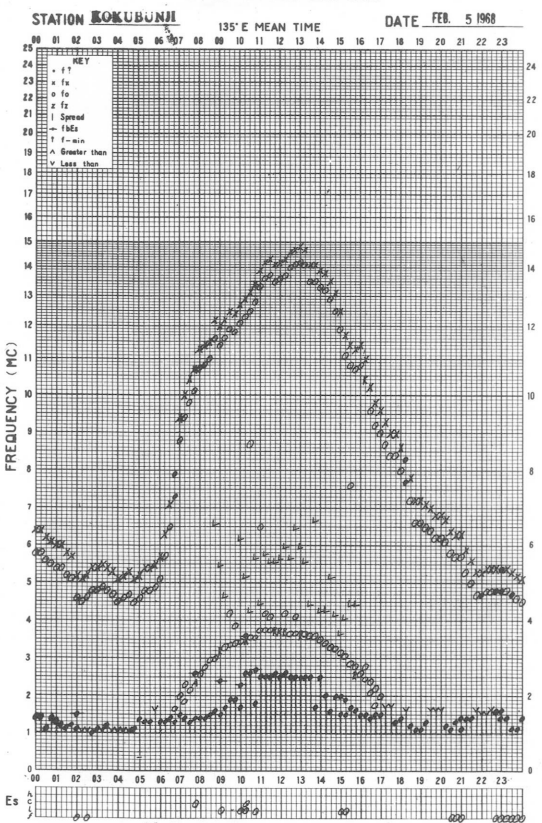
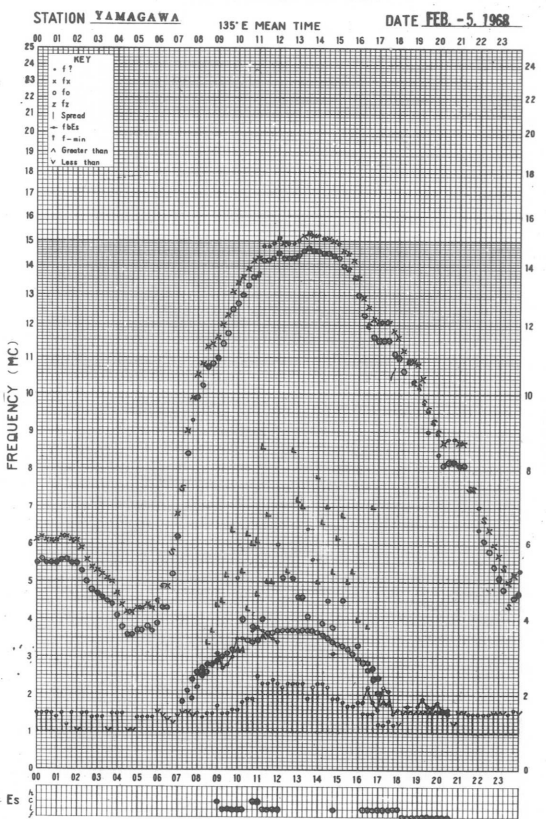


SCALED BY K. Yoshikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE FEB. -5. 1968

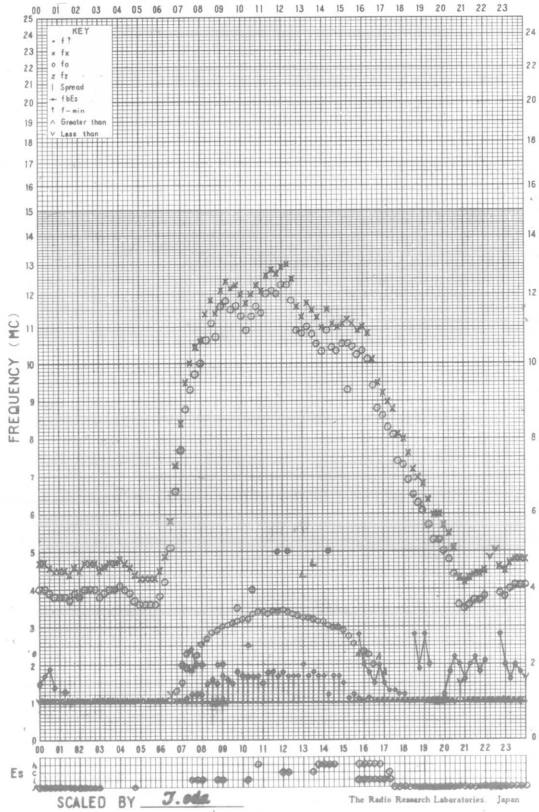


SCALED BY S. Nakashima

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135° E MEAN TIME DATE FEB. 6. 1968



SCALED BY T. Oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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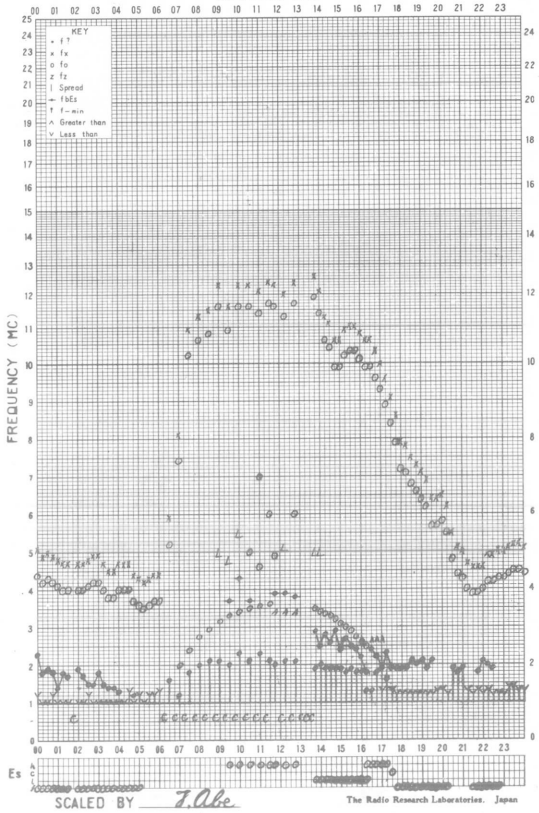

SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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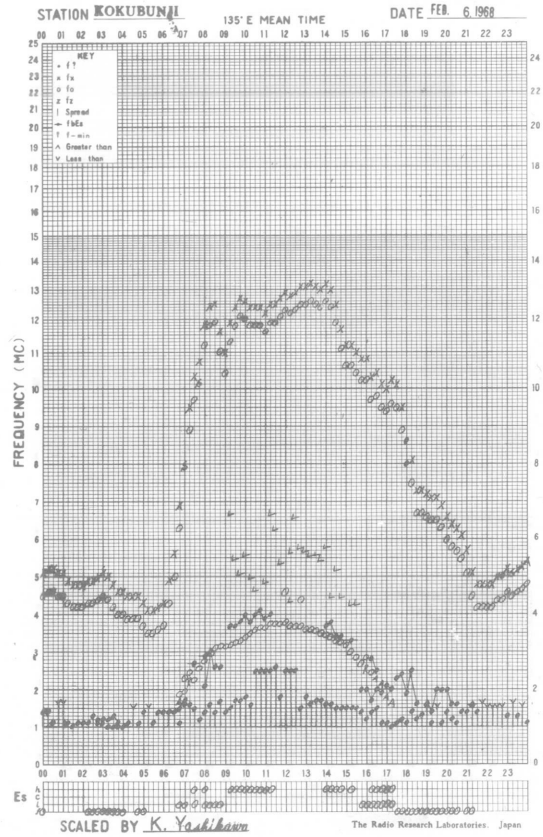
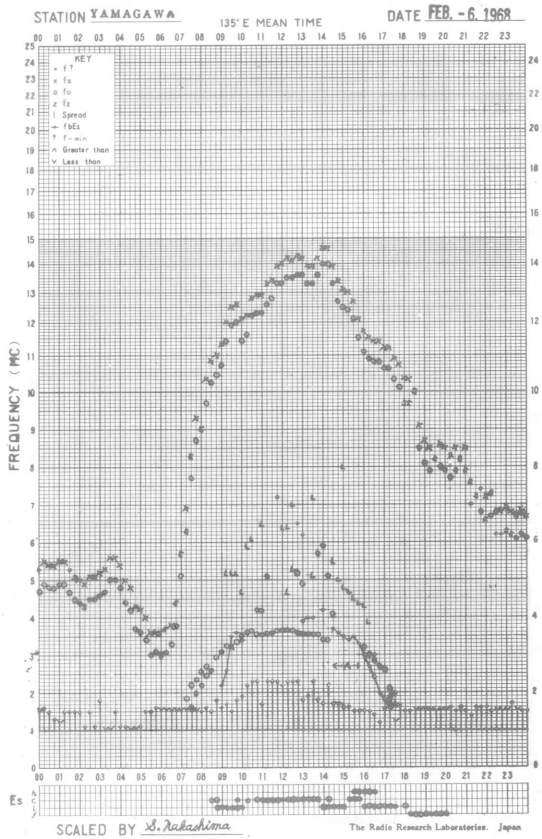


SCALED BY K. Yoshikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135° E MEAN TIME DATE FEB. - 6. 1968

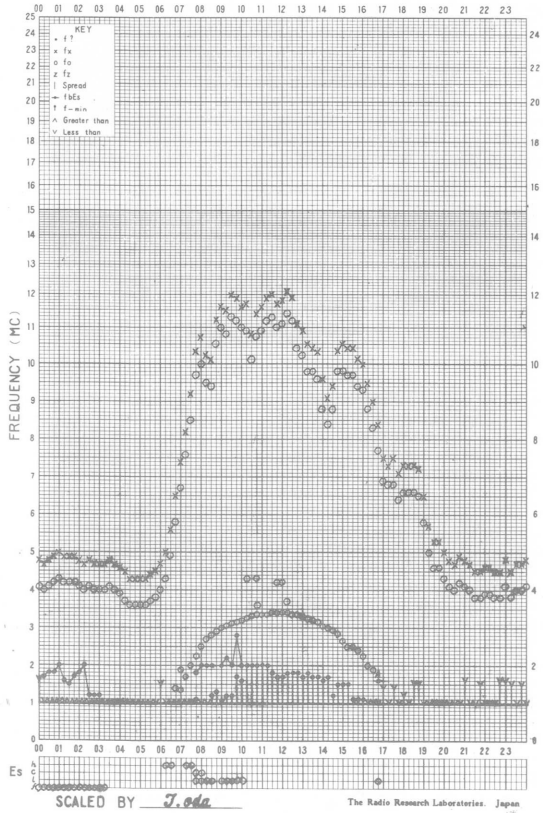


SCALED BY S. Nakashima

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE FEB. 7, 1968



SCALED BY T. Oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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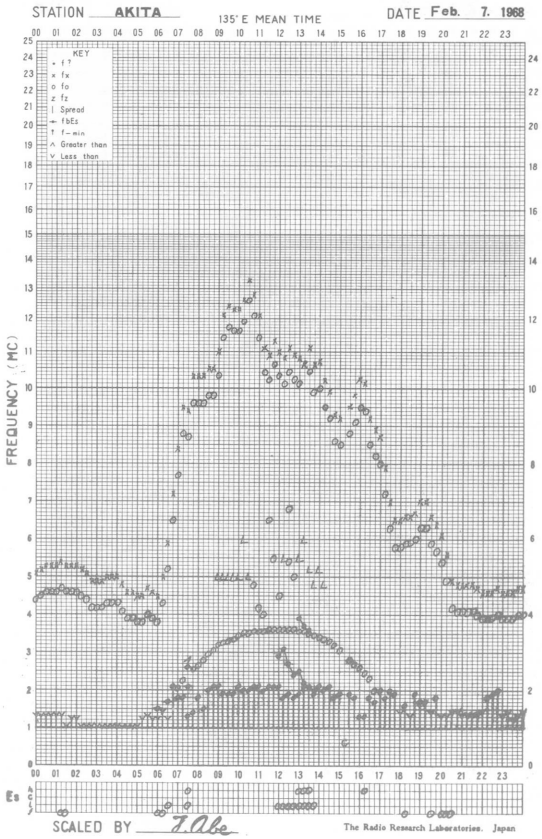

SCALED BY T. Abe

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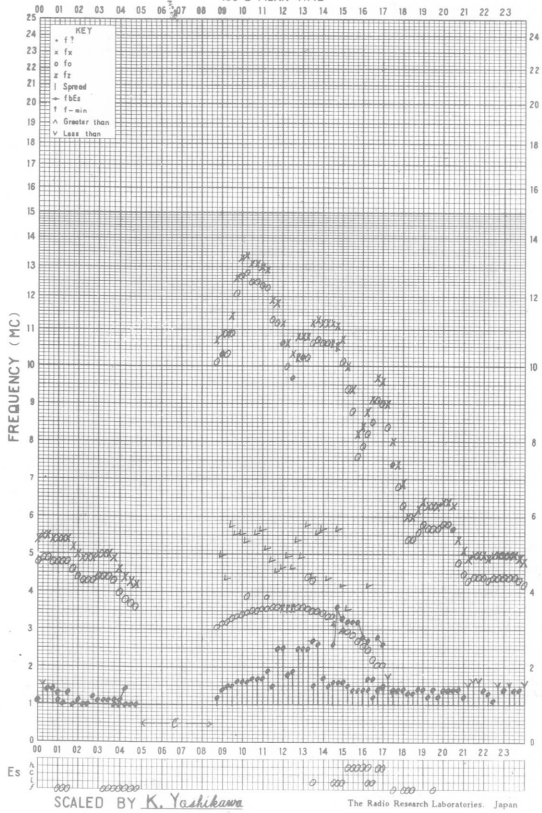

SCALED BY K. Yoshikawa

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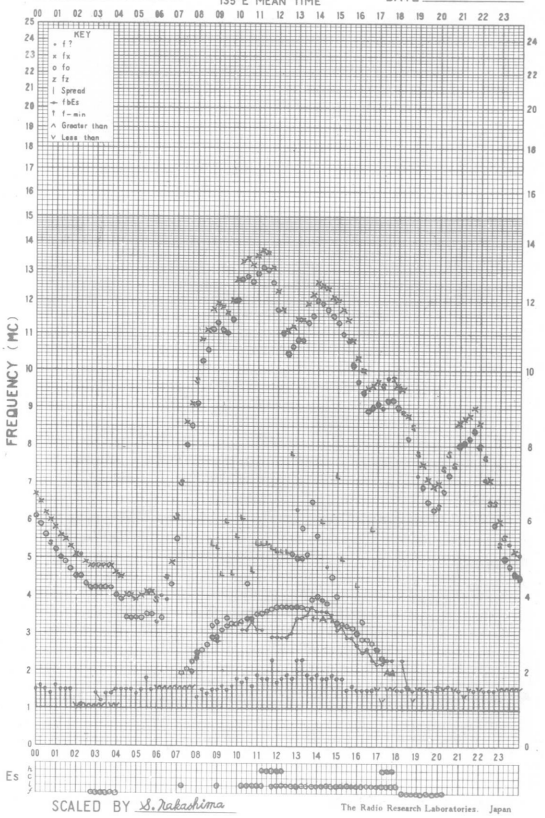

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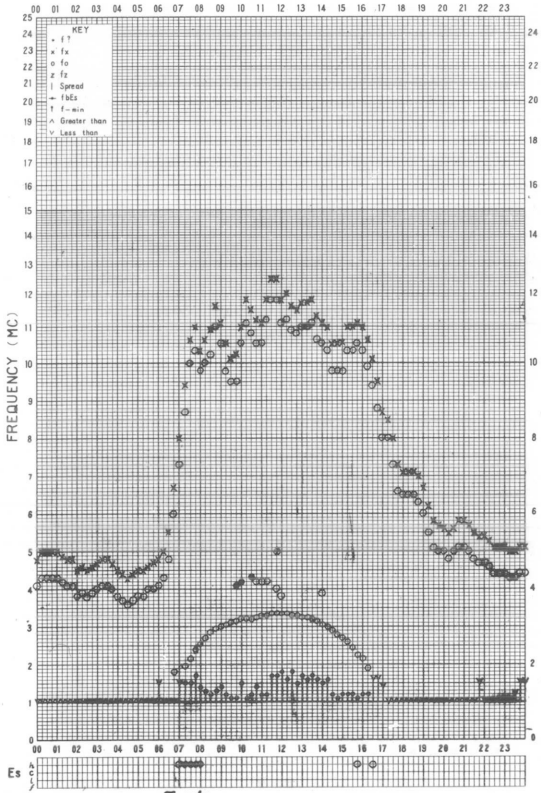

SCALED BY J. oda

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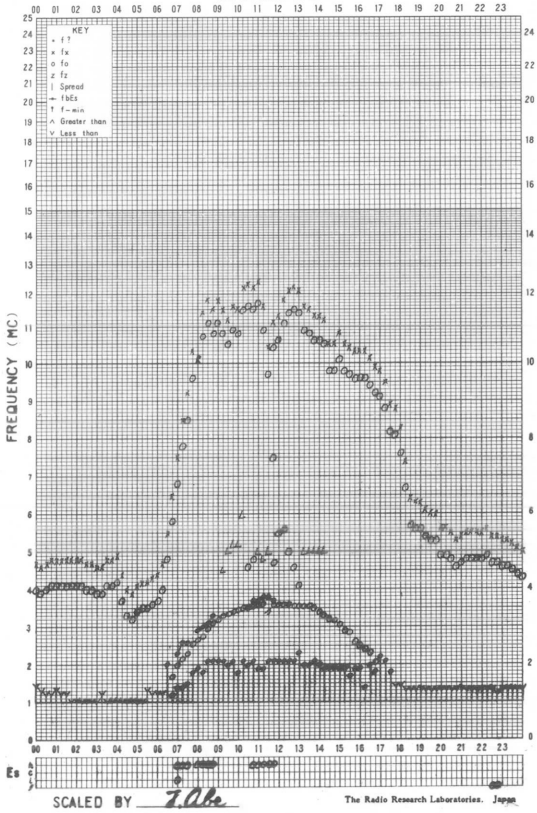

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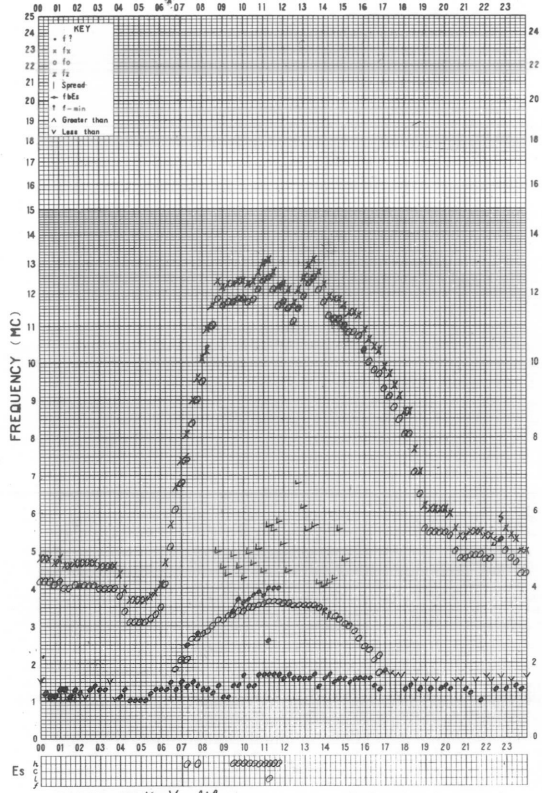

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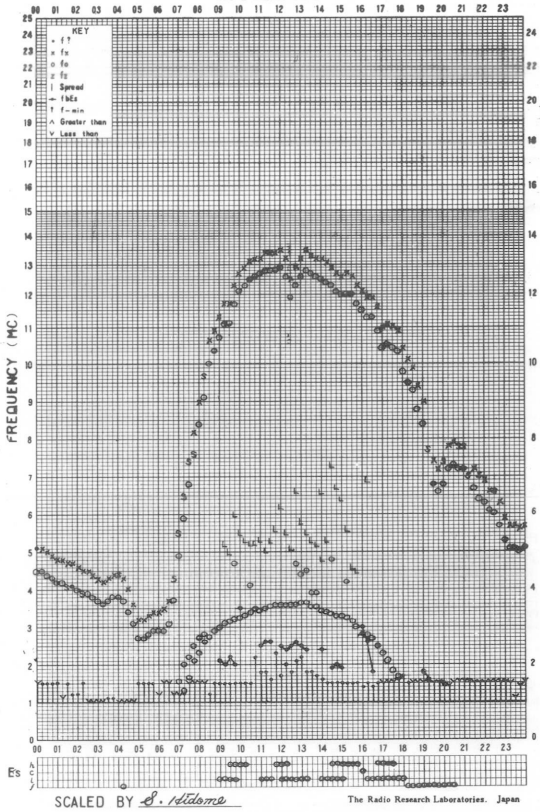

SCALED BY S. Ishidome

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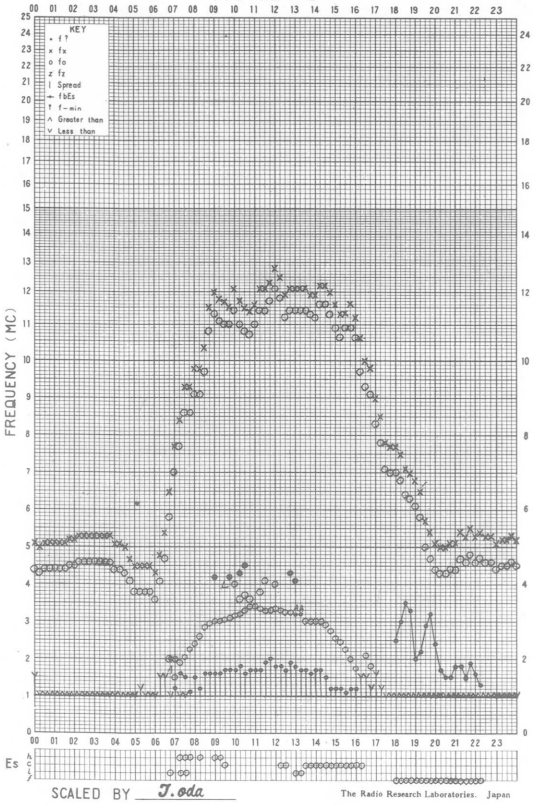
f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE FEB. 9.1968



SCALED BY T. Oda

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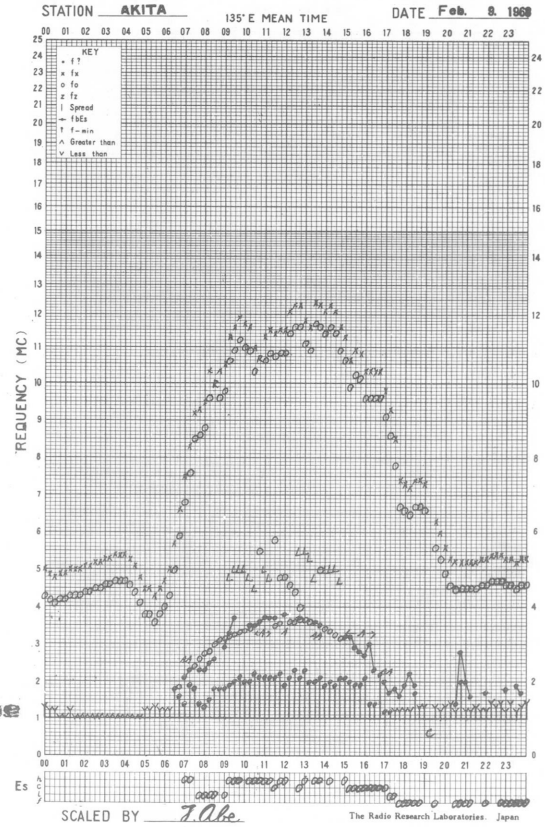

SCALED BY T. Abe

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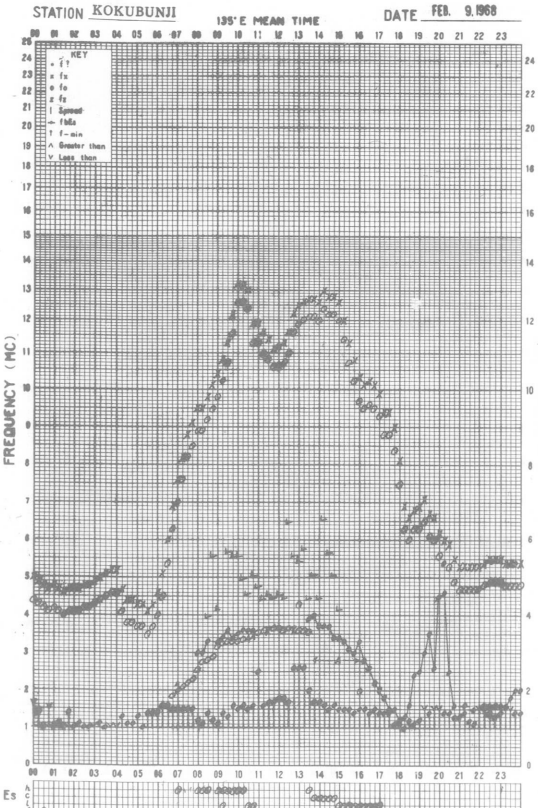

SCALED BY K. Yashikawa

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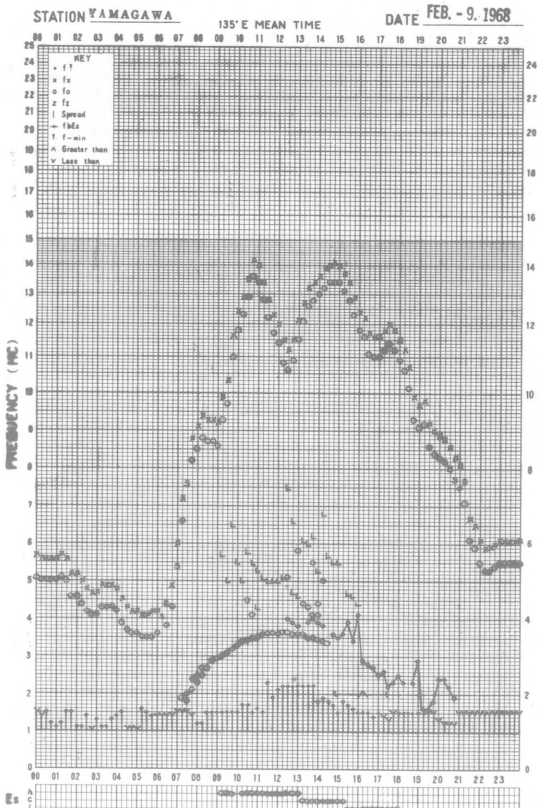

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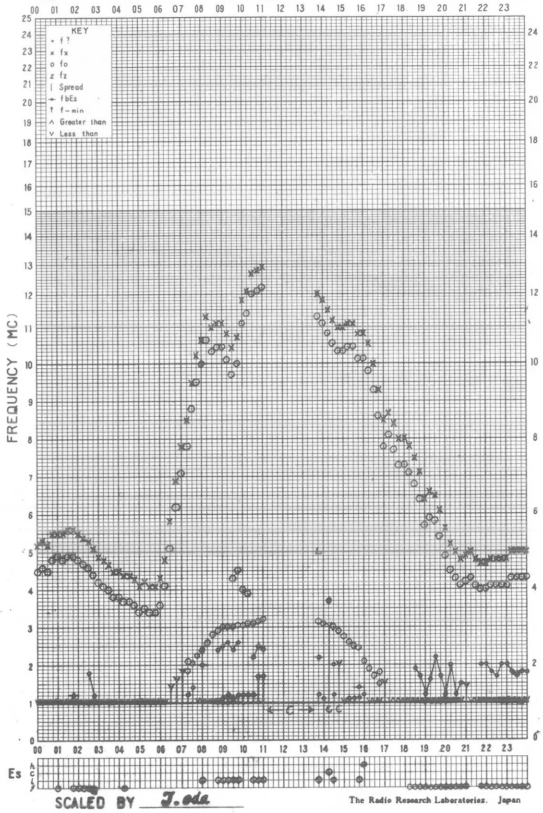

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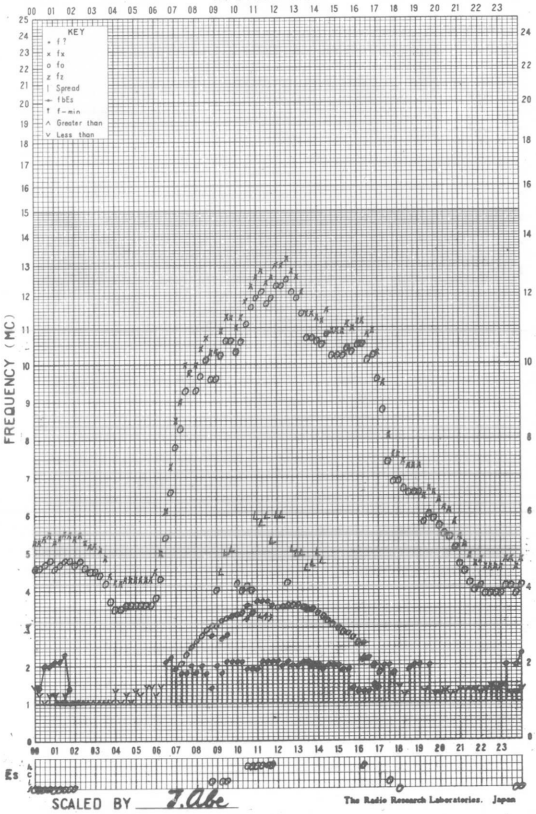

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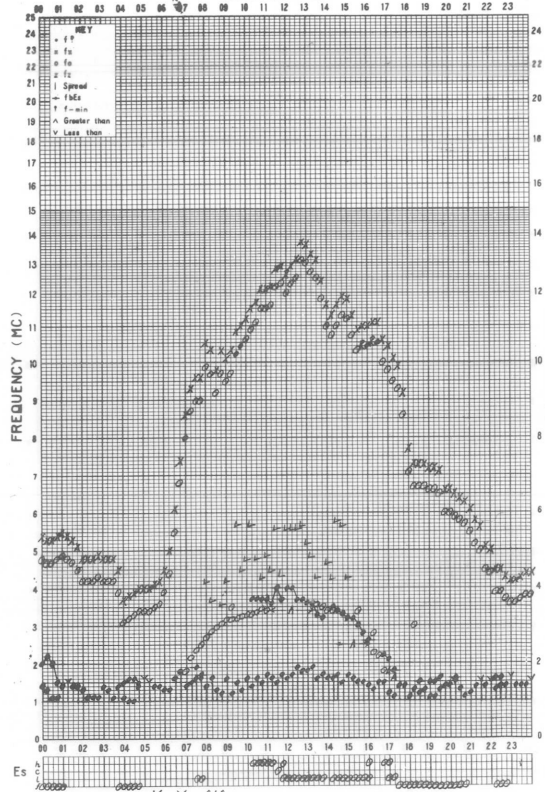

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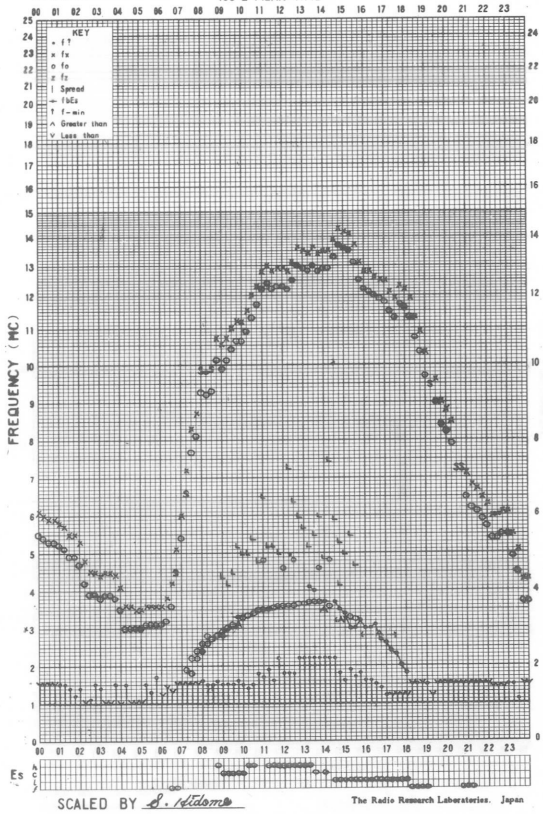

SCALED BY S. Nitsumo

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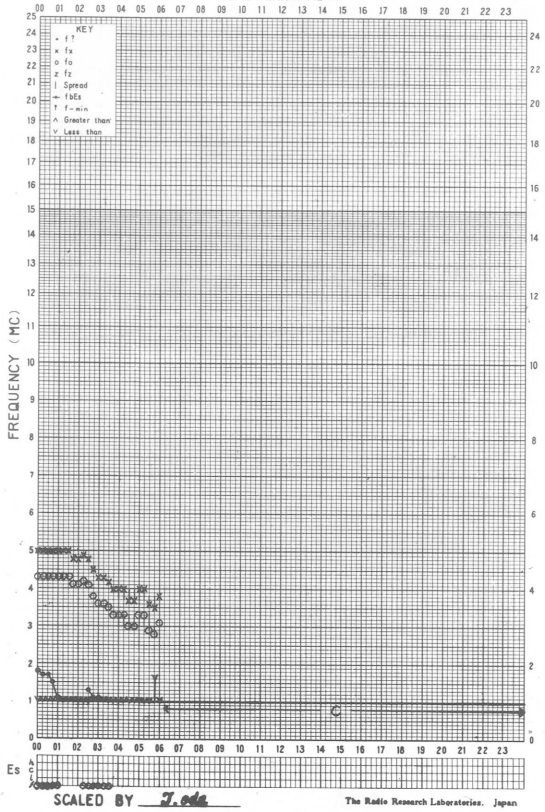

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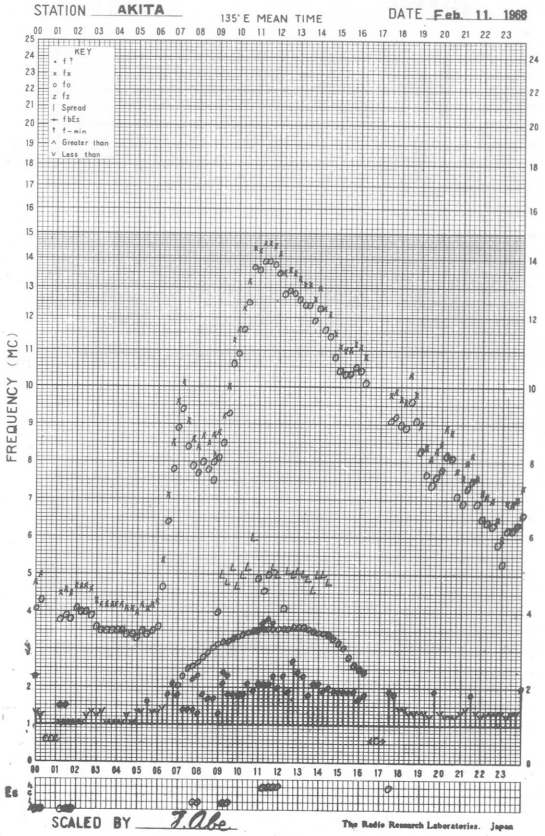

SCALED BY T. Abe

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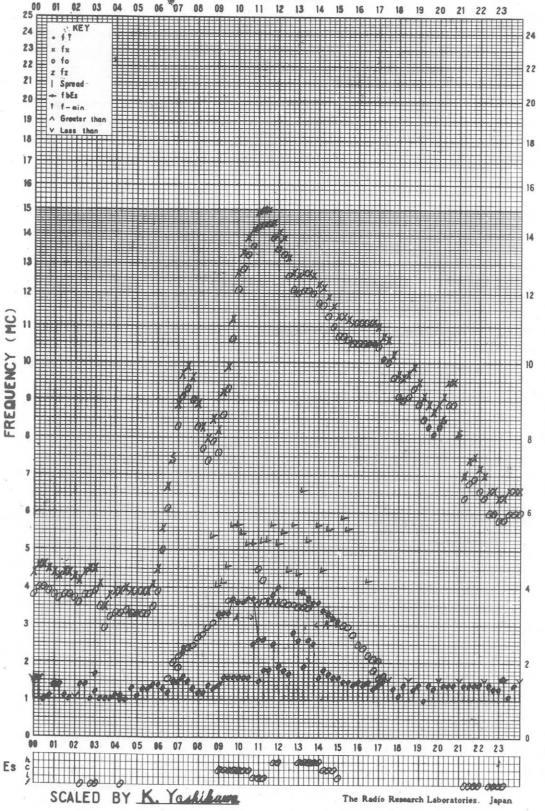

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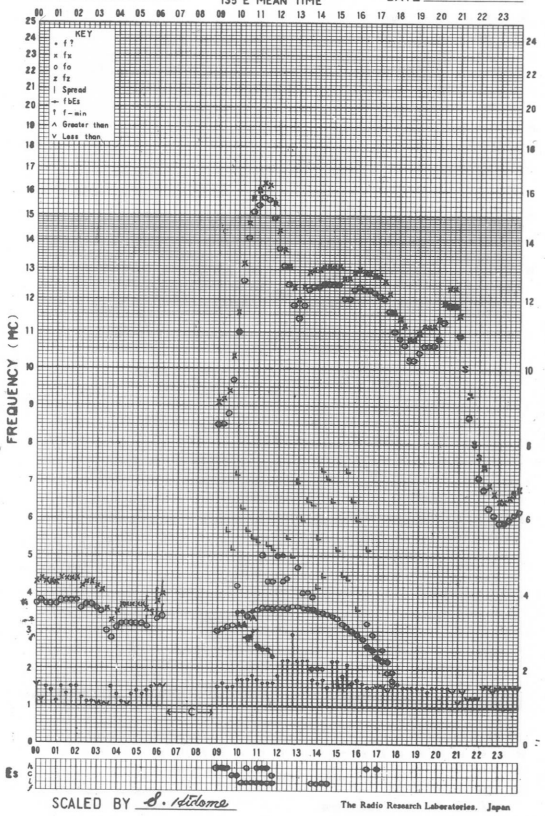

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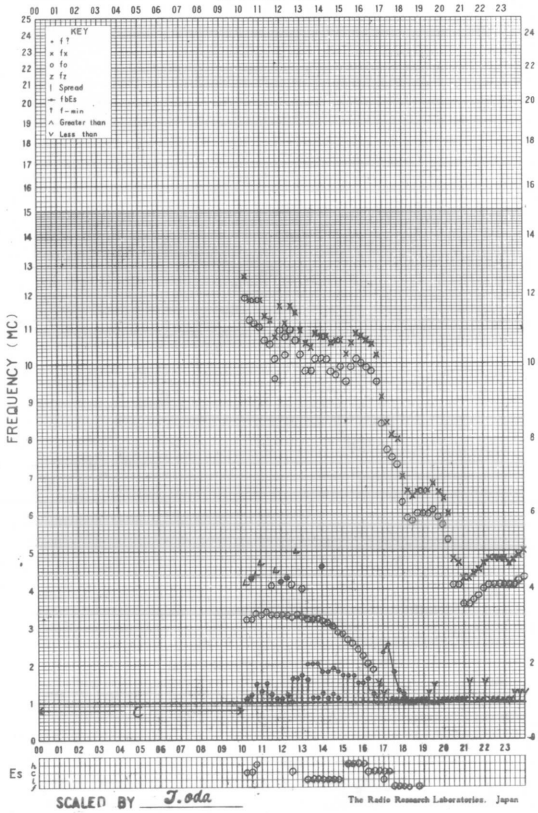

SCALED BY T. Oda

The Radio Research Laboratories. Japan

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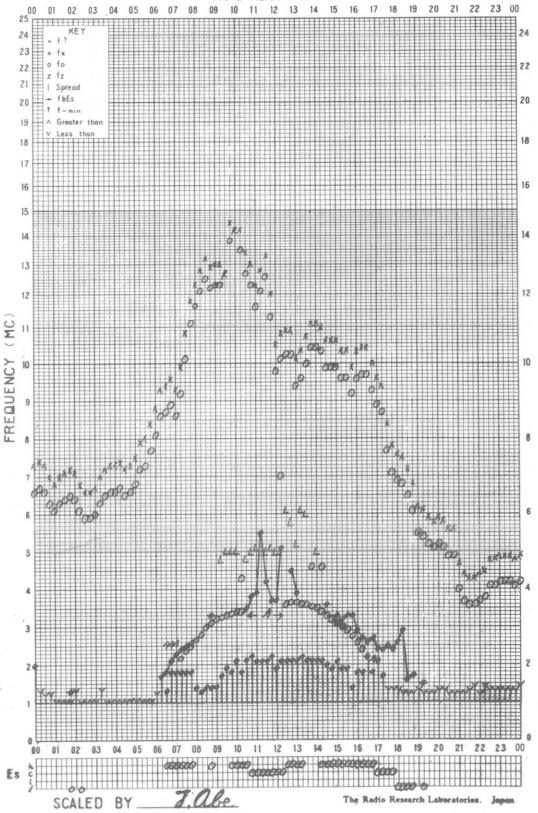

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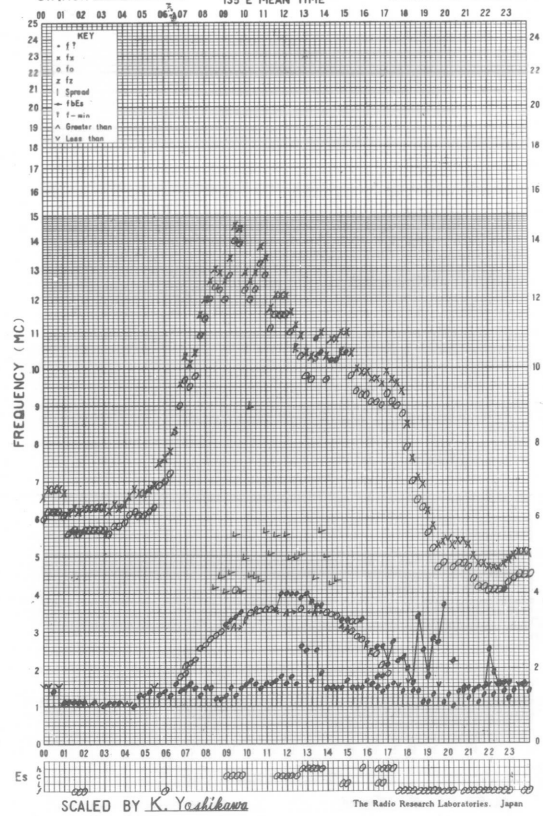

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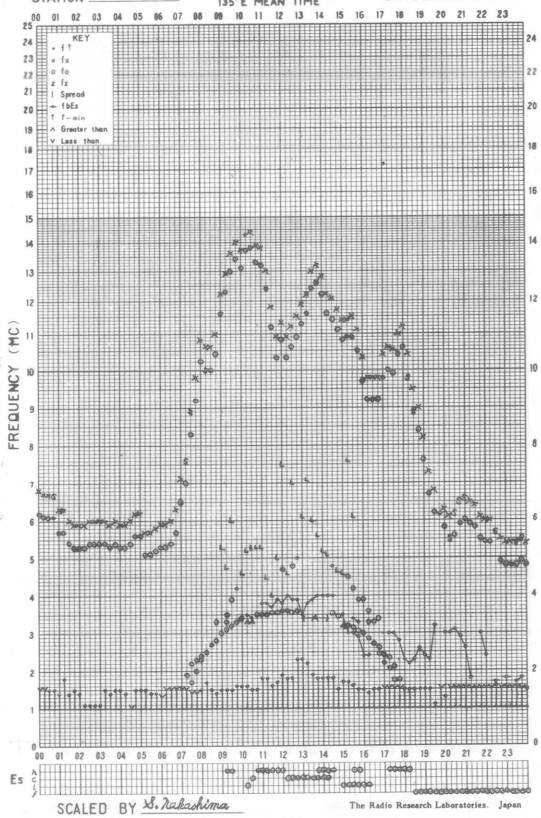

SCALED BY S. Nakashima

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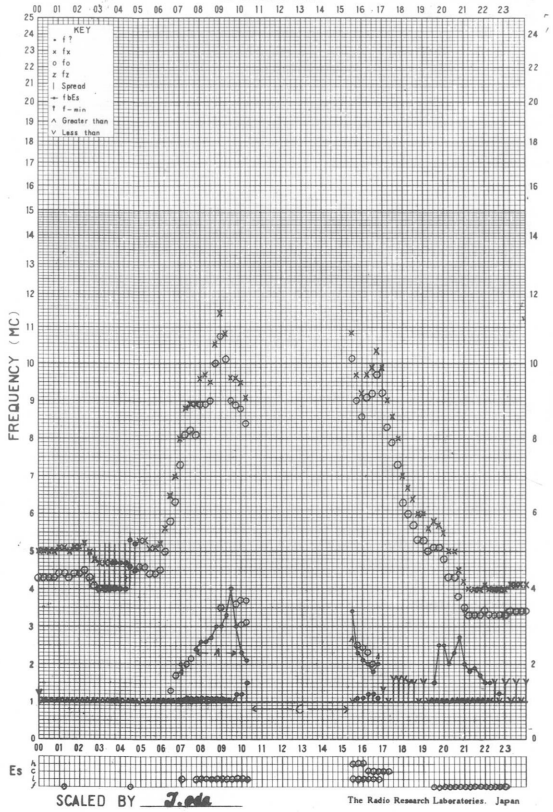

SCALED BY T. ede

The Radio Research Laboratories. Japan

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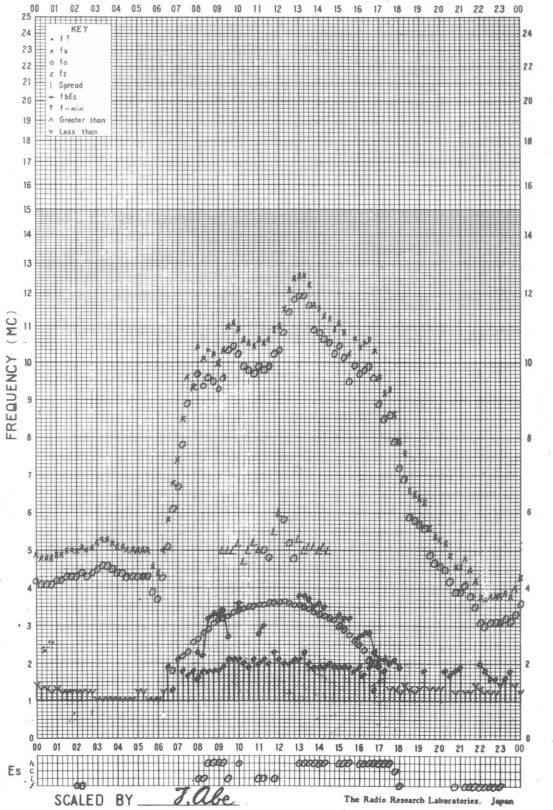

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The Radio Research Laboratories. Japan

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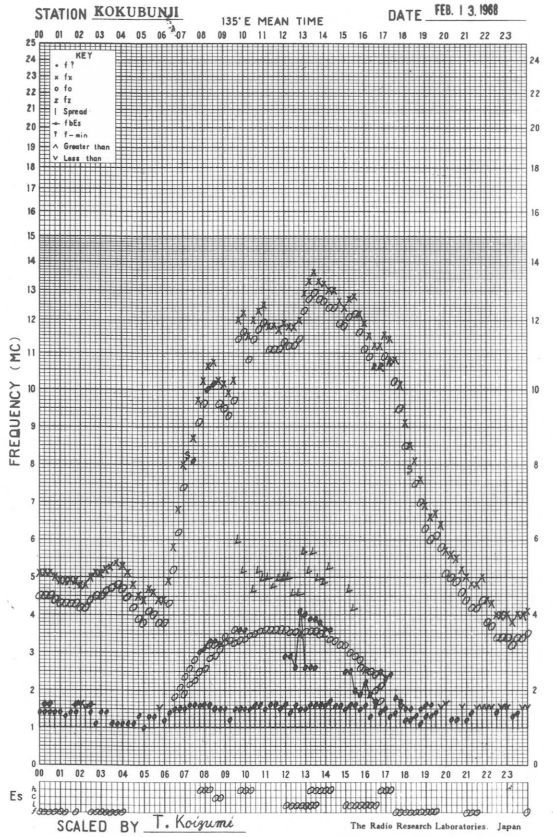

SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

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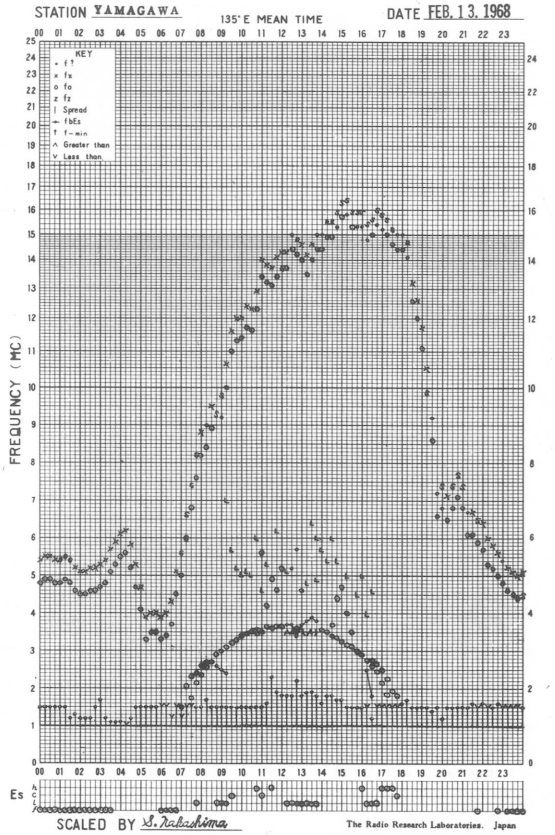

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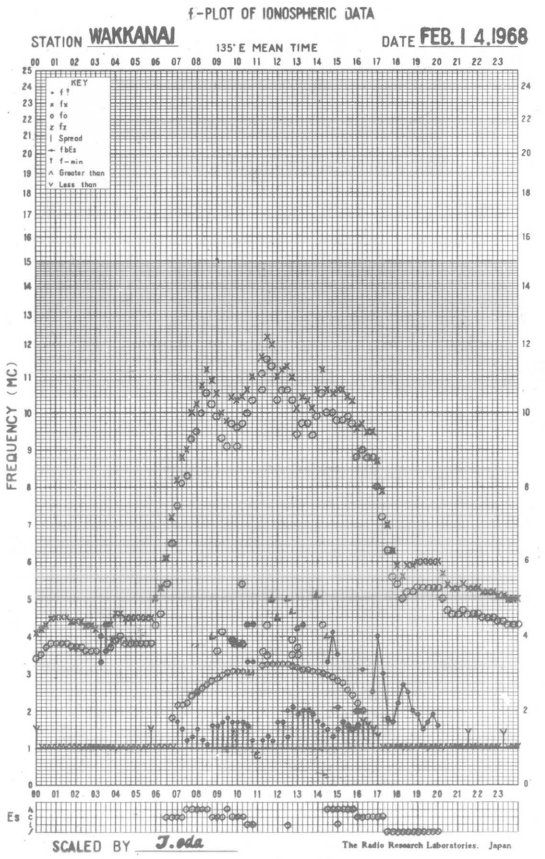
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STATION WAKKANAI
135° E MEAN TIME
DATE FEB. 14, 1968
KEY
FREQUENCY (MC)
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SCALED BY T. oda
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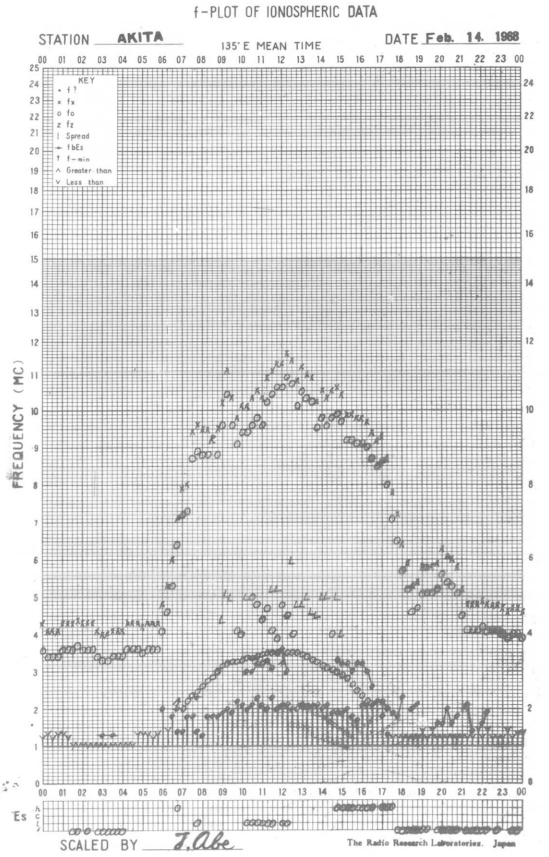
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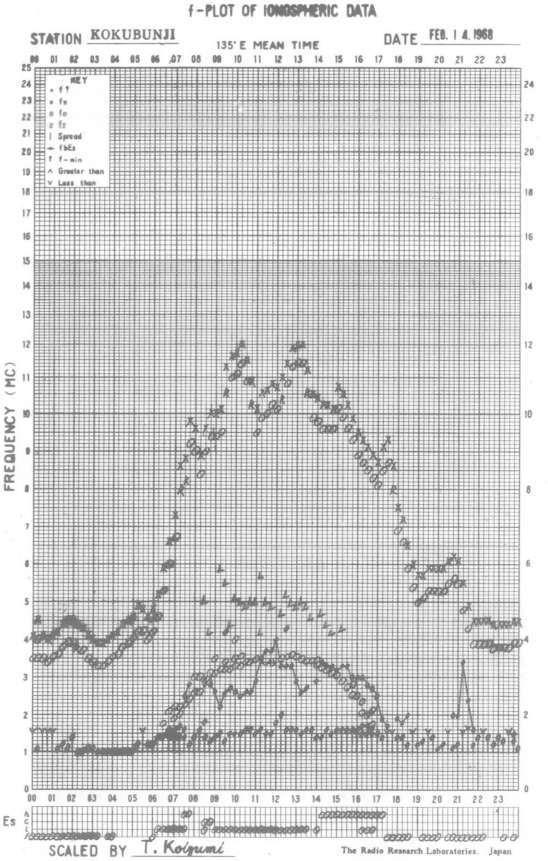
The Radio Research Laboratories. Japan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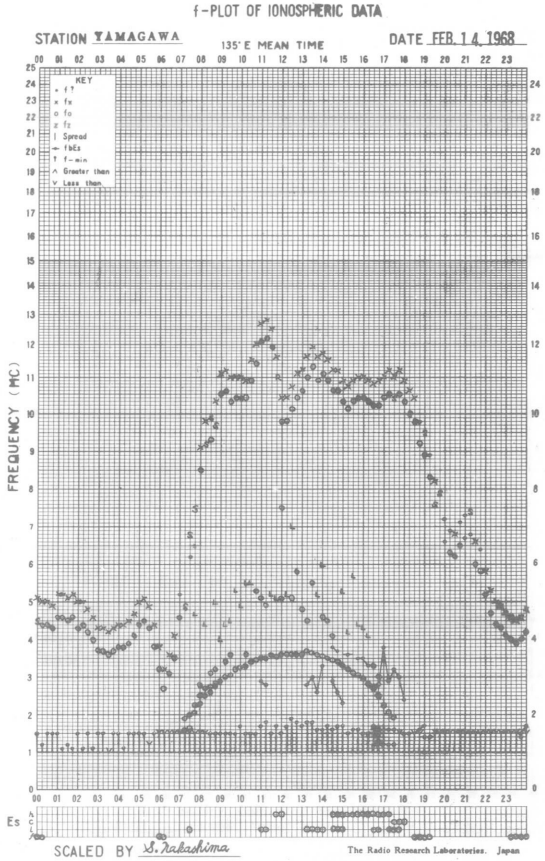
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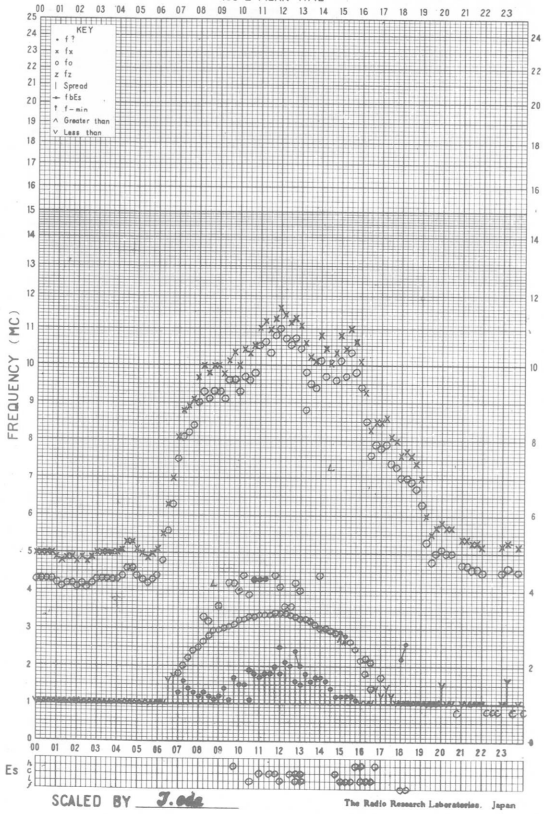

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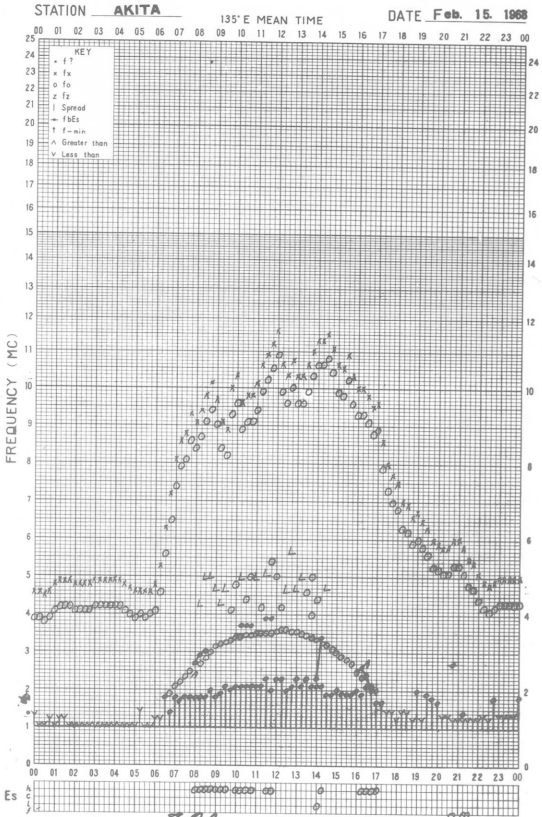

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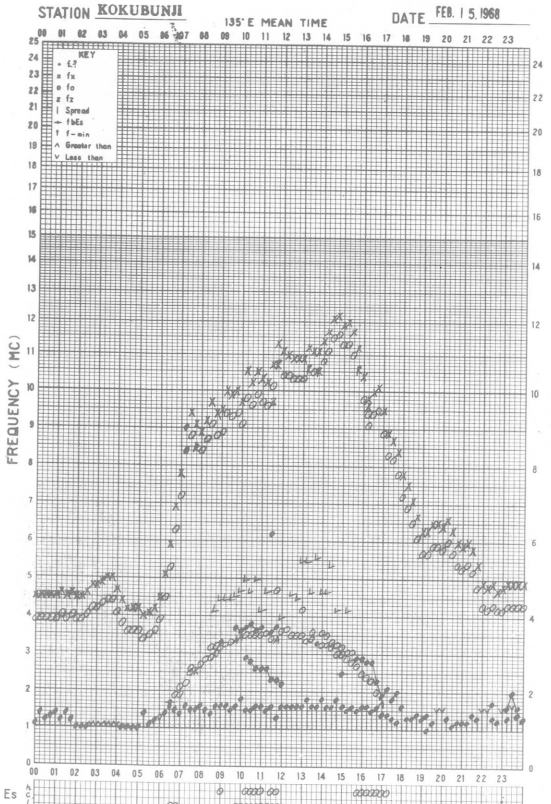

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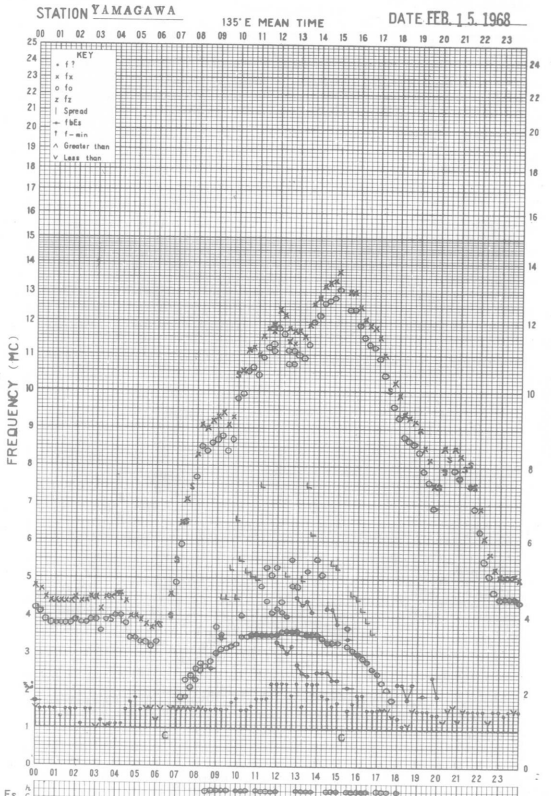

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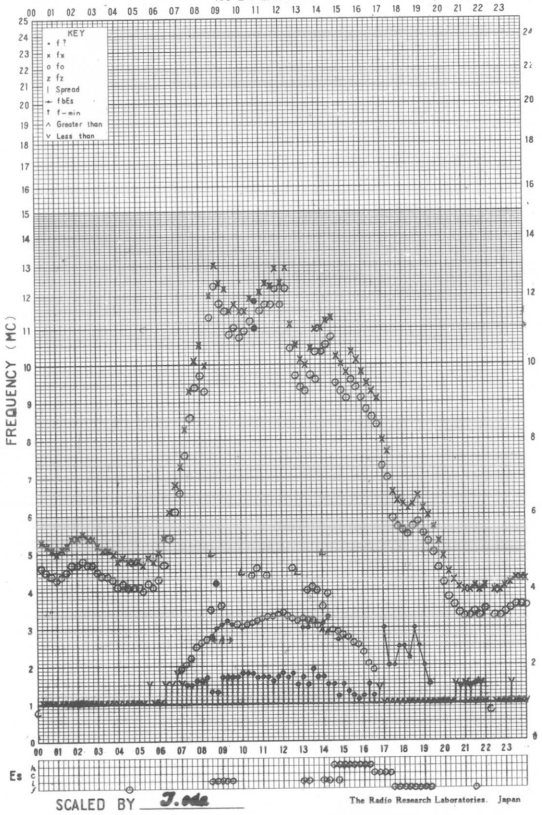

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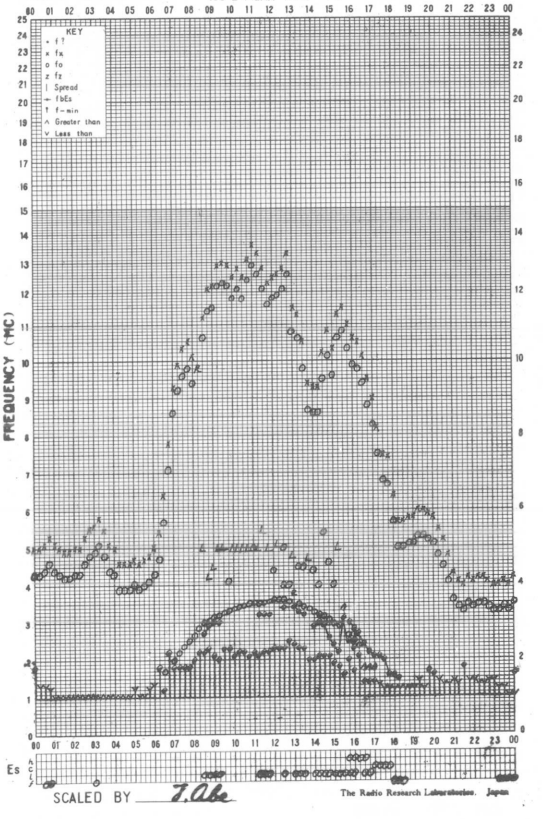

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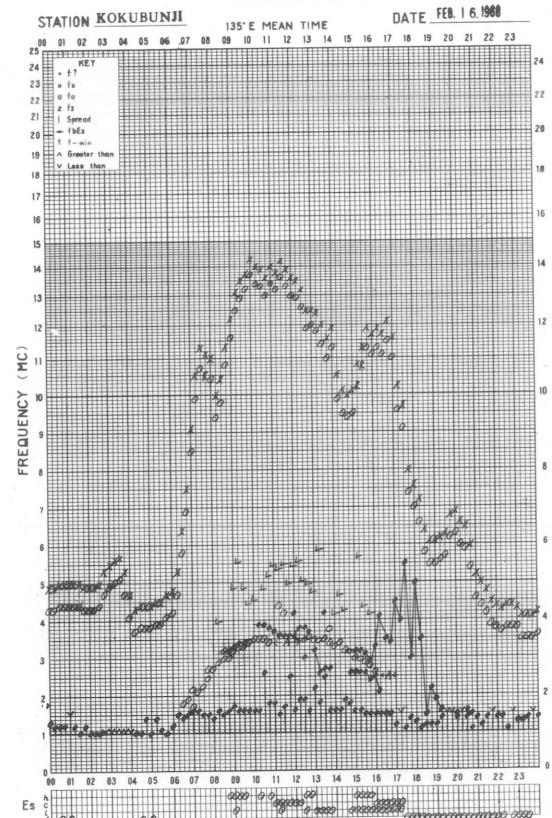

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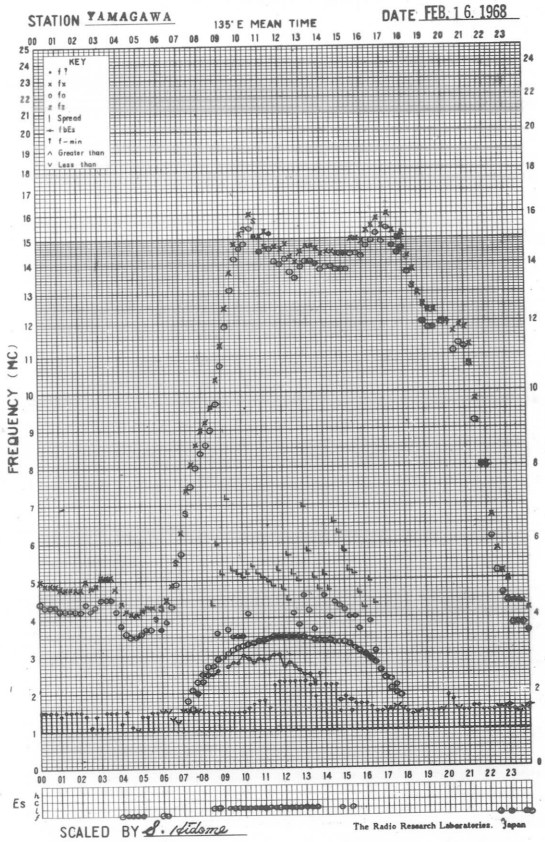

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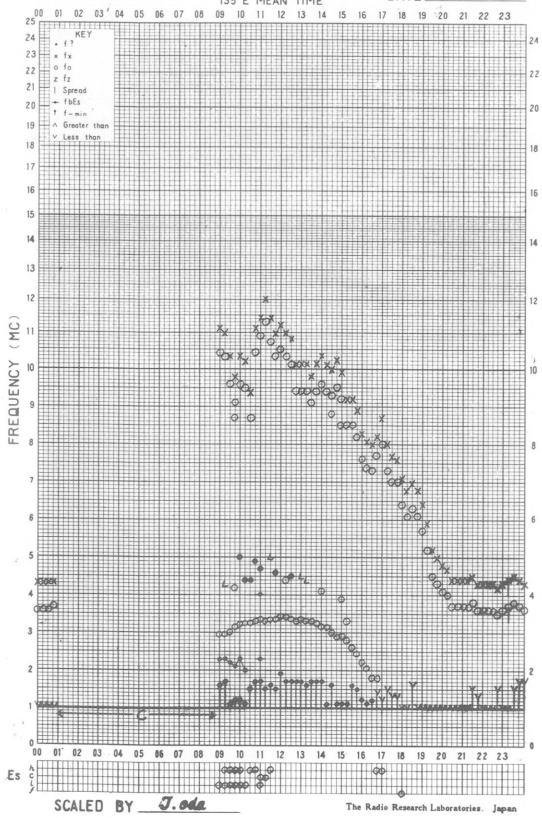

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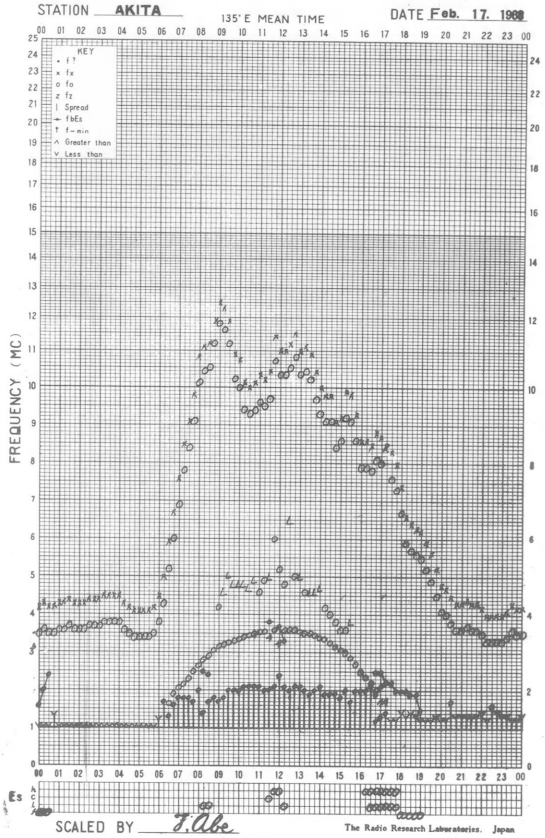

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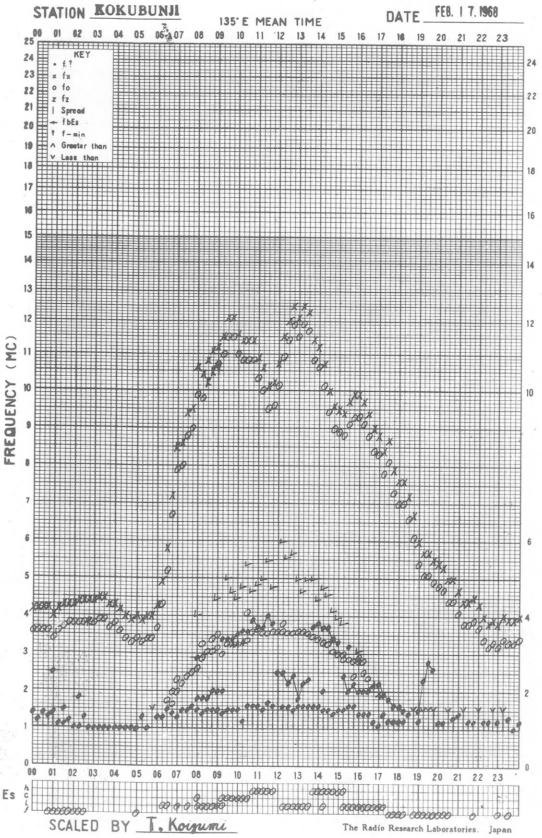

SCALED BY T. Koyama

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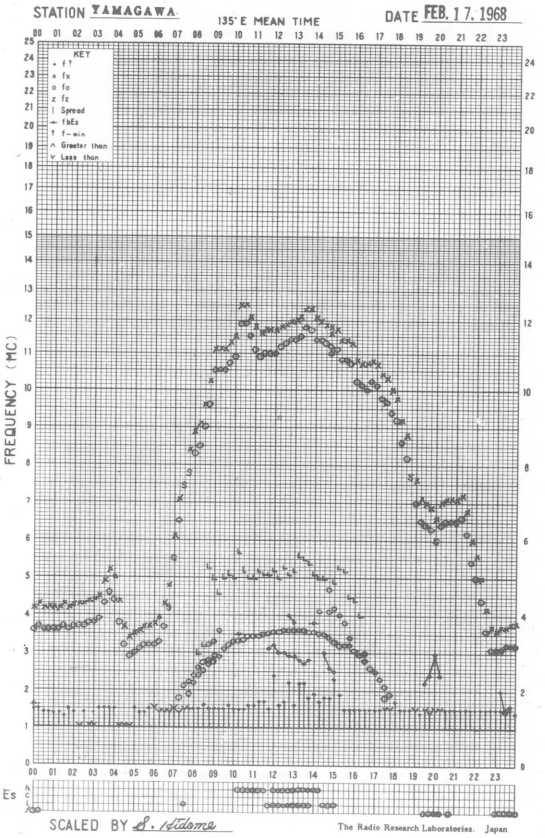
STATION YAMAGAWA 135°E MEAN TIME DATE FEB. 17. 1968



SCALED BY S. Nitoma

The Radio Research Laboratories. Japan

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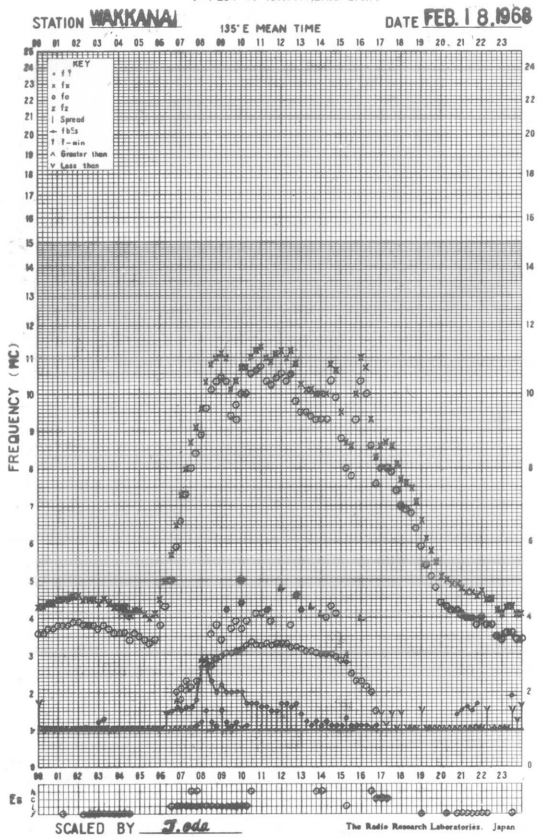

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The Radio Research Laboratories. Japan

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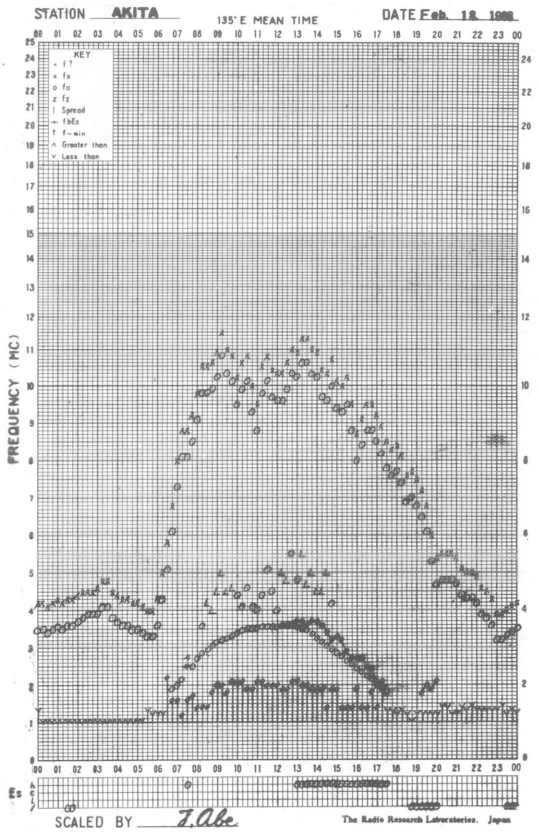

SCALED BY T. Abe

The Radio Research Laboratories. Japan

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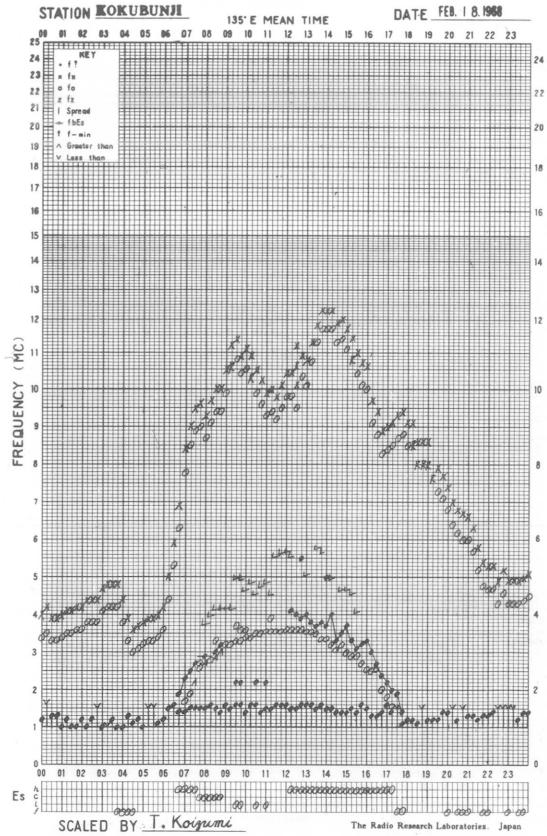

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The Radio Research Laboratories. Japan

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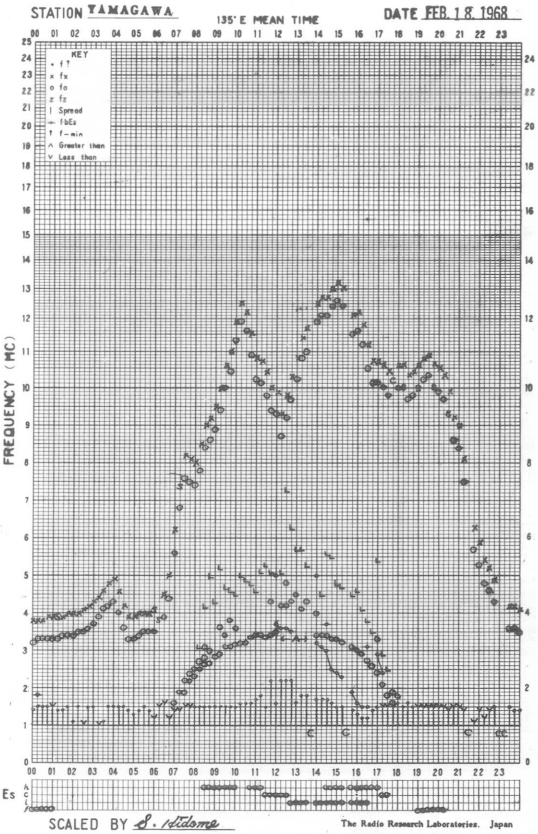

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The Radio Research Laboratories. Japan

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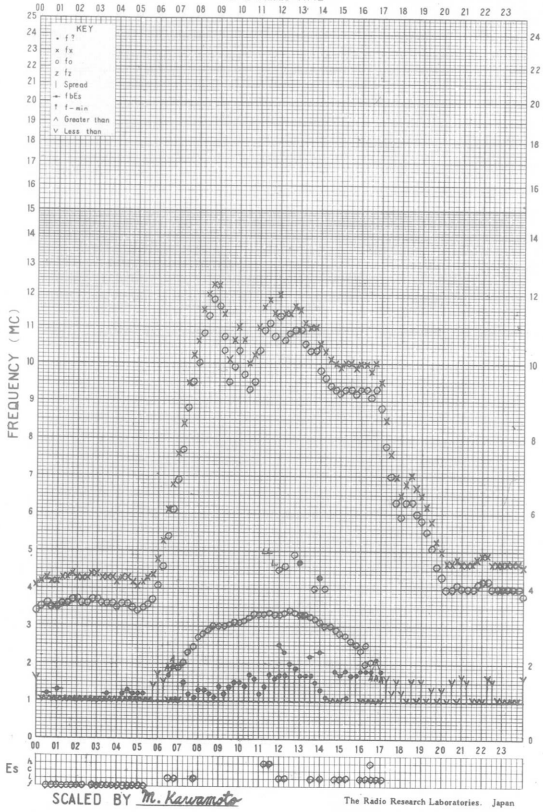

SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

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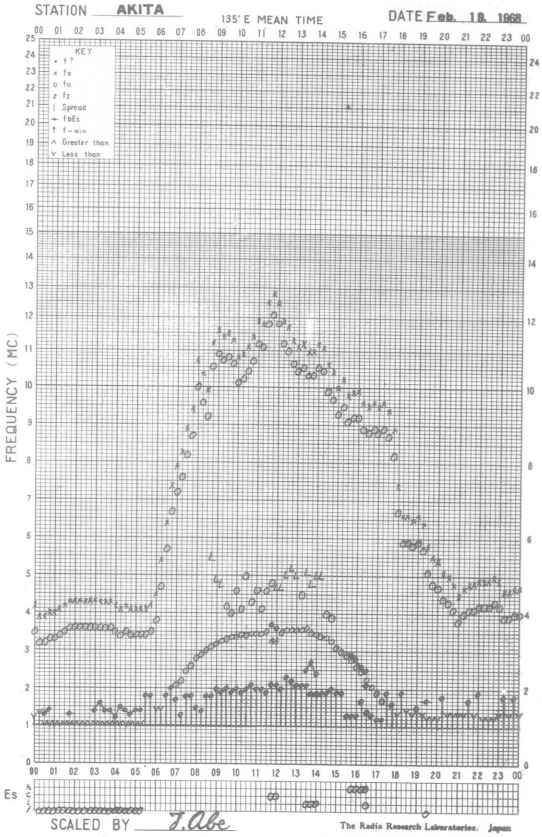

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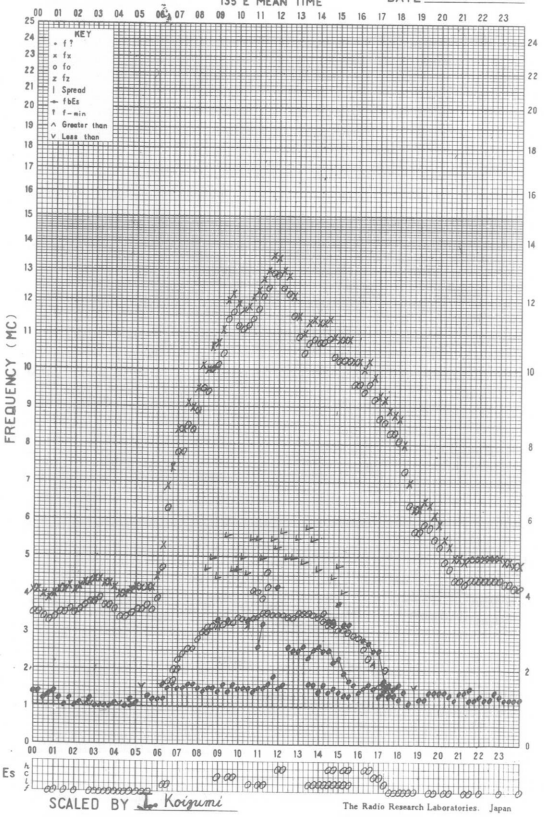

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The Radio Research Laboratories. Japan

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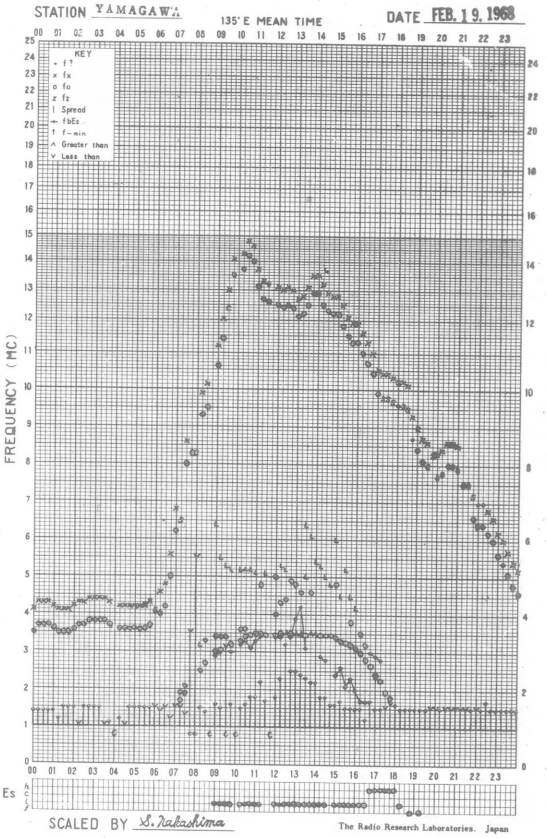

SCALED BY S. Nakashima

The Radio Research Laboratories. Japan

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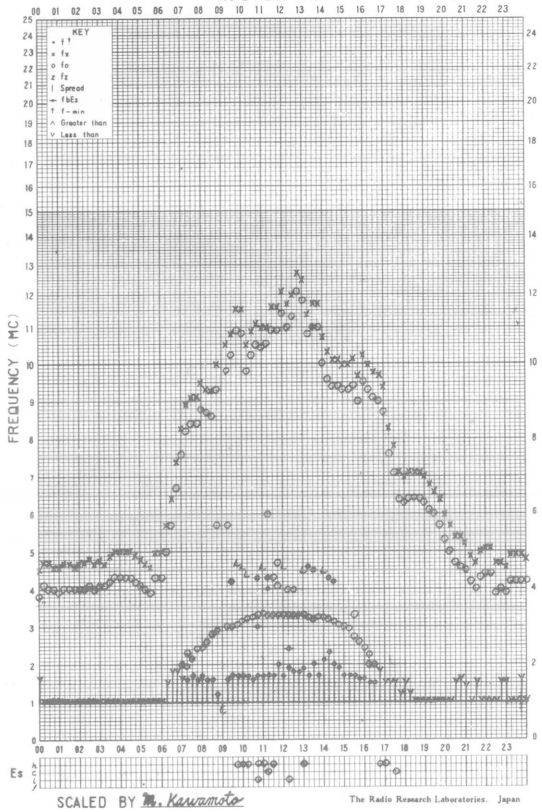

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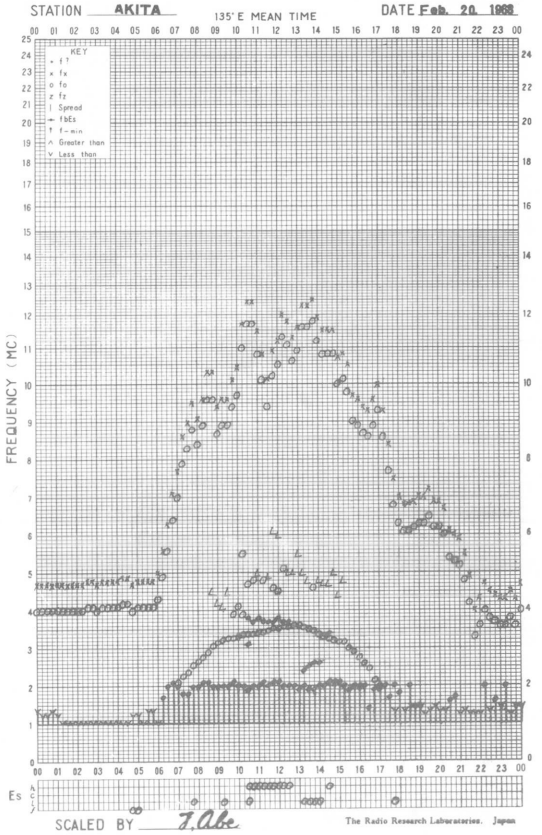

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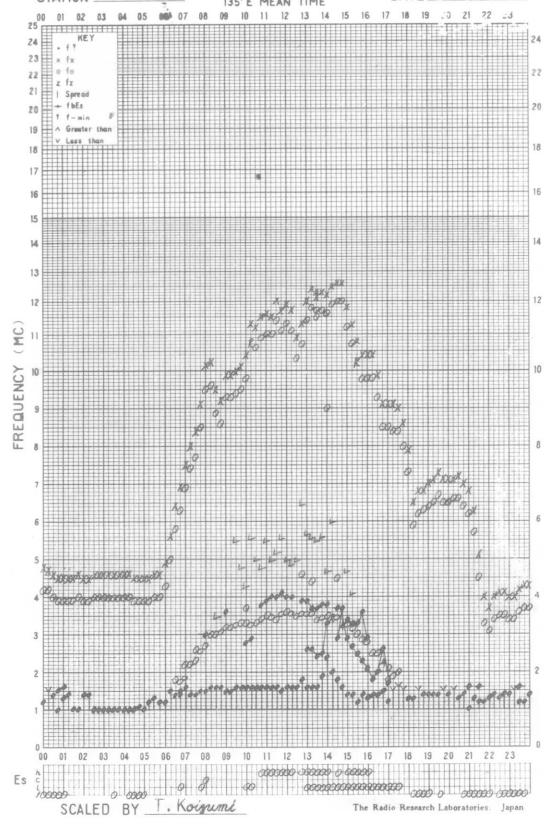

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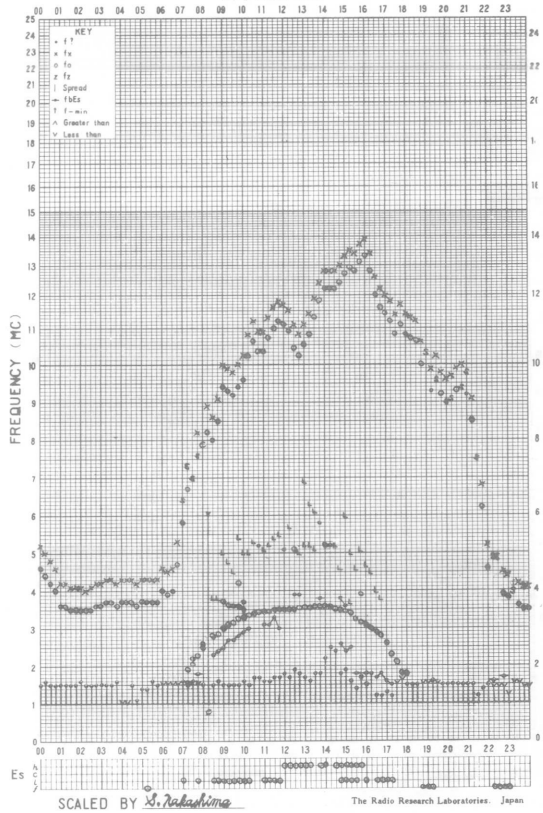

SCALED BY S. Takashima The Radio Research Laboratories. Japan

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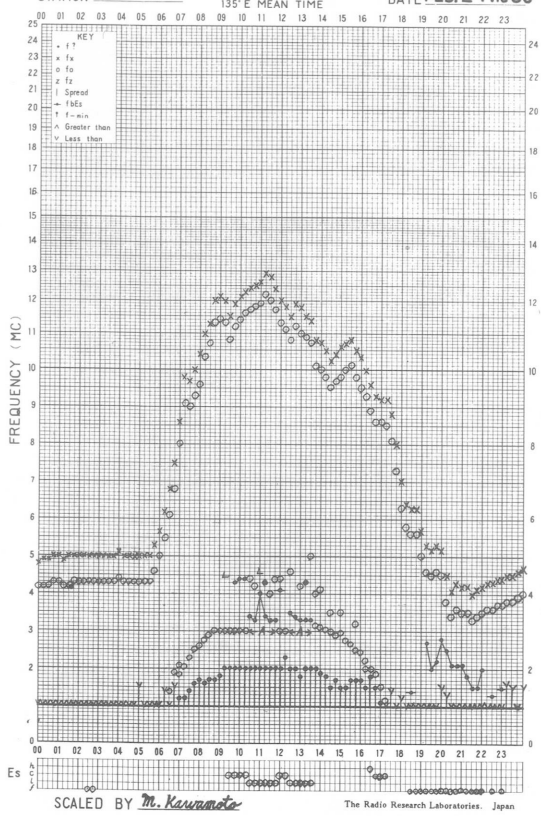

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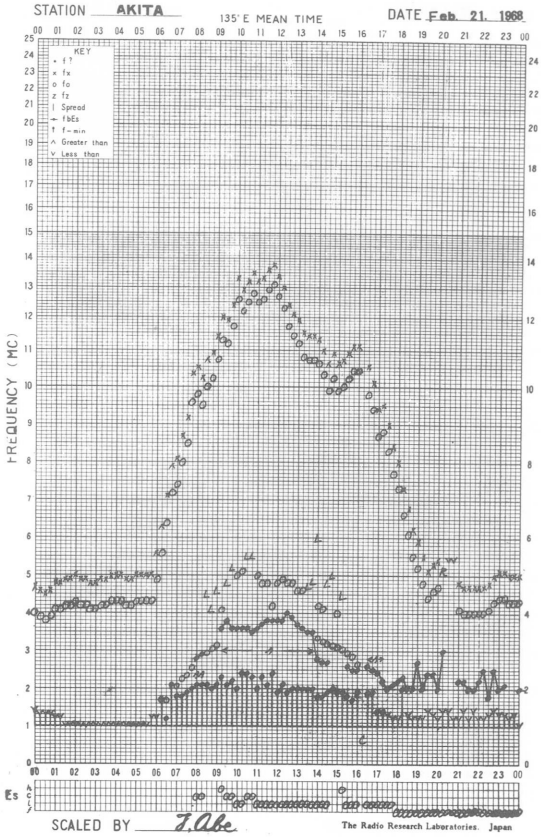

SCALED BY T. Abe The Radio Research Laboratories. Japan

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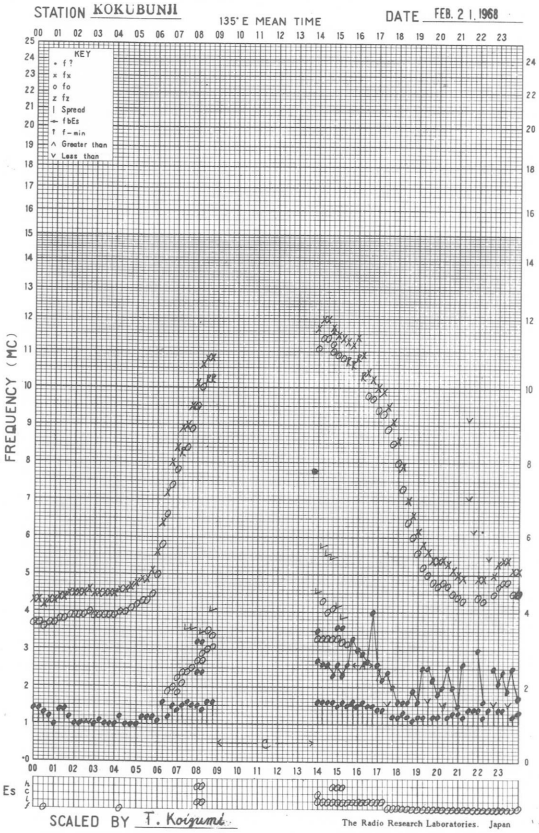

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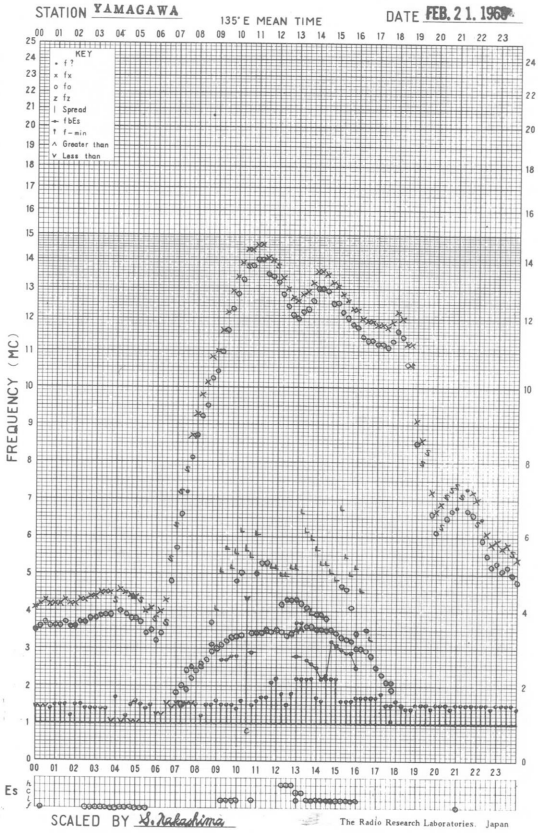

SCALED BY S. Nakashima The Radio Research Laboratories. Japan

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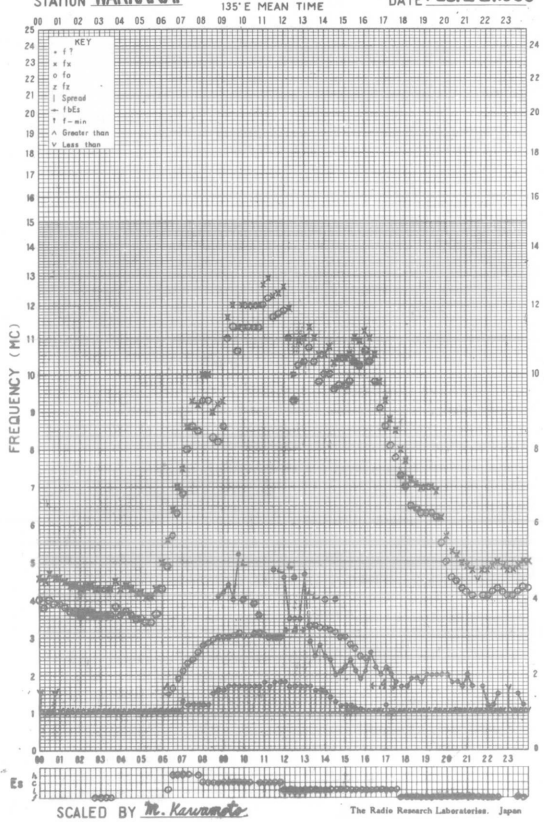

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The Radio Research Laboratories. Japan

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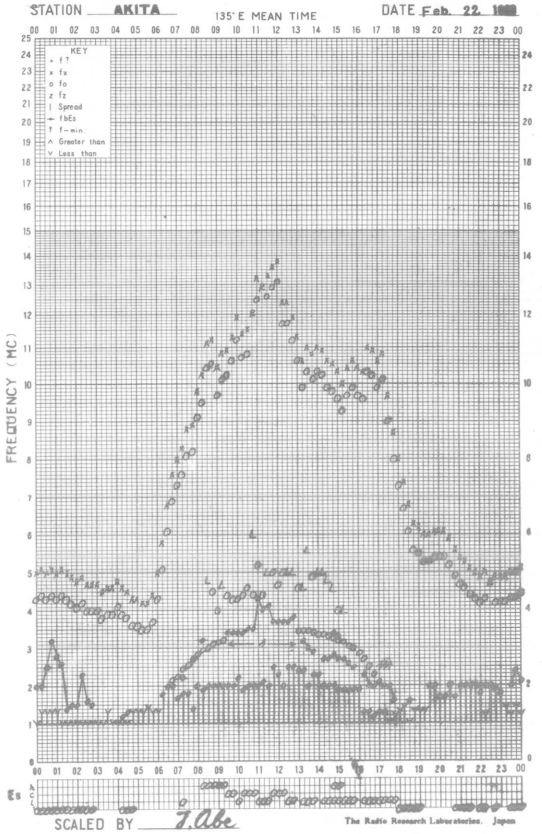

SCALED BY T. Abe

The Radio Research Laboratories. Japan

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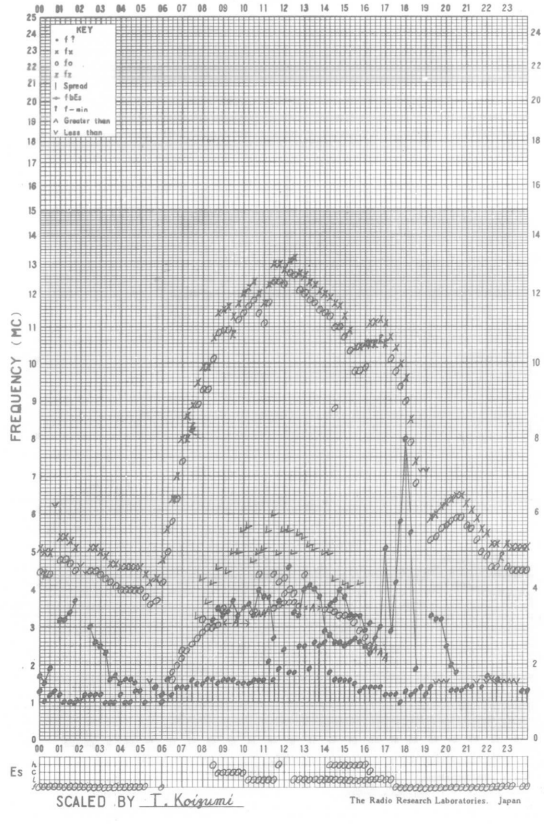

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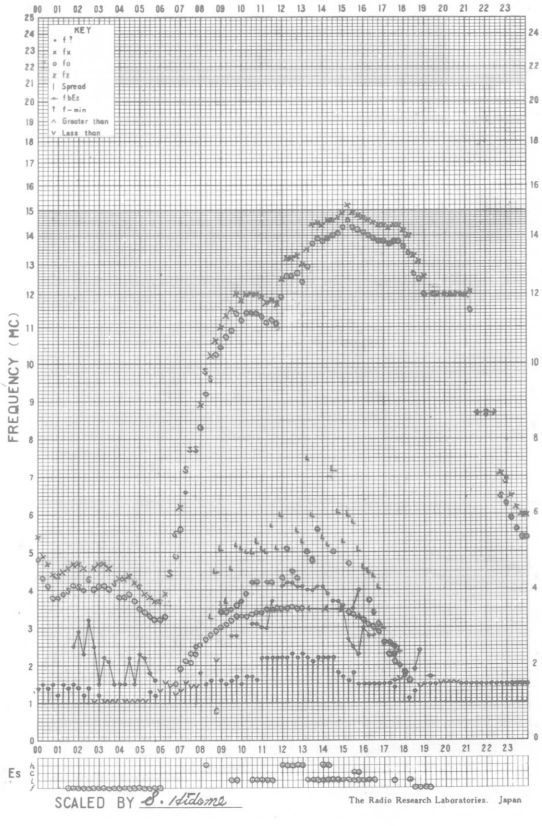

SCALED BY S. Watanabe

The Radio Research Laboratories. Japan

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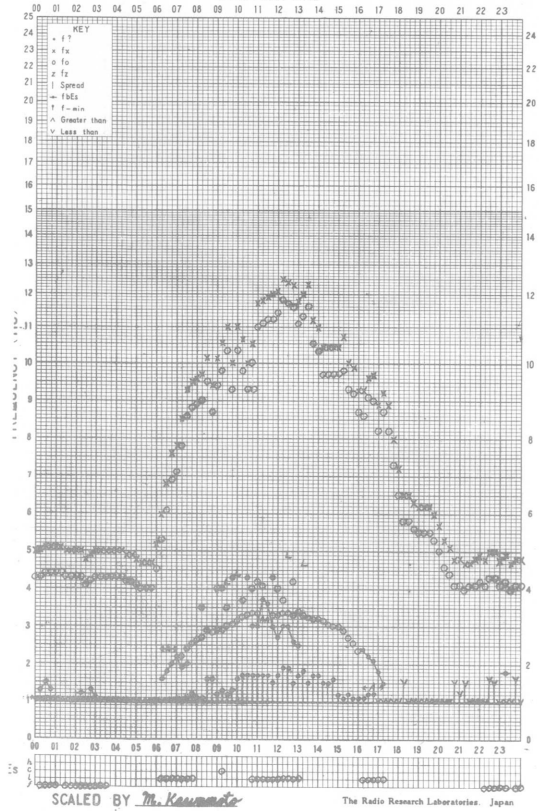

SCALED BY M. Kawamata

The Radio Research Laboratories. Japan

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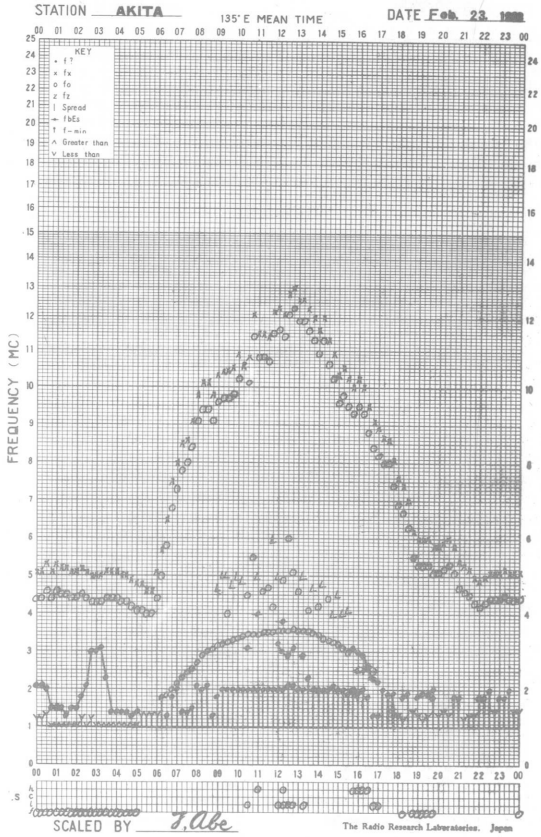

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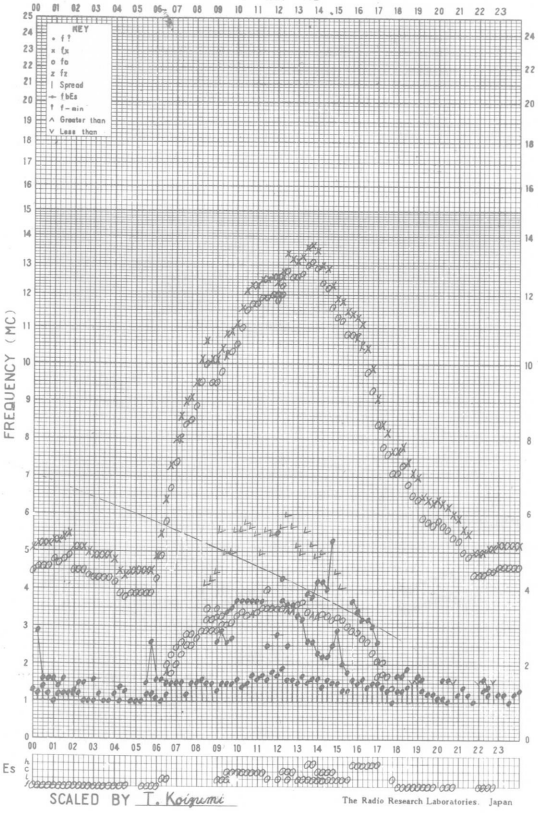

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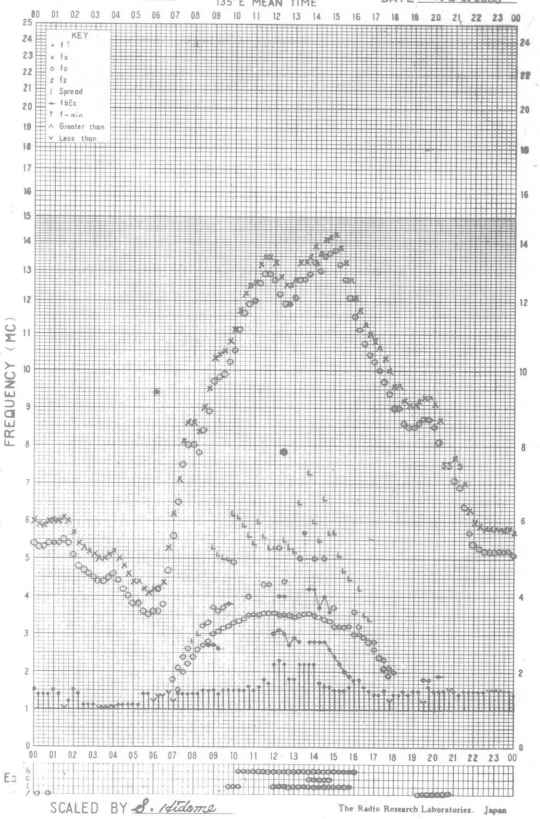

SCALED BY S. Kitamura

The Radio Research Laboratories. Japan

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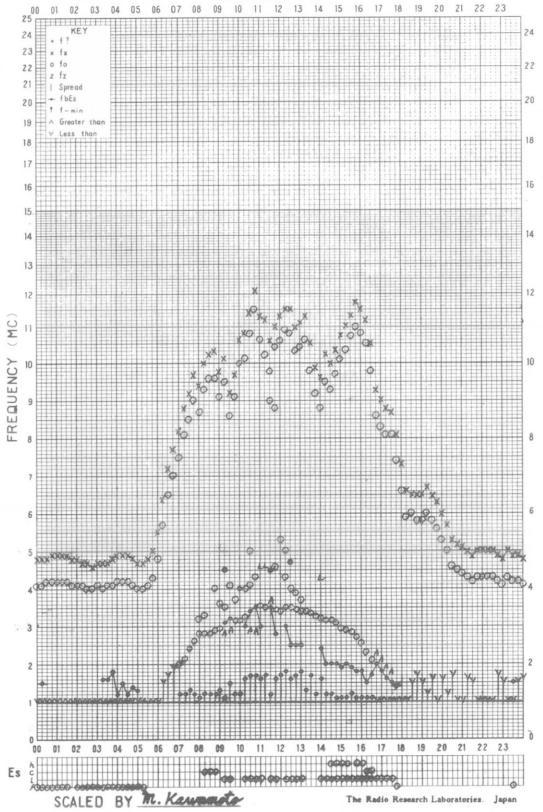

SCALED BY M. Kawamoto

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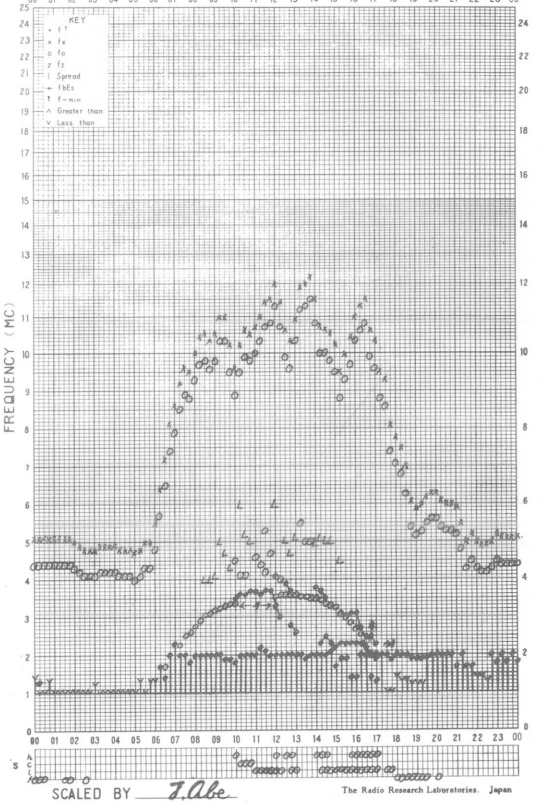

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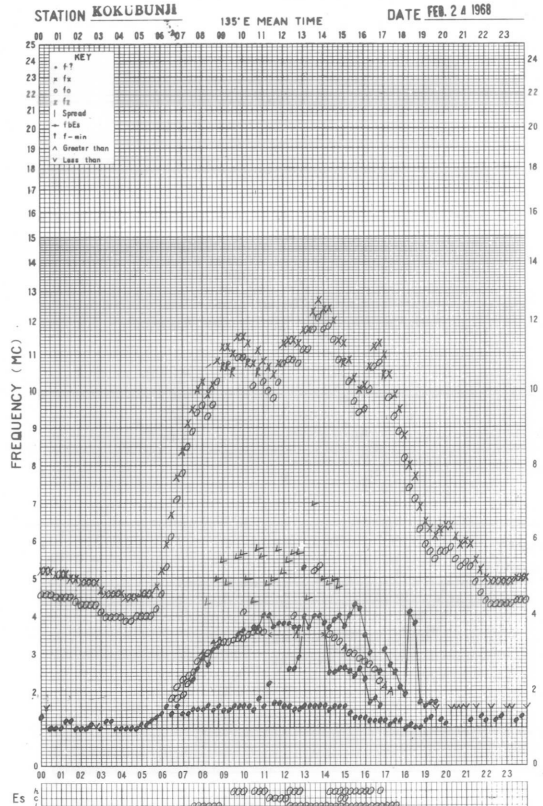

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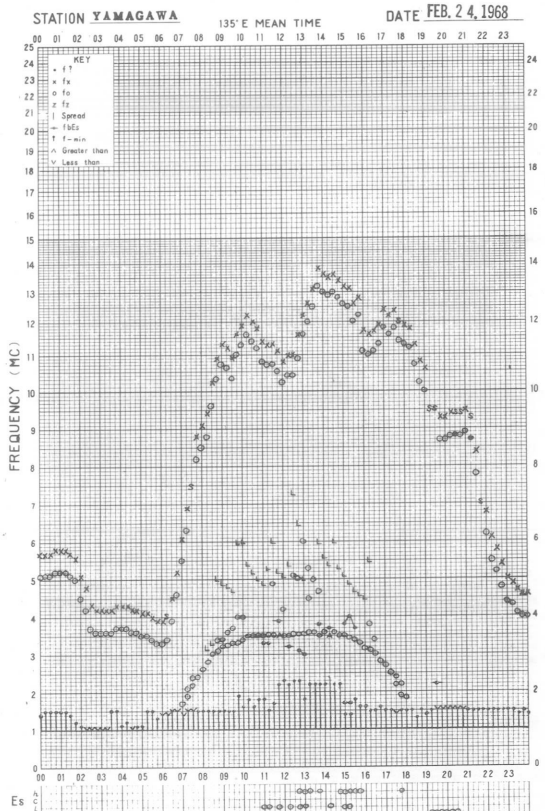

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The Radio Research Laboratories. Japan

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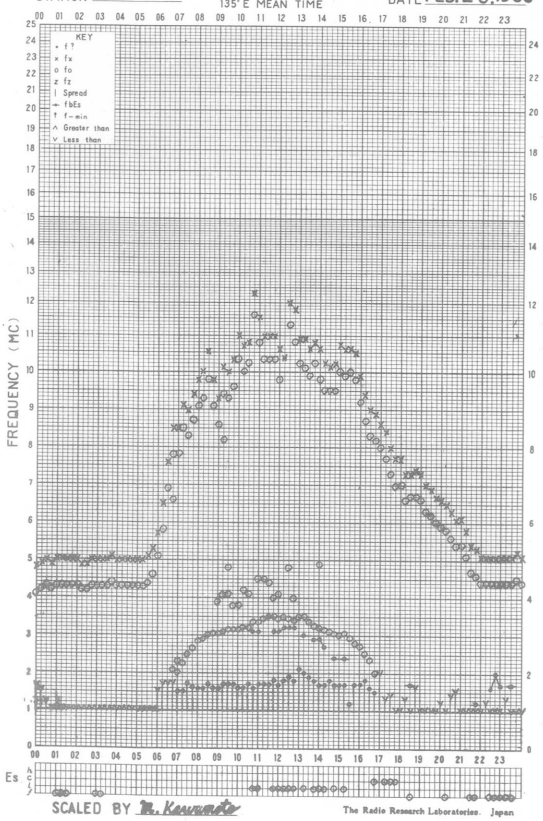

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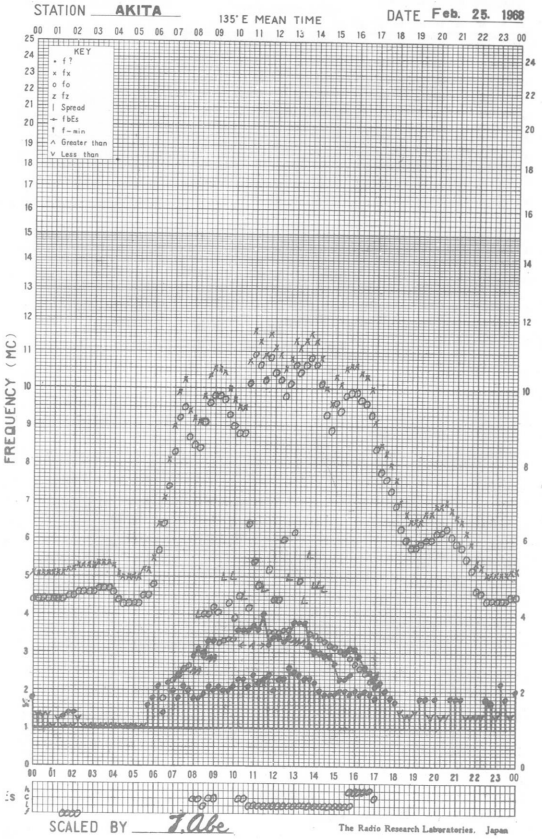

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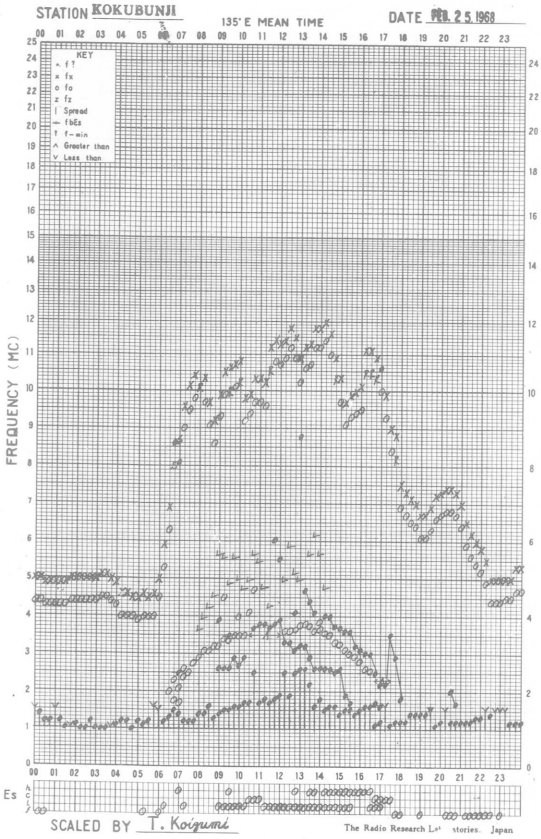

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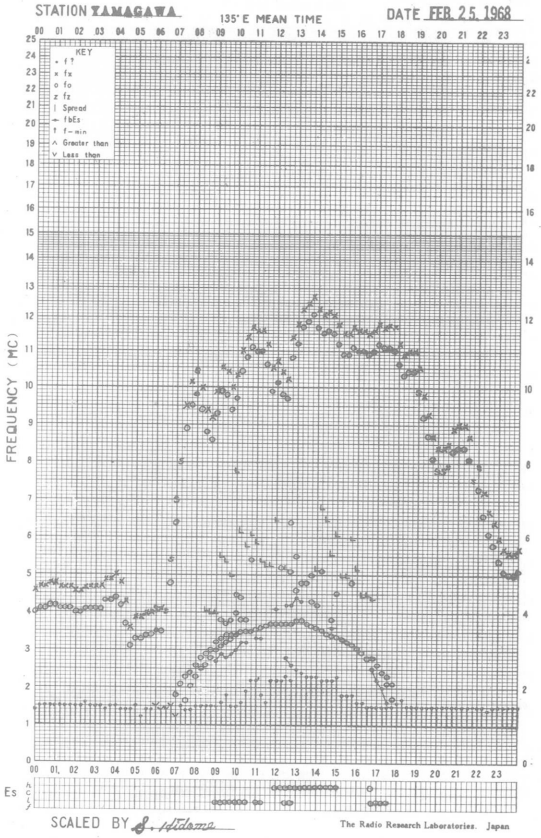

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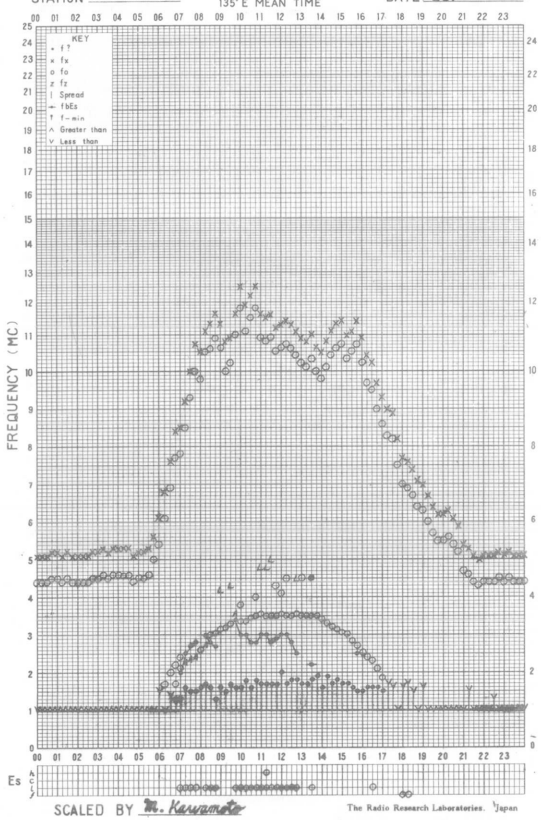

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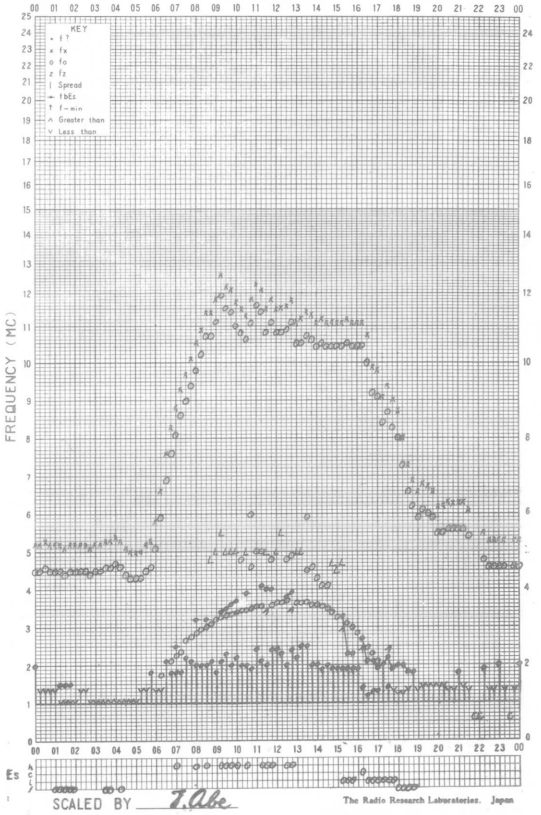

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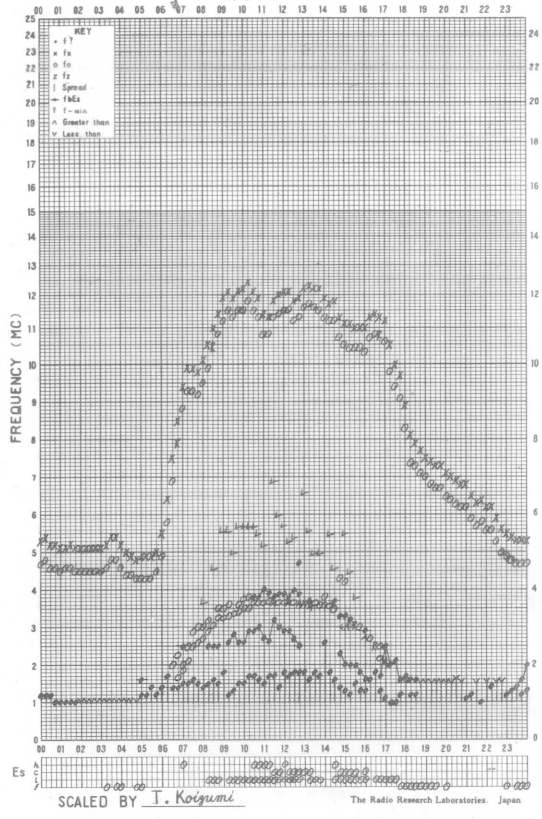

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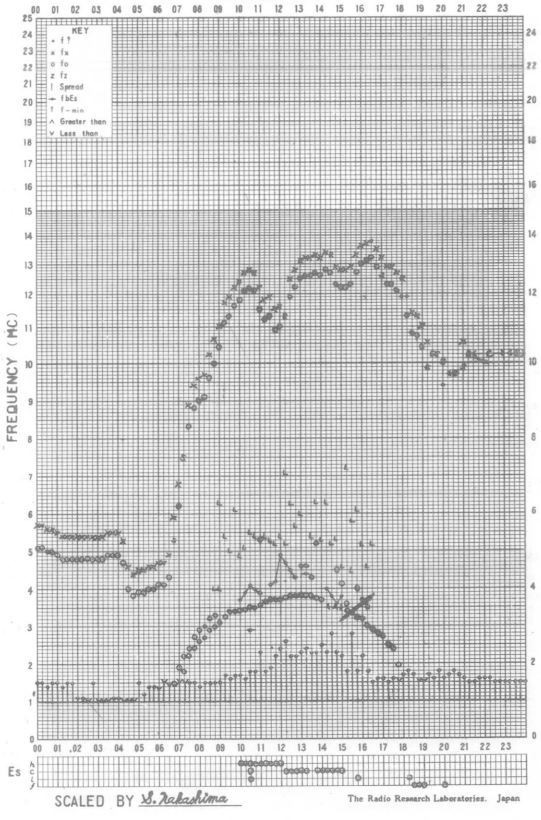

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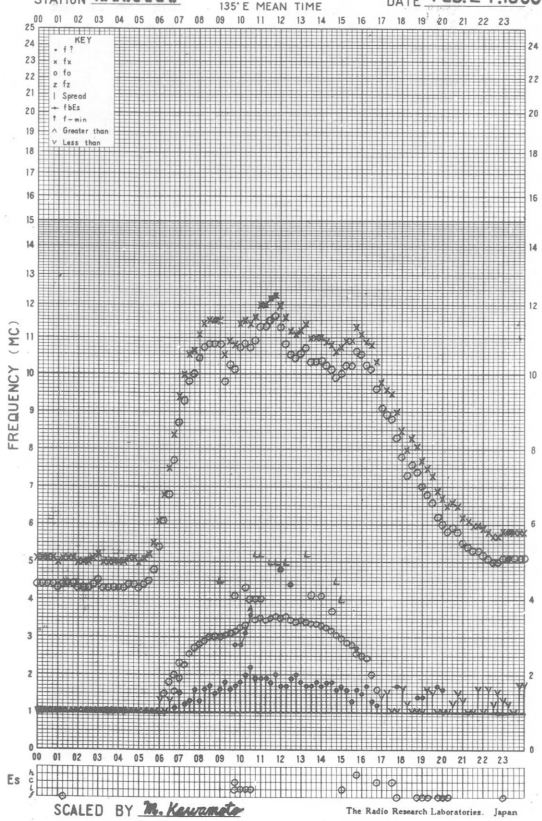

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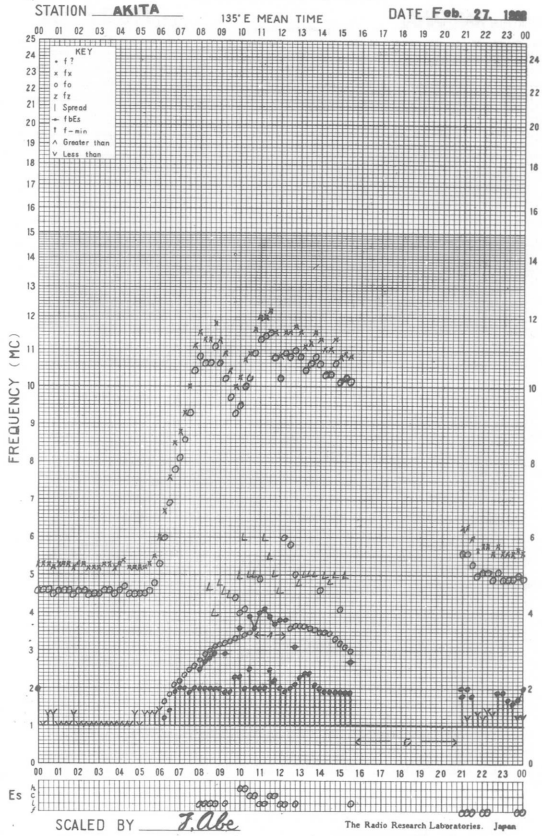

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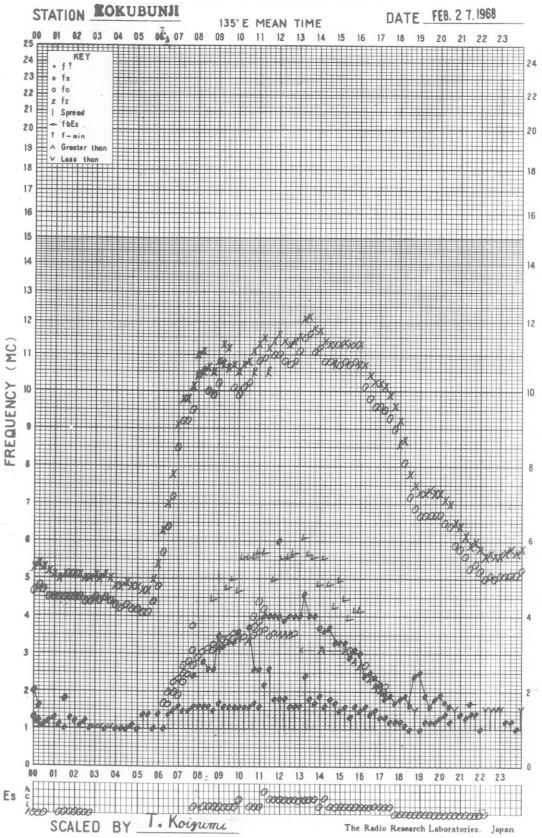

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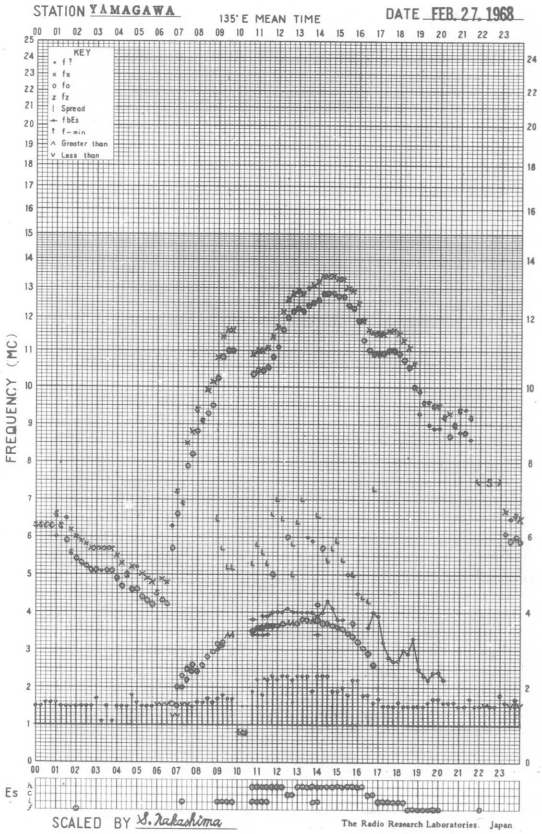

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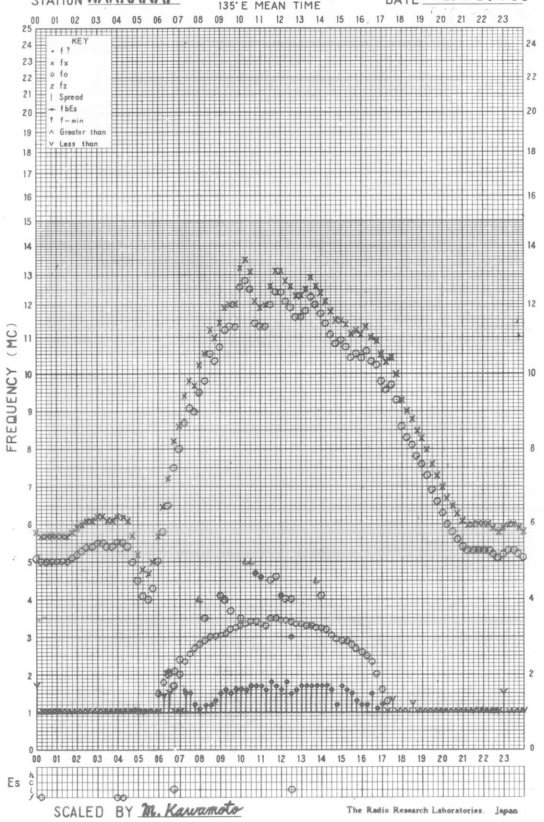

SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

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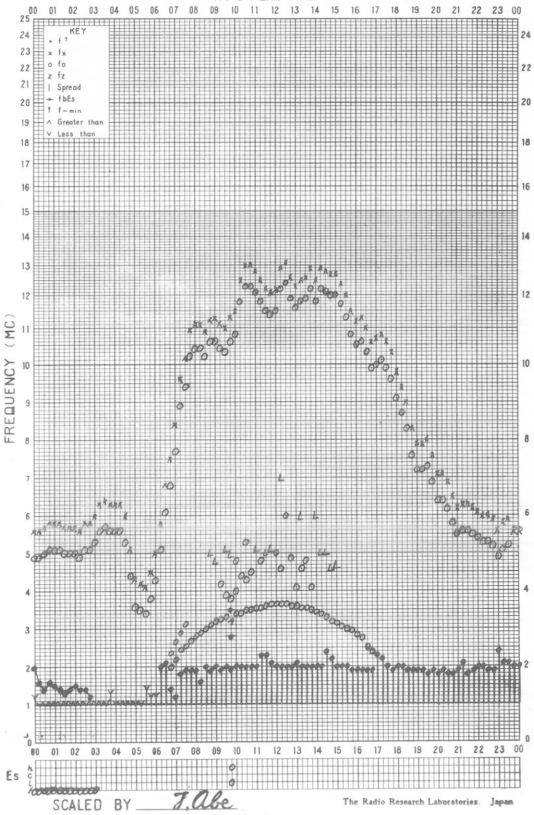

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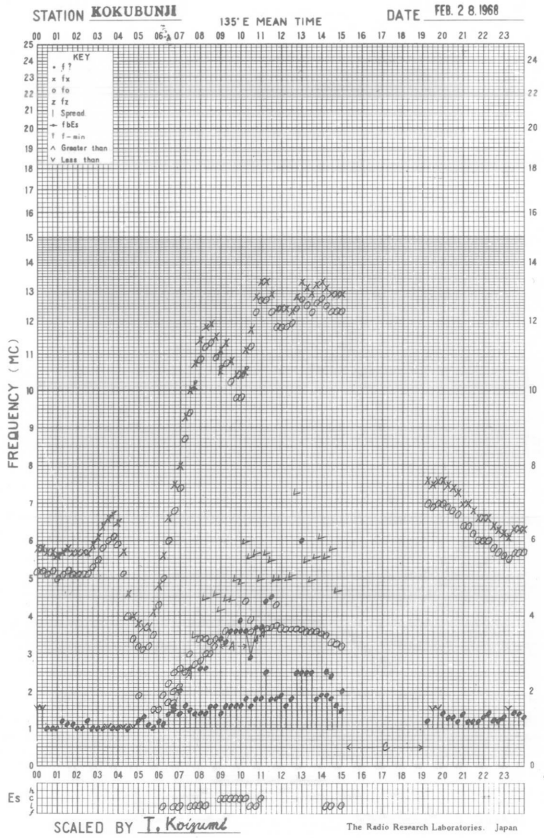

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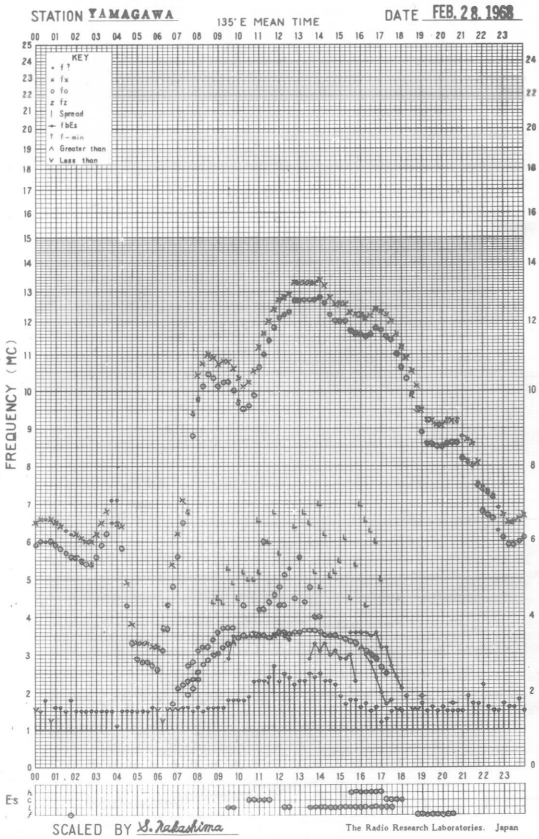
f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE FEB. 28. 1968

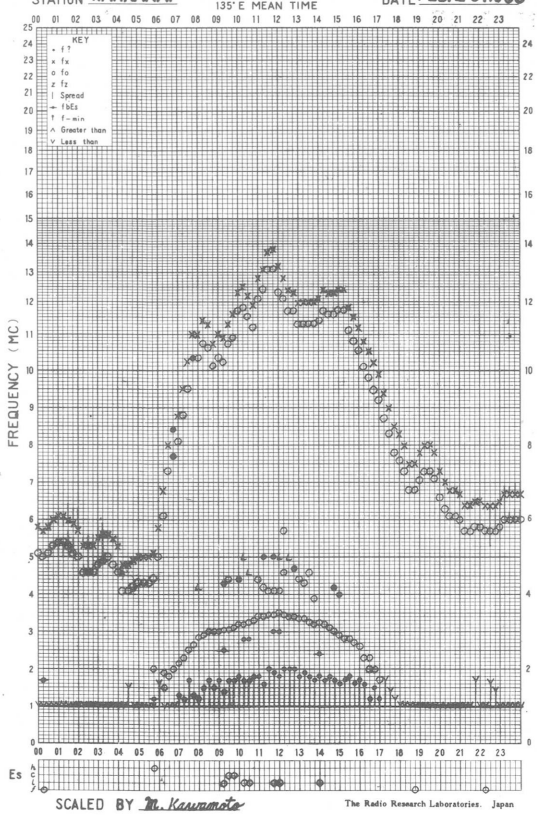


SCALED BY S. Nakashima

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE FEB. 29. 1968

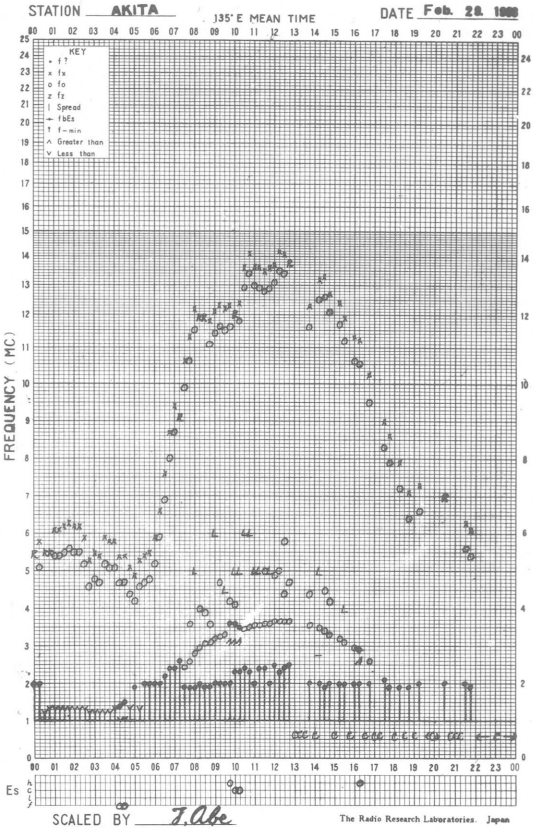


SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Feb. 28. 1968

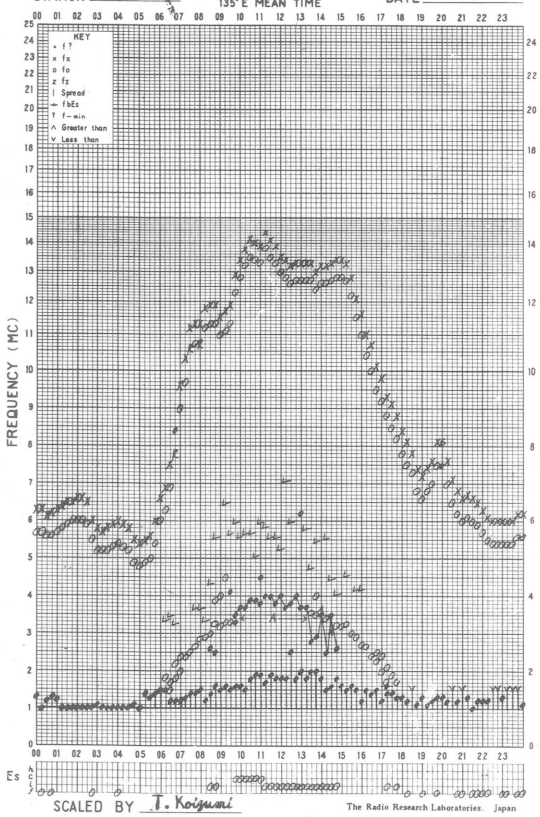


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE FEB. 29. 1968

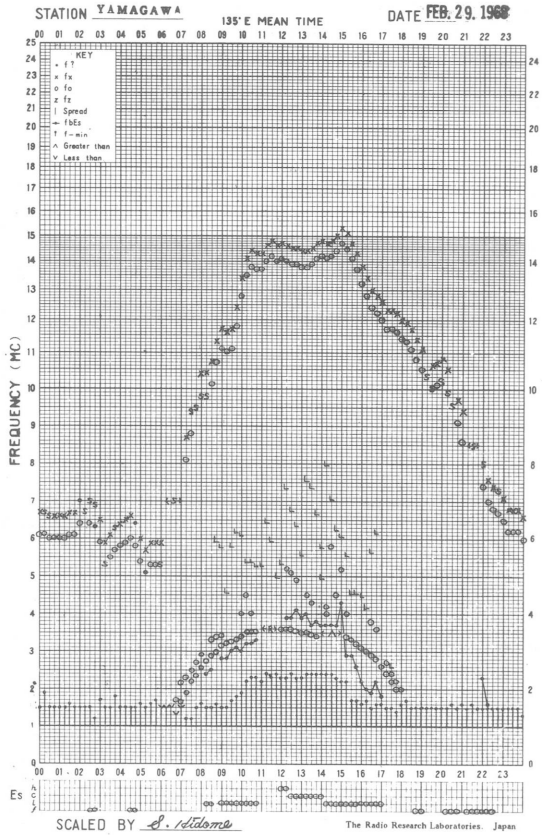


SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE FEB. 29. 1968



SCALED BY S. Hidoma

The Radio Research Laboratories. Japan

SOLAR RADIO EMISSION

Flux Density and Variability

Month: February 1968
Observing station: Hiraiso
Frequency: 200 MHz

UT	Flux density 10^{-22} Wm^{-2}(Hz)$^{-1}$					Variability 0 to 3				
	00-03	03-06	06-09	21-24	Day	00-03	03-06	06-09	21-24	Day
Date										
1	-	97	(133)	41	130	-	0	(1)	1	1
2	33	33	(28)	15	28	1	1	(1)	1	1
3	15	17	(18)	21	16	1	1	(1)	1	1
4	19	16	(13)	11	18	1	1	(1)	1	1
5	12	11	(12)	11	11	1	1	(1)	0	1
6	10	8	(8)	8	9	0	0	(0)	1	0
7	8	7	(8)	7	7	1	0	(1)	1	1
8	-	-	-	-	(7)	-	-	-	-	(1)
9	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-

Note No observations during the following periods:

1st 0000- 0300
8th 0000- 29th 2400

SOLAR RADIO EMISSION

Flux Density

Month: February 1968
Observing station: Hiraiso Frequency: 500 MHz

Flux density 10^{-22} $Wm^{-2}(Hz)^{-1}$

UT	00-03	03-06	06-09	21-24	Day
Date					
1	64	56	(56)	59	61
2	57	56	(64)	46	58
3	49	47	(50)	49	48
4	49	47	(44)	43	48
5	45	45	(44)	39	44
6	40	40	(41)	36	40
7	38	38	(37)	36	38
8	36	35	(36)	35	36
9	38	38	(36)	32	37
10	34	34	(33)	32	33
11	33	33	(30)	29	32
12	34	32	(31)	32	32
13	34	32	(31)	31	32
14	32	32	(33)	30	32
15	31	33	(32)	-	31
16	31	29	-	-	30
17	33	30	(31)	29	31
18	30	28	(27)	27	29
19	30	31	(30)	30	30
20	31	32	(32)	33	31
21	33	32	(30)	33	32
22	35	33	(33)	34	34
23	34	34	(29)	(34)	33
24	34	35	(34)	-	34
25	38	38	(37)	-	38
26	41	39	(43)	-	40
27	42	43	(44)	38	43
28	38	37	(38)	34	38
29	35	36	(34)	-	35

Note No observations during the following periods:

5th	0030-		0100	23rd	2300-		2400
15th	2120-	16th	0100	24th	2120-	25th	0100
16th	0500-	17th	0100	25th	2120-	26th	0100
17th	2120-		2235	26th	2120-		2400
18th	2120-		2235	29th	2120-		2400

Distinctive Events

(single-frequency observations)

Month: February 1968
Observing station: Hiraiso
Normal observing period: 2120 - 0820 (sunrise to sunset)

Date	Frequency	Starting time	Time of maximum	Duration	Type	Flux density $10^{-22}Wm^{-2}(Hz)^{-1}$		Remarks
	MHz	UT	UT	minutes		peak	mean	
1	500	0655.5	0657.5	10.5	C	110	10	
2	500	0000.0	0007.0	11.0	C	100	20	
		0256.0	0259.0	13.0	C	555	20	
	200	0257.5	0258.0	1.5	C	700	70	
	500	0540.0	0550.0	23.0	C	170	25	
	200	0541.5	0547.5	8.0	C	>1220	>120	
3	500	0417.0	0417.0	1.5	C	1170	190	
25	500	0352.0	0359.5	10.0	C	70	10	

Measurement of H.F. Field Strength (Upper Side-band of WWV)

Feb. 1968 Frequency: 15 MHz, Bandwidth: ±40 Hz, Receiving Antenna: Rod (4.5 m) Measured at Hiraiso

UT / 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	5	13	13	19	5	<- 8s	<-10s	<-16s	<- 7s	<- 6s	<- 6s	<- 4s	<-13s	<-12s	<-23s	-22	-20	-23	<-28s	<-29s	<-29s	- 4	5	6
2	7	17	16	15	21	- 5	-13	<-13s	<-12s	<- 9s	<- 1s	<- 3s	- 6	- 4	0	-20	<-27s	-17	-18	<-29s	-19	- 3	3	3
3	0	3	9	17	16	- 3	<-17s	-11	- 7	<- 1s	<- 9s	<- 8s	<- 2s	- 7	-18	-21	<-28s	<-28s	<-28s	<-28s	<-28s	- 1	0	S
4	0	5	8	10	17	<-11s	<-14s	-10	- 8	< 0s	< 5s	<- 4s	<- 5s	- 9	14	8	-12	-21	-24	<-30s	-12	0	0	3
5	3	2	9	12	15	- 4	<-12s	<-12s	< 6s	<- 2s	<-17s	<-11s	<-14s	<- 7s	-23	-21	-23	<-29s	<-29s	<-31s	<-31s	- 1	- 1	3
6	4	6	13	17	17	11	<-17s	<-14s	<-12s	<- 6s	3	<-13s	<- 9s	-10	-17	-17	-21	<-26s	<-27s	<-31s	<-31s	0	6	9
7	12	11	15	12	14	< 5s	-17	-11	<-13s	<- 4s	<-18s	<- 9s	<-13s	<-17s	<-26s	-17	-19	<-27s	<-30s	<-30s	<-30s	6	12	13
8	9	15	17	18	22	22	<- 9s	<- 6s	<- 7s	< 14s	<- 1s	<- 7s	<- 7s	<- 8s	-13	-16	-22	<-26s	<-30s	<-30s	<-30s	27	30	10
9	11	13	16	9	16	0	17	1	- 4	- 3	7	- 2	-10	-21	-10	-11	-13	<-23s	<-30s	<-29s	<-29s	4	13	8
10	9	10	12	12	0	- 1	11	<-11s	<- 6s	<- 3s	<- 2s	<- 4s	<-19s	<-14s	-21	-22	-24	<-30s	<-30s	<-30s	<-24s	4	12	9
11	8	23	13	7	22	12	- 5	<-11s	<- 6s	C	1	< 0s	C	- 6	<-20s	16	15	- 6	17	13	7	9	13	8
12	8	9	3	C	2	<- 4s	C	1	<-10s	C	C	<- 4s	C	<-28s	-24	<-27s	<-27s	<-27s	<-30s	<-30s	<-30s	C	3	2
13	<- 6s	2	10	13	- 1	<- 5s	<-11s	-12	<- 5s	<- 2s	<- 3s	<- 7s	-10	-17	<-30s	<-29s	<-30s	<-30s	<-30s	<-30s	<-30s	3	9	9
14	4	9	12	19	9	<- 3s	<-13s	<-11s	<- 9s	<- 6s	<-17s	<- 8s	<- 9s	<-23s	<-28s	<-32s	<-32s	<-32s	-17	<-32s	- 7	1	7	6
15	5	6	6	11	9	<- 6s	<-11s	<-11s	S	<- 1s	<- 9s	<- 5s	<- 6s	<-13s	<-26s	-18	- 2	- 2	<-30s	<-30s	C	C	C	C
16	- 2	4	8	6	- 2	- 4	<-12s	S	<- 4s	<- 5s	<- 8s	<- 1s	<-13s	<-18s	-21	-24	<-30s	<-30s	<-30s	<-21s	<-29s	0	7	11
17	7	4	14	S	<- 3s	0	-10	-10	- 9	- 4	<- 4s	<- 8s	<-16s	<-31s	<-31s	<-30s	<-30s	<-29s	<-29s	<-29s	-20	4	5	5
18	6	12	11	14	8	<- 8s	<-13s	<- 7s	- 7	<- 4s	< 0s	-10	<-14s	-22	-13	-22	-22	<-31s	<-27s	<-31s	- 6	11	9	12
19	9	5	15	11	0	<- 6s	<-15s	<-20s	- 8	- 3	<- 4s	- 8	<- 3s	-12	-20	-10	<-20s	<-20s	<-20s	<-20s	- 7	5	8	9
20	12	11	14	16	3	<- 9s	<-10s	- 7	- 3	< 16s	< 7s	< 4s	< 0s	<-22s	- 9	-14	-22	<-30s	<-31s	<-31s	-22	- 2	5	2
21	8	1	7	2	2	< 1s	-13	- 9	<-10s	<- 1s	-16	<- 9s	<- 7s	<-10s	-13	-15	-21	<-29s	<-29s	<-29s	-23	- 2	6	2
22	2	5	9	S	16	- 1	<-21s	<-12s	-10	<- 2s	<- 9s	<-11s	<-13s	<- 7s	-13	-14	-10	-23	<-32s	<-32s	-11	2	4	0
23	6	9	10	(10c	10	<- 8s	C	<- 6s	<- 7s	< 10s	< 4s	- 7	-11	-16	-19	-14	-11	<-30s	<-30s	<-30s	- 4	1	4	7
24	3	9	8	15	19	3	<-10s	<-10s	<- 8s	<- 5s	< 2s	<- 9s	- 6	-15	-21	-21	<-32s	<-32s	<-32s	<-32s	-14	6	1	C
25	C	C	C	C	C	C	<- 5s	<- 8s	< 4s	<- 4s	< 4s	<- 4s	<- 2s	<- 3s	-13	-20	<-30s	<-30s	-24	<-30s	- 5	0	2	7
26	5	5	8	14	16	9	- 9	<-14s	<- 8s	<- 5s	- 2	0	- 4	<-12s	<- 7s	-19	<-17s	-19	<-28s	<-28s	- 3	3	3	6
27	4	8	12	18	18	- 2	<-19s	<-10s	<-10s	< 0s	<- 1s	<- 7s	<- 6s	<- 3s	- 4	-19	- 6	16	5	7	- 4	- 3	5	3
28	4	6	10	11	16	25	11	2	1	<- 2s	< 4s	< 1s	<- 2s	<- 3s	-17	- 7	S	10	C	<-27s	- 6	12	19	11
29	12	11	21	17	9	19	19	4	- 2	<- 2s	8	11	<- 1s	0	6	- 1	- 4	6	- 3	-20	- 6	5	4	4
Median	6	9	12	13	14	<- 2s	<-11s	<-10s	<- 7s	<- 3s	<- 2s	<- 7s	<- 7s	<-12s	<-18s	-19	<-21s	<-27s	<-29s	<-30s	-19	2	5	7
Median Count	28	28	28	25	28	28	27	28	28	27	28	29	27	29	29	29	28	29	28	29	28	27	28	26
Upper decile	12	15	16	18	21	19	11	1	< 1s	< 10s	< 5s	< 1s	<- 2s	<- 3s	0	- 1	- 4	6	5	-20	- 4	11	13	11
Lower decile	0	2	7	7	- 1	<- 8s	<-17s	<-14s	<-12s	<- 6s	<-11s	<-11s	<-14s	<-23s	<-28s	<-29s	<-30s	<-31s	<-31s	<-32s	<-30s	- 3	0	2

Measurement of H.F. Field Strength (Upper Side-band of WWVH)

Feb. 1968 Frequency: 15 MHz, Bandwidth: ± 40 Hz, Receiving Antenna: Rod (4.5 m) Measured at Hiraiso

UT 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	5	7	15	21	22	13	5	23	27	16	<- 6s	-11	-14	-22	-14	-17	-15	-18	<-29s	8	7	0	0
2	- 1	4	3	13	25	20	25	23	23	20	24	23	3	- 2	-15	-16	-15	21	-23	-18	4	4	2	- 2
3	- 5	- 2	1	8	12	23	25	24	26	2	- 2	21	<- 4s	- 8	<-11s	<-25s	<-28s	<-28s	<-28s	<-28s	- 2	4	4	1
4	- 2	5	4	11	20	23	21	24	27	22	21	1	0	7	< 0s	- 3	- 4	-15	<-30s	<-30s	4	4	1	<- 3s
5	- 5	1	4	15	15	22	23	25	24	29	23	< 4s	- 5	-11	-20	-17	-18	-20	<-28s	<-31s	2	9	3	- 2
6	<- 3s	- 2	2	12	14	24	20	24	27	14	12	- 3	- 6	<- 2s	-10	-16	-19	-21	<-30s	<-31s	6	3	2	3
7	3	6	6	8	20	21	17	22	25	17	15	- 5	- 8	-12	-13	-14	<-27s	-12	<-30s	<-31s	9	4	2	7
8	- 1	10	6	13	20	20	14	24	20	24	3	- 3	- 2	- 5	- 9	-17	-21	-22	<-30s	<-30s	0	31	27	<- 7s
9	- 4	- 1	4	14	17	20	19	23	22	18	4	- 5	- 7	- 7	- 6	-11	-13	-22	<-30s	<-29s	1	5	1	1
10	4	0	5	14	19	20	15	0	16	1	<- 1s	- 4	<-6s	<-20s	-24	<-30s	<-30s	-13	<-30s	<-24s	3	6	3	0
11	2	1	8	1	17	22	19	31	35	18	29	26	24	16	14	6	10	10	21	12	10	6	1	1
12	5	2	3	11	22	27	18	16	15	C	<- 2s	<- 2s	<-12s	-19	-14	-18	<-27s	0	<-30s	<-30s	2	3	2	1
13	- 1	3	6	9	14	18	16	- 1	14	16	- 7	- 9	-13	-15	<-30s	<-30s	<-30s	<-30s	<-30s	<-30s	2	2	0	- 1
14	0	0	5	12	13	26	S	- 4	<- 4s	< 1s	-10	<- 3s	-10	<-28s	<-28s	<-32s	<-32s	<-32s	<-32s	<-32s	5	4	2	1
15	- 4	- 1	7	12	16	20	13	13	10	- 5	- 5	- 4	<- 6s	-13	-17	-24	-22	-16	<-30s	<-30s	C	C	C	< 11s
16	1	1	8	11	18	14	18	16	2	<- 5s	- 5	<- 5s	-12	-12	-21	-26	<-30s	<-30s	<-29s	<-29s	3	5	1	3
17	0	2	10	12	19	15	19	13	23	-19	- 3	- 8	-16	<-31s	<-31s	<-30s	<-30s	<-29s	-21	<-29s	4	4	5	1
18	0	5	7	7	17	18	18	13	24	17	15	6	- 3	-10	-22	-19	-25	0	-23	<-31s	16	4	12	3
19	3	4	8	6	14	23	14	20	20	< 7s	- 2	- 7	-10	-10	-21	<-28s	<-20s	<-20s	<-20s	<-20s	5	2	- 1	- 1
20	- 2	6	6	7	14	15	21	15	21	3	6	29	- 6	<-22s	<-25s	-14	-11	-23	<-31s	<-31s	- 2	- 3	0	- 2
21	- 1	16	9	15	16	18	19	22	19	4	- 3	<- 3s	- 5	- 9	-10	-15	<-30s	<-29s	<-29s	<-29s	- 2	- 3	0	- 2
22	- 1	- 2	4	9	16	19	15	6	10	1	<- 8s	<- 9s	-13	-13	-10	-16	<-13s	-20	-23	-20	11	3	- 1	- 2
23	1	1	9	11	16	17	21	24	24	16	5	- 3	- 7	- 7	-11	-21	<-30s	<-30s	<-30s	<-30s	0	4	4	4
24	- 1	1	2	8	14	26	25	11	21	0	<- 2s	<- 5s	-11	-17	-23	<-32s	<-32s	-26	<-32s	-28	4	2	- 3	C
25	C	C	C	C	C	C	26	26	28	17	10	13	<- 3s	<- 9s	<-28s	<-28s	<-30s	<-30s	<-30s	<-30s	2	1	- 2	2
26	- 2	- 1	6	9	12	22	19	(20c	22	21	28	- 2	- 3	- 7	- 6	-19	-19	-13	<-28s	-19	2	4	1	- 1
27	C	- 3	- 1	5	11	23	13	20	20	13	<-3s	<- 3s	<- 9s	<- 4s	<-25s	<-28s	<-20s	24	7	2	- 3	2	- 1	- 2
28	- 5	- 2	2	9	14	23	20	33	26	15	8	6	- 3	4	-17	<- 7s	-12	< 3s	S	- 2	6	2	1	- 3
29	1	3	2	8	15	19	28	28	15	< 3s	< 3s	< 1s	<- 2s	- 9	<- 1s	<-11s	<-24s	<- 5s	6	<- 8s	8	4	- 1	- 1
Median	- 1	1	6	11	16	21	19	20	22	15	3	<- 3s	<- 6s	<-10s	<-17s	<-18s	<-22s	<-20s	<-29s	<-29s	4	4	1	< 0s
Median Count	27	28	28	28	28	28	28	29	29	28	29	29	29	29	29	29	29	29	28	29	28	28	28	28
Upper decile	3	6	9	15	21	26	25	28	27	24	24	23	0	4	<- 1s	<- 7s	-11	< 3s	6	- 2	10	7	5	< 4s
Lower decile	<- 5s	- 2	2	6	12	15	13	0	10	<- 5s	<- 7s	<- 8s	<-13s	<-22s	<-28s	<-30s	<-30s	<-30s	<-31s	<-31s	- 2	1	- 1	<- 3s

RADIO PROPAGATION QUALITY FIGURES

HIRAISO

Time in U.T.

Feb. 1968	Whole Day Index	H B 06 12 18 / 12 18 24	W W V 00 06 12 18 / 06 12 18 24	S F 00 06 12 18 / 06 12 18 24	W W V H 00 06 12 18 / 06 12 18 24	Warning 00 06 12 18 / 06 12 18 24	Principal magnetic storms Start	End	H
1	4o	4 4 4	4 4 4 4	4 4 4 4	4 4 - 4	N N N N			
2	4+	4 4 4	4 5 5 4	4 4 4 4	4 5 5 4	N N N N			
3	4+	4 4 4	5 4 5 4	4 4 (4) 4	4 4 - 4	N N N N			
4	4+	4 4 4	5 5 5 4	4 4 5 4	4 4 5 4	N N N N	0100	21xx	64Y
5	4o	4 4 4	5 4 4 4	4 4 4 4	4 4 - 4	N N N N			
6	4o	C 4 4	4 3 4 4	4 4 4 4	4 4 - 4	N N N N			
7	4o	4 4 4	4 3 4 4	4 4 4 4	4 4 - 4	N N N N	17.13	---	70Y
8	4+	5 5 (4)	5 5 4 4	5 4 4 4	4 4 - 4	N N N N	---	---	
9	4+	4 4 4	4 5 5 4	4 4 4 4	4 4 5 4	N N N N	---	18xx	
10	4o	4 4 3	4 5 5 4	4 4 4 4	4 4 - 4	N N N N	1621	---	183Y
11*	4+	3 3 (4)	4 5 5 5	4 4 5 5	4 5 5 5	N N U U	---	---	
12	4-	4 4 4	3 3 3 4	4 4 (4)(4)	4 4 - 4	U U N N	---	21xx	
(13)	4-	4 3 4	4 3 4 4	3 4 4 4	4 4 - 4	N N N N			
(14)	4o	5 4 4	4 3 3 4	4 4 4 4	4 3 - 4	N N N N	22.3	---	74Y
(15)	4o	5 4 (4)	4 4 4 (4)	4 4 (4)(4)	4 4 - C	N N N N	---	---	
16	4o	4 4 4	4 4 4 4	4 4 4 (4)	4 4 - 4	N N N N	---	03xx	
17	4o	4 4 4	4 4 4 4	4 4 4 4	4 4 - 4	N N N N			
18	4o	4 4 4	4 4 4 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	4o	3 3 4	4 4 5 4	4 4 4 4	4 4 - 4	N N N N	0703	---	106Y
21	4o	C C 4	(4) 3 4 4	4 4 4 (4)	4 4 - 4	N N U U	---	24xx	
22	4+	C 4 5	5 4 4 4	4 4 4 4	4 4 - 4	N N N N			
23	4o	(4) 4 5	4 4 3 4	4 4 4 4	4 4 - 4	N N N N			
24	4o	4 4 4	4 4 4 (4)	4 4 4 (4)	4 4 - 4	N N N N			
25	4o	4 4 4	C 4 4 4	C 4 4 4	C 4 - 4	N N N N			
26	4+	5 4 4	5 4 4 4	4 4 4 4	4 4 4 4	N N N N			
27	4o	C 4 4	4 4 4 4	4 4 4 4	4 4 - 4	N N N N			
28	4o	C C C	5 4 4 4	5 4 3 4	4 4 5 4	N N N N			
29	4o	C C C	4 5 4 4	4 4 (4) 4	4 4 - 4	N N N N			

IQSY GEOALERT and ADALERT (Western Pacific Region)

* = MAGSTORM

o = MAGCALME

Δ = COSMIC EVENT

( ) = Regular World Day

\- = impossible to evaluate

( ) = inaccurate

C = artificial accident

--- = continuing magnetic storm

SUDDEN IONOSPHERIC DISTURBANCES

(S.I.D.)

HIRAISO

Time in U.T.

Feb. 1968	S W F									Correspondence		
	Drop-out Intensities (db)						Start-time	Dura-tion	Type	Imp.	Flare	Solar Noise	Mag.
	CO	SF	HA	TO	HB	SH							
2	-	14		-'			02.59	13	S	1	x	x	

IONOSPHERIC DATA IN JAPAN FOR FEBRUARY 1968

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