F—229

IONOSPHERIC DATA IN JAPAN

FOR JANUARY 1968

Vol. 20 No. 1

Issued in April 1968

Prepared by

THE RADIO RESEARCH LABORATORIES

MINISTRY OF POSTS AND TELECOMMUNICATIONS

KOKUBUNJI, TOKYO, JAPAN

F—229

IONOSPHERIC DATA IN JAPAN

FOR JANUARY 1968

Vol. 20 No. 1

RADIO RESEARCH LABORATORIES

KOKUBUNJI, TOKYO, JAPAN

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 *F*2 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 *hpF*2 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·m^{-2}·(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

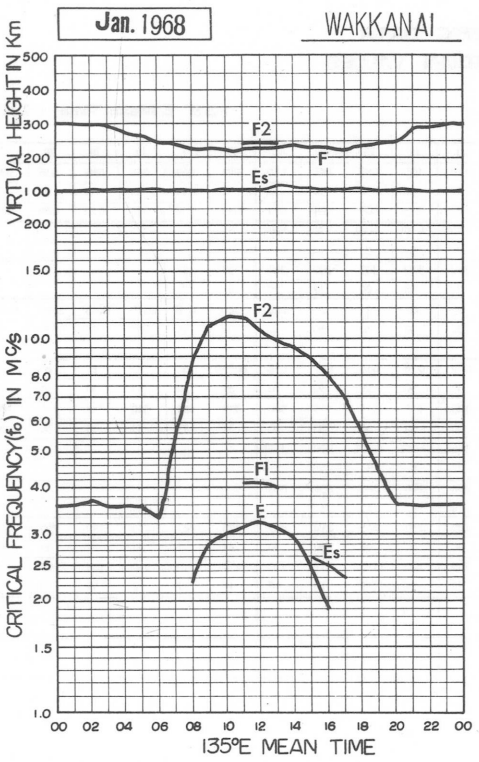
Importances

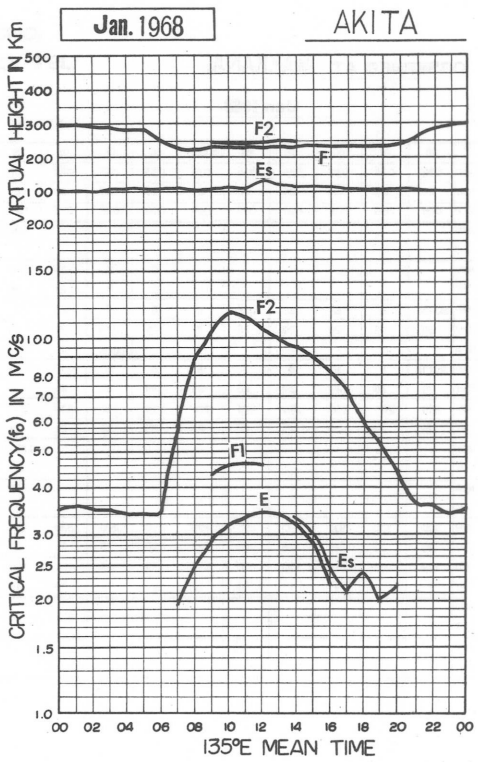
Degrees of SWF are classified into 9 grades according to the amplitude of fade-out;

1−	1	1+
2−	2	2+
3−	3	3+

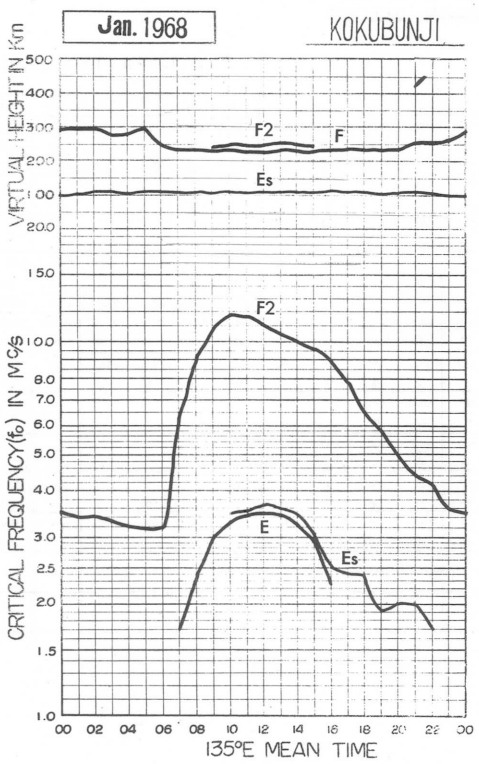
Besides, the time associated phenomena with SID's, that is, solar flare, solar radio noise outburst and crochet (solar flare effect in magnetic record), are given in this table from interchange messages of IUWDS or measurements at Hiraiso.

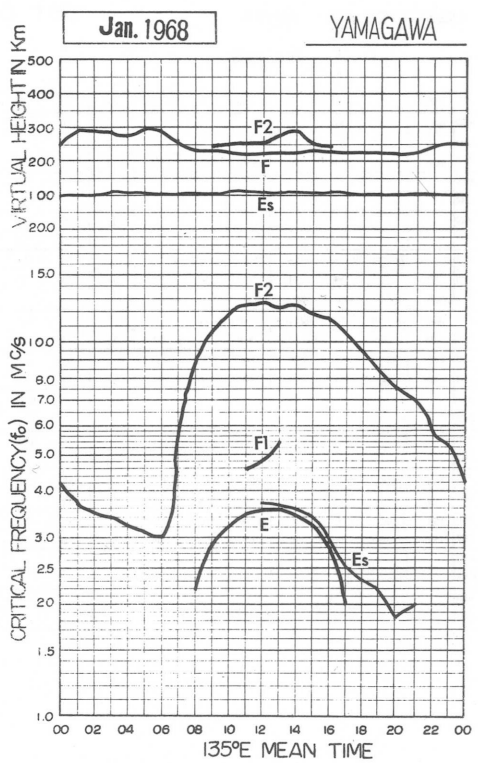
IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS





IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS





IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: WAKKANAI

Jan. 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	036	036	037	036	036	036	033	055	088	108	113	113	105	098	096	089	081	069	056	044	036	036	036	036
	CNT	29	29	29	29	28	27	28	29	29	29	30	30	30	30	30	30	31	31	31	31	30	30	28	27
	Q R	005	006	006	007	007	004	006	008	018	026	023	012	015	009	009	011	013	018	010	010	009	008	005	004
foF1	MED										U420L	U420L	410L	410L	400L	370L	400L								
	CNT										2	2	7	5	5	3	1								
foE	MED							E	E	225	280	300	310	320	305	290	240	190	E						
	CNT							6	4	21	26	28	29	28	27	27	27	6	7						
foEs	MED	E015	E	E	E	016	E	E	G	023	G	G	G	G	G	G	026	020	018	E015	E015	E015	E015	E012	E015
	CNT	29	28	29	29	28	29	29	29	29	29	30	30	30	30	30	30	31	30	31	31	31	31	29	29
	Q R								D006																
f-min	MED	E011S	E	E	E	E	E	E	E	012	016	017	017	018	017	017	016	E014S	E	E	E	E	E	E	E012S
	CNT	29	28	29	29	28	29	29	29	29	29	30	30	30	30	30	30	31	30	31	31	31	31	29	29
M (3000) F2	MED	265	265	260	270	275	280	295	310	330	330	325	325	315	315	315	320	315	305	310	315	290	280	280	270
	CNT	29	29	29	29	28	27	28	29	29	29	30	30	30	30	30	30	31	31	31	31	30	30	28	27
M (3000) F1	MED										U385L	U380L	385L	400L	400L	400L	375L								
	CNT										2	2	7	5	5	3	1								
h'F2	MED										260	240	240	240	240	230	240								
	CNT										2	3	14	9	11	3	1								
h'F	MED	300	300	300	290	275	270	250	240	220	230	225	225	230	235	240	225	225	225	235	240	250	285	285	295
	CNT	29	29	28	28	28	28	28	28	29	29	30	30	30	29	30	30	31	31	31	31	31	31	29	29
h'Es	MED	105	100	110	110	110	110	110	105	105	105	105	105	100	120	115	110	110	110	110	105	105	105	100	100
	CNT	7	7	9	11	16	12	9	14	19	16	13	12	10	12	12	18	17	17	12	14	13	10	8	6
hpF2	MED																								
	CNT																								
ypF2	MED																								
	CNT																								

IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: AKITA

Jan. 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	035	036	035	035	034	034	034	059	089	103	117	114	105	098	095	088	082	072	060	052	044	036	036	034
	CNT	30	30	31	31	30	30	31	31	31	31	31	31	31	30	30	30	30	30	30	30	30	30	30	30
	Q R	004	004	004	006	004	004	010	007	008	033	025	015	017	015	009	011	011	012	014	012	013	007	007	005
foF1	MED										350	430	460	460L	460L	500	390								
	CNT										2	5	7	8	8	2	1								
foE	MED								195	250	295	320	330	345	340	320	285	220							
	CNT								5	24	26	28	29	30	27	26	24	12							
foEs	MED	E021B	E013S	E013S	E013	E012	E013S	E020B	E020B	026	G	G	G	G	G	033	030	024	J021	J024	J020	J022	E021	E020	E020B
	CNT	30	30	31	31	31	31	31	31	31	31	30	31	30	29	28	29	29	30	30	30	30	30	30	30
	Q R	D004	D003	D002	D007	D006	D002	D003	D003										D010	D010	D026	D012	D008	D007	D003
f-min	MED	020	E013S	E012S	E012S	E012S	E012S	018	018	020	021	021	023	023	022	021	021	020	018	E014S	E013S	E014S	E016S	017	019
	CNT	30	30	31	31	31	31	31	31	31	31	30	31	30	29	28	29	29	30	30	30	30	30	30	30
M (3000) F2	MED	280	275	275	275	285	280	300	325	335	330	325	320	310	310	315	320	320	310	315	320	300	295	290	285
	CNT	30	30	31	31	30	30	31	31	31	31	31	31	31	30	30	30	30	30	30	30	30	30	30	30
M (3000) F1	MED										420	375	375	380L	370L	370	370								
	CNT										2	5	7	8	8	2	1								
h'F2	MED										250	245	240	245	250	250	240								
	CNT										9	31	31	31	30	23	2								
h'F	MED	300	300	290	285	270	280	255	235	225	230	230	230	225	230	230	230	230	230	235	230	240	270	280	290
	CNT	29	29	31	29	29	28	30	31	31	31	31	31	31	30	30	30	30	30	30	28	27	29	29	30
h'Es	MED	105	100	100	110	110	110	110	110	105	110	115	105	130	120	120	120	115	110	105	105	105	105	100	100
	CNT	11	10	8	10	11	8	10	11	20	17	12	15	10	15	15	16	15	15	19	17	18	13	14	9
hpF2	MED																								
	CNT																								
ypF2	MED																								
	CNT																								

IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: KOKUBUNJI

Jan. 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	035	034	034	033	032	032	032	062	091	108	118	117	110	104	100	096	088	078	065	058	050	044	042	036
	CNT	30	30	30	29	27	26	25	26	25	30	30	30	30	30	29	29	29	29	29	28	30	30	30	30
	Q R	004	007	006	006	005	006	008	012	007	022	022	014	018	024	019	013	012	017	017	018	012	012	012	008
foF1	MED											400L	U490L			420L									
	CNT											2	2			1									
foE	MED								170	240	305	330	345	350	345	325	295	225	E						
	CNT								7	16	25	26	21	22	22	19	19	16	2						
foEs	MED	E016	E015	E012	015	E	E013	016	020	G	G	035	035	037	036	035	031	025	024	J024	019	020	J020	017	E015
	CNT	30	29	29	29	27	27	26	26	25	30	30	30	30	30	29	29	29	30	30	30	30	30	30	29
	Q R	D008	D007				D006	D007											010	011	D011	D011	D009	D006	D007
f-min	MED	012	012	010	010	010	012	012	014	015	015	016	017	017	017	016	015	014	012	012	012	012	013	013	012
	CNT	30	29	29	29	27	27	26	26	25	30	30	30	30	30	29	29	29	30	30	30	30	30	30	29
M (3000) F2	MED	275	280	280	280	280	275	300	330	335	325	325	315	310	300	305	310	315	320	315	325	305	290	290	285
	CNT	30	30	30	29	27	26	24	26	25	30	30	30	30	30	29	29	29	29	29	28	30	30	30	30
M (3000) F1	MED											425L	U400L			440L									
	CNT											2	2			1									
h'F2	MED								225	255	240	250	245	250	260	250	245	260							
	CNT								1	1	19	27	27	27	24	21	5	3							
h'F	MED	280	290	290	275	275	300	250	230	230	230	230	225	225	230	230	230	230	230	230	230	230	255	255	260
	CNT	30	30	30	28	27	26	24	26	25	30	29	29	29	29	29	28	28	29	29	29	30	30	30	30
h'Es	MED	100	105	115	115	110	115	115	110	110	110	110	110	115	115	115	110	115	110	110	105	105	105	105	100
	CNT	12	14	9	17	10	8	14	18	17	21	24	21	25	24	21	23	22	28	25	21	19	20	19	12
hpF2	MED	360	360	350	350	360	370	320	280	275	290	295	300	310	315	315	300	295	295	300	295	310	335	340	345
	CNT	30	30	30	28	27	26	23	26	25	30	30	30	30	30	29	28	29	29	29	28	30	30	30	30
ypF2	MED	080	080	075	075	080	080	065	065	060	060	065	075	085	080	085	080	070	070	065	060	075	075	075	075
	CNT	30	30	30	28	27	26	23	26	25	30	30	30	30	30	29	28	29	29	29	28	30	30	30	30

IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: YAMAGAWA

Jan. 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	042	037	035	034	032	031	030S	045S	088	104	119	124	127	122	124	118	112	103	093	083S	075	068S	056	052
	CNT	30	30	30	30	29	29	30	30	30	30	31	31	31	31	31	29	30	31	31	30	30	30	30	30
	Q R	016	011	007	007	005	005	009	009	012	014	017	019	016	022	026	018	019	024	030	023	026	019	010	016
foF1	MED										370	390	460L	480L	540L	430L	530L	350							
	CNT										1	1	4	8	4	1	3	4							
foE	MED									220	290	320	345	355	355	345	325	280	200						
	CNT									25	28	28	28	28	28	27	25	26	18						
foEs	MED	E015B	E015B	E014B	E014B	E014	E015B	E015S	E015S	G	G	G	G	037	037	036	034	029	J025	023	J022	018	020	E015	E015
	CNT	30	30	30	30	30	30	30	30	30	30	31	31	31	31	30	31	31	31	29	30	30	30	30	30
	Q R	D005		D008			D008	D006	D007										014	010	010	D007	D006	D006	D006
f-min	MED	015	014	014	012	E	014	E015S	E014S	014	015	016	018	018	018	018	016	015	E014S	E015	014	E015S	E015S	E015S	014
	CNT	30	30	30	30	30	30	30	30	30	30	31	31	31	31	30	31	31	31	29	30	30	30	30	30
M (3000) F2	MED	280	280	285	275	280	265	280S	300S	335	330	320	305	300	290	290	295	305	305	310	310S	310	295S	290	290
	CNT	30	30	30	30	29	29	30	30	30	30	31	31	31	31	30	29	30	31	31	30	30	30	30	30
M (3000) F1	MED										400	410	380L	390L	360L	400L	360L	400							
	CNT										1	1	3	8	4	1	3	4							
h'F2	MED									240	245	250	250	260	275	280	250	245							
	CNT									1	23	31	31	31	31	30	29	16							
h'F	MED	250	285	280	290	270	295	295	270	235	230	225	220	225	225	225	230	230	225	225	225	220	225	240	250
	CNT	30	30	30	29	29	30	30	30	30	30	31	31	31	31	31	30	31	31	31	29	30	30	30	30
h'Es	MED	100	100	100	115	110	110	110	105	105	105	105	110	115	110	110	110	110	105	100	100	100	100	100	100
	CNT	9	6	8	5	9	11	11	13	17	19	22	21	24	26	20	26	26	26	25	23	17	19	13	11
hpF2	MED																								
	CNT																								
ypF2	MED																								
	CNT																								

IONOSPHERIC DATA

Jan.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	034	031	030F	031	033	031	031	050	081	113	128	098	U086R	U083R	071	067	068	058	048	036	038	040	030	025
2	022	023	022F	020	I021A	I024A	U027F	U047F	096	105	135	113	092	086	078	076	076	059	049	041	038	039	044	046
3	046	029	U031S	U032F	U031F	F	041	067	083	121	126	124	114	103	094	084	083	069	056	062	044	041	035	033
4	033F	U033F	036F	033	030	026	I026A	045	073	100	113	116	104	091	085	077	066	043	047	034	SF	SF	U036F	U036F
5	U036F	U040F	040F	030	030	SF	SF	U056F	100	126	129	107	103	092	096	083	080	066	060	056	U041F	U037F	SF	F
6	034	033F	U038F	038	042	030F	023F	043	093	127	140	132	106	106	104	093	088	058	042	038	034	038S	037S	033
7	031	033	033	033	030	I027A	024	054	105	132	140	124	115	111	103	097	081	060	046	I034A	033	035	035	038
8	038	037	039	043	033	I032A	027	055	101	120	125	114	101	099	095	089	081	070	I054A	043	I035A	033	035	034
9	034	036	037	037	037	035	031	049	087	099	113	106	104	101	088	083	079	080	063	043	031	033	035	035
10	030	030	031	030F	036	033	033	055	086	102	114	103	098	100	095	090	083	079	066	045	031	034	035	034
11	036	038	038	040	043S	042S	040	058	102	108	108	113H	101	095	096	087	082	075	063	043	034	033	033	036
12	U033F	U033F	036F	033	033	036	027	057	088	117	119	113	112	104	103	093	090	088	065	046	045	045	038S	F
13	036F	037	036	037	040	036	034	055	104	117	123	131	130	121	110	108	099	083	070	044	044	043	037	U036F
14	041F	040F	043F	043	040F	036	035	061	102	128	126	126	116	121	109	097	091	085	068	049	049	U048F	U043F	036F
15	040F	I040C	040	043	043F	037	033	058	103	128	133	118	125	118	113	094	098	083	045	036	035	036	039	038
16	038	038	038	036	I037C	039	038	062	098	130	137	112	097	103	089	079	075	067	050	U039F	U033F	034F	U038F	036F
17	037S	038	037	035	F	U033F	030	052	084	113	102	117	111	097	111	096	083	075	055	036	031	033	035	033
18	033	033	033	032	033	033	030	051	099	130	103	093	099	096	101	070	064	076	058	038	037	037	C	C
19	C	C	C	C	C	C	C	C	C	112	113	120	104	096	093	080	069	068	060	051	032	034	036	034
20	034	033	033	033	035	036	036	057	083	099	113	110	110	094	095	091	072	063	056	048	038	038	042	037
21	033	036	035S	036	038	035	033	051	077	100	103	099	101	096	092	083	074	I070C	059	036	028	031	C	C
22	C	C	C	C	C	C	C	C	C	C	103	093	096	089	096	085	083	051	043	040	036	033	034	034
23	033	034	035	035	033	036	033	050	070	092	110	113	093H	090V	093	093	075	050	059	046	034	033	035	036
24	036	038	037	036	036	034	034	053	077	089	094	108	097	099	090	090	081	055	050	048	043	036	037	038
25	037	036	037	037	036	036	032	053	072	098	100	104	106	107	093	083	073	065	056	044	034	032	031	033
26	035F	036F	038F	040	036	U035F	U033F	056	093	094	095	096H	110	095H	098H	089H	076	056	053	044	036	034	036	036
27	037	036	034	034	034	037	036	U058S	078	087H	116	134	122	098	088	083	080	075	052	044	042	043	043F	U046F
28	U042F	043S	040F	039F	039	040	043	067	085	C	C	C	C	C	C	C	090	067	057	048	048	033	035	037
29	U036F	040F	042F	U042F	U043F	045	033	062	090	090	109	115	117	104	096H	095	088	077	057	053	045	044	045	042
30	044	044	047	046	045	045F	U043F	060	084	102	093	111	109	098	096H	098	088H	076	068	067	044	044	047	050
31	048	046	048F	U051F	U047F	048	048	065	089	094	108	118	118	098	096	096	083	077	052	044	043	045	044	042
Count	29	29	29	29	28	27	28	29	29	29	30	30	30	30	30	30	31	31	31	31	30	30	28	27
Median	036	036	037	036	036	036	033	055	088	108	113	113	105	098	096	089	081	069	056	044	036	036	036	036
U.Q.	038	039	040	040	040	037	036	059	100	124	126	118	114	104	101	094	088	077	060	048	043	041	040	038
L.Q.	033	033	034	033	033	033	030	051	082	098	103	106	099	095	092	083	075	059	050	038	034	033	035	034
Q.R.	005	006	006	007	007	004	006	008	018	026	023	012	015	009	009	011	013	018	010	010	009	008	005	004

foF2

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

The Radio Research Laboratories, Japan

W1

IONOSPHERIC DATA

Jan.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										U400L	420	U410L	450L	B										
2											L	370												
3														L	340									
4																								
5																								
6																								
7									A		U430L	L												
8												L		390										
9												U410L		L										
10													L											
11																								
12																								
13													L											
14																								
15													360											
16												420L												
17												L												
18												L												
19									C			L	U400L	L										
20												L	L	400										
21												U420L	410L											
22									C	C				L										
23												L		400L										
24										U440L		380				400L								
25														L	U400L									
26													U500L											
27													L	U420L	370L									
28										C	C	C	C	C	C	C								
29																								
30																								
31												490		U500L										
Count										2	2	7	5	5	3	1								
Median										U420L	U420L	410L	410L	400L	370L	400L								
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

Jan.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								135	220	255	B	B	B	B	A	A	A							
2								A	225	270	290	300	A	A	A	245	S							
3								A	A	A	280	290	300	A	A	A	A							
4								A	A	A	300	310	310	305	285	210	S							
5								S	S	265	295	300	310	300	275	230	S							
6								A	A	I265A	295	I300A	305	300	265	240	S							
7								A	A	A	A	320	325	300	290	A	S							
8								A	A	290	310	I315A	320	310	290	235	A							
9							E	S	225	295	305	325	330	315	290	I240A	S							
10								A	A	295	310	325	325	320	290	245	S							
11								S	230	290	305	305	315	310	290	235	S							
12							S	S	235	290	305	325	325	315	290	240	S							
13								S	225	295	315	330	325	320	280	I225A	S							
14								A	A	285	310	325	325	305	275	225	S	E						
15							E	S	210	280	300	310	320	305	280	240	S	E						
16								A	200	275	300	305	320	305	290	230	S	E						
17							A	A	230	280	310	305	I305A	310	295	240	A							
18								A	235	270	300	310	315	310	295	250	E							
19							C	C	C	280	300	300	305	300	280	230	S	E						
20							E	110	200	265	285	305	305	300	290	225	120	S						
21							E	A	190	270	290	300	300	305	275	235	S							
22							C	C	C	C	300	300	300	300	295	250	S	S						
23							E	S	205	270	295	305	305	300	290	250	S	S						
24								S	205	250	275	300	305	300	295	255	S	E						
25								E	225	280	305	310	310	305	300	265	S	E						
26							E	S	230	275	290	310	320	315	295	255	180							
27								S	245	290	I300A	315	320	305	290	265	200	S						
28								E	215	C	C	C	C	C	C	C	S							
29								S	240	300	305	325	325	330	310	270	A	A						
30								S	220	295	310	325	325	320	300	275	200	S						
31								S	225	300	315	325	335	335	320	270	205	E						
Count							6	4	21	26	28	29	28	27	27	27	6	7						
Median							E	E	225	280	300	310	320	305	290	240	190	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

Jan.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	015	018	J028	E	E	015	019	G	G	G	E032B	E035B	033	E043B	036	030	J033	J061	E	E	E	J029	E	E015S
2	E015S	E	015	J024	J054	J033	033	018	G	G	G	029G	J057	033	031	G	E017S	E	E	016	E	E	019	E
3	J023	E	J023	J028	J024	020	E	J025	023	033	030	G	028G	J044	031	033	J063	J023	030	J021	018	E015S	E	E
4	E017S	E	E	E	023	E	J031	020	031	033	033	033	018G	038	033	033	E018S	J021	E	E016S	E	E014S	E	E
5	E	E	E	E	018	J040	J023	E015S	G	030	G	033	038	032	G	030	J033	J035	J030	E	E	E018S	E	025
6	020	E	020	019	J024	E015S	E015S	023	025	J033	G	033	G	G	G	030	J043	J041	021	J026	J025	J061	J040	J030
7	E	E	E015S	J023	J026	037M	J025	J053	J093	040	J051	029G	G	G	034	030	063	J063	J063	J042	020	E	018	E012S
8	E	E	E	018	J024	043	J024	021	028	031	030G	J050	J063	J043	G	G	020	E	J072	J065	J054	J033	J033	J025
9	J020	J020	J025	017	E	E	E	E016S	023	G	G	G	G	G	G	031	G	E	J025	J035	J044	J033	J033	E018S
10	E015S	E	E	E	E	E	E	J025	025	G	G	G	032G	G	G	G	G	E	E	E	E015S	J020	E015S	E015S
11	E	E	E	E	E	E	E	025	015G	G	G	G	G	G	G	G	G	014	E	E	J031	J031	E013S	E
12	E	017	015	015	J021	E	E015S	E015S	025	023G	029G	G	G	020G	032	022G	G	J028	J024	J033	E	E	E015S	018
13	021	015	E	E	E	E	E	E016S	G	G	015G	G	040	050	033	030	E019S	E	E	E	E	E016S	E012S	E015S
14	E015S	E	E	E	E	E	E	018	024	024G	G	G	G	034	032	029	020	018	J063	J065	J030	J035	E	E015S
15	E	C	E	E	011	E	E	E016S	G	G	G	G	G	G	G	G	G	E	E	020	E	E015S	J023	E016S
16	E015S	E	E	017	C	J023	J033	J023	019G	020G	G	G	G	G	031	028	G	E	E	J021	E	E	018	015
17	E011S	E	J022	E	015	J021	J033	018	020G	024G	038M	040	038M	033	033	033	032	J023	E	E	E	E014S	E	E014S
18	J021	017	E	E	018	J028	E	020	030	030	033	033	G	035	G	G	J040	J023	E	E	J021	J021	C	C
19	C	C	C	C	C	C	C	C	C	G	G	G	G	G	G	G	G	E	E	E	E017S	E	E015S	E
20	E	018	E	E	E	E	015	018	025	032	032	G	G	G	G	030	020	E012S	E016S	E	J025	E	E	E
21	E016S	E	016	E	E	E	E	022	020G	G	G	033	G	024G	G	G	E018S	C	J035	E	019	J020	C	C
22	C	C	C	C	C	C	C	C	C	C	032	G	G	G	G	G	E020S	E012S	E	E	E	E017S	E	E
23	E016S	E	E	E	E	E	E	E015S	G	G	G	036	G	G	G	G	G	E015S	E	E013S	E015S	E015S	E	E017S
24	E	E	E	E	E	E	E	E015S	028	040	041	G	G	G	G	020G	028	021	E	E	E	E	E016S	E
25	E016S	E	E	E	E	E	E	G	028	G	063	040	024G	037	033	025G	E023S	J028	J024	J025	J020	E015S	E	E012S
26	023	E	E	J020	J023	J023	E	G	G	G	G	G	G	G	G	031	025	J041	E015S	E015S	J023	E	E012S	E015S
27	E	J020	E	E	016	E	E	E016S	G	038	045	038	G	G	015G	G	J033	E013S	E	E	E	E	E	E
28	E	E	016	E	J020	J024	E	G	030	C	C	C	C	C	C	C	J058	J055	J021	J031	E015S	E	J030	E
29	E	E	E	J024	J021	J025	E	G	G	029G	G	G	G	G	G	033	030	J025	J033	J030	E	E	E	E015S
30	E016S	E	E	E	E	E	E	E018S	024	022G	G	G	G	G	G	G	024	E011S	E015S	E	E017S	E016S	E015S	E015S
31	E018S	E	E	018	018	E	E	G	G	G	G	G	G	G	G	032	030	018	E015S	023	J023	J021	E012S	019
Count	29	28	29	29	28	29	29	29	29	29	30	30	30	30	30	30	31	30	31	31	31	31	29	29
Median	E015	E	E	E	016	E	E	G	023	G	G	G	G	G	G	026	020	018	E015	E015	E015	E015	E012	E015
U.Q.	018	E	016	018	022	024	021	022	026	032	032	033	G	034	032	030	033	028	025	026	023	021	018	016
L.Q.	E	E	E	E	E	E	E	E015	G	G	G	G	G	G	G	G	G	E	E	E	E	E	E	E
Q.R.								D007																

foEs

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

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

Jan.1968 | f_bEs | 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	015	015	025			012	016				B	B	E033R	B	032	029	020	030				021		S
2	S		012	013	A	A	017	015				028G	031	030	027		S			016			015	
3	018		021	027	017	016		021	022	026	022		027G	035	027	032	026	E	015	015	015	S		
4	S				E		A	017	024	030	020	025	017G	G	G	G	S	E		S		S		
5					013	022	018	S		019		021	020	G		G	028	029	020			S		S
6	019		012	015	020	S	S	016	023	028		031				G	040	037	020	018	017	027	020	015
7			S	020	025	A	020	046	068	030	033	022G			022	027	038	030	030	A	012		015	S
8				E	014	A	016	015	025	025	024G	037	028	027			020		A	027	A	020	017	017
9	020	016	013	E				S	G							025			017	017	020	020	025	S
10	S							016	024				018G								S	014	S	S
11								G	015G									013			015	018	S	
12		012	E	013	014		S	S	020	020G	023G			020G	018	018G		025	E	022			S	E
13	016	012						S			014G		020G	024	020G	025	S					S	S	S
14	S							018	024	016G				G	G	G	G	016	020	024	018	018		S
15		C			E			S												015		S	018	S
16	S			E	C	012	018	015	014G	018G					G	G				012			011	015
17	S		E		E	013	017	015	018G	018G	024	G	032	G	G	G	025	015				S		S
18	017	012			E	024		016	020	G	G	G		G			G	016			E	018	C	C
19	C	C	C	C	C	C	C	C	C												S		S	
20		E					G	G	G	G	G					G	G	S	S		013			
21	S		E					015	018G			G		024G			S	C	016		012	017	C	C
22	C	C	C	C	C	C	C	C	C	C	016						S	S				S		
23	S							S				G						S		S	S	S		S
24								S	G	G	G					020G	G	G					S	
25	S								G		026	022	022G	G	G	013G	S	015	015	015	015	S		S
26	S			013	013	E										G	G	018	S	S	015		S	S
27		012			012			S		030	032	024G			015G		015	S						
28			E		014	020			G	C	C	C	C	C	C	C	G	021	017	016	S		018	
29				E	E	013				027G						G	021	015	019	018				S
30	S							S	018	020G							G	S	S		S	S	S	S
31	S			E	E											G	G	G	S	E	015	E	S	017
Count																								
Median																								
U.Q.																								
L.Q.																								
Q.R.																								

The Radio Research Laboratories, Japan

f_bEs | Sweep 1.0 Mc to 20.0 Mc in 20 sec in automatic operation | W5

IONOSPHERIC DATA

Jan.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	E	017	021	032	035	030	043	022	015	E	E	E	E	E	E	E	E015S
2	E015S	E	E	E	E	E	E	E	015	020	020	020	020	018	016	017	E017S	E	E	E	E	E	E	E
3	E	E	E	E	E	E	E	E	016	016	017	018	020	018	017	012	E	E	E	E	E	E015S	E	E
4	E017S	E	E	E	E	E	E015S	E	E	E	015	012	E	016	018	018	E018S	E	E	E016S	E	E014S	E	E
5	E	E	E	E	E	E	E	E015S	E020S	E	020	E	012	017	017	016	E015S	E	E	E	E	E018S	E	E016S
6	E012S	E	E	E	E	E015S	E015S	E	E	E	020	011	020	020	016	017	E013S	E	E	E	E015S	E016S	E015S	E012S
7	E	E	E015S	E	E	E	E	E	017	020	020	017	023	023	017	017	E016S	E	E	E	E	E	E	E012S
8	E	E	E	E	E	E	E	E	018	019	020	019	018	017	020	019	E014S	E	E	E	E	E	E	E
9	E012S	E	E	E	E	E	E	E016S	016	020	021	023	021	022	020	018	E015S	E	E	E	E	E	E	E018S
10	E015S	E	E	E	E	E	E	E	E	017	018	017	015	017	018	017	E015S	E	E	E	E015S	E	E015S	E015S
11	E	E	E	E	E	E	E	E016S	E	018	017	017	020	017	016	013	E015S	E	E	E	E	E	E013S	E
12	E	E	E	E	E	E	E015S	E015S	E	011	011	011	015	015	011	011	E017S	E	E	E	E	E	E015S	E
13	E	E	E	E	E	E	E	E016S	016	014	E	018	016	012	011	E	E019S	E	E	E	E	E016S	E012S	E015S
14	E015S	E	E	E	E	E	E	E	011	012	016	017	017	017	017	017	E012S	E	E	E	E	E	E	E015S
15	E	C	E	E	E	E	E	E016S	017	017	019	020	018	016	017	016	E014S	E	E	E	E	E015S	E015S	E016S
16	E015S	E	E	E	C	E	E	E	E	011	017	019	018	018	020	012	E018S	E	E	E	E	E	E	E
17	E011S	E	E	E	E	E	E	E	012	011	012	017	017	017	019	018	E	E	E	E	E	E014S	E	E014S
18	E013S	E	E	E	E	E	E	E	012	020	020	020	020	020	017	015	E	E	E	E	E014S	E	C	C
19	C	C	C	C	C	C	C	C	C	017	018	019	018	017	017	012	E014S	E	E	E	E017S	E	E015S	E
20	E	E	E	E	E	E	E	E	011	018	016	019	017	015	017	012	E	E012S	E016S	E	E	E	E	E
21	E016S	E	E	E	E	E	E	E	E	017	016	017	017	020	020	016	E018S	C	E	E	E	E	C	C
22	C	C	C	C	C	C	C	C	C	C	011	018	016	020	017	017	E020S	E012S	E	E	E	E017S	E	E
23	E016S	E	E	E	E	E	E	E015S	012	017	017	017	017	015	016	015	E014S	E015S	E	E013S	E015S	E015S	E	E017S
24	E	E	E	E	E	E	E	E015S	012	016	018	020	019	020	017	017	E015S	E	E	E	E	E	E016S	E
25	E016S	E	E	E	E	E	E	E	013	015	015	016	015	017	018	011	E023S	E	E	E	E	E015S	E	E012S
26	E016S	E	E	E	E	E	E	E012S	012	015	016	015	016	017	017	015	012	E015S	E015S	E015S	E012S	E	E012S	E015S
27	E	E	E	E	E	E	E	E016S	011	013	017	015	017	012	E	013	E	E013S	E	E	E	E	E	E
28	E	E	E	E	E	E	E	E	012	C	C	C	C	C	C	C	E017S	E	E	E	E015S	E	E	E
29	E	E	E	E	E	E	E	E012S	012	015	017	017	020	021	016	015	012	E	E	E	E	E	E	E015S
30	E016S	E	E	E	E	E	E	E018S	012	015	018	017	018	020	017	017	011	E011S	E015S	E	E017S	E016S	E015S	E015S
31	E018S	E	E	E	E	E	E	E015S	015	017	017	017	017	020	017	013	011	E	E015S	E015S	E	E015S	E012S	E
Count	29	28	29	29	28	29	29	29	29	29	30	30	30	30	30	30	31	30	31	31	31	31	29	29
Median	E011S	E	E	E	E	E	E	E	012	016	017	017	018	017	017	016	E014S	E	E	E	E	E	E	E012S
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

Jan. 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	245	240	235F	240	235	235	270	265	285	300	305	325	U300R	U310R	315	300	310	315	315	270	280	275	310	270
2	250	260	275F	275	I265A	I270A	U295F	U285F	335	325	345	355	315	325	335	335	320	305	300	300	260	250	250	285
3	290	285	U230S	U240F	U250F	F	295	330	330	330	320	330	325	320	320	310	315	320	290	335	315	300	285	275
4	260F	U255F	265F	290	305	325	I285A	305	320	320	335	340	325	320	340	340	320	305	325	320	SF	SF	U245F	U260F
5	U275F	U285F	300F	315	265	SF	SF	U305F	330	315	335	315	320	310	315	325	315	290	300	325	U315F	U295F	SF	F
6	265	240F	U235F	265	295	335F	260F	280	300	315	320	335	305	310	315	300	320	310	305	305	275	265S	295S	265
7	260	240	245	275	275	I280A	270	280	325	330	330	325	315	310	310	315	330	315	320	I305A	260	270	275	265
8	265	255	265	300	295	I270A	275	310	325	330	340	335	320	315	315	315	310	305	I320A	325	I305A	285	285	270
9	265	260	260	275	285	320	315	305	335	325	320	310	310	325	310	315	295	310	315	330	290	290	285	300
10	265	270	260	265F	270	295	295	315	335	325	335	295	320	320	315	320	310	305	320	330	270	275	275	260
11	250	265	265	275	275S	290S	300	305	355	345	335	335H	320	305	315	310	310	295	320	315	295	265	275	270
12	U250F	U250F	250F	260	260	285	335	310	315	325	325	305	305	300	295	305	290	315	310	290	290	310	290	F
13	250F	250	235	250	275	280	310	285	325	325	310	305	310	300	305	305	310	300	315	295	275	300	295	265F
14	270F	260F	280F	300	300F	305	285	300	325	330	310	320	310	315	295	310	295	295	310	290	290	U315F	U280F	260F
15	265F	I265C	260	280	280F	285	250	295	330	345	340	320	320	315	320	320	300	300	310	280	285	285	280	280
16	265	265	275	280	I260C	260	290	305	325	335	330	340	310	305	315	330	295	315	320	U335F	U305F	290F	U275F	260F
17	275S	265	255	270	F	U260F	315	320	320	335	320	325	310	300	310	325	325	320	345	330	275	290	285	280
18	300	275	260	260	260	275	300	295	320	345	325	325	315	315	305	345	295	305	320	315	295	290	C	C
19	C	C	C	C	C	C	C	C	C	340	320	325	325	315	325	315	315	310	310	320	280	290	280	280
20	270	275	260	260	255	280	310	335	315	315	325	310	300	330	315	330	320	285	320	315	290	270	300	280
21	275	265	255S	280	295	290	295	315	350	340	330	325	315	325	325	335	325	I310C	335	290	295	270	C	C
22	C	C	C	C	C	C	C	C	C	C	330	325	335	325	325	335	330	320	300	290	290	280	280	295
23	275	275	265	260	280	280	335	340	330	340	325	345	290H	315V	305	325	335	260	310	320	310	275	280	260
24	280	265	265	280	300	280	305	325	360	325	320	305	320	315	320	330	345	330	290	310	310	270	275	265
25	270	265	265	280	280	280	275	310	335	330	320	325	310	320	295	335	315	295	305	320	290	280	285	260
26	250F	265F	265F	300	300	U285F	U290F	320	345	340	325	300H	315	335H	325H	320H	355	305	315	320	295	265	275	265
27	260	255	245	245	245	270	300	U335S	320	315H	275	325	330	330	320	315	325	305	290	295	295	280	255F	U285F
28	U270F	265S	270F	265F	265	250	290	335	350	C	C	C	C	C	C	C	320	325	315	295	315	335	270	270
29	U255F	265F	255F	U255F	U275F	295	340	320	345	310	305	310	300	310	295H	300	310	315	300	305	290	285	290	265
30	255	275	265	270	280	255F	300F	320	335	315	300	310	305	300	285H	305	310H	305	285	320	320	275	275	260
31	270	260	265F	U265F	U270F	270	300	340	325	330	305	320	310	305	290	290	315	285	295	290	285	275	295	270
Count	29	29	29	29	28	27	28	29	29	29	30	30	30	30	30	30	31	31	31	31	30	30	28	27
Median	265	265	260	270	275	280	295	310	330	330	325	325	315	315	315	320	315	305	310	315	290	280	280	270
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

W 7

IONOSPHERIC DATA

Jan. 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										U360L	355	U365L	365L	B										
2											L	405												
3														L	395									
4																								
5																								
6																								
7									A		U405L	L												
8												L		385										
9												U405L		L										
10													L											
11																								
12																								
13													L											
14																								
15													415											
16												385L												
17												L												
18												L												
19									C			L	U400L	L										
20												L	L	400										
21												U380L	415L											
22									C	C				L										
23												L		400L										
24										U410L		395				375L								
25														L	U400L									
26													U400L											
27													L	U405L	400L									
28										C	C	C	C	C	C	C								
29																								
30																								
31												380		U400L										
Count										2	2	7	5	5	3	1								
Median										U385L	U380L	385L	400L	400L	400L	375L								
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

W8

IONOSPHERIC DATA

Jan. 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										290	260	245	290	285										
2											240	215												
3														235	230									
4																								
5																								
6																								
7									A		225	225												
8												240L		240										
9												235		250										
10													250											
11																								
12																								
13													245											
14																								
15													215H											
16												225												
17												240												
18												225												
19									C			240	230	235										
20												240	225	240										
21												240	235											
22									C	C				245										
23												240		220										
24										230		230				240								
25														265	215									
26													265											
27													240	235	230									
28										C	C	C	C	C	C	C								
29																								
30																								
31												250		265										
Count										2	3	14	9	11	3	1								
Median										260	240	240	240	240	230	240								
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

Jan. 1968 | h'F 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	355	355	460	360	375	305	330	270	260	245	260	255	250	B	270	260	255	250	235	250	250	285	230	290
2	400	325	305	400	I350A	I345A	305	270	235	230	225	210	220	225	220	225	220	210	260	255	300	330	345	295
3	270	240	A	A	365	320	265	240	225	240	240	235	235	235	220	225	235	215	245	235	230	260	250	250
4	310	305	295	245	225	215	I270A	240	215	240	245	225	240	235	225	225	220	210	230	235	260	300	350	310
5	295	275	250	210	295	355	300	250	240	240	240	225	230	235	260	230	225	235	250	220	225	250	250	300
6	330	365	330	300	275	220	300	265	240	240	225	230	235	245	240	220	245A	250A	245	250	300	350A	270	295
7	325	360	340	325	A	A	A	A	I245A	240	225	220	230	240	235	230	230A	250A	265A	I250A	300	300	300	295
8	300	340	300	245	240	I280A	300	240	225	240	235	240	230	235	240	235	235	230	I245A	240	I280A	310	290	300
9	350	315	310	275	260	235	220	240	220	225	240	225	240	240	230	235	230	225	225	230	300	345	320	275
10	300	275	300	305	285	230	260	225	215	225	235	220	225	245	240	240	235	225	215	210	285	300	290	320
11	300	305	300	265	275	255	240	230	225	220	225	220H	225	230	235	225	240	240	225	210	275	315	320	315
12	335	355	330	325	315	270	250	245	240	225	230	230	240	245	240	240	240	245	215	250	275	245	260	330
13	345	340	365	325	290	275	225	230	225	225	225	240	225	230	235	240	225	225	220	220	275	250	245	310
14	305	290	250	245	220	250	265	245	240	240	225	225	235	240	235	240	240	245	220	250	270	250	260	300
15	280	I295C	290	275	260	245	300	250	215	220	220	210	210	230	240	220	245	215	205	260	260	280	290	290
16	300	300	265	265	I300C	310	275	240	220	225	240	225	230	245	240	225	240	210	220	220	250	260	285	290
17	300	300	300	290	340	315	260	205	215	230	225	225	225	225	245	225	220	225	215	225	220	275	270	280
18	280	275	305	300	295	300	245	250	245	235	215	225	235	240	245	220	235	255	220	240	250	300	C	C
19	C	C	C	C	C	C	C	C	C	235	230	235	210	220	240	220	215	235	240	220	250	285	270	275
20	300	295	290	305	330	275	250	215	215	235	225	225	220	225	230	240	210	250	235	245	245	300	260	260
21	305	310	290	285	250	255	250	220	210	230	240	240	210	245	240	225	225	I250C	215	220	250	315	C	C
22	C	C	C	C	C	C	C	C	C	C	225	220	210H	245	240	240	235	210	250	250	250	280	275	250
23	300	300	300	305	260	260	220	220	215	230	225	240	215H	210	240	245	225	200	250	240	250	295	300	320
24	295	300	300	260	240	285	210	225	205	210	225	200	240	230	230	215H	220	210	270	250	230	290	305	300
25	300	300	300	270	260	260	235	225	210	210H	240	240	230	220	210	210	220	210	240	225	250	295	280	320
26	350	300	290	260	250	250	250	240	225	225	215	215	220	225H	235H	215H	215	210	240	240	265	270	295	295
27	310	350	360	350	360	300	215	220	215	210H	230	245	240	220	215	220	240	230	215	250	255	275	330	265
28	295	290	295	290	295	350	260	225	220	C	C	C	C	C	C	C	215	215	250	225	225	220	290	300
29	300	300	300	310	255	245	200	240	210	215	240	240	240	240	225H	225	210	215	225	240	240	255	250	280
30	300	285	285	280	250	275	205	210	220	235	205H	250	245	235	240	240	225	210	240	240	220	265	290	295
31	275	275	285	305	260	265	225	220	215	210	220	245	240	225	240	240	225	215	250	235	275	295	260	280
Count	29	29	28	28	28	28	28	28	29	29	30	30	30	29	30	30	31	31	31	31	31	31	29	29
Median	300	300	300	290	275	270	250	240	220	230	225	225	230	235	240	225	225	225	235	240	250	285	285	295
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

W 10

IONOSPHERIC DATA

Jan. 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	150	125	115	E	E	140	120	G	G	G	B	B	135	B	115	110	105	105	E	E	E	100	E	S
2	S	E	115	110	105	105	105	100	G	G	G	110	110	110	110	G	S	E	E	105	E	E	105	E
3	100	E	115	115	115	110	E	105	110	100	105	G	110	110	110	105	105	105	105	105	100	S	E	E
4	S	E	E	E	110	E	110	105	100	100	100	100	100	135	120	100	S	110	E	S	E	S	E	E
5	E	E	E	E	120	110	110	S	G	100	G	100	100	135	G	115	110	110	110	E	E	S	E	100
6	105	E	140	125	115	S	S	110	100	100	G	100	G	G	G	125	115	110	110	110	110	105	100	105
7	E	E	S	115	110	110	110	105	105	105	100	100	G	G	100	100	110	110	105	105	105	E	100	S
8	E	E	E	110	105	105	105	110	110	110	110	100	100	100	G	G	110	E	110	105	105	100	100	100
9	100	100	100	100	E	E	E	S	110	G	G	G	G	G	G	110	G	E	110	105	105	100	105	S
10	S	E	E	E	E	E	E	110	105	G	G	G	100	G	G	G	G	E	E	E	S	105	S	S
11	E	E	E	E	E	E	E	105	100	G	G	G	G	G	G	G	G	105	E	E	105	105	S	E
12	E	100	100	100	100	E	S	S	105	105	105	G	G	100	100	100	G	110	110	105	E	E	S	105
13	105	100	E	E	E	E	E	S	G	G	100	G	125	115	115	100	S	E	E	E	E	S	S	S
14	S	E	E	E	E	E	E	100	105	105	G	G	G	140	125	120	115	110	105	105	105	100	E	S
15	E	C	E	E	110	E	E	S	G	G	G	G	G	G	G	G	G	E	E	110	E	S	100	S
16	S	E	E	100	C	110	110	105	105	105	G	G	G	G	140	120	G	E	E	105	E	E	100	100
17	S	E	110	E	110	110	105	105	100	100	100	125	100	150	140	125	110	110	E	E	E	S	E	S
18	100	100	E	E	110	110	E	110	105	175	105	150	G	140	G	G	115	110	E	E	105	105	C	C
19	C	C	C	C	C	C	C	C	C	G	G	G	G	G	G	G	G	E	E	E	S	E	S	E
20	E	100	E	E	E	E	140	135	125	125	135	G	G	G	G	115	110	S	S	E	105	E	E	E
21	S	E	100	E	E	E	E	105	105	G	G	140	G	110	G	G	S	C	105	E	140	105	C	C
22	C	C	C	C	C	C	C	C	C	C	100	G	G	G	G	G	S	S	E	E	E	S	E	E
23	S	E	E	E	E	E	E	S	G	G	G	140	G	G	G	G	G	S	E	S	S	S	E	S
24	E	E	E	E	E	E	E	S	140	110	110	G	G	G	G	100	120	110	E	E	E	E	S	E
25	S	E	E	E	E	E	E	G	195	G	105	100	105	125	120	100	S	115	110	105	100	S	E	S
26	105	E	E	110	110	110	E	G	G	G	G	G	G	G	G	140	140	110	S	S	100	E	S	S
27	E	100	E	E	105	E	E	S	G	110	105	160	G	G	105	G	100	S	E	E	E	E	E	E
28	E	E	100	E	100	100	E	G	150	C	C	C	C	C	C	C	110	110	110	100	S	E	100	E
29	E	E	E	105	105	105	E	G	G	110	G	G	G	G	G	135	105	105	100	100	E	E	E	S
30	S	E	E	E	E	E	E	S	105	100	G	G	G	G	G	G	145	S	S	E	S	S	S	S
31	S	E	E	110	100	E	E	G	G	G	G	G	G	G	G	150	150	160	S	100	100	105	S	125
Count	7	7	9	11	16	12	9	14	19	16	13	12	10	12	12	18	17	17	12	14	13	10	8	6
Median	105	100	110	110	110	110	110	105	105	105	105	105	100	120	115	110	110	110	110	105	105	105	100	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

W11

IONOSPHERIC DATA

Jan.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	f	f	f3			f	f2						h		1	1	12	f3				f2		
2			f	f2	f4	f3	f2	1				1	1	1	1					f			f	
3	f		f2	f5	f4	f2		12	1	1	1		1	12	1	12	12	f	f	f	f			
4					f		f4	1	1	1	1	1	1	h	c	1 c		f						
5					f2	f4	f			1		1	1	h		c	c2	f4	f2					f
6	f		f2	f2	f3			1	1	1		1				c	c2	f3	f2	f	f	f3	f2	f
7				f2	f4	f4	f2	12	14	1	12	1			1	12	12	f2	f4	f4	f		f	
8				f	f2	f3	f2	1	1	1	1	12	1	1			1		f7	f4	f3	f2	f	f
9	f	f	f	f					1							1			f	f	f2	f	f2	
10								1	1				1									f		
11								1	1									f			f2	f2		
12		f	f	f3	f3				1	1	1			1	1	1		f2	f	f2				f
13	f	f2									1		c 1	c 1	c 1	1								
14								1	1	1				h	c	c	c	c	f2	f2	f	f2		
15					f															f			f	
16				f		f	f2	1	1	1					h	c				f			f	f
17			f		f	f	12	1	1	1	1	c	1	h	h	c	1	f						
18	f	f			f	f2		1	1	h	1	h		h			c2	f2			f	f		
19																								
20		f					h	h	c	c	h					c	c				f			
21			f					1	1			h		1					f2		f	f		
22											1													
23												h												
24									h	c	c					1	c	c						
25									h		1 h	1 h	1	c	c	1		c	f	f	f			
26	f			f2	f	f2										h	h	f			f			
27		f			f					1	12	h 1			1		1							
28			f		f	f3			h								c	f	f	f			f	
29				f2	f2	f				1						h	1	12	f	f				
30									1	1							h							
31				f2	f											h	h	h		f	f	f		f
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

IONOSPHERIC DATA

Jan. 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	036	034	031	031	032	033	031	068	104	129	134	124	091	096	C93	089	076	072	062	052	052	042	046	028
2	026	027	029	031	031	031	027	051	102	133	132	106	092	085	082	074	071	073	056	058	051	057	056	063
3	062	059R	031	030	028	I032A	036	068	096	122	126	125	111	097	091	090	087	075	057	067	048	053	039	030
4	028	028	031	035	034	029	023	051	073	089	116R	107	088	096	086	076	067	057	043	036	033	036	039	041
5	041	043	046	027	023	026	028	057	093	116	138	114	109	096	091	086	077	067	055	048	I035R	036	034	029
6	031	028	032	036	034	039S	026	052	094	136	148	121	103	106	105	093	086	069	045	036	036	041	036	030
7	029	029	032	029	A	A	026	058	107	132	138	123	112	111	111	096	087	072	055	I038A	030	036	036	035
8	035	036	038	039Z	032	031	025	059	088	123	123	116	106	096	091	086	081	074	058	I041A	I038A	I036A	I036A	038
9	035	036	035	034	034	033	027	056	078	102	114	I104R	105	113	100	084	084	080	081	054	047	038	042	038
10	031	030	030	031	033	034	031	060	079	102	115	106	088	093	096	091	081	081	072	048	I034R	034	035	034
11	035	035	036	036	036	037	039	065	096	098	114	106	101	098	094	087	084	077	065	051	035	034	036	035
12	033	033	033	035	036	035	034	058	088	116	I120C	107	103	101	098	098	087	088	076	054	044	047	043	033
13	036	036	036	I036R	038	038	036	069	101	121	126	124	123	C	C	C	C	C	C	C	C	C	C	C
14	C	C	036	037	042	034	036	059	093	124	133	125	112	108	108	104	088	085	085	064	048	046	I043A	036
15	037	040	040	040	038	042	038	066	113	124	133	119	109	114	112	103	085	082	072	048	032	034	037	036
16	036	036	036	036	036	034	038	063	089	123	119	121	098	096	091	083	073	074	056	042	032	034	036	034
17	035S	035	036	034	035	033	028	053	093	112	117	116	114	109	101	109	082	072	069	039	033	037	034	036
18	035	034	034	032	033	033	033	053	085	125	122	087	089	097	093	088	063	064	074	052	031	033	033	032
19	033	033	033	033	036	037	036	066	089	103	117	115	105	093	I088C	084	072	061	070	065	035	032	033	034
20	031	033	033	031	032	035	038	058	086	091	I122R	106	101	085	086	086	086	053	058	054	044	036	040	033
21	032	032	033	033	036	036	036	059	069	077	112	122	096	091	096	086	077	069	067	062	034	I028A	033	032
22	034	036	036	031	031	033	034	062	083	077	103	107	094	092	I086C	I085C	I078C	063	041	041	043S	036	033	034
23	033	031	031	033	033	034	034	058	074	087	101	114	101	092	091	089	079	059	051	059	044	030	034	034
24	036	036	037	037	036	031	035	058	088	080	089	096	092	099	097	086	077	062	I058R	053	049	037	036	037
25	036	036	036	037	036	035	034	064	082	088	096	113	108	103	108	082	076	062	062	061	045	032	033	032
26	032	032	034	037	033	029	028	058	089	099	097	092	094	094	092	085	086H	066	046	I050R	044	039	032	034
27	033	034	032	032	032	034	042	059	084	I105R	100V	111H	125	107	090	082	076	067	064	052	048	042	041	039
28	039	042	041	039	039	037	039	072	087	096	116	117	113	110	099	096	096	081	054	051	047	038	033	033
29	036	036	036	037	041	036	038	059	086	098	101H	126	118	112	104	098	087	076	065	051	039	041	041	039
30	040	041	041	042	042	039	046	062	089	086	095	099	109	113	096	104	087	084	064	066	044	038	043	039
31	041	041	041	041	044	042	041	073	094	097	099H	111	I110C	I109C	098	093	093	075	057	046	048	047	044	043
Count	30	30	31	31	30	30	31	31	31	31	31	31	31	30	30	30	30	30	30	30	30	30	30	30
Median	035	036	035	035	034	034	034	059	089	103	117	114	105	098	095	088	082	072	060	052	044	036	036	034
U.Q.	036	036	036	037	036	037	038	065	094	124	123	121	111	109	100	096	087	076	069	058	047	041	041	038
L.Q.	032	032	032	031	032	033	028	058	086	091	101	106	094	094	091	085	076	064	055	046	034	034	034	033
Q.R.	004	004	004	C06	004	004	010	007	008	033	025	015	017	015	009	011	011	012	014	012	013	007	007	005

foF2

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

The Radio Research Laboratories, Japan

A1

IONOSPHERIC DATA

Jan. 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	L	L	L	L										
2											L	L	L	L	L									
3											L	L	L	LH	L									
4											L	L	L	L										
5										L	L	L	420	L	LH									
6											L	L	L	420										
7											L	L	L	L										
8											L	L	L	L										
9										L	L	L	LH	L	L									
10											450	400	L	L	L									
11											L	L	LH	L	L									
12											C	L	L	L	L									
13											L	L	L	C	C									
14										L	L	L	LH	460L	L									
15										340	L	L	LH	L	L									
16										L	L	L	L	610L	L									
17											L	480L	L	L	L									
18											L	L	620L	L	L									
19											L	L	L	400	C									
20											L	L	460L	400	390									
21											430L	L	L	L	L									
22										360	430	390	L	460L	C									
23											L	460L	460L	L	L									
24											420	460	430	L	L									
25											L	480	L	500H	L	390								
26											L	L	L	L	620H									
27											720H	L	440	L	L									
28										L	L	L	460L	550L	L	L								
29											L	L	L	L	L									
30										L	L	400	560L	L	L									
31											L	L	C	C	L									
Count										2	5	7	8	8	2	1								
Median										350	430	460	460L	460L	500	390								
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

A 2

IONOSPHERIC DATA

Jan. 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								A	230	280	300	310	320	I330B	A	A	A							
2								A	I235A	I275A	310	325	335	A	A	A	230							
3								B	A	A	A	A	A	A	A	A	A							
4								A	255	I280A	305	320	330	330	I310A	270	B							
5								B	A	A	310	325	330	330	315	A	B							
6								B	250	285	315	325	340	335	I315A	A	A							
7								A	250	A	A	A	340	A	A	A	B							
8								A	A	300	325	345	355	345	325	275	B							
9								B	255	305	330	350	355	345	320	305	B							
10								A	255	310	325	350	355	345	325	295	215							
11								B	260	300	325	I335A	345	345	315	275	B							
12								185	255	305	I325C	340	355	350	I325A	280	A							
13								B	255	295	I330A	I350A	355	C	C	C	C							
14								B	245	295	325	340	345	345	315	285	A							
15								B	I255A	305	325	345	350	340	320	285	210							
16								A	I245A	295	320	340	350	350	I320A	255	A							
17								A	A	305	325	330	345	345	325R	300	220	B						
18								190	260	295	I320A	335	340	340	320	I270A	B	B						
19								195	240	295	315	325	335	325	I310C	290	B	B						
20								B	A	285	320	330	335	325	315	270	220	S						
21								B	230	285	315	325	I335A	330	305	275	220	S						
22								B	250	285	310	325	335	330	I310C	I270C	C	B						
23								B	I240A	295	315	325	335	325	I310A	285	225	B						
24								A	A	A	A	320	345	330	320	285	245	B						
25								B	250	290	320	330	340	335	320	290	235	A						
26								B	250	A	315	330	345	340	320	275	A	S						
27								B	255	295	310	330	345	340	320	280	220	S						
28								200	265	295	325	350	355	355	335A	I300A	235	B						
29								B	A	285	320	355	365H	350	335	300A	A	A						
30								B	255	I310A	335	345	350	345	325	300	A	B						
31								195	265	310	330	350	I355C	I355C	350	310	230	B						
Count								5	24	26	28	29	30	27	26	24	12							
Median								195	250	295	320	330	345	340	320	285	220							
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

A 3

IONOSPHERIC DATA

Jan. 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	E018B	E013S	J023	J027	J013	E014S	E021B	J020	G	G	G	034	G	E043B	J080	J078	J078	J068	J043	J043	J031	J029	J024	E019B
2	E018B	J013	E013S	E014S	E012S	J017	E021B	J019	026	030	G	G	G	034	032	J030	J024	J023	E021B	J030	E023B	024M	026M	E020B
3	E020B	E013S	E014S	J020	J022	J064	025M	E019B	J038	030	J045	J058	J052	035	J072	J069	J049	J044	J028	J018	E020B	E017B	E020B	E020B
4	E020B	E013S	E013S	E012S	E013S	E013S	E020B	J025	J029	J035	036	J084	042	043	036	G	E022B	E018B	025M	E018B	E018B	E021B	E021B	E018B
5	E018B	E012S	E	E	E	J028	J029	J052	J062	J033	J026G	G	G	G	G	030	J038	J030	J035	J020	J035	E014S	J025	E018B
6	J023	J019	E	J029	J029	E014S	J021	E022B	G	027G	G	G	030G	J036	J043	J053	J064	J085	J035	J050	J035	J028	J029	J030
7	J027	J023	J022	J028	J040	J035	J063	J036	J044	J076	J053	J062	J062	J038	J047	J030	E023B	J054	J063	J054	J079	J029	J034	J025
8	E019B	E012S	E	E	J024	J034	J053	J033	J042	030G	G	J035	G	G	G	G	E024B	E020B	J026	J064	J080	J048	J048	J028
9	J028	E012S	E012S	E022B	E013S	E014S	E021B	E021B	G	G	G	G	G	G	G	G	E023B	E018B	J024	J019	J019	022M	E014S	J024
10	027M	E013S	E	E013S	E013S	E012S	J019	J028	027	G	G	G	G	G	G	G	G	J025	J034	J051	J043	J034	J023	E019B
11	E020B	E013S	E012S	E012S	E012S	E012S	E014S	E020B	G	J029G	G	036	G	G	G	031	025	E016B	J025	E012S	E012S	E021B	E018B	E021B
12	E021B	J013	E012S	E013S	E012S	E012S	E020B	G	J023G	J043	C	J029G	G	037	034	022G	J023	E019B	E018B	E013S	E018B	E014S	E018B	E019B
13	E018B	E	E012S	E021B	E012S	E012S	J015	E020B	G	G	038	038	G	C	C	C	C	C	C	C	C	C	C	C
14	C	C	E	E	E012S	E012S	E020B	E020B	J025	J034	G	G	G	G	G	G	026	E019B	E013S	J023	J019	J025	J051	J035
15	E021B	J023	E013S	E012S	E	J013	E013S	E022B	J029	G	G	G	G	G	G	G	G	E019B	E012S	E013S	J030	J023	J030	J034
16	J023	J019	J019	E013S	J019	E013S	J029	JC24	J036	G	J037	J030G	G	J030G	J038	J034	024	J042	J029	J029	J029	E022B	E022B	E021B
17	EC21B	E	E012S	E012S	E012S	E	E018B	J039	J041	J036	J032G	G	G	G	G	G	G	E019B	J029	J020	J025	E018B	E014S	E020B
18	E013S	E012S	E012S	E014S	E013S	E012S	J022	J020	G	G	038	037	039	037	039	035	E023B	E022B	E018B	E014S	E022B	E021B	E014S	E021B
19	E014S	E013S	E012S	J018	J021	J024	E020B	G	029	J024G	G	G	G	G	C	G	E024B	E021B	E021B	E013S	E012S	E013S	EC20B	E012S
20	E021B	E013S	E013S	E021B	E012S	E012S	E017B	E021B	026	G	G	J023G	J029G	J020G	G	G	G	J022	J023	J018	J017	E012S	E014S	E013S
21	J020	E013S	E013S	E012S	E	J013	E014S	E018B	G	G	G	G	040	036	G	G	G	J018	E019B	E020B	J030	JC36	J023	E020B
22	J021	E012S	J020	E012S	E012S	E014S	E020B	E020B	J030	J034	031G	G	G	G	C	C	C	E019B	022M	E014S	E021B	E020B	E020B	E019B
23	E020B	E013S	E013S	E012S	E012S	E012S	E020B	E020B	025	G	G	G	037	036	035	G	G	E019B	E019B	E019B	E016B	E018B	E020B	E018B
24	E017B	E013S	E012S	E012S	E	E013S	E018B	J019	028	032	036	J035	G	JC26G	G	G	G	E021B	E019B	E019B	E019B	E012S	E018B	E020B
25	EC21B	E013S	E	J012	E	E	E018B	E022B	G	G	037	036	037	G	039	G	G	J021	J027	J024	J029	J026	JC23	E021B
26	026M	J016	017M	J018	JC18	E012S	E020B	E021B	026	032	038	G	G	041	041	J043	J033	JC28	J045	J066	J026	J023	JC20	E022B
27	E021B	E014S	E012S	017	J013	E013S	E018B	E022B	G	G	G	G	G	G	G	032	025	JC23	EC21B	E013S	J043	E018B	J029	J027
28	J029	J033	JC26	J019	018M	E013S	E019B	G	G	G	G	G	G	G	042	037	C26	E021B	J021	JC22	J025	E018B	E021B	E020B
29	E022B	E013S	E013S	J019	E012S	E012S	J019	EC22B	028	031	G	JC38	G	037	038	J044	J054	J029	J024	J030	JC21	E013S	E013S	J019
30	J019	017M	J024	E	E	E013S	E013S	E018B	J030	J033	G	G	038	037	036	035	029	J030	JC25	EC14S	E016B	JC21	E018B	E021B
31	JC18	J020	J013	E012S	J031	E013S	E017B	G	G	G	G	032G	C	C	G	034	026	E018B	E013S	E017B	E018B	E013S	JC18	J019
Count	30	30	31	31	31	31	31	31	31	31	30	31	30	29	28	29	29	30	30	30	30	30	30	30
Median	EC21B	E013S	E013S	E013	EC12	E013S	E020B	EC20B	026	G	G	G	G	G	033	030	024	JC21	JC24	JC20	JC22	EC21	E020	E020B
U. Q.	022	016	014	019	018	014	021	022	030	033	036	036	037	036	039	035	028	029	029	030	030	025	025	022
L. Q.	EC18	EC13	EC12	EC12	EC12	EC12	E018	E019	G	G	G	G	G	G	G	G	G	EC19	E019	E014	EC18	E017	EC18	E019
Q. R.	DC04	DC03	DC02	DC07	DC06	DC02	DC03	DC03										DC10	DC10	DC26	DC12	DC08	DC07	DC03

foEs

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

The Radio Research Laboratories, Japan

A 4

IONOSPHERIC DATA

Jan. 1968 | f_bEs | 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	B	S	016	024	013	S	B	018				034		B	062	055	029	038	021	022	026	030	021	B
2	B	E	S	S		014	B	019	025	030				034	031	030	020	021	B	022	B	E	E	B
3	B	S	S	016	018	A	E	B	025	030	035	038	046	032	039	059	048	029	024	018	B	B	B	B
4	B	S	S	S	S	S	B	022	024	031	034	037	040	042	034		B	B	E	B	B	B	B	B
5	B	S				017	022	034	044	032	023G					029	028	020	025	020	030	S	E	B
6	E	016		022	017	S	E	B		025G			028G	031	033	042	060	044	021	023	023	021	021	022
7	021	020	020	025	A	A	020	022	022	055	037	049	029	038	045	030	B	026	029	A	024	020	028	020
8	B	S			E	E	024	024	027	025G		028					B	B	020	A	A	A	A	023
9	023	S	S	B	S	S	B	B									B	B	021	019	019	021	S	018
10	E	S		S	S	S	019	019	027									019	021	023	025	020	019	B
11	B	S	S	S	S	S	S	B		022G		036				030	024	B	021	S	S	B	B	B
12	B	013	S	S	S	S	B		021G	024	C	025G		037	034	021G	023	B	B	S	B	S	B	B
13	B		S	B	S	S	U015R	B			034	036		C	C	C	C	C	C	C	C	C	C	C
14	C	C			S	S	B	B	022	026							025	B	S	019	017	022	A	028
15	B	022	S	S		012	S	B	028									B	S	S	022	021	024	028
16	021	016	018	S	013	S	023	022	026		027G	030G		024G	033	029	024	023	023	022	022	B	B	B
17	B		S	S	S		B	032	036	028	029G							B	021	020	021	B	S	B
18	S	S	S	S	S	S	020	015			037	037	037	037	037	031	B	B	B	S	B	B	S	B
19	S	S	S	016	014	018	B		021	023G					C		B	B	B	S	S	S	B	S
20	B	S	S	B	S	S	B	B	026			022G	024G	020G				021	020	018	017	S	S	S
21	020	S	S	S		013	S	B					035	G				018	B	B	022	A	020	B
22	021	S	E	S	S	S	B	B	023	026	030G				C	C	C	B	E	S	B	B	B	B
23	B	S	S	S	S	S	B	B	025				035	G	033			B	B	B	B	B	B	B
24	B	S	S	S		S	B	019	027	032	033	027		025G				B	B	B	B	S	B	B
25	B	S		012			B	B			037	035	037		038			021	019	E	023	019	E	B
26	024	016	E	E	014	S	B	B	G	032	G			039	037	038	032	023	027	039	022	021	E	B
27	B	S	S	E	E	S	B	B								032	U025R	022	B	S	032	B	021	020
28	021	022	016	E	E	S	B								038	035	G	B	E	E	019	B	B	B
29	B	S	S	013	S	S	019	B	028	031		026		037	038	043	037	025	019	020	E	S	S	017
30	017	E	E			S	S	B	023	033			038	037	G	034	028	027	019	S	B	021	B	B
31	018	C12	012	S	E	S	B					032G	C	C		G	026	B	S	B	B	S	016	017
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

Jan. 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	018	E013S	E012S	E012S	E	E014S	012	E012S	019	023	022	024	023	043	024	020	018	E012S	E014S	E012S	E013S	018	E014S	019
2	018	E	E013S	E014S	E012S	E	021	E012S	022	023	023	023	023	021	020	021	020	E014S	021	E013S	023	018	021	020
3	020	E013S	E014S	E	E	E013S	020	019	019	021	021	023	023	019	020	019	019	E013S	E014S	E014S	020	017	020	020
4	020	E013S	E013S	E012S	E013S	E013S	020	018	019	018	014	018	021	023	021	021	022	018	018	018	018	021	021	018
5	018	E012S	E	E	E	E	E012S	020	021	022	023	023	024	021	020	019	021	E014S	E012S	E012S	E014S	E014S	018	018
6	020	E013S	E	E	E	E014S	E014S	022	021	023	023	023	024	024	023	020	020	019	E014S	E014S	016	020	020	018
7	020	E014S	E012S	E012S	E012S	E012S	018	016	020	021	020	021	019	025	023	021	023	E012S	016	018	E013S	E012S	E014S	E013S
8	019	E012S	E	E	E	E012S	E013S	E012S	021	020	021	023	025	024	025	023	024	020	E012S	020	E013S	E014S	E012S	E013S
9	E012S	E012S	E012S	022	E013S	E014S	021	021	023	023	024	026	025	023	021	023	023	018	E012S	E013S	E013S	020	E014S	E014S
10	016	E013S	E	E013S	E013S	E012S	E012S	E012S	019	020	020	021	022	022	022	022	019	E012S	E013S	E012S	E013S	E013S	E013S	019
11	020	E013S	E012S	E012S	E012S	E012S	E014S	020	021	021	020	023	023	021	021	021	021	016	E014S	E012S	E012S	021	018	021
12	021	E	E012S	E013S	E012S	E012S	020	E014S	014	021	C	019	022	023	020	019	013	019	018	E013S	018	E014S	018	019
13	018	E	E012S	021	E012S	E012S	E	020	020	020	021	022	020	C	C	C	C	C	C	C	C	C	C	C
14	C	C	E	E	E012S	E012S	020	020	019	022	022	023	023	023	019	021	020	019	E013S	E012S	E012S	E012S	E012S	E013S
15	021	E012S	E013S	E012S	E	E	E013S	022	021	022	022	023	023	023	024	021	020	019	E012S	E013S	E	E012S	E013S	017
16	020	E012S	E012S	E013S	E	E013S	E012S	E012S	018	014	021	022	023	023	021	017	018	E012S	E013S	E012S	E012S	022	022	021
17	021	E	E012S	E012S	E012S	E	018	E012S	014	021	021	023	025	024	023	024	021	019	E012S	E012S	E012S	018	E014S	020
18	E013S	E012S	E012S	E014S	E013S	E012S	E012S	015	018	022	022	023	023	024	022	020	023	022	018	E014S	022	021	E014S	021
19	E014S	E013S	E012S	E	E012S	E012S	020	013	017	018	023	023	022	022	C	021	024	021	019	E013S	E012S	E013S	020	E012S
20	021	E013S	E013S	021	E012S	E012S	017	021	020	023	022	021	019	014	020	019	019	E012S	E012S	E012S	E013S	E012S	E014S	E013S
21	E012S	E013S	E013S	E012S	E	E	E014S	018	020	021	021	020	020	020	018	013	019	E013S	019	020	019	018	E012S	020
22	019	E012S	E013S	E012S	E012S	E014S	020	020	013	020	021	021	023	021	C	C	C	019	019	E014S	021	020	020	019
23	020	E013S	E013S	E012S	E012S	E012S	020	020	020	020	020	023	021	021	020	020	020	019	019	019	016	018	020	018
24	017	E013S	E012S	E012S	E	E013S	018	014	020	021	024	024	024	021	023	020	021	021	019	019	019	E012S	018	020
25	021	E013S	E	E	E	E	018	022	021	021	021	021	021	021	022	021	020	012	E013S	020	E014S	E014S	018	021
26	023	E	E012S	E	E	E012S	020	021	021	021	021	023	021	023	021	014	018	E013S	E013S	E013S	019	E014S	016	022
27	021	E014S	E012S	E013S	E	E013S	018	022	017	018	020	023	022	020	019	021	020	E013S	021	E013S	017	018	E013S	E012S
28	016	E012S	E	E013S	E013S	E013S	019	012	020	020	022	019	021	023	020	019	014	021	E013S	E014S	E014S	018	021	020
29	022	E013S	E013S	E	E012S	E012S	E012S	022	024	018	020	020	023	022	021	019	018	E012S	E013S	E012S	E013S	E013S	E013S	E013S
30	E012S	E013S	E012S	E	E	E013S	E013S	018	017	021	021	020	020	020	021	021	021	017	E012S	E014S	016	E013S	018	021
31	E012S	E	E	E012S	E	E013S	017	017	021	021	021	023	C	C	021	021	021	018	E013S	017	018	E013S	E012S	E012S
Count	30	30	31	31	31	31	31	31	31	31	30	31	30	29	28	29	29	30	30	30	30	30	30	30
Median	020	E013S	E012S	E012S	E012S	E012S	018	018	020	021	021	023	023	022	021	021	020	018	E014S	E013S	E014S	E016S	017	019
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

A 6

IONOSPHERIC DATA

Jan. 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	250	265	235	225	250	255	260	320	305	325	315	320	320	315	325	325	315	320	310	290	290	305	335	280
2	260	265	265	265	290	285	280	295	335	330	335	335	325	320	330	325	325	330	300	325	285	275	275	265
3	290	330R	235	245	255	I270A	290	335	335	325	325	320	315	320	305	325	320	310	315	330	320	325	305	285
4	270	280	260	290	295	280	295	325	325	330	325R	340	330	335	325	340	330	335	325	310	290	275	285	285
5	270	285	310	340	275	275	285	310	330	325	330	315	320	315	320	315	320	325	325	320	I310R	285	295	280
6	270	255	255	265	300	305S	270	300	310	325	325	320	320	310	315	315	325	320	315	310	300	290	295	305
7	270	250	280	275	A	A	275	310	315	330	320	325	305	305	305	310	310	310	325	I320A	270	275	290	285
8	280	265	285	335Z	275	280	290	325	320	330	310	325	315	310	315	315	310	310	335	I320A	I305A	I290A	I295A	290
9	280	275	275	280	300	310	305	320	335	325	325	I320R	295	300	310	320	310	300	335	325	300	295	305	305
10	290	275	265	285	285	310	335	335	330	335	320	330	330	305	315	320	315	320	320	345	I290R	295	285	275
11	270	270	280	295	275	285	305	335	355	330	330	325	305	305	315	315	310	315	325	320	315	270	280	290
12	265	245	255	285	280	275	315	305	325	315	I320C	315	290	295	300	305	310	305	315	330	295	300	310	275
13	280	280	250	I260R	305	275	310	330	320	320	320	305	305	C	C	C	C	C	C	C	C	C	C	C
14	C	C	270	300	305	315	295	310	325	325	330	320	295	300	300	320	310	295	315	330	310	295	I290A	270
15	295	275	280	280	270	275	280	310	335	335	325	320	295	300	305	320	330	305	335	335	295	280	290	275
16	280	270	275	270	270	270	310	315	330	325	315	325	310	305	320	320	320	315	335	315	295	295	305	295
17	295S	275	290	285	270	265	350	320	345	330	325	310	310	315	305	330	330	305	335	335	295	305	320	310
18	290	295	280	270	275	275	290	320	305	320	330	325	315	325	325	345	310	295	325	335	295	280	285	295
19	275	280	285	275	275	290	300	335	350	315	325	330	325	325	I330C	335	335	305	315	345	320	285	290	295
20	290	280	275	260	265	280	325	340	350	320	I330R	330	315	330	315	325	340	310	310	315	320	290	300	295
21	285	255	275	275	295	280	335	340	350	325	325	325	335	310	325	330	330	320	330	340	330	I285A	290	280
22	280	285	310	305	285	275	290	335	365	330	330	325	320	325	I335C	I325C	I320C	320	270	295	310S	310	280	290
23	280	275	270	255	290	280	330	330	350	345	330	325	325	315	320	325	355	320	300	325	335	300	275	270
24	280	290	285	305	305	260	315	330	350	355	335	320	305	315	335	345	340	310	I305R	305	320	305	295	290
25	285	275	285	285	290	280	275	330	345	340	325	325	330	315	315	315	330	305	305	315	320	290	280	280
26	270	275	280	315	320	280	285	325	345	345	340	315	300	310	305	300	305H	340	310	I310R	315	315	295	280
27	265	265	250	255	255	270	310	340	335	I330R	355V	295H	310	325	320	320	335	330	305	310	315	305	300	280
28	275	265	280	280	285	265	285	335	345	315	310	305	300	300	315	315	315	335	320	315	300	305	290	280
29	265	260	270	270	305	300	320	325	325	330	300H	305	300	295	315	325	305	310	315	325	290	295	295	295
30	275	280	275	275	285	270	305	340	350	305	335	310	305	300	310	310	335	305	300	330	310	280	270	280
31	285	285	270	270	285	275	305	330	330	330	325H	305	I305C	I305C	310	310	320	325	315	285	290	300	295	285
Count	30	30	31	31	30	30	31	31	31	31	31	31	31	30	30	30	30	30	30	30	30	30	30	30
Median	280	275	275	275	285	280	300	325	335	330	325	320	310	310	315	320	320	310	315	320	300	295	290	285
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

A7

IONOSPHERIC DATA

Jan. 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	L	L	L	L										
2											L	L	L	L	L									
3											L	L	L	LH	L									
4											L	L	L	L										
5										L	L	L	380	L	LH									
6											L	L	L	380										
7											L	L	L	L										
8											L	L	L	L										
9										L	L	L	LH	L	L									
10											365	400	L	L	L									
11											L	L	LH	L	L									
12											C	L	L	L	L									
13											L	L	L	C	C									
14										L	L	L	LH	370L	L									
15										415	L	L	LH	L	L									
16										L	L	L	L	370L	L									
17											L	375L	L	L	L									
18											L	L	365L	L	L									
19											L	L	L	400	C									
20											L	L	380L	405	385									
21											375L	L	L	L	L									
22										420	395	410	L	365L	C									
23											L	375L	370L	L	L									
24											400	370	390	L	L									
25											L	360	L	365H	L	370								
26											L	L	L	L	360H									
27											360H	L	405	L	L									
28										L	L	L	375L	360L	L	L								
29											L	L	L	L	L									
30										L	L	410	350L	L	L									
31											L	L	C	C	L									
Count										2	5	7	8	8	2	1								
Median										420	375	375	380L	370L	370	370								
U.Q.																								
L.Q.																								
Q.R.																								

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

The Radio Research Laboratories, Japan

A8

IONOSPHERIC DATA

Jan. 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	250	250	240	255										
2											230	220	245	235	250									
3											235	250	240	255	255									
4											250	230	235	240										
5										250	240	235	250	250	265									
6											235	225	225	255										
7											245	230	255	250										
8											245	250	245	275										
9										250	245	240	255	255	235									
10											250	235	235	255	250									
11											250	245	255	245	250									
12											I240C	240	255	255	245									
13											240	250	250	C	C									
14										260	245	235	275	260	245									
15										230	240	240	270	250	255									
16										255	255	245	250	290	240									
17											240	240	245	245	250									
18											240	230	285	255	250									
19											245	240	240	230	C									
20											250	235	240	230	230									
21											250	250	235	235	240									
22										220	250	230	245	245	C									
23											240	255	240	245	250									
24											240	250	240	245	245									
25											240	255	250	255	250	225								
26											240	235	245	240	290									
27											290	215	250	235	240H									
28										250	255	240	240	270	230	255								
29											265	265	255	280	250									
30										230	245	245	285	250	250									
31											230H	270	I250C	I250C	250									
Count										9	31	31	31	30	23	2								
Median										250	245	240	245	250	250	240								
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

A9

IONOSPHERIC DATA

Jan. 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	340B	315	380	I385A	365	330	I325B	250	245	235	235	240	230	I240B	240	255	240	240	235	280	290	280A	220	300B
2	I320B	310	295	300	280	270	I280B	245	240	235	230	220	225	230	240	220	225	230	250	245	260	285	285	295
3	255	220	E340S	A	A	A	270	240	235	240	230	230	220	215H	230	240A	240	225	230	230	235	220	245	300
4	I300B	300	290	270	235	240	I260B	230	210	230	240	230	225	240	235	220	220	220	235	235	260	280	285	290
5	295	270	240	215	E300E	A	I290A	255	235	245	240	225	215	230	215H	240	230	220	235	235	A	270	240	280
6	310	340A	315	I320A	255	250	250	265	245	240	225	225	215	210	240	230	250	240	240	250	290	290	255	280
7	A	A	310A	A	A	A	A	255	245	230	230	I230A	225	I230A	245	230	230	230	240	A	A	315	I305A	305
8	290	305	280	240	220	290	I260A	240	230	240	230	230	230	220	240	235	230	230	215	A	A	A	A	280
9	I305A	285	280	290	245	250	I250B	230	225	235	235	230	220H	230	230	230	235	230	230	225	240	280	250	255
10	275	290	300	290	285	240	225	235	210	230	230	225	225	220	235	230	230	230	230	220	A	300	285	300
11	325	300	290	255	265	280	240	235	220	225	230	225	205H	220	230	220	230	230	230	220	220	310	295	300
12	320	350	335	280	295	300	230	235	235	245	I220C	230	240	235	230	235	230	230	225	210	250	260	235	300B
13	305	300	340	I340B	270	280	255	240	225	230	230	230	230	C	C	C	C	C	C	C	C	C	C	C
14	C	C	285	250	245	230	255	245	230	240	235	225	220H	220	225	240	230	245	230	225	240	275	I285A	I300A
15	300	305	280	280	255	290	275	245	220	215	230	230	220H	230	240	225	230	240	210	215	260	305	305	I300A
16	285	300	295	300	300	315	290	240	225	230	230	235	230	230	230	235	225	230	225	240	255	285B	275	285
17	300	300	310	280	330	320	220	225	230	230	230	220	220	230	230	240	220	225	225	220	255	265	250	280
18	270	270	290	315	285	290	280	235	230	235	230	I225A	230	I240A	245	240	210H	255	235	215	I230B	300	285	280
19	320	285	280	285	290	285	280	235	220	225	235	230	230	220	I225C	230	215	235	240	215	205	285	300	265
20	305	280	285	E330B	340	320	225	220	230	230	230	235	210	215	210	225	230	210	255	230	230	265	270	230
21	290	310	305	315	260	270	235	225	205	215	205	240	225	225	240	230	225	230	235	225	230	I260A	290	320
22	315	275	240	240	260	300	300	245	215	215	190	205	205	225	I230C	I230C	I225C	210	250	240	255	245	295	290
23	280	290	325	325	270	280	240	230	220	230	230	230	220	230	230	240	220	230	265	230	225	255	310	305
24	295	280	275	265	235	300	250	225	230	210	215	190	215	235	245	230	225	210	260	250	230	230	280	290
25	290	290	290	280	240	270	280	245	220	225	230	230	230	205H	240	215	215	220	240	235	235	270	295	320
26	350	320	290	240	215	230	I290B	240	220	230	230	220	215	230	220H	225	220H	205	235	I250A	240	245	275	290
27	340	320	365	350	340	315	255	220	215	230	195H	215	195	235	225	230	230	230	245	230	270	230	270	290
28	315	335	290	285	270	290	285	230	215	220	230	230	230	230	230	230	235	230	220	240	260	240	270	310
29	330	315	310	310	250	230	230	220	225	255	225	235	235	230	240	255	225	210	235	225	240	250	255	280
30	300	280	260	270	250	280	245	215	230	220	230	195	230	230	230	250	230	225	220	220	220	280	285	290
31	290	265	290	290	280	270	235	240	225	230	205	230	I230C	I235C	240	225	230	205	215	255	260	255	245	270
Count	29	29	31	29	29	28	30	31	31	31	31	31	31	30	30	30	30	30	30	28	27	29	29	30
Median	300	300	290	285	270	280	255	235	225	230	230	230	225	230	230	230	230	230	235	230	240	270	280	290
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

Jan. 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	125	115	115	S	B	110	G	G	G	140	G	B	115	105	105	105	100	100	100	100	100	B
2	B	100	S	S	S	105	B	100	105	115	G	G	G	110	110	105	110	105	B	110	B	105	105	B
3	B	S	S	120	120	110	110	B	105	110	105	105	105	120	110	105	105	105	105	105	B	B	B	B
4	B	S	S	S	S	S	B	105	100	100	140	100	130	120	115	G	B	B	110	B	B	B	B	B
5	B	S	E	E	E	110	110	105	105	105	105	G	G	G	G	130	115	110	105	105	105	S	110	B
6	110	110	E	120	120	S	115	B	G	110	G	G	105	105	110	105	115	110	110	110	105	105	100	100
7	100	100	100	115	115	110	110	110	105	100	100	100	105	100	110	110	B	105	105	105	105	105	100	100
8	B	S	E	E	115	110	105	100	110	110	G	105	G	G	G	G	B	B	110	105	100	100	100	100
9	100	S	S	B	S	S	B	B	G	G	G	G	G	G	G	G	B	B	105	105	110	105	S	100
10	105	S	E	S	S	S	120	115	150	G	G	G	G	G	G	G	G	110	105	105	105	105	110	B
11	B	S	S	S	S	S	S	B	G	105	G	130	G	G	G	140	115	B	105	S	S	B	B	B
12	B	100	S	S	S	S	B	G	105	110	C	100	G	140	120	100	100	B	B	S	B	S	B	B
13	B	E	S	B	S	S	105	B	G	G	130	130	G	C	C	C	C	C	C	C	C	C	C	C
14	C	C	E	E	S	S	B	B	120	115	G	G	G	G	G	G	110	B	S	100	105	100	100	100
15	B	100	S	S	E	115	S	B	130	G	G	G	G	G	G	G	G	B	S	S	105	105	100	100
16	100	100	100	S	110	S	110	110	105	G	100	100	G	100	100	100	115	105	105	105	100	B	B	B
17	B	E	S	S	S	E	B	105	100	100	100	G	G	G	G	G	G	B	110	100	100	B	S	B
18	S	S	S	S	S	S	110	110	G	G	140	145	150	145	130	120	B	B	B	S	B	B	S	B
19	S	S	S	115	110	110	B	G	105	105	G	G	G	G	C	G	B	B	B	S	S	S	B	S
20	B	S	S	B	S	S	B	B	145	G	G	105	100	100	G	G	G	100	100	100	100	S	S	S
21	100	S	S	S	E	110	S	B	G	G	G	G	130	130	G	G	G	155	B	B	105	100	100	B
22	105	S	100	S	S	S	B	B	105	105	110	G	G	G	C	C	C	B	115	S	B	B	B	B
23	B	S	S	S	S	S	B	B	140	G	G	G	130	130	120	G	G	B	B	B	B	B	B	B
24	B	S	S	S	E	S	B	150	140	125	120	110	G	105	G	G	G	B	B	B	B	S	B	B
25	B	S	E	105	E	E	B	B	G	G	155	155	140	G	140	G	G	110	110	110	100	100	100	B
26	130	100	100	105	110	S	B	B	140	130	140	G	G	145	140	120	120	115	105	105	110	105	105	B
27	B	S	S	110	105	S	B	B	G	G	G	G	G	G	G	140	140	100	B	S	110	B	100	105
28	100	100	100	100	100	S	B	G	G	G	G	G	G	G	130	125	150	B	120	110	105	B	B	B
29	B	S	S	105	S	S	110	B	155	155	G	105	G	E175G	140	130	110	115	105	100	105	S	S	120
30	120	140	110	E	E	S	S	B	105	105	G	G	155	150	155	135	140	120	105	S	B	105	B	B
31	120	120	115	S	105	S	B	G	G	G	G	110	C	C	G	140	130	B	S	B	B	S	120	120
Count	11	10	8	10	11	8	10	11	20	17	12	15	10	15	15	16	15	15	19	17	18	13	14	9
Median	105	100	100	110	110	110	110	110	105	110	115	105	130	120	120	120	115	110	105	105	105	105	100	100
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

Jan. 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			f3	f3	f			1				h 12			c2	13	12	f3	f3	f2	f3	f	f	
2		f				f2		12	1	c				12	1	1	1	f		f2		f	f	
3				f3	f3	f5	f2		12	1	12	12	12	c2	13	14	13	f3	f3	f2				
4								1	1	1	h 1	1 h	h2	c2	c2				f					
5						f	f3	13	13	12	1					h	c3	f	f3	f2	f3		f2	
6	f	f		f2	f2		f2			1			1	12	1	13	c3	f2	f2	f2	f2	f2	f2	f2
7	f	f	f	f4	f5	f5	f2	12	1	13	13	13	1	1	c2	c		f2	f3	f4	f3	f2	f3	f2
8					f	f2	f2	12	1	1		1							f	f3	f3	f2	f2	f2
9	f2																		f	f	f	f		f
10	f						f	c	h21									f3	f2	f2	f3	f2	f	
11										1		h				h2	c2		f					
12		f							12	12		1		h	c2	1	1							
13							f				h	h												
14									1	1							12			f2	f	f2	f4	f2
15		f2				f			c												f2	f	f2	f2
16	f	f	f		f		f	12	12		12	12		1	1	1 h	c	f	f2	f2	f2			
17								13	14	12	12								f	f2	f2			
18							f2	1			h	h	h	h	h	c2								
19				f	f2	f2			1	1														
20									h			1	1	1				1	f2	f2	f			
21	f2					f							h	h				h			f2	f3	f2	
22	f		f						1	12	1								f					
23									h				h	h	c2									
24								h	h	c2	c	1		1										
25				f2							h	h	h 1		h2			1	f	f	f3	f2	f2	
26	f	f2	f	f	f				h	c2	h			h2	h2	c3	c2	c2	f3	f2	f	f2	f	
27				f	f											h2	h2	1			f3		f2	f2
28	f2	f3	f	f	f										h	c2	h		f	f	f			
29				f2			f		h	h		12		h	h2	h4	c3	c6	f2	f2	f			f2
30	f2	f	f						12	12			h	h	h	h2	h2	c3	f2			f		
31	f2	f2	f		f							1				h2	h						f	f
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

A12

IONOSPHERIC DATA

Jan. 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	039	042	034	030	I030A	032	I039A	U074S	123	135	124	121	U103R	093S	100	095	078	074	064	054	053	054	049	032
2	025	025	025	026	029	028	C	C	C	142	136	101	090	088	081	080	069	071	063	U071S	061	070	068	U064S
3	U070S	071S	037	037	037	033	030	072	U104R	115	135	130Z	114	094	092	099	078	082	065	A	058	065S	050	035
4	032	031	025	027	024	027	030	059	073	097	115	103R	095	096	088	079	064	066	043	040	035	035S	036	041
5	043	043	047S	026	023	024	029	063	086	115	134	135	119	117	097	092	089	078S	058	045	035	039	043	030
6	028	029	029	032	030	027	028	057	091S	134	154S	121	111	105R	115	U103R	086	A	A	A	044	045	044	030
7	030	030	034	026	026	A	A	060	093	136	142	140	133	131	126	116	096	085	062	039	032	042	046	043
8	036	035	042	033	028	029	028	056	093	128	131	118	120	U103R	098	093	091	080	069	050	044	042	045	048
9	040	038	035	035	032	027	029	059	084	096	119	110	111	123	119	101	095	085	086	073S	069	064	061	049
10	034	030	031	030	030	036	027	058	087	J106R	110	108	100	092H	098	096	087	082	078	068	049	042	043	037
11	037	037	037	035	032	034	039	069	093	098	118	107	102	108	098H	096	088	087	074	064	049	045	052	046
12	038	035	034	037	033	034	039	057	091	119	135	110	102	104	103	101	095	091	J082S	069	045	050	048	036
13	036	035	035	034	038	039	038	070	098	127	134	127	127	124	118	111	098	101R	J081R	070	049	052	044	043
14	036	038	034	033	032	028	032	059	087	118	129	124	110	107H	112	113	088	085	087	082S	056	050	048R	041
15	035	038	038	035	036	038	039	J074R	J106R	J103R	119	122	117	124	123	117	088	079	085	074	039	037	041	038
16	030	029	032	031	032	033	036	071	089	107	119	121	104H	102	098	092	078	070	070	046	032	033	037	033
17	034	034	037V	036	035	030	031	055	087	108	129	129	129	109	103	107	088	070	J072S	051	038	039	034	034
18	032	030	029	031	032	032	033	061	J085S	117	115	095V	086	096	J105R	082	075	059	J076R	060	036	031	032	I033C
19	034	I032C	I031C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	062	J073R	071	052	032	034	034
20	033	032	031	030	031	032	034	062	084	089	115	120	096	093	089	088	088	067	050	063	052	041	039	038
21	035	029	030S	031	C	C	C	C	C	082	U103R	116	114	095	100S	095	082	068	065	070S	051	030	031	I030A
22	031	033	033	030	028	030	030	063	U097S	086	099	116	106	U103R	096	097	089	074	045	052	052S	047	032	033S
23	032	030	030	030	032	031	033	062	087	091	097	112	J106R	097	097	092	093	064	049	057	052S	I035A	032	034
24	035	037	038	037	035	029	031	063S	086	097	085	088	104R	102R	104R	097	082	060	050	056	062	051	038	037
25	036	035	036	035	C	C	C	C	C	086	J107S	104R	113	112	110	U110R	084	070	064	U074S	065	048S	039	034
26	035	034	035	034	030	025	026	060	092	110	098	097	096	098	096	097	091	082	059	057	058	051	034	033
27	032	032	030	032	032	034	040	U076S	093	113	109	118	130	124	U100R	085	075	065	058	058	054	044	043	038
28	033	036	037	036	035	033	036	U076S	092	095	120	125	128	117	117	096S	095S	091	065	052	047	047S	036	034
29	036	035	036	037	039	030	032	066	089	108	112	125	131	124	122	U096S	092	086	067	053	042	041	041	041
30	039	041	042	038	037	034	040	U078S	C	090	111	104R	108	120	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	112	108	112	126	133	119	107	U098S	085	064	052	050	053	048	042
Count	30	30	30	29	27	26	25	26	25	30	30	30	30	30	29	29	29	29	29	28	30	30	30	30
Median	035	034	034	033	032	032	032	062	091	108	118	117	110	104	100	096	088	078	065	058	050	044	042	036
U.Q.	036	037	037	036	035	034	038	071	093	118	131	124	120	120	116	105	092	085	075	070	054	051	048	041
L.Q.	032	030	031	030	030	028	030	059	086	096	109	107	102	096	097	092	080	068	058	052	042	039	036	033
Q.R.	004	007	006	006	005	006	008	012	007	022	022	014	018	024	019	013	012	017	017	018	012	012	012	008

foF2

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

The Radio Research Laboratories, Japan

K1

IONOSPHERIC DATA

Jan. 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	B	L									
2								C	C	L	L	L	L											
3										L	L	L	L	L	420L									
4										L	L	L	L	L										
5										L	L	L	L	L	L									
6										L	L	L	L	L	L									
7										L	A	A	A	L	L	L								
8										L		L	L	L	L									
9											L	L	L	L	L									
10												L	L		L									
11											L	L	L	L	L									
12											L		L	L										
13												L	L	L	L									
14										L	L	L			L									
15										L	L	L	L	L										
16											L	L												
17								L			L	L	L		L									
18										L	L	U560L		L	L									
19								C	C	C	C	C	C	C	C	C	C							
20											L		L		L									
21								C	C	L	L	L	L	L	L									
22										L	410L	L	L	L	L	L								
23										L	L	420L	L	L										
24										L	390L	L	L	L	L									
25								C	C	L	L	L	L	L	L	L	L							
26										L	L	L	L	L		A	A							
27										L	L	L	L	S	L									
28											L	L	L	L	L									
29											L	L	L	L	L									
30									C		L	L	L	L	C	C	C							
31								C	C	L	L	L	L	L		L	L							
Count											2	2			1									
Median											400L	U490L			420L									
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

Jan. 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								A	A	A	310	320	R	B	310	A	A							
2								C	C	A	A	A	A	A	A	A	A							
3								B	A	290	310	A	A	330	A	A	A							
4								A	I230A	295	320	A	340	A	A	A	A							
5								A	A	A	330	A	A	340	325	285	R							
6								A	A	300	325	345	350	A	A	A	A							
7								A	A	320	A	A	A	A	A	A	R							
8								A	A	320	335	345	355	350	330	300	A							
9								A	270	320	340	350	350	350	330	305	220							
10								B	A	305	340	360	360	I350A	A	A	A							
11								A	240	310	330	350	A	A	310	280	225	B						
12								160	270	325	A	A	I355A	355	I320A	300	I200A	A						
13								170	250	310	340	A	A	A	A	290	225	E						
14								160	250	305	330	355	355	345	330	300	A	B						
15								170	260	300	340	360	355	340	320	295	235R	B						
16								A	A	A	330	A	355	335	325	290	205	B						
17								A	265	310	330	355	350	340	330	300	235	B						
18								170	240R	290	330	340	350	I340A	325	I275A	I220A	B						
19								C	C	C	C	C	C	C	C	C	C	A						
20								A	250	300	I315A	330	340	330	I315A	A	220	B						
21								C	C	300	I320A	335	340	A	310	275	225	B						
22								A	R	295	310	320	335	330	A	285	210	A						
23								B	240	290	325	330	335	330	320	285	220	B						
24								B	220	A	A	A	A	345	320	A	A	B						
25								C	C	300	325	330	345	335	R	280	240	B						
26								A	230	305	325	I340R	350	350	330	295	R	B						
27								180	240	295	320	340	350	345	I325A	300	235	B						
28								A	240	305	325	350	360	350	A	A	R	A						
29								B	245	295	335	365	365	I355A	340	I310A	I250R	160						
30								160	C	315	I335A	360	355	345	C	C	C	C						
31								C	C	325	340	355	360	I355R	340	315	255	A						
Count								7	16	25	26	21	22	22	19	19	16	2						
Median								170	240	305	330	345	350	345	325	295	225	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

K3

IONOSPHERIC DATA

Jan. 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	E013B	J020	J025	J038	J038	J021	039	J029	J036	J042	028G	G	030G	E053B	035	J029	J024	J026	021	022	021	022	E016S	E015S
2	E016S	E015S	E	J015	E	E013B	C	C	C	034	J035	035	036	035	035	030	J038	048	J030	E015S	J026	J018	J018	E016S
3	E016S	E013B	E012B	019	J015	J035	J034	E015B	J023	033	J041	J041	J053	038	J041	050	034	J052	J064	J054	J036	J026	E015S	E014B
4	E015S	E013B	E015S	J018	E	020	E015S	021	J028	034	036	038	042	043	J038	J036	024	J019	021	J018	E015S	020	E013B	E013B
5	E012B	E014B	E	E	E	020	J018	021	J029	J036	032G	039	J038	G	G	G	G	J030	J037	J026	021	J017	J017	E012B
6	E014B	E	E	J015	J038	J025	J029	021	J028	028G	030G	J030G	J037	J038	J052	J108	J041	J089	J129	J108	J043	J037	J025	J024
7	J029	J026	E016S	J018	J018	J043	J036	J029	J038	J028G	J070	J084	J055	045	J036	J030	G	J054	J029	J025	J030	J037	J042	022
8	020	E015S	E	J017	J016	E015S	J016	J027	J043	030G	G	G	G	G	G	G	G	J024	J025	J017	J017	J030	J028	J025
9	022	021	J025	E013B	E012B	E015S	021	020	G	G	J023G	J029G	G	G	G	G	018G	J024	J025	J028	023	021	021	E012B
10	E013B	E014B	E	E	E	E011B	J014	020	J038	024G	029G	G	G	036	037	J042	J062	J029	E012B	E014B	E015S	J015	021M	021M
11	021M	E012B	E011B	E	E	E	E012B	022	015G	J029G	035	037	039	038	G	G	G	E011B	J018	022M	020M	E011B	E015S	E015S
12	E015S	019	E	E	E	E012B	E013B	G	G	G	J040	J037	037	035G	032	G	024	017	018	018	E015S	E015S	E015S	E015S
13	E011B	E015S	E	E	E	E013B	E015S	019	G	G	038	J042	J041	J044	J032	020G	J033	J026	023M	018M	E012B	E015S	E013B	E013B
14	E015S	E	E	E012B	E	E015S	E015S	G	G	032	G	G	G	033G	036	020G	J028	J026	J038	021M	E011B	J025	J028	J025
15	022M	021M	021M	J015	J015	E013B	J018	022	022G	018G	J029G	027G	J029G	024G	020G	022G	G	020	E015S	E012B	E012B	J030	036M	J024
16	J023	J018	021M	J017	022M	J018	J025	J026	J027	043	J043	J038	038	038	G	032	J038	J029	J026	J040	J028	022M	020M	E015S
17	E013B	E	E	013	E	E	J016	J015	022G	G	G	G	G	G	036	036	J042	J043	J121	J060	J033	J024	019	J018
18	021M	E015S	020M	022	E	E	020M	J017	023G	022G	039	040	042	043	041	J042	J029	E015B	J014	E015S	J021	E016S	E012B	C
19	E019C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	J025	J025	018M	E015S	E013B	E014B	E013B
20	E012B	J016	J016	J017	E	E013B	J018	022	030	018G	033	032G	036	032G	036	035	G	018	021	020	E013B	E015S	E016S	E015S
21	E	J016	J018	J015	C	C	C	C	C	J021G	J050	027G	037	037	G	031	J028	018	J027	J043	020	J020	J016	J036
22	020	J020	J016	J015	J013	E013B	E013B	022	031	G	G	G	033G	J027G	J041	035	025	J024	J024	J016	E014B	E015S	J017	J018
23	E013B	E013B	E013B	E012B	E	E012B	E012B	E017B	G	031	G	038	037	035	G	G	023	019	E015S	E016S	J041	J038	J017	E015S
24	020	020	E013B	E	E	E013B	E014B	E018B	G	034	036	036	J038	027G	026G	J041	J038	023	J017	022	E013B	021	021	020
25	022	E014B	E	E014B	C	C	C	C	C	036	037	035	039	037	034	025G	G	027	J029	J029	J023	J024	021	E015S
26	E017S	020	E013B	J028	J015	E014B	J016	J024	020G	037	037	G	040	041	044	J069	J055	J029	J028	J023	J026	E012B	E013B	E015S
27	021	J017	E	J021	J028	J016	E012B	G	G	G	035	G	031G	J036	036	020G	028	J022	021	E012B	J020	J018	J016	E015S
28	E015S	020	E012B	E	E	E013B	E013B	022	029	G	G	G	035G	G	043	J041	022G	030	030	E013B	J024	J017	E015S	E015S
29	E014B	E013B	E012B	E	E	E	E013B	E015B	G	024G	040	038	042	043	G	037	021G	J018	020	E015S	022	020	020	019
30	018	J018	019	020	E	E013B	E015S	G	C	G	J037	038	031G	041	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	G	036	036	032G	034G	038	037	031	022	E013B	E011B	E013B	E015S	021	J038
Count	30	29	29	29	27	27	26	26	25	30	30	30	30	30	29	29	29	30	30	30	30	30	30	29
Median	E016	E015	E012	015	E	E013	016	020	G	G	035	035	037	036	035	031	025	024	J024	019	020	J020	017	E015
U.Q.	021	020	017	018	015	018	020	022	030	034	038	038	039	040	038	039	036	029	029	026	026	024	021	022
L.Q.	E013	E013	E	E	E	E012	E013	G	G	G	G	G	G	G	G	G	G	019	018	E015	E015	E015	E015	E015
Q.R.	D008	D007				D006	D007											010	011	D011	D011	D009	D006	D007

foEs

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

The Radio Research Laboratories, Japan

K4

IONOSPHERIC DATA

Jan. 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	017	016	026	A	015	A	025	028	029	026G		026G	B	032	027	022	016	E	016	016	016	S	S
2	S	S		013		B	C	C	C	027	033	034	034	034	032	030	037	048	025	S	019	016	016	S
3	S	B	B	E	013	026	016	B	E023R	033	026	040	040	036	039	046	030	046	050	054	026	019	S	B
4	S	B	S	014		E	S	019	027	026	034	037	041	039	037	033	021	016	E	016	S	E	B	B
5	B	B				E	016	019	028	033	029G	037	038					015	027	023	E	016	E	B
6	B			014	012	018	025	019	026	026G	029G	026G	030	037	033	038	029	A	A	A	025	019	017	018
7	020	017	S	015	015	A	A	021	030	025G	052	056	052	038	033	029		036	016	E	015	029	033	E
8	E	S		E	E	S	E	019	029	026G								020	020	015	015	016	020	019
9	E	E	E	B	B	S	E	018			021G	026G					018G	018	019	018	016	E	020	B
10	B	B				B	E	019	018	021G	029G			036	036	038	040	026	B	B	S	S	E	016
11	E	B	B				B	013	015G	025G	034	037	039	038				B	018	E	E	B	S	S
12	S	E				B	B				034	036	037	029G	032		024	016	E	016	S	S	S	S
13	B	S				B	S	G			037	038	037	037	032	019G	020	020	016	E	B	S	B	B
14	S			B		S	S			G				032G	G	019G	026	017	015	E	B	017	016	E
15	E	E	E	E	E	B	016	016	020G	018G	026G	026G	026G	024G	020G	022G		017	S	B	B	016	025	016
16	016	E	E	E	E	014	019	022	025	031	026	038	037	038		032	029	029	026	026	019	E	E	S
17	B			E			E	015	021G						034	034	037	040	022	029	022	016	E	E
18	016	S	E	E			E	015	022G	E022R	038	038	040	039	039	032	024	B	E	S	015	S	B	C
19	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	015	018	E	S	B	B	B
20	B	E	E	E		B	E	020	028	016G	033	025G	027	024G	031	030		016	E	016	B	S	S	S
21		013	014	011	C	C	C	C	C	018G	042	025G	037	033		030	016G	016	016	040	E	016	015	A
22	E	016	015	011	E	B	B	019	026				026G	025G	033	030	025	017	016	015	B	S	015	017
23	B	B	B	B		B	B	B		030		027	037	034			015	017	S	S	029	A	016	S
24	E	E	B			B	B	B		033	034	034	036	026G	025G	032	017	G	E	E	B	016	E	E
25	016	B		B	C	C	C	C	C	025	036	035	037	036	033	024G		025	017	015	020	015	015	S
26	S	E	B	015	E	B	016	018	016G	035	037		040	037	040	063	054	024	020	019	019	B	B	S
27	E	015		016	016	015	B				033		029G	028	033	016G	025	017	E	B	015	015	E	S
28	S	E	B			B	B	021	028				034G		G	033	018G	025	026	B	019	015	S	S
29	B	B	B				B	B		023G	035	038	040	039		033	020G	015	016	S	E	015	015	E
30	016	015	E	E		B	S		C		036	026	026G	040	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C		033	033	030G	033G	036	036	028	021	B	B	B	S	E	034
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

Jan. 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	013	010	010	010	010	012	013	013	014	016	018	026	017	053	025	016	013	012	014	E015S	E015S	E015S	E016S	E015S
2	E016S	E015S	010	010	010	013	C	C	C	015	016	016	017	024	018	025	015	014	012	E015S	012	013	E015S	E016S
3	E016S	013	012	010	010	010	014	015	015	015	018	025	020	017	018	015	013	014	E015S	E015S	E015S	014	E015S	014
4	E015S	013	E015S	010	010	014	E015S	014	013	011	010	013	012	025	015	015	014	011	013	E015S	E015S	013	013	013
5	012	014	010	010	010	012	014	014	016	018	026	025	025	026	026	016	015	011	010	011	014	014	014	012
6	014	010	010	010	010	010	011	014	016	015	015	013	026	026	026	017	014	011	013	014	011	013	013	013
7	E016S	010	E016S	010	010	010	012	015	015	017	018	026	015	019	025	017	015	012	011	014	014	E015S	011	014
8	014	E015S	010	010	010	E015S	012	012	015	017	026	025	017	029	026	025	016	012	011	012	014	011	012	012
9	014	014	013	013	012	E015S	013	015	016	018	018	019	017	019	019	018	015	015	013	010	E015S	014	012	012
10	013	014	010	010	010	011	011	016	016	016	017	018	019	020	016	016	011	010	012	014	E015S	E015S	E015S	011
11	014	012	011	010	010	010	012	011	011	012	015	018	019	017	015	014	013	011	011	012	013	011	E015S	E015S
12	E015S	E015S	010	010	010	012	013	013	016	016	016	015	017	015	015	015	012	011	013	E015S	E015S	E015S	E015S	E015S
13	011	E015S	010	010	010	013	E015S	013	013	013	015	019	015	016	015	013	012	010	010	012	012	E015S	013	013
14	E015S	010	010	012	010	E015S	E015S	013	013	014	018	015	015	017	016	015	014	012	012	E015S	011	013	013	E015S
15	E015S	013	012	E	010	013	012	012	012	015	016	017	016	016	015	015	016	012	E015S	012	012	013	013	012
16	E015S	010	010	010	010	012	012	013	013	015	016	013	019	016	017	015	013	013	014	E015S	011	E015S	E015S	E015S
17	013	010	010	010	010	010	E015S	013	013	014	016	025	026	024	018	025	015	013	E015S	011	012	011	E015S	013
18	010	E015S	012	010	010	010	014	012	012	016	015	018	017	016	017	015	014	015	013	E015S	011	E016S	012	C
19	E019C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	011	E015S	013	E015S	013	014	013
20	012	012	010	010	010	013	E015S	013	012	011	011	012	011	012	012	015	015	013	013	E015S	013	E015S	E016S	E015S
21	010	010	010	010	C	C	C	C	C	011	011	012	013	018	011	012	014	013	014	E015S	013	012	013	013
22	013	010	010	010	010	013	013	015	016	013	015	015	017	016	012	012	014	011	012	011	014	E015S	013	E015S
23	013	013	013	012	E	012	012	017	013	011	014	016	015	014	016	013	011	016	E015S	E016S	E015S	E015S	014	E015S
24	014	014	013	010	E	013	014	018	015	016	026	026	018	018	015	013	014	015	014	014	013	E015S	014	014
25	E015S	014	010	014	C	C	C	C	C	011	015	015	016	016	017	015	012	013	012	012	011	013	014	E015S
26	E017S	013	013	010	E	014	E015S	013	014	012	015	026	020	020	016	013	012	012	E015S	013	013	012	013	E015S
27	014	013	010	010	E	010	012	014	015	013	014	016	025	015	013	012	012	014	014	012	013	013	011	E015S
28	E015S	014	012	E	E	013	013	014	015	015	015	015	016	016	017	014	013	011	011	013	013	013	E015S	E015S
29	014	013	012	E	E	E	013	015	015	015	017	017	019	017	014	014	013	011	014	E015S	012	014	014	011
30	E015S	010	011	011	010	013	E015S	013	C	012	013	018	017	017	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	015	016	016	025	025	017	013	014	013	013	011	013	E015S	014	011
Count	30	29	29	29	27	27	26	26	25	30	30	30	30	30	29	29	29	30	30	30	30	30	30	29
Median	012	012	010	010	010	012	012	014	015	015	016	017	017	017	016	015	014	012	012	012	012	013	013	012
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

Jan. 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	245	260	245	245	I250A	250	I295A	U325S	330	330	310	310	U330R	310S	330	335	320	325	315	325	300	300	330	280
2	280	290	265	275	290	315	C	C	C	325	335	305	320	315	320	335	310	320	320	U340S	280	285	280	U285S
3	U315S	320S	240	245	260	275	300	325	U345R	320	330	315Z	315	310	290	320	320	325	330	A	315	330S	320	280
4	295	305	305	295	315	300	325	340	340	330	335	350R	310	310	325	340	335	330	330	315	300	285S	290	280
5	305	325	330S	370	250	265	290	335	335	315	310	320	300	295	305	295	320	335S	340	325	295	285	305	285
6	285	270	260	280	325	285	A	310	305S	320	325S	310	315	290R	310	U330R	310	A	A	A	300	300	330	310
7	275	265	290	315	285	A	A	320	310	320	315	305	300	310	285	295	305	325	335	335	270	260	280	295
8	275	275	310	330	265	270	325	320	340	315	320	305	310	U310R	305	295	305	315	330	300	295	290	280	290
9	290	285	285	280	315	290	315	330	320	325	325	325	290	295	300	300	285	300	300	330S	305	315	295	285
10	280	285	280	265	275	285	300	320	340	J320R	325	325	320	295H	305	305	310	305	330	340	270	295	280	280
11	270	270	280	295	270	280	325	325	355	335	330	320	305	315	300H	305	305	310	315	330	265	265	270	290
12	275	255	255	290	275	265	335	300	330	330	330	310	295	290	300	305	305	310	J300S	325	310	270	315	290
13	275	265	260	260	255	290	315	325	335	325	290	305	300	300	295	305	310	315R	J320R	330	305	310	315	300
14	295	275	295	295	310	290	315	330	335	320	320	325	315	280H	295	310	310	295	310	330S	315	290	290R	295
15	255	280	290	270	280	270	280	J325R	J350R	J305R	315	310	300	300	300	320	335	305	320	355	255	275	290	310
16	295	280	275	275	280	270	295	340	340	310	315	315	300H	295	305	325	325	325	335	330	315	295	305	290
17	275	270	260V	290	245	245	355	345	335	325	320	315	325	310	310	315	340	325	J325S	350	290	310	295	315
18	305	300	285	260	265	280	295	330	J340S	325	340	315V	310	300	J315R	320	325	305	J315R	350	335	290	285	I275C
19	275	I270C	I280C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	315	J315R	350	330	265	280	290
20	285	285	285	255	260	270	330	345	345	310	325	335	310	315	305	320	325	350	285	320	335	310	285	300
21	290	250	280S	275	C	C	C	C	C	330	U320R	320	330	305	305S	315	330	325	315	340S	335	285	275	I285A
22	275	300	310	325	275	275	285	330	U355S	330	325	315	320	U300R	310	310	330	335	295	320	310S	330	275	290S
23	295	290	255	280	295	275	310	345	355	325	320	325	J330R	295	305	305	320	330	305	315	345S	I310A	275	270
24	270	285	295	290	315	270	295	345S	345	355	325	325	315R	305R	310R	335	325	345	310	305	325	335	290	285
25	270	265	280	290	C	C	C	C	C	335	J325S	315R	310	315	290	U320R	325	330	300	U325S	335	290S	285	265
26	270	275	275	310	340	290	280	325	320	355	335	325	320	310	310	310	305	310	310	300	320	310	305	280
27	270	280	265	265	255	270	295	U345S	330	335	300	295	295	320	U325R	315	315	310	320	305	310	310	280	265
28	275	280	285	280	290	265	270	U340S	330	310	315	300	300	305	305	300S	315S	315	330	320	295	330S	270	275
29	275	270	270	270	310	285	290	330	335	330	315	295	295	295	305	U305S	310	320	310	300	300	290	280	275
30	270	270	290	295	295	270	300	U345S	C	340	325	305R	285	295	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	350	325	295	285	295	295	300	U310S	320	315	310	295	290	295	285
Count	30	30	30	29	27	26	24	26	25	30	30	30	30	30	29	29	29	29	29	28	30	30	30	30
Median	275	280	280	280	280	275	300	330	335	325	325	315	310	300	305	310	315	320	315	325	305	290	290	285
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

Jan. 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	B	L									
2								C	C	L	L	L	L											
3										L	L	L	L	L	440L									
4										L	L	L	L	L										
5										L	L	L	L	L	L									
6										L	L	L	L	L	L									
7										L	A	A	A	L	L	L								
8										L		L	L	L	L									
9											L	L	L	L	L									
10												L	L		L									
11											L	L	L	L	L									
12											L		L	L										
13												L	L	L	L									
14										L	L	L			L									
15										L	L	L	L	L										
16											L	L												
17								L			L	L	L		L									
18										L	L	U375L		L	L									
19								C	C	C	C	C	C	C	C	C	C							
20											L		L		L									
21								C	C	L	L	L	L	L	L									
22										L	440L	L	L	L	L	L								
23										L	L	420L	L	L										
24										L	410L	L	L	L	L									
25								C	C	L	L	L	L	L	L	L	L							
26										L	L	L	L	L		A	A							
27										L	L	L	L	S	L									
28											L	L	L	L	L									
29											L	L	L	L	L									
30									C		L	L	L	L	C	C	C							
31								C	C	L	L	L	L	L		L	L							
Count											2	2			1									
Median											425L	U400L			440L									
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

Jan. 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									255	250	240		245	250	250									
2								C	C	235	230	220	235											
3										240	250	245	245	220	235									
4										245	250	225	255	260										
5										265	255	245	275	260	275									
6										250	245	220	245	285	260									
7										260	245	255	250	265	250	250								
8										260		240	260	245	260									
9											235	250	255	270	250									
10												240	240		280									
11											255	240	255	260	240H									
12											250		280	260										
13												255	255	255	240									
14										250	240	250			260									
15										225	250	240	255	260										
16											250	250												
17								225			240	240	250		250									
18										240	240	280		255	260									
19								C	C	C	C	C	C	C	C	C	C							
20											250		235		240									
21								C	C	235	265	240	230	235	240									
22										225	230	280	250	235	235	245								
23										230	235	260	250	245										
24										230	225	240	260	270	255									
25								C	C	230	250	235	260	245	295	235	230							
26										240	230	235	250	265		245	275							
27										240	230	245	240	260	235									
28											260	235	250	255	255									
29											255	255	260	270	270									
30									C		255	250	275	260	C	C	C							
31								C	C	235	275	285	275	255		265	260							
Count								1	1	19	27	27	27	24	21	5	3							
Median								225	255	240	250	245	250	260	250	245	260							
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

Jan. 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	280	335	395	A	I400A	370	A	280	255	235	215	245	225H	B	235	230	230	230	230	230	280	250	210	255
2	300	300	330	335	280	250	C	C	C	230	230	220	220	240	230	235	230	I240A	250	235	250	255	250	275
3	250	225	250	370	320	E360A	265	260	235	235	230	235	230	215	200	260	225	250	280	E370A	250	230	220	260
4	275	255	290	290	250	260	250	230	215	230	230	225	230	230	235	230	225	230	205	240	245	255	290	280
5	250	240	230	210	375	345	280	245	230	245	235	225	225	230	240	240	245	225	230	245	245	280	245	245
6	280	315	325	280	235	325	E350A	260	230	230	225	220	220	235	240	240	230	A	A	A	290	260	250	235
7	340	350	285	230	275	A	A	230	230	240	A	A	A	230	225	230	230	240	210	205	275	360	330	250
8	260	295	255	225	250	315	250	230	225	240	240	225	230	220	230	230	235	230	225	230	230	265	285	265
9	250	280	270	290	245	260	250	230	230	230	220	225	230	230	230	230	240	230	240	225	230	230	240	225
10	245	300	295	275	290	280	200	225	225	240	225	205H	225	230H	220	245	230	230	225	210	210	260	255	260
11	300	290	275	250	250	295	245	230	225	225	225	210	205H	240	225	235	240	240	230	210	210	255	255	255
12	280	345	320	260	280	300	230	230	240	240	240	225	210	230	230	235	240	230	225	210	225	270	245	260
13	275	E305S	320	340	315	280	240	245	240	230	235	230	225	225	225	230	230	230	225	215	225	245	230	245
14	255	265	240	255	220	240	250	240	230	230	240	225	230	225H	220H	240	225	245	245	225	225	260	255	255
15	310	295	255	E260E	275	290	290	250	210H	220	205H	225	205	230	240	240	220	240	235	200	210	300	300A	255
16	260	290	280	295	285	305	290	240	225	240	230	230	225H	230	230	240	220	250A	240	240A	255	275	260	260
17	290	280	300	245	345	355	210	205	230	230	230	225	210H	230	225	240	220	E250A	240	230	260	250	250	250
18	255	290	255	315	290	285	260	240	225	230	240	210	240	230	230	230	225	240	250	210	215	290	265	I300C
19	300	I300C	I300C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	230	255	225	220	230	280	275
20	255	255	275	325	345	320	220	230	230	225	230	235	210	240	215	230	235	210	255	245	215	235	260	245
21	260	290	315	305	C	C	C	C	C	225	250	210	230	215	225	230	225	225	235	E245A	210	270	285	I305A
22	305	290	240	230	305	310	290	250	230	220	200	195H	230	225	225	230	230	225	210	240	250	220	275	295
23	275	265	330	325	E275E	275	250	230	230	220	210	205	225	225	230	230	235	215	235	245	E240A	I240A	295	310
24	310	280	270	265	E225E	295	270	230	230	230	215	215	220	220	230	235	225	210	230	260	230	215	270	255
25	280	280	300	275	C	C	C	C	C	220	230H	230	215	235	200H	235	215	230	250	245	215	250	260	300
26	310	310	295	260	220	295	315	240	220	235	225	230	230	230	240	A	A	215	210	260	245	225	240	300
27	320	330	355	370	385	340	255	230	230	225	215	180	215	235	225	225	220	215	230	245	235	230	245	260
28	310	310	280	E285E	E245E	315	300	240	220	230	225	225	230	230	230	230	230	220	220	250	240	225	255	290
29	310	320	310	E295E	E245E	E220E	255	230	225	230	235	215	245	230	230	230	225	235	230	210	230	265	265	270
30	275	285	255	250	255	300	250	225	C	225	230H	215	210H	230	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	235	210H	230	230	245	245	230	230	215	215	225	250	260	240	I270A
Count	30	30	30	28	27	26	24	26	25	30	29	29	29	29	29	28	28	29	29	29	30	30	30	30
Median	280	290	290	275	275	300	250	230	230	230	230	225	225	230	230	230	230	230	230	230	230	255	255	260
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

K10

IONOSPHERIC DATA

Jan. 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	130	125	120	120	135	110	110	110	110	110	G	110	B	145	110	110	110	105	105	105	115	S	S
2	S	S	E	140	E	B	C	C	C	115	115	115	115	115	110	110	110	110	110	S	110	105	105	S
3	S	B	B	130	120	115	115	B	115	195	110	110	110	130	115	115	110	110	110	105	110	110	S	B
4	S	B	S	115	E	105	S	105	110	105	145	145	130	120	110	110	145	105	110	110	S	105	B	B
5	B	B	E	E	E	125	110	115	110	110	110	110	115	G	G	G	G	115	115	110	115	110	110	B
6	B	E	E	110	115	115	115	115	115	110	105	110	110	110	110	110	120	115	110	110	110	110	105	105
7	100	100	S	125	125	115	115	115	110	110	105	105	105	105	115	115	G	110	110	105	105	105	105	110
8	110	S	E	120	130	S	130	110	110	110	G	G	G	G	G	G	G	110	110	110	105	105	100	100
9	100	100	115	B	B	S	100	105	G	G	110	110	G	G	G	G	125	110	105	110	105	105	105	B
10	B	B	E	E	E	B	130	125	115	110	110	G	G	110	115	110	105	105	B	B	S	S	100	100
11	095	B	B	E	E	E	B	105	105	100	145	130	115	115	G	G	G	B	110	105	105	B	S	S
12	S	100	E	E	E	B	B	G	G	G	115	115	120	115	115	G	115	115	105	105	S	S	S	S
13	B	S	E	E	E	B	S	105	G	G	130	125	120	115	110	105	100	100	100	100	B	S	B	B
14	S	E	E	B	E	S	S	G	G	130	G	G	G	115	140	105	110	110	105	105	B	100	100	100
15	100	100	100	100	100	B	115	110	105	105	100	105	105	100	100	100	G	100	S	B	B	100	100	100
16	100	110	105	115	105	105	115	110	110	105	105	110	150	130	G	150	120	110	105	100	100	100	100	S
17	B	E	E	130	E	E	115	120	105	G	G	G	G	G	180	140	125	110	110	100	100	100	100	100
18	100	S	115	115	E	E	110	110	105	105	145	140	140	130	130	120	115	B	S	S	100	S	B	C
19	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	100	115	100	S	B	B	B
20	B	100	100	105	E	B	100	140	140	110	120	105	100	100	120	120	G	150	105	105	B	S	S	S
21	E	120	115	115	C	C	C	C	C	105	105	105	130	115	G	170	115	110	110	110	110	125	105	105
22	100	100	100	100	100	B	B	115	120	G	G	G	110	105	100	155	150	115	110	115	B	S	100	100
23	B	B	B	B	E	B	B	B	G	130	G	105	130	130	G	G	100	105	S	S	110	100	110	S
24	105	105	B	E	E	B	B	B	G	125	120	115	110	110	105	105	105	105	115	105	B	110	110	110
25	105	B	E	B	C	C	C	C	C	110	165	165	150	160	110	110	G	165	110	110	135	125	100	S
26	S	105	B	110	110	B	110	110	110	165	165	G	150	155	145	120	115	115	105	100	105	B	B	S
27	105	110	E	110	110	115	B	G	G	G	110	G	110	105	105	100	130	105	105	B	110	110	110	S
28	S	110	B	E	E	B	B	155	155	G	G	G	115	G	115	110	110	110	110	B	105	100	S	S
29	B	B	B	E	E	E	B	B	G	110	145	130	125	115	G	150	110	110	110	S	105	100	105	130
30	130	115	120	115	E	B	S	G	C	G	110	110	110	155	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	G	110	110	115	115	155	130	140	150	B	B	B	S	130	115
Count	12	14	9	17	10	8	14	18	17	21	24	21	25	24	21	23	22	28	25	21	19	20	2	12
Median	100	105	115	115	110	115	115	110	110	110	110	110	115	115	115	110	115	110	110	105	105	105	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

K11

IONOSPHERIC DATA

Jan. 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		f3	f3	f5	f6	f2	f5	13	12	1	1		1		h	1	1	f	f	f	f	f		
2				f						1	1	1	1	1	1	1	13	f4	f4		f3	f2	f	
3				f	f2	f7	f3		12	h	1	12	12	h	c2	14	13	f3	f3	f4	f2	f2		
4				f		f		1	1	13	h12	h1	h1	c	c2	c2	h12	f	f	f2		f		
5						f	f	12	12	13	1	1	1					f	f4	f3	f	f2	f	
6				f2	f2	f5	f5	14	1	1	1	1	1	12	1	13	1	f4	f4	f3	f3	f3	f2	f2
7	f	f3		f	f2	f7	f7	13	12	1	1	12	1	1	1	1		f3	f	f	f2	f3	f3	f
8	f			f	f		f	1	1	1								f4	f3	f2	f2	f2	f2	f2
9	f	f	f				f	1			1	1					1	f	f2	f3	f	f	f	
10							f	h	1	1	1			c	c2	c2	13	f3				f	f	f
11	f							1	1	12	h1	h	c	c					f2	f2	f			
12		f									c2	c	c	1	12		12	1	f	f				
13								1			h	h	c	c	12	1	12	14	f2	f				
14										h				1	h	1	12	12	f3	f		f2	f2	f
15	f2	f	f	f	f		f2	1	12	1	1	1	1	1	1	1		1				f2	f4	f2
16	f2	f	f	f	f2	f2	f5	13	12	13	1	12	h1	h12		h	c2	14	f3	f3	f3	f2	f	
17				f			f	1	13						h	h	c3	14	f3	f3	f5	f2	f2	f
18	f		f	f			f	1	12	1	h	h	h1	h	h2	h2	c2		f		f3			
19																		1	f3	f				
20		f	f	f			f	h4	h	1	c1	12	12	1	c1	c1		h	f	f2				
21		f2	f2	f2						12	13	1	h1	c		h1	11	12	f5	f4	f	f2	f2	f3
22	f	f4	f2	f2	f			1h2	c				1	1	12	h1	h	1	f	f			f2	f2
23										h		12	h1	h1			1	1			f2	f3	f	
24	f	f								h	c	c	12	1	1	12	1	1	f	f		f	f2	f
25	f									1	h	h	h1	h	1	1		h2	f2	f2f2	f2f2	f2f	f	
26		f		f3	f		f2	12	12	h	h		h	h1	h	c3	c4	1214	f	f3	f2			
27	f	f		f4	f3	f					1		12	13	12	1	h12	1	f		f2	f	f	
28		f						h2	h2				1		1h	1	12	12	f3		f2	f		
29										1	h	h	h	1		h21	1	1	f		f	f2	f	f
30	f	f3	f	f							1	1	1	h1										
31											1	1	1	1	h1	h2	h	h212					f	f3
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

K 12

IONOSPHERIC DATA

Jan. 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	445	400	465	A	I450A	430	A	U310S	285	280	305	310	U280R	305S	285	285	290	285	310	295	340	340	290	345
2	350	335	405	390	350	295	C	C	C	280	265	300	300	295	295	280	305	305	300	U275S	355	360	355	U380S
3	U315S	295S	445	445	395	365	335	295	U275R	300	280	305Z	300	295	345	295	295	295	285	A	310	290S	300	370
4	340	335	315	330	310	300	295	270	275	290	285	260R	295	300	285	270	285	290	280	305	310	335S	350	360
5	310	315	295S	235	435	390	335	280	290	305	315	295	330	325	310	325	290	280S	280	295	325	360	315	345
6	350	400	400	350	295	355	A	310	305S	300	280S	300	305	345R	315	A	295	A	A	A	345	335	290	300
7	375	405	350	280	340	A	A	295	310	300	295	320	330	305	345	325	305	295	275	275	365	400	360	350
8	375	370	315	275	385	390	290	300	270	300	295	315	315	U310R	320	325	305	300	280	330	330	345	365	335
9	340	350	350	360	300	330	280	285	280	280	295	280	340	335	315	315	360	315	340	295S	325	305	290	360
10	350	360	365	350	375	335	295	325	270	J295R	275	290	300	315H	305	300	290	305	270	250	355	330	350	340
11	385	365	350	320	370	370	280	280	250	280	290	290	310	300	315H	300	300	290	295	290	350	380	360	330
12	355	405	420	335	370	390	250	315	280	290	290	305	330	340	320	315	300	300	J305S	280	295	350	300	340
13	360	380	410	420	400	335	290	280	275	280	350	305	320	315	310	320	300	300R	J285R	275	305	320	295	315
14	330	350	320	330	300	300	295	285	260	300	290	285	305	355H	345	305	295	305	305	260S	295	345	340R	320
15	390	360	330	355	350	380	350	J280R	J250R	J290R	300	305	320	325	315	295	260	300	290	245	395	380	340	300
16	340	360	360	375	360	390	330	260	250	300	300	300	310H	330	305	290	275	290	280	260	290	320	305	330
17	360	370	375V	340	430	430	240	250	265	300	300	300	290	305	310	300	250	295	J270S	250	345	295	305	295
18	310	315	310	385	380	365	325	280	J250S	290	270	305V	305	315	J300R	275	280	315	J295R	250	245	345	335	I345C
19	360	I355C	I350C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	310	J305R	255	270	370	350	335
20	350	335	350	430	430	380	270	260	250	300	290	275	300	300	325	295	295	260	355	300	280	305	350	310
21	350	400	380S	385	C	C	C	C	C	285	U305R	300	275	305	315S	295	285	295	305	275S	270	345	340	I360A
22	365	340	295	275	385	370	360	295	U255S	260	300	305	300	U325R	305	305	290	280	330	300	315S	275	355	345S
23	340	345	400	395	345	365	315	270	265	290	305	290	J285R	320	315	300	290	280	315	310	270S	I320A	375	385
24	370	350	345	345	300	375	320	275S	265	255	295	280	310R	315R	300R	270	290	265	310	340	295	280	350	345
25	355	370	370	355	C	C	C	C	C	275	J285S	295R	315	290	345	U285R	285	290	340	U295S	275	335S	345	380
26	375	380	350	315	280	350	365	295	290	265	280	290	295	310	315	300	315	300	310	340	295	300	315	365
27	395	395	450	430	450	405	350	U275S	275	280	350	350	340	300	U295R	295	295	305	300	320	310	310	330	350
28	385	380	350	365	335	400	380	U275S	275	300	305	330	305	325	310	325S	300S	295	270	310	330	290S	345	360
29	365	395	395	400	305	345	350	295	285	290	295	330	325	335	325	U300S	295	295	320	300	315	350	350	355
30	370	355	350	335	340	395	340	U270S	C	260	295	315R	350	350	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	270	310	330	350	325	325	330	U315S	295	300	315	345	350	345	I350A
Count	30	30	30	28	27	26	23	26	25	30	30	30	30	30	29	28	29	29	29	28	30	30	30	30
Median	360	360	350	350	360	370	320	280	275	290	295	300	310	315	315	300	295	295	300	295	310	335	340	345
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

Jan. 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	090	095	090	A	I080A	080	A	U055S	065	070	080	070	U065R	080S	070	055	060	050	060	060	075	065	060	065
2	095	100	080	085	090	085	C	C	C	070	060	085	085	060	055	060	075	050	055	U055S	110	080	090	U060S
3	U090S	060S	100	090	080	080	065	055	U060R	075	070	070Z	070	085	080	075	070	050	075	A	055	050S	060	055
4	055	050	085	080	060	085	055	065	055	055	065	075R	090	085	080	065	050	045	070	055	065	075S	075	075
5	065	060	055S	050	070	065	090	065	055	075	065	075	085	105	070	085	085	065S	060	050	070	070	080	100
6	095	095	065	095	070	065	A	075	085S	070	070S	080	075	080R	085	A	080	A	A	A	055	065	060	075
7	085	075	060	095	095	A	A	070	060	060	070	080	085	085	090	110	075	055	070	070	090	095	065	075
8	075	075	065	065	085	080	065	060	060	075	065	080	080	U075R	060	090	085	070	060	070	070	075	065	065
9	070	075	080	075	070	090	100	080	095	080	070	080	090	085	110	080	085	080	065	075S	075	070	060	075
10	080	080	075	070	070	090	080	070	060	J055R	060	050	070	085H	090	095	095	075	070	055	100	085	105	105
11	070	090	090	075	080	075	065	070	050	050	060	065	085	075	085H	080	095	090	065	060	115	080	105	080
12	100	095	090	065	080	070	065	085	065	055	055	075	075	105	080	080	075	095	J080S	070	060	105	085	070
13	090	085	070	065	100	060	065	065	050	060	065	075	080	085	100	075	070	080R	J065R	060	090	075	065	085
14	080	100	075	070	095	095	065	065	085	060	065	065	095	090H	095	090	075	090	080	080S	100	100	110R	125
15	105	085	065	095	095	075	095	J060R	J070R	J060R	095	080	105	075	095	075	085	085	060	055	105	120	075	085
16	060	090	100	075	100	105	070	045	060	095	070	075	090H	070	065	060	070	060	060	080	065	080	090	070
17	090	080	090V	070	100	085	060	055	060	050	055	095	065	090	085	075	070	060	J050S	050	105	060	095	055
18	090	080	090	105	080	085	075	070	J060S	060	040	095V	095	080	J070R	100	065	085	J055R	055	080	100	065	I100C
19	090	I095C	I085C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	085	J055R	045	080	100	100	075
20	090	075	060	110	070	070	065	060	055	115	080	075	085	085	085	075	065	070	065	070	065	070	070	085
21	070	110	085S	080	C	C	C	C	C	045	U060R	080	090	065	070S	085	060	055	070	060S	095	090	070	I070A
22	080	065	070	065	080	075	070	055	U050S	090	050	075	085	U090R	070	070	055	055	065	070	080S	065	080	070S
23	055	065	110	075	060	080	060	060	045	070	050	065	J065R	080	070	095	065	065	080	065	050S	I070A	095	085
24	080	060	055	055	065	090	070	055S	055	060	055	075	065R	080R	090R	060	055	075	080	060	070	065	075	055
25	090	090	075	085	C	C	C	C	C	080	J065S	080R	075	105	085	U090R	075	055	055	U055S	060	095S	070	090
26	070	065	090	070	065	080	080	065	055	045	060	060	060	060	065	075	070	075	085	085	065	100	075	070
27	080	065	065	075	060	090	075	U060S	065	060	065	075	060	075	U060R	055	060	085	050	060	070	065	050	065
28	045	055	070	075	090	075	065	U065S	065	080	065	080	090	085	090	070S	060S	080	080	070	100	060S	110	090
29	080	055	060	070	070	110	085	050	060	055	100	090	120	080	085	U085S	085	070	060	065	085	065	095	075
30	080	075	075	060	060	075	055	U065S	C	070	050	085R	095	070	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	055	050	085	100	090	105	080	U065S	070	065	080	065	085	080	I070A
Count	30	30	30	28	27	26	23	26	25	30	30	30	30	30	29	28	29	29	29	28	30	30	30	30
Median	080	080	075	075	080	080	065	065	060	060	065	075	085	080	085	080	070	070	065	060	075	075	075	075
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

Jan. 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	052	041	039	040S	041	039S	049	I061S	119	128	144	143	132	115	111	102	090	U098S	086	057	054	067	055	055
2	030	028F	022	024	025	030	028	043	109	133	119	154	143R	120H	113H	092	080	076S	082	086	088	U073S	069	065
3	060	056	038	040	049	S	043	050S	087	099	140	135	111	100	101	105	097S	097S	I088S	069S	U075S	075S	058	057
4	057	052	033	019	I020A	022	025	045	077S	095	124	114	094	097	096	091	076	064	065	049	049	048S	037	037
5	038S	034	033	027	F	035S	038S	057	080S	089	128	149	U154S	U154S	142R	122	120	100	U075S	I066A	I062S	057S	057	048S
6	034S	037	032	031	027	024	I026A	042	086	118	152S	135	125	120	119	110	088	084S	I078A	U067S	060	060	I060S	059
7	050	035F	035F	I030A	025	023	028	045S	083	109	143	U156S	175R	I172R	U162S	146	136	123	122	U092S	064H	061S	059	051
8	053	053	050	036	024	024	024	043	086	104	138	132	133R	U131R	128	J129R	J134R	J129R	J112R	I092S	I090S	I088S	U073S	J065S
9	058S	045	041	038	034S	027	025	043S	088	110	118	118	128	151R	I173R	R	S	148S	I144R	142R	127	U115R	I095S	082S
10	055S	046	041	035	031	035	035S	039S	077	103	121	121	114	113	106	107	106	090S	086	085	J077S	J064S	064	058S
11	050S	044	040S	039	030	030	032S	051S	088S	092	113	117	117	122	121	113	115	104S	110	J108R	I126R	I126R	116S	090
12	066	U047S	042	041	031	032F	040S	043S	080S	117	141	124	118	114	114	117	112	104	100S	U094S	068	054	055	042
13	037	033	033	034	035	035	044S	054S	089	116	125	128	128	126	125	117	114	116	116	106	088	075S	074S	066
14	041	037	035	029	029	026	026S	042S	077S	095	113	122	119	117	119	125	112H	103	095	I090S	080	063S	056	056S
15	039	037	039	036	035	032	U035S	054S	100	088	097	124	126R	127	137S	128S	109	091S	J095S	J095S	U062S	056	054	055S
16	040	033	031	031	031S	032S	032S	049	U092S	102	119	131	127	120S	121	110	104S	090	U072S	069S	060	U050S	044	041
17	034	032	035	040	034	032	034S	J042S	070S	102	126	140	129	121	124	121	121	101	078S	I072S	062S	056	056	053
18	049	039S	034	034	033	032S	030	J044S	I092S	108	110	116	117S	126	116	112V	J098S	084	077S	082	077S	047	033	034S
19	034	031	030	033	032F	033S	I037S	050S	088	104	106	127	140	U148S	150S	133	128	113	J096S	100	111	J082S	054H	058
20	067S	J067S	045H	045	043	046	051S	052	082	094S	100S	114	117	120	117H	118	116	117	I078C	J069C	088S	079	043	043
21	042	034	030	029	029	029	029S	048S	I092S	077	089	107	119	124H	127	121	111	J102S	086	I078S	082	055S	033S	031S
22	030	032	033	032S	027	027	028S	038S	088S	107R	U127R	117S	J132R	U146S	D144R	152S	U147S	142R	I124R	087S	070S	069S	053S	038S
23	037	034	028	029	031	029	026	J041S	082S	104	108	094	099	116	118	J129S	U116S	105	I076S	U064S	071S	070S	J055S	046
24	043	U039S	038	038	037	031	U029S	042S	079	105	J094S	096S	103	111	I118C	121	108	090	U077S	J070S	081	088	062	039S
25	033	034	033	032	032	028	029S	J044S	089S	108	102	109	132	139	U149S	R	U156S	U153S	J122S	102S	108	U072S	058	043
26	038	034	032	033	030	030	028S	041	094S	097	110	098	104	110	116	110	102	114	108R	I078S	075S	072S	048	033
27	033S	034	031	032	034	037	040S	I055S	093	119	126	123	134	137	144H	118H	100S	081	080	069S	084	072S	058	042S
28	041	038	038	036	034	032	030S	046S	100S	108	117	127	140	129	127	121	121	112	100R	084	067S	J076S	065S	050
29	045	039	035	036	034	030	029S	046	083	104S	114	J135S	J139R	140	U141R	131	118S	103	U093S	J078S	064S	U054S	054S	J052S
30	J055S	J053S	045S	039	034S	033	033S	J055S	079	092	120	122	106	122	126	109	110	108	104	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	118S	124	129	U138R	143R	142R	J130R	112	I102C	085S	061S	U065S	068S	058
Count	30	30	30	30	29	29	30	30	30	30	31	31	31	31	31	29	30	31	31	30	30	30	30	30
Median	042	037	035	034	032	031	030S	045S	088	104	119	124	127	122	124	118	112	103	093	083S	075	068S	056	052
U.Q.	053	045	039	038	034	033	037	051	092	109	127	135	133	138	142	128	121	114	108	092	088	075	064	058
L.Q.	037	034	032	031	029	028	028	042	080	095	110	116	117	116	116	110	102	090	078	069	062	056	054	042
Q.R.	016	011	007	007	005	005	009	009	012	014	017	019	016	022	026	018	019	024	030	023	026	019	010	016

The Radio Research Laboratories, Japan

foF2

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

Y 1

IONOSPHERIC DATA

Jan. 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	LH	L	L	L	L	A	L							
2										L	L	440H	440	L	LH	L								
3										LH	L	L	LH	550H	LH		A							
4											L	L	L	L	LH	A								
5										L	L	L	L	LH	LH	LH								
6										L	LH	L	L	LH	L									
7										L	L	L	L	LH	L	L	L							
8										LH	LH	LH	LH	L	L	LH								
9											L	L	LH	L	L	L								
10											L	L	LH	LH	L	L								
11										L	LH	L	LH	LH	L	L	L							
12										L	L	LH	L	LH	L	L								
13										L	L	L	L	A	LH	L	L							
14										L	L	LH	L	L	L	LH								
15										370	L	490L	LH	LH	LH	L								
16											LH	LH	L	L	L	A	L							
17										L	L	LH	510	LH	LH	L	350							
18										L	390	L	L	LH	LH	L								
19										L	L	L	LH	LH	LH	L	LH							
20										L	L	L	480	L	L	L	U340L							
21										L	L	LH	L	LH	L	L	L							
22									L	L	L	430L	LH	L	L	400								
23										L	L	L	U490L	U530L	430L	L								
24										L	L	L	480L	L	C	L								
25										L	L	LH	430	L	L	U530L	L							
26										L	L	L	LH	L	L	L	A							
27										L	L	LH	LH	LH	L	L	350							
28											L	L	L	L	L	L	L							
29											L	U530L	U510L	540L	L	L	350H							
30											L	L	640L	600L	LH	L								
31									C	C	LH	L	LH	LH	L	530L	LH							
Count										1	1	4	8	4	1	3	4							
Median										370	390	460L	480L	540L	430L	530L	350							
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

Jan. 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	A	270	310	I330A	I340A	B	A	A	240	A						
2								S	200	260	305	330	340	340	330	325	270	A						
3								S	200	275	A	A	350	I350A	340	A	A	A						
4								S	200	280	320	345	350	345	330	300	A	A						
5								S	220	290	320	340	355	360	350	340	I280A	160						
6								S	A	A	A	330	350	350	350	I325A	280	170						
7								B	A	I280A	I330A	I345A	370	360	350	320	270	A						
8								S	230	305	340	360	370	365	350	325	280	180						
9								S	235	305	340	360	370	370	355	335	290	A						
10								S	A	A	A	355	370	I365A	360	325	275	175						
11								S	190	295	325	350	360	360	350	A	A	A						
12								S	230H	300	330	355	365	365	355	330	280	180						
13								S	220	290	330	365	A	A	A	320	280	200H						
14								S	230H	295	330	350	360	365	355	A	A	A						
15								S	230	290	335	A	A	365	A	A	260	200						
16								S	205	290	330	A	A	A	A	A	275	220						
17								S	210	280	320	345R	355R	355	345	340R	280	210H						
18								S	200H	280	320	345	360	360	345	320	I275A	200						
19								S	220	280	I320A	340	350	340	340	320	270	200						
20								S	220	280	310	330	345	340	340	320	270	A						
21								S	210	280	320	340	350	340	320	I305A	I250A	A						
22								S	200	290	I315A	335	350	350	335	I310A	285	195						
23								S	220	275	320	335	350	350	340	300	I275A	A						
24								S	A	280	310	340	340	I355A	I340C	315	A	A						
25								S	220	290	320	340	355	350	340	I320A	280	215						
26								S	210	290	325	350	355	350	340	325H	295	220						
27								S	210	280	320	340	350	350	345	330	285	A						
28								S	210	285	320	345	360	365	360	340	310	235						
29								S	230	310	345R	350	360	355	I350A	335	300	220						
30								S	220	300	340	360	365R	360R	355	335	300	220						
31								C	C	C	340	360	360	355	360	345	300	230						
Count									25	28	28	28	28	28	27	25	26	18						
Median									220	290	320	345	355	355	345	325	280	200						
U.Q.																								
L.Q.																								
Q.R.																								

foE

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

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

Jan. 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	E015S	020	021	E016B	J022	022	023	J025	J054	J047	028G	J056	036	051	036	J060	038	J032	J028	J029	021	020	E015B	E012B
2	E016B	E014B	E011B	E011B	E011B	E015B	E012B	E014S	G	G	035	G	G	G	G	032G	J029	J034	J028	E012B	J023	E014S	E015S	E015S
3	E015B	E014B	E011B	E015B	E	017	020	J052	020G	030	J043	J045	J037	036	G	J066	J063	J041	J090	J042	018	021	J027	021
4	E014B	E014B	E011B	E011B	J024	E012B	E014S	E015S	G	J027G	037	049	047	043	037	J054	J041	J034	J029	J029	021	020	E015S	E014S
5	E015B	E011B	E012B	E	E011B	020	020	021	027	G	G	050	041	G	G	G	033	025	J058	J111	J054	J093	J034	J044
6	J029	J024	J029	J024	E	021	J053	J041	J042	032	J033	032G	J038	G	G	J124	J079	J056	J118	123	J054	J030	J093	J041
7	J024	E015B	E014B	J030	J044	J027	J046	J041	J040	J113	J040	J039	032G	034G	G	032G	029	022	J028	J029	J022	021	J023	J029
8	J029	021	E014B	E	E011B	E011B	020	021	J027	G	031G	G	032G	032G	G	G	G	017G	J024	J021	J025	J021	E015B	E018B
9	E018B	E017B	E022B	E016B	E015B	E014B	024	021	G	028G	G	G	031G	033G	034G	029G	028G	J039	021	021	020	020	E016B	E015B
10	E015B	E014B	E014B	E015B	E014B	E015B	020	E012S	J026	031	J044	038	039	J038	G	G	G	020	E014B	E015B	021	020	E015S	E016B
11	E015B	E014B	E014B	E014B	E015B	E012B	E015S	E013S	G	G	034	G	G	039	044	J055	032	J032	J036	J027	019	020	020	021
12	021	E015S	E014B	E014B	E014B	E	E012S	E015S	G	G	J046	G	G	037	034G	026G	019G	G	E015S	020	E015B	E015B	E015B	E015B
13	E014B	E014B	E015B	E013B	E	E	E014S	E014S	G	G	G	G	J052	J067	J040	030G	G	G	E037C	021	018	E015S	E015B	E014S
14	E015B	E012B	E012B	E011B	E	020	E012S	E014S	G	020G	G	G	023G	038	040	038	J053	J029	021	020	E015B	E013B	E015B	E014B
15	E015B	E	E	E	E014B	E	E012B	E012S	J027	023G	J042	J070	050	J045	J043	J038	027	J025	019	J027	J039	020	J024	E015B
16	E015B	E015B	020	020	021	J025	021	J025	J028	026G	J034	038	038	J052	038	J045	026G	J025	J025	J026	E012B	021	E015S	E014B
17	E015B	E016B	E015B	E015B	E015B	E014B	E015S	E015S	G	029	031G	033G	035G	G	G	G	G	G	E015B	J022	E015S	J030	J023	020
18	E015B	018	020	E	J039	018	E012S	E012S	G	030	036	041	040	038	G	023G	J036	J042	019	J026	021	J027	021	021
19	E015B	E011B	E012B	E012B	E	E016B	E016S	E014S	G	G	J038	G	027G	J025G	J030G	G	019G	J027	021	023	E015S	021	E012S	E015B
20	024	E015B	022	E014B	E013B	E015B	E015S	E015S	024	031	036	033G	G	G	G	020G	022G	J025	C	E014B	E014B	E011B	E015S	E015B
21	E014B	E015B	E012B	E	E	E011B	E013S	E015S	020G	015G	020G	038	037	038	038	031	027	021	020	E015B	E014B	E015S	E014B	E013S
22	E015B	E015B	E011B	019	020	020	019	021	025	G	035	034	G	036	043	034	G	J037	020	J025	021	J025	022	021
23	E015S	J027	J022	020	020	E012B	E015S	E014S	G	030	G	037	039	039	038	040	029	J025	017	J036	E014B	E015B	E015S	E015S
24	E015B	E015B	020	E015B	E017B	E014B	E012S	020	J040	033	J054	043	041	036	C	037	J034	J033	J036	J041	J043	J021	020	021
25	J022	E015B	E017B	E	E	E015B	E015S	E015S	020G	J030	030G	031G	037	036	035	J039	030	022	022	019	E014S	020	J020	J025
26	020	J024	021	E014B	E015B	E015B	E014S	021	025	020G	G	G	G	037	043	039	J065	J049	J077	J074	022	J026	021	E014B
27	J039	E015B	E015B	E011B	013	020	024	J028	020G	G	G	G	038	024G	039	035	035	J034	J030	020	E015S	E015B	E014B	E015B
28	E012B	E014B	E	E014B	E	E011B	E015S	E014S	022	032	G	036	G	039	042	032G	020G	G	J024	E014B	E015B	E015B	E015B	E015B
29	E014B	E014B	E011B	E	E	E	E014S	E014S	G	G	034G	039	041	050	038	J034	028G	021G	020	E015S	E015S	E015S	017	J019
30	020	E013B	E015B	E	019	020	E015S	019	G	G	G	J037	040	028G	028G	036	035	024	021	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	029G	029G	040	039	038	037	033	G	C	E015B	E016B	E015B	E015B	E015B
Count	30	30	30	30	30	30	30	30	30	30	31	31	31	31	30	31	31	31	29	30	30	30	30	30
Median	E015B	E015B	E014B	E014B	E014	E015B	E015S	E015S	G	G	G	G	037	037	036	034	029	J025	023	J022	018	020	E015	E015
U.Q.	020	E016	020	E015	019	020	020	021	027	030	037	039	040	039	039	039	035	034	030	029	022	021	021	021
L.Q.	E015	E014	E012	E	E	E012	E014	E014	G	G	G	G	G	G	G	G	G	020	020	019	E015	E015	E015	E015
Q.R.	D005		D008			D008	D006	D007										014	010	010	D007	D006	D006	D006

IONOSPHERIC DATA

Jan. 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	S	E	E	B	014	E	E	025	024	024	028G	041	035	050	035	045	036	022	E	016	018	018	B	B
2	B	B	B	B	B	B	B	S			G					032G	025	024	021	B	017	S	S	S
3	B	B	B	B		E	E	024	017G	023	038	042	032	035		042	055	040	081	031	E	E	024	E
4	B	B	B	B	A	B	S	S		022G	035	040	041	040	035	052	029	028	015	017	E	E	S	S
5	B	B	B		B	E	E	S	G			047	038				032	G	057	A	E054S	032	019	030
6	021	016	021	020		E	A	019	034	030	032	030G	030			035	043	051	A	033	040	024	051	024
7	017	B	B	A	018	015	022	022	023	040	037	039	031G	034G		029G	025	E022R	022	022	022	E	018	028
8	027	018	B		B	B	E	S	018		028G		031G	032G				G	015	E	017	018	B	B
9	B	B	B	B	B	B	E	S		026G			031G	033G	034G	028G	023G	028	E	E	E	E	B	B
10	B	B	B	B	B	B	E	S	023	030	034	033	036	037				E020R	B	B	E	E	S	B
11	B	B	B	B	B	B	S	S			G			038	042	049	030	030	E036S	E027S	E	E	E	017
12	016	S	B	B	B		S	S			G			033	034G	026G	019G		S	E	B	B	B	B
13	B	B	B	B			S	S					038	067	035	028G			C	E	E	S	B	S
14	B	B	B	B		E	S	S		020G			023G	G	G	034	030	017	E	E	B	B	B	B
15	B				B		B	S	019	021G	029	039	042	034	039	034	G	017	016	022	019	E	021	B
16	B	B	014	011	015	E	E	018	019	024G	031	037	038	037	037	044	025G	016	022	E	B	E	S	B
17	B	B	B	B	B	B	S	S		027	030G	032G	034G						B	019	S	022	022	E
18	B	E	014		017	E	S	S		023G	036	040	039	G		023G	031	017	E	019	E	018	E	E
19	B	B	B	B		B	S	S			033		025G	025G	022G		015G	017	016	E	S	E	S	B
20	022	B	E	B	B	B	S	S	G	G	034	032G				020G	021G	022	C	B	B	B	S	B
21	B	B	B			B	S	S	G	015G	018G	036	G	036	024G	031	027	021	E	B	B	S	B	S
22	B	B	B	E	E	E	E	S	G		033	033		G	041	033		023	E	025	E	023	016	E
23	S	019	019	015	E	B	S	S		030		036	038	038	037	039	017G	024	016	018	B	B	S	S
24	B	B	E	B	B	B	S	S	G	G	041	039	G	036	C	036	031	025	034	039	041	018	E	E
25	E022R	B	B			B	S	S	018G	023	030G	030G	033G	032G	028G	035	023G	020	014	E	S	E	016	020
26	E	021	E	B	B	B	S	S	015G	016G				G	042	035	063	046	072	019	022	E	E	B
27	023	B	B	B	013	012	014	016	015G				026G	024G	038	028G	033	032	025	E	S	B	B	B
28	B	B		B		B	S	S	019	025		G		G	040	031G	020G		016	B	B	B	B	B
29	B	B	B				S	S			034G	G	040	048	037	031	025G	017G	E	S	S	S	E	018
30	E	B	B		E	E	S	S				035	G	027G	028G	036	033	019G	E	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	029G	029G	040	039	038	G	032		C	B	B	B	B	B
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

Y 5

IONOSPHERIC DATA

Jan. 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	E015S	015	014	016	E	015	E015S	E012S	015	014	016	022	022	042	023	015	015	012	E015S	E015S	015	016	015	012
2	016	014	011	011	011	015	012	E014S	015	015	017	020	022	022	017	026	014	012	011	012	E015S	E014S	E015S	E015S
3	015	014	011	015	E	015	E015S	E014S	E013S	016	018	019	017	018	016	015	014	E015S	E015S	E015S	E015S	014	015	015
4	014	014	011	011	015	012	E014S	E015S	E015S	014	015	015	022	023	024	022	015	E013S	E012S	E015S	E015S	E015S	E015S	E014S
5	015	011	012	E	011	013	E015S	E015S	016	017	022	024	024	024	028	022	018	E015S	E	E015S	E015S	E014S	E015S	015
6	E014S	014	015	E	E	014	E014S	E012S	015	015	017	018	018	018	019	016	017	E015S	E015S	E015S	E015S	E015S	E014S	E015S
7	E014S	015	014	013	E	012	E015S	011	015	019	019	023	022	024	021	017	015	015	E012S	015	E015S	E015S	E015S	015
8	015	015	014	E	011	011	E012S	E014S	E015S	015	018	023	024	023	024	017	016	E015S	011	E015S	E015S	015	015	018
9	018	017	022	016	015	014	E015S	E015S	E015S	015	016	022	022	023	019	019	015	014	015	015	015	E015S	016	015
10	015	014	014	015	014	015	E015S	E012S	E015S	017	017	022	019	019	019	018	015	E015S	014	015	E015S	E015S	E015S	016
11	015	014	014	014	015	012	E015S	E013S	E015S	015	018	019	022	022	022	017	015	012	015	015	E015S	E016S	E015S	E015S
12	015	E015S	014	014	014	E	E012S	E015S	015	015	015	022	017	018	017	016	015	E015S	E015S	E012S	015	015	015	015
13	014	014	015	013	E	E	E014S	E014S	015	014	015	017	016	018	016	015	012	E014S	E037C	014	E014S	E015S	015	E014S
14	015	012	012	011	E	012	E012S	E014S	014	015	018	015	016	022	018	018	015	014	014	014	015	013	015	014
15	015	E	E	E	014	E	012	E012S	015	015	019	017	022	017	018	015	012	013	E015S	E015S	E015S	E015S	E015S	015
16	015	015	E	E	E	015	E015S	E015S	E015S	012	016	015	019	017	022	018	015	E015S	E015S	E015S	012	016	E015S	014
17	015	016	015	015	015	014	E015S	E015S	E015S	015	017	018	022	023	022	025	015	015	015	011	E015S	E015S	015	015
18	015	015	E	E	E	014	E012S	E012S	015	015	015	017	018	023	015	015	013	012	E014S	E015S	E015S	E015S	E015S	E015S
19	015	011	012	012	E	016	E016S	E014S	015	014	015	015	015	016	015	015	012	E012S	E015S	E015S	E015S	E015S	E012S	015
20	014	015	013	014	013	015	E015S	E015S	015	012	012	015	016	015	015	015	015	E014S	C	014	014	011	E015S	015
21	014	015	012	E	E	011	E013S	E015S	015	012	015	015	018	017	015	015	015	015	E015S	015	014	E015S	014	E013S
22	015	015	011	012	E	014	E015S	E015S	015	015	015	016	013	015	018	015	015	E015S	E015S	013	E015S	014	E015S	E015S
23	E015S	015	014	E	E	012	E015S	E014S	E015S	015	015	015	015	016	016	018	013	E015S	015	015	014	015	E015S	E015S
24	015	015	012	015	017	014	E012S	E015S	E015S	015	017	016	018	017	C	017	012	013	015	E015S	013	011	E015S	E015S
25	E015S	015	017	E	E	015	E015S	E015S	E015S	015	015	015	017	015	014	015	014	E013S	011	014	E014S	E012S	E014S	E015S
26	E015S	E015S	014	014	015	015	E014S	E015S	E014S	012	018	023	022	023	015	015	012	012	E012S	E015S	E015S	E015S	015	014
27	015	015	015	011	E	E	E013S	E012S	012	015	015	015	015	017	015	013	015	E015S	015	017	E015S	015	014	015
28	012	014	E	014	E	011	E015S	E014S	E015S	015	016	016	015	017	018	015	015	E013S	015	014	015	015	015	015
29	014	014	011	E	E	E	E014S	E014S	016	016	016	019	018	018	018	018	015	012	014	E015S	E015S	E015S	E015S	E015S
30	015	013	015	E	014	011	E015S	E015S	E015S	015	016	018	018	017	018	017	013	E013S	E015S	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	017	018	019	021	017	016	016	015	C	015	016	015	015	015
Count	30	30	30	30	30	30	30	30	30	30	31	31	31	31	30	31	31	31	29	30	30	30	30	30
Median	015	014	014	012	E	014	E015S	E014S	014	015	016	018	018	018	018	016	015	E014S	E015	014	E015S	E015S	E015S	014
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

Y 6

IONOSPHERIC DATA

Jan. 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	270	245	240	235S	255	235S	275	I280S	335	315	315	300	305	290	305	320	305	U305S	325	290	285	320	290	310
2	315	285F	280	255	260	310	330	280	335	330	300	300	300R	280H	275H	315	305	315S	310	325	325	U285S	265	260
3	275	300	265	245	275	S	280	290S	345	315	320	320	305	300	285	295	305S	310S	I320S	295S	U305S	305S	290	285
4	305	290	335	265	I255A	275	285	320	335S	330	330	335	315	310	305	320	335	315	320	310	290	290S	300	300
5	295S	295	305	270	F	260S	270S	325	335S	315	305	305	U280S	U280S	290R	280	310	320	U305S	I295A	I290S	280S	300	315S
6	275S	255	250	275	310	265	I280A	285	325	305	330S	310	295	285	280	300	305	295S	I310A	U315S	285	270	I280S	305
7	340	275F	285F	I305A	260	260	285	270S	325	305	305	U300S	285R	I290R	U290S	295	295	305	315	U325S	280H	265S	290	270
8	265	290	325	335	255	260	295	305	330	315	325	305	305R	U295R	295	J280R	J270R	J295R	J275R	I290S	I290S	I290S	U285S	J285S
9	275S	270	290	285	315S	305	280	305S	340	335	325	300	280	280R	I290R	R	S	290S	I300R	325R	325	U300R	I315S	320S
10	310S	265	280	265	275	270	330S	300S	330	330	330	315	300	285	290	290	315	305S	310	330	J300S	J305S	295	295S
11	270S	280	290S	295	320	270	280S	320S	375S	335	320	315	305	285	290	295	295	290S	305	J310R	I280R	I280R	285S	310
12	310	U235S	235	295	260	245F	295S	285S	300S	305	315	300	290	280	280	285	300	295	300S	U305S	310	275	305	285
13	280	275	255	240	260	260	295S	295S	335	325	310	295	295	280	285	285	295	295	300	315	320	290S	290S	305
14	295	285	305	295	310	270	290S	285S	325S	310	325	295	295	275	270	285	280H	275	295	I310S	310	270S	285	305S
15	285	285	295	285	300	265	U270S	300S	370	340	300	305	290R	280	285S	300S	305	310S	J295S	J330S	U315S	285	290	320S
16	305	280	305	275	290S	265S	280S	300	U345S	310	305	300	305	290S	300	295	310S	330	U320S	320S	335	U290S	300	315
17	290	285	285	300	285	235	320S	J320S	325S	320	320	320	315	295	300	300	320	330	315S	I330S	315S	290	305	315
18	315	300S	295	275	275	270S	285	J295S	I350S	350	320	320	290S	305	290	285V	J315S	315	300S	320	335S	340	275	275S
19	300	295	265	270	280F	300S	I290S	310S	350	355	310	310	305	U290S	300S	300	290	300	J300S	310	335	J325S	260H	270
20	300S	J300S	260H	250	260	260	295S	310	345	335S	310S	325	310	290	280H	285	300	330	I300C	J280C	315S	340	325	280
21	275	280	275	275	275	270	260S	310S	I360S	350	330	310	310	290H	310	330	315	J315S	320	I310S	320	330S	265S	270S
22	270	280	305	320S	265	270	285S	290S	350S	330R	U330R	300S	J295R	U300S	R	305S	U305S	305R	I320R	340S	300S	330S	290S	275S
23	280	315	285	260	300	375	265	J305S	345S	335	355	320	305	300	295	J290S	U285S	320	I320S	U305S	325S	325S	J290S	260
24	280	U280S	290	285	320	330	U290S	310S	335	345	J330S	315S	305	295	I300C	310	315	330	U290S	J285S	320	335	335	285S
25	270	285	285	275	295	255	270S	J300S	350S	350	335	305	305	295	U280S	R	U310S	U300S	J305S	285S	315	U305S	310	270
26	275	280	265	290	285	280	260S	280	340S	330	330	315	300	305	295	310	300	315	320R	I290S	290S	305S	310	300
27	295S	250	250	250	245	245	255S	J295S	325	330	315	310	305	290	280H	280H	320S	315	315	280S	310	315S	335	265S
28	270	270	280	280	295	265	265S	275S	335S	335	315	300	300	290	300	290	300	305	300R	325	275S	J300S	310S	240
29	260	255	270	275	295	265	270S	295	315	315S	295	J305S	J305R	290	U285R	295	300S	305	U310S	J310S	335S	U285S	295S	J290S
30	J285S	J285S	310S	330	305S	275	275S	J315S	340	325	315	330	285	280	295	295	290	300	315	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	315S	300	285	U280R	285R	285R	J290R	300	I305C	305S	295S	U290S	305S	310
Count	30	30	30	30	29	29	30	30	30	30	31	31	31	31	30	29	30	31	31	30	30	30	30	30
Median	280	280	285	275	280	265	280S	300S	335	330	320	305	300	290	290	295	305	305	310	310S	310	295S	290	290
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

Y 7

IONOSPHERIC DATA

Jan. 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	LH	L	L	L	L	A	L							
2										L	L	385H	405	L	LH	L								
3										LH	L	L	LH	400H	LH		A							
4											L	L	L	L	LH	A								
5										L	L	L	L	LH	LH	LH								
6										L	LH	L	L	LH	L									
7										L	L	L	L	LH	L	L	L							
8										LH	LH	LH	LH	L	L	LH								
9											L	L	LH	L	L	L								
10											L	L	LH	LH	L	L								
11										L	LH	L	LH	LH	L	L	L							
12										L	L	LH	L	LH	L	L								
13										L	L	L	L	A	LH	L	L							
14										L	L	LH	L	L	L	LH								
15										400	L	380L	LH	LH	LH	L								
16											LH	LH	L	L	L	A	L							
17										L	L	LH	390	LH	LH	L	400							
18										L	410	L	L	LH	LH	L								
19										L	L	L	LH	LH	LH	L	LH							
20										L	L	L	395	L	L	L	U400L							
21										L	L	LH	L	LH	L	L	L							
22									L	L	L	420L	LH	L	L	410								
23										L	L	L	U385L	U360L	400L	L								
24										L	L	L	375L	L	C	L								
25										L	L	LH	400	L	L	U350L	L							
26										L	L	L	LH	L	L	L	A							
27										L	L	LH	LH	LH	L	L	400							
28											L	L	L	L	L	L	L							
29											L	U350L	U360L	355L	L	L	405H							
30											L	L	360L	360L	LH	L								
31									C	C	LH	L	LH	LH	L	360L	LH							
Count										1	1	4	8	4	1	3	4							
Median										400	410	380L	390L	360L	400L	360L	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

Y 8

IONOSPHERIC DATA

Jan. 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										245	250	240	240	300	250	250	250							
2										225	215	250	245	280	270	250								
3										255	260	255	250	250	300		E265A							
4											270	245	240	250	280	250								
5										250	260	260	255	300	280	300								
6										245	260	250	250	275	280									
7										250	270	255	255	260	275	260	240							
8										250	255	250	280	250	255	280								
9											250	245	305	290	280	250								
10											255	245	290	250	300	295								
11										225	255	250	265	305	300	305	255							
12										250	250	280	250	310	300	300								
13										235	250	275	265	300	280	280	245							
14										300	245	280	260	290	300	280								
15										220	280	250	275	280	295	250								
16											250	270	250	290	285	255	240							
17										255	240	250	250	285	285	250	245							
18										220	235	270	250	275	275	250								
19										240	240	255	275	280	275	240	240							
20										235	250	235	275	240	250	250	250							
21										225	240	255	250	260	250	250	250							
22									240	230	230	245	270	260	250	250								
23										250	225	250	245	280	250	250								
24										245	225	220	255	250	C	270								
25										230	235	275	245	250	240	280	230							
26										230	240	240	275L	250	285	250	E270A							
27										260	250	250	290	270	255	240	240							
28											240	250	275	250	290	250	250							
29											270	270	265	300	250	270	235							
30											270	245	305	300	280	275								
31									C	C	250	250	300	275	U290C	295C	270C							
Count									1	23	31	31	31	31	30	29	16							
Median									240	245	250	250	260	275	280	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

Y 9

IONOSPHERIC DATA

Jan. 1968 | h'F km | 135° E Mean Time (G.M.T. +9h) | Yamagawa | Lat. 31°12.1'N Long. 130°37.1'E

60

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	250	350	375	380	370	380	285	300	250	235	220H	230	225	I240B	240	A	240	230	215	210H	265	245	250	225
2	240	300	E260B	340	340	275	250	275	245	225	220	195H	225	250	210H	245	230	235	240	230	230	225	230	240
3	275	250	230	E390B	305	245	205	275	240	210H	250	240	225H	220H	205H	250	I250A	250	E295A	250	225	225	245	250
4	240	245	225	E300H	A	290	275	250	215	230	235	240	225	225	200H	I240A	230	225	225	230	230	250	230	255
5	250	255	230	250H	310	325	275	250	225	235	225	E240A	245	230H	205H	245H	250	220	E260A	A	I250A	265	250	255
6	300	300	E360A	E310A	210	E340B	I310A	300	240	230	205H	225	225	220H	235	230	240	270	I255A	255	300	280	290	270
7	230	290	300	A	E350A	E350A	E340A	250	240	240	230	240	235	225H	220	225	230	225	255	205	200H	245	270	300
8	310	265	240	215	E255B	300	295	255	230	220H	225H	220H	225H	230	225	220H	235	205H	205	220	225	225	230	240
9	250	275	290	300	250	255	320	270	240	235	220	215	210H	250	240	230	230	220	230	220	220	220	220	230
10	220	280	280	300	320	300	225	205H	235H	235	225	215	220H	200H	230	240	250	220	225	220	220	220	240	250
11	270	290	275	255	250	305	300	250	215	225	225H	210	200H	200H	235	250	225	230	245	230	210	215	240	230
12	240	310	325	250	300	350	255	250	240	240	240	225H	235	220H	230	230	240	230	235	230	220	250	240	250
13	260	300	340	350	270	320	255	260	235	225	230	230	230	I230A	225H	235	235	240	240	225	215	215	240	240
14	245	280	250	250	250	250	250	250	230	235	250	220H	230	225	230	225H	240	240	240	240	220	210	250	250
15	240	250	250	270	250	240H	300	275	210	220	230	210H	240H	210H	220H	245	230	220H	235	225	205	240	265	245
16	250	290	265	295	300	330	315	270	225	230	220H	220H	225	225	230	I235A	230	225	225	230	215	230H	260	250
17	250	295	300	270	280	385	245	205	210	230	200	205H	210	220H	205H	235	230	225H	215	225	200	250	250	250
18	245	240	250	250	305	330	295	270	230	230	225	230	225	205H	225H	230	235	230	225	230	210	200	270	300
19	250	250	300	285	255	300	280	270	225	225	220	215	200H	205H	210H	215	225H	225	215	250	210	200	205	285
20	265	225	215	300	300	290	250	240	230	230	210	220	200	230	210	225	225	230	I200C	270	230	215	215	270
21	250	265	300	300	275	295	320	270	225	225	220	205H	205	195H	225	225	240	230H	205	220	220	210	250	270
22	315	300	250	250	260	330	310	280	240	225	230	205	200H	235	225	205	225	205H	200	210	255	225	220	250
23	295	270	305	350	290	205	340	270	240	230	230	215	215	205	205	235	220	230	205	230	220	220	210	270
24	295	290	290	300	250	220	255	260	235	230	225	220	185H	225	I215C	220	235	220	220	280	255	230	215	250
25	350	300	300	285	250	300	350	275	235	230	225	205H	230	230	225	210	230	225	200	205	230	205	250	275
26	290	300	305	280	250	275	330	280	240	220	215	225	215H	220	240	240	I225A	250	E250A	205	250	230	220	250
27	E350A	345	380	360	350	345	320	275	240	230	225	200H	205H	240H	240	230	220	225	225	240	245	220	210	250
28	260	275	255	290	265	290	E350S	295	240	230	225	220	225	225	225	225	230	225	205	205	250H	235	225	250
29	290	305	300	295	250	245	330	265	230	235	230	225	235	E260A	235	220	235H	235	225	210	205	245	250	265
30	270	270	250	235	260	280	320	235	220	230	240	230	220H	230	210H	225	240	240	220	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	210H	225	220H	210H	220C	210	220H	220H	I225C	215	230	255	250	230
Count	30	30	30	29	29	30	30	30	30	30	31	31	31	31	31	30	31	31	31	29	30	30	30	30
Median	250	285	280	290	270	295	295	270	235	230	225	220	225	225	225	230	230	225	225	225	220	225	240	250
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

IONOSPHERIC DATA

Jan. 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	S	140	125	B	110	120	145	105	105	105	105	105	105	105	105	120	110	100	100	100	100	095	B	B
2	B	B	B	B	B	B	B	S	G	G	130	G	G	G	G	110	105	100	100	B	100	S	S	S
3	B	B	B	B	E	110	110	105	105	105	105	105	105	105	G	105	105	150	100	100	100	100	100	100
4	B	B	B	B	100	B	S	S	G	100	150	130	130	125	125	110	105	105	100	100	100	100	S	S
5	B	B	B	E	B	125	120	150	140	G	G	120	125	G	G	G	170	125	110	100	100	100	100	100
6	100	100	100	100	E	120	115	110	110	110	110	105	100	G	G	115	120	115	105	105	100	095	095	100
7	100	B	B	120	115	115	110	105	110	105	105	105	105	110	G	105	110	105	105	100	100	100	100	095
8	100	100	B	E	B	B	110	110	100	G	105	G	110	110	G	G	G	105	100	100	100	100	B	B
9	B	B	B	B	B	B	120	120	G	105	G	G	105	105	105	105	105	100	100	100	100	100	B	B
10	B	B	B	B	B	B	100	S	105	120	105	105	105	105	G	G	G	145	B	B	100	100	S	B
11	B	B	B	B	B	B	S	S	G	G	145	G	G	125	110	110	105	105	100	100	100	100	100	100
12	095	S	B	B	B	E	S	S	G	G	120	G	G	110	105	105	105	G	S	100	B	B	B	B
13	B	B	B	B	E	E	S	S	G	G	G	G	120	105	105	100	G	G	C	100	100	S	B	S
14	B	B	B	B	E	100	S	S	G	105	G	G	100	135	125	115	110	105	105	105	B	B	B	B
15	B	E	E	E	B	E	B	S	105	105	100	115	100	100	100	110	140	100	150	125	110	100	100	B
16	B	B	120	115	110	110	110	105	105	105	105	105	110	105	115	105	105	105	100	105	B	100	S	B
17	B	B	B	B	B	B	S	S	G	105	110	110	110	G	G	G	G	G	B	105	S	100	100	100
18	B	125	115	E	105	105	S	S	G	150	150	130	130	140	G	105	105	105	105	100	100	095	095	095
19	B	B	B	B	E	B	S	S	G	G	105	G	100	100	100	G	100	100	100	100	S	100	S	B
20	125	B	100	B	B	B	S	S	145	130	125	115	G	G	G	100	100	100	C	B	B	B	S	B
21	B	B	B	E	E	B	S	S	100	100	100	130	135	125	120	120	110	100	100	B	B	S	B	S
22	B	B	B	115	115	110	115	110	125	G	120	105	G	135	110	105	G	115	100	105	105	100	100	100
23	S	100	105	105	105	B	S	S	G	125	G	135	125	125	120	110	110	100	110	105	B	B	S	S
24	B	B	100	B	B	B	S	100	120	120	115	120	120	110	C	120	110	105	105	105	100	100	105	100
25	095	B	B	E	E	B	S	S	105	105	100	100	170	150	155	100	125	100	100	100	S	100	100	095
26	095	095	095	B	B	B	S	105	135	100	G	G	G	125	150	140	125	120	110	110	105	100	105	B
27	100	B	B	B	105	105	105	105	105	G	G	G	140	100	170	170	135	120	110	100	S	B	B	B
28	B	B	E	B	E	B	S	S	110	105	G	150	G	145	125	105	105	G	100	B	B	B	B	B
29	B	B	B	E	E	E	S	S	G	G	105	115	170	110	105	105	105	100	105	S	S	S	140	120
30	115	B	B	E	115	110	S	110	G	G	G	100	150	100	100	140	155	125	100	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	105	105	155	155	145	125	120	G	C	B	B	B	B	B
Count	9	6	8	5	9	11	11	13	17	19	22	21	24	26	20	26	26	26	25	23	17	19	13	11
Median	100	100	100	115	110	110	110	105	105	105	105	110	115	110	110	110	110	105	100	100	100	100	100	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

Y 11

IONOSPHERIC DATA

Jan. 1968 | Types of Es | 135° E Mean Time (G.M.T. +9h) | Yamagawa | Lat. 31°12.1'N | Long. 130°37.1'E

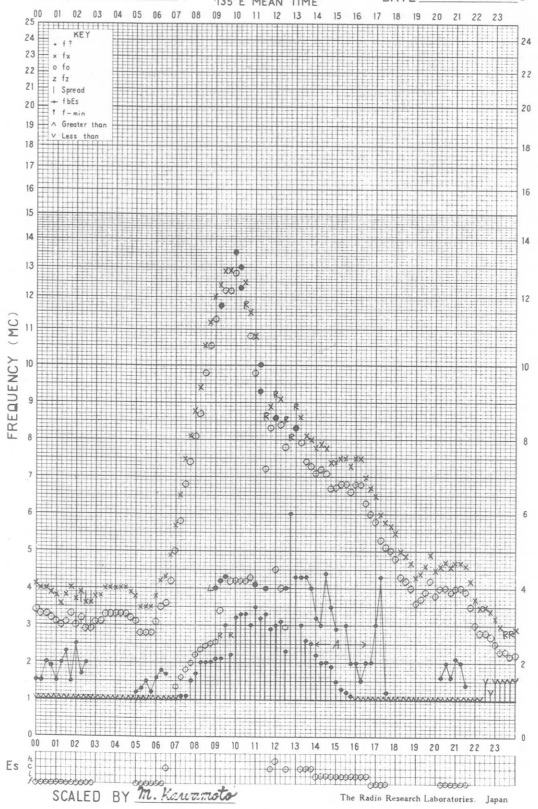
Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1		f	f2		f3	f	f	14	13	12h	12	13	12	1	1	c21	c31	13	f	f	f	f		
2											h					1	12	14h	f4		f			
3						f	f	12	1	1	13	12	12	1		14	15	h614	f4	f4	f	f	f2	f
4					f2					1	h 1	h2	h	h	h	c3	c21	13	f2	f2	f2	f2		
5						f	f f	h	h2			c3	h				h21	h2	f7	f4	f3	f3	f2	f3
6	f2	f2	f4	f4		f	f3	14	14	c2	c2	1	1			c2	c3	c3	f4	f3	f3	f2	f2	f
7	f			f3	f3	f2	f4	15	12	14	12	12	1	1		1	1	12	f3	f2	f3	f	f2	f3
8	f4	f					f	1	1		1		1	1				1	f	f	f2	f2		
9							f	c		1			1	1	12	1	1	14	f	f	f	f		
10							f		1	c	12	1	1	1				h			f	f		
11											h			h	c2	c4	14	15	f4	f4	f2	f	f	f2
12	f2										c			c	12	1	1			f				
13													c	14	12	12				f	f			
14						f				1			1	h	h	c2	12	12h	f	f				
15									12h	1	12	c 12	13	13	12	1	h	12	f	f f	f2	f	f3	
16			f	f	f2	f2	f2	14	13	1	1	12	1	1 c	c	13	12	1 h	f2	f		f		
17										1	1	1	1							f5		f2	f2	f
18		f	f2		f2	f				h212	h 12	h 1	h	h		1	13	12	f	f4	f	f2	f	f
19											12		1	1	1		1	1	f	f		f		
20	f5		f						h	h4	h2	c				1	12	13						
21									1	1	1	h	h	h 1	c 1	c 12	c21	12	f					
22				f	f	f2	f	12	h2		c	1		h	c2	12		c2	f	f5	f2	f4	f3	f2
23		f2	f	f	f					h2		h	h	h	c	c2	c21	12h	f	f3				
24			f					1	c2	c2	c2	c2	c2	1		c2	c21	14	f5	f3	f4	f5	f	f
25	f								1	1	1	1	h 1	h 12	h 12	13	h21	14	f	f		f	f2	f2
26	f	f2	f					12	h 1	1				h	h	h	h21	c51	f4f2	f3f	f3	f2	f	
27	f3				f2	f2	f2	13	1				h 1	1	h 1	h 13	h2	c212	f2	f				
28									1	1 h		h		h	h2	1	1		f2					
29											1	c	h c	c3	12	12	12	12	f				f	f2
30	f2				f	f2		1				12	h	1	1	h	h	h212	f					
31											1	1	h	h 1	h 1	h	c2							
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

f-PLOT OF IONOSPHERIC DATA

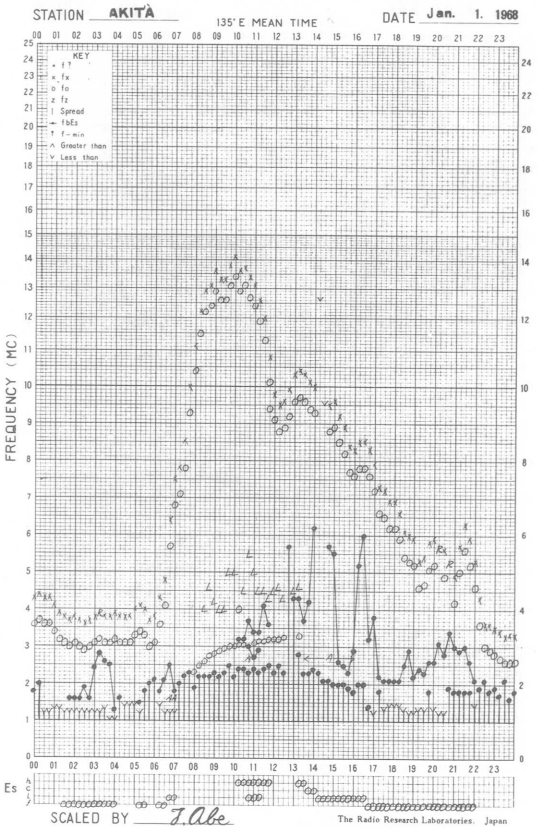
STATION WAKKANAI 135°E MEAN TIME DATE JAN. 1.1968



SCALED BY M. Kuzumoto The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

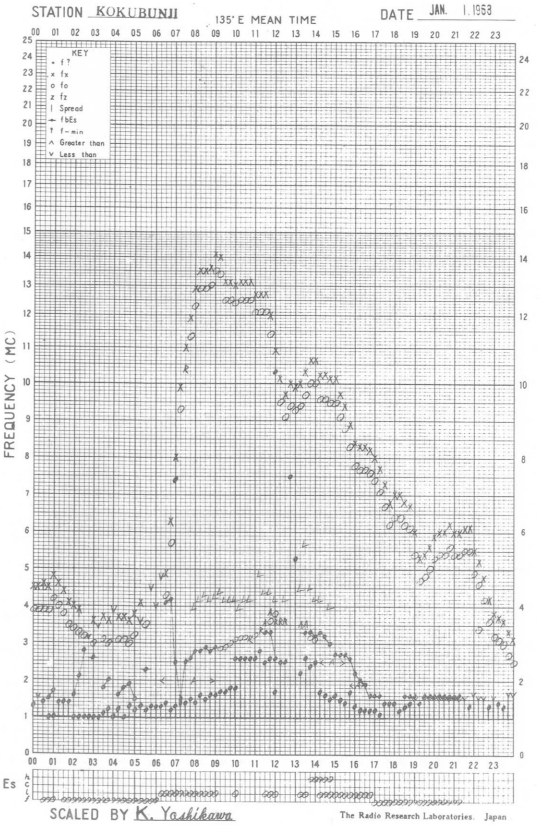
STATION AKITA 135°E MEAN TIME DATE Jan. 1. 1968



SCALED BY T. Abe The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

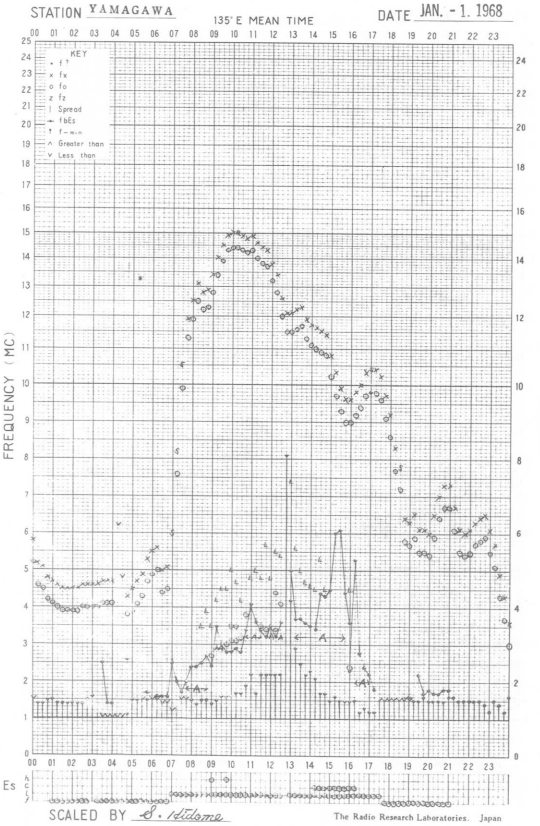
STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 1.1968



SCALED BY K. Yoshikawa The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

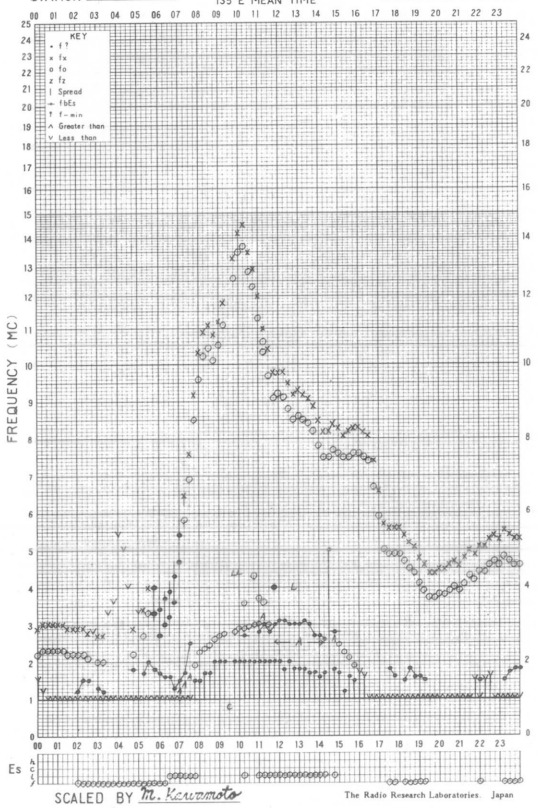
STATION YAMAGAWA 135°E MEAN TIME DATE JAN. - 1. 1968



SCALED BY S. Ichitome The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135° E MEAN TIME DATE JAN. 2.1968

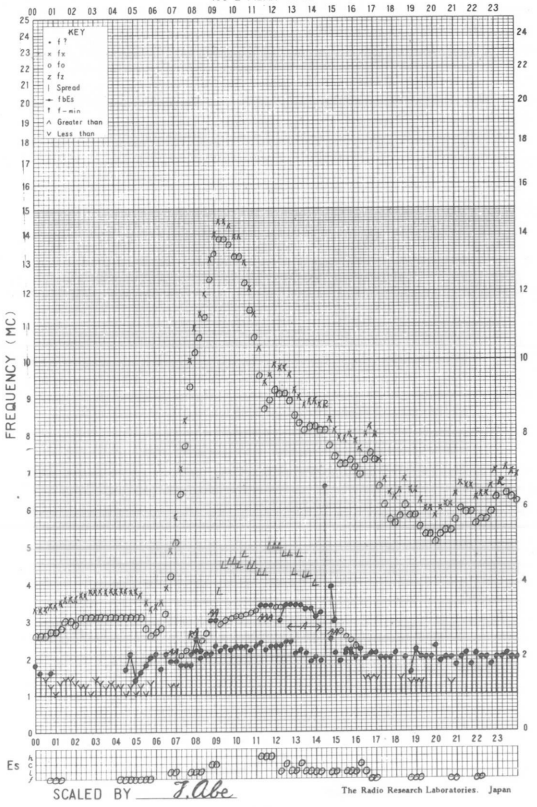


SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135° E MEAN TIME DATE Jan. 2. 1968

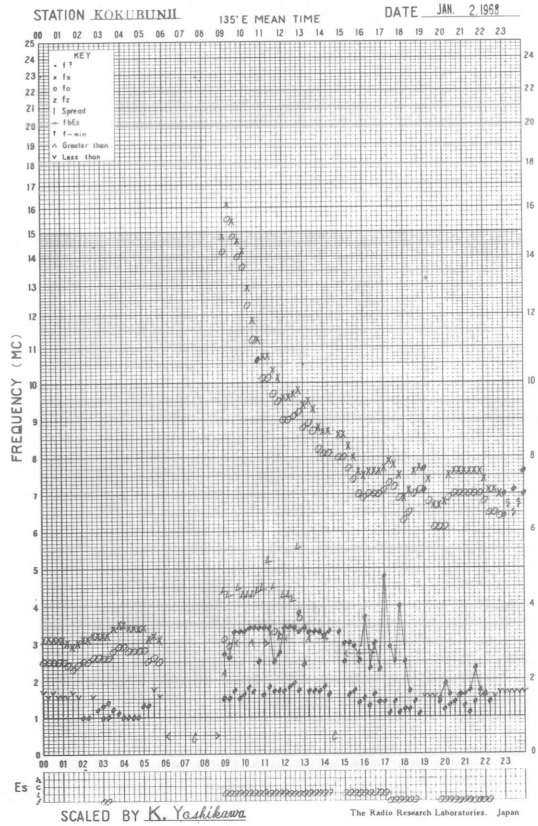


SCALED BY J. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135° E MEAN TIME DATE JAN. 2.1968

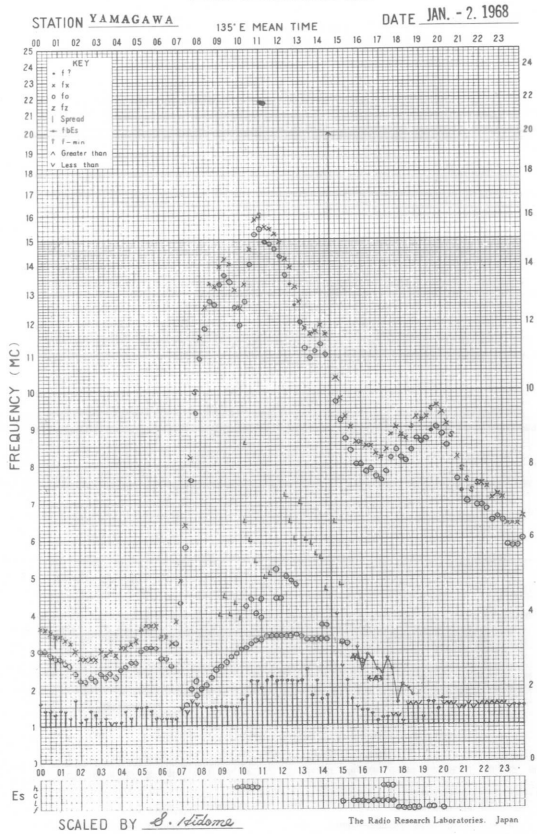


SCALED BY K. Yoshikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135° E MEAN TIME DATE JAN. - 2. 1968

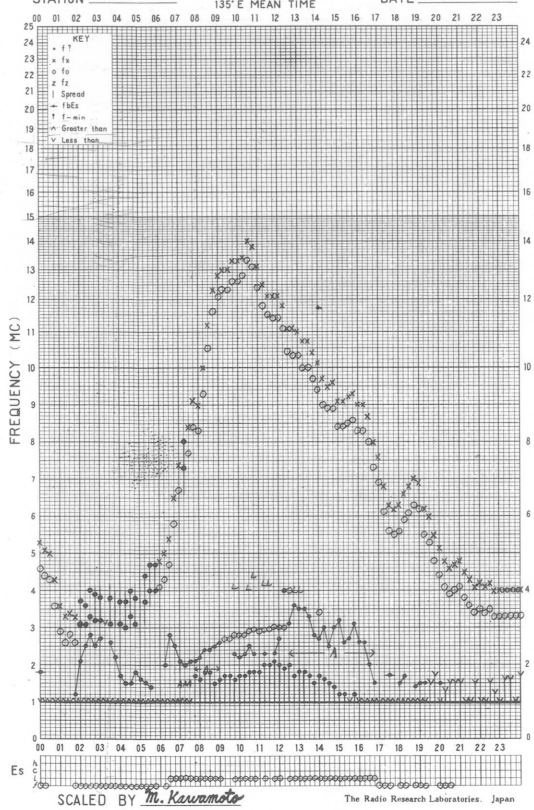


SCALED BY S. Aidoma

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

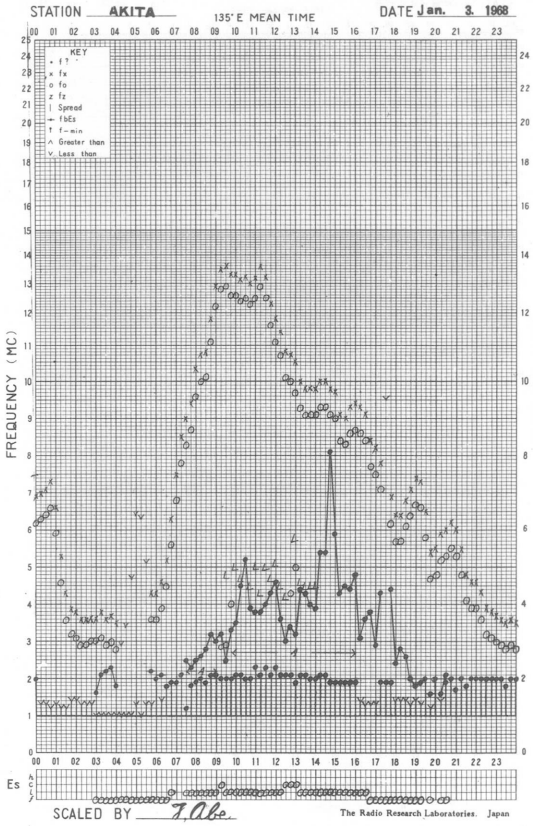
STATION WAKKANAI 135°E MEAN TIME DATE JAN. 3.1968



SCALED BY M. Kawamoto The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

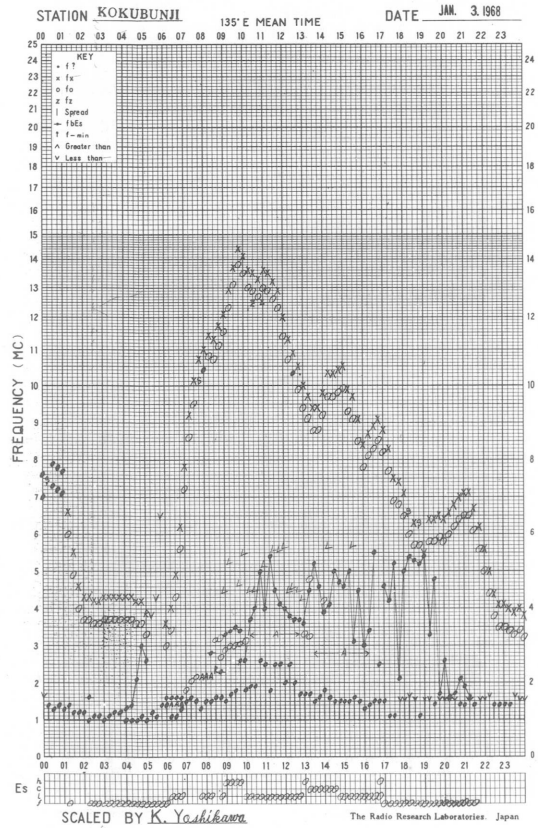
STATION AKITA 135°E MEAN TIME DATE Jan. 3. 1968



SCALED BY T. Abe The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

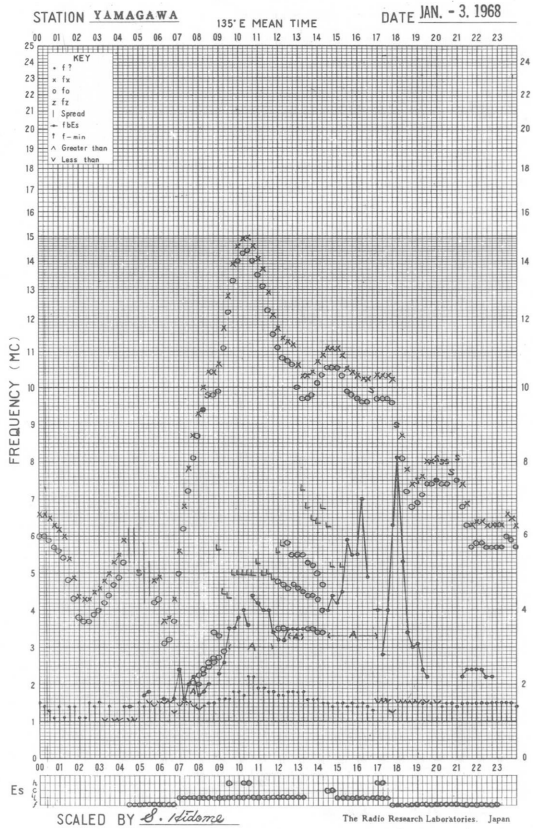
STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 3. 1968



SCALED BY K. Yoshikawa The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

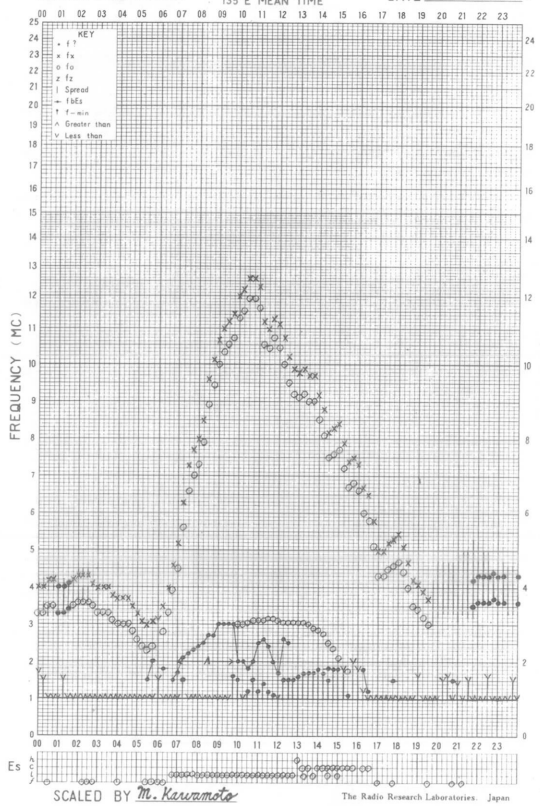
STATION YAMAGAWA 135°E MEAN TIME DATE JAN. - 3. 1968



SCALED BY S. Iidome The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN. 4. 1968

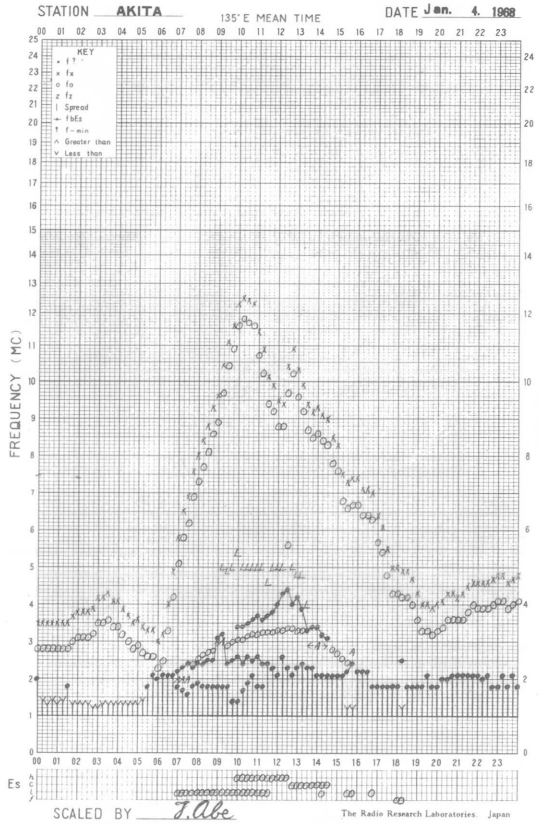


SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Jan. 4. 1968

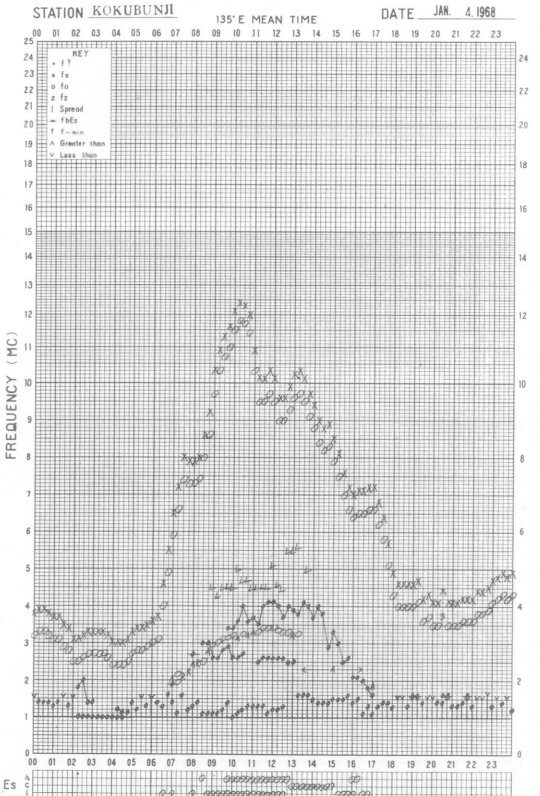


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 4. 1968

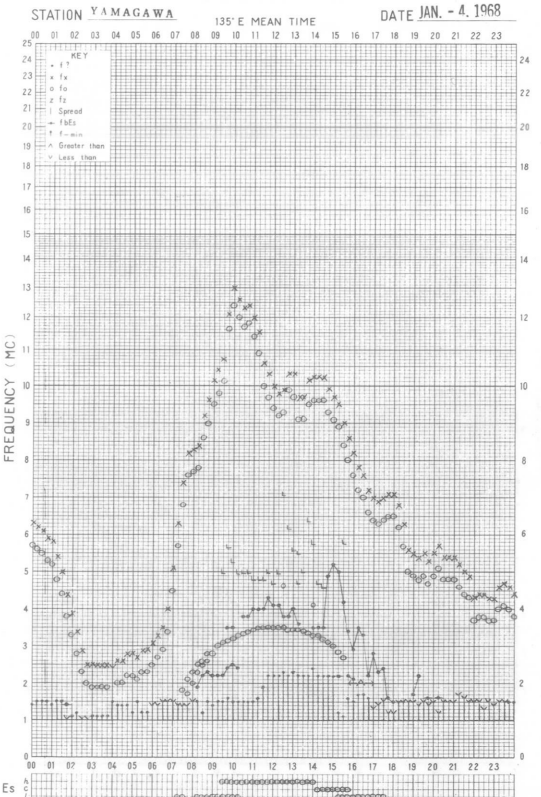


SCALED BY K. Yashikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE JAN. - 4. 1968

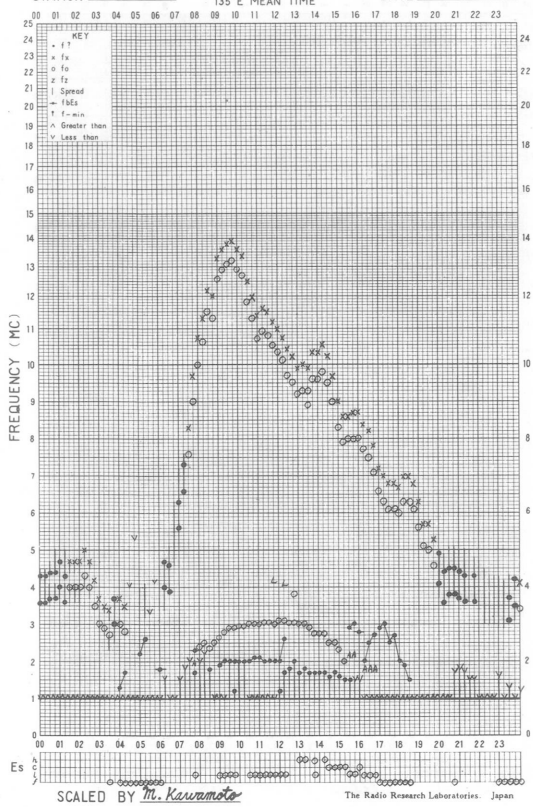


SCALED BY S. Ichimoto

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN. 5.1968

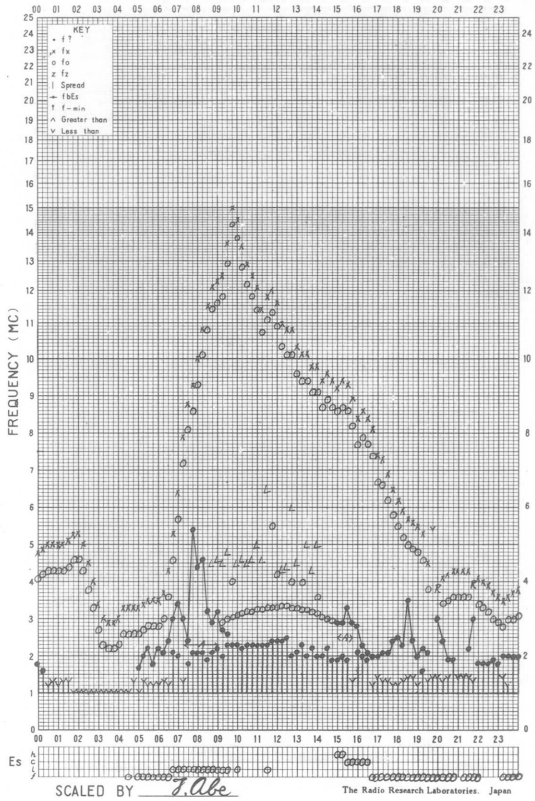


SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Jan. 5. 1968

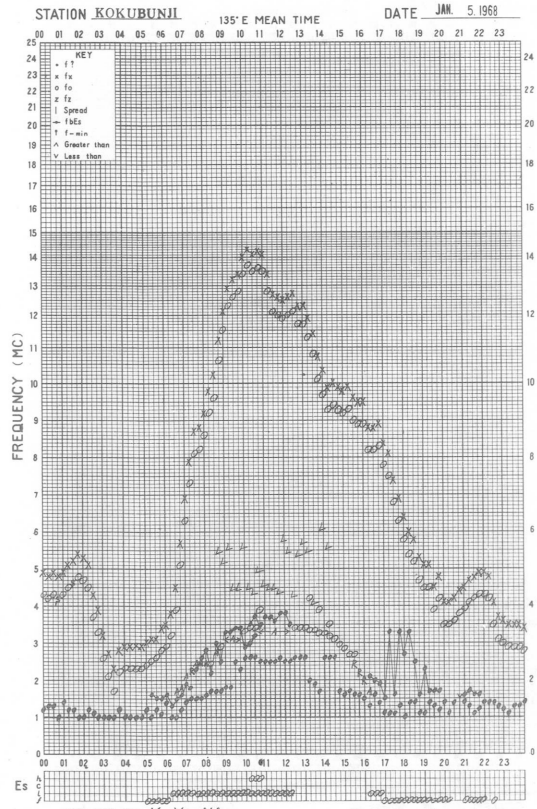


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 5.1968

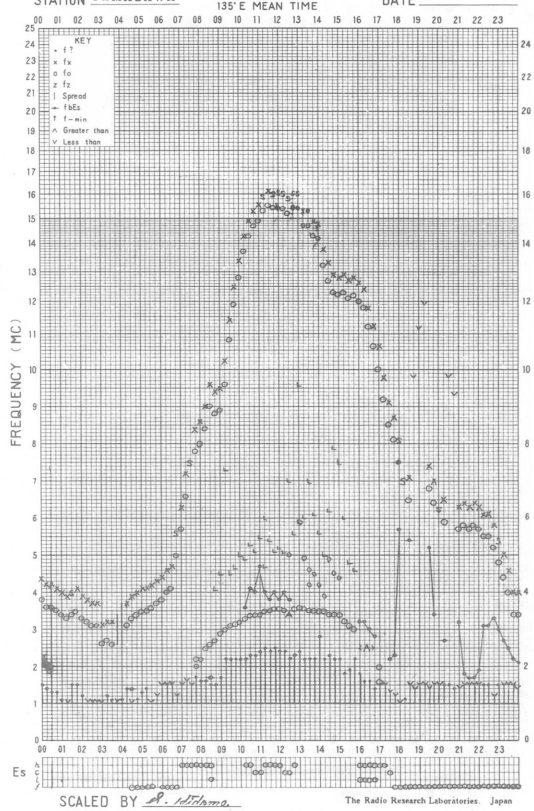


SCALED BY K. Yoshikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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

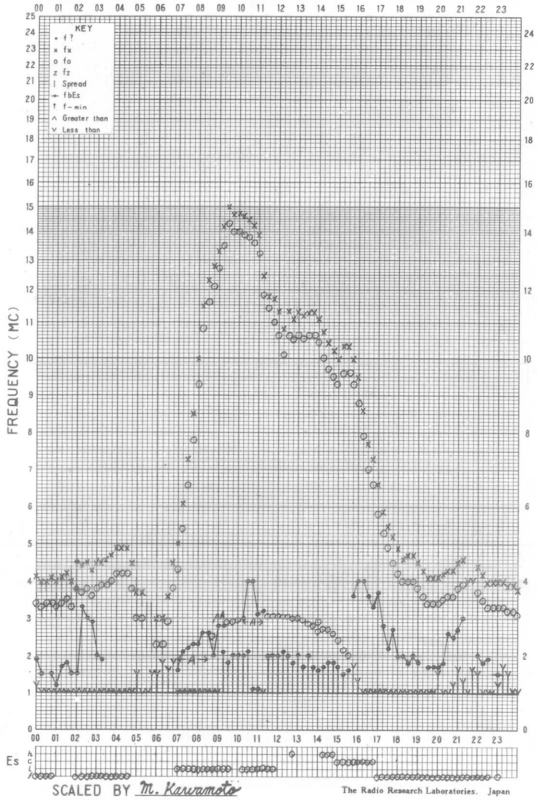


SCALED BY S. Ichihara

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN. 6.1968

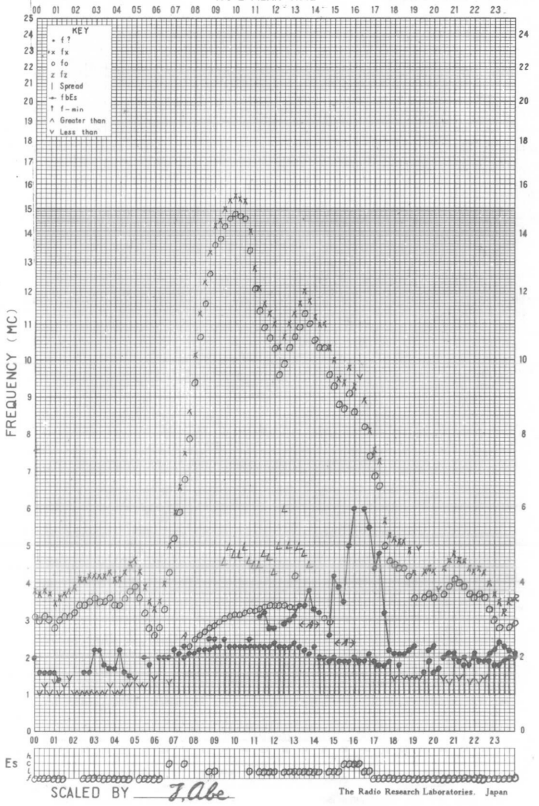


SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Jan. 6. 1968

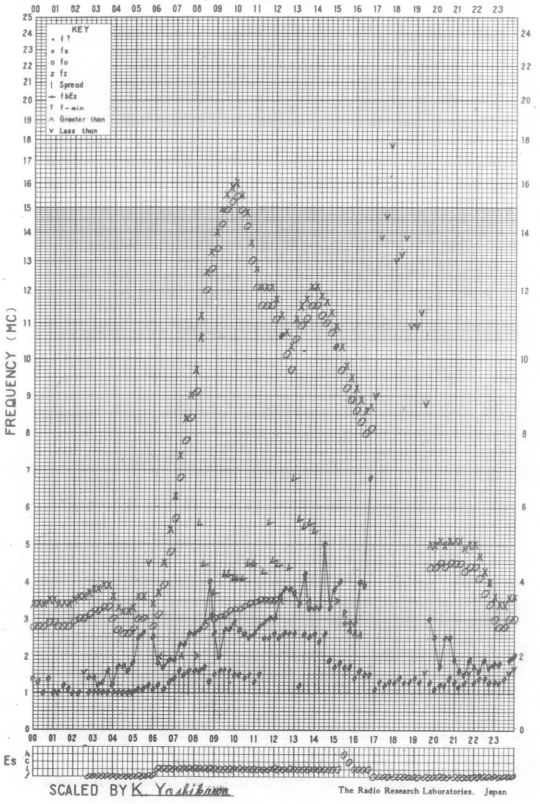


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 6. 1968

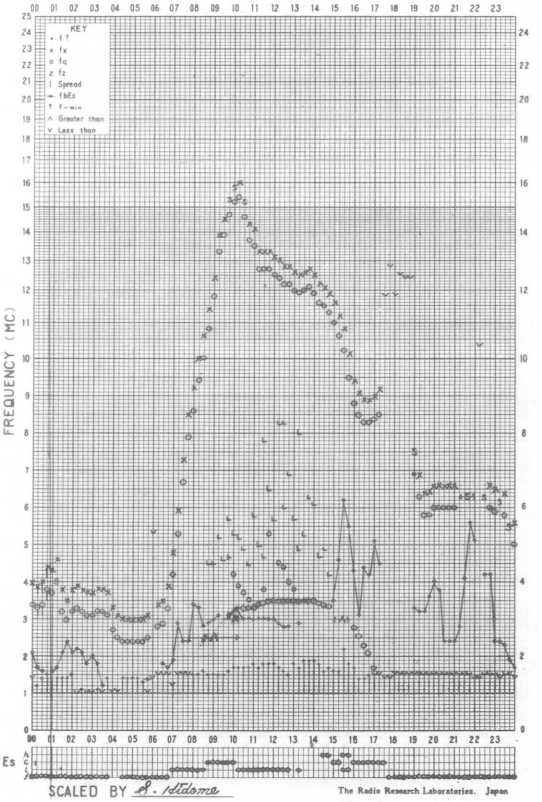


SCALED BY K. Yoshikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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

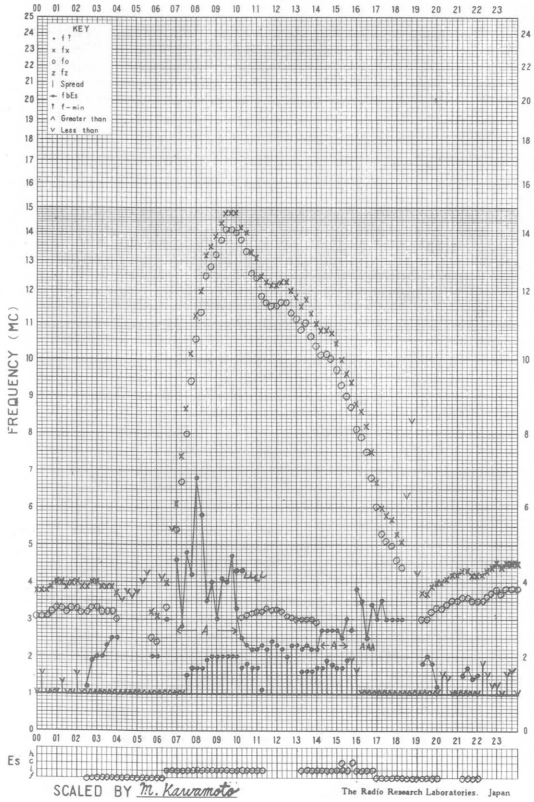


SCALED BY S. Ishidome

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

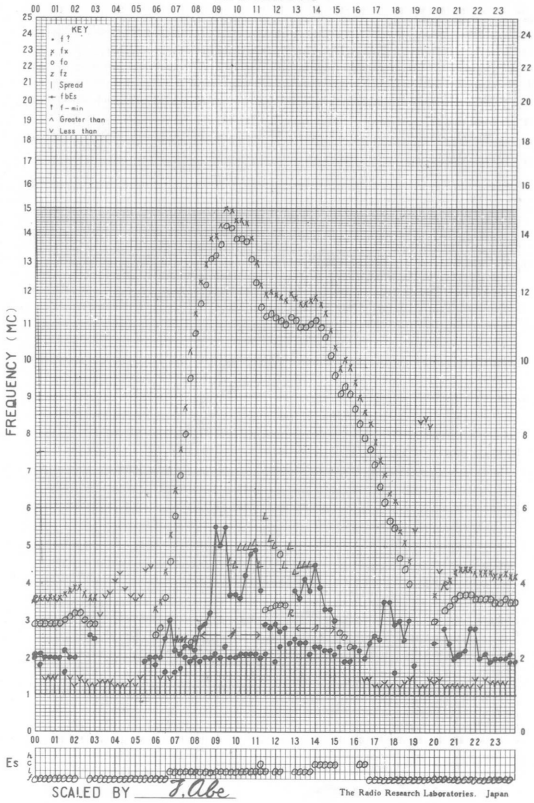
STATION WAKKANAI 135° E MEAN TIME DATE JAN. 7. 1968



SCALED BY M. Kawamoto The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

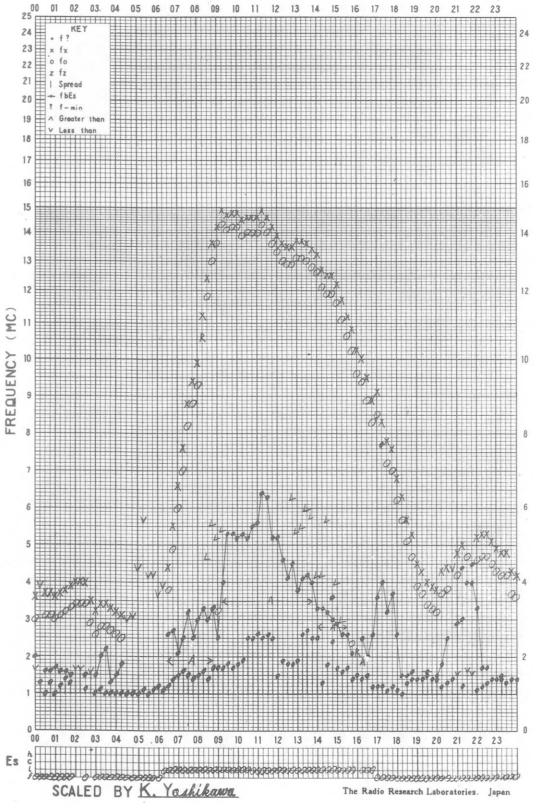
STATION AKITA 135° E MEAN TIME DATE Jan. 7. 1968



SCALED BY T. Abe The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

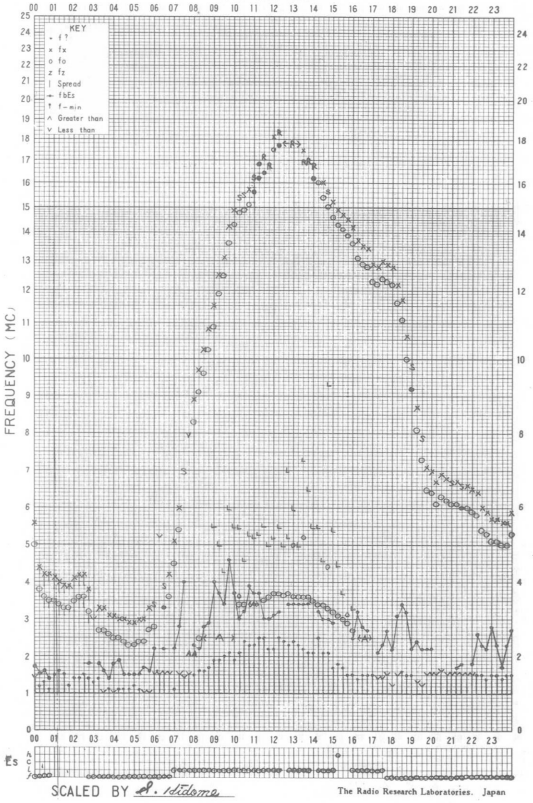
STATION KOKUBUNJI 135° E MEAN TIME DATE JAN. 7. 1968



SCALED BY K. Yoshikawa The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

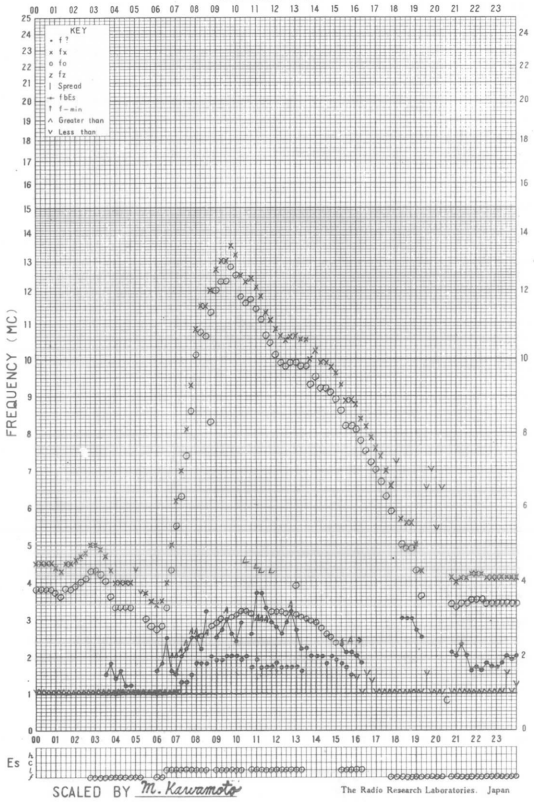
STATION YAMAGAWA 135° E MEAN TIME DATE JAN. - 7. 1968



SCALED BY S. Ishizawa The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

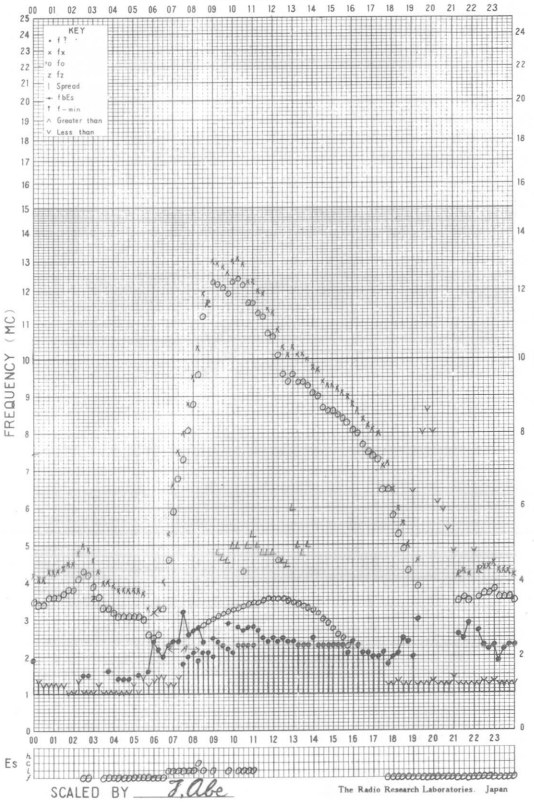
STATION WAKKANAI 135°E MEAN TIME DATE JAN. 8.1968



SCALED BY M. Kawamoto The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

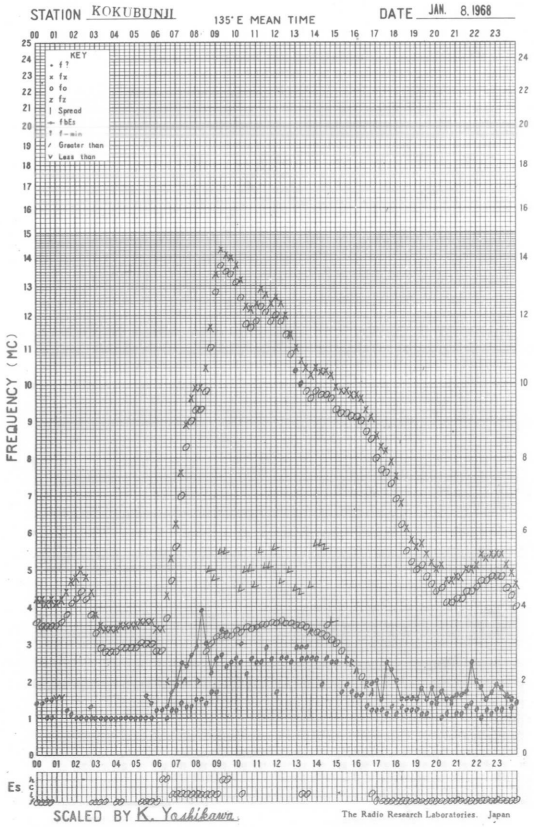
STATION AKITA 135°E MEAN TIME DATE Jan. 8. 1968



SCALED BY T. Abe The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

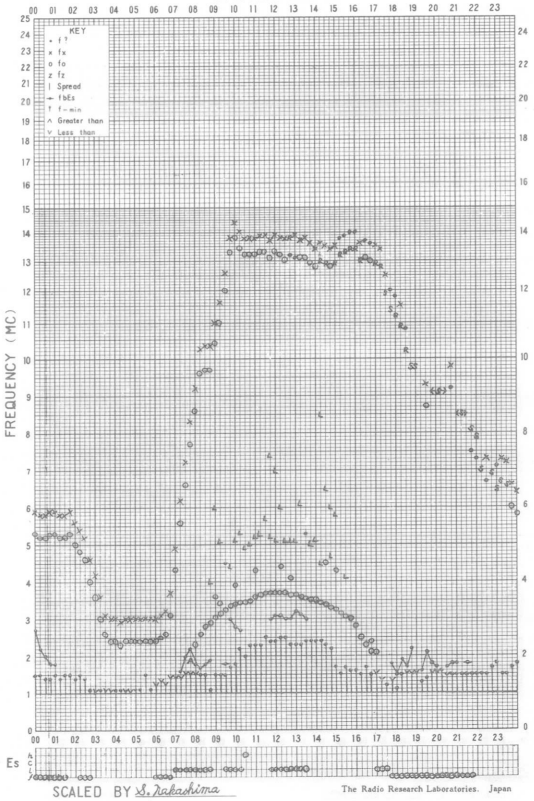
STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 8. 1968



SCALED BY K. Yoshikawa The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

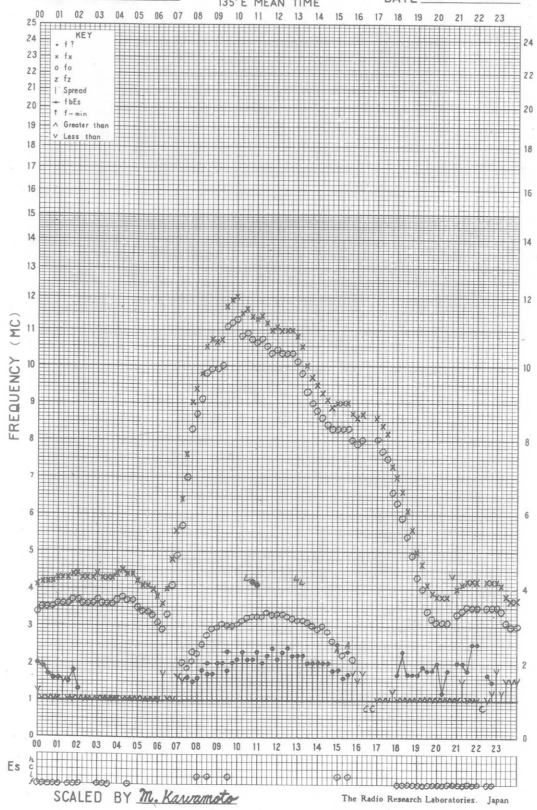
STATION YAMAGAWA 135°E MEAN TIME DATE JAN. - 8. 1968



SCALED BY S. Takashima The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

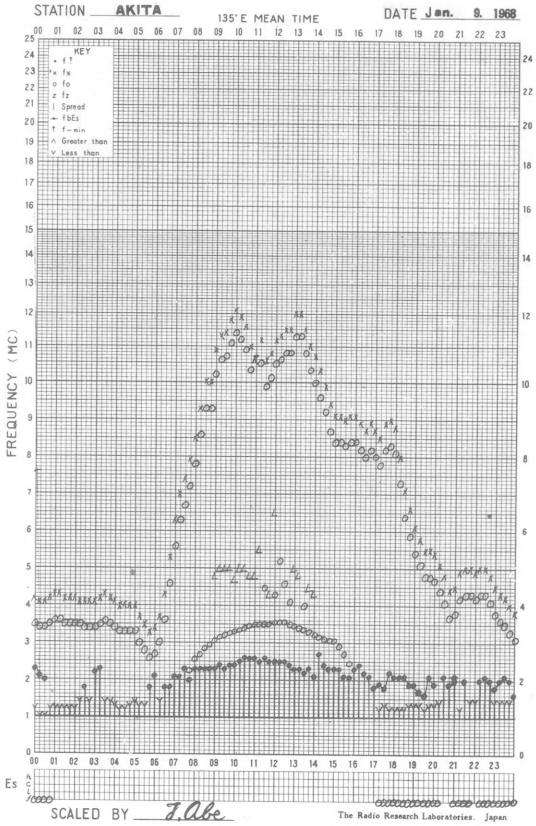
STATION WAKKANAI 135°E MEAN TIME DATE JAN. 9.1968



SCALED BY M. Kawamoto The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

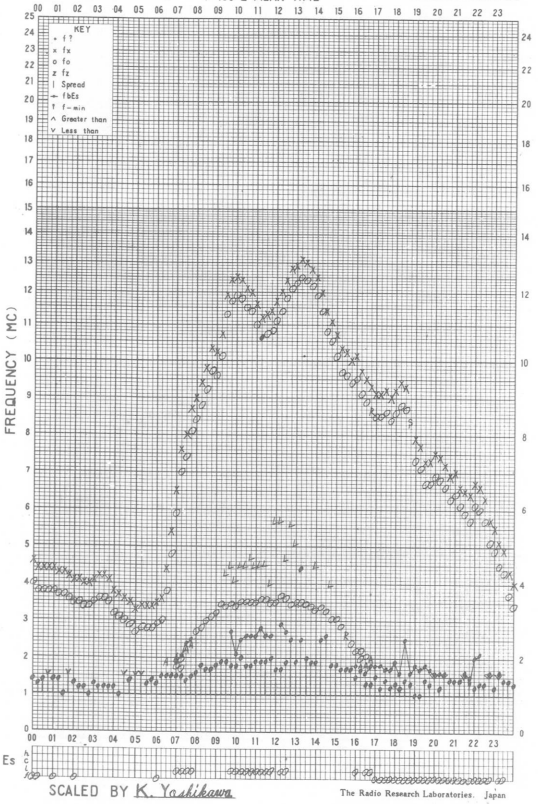
STATION AKITA 135°E MEAN TIME DATE Jan. 9. 1968



SCALED BY T. Abe The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

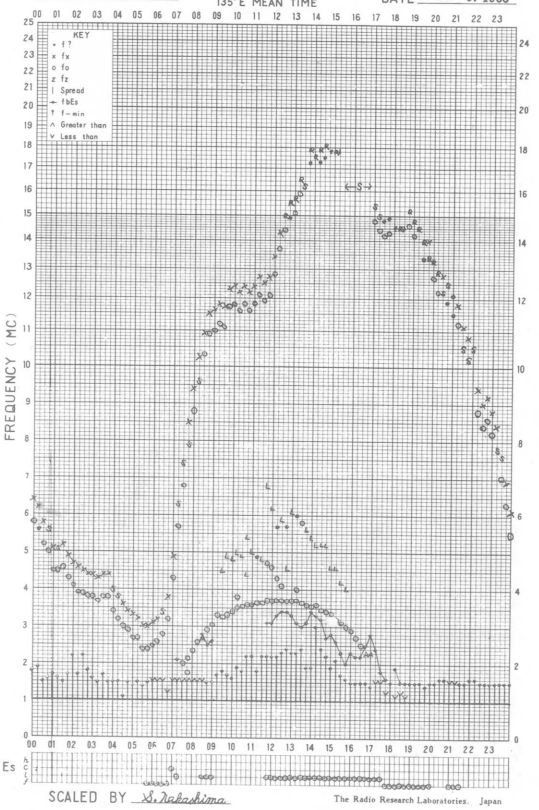
STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 9.1968



SCALED BY K. Yoshikawa The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

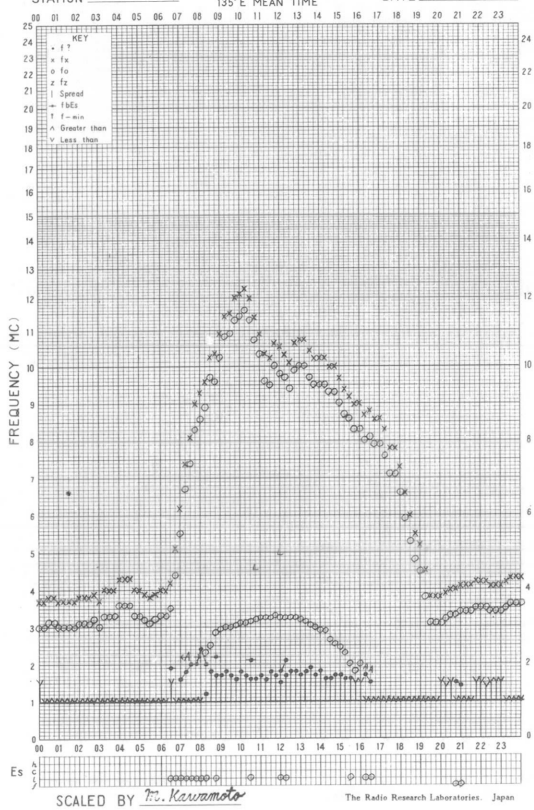
STATION YAMAGAWA 135°E MEAN TIME DATE JAN. - 9. 1968



SCALED BY S. Nakashima The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN. 10. 1968

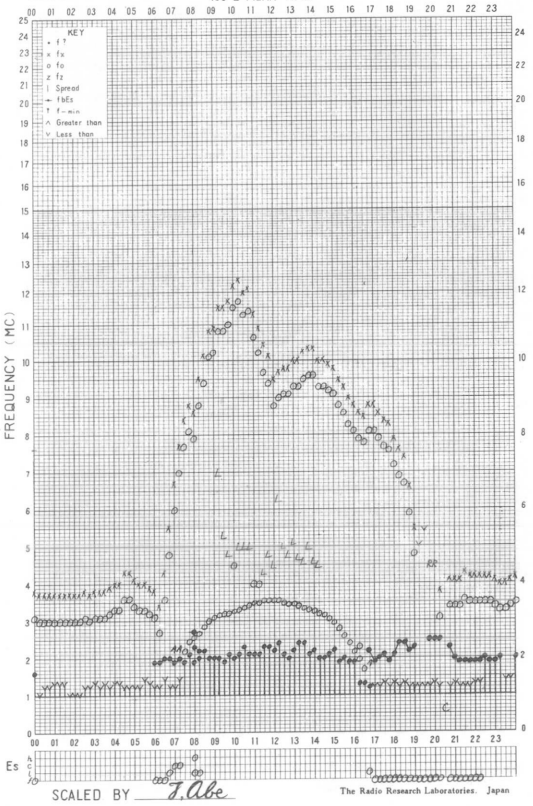


SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Jan. 10. 1968

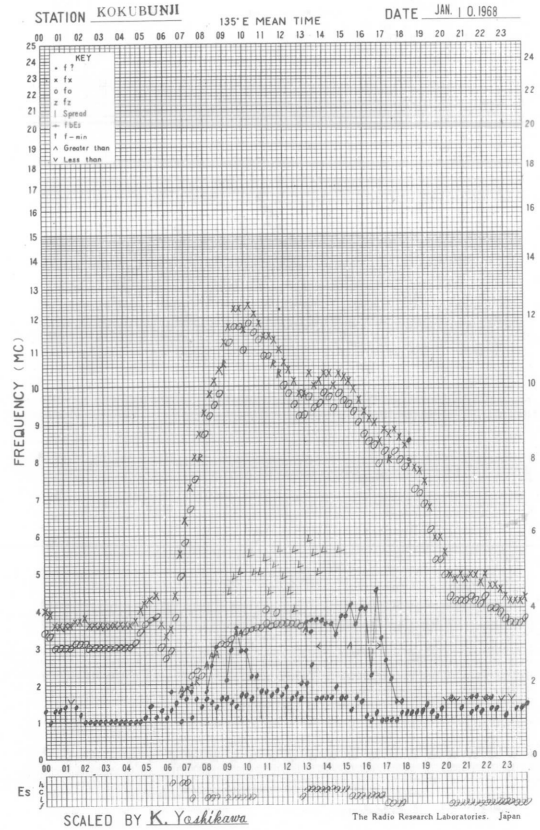


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 10. 1968

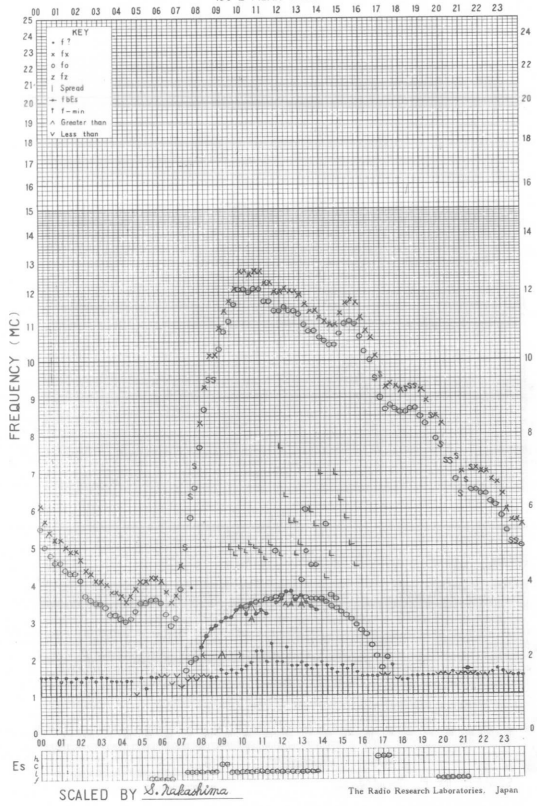


SCALED BY K. Yoshikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE JAN. 10. 1968

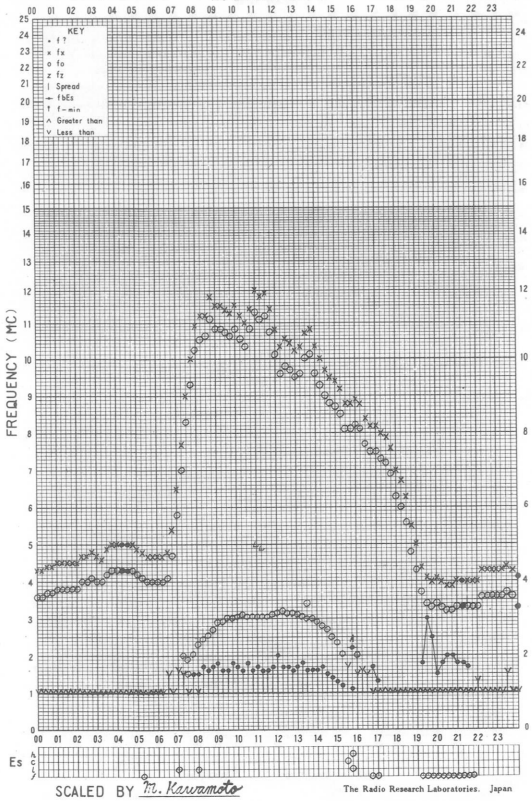


SCALED BY S. Nakashima

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

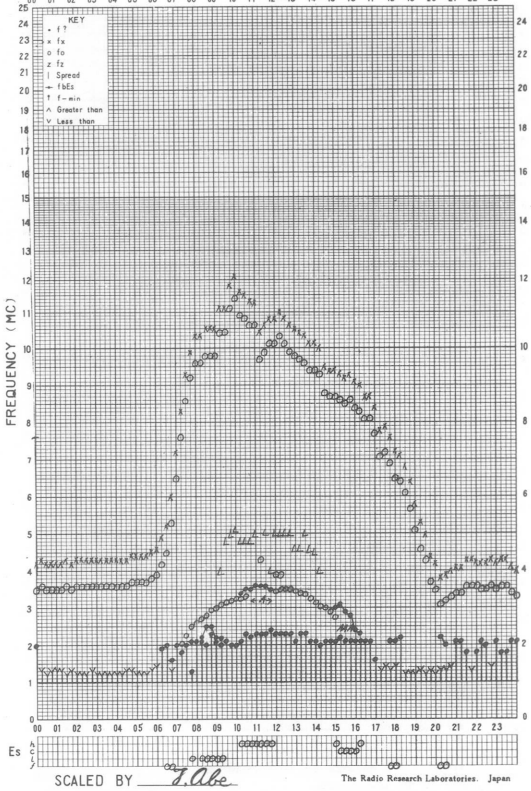
STATION WAKKANAI 135°E MEAN TIME DATE JAN. 11.1968



SCALED BY M. Kawamoto The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

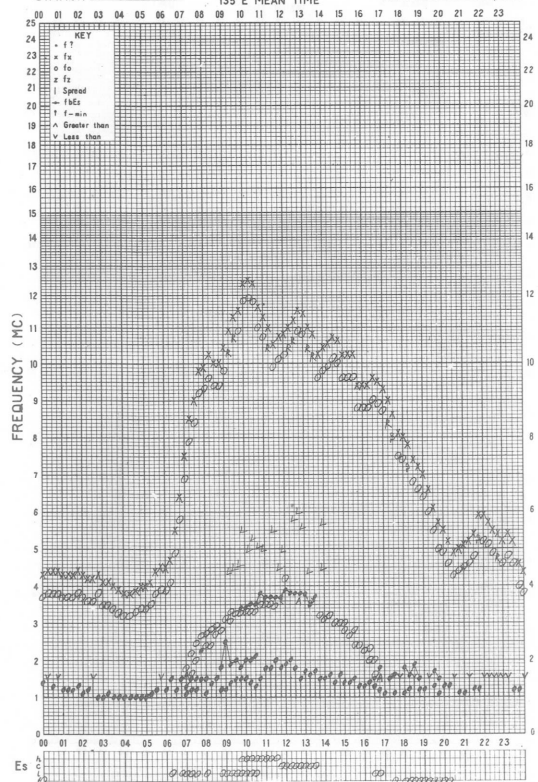
STATION AKITA 135°E MEAN TIME DATE Jan. 11. 1968



SCALED BY T. Abe The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

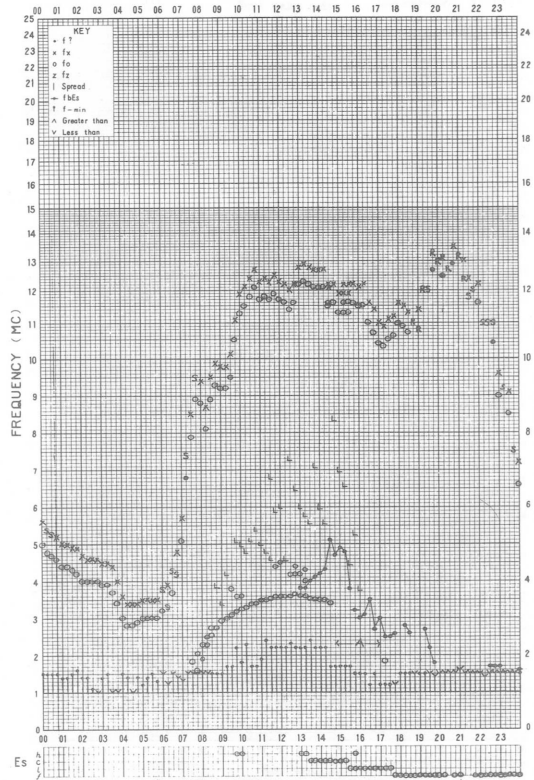
STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 11.1968



SCALED BY T. Koizumi The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

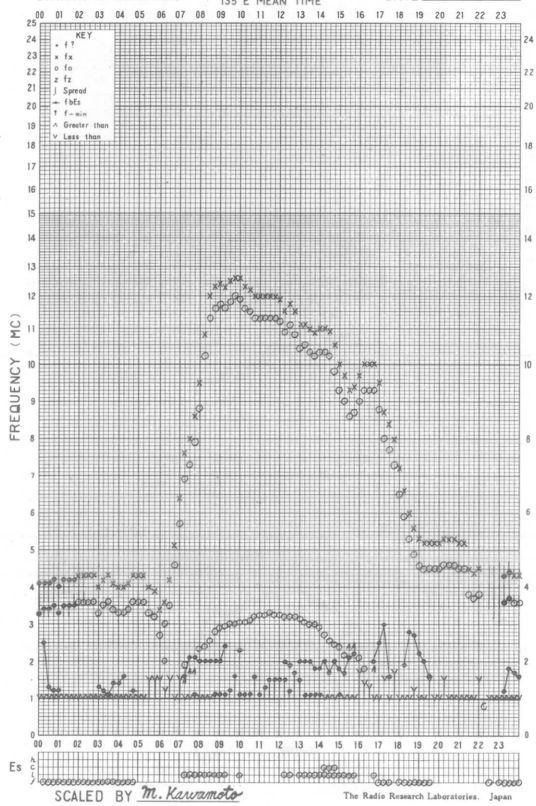
STATION YAMAGAWA 135°E MEAN TIME DATE JAN. 11. 1968



SCALED BY S. Shidomi The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

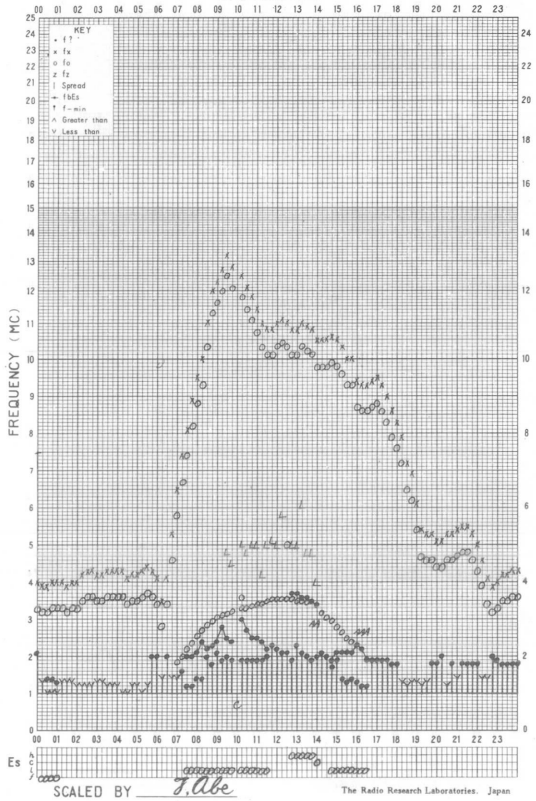
STATION WAKKANAI 135°E MEAN TIME DATE JAN. 12.1968



SCALED BY M. Kawamoto The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

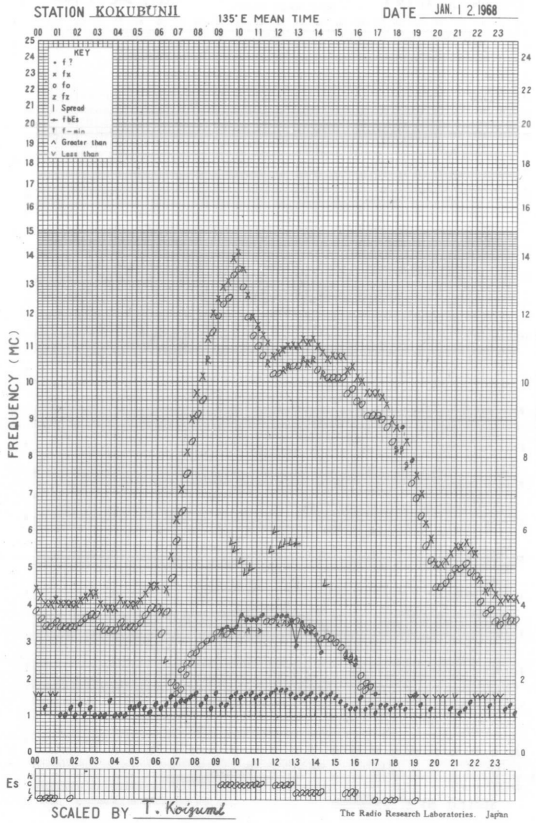
STATION AKITA 135°E MEAN TIME DATE Jan. 12. 1968



SCALED BY T. Abe The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

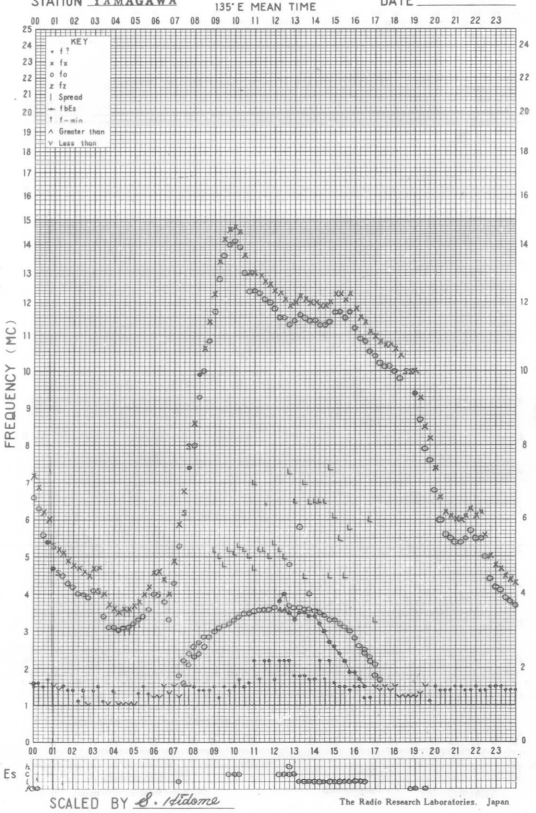
STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 12.1968



SCALED BY T. Koizumi The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

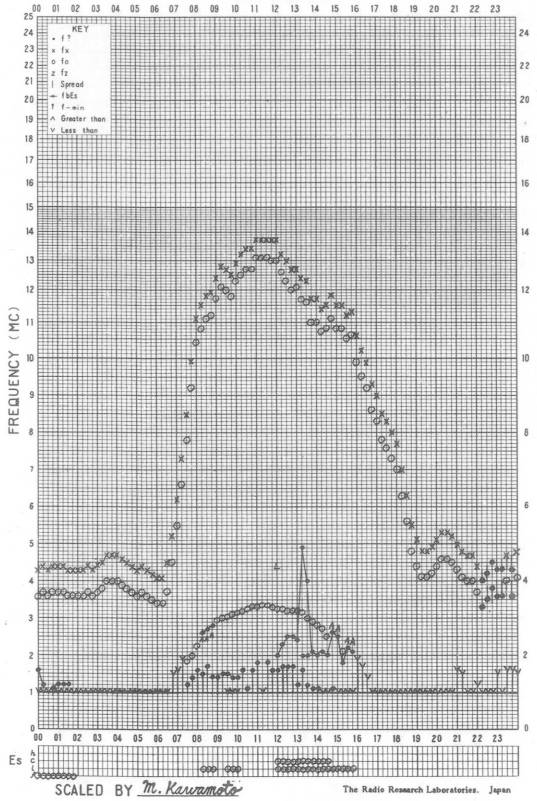
STATION YAMAGAWA 135°E MEAN TIME DATE JAN. 12. 1968



SCALED BY S. Hidome The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

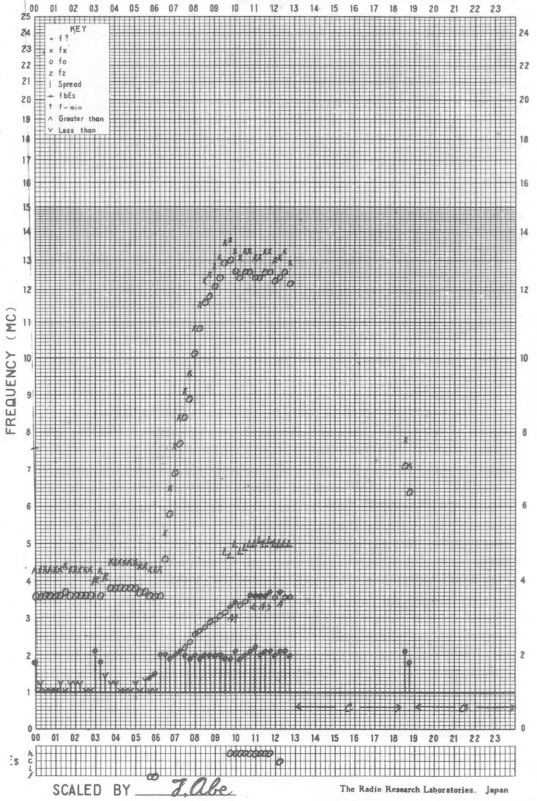
STATION WAKKANAI 135°E MEAN TIME DATE JAN. 13.1968



SCALED BY M. Kawamoto The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

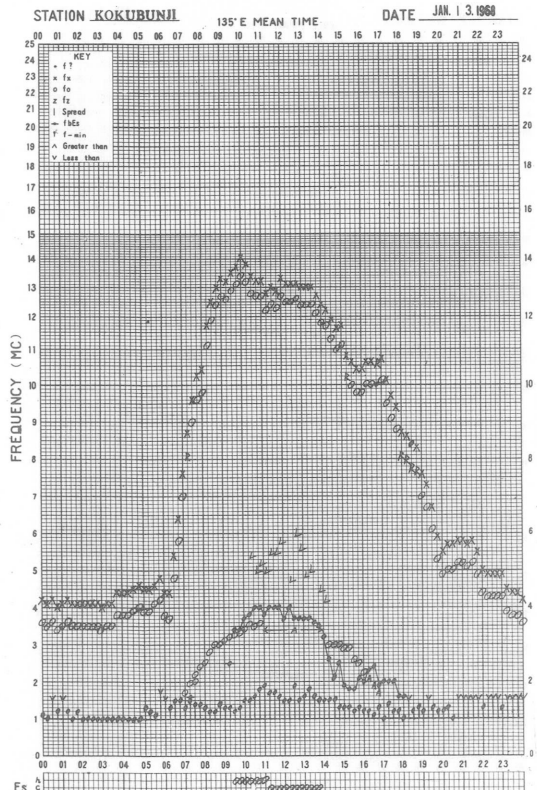
STATION AKITA 135°E MEAN TIME DATE Jan. 13. 1968



SCALED BY T. Abe The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

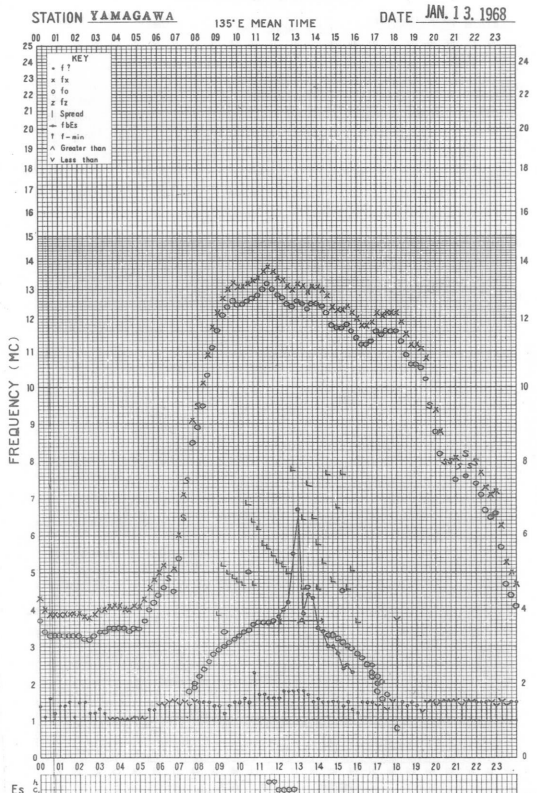
STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 13.1968



SCALED BY T. Koizumi The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

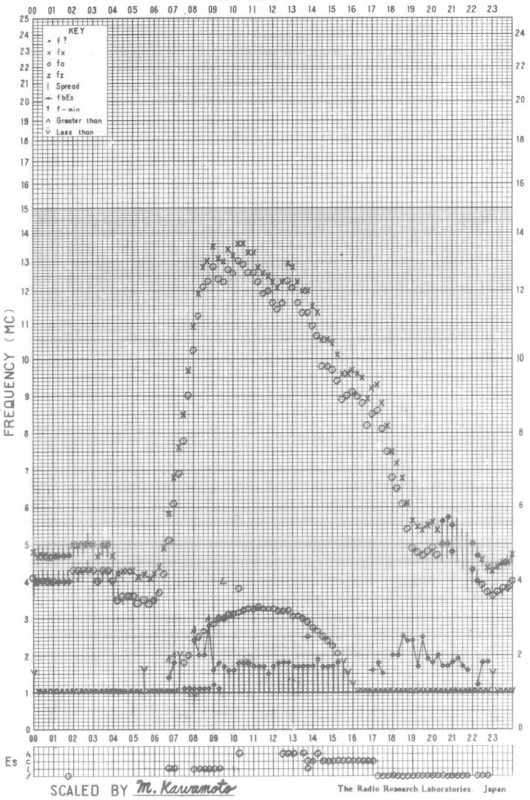
STATION YAMAGAWA 135°E MEAN TIME DATE JAN. 13. 1968



SCALED BY S. Nitome The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

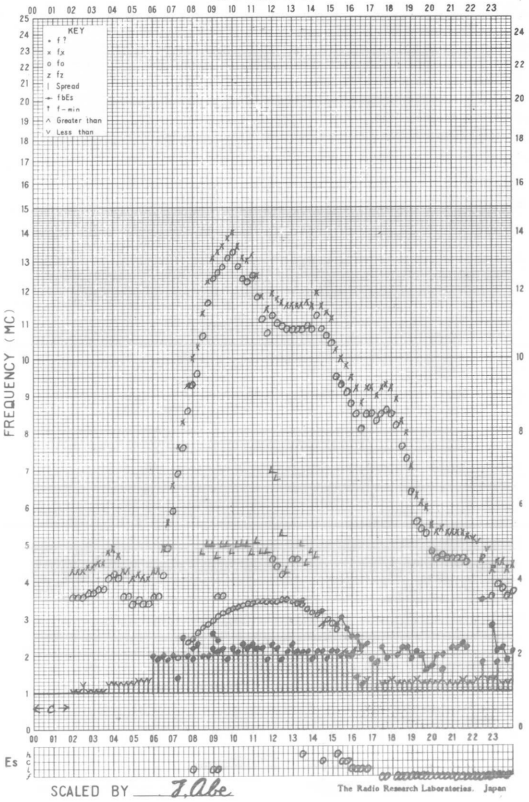
STATION WAKKANAI 135°E MEAN TIME DATE JAN. 14.1968



SCALED BY M. Kawamoto The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

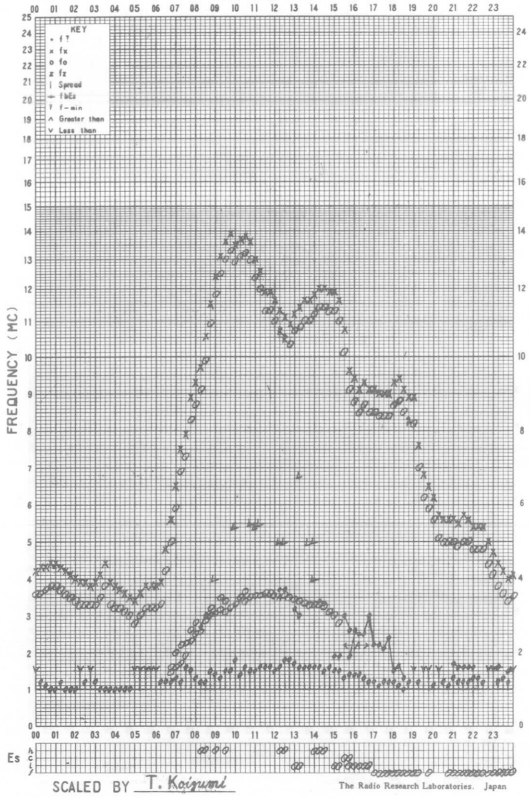
STATION AKITA 135°E MEAN TIME DATE Jan. 14. 1968



SCALED BY T. Abe The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

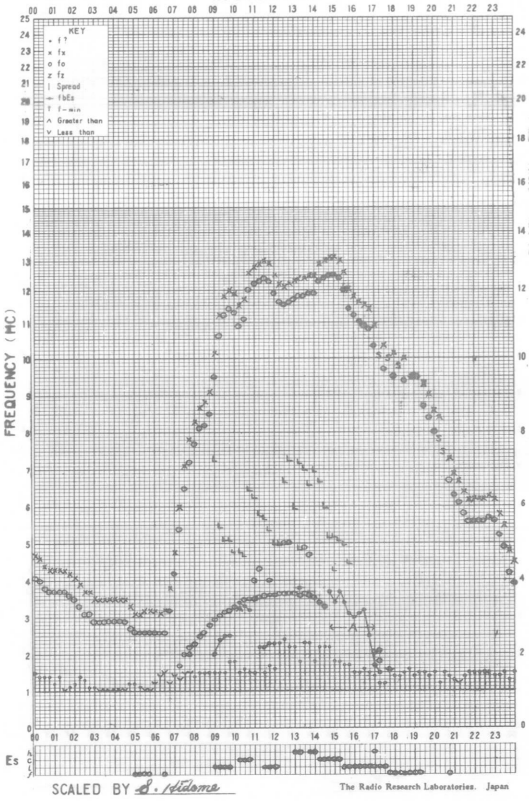
STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 14. 1968



SCALED BY T. Koizumi The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

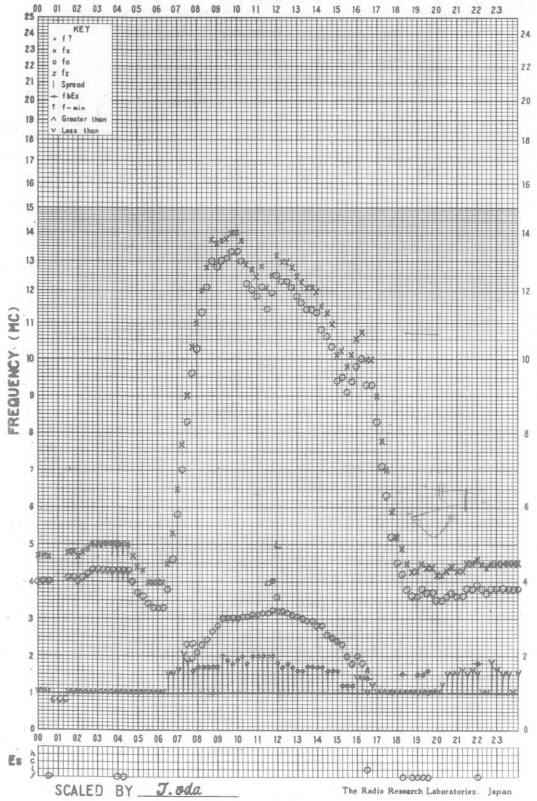
STATION YAMAGAWA 135°E MEAN TIME DATE JAN. 14. 1968



SCALED BY S. Kitsuma The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN. 15.1968

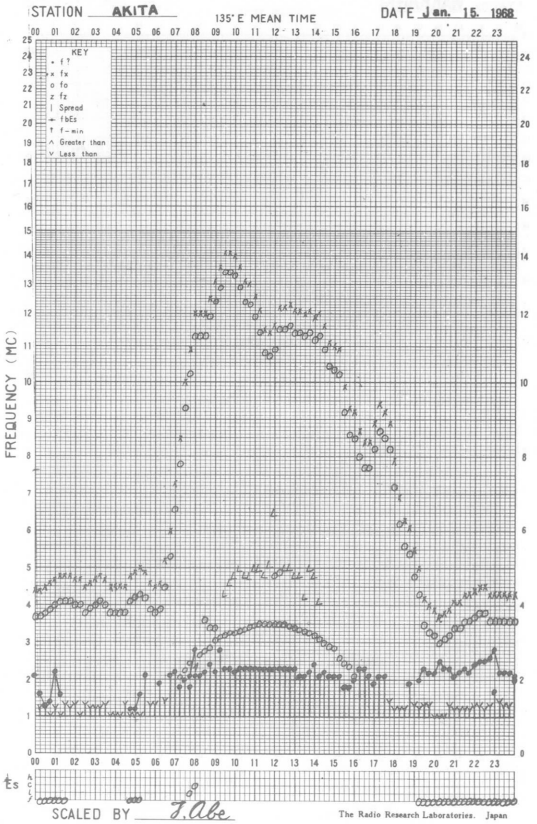


SCALED BY T. oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Jan. 15. 1968

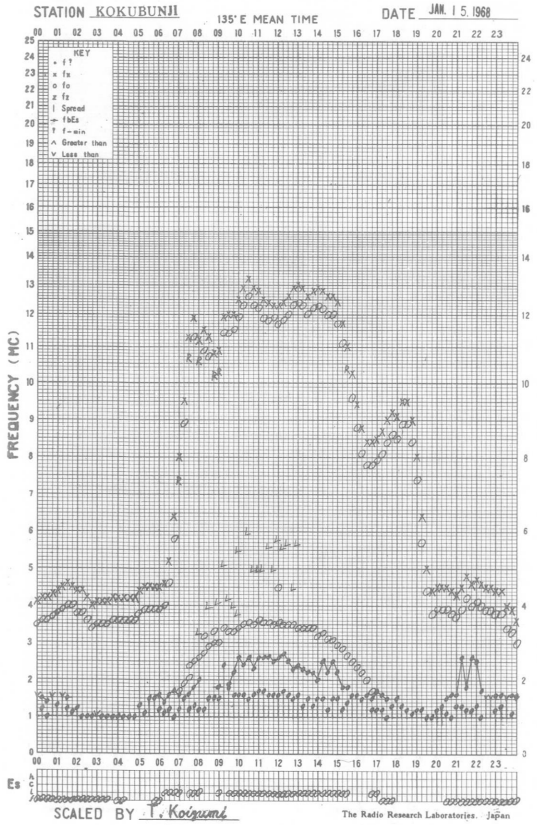


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 15. 1968

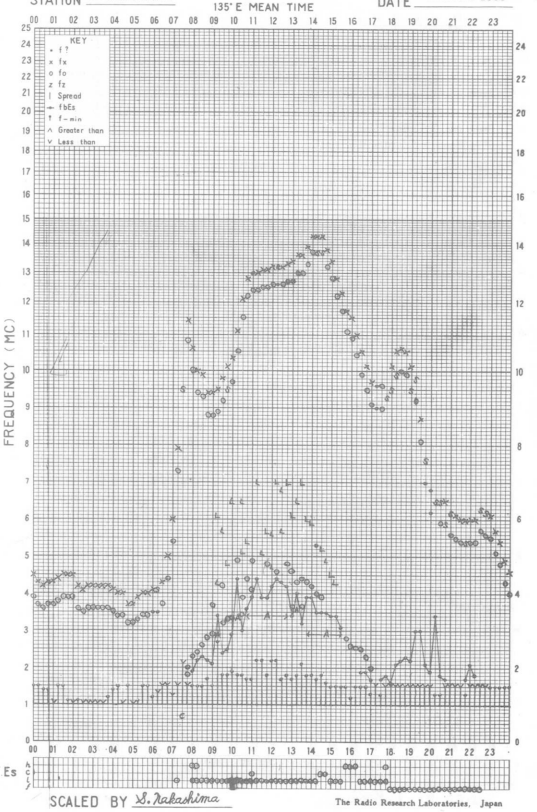


SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE JAN. 15. 1968

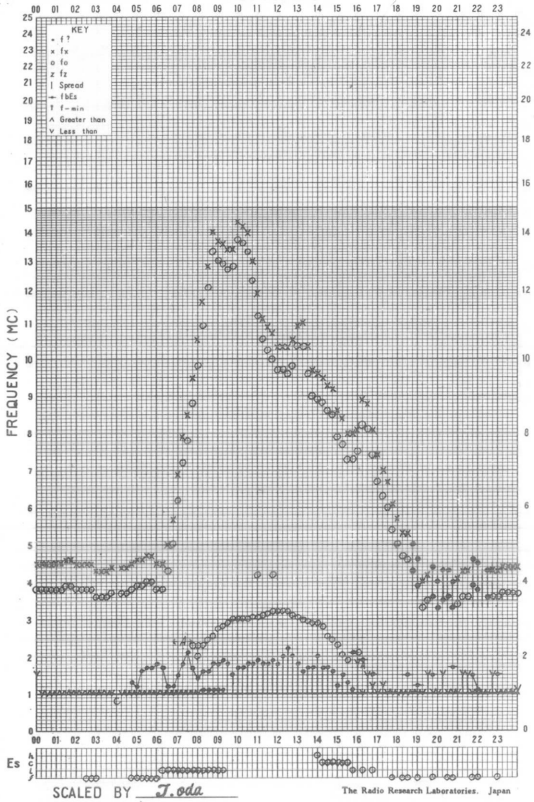


SCALED BY S. Takashima

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN. 16, 1968

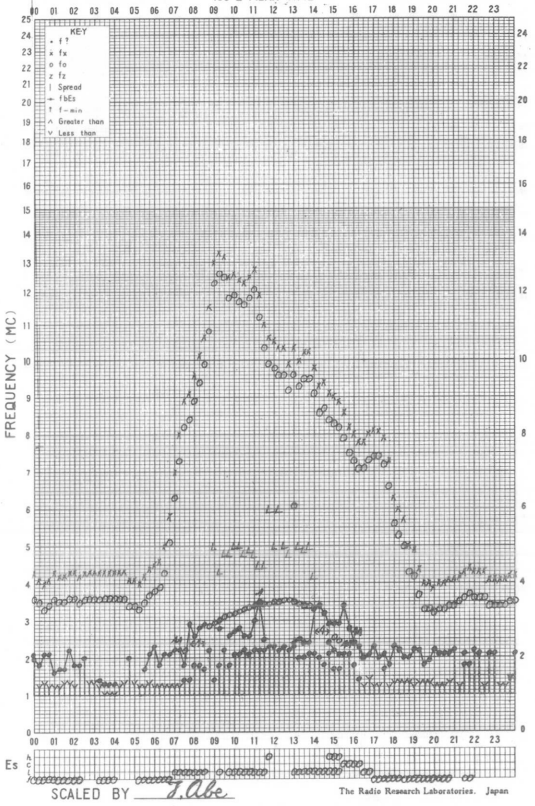


SCALED BY J. Oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Jan. 16. 1968

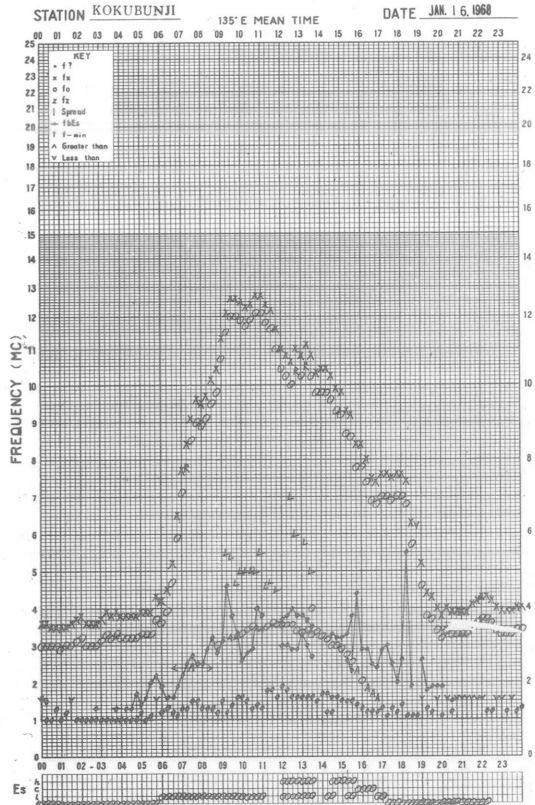


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 16, 1968

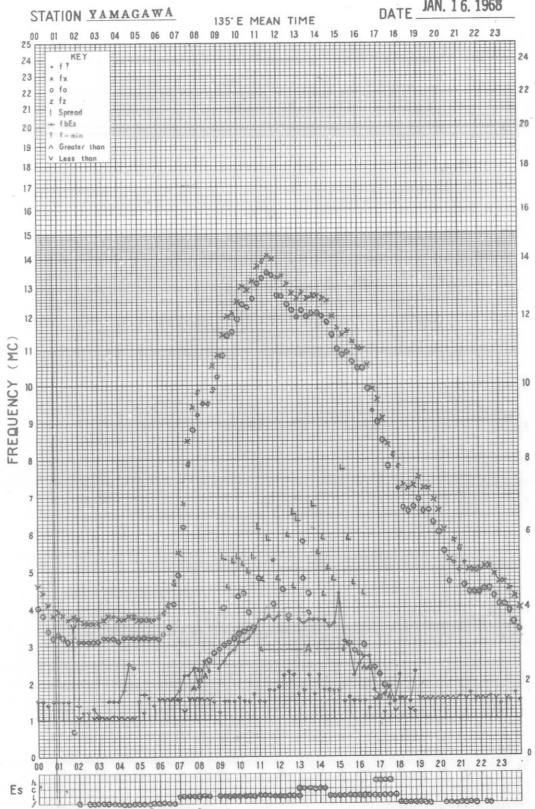


SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE JAN. 16, 1968

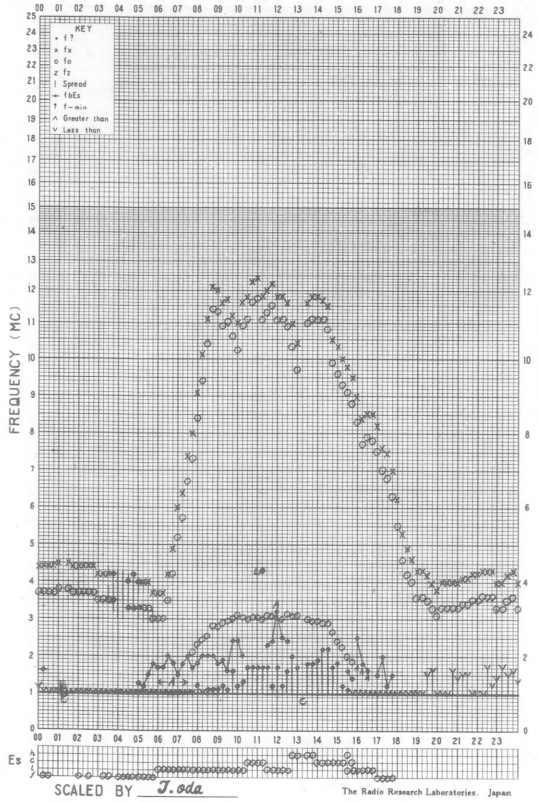


SCALED BY S. Nakashima

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN. 17, 1968

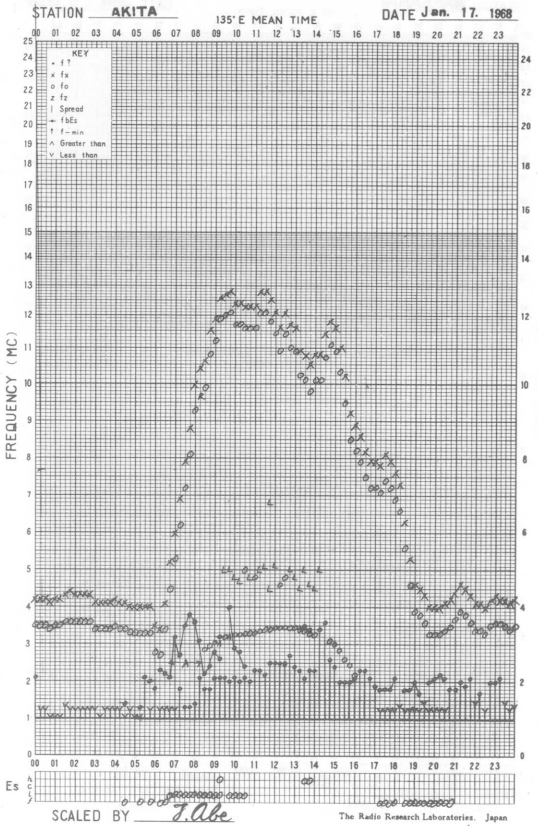


SCALED BY T. Oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Jan. 17. 1968

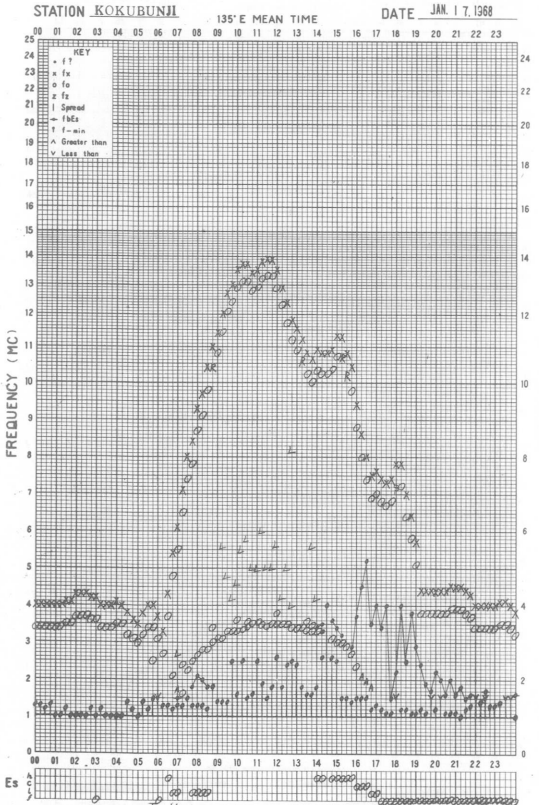


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 17, 1968

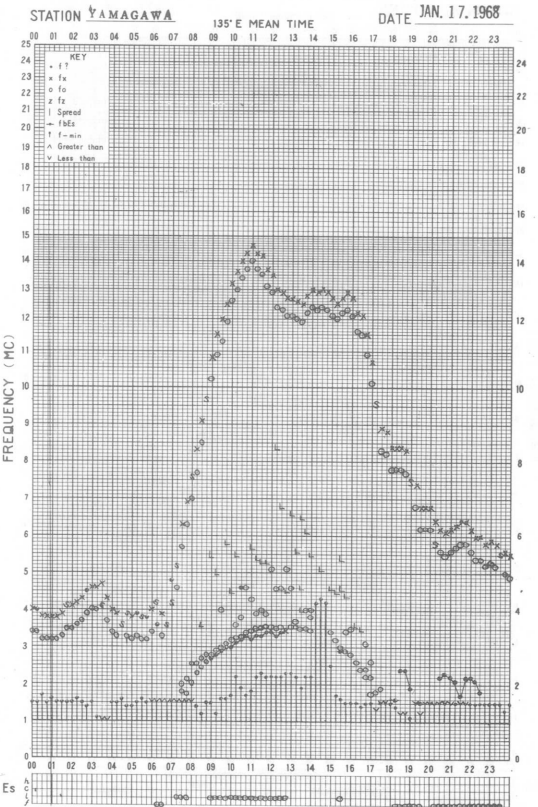


SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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

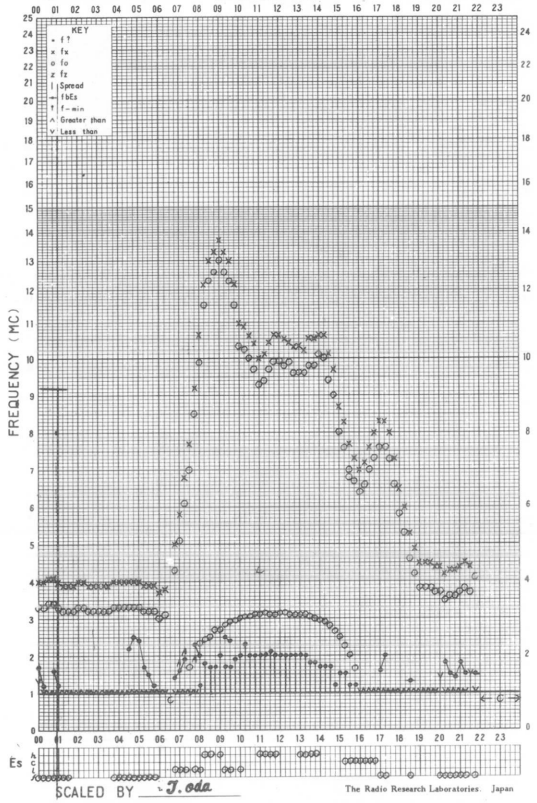


SCALED BY S. Nakashima

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN. 18,1968

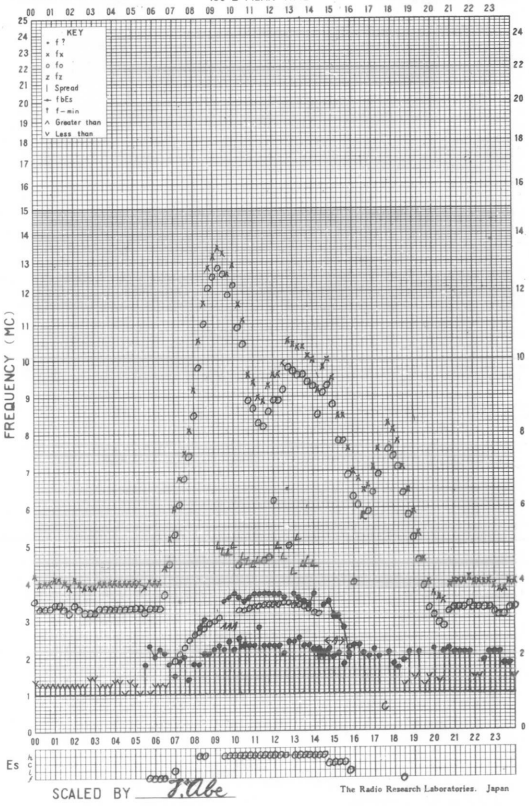


SCALED BY J. Oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Jan. 18. 1968

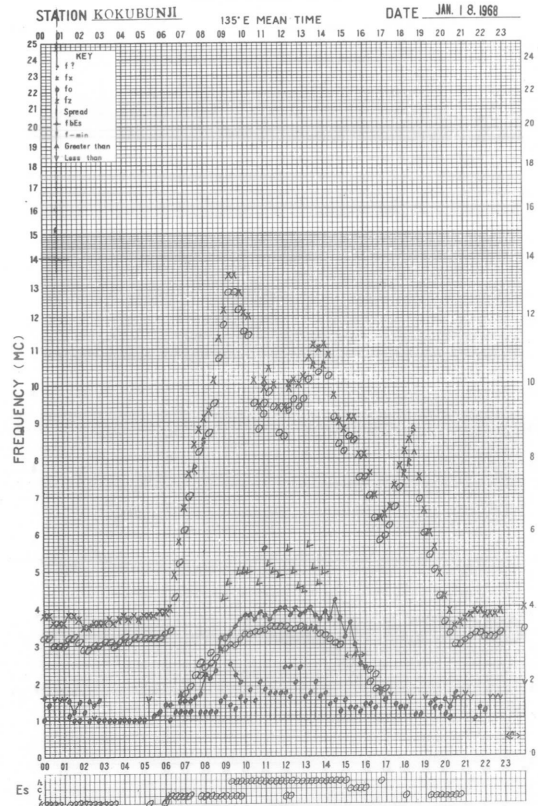


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 18. 1968

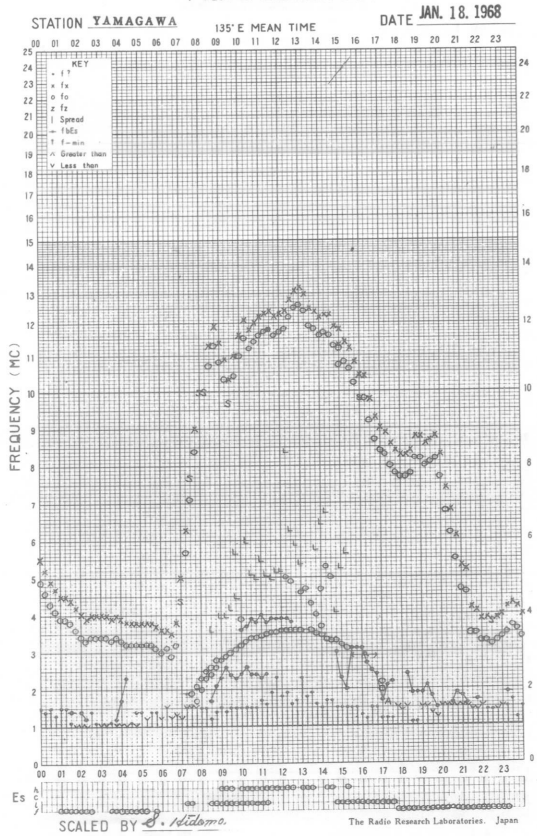


SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE JAN. 18. 1968

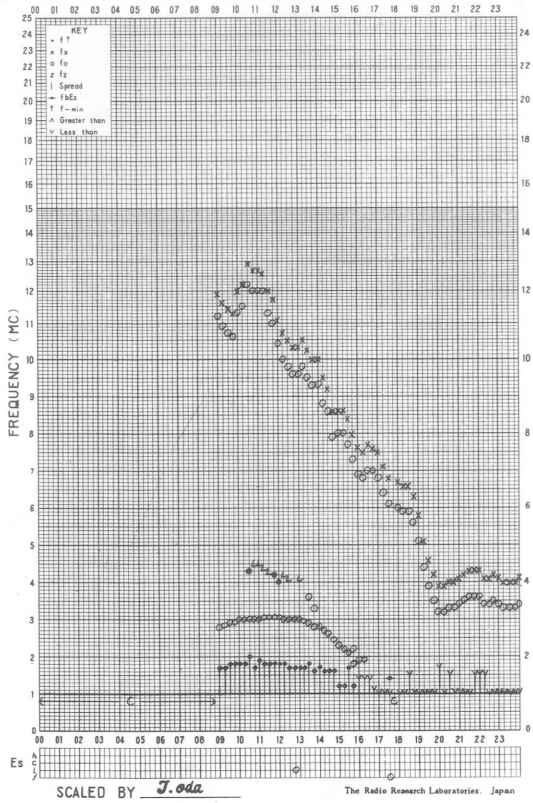


SCALED BY S. Hidomo.

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN. 19.1968

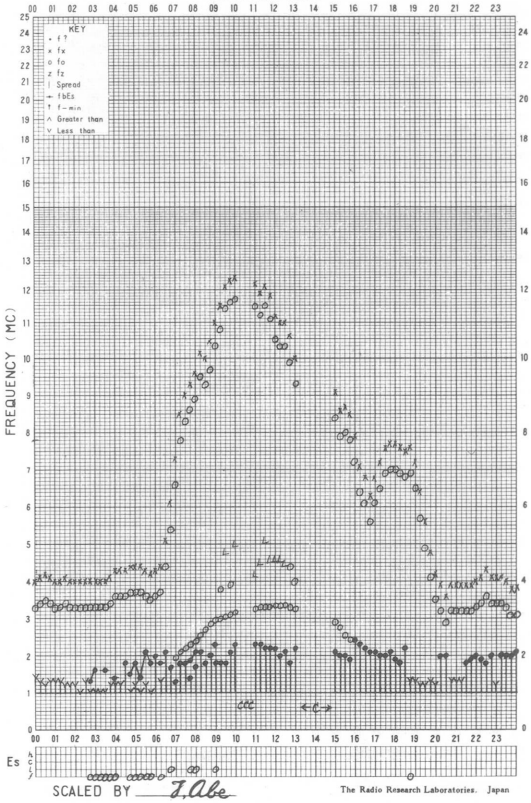


SCALED BY T. Oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Jan. 19. 1968

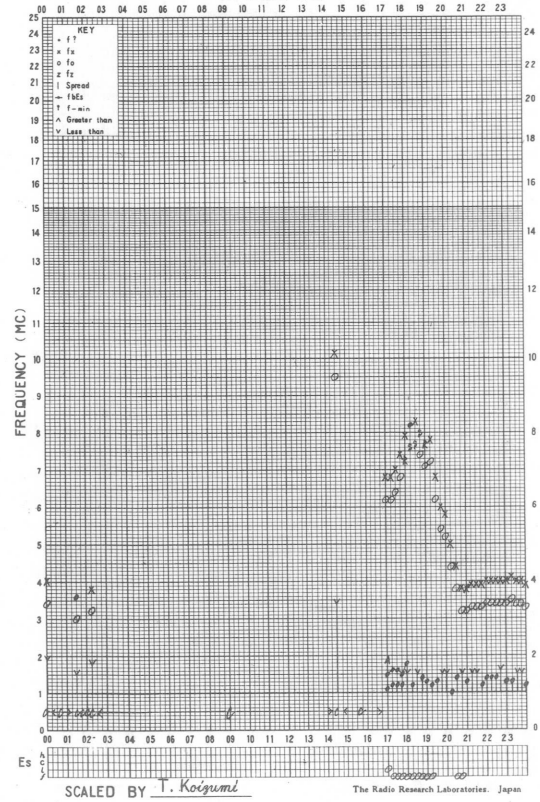


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 19. 1969

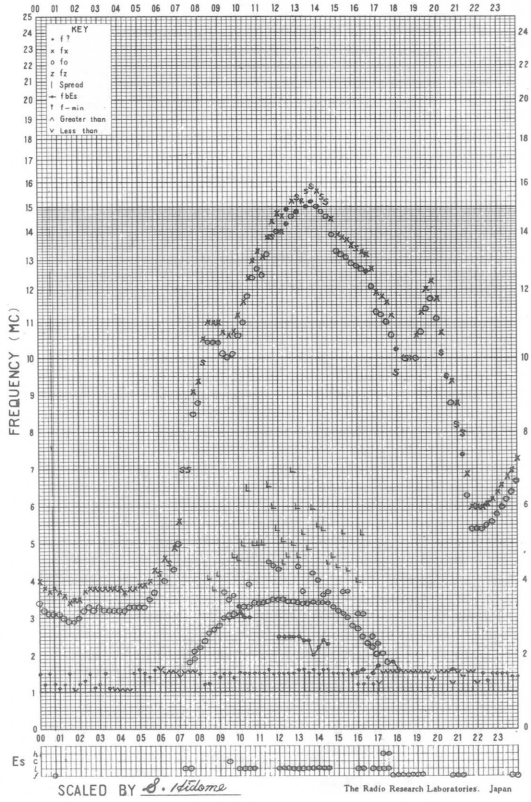


SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE JAN. 19. 1968

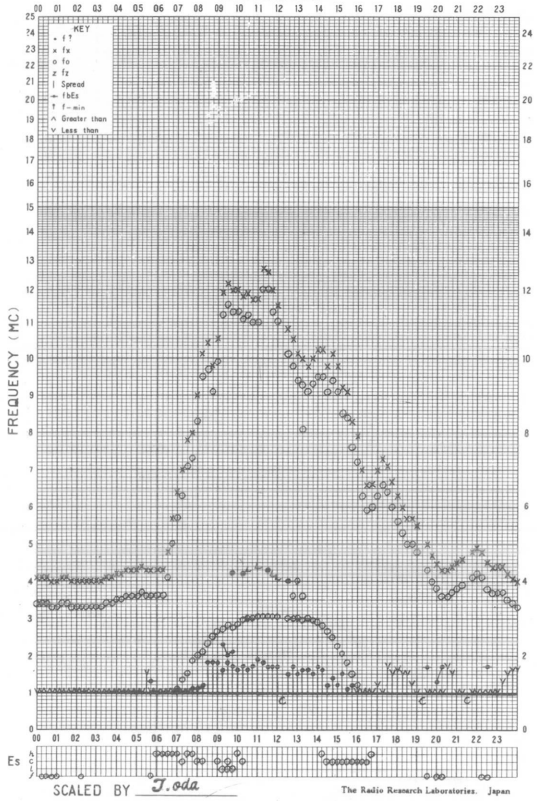


SCALED BY S. Shidome

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN. 20. 1968

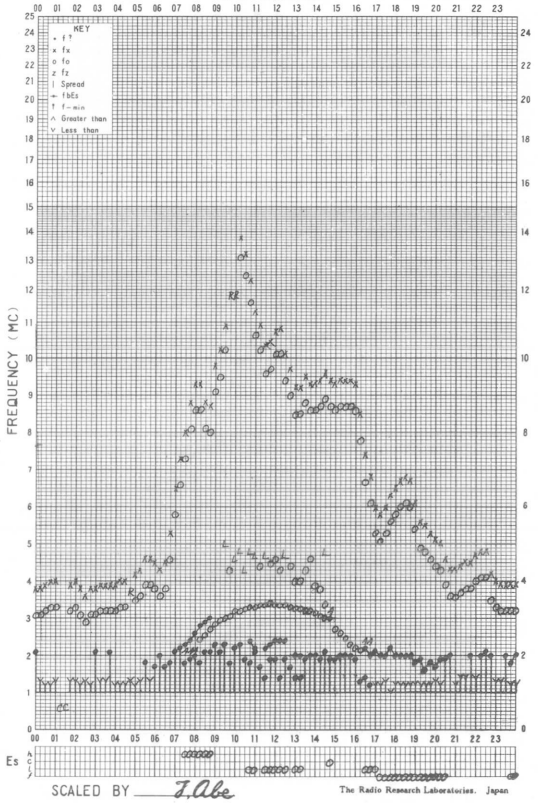


SCALED BY J. Oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Jan. 20. 1968

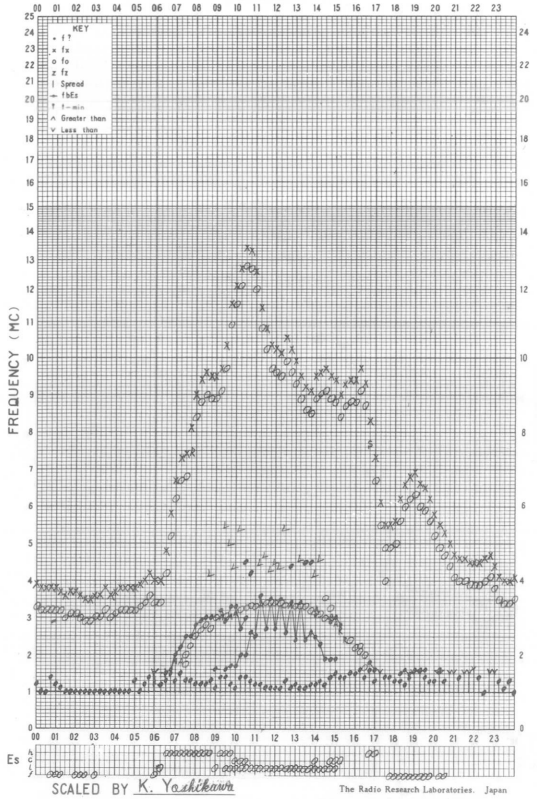


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 20 1968

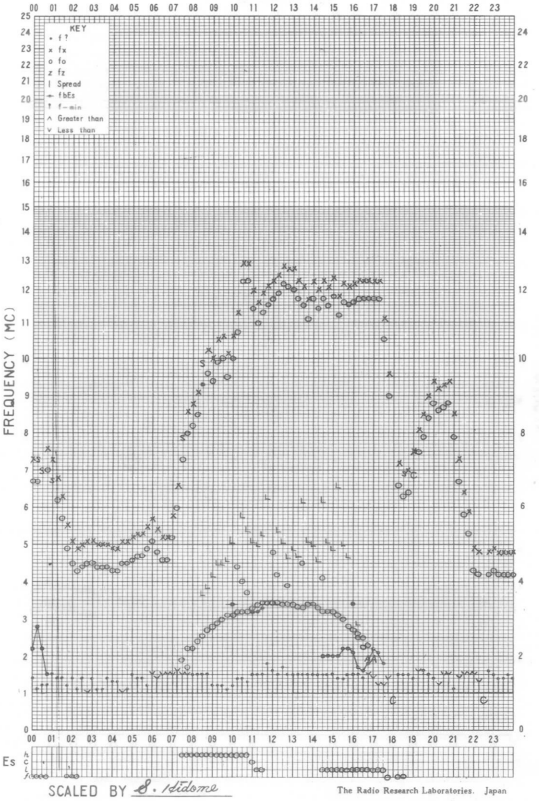


SCALED BY K. Yoshikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE JAN. 20. 1968

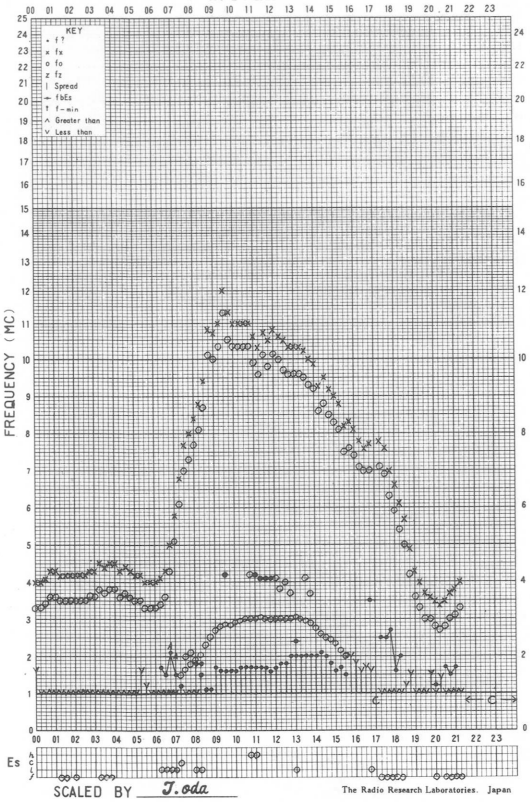


SCALED BY S. Uidome

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN. 21, 1968

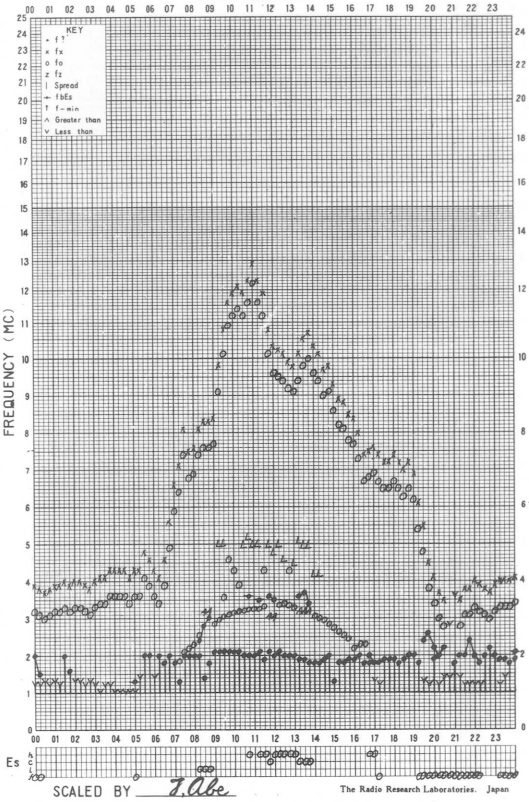


SCALED BY J. Oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Jan. 21, 1968

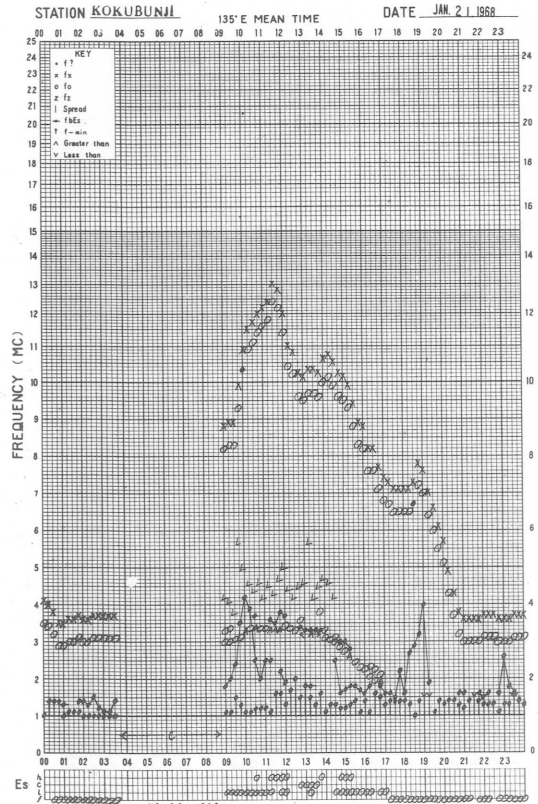


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 21, 1968

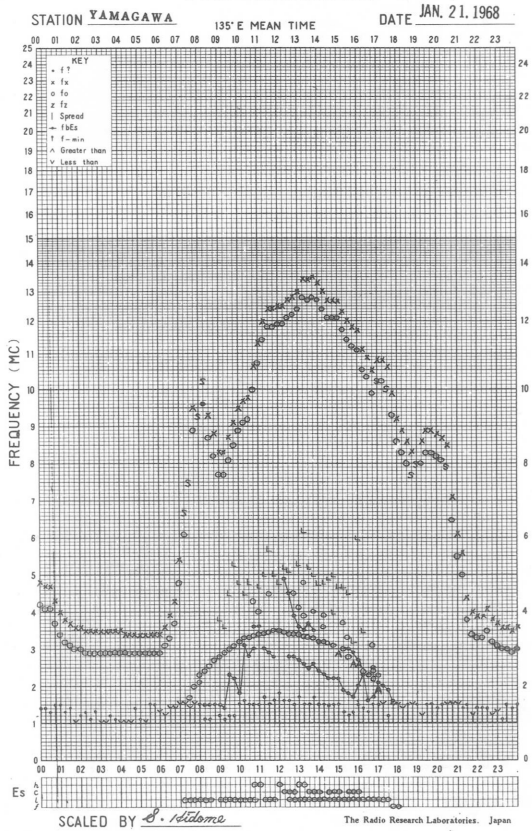


SCALED BY K. Yashikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE JAN. 21, 1968

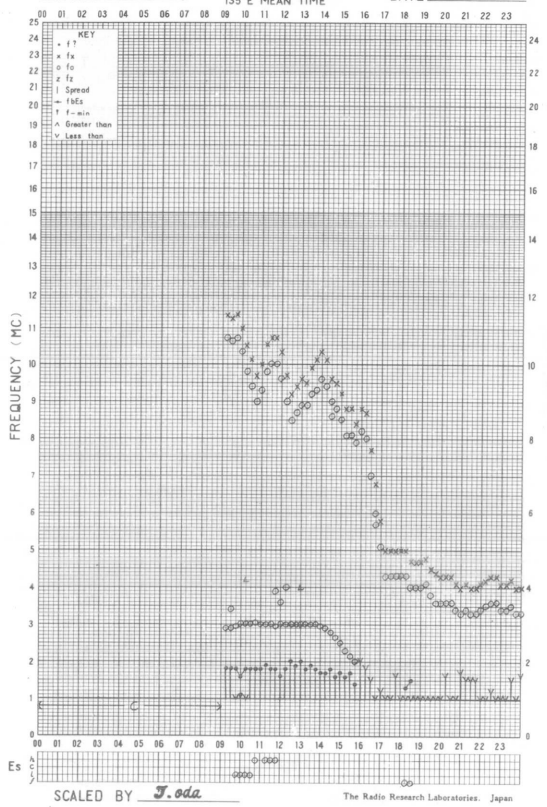


SCALED BY S. Uchima

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN. 22.1968

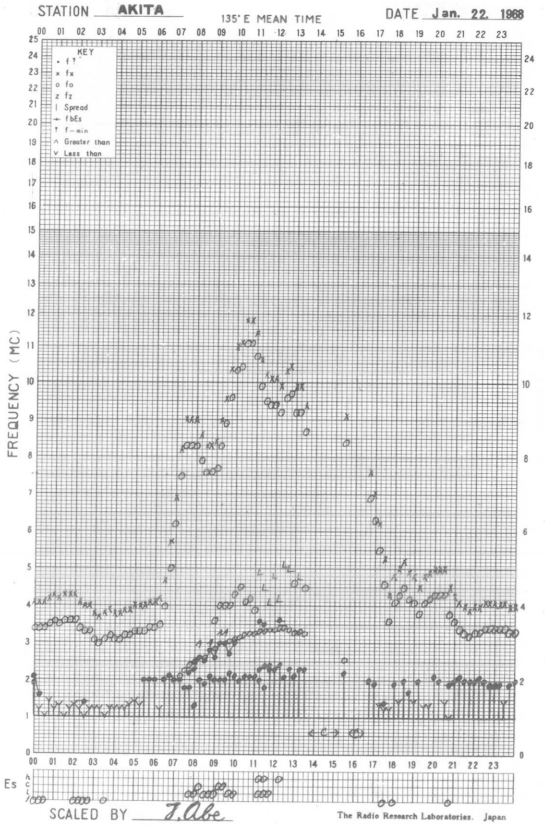


SCALED BY T. oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Jan. 22. 1968

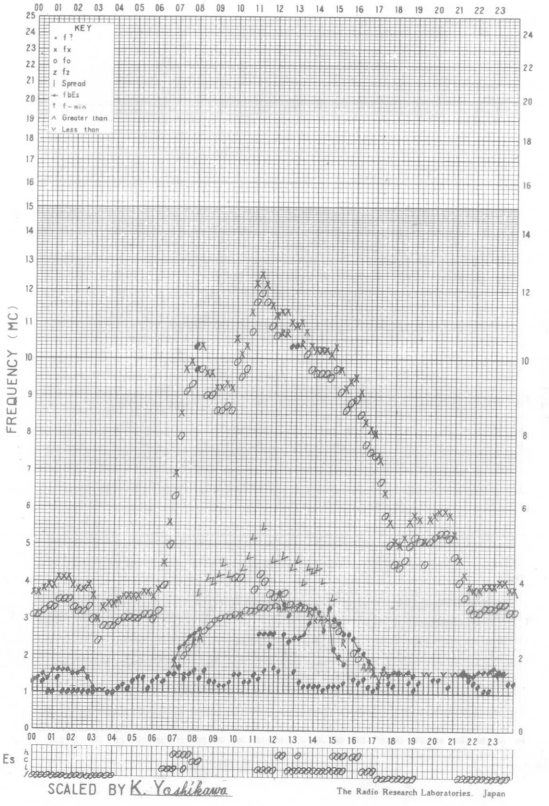


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 22.1968

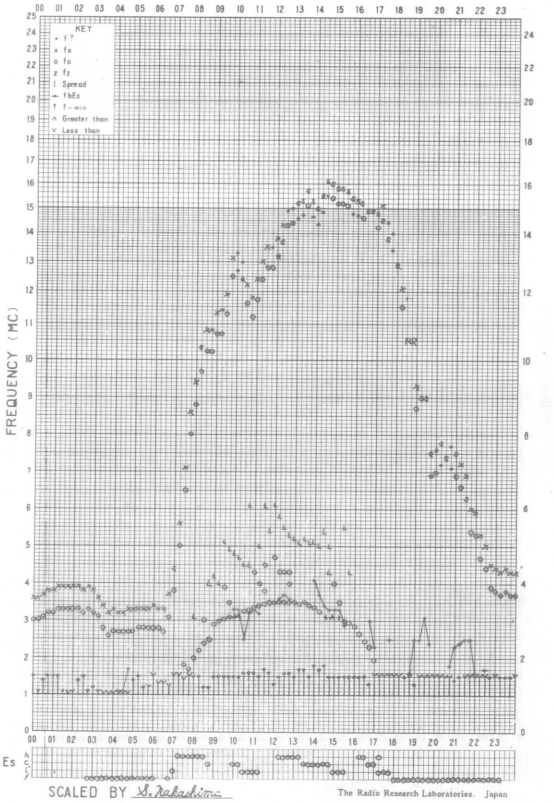


SCALED BY K. Yashikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE JAN. 22. 1968

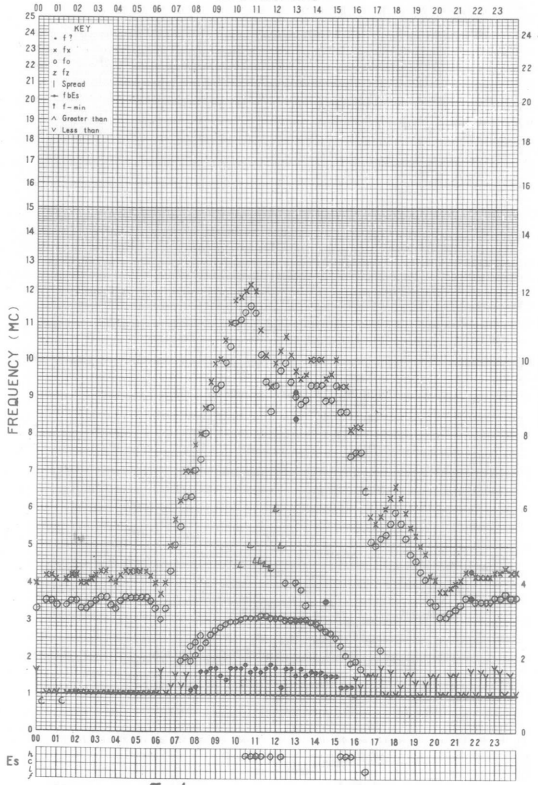


SCALED BY S. Nakashima

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135° E MEAN TIME DATE JAN. 23. 1968

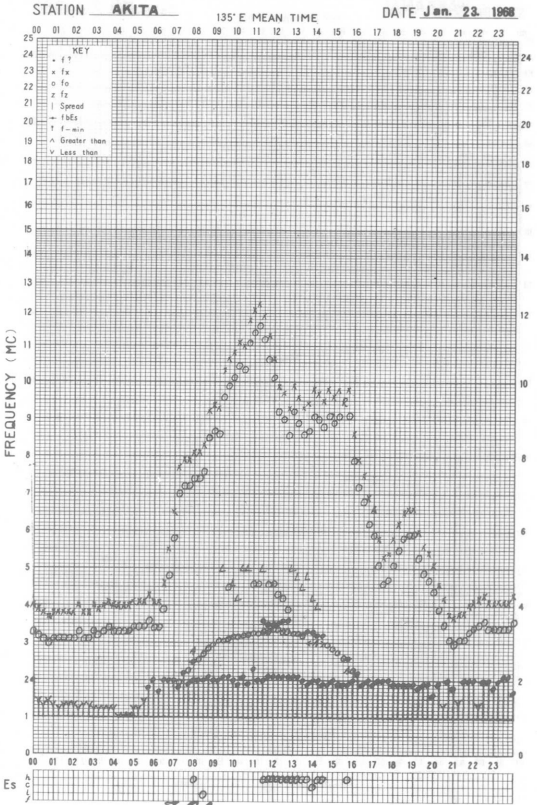


SCALED BY J. oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135° E MEAN TIME DATE Jan. 23. 1968

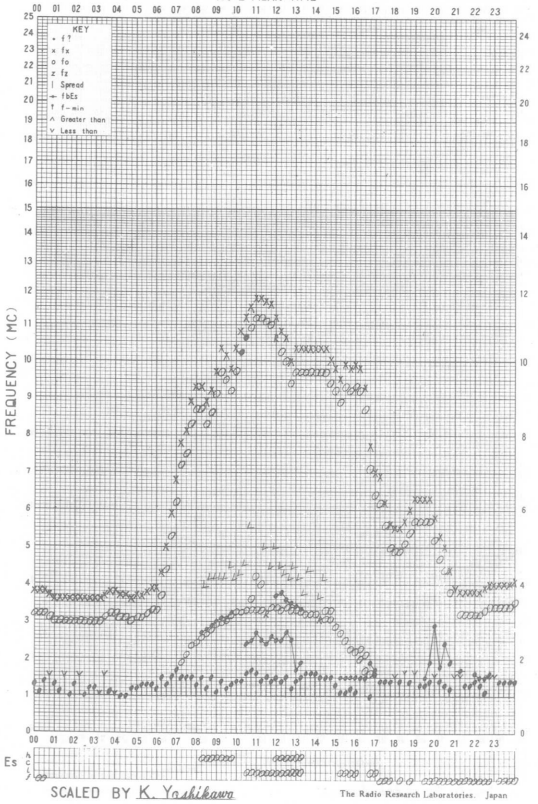


SCALED BY J. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135° E MEAN TIME DATE JAN. 23. 1968

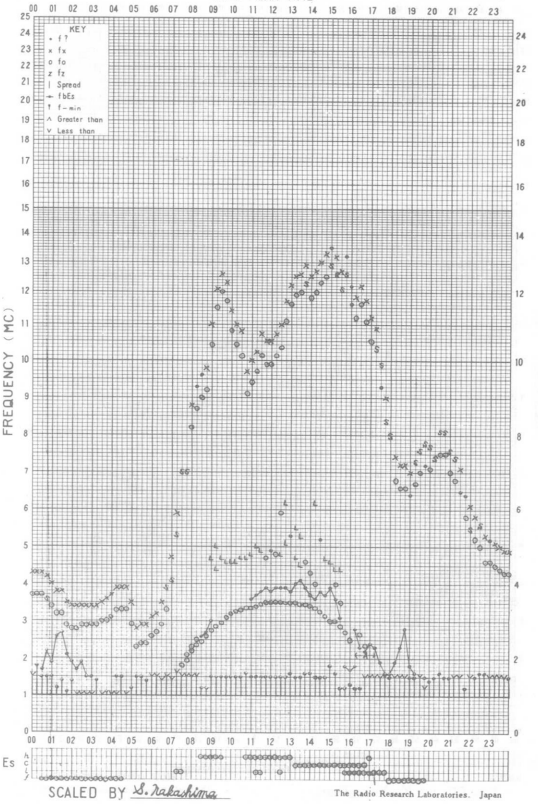


SCALED BY K. Yoshikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135° E MEAN TIME DATE JAN. 23. 1968

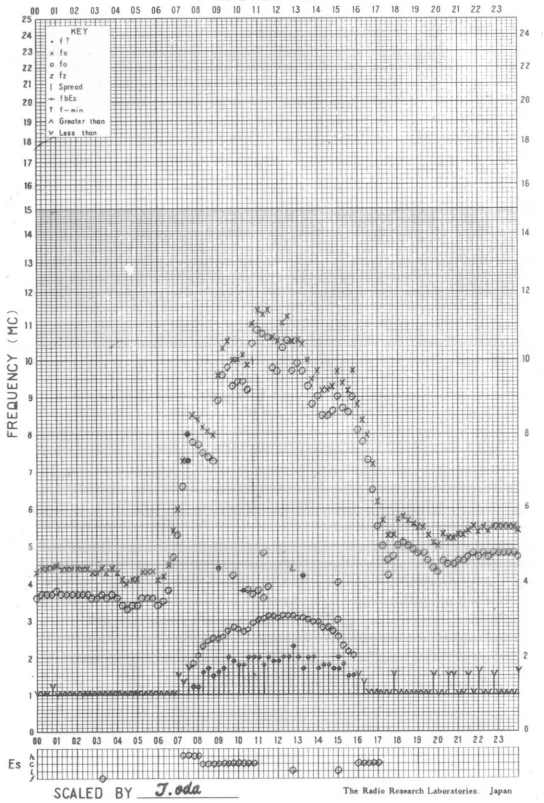


SCALED BY S. Nakashima

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN. 24, 1968

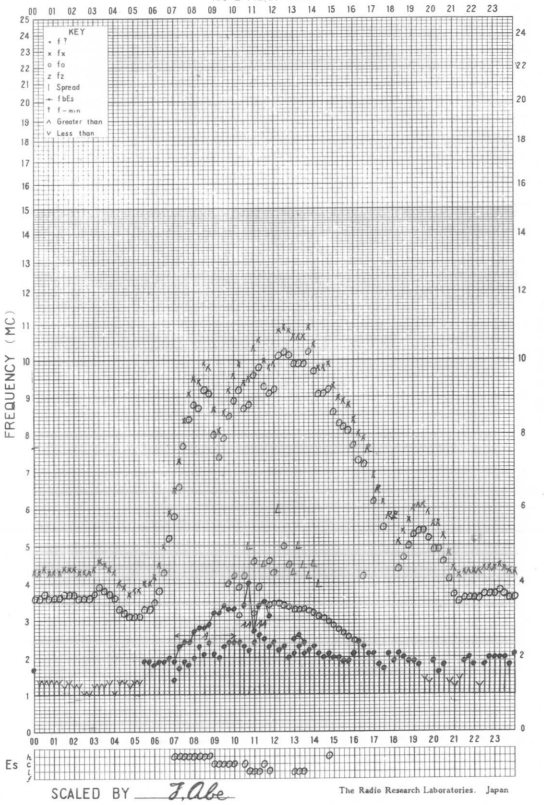


SCALED BY J. Oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Jan. 24, 1968

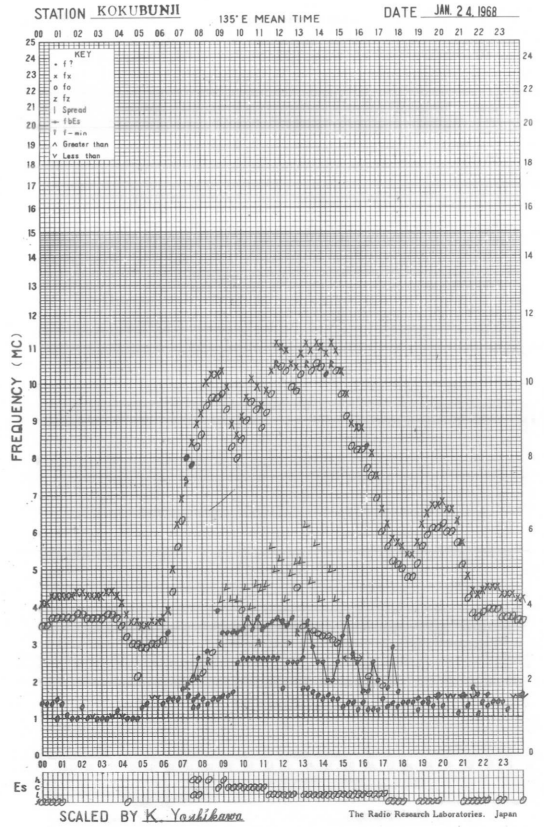


SCALED BY J. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 24, 1968

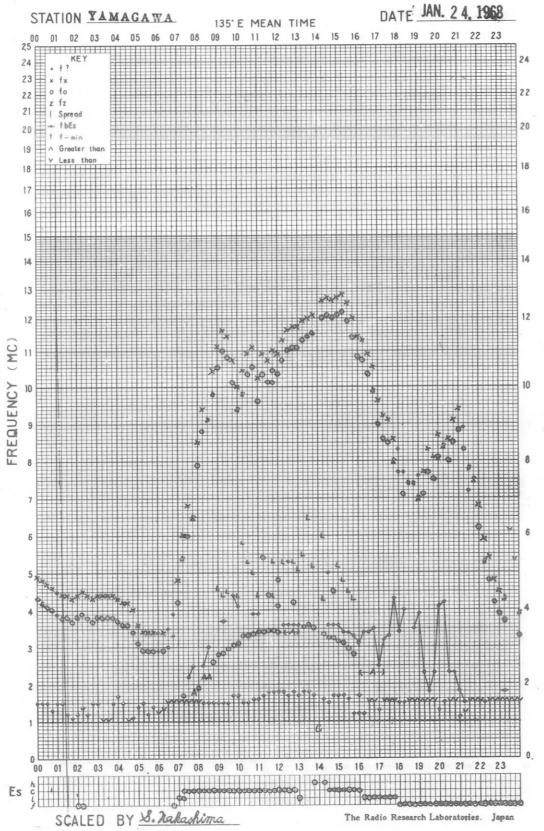


SCALED BY K. Yoshikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE JAN. 24, 1968

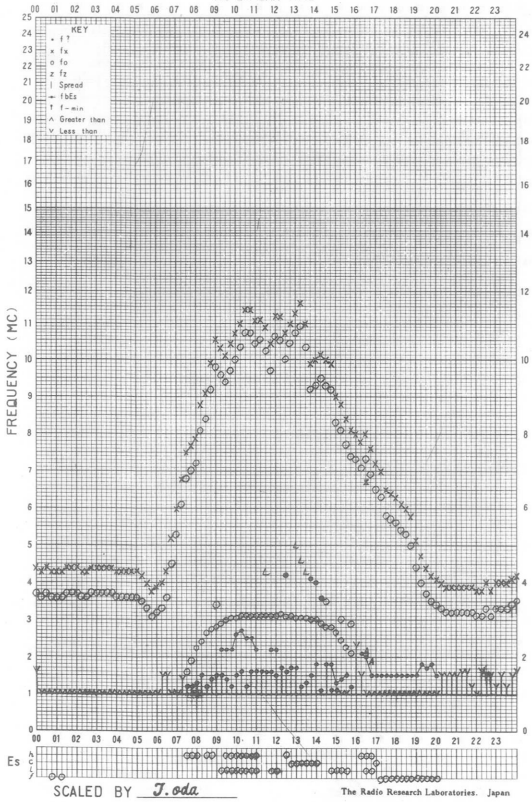


SCALED BY S. Takashima

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN. 25. 1968

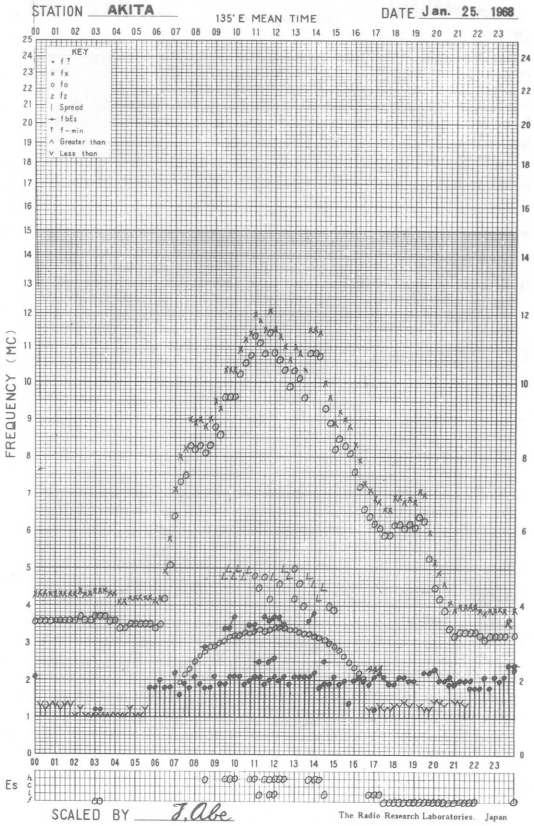


SCALED BY J. Oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Jan. 25. 1968

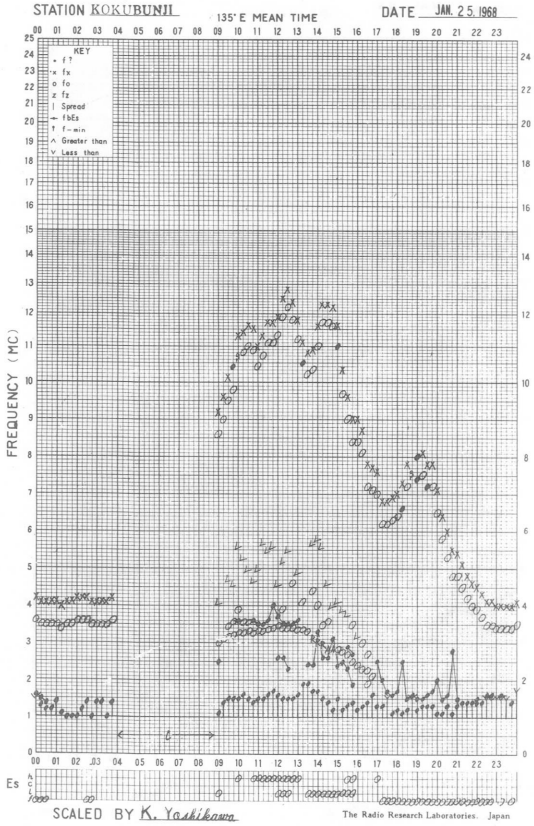


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 25. 1968

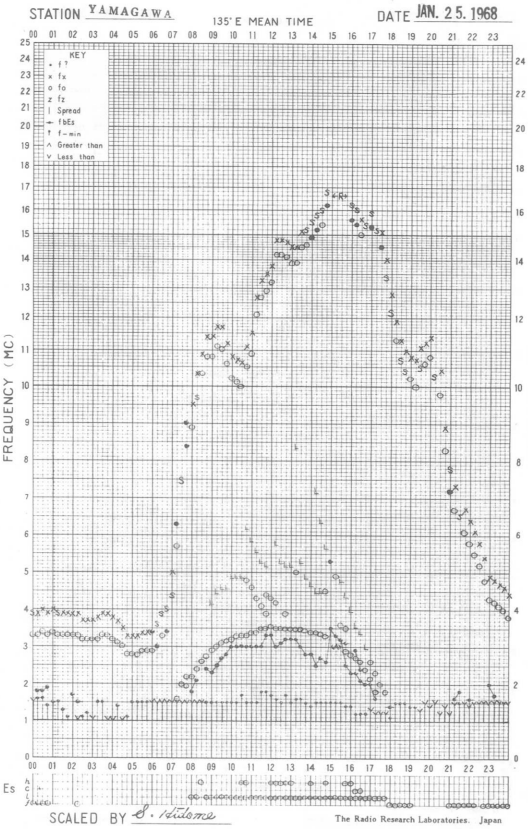


SCALED BY K. Yoshikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE JAN. 25. 1968

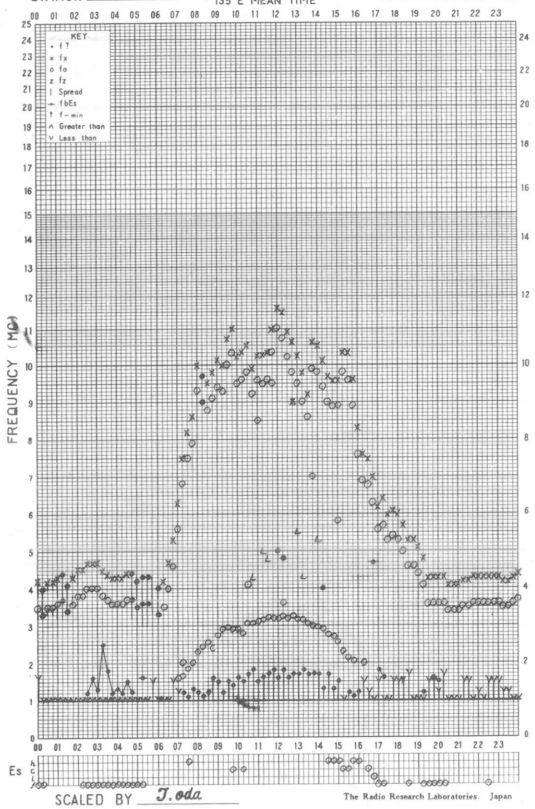


SCALED BY S. Hitoshi

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN. 26. 1968

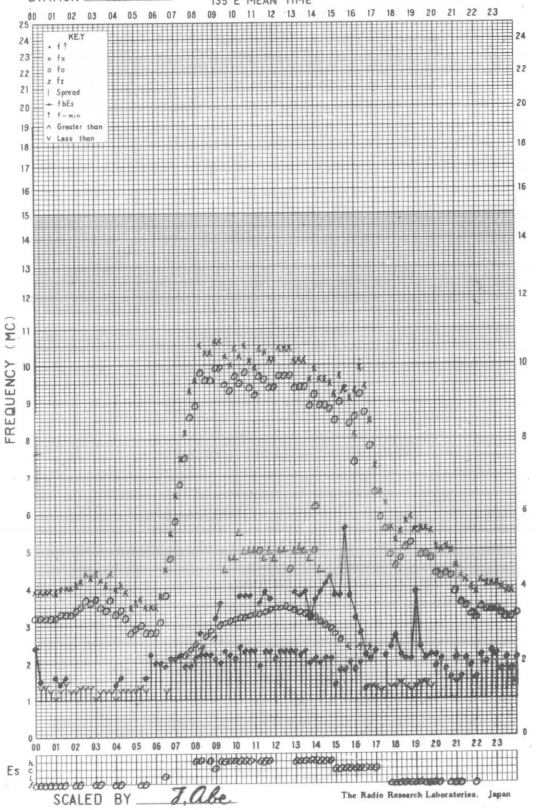


SCALED BY T. Oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Jan. 26. 1968

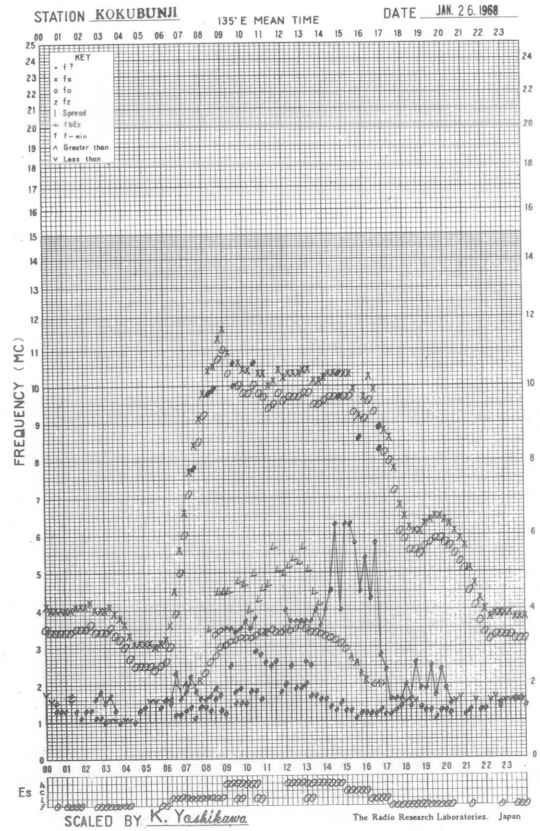


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 26. 1968

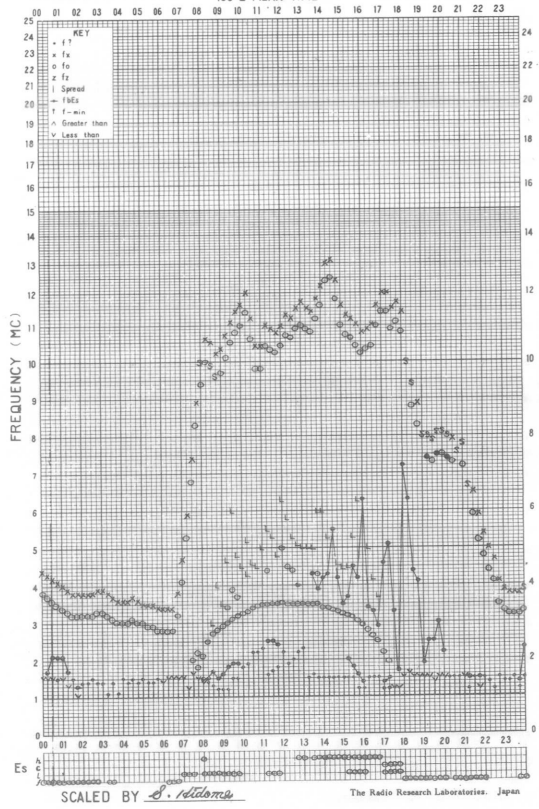


SCALED BY K. Yashikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE JAN. 26. 1968

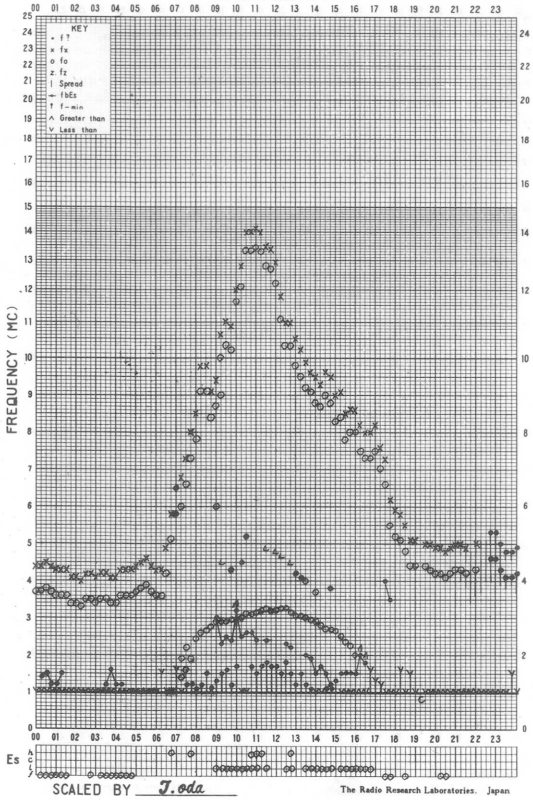


SCALED BY S. Midorikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135° E MEAN TIME DATE JAN. 27. 1968

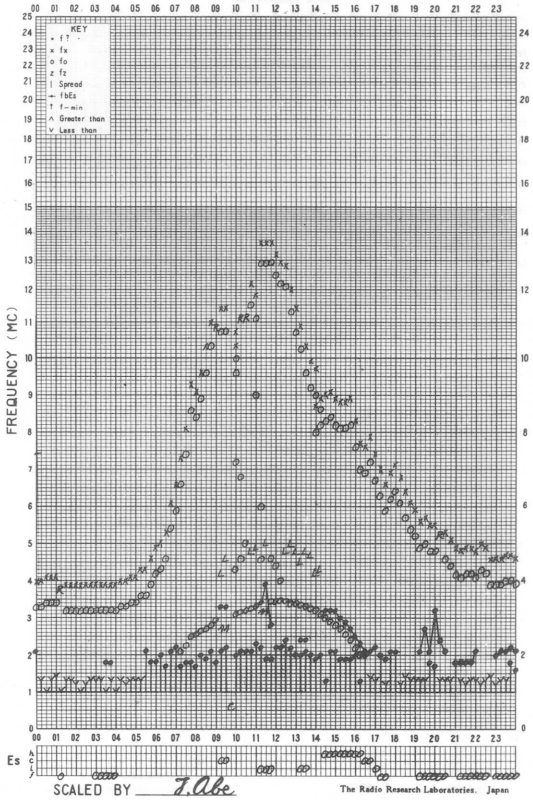


SCALED BY T. Oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135° E MEAN TIME DATE Jan. 27. 1968

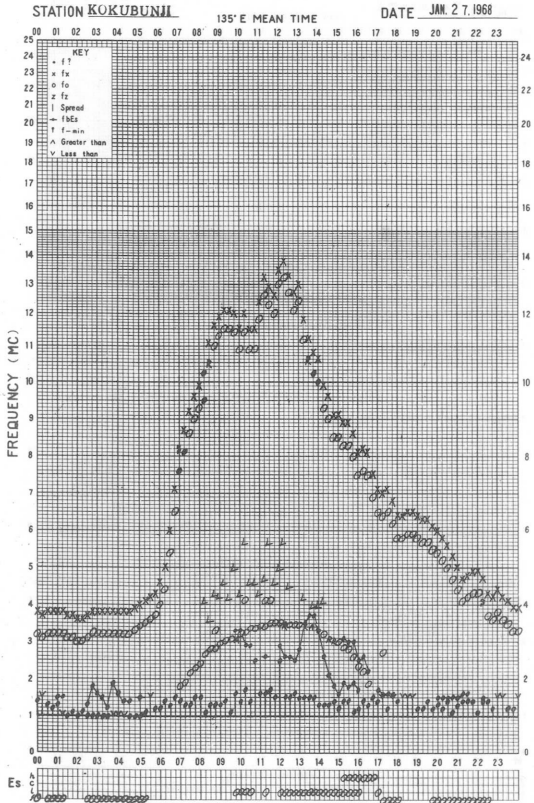


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135° E MEAN TIME DATE JAN. 27. 1968

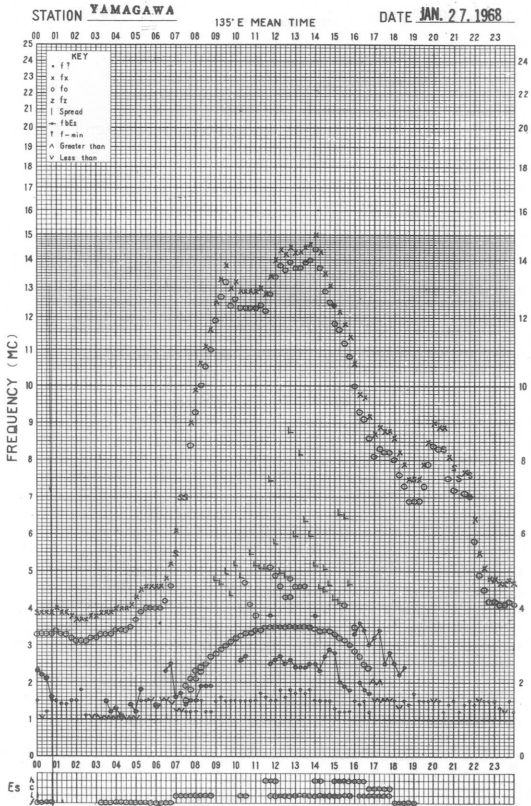


SCALED BY K. Yoshikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135° E MEAN TIME DATE JAN. 27. 1968

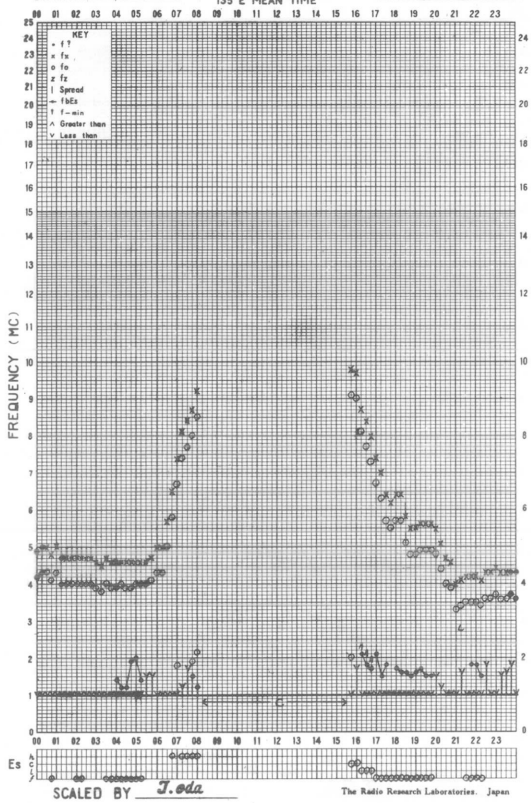


SCALED BY S. Ishitomo

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN. 28. 1968

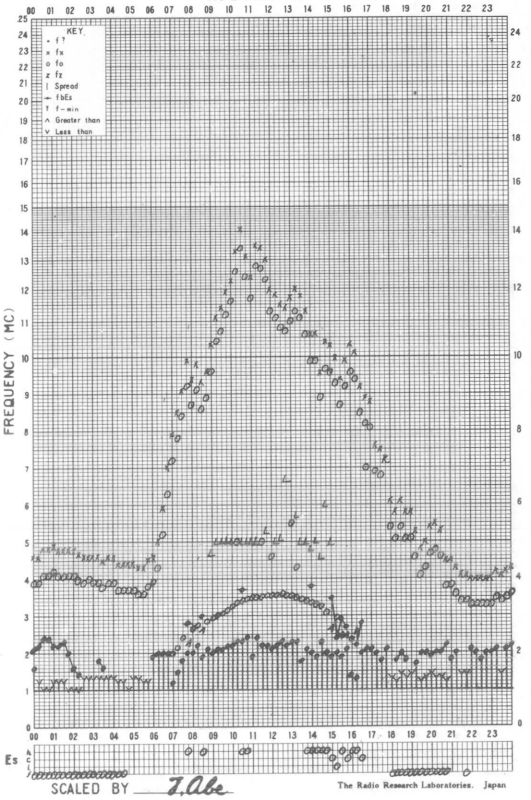


SCALED BY T. oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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

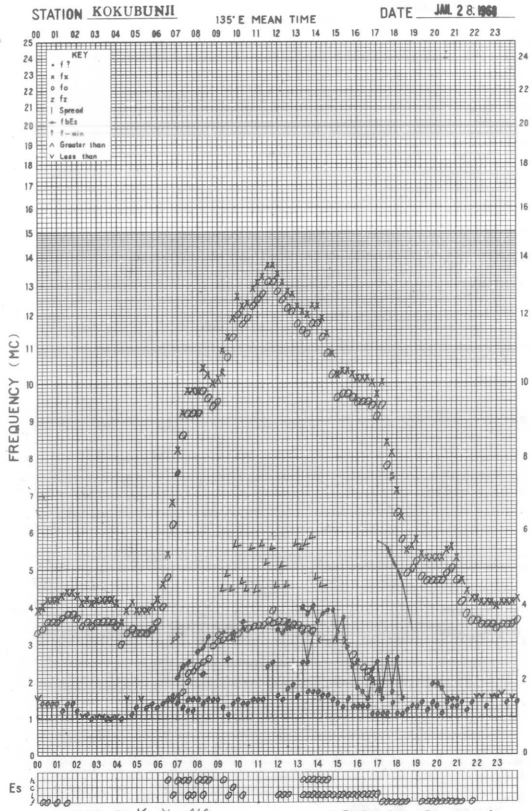


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 28. 1968

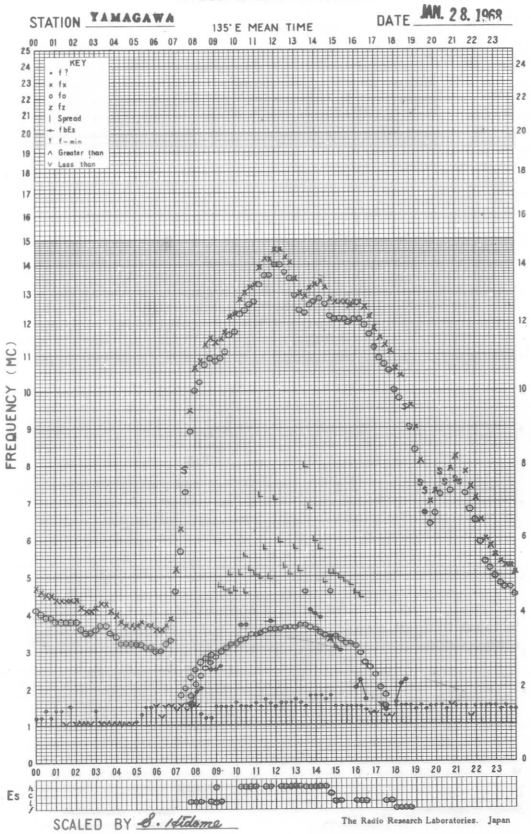


SCALED BY K. Yoshikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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

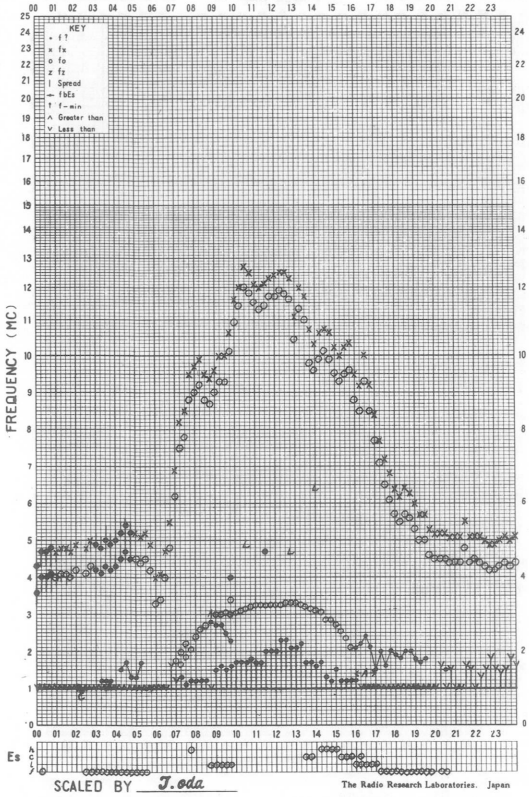


SCALED BY S. Hidaka

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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

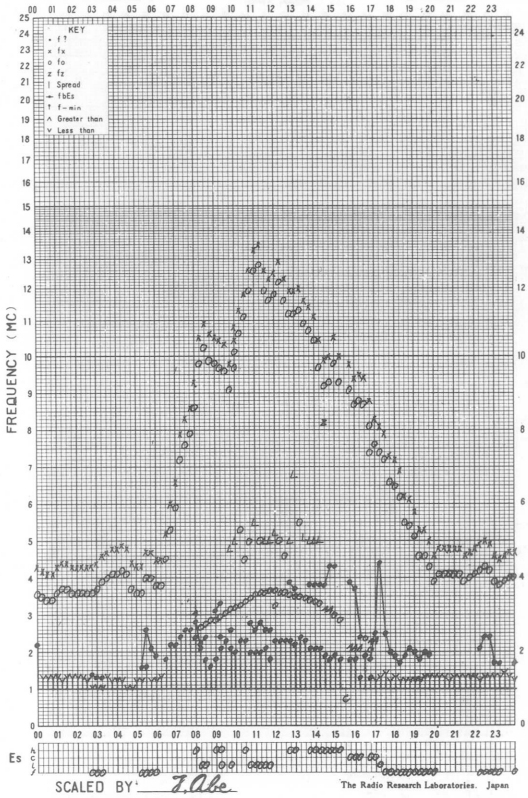


SCALED BY J. oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Jan. 29. 1968

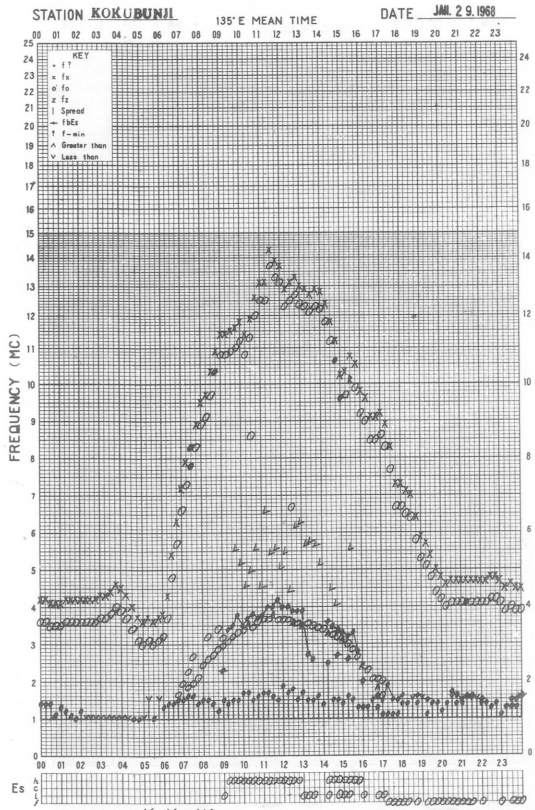


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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

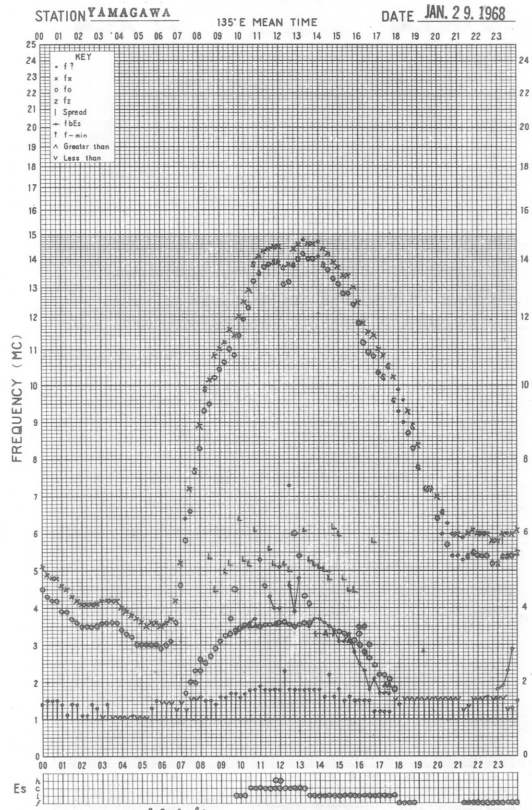


SCALED BY K. Yashikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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

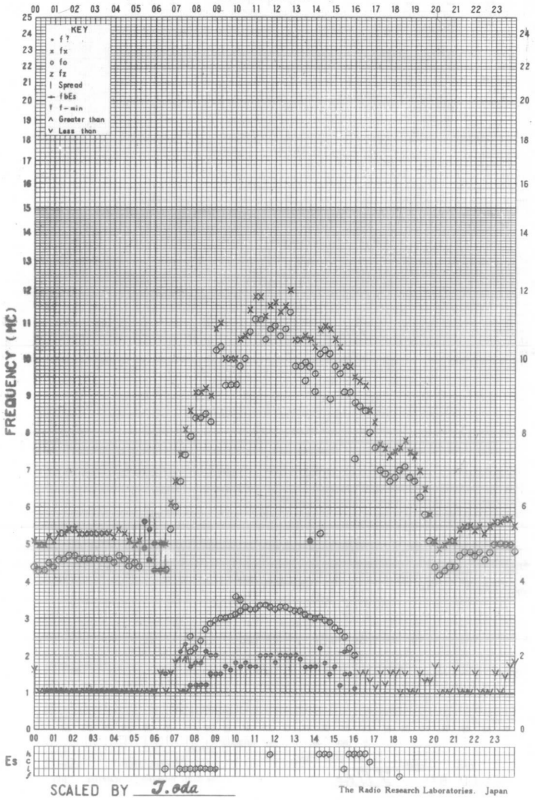


SCALED BY S. Takashima

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135° E MEAN TIME DATE JAN. 30. 1968

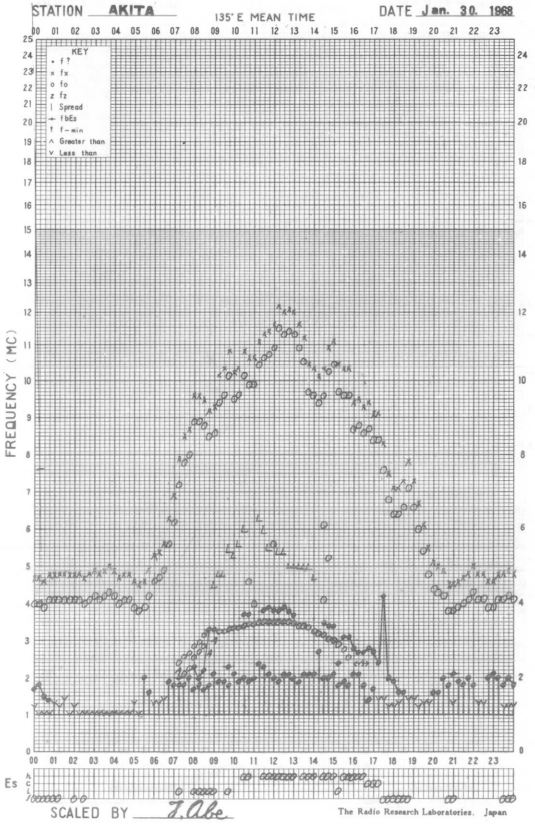


SCALED BY J. oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135° E MEAN TIME DATE Jan. 30. 1968

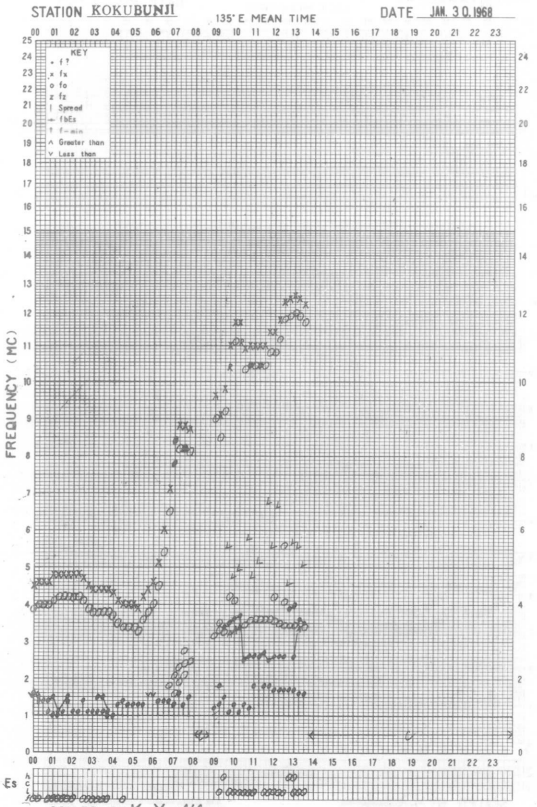


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135° E MEAN TIME DATE JAN. 30. 1968

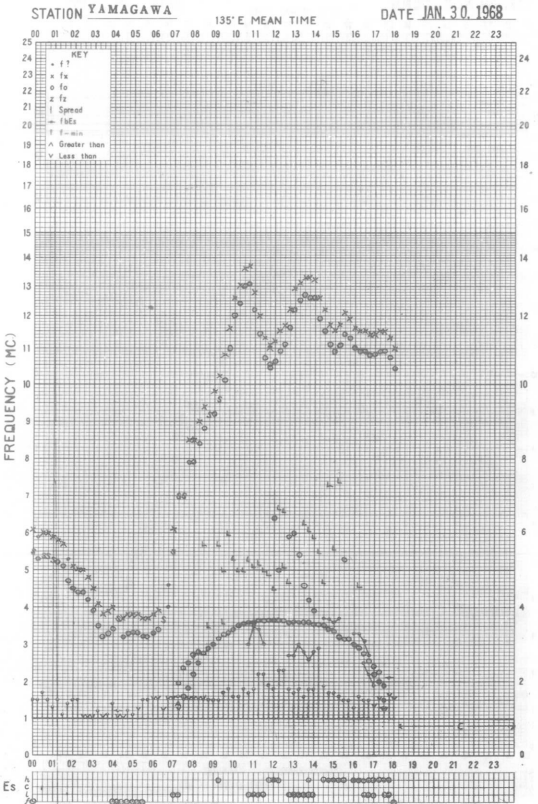


SCALED BY K. Yoshikawa

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135° E MEAN TIME DATE JAN. 30. 1968

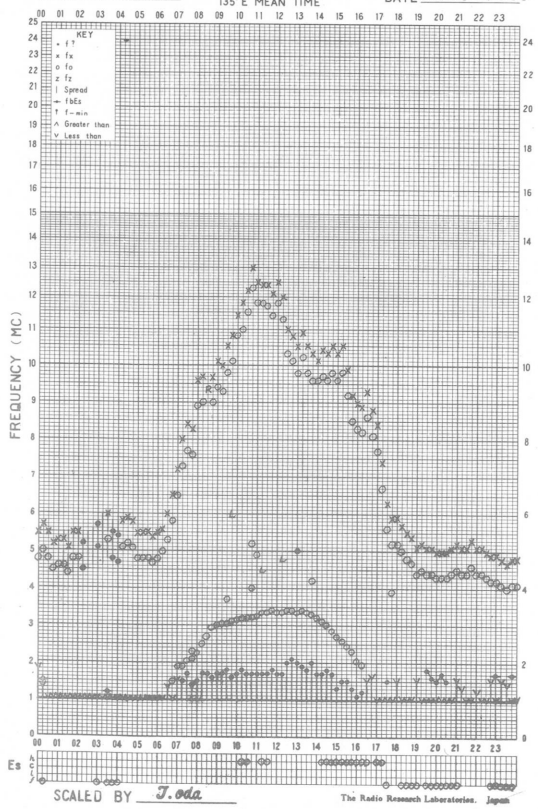


SCALED BY S. Nakashima

The Radio Research Laboratories. Japan

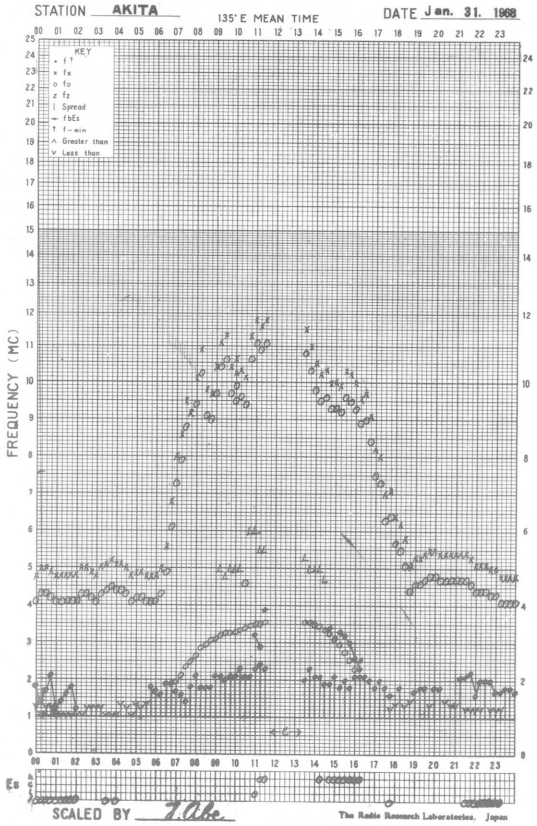
f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN. 31.1968



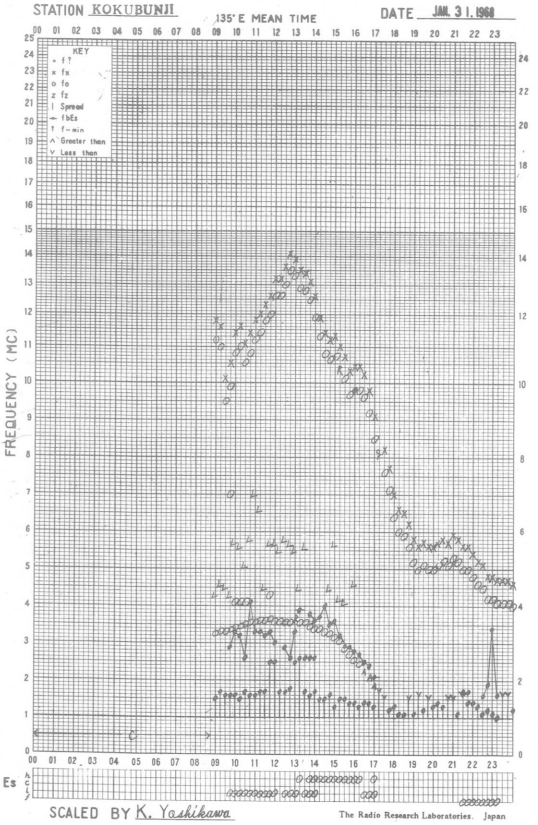
f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Jan. 31. 1968



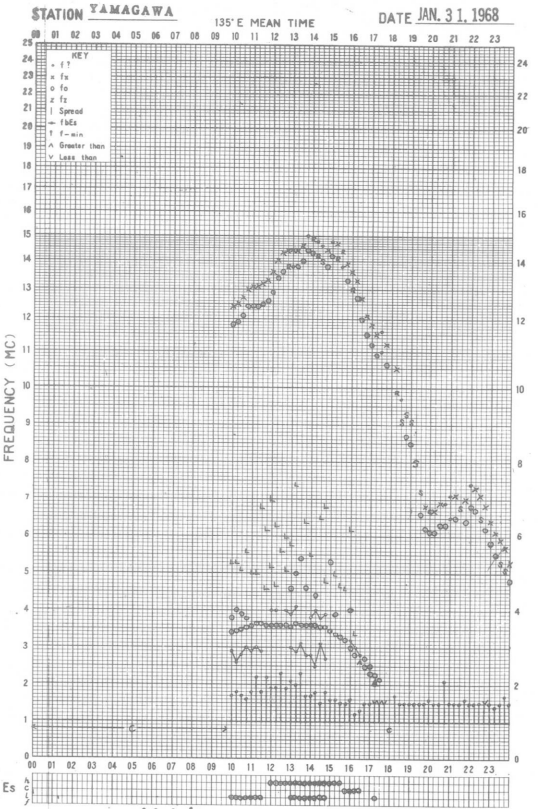
f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 31. 1968



f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE JAN. 31, 1968



SOLAR RADIO EMISSION

Flux Density and Variability

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

UT	Flux density 10^{-22} Wm^{-2}(Hz)$^{-1}$					Variability 0 to 3				
Date	00-03	03-06	06-09	21-24	Day	00-03	03-06	06-09	21-24	Day
1	7	6	-	(7)	7	1	1	-	(1)	1
2	7	6	-	(6)	7	0	1	-	(0)	1
3	7	7	-	-	7	1	0	-	-	0
4	6	6	-	(7)	6	0	0	-	(1)	0
5	7	7	-	(7)	7	1	1	-	(0)	1
6	7	8	-	(9)	7	1	1	-	(1)	1
7	8	8	-	(8)	9	1	1	-	(1)	1
8	8	8	-	(16)	8	2	1	-	(1)	1
9	11	10	-	-	11	1	1	-	-	1
10	14	14	-	(12)	14	1	1	-	(1)	1
11	13	16	-	(7)	14	2	2	-	(1)	2
12	7	7	-	(7)	7	1	1	-	(1)	1
13	7	7	-	-	7	1	1	-	-	1
14	7	(6)	-	-	(7)	0	(1)	-	-	(1)
15	-	-	-	-	-	-	-	-	-	-
16	-	-	-	6	-	-	-	-	0	-
17	7	-	-	6	(6)	0	-	-	1	(0)
18	6	7	(7)	6	6	1	0	(0)	0	1
19	6	6	(6)	6	6	0	0	(1)	0	0
20	6	6	(6)	-	6	0	0	(0)	-	0
21	6	7	-	5	6	0	1	-	1	1
22	6	7	(6)	7	6	1	0	(0)	1	1
23	6	6	(6)	8	6	1	1	(1)	1	1
24	9	11	(8)	-	9	1	1	(1)	-	1
25	8	10	(8)	10	9	1	1	(0)	1	1
26	11	10	-	25	10	1	0	-	1	1
27	28	16	(17)	28	21	1	1	(1)	2	1
28	32	41	(47)	25	40	2	2	(2)	2	2
29	39	62	(81)	83	52	1	1	(1)	1	1
30	70	77	(71)	28	75	1	1	(1)	1	1
31	30	28	(21)	180	28	1	1	(1)	1	1

Note No observations during the following periods:

3rd	2150-	4th	0100	17th	0140-		0750
9th	2150-		2400	20th	2150-		2400
13th	2150-		2330	21st	0500-		0750
14th	0200-		0500	24th	2150-		2400
14th	2150-	16th	0750	26th	0540-		0750

SOLAR RADIO EMISSION

Flux Density

Month: January 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	28	29	-	(28)	28
2	29	30	-	(28)	30
3	28	28	-	(29)	28
4	31	31	-	(30)	31
5	35	33	-	(36)	33
6	36	35	-	(34)	36
7	35	35	-	(36)	35
8	38	38	-	(38)	38
9	37	36	-	(36)	36
10	37	36	-	(34)	36
11	37	41	-	(41)	38
12	40	41	-	(37)	41
13	38	39	-	(39)	38
14	39	39	-	(37)	39
15	37	37	-	36	37
16	38	39	(38)	38	38
17	36	37	(35)	33	37
18	35	35	(34)	33	35
19	33	34	(33)	-	33
20	32	30	(31)	31	31
21	30	30	(32)	29	30
22	30	31	(29)	28	30
23	32	31	(30)	30	30
24	33	34	(33)	33	33
25	34	36	(33)	33	34
26	39	37	(40)	36	37
27	39	37	(36)	34	37
28	35	37	(35)	32	36
29	36	37	(38)	34	36
30	37	38	(38)	32	37
31	(40)	41	(40)	66	38

Note No observations during the following periods:

19th	2150-	2400
23rd	0000-	0100
31st	0000-	0200

Distinctive Events

(single-frequency observations)

Month: January 1968
Observing station: Hiraiso
Normal observing period: 2150 - 0750 (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	
2	500	0523	0524.3	8.0	C	3800	90	
	200	0522.5	0524.5	13.5	C	725	60	
4	200	2238	2240.0	9.0	C	250	10	
5	500	0457.5	0458.5	8.5	C	35	15	1st peak
			0503.8			80		2nd peak
	200	0457.6	0458.2	4.5	C	590	30	
7	200	0013.9	0014.4	2.0	C	170	50	
		0026.3	0026.5	0.8	C	170	75	
		0305.0	0307.0	2.5	C	230	190	
	500	0336.0	0336.4	1.0	C	130	15	
	200	0336.0	0336.5	3.0	C	200	40	
8	500	0650.0	0653.3	8.0	C	135	25	
	200	0649.6	0651.0	5.8	C	760	40	
9	500	0013.5	0016.0	10.5	C	100	20	
	200	0011.5	0013.8	9.0	C	740	85	
	500	0108.0	0110.8	9.0	C	540	110	
	200	0108.0	0114.0	8.0	C	430	150	
	500	0510.0	0511.0	5.0	C	250	10	
	200	0512.0	0512.5	4.5	C	225	10	
	200	0719.0	0719.8	6.0	C	~700	~30	
	500	2356.0	2356.5	1.0	C	580	100	
11	500	2340.5	2343.0	3.5	C	120	5	
	200	2340.0	2342.0	4.0	C	50	20	
12	500	0133.5	0136.0	5.0	C	65	10	
	200	0133.2	0136.5	4.0	C	340	30	
13	500	0141.0	0141.2	5.5	C	230	15	
	200	0140.5	0141.0	4.5	C	240	20	
	500	0341.5	0350.8	5.3	C	155	20	
		0406.7	0407.5	7.0	C	630	55	
	200	0406.0	0407.5	6.5	C	330	20	
	500	0629.5	0632.0	6.0	C	720	15	
	200	0628.5	0631.0	3.5	C	25	10	
17	200	2217.3	2218.0	1.0	C	470	90	
22	200	2333.0	2333.1	3.0	C	380	90	
27	500	0132.5	0132.5	2.0	C	710	20	
	200	0132.0	0134.2	3.0	C	700	100	
28	200	2357.0	2357.5	1.5	C	1420	300	

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

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

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

Jan. 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	6	6	14	-16	21	27	31	27	15	6	- 3	0	1	<-10s	<-27s	<-31s	<-31s	<-31s	-22	-22	1	9	10	6
2	6	7	20	22	21	8	23	4	26	23	16	- 9	- 9	<-11s	- 3	13	-13	<-19s	8	12	10	17	10	11
3	9	13	16	22	25	29	26	20	15	< 7s	<- 3s	<- 6s	<-14s	<-29s	<-29s	<-29s	<-29s	<-30s	<-30s	<-30s	4	2	5	1
4	4	6	11	21	21	16	8	11	- 4	<- 5s	21	- 9	- 7	- 7	<-21s	<-22s	<-31s	<-31s	-23	- 2	12	7	<-10s	3
5	5	7	11	23	24	29	29	18	2	1	1	- 2	- 7	<-14s	<-29s	<-30s	<-30s	<-31s	3	-16	13	10	4	6
6	4	10	14	19	22	32	27	19	5	17	10	10	12	<- 2s	<-26s	<-26s	<-30s	-22	<-30s	S	7	10	C	C
7	4	6	13	18	24	21	20	18	0	- 2	< 2s	- 3	- 2	- 5	- 8	-17	<-23s	<-29s	<-29s	-16	7	10	<-11s	- 1
8	1	5	18	13	20	23	27	23	20	14	10	2	- 4	- 5	<-22s	<-25s	<-25s	-20	-14	-22	0	8	5	4
9	0	8	8	15	21	24	24	23	23	10	1	1	0	- 1	-11	-21	<-26s	-22	-22	-23	4	7	7	5
10	4	- 2	11	14	23	25	23	21	22	16	20	- 5	- 6	<- 9s	<-26s	-24	<-30s	-16	<-26s	<-26s	8	11	11	- 6
11	10	10	13	21	20	33	S	16	3	1	- 1	- 3	- 5	- 6	-17	<-29s	-16	-17	-17	-18	5	11	6	3
12	8	5	8	17	24	28	26	22	27	28	4	<- 5s	0	- 2	-10	-18	<-31s	<-31s	<-31s	<-31s	8	9	5	7
13	7	4	15	17	25	28	20	18	27	26	1	<- 1s	- 4	<- 4s	- 8	-22	<-25s	-21	<-26s	<-26s	7	8	5	4
14	2	10	10	11	19	23	24	34	26	24	4	0	3	- 9	<-28s	<-28s	<-28s	<-28s	<-28s	<-28s	3	7	10	7
15	4	8	13	17	18	22	21	21	3	5	<- 5s	- 6	- 5	-12	<-29s	<-29s	<-29s	<-29s	<-29s	<-28s	4	12	8	7
16	6	10	10	13	18	15	27	23	21	- 1	- 5	- 4	-13	-22	<-27s	<-27s	<-27s	<-27s	<-27s	<-27s	10	9	9	3
17	6	13	16	14	24	7	26	26	21	7	- 4	- 6	- 9	-18	-25	<-29s	<-29s	<-29s	<-29s	- 9	11	14	6	5
18	6	7	19	6	22	12	29	17	13	27	- 1	- 9	<-27s	<-28s	<-28s	<-29s	<-29s	<-29s	<-29s	<-29s	7	13	10	11
19	16	12	18	28	27	21	9	26	23	19	< 5s	2	- 7	<- 9s	-16	<-20s	<-24s	<-24s	<-24s	<-20s	9	15	15	11
20	6	6	10	16	24	27	5	13	10	6	1	- 1	<-17s	-19	<-27s	-27	<-31s	<-31s	<-31s	<-31s	10	11	C	C
21	C	C	C	C	C	C	- 3	19	22	7	< 3s	13	-15	-21	<-30s	<-22s	<-27s	<-27s	<-27s	<-28s	5	29	8	9
22	7	8	13	13	16	- 1	16	29	15	- 5	- 5	C	-10	-16	-20	<-28s	<-29s	<-29s	<-29s	-17	4	8	8	5
23	6	9	9	16	16	20	- 4	20	1	17	- 3	- 7	- 9	-18	-17	-17	-21	-17	<-29s	<-29s	4	14	7	3
24	4	3	8	14	17	14	21	21	18	- 5	- 4	<- 7s	<-11s	<-31s	C	C	C	C	<-31s	<-31s	2	6	4	1
25	2	6	4	17	19	21	- 4	16	14	0	<- 1s	<- 5s	-14	-17	-21	-16	<-25s	- 7	- 5	<- 9s	- 1	6	7	6
26	7	7	9	15	22	21	6	26	26	16	- 5	<- 5s	-10	-16	<-21s	<-30s	<-30s	<-30s	<-30s	<-30s	7	11	9	5
27	5	6	11	17	21	13	9	15	6	- 2	- 3	- 2	- 6	-21	<-30s	<-29s	<-29s	<-29s	<-29s	<-29s	6	5	6	5
28	3	8	11	16	24	26	27	17	19	16	- 2	<- 4s	- 5	- 3	- 6	-23	-23	-23	<-29s	<-29s	8	10	7	4
29	5	7	11	21	18	22	26	25	23	17	<- 4s	<- 4s	-10	-10	-15	-17	-14	-19	<-28s	<-28s	3	8	6	- 6
30	5	0	9	15	19	27	18	18	25	6	0	<- 5s	-11	<-13s	-14	<- 8s	<-27s	<-27s	-23	<-27s	4	13	2	- 1
31	2	4	11	14	16	24	23	26	22	8	- 1	- 3	1	- 6	-15	-19	-19	-22	-24	<-27s	3	- 7	3	S
Median	5	7	11	16	21	23	23	20	19	7	<(0)s	<- 4)s	- 7	<-11s	<-21)s	<-24s	<-27s	<-27s	<-27s	<-27s	6	10	7	5
Median Count	30	30	30	30	30	30	30	31	31	31	31	30	31	31	30	30	30	30	31	30	31	31	29	28
Upper decile	9	12	18	22	25	29	29	27	26	26	16	2	1	<- 2s	- 6	<- 8s	-16	-17	- 5	- 9	11	15	10	11
Lower decile	2	3	8	11	16	8	- 3	13	1	<- 5s	<- 5s	<- 9s	<-14s	<-28s	<-29s	<-30s	<-31s	<-31s	<-31s	<-31s	1	5	2	- 1

RADIO PROPAGATION QUALITY FIGURES

HIRAISO — Time in U.T.

Jan. 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	ΔH
1	4-	4 4 4	3 4 3 4	4 4 4 4	4 4 - 3	U N N N	---	---	
2	4o	4 4 4	3 4 4 4	4 4 4 4	4 5 5 5	N U U U	---	---	
3	4-	4 4 4	4 3 3 4	4 4 4 4	4 4 - (3)	N N N N	---	12xx	
4	4o	4 5 4	(3) 3 4 4	4 4 4 4	4 4 4 4	N N N N			
5	4o	4 4 4	4 5 3 4	4 4 4 4	4 4 - 4	N N N N			
6	4+	4 5 4	5 4 (4) 4	4 4 4 (4)	4 5 - 4	N N N N			
7	4o	3 4 5	4 4 4 4	4 4 4 (4)	4 4 - 3	N N N N			
8	4-	4 3 4	4 3 3 5	(4) 4 4 4	4 5 - 3	N N N N			
9	4-	3 3 4	4 3 4 4	4 (4) 4 4	4 4 - 4	N N N N			
10	4o	3 (4) 5	4 3 4 4	4 4 4 4	5 4 - 4	N N N N			
11	4-	3 4 4	4 4 3 4	5 4 (3 4)	4 4 - 4	N N N N	1252	---	58γ
12	5-	5 5 4	5 5 5 4	5 4 4 4	4 4 4 4	N N N N	---	---	
13	4+	4 4 5	4 5 5 4	4 4 4 4	4 4 - 4	N N N N	---	05xx	
14	4+	5 5 4	4 5 5 4	4 4 4 4	4 4 - 4	N N N N			
15	4+	5 5 3	4 5 5 4	4 4 4 4	4 4 - 4	N N N N			
(16)	4o	4 4 3	4 4 4 4	4 4 4 4	4 4 - 4	N N N N			
(17)	4o	4 5 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 3 4 4	4 4 4 (4)	4 4 - 4	N N N N			
20	4o	4 4 5	3 4 5 (4)	4 4 4 (4)	4 4 - (5)	N N N N			
21	4o	4 4 (4)	C 4 4 4	C 4 4 4	C 4 - 4	N N N N			
22	4o	4 4 4	4 (4) 4 (4)	4 (4) 4 4	4 4 - 4	N N N N			
23	4o	4 4 4	4 3 4 4	4 4 4 4	4 4 - 4	N N N N			
24	4-	4 4 3	4 3 3 4	4 4 4 4	4 4 - 4	N N N N			
25	4o	4 4 4	4 3 4 4	4 4 4 4	4 3 - 4	N N N N			
26	4o	4 4 4	4 3 4 4	4 4 4 (4)	4 4 - 4	N N N N			
27	4+	4 4 4	5 4 5 4	5 4 4 4	4 4 - 4	N N N N			
28	4+	5 4 4	5 4 4 4	4 4 4 4	4 4 - 4	N N N N			
29	4+	4 4 4	5 5 5 4	4 4 4 4	4 4 - 4	N N N N			
30	4o	5 4 4	5 5 4 3	4 4 4 3	4 4 - 4	N N N N			
31	4o	4 4 4	4 4 4 4	(3) 4 4 4	4 4 - 4	N N N N			

IQSY GEOALERT and ADALERT (Western Pacific Region)

* = MAGSTORM

° = MAGCALME

△ = 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.

Jan.	S W F										Correspondence		
	Drop-out Intensities (db)						Start-time	Dura-tion	Type	Imp.	Flare	Solar Noise	Mag.
1968	CO	SF	HA	TO	HB	SH							
1	- / 35'	22	35 / 30'	25			03.33	xx	G	3+			
2		60					05.22	25	S	3+	x	x	
4		11					22.41	12	S	1-	x	x	
5		12	4		6		04.56	13	Slow	1-		x	
7		11	-				21.55	20	Slow	1-			
9		14					00.15	18	S	1		x	x
14		25					20.10	xx	Slow	2-	x	x	
15		13					00.07	23	S	1		x	
17		10	11		-		05.10	60	Slow	1+		x	
30	- / -'	37	38 / 40		29	38 / 33'	05.06	16	S	3+			

IONOSPHERIC DATA IN JAPAN FOR JANUARY 1968

第20巻 第1号

1968年4月20日 印刷
1968年4月25日 発行

(不許複製非売品)

編集兼発行人 越智文雄
東京都小金井市貫井北町4の573

発行所 郵政省電波研究所
東京都小金井市貫井北町4の573
電話国分寺(0423)(21)1211(代)

印刷所 (有)丸井工文社
東京都千代田区神田猿楽町2の8
電話 (292) 0841(代)