F—251

IONOSPHERIC DATA IN JAPAN

FOR NOVEMBER 1969

VOL. 21 No. 11

Issued in February 1970

Prepared by

THE RADIO RESEARCH LABORATORIES

MINISTRY OF POSTS AND TELECOMMUNICATIONS

TOKYO, JAPAN

F−251

IONOSPHERIC DATA IN JAPAN

FOR NOVEMBER 1969

Vol. 21 No. 11

RADIO RESEARCH LABORATORIES

NUKUI-KITAMACHI, KOGANEI-SHI, TOKYO, JAPAN

CONTENTS

SITE OF THE RADIO WAVE OBSERVATORIES AND HIRAISO BRANCH

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.	Nukui-Kitamachi, 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. and Inubo Radio Wave Observatory.

	Latitude	Longitude	Site
Hiraiso	36°22.0′N.	140°37.5′E.	Isozaki-machi, Nakaminato-shi, Ibaraki-ken
Inubo	35°42.2′N.	140°51.5′E.	9912 Tennodai, Choshi-shi, Chiba-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 component 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 *Es*.

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. Definitions of the CNT, MED, UQ and LQ

Median count (CNT) is the number of values from which a median has been computed. In addition to numerical values, the count may include certain descriptive letters.

Median (MED) of a set of numbers is the middle value when the numbers are arranged in order of magnitude, or the average of the two middle values if there is an even number of values.

Upper quartile (UQ) is the median value of the upper half of the values when they are ranked according to magnitude; the *lower quartile* (LQ) is the median value of the lower half.

d. Description of Standard Types of *Es*

The eight standard types of *Es* are identified by corresponding capital letters: *F*, *L*, *C*, *H*, *Q*, *R*, *A*, *S*. These letters suggest the names flat, low, cusp, high, equatorial, retardation, auroral and slant, respectively. The letter '*N*' is used to designate any *Es* trace that does not correspond to any of the eight types.

F An *Es* 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 *Es* traces observed in the daytime are classified according to their virtual hight: *H* or *L*.

L A flat *Es* 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 *Es* 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 *Es* 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 *Es* trace lying clearly above the high frequency end of the normal *E* trace. (Usually a daytime type.)

Q An *Es* 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 *Es* 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 *Es* 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 *Es* trace which rises steadily with frequency and usually emerges from another type *Es* 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 *Es* trace such as *Es-L* or *Es-F*, at frequencies which greatly exceed the *E* layer critical frequency, whereas at low latitudes it usually rises from *Es-Q* *Es-C* or *Es-H* at frequencies near the regular *E* critical frequency. Type *S* is never used to determine f_0Es and $h'Es$. The slant trace is sometimes observed to start at f_0E without echoes clearly identifiable as *Es* echoes being seen.

N The designation '*N*' is used to denote an *Es* 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.

e. Multiple Reflections from *Es*

When the ionogram shows the presence of multiple reflections from *Es* 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 MHz at Hiraiso Branch.
Antennas are two parabolic reflectors : 10 meter for 200 MHz and
5 meter for 500 MHz, 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}Hz^{-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 MHz 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.

Bracket means that observation time does not exceed one third of the period.

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 Strengths of WWV and WWVH

Field Strengths 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 Hz is picked up by the use of a narrow band pass filter with ±40 Hz bandwidth.

The *tabulated field strength* 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	λ/2 vertical	λ/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 Hz 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.

U: Inaccurate measurement influenced by interferences, atmospherics, or non-propagational reasons.

E: 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 MHz frequencies broadcast from Fort Collins, Colorado), Lima (commercial circuit) and WWVH (10 and 15MHz frequencies broadcast from Hawaii), which are received at Hiraiso Branch.

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 Lima.

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

c. Sudden Ionospheric Disturbances (S.I.D's.)

(i) SWF

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 MHz 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 MHz (Fort Collins, Colorado)
L M .....Various frequencies of commercial circuit (Lima)
H A .....WWVH 15 and 10 MHz (Hawaii)
T O .....JJY 15 and 10 MHz (Tokyo)
S H .....BPV 15 and 10 MHz (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 of phenomena associated 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.

(ii) SPA

The data of sudden phase anomaly (SPA) are prepared from the records of phase measurement of VLF radio wave propagation received at Inubo Radio Wave Observatory. Characteristics of the VLF radio wave propagation are as the following table. In the last column, a spherical earth with a radius of 6371.2 km is assumed.

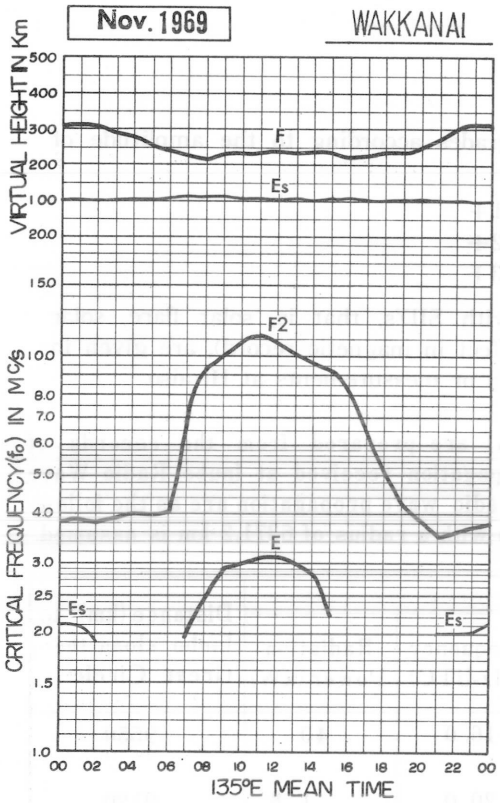
Transmitting Site					Distance (km) to Inubo along the Great Circle
Name	Location (Geographic Coordinate)	Station Call	Frequency (kHz-UTC)	Radiation Power (kW)	
Rugby	52° 22′ N 001° 11′ W	GBR	16.0	40	9550
Fort Collins	40° 41′ N 105° 03′ W	WWVL	20.0	1.8	9190
Cutler	44° 39′ N 067° 12′ W	NAA	17.8	1000	10650
North West Cape	21° 49′ S 114° 10′ E	NWC	22.3	1000	6990
Lualualei	21° 26′ N 158° 10′ W	NPM	23.4	300	6070
Jim Creek	48° 12′ N 121° 55′ W	NPG	18.6	250	7620
Haiku	21° 24′ N 157° 50′ W	HA0 HA2 HA3	10.2 12.2 13.6	2	6100
Aldra	66° 25′ N 013° 09′ E	AL0 AL2 AL3	10.2 12.2 13.6	4	7820

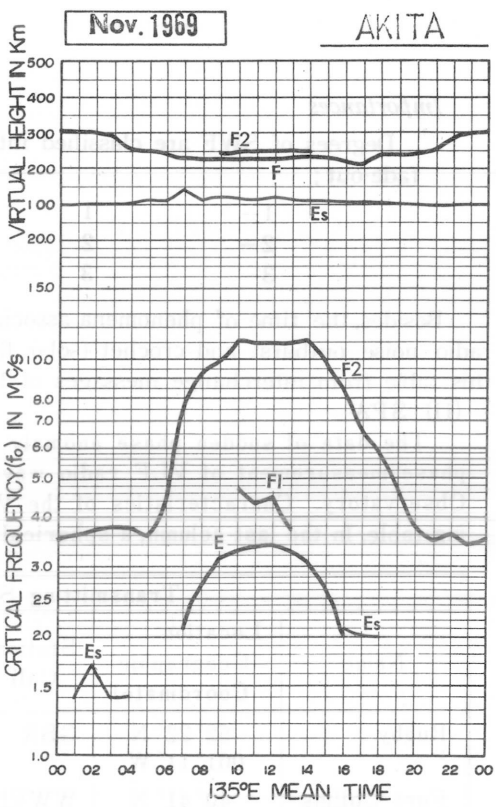
The phase advance is shown in its maximum stage. In the column 'Phase Advance', —means no transmission or no reception during the period, and blank means indistinguishable record.

Out of more than two circuits to have observed the same SPA event listed in the text, the phase advance on some circuit on which the event is the most remarkable or distinct is underlined. As for the underlined phase advance, the starting, the ending, and the maximum times are described.

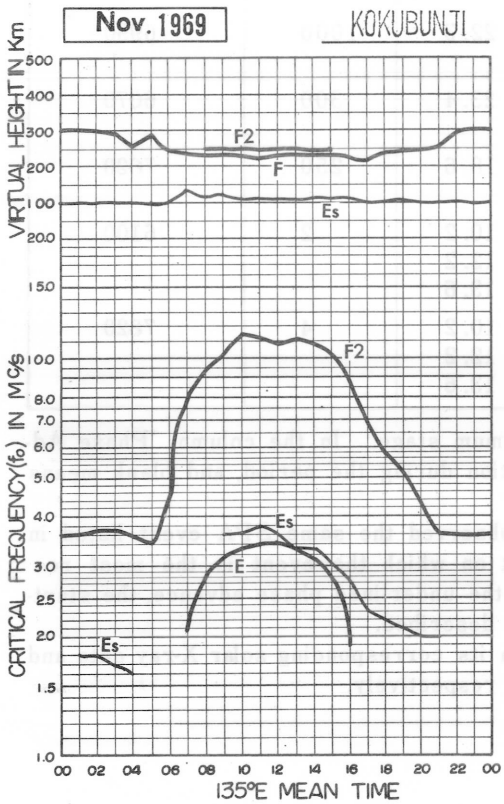
In the column 'Remarks', the event with its corresponding solar X-ray data and solar radio data is shown by 'X' and 'R', respectively.

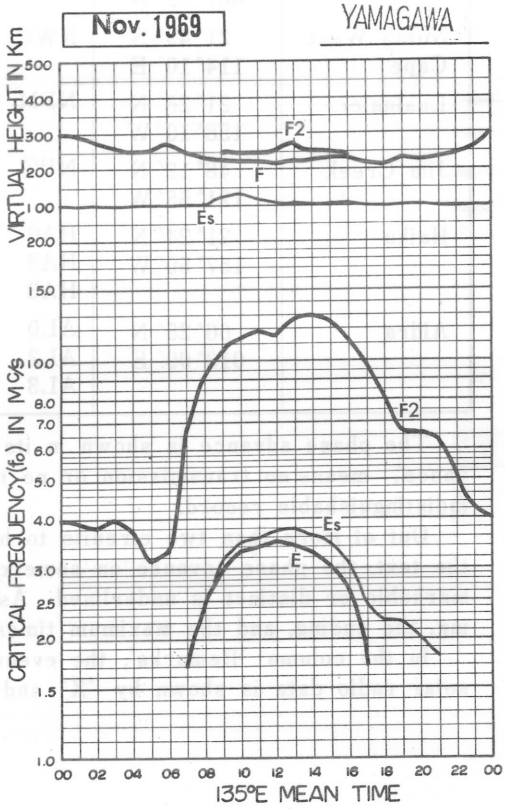
IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS





IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS





IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: WAKKANAI

Nov. 1969

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	038	039	038	039	040	040	040	070	094	100	108	112	108	101	096	092	082	062	051	042	039	035	036	037
	CNT	28	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	29
	Q R	006	009	005	006	005	005	010	011	016	021	025	015	016	014	011	012	017	018	016	009	007	007	007	007
foF1	MED											390	400	430											
	CNT											2	3	2											
foE	MED								195	242	290	300	305	305	300	278	220	E							
	CNT								17	26	26	28	29	29	27	26	24	4							
foEs	MED	021	021	019	E015E	E015E	E014E	E015S	G	G	028	G	G	G	E020G	G	G	E018G	E016E	E016E	017	E016E	020	020	020
	CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
	Q R	D008	D010	D006														D011	D013		D008	D009	D012	D008	D009
f-min	MED	E015S	E014S	E014S	E	E	E	E014S	014	015	016	016	017	017	017	015	015	E015S	E015S	E015S	E015S	E014S	E014S	E015S	E015S
	CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
M (3000) F2	MED	265	270	270	278	280	293	305	330	338	330	325	320	322	320	320	320	325	310	308	310	300	280	272	270
	CNT	28	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	29
M (3000) F1	MED											412	400	408											
	CNT											2	3	2											
h'F2	MED											238	230	235											
	CNT											2	3	3											
h'F	MED	312	310	308	290	280	248	240	222	220	228	228	232	235	230	238	235	220	225	228	242	250	275	300	315
	CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30
h'Es	MED	100	100	100	100	105	102	105	110	112	115	110	105	105	108	102	110	110	105	105	105	105	105	102	102
	CNT	19	18	17	10	11	6	4	10	12	17	13	10	10	14	12	12	14	13	13	14	13	17	16	18
hpF2	MED																								
	CNT																								
ypF2	MED																								
	CNT																								

IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: AKITA

Nov. 1969

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	037	038	033	036	044	077	093	099	111	110	109	110	101	096	083	066	058	048	038	035	036	034
	CNT	29	29	29	29	29	29	29	28	27	27	29	30	29	29	29	29	29	30	29	29	29	29	29	29
	Q R	005	006	005	005	006	005	009	011	005	022	019	017	011	011	011	012	016	015	013	008	008	006	005	003
foF1	MED								260	320	360	470L	430	450	370	405	320								
	CNT								1	1	1	5	7	7	5	2	1								
foE	MED								210	270	315	325	335	340	330	305	260	200							
	CNT								28	28	28	28	29	26	24	25	26	15							
foEs	MED	E014S	014	017	014	014	E014S	E014S	G	G	G	029G	G	G	G	029G	E027G	021	J020X	J020X	E014S	E014S	E014S	E014S	E014S
	CNT	29	29	29	29	29	29	29	29	29	29	29	30	28	28	28	30	29	30	28	28	28	28	29	29
	Q R	D012	D005	D006	D003			D005											D012	D017	D020	D011	D013	D009	D008
f-min	MED	E014S	E014S	E013S	E013S	E013S	E014S	E013S'	015	015	016	016	018	018	017	017	015	014	E014S	E014S	E014S	E014S	E014S	E014S	E014S
	CNT	29	29	29	29	29	29	29	29	29	29	30	30	29	29	29	30	29	30	28	28	28	28	29	29
M (3000) F2	MED	275	270	280	290	290	290	305	332	335	325	325	320	315	320	315	320	325	310	310	310	300	290	280	280
	CNT	29	29	29	29	29	29	29	28	27	27	29	30	29	29	29	29	29	30	29	29	29	29	29	29
M (3000) F1	MED								400	425	420	360L	380	380	390	375	405								
	CNT								1	1	1	5	7	7	5	2	1								
h'F2	MED								230	230	245	245	248	255	250	255	230								
	CNT								1	4	23	29	30	29	25	9	1								
h'F	MED	310	305	305	290	255	255	245	230	230	230	230	228	230	240	240	235	225	215	240	235	245	255	290	300
	CNT	29	29	29	29	29	29	29	29	29	29	30	30	29	29	29	30	30	30	29	29	29	29	29	29
h'Es	MED	100	105	105	105	105	108	110	148	115	120	120	115	120	115	115	115	112	110	110	105	105	105	105	105
	CNT	11	14	15	11	9	6	9	6	11	13	15	13	13	13	16	15	18	18	16	12	12	13	13	12
hpF2	MED																								
	CNT																								
ypF2	MED																								
	CNT																								

IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: KOKUBUNJI

Nov. 1969

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	037	036	034	045	080	094	101	114	111	108	111	109	102	088	070	057	051	043	036	036	036
	CNT	28	29	30	29	30	30	30	27	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30
	Q R	007	006	005	004	006	006	008	011	017	020	017 .	015	012	011	012	014	016	024	016	012	010	010	005	006
foF1	MED													400L											
	CNT													1											
foE	MED							190	205	285	315	330	340	345	332	315	275	188							
	CNT							1	21	21	15	12	13	17	18	16	18	10							
foEs	MED	E016S	018	018	017	016	E015B	E016B	G	G	036	036	038	036	033	033	030	027	J023X	022	021	020	020	E016	E016
	CNT	28	29	30	30	30	30	30	29	30	30	28	30	30	30	28	30	29	30	30	30	30	30	30	28
	Q R	D006	D007	D006	D007	D010	D006	D006			004	006							D014	D014	008	D009	D008	D006	D008
f·min	MED	E015S	E015S	11012	E015S	011	E015S	014	015	015	015	016	018	018	016	016	015	015	014	E015S	E015S	E015S	E015S	E015S	E015S
	CNT	28	29	30	30	30	30	30	29	30	30	28	30	30	30	28	30	29	30	30	30	30	30	30	28
M (3000) F2	MED	278	275	280	290	295	290	310	335	335	328	322	318	310	305	315	318	328	320	315	320	310	300	280	275
	CNT	28	29	30	29	30	30	30	27	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30
M (3000) F1	MED													405L											
	CNT													1											
h'F2	MED									248	250	250	250	250	250	250	250								
	CNT									16	28	25	29	27	26	17	5								
h'F	MED	300	300	300	290	258	290	250	238	240	235	230	225	230	240	240	240	225	210	240	240	245	255	290	300
	CNT	28	29	30	29	30	30	30	30	30	30	30	30	30	30	29	30	30	30	29	30	30	29	30	30
h'Es	MED	100	100	100	100	100	100	100	140	115	125	112	115	115	110	110	110	112	100	105	100	100	100	100	100
	CNT	10	17	16	16	15	8	11	13	13	25	22	21	19	19	15	17	20	20	19	23	17	17	13	13
hpF2	MED	380	380	368	350	325	350	310	270	270	290	290	300	300	308	300	300	280	290	300	300	310	330	375	380
	CNT	28	29	30	29	30	30	30	27	30	30	30	30	30	30	29	30	30	30	30	30	30	29	30	30
ypF2	MED	100	095	098	090	098	090	098	080	070	082	082	090	090	090	090	090	082	090	090	095	090	090	100	100
	CNT	28	29	30	29	30	30	30	27	30	30	30	30	30	30	29	30	30	30	30	30	30	29	30	30

IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: YAMAGAWA

Nov. 1969

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	040	039	038	040	038	031	033	066	091	104	113	113	115	126	128	124	112	098	082	066	065	062	052	042
	CNT	28	28	28	28	27	28	28	28	27	28	28	28	28	28	28	29	29	29	28	28	28	28	28	28
	Q R	013	009	008	010	010	006	008	010	017	016	022	011	016	015	013	018	016	019	023	012	013	014	010	013
foF1	MED									280	370L	U425L	U465L	465L	490L	395	355	310	220						
	CNT									1	1	4	2	2	3	2	4	2	1						
foE	MED								170	250	300	328	340	350	345	330	305	260	170						
	CNT								12	27	28	26	23	22	21	21	23	22	9						
foEs	MED	E015S	E015B	E014B	E012B	E012B	E015B	019	017	G	032	035	036	037	038	036	035	J031X	J024X	J022X	022	020	018	E015	E015S
	CNT	28	28	28	28	28	28	27	28	27	28	28	27	28	28	28	29	29	29	28	28	28	28	28	28
	Q R		D006				D008	D007	D008		012	003	006	008	006	014	016	008	010	D013	D009	D010	D009	D007	
f·min	MED	015	015	014	012	012	014	E015S	E015S	014	015	015	017	018	018	017	016	015	015	E015E	015	015	015	015	015
	CNT	28	28	28	28	28	28	27	28	27	28	28	27	28	28	28	29	29	29	28	28	28	28	28	28
M (3000) F2	MED	270	270	280	283	300	270	290	318	335	330	322	315	305	295	300	305	315	320	308	300	300	295	290	282
	CNT	28	28	28	28	27	28	28	28	27	28	28	23	28	23	28	29	29	29	28	28	28	28	28	28
M (3000) F1	MED									395C	420L	U395L	U335L	395L	355L	430	395	413	405						
	CNT									1	1	4	2	2	3	2	3	2	1						
h'F2	MED									245	245	245	250	255	275	255	250	238	230						
	CNT									3	24	28	28	28	27	28	25	6	2						
h'F	MED	299	298	278	268	251	258	272	245	235	228	225	224	218	225	225	230	230	220	208	222	229	230	242	260
	CNT	28	28	28	28	28	28	27	28	27	28	28	28	28	28	26	28	28	29	28	28	28	28	28	28
h'Es	MED	100	100	100	100	100	100	100	100	110	125	130	120	112	112	105	105	108	100	100	100	100	100	100	100
	CNT	4	9	3	5	5	8	14	14	9	22	24	21	24	22	25	24	26	23	20	17	17	14	12	6
hpF2	MED																								
	CNT																								
ypF2	MED																								
	CNT																								

IONOSPHERIC DATA

NOV. 1969 | FOF2 (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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	48	48	48	45	42	51	93	124	117	121	131	118	111	105	106	105	75	63	58	50	47	44	43
2	43	43	43	43	43	40	50	82	99	108	115	118	125	106	116	117	97	83	75	64	50	44	44	44
3	43	43	38	43	45	49	44	83	98	126	130	131	131	120	117	111	103	84	70	64	53	50	48	43
4	42	42	41	44	46	42	47	82	113	131	134	138	124	109	112	108	102	77	59	48	47	43	S 40	42
5	43	43	40	39	37	36	47	79	99	114	122	107	123	102	92	98	93	63	63	56	54	38	38	38
6	U S 36	38	38	41	40	38	44	U S 78	97	104	120	127	118	98	90	88	86	67	51	40	40	40	39	38
7	38	39	39	39	40	41	48	78	88	101	106	106	104	95	103	97	95	70	61	51	40	36	36	40
8	38	40	40	40	39	38	45	78	106	114	123	116	116	104	103	90	83	78	63	40	I A 33	31	34	33
9	36	35	36	39	42	43	40	S 78	87	130	119	116	120	113	101	92	83	94	63	46	43	45	36	40
10	40	S 39	37	39	U S 42	U S 42	44	71	94	136	128	135	118	96	101	100	84	71	63	53	42	A	U S 33	S 39
11	39	U S 36	41	43	41	U S 37	43	80	99	99	126	104	110	103	95	89	80	Z 53	45	40	38	38	35	33
12	F 32	F 33	33	37	40	44	38	68	83	97	104	107	100	87	94	86	63	55	49	41	36	35	40	S 36
13	S 36	41	I S 37	S 37	I S 37	S 41	45	68	88	84	92	106	110	90	84	83	68	48	43	36	35	U S 41	I S 41	U S 40
14	41	43	41	F 40	37	37	39	66	76	92	105	107	121	101	86	91	73	50	44	33	34	35	37	U S 35
15	35	I S 36	U S 38	37	41	U S 37	37	S 73	85	88	H 93	99	94	89	83	86	76	51	44	38	33	30	33	34
16	33	S 32	36	36	38	40	35	67	83	87	96	108	93	96	93	82	87	51	49	37	31	S 33	33	33
17	34	34	36	36	37	38	36	74	81	93	88	106	90	83	84	81	74	47	44	I A 42	37	S 40	40	S
18	S	S	U S 44	50	52	50	44	I S 77	U S 95	93	103	95	103	95	89	85	80	61	58	47	40	38	40	U S 40
19	40	43	43	44	41	44	46	68	93	98	93	110	98	94	98	98	66	58	51	45	42	U S 40	37	S 37
20	U S 39	U S 40	44	46	44	40	41	70	100	R 96	89	U R 96	108	96	92	94	75	57	47	39	34	33	34	33
21	36	36	37	38	40	37	33	65	75	98	103	124	100	103	95	79	72	50	55	32	29	I A 28	30	33
22	33	33	33	37	39	33	29	63	77	113	103	103	108	80	96	77	72	63	56	34	40	30	30	32
23	S 33	F 33	U F 33	33	34	30	34	67	93	91	94	105	107	110	88	88	70	56	40	42	41	35	41	41
24	43	43	43	42	41	43	35	71	96	94	93	108	102	92	97	106	76	67	46	44	43	37	S 43	43
25	44	48	48	47	50	53	35	64	77	93	101	113	104	96	92	91	73	50	43	43	38	33	U F 34	36
26	40	40	38	37	35	38	38	67	80	100	113	113	103	104	103	82	82	58	40	40	42	35	33	35
27	38	36	35	34	33	40	34	67	105	118	120	114	106	113	106	97	90	74	57	47	35	34	36	36
28	33	34	35	35	39	36	36	69	105	126	121	121	108	114	103	100	84	70	51	43	36	32	30	27
29	U S 34	33	U S 34	F 36	36	S 36	40	63	82	103	109	H 116	101	101	100	96	81	62	51	48	34	29	30	30
30	33	33	35	35	33	33	2R	64	103	102	122	128	117	116	114	97	91	60	55	39	36	31	37	38
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	29
MED	38	39	38	39	40	40	40	70	94	100	108	112	108	101	96	92	82	62	51	42	39	35	36	37
UQ	40	43	41	43	42	42	45	78	99	114	121	121	118	109	103	98	90	71	61	48	42	40	40	40
LQ	34	34	36	37	37	37	35	67	83	93	96	106	102	95	92	86	73	53	45	39	35	33	33	33

The Radio Research Laboratories, Japan

NOV. 1969 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

NOV. 1969 | FOF1 (0.01 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatio operation

Hour / 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														
2																								
3																								
4											380	400	L											
5																								
6																								
7																								
8																								
9																								
10																								
11											400	400	410											
12																								
13												L 400												
14																								
15																								
16																								
17																								
18																								
19																								
20																								
21																								
22																								
23																								
24																								
25																								
26																								
27																								
28																								
29													U L 450											
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT											2	3	2											
MED											390	400	430											
UQ												400												
LQ												400												

The Radio Research Laboratories, Japan

NOV. 1969 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

NOV. 1969 | FOE (0.01 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station WAKKANAI Lat. 45° 23·6 N. Long. 141° 41·1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	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 215	280	300	305	300	300	A	A	A	A							
2								S 195	270	295	305	305	310	300	280	240	S							
3								S 205	250	300	290	I A 300	300	300	290	240	S							
4							S	A	A	R	300	300	I A 310	300	290	240	165							
5								S 210	265	300	300	300	315	305	290	220	S							
6								S 195	240	290	300	305	I A 310	A	A	235	A							
7								S 195	235	295	305	325	325	320	300	235	A							
8								S H 215	255	290	300	300	305	300	290	250	S							
9								S 200	260	295	300	315	A	A	R	A	A							
10								S S	235	285	295	310	300	300	270	220	A							
11								S 160	240	A	A	305	300	295	I A 280	270	S							
12								200	240	290	300	310	300	310	275	210	S							
13								190	250	285	300	300	300	290	265	210	S							
14								180	225	260	I A 295	310	I A 305	300	I A 280	A	S							
15								S	255	295	I A 300	300	300	295	285	220	S							
16								185	240	290	305	315	320	300	280	220	S							
17								180	265	290	300	310	305	300	A	A	A							
18								S	250	300	305	315	310	300	295	220	S							
19								195	235	I A 300	300	I B 300	300	295	290	245	S							
20								S	235	280	300	305	310	295	265	210	S							
21								S	240	300	300	300	300	285	250	205	E							
22								A	235	290	300	305	300	290	250	210	S							
23								200	250	270	300	310	305	I B 295	280	235	S							
24								150	245	280	290	300	300	295	245	210	S							
25								A	A	285	300	S 305	320	300	275	A	A							
26								A	265	300	305	315	315	295	265	H 215	S							
27								S	230	285	300	310	305	300	265	190	E							
28								A	A	A	A	A	300	305	265	240	S							
29								A	240	280	305	305	320	305	275	A	A							
30								S	A	A	300	315	315	309	265	195	E							
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								17	26	26	28	29	29	27	26	24	4							
MED								195	242	290	300	305	305	300	278	220	E							
UQ								200	255	300	302	310	310	300	290	240	F E 165							
LQ								185	235	285	300	300	300	295	265	210	E							

NOV. 1969 | FOE (0.01 MHZ)

IONOSPHERIC DATA

NOV. 1969 | FOES (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6 N. Long. 141° 41.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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	26	E S 13	E S 13	E	E	E	E S 17	G	41	J X 73	45	J X 53	J X 80	J X 46	36	J X 36	J X 41	J X 43	20	18	J X 31	J X 21	J X 21	J X 24
2	22	20	E S 15	E	21	E	E S 16	G	31	33	G	G	G	G 26	G	G	E S 20	E S 13	E	E S 15	E S 15	20	J X 23	J X 21
3	J X 30	J X 21	J X 20	J X 25	E	E	E S 16	G	30	35	J X 48	J X 55	G	G	G 24	G	E S 18	E S 15	J X 20	J X 21	J X 61	J X 29	J X 29	J X 22
4	26	J X 22	26	22	21	E S 17	E S 16	21	27	28	G	G	J X 39	J X 36	G	G	G	E S 15	E S 15	E S 17	J X 22	J X 27	J X 22	J X 76
5	J X 41	J X 21	20	E S 16	19	E S 16	E S 15	24	G	G	G	G	G	G	G	G	E S 18	J X 23	J X 23	E S 15	E S 17	E S 18	E S 18	E S 15
6	E S 14	E S 12	E S 15	E	E S 16	E	E S 17	G	G	G	G	G 29	36	J X 36	J X 35	G 20	27	E S 15	J X 21	E S 15	J X 43	J X 33	21	J X 21
7	J X 21	J X 23	J X 21	E S 15	E	E S 17	E S 15	G	G	G	35	G	G	42	G	G	21	J X 45	J X 43	J X 43	J X 35	27	E S 17	E S 16
8	E S 16	22	E	E S 13	M 26	E S 15	E S 13	G	G	40	41	G	G	G	G	G	E S 17	E S 15	E S 16	J X 23	J X 53	E S 16	E S 18	22
9	E S 15	E S 18	E S 15	E S 16	J X 21	E S 15	E S 14	G	G	35	G	J X 56	37	33	G	26	21	E S 17	E	E S 15	E S 14	J X 23	23	E
10	E S 16	E S 16	E S 16	E S 16	25	20	21	E S 20	G	33	G	G	G	37	G	G	18	E S 16	E	E S 15	E S 14	J X 43	J X 21	J X 35
11	22	24	21	26	19	E S 12	E S 16	20	G	38	39	35	34	36	32	G	J X 21	J X 20	E S 17	27	20	J X 36	J X 33	J X 25
12	J X 74	J X 32	J X 26	23	E S 12	E S 15	E S 11	G	29	G	33	34	G	G	G	G	E S 15	E S 16	23	E S 16	E S 16	E S 17	E S 16	E S 15
13	E	E	E	E S 15	E S 14	E S 16	E S 15	G	G	33	G	G	G	G	G	26	E S 18	E S 15	E S 15	E S 15	E S 15	E S 12	20	J X 20
14	E S 15	23	E S 15	E S 16	E S 16	E S 16	E S 16	22	26	34	40	G	33	G 29	28	28	E S 16	E S 18	E S 16	E S 14	23	J X 21	23	E S 17
15	E S 15	E S 14	22	E	E	E	E	E S 20	G	G	33	G 28	G	G	G 21	27	E S 18	J X 31	E S 15	E S 14	E S 13	E	E	E S 15
16	E	E S 15	22	E	E	E	E	G	G	G	35	G	G	G	G	G	E S 19	J X 35	E S 15	25	18	28	J X 21	J X 24
17	J X 22	J X 23	J X 21	24	E	E	E S 15	G	G	G	G	G	G	G	35	J X 40	J X 31	J X 28	J X 33	J X 44	E S 16	J X 25	22	24
18	E	22	25	J X 20	E S 15	18	E S 15	G	G	G	G	G	G	G	G	G	E S 17	E S 15	E S 16	E S 16	E S 16	E S 15	E S 15	E S 20
19	J X 21	24	E S 15	E	E S 15	E S 15	E S 15	G	G	32	G	E B 34	G	G 27	G	G	E S 15	E S 15	23	E S 12	E	E S 15	E	E S 17
20	22	E	J X 21	E	E	E	E	G	G	G	G	G	G 25	G 20	G 18	G	E S 16	21	21	23	E S 15	E	E S 15	E S 15
21	E	E	E	E	E	E	E S 15	G	G	G	G	G	G	G	G 23	G	J X 31	J X 33	J X 53	J X 20	E S 14	J X 70	E	J X 23
22	21	E	E	15	15	20	J X 26	J X 27	G	G 28	G	G	G	G	G	G	E S 16	E S 15	E	E	E	20	E	E S 15
23	20	E	E	E	E	E	E	G	G 23	G	G	G	G	E B 33	G	33	J X 34	J X 33	E S 15	20	J X 63	J X 61	J X 71	J X 43
24	J X 23	J X 23	J X 20	E	J X 23	E	E	22	G	G	G	G	G	G	G	G	E S 13	E	E	J X 25	J X 20	E	E	18
25	22	J X 23	J X 20	17	15	19	18	J X 23	J X 43	31	G	G	G 24	G	G	29	J X 35	E	E	J X 24	J X 25	J X 23	J X 23	J X 21
26	J X 20	J X 23	23	E	E	E	E	21	J X 33	G	G 23	G 22	G	G	G	G	17	E	E	E S 13	E S 13	E	E	J X 20
27	J X 25	J X 23	15	E	E	E	E	G	G	27	G 27	G	G	31	20	21	20	J X 29	21	23	J X 19	J X 20	J X 23	23
28	21	15	J X 18	J X 20	J X 18	J X 20	E	J X 43	J X 34	J X 47	J X 52	J X 73	J X 43	J X 37	22	26	J X 29	21	J X 29	J X 20	E S 16	E S 17	20	J X 42
29	J X 33	J X 23	24	25	E S 15	22	24	J X 22	G 23	G 27	34	G 28	G	33	29	J X 30	J X 38	18	20	E S 17	E S 16	E S 16	E S 15	E S 15
30	E	E	E	E	E	E	E	E S 17	J X 33	30	G	G	J X 58	G	G	G	G	E	E	E	E	E	E S 15	E S 15
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	21	21	19	E E 15	E E 15	E E 14	E S 15	G	G	28	G	G	G	E G 20	G	G	E G 18	E E 16	E E 16	17	E E 16	20	20	20
UQ	J X 23	J X 23	21	20	19	E S 17	E S 16	21	29	33	35	G 28	33	33	23	26	J X 27	J X 28	21	J X 23	J X 23	J X 27	J X 23	J X 24
LQ	E E 15	E E 13	E E 15	E	E	E	E	G	G	G	G	G	G	G	G	G	E S 16	E S 15	E	E S 15	E S 14	E S 15	E S 15	E S 15

The Radio Research Laboratories, Japan

NOV. 1969 | FOES (0.1 MHZ)

IONOSPHERIC DATA

NOV. 1969 | FBES (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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 S 13	E S 13	E	E	E	E S 17	G	G	68	G	G	46	45	35	34	40	26	E	E	25	18	20	22
2	E	15	E S 15	E	E	E	E S 16	G	G	G	G	G	G	G 25	G	G	E S 20	E S 13	E	E S 15	E S 15	E	E	17
3	20	17	16	E	E	E	E S 16	G	G	G	43	40	G	G	G 22	G	E S 18	E S 15	E	18	17	19	26	20
4	E	17	E	E	E	E S 17	E S 16	22	27	G	G	G	38	27	G	G	G	E S 15	E S 15	E S 17	18	25	21	E
5	33	18	17	E S 16	E	E S 16	E S 15	G	G	G	G	G	G	G	G	G	E S 15	E	E	E S 15	E S 17	E S 18	E S 18	E S 15
6	E S 14	E S 12	E S 15	E	E S 16	E	E S 12	G	G	G	G	G 24	35	34	32	G 18	23	E S 15	17	E S 15	20	27	E	E
7	E	E	E	E S 15	E	E S 17	E S 15	G	G	G	G	G	G	G	G	G	19	16	29	30	23	18	E S 17	E S 16
8	E S 16	E	E	E S 13	E	E S 15	E S 13	G	G	G	G	G	G	G	G	G	E S 17	E S 15	E S 16	22	A	E S 16	E S 18	E
9	E S 15	E S 18	E S 15	E S 16	16	E S 15	E S 14	G	G	G	G	G	34	30	G	26	17	E S 17	E	E S 15	E S 14	17	E	E
10	E S 16	E S 16	E S 16	E S 16	E	E	E S 17	E S 20	G	G	G	G	G	G	G	G	18	E S 16	E	E S 15	E S 14	A	28	20
11	E	E	E	E	E	E S 12	E S 16	G	G	35	36	G	G	35	30	G	19	19	E S 17	E	19	22	26	18
12	E	E	22	15	E S 12	E S 15	E S 11	G	G	G	G	G	G	G	G	G	E S 15	E S 16	E	E S 16	E S 16	E S 17	E S 16	E S 15
13	E	E	E	E S 15	E S 14	E S 16	E S 15	G	G	G	G	G	G	G	G	G	E S 18	E S 15	E S 15	E S 15	E S 15	E S 12	E	E
14	E S 15	E	E S 15	E S 16	E S 16	E S 16	E S 16	G	G	G	37	G	33	21	27	24	E S 16	E S 18	E S 16	E S 14	E	18	E	E S 17
15	E S 15	E S 14	E	E	E	E	E	E S 20	G	G	33	G 28	G	G	G 17	20	E S 18	25	E S 15	E S 14	E S 13	E	E	E S 15
16	E	E S 15	E	E	E	E	E	G	G	G	G	G	G	G	G	G	E S 19	E	E S 15	E	14	18	E	21
17	18	15	E	E	E	E	E S 15	G	G	G	G	G	G	G	34	27	20	20	20	A	E S 16	24	E	E
18	E	E	E	15	E S 15	16	E S 15	G	G	G	G	G	G	G	G	G	E S 17	E S 15	E S 16	E S 16	E S 16	E S 15	E S 15	E S 20
19	17	E	E S 15	E	E S 15	E S 15	E S 15	G	G	30	G	E B 34	G	G 26	G	G	E S 15	E S 15	18	E S 12	E	E S 15	E	E S 17
20	E	E	E	E	E	E	E	G	G	G	G	G	G 24	G 19	G 17	G	E S 16	E	E	E	E S 15	E	E S 15	E S 15
21	E	E	E	E	E	E	E S 15	G	G	G	G	G	G	G	G 22	G	30	22	34	15	E S 14	A	E	E
22	E	E	E	E	E	E	20	21	G	G 24	G	G	G	G	G	G	E S 16	E S 15	E	E	E	E	E	E S 15
23	16	E	E	E	E	E	E	G	G 22	G	G	G	G	E B 33	G	G	G	16	E S 15	E	16	18	16	15
24	E	17	15	E	14	E	E	G	G	G	G	G	G	G	G	G	E S 13	E	E	15	15	E	E	E
25	E	E	15	E	E	14	E	20	25	25	G	G	G 23	G	G	24	15	E	E	16	E	E	17	17
26	15	15	E	E	E	E	E	18	20	G	G 20	G 20	G	G	G	G	G	E	E	E S 13	E S 13	E	E	13
27	15	15	14	E	E	E	E	G	G	G	G 26	G	G	29	19	G	20	20	12	E	16	E	17	E
28	E	E	15	E	E	14	E	40	26	30	31	48	27	27	21	18	17	E	30	15	E S 16	E S 17	E	E
29	27	E	E	E	E S 15	E	E	18	G 22	G 24	22	G 26	G	20	24	25	22	E	16	E S 17	E S 16	E S 16	E S 15	E S 15
30	E	E	E	E	E	E	E	E S 17	24	27	G	G	21	G	G	G	G	E	E	E	E	E	E S 15	E S 15
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	E	E	E	E	E	E	E S 14	G	G	G	G	G	G	G	G	G	E G 18	E E 15	E E 15	E E 15	E E 16	E E 17	E E 15	E E 15
UQ	16	15	E E 15	E E 15	E E 14	E S 15	E S 16	E G 18	G	G 24	G 20	G	G 23	26	22	18	19	16	E S 16	16	17	18	16	16
LQ	E	E	E	E	E	E	E	G	G	G	G	G	G	G	G	G	E S 15	E	E	E	E S 14	E	E	E

NOV. 1969 | FBES (0.1 MHZ)

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

NOV. 1969 | F-MIN (0.1 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station WAKKANAI Lat. 45 23·6 N Long. 141 41·1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	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 S17	E S13	E S13	E	E	E	E S17	14	16	14	17	17	17	18	12	15	12	E	E	E	E	E	E S15	E
2	E S13	E	E S15	E	E	E	E S16	13	12	12	17	17	17	17	12	12	E S20	E S13	E	E S15	E S15	E	E	E S12
3	E S12	E S15	E S15	E	E	E	E S16	15	14	12	16	17	17	17	15	17	E S18	E S15	E S12	E S15	E S13	E S16	E S16	E S15
4	E S16	E S15	E S16	E S15	E S16	E S17	E S16	15	15	15	16	16	20	18	17	15	E S15	E S15	E S15	E S17	E S17	E S15	E S15	E S15
5	E S15	E S15	E S14	E S16	E S16	E S16	E S15	15	16	17	16	17	16	16	17	14	E S18	E S15	E S15	E S15	E S17	E S18	E S18	E S16
6	E S14	E S12	E S15	E	E S16	E	E S12	16	15	17	16	16	15	12	15	11	12	E S15	E S15	E S15	E S15	E S17	E S16	E S15
7	E S12	E S14	E S15	E S15	E	E S17	E S15	17	16	18	16	16	18	19	18	17	E S15	E	E	E S15	E S15	E S15	E S17	E S16
8	E S16	E S15	E	E S13	E	E S15	E S13	15	17	18	18	18	21	18	20	16	E S17	E S15	E S16	E S17	E S13	E S16	E S18	E S17
9	E S15	E S18	E S15	E S16	E	E S15	E S14	15	18	17	20	18	17	17	17	17	15	E S17	E	E S15	E S14	E S15	E S17	E
10	E S16	E S16	E S16	E S16	E S13	E S15	E S17	E S20	17	17	20	18	17	17	13	12	11	E S16	E	E S15	E S14	E S12	E S15	E S12
11	E S16	E S16	E S15	E S12	E	E S12	E S16	14	17	16	16	18	15	16	15	16	E S17	E S16	E S17	E S18	E S16	E S15	E S12	E S14
12	E S16	E S17	E S16	E	E S12	E S15	E S11	15	17	17	18	18	17	16	15	12	E S15	E S16	E S18	E S16	E S16	E S17	E S16	E S15
13	E	E	E	E S15	E S14	E S16	E S15	E S15	17	15	16	16	17	17	18	17	E S18	E S15	E S15	E S15	E S15	E S12	E	E
14	E S15	E S14	E S15	E S16	E S16	E S16	E S16	16	16	18	20	24	20	18	17	17	E S16	E S18	E S16	E S14	E S15	E S15	E S17	E S17
15	E S15	E S14	E S16	E	E	E	E	E S20	15	17	16	17	17	12	12	16	E S18	E	E S15	E S14	E S13	E	E	E S15
16	E	E S15	E	E	E	E	E	12	16	15	16	18	16	17	16	15	E S19	E	E S15	E S16	E	E S15	E S17	E S15
17	E S15	E	E S15	E S15	E	E	E S15	12	14	17	17	18	20	20	18	11	13	E S16	E S16	E S14	E S16	E	E S15	E S17
18	E	E S15	E S15	E	E S15	E	E S15	12	15	16	15	16	22	20	20	18	E S17	E S15	E S16	E S16	E S16	E S15	E S15	E S20
19	E S15	E S15	E S15	E	E S15	E S15	E S15	16	15	19	20	34	21	20	20	22	E S15	E S15	E S15	E S12	E	E S15	E	E S17
20	E S15	E	E	E	E	E	E	E S16	15	14	14	16	16	16	15	18	E S16	E S14	E S15	E S15	E S15	E	E S15	E S15
21	E	E	E	E	E	E	E S15	E S15	15	16	16	16	17	17	12	14	E	E	E S14	E	E S14	E S14	E	E S15
22	E S15	E	E	E	E	E	E	E	15	16	17	15	16	16	15	15	E S16	E S15	E	E	E	E	E	E S15
23	E	E	E	E	E	E	E	14	19	19	20	23	20	33	22	20	E S15	E	E S15	E	E	E	E	E
24	E	E	E	E	E	E	E	E	16	17	17	18	17	19	16	16	E S13	E	E	E	E	E	E	E
25	E S15	E	E	E	E	E	E	E	12	16	17	25	19	17	15	14	E	E	E	E	E	E	E	E
26	E	E	E	E	E	E	E	E	12	15	16	16	16	15	14	11	E S11	E	E	E S13	E S13	E	E	E
27	E	E	E	E	E	E	E	E S12	14	12	15	18	19	17	15	15	E	E	E	E S15	E S13	E	E	E
28	E	E	E	E	E	E	E	E	E	15	14	15	15	12	14	11	E S15	E S15	E S15	E S13	E S16	E S17	E S16	E S16
29	E S16	E S16	E S16	E	E S15	E S16	E S16	E S11	16	16	16	19	20	18	16	E	E	E S15	E S13	E S17	E S16	E S16	E S15	E S15
30	E	E	E	E	E	E	E	E S17	11	11	11	17	11	17	15	11	E	E	E	E	E	E	E S15	E S15
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	E S15	E S14	E S14	E	E	E	E S14	14	15	16	16	17	17	17	15	15	E S15	E S15	E S15	E S15	E S14	E S14	E S15	E S15
UQ	E S15	E S15	E S15	E S15	E S14	E S15	E S16	16	16	17	17	18	20	18	17	17	E S17	E S15	E S15	E S15	E S16	E S15	E S16	E S15
LQ	E	E	E	E	E	E	E	E E12	14	15	16	16	16	16	15	12	E E12	E	E	E S12	E	E	E	E

The Radio Research Laboratories, Japan

NOV. 1969 | F-MIN (0.1 MHZ)

IONOSPHERIC DATA

NOV. 1969 | M(3000)F2 (0.01) | 135° E Mean Time (G. M. T.+ 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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	250	265	270	290	305	285	325	330	325	305	320	310	305	305	320	345	305	305	305	300	300	285	275
2	265	280	280	280	295	295	320	340	345	340	320	305	295	300	320	320	330	300	330	315	300	290	275	290
3	270	255	245	245	275	335	300	320	315	320	315	315	310	305	315	320	310	305	305	300	315	300	300	300
4	285	265	255	295	305	310	300	330	335	335	345	335	330	315	320	320	325	325	320	310	305	295	S 275	285
5	290	295	300	300	280	285	305	340	340	335	330	310	325	330	315	315	325	275	315	300	310	300	270	265
6	U S 265	260	265	275	295	295	300	U S 335	340	335	335	320	325	325	310	310	325	285	315	295	305	295	265	265
7	280	270	270	270	280	295	315	340	330	325	340	325	320	320	300	320	325	305	305	315	300	260	265	260
8	265	275	275	275	280	275	290	320	330	325	310	320	310	320	330	315	330	325	335	310	I A 320	270	265	275
9	265	265	260	265	275	300	275	S 335	310	315	310	300	320	310	325	305	315	310	315	315	280	265	250	260
10	265	S 245	260	260	U S 305	U S 285	290	325	300	325	320	315	325	320	315	325	320	300	300	320	295	A	U S 295	S 260
11	245	U S 280	265	290	290	U S 290	300	335	355	320	350	325	320	330	325	335	340	Z 310	300	315	295	275	300	275
12	F 280	F 275	275	295	275	325	310	320	340	310	335	335	320	345	360	330	300	310	305	295	305	270	280	S 305
13	S 285	295	I S 290	S 280	I S 270	S 275	320	340	345	350	325	310	315	335	300	335	325	310	310	305	280	U S 295	I S 290	U S 275
14	270	275	270	F 275	285	310	320	360	340	335	325	335	330	335	305	330	330	300	325	275	295	285	270	U S 285
15	270	I S 270	U S 255	280	295	U S 305	305	S 325	340	340	H 395	345	340	310	335	315	345	335	300	315	280	275	275	280
16	275	S 290	265	270	290	325	290	345	350	300	325	335	335	320	345	320	330	315	305	310	290	S 280	275	280
17	265	270	270	280	255	315	305	340	360	350	345	340	340	315	345	335	350	310	295	I A 310	295	S 275	275	S
18	S	S	U S 275	280	280	320	295	I S 335	U S 345	335	340	330	340	305	335	320	335	300	320	320	305	290	300	U S 260
19	265	280	290	290	295	295	310	345	345	345	305	305	335	320	320	345	320	290	315	305	295	U S 300	270	S 270
20	U S 250	U S 250	275	290	305	285	280	330	340	R 355	330	U R 330	335	335	325	350	345	315	300	310	300	275	265	280
21	280	280	270	285	280	330	305	325	325	320	300	325	320	320	360	315	335	295	325	290	310	I A 270	265	265
22	255	275	270	280	310	335	305	315	335	350	320	315	330	340	290	350	315	315	320	325	300	280	265	260
23	S 265	F 240	U F 275	310	315	315	280	330	335	310	335	325	300	325	330	315	320	320	295	280	295	270	270	270
24	255	265	255	245	270	300	320	325	335	360	325	325	325	315	300	290	330	315	305	290	300	270	S 265	265
25	265	270	270	275	280	300	365	330	320	330	315	310	335	320	330	335	340	320	300	305	325	275	U F 260	265
26	255	260	270	270	265	295	325	345	340	320	325	320	290	305	320	305	320	295	285	300	310	300	275	270
27	270	270	265	245	240	285	295	315	325	325	330	305	305	300	305	310	310	310	305	320	320	250	240	250
28	240	245	240	255	265	270	265	310	325	330	320	315	295	315	310	320	310	320	325	340	315	315	300	275
29	U S 270	280	U S 275	F 265	290	S 295	320	345	330	330	320	H 315	335	305	320	320	325	305	325	340	330	310	290	255
30	250	265	265	285	275	285	305	315	340	335	320	320	315	300	320	330	330	300	315	330	305	245	270	280
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	29
MED	265	270	270	278	280	298	305	330	338	330	325	320	322	320	320	320	325	310	308	310	300	280	272	270
UQ	272	280	275	285	295	315	315	340	340	340	335	330	335	325	330	330	335	315	320	315	310	295	285	280
LQ	260	260	265	270	275	285	290	325	330	320	315	315	310	305	310	315	320	300	300	300	295	270	265	265

The Radio Research Laboratories, Japan

NOV. 1969 | M(3000)F2 (0.01)

IONOSPHERIC DATA

NOV. 1969 | M(3000)F1 (0.01) | 135° E Mean Time (G. M. T.+ 9h)

Station WAKKANAI Lat. 45° 23·6' N. Long. 141° 41·1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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														
2																								
3																								
4											425	400	L											
5																								
6																								
7																								
8																								
9																								
10																								
11											400	400	415											
12																								
13												L 410												
14																								
15																								
16																								
17																								
18																								
19																								
20																								
21																								
22																								
23																								
24																								
25																								
26																								
27																								
28																								
29													U L 400											
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT											2	3	2											
MED											412	400	408											
UQ												405												
LQ												400												

The Radio Research Laboratories, Japan

NOV. 1969 | M(3000)F1 (0.01)

IONOSPHERIC DATA

NOV. 1969 | H'F2 (KM) | 135° E Mean Time (G. M. T.+ 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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														
2																								
3																								
4											225	230	230											
5																								
6																								
7																								
8																								
9																								
10																								
11											250	225	245											
12																								
13												250												
14																								
15																								
16																								
17																								
18																								
19																								
20																								
21																								
22																								
23																								
24																								
25																								
26																								
27																								
28																								
29													235											
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT											2	3	3											
MED											238	230	235											
UQ												240	240											
LQ												228	232											

NOV. 1969 | H'F2 (KM)

IONOSPHERIC DATA

NOV. 1969 | H'F (KM) | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N Long. 141° 41.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	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	345	310	300	270	250	240	250	225	245	I A 235	225	210	240	250	240	240	235	225	225	235	275	260	280	320
2	315	300	290	270	250	220	250	220	215	230	220	230	225	230	250	250	215	220	225	235	235	270	275	315
3	305	325	355	330	280	215	235	220	220	225	245	230	225	215	225	240	240	220	225	245	240	255	270	285
4	290	315	355	275	250	230	230	225	230	235	210	215	240	225	240	235	225	205	225	235	260	295	305	305
5	355	270	260	270	285	270	250	220	225	230	230	220	220	225	235	245	225	205	240	250	245	240	295	310
6	305	310	310	300	260	250	230	215	220	220	240	225	240	220	225	240	220	210	225	225	285	305	305	315
7	310	305	300	300	290	260	240	215	225	230	235	235	240	235	240	240	220	220	250	260	295	320	335	325
8	300	300	290	300	280	300	260	230	230	245	225	235	225	240	245	235	235	230	225	260	I A 280	310	330	350
9	315	350	345	310	305	240	300	220	240	245	245	245	240	230	245	250	245	240	210	230	275	310	300	320
10	310	360	340	330	265	300	255	225	225	240	225	210	235	230	240	240	225	240	225	235	245	A	360	350
11	350	305	320	285	270	265	250	230	220	230	230	220	210	235	235	225	235	235	240	250	275	310	305	270
12	300	310	355	275	280	220	230	220	220	200	240	240	240	230	230	220	200	245	245	260	260	305	300	270
13	300	265	275	295	315	290	235	215	225	220	215	200	230	225	225	225	220	225	235	260	295	275	300	300
14	305	300	310	320	300	255	235	220	220	220	240	235	240	230	220	235	215	220	225	270	280	290	285	300
15	320	310	320	300	265	230	245	230	215	220	220	240	225	225	225	235	220	245	250	245	250	290	310	305
16	300	305	315	310	275	235	235	220	220	215	220	240	230	240	240	230	235	200	230	240	280	300	300	315
17	335	305	310	300	300	245	215	220	220	235	220	250	225	225	235	225	220	235	250	I A 255	260	310	300	315
18	310	300	300	280	280	210	235	230	220	220	240	230	245	240	230	240	225	240	245	240	250	275	275	325
19	320	300	265	250	290	260	220	225	215	240	220	245	245	240	245	230	210	245	245	240	250	250	295	325
20	305	310	300	260	230	250	240	230	240	225	230	250	245	245	245	240	215	220	230	235	255	270	295	310
21	300	300	300	290	270	205	250	220	215	220	235	250	240	245	225	230	220	260	260	250	250	I A 305	345	325
22	345	325	305	290	250	215	275	225	210	235	240	235	240	225	240	220	225	230	225	225	250	260	310	325
23	340	350	310	245	260	215	270	225	240	225	230	230	250	260	235	225	215	230	220	250	245	300	315	305
24	340	310	325	340	305	250	215	225	215	230	235	235	230	235	240	245	220	215	230	250	250	265	300	310
25	300	290	300	280	275	225	250	215	205	215	225	225	230	240	240	225	210	210	225	250	220	260	345	340
26	320	315	300	275	310	260	235	220	210	215	220	230	225	250	240	225	245	205	250	250	250	250	300	305
27	310	310	340	350	375	280	230	235	240	235	H 220	240	245	250	245	235	235	240	225	240	250	350	390	350
28	360	360	370	310	305	250	245	I A 230	230	245	240	255	230	230	230	225	215	220	260	225	245	240	260	305
29	I A 350	320	305	290	290	265	240	215	200	215	220	230	235	230	230	230	225	210	225	225	225	250	305	340
30	350	320	300	260	260	240	250	230	215	215	225	225	225	225	220	215	210	225	220	210	235	250	310	290
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30
MED	312	310	308	290	280	248	240	222	220	228	228	232	235	230	238	235	220	225	228	242	250	275	300	315
UQ	340	320	325	310	300	260	250	230	230	235	240	240	240	240	240	240	235	240	245	250	275	305	310	325
LQ	305	300	300	275	260	225	235	220	215	220	220	225	225	225	230	225	215	215	225	235	245	260	295	305

The Radio Research Laboratories, Japan

NOV. 1969 | H'F (KM)

IONOSPHERIC DATA

NOV. 1969 | H'ES (KM) | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23·6' N. Long. 141° 41·1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	110	S	S	E	E	E	S	G	140	120	115	110	110	110	110	110	110	105	105	105	100	105	100	100
2	100	100	S	E	105	E	S	G	125	115	G	G	G	100	G	G	S	S	E	S	S	105	100	100
3	100	100	100	100	E	E	S	G	115	115	110	105	G	G	105	G	S	S	110	105	120	105	105	100
4	105	100	100	100	100	S	S	115	110	110	G	G	105	110	G	G	G	S	S	S	105	105	105	115
5	105	105	105	S	100	S	S	150	G	G	G	G	G	G	G	G	S	110	110	S	S	S	S	S
6	S	S	S	E	S	E	S	G	G	G	G	105	105	100	100	105	105	S	100	S	110	110	100	100
7	110	105	105	S	E	S	S	G	G	G	170	G	G	125	G	G	110	105	100	100	100	100	S	S
8	S	115	E	S	100	S	S	G	G	125	120	G	G	G	G	G	S	S	S	110	110	S	S	115
9	S	S	S	S	105	S	S	G	G	150	G	115	110	110	G	110	110	S	E	S	S	125	110	E
10	S	S	S	S	105	105	105	S	G	120	G	G	G	135	G	G	105	S	E	S	S	115	110	110
11	115	100	105	130	105	S	S	155	G	110	110	135	125	115	110	G	100	100	S	105	140	120	115	110
12	110	110	110	110	S	S	S	G	120	G	125	120	G	G	G	G	S	S	100	S	S	S	S	S
13	E	E	E	S	S	S	S	G	G	125	G	G	G	G	G	160	S	S	S	S	S	S	110	105
14	S	110	S	S	S	S	S	155	115	120	110	G	110	110	110	105	S	S	S	S	100	105	100	S
15	S	S	105	E	E	E	E	S	G	G	110	105	G	G	100	145	S	100	S	S	S	E	E	S
16	E	S	100	E	E	E	E	G	G	G	150	G	G	G	G	G	S	110	S	110	145	110	100	100
17	100	100	100	100	E	E	S	G	G	G	G	G	G	G	100	100	100	100	110	110	S	105	100	100
18	E	100	100	100	S	100	S	G	G	G	G	G	G	G	G	G	S	S	S	S	S	S	S	S
19	100	100	S	E	S	S	S	G	G	105	G	B	G	100	G	G	S	S	100	S	E	S	E	S
20	100	E	100	E	E	E	E	G	G	G	G	G	105	105	100	G	S	100	100	100	S	E	S	S
21	E	E	E	E	E	E	S	G	G	G	G	G	G	G	110	G	110	115	110	105	S	110	E	105
22	105	E	E	105	105	110	105	105	G	110	G	G	G	G	G	G	S	S	E	E	E	105	E	S
23	100	E	E	E	E	E	E	G	115	G	G	G	G	B	G	150	120	110	S	110	105	100	105	105
24	105	105	105	E	110	E	E	110	G	G	G	G	G	G	G	G	S	E	E	110	105	E	E	100
25	100	100	100	100	100	105	105	100	100	105	G	G	100	G	G	115	115	E	E	100	100	105	100	100
26	100	100	100	E	E	E	E	110	110	G	105	105	G	G	G	G	170	E	E	S	S	E	E	110
27	100	100	100	E	E	E	E	G	G	120	110	G	G	105	105	145	120	115	125	120	110	110	105	105
28	110	105	105	105	105	100	E	110	105	105	125	100	105	100	100	100	110	105	105	105	S	S	100	100
29	100	100	100	100	S	100	100	105	105	105	105	100	G	105	100	100	100	100	105	S	S	S	S	S
30	E	E	E	E	E	E	E	S	110	110	G	G	100	G	G	G	G	E	E	E	E	E	S	S
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	19	18	17	10	11	6	4	10	12	17	13	10	10	14	12	12	14	13	13	14	13	17	16	18
MED	100	100	100	100	105	102	105	110	112	115	110	105	105	108	102	110	110	105	105	105	105	105	102	102
UQ	108	105	105	105	105	105	105	150	118	120	125	115	110	110	110	145	115	110	110	110	110	110	108	110
LQ	100	100	100	100	100	100	102	105	108	110	110	105	105	100	100	102	105	100	100	105	100	105	100	100

NOV. 1969 | H'ES (KM)

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

NOV. 1969 | TYPES OF ES | 135° E Mean Time (G. M. T.+ 9h)

Station WAKKANAI Lat. 45° 23·6' N. Long. 141° 41·1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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	F1								H1	C3	C3	C1	C2	L2	L1	L3	L2	F3	F1	F1	F2	F2	F2	F3
2	F1	F1			F1				C1	C1				L1								F1	F1	F1
3	F2	F2	F2	F1					C1	C1	C3	L2			L1				F1	F1	FF12	F2	F2	F2
4	F1	F2	F1	F1	F1			L1	L1	C1			L2	L2							F2	F2	F2	FF12
5	F3	F2	F1		F1			H1										F1	F1					
6												L1	L1	L2	L3	L1	L1		F1		F2	F3	F1	F1
7	F1	F1	F1								H1			C1			L1	F1	F2	F2	F2	F1		
8		F1			F1					C1	C1									F1	F3			F1
9					F1					H1		C1	L1	L1		L1	L1					F1	F1	
10					F2	F1	L1			C1				H1			L1					F3	F2	F3
11	F1	F1	F1	F1	F1			H1		L1	L1	H1	C1	C1	L1		L1	F1		F1	F1	F3	F2	F3
12	F2	FF22	FF31	FF11					C1		C1	C1							F1					
13										C1						H1							F1	F1
14		F1						H1	C1	C1	L1		L1	L1	L1	L1					F1	F1	F1	
15			F1								L1	L1			L1	HL11		F2						
16			F1								H1							F1		F1	F1	F1	F1	F2
17	F2	F2	F2	F1											L1	L1	L1	F1	F1	F2		F2	F1	F2
18		F1	F1	F2		F1																		
19	F2	F1								L1				L1					F1					
20	F1		F1										L1	L1	L1			F1	F1	F1				
21															L1		C2	F3	F2	F1		F2		F1
22	F1			F1	F1	F1	F2	L1		L1												F1		
23	F1								L1							H1	C1	F1		F1	F2	F2	F2	F1
24	F1	F2	F1		F2			L1												F1	F1			F1
25	F1	F1	F1	F1	F1	F1	F1	L2	L1	L1			L1			L1	L1			F1	F1	F1	F1	F1
26	F1	F1	F1					L1	L1		L1	L1					H1							F1
27	F2	F2	F1							C1	L1			L1	L1	H1	C2	F5	F1	F1	F1	F1	F2	F1
28	F1	F1	F2	F2	F1	F2		L4	L2	L2	CL12	L3	L1	L1	L1	L1	L1	F1	F2	F1			F1	F1
29	F2	F1	F1	F1		F1	F1	L1	L1	L1	L1	L1		L1	L1	L2	L2	F1	F1					
30									L1	L1			L1											
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
UQ																								
LQ																								

The Radio Research Laboratories, Japan

NOV. 1969 | TYPES OF ES

IONOSPHERIC DATA

NOV. 1969 | FOF2 (0.1 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station AKITA Lat. 39° 43·5' N. Long. 140° 08·2' E Sweep 1 MHz to 20 MHz in 20 sec in automatio operation

Hour / 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	45	47	44	46	44	40	59	R	R	R	R	117	118	118	110	116	I R 102	81	64	59	59	46	44	42
2	39	40	41	43	44	36	49	84	I R 100	114	I R 114	I R 116	I R 119	114	115	119	I R 112	84	71	I R 62	I A 50	45	44	44
3	41	41	39	40	42	36	50	82	97	119	124	I R 132	117	112	116	106	I R 100	90	76	68	56	45	44	47
4	44	44	41	44	47	35	53	83	I R 112	I R 140	I R 137	I R 128	I R 119	112	I R 109	R	R	87	64	52	49	48	46	48
5	46	48	46	36	34	34	48	86	R	R	I R 114	114	112	106	93	94	95	83	58	57	52	44	35	36
6	35	37	37	37	41	33	45	83	106	126	117	106	109	114	100	86	98	70	56	49	42	39	36	35
7	34	36	35	36	39	36	43	81	92	106	102	98	109	102	88	104	100	73	59	46	40	35	36	39
8	37	39	38	38	35	36	48	83	99	116	119	112	109	113	108	101	87	71	69	48	33	34	34	36
9	36	35	36	38	38	34	39	84	93	114	116	114	114	113	114	91	93	87	81	44	31	36	39	34
10	40	40	42	41	43	42	51	91	I R 111	118	I R 129	125	129	105	92	101	89	69	69	55	38	35	36	36
11	38	40	38	40	39	40	46	82	I R 108	102	R 100	110	100	115	108	91	78	54	54	56	39	36	I A 36	34
12	28	30	30	33	31	34	40	I R 72	76	91	I R 101	103	108	94	98	H 84	69	46	52	49	36	29	30	33
13	32	32	33	32	31	31	44	78	92	99	96	100	95	99	87	84	79	52	47	46	34	38	S 36	36
14	36	37	37	36	36	36	46	73	83	94	114	116	106	109	99	84	79	57	47	43	36	36	37	34
15	34	33	34	35	37	33	39	74	94	91	96	89	C	C	C	89	I C 80	59	I C 40	I C 35	I C 32	I C 32	33	29
16	34	34	34	34	36	37	37	69	91	86	92	98	106	103	103	96	81	71	56	46	I A 30	33	33	33
17	33	34	36	35	35	36	47	66	I R 90	84	96	95	99	94	88	79	78	53	47	I R 42	38	I A 34	36	34
18	36	36	36	38	38	41	41	77	93	92	97	94	87	102	100	84	79	63	60	54	42	41	37	34
19	36	40	41	37	37	38	46	85	91	94	106	103	102	114	103	105	80	52	56	44	41	37	31	33
20	33	36	38	39	41	33	39	I R 74	84	99	94	100	107	111	98	96	83	54	54	51	36	32	33	32
21	35	36	37	39	39	33	33	73	91	93	96	126	124	112	104	82	78	57	48	47	30	29	30	31
22	32	33	33	36	41	33	H 32	I A 68	82	93	107	104	101	110	83	100	70	62	64	42	32	30	30	32
23	I R 33	36	36	41	41	24	32	73	89	98	92	96	106	113	108	89	79	59	44	42	40	33	36	38
24	41	41	41	40	44	43	43	72	96	97	116	108	105	98	93	96	94	58	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	107	110	I R 106	99	99	91	74	54	46	46	43	32	30	33
26	S 34	36	36	41	38	41	48	78	96	94	115	108	106	99	97	101	78	67	51	40	44	37	35	32
27	33	34	36	33	31	36	37	62	91	116	125	I R 118	114	110	113	103	97	72	68	49	34	33	I R 36	40
28	38	36	40	40	42	39	46	77	96	119	125	121	118	109	104	96	93	69	65	47	36	31	31	I A 30
29	30	32	33	32	34	33	39	77	91	93	114	113	113	104	101	101	97	66	64	51	37	29	26	29
30	29	31	31	33	29	32	33	68	96	I R 110	111	120	121	116	109	105	85	66	61	48	31	32	30	35
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	29	29	29	29	28	27	27	29	30	29	29	29	29	29	30	29	29	29	29	29	29
MED	35	36	37	38	38	36	44	77	93	99	111	110	109	110	101	96	83	66	58	48	38	35	36	34
UQ	38	40	40	40	41	38	48	83	96	115	116	117	117	113	108	101	95	72	64	52	42	38	36	36
LQ	33	34	35	35	35	33	39	72	91	93	97	100	106	102	97	89	79	57	51	44	34	32	31	33

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

NOV. 1969 | FOF1 (0.01 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatio operation

Hour / 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	L	L	L	L	L									
2										L	L	L 510	L	L	L									
3										L	L	L	L	L	L									
4										L	L	L	L	L										
5										L	L	L	L	L										
6											L 430	420	L	L	L									
7								260	320	L	L	L	L	L										
8										L	L 500	L	L	L	L 410									
9									L	L	L	A	L 450	L	L									
10									L	L	L	L	L 450											
11												A	L	A	L									
12										L	L	L	L			320								
13										L	L	H 500	420	370										
14										L	L 470	L	L	360										
15										L	L	L	C	C										
16									L	L	L	L	A	L										
17										L	L	L 420	H 600	L										
18										L	L	430	420	440										
19										L	L	L	L	L	400									
20										L	L	L	L	L										
21										L	L	460		L	L									
22										360	L 500	L	L	L										
23										L	L	L 410	L	L	L									
24										L	L	L	L	360										
25											L	L	L	L 500										
26											L 450	L	L											
27											L	L	L											
28											L	L	L 420	L										
29										L	L	L	550	L										
30											L	L	L	L										
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	1	1	5	7	7	5	2	1								
MED								260	320	360	L 470	430	450	370	405	320								
UQ											L 500	480	500	440										
LQ											L 450	420	420	360										

The Radio Research Laboratories, Japan

NOV. 1969 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

NOV. 1969 | FOE (0.01 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station AKITA Lat. 39° 43.5' N Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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	245	IA 290	IA 325	335	IA 340	360	A	A	A	A	A						
2							S	235	295	320	335	340	350	IsA 350	325	295	A	A						
3							S	IA 250	IA 290	IA 315	335	340	A	A	315	275	230	S						
4							S	235	290	320	330	340	345	330	315	IA 260	205	S						
5							S	235	295	325	335	345	350	335	305	265	220	A						
6							S	220	270	305	315	325	330	320	295	255	A	S						
7							S	200	265	305	315	330	340	325	305	IA 250	200	S						
8							S	220	270	315	330	335	IA 340	330	310	IA 270	215	S						
9							S	230	275	305	320	IA 330	A	A	A	A	A	S						
10							S	220	IA 285	315	325	335	IA 330	305	270	245	185	S						
11							S	190	245	280	305	315	315	305	275	240	S							
12							S	IA 185	255	285	305	315	325	IA 310	295	230	B							
13								190	250	IA 290	320	325	335	320	300	IA 255	200							
14								205	A	A	A	335	325	A	A	A	A							
15								215	270	315	320	325	C	C	C	245	C							
16								205	270	IA 310	A	A	A	A	A	A	B							
17								200	270	310	320	335	340	325	305	IA 265	200							
18								215	280	315	330	340	340	330	310	275	A							
19								205	265	315	325	340	345	325	305	IB 275	A							
20								200	270	315	325	335	345	320	295	260	A							
21								200	270	315	325	IA 335	IA 340	325	295	IA 250	IA 180							
22								A	IA 265	300	IA 320	340	345	335	310	260	180							
23								225	285	310	320	330	345	340	320	270	205							
24								215	275	310	IA 320	330	345	330	295	255	200							
25								C	C	C	325	335	IA 340	335	305	250	A							
26								205	270	315	330	340	345	335	310	260	195							
27								215	285	315	325	335	350	345	325	275	A							
28								195	275	315	IA 325	335	IA 340	330	IA 310	270	A							
29								205	280	315	335	345	340	330	300	255	200							
30								185	IA 255	310	325	335	345	335	305	255	180							
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								28	28	28	28	29	26	24	25	26	15							
MED								210	270	315	325	335	340	330	305	260	200							
UQ								222	285	315	330	340	345	335	310	270	205							
LQ								200	268	308	320	330	340	322	295	250	190							

The Radio Research Laboratories, Japan

NOV. 1969 | FOE (0.01 MHZ)

IONOSPHERIC DATA

NOV. 1969 | FOES (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station AKITA | Lat. 39° 43.5 N | Long. 140° 08.2 E | Sweep 1 MHz to 20 MHz in 20 sec | in automatic operation

Hour / 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	J X 28	J X 33	J X 20	J X 25	J X 20	J X 24	J X 30	30	J X 44	J X 54	38	39	G	J X 49	J X 43	J X 45	J X 39	J X 38	J X 44	J X 51	J X 25	J X 26	J X 23	J X 22
2	E S 14	J X 20	J X 18	E	E	E	E S 14	G	G	G		J G 33	G	37	G	G	26	J X 20	J X 20	J X 65	J X 89	J X 33	J X 34	J X 23
3	E S 14	E S 13	E	E	E	E	E S 17	27	31	36	G	G	J X 42	J X 49	J G 30	G	G	J X 21	E S 14	E S 14	E S 14	J X 23	E S 14	J X 59
4	J X 30	J X 23	J X 19	J X 15	E S 13	E S 14	E S 14	G	G	G	G	G	G	G	34	32	J G 20	J X 20	J X 46	J X 33	J X 34	E S 14	J X 20	J X 19
5	J X 29	J X 19	J X 21	J X 20	J X 20	J X 23	E S 14	G	G	G	G	G	G	G	G	G	J G 20	J X 23	J X 24	E S 14	E S 14	E S 14	E S 14	E S 14
6	E S 14	J X 19	J X 19	E S 14	J X 20	J X 20	J X 20	G	G	35	36	35	40	34	32	J X 40	J X 29	J X 31	E S 14	E S 14	E S 13	E S 14	E S 13	E S 13
7	E S 13	E S 13	E S 13	E S 13	E S 13	E S 14	J X 19	G	G	G	G	39	38	39	44	J X 38	G	E S 14	20	E S 13	E S 13	E S 13	E S 13	E S 14
8	E S 14	E S 14	17	E S 13	E S 13	E S 13	E S 14	G	G	36	40	J X 49	37	G	G	J X 32	G	E S 14	J X 33	E S 14	E S 13	E S 14	E B 17	E S 14
9	E S 14	J X 16	J X 18	E S 14	E	J X 17	E S 14	G	37	G	41	J X 53	37	J X 40	J X 74	J X 43	J X 55	J X 46	J X 34	J X 34	J X 20	E S 13	E S 14	E S 14
10	E S 14	E S 14	E S 14	J X 18	J X 13	E S 14	J X 20	G	32	36	40	J X 46	37	35	G	J X 41	27	J X 36	J X 50	J X 36	J X 26	J X 21	J X 20	J X 23
11	J X 29	J X 18	J X 21	J X 16	E	E S 13	E S 14	G	29	40	J X 50	J X 46	44	J X 43	38	G	25	E S 14	J X 20	E S 13	E S 13	J X 30	J X 73	E S 13
12	E S 13	J X 18	M 22	J X 23	J X 28	J X 38	J X 39	25	28	32	G	G	G	J X 45	J X 48	G	J X 25	J X 26	E S 14	E S 14	M 24	E S 14	E S 13	E S 13
13	E S 13	E S 13	E S 13	E S 14	E S 14	E S 14	E S 13	G	G	34	G	G	G	G	J G 28	J X 27	G	E S 14	E S 14	E S 14	E S 14	E S 14	J X 23	J X 20
14	E S 14	E	J X 20	E S 14	E S 14	E S 14	E S 14	G	31	34	J X 43	G	35	35	33	J X 37	J X 27	J X 23	E S 14	J X 20	J X 22	E S 13	E S 13	E S 13
15	E S 13	E S 14	E S 14	E S 13	E	E S 14	E S 14	G	G	J X 99	G 29	G	C	C	C	27	C	E S 13	C	C	C	C	E S 14	E S 14
16	E S 14	E S 14	E S 13	E S 13	J X 19	E S 13	E S 13	G	G	34	39	J X 40	J X 49	J X 39	33	28	E B 21	E S 14	E S 14	J X 26	J X 43	J X 28	J X 24	J X 23
17	J X 26	E S 14	E S 16	E S 14	E S 14	E S 14	E S 14	G	G	G	36	G	G	G	G	J X 41	G	E S 14	J X 79	J X 44	J X 24	J X 40	J X 38	E S 14
18	J X 18	E S 14	J X 34	E S 13	E S 14	E S 13	E S 14	G 20	G	G	G	G	G	G	G	G	21	J X 25	J X 23	J X 20	J X 27	J X 33	J X 37	J X 25
19	J X 25	J X 19	J X 18	J X 13	J X 24	E	J X 18	G	G	G	G	G				E B 31	J X 26	J X 24	E S 14	E S 13	E S 13	J X 20	J X 18	J X 30
20	E S 13	E S 14	E S 14	J X 20	E S 14	E S 14	E S 14	G	G	G	G	G	G	G	J G 26	G	J X 30	J X 39	J X 24	E S 14	E S 14	E S 14	E S 14	E S 14
21	E S 14	E S 13	E	J X 18	E S 14	E S 14	E S 14	G	G	G	G	36	J X 40	G	34	31	24	E S 13	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
22	J X 20	J X 44	J X 33	E S 14	E	E S 14	J X 20	J X 81	J X 33	J G 30	J X 43	G	G	G	G	G	G	E S 14	J X 34	J X 43	J X 25	E S 14	E S 14	E S 14
23	E S 14	E S 14	E S 14	E	E	E S 14	E S 14	24	G	G	G	G	G	G	G	G	G	E S 14	E S 14	E S 14	E S 14	J X 40	E S 14	E S 14
24	J X 29	J X 28	J X 28	J X 16	J X 19	E S 14	J X 20	G	G	G	J X 48	G	G	G	J X 34	G	J G 20	J X 46	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	G	J X 43	J X 53	J X 80	33	G	23	J X 25	J X 29	J X 44	J X 35	J X 16	J X 20	J X 22
26	E S 14	J X 18	E S 13	E S 13	E S 13	E S 14	E S 14	G	G	G	36	G	36	G	G	G	G	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
27	E S 14	E	E S 14	E	E	E S 14	E S 14	G	G	G	G	G	G	G	G	29	23	J X 19	J X 21	J X 21	E S 14	J X 26	J X 30	J X 20
28	J X 31	J X 28	J X 20	J X 16	J X 19	E S 14	J X 31	G	J X 28	J X 54	J X 41	J X 38	J X 38	37	35	J X 38	J X 39	J X 26	E S 14	E S 14	E S 14	J X 29	J X 23	J X 33
29	J X 28	J X 20	E S 14	E S 13	E S 14	J X 17	E S 14	G	J X 33	G	G	G	G	G	G	G	G	E S 14	J X 18	E S 14	E S 14	E S 14	E S 14	E S 14
30	E S 14	E S 14	E S 14	E	E S 13	E S 14	E S 14	G	28	G	J X 33	G 32	G	G	G	G	G	J X 17	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	29	29	29	29	29	29	29	29	30	28	28	28	30	29	30	28	28	28	28	29	29
MED	E S 14	14	17	14	14	E S 14	E S 14	G	G	G	G 29	G	G	G	G 29	E G 27	21	J X 20	J X 20	E S 14	E S 14	E S 14	E S 14	E S 14
UQ	J X 26	J X 19	J X 20	J X 16	J X 19	E S 14	J X 19	G	29	35	40	J 39	38	39	34	J X 37	J X 26	J X 26	J X 31	J X 34	J X 25	J X 27	J X 23	J X 22
LQ	E S 14	E S 14	E S 14	E S 13	E	E S 14	E S 14	G	G	G	G	G	G	G	G	G	G	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14

NOV. 1969 | FOES (0.1 MHZ)

IONOSPHERIC DATA

NOV. 1969 | FBES (0.1 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station AKITA | Lat. 39° 43.5' N | Long. 140° 08.2' E | Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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	15	20	E	E	24	30	42	51	37	37	G	48	42	43	35	35	36	36	23	E	E	E
2	E S 14	E	E	E	E	E	E S 14	G	G	G	G	G 29	G	37	G	G	25	18	E	37	A	24	19	E
3	E S 14	E S 13	E	E	E	E	E S 17	27	38	36	G	G	38	34	G 28	G	G	E	E S 14	E S 14	E S 14	E	E S 14	38
4	21	17	15	14	E S 13	E S 14	E S 14	G	G	G	G	G	G	G	G	29	G 17	17	34	E	20	E S 14	E	E
5	18	E	E	17	18	E	E S 14	G	G	G	G	G	G	G	G	G	G 18	19	20	E S 14	E S 14	E S 14	E S 14	E S 14
6	E S 14	E	E	E S 14	E	E	E	G	G	35	35	35	39	33	31	32	24	17	E S 14	E S 14	E S 13	E S 14	E S 13	E S 13
7	E S 13	E S 13	E S 13	E S 13	E S 13	E S 14	15	G	G	G	G	38	37	39	35	27	G	E S 14	18	E S 13	E S 13	E S 13	E S 13	E S 14
8	E S 14	E S 14	17	E S 13	E S 13	E S 13	E S 14	G	G	34	35	46	36	G	G	29	G	E S 14	23	E S 14	E S 13	E S 14	E B 17	E S 14
9	E S 14	E	E	E S 14	E	E	E S 14	G	30	G	40	52	36	36	32	34	44	26	24	26	18	E S 13	E S 14	E S 14
10	E S 14	E S 14	E S 14	E	E	E S 14	E	G	31	32	37	42	35	34	G	30	25	30	30	24	19	18	16	17
11	28	15	15	13	E	E S 13	E S 14	G	29	30	38	47	40	E R 43	35	G	18	E S 14	17	E S 13	E S 13	E	A	E S 13
12	E S 13	15	16	17	16	E	16	23	28	32	G	G	G	33	27	G	17	16	E S 14	E S 14	E	E S 14	E S 13	E S 13
13	E S 13	E S 13	E S 13	E S 14	E S 14	E S 14	E S 13	G	G	34	G	G	G	G	G 26	27	G	E S 14	E S 14	E S 14	E S 14	E S 14	20	E
14	E S 14	E	E	E S 14	E S 14	E S 14	E S 14	G	31	33	34	G	35	35	32	31	23	E	E S 14	17	18	E S 13	E S 13	E S 13
15	E S 13	E S 14	E S 14	E S 13	E	E S 14	E S 14	G	G	28	G 29	G	C	C	C	G	C	E S 13	C	C	C	C	E S 14	E S 14
16	E S 14	E S 14	E S 13	E S 13	E	E S 13	E S 13	G	G	34	37	37	45	39	33	28	E B 21	E S 14	E S 14	18	A	25	E	18
17	19	E S 14	E S 16	E S 14	E S 14	E S 14	E S 14	G	G	G	35	G	G	G	G	33	G	E S 14	20	26	E	A	19	E S 14
18	E	E S 14	27	E S 13	E S 14	E S 13	E S 14	G 18	G	G	G	G	G	G	G	G	20	18	16	15	21	19	24	21
19	15	14	E	E	E	E	E	G	G	G	G	G	G	G	G	E B 31	22	19	E S 14	E S 13	E S 13	E	E	19
20	E S 13	E S 14	E S 14	E	E S 14	E S 14	E S 14	G	G	G	G	G	G	G	G 23	G	24	26	18	E S 14	E S 14	E S 14	E S 14	E S 14
21	E S 14	E S 13	E	E	E S 14	E S 14	E S 14	G	G	G	G	35	35	G	34	28	21	E S 13	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
22	19	17	E	E S 14	E	E S 14	16	A	30	G 25	34	G	G	G	G	G	G	E S 14	E	18	16	E S 14	E S 14	E S 14
23	E S 14	E S 14	E S 14	E	E	E S 14	E S 14	G	G	G	G	G	G	G	G	G	G	E S 14	E S 14	E S 14	E S 14	19	E S 14	E S 14
24	E	E	17	E	E	E S 14	15	G	G	G	35	G	G	G	20	G	G 17	16	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	G	25	38	28	G	G	23	18	18	28	E	E	E	E
26	E S 14	E	E S 13	E S 13	E S 13	E S 14	E S 14	G	G	G	G	G	G	G	G	G	G	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
27	E S 14	E	E S 14	E	E	E S 14	E S 14	G	G	G	G	G	G	G	G	G	23	17	E	17	E S 14	E	24	E
28	E	15	15	14	E	E S 14	E	G	25	28	34	29	35	G	32	24	22	E	E S 14	E S 14	E S 14	E	E	A
29	E	E	E S 14	E S 13	E S 14	E	E S 14	G	26	G	G	G	G	G	G	G	G	E S 14	E	E S 14	E S 14	E S 14	E S 14	E S 14
30	E S 14	E S 14	E S 14	E	E S 13	E S 14	E S 14	G	28	G	29	G 29	G	G	G	G	G	E	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	29	29	29	29	29	29	29	30	30	29	29	29	30	29	30	28	28	28	28	29	29
MED	E S 14	14	E E 14	E E 13	E	E S 14	E S 14	G	G	G	G	G	G	G	G	G	18	14	14	E S 14	E S 14	E S 14	E S 14	E S 14
UQ	E S 14	E S 14	15	E S 14	E S 14	E S 14	E S 14	G	28	32	35	35	36	34	32	29	23	18	19	18	18	E S 14	E S 16	E S 14
LQ	E S 13	E	E	E	E	E	E S 14	G	G	G	G	G	G	G	G	G	G	E S 14	E S 14	E S 14	E S 13	E S 13	E S 13	E S 13

NOV. 1969 | FBES (0.1 MHZ)

IONOSPHERIC DATA

NOV. 1969 | F-MIN (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station AKITA Lat. 39° 43·5' N. Long. 140° 08·2' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	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 S 14	E S 14	E	S 13	E S 13	E S 14	E S 13	15	14	16	16	16	18	17	16	16	13	13	E S 13	E S 13	E S 13	E S 13	E S 13	E S 14
2	E S 14	E S 13	E S 14	E	E	E	E S 14	16	16	16	15	14	14	15	15	16	14	13	E S 14	E S 13	E S 13	E S 13	E S 13	E S 13
3	E S 14	E S 13	E	E	E	E	E S 17	15	15	16	15	16	18	16	16	14	14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
4	E S 14	E	E	E	E S 13	E S 14	E S 14	14	15	16	15	15	16	14	18	16	14	E S 13	E S 14	E S 14	E S 13	E S 14	E S 14	E S 14
5	E S 13	E S 13	E	E	E	E S 14	E S 14	16	15	15	15	15	18	16	18	14	12	12	E S 13	E S 14	E S 14	E S 14	E S 14	E S 14
6	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	15	18	21	18	22	20	18	18	15	14	E S 14	E S 14	E S 14	E S 13	E S 14	E S 13	E S 13
7	E S 13	E S 13	E S 13	E S 13	E S 13	E S 14	E S 14	14	18	16	20	20	20	22	19	15	15	E S 14	E S 13	E S 13	E S 13	E S 13	E S 13	E S 14
8	E S 14	E S 14	E S 14	E S 13	E S 13	E S 13	E S 14	15	15	18	16	19	18	19	19	18	16	E S 14	E S 14	E S 14	E S 13	E S 14	17	E S 14
9	E S 14	E S 14	E S 14	E S 14	E	E S 13	E S 14	15	16	18	19	20	19	18	18	15	13	E S 14	E S 13	E S 13	E S 14	E S 13	E S 14	E S 14
10	E S 14	E S 14	E S 14	E S 13	E	E S 14	E S 14	16	15	18	19	20	18	21	16	16	15	E S 14	E S 13	E S 14	E S 14	E S 14	E S 14	E S 14
11	E S 14	E S 13	E S 14	E	E	E S 13	E S 14	15	15	17	17	17	18	17	16	13	E S 15	E S 14	E S 13	E S 13	E S 13	E S 13	E S 13	E S 13
12	E S 13	E S 13	E S 13	E S 13	E S 13	E S 13	E S 13	15	16	16	20	16	18	19	19	15	E S 15	E S 15	E S 14	E S 14	E S 12	E S 14	E S 13	E S 13
13	E S 13	E S 13	E S 13	E S 14	E S 14	E S 14	E S 13	16	16	16	16	16	16	18	16	16	15	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
14	E S 14	E	E S 13	E S 14	E S 14	E S 14	E S 14	15	15	17	20	19	20	19	19	14	14	E S 14	E S 14	E S 13	E S 13	E S 13	E S 13	E S 13
15	E S 13	E S 14	E S 14	E S 13	E	E S 14	E S 14	14	15	17	17	18	C	C	C	14	C	E S 13	C	C	C	C	E S 14	E S 14
16	E S 14	E S 14	E S 13	E S 13	E	E S 13	E S 13	16	16	18	15	18	19	16	16	15	21	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 13
17	E S 13	E S 14	E S 16	E S 14	E S 14	E S 14	E S 14	14	14	16	16	19	18	16	15	15	14	E S 14	E S 14	E S 14	E S 14	E S 13	E S 13	E S 14
18	E S 13	E S 14	E S 13	E S 13	E S 14	E S 13	E S 14	14	15	16	18	18	17	19	17	15	12	E	E	E	E S 13	E	E	E S 13
19	E	E	E S 14	E	E	E	E S 14	15	15	18	18	29	19	17	20	31	14	E S 13	E S 14	E S 13	E S 13	E S 14	E S 14	E S 14
20	E S 13	E S 14	E S 14	E	E S 14	E S 14	E S 14	15	16	20	19	19	18	17	15	15	E	E	E S 12	E S 14	E S 14	E S 14	E S 14	E S 14
21	E S 14	E S 13	E	E	E S 14	E S 14	E S 14	14	15	15	17	15	18	18	17	17	14	E S 13	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
22	E S 14	E S 14	E S 13	E S 14	E	E S 14	E	14	14	14	15	14	18	23	18	17	14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
23	E S 14	E S 14	E S 14	E	E	E S 14	E S 14	14	18	15	19	21	23	17	19	16	15	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
24	E S 14	E	E	E	E	E S 14	E	15	16	17	20	18	21	23	17	14	14	E	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	17	14	16	16	16	14	13	E S 13	E S 13	E S 13	E S 14	E S 14	E S 14	E S 14
26	E S 14	E S 14	E S 13	E S 13	E S 13	E S 14	E S 14	15	17	16	16	15	15	16	16	15	13	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
27	E S 14	E	E S 14	E	E	E S 14	E S 14	15	16	16	15	22	22	20	19	16	12	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
28	E S 14	E	E	E	E S 14	E S 14	E S 14	14	15	15	15	15	20	17	14	14	14	E S 13	E S 14	E S 14	E S 14	E S 14	E S 14	E S 13
29	E S 14	E S 14	E S 14	E S 13	E S 14	E S 14	E S 14	13	14	15	16	16	18	18	15	16	14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
30	E S 14	E S 14	E S 14	E	E S 13	E S 14	E S 14	14	16	18	16	19	19	17	16	16	14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	29	29	29	29	29	29	29	30	30	29	29	29	30	29	30	28	28	28	28	29	29
MED	E S 14	E S 14	E S 13	E S 13	E S 13	E S 14	E S 14	15	15	16	16	18	18	17	17	15	14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
UQ	E S 14	E S 14	E S 14	E S 13	E S 14	E S 14	E S 14	15	16	18	19	19	19	19	18	16	15	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14	E S 14
LQ	E S 13	E S 13	E S 13	E	E	E S 13	E S 14	14	15	16	15	15	18	16	16	14	13	E S 13	E S 13	E S 13	E S 13	E S 13	E S 13	E S 13

The Radio Research Laboratories, Japan

NOV. 1969 | F-MIN (0.1 MHZ)

IONOSPHERIC DATA

NOV. 1969 | M(3000)F2 (0.01) | 135° E Mean Time (G. M. T.+ 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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	260	265	265	285	280	270	315	R	R	R	R	300	295	305	300	315	I R 315	315	305	305	315	295	290	280
2	270	270	280	290	335	300	305	335	I R 335	325	I R 320	I R 300	I R 310	300	295	310	I R 320	315	310	I R 310	I A 295	295	280	280
3	275	270	255	255	285	315	300	320	325	305	330	I R 315	310	300	310	315	I R 310	310	305	310	300	290	295	290
4	290	265	260	275	300	285	290	320	I R 310	I R 320	I R 330	I R 330	I R 310	305	I R 310	R	R	315	315	295	295	290	285	285
5	300	305	305	295	285	285	305	325	R	R	I R 325	320	315	325	315	325	315	320	310	300	300	300	275	275
6	275	275	275	290	315	285	300	330	330	320	330	325	300	320	330	310	340	320	310	300	315	310	295	270
7	265	260	270	290	310	320	300	340	340	335	320	335	320	320	310	330	325	325	320	290	295	285	265	255
8	290	285	290	290	285	280	300	330	320	320	325	320	310	315	315	320	320	310	325	315	295	285	265	270
9	280	270	265	275	290	290	270	315	310	315	315	310	315	310	315	305	305	300	325	300	280	265	310	260
10	265	250	270	260	290	265	295	315	I R 330	305	I R 310	310	325	325	315	315	340	310	315	320	305	270	265	255
11	250	265	275	265	285	285	310	325	I R 335	345	R 305	320	315	320	325	325	325	310	310	315	300	290	I A 305	325
12	270	270	265	290	310	305	320	I R 335	340	340	I R 340	320	320	330	330	H 325	340	305	300	325	325	295	275	290
13	285	285	305	295	280	290	305	350	350	330	315	330	320	345	325	320	330	300	315	305	295	280	S 290	295
14	270	270	275	270	280	290	310	345	340	320	290	330	320	320	315	325	325	330	300	305	280	290	300	280
15	275	270	285	285	305	315	310	340	345	340	335	335	C	C	C	340	300	335	I C 295	I C 295	I C 295	I C 290	275	290
16	280	280	280	280	300	310	325	335	340	340	325	320	320	315	330	325	320	325	305	350	I A 285	295	290	290
17	275	270	265	285	290	290	315	335	I R 355	340	345	330	315	325	325	330	335	315	315	I R 320	315	I A 295	270	275
18	280	280	285	290	280	295	310	330	355	335	330	340	320	325	320	320	295	325	315	310	300	285	300	290
19	280	275	300	300	290	285	350	340	350	330	330	310	310	335	325	335	345	300	300	320	295	300	300	280
20	270	270	285	305	315	280	300	I R 335	345	325	330	320	320	320	325	325	325	300	260	315	310	285	295	285
21	280	290	285	290	295	295	285	325	340	320	325	315	315	325	330	345	340	320	295	330	275	280	275	285
22	260	270	300	295	320	310	H 300	I A 330	320	325	330	320	325	320	315	320	330	305	320	310	295	300	265	270
23	I R 265	270	280	300	320	300	295	310	335	340	325	305	300	300	325	320	330	305	295	305	310	285	270	280
24	270	260	275	260	285	290	355	335	335	330	330	325	310	325	325	315	340	315	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	320	310	I R 320	320	330	300	320	320	300	300	305	305	275	265
26	S 270	285	285	290	280	270	315	350	340	325	315	315	295	300	310	330	320	305	295	290	310	300	300	280
27	280	280	280	255	245	270	320	330	330	310	315	I R 310	305	300	300	310	300	295	330	335	300	265	I R 260	260
28	255	260	260	270	275	275	305	340	325	330	330	320	310	320	320	315	325	310	310	325	320	305	285	I A 275
29	280	280	280	285	285	290	310	340	335	315	330	320	325	315	305	320	340	310	315	315	315	280	270	280
30	270	270	270	310	290	300	305	325	320	I R 330	315	315	315	315	310	325	320	310	335	320	335	300	280	285
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	29	29	29	29	28	27	27	29	30	29	29	29	29	29	30	29	29	29	29	29	29
MED	275	270	280	290	290	290	305	332	335	325	325	320	315	320	315	320	325	310	310	310	300	290	280	280
UQ	280	280	285	290	305	300	315	340	340	335	330	325	320	325	325	325	335	320	315	320	310	300	295	285
LQ	270	270	270	275	285	285	300	325	328	320	315	310	310	310	310	315	320	305	300	300	295	285	270	270

NOV. 1969 | M(3000)F2 (0.01)

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

NOV. 1969 | M(3000)F1 (0.01) | 135° E Mean Time (G. M. T. + 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	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	L	L	L	L	L									
2										L	L	L 370	L	L	L									
3										L	L	L	L	L	L									
4										L	L	L	L	L										
5										L	L	L	L	L										
6											L 405	410	L	L	L									
7								400	425	L	L	L	L	L										
8										L	L 360	L	L	L	L 375									
9									L	L	L	A	L 350	L	L									
10									L	L	L	L	L 385											
11												A	L	A	L									
12										L	L	L	L			405								
13										L	L	H 380	405	435										
14										L	L 355	L	L	390										
15										L	L	L	C	C										
16									L	L	L	L	A	L										
17										L	L	L 400	H 355	L										
18										L	L	380	385	365										
19										L	L	L	L	L	375									
20										L	L	L	L	L										
21										L	L	350	L	L										
22										420	L 360	L	L	L										
23										L	L	L 390	L	L	L									
24										L	L	L	L	415										
25											L	L	L	L 340										
26											L 365	L	L											
27											L	L	L											
28											L	L	L 380	L										
29										L	L	L	365	L										
30											L	L	L	L										
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	1	1	5	7	7	5	2	1								
MED								400	425	420	L 360	380	380	390	375	405								
UQ											L 365	395	385	415										
LQ											L 360	375	360	365										

The Radio Research Laboratories, Japan

NOV. 1969 | M(3000)F1 (0.01)

IONOSPHERIC DATA

NOV. 1969 | H'F2 (KM) | 135° E Mean Time (G. M. T.+ 9h)

Station AKITA Lat. 39° 43.5' N Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	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	230	255	250	250	255									
2										245	250	265	260	250	270									
3										250	240	255	240	245	255									
4										230	250	230	255	255										
5										240	245	250	250	250										
6											240	240	245	250	255									
7								230	230	245	240	245	265	250										
8										245	250	255	255	250	250									
9									230	245	250	250	255	260	250									
10									230	235	245	250	250											
11												245	240	255	250									
12										245	245	240	255			230								
13										250	240	255	230	230										
14										250	250	255	245	250										
15										235	245	230	C	C										
16									235	240	260	245	255	250										
17										230	240	240	275	245										
18										230	240	240	230	270										
19										225	255	250	250	250	255									
20										240	235	255	280	270										
21										245	245	265	245	250										
22										240	265	245	255	255										
23										245	240	230	280	250	260									
24										245	260	250	250	235										
25											245	235	300	275										
26											250	240	250											
27											250	265	255											
28											250	240	245	245										
29										245	250	255	270	255										
30											240	245	255	250										
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	4	23	29	30	29	29	9	1								
MED								230	230	245	245	248	255	250	255	230								
UQ									232	245	250	255	255	255	255									
LQ									230	238	240	240	245	250	250									

The Radio Research Laboratories, Japan

NOV. 1969 | H'F2 (KM)

IONOSPHERIC DATA

NOV. 1969 | H'F (KM) | 135° E Mean Time (G. M. T.+ 9h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 08.2' E Sweep 1 MHz to 20 MHz in 20 sec in automatio operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	320	305	295	280	240	270	250	235	215	I A 245	215	225	235	235	235	250	230	230	270	280	245	240	265	280
2	290	290	290	245	245	230	235	225	220	230	230	205	230	240	240	250	235	210	230	245	I A 255	270	290	285
3	290	295	320	315	255	215	245	225	225	230	220	200 H	230	230	225	245	235	225	240	220	220	245	270	I A 275
4	290	295	325	290	225	240	270	230	230	215	200 H	220	220	230	230	235	230	215	245	230	260	250	280	280
5	280	255	240	245	270	295	250	220	230	230	230	230	230	230	235	240	235	225	245	245	245	240	280	300
6	310	305	310	280	230	250	255	220	240	240	230	215	235	245	245	230	235	220	245	245	245	240	260	275
7	310	315	320	280	255	245	245	230	200	235	230	240	215	245	235	245	245	210	240	230	245	255	315	315
8	270	295	290	275	280	295	260	235	235	230	230	245	235	240	230	230	230	215	225	215	250	290	310	320
9	300	310	320	295	270	240	270	250	230	230	240	I A 240	230	240	250	240	250	240	220	265	300	340	250	355
10	320	345	290	320	260	310	280	250	235	235	220	235	240	235	230	240	225	250	250	240	240	320	340	330
11	335	320	270	300	250	280	255	240	230	240	240	I A 240	240	I A 245	240	225	215	210	260	240	230	280	I A 245	240
12	285	320	320	305	250	250	245	230	220	205 H	225	215	230	245	235	225	230	205	245	235	240	255	300	270
13	280	280	270	275	310	275	250	230	230	230	230	210 H	200	190	240	235	215	205	240	240	245	260	290	290
14	315	300	295	305	290	290	230	215	220	230	230	230	230	220	240	220	215	205	240	230	285	270	270	290
15	315	320	305	290	245	240	250	225	235	230	230	230	C	C	C	230	I C 225	205	I C 210	I C 225	I C 320	I C 300	305	325
16	310	310	315	305	275	255	230	225	230	230	230	230	I A 235	240	250	230	225	220	240	240	I A 295	I A 310	290	300
17	310	310	340	295	290	290	230	210	220	230	230	215	200 H	230	230	230	225	200	245	255	245	I A 250	295	300
18	310	290	320	290	300	245	225	230	220	230	230	225	220	210	245	235	215	215	245	240	255	255	295	310
19	300	290	255	245	250	255	245	220	215	215	235	245	235	250	230	235	225	235	245	225	255	245	245	320
20	330	325	285	280	230	265	240	230	225	230	230	220 H	230 H	240	245	235	225	220	245	230	235	260	280	290
21	290	290	290	275	255	240	225	245	240	230	230	205	245	240	245	220	230	205	240	215	270	280	305	305
22	340	340	330	280	230	215	230 H	I A 225	230	190	215	230	240	245	230	245	225	240	220	225	270	250	315	330
23	340	305	320	260	230	240	290	235	235	240	230	205	245	250	240	230	225	205	220	240	240	270	290	290
24	305	305	320	320	280	265	215	220	215	230	245	245	230	215	240	245	225	205	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	230	225	230 H	220	245	240	215	210	215	270	245	245	315	340
26	320 S	295	290	265	265	295	240	215	230	230	225	230	225	245	240	245	235	215	205	255	240	245	250	260
27	310	295	300	350	360	315	200	220	225	240	240	240	240	245	245	240	225	210	235	215	245	300	I A 350	340
28	340	350	320	295	295	290	245	235	230	240	235	225	215	230	235	230	220	220	235	215	225	245	280	I A 300
29	310	310	305	290	290	245	250	225	225	230	240	230	230	230	240	230	220	205	240	230	225	260	300	320
30	340	305	330	255	245	285	230	235	220	230	230	225	230	230	240	225	215	220	220	220	230	250	305	295
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	29	29	29	29	29	29	29	30	30	29	29	29	30	30	30	29	29	29	29	29	29
MED	310	305	305	290	255	255	245	230	230	230	230	228	230	240	240	235	225	215	240	235	245	255	290	300
UQ	320	315	320	300	280	285	250	235	230	235	230	235	235	245	245	240	230	220	245	245	255	280	305	320
LQ	290	295	290	275	245	240	230	220	220	230	230	215	230	230	235	230	220	205	225	225	240	245	270	285

The Radio Research Laboratories, Japan

NOV. 1969 | H'F (KM)

IONOSPHERIC DATA

NOV. 1969 | H'ES (KM) | 135° E Mean Time (G. M. T.+ 9h)

Station AKITA Lat. 39° 43·5 N. Long. 140° 08·2 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	105	105	110	105	105	110	150	145	115	115	130	120	G	115	115	115	110	110	105	100	100	100	100	100
2	S	100	100	E	E	E	S	G	G	G	G	105	G	130	G	G	130	115	115	105	100	100	100	105
3	S	S	E	E	E	E	S	170	115	120	G	G	110	110	105	G	G	110	S	S	S	105	S	105
4	100	105	100	100	S	S	S	G	G	G	G	G	G	G	130	115	100	105	110	105	105	S	105	105
5	100	105	105	100	100	100	S	G	G	G	G	G	G	G	G	G	105	100	100	S	S	S	S	S
6	S	100	110	S	105	105	100	G	G	145	145	140	130	135	150	135	120	115	S	S	S	S	S	S
7	S	S	S	S	S	S	105	G	G	G	G	150	135	130	130	115	G	S	105	S	S	S	S	S
8	S	S	115	S	S	S	S	G	G	150	140	125	125	G	G	130	G	S	115	S	S	S	B	S
9	S	105	105	S	E	105	S	G	150	G	130	115	120	115	110	105	105	100	100	100	100	S	S	S
10	S	S	S	100	100	S	105	G	125	125	125	120	120	125	G	130	145	110	110	110	115	110	110	120
11	105	110	110	110	E	S	S	G	125	125	120	120	120	120	125	G	125	S	100	S	S	110	110	S
12	S	105	105	105	105	110	110	150	125	125	G	G	G	110	110	G	115	105	S	S	100	S	S	S
13	S	S	S	S	S	S	S	G	G	120	G	G	G	G	115	115	G	S	S	S	S	S	105	115
14	S	E	105	S	S	S	S	G	120	120	115	G	115	115	110	110	110	110	S	105	105	S	S	S
15	S	S	S	S	E	S	S	G	G	110	110	G	C	C	C	120	C	S	C	C	C	C	S	S
16	S	S	S	S	100	S	S	G	G	120	115	115	110	115	150	120	B	S	S	110	105	100	105	100
17	100	S	S	S	S	S	S	G	G	G	150	G	G	G	G	115	G	S	110	110	110	105	105	S
18	100	S	100	S	S	S	S	100	G	G	G	G	G	G	G	G	140	110	110	110	105	105	100	100
19	100	100	100	105	105	E	115	G	G	G	G	G	G	G	G	B	100	100	S	S	S	105	105	100
20	S	S	S	100	S	S	S	G	G	G	G	G	G	G	100	G	100	100	100	S	S	S	S	S
21	S	S	E	100	S	S	S	G	G	G	G	115	110	G	165	140	120	S	S	S	S	S	S	S
22	105	100	100	S	E	S	100	105	105	105	100	G	G	G	G	G	G	S	110	105	105	S	S	S
23	S	S	S	E	E	S	S	150	G	G	G	G	G	G	G	G	G	S	S	S	S	110	S	S
24	110	105	105	110	110	S	110	G	G	G	110	G	G	G	105	G	100	110	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	G	110	100	100	130	G	140	115	110	105	105	105	100	105
26	S	100	S	S	S	S	S	G	G	G	130	G	130	G	G	G	G	S	S	S	S	S	S	S
27	S	E	S	E	E	S	S	G	G	G	G	G	G	G	G	160	135	125	115	115	S	110	105	105
28	105	105	105	105	105	S	110	G	110	115	110	105	105	130	115	105	110	110	S	S	S	105	105	100
29	100	100	S	S	S	110	S	G	110	G	G	G	G	G	G	G	G	S	105	S	S	S	S	S
30	S	S	S	E	S	S	S	G	115	G	110	110	G	G	G	G	G	100	S	S	S	S	S	S
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	11	14	15	11	9	6	9	6	11	13	15	13	13	13	16	15	18	18	16	12	12	13	13	12
MED	100	105	105	105	105	108	110	148	115	120	120	115	120	115	115	115	112	110	110	105	105	105	105	105
UQ	105	105	108	105	105	110	110	150	125	125	130	120	125	130	130	130	130	110	110	110	105	110	105	105
LQ	100	100	100	100	100	105	105	105	112	115	110	110	110	115	110	115	105	100	102	105	100	105	100	100

NOV. 1969 | H'ES (KM)

IONOSPHERIC DATA

NOV. 1969 | TYPES OF ES | 135° E Mean Time (G. M. T. + 9h)

Station AKITA | Lat. 39° 43·5 N | Long. 140° 08·2 E | Sweep 1 MHz to 20 MHz in 20 sec in automatio operation

Hour / 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	F1	F2	F2	F3	F1	F1	H2	H1	C1	C2	H2	C1		C3	C3	C4	L4	L6	F4	F5	F3	F2	F2	F2
2		F1	F2									L2		H2			H2	C2	F1	F3	F5	F3	F2	F1
3								H1	C2	C2			L2	L2	L2			L1				F1		F4
4	F3	F2	F3	F2											H1	C1	L1	L1	F2	F1	F2		F1	F1
5	F2	F2	F2	F2	F2	F2											L2	L2	F2					
6		F1	F1		F1	F1	L1			H1	H1	H1	H2	H1	H1	H4	C3	C1						
7							L1					H1	H2	H1	H1	C2			F1					
8			F2							H1	H1	H2	H2			H2			F2					
9		F1	F2								H1	C2	C2	C2	C1	L3	L3	L3	F3	F2	F1			
10				F1	F1		L1		C1	H1	H1	C2	C2	H1		H1	H2	C1	F3	F2	F2	F1	F1	F2
11	F5	F2	F1	F2					H1	H1	C2	C2	C2	C2	H2		H2		F2			F1	F5	
12		F2	F3	F2	F1	F1	C2	HL12	H1	H1				C1	L2		L1	F2			F1			
13										C1					L2	C1							F2	F1
14			F1						C3	C1	C1		C1	C1	L2	L3	L2	F1		F1	F2			
15										L1	L2					C1								
16					F1					C1	C1	C1	L3	C2	C1	C2				F2	F4	F4	F2	F2
17	F3										H1					C3			F2	F3	F2	F3	F2	
18	F1		F2					L1									H2	F2	F2	F1	F3	F4	F3	F2
19	F1	F1	F1	F1	F1		F1										L1	F1				F2	F2	F2
20				F1											L2		L2	F2	F1					
21				F1								C2	L2		H1	H2	C2							
22	F2	F2	F1				F2	L3	L1	L1	L1								F1	F2	F2			
23								H1														F2		
24	F1	F2	F2	F1	F1		F1				L1				L1		L1	F1						
25												L1	L2	L2	H1		H2	F2	F1	F4	F2	F1	F1	F1
26		F1									H1		H1											
27																H1	H1	F1	F1	F1		F1	F1	F1
28	F2	F1	F1	F2	F1		F1		L2	L1	L2	L1	L2	H1	L2	L2	L3	F1				F2	F1	F2
29	F1	F1				F1			L1										F1					
30									C2		L1	L1						F1						
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
UQ																								
LQ																								

NOV. 1969 | TYPES OF ES

IONOSPHERIC DATA

NOV. 1969 | FOF2 (0.1 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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	45	46	45	A	43	41	59	86	109	101	123	112	124	122	127	110	102	86	64	66	68	50	45	44
2	41	41	42	44	44	35	50	83	98	116	114	111	114	126	118	124	120	98	66	61	53	51	44	44
3	42	40	40	40	40	35	58	94	107	120	128	120	117	111	111	110	107	95	B 77	68	56	46	48	50
4	46	43	I R 41	43	41	32	51	93	117	136	144	130	114	126	115	111	108	95	71	61	60	60	59	56
5	58	58	50	36	32	32	48	94	116	J R 104	115	121	106	111	101	96	92	90	67	50	50	47	36	36
6	36	37	37	40	42	28	45	85	106	130	121	104	104	123	115	107	I R 87	71	60	61	52	43	42	42
7	38	37	36	38	39	34	45	84	96	101	J R 104	106	101	110	102	101	101	94	54	52	52	50	41	42
8	44	42	41	39	36	36	49	81	J R 107	120	110	110	106	119	117	108	88	73	67	49	38	38	36	37
9	39	38	37	39	39	34	43	80	106	112	112	114	112	116	113	104	98	88	J R 84	47	35	35	44	32
10	36	36	39	35	39	39	49	90	127	113	120	128	116	111	101	102	91	96	68	57	47	35	37	39
11	40	41	44	39	40	38	50	87	106	109	105	111	120	111	120	J R 106	88	70	51	56	43	40	37	J R 37
12	31	31	31	31	34	30	44	R 77	90	90	98	101	J R 104	J R 109	J R 104	92	70	62	50	56	41	34	30	32
13	31	33	34	31	30	30	45	R	J R 103	90	119	101	96	106	J R 104	84	I C 80	50	50	51	45	40	38	34
14	34	35	36	35	34	35	50	75	84	91	119	111	106	104	115	100	80	70	49	51	41	37	38	38
15	36	35	35	37	35	29	40	R	91	92	I C 96	98	93	103	109	94	84	63	I A 48	43	35	31	30	32
16	I C 34	34	37	37	37	36	40	77	88	98	92	100	105	122	112	110	84	69	55	41	33	33	35	34
17	33	33	34	34	33	34	44	69	H 80	90	104	99	95	106	93	89	82	62	45	44	35	31	34	31
18	A	36	36	38	34	37	48	J R 75	88	91	96	99	91	93	108	98	84	71	54	55	46	41	36	36
19	36	39	40	35	34	35	45	81	86	91	101	107	107	113	106	101	90	56	47	52	45	J R 44	36	33
20	32	33	36	35	36	34	41	I R 78	90	93	111	100	107	110	J R 105	96	88	62	53	51	43	36	33	35
21	36	38	39	39	35	32	35	71	J R 104	J R 106	117	116	135	113	96	97	80	61	46	J R 54	39	36	34	35
22	35	33	34	36	40	26	35	71	89	96	112	113	107	J R 104	101	84	85	58	64	50	34	33	32	33
23	34	35	J R 39	40	40	26	36	75	91	100	97	97	110	123	115	111	79	54	55	42	41	34	34	37
24	39	39	38	38	40	39	44	R	84	95	116	108	109	106	88	85	96	64	53	36	37	37	36	38
25	37	37	38	39	39	39	36	70	91	100	126	113	107	109	103	93	86	58	56	42	45	35	30	31
26	33	R 35	35	35	34	35	45	I C 84	100	114	I C 115	121	119	109	109	106	85	64	58	40	43	40	37	I C 34
27	30	33	34	30	F 30	30	44	65	79	108	129	120	121	114	I C 113	113	100	74	73	44	I A 34	33	37	I C 41
28	C	C	41	41	39	39	46	78	96	117	130	120	124	115	C	100	J R 105	70	65	51	36	31	28	31
29	30	31	32	32	32	31	41	87	93	96	108	116	114	121	119	115	J R 107	82	66	55	43	30	27	31
30	30	31	32	33	29	29	33	71	93	113	121	113	118	120	116	116	91	71	70	41	R 38	31	30	34
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	30	29	30	30	30	27	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30
MED	36	36	37	37	36	34	45	80	94	101	114	111	108	111	109	102	88	70	57	51	43	36	36	36
UQ	40	39	40	39	40	36	49	86	106	113	121	116	117	120	115	110	100	86	67	56	47	43	38	39
LQ	33	33	35	35	34	30	41	75	89	93	104	101	105	109	103	96	84	62	51	44	37	33	33	33

NOV. 1969 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

NOV. 1969 | FOF1 (0.01 MHZ) | 135 E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35 42·4 N. Long. 139 29·3 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	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	A	A	L	L	L	L	L								
2										L	L	L	L	L	L	L								
3									L	L	L	L		L	L									
4									L	L	L	L	L	L	L									
5									L	L	L	L	L	L										
6									L	L	L	L	L	L	L									
7									L	L	L	L	L	L	L	L								
8									L	L	L	L		L										
9										L		A	L											
10										L	L	L	L	L	L									
11									L	L	L	L	L	L	L									
12										L		L	L	L										
13									L	L	L	L	L 400	L			C							
14									L	L	L	L	L	L	L									
15									L	L	C	L	L	L										
16										L	L	L	L	L	L									
17										L	L	L	L	L										
18										L	L	L	L	L										
19									L	L		L	L	L	L									
20									L			L	L											
21									L	L	L	L	L	L	L									
22										L	L	L	L											
23										L	L	L		L	L									
24										L	L	L	L	L	L									
25										L	L	L	L	L										
26									L	L	C	L	L	L	L									
27										L	L	L	L											
28										L	L		L	L	C	L								
29									L		L	L	L	L	L									
30										L	L	L	L	L	L	L								
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT													1											
MED													L 400											
UQ																								
LQ																								

NOV. 1969 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

NOV. 1969 | FOE (0.01 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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	A	I A 295	I A 320	A	R	A	A	A	A	A	A						
2							B	250	300	I A 320	I A 330	A	A	A	A	A	A	A						
3							190	R	A	A	A	A	A	A	A	A	A	B						
4							B	A	A	A	A	A	340	335	I R 320	290	R	B						
5							B	A	300	A	A	R	345	330	305	280	A	A						
6							B	230	285	310	330	335	I A 335	A	320	A	A	A						
7							B	210	290	A	A	A	350	A	A	A	R 220	A						
8							B	I A 205	290	315	320	340	340	345	330	280	225	B						
9							B	210	290	315	330	330	A	A	A	A	A	B						
10							B	210	A	A	A	A	A	A	A	I A 280	A	A						
11							B	210	R 260	300	A	A	A	A	A	A	A	B						
12							B	R	R 270	A	R	A	A	330	R	A	A	A						
13							B	I R 220	R	310	R	R	I R 330	320	A	A	C	B						
14							B	R	A	A	A	A	A	A	R	A								
15							B	220	I R 270	290	I C 315	A	A	A	A	275	205	B						
16							B	190	R	A	A	A	335	I R 330	310	I A 265	A	B						
17							B	200	280	A	R	A	A	I A 330	320	260	180	B						
18								A	A	A	A	340	350	340	300	280	R	A						
19								200	I R 275	325	I R 330	I R 340	345	330	330	B	R	A						
20								220	280	315	335	340	I R 340	330	310	270	A	A						
21								R	A	A	A	I A 350	345	325	310	I R 270	220	B						
22								200	285	320	I A 325	325	350	340	320	280	195	B						
23								180	290	A	A	345	350	345	325	265	175	B						
24								A	A	315	I R 340	350	345	330	310	275	A	B						
25							B	200	275	310	335	345	A	A	A	290	175	A						
26								I C 195	290	325	I C 330	340	345	340	305	R 265	175	B						
27							B	190	I A 275	310	330	350	355	350	I C 335	285	A	B						
28								200	280	A	A	A	A	A	C	A	A	B						
29								260	300	A	A	A	A	340	A	270	175	B						
30								200	260	A	A	A	340	335	310	I R 240	B	B						
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1	21	21	15	12	13	17	18	16	18	10							
MED							190	205	285	315	330	340	345	332	315	275	188							
UQ								220	290	320	332	345	350	340	322	280	220							
LQ								200	275	310	U 328	340	340	330	310	265	175							

NOV. 1969 | FOE (0.01 MHZ)

IONOSPHERIC DATA

NOV. 1969 | FOES (0.1 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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	J^X_{25}	J^X_{29}	J^X_{42}	J^X_{65}	J^X_{42}	J^X_{29}	23	34	J^X_{43}	J^X_{74}	J^X_{65}	G	42	J^X_{39}	39	39	32	J^X_{29}	J^X_{23}	J^X_{27}	J^X_{24}	J^X_{29}	20	22
2	20	21	E^S_{15}	E	E^S_{15}	E^B_{13}	20	G	G	36	38	40	J^X_{42}	42	35	J^X_{37}	J^X_{29}	J^X_{54}	J^X_{53}	J^X_{25}	E^S_{15}	E^S_{15}	23	J^X_{25}
3	J^X_{26}	J^X_{24}	J^X_{25}	20	20	E^B_{13}	23	G	J^X_{36}	J^X_{36}	J^X_{40}	J^X_{40}	J^X_{42}	48	J^X_{40}	J^X_{54}	J^X_{65}	J^X_{40}	J^X_{34}	21	19	E^S_{15}	E^S_{15}	E^S_{16}
4	E^S_{15}	J^X_{40}	47	J^X_{35}	J^X_{29}	24	E^B_{15}	31	35	38	J^X_{37}	J^X_{37}	J^X_{37}	G	G	G	G	E^B_{15}	E^B_{14}	J^X_{53}	J^X_{22}	20	23	J^X_{25}
5	J^X_{36}	22	J^X_{27}	23	J^X_{23}	E^S_{15}	20	26	G	36	37	G	G	G	G	G	J^X_{27}	J^X_{25}	J^X_{24}	21	E^S_{16}	J^X_{25}	20	20
6	E^S_{16}	E^S_{15}	E^B_{13}	E^S_{16}	22	E^S_{16}	E^B_{16}	G	33	36	39	44	40	36	G	35	J^X_{54}	J^X_{29}	E^S_{16}	20	E^B_{13}	21	E^S_{15}	E^S_{16}
7	E^S_{15}	18	20	20	E^B_{12}	E^B_{13}	E^B_{16}	G	G	36	36	37	J^X_{54}	42	36	35	G	21	J^X_{25}	21	E^S_{16}	E^B_{14}	E^S_{15}	E^S_{15}
8	E^S_{15}	19	E^S_{15}	E^B_{13}	E^B_{12}	21	E^B_{16}	28	G	34	38	43	36	37	37	34	33	J^X_{28}	J^X_{26}	J^X_{23}	J^X_{25}	J^X_{26}	E^B_{13}	22
9	21	E^B_{14}	20	E^B_{14}	J^X_{16}	E^B_{14}	E^B_{13}	G	31	37	J^X_{43}	J^X_{61}	77	J^X_{45}	J^X_{41}	J^X_{55}	J^X_{33}	J^X_{43}	J^X_{50}	J^X_{33}	J^X_{26}	E^B_{14}	J^X_{20}	J^X_{23}
10	J^X_{25}	E^B_{12}	J^X_{18}	J^X_{15}	22	E^S_{15}	E^B_{14}	G	J^X_{39}	J^X_{37}	J^X_{37}	40	J^X_{40}	J^X_{50}	35	J^X_{53}	J^X_{78}	J^X_{27}	20	J^X_{29}	J^X_{43}	22	E^S_{15}	E^S_{15}
11	E^S_{15}	J^X_{40}	J^X_{30}	E^B_{12}	E^B_{12}	E^B_{12}	20	G	34	36	36	36	36	J^X_{39}	35	J^X_{54}	J^X_{29}	E^B_{15}	21	E^B_{13}	E^B_{13}	E^S_{15}	E^S_{15}	E^S_{15}
12	E^S_{15}	22	21	20	22	J^X_{24}	J^X_{29}	G	G	38	G	41	J^X_{37}	G	G	32	J^X_{30}	J^X_{40}	J^X_{29}	J^X_{24}	J^X_{24}	E^S_{15}	E^S_{15}	E^S_{15}
13	E^S_{15}	E^B_{12}	21	21	21	E^S_{16}	E^B_{16}	G	G	G	G	G	G	J^G_{29}	35	J^X_{28}	C	E^B_{15}	E^S_{15}	E^S_{15}	E^S_{15}	E^B_{13}	E^S_{15}	23
14	21	E^S_{15}	E^S_{15}	E^S_{15}	22	E^S_{15}	E^B_{15}	G	35	37	J^X_{36}	J^X_{39}	J^X_{78}	J^X_{36}	G	J^X_{29}	J^X_{25}	J^X_{26}	J^X_{51}	J^X_{29}	J^X_{25}	23	J^X_{23}	23
15	20	22	20	20	E^S_{15}	E^S_{15}	E^B_{16}	25	G	34	C	35	34	35	J^X_{42}	G	25	J^X_{26}	J^X_{72}	J^X_{30}	J^X_{22}	J^X_{42}	J^X_{28}	J^X_{28}
16	C	J^X_{28}	J^X_{19}	18	21	E^S_{15}	E^B_{13}	20	G	J^X_{33}	36	34	$^G_{32}$	J^G_{31}	G	J^X_{32}	J^X_{37}	E^B_{14}	J^X_{22}	J^X_{40}	J^X_{17}	J^X_{24}	21	J^X_{28}
17	E^S_{15}	22	E^B_{12}	E^B_{14}	E	E^B_{14}	E^B_{13}	G	G	35	G	42	J^X_{40}	J^X_{39}	G	G	G	E^B_{15}	20	J^X_{24}	E^S_{16}	22	E^S_{15}	E^S_{15}
18	J^X_{53}	J^X_{40}	J^X_{28}	J^X_{24}	E^S_{15}	E^S_{15}	21	J^X_{30}	35	J^X_{36}	40	G	G	G	33	30	G	J^X_{25}	E^S_{15}	E^S_{15}	21	23	19	E^S_{16}
19	E^S_{15}	E^S_{15}	E^B_{13}	E^S_{15}	E^S_{15}	20	20	25	G	G	G	E^B_{39}	G	G	G	E^B_{35}	$^G_{21}$	21	J^X_{24}	E^S_{15}	E^S_{15}	20	21	J^X_{24}
20	21	21	E^S_{15}	E^S_{15}	E^S_{15}	E^S_{15}	E^S_{15}	G	G	J^G_{28}	35	G	G	G	33	32	31	J^X_{21}	E^S_{15}	E^S_{15}	E^S_{16}	E^S_{15}	E^S_{16}	E^S_{16}
21	E^S_{16}	E^S_{15}	18	E^B_{12}	E^S_{15}	E^S_{15}	21	$^G_{20}$	34	38	40	40	G	36	G	G	G	E^B_{13}	E^S_{15}	20	20	20	E^S_{16}	E^S_{16}
22	E^S_{15}	E^S_{15}	E^S_{15}	E^S_{15}	E^S_{15}	E^S_{15}	E^B_{14}	E^S_{15}	G	G	J^G_{28}	J^X_{37}	33	39	G	35	G	G	E^B_{15}	E^B_{14}	J^X_{18}	20	$^M_{19}$	J^X_{22}	21
23	E^S_{16}	E^B_{14}	E^B_{14}	E	E	E^B_{14}	E^B_{13}	G	G	33	35	$^G_{34}$	G	J^G_{30}	G	G	25	E^B_{14}	E^B_{12}	$^M_{20}$	E^B_{14}	E^B_{12}	E^B_{14}	E^B_{14}
24	E^S_{15}	15	E^B_{14}	J^X_{23}	J^X_{20}	21	E^B_{13}	J^X_{36}	J^X_{29}	G	G	G	G	$^G_{20}$	G	31	J^X_{37}	J^X_{29}	J^X_{29}	J^X_{17}	E^S_{15}	E^S_{15}	E^B_{13}	E^S_{15}
25	E^B_{14}	18	E^B_{14}	18	E	E^B_{12}	E^B_{14}	25	G	G	J^G_{30}	39	41	J^X_{38}	J^X_{37}	G	G	20	22	E^S_{16}	21	E^S_{16}	E^S_{16}	E^S_{15}
26	E^S_{16}	E^S_{15}	21	21	E^B_{12}	E^S_{15}	E^S_{16}	C	G	G	C	G	G	G	G	G	25	J^X_{19}	19	$^M_{20}$	20	E^S_{16}	E^S_{15}	C
27	E^S_{15}	E	E^S_{15}	E^B_{12}	$^M_{20}$	E^S_{15}	E^B_{14}	G	J^X_{28}	34	G	G	G	G	C	G	J^X_{28}	J^X_{29}	J^X_{29}	J^X_{24}	J^X_{53}	23	J^X_{25}	C
28	C	C	E^B_{14}	$^M_{21}$	E	E^S_{15}	E^B_{13}	G	J^G_{28}	J^X_{41}	J^X_{36}	42	J^X_{40}	J^X_{37}	C	J^X_{35}	J^X_{64}	J^X_{40}	E^S_{15}	E^S_{15}	E^S_{15}	22	23	E^S_{16}
29	E^B_{14}	20	19	21	20	20	21	G	G	35	J^X_{35}	40	38	G	J^X_{37}	G	G	E^B_{13}	E^S_{15}	20	J^X_{27}	23	E^S_{16}	E^S_{15}
30	E^S_{15}	E^S_{16}	E^S_{16}	E^S_{15}	J^X_{24}	20	23	J^G_{28}	G	33	J^X_{37}	J^X_{38}	G	G	G	G	E^B_{17}	E^B_{15}	E^B_{12}	21	E^S_{15}	E^S_{15}	E^S_{16}	20
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	30	30	30	30	30	29	30	30	28	30	30	30	28	30	29	30	30	30	30	30	30	28
MED	E^S_{16}	18	18	17	16	E^B_{15}	E^B_{16}	G	G	36	36	38	36	33	33	30	27	J^X_{23}	22	21	20	20	E16	E16
UQ	21	22	21	21	22	20	20	25	34	37	38	40	J^X_{40}	J^X_{39}	36	35	J^X_{33}	J^X_{29}	J^X_{29}	J^X_{25}	J^X_{24}	23	21	23
LQ	E^S_{15}	E^B_{15}	E^B_{15}	E^B_{14}	E^B_{12}	E^B_{14}	E^B_{14}	G	G	33	32	G	G	G	G	G	G	E^B_{15}	E^B_{15}	17	E^S_{15}	E^S_{15}	E^S_{15}	E^S_{15}

The Radio Research Laboratories, Japan

NOV. 1969 | FOES (0.1 MHZ)

IONOSPHERIC DATA

NOV. 1969 | FBES (0.1 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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	24	19	30	A	24	17	18	32	32	69	62	G	40	38	35	35	25	15	22	25	18	20	E	E
2	E	E	E S 15	E	E S 15	E B 13	G	G	G	34	37	40	40	37	33	32	25	40	30	18	E S 15	E S 15	E	E
3	17	15	16	E	E	E B 13	17	G	28	34	40	40	42	40	35	40	31	25	30	E	E	E S 15	E S 15	E S 16
4	E S 15	25	A	28	23	16	E B 15	25	30	33	33	35	30	G	G	G	G	E B 15	E B 14	23	19	E	E	20
5	20	E	E	15	15	E 15	G	25	G	32	34	G	G	G	G	G	23	20	17	E	E S 16	15	E	E
6	E S 16	E S 15	E B 13	E S 16	E	E S 16	E B 16	G	30	33	39	42	38	35	G	31	30	G	E S 16	E	E B 13	E	E S 15	E S 16
7	E S 15	E	E	E	E B 12	E B 13	E B 16	G	G	36	E R 36	37	40	42	34	29	G	G	21	17	E S 16	E B 14	E S 15	E S 15
8	E S 15	E	E S 15	E S 13	E B 12	E	E B 16	25	G	33	38	42	36	37	37	33	32	17	19	19	24	21	E B 13	17
9	E	E B 14	E	E B 14	15	E B 14	E B 13	G	31	37	41	57	44	45	38	45	30	28	25	25	19	E B 14	18	17
10	16	E B 12	14	E	E	E S 15	E B 14	G	28	35	35	38	40	45	32	51	74	19	16	27	31	E	E S 15	E S 15
11	E S 15	23	20	E B 12	E B 12	E B 12	G	G	28	34	35	35	35	39	30	29	23	E B 15	E	E B 13	E B 13	E S 15	E S 15	E S 15
12	E S 15	E	E	E	E	E	19	G	G	32	G	38	35	G	G	25	25	26	25	E	E	E S 15	E S 15	E S 15
13	E S 15	E B 12	E	E	E	E S 16	E B 16	G	G	G	G	G	G	G 28	32	27	C	E B 15	E S 15	E S 15	E S 15	E B 13	E S 15	E
14	E	E S 15	E S 15	E S 15	15	E S 15	E B 15	G	25	34	34	37	38	33	G	26	21	26	38	25	E	E	E	17
15	E	E	E	E	E S 15	E S 15	E B 16	23	G	33	C	35	34	34	32	G	25	20	A	22	19	25	24	16
16	C	16	17	E	E	E S 15	E B 13	18	G	33	35	34	G 32	G 31	G	30	25	E B 14	21	25	17	16	16	E
17	E S 15	E	E B 12	E B 14	E	E B 14	E B 13	G	G	32	G	36	39	35	G	G	G	E B 15	E	15	E S 16	16	E S 15	E S 15
18	A	26	E	E	E S 15	E S 15	E	25	29	30	35	G	G	G	33	30	G	16	E S 15	E S 15	E	E	E	E S 16
19	E S 15	E S 15	E B 13	E S 15	E S 15	E	E	24	G	G	G	E B 39	G	G	G	E B 35	E R 21	19	E	E S 15	E S 15	E	E	E
20	E	E	E S 15	E S 15	E S 15	E S 15	E S 15	G	G	G 28	31	G	G	G	33	30	25	G	E S 15	E S 15	E S 16	E S 15	E S 16	E S 16
21	E S 16	E S 15	E	E B 12	E S 15	E S 15	F	E R 20	29	32	34	36	G	35	G	G	G	E B 13	E S 15	E	E	E	E S 16	E S 16
22	E S 15	E S 15	E S 15	E S 15	E S 15	E B 14	E S 15	G	G	G 22	37	25	37	G	35	G	G	E B 15	E B 14	E	E	E	16	E
23	E S 16	E B 14	E B 14	E	E	E B 14	E B 13	G	G	32	34	G 31	G	G 30	G	G	25	E B 14	E B 12	E	E B 14	E B 12	E B 14	E B 14
24	E S 15	15	E B 14	16	E	E	E B 13	25	29	G	G	G	G	G 20	G	30	26	22	E	E	E S 15	E S 15	E B 13	E S 15
25	E B 14	E	E B 14	E	E	E B 12	E B 14	25	G	G	G 28	38	36	36	33	G	G	G	E	E S 16	E	E S 16	E S 16	E S 15
26	E S 16	E S 15	E	E	E B 12	E S 15	E S 16	C	G	G	C	G	G	G	G	G	25	E	E	E	E	E S 16	E S 15	C
27	E S 15	E	E S 15	E B 12	E	E S 15	E B 14	G	27	33	G	G	G	G	C	G	25	29	29	23	A	E	E	C
28	C	C	E B 14	15	E	E S 15	E B 13	G 18	G 26	33	34	40	38	35	C	29	25	25	E S 15	E S 15	E S 15	E	E	E S 16
29	E B 14	E	E	E	E	15	E	G	G	34	33	37	35	G	33	G	G	E B 13	E S 15	E	25	E	E S 16	E S 15
30	E S 15	E S 16	E S 16	E S 15	16	E	E	G 17	G	32	30	35	G	G	G	G	E B 17	E B 15	E B 12	E	E S 15	E S 15	E S 16	E
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	30	30	30	30	30	29	30	30	28	30	30	30	28	30	29	30	30	30	30	30	30	28
MED	E S 15	E E 14	E E 14	E E 12	E E 12	E B 15	E B 14	G	G	33	34	36	35	32	31	27	25	15	E E 15	E E 15	E E 15	E E 14	E E 15	E S 15
UQ	E S 16	E B 15	E B 15	E B 15	E 15	E S 15	E B 16	24	28	34	36	38	38	37	33	30	25	22	22	22	18	E S 15	E S 16	E S 16
LQ	E S 14	E	E	E	E	E B 13		G	G	30	29	G	G	G	G	G	G	E B 14	E B 12	E	E	E	E	E

The Radio Research Laboratories, Japan

NOV. 1969 | FBES (0.1 MHZ)

IONOSPHERIC DATA

NOV. 1969 | F-MIN (0.1 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42·4 N. Long. 139° 29·3 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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 S 15	E S 15	11	12	12	12	15	15	12	15	16	15	25	19	15	15	14	11	12	10	13	E S 16	E S 15	E S 16
2	E S 15	E S 15	E S 15	10	E S 15	13	15	15	13	15	15	16	15	15	15	13	13	15	E S 15	12	E S 15	E S 15	E S 15	E S 15
3	12	12	12	E S 15	E S 15	13	15	16	18	15	15	25	15	25	15	15	14	12	10	E S 15	E S 15	E S 15	E S 15	E S 16
4	E S 15	12	12	E S 15	10	12	15	13	13	15	15	15	18	15	16	15	15	15	14	12	E S 15	E S 15	E S 15	12
5	E S 15	12	13	10	13	E S 15	16	15	15	15	17	16	16	16	15	13	15	12	E S 15	E S 16	E S 16	13	E S 15	E S 15
6	E S 16	E S 15	13	E S 16	12	E S 16	16	14	13	14	25	26	25	19	16	15	15	15	E S 16	E S 15	13	E S 16	E S 15	E S 16
7	E S 15	E S 15	E S 15	E S 15	12	13	16	15	15	13	15	15	25	26	15	16	15	16	13	E S 15	E S 16	14	E S 15	E S 15
8	E S 15	E S 15	E S 15	13	12	13	16	15	13	14	16	15	15	13	14	14	14	13	13	E S 15	13	13	13	E S 15
9	E S 15	14	14	14	10	14	13	16	15	16	15	25	18	20	15	14	14	13	E S 15	E S 15	E S 15	14	13	E S 15
10	14	12	10	10	10	E S 15	14	14	14	15	25	25	18	15	16	15	16	12	12	13	E S 15	E S 15	E S 15	E S 15
11	E S 15	12	10	12	12	12	15	13	15	13	15	15	16	15	15	15	15	15	E S 15	13	13	E S 15	E S 15	E S 15
12	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	15	15	13	16	26	16	19	16	13	13	13	12	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15
13	E S 15	12	E S 15	E S 15	E S 15	E S 16	16	16	15	17	25	17	26	18	18	15	C	15	E S 15	E S 15	E S 15	13	E S 15	E S 16
14	E S 15	E S 15	E S 15	E S 15	10	E S 15	15	15	16	16	16	25	25	25	25	19	15	15	E S 15	E S 15	E S 15	E S 15	E S 15	13
15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	16	15	15	16	C	16	16	16	14	15	14	12	E S 15	12	12	14	E S 15	E S 15
16	C	13	12	E S 15	12	E S 15	13	14	15	15	16	16	16	17	17	16	15	14	13	13	14	13	12	E S 15
17	E S 15	14	12	14	10	14	13	13	14	15	16	25	25	15	19	15	15	15	E S 15	13	E S 16	12	E S 15	E S 15
18	E S 16	E S 16	E S 15	E S 15	E S 15	E S 15	E S 15	E S 16	15	15	15	19	18	18	26	19	15	16	15	E S 15	E S 16	E S 15	E S 15	E S 16
19	E S 15	E S 15	13	E S 15	E S 15	E S 15	E S 15	12	15	18	25	39	26	25	18	35	15	12	E S 15	E S 15	E S 15	E S 15	E S 16	E S 15
20	E S 16	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	15	16	18	25	25	26	16	18	16	16	16	E S 15	E S 15	E S 16	E S 15	E S 16	E S 16
21	E S 16	E S 15	E S 15	12	E S 15	E S 15	E S 15	15	15	15	16	18	25	20	16	16	15	13	E S 15	E S 15	13	E S 16	E S 16	E S 16
22	E S 15	E S 15	E S 15	E S 15	E S 15	14	E S 15	15	13	15	15	16	19	25	20	16	16	15	14	14	E S 15	14	14	E S 15
23	E S 16	14	14	10	10	14	13	14	14	16	16	19	26	25	19	15	14	14	12	E S 15	14	12	14	14
24	E S 15	12	14	11	10	14	13	15	14	16	16	20	17	15	16	12	13	14	E S 15	E S 15	E S 15	E S 15	13	E S 15
25	14	E S 15	14	10	10	12	14	15	14	15	16	25	25	13	12	15	15	15	E S 15	E S 16	E S 15	E S 16	E S 16	E S 15
26	E S 16	E S 15	E S 15	E S 15	12	E S 15	E S 16	C	16	15	C	18	18	16	15	12	14	E S 15	E S 15	E S 15	E S 15	E S 16	E S 15	C
27	E S 15	10	E S 15	12	11	E S 15	14	15	13	14	17	25	25	25	C	15	16	12	E S 15	13	E S 15	E S 15	E S 15	C
28	C	C	14	10	10	E S 15	13	14	15	15	16	25	25	15	C	16	13	15	E S 15	E S 15	E S 15	E S 15	E S 16	E S 16
29	14	E S 15	11	E S 15	13	12	E S 16	15	15	15	15	15	15	15	17	14	15	13	E S 15	E S 15	12	E S 15	E S 16	E S 15
30	E S 15	E S 16	E S 16	E S 15	10	E S 15	E S 15	11	13	15	13	16	16	16	16	15	17	15	12	E S 15	E S 15	E S 15	E S 16	E S 16
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	30	30	30	30	30	29	30	30	28	30	30	30	28	30	29	30	30	30	30	30	30	28
MED	E S 15	E S 15	U 12	E S 15	11	E S 15	14	15	15	15	16	18	18	16	16	15	15	14	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15
UQ	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	16	15	15	16	18	25	25	25	18	16	15	15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 16
LQ	E S 15	12	12	12	10	13	14	14	13	15	15	16	16	15	15	14	14	12	12	12	13	14	E S 15	E S 15

The Radio Research Laboratories, Japan

NOV. 1969 | F-MIN (0.1 MHZ)

IONOSPHERIC DATA

NOV. 1969 | M(3000)F2 (0.01) | 135° E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N Long. 139° 29.3' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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	265	265	280	A	300	310	320	335	340	310	315	295	290	285	310	305	315	315	295	305	325	320	305	295
2	295	280	295	315	320	310	315	340	325	320	325	305	290	300	290	300	315	335	320	330	300	320	295	290
3	285	280	260	270	305	295	315	340	325	320	320	305	310	300	300	320	315	320	310R	320	320	300	295	305
4	310	285	270IR	285	350	290	310	335	310	320	315	305	280	310	305	315	320	325	315	310	300	300	285	300
5	305	315	325	310	290	290	315	335	335	335JR	325	320	305	315	305	305	325	325	315	320	305	320	305	280
6	280	280	280	295	340	270	300	320	325	325	330	320	285	310	315	320	315IR	310	300	320	310	300	295	295
7	290	290	285	290	320	300	305	330	330	330	325JR	315	305	310	325	305	310	335	295	310	310	300	270	260
8	295	290	295	290	295	295	300	320	315JR	325	320	310	310	305	310	330	330	330	320	310	280	290	270	285
9	280	280	270	290	310	270	285	300	320	320	315	320	315	310	310	310	315	305	320JR	320	255	255	320	255
10	265	260	280	280	270	265	285	320	345	310	310	310	305	315	320	305	325	305	300	300	330	265	250	275
11	255	270	300	270	290	280	310	325	320	325	335	315	325	295	325	315JR	345	315	315	325	310	280	305	320JR
12	270	275	270	295	330	270	300	340R	355	330	330	320	315JR	310JR	325JR	335	345	335	320	345	300	305	275	290
13	290	305	290	300	270	290	315	R	340JR	330	340	335	320	300	320JR	310	335IC	320	305	330	295	280	295	290
14	265	275	285	285	265	275	325	350	345	335	320	335	315	300	330	320	325	315	290	320	290	290	275	285
15	285	270	285	295	315	295	305	R	340	350	320IC	335	315	300	320	340	340	340	340IA	305	325	305	265	270
16	270IC	270	280	285	315	295	330	330	340	350	345	330	305	320	315	335	330	335	330	345	320	275	290	290
17	275	275	275	270	285	290	345	345	340H	335	325	345	340	315	330	335	335	325	310	320	315	280	280	260
18	A	280	280	290	260	295	335	345JR	340	345	335	325	320	300	320	335	335	335	300	325	305	315	300	280
19	285	290	305	305	290	285	310	330	340	330	310	320	300	300	330	315	335	325	295	325	310	315JR	295	275
20	270	255	285	285	330	295	310	345IR	335	315	315	315	320	320	325R	325	340	335	315	315	335	305	265	265
21	285	295	290	310	345	290	295	325	320JR	330JR	315	310	320	300	315	310	315	335	305	330JR	310	295	265	270
22	265	255	270	295	330	345	295	330	335	330	320	330	320	295JR	335	300	340	310	325	340	325	300	265	260
23	260	260	285	315	350	270	280	325	340	340	340	330	290	310	315	330	340	315	315	300	300	310	260	260
24	265	265	265	255	290	285	320	R	330	325	330	315	310	320	325	320	335	325	330	290	280	300	280	275
25	280	280	285	270	290	310	285	330	330	310	325	330	310	310	310	325	340	305	320	310	305	315	280	260
26	270	285R	270	295	275	270	305	340IC	335	335	315IC	310	305	295	300	310	330	310	325	275	300	300	310	300IC
27	285	275	280	265	235E	265	325	355	315	305	310	310	305	305	300IC	320	320	315	325	365	290IA	270	260	260IC
28	C	C	270	270	280	280	315	345	345	300	325	310	305	305	C	305	325JR	310	310	335	330	290	280	270
29	270	275	290	290	290	290	295	345	340	330	320	305	315	305	305	305	315JR	315	320	330	325	285	265	275
30	260	270	270	280	295	280	325	325	335	325	330	320	310	310	310	325	325	310	340	310	310R	290	265	270
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	30	29	30	30	30	27	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30
MED	278	275	280	290	295	290	310	335	335	328	322	318	310	305	315	318	328	320	315	320	310	300	280	275
UQ	285	285	290	295	320	295	320	342	340	335	330	330	315	310	325	325	335	335	320	330	320	305	295	290
LQ	265	270	270	280	285	275	300	325	325	320	315	310	305	300	310	305	315	310	305	310	300	285	265	265

NOV. 1969 | M(3000)F2 (0.01)

IONOSPHERIC DATA

NOV. 1969 | M(3000)F1 (0.01) | 135° E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42·4' N. Long. 139° 29·3' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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	A	A	L	L	L	L	L								
2										L	L	L	L	L	L	L								
3									L	L	L	L		L	L									
4									L	L	L	L	L	L	L									
5									L	L	L	L	L	L										
6									L	L	L	L	L	L	L									
7									L	L	L	L	L	L	L	L								
8									L	L	L	L		L										
9										L		A	L											
10										L	L	L	L	L	L									
11									L	L	L	L	L	L	L									
12										L		L	L	L										
13									L	L	L	L	L 405	L			C							
14									L	L	L	L	L	L	L									
15									L	L	C	L	L	L										
16										L	L	L	L	L	L									
17										L	L	L	L	L										
18										L	L	L	L	L										
19									L	L		L	L	L	L									
20									L			L	L											
21									L	L	L	L	L	L	L									
22										L	L	L	L											
23										L	L	L		L	L									
24										L	L	L	L	L	L									
25										L	L	L	L	L										
26									L	L	C	L	L	L	L									
27										L	L	L	L											
28										L	L		L	L	C	L								
29									L		L	L	L	L	L									
30										L	L	L	L	L	L	L								
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT													1											
MED													L 405											
UQ																								
LQ																								

NOV. 1969 | M(3000)F1 (0.01)

IONOSPHERIC DATA

NOV. 1969 | H'F2 (KM) | 135° E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									240	260	250	250	265	250	255	240								
2										250	245	245	250	260	260	260								
3									245	250	250	250		250	250									
4									250	250	240	240	245	255	250									
5									250	245	250	245	250	250										
6									240	250	250	250	240	280	250									
7									250	250	250	250	260	265	250	250								
8									245	250	240	250		270										
9										250		250	260											
10										250	245	245	255	250	250									
11									240	240	245	250	250	255	250									
12										240		250	250	245										
13									240	280	245	235	245	240			C							
14									250	250	250	250	250	250	250									
15									245	225	I C 230	240	255	250										
16										245	240	250	280	250	260									
17										245	250	230	240	255										
18										250	250	250	240	265										
19									250	240		260	250	250	245									
20									250			250	255											
21									250	250	250	265	265	245	250									
22										240	250	250	275											
23										240	245	240		260	245									
24										230	245	250	250	245	225									
25										250	250	250	260	250										
26									250	240	C	240	245	245	255									
27										270	250	240	255											
28										250	250		250	250	C	250								
29									245		245	250	250	260	250									
30										250	250	250	250	250	240	250								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									16	28	25	29	27	26	17	5								
MED									248	250	250	250	250	250	250	250								
UQ									250	250	250	250	258	260	250	250								
LQ									242	240	245	245	250	250	250	250								

The Radio Research Laboratories, Japan

NOV. 1969 | H'F2 (KM)

IONOSPHERIC DATA

NOV. 1969 | H'F (KM) | 135° E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42·4 N Long. 139° 29·3 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	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	345	325	E A 350	A	275	290	245	240	240	I A 250	I A 250	210	210	250	250	240	245	220	240	250	245	245	275	290
2	290	295	290	250	240	245	245	230	240	240	230	200	245	245	240	245	245	230	250	240	250	250	255	280
3	300	300	345	320	260	255	255	240	240	240	240	230	250	220	235	250	250	215	250	210	240	250	290	260
4	250	300	I A 350	325	230	300	290	240	230	230	200	220	210	225	240	250	240	210	210	250	250	260	260	300
5	250	245	240	240	260	305	255	240	250	235	210	220	200	240	240	240	230	220	210	240	250	240	250	310
6	305	300	305	280	210	340	280	240	240	240	240	240	235	210	245	245	210	205	245	245	245	235	260	270
7	285	300	295	295	250	230	260	235	240	240	230	240	245	250	240	220	230	220	245	245	260	240	300	320
8	280	255	260	245	260	295	275	240	245	225	210	225	240	245	250	240	220	210	250	240	320 A	305	305	320
9	300	300	310	280	240	270	255	250	240	225	240	I A 240	240	250	250	240	245	230	220	250	295	345	250	300
10	340	325	300	255	290	305	290	250	240	230	205	210	210	240	240	260	E A 290	240	250	245	250	325	310	305
11	315	350	290	300	250	290	245	230	220	230	200	205	200	240	240	240	220	230	245	215	240	260	285	250
12	295	305	300	300	240	290	255	230	240	220	240	230	230	240	230	240	210	245	260	230	220	230	290	300
13	295	275	295	250	240	300	245	230	240	220	230	210	200	200	240	225	I C 225	200	265	240	240	260	260	290
14	300	300	295	295	300	305	245	215	230	240	240	230	210	230	240	240	240	210	320 A	270	250	290	300	300
15	300	310	310	290	240	260	250	230	230	225	I C 220	H 200	215	225	245	240	225	210	A	250	240	A	E A 390	315
16	I C 325	310	310	300	250	260	225	225	225	220	225	210	H 200	240	240	240	210	210	220	245	240	300	260	275
17	300	300	300	305	260	270	225	205	H 220	240	230	210	230	200	240	240	240	200	230	240	210	270	280	350
18	A	350	300	280	300	290	240	240	240	240	220	210	200	240	255	250	240	230	240	240	245	250	250	300
19	300	290	250	250	290	300	250	220	230	210	245	245	240	240	245	240	240	210	245	240	240	245	290	320
20	340	350	300	295	255	260	245	230	230	235	245	230	245	250	240	240	230	210	245	240	230	255	290	300
21	300	285	290	305	240	250	260	240	240	240	240	210	230	240	240	240	210	210	230	240	225	270	300	300
22	305	330	315	290	240	240	290	240	240	220	225	205	210	225	240	225	220	200	240	210	225	260	300	340
23	345	340	290	250	205	270	260	240	240	230	230	230	240	240	210	245	210	195	240	225	245	240	300	310
24	325	320	320	340	270	275	225	225	210	210	245	225	225	210	220	230	225	220	230	210	290	260	300	300
25	300	310	300	290	275	245	245	240	240	240	240	240	240	245	250	240	215	210	240	235	250	240	310	350
26	340	300	300	290	290	310	250	I C 235	240	240	I C 235	210	205	230	240	240	220	200	230	240	255	250	250	I C 265
27	290	300	305	355	390	345	230	210	225	240	210	240	240	245	I C 240	245	225	210	245	210	I A 240	290	350	I C 345
28	C	C	310	300	250	300	245	225	225	340	240	250	240	240	C	225	245	205	235	205	215	255	290	300
29	300	320	290	295	280	300	300	240	240	240	230	240	240	240	245	240	225	200	240	210	250	250	340	310
30	350	330	315	260	260	300	240	240	230	230	230	240	240	240	240	240	210	230	210	230	245	250	300	310
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	30	29	30	30	30	30	30	30	30	30	30	30	29	30	30	30	29	30	30	29	30	30
MED	300	300	300	290	258	290	250	238	240	235	230	225	230	240	240	240	225	210	240	240	245	255	290	300
UQ	325	325	310	300	275	300	260	240	240	240	240	240	240	245	245	245	240	220	245	245	250	270	300	315
LQ	295	300	290	260	240	260	245	230	230	225	220	210	210	225	240	240	220	205	230	225	240	245	260	290

NOV. 1969 | H'F (KM)

IONOSPHERIC DATA

NOV. 1969 | H'ES (KM) | 135° E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42·4' N. Long. 139° 29·3' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	100	100	100	105	105	100	105	145	140	125	120	G	120	110	110	110	105	105	105	100	100	100	100	100
2	100	100	S	E	S	B	105	G	G	130	120	120	110	115	100	100	105	105	105	100	S	S	100	100
3	100	100	100	100	100	B	170	G	110	110	110	110	105	105	110	105	105	105	105	100	105	S	S	S
4	S	100	100	100	100	100	B	160	110	110	110	110	105	G	G	G	G	B	B	105	105	100	100	100
5	100	100	100	100	100	S	100	150	G	110	110	G	G	G	G	G	100	100	100	100	S	100	100	100
6	S	S	B	S	100	S	B	G	175	170	145	130	130	125	G	150	130	120	S	100	B	100	S	S
7	S	100	100	100	B	B	B	G	G	165	140	130	145	130	110	110	G	100	100	100	S	B	S	S
8	S	100	S	B	B	100	B	140	G	155	130	125	150	145	190	150	180	100	100	100	140	125	B	105
9	100	B	100	B	100	B	B	G	180	145	120	115	120	110	110	105	105	100	100	100	100	B	100	100
10	105	B	105	105	100	S	B	G	125	115	110	120	110	110	125	125	120	110	100	100	105	100	S	S
11	S	105	100	B	B	B	100	G	150	130	130	120	130	120	120	110	110	B	110	B	B	S	S	S
12	S	100	100	100	100	100	100	G	G	130	G	110	110	G	G	105	105	100	100	100	100	S	S	S
13	S	B	100	100	100	S	B	G	G	G	G	G	G	105	110	110	C	B	S	S	S	B	S	100
14	100	S	S	S	100	S	B	G	130	130	120	115	110	110	G	110	110	100	100	100	100	100	100	100
15	100	100	100	100	S	S	B	180	G	120	C	125	115	125	100	G	145	115	115	105	105	105	105	110
16	C	105	105	105	105	S	B	115	G	115	115	115	115	115	G	115	115	B	105	105	105	105	105	105
17	S	100	B	B	E	B	B	G	G	140	G	125	110	110	G	G	G	B	100	100	S	100	S	S
18	100	100	100	100	S	S	100	115	110	115	110	G	G	G	165	155	G	110	S	S	100	100	100	S
19	S	S	B	S	S	100	100	160	G	G	G	B	G	G	G	B	100	100	100	S	S	100	100	100
20	100	100	S	S	S	S	S	G	G	110	105	G	G	G	150	130	130	100	S	S	S	S	S	S
21	S	S	100	B	S	S	110	110	115	115	115	110	G	150	G	G	G	B	S	100	100	100	S	S
22	S	S	S	S	S	B	S	G	G	100	105	105	140	G	130	G	G	B	B	140	100	100	100	100
23	S	B	B	E	E	B	B	G	G	130	115	110	G	105	G	G	155	B	B	110	B	B	B	B
24	S	110	B	105	110	115	B	115	110	G	G	G	G	105	G	155	125	125	130	110	S	S	B	S
25	B	105	B	105	E	B	B	190	G	G	110	155	115	100	100	G	G	100	110	S	100	S	S	S
26	S	S	100	100	B	S	S	C	G	G	C	G	G	G	G	G	155	100	105	105	100	S	S	C
27	S	E	S	B	105	S	B	G	110	180	G	G	G	G	C	G	115	115	110	105	105	105	105	C
28	C	C	B	105	E	S	B	120	115	110	110	110	110	110	C	110	110	100	S	S	S	100	100	S
29	B	105	100	100	100	100	100	G	G	115	110	110	110	G	105	G	G	B	S	100	100	100	S	S
30	S	S	S	S	100	100	100	105	G	140	110	110	G	G	G	G	B	B	B	100	S	S	S	100
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	10	17	16	16	15	8	11	13	13	25	22	21	19	19	15	17	20	20	19	23	17	17	13	13
MED	100	100	100	100	100	100	100	140	115	125	112	115	115	110	110	110	112	100	105	100	100	100	100	100
UQ	100	105	100	105	102	100	105	160	140	140	120	125	125	122	128	130	130	110	108	105	105	100	100	100
LQ	100	100	100	100	100	100	100	115	110	115	110	110	110	108	108	110	105	100	100	100	100	100	100	100

NOV. 1969 | H'ES (KM)

IONOSPHERIC DATA

NOV. 1969 | TYPES OF ES | 135° E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42·4′ N. Long. 139° 29·3′ E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F3	F2	F3	F5	F4	F2	L2	H1	H3	H2	H4		H1	C1	C1	C1	L2	L2	L3	F5	F3	F3	F1	F2
2	F1	F2					L1			H1	H1	H1	C2	C1	L1	L3	L2	L4	F3	F3			F1	F2
3	F2	F2	F2	F1	F1		H1		C1	C1	C1	C2	L1	L1	C2	L4	L3	L3	F5	F1	F1			
4		F5	F5	F5	F4	F2		H1	C1	C1	C1	C1	L1							F4	F4	F1	F1	F3
5	F3	F1	F2	F2	F2		L1	H1		C1	C1						L2	L3	F2	F1		F2	F1	F1
6					F1				H1	H1	H1	H1	H1	H1		H1	H3	H1		F1		F1		
7		F1	F1	F1						H1	HL11	H1	H1	H1	C1	C1		L2	F2	F2				
8		F1				F1		H1		H1	H1	H2		H1	HL11	HL21	H1	L3	F2	F1	FF22	F5		F2
9	F1		F2		F1				H1	H1	HL21	C3	C2	C2	C3	L3	L3	L4	F3	F3	F2		F2	F2
10	F2		F1	F1	F2				H2	C2	C1	H1	C1	C2	H1	H2	H4	L3	F1	F3	F3	F2		
11		F4	F4				L1		H1	H1	H1	H1	H1	H1	H1	C1	L1		F1					
12		F2	F1	F1	F2	F2	L2			H1		C1	C1			L1	L2	L3	F3	F2	F2			
13			F1	F2	F2									L1	L1	L1								F2
14	F2				F2				H1	H1	H1	C1	C1	C1		C1	C1	L2	F3	F3	F1	F2	F2	F2
15	F1	F1	F1	F1				H1		H2		H1	C1	HL21	L2		HL11	C4	F4	F4	F2	F3	F4	F2
16		F2	F2	F1	F1			L2		C1	C1	C1	L1	L2		C2	C2		F3	F3	F2	F2	F1	F2
17		F1								H1		H1	C1	C2					F1	F2		F2		
18	F3	F3	F2	F2			F1	C1	C1	C1	C1				H1	H1		L1			F1	F1	F1	
19						F1	F1	H1									L1	L1	F1			F1	F1	F2
20	F1	F1								L1	L1				H1	H1	H1	L2						
21			F1				F1	L1	C1	C1	C1	C1		H1						F1	F1	F1		
22										L1	L2	L1	HL11		H1					F1	F1	F1	F1	F1
23										H1	C1	L1		L2			H1			F1				
24		F1		F2	F1	F1		C1	C1					L1		HL22	HL12	HL12	FF11	F1				
25		F1		F1				H1			L1	H1	C1	L1	L1			L1	F1		F1			
26			F1	F1													H1	F1	F1	F1	F1			
27					F1				C1	H1							C2	C5	F6	F4	F4	F1	F2	
28				F2				L2	L2	C2	C1	C2	C1	C1		C2	L2	L2				F2	F2	
29		F1	F1	F1	F1	F2	F1			C1	C1	C1	C1		L2					F1	F3	F2		
30					F2	F2	F2	L1		H1	C1	C2								F1				F1
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
UQ																								
LQ																								

The Radio Research Laboratories, Japan

NOV. 1969 | TYPES OF ES

IONOSPHERIC DATA

NOV. 1969 | HPF2 (KM) | 135° E Mean Time (G. M. T.+ 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42·4' N Long. 139° 29·3' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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	400	400	385	A	305	325	300	270	270	300	290	340	350	350	300	310	290	290	340	320	290	300	340	350
2	350	360	350	315	300	300	320	260	280	290	285	305	350	310	330	310	300	280	300	295	350	310	350	350
3	370	380	400	420	320	330	300	260	280	295	295	320	300	320	320	300	300	300	300 B	300	300	340	350	315
4	310	350	I R 395	360	260	350	320	280	300	295	300	300	350	300	305	300	290	300	300	310	330	340	380	350
5	320	300	290	310	330	350	310	280	260	J R 275	290	300	300	300	310	300	290	290	310	300	315	300	310	390
6	380	380	390	350	260	380	330	280	280	290	270	280	360	310	300	300	I R 290	300	330	300	310	340	350	350
7	370	360	350	360	305	300	330	270	280	260	J R 280	300	300	300	290	310	300	265	350	330	340	330	380	400
8	360	350	350	350	350	350	340	280	J R 290	280	290	300	300	310	300	260	280	270	300	305	360	350	370	370
9	355	370	380	340	290	360	350	305	290	295	300	300	300	300	300	300	290	300	J R 280	290	390	410	300	420
10	400	405	365	360	375	380	350	295	250	300	300	300	300	300	290	300	290	310	335	300	290	400	390	400
11	400	400	330	400	340	360	300	290	290	280	280	300	290	320	290	J R 300	260	300	310	290	300	380	340	J R 290
12	380	360	370	350	290	370	290	R 260	250	280	270	290	J R 290	J R 300	J R 260	260	250	280	310	260	310	310	390	350
13	350	315	340	300	400	350	300	R	J R 270	290	270	260	290	300	J R 290	300	I C 275	300	340	290	310	360	320	350
14	390	390	350	360	400	390	300	240	260	280	300	265	300	300	280	300	300	300	370	310	370	380	380	380
15	380	390	380	360	300	340	310	R	265	250	I C 285	270	305	315	290	270	250	250	I A 265	305	290	A	400	360
16	I C 370	380	370	350	300	320	290	260	260	250	255	285	305	280	300	280	255	280	280	255	290	360	325	330
17	355	365	360	370	330	340	265	250	250 H	260	290	260	260	300	290	280	280	290	320	300	300	350	350	380
18	A	390	390	350	400	350	290	J R 250	260	250	260	290	300	330	300	280	260	280	310	300	330	300	330	390
19	380	350	330	320	370	380	320	270	260	280	310	300	310	340	290	290	280	300	350	300	300	J R 300	320	400
20	400	410	380	380	290	310	300	I R 250	280	300	290	300	300	300	J R 300	290	250	280	300	300	300	320	400	400
21	380	350	350	300	270	330	360	300	J R 300	J R 290	300	310	300	310	300	300	290	280	310	J R 290	300	320	400	390
22	400	400	400	330	290	250	310	280	270	290	290	270	300	J R 330	260	305	255	300	295	260	280	325	380	390
23	400	400	340	305	250	340	340	290	260	260	255	265	340	310	300	280	250	290	300	300	300	300	380	380
24	390	390	385	405	340	340	290	R	270	290	280	300	300	280	280	265	260	280	280	320	360	310	370	370
25	350	370	355	370	340	300	335	270	290	300	280	280	300	320	300	300	260	300	300	300	310	300	400	400
26	400	B 390	400	320	390	400	310	I C 255	280	260	I C 300	300	305	320	310	300	270	305	295	350	320	310	300	I C 310
27	345	370	360	420	F 455	410	280	245	280	320	300	300	300	305	I C 310	295	290	285	290	240	I 340	380	400	I C 405
28	C	C	385	390	350	355	305	250	250	300	300	300	300	300	C	300	J R 280	300	300	280	290	310	390	360
29	390	400	350	330	330	360	360	275	260	280	290	300	300	315	315	300	J R 300	280	300	290	300	340	410	400
30	420	400	400	340	320	360	290	300	290	290	260	300	300	300	300	290	300	300	260	300	320 B	330	400	400
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	30	29	30	30	30	27	30	30	30	30	30	30	29	30	30	30	30	30	30	29	30	30
MED	380	380	368	350	325	350	310	270	270	290	290	300	300	308	300	300	280	290	300	300	310	330	375	380
UQ	400	400	385	370	350	360	330	280	280	295	300	300	305	320	300	300	290	300	320	305	330	350	390	400
LQ	355	360	350	330	290	330	300	258	260	275	280	280	300	300	290	280	260	280	295	290	300	310	340	350

IONOSPHERIC DATA

NOV. 1969 | YPF2 (KM) | 135° E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	100	90	95	A	105	85	90	90	80	90	90	100	100	100	90	100	70	90	110	100	110	100	100	100
2	90	90	90	95	100	100	120	100	70	90	105	85	100	100	120	90	100	70	110	85	90	90	90	100
3	80	100	90	70	70	80	90	70	60	85	85	110	90	80	90	80	80	90	90R	90	100	100	100	125
4	100	100	I R 100	90	90	100	90	70	90	65	90	90	100	90	95	90	70	80	90	90	110	80	100	100
5	110	100	100	100	110	90	100	60	80	J R 105	70	90	100	90	90	80	100	100	100	90	85	100	90	100
6	100	100	100	90	90	130	110	100	70	60	80	70	90	100	90	90	I R 100	90	80	90	90	100	90	100
7	110	90	100	90	95	100	80	80	60	90	J R 80	90	90	100	90	90	100	115	90	110	100	110	100	100
8	90	90	100	100	100	100	110	100	J R 90	60	65	70	100	90	85	80	75	85	55	95	90	90	90	75
9	90	80	75	70	80	95	95	90	70	60	55	60	75	85	85	95	70	75	J R 75	80	110	85	60	90
10	95	95	85	95	80	90	100	65	50	90	90	90	100	90	90	90	70	100	105	100	100	100	100	100
11	100	100	110	100	100	100	100	100	100	120	70	90	100	80	100	J R 80	120	90	80	100	100	100	100	J R 100
12	100	90	80	70	90	90	110	R 90	60	100	80	80	J R 90	J R 80	J R 90	80	80	70	90	90	90	100	100	100
13	80	85	110	100	100	80	100	R	J R 70	100	60	140	70	90	J R 90	90	I C 75	110	100	100	130	100	90	100
14	100	100	100	100	100	100	90	60	70	70	80	85	90	90	70	90	90	90	120	100	110	110	110	110
15	110	100	110	90	100	100	90	R	65	50	I C 85	75	80	80	65	75	75	70	I A 70	95	70	A	90	85
16	I C 80	70	75	90	70	80	65	50	55	50	65	60	85	75	60	60	90	40	40	50	60	80	75	75
17	85	75	90	85	75	65	55	50	H 50	100	100	120	90	100	90	100	70	100	100	100	90	100	100	110
18	A	100	100	100	100	100	100	J R 90	100	80	90	90	90	70	90	70	90	100	100	100	110	100	70	100
19	110	100	80	90	110	110	100	90	80	110	90	90	90	90	90	70	100	90	100	90	100	J R 100	100	100
20	100	100	100	110	110	90	100	I R 80	70	90	100	90	80	90	J R 90	90	100	100	90	100	90	80	100	100
21	110	90	90	90	70	90	90	90	J R 100	J R 60	90	80	80	100	90	100	100	100	90	J R 90	90	80	100	100
22	100	100	100	80	90	90	100	70	110	60	60	80	60	J R 85	80	105	60	75	65	110	80	75	70	80
23	90	90	80	85	50	110	110	65	60	60	55	80	80	90	70	70	60	110	55	100	100	80	70	90
24	100	70	75	95	65	60	65	R	70	55	60	70	60	80	90	115	65	90	75	85	90	90	60	100
25	95	80	90	85	75	70	115	70	65	90	100	110	100	100	90	90	90	100	90	100	90	100	100	100
26	100	R 100	100	80	100	100	90	I C 95	100	70	I C 70	85	100	110	85	70	85	90	60	95	85	90	100	I C 90
27	70	75	55	80	F 120	90	80	50	70	80	70	95	95	90	I C 90	75	65	105	70	60	I A 70	75	100	I C 100
28	C	C	75	65	100	90	90	50	55	100	90	90	100	100	C	100	J R 100	90	100	100	90	90	110	90
29	100	100	140	80	80	90	80	65	90	70	90	100	100	85	95	100	J R 90	110	90	100	90	80	90	100
30	100	100	100	100	120	130	110	90	90	90	90	90	100	100	100	70	80	90	90	90	R 100	90	100	100
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	30	29	30	30	30	27	30	30	30	30	30	30	29	30	30	30	30	30	30	29	30	30
MED	100	95	98	90	98	90	98	80	70	82	82	90	90	90	90	90	82	90	90	95	90	90	100	100
UQ	100	100	100	100	100	100	100	90	90	90	90	90	100	100	90	95	100	100	100	100	100	100	100	100
LQ	90	90	80	80	80	90	90	65	60	60	70	80	80	85	85	75	70	85	75	90	90	80	90	90

NOV. 1969 | YPF2 (KM)

IONOSPHERIC DATA

NOV. 1969 | FOF2 (0.1 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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 49	S 50	45	46	47	42	S 40	75	S 91	111	132	125	123	141	144	132	120	120	102	88	S 86	87	J S 64	52
2	51	46	43	43	49	32	I C 38	66	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	117	132	S 124	127	128	125	130	115	122	106	86	77	64	57	S 57
4	56	55	49	44	41	28	32	70	124	S 133	150	S 134	128	140	151	144	138	133	J S 127	U R 138	U R 139	I R 134	I R 122	J S 104
5	I S 101	U R 90	63	44	36	29	34	78	109	111	123	I C 121	112	126	134	S 124	115	112	J S 103	H 70	63	67	54	40
6	39	40	38	42	47	22	26	66	114	129	120	S 119	112	126	S 138	131	J S 118	U S 100	94	J S 85	90	I S 94	J S 91	S 74
7	69	I S 62	S 51	47	48	36	29	68	U S 94	S 97	98	116	105	S 121	130	117	S 118	105	84	65	69	74	S 58	52
8	49	S 47	45	44	38	30	32	66	96	S 111	S 112	108	100	117	140	S 132	107	S 97	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	116	110	121	130	134	S 121	113	108	72	64	59	55	49
10	41	41	40	46	35	35	S 35	70	107	100	S 120	120	109	118	124	111	108	J S 98	70	70	72	J R 64	J S 51	48
11	46	43	49	39	39	34	S 36	S 68	106	J S 95	S 100	115	125	128	126	133	140	108	98	66	79	J S 68	S 52	48
12	41	35	33	34	39	23	26	65	I S 101	89	U S 98	114	S 116	125	J R 126	112	104	89	U S 74	J S 64	S 69	S 60	U S 46	37
13	33	33	34	32	30	31	34	J S 67	U S 81	102	S 119	116	104	112	V 109	123	100	89	76	67	69	J S 66	J S 48	39
14	S 40	40	40	40	38	34	36	66	78	S 98	S 115	S 116	114	111	129	131	S 109	91	80	J S 63	65	54	55	J S 50
15	S 43	39	39	40	38	30	28	S 61	85	S 94	94	110	102	112	114	123	112	S 90	70	55	S 61	46	40	35
16	35	S 37	37	42	52	34	34	66	I S 86	85	90	98	102	S 129	H 134	133	117	S 95	84	58	S 62	53	48	S 43
17	33	30	31	33	30	31	33	S 58	70	85	99	C	C	C	C	101	95	91	69	59	H 60	S 51	S 46	37
18	35	34	34	35	34	32	S 41	62	S 85	87	S 96	98	96	92	114	S 118	S 104	J R 88	72	68	S 69	R 66	53	U S 41
19	37	S 37	38	36	31	31	31	U S 61	U S 84	109	S 107	R 118	I S 122	J R 124	S 123	115	101	J S 87	66	67	77	S 69	52	S 39
20	34	35	35	31	F 31	32	31	57	S 83	S 96	S 115	109	106	107	106	98	94	S 84	U S 64	57	72	63	40	U S 38
21	S 39	39	36	34	34	26	27	S 53	S 91	S 122	S 121	128	133	130	131	S 137	S 112	S 93	83	76	R 86	S 68	63	S 51
22	S 46	44	40	40	48	25	25	58	92	S 109	103	122	U S 119	129	130	U S 102	111	81	S 72	S 70	65	J S 61	S 45	39
23	39	37	U S 43	49	26	F 24	28	60	S 97	101	98	108	122	130	128	136	111	82	72	54	62	57	39	34
24	36	36	36	34	36	33	35	58	83	103	107	107	110	110	108	106	100	100	67	66	U S 61	62	S 69	57
25	J S 50	U S 40	S 40	38	39	29	26	S 53	84	116	125	S 120	105	122	121	107	103	S 86	69	66	61	64	S 42	32
26	S 32	33	35	33	34	30	S 33	U S 68	S 102	130	129	S 135	R 140	144	S 142	138	J S 128	U S 117	J S 87	J S 62	58	J S 62	U S 52	44
27	34	33	S 32	F 31	F	31	J S 40	56	78	106	135	124	126	127	135	131	108	98	73	63	54	43	S 43	43
28	41	41	43	46	48	36	44	68	S 97	112	S 114	126	122	113	119	115	U S 121	S 107	I S 88	78	61	53	S 47	34
29	33	31	33	33	33	F 28	29	57	U S 101	S 97	105	S 117	122	136	143	146	144	S 130	93	79	64	55	46	34
30	35	35	36	32	F 31	F 29	S 33	53	88	S 108	109	R 121	R 119	132	U R 121	U S 123	123	S 100	S 93	62	56	J S 51	36	29
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	27	28	28	28	27	28	28	28	28	28	28	29	29	29	28	28	28	28	28	28
MED	40	39	38	40	38	31	33	66	91	104	113	118	115	126	128	124	112	98	82	66	65	62	52	42
UQ	48	44	43	44	44	34	36	68	101	112	122	123	122	130	134	133	120	108	94	74	74	68	56	50
LQ	35	35	35	34	34	28	28	58	84	96	100	112	106	115	121	115	104	89	71	62	61	54	S 46	37

NOV. 1969 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

NOV. 1969 | FOF1 (0.01 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station YAMAGAWA Lat. 31° 12.1' N Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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	A	L	A	A	A	L	A						
2									C	C	C	C	C	C	C	C	C							
3									C	L	L	L	L	L	L	L								
4									L	L	U L 410	L	L	L	L	L								
5										L	L	C	L	L	L									
6										L	L	L	L	L	L	L								
7										L	L	L	L	L	L									
8										L	L	L	L	L 540	L	L	L	220						
9									C	C	C	L	L	L	L	L	L							
10									L	L	L	L	A	L	L	L								
11										L	L	L	L	L	L	L	A							
12										L	L U L 440 510		L	L	H 380	350								
13										L	L	L	L	L		L								
14										L	L	L	L 480	L	L	L								
15										L	L	L	L	L	L	L								
16										L	U L 440	U L 420	L	L	L	A	L 320							
17										L	L	C	C	C	C	L								
18										L	L	L	L 450		L	L								
19										L	L	L	L	L	L									
20										L 370	L	L	L	L	L	L								
21										L	L	L	L	L 480	L	L								
22										L	L	L	L	L 490	410	360								
23											L	L	L	L	L	L								
24									280	L	U L 410	L	L	L	L									
25										L	L	L	L	L	L	L	300							
26										L	L	L	L	L	L	L								
27											L	L	L	L	L	340								
28										L	L	L	A	L	A	U L 380								
29											L	L	L	L	L	L								
30											L	L	L	L	L	L								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									1	1	4	2	2	3	2	4	2	1						
MED									280	U L 370	U L 425	U L 465	L 465	L 490	395	355	310	220						
UQ											L 440			L 515		370								
LQ											U L 410			L 485		345								

The Radio Research Laboratories, Japan

NOV. 1969 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

NOV. 1969 | FOE (0.01 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station YAMAGAWA Lat. 31° 12·1' N Long. 130° 37·1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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								165	275	320	340	360	360	350	A	A	A	A						
2								170	C	C	C	C	C	C	C	C	C	C						
3								C	C	310	325	A	A	A	350	I A 315	280	A						
4								H 180	H 280	310	325	340	350	355	340	315	265	175						
5								180	270	H 305	330	I C 340	345	H 350	340	310	260	190						
6								170	260	310	330	345	350	340	I A 300	285	270	180						
7								150	260	310	340	350	I A 355	380	A	A	250	B						
8								S	250	300	325	340	H 345	335	325	305	260	160						
9								C	C	C	C	340	350	H 340	I A 320	I A 310	260	A						
10								S	250	290	320	335	350	340	330	300	255	165						
11								190	250	295	320	330	330	330	310	I A 280	A	A						
12								170	250	300	330	A	A	A	I A 325	I A 295	260	A						
13								180	H 250	300	320	330	330	330	330	H 310	260	S						
14								160	260	300	H 330	335	I A 345	340	A	A	A	A						
15								S	240	H 300	310	320	A	A	A	A	A	A						
16								S	250	300	325	325	345	350	I A 330	I A 305	250	A						
17								160	250	300	330	C	C	C	C	320	270	A						
18								160	270	310	335	350	355	360	A	A	255	190						
19								S	H 250	310	325	B	355	H 350	335	I B 320	250	S						
20								S	240	295	330	345	355	340	330	305	260	A						
21								S	250	300	340	345	355	340	340	320	260	160						
22								S	250	300	330	345	360	355	330	305	250	S						
23								S	260	290	A	A	A	A	340	A	A	A						
24								S	H 260	310	325	350	360	355	335	300	260	150						
25								S	H 240	300	I A 330	I A 350	360	A	A	320	A	A						
26								S	260	305	330	340	345	340	325	300	240	S						
27								S	250	H 310	320	360	I B 380	380	345	320	270	170						
28								S	250	305	A	A	A	A	A	305	A	A						
29								S	270	300	325	330	A	A	340	I A 300	260	A						
30								S	H 250	290	310	I A 330	I A 345	345	330	305	255	S						
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								12	27	28	26	23	22	21	21	23	22	9						
MED								170	250	300	328	340	350	345	330	305	260	170						
UQ								180	260	310	330	348	355	355	340	315	260	180						
LQ								160	250	300	325	332	345	340	325	300	255	160						

The Radio Research Laboratories, Japan

NOV. 1969 | FOE (0.01 MHZ)

IONOSPHERIC DATA

NOV. 1969 | FOES (0.1 MHZ) | 135° E Mean Time (G. M. T.+ 9h)

Station YAMAGAWA Lat. 31° 12.1' N, Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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 S 15	22	E B 13	E B 11	19	20	22	24	31	39	39	J X 64	J X 60	J X 59	J X 63	J X 57	J X 50	J X 35	J X 37	J X 30	J X 40	J X 27	E B 15	22
2	E B 14	E B 14	E B 12	E B 12	E B 12	E B 14	C	19	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	33	37	36	37	40	G 22	38	34	J X 31	J X 24	J X 22	J X 23	J X 25	J X 24	E B 13
4	E B 13	E B 13	E B 16	E	E	E B 15	J X 22	G	G	J X 34	J X 71	G	G 34	G	G	G	G	G	E S 15	E S 15	18	22	20	E S 15
5	E S 15	J X 24	J X 25	J X 21	J X 22	J X 24	J X 19	23	G 23	35	37	C	39	G	G 26	G 24	31	J X 26	J X 24	E S 15	24	24	24	J X 2
6	22	20	E B 13	26	E	E B 11	24	24	J X 30	G	G 21	40	37	40	37	34	J X 42	J X 28	J X 30	J X 26	J X 21	E S 15	E S 15	E S 15
7	E S 15	E B 15	E B 13	E B 12	E B 11	E B 15	E S 15	23	G	36	37	G	42	44	44	50	J X 67	J X 44	J X 23	J X 32	J X 32	J X 24	25	E B 15
8	E B 15	19	E B 15	E	E	23	22	24	G	32	37	36	37	38	42	37	J G 24	23	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	G 23	G 23	G	38	J X 45	G	J X 31	J X 22	E B 15	20	J X 34	J X 24	J X 38
10	E B 12	22	E B 13	22	E B 15	E B 15	E S 15	E S 15	30	J X 60	39	J X 43	J X 61	J X 51	42	35	29	J X 24	22	24	J X 25	E B 16	J X 22	E S 15
11	E S 15	21	E B 17	J X 29	J X 33	J X 21	19	23	G	34	37	38	41	39	40	J X 41	J X 38	J X 31	J X 54	22	J X 27	J X 25	E B 15	E B 15
12	E B 15	E B 15	E B 14	E B 12	E	E	E S 13	J X 24	J X 30	G	G	35	36	36	J X 34	J X 44	J X 34	J X 29	J X 21	23	J X 20	23	E B 15	E B 16
13	E S 15	E B 13	E B 13	E B 12	E B 15	J X 19	23	23	G	G 24	35	39	36	37	G 29	J G 29	G 23	E S 15	J X 25	20	E B 15	23	E B 15	22
14	20	J X 21	J X 26	22	E B 16	E B 14	E S 13	G	33	35	41	45	J X 64	J X 51	J X 42	J X 41	J X 34	J X 65	J X 48	E S 15	J X 29	E S 15	E S 15	E S 13
15	E S 15	E B 15	E B 12	E B 15	E B 16	E B 15	E S 15	E S 15	G	G 27	34	35	J X 36	35	34	34	J X 34	J X 34	J X 28	24	E B 15	25	E B 14	E B 14
16	E B 16	E B 16	E B 16	E	E B 16	E	E S 15	E S 15	J X 28	31	G	36	G 34	38	J X 52	J X 87	26	21	21	J X 25	J X 25	J X 21	20	E S 15
17	E S 15	E B 15	E B 12	E B 12	E	E B 15	E S 15	G	G	G	35	C	C	C	C	35	J X 31	24	E B 15	J X 29	E B 15	E B 16	24	21
18	E B 15	E B 13	E B 14	E B 15	E B 15	E	21	G	G	G	35	G 35	G	G 35	J X 52	J X 49	J X 29	G	E S 15	E S 15	E S 15	E S 14	E B 11	E S 15
19	E B 15	E B 12	E B 15	E	E B 11	E B 15	E S 15	E S 15	G	J X 37	G	E B 44	G	39	39	E B 49	35	J X 21	E S 16	E B 15	E B 15	E B 12	E S 15	E B 15
20	E S 15	J X 24	23	E B 13	E B 13	E B 16	J X 24	J X 24	28	32	G	G	G	39	39	35	32	21	20	E S 15	E S 15	E S 15	E S 15	E S 15
21	E S 15	E B 15	E B 12	E B 11	E B 13	E B 13	E S 15	E S 15	G	G 21	40	37	38	37	36	J X 36	G 24	J X 46	E B 14	E B 15	E B 15	E S 13	E S 15	E S 12
22	E B 15	E B 15	E B 15	E B 12	E B 11	E	E S 14	23	G	G	34	G	42	G	G 27	G 25	30	E S 15	E B 11	E S 15	E S 15	E S 15	22	E S 15
23	E B 15	E B 15	E B 15	E	E B 11	E B 13	E S 13	E S 15	G	31	34	40	39	37	G 34	G 31	J X 33	34	J X 35	J X 24	E B 12	E B 17	20	E B 15
24	E B 15	E B 15	E B 15	E B 14	E B 11	J X 24	J X 22	23	G	G	34	36	G	G	G	G	G	G	E S 15	E S 13	J X 36	23	E S 15	E S 15
25	E S 15	E B 13	E B 16	E	E	E B 14	E S 15	E S 15	G	J G 30	37	42	40	40	J X 38	G	J X 27	18	J X 24	19	23	20	E B 14	E B 13
26	E B 11	E B 14	E	E	J X 28	J X 22	24	24	G	31	J G 32	J G 32	J G 34	J G 32	J G 29	G	J X 25	J X 22	24	24	24	E S 15	E S 15	E S 13
27	E B 14	E B 13	E B 12	E	23	23	23	E S 15	G	34	35	G	G 36	G	G	G 20	29	21	21	E B 13	E B 15	E B 12	23	J X 25
28	J X 26	J X 24	E B 15	E B 16	E B 12	E B 11	E S 15	E S 15	G 24	J X 33	J X 39	37	J X 49	41	J X 76	J X 32	J X 73	J X 30	J X 52	J X 30	J X 31	J X 25	25	E S 15
29	19	E S 15	E B 12	E B 14	E B 13	E B 16	20	23	G	32	35	40	40	90	36	J X 39	J X 33	J X 29	J X 33	J X 31	22	E B 16	E B 15	E B 15
30	E B 15	E B 15	E B 11	E	E B 12	E	23	E S 15	G	32	36	38	J X 46	J X 43	J G 28	G 22	J X 29	E S 15	E S 15	22	E S 15	E S 15	E S 15	E B 17
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	28	28	27	28	27	28	28	27	28	28	28	29	29	29	28	28	28	28	28	28
MED	E S 15	E B 15	E B 14	E B 12	E B 12	E B 15	19	17	G	32	35	36	37	38	36	35	J X 31	J X 24	J X 22	22	20	18	E 15	E S 15
UQ	E B 15	20	E B 16	E B 15	E B 16	20	22	23	26	34	37	40	42	40	42	J X 41	J X 34	J X 31	J X 29	J X 24	J X 25	24	22	E S 16
LQ	E B 15	E B 14	E B 12	E	E B 11	E B 12	E S 15	E S 15	G	G 22	34	G 34	G 34	G 34	G 28	G 25	26	21	E 16	E 15	E 15	E S 15	E 15	E S 15

NOV. 1969 | FOES (0.1 MHZ)

IONOSPHERIC DATA

NOV. 1969 | FBES (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatio operation

Hour / 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 S 15	E	E B 13	E B 11	14	E	E	22	G	36	37	63	57	54	59	51	48	32	33	25	29	20	E B 15	E
2	E B 14	E B 14	E B 12	E B 12	E B 12	E B 14	C	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	G	37	36	37	38	G 22	36	G	28	21	16	E	18	15	E B 13
4	E B 13	E B 13	E B 16	E	E	E B 15	E	G	G	29	29	G	G 34	G	G	G	G	G	E S 15	E S 15	16	E	E	E S 15
5	E S 15	E	17	17	E	18	E	G	G 17	G	G	C	G	G	G 26	G 24	G	15	15	E S 15	E	E	E	E
6	E	E	E B 13	E	E	E B 11	E	G	14	G	G 20	39	G	39	G	33	31	S	16	16	E	E S 15	E S 15	E S 15
7	E S 15	E B 15	E B 13	E B 12	E B 11	E B 15	E S 15	G	G	G	G	G	41	40	39	48	41	32	18	21	24	19	E	E B 15
8	E B 15	E	E B 15	E	E	E	E	21	G	G	36	G	36	38	41	34	G	G	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	G 23	G 23	G	35	31	G	25	15	E B 15	20	24	E	36
10	E 12	E	E B 13	E	E B 15	E B 15	E S 15	E S 15	G	32	39	37	56	48	39	33	29	G	E	E	20	E B 16	17	E S 15
11	E S 15	E	E B 17	E	15	E	E	G	G	G	G	36	40	38	39	37	33	26	42	E	18	16	E B 15	E B 15
12	E B 15	E B 15	E B 14	E B 12	E	E	E S 13	G	20	G	G	35	35	36	33	34	19	24	15	E	19	E	E B 15	E B 16
13	E S 15	E B 13	E B 13	E B 12	E B 15	E	E	G	G	G 24	G	G	G	36	G 25	G 26	G 20	E S 15	22	18	E B 15	E	E B 15	E
14	E	14	E	17	E B 16	E B 14	E S 13	G	G	35	40	43	37	41	39	35	29	62	22	E S 15	16	E S 15	E S 15	E S 13
15	E S 15	E B 15	E B 12	E B 15	E B 16	E B 15	E S 15	E S 15	G	G 27	G	35	36	35	33	32	29	23	18	E	E B 15	E	E B 14	E B 14
16	E B 16	E B 16	E B 16	E	E B 16	E	E S 15	E S 15	20	28	G	35	G 34	G	34	82	24	21	E	21	18	20	E	E S 15
17	E S 15	E B 15	E B 12	E B 12	E	E B 15	E S 15	G	G	G	28	C	C	C	C	30	24	21	E B 15	26	E B 15	E B 16	E	E
18	E B 15	E B 13	E B 14	E B 15	E B 15	E	E	G	G	G	33	G 33	G	G 34	42	33	25	G	E S 15	E S 15	E S 15	E S 14	E B 11	E S 15
19	E B 15	E B 12	E B 15	E	E B 11	E B 15	E S 15	E S 15	G	G	G	E B 44	G	39	38	E B 49	33	17	E S 16	E B 15	E B 15	E B 12	E S 15	E B 15
20	E S 15	18	E	E B 13	E B 13	E B 16	E	16	G	G	G	G	G	39	38	34	30	20	E	E S 15	E S 15	E S 15	E S 15	E S 15
21	E S 15	E B 15	E B 12	E B 11	E B 13	E B 13	E S 15	E S 15	G	G 21	G	G	G	G	32	29	G 19	15	E B 14	E B 15	E B 15	E S 13	E S 15	E S 12
22	E B 15	E B 15	E B 15	E B 12	E B 11	E	E S 14	S	G	G	G	G	42	G	G 27	G 24	29	E S 15	E B 11	E S 15	E S 15	E S 15	E	E S 15
23	E B 15	E B 15	E B 15	E	E B 11	E B 13	E S 13	E S 15	G	G	33	38	38	36	G 32	G 31	29	20	27	20	E B 12	E B 17	E	E B 15
24	E B 15	E B 15	E B 15	E B 14	E B 11	16	15	S	G	G	G	G	G	G	G	G	G	G	E S 15	E S 13	31	E	E S 15	E S 15
25	E S 15	E B 13	E B 16	E	E	E B 14	E S 15	E S 15	G	G 27	36	41	39	39	35	G	26	18	19	15	18	E	E B 14	E B 13
26	E B 11	E B 14	E	E	14	E	E	S	G	30	G 30	G 30	G 31	G 30	G 29	G	18	S	E	E	16	E S 15	E S 15	E S 13
27	E B 14	E B 13	E B 12	E	12	E	E	E S 15	G	G	E R 35	G	E G 36	G	G	G 18	G	G	E	E B 13	E B 15	E B 12	15	E
28	18	E	E B 15	E B 16	E B 12	E B 11	E S 15	E S 15	G 22	29	33	E R 37	45	37	48	30	43	24	32	17	22	20	17	E S 15
29	E	E S 15	E B 12	E B 14	E B 13	E B 16	E	S	G	G	G	G	38	35	32	34	20	19	26	18	E	E B 16	E B 15	E B 15
30	E B 15	E B 15	E B 11	E	E B 12	E	E	E S 15	G	31	33	37	39	34	G 20	G 22	17	E S 15	E S 15	E	E S 15	E S 15	E S 15	E B 17
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	28	28	27	24	27	28	28	27	28	28	28	29	29	27	28	28	28	28	28	28
MED	E S 15	E B 14	E B 13	E B 12	E B 12	E B 13	E S 15	15	G	G	U G 22	U 32	36	36	33	32	24	19	15	15	15	E B 15	E 15	E S 15
UQ	E B 15	E B 15	E B 15	E B 14	E B 14	E B 15	E S 15	E S 15	G	28	34	36	39	39	39	34	29	24	22	18	18	E S 16	E 15	E S 15
LQ	E B 14	E B 12	E B 12	E	E B 11	E	E	G	G	G	G	G	G	G	G 26	G 24	G 17	15	E B 14	E S 13	E 15	E B 12	E	E B 13

NOV. 1969 | FBES (0.1 MHZ)

IONOSPHERIC DATA

NOV. 1969 | F-MIN (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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 S 15	13	13	11	E	15	E S 15	E S 15	16	15	16	17	17	20	18	15	15	12	E S 12	11	12	14	15	13
2	14	14	12	12	12	14	C	E S 15	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	16	15	18	18	17	17	17	15	15	12	12	15	11	13	13
4	13	13	16	E	E	15	E S 15	13	15	15	15	17	17	16	18	18	16	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15
5	E S 15	13	14	E	14	15	E S 15	E S 15	15	14	16	C	17	19	16	16	15	12	11	E S 15	15	12	13	14
6	15	14	13	14	E	11	E S 15	E S 14	11	17	15	19	16	16	18	17	15	E S 15	E S 15	E S 15	E S 14	E S 15	E S 15	E S 15
7	E S 15	15	13	12	11	15	E S 15	E S 14	16	16	17	18	18	19	18	16	14	15	15	11	15	14	15	15
8	15	14	15	E	E	11	E S 15	E S 15	12	12	18	17	16	19	16	16	15	E S 15	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	18	18	18	19	17	16	13	12	15	14	15	15	14
10	12	15	13	E	15	15	E S 15	E S 15	14	15	15	16	18	18	17	16	16	E S 15	E S 15	16	E S 14	16	E S 15	E S 15
11	E S 15	15	17	13	12	E S 15	E S 15	E S 15	15	14	15	15	19	19	15	15	16	12	13	15	E	12	15	15
12	15	15	14	12	E	E	E S 13	E S 14	15	15	15	17	19	18	16	17	11	13	E	18	E S 13	16	15	16
13	E S 15	13	13	12	15	15	E S 15	E S 15	13	16	15	16	16	16	15	15	16	E S 15	E	12	15	16	15	15
14	15	13	15	E	16	14	E S 13	E S 15	14	15	17	17	18	18	16	16	15	12	E S 13	E S 15	E S 15	E S 15	E S 15	E S 13
15	E S 15	15	12	15	16	15	E S 15	E S 15	15	15	15	15	15	19	16	17	15	15	15	13	15	E S 15	14	14
16	16	16	16	E	16	E	E S 15	E S 15	14	15	15	16	17	17	16	16	15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 13	E S 15
17	E S 15	15	12	12	E	15	E S 15	E S 15	15	15	15	C	C	C	C	18	15	15	15	15	15	16	16	15
18	15	13	14	15	15	E	E S 14	E S 13	15	15	18	18	20	25	19	18	17	15	E S 15	E S 15	E S 15	E S 14	11	E S 15
19	15	12	15	E	11	15	E S 15	E S 15	15	18	17	44	17	15	21	49	16	E S 15	E S 16	15	15	12	E S 15	15
20	E S 15	E S 15	15	13	13	16	E S 14	E S 15	17	15	16	18	19	17	17	16	17	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15
21	E S 15	15	12	11	13	13	E S 15	E S 15	13	15	15	17	19	18	19	17	15	14	14	15	15	E S 13	E S 15	E S 12
22	15	15	15	12	11	E	E S 14	E S 13	14	15	16	16	19	20	18	18	15	E S 15	11	E S 15	E S 15	E S 15	E S 15	E S 15
23	15	15	15	E	11	13	E S 13	E S 15	14	13	15	18	18	18	19	17	16	14	14	15	12	17	15	15
24	15	15	15	14	11	E	E S 11	E S 15	11	15	15	18	19	18	17	16	15	E S 13	E S 15	E S 13	E S 13	E S 15	E S 15	E S 15
25	E S 15	13	16	E	E	14	E S 15	E S 15	12	15	15	16	18	17	18	15	15	12	15	11	17	15	14	13
26	11	14	E	E	E	14	E S 15	E S 15	14	15	16	16	17	18	16	15	12	E S 15	E S 15	E S 15	E S 13	E S 15	E S 15	E S 13
27	14	13	12	E	E	15	E S 15	E S 15	12	14	16	25	26	26	20	16	14	E S 15	13	13	15	12	E	15
28	12	15	15	16	12	11	E S 15	E S 15	13	15	16	18	18	18	16	16	15	15	E S 15	E S 15	E S 14	E S 15	E S 15	E S 15
29	E S 15	E S 15	12	14	13	16	E S 15	E S 15	15	15	18	16	17	18	17	15	15	12	15	15	15	16	15	15
30	15	15	11	E	12	E	E S 15	E S 15	14	15	14	18	19	18	16	16	15	E S 15	E S 15	E S 14	E S 15	E S 15	E S 15	17
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	28	28	27	28	27	28	28	27	28	28	28	29	29	29	28	28	28	28	28	28
MED	15	15	14	12	12	14	E S 15	E S 15	14	15	15	17	18	18	17	16	15	15	E F 15	15	15	15	15	15
UQ	15	15	15	13	14	15	E S 15	E S 15	15	15	16	18	19	19	18	17	16	E S 15	E S 15	15	15	15	15	15
LQ	E S 15	13	12	E	E	11	E S 14	E S 15	13	15	15	16	17	17	16	16	15	12	12	12	E S 14	12	E S 14	E S 14

The Radio Research Laboratories, Japan

NOV. 1969 | F-MIN (0.1 MHZ)

IONOSPHERIC DATA

NOV. 1969 | M(3000)F2 (0.01) | 135° E Mean Time (G. M. T.+ 9h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatio operation

Hour / 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	275S	270S	280	295	315	300	315S	330	335S	305	310	305	280	300	300	295	290	310	295	300	305S	310	280S	290
2	275	285	285	295	325	315	295C	335	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	325	310	290S	305	295	290	305	285	305	315	305	300	265	280	285S
4	295	300	305	295	350	255	270	300	325	325S	325	305S	280	285	295	300	305	310	290S	290R	285R	290R	295R	300S
5	300IS	325UR	335	285	300	260	290	315	345	335	315	325IC	295	295	300	300S	295	295	330S	315H	285	315	315	275
6	255	270	265	285	340	275	270	305	335	330	335	320S	295	295	295S	315	305S	325US	315	300S	300	300IS	275S	305S
7	295	285IS	285S	310	320	375	295	335	345US	340S	325	310	315	290S	300	305	315S	315	320	280	265	305	260S	250
8	275	280S	290	295	295	270	280	305	325	325S	330S	325	295	285	305	315S	320	310S	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	300	300	290	295	305	295S	300	315	280	265	240	280	285
10	245	260	265	305	245	255	260S	315	335	320	315S	325	305	300	305	320	315	335S	290	275	300	305R	285S	270
11	270	270	295	270	295	275	290S	320S	355	310S	310S	315	310	315	300	300	320	305	335	255	315	265S	290S	280
12	255	260	270	275	345	265	290	330	350IS	340	330US	330	305S	310	310R	320	325	330	330US	280S	305S	310S	290S	290
13	280	285	300	295	265	275	305	340IS	335US	335	335S	335	320	305	285V	325	330	325	310	285	305	285S	295S	260
14	255S	255	275	275	290	265	275	345	345	325S	315S	330S	310	315	305	315	320S	320	320	295S	325	300	280	285S
15	275S	270	270	295	325	320	305	340S	355	340S	330	330	315	305	305	325	325	335S	330	270	295S	305	285	255
16	255	255S	265	265	325	295	280	335	350IS	360	345	335	325	300S	285H	325	320	335S	335	305	300S	295	305	305S
17	270	275	270	290	300	285	325	335S	350	335	325	C	C	C	C	305	315	330	295	300	300H	295S	280S	280
18	265	265	270	285	285	265	310S	310	340S	335	345S	330	310	275	305	320S	320S	325UR	300	305	310S	300R	315	300US
19	275	290S	310	325	290	270	300	335US	335US	340	320S	315R	310IS	310UR	310S	315	315	330US	285	300	300	320S	300	310S
20	270	285	310	290	290F	295	305	325	335S	315S	320S	325	300	320	315	305	325	335S	315US	285	315	325	305	285US
21	285S	305	290	310	325	305	275	305S	325S	310S	290S	285	285	275	275	305S	305S	305S	305	285	290R	280S	270	275S
22	285S	255	275	275	345	320	280	310	325	345S	315	310	305US	300	330	285US	340	325	300S	310S	315	270S	290S	270
23	255	270	270US	350	330	260F	275	315	345S	330	325	315	285	290C	290	315	340	290C	305	280	285	265	280	265
24	265	260	275	255	285	270	285	310	325C	330C	325C	320	315	315	305	305	300	330	285	315	290US	285	300S	295
25	270US	265US	285S	280	305	345	290	320S	325	320	330	325S	285	295	300	310	320	315S	305	320	280	295	305S	250U
26	245S	260	255	275	265	265	275S	310US	325S	330	320	300S	290S	290	285S	295	290US	325S	300S	285S	295	285S	310S	285
27	280	275	280S	250F	F	250	300S	330	320	285	320	305	295	295	295	300	315	315	305	305	325	255	235S	240
28	250	235	245	270	290	250	275	310	350S	335	315S	315	305	295	295	300	315US	320S	320IS	330	320	305	275S	285
29	270	270	290	305	320	265F	265	295	345US	310S	325	305S	305	295	295	300	300	300S	295	315	300	310	300	260
30	235	255	285	285	290F	260F	300S	310	320	330S	320	315R	305R	305	295UR	305US	310	320S	320S	315	305	285S	300	255
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	27	28	28	28	27	28	28	28	28	28	28	29	29	29	28	28	28	28	28	28
MED	270	270	280	288	300	270	290	318	335	330	322	315	305	295	300	305	315	320	308	300	300	295	290	282
UQ	278	285	290	295	325	298	300	335	345S	335	330	325	310	305	305	315	320	330S	320	308	308	305	300	290S
LQ	255	260	270	275	290	262	275	310	325	320S	315	305	295	290	295	300	305	310	298	282	290	282	280S	262

NOV. 1969 | M(3000)F2 (0.01)

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

NOV. 1969 | M(3000)F1 (0.01) | 135° E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31° 12.1' N Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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	A	L	A	A	A	L	A						
2									C	C	C	C	C	C	C	C	C							
3									C	L	L	L	L	L	L	L								
4									L	L	U L 395	L	L	L	L	L								
5										L	L	C	L	L	L									
6										L	L	L	L	L	L	L								
7										L	L	L	L	L	L									
8										L	L	L	L	L 355	L	L	L	405						
9									C	C	C	L	L	L	L	L	L							
10									L	L	L	L	A	L	L	L								
11										L	L	L	L	L	L	L	A							
12										L	L 405	U L 365	L	L	H 425	A								
13										L	L	L	L	L		L								
14										L	L	L	L 385	L	L	L								
15										L	L	L	L	L	L	L								
16										L	U L 395	U L 405	L	L	L	A	L 405							
17										L	L	C	C	C	C	L								
18										L	L	L	L 405		L	L								
19										L	L	L	L	L	L									
20										L 420	L	L	L	L	L	L								
21										L	L	L	L	L 335	L	L								
22										L	L	L	L	L 435	435	430								
23											L	L	L	L	L	L								
24									C 395	L	U L 340	L	L	L	L									
25										L	L	L	L	L	L	L	430							
26										L	L	L	L	L	L	L								
27											L	L	L	L	L	395								
28										L	L	L	A	L	A	U L 395								
29											L	L	L	L	L	L								
30											L	L	L	L	L	L								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									1	1	4	2	2	3	2	3	2	1						
MED									C 395	L 420	U L 395	U L 385	L 395	L 355	430	395	418	405						
UQ											L 400			L 395		412								
LQ											U L 368			L 345		395								

The Radio Research Laboratories, Japan

NOV. 1969 | M(3000)F1 (0.01)

IONOSPHERIC DATA

NOV. 1969 | H'F2 (KM) | 135° E Mean Time (G. M. T.+ 9h)

Station YAMAGAWA Lat. 31° 12.1' N, Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / 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	270	250	300	290	275	245	250	240						
2									C	C	C	C	C	C	C	C	C							
3									C	245	255	240	290	285	275	260								
4									260	240	245	230	270	295	275	255								
5										230	250	I C 245	295	275	275									
6										245	240	240	230	280	255	250								
7										240	235	265	290	295	260									
8										250	245	250	300	305	275	245	225	220						
9									C	C	C	250	290	280	280	260	250							
10									245	240	255	250	290	290	270	255								
11										225	240	260	280	255	250	250	240							
12										225	245	270	265	265	250	250								
13										245	245	230	240	250		240								
14										260	265	240	255	290	275	255								
15										240	245	250	275	275	255	255								
16										230	240	245	300	280	250	265	230							
17										225	250	C	C	C	I C 255	245								
18										245	240	245	245		280	260								
19										250	250	280	260	255	250									
20										250	250	255	255	290	255	275								
21										255	245	250	245	255	250	245								
22										250	250	275	255	275	255	240								
23											245	275	300	C 250	240	250								
24									C 230	C 265	C 250	C 255	270	255	250									
25										250	235	240	280	275	255	240	235							
26										255	250	240	250	275	280	270								
27											250	260	280	290	280	250								
28										250	240	265	250	245	255	240								
29											245	290	250	290	265	250								
30											245	250	255	280	240	255								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									3	24	28	28	28	27	28	25	6	2						
MED									245	245	245	250	255	275	255	250	238	230						
UQ									252	250	250	262	278	288	275	255	250							
LQ									238	240	242	242	250	255	250	245	230							

NOV. 1969 | H'F2 (KM)

IONOSPHERIC DATA

NOV. 1969 | H'F (KM) | 135 E Mean Time (G. M. T.+ 9h)

Station YAMAGAWA Lat. 31° 12·1 N. Long. 130° 37·1 E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	300	280	285	265	250	260	245	235	220	225	205H	IA245	250	IA250	A	A	A	IA235	225	225	250	230	230	255
2	250	255	250	250	240	200	C	225	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	240	225	215	200H	215H	200H	245	240	235	205	225	210	250	250	260
4	255	250	250	245	200	310	310	250	240	230	200	200H	210H	205	210H	220	240	230	205	205	225	230	230	240
5	230	225	220	230	260	EA300	300	250	235	230	225	IC215	205	200H	220H	245	240	225	205	200	250	245	225	250
6	305	300	300	290	205	200H	ES340	250	245	230	225	225	200H	200H	240	230	230	220	225	225	225	220	225	245
7	255	230	265	255	245	205	275	250	235	225	215	215H	225	225H	240	IA250	245	225	205	230	270	250	250	275
8	290	250	250	250	225	245H	295	245	240	225	215	220	205H	200H	260	240	225	205	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	220H	205	250	250	225	230	240	205	200	250	300	270	EA300
10	300	300	320	220	330	300	330	255	240	225	EA240	225	IA225	EA250	240	225H	230	220	215	220	240	225	270	285
11	300	320	265	250	255	300	275	255	230	225	210	220H	225H	230	215	240	IA230	205H	230	200	240	210	250	250
12	275	300	300	295	205	250	290	250	230	220	205	200H	205H	230	200H	EA240	230	220	205	210	230	220	235	270
13	300	290	265	270	EB330	310	255	230	220	225H	210H	230	200H	200H	230	230	230	220	205	240	240	220	230	250
14	295	280	270	260	250	295	250	230	225	245	235	EA240	215	240	220	EA250	225	250	220	230	220	235	250	255
15	280	295	275	270	245	250	265	230	225	225	220	225	220H	215H	205H	220	235	210	200	200	225	225	245	300
16	340	325	315	295	235	205	275	230	220	210H	200H	230	200H	240	240	IA245	220	215	215	230	230	230	235	245
17	285	315	310	295	260	280	260	225	220	225	225	C	C	C	C	230	230	230	205	240	215	230	250	270
18	300	300	300	300	295	240	245	225	235	220	220	220	205	230	IA215	255	235	225	210	225	225	230	230	250
19	310	275	250	250	270	310	270	240	230	245	235	250	240	245	230	250	240	220	205	250	240	220	250	250
20	ES305	300	270	290	295	255	250	230	235	205	230	225	230	240	230	230H	230	220	210	245	250	225	230	270
21	280	270	275	255	240	255	300	255	240	235	230	225	230	215	205	240	225	210	205	225	215	235	250	255
22	275	290	295	280	225	200	310	260	235	245H	225	225	240	210	205	210	240	220	200	215	220	230	250	295
23	320	305	280	220	210	280	310	240	240	235	230	215H	210H	190C	225	225H	230	205C	225	245	250	230	235	295
24	300	300	300	320	280	EA290	250	240	225C	215C	225C	240C	225	240	225	245	220	225	190	220	EA255	235	250	250
25	265	280	300	275	255	225	270	250	240	240	240	EA240	235H	205H	200H	215H	215	220	230	210	250	225	230	EB300
26	350	300	300	295	300	EB300	300	250	245	215H	240	220	215	225	220H	205H	250H	225	210	210	255	240	240	240
27	270	295	280	340	390	360	265	225	235	235	230	230H	255	245H	240	245	225	220	200H	225	210	265	290	300
28	340	350	345	300	245	260	260	245	225	240	225	225	IA220	225	A	220	250	220	230	220	225	220	230	280
29	305	320	275	255	260	EB300	325	275	240	230	225	225	210	225	235H	230	245	215	220	215	215	225	240	325
30	350	340	260	230H	260	270	250	250	245	240	225	215	240	225	230	220	235	220	215	205	225	215	250	EB360
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	28	28	28	27	28	27	28	28	28	28	28	26	28	28	29	28	28	28	28	28	28
MED	299	298	278	268	251	258	272	245	235	228	225	224	218	225	225	230	230	220	208	222	229	230	242	260
UQ	305	302	300	295	270	300	300	250	240	238	230	228	230	240	240	245	240	225	220	230	250	235	250	286
LQ	275	278	265	250	238	242	258	230	225	225	215	218	205H	208	210H	222	228	220	205	210	222	222	230	250

NOV. 1969 | H'F (KM)

IONOSPHERIC DATA

NOV. 1969 | H'ES (KM) | 135° E Mean Time (G. M. T.+ 9h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	S	100	B	B	100	100	100	130	130	125	125	110	110	110	105	105	105	100	100	100	100	100	B	100
2	B	B	B	B	B	B	C	150	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	170	140	120	140	105	100	155	140	105	100	100	100	100	100	B
4	B	B	B	E	E	B	100	G	G	105	105	G	105	G	G	G	G	G	S	S	100	105	100	S
5	S	105	100	100	100	100	100	100	100	150	130	C	125	G	100	100	150	100	100	S	100	100	100	100
6	100	100	B	100	E	B	100	100	100	G	100	130	140	120	170	110	130	105	105	100	100	S	S	S
7	S	B	B	B	B	B	S	100	G	155	150	G	155	170	155	130	110	125	100	95	95	95	100	B
8	B	100	B	E	E	100	100	100	G	170	150	150	140	125	160	150	100	100	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	100	100	G	15	105	G	100	100	B	95	100	100	100
10	B	100	B	100	B	B	S	S	150	125	140	125	125	125	120	120	120	100	100	100	100	B	100	S
11	S	100	B	105	105	105	100	100	G	130	130	125	115	120	110	105	105	105	100	105	105	100	B	B
12	B	B	B	B	E	E	S	100	100	G	G	105	105	105	105	105	105	100	100	100	100	100	B	B
13	S	B	B	B	B	105	105	170	G	100	150	145	170	170	100	100	105	S	105	130	B	100	B	100
14	100	100	100	100	B	B	S	G	130	125	120	115	115	115	105	105	105	105	100	S	100	S	S	S
15	S	B	B	B	B	B	S	S	G	105	130	120	105	105	105	110	110	100	105	105	B	110	B	B
16	B	B	B	E	B	E	S	S	105	105	G	130	105	125	115	105	110	105	105	105	105	100	100	S
17	S	B	B	B	E	B	S	G	G	G	100	C	C	C	C	110	105	105	B	100	B	B	100	95
18	B	B	B	B	B	E	100	G	G	G	105	105	G	110	110	110	110	G	S	S	S	S	B	S
19	B	B	B	E	B	B	S	S	G	100	G	B	G	150	140	B	115	100	S	B	B	B	S	B
20	S	100	100	B	B	B	105	140	155	150	G	G	G	150	130	125	115	110	105	S	S	S	S	S
21	S	B	B	B	B	B	S	5	G	105	130	130	125	120	105	105	105	100	B	B	B	S	S	S
22	B	B	B	B	B	E	S	100	G	G	155	G	125	G	110	105	160	S	B	S	S	S	100	S
23	B	B	B	E	B	B	S	S	G	130	145	105	110	100	C 100	100	100	100	C 100	100	B	B	100	B
24	B	B	B	B	B	100	100	100	G	G	C 130	C 150	G	G	G	G	G	G	S	S	110	105	S	S
25	S	B	B	E	E	B	S	5	G	105	165	150	145	105	105	G	110	105	105	100	100	100	B	B
26	B	B	E	E	100	100	100	100	G	105	105	105	105	105	105	G	100	100	120	100	100	S	S	S
27	B	B	B	E	100	105	110	S	G	170	125	G	110	G	G	100	130	150	105	B	B	B	100	100
28	100	100	B	B	B	B	S	S	110	105	105	110	105	105	105	110	105	105	105	105	105	105	105	S
29	100	S	B	B	B	B	105	105	G	125	125	110	105	105	105	100	100	100	100	100	95	B	B	B
30	B	B	B	E	B	E	100	S	G	125	120	110	105	105	100	105	105	S	S	105	S	S	S	B
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	4	9	3	5	5	8	14	14	9	22	24	21	24	22	25	24	26	23	20	17	17	14	12	6
MED	100	100	100	100	100	100	100	100	110	125	130	120	112	112	105	105	108	100	100	100	100	100	100	100
UQ	100	100	100	100	100	105	105	130	130	150	142	130	132	125	120	110	115	105	105	105	100	105	100	100
LQ	100	100	100	100	100	100	100	100	100	105	112	110	105	105	105	105	105	100	100	100	100	100	100	100

NOV. 1969 | H'ES (KM)

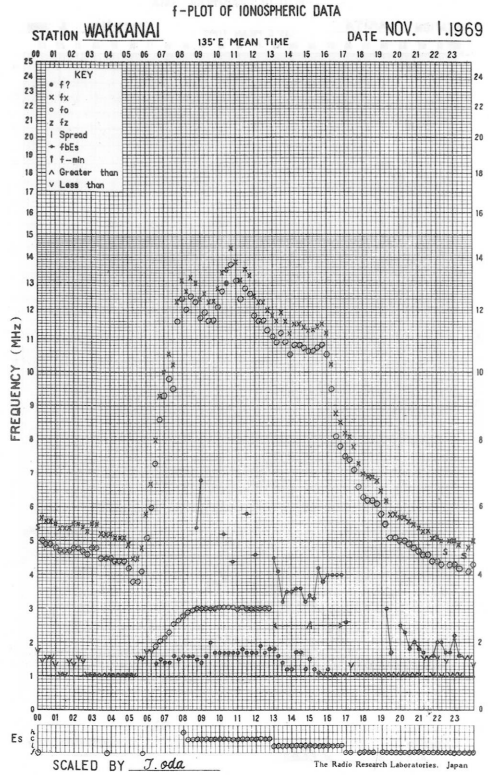
IONOSPHERIC DATA

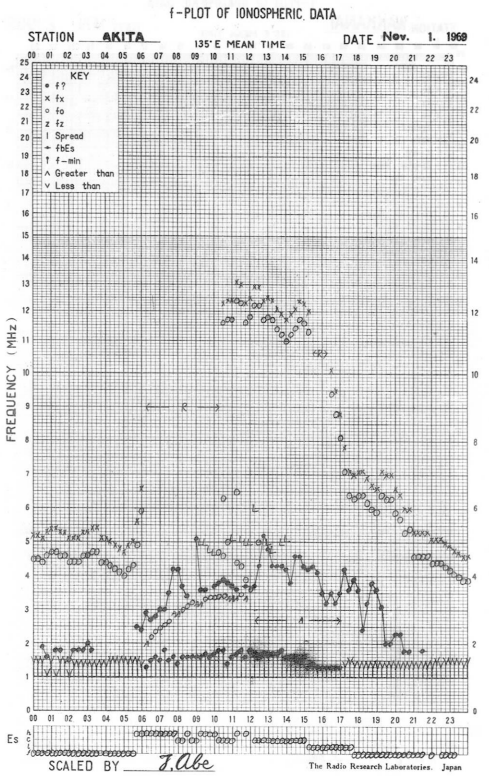
NOV. 1969 | TYPES OF ES | 135° E Mean Time (G. M. T. + 9h)

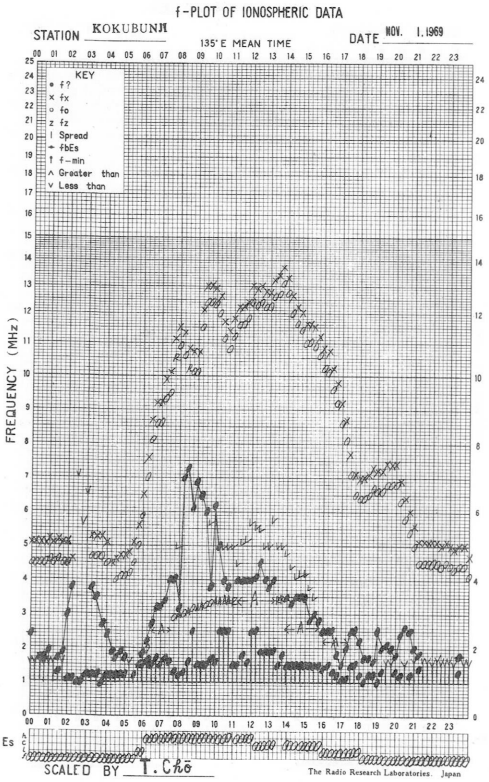
Station YAMAGAWA Lat. 31 12.1 N Long. 130 37.1 E Sweep 1 MHz to 20 MHz in 20 sec in automatio operation

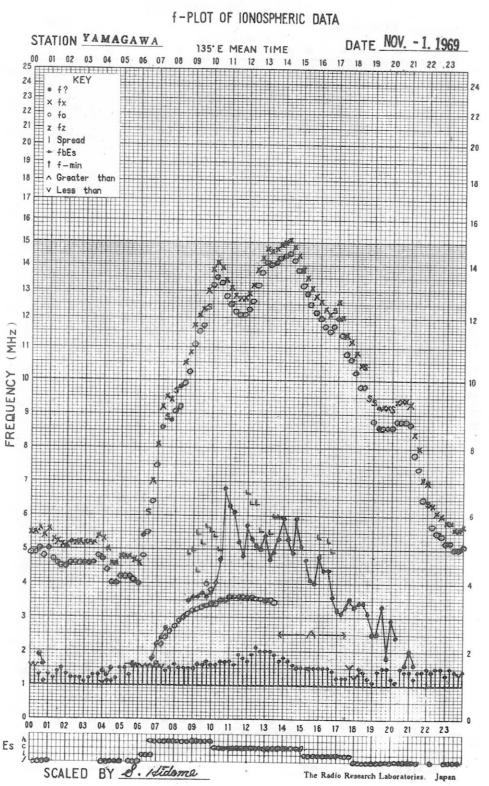
Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1		F 1			F 1	F 1	F 1	H 2	H 1	H 2	H 1	C 3	C 2	C 2	C 4	C 4	L 4	L 6	F 7	F 7	F 3	F 3		F 1
2								H 1																
3										H 1	HL 11	C 1	HL 11	L 1	L 1	HL 22	HL 32	L 5	F 3	F 2	F 1	F 1	F 1	
4							F 2			L 2	L 2		L 1								F 1	F 1	F 1	
5		F 1	F 3	F 2	F 1	F 2	F 2	L 1	L 1	H 1	HL 11		HL 11		L 1	L 1	HL 22	LH 12	F 1		F 1	F 1	F 1	F 1
6	F 2	F 1		F 1			F 1	L 1	LH 11		L 1	H 1	HL 11	CL 11	HC 11	CH 21	HL 32	L 2	F 3	F 1	F 1			
7								L 1		H 2	H 1		HC 11	HC 11	HC 12	HC 31	CL 42	H 3	F 2	F 4	F 4	F 1	F 1	
8		F 1				F 1	F 1	L 1		HL 12	H 1	H 1	H 1	H 1	HH 11	HL 11	L 1	L 1						
9												L 1	L 1		C 1	L 2		L 2	F 1		F 1	F 3	F 1	F 3
10		F 1		F 2					H 2	H 2	HL 21	HL 12	HL 21	H 1	H 2	H 3	C 2	L 1	F 1	F 1	F 2		F 1	
11		F 1		F 3	F 1	F 1	F 1	L 1		H 2	H 1	HL 11	CL 21	CL 11	CL 12	C 3	C 5	L 5	F 5	F 1	F 3	F 1		
12								L 1	L 1			L 2	L 1	L 2	L 2	L 3	L 4	L 4	F 1	F 1	F 1	F 1		
13						F 1	F 1	H 2		L 1	H 1	HL 11	HL 11	HL 11	L 1	L 1	L 1		F 5	FF 11		F 1		F 1
14	F 1	F 1	F 1	F 2					HL 21	H 2	C 2	C 1	C 1	C 2	L 2	L 3	L 4	L 4	F 4		F 2			
15										L 2	HL 11	C 1	C 1	C 2	CL 21	C 2	CL 21	L 3	F 4	F 1		F 1		
16									L 1	L 2		H 1	L 1	H 1	C 2	L 3	L 2	L 3	F 1	F 6	F 2	F 2	F 1	
17											LH 11					LH 21	L 2	L 2		F 7			F 1	F 1
18							F 1				L 1	L 1		L 1	L 2	L 2	LH 21							
19										L 1				HL 11	H 1		CL 11	L 1						
20		F 2	F 1				F 1	H 1	H 1	H 1				H 1	H 1	H 2	C 2	C 2	F 1					
21										L 1	H 1	H 1	H 1	H 1	L 1	L 2	L 2	L 2						
22								L 1			H 1		H 1		L 1	L 1	H 1						F 1	
23										HL 22	HC 11	L 1	C 1	L 1	L 1	L 2	L 4	L 3	F 5	F 2			F 1	
24						F 2	F 2	L 1			H 1	H 1									F 3	F 1		
25										L 2	HL 21	HL 22	HL 12	L 2	L 2		L 3	L 1	F 1	F 1	F 1	F 1		
26					F 1	F 1	F 1	L 1		L 2	L 2	L 1	L 2	L 2	L 1		L 1	LH 11	FF 11	F 1	F 2			
27					F 1	F 1	F 1			H 1	H 1		L 1			L 1	HL 11	H 1	F 1				F 2	F 1
28	F 2	F 1							L 2	L 2	L 2	L 1	L 2	L 1	L 3	L 2	L 3	L 4	F 4	F 3	F 5	F 6	F 1	
29	F 1						F 1	L 1		H 1	H 1	CL 11	C 2	L 1	L 2	L 4	L 2	L 2	F 3	F 3	F 1			
30							F 1			H 2	C 1	C 2	L 2	L 3	L 1	L 1	L 2			F 1				
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
UQ																								
LQ																								

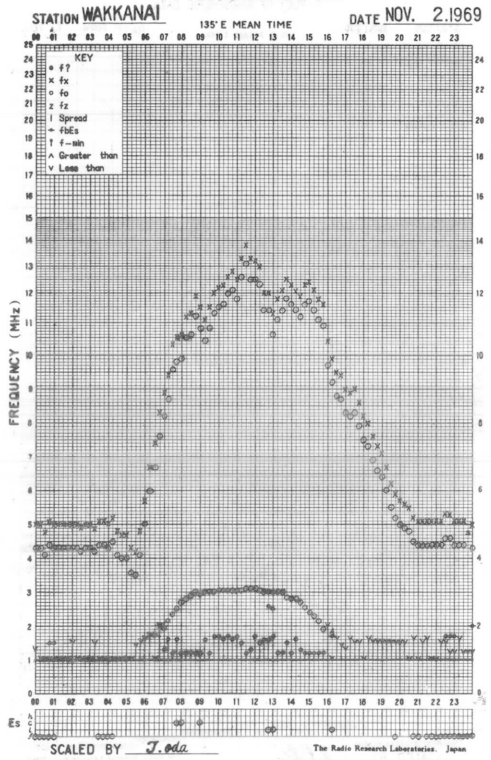
NOV. 1969 | TYPES OF ES

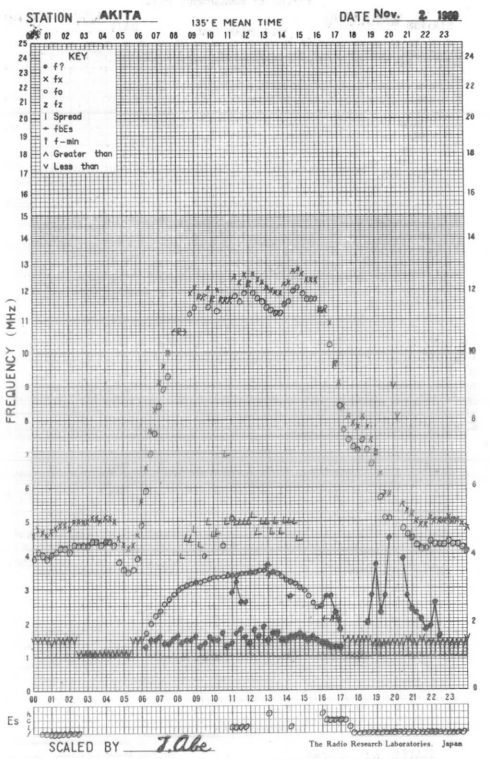

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE NOV. 1.1969
KEY
FREQUENCY (MHz)
Es
SCALED BY T. Oda
The Radio Research Laboratories. Japan

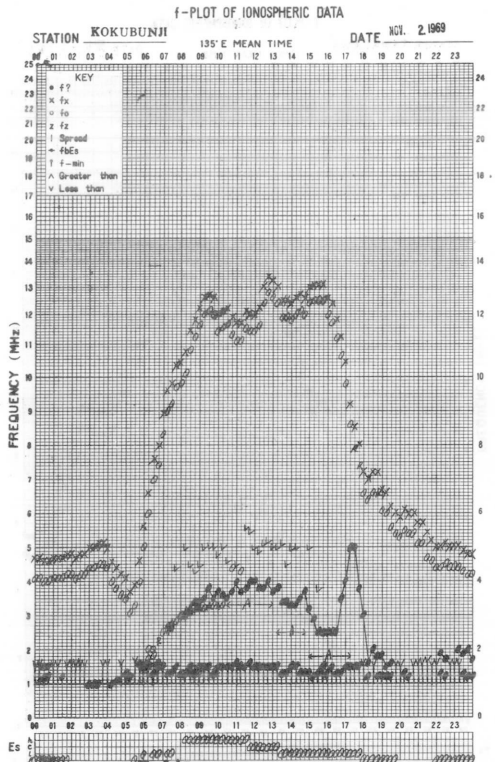

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE Nov. 1. 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

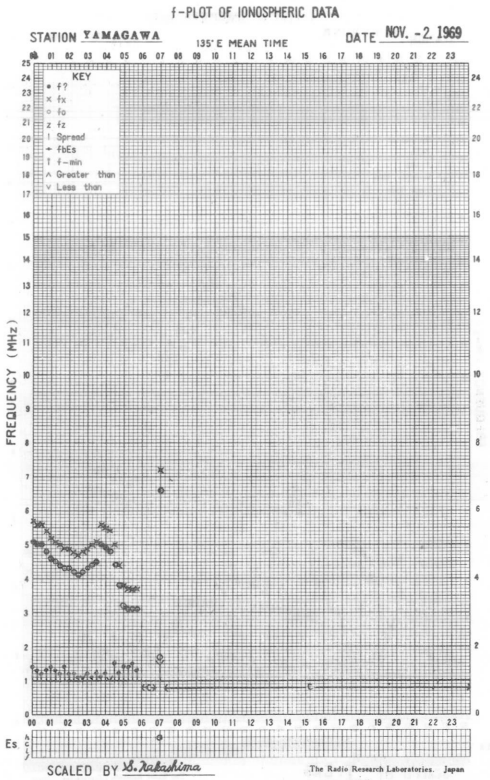

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
DATE NOV. 1.1969
KEY
FREQUENCY (MHz)
Es
SCALED BY T. Cho
The Radio Research Laboratories. Japan

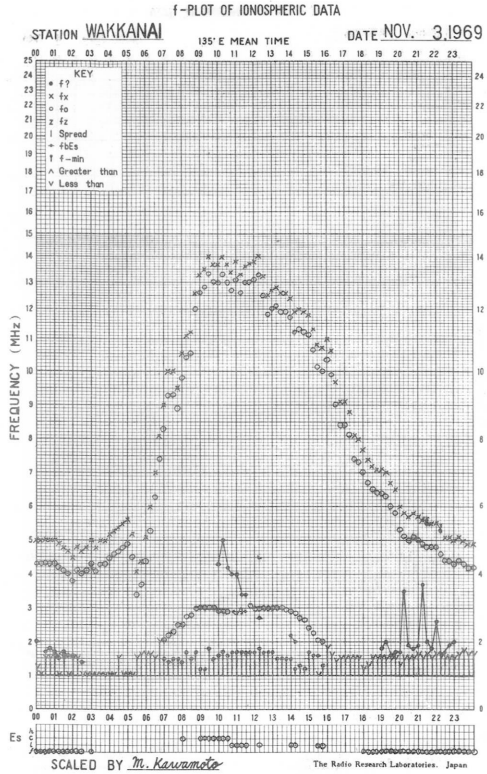

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE NOV. - 1. 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY S. Nidama
The Radio Research Laboratories. Japan

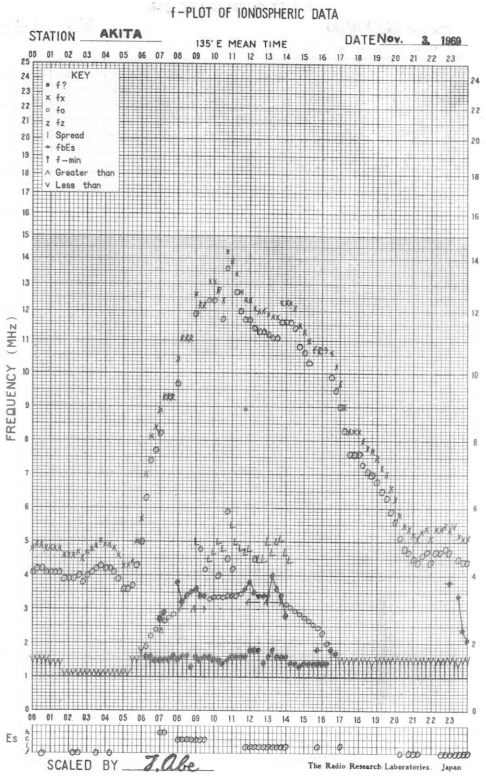

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE NOV. 2.1969
KEY
f?
fx
fo
fz
Spread
fbEs
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY T.oda
The Radio Research Laboratories. Japan

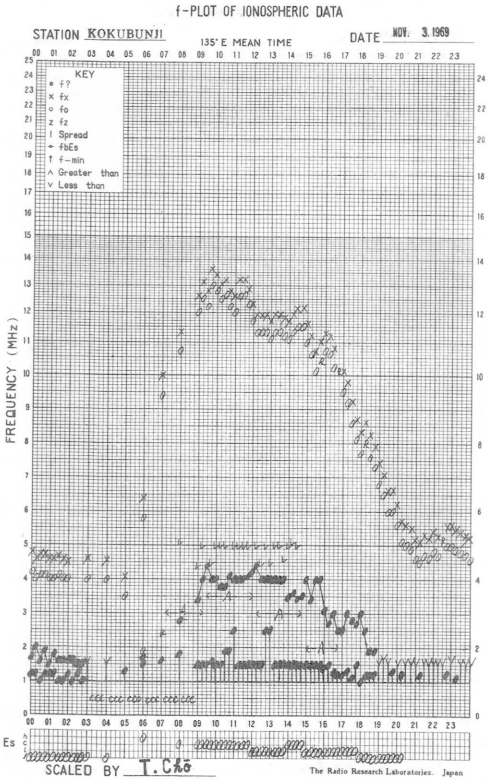

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE Nov. 2 1969
KEY
f?
fx
fo
fz
Spread
fbEs
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY T.Abe
The Radio Research Laboratories. Japan

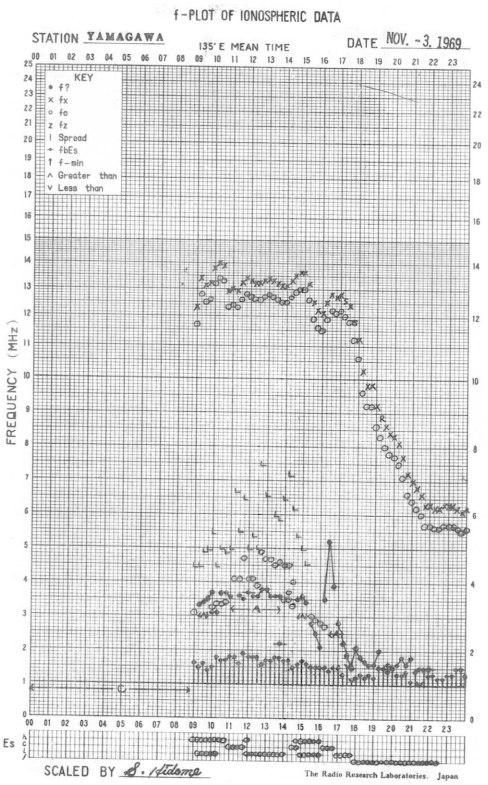

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
DATE NOV. 2 1969
KEY
f?
fx
fo
fz
Spread
fbEs
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY T. Cho
The Radio Research Laboratories. Japan

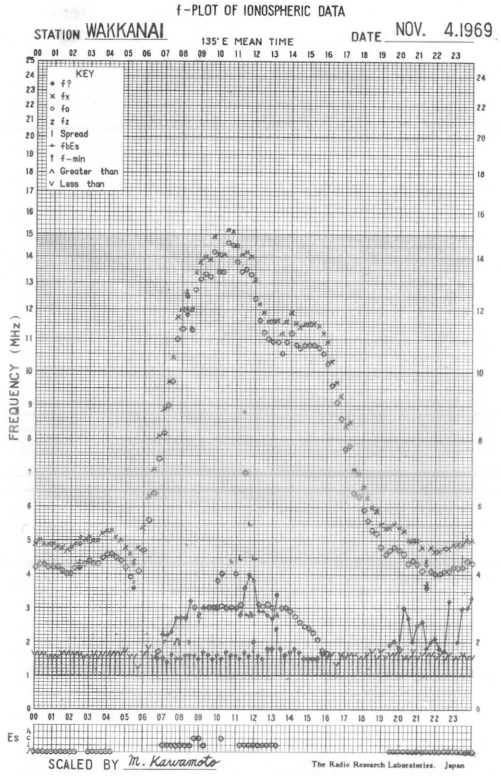

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE NOV. -2. 1969
KEY
f?
fx
fo
fz
Spread
fbEs
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan

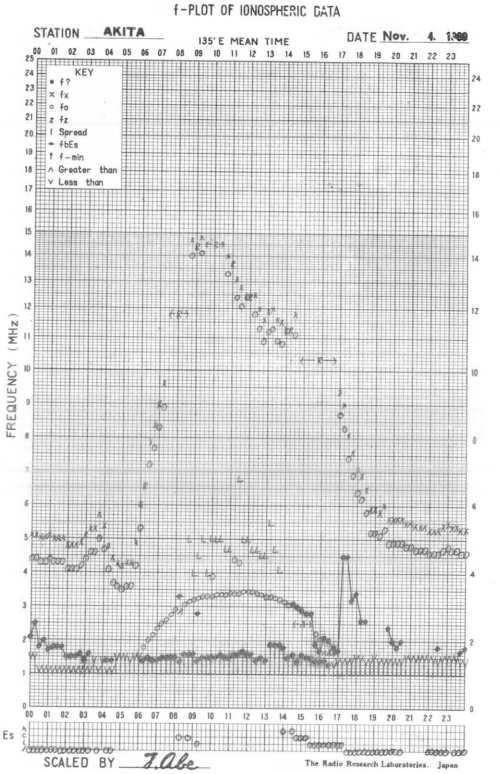

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135° E MEAN TIME
DATE NOV. 3, 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
÷ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan

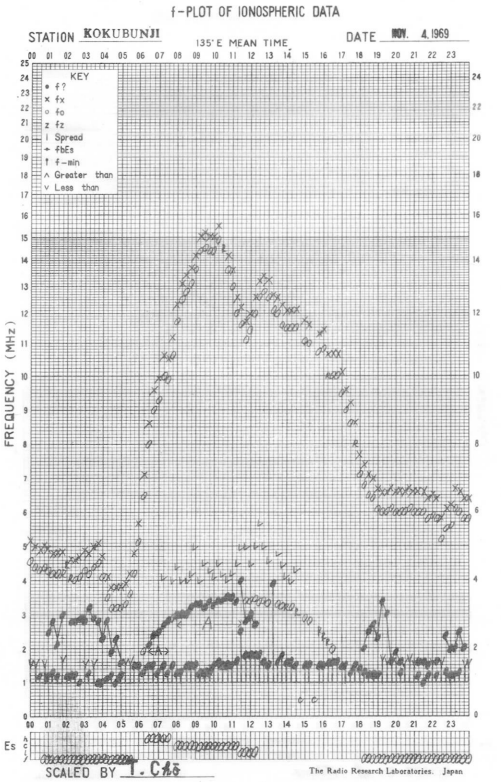

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135° E MEAN TIME
DATE Nov. 3, 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
÷ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

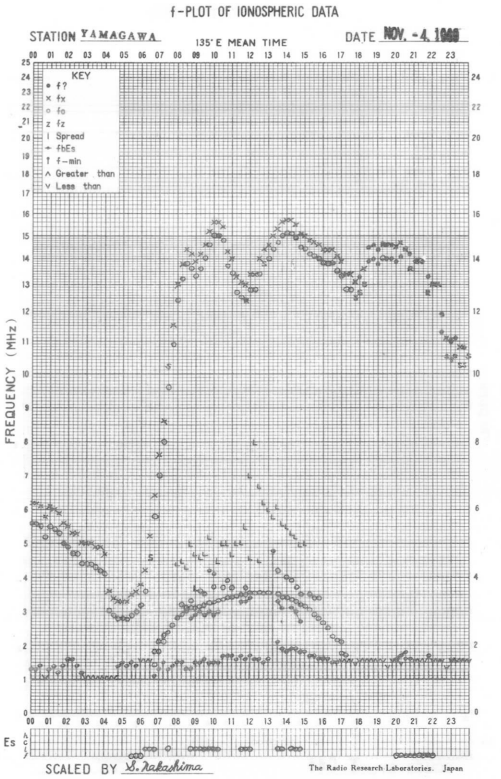

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135° E MEAN TIME
DATE NOV. 3, 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
÷ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Cho
The Radio Research Laboratories. Japan

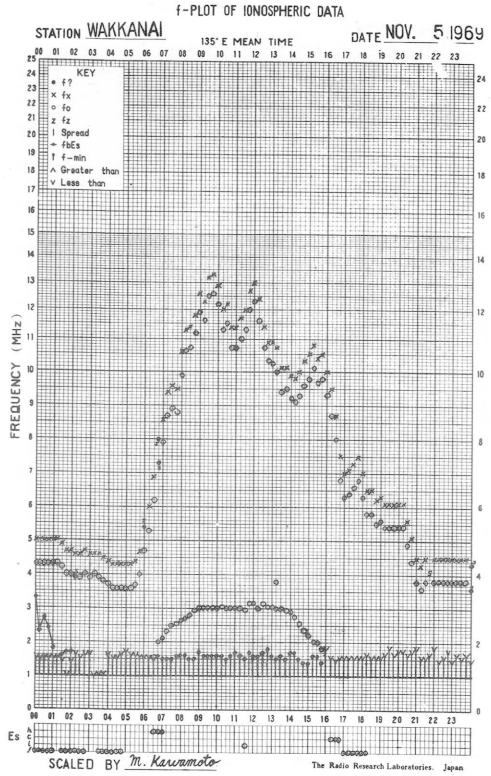

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135° E MEAN TIME
DATE NOV. 3, 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
÷ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Kitamo
The Radio Research Laboratories. Japan

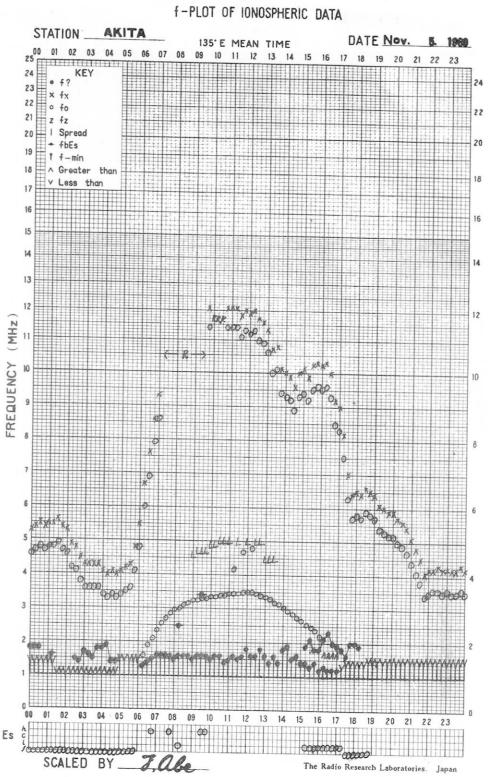

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE NOV. 4.1969
KEY
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan

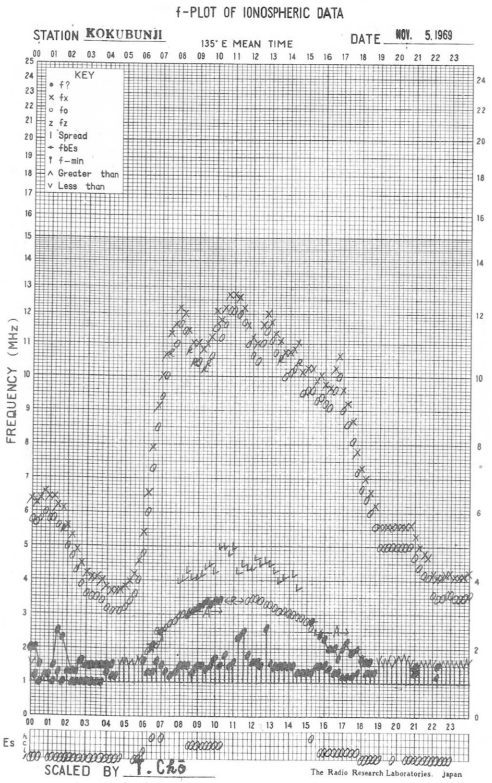

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE Nov. 4. 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

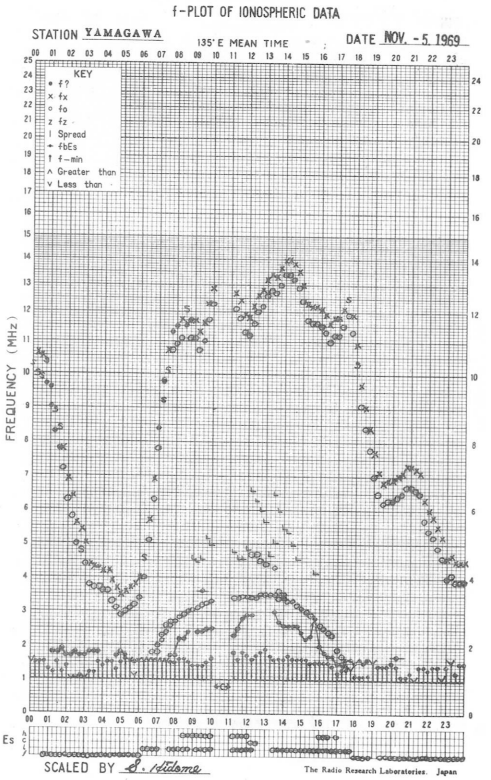

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
DATE NOV. 4.1969
KEY
FREQUENCY (MHz)
Es
SCALED BY T. C.
The Radio Research Laboratories. Japan

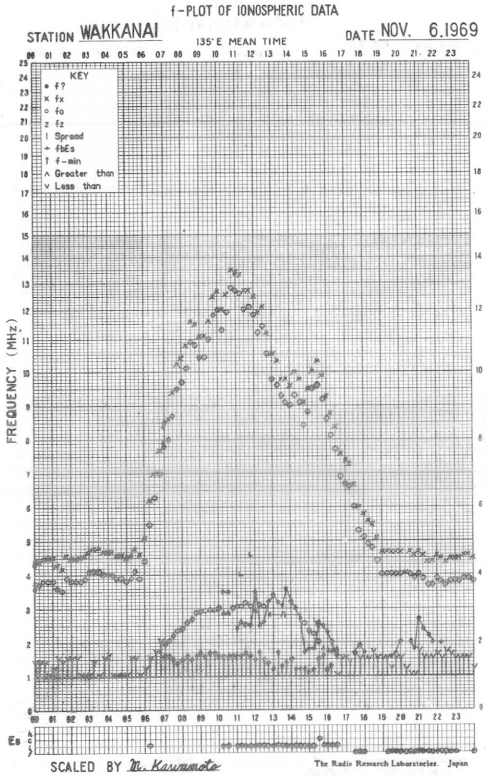

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE NOV. 4. 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY S. Takashima
The Radio Research Laboratories. Japan

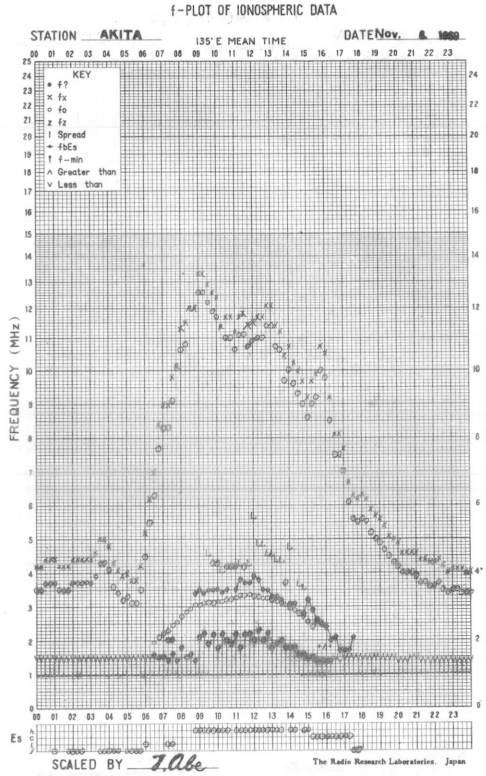

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135° E MEAN TIME
DATE NOV. 5 1969
KEY
• f?
× fx
○ fo
z fz
| Spread
⊣ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan

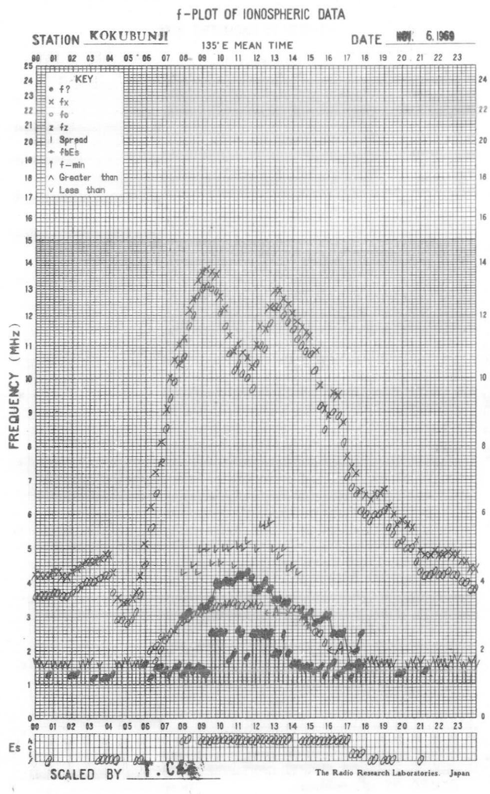

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135° E MEAN TIME
DATE Nov. 5. 1969
KEY
• f?
× fx
○ fo
z fz
| Spread
⊣ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

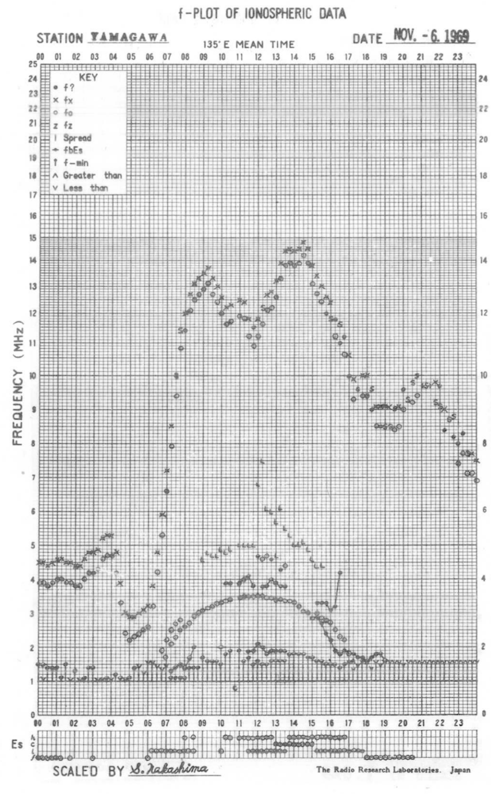

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135° E MEAN TIME
DATE NOV. 5.1969
KEY
• f?
× fx
○ fo
z fz
| Spread
⊣ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Ono
The Radio Research Laboratories. Japan

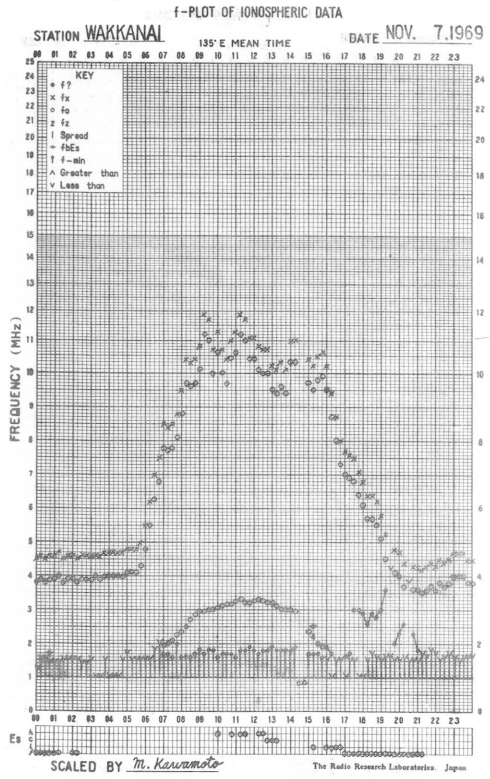

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135° E MEAN TIME
DATE NOV. - 5. 1969
KEY
• f?
× fx
○ fo
z fz
| Spread
⊣ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Hitomi
The Radio Research Laboratories. Japan

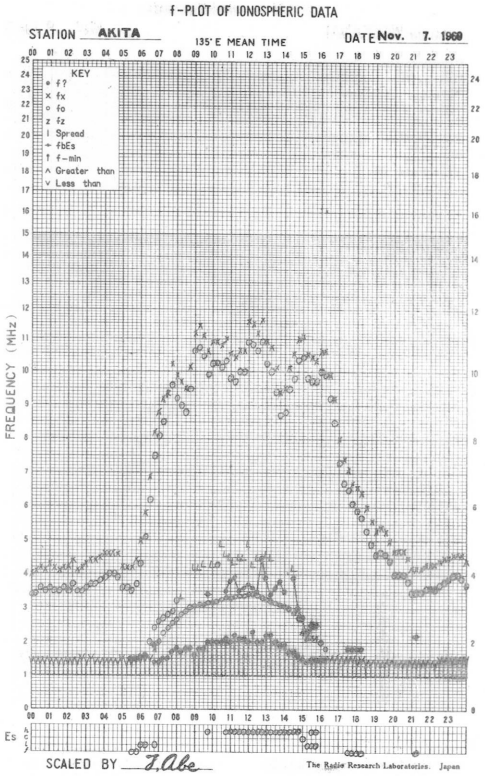

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
DATE NOV. 6.1969
135°E MEAN TIME
KEY
• f?
× fx
○ fo
z fz
! Spread
fbEs
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan

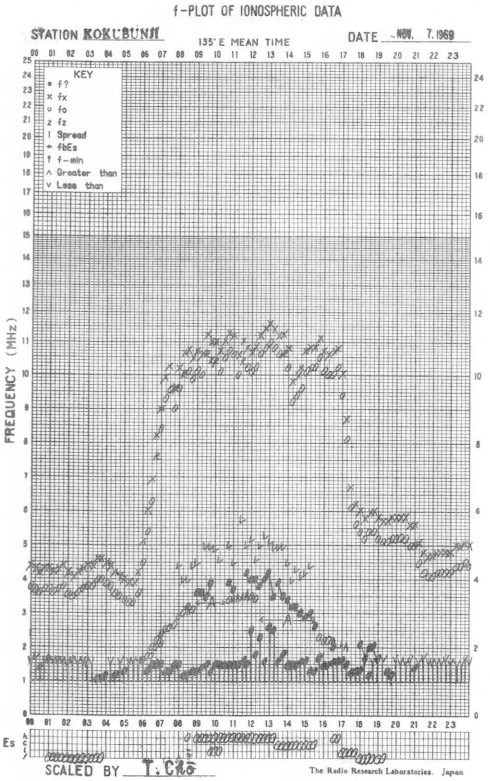

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
KEY
• f?
× fx
○ fo
z fz
! Spread
fbEs
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

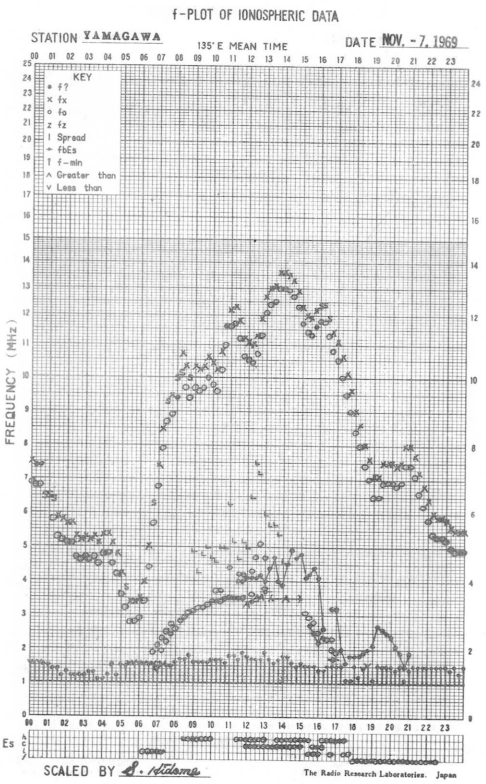

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
KEY
• f?
× fx
○ fo
z fz
! Spread
fbEs
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY
The Radio Research Laboratories. Japan

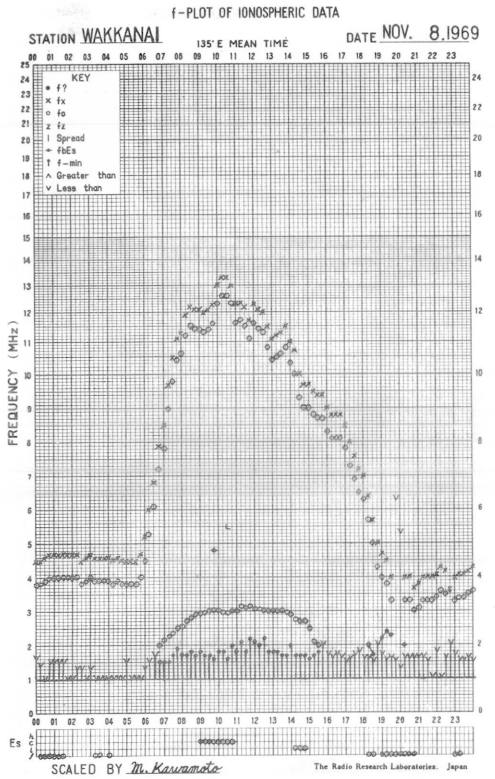

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
DATE NOV. - 6. 1969
135°E MEAN TIME
KEY
• f?
× fx
○ fo
z fz
! Spread
fbEs
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan

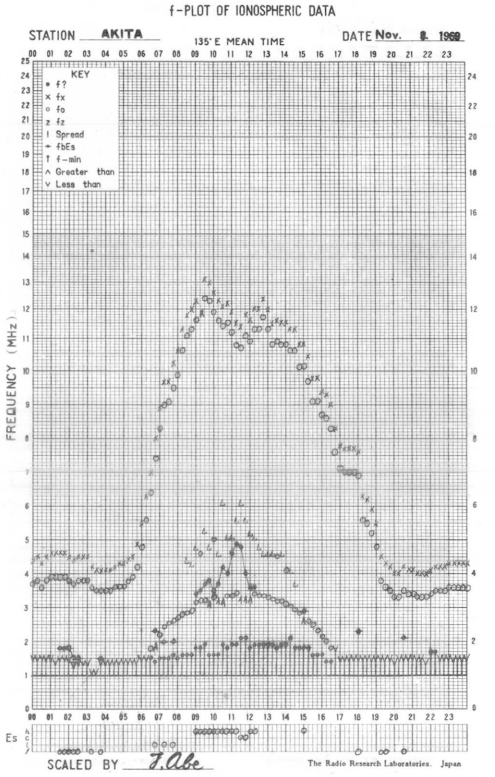

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE NOV. 7.1969
KEY
FREQUENCY (MHz)
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan

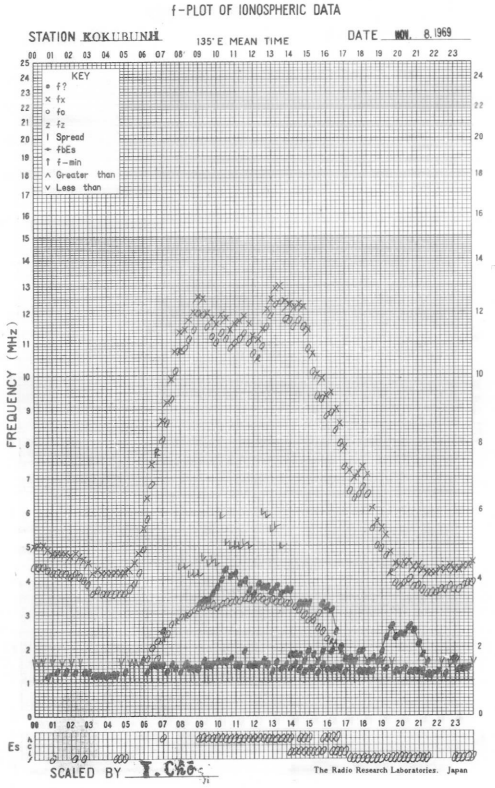

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE Nov. 7. 1969
KEY
FREQUENCY (MHz)
SCALED BY T. Abe
The Radio Research Laboratories. Japan

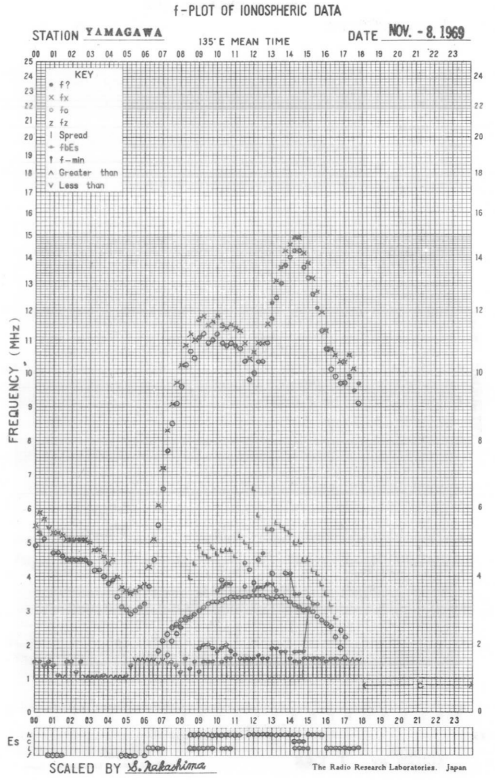

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
DATE NOV. 7.1969
KEY
FREQUENCY (MHz)
SCALED BY T. Ono
The Radio Research Laboratories. Japan

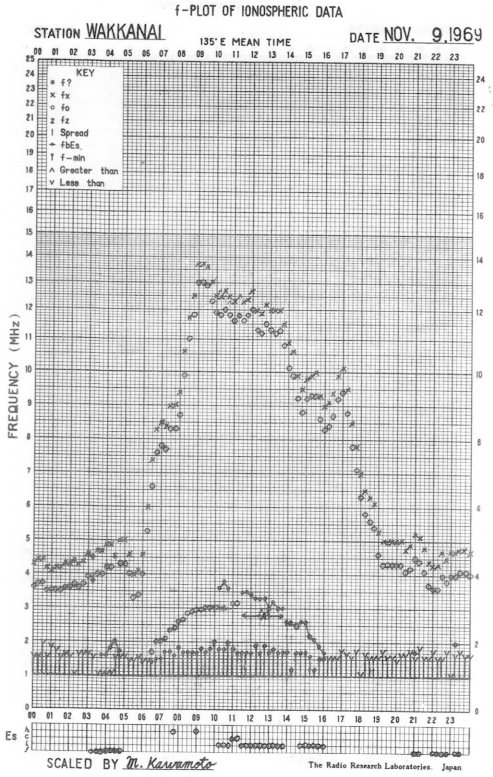

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE NOV. 7. 1969
KEY
FREQUENCY (MHz)
SCALED BY S. Nitadama
The Radio Research Laboratories. Japan

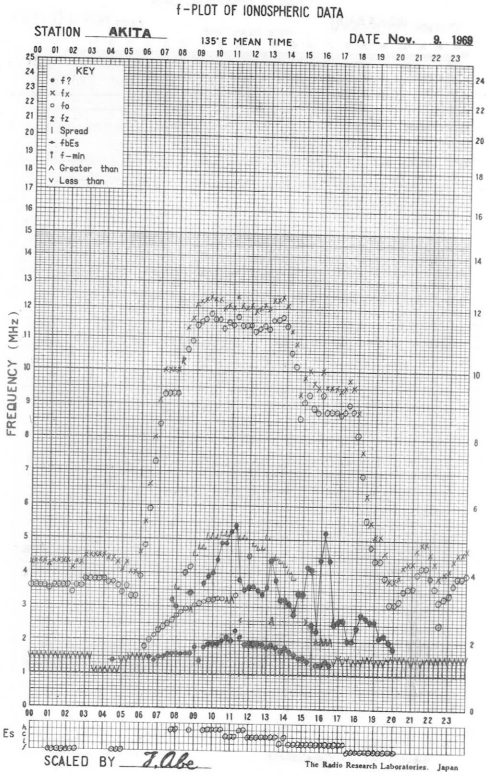

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE NOV. 8.1969
KEY
• f?
× fx
○ fo
z fz
! Spread
⇥ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan

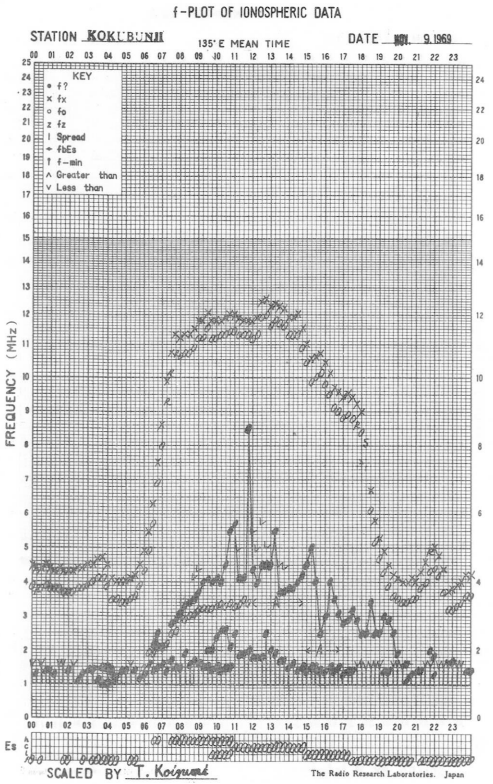

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE Nov. 8. 1969
KEY
• f?
× fx
○ fo
z fz
! Spread
⇥ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

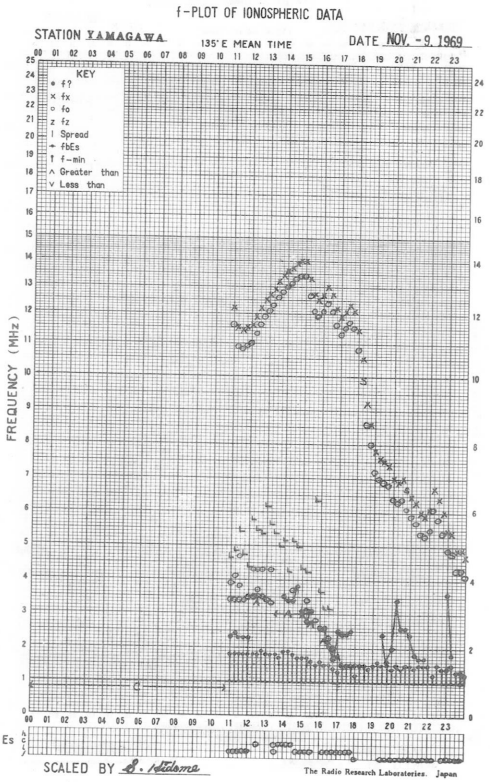

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
DATE NOV. 8.1969
KEY
• f?
× fx
○ fo
z fz
! Spread
⇥ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Ono
The Radio Research Laboratories. Japan

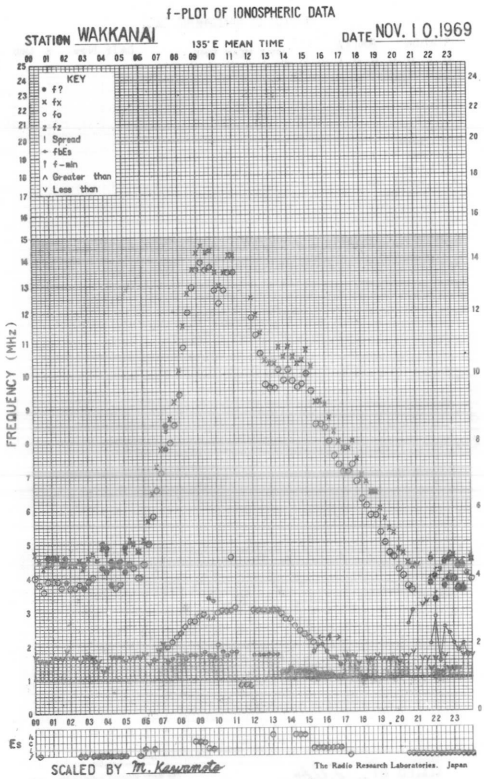

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE NOV. - 8. 1969
KEY
• f?
× fx
○ fo
z fz
! Spread
⇥ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan

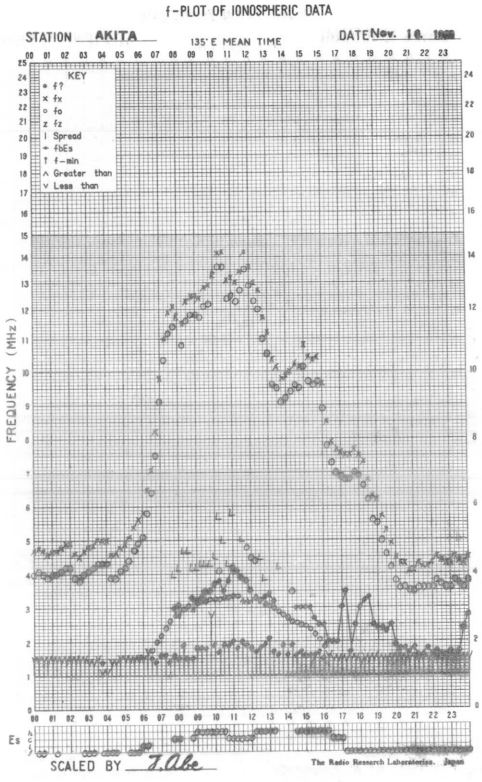

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135° E MEAN TIME
DATE NOV. 9, 1969
KEY
* f?
× fx
○ fo
z fz
! Spread
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan

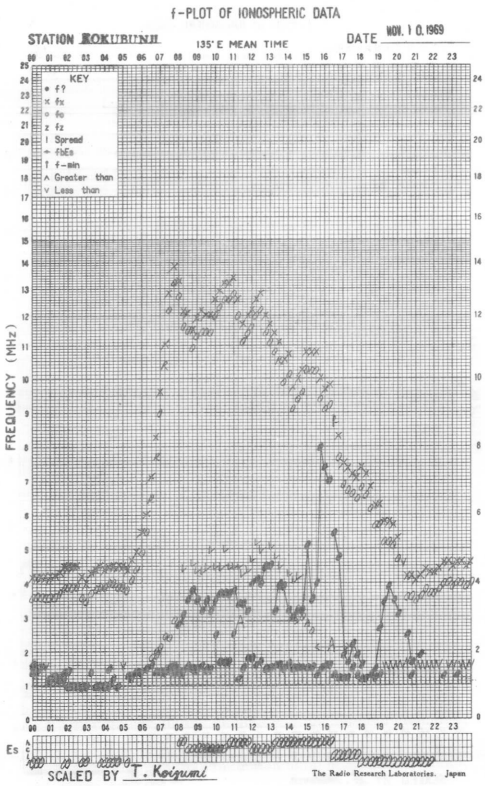

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135° E MEAN TIME
DATE Nov. 9, 1969
KEY
* f?
× fx
○ fo
z fz
! Spread
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

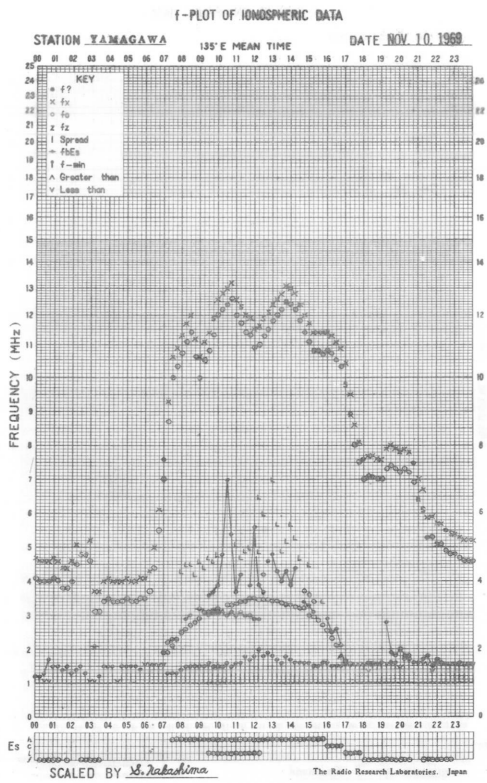

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135° E MEAN TIME
DATE NOV. 9, 1969
KEY
* f?
× fx
○ fo
z fz
! Spread
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Koizumi
The Radio Research Laboratories. Japan

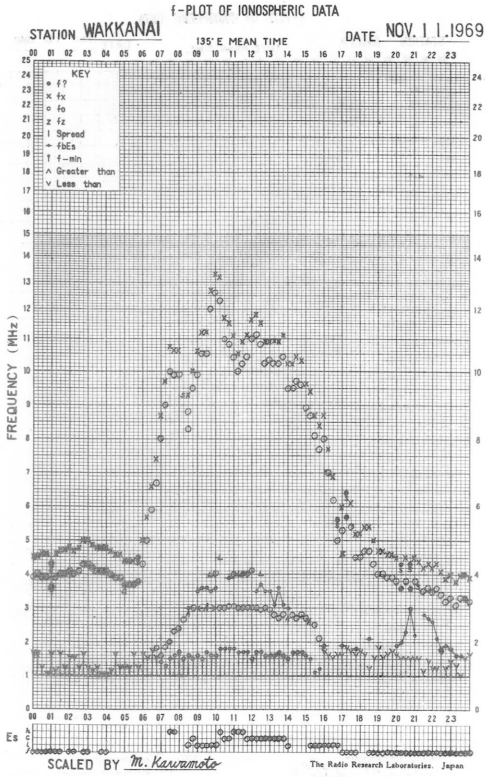

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135° E MEAN TIME
DATE NOV. - 9, 1969
KEY
* f?
× fx
○ fo
z fz
! Spread
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Ishidama
The Radio Research Laboratories. Japan

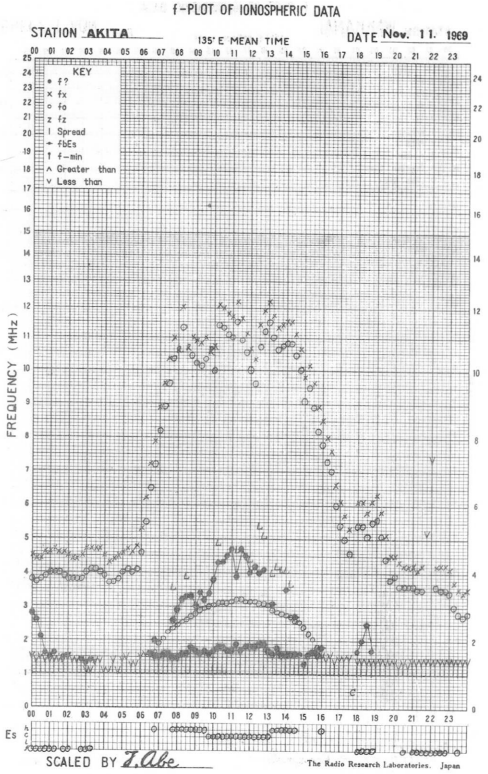

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE NOV. 10,1969
KEY
FREQUENCY (MHz)
Es
SCALED BY M. Kasuamoto
The Radio Research Laboratories. Japan

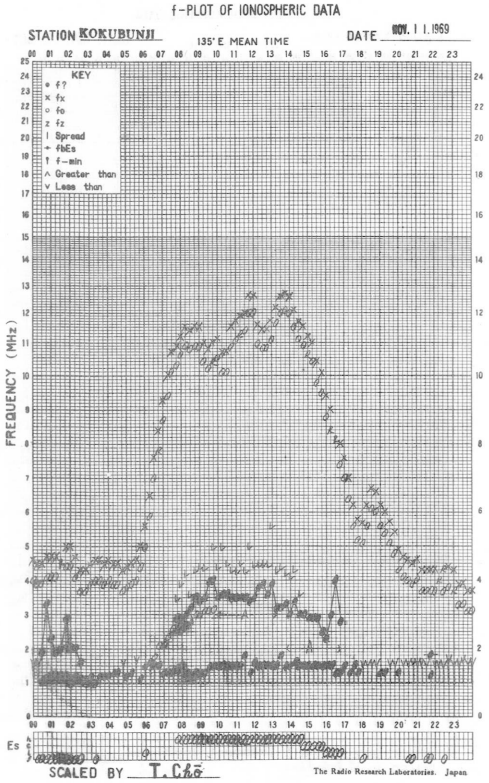

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE Nov. 10, 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

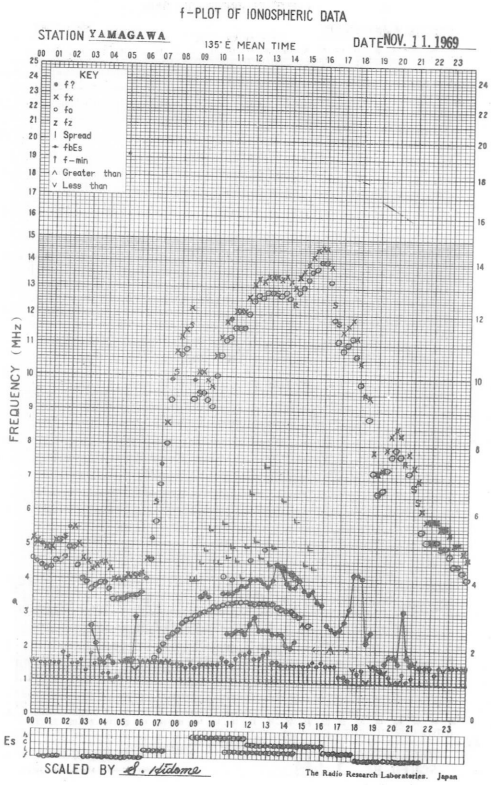

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
DATE NOV. 10,1969
KEY
FREQUENCY (MHz)
Es
SCALED BY T. Koizumi
The Radio Research Laboratories. Japan

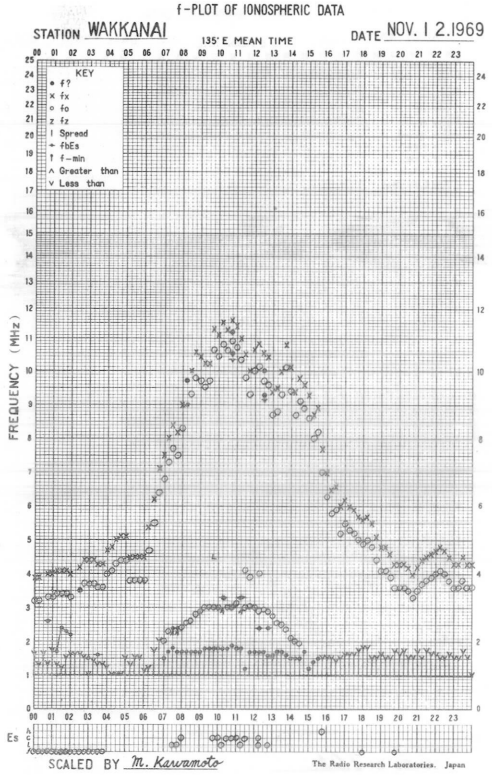

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE NOV. 10, 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan

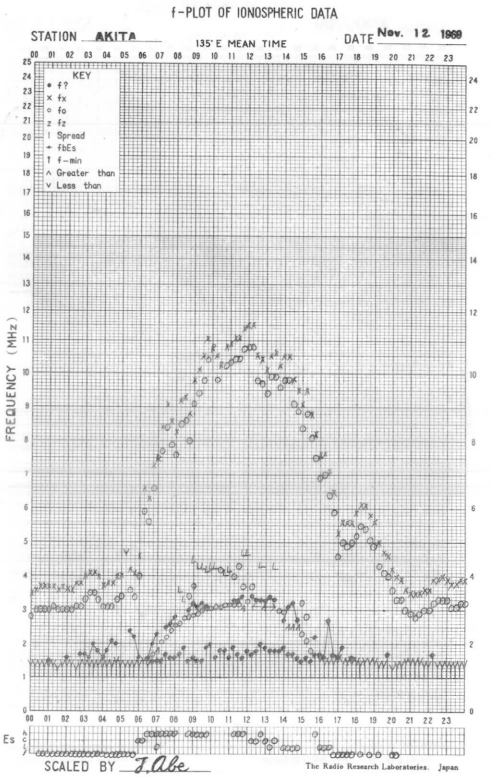

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135° E MEAN TIME
DATE NOV. 11.1969
KEY
* f?
× fx
○ fo
z fz
| Spread
← fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan

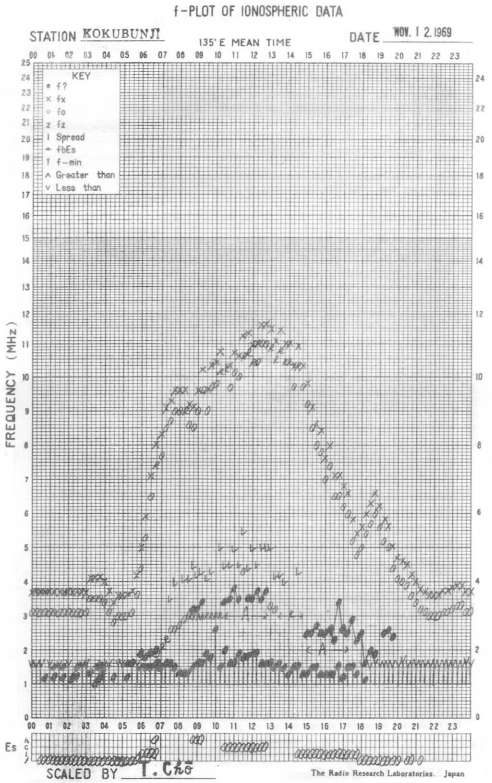

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135° E MEAN TIME
DATE Nov. 11. 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
← fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY I. Abe
The Radio Research Laboratories. Japan

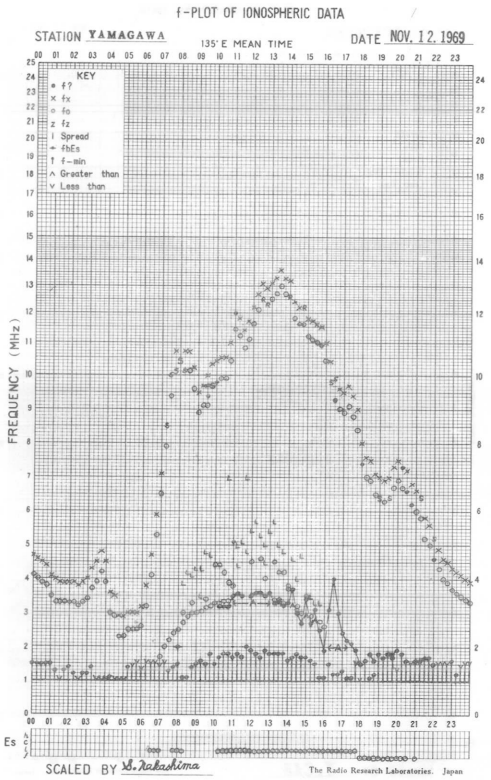

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135° E MEAN TIME
DATE NOV. 11.1969
KEY
* f?
× fx
○ fo
z fz
| Spread
← fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Chō
The Radio Research Laboratories. Japan

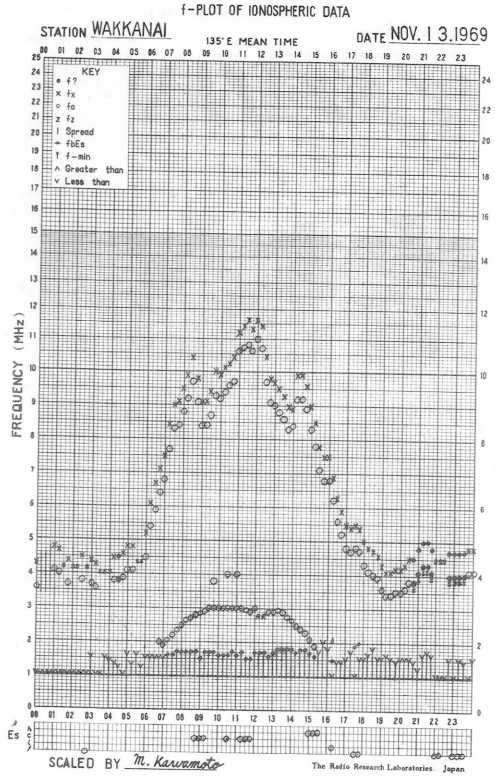

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135° E MEAN TIME
DATE NOV. 11.1969
KEY
* f?
× fx
○ fo
z fz
| Spread
← fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Mitsuma
The Radio Research Laboratories. Japan

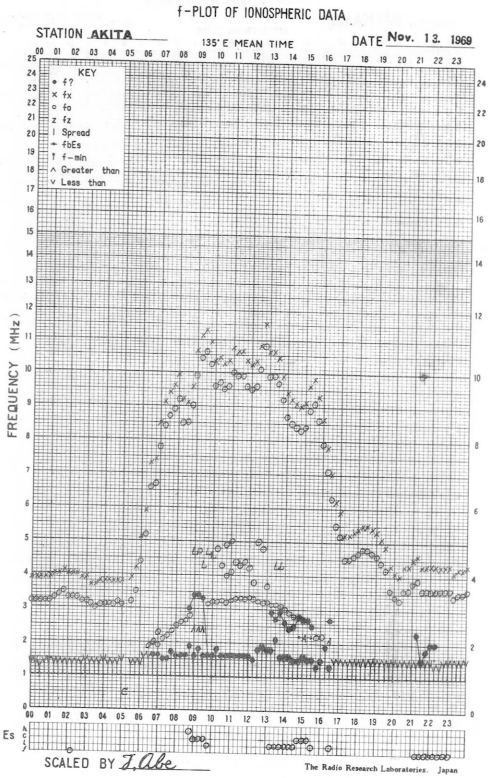

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE NOV. 12.1969
KEY
* f?
× fx
○ fo
z fz
| Spread
÷ fbEs
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan

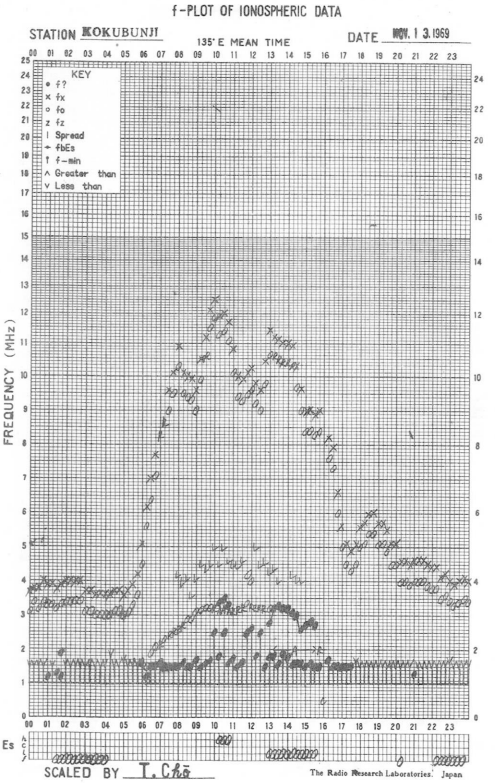

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE Nov. 12. 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
÷ fbEs
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY J. Abe
The Radio Research Laboratories. Japan

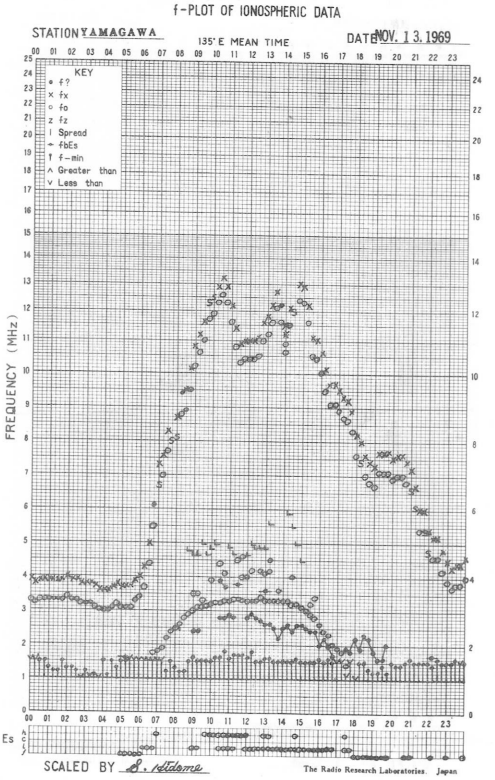

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
DATE NOV. 12.1969
KEY
* f?
× fx
○ fo
z fz
| Spread
÷ fbEs
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY T. Cho
The Radio Research Laboratories. Japan

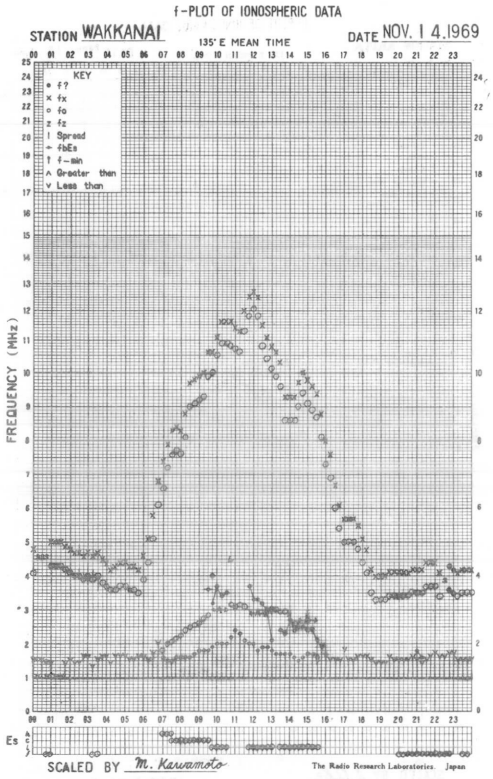

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE NOV. 12.1969
KEY
* f?
× fx
○ fo
z fz
| Spread
÷ fbEs
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan

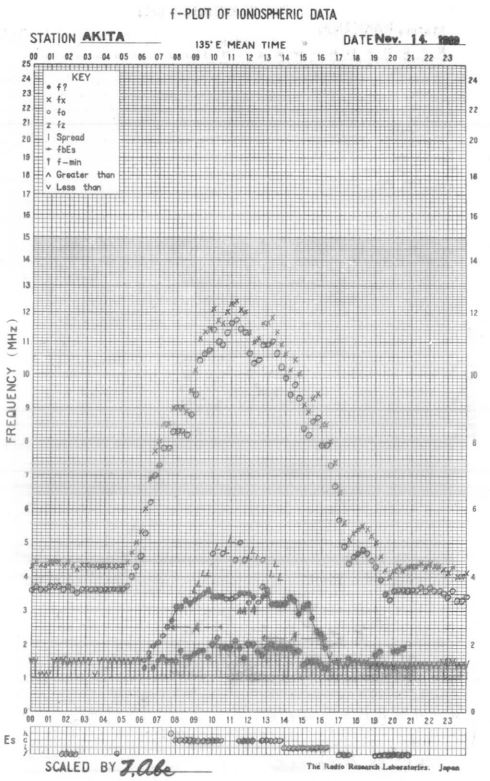

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE NOV. 13.1969
KEY
• f?
× fx
○ fo
z fz
| Spread
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan

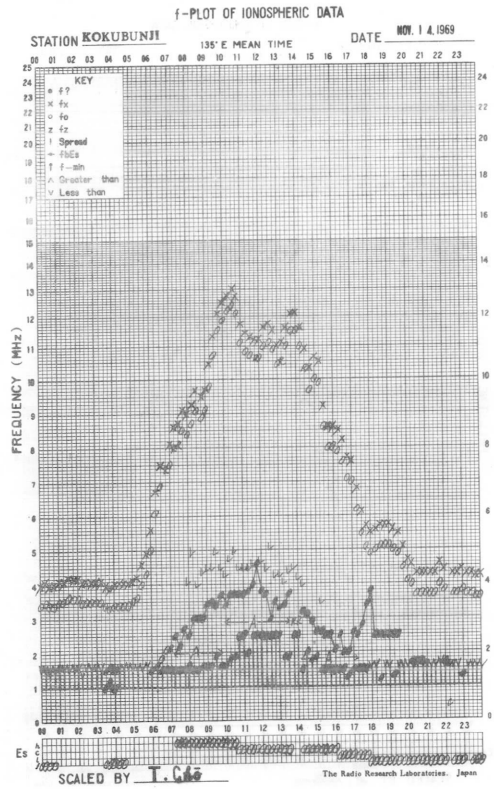

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE Nov. 13. 1969
KEY
• f?
× fx
○ fo
z fz
| Spread
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

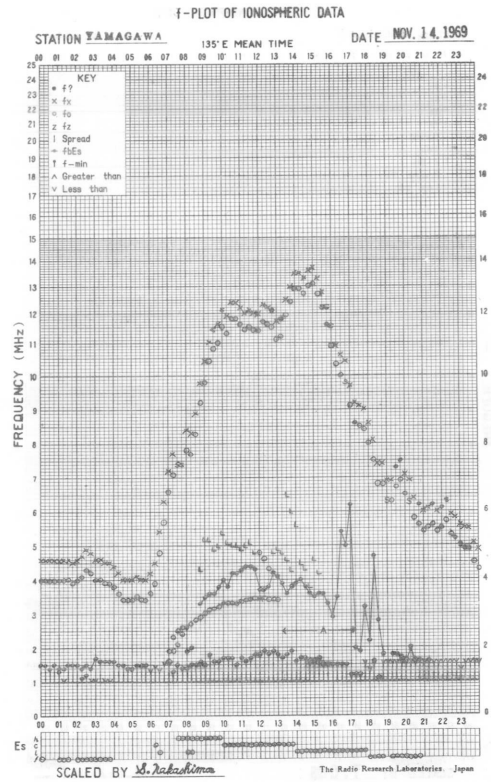

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
DATE NOV. 13.1969
KEY
• f?
× fx
○ fo
z fz
| Spread
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Chō
The Radio Research Laboratories. Japan

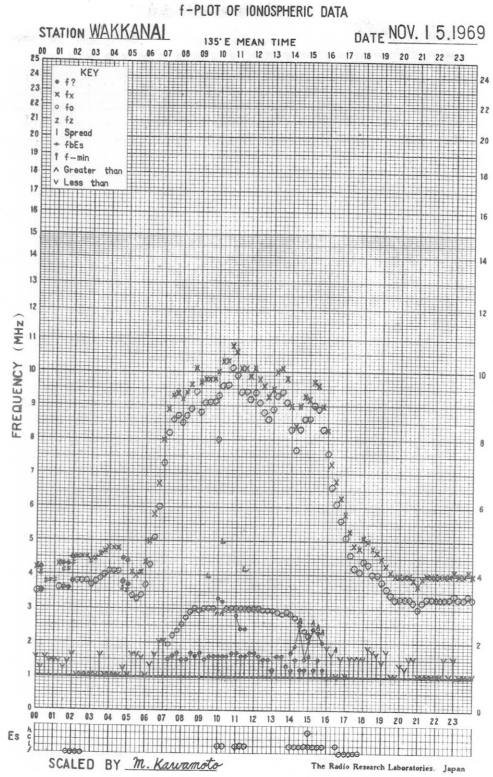

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE NOV. 13.1969
KEY
• f?
× fx
○ fo
z fz
| Spread
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Ichidama
The Radio Research Laboratories. Japan

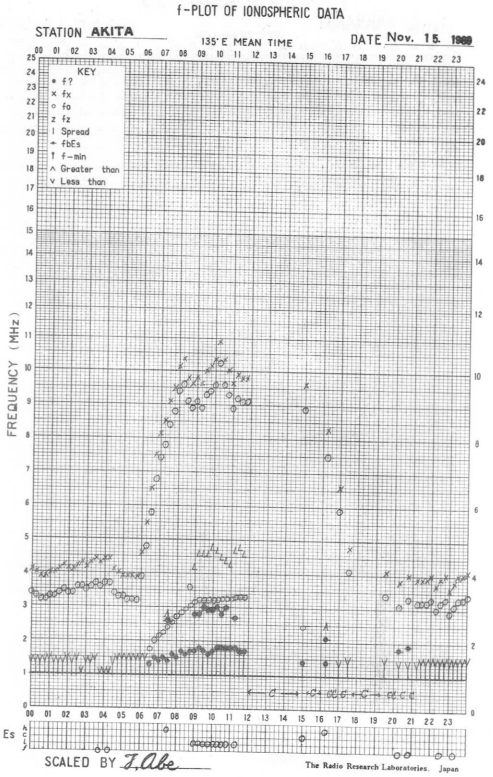

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135° E MEAN TIME
DATE NOV. 14.1969
KEY
* f?
× fx
○ fo
z fz
| Spread
= fbEs
T f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan

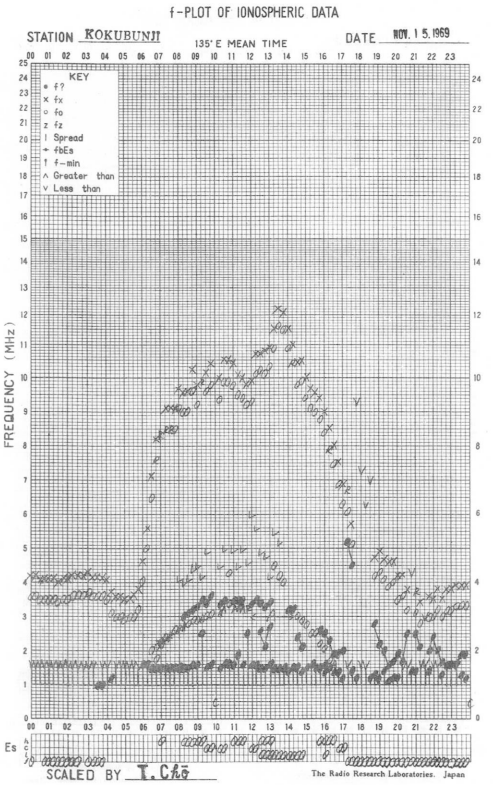

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135° E MEAN TIME
DATE Nov. 14. 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
= fbEs
T f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

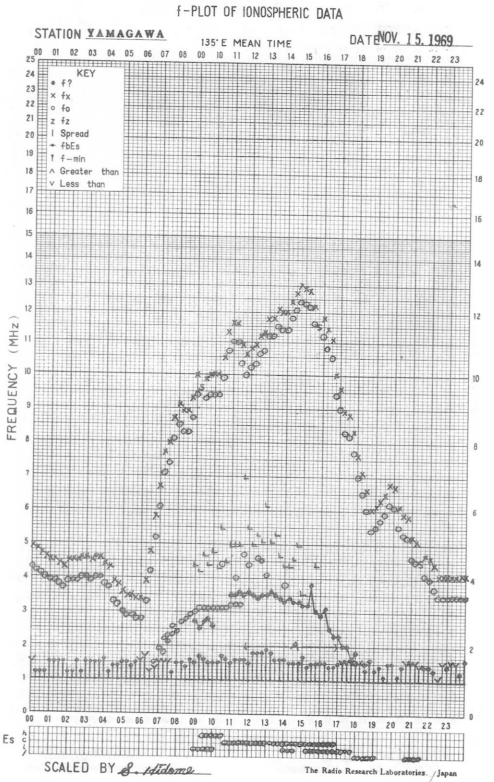

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135° E MEAN TIME
DATE NOV. 14.1969
KEY
* f?
× fx
○ fo
z fz
| Spread
= fbEs
T f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

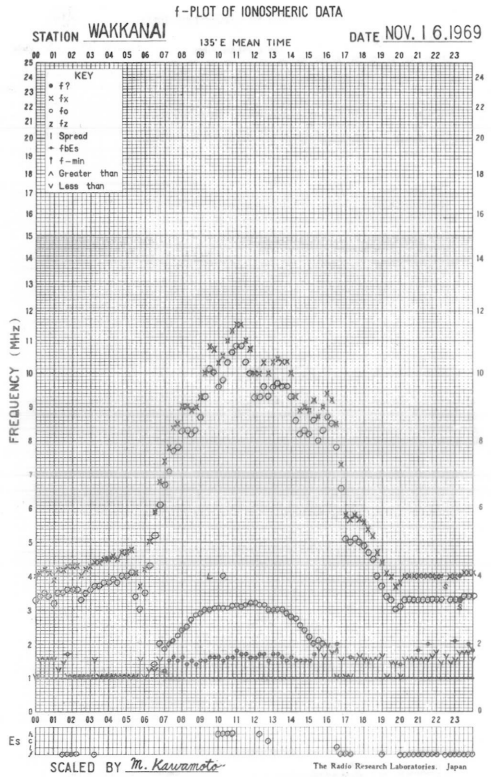

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135° E MEAN TIME
DATE NOV. 14, 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
= fbEs
T f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan

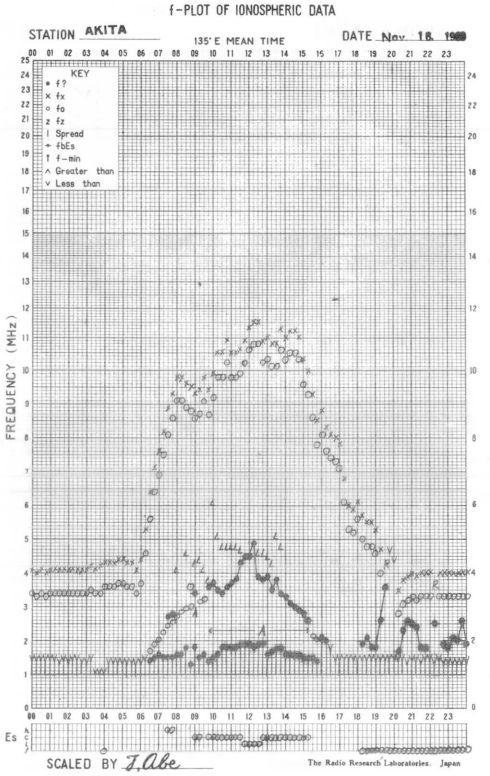

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE NOV. 15.1969
KEY
* f?
× fx
○ fo
z fz
! Spread
- fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kasuyamoto
The Radio Research Laboratories. Japan

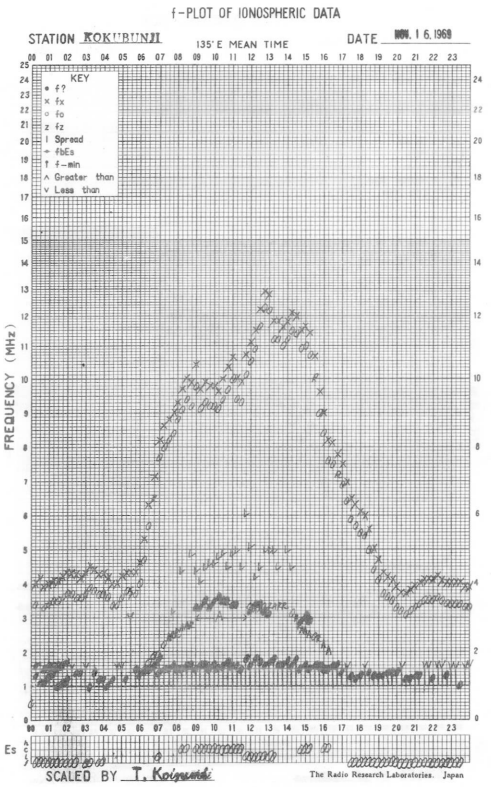

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE Nov. 15. 1969
KEY
* f?
× fx
○ fo
z fz
! Spread
- fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

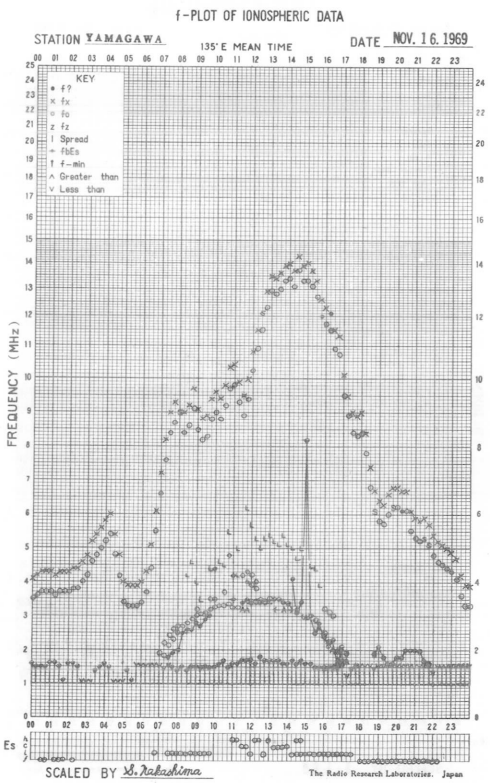

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
DATE NOV. 15.1969
KEY
* f?
× fx
○ fo
z fz
! Spread
- fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Chō
The Radio Research Laboratories. Japan

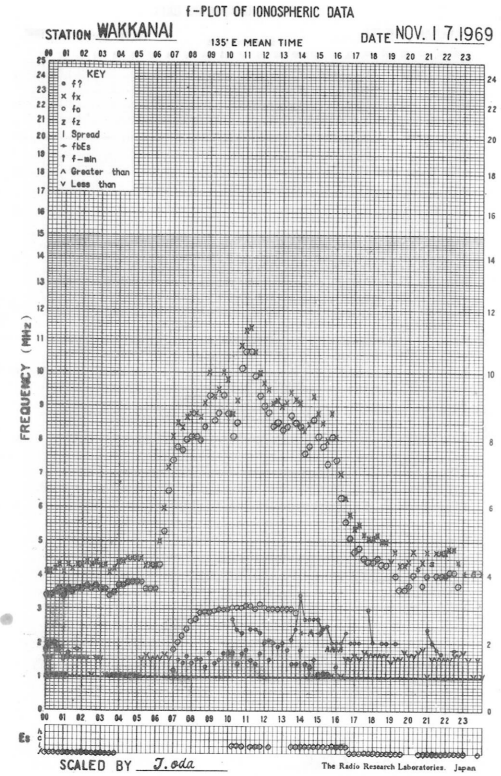

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE NOV. 15. 1969
KEY
* f?
× fx
○ fo
z fz
! Spread
- fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Ishidome
The Radio Research Laboratories. Japan

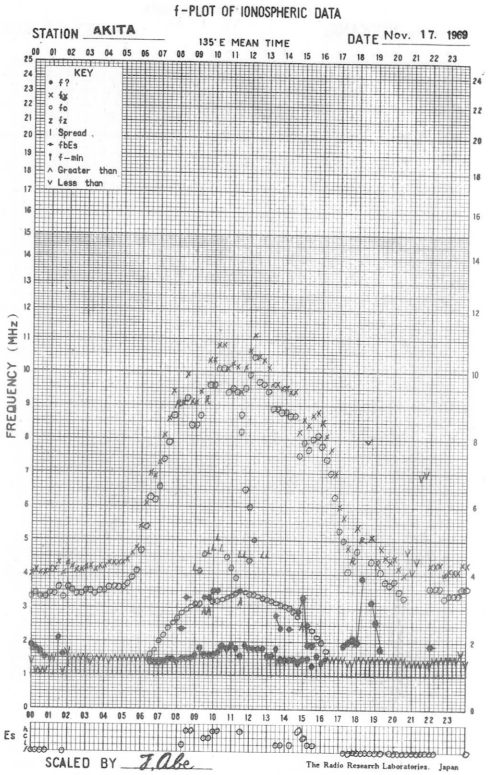

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE NOV. 16.1969
KEY
• f?
× fx
○ fo
z fz
| Spread
+ fbEs
T f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan

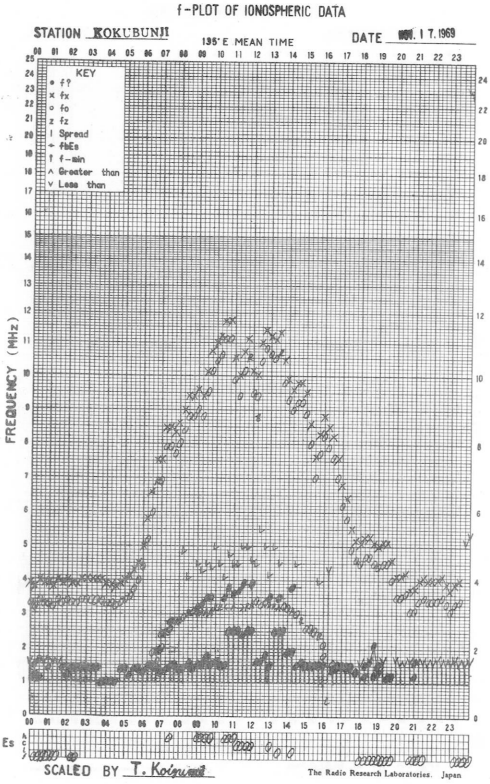

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE Nov. 16. 1969
KEY
• f?
× fx
○ fo
z fz
| Spread
+ fbEs
T f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

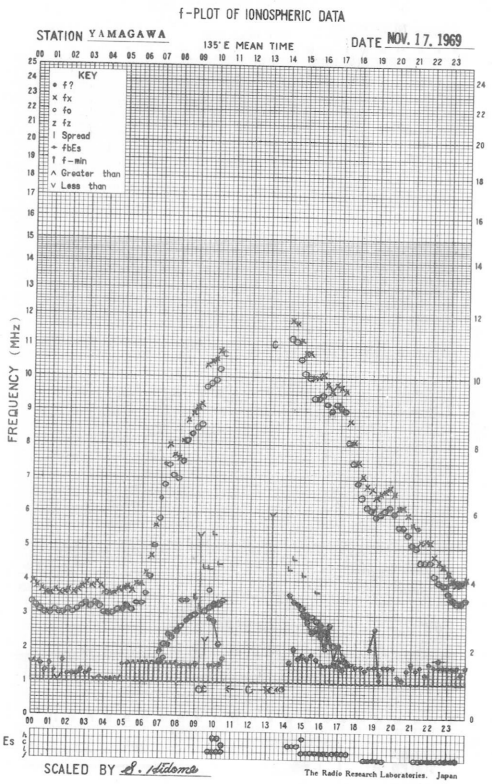

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
DATE NOV. 16.1969
KEY
• f?
× fx
○ fo
z fz
| Spread
+ fbEs
T f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Koizumi
The Radio Research Laboratories. Japan

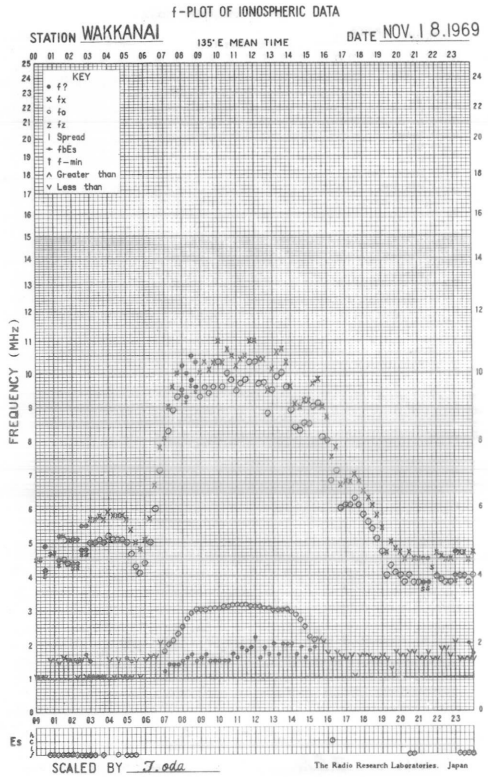

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE NOV. 16. 1969
KEY
• f?
× fx
○ fo
z fz
| Spread
+ fbEs
T f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan

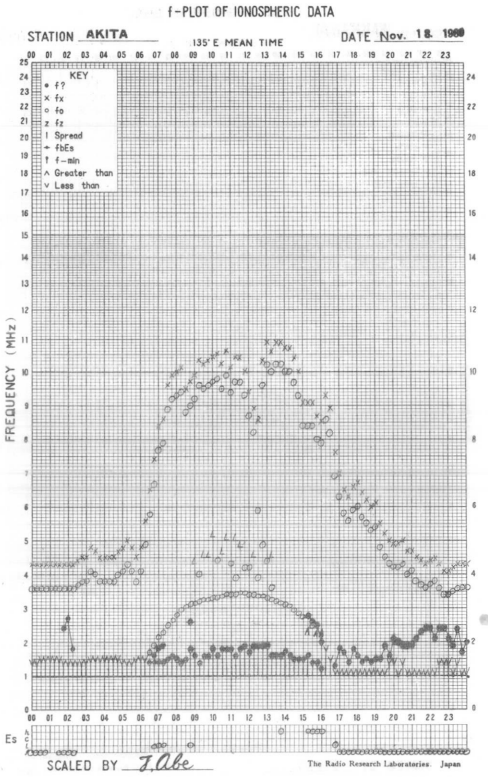

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE NOV. 17.1969
KEY
FREQUENCY (MHz)
SCALED BY J. oda
The Radio Research Laboratories. Japan

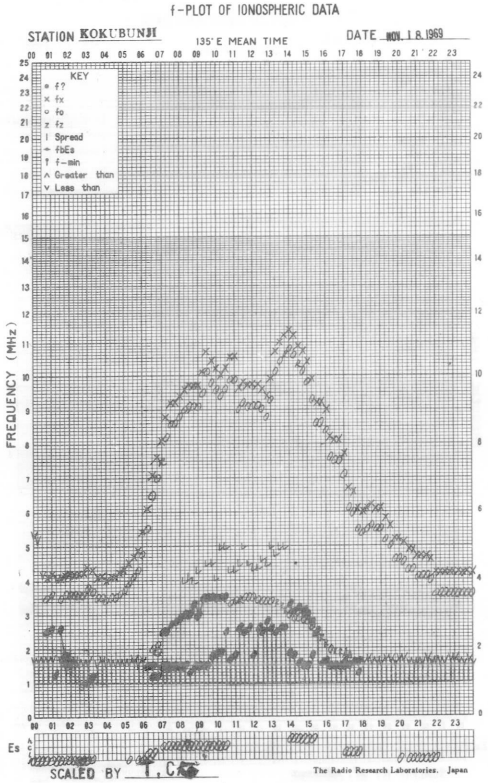

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE Nov. 17. 1969
KEY
FREQUENCY (MHz)
SCALED BY T. Abe
The Radio Research Laboratories. Japan

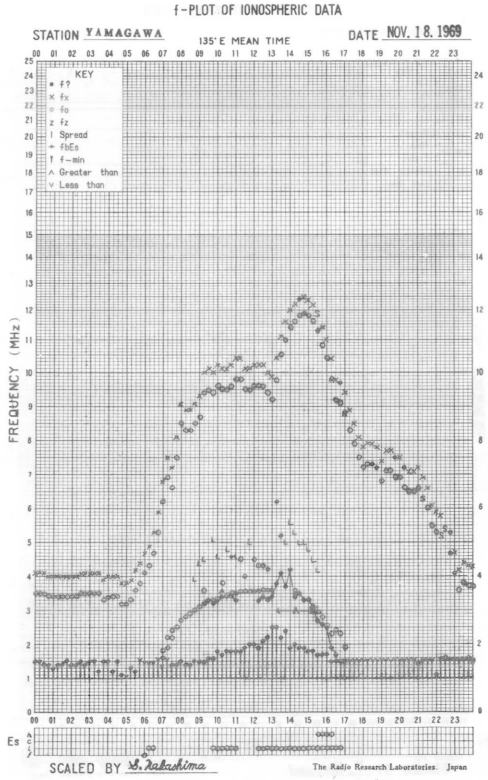

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
DATE NOV. 17.1969
KEY
FREQUENCY (MHz)
SCALED BY T. Koizumi
The Radio Research Laboratories. Japan

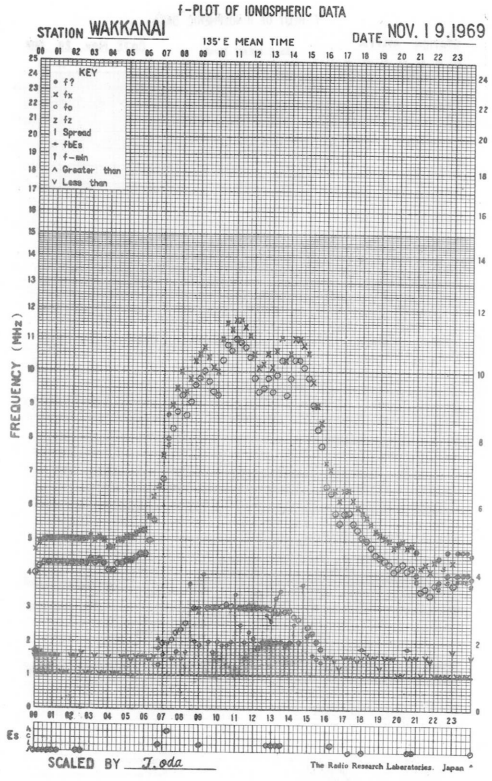

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE NOV. 17. 1969
KEY
FREQUENCY (MHz)
SCALED BY S. Ichidomo
The Radio Research Laboratories. Japan

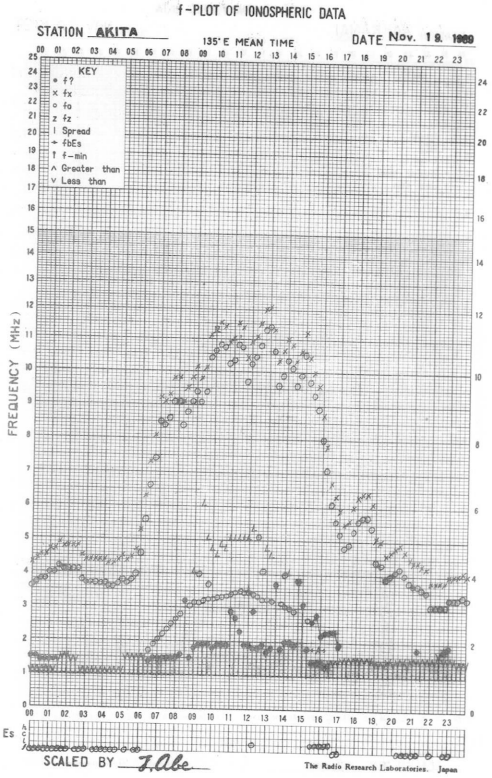

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE NOV. 18.1969
KEY
* f?
× fx
○ fo
z fz
| Spread
= fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Oda
The Radio Research Laboratories. Japan

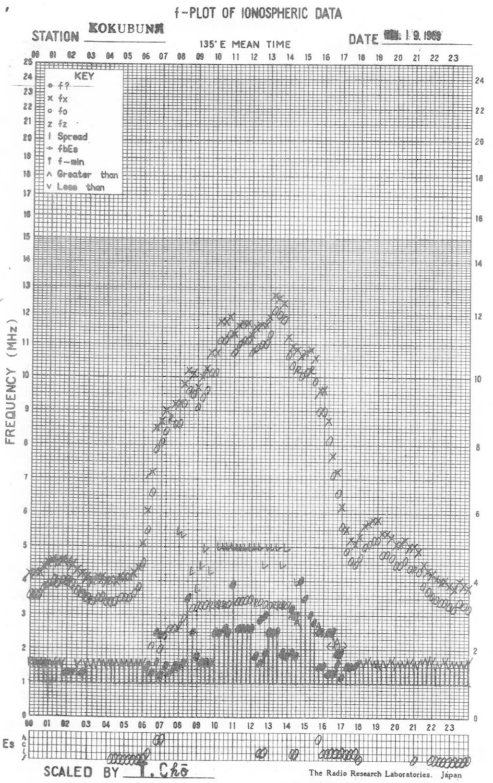

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE Nov. 18. 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
= fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

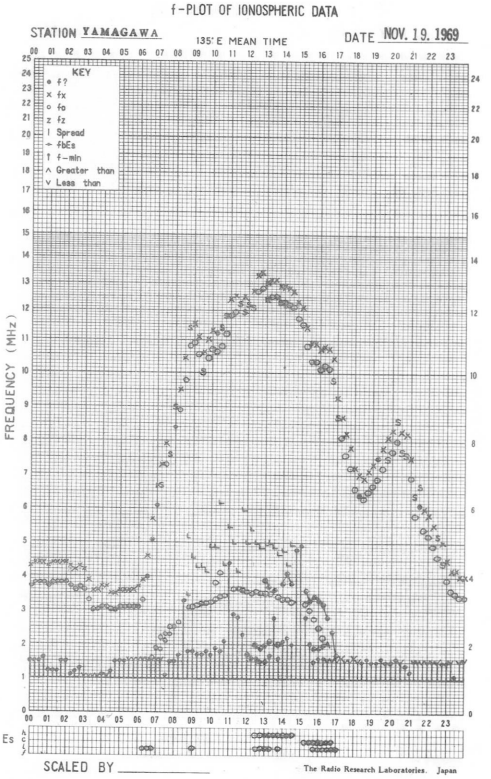

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
DATE NOV. 18.1969
KEY
* f?
× fx
○ fo
z fz
| Spread
= fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. C
The Radio Research Laboratories. Japan

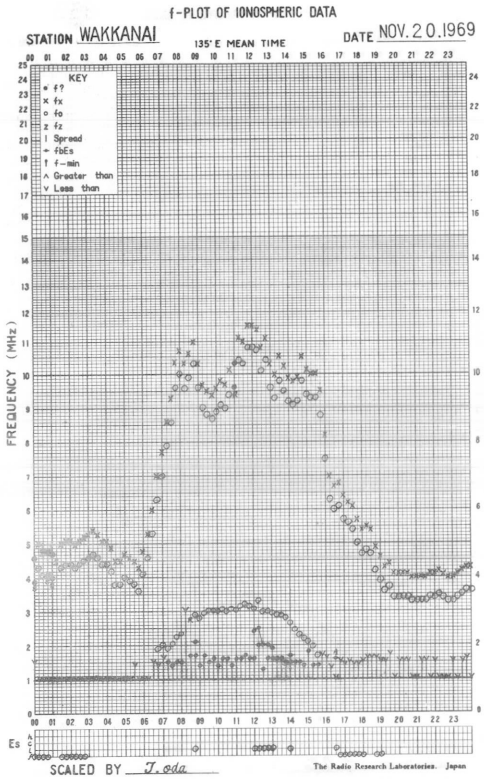

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE NOV. 18. 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
= fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Takashima
The Radio Research Laboratories. Japan

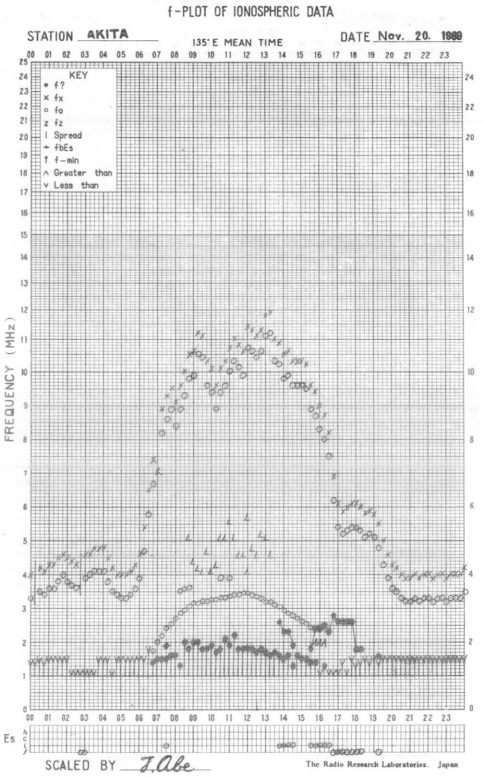

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135° E MEAN TIME
DATE NOV. 19.1969
KEY
FREQUENCY (MHz)
Es
SCALED BY T. Oda
The Radio Research Laboratories. Japan

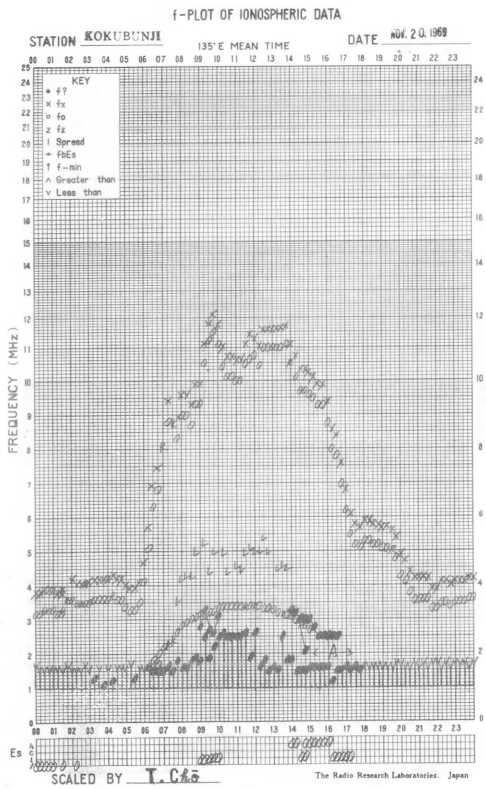

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135° E MEAN TIME
DATE Nov. 19. 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

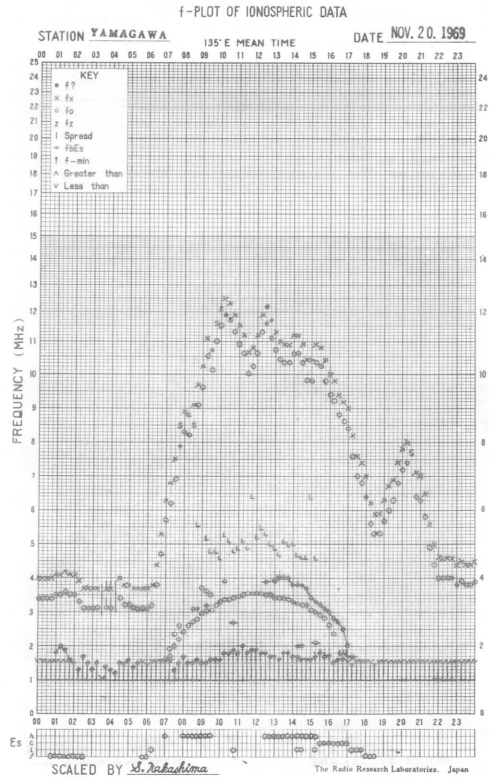

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135° E MEAN TIME
DATE NOV. 19.1969
KEY
FREQUENCY (MHz)
Es
SCALED BY T. Ono
The Radio Research Laboratories. Japan

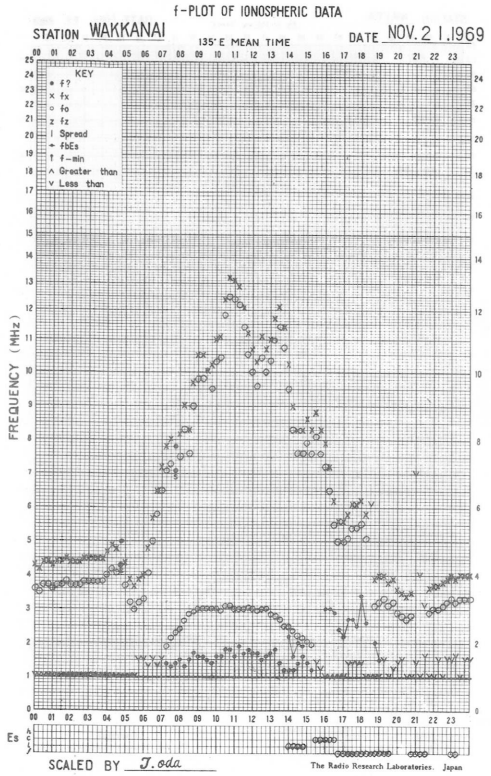

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135° E MEAN TIME
DATE NOV. 19. 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY
The Radio Research Laboratories. Japan

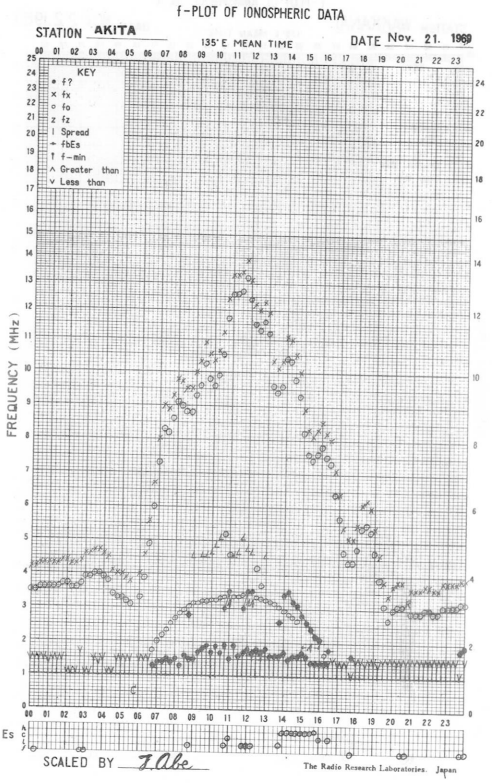

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE NOV. 20. 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY T. Oda
The Radio Research Laboratories. Japan

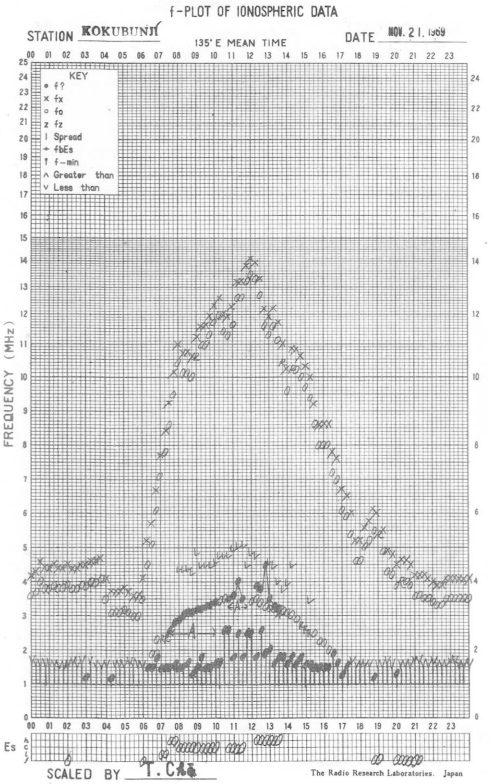

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE Nov. 20. 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

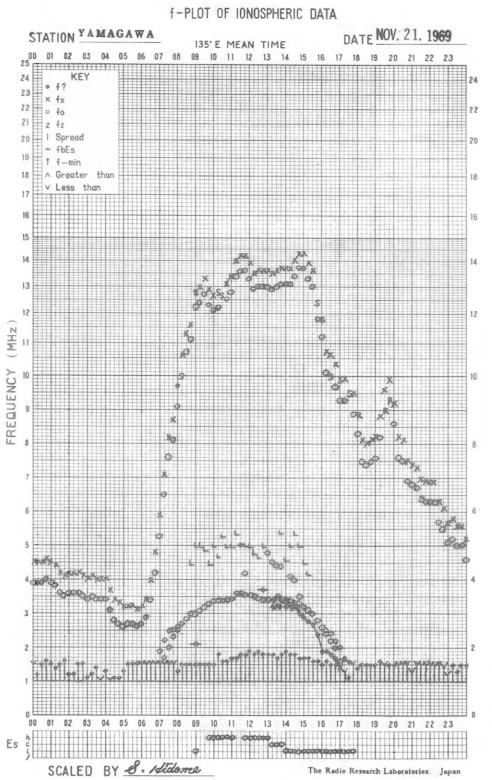

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
DATE NOV. 20. 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY T. Chō
The Radio Research Laboratories. Japan

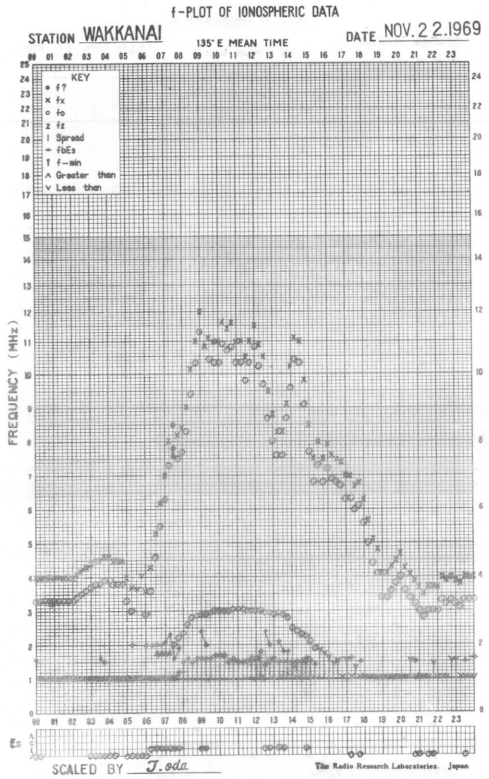

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE NOV. 20. 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan

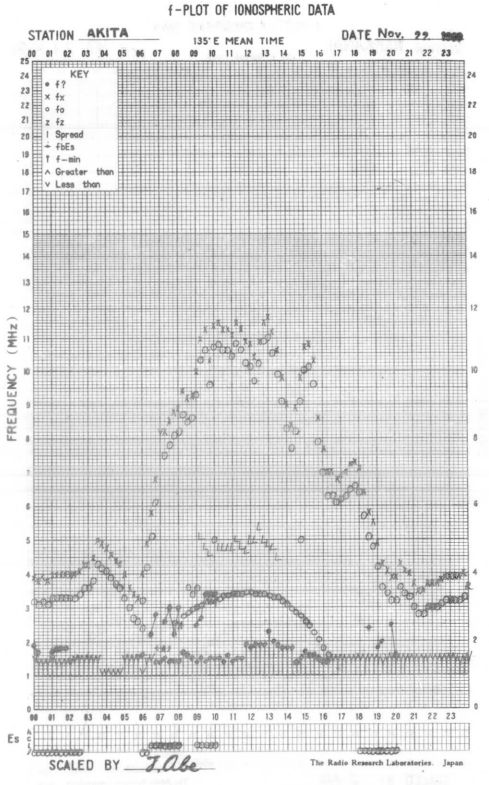

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE NOV. 21. 1969
KEY
• f?
× fx
○ fo
z fz
| Spread
~ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY J. Oda
The Radio Research Laboratories. Japan

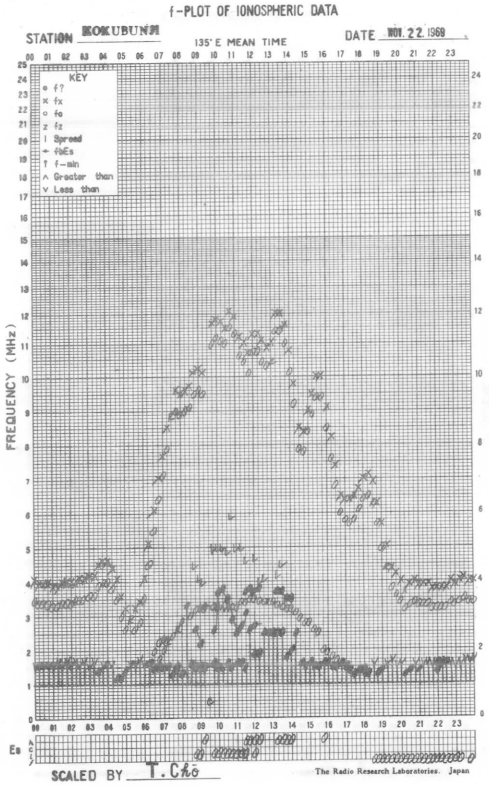

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE Nov. 21. 1969
KEY
• f?
× fx
○ fo
z fz
| Spread
~ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

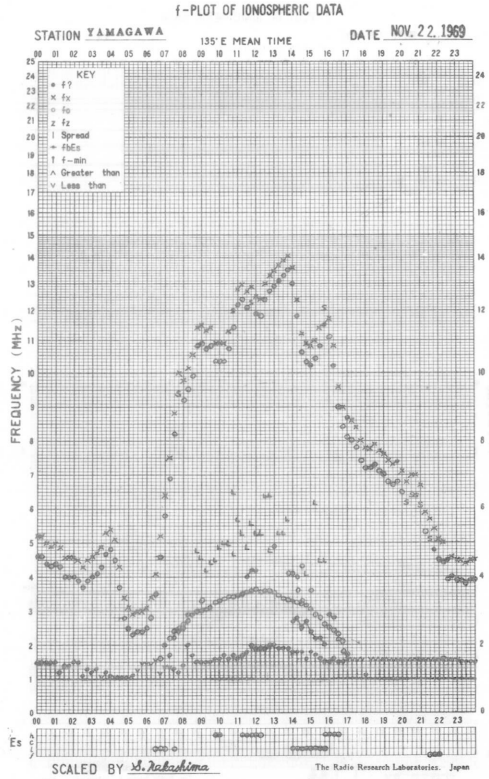

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
DATE NOV. 21. 1969
KEY
• f?
× fx
○ fo
z fz
| Spread
~ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Obi
The Radio Research Laboratories. Japan

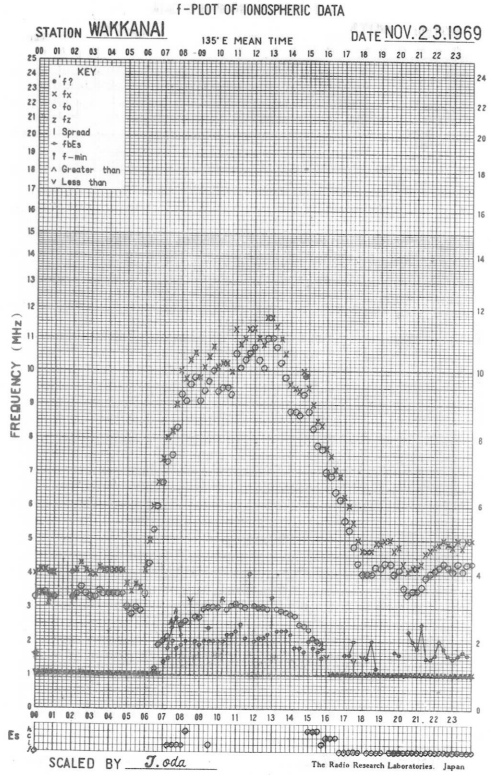

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE NOV. 21. 1969
KEY
• f?
× fx
○ fo
z fz
| Spread
~ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Ichidome
The Radio Research Laboratories. Japan

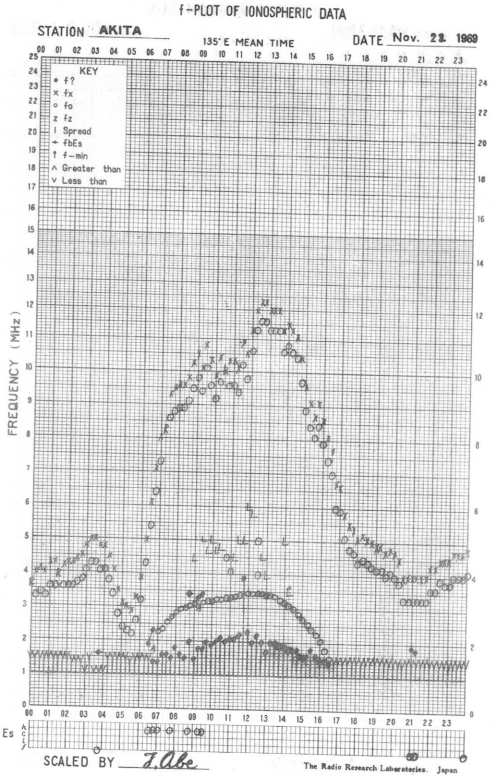

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE NOV. 22. 1969
KEY
● f?
× fx
○ fo
z fz
| Spread
= fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. oda
The Radio Research Laboratories. Japan

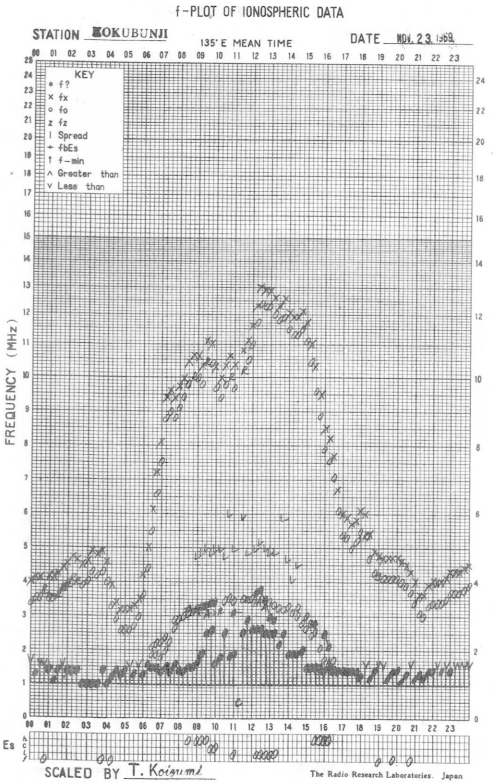

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE Nov. 22. 1969
KEY
● f?
× fx
○ fo
z fz
| Spread
= fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

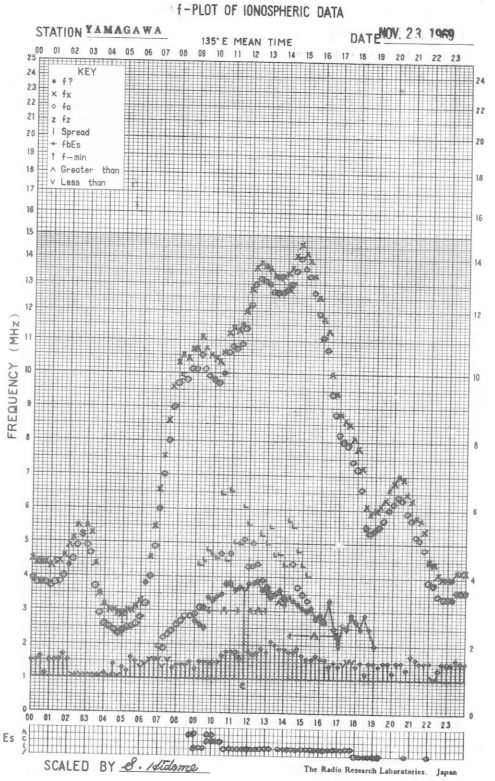

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
DATE NOV. 22. 1969
KEY
● f?
× fx
○ fo
z fz
| Spread
= fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Cho
The Radio Research Laboratories. Japan

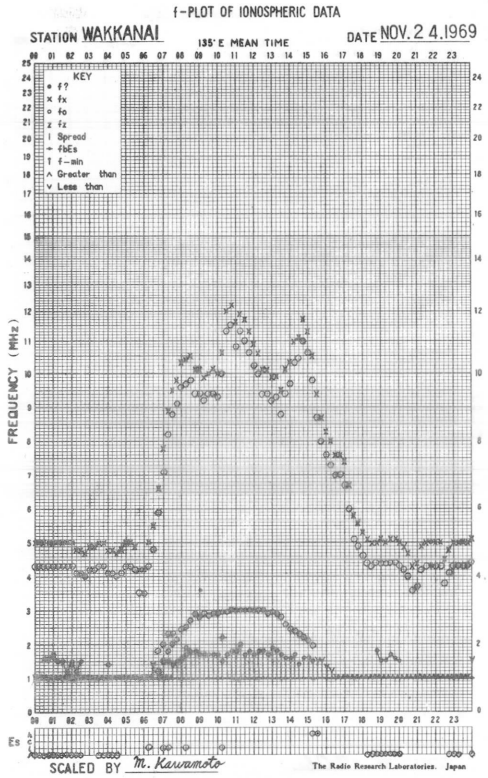

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE NOV. 22. 1969
KEY
● f?
× fx
○ fo
z fz
| Spread
= fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Takashima
The Radio Research Laboratories. Japan

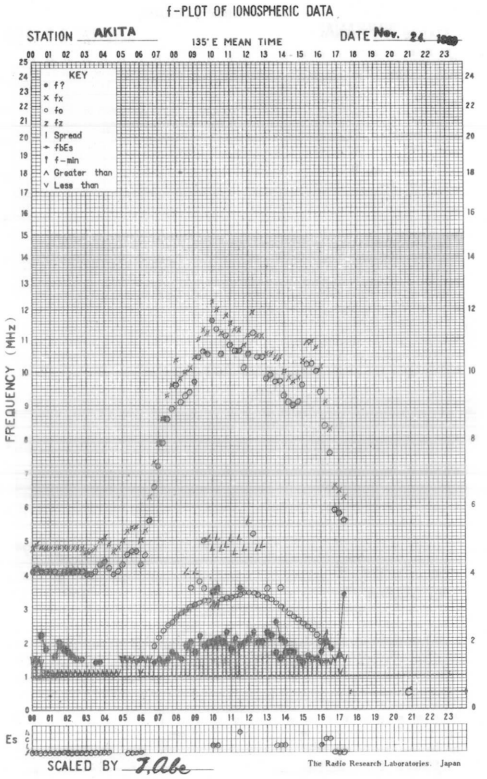

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE NOV. 23.1969
KEY
* f?
× fx
○ fo
z fz
| Spread
= fbEs
T f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Oda
The Radio Research Laboratories. Japan

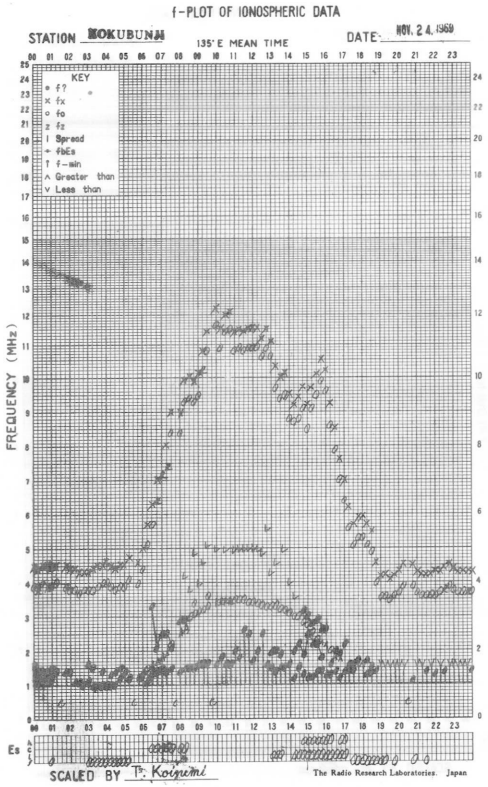

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE Nov. 23. 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
= fbEs
T f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

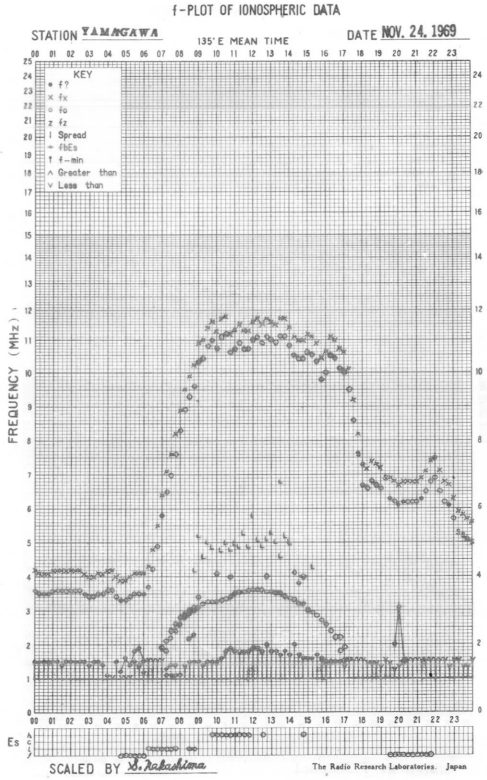

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
DATE NOV. 23. 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
= fbEs
T f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Koizumi
The Radio Research Laboratories. Japan

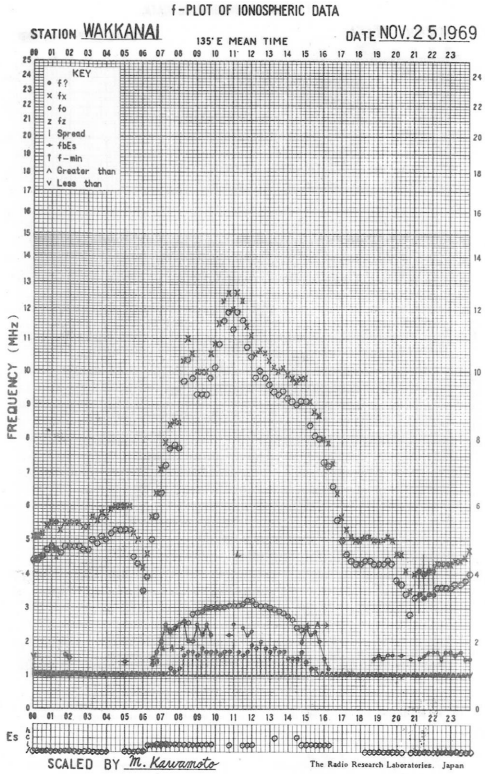

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE NOV. 23. 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
= fbEs
T f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Ishidome
The Radio Research Laboratories. Japan

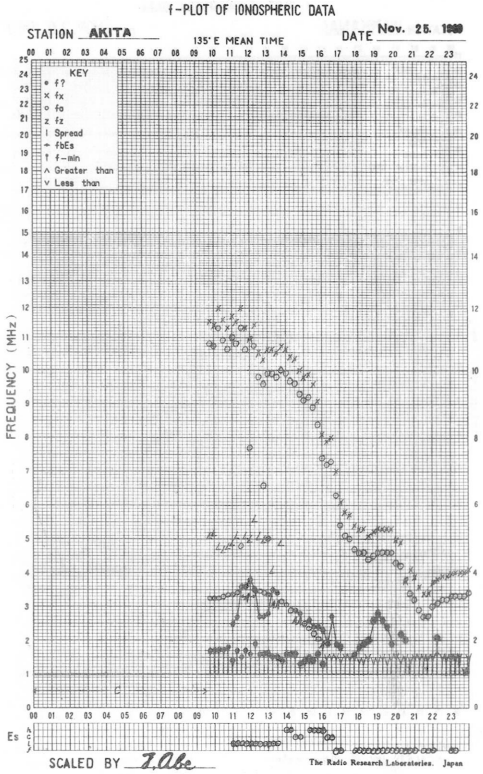

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135° E MEAN TIME
DATE NOV. 2 4, 1969
KEY
* f?
× fx
○ fo
z fz
I Spread
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan

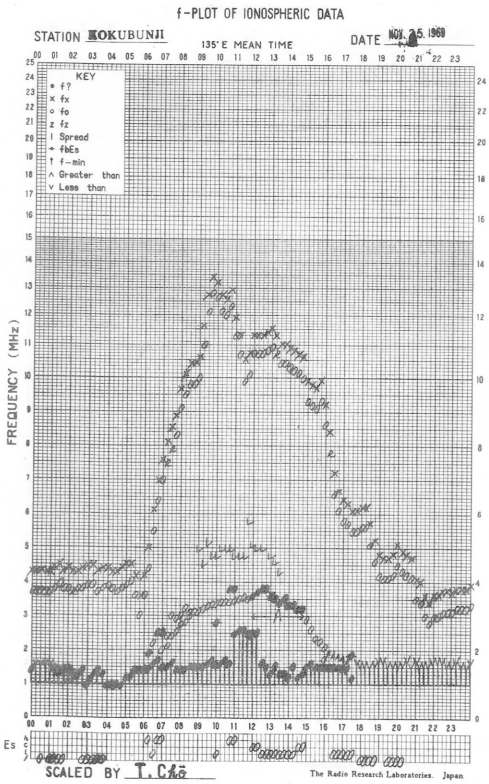

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135° E MEAN TIME
DATE Nov. 24, 1969
KEY
* f?
× fx
○ fo
z fz
I Spread
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

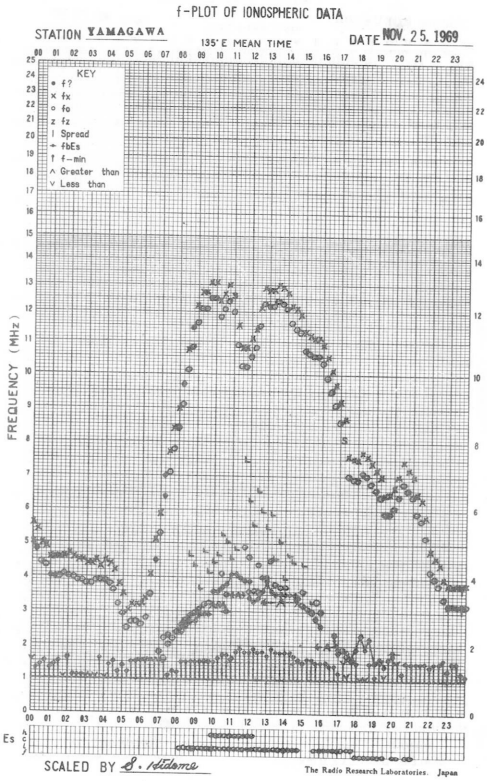

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135° E MEAN TIME
DATE: NOV. 24, 1969
KEY
* f?
× fx
○ fo
z fz
I Spread
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Koinumi
The Radio Research Laboratories. Japan

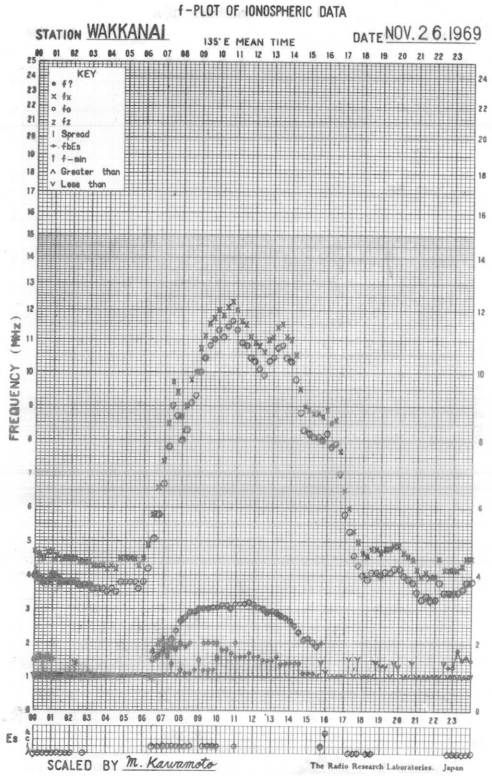

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135° E MEAN TIME
DATE NOV. 24, 1969
KEY
* f?
× fx
○ fo
z fz
I Spread
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan

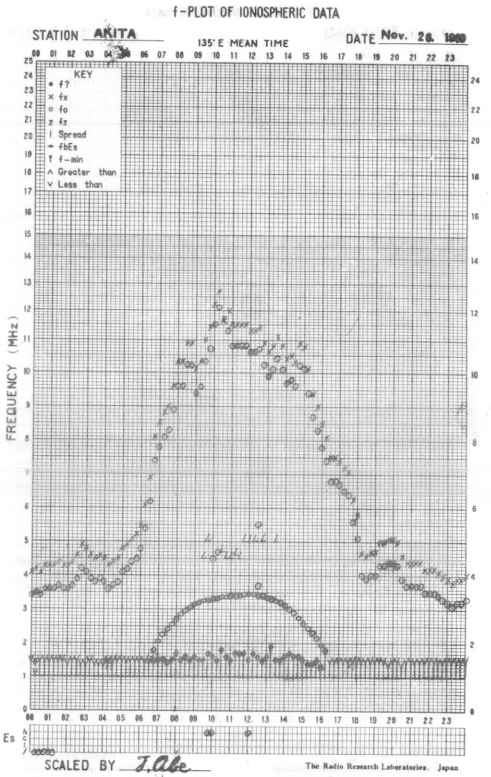

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE NOV. 25, 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan

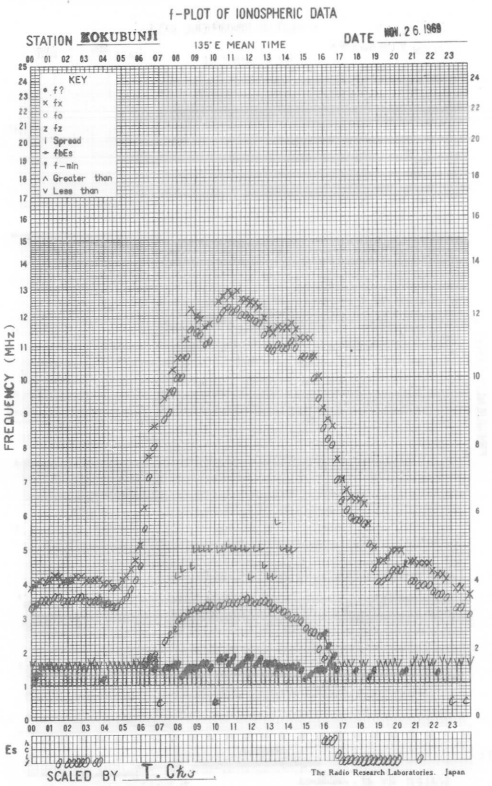

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE Nov. 25. 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

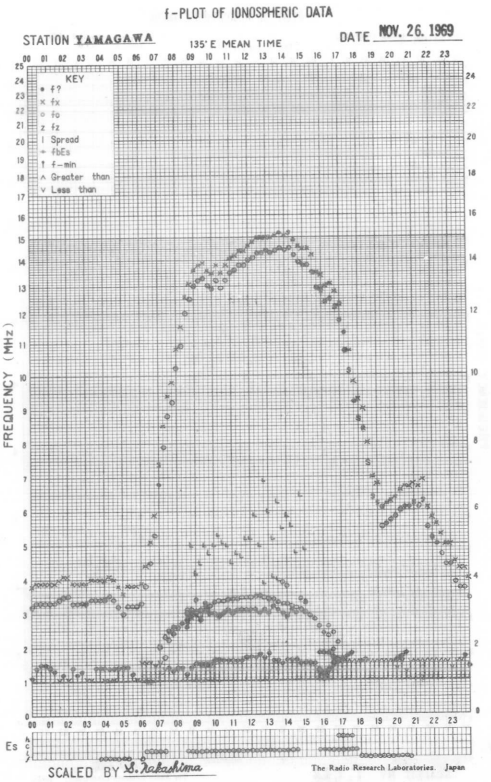

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
DATE NOV. 25. 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY T. Chō
The Radio Research Laboratories. Japan

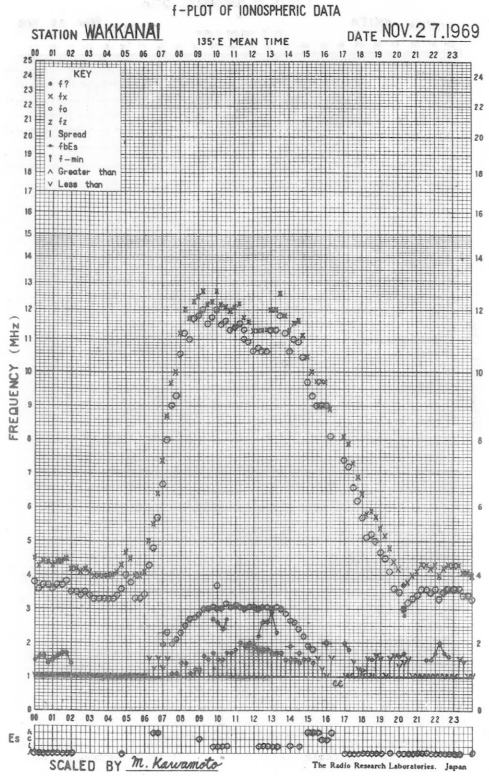

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE NOV. 25. 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY S. Kitama
The Radio Research Laboratories. Japan

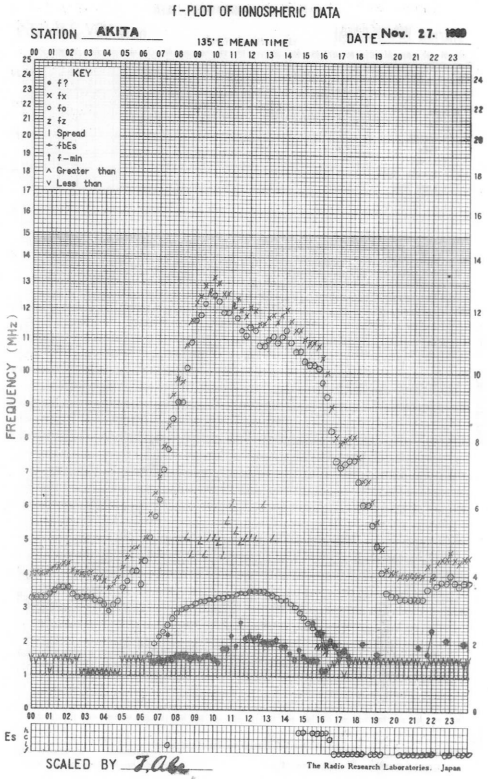

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE NOV. 26. 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan

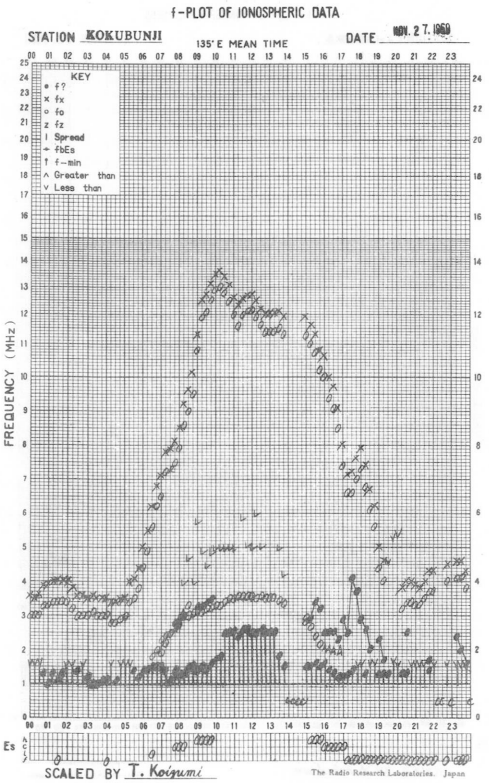

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE Nov. 26. 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY I. Abe
The Radio Research Laboratories. Japan

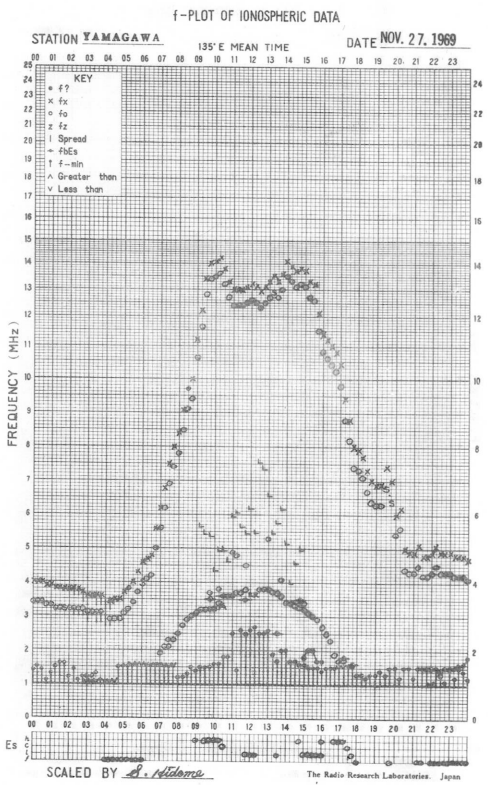

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
DATE NOV. 26. 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY T. Chu
The Radio Research Laboratories. Japan

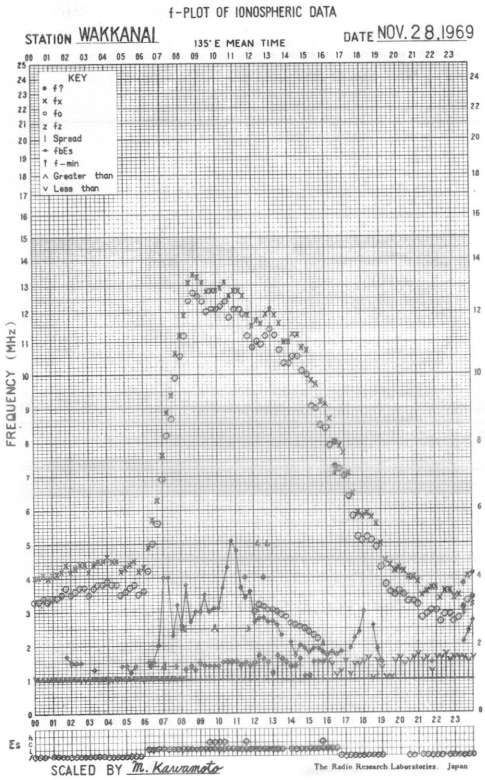

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE NOV. 26. 1969
KEY
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan

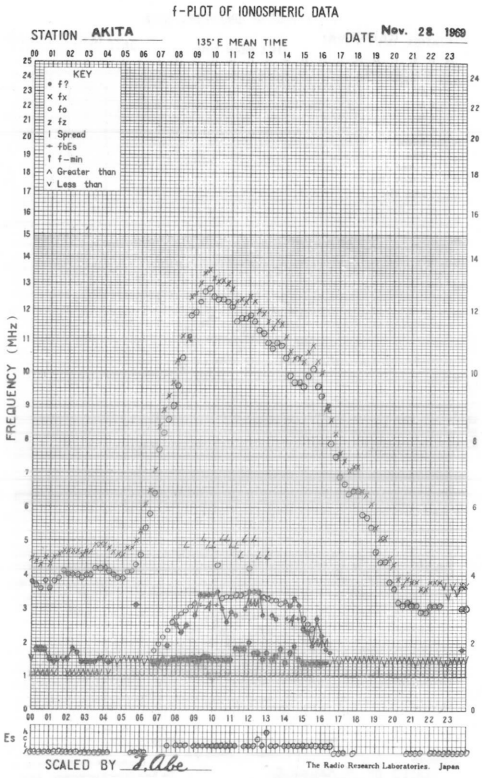

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135° E MEAN TIME
DATE NOV. 27. 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan

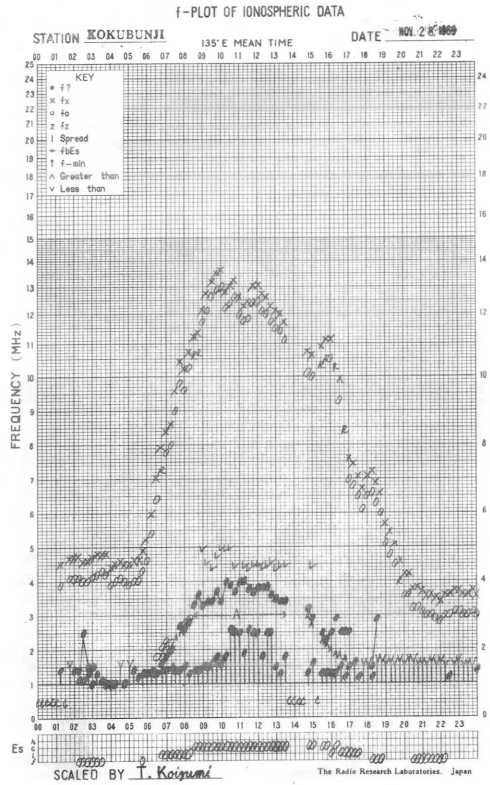

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135° E MEAN TIME
DATE Nov. 27. 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

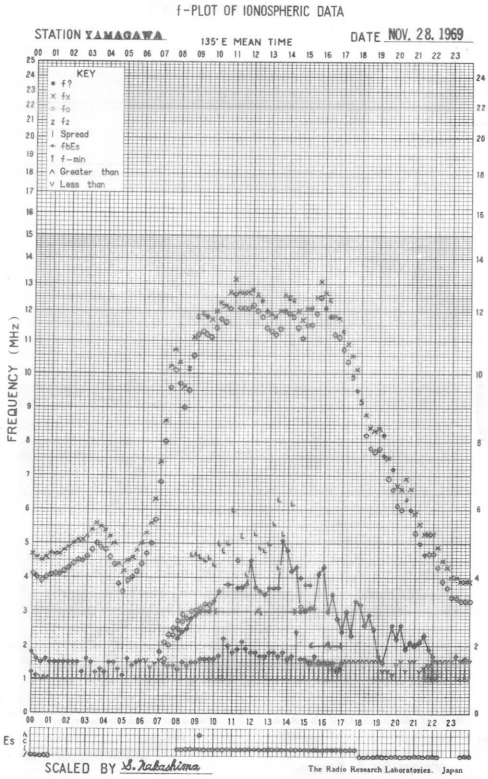

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135° E MEAN TIME
DATE NOV. 27. 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Koizumi
The Radio Research Laboratories. Japan

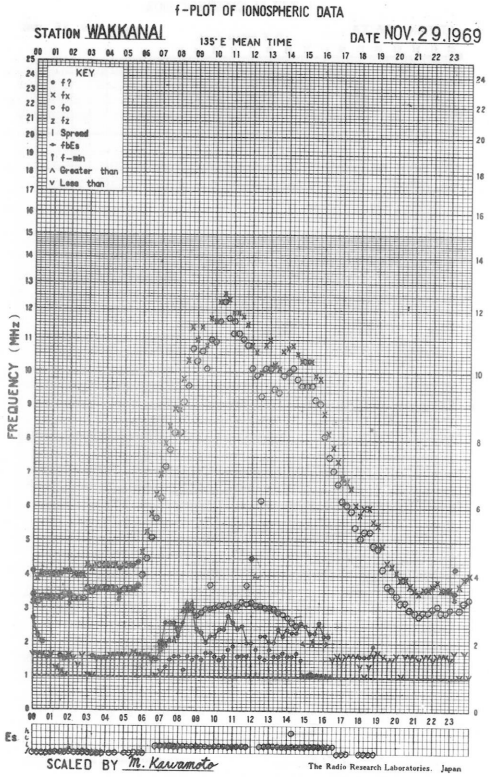

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135° E MEAN TIME
DATE NOV. 27. 1969
KEY
* f?
× fx
○ fo
z fz
| Spread
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Shidama
The Radio Research Laboratories. Japan

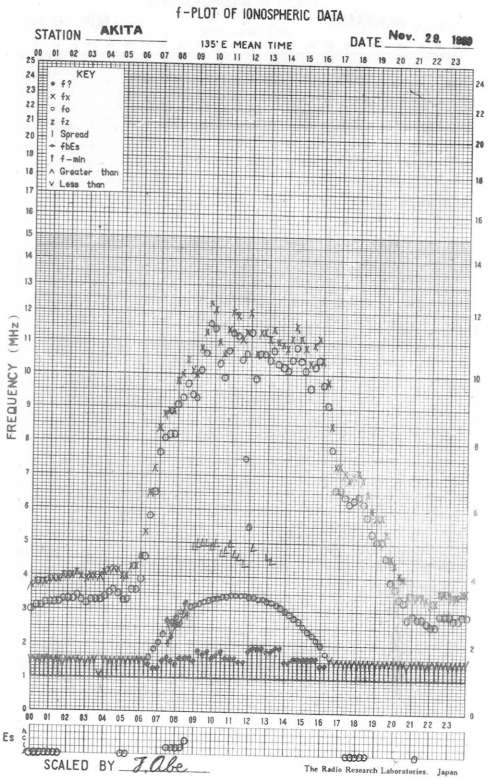

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135° E MEAN TIME
DATE NOV. 28, 1969
KEY
• f?
× fx
○ fo
z fz
| Spread
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan

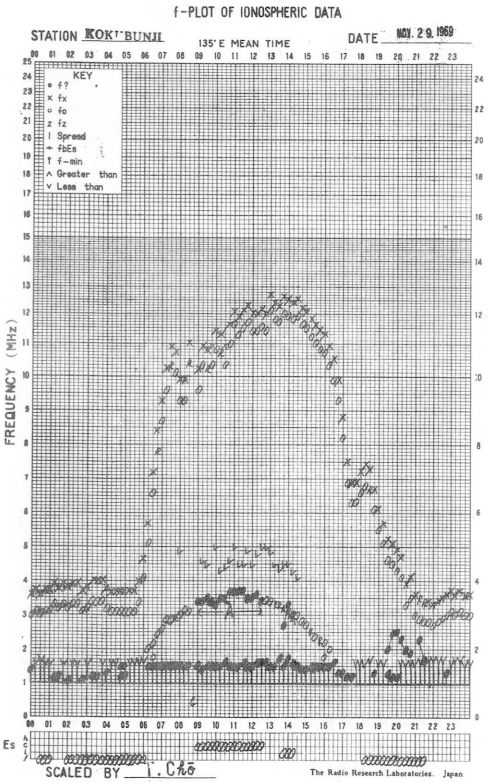

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135° E MEAN TIME
DATE Nov. 28. 1969
KEY
• f?
× fx
○ fo
z fz
| Spread
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan

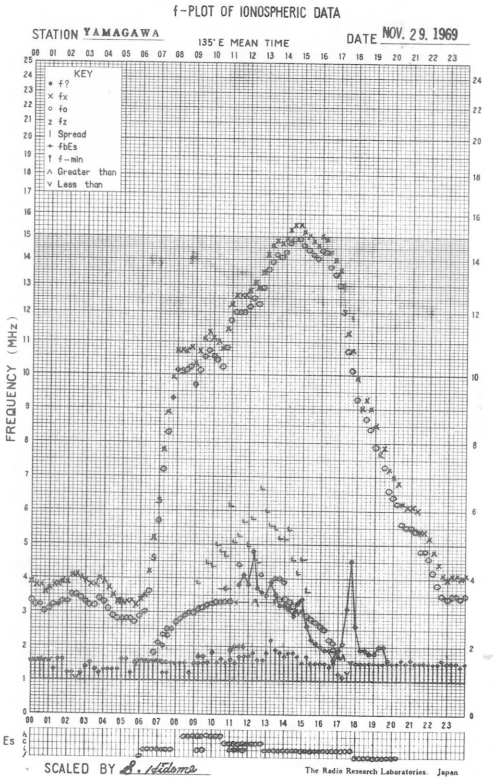

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135° E MEAN TIME
DATE NOV. 28, 1969
KEY
• f?
× fx
○ fo
z fz
| Spread
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Koizumi
The Radio Research Laboratories. Japan

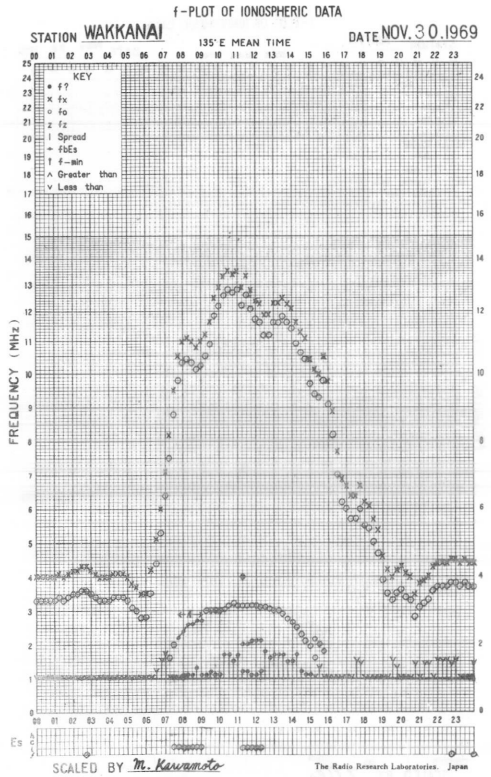

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135° E MEAN TIME
DATE NOV. 28, 1969
KEY
• f?
× fx
○ fo
z fz
| Spread
⌁ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Takashima
The Radio Research Laboratories. Japan

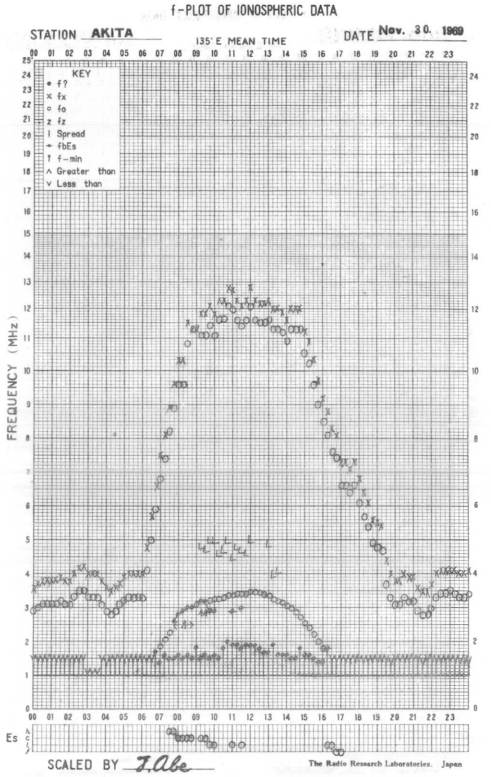

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135° E MEAN TIME
DATE NOV. 29. 1969
KEY
FREQUENCY (MHz)
SCALED BY M. Kawamoto
The Radio Research Laboratories, Japan

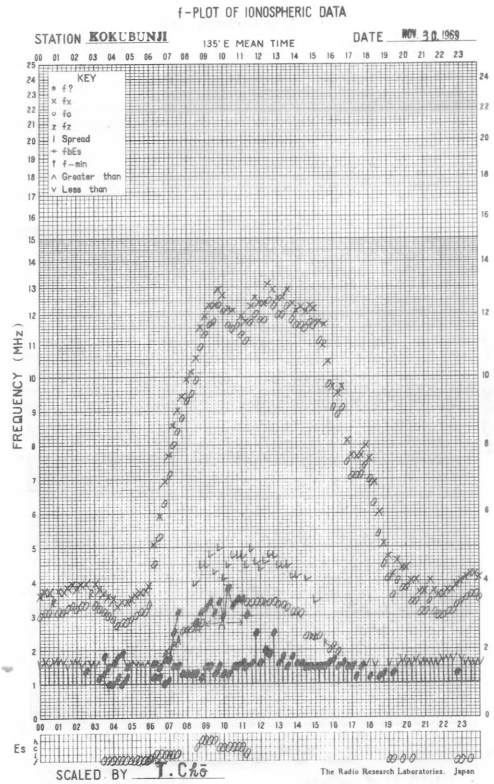

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135° E MEAN TIME
DATE Nov. 29. 1969
KEY
FREQUENCY (MHz)
SCALED BY T. Abe
The Radio Research Laboratories, Japan

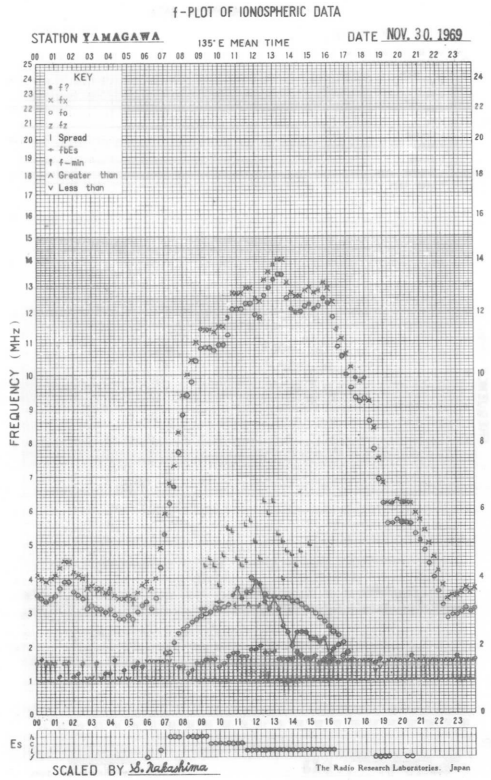

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135° E MEAN TIME
DATE NOV. 29. 1969
KEY
FREQUENCY (MHz)
SCALED BY I. Cho
The Radio Research Laboratories, Japan


f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135° E MEAN TIME
DATE NOV. 29. 1969
KEY
FREQUENCY (MHz)
SCALED BY S. Hidoma
The Radio Research Laboratories, Japan


f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135° E MEAN TIME
DATE NOV. 30. 1969
KEY
* f?
× fx
○ fo
z fz
I Spread
= fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135° E MEAN TIME
DATE Nov. 30. 1969
KEY
* f?
× fx
○ fo
z fz
I Spread
= fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Abe
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135° E MEAN TIME
DATE NOV. 30. 1969
KEY
* f?
× fx
○ fo
z fz
I Spread
= fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Cho
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135° E MEAN TIME
DATE NOV. 30. 1969
KEY
* f?
× fx
○ fo
z fz
I Spread
= fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan

SOLAR RADIO EMISSION

Flux Density and Variability

Month: November 1969
Observing station: Hiraiso
Frequency: 200 MHz

	Flux density $10^{-22}Wm^{-2}(Hz)^{-1}$					Variability 0 to 3				
UT Date	00-03	03-06	06-09	21-24	Day	00-03	03-06	06-09	21-24	Day
1	9	7	(6)	5	10	1	0	(1)	0	1
2	5	5	(5)	(6)	5	0	0	(0)	(0)	0
3	5	6	(5)	7	5	0	0	(0)	0	0
4	6	5	(5)	5	6	0	0	(0)	1	0
5	5	5	(5)	5	5	0	0	(0)	0	0
6	5	5	(5)	5	5	1	0	(0)	0	0
7	5	7	(12)	8	6	0	0	(1)	1	0
8	8	7	(9)	30	8	1	1	(1)	1	1
9	19	9	(9)	9	17	1	1	(1)	1	1
10	6	7	(6)	13	7	0	0	(0)	1	0
11	16	16	(20)	26	16	1	1	(0)	1	1
12	25	19	(17)	8	22	0	0	(0)	0	0
13	7	7	(6)	8	7	0	1	(0)	1	0
14	8	7	(7)	7	7	1	1	(1)	2	1
15	7	7	(7)	6	7	1	1	(1)	1	1
16	7	8	(7)	5	7	1	1	(1)	1	1
17	5	5	(6)	5	5	0	0	(0)	1	0
18	6	6	(6)	6	6	1	0	(0)	1	0
19	5	5	(7)	12	6	0	0	(0)	1	0
20	9	8	(7)	7	9	1	1	(1)	1	1
21	6	7	(8)	12	7	0	1	(1)	2	1
22	10	15	(9)	5	12	1	1	(1)	0	1
23	5	5	(6)	9	5	0	0	(1)	2	0
24	10	7	(8)	8	8	2	1	(1)	0	1
25	9	9	(10)	15	9	0	0	(1)	1	0
26	12	13	(12)	15	13	1	1	(1)	1	1
27	16	14	(17)	27	15	1	1	(1)	2	1
28	16	9	(8)	12	15	1	1	(1)	1	1
29	9	10	(11)	(8)	10	0	1	(1)	(1)	1
30	20	39	(43)	21	28	1	1	(1)	1	1

Note No observations during the following periods:

2nd 2300- 2400
29th 2310- 30th 0015

SOLAR RADIO EMISSION

Flux Density

Month: November 1969
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	39	37	(37)	32	38
2	35	36	(34)	-	36
3	33	35	(33)	34	34
4	35	35	(33)	32	35
5	31	31	(31)	30	31
6	32	32	(30)	30	31
7	30	31	(31)	31	30
8	31	28	(27)	28	29
9	28	27	(27)	28	27
10	28	27	(26)	28	28
11	29	29	(29)	28	29
12	27	26	(27)	27	27
13	28	28	(27)	28	28
14	29	27	(27)	30	28
15	29	28	(29)	26	29
16	27	25	(24)	29	26
17	30	30	(29)	31	30
18	30	30	(30)	30	30
19	31	30	(30)	33	30
20	32	32	(31)	30	32
21	29	29	(30)	31	29
22	31	30	(30)	30	31
23	29	28	(28)	30	29
24	30	28	(27)	30	29
25	31	31	(31)	33	31
26	32	32	(30)	30	32
27	31	31	(31)	30	31
28	31	30	(29)	30	30
29	30	29	(28)	27	30
30	28	29	(26)	26	28

Note No observations during the following periods:

2nd	2120-	3rd	0030
4th	0650-		0710
15th	2340-	16th	0010
22nd	0400-		0435

Distinctive Events

(single-frequency observations)

Month: November 1969
Observing station: Hiraiso
Normal observing period: 2120 - 0730 (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	
4	500	0406.0	0409.0	6.0	C	160	24	
	200	0408.5	0409.0	2.5	C	60	10	
	100	0408.0	0409.0	12.0	C	250	20	
	500	0420.5	0433.0	21.5	C	145	14	
	200	0423.0	0424.1	3.0	C	80	10	
18	500	0045.5	0045.6	2.0	C	80	8	
	200	0045.4	0045.8	2.0	C	>1700	> 600	
	100	0045.4	0046.0	2.0	C	> 350	> 220	
	200	2156.0	2156.0	3.0	C	200	50	
	100	2156.0	2157.0	2.5	C	> 450	> 300	
19	500	0535.0	0540.8	18.0	C	25	20	
	200	0539.0	0539.5	1.0	C	25	10	
20	200	0425.0	0425.5	1.0	C	100	50	
	100	0422.5	0426.0	10.5	C	> 400	150	
	100	2155.0	2156.5	2.0	C	> 490	150	
	100	2232.0	2233.0	3.0	C	> 600	160	
23	500	0139.0	0139.0	1.0	C	650	170	
25	500	0612.0	0612.6	3.0	C	95	20	
	100	0610.0	0613.0	4.0	C	> 280	>150	
26	500	2319.3	2319.5	1.7	C	235	10	
	200	2318.5	2319.5	1.5	C	435	150	
	100	2318.0	2319.0	2.0	C	> 250	>150	
27	200	0548.0	-	49.0	F	360	-	
	200	2237.0	2237.0	0.5	C	430	300	
	200	2257.0	2258.5	3.0	C	290	80	
28	100	2254.0	2259.0	9.0	C	> 220	> 100	

MEASUREMENT OF H.F. FIELD STRENGTH (UPPER SIDE-BAND OF WWV)

NOV 1969 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

UT DAY	00H 15M	01H 15M	02H 15M	03H 15M	04H 15M	05H 15M	06H 15M	07H 15M	08H 15M	09H 15M	10H 15M	11H 15M	12H 15M	13H 15M	14H 15M	15H 15M	16H 15M	17H 15M	18H 15M	19H 15M	20H 15M	21H 15M	22H 15M	23H 15M
1	9	11	17	22	13	ES -14	ES -13	-10	ES -10	ES -7	ES -4	ES 3	ES -9	ES -11	ES -17	ES -17	ES -17	ES -17	ES -17	ES -17	0	13	13	13
2	10	14	15	13	-3	ES -9	ES -4	ES -3	ES 1	ES 2	ES -3	ES -4	ES -2	ES -5	ES -14	ES -14	ES -14	ES -14	ES -14	ES -14	7	11	11	12
3	10	16	13	13	22	2	-1	0	ES -5	ES -4	ES -7	ES 0	ES -9	ES -14	-7	-7	ES -29	ES -29	ES -29	ES -29	1	7	6	10
4	13	15	19	17	ES -27	ES -4	ES -9	ES 3	ES -2	ES -1	ES 0	ES -5	ES -5	ES -10	-9	-9	-16	ES -30	ES -30	ES -30	-5	9	8	10
5	9	16	13	9	ES -13	ES -9	ES -9	ES -3	ES -10	ES -10	ES -30	ES -22	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	C	C	C	C
6	C	C	C	C	C	-4	ES -1	ES -9	ES -8	ES -13	ES -9	ES -22	ES -14	ES -24	-11	ES -24	ES -24	ES -22	ES -22	-23	4	10	15	11
7	17	18	24	19	ES 3	ES -13	ES -2	ES -7	ES -4	ES -7	ES -13	ES -14	ES -22	ES -22	-16	-11	-22	ES -33	ES -33	ES -33	4	14	15	12
8	19	23	24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	17	19	22	ES 2	ES -5	ES -3	ES 2	ES -5	ES -2	ES -12	ES -23	ES -17	ES -9	ES -17	-20	ES -34	ES -34	-14	-17	-1	15	18	21
10	19	22	15	1	-8	ES -4	ES -13	ES -11	ES 1	ES -2	ES -8	ES -10	ES -17	ES -34	-25	-13	-17	-19	-17	ES -33	6	12	12	11
11	12	20	16	ES -7	ES -5	ES 0	-10	-10	-10	-10	ES -9	-9	ES -11	ES -33	-22	-25	-25	ES -33	-8	-20	1	10	12	16
12	12	13	11	2	ES 2	C	ES -9	C	ES -7	-7	ES -5	ES -8	ES -33	ES -33	ES -33	ES -33	ES -33	ES -33	ES -33	ES -33	-7	7	14	11
13	6	13	9	11	1	-4	ES -2	ES -2	ES -3	ES -23	ES -12	ES -15	ES -21	ES -35	-21	-22	-27	ES -35	ES -35	ES -35	-12	11	14	12
14	14	17	16	10	-2	ES -5	ES -6	ES -3	ES -7	ES -12	ES -3	ES -9	ES -29	ES -36	ES -36	-11	-18	-22	-16	-25	-18	11	9	11
15	15	15	16	-13	ES -6	ES -3	ES -7	ES -6	ES -1	ES -10	ES -10	ES -13	ES -30	ES -35	ES -35	ES -35	ES -35	ES -35	ES -35	ES -35	-6	9	14	12
16	14	14	14	-14	1	ES -5	ES -7	ES -5	ES -3	ES -6	ES -8	ES -7	ES -5	ES -35	-21	-11	ES -35	ES -35	ES -35	-21	-1	17	17	19
17	17	17	19	0	ES 5	ES -9	ES -5	ES -3	ES -8	ES -9	ES 1	ES 5	ES -4	ES -36	0	-3	-2	-10	-9	-19	11	14	15	11
18	17	18	22	-1	ES -15	ES -9	ES -3	ES -3	ES -3	ES 0	ES -3	ES -8	ES -1	ES -27	-25	ES -27	-21	ES -35	ES -35	ES -35	0	10	15	14
19	14	16	11	24	17	-12	ES -17	ES -12	ES -11	ES -25	ES -18	ES -18	ES -18	ES -26	ES -26	ES -34	ES -34	ES -34	-14	ES -34	ES -34	12	12	11
20	7	10	15	15	-7	ES -7	ES -4	ES 0	ES 4	ES -28	ES -1	ES -17	ES -15	ES -33	-23	-23	-28	ES -33	-20	ES -33	-23	7	10	9
21	11	9	17	24	11	C	35	33	ES 28	ES 23	ES 17	ES 7	ES -23	ES -15	-19	-17	-22	-29	-15	ES -34	-22	6	12	-2
22	11	15	16	12	-4	ES -10	-14	-10	ES -10	S	ES -17	ES -16	ES -19	ES -25	ES -25	-26	-23	-19	-8	ES -34	-21	9	10	10
23	0	15	9	5	-9	ES -13	ES -15	ES -2	ES -13	ES -17	ES -18	ES -26	ES -19	ES -25	-25	-28	-28	ES -34	ES -34	ES -34	-5	1	6	5
24	2	5	8	14	-10	ES -10	6	ES -6	ES -8	ES -10	ES -12	ES -25	S	ES -24	-13	-17	-15	-14	ES -31	S	-2	3	6	6
25	5	12	11	11	ES -6	ES -4	ES -23	ES -14	ES -10	ES -3	ES -10	ES -11	ES -18	ES -32	-24	-19	-24	-30	ES -34	ES -29	-23	8	8	8
26	16	16	15	9	-3	-5	-9	-7	ES -3	ES -23	ES -20	ES -3	ES -9	ES -26	-20	-24	ES -7	ES -9	ES -4	ES -6	-4	6	11	7
27	15	17	10	15	-9	ES 5	ES -18	ES -12	ES 5	ES -1	ES -7	ES -17	ES -20	ES -33	-20	-22	-7	-8	-13	-19	ES -33	8	10	9
28	9	12	14	0	ES -8	ES -2	ES -4	ES -6	ES -6	ES -5	ES -1	ES 0	ES -3	ES -32	ES -32	ES -32	ES -32	ES -32	ES -35	ES -35	ES -8	ES -13	12	4
29	6	11	13	C	C	C	C	C	C	C	C	C	C	C	C	ES -33	ES -27	-26	-26	ES -33	-22	2	7	6
30	10	12	19	15	ES 14	ES -7	ES 4	ES 4	ES -5	ES 0	ES -13	ES -23	ES -22	ES -31	ES -31	ES -29	ES -31	ES -31	ES -31	ES -31	-16	4	5	4
CNT	28	29	29	27	27	26	28	27	28	27	28	28	27	28	28	29	29	29	29	28	28	28	28	28
MED	12	15	15	11	ES -3	ES -5	ES -6	ES -5	ES -5	ES -7	ES -8	ES -10	ES -17	ES -28	ES -22	VS -22	ES -24	ES -30	ES -26	ES -30	-5	9	12	11
UD	17	20	22	22	ES 14	ES 0	ES 4	ES 3	ES 4	ES 0	ES 0	ES 3	ES -3	ES -10	-9	-9	ES -7	ES -10	ES -8	ES -17	6	14	15	16
LD	5	10	9	ES -7	ES -13	ES -13	ES -17	ES -12	ES -10	ES -23	ES -18	ES -23	ES -29	ES -35	ES -33	ES -33	ES -34	ES -35	ES -35	ES -35	ES -23	2	6	4

MEASUREMENT OF H.F. FIELD STRENGTH (UPPER SIDE-BAND OF WWVH)

NOV 1969 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISO

UT DAY	00H 45M	01H 45M	02H 45M	03H 45M	04H 45M	05H 45M	06H 45M	07H 45M	08H 45M	09H 45M	10H 45M	11H 45M	12H 45M	13H 45M	14H 45M	15H 45M	16H 45M	17H 45M	18H 45M	19H 45M	20H 45M	21H 45M	22H 45M	23H 45M
1	-3	1	5	11	15	16	1	19	7	ES -10	ES -4	ES -7	ES -8	ES -17	ES -17	ES -17	ES -17	ES -17	ES -17	-4	7	2	2	3
2	-2	3	5	11	13	17	27	18	15	10	ES -16	ES -5	ES -5	ES -10	ES -14	ES -14	ES -14	ES -14	ES -14	ES -14	1	3	0	-5
3	-3	-1	4	12	13	18	18	16	16	12	ES -7	ES -24	ES -9	ES -14	ES -20	ES -29	ES -29	ES -29	ES -29	-3	2	-3	-3	0
4	-2	0	9	14	13	9	11	11	20	ES -5	ES -5	ES -10	ES -10	ES -7	-10	-16	-22	ES -30	ES -30	-13	1	-17	-4	-3
5	-1	2	7	8	12	18	18	6	14	ES -8	ES -22	ES -22	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	C	C	C	C
6	C	C	C	C	C	12	ES -8	18	ES -7	ES -13	-11	-18	-15	ES -25	ES -24	ES -24	ES -22	ES -22	ES -28	5	0	-1	3	-2
7	-1	3	5	14	14	14	14	19	11	16	-10	-7	ES -16	-19	-17	-18	-28	ES -33	ES -33	-7	5	4	1	0
8	3	4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	2	3	9	12	16	20	21	27	15	ES -9	ES -10	ES -23	ES -11	ES -12	ES -29	ES -34	ES -34	ES -34	ES -34	-13	3	7	1	ES -1
10	-1	-4	8	8	14	19	24	18	8	-2	ES -11	ES -15	ES -17	ES -34	ES -34	ES -30	-23	ES -13	ES -33	-16	8	6	1	6
11	3	3	6	11	18	16	0	14	2	0	ES -10	-12	ES -20	-25	ES -33	ES -33	ES -33	ES -33	-25	-14	3	2	1	1
12	-2	6	9	16	15	4	ES -25	ES 4	22	16	ES -8	ES -25	ES -33	ES -33	ES -33	ES -33	ES -33	ES -33	ES -33	ES -33	-7	-5	-7	-8
13	-2	4	6	13	14	14	14	17	ES -9	-13	ES -16	ES -15	ES -15	-27	-30	ES -35	ES -35	ES -35	ES -35	-10	6	6	5	2
14	2	4	10	14	16	16	19	7	ES -7	ES -9	-8	ES -23	-23	ES -36	ES -36	ES -36	ES -36	-26	ES -36	-8	-1	2	0	-2
15	-6	-2	9	13	19	4	ES -1	5	ES -1	-1	-14	-17	ES -35	ES -35	ES -35	ES -35	ES -35	ES -35	ES -35	-17	-3	-4	-8	-4
16	15	5	7	16	16	16	21	7	4	-6	ES -5	ES -8	-15	-14	-21	ES -35	ES -35	ES -35	ES -35	-14	6	-1	1	5
17	1	2	7	12	19	12	5	2	ES -6	ES 5	ES 2	ES -7	ES -14	ES -26	ES -36	ES -36	ES -22	-19	ES -19	ES -20	4	1	-4	-5
18	-1	4	7	7	17	11	21	4	ES -3	-6	ES -3	ES -14	ES -15	-25	ES -35	ES -27	ES -35	ES -35	ES -35	-24	9	0	-1	ES -11
19	0	-5	10	12	20	9	10	8	-6	-5	-4	-12	-15	ES -26	ES -26	ES -34	ES -34	ES -34	ES -34	ES -34	-3	0	-2	1
20	-3	1	5	14	20	18	-3	11	-1	-5	-11	-13	-18	-28	ES -33	ES -33	ES -33	ES -33	ES -33	ES -33	5	3	1	0
21	0	1	4	13	17	C	61	57	31	28	27	25	-11	-19	ES -28	ES -34	ES -31	-25	-25	-15	1	ES -31	1	-2
22	-4	1	8	5	19	17	14	1	11	-7	-12	-12	-18	-23	ES -34	ES -34	-25	-14	ES -34	-26	6	-17	0	1
23	1	1	-8	15	15	17	10	ES -9	10	-6	ES -14	-11	-13	-22	ES -34	ES -34	ES -34	ES -34	ES -34	-22	5	0	2	-2
24	1	2	11	13	21	15	21	4	12	-10	-11	ES -10	S	-15	ES -24	ES -31	-28	ES -13	ES -31	S	9	1	0	6
25	0	-2	4	9	23	22	24	20	-5	-5	ES -6	-10	-12	-21	-21	-19	-24	-24	ES -34	-23	3	3	-8	0
26	3	3	9	17	19	12	21	7	2	-6	ES -12	ES -5	ES -9	-23	ES -35	ES -9	ES -5	ES -6	ES -6	ES -6	3	1	-1	2
27	3	2	0	7	14	19	17	19	12	8	-8	-15	-16	-16	-22	-20	-22	-17	-14	ES -33	-2	7	4	0
28	2	4	S	14	12	18	12	9	ES 0	ES -1	ES -7	ES -8	ES -21	ES -32	ES -32	ES -32	ES -32	ES -32	ES -35	-19	ES -4	ES -3	-7	-2
29	-2	3	C	C	C	C	C	C	C	C	C	C	C	C	C	ES -33	ES -27	-27	ES -33	-26	4	12	6	7
30	6	5	12	19	24	18	24	10	17	15	-8	ES -8	-16	-28	-25	ES -31	ES -31	ES -31	ES -31	ES -31	4	8	7	6
CNT	29	29	26	27	27	27	28	28	28	28	28	28	27	28	28	29	29	29	29	28	28	28	28	28
MED	0	2	7	13	16	16	16	10	8	US -5	ES -9	ES -12	ES -15	ES -24	ES -29	ES -32	ES -29	ES -29	ES -33	US -16	3	1	0	0
UD	3	5	10	16	21	19	24	20	20	16	ES -3	ES -5	ES -9	ES -12	ES -17	ES -16	ES -17	ES -13	ES -14	-4	8	7	5	6
LD	-3	-2	4	7	13	9	ES -3	ES 2	ES -7	ES -10	ES -16	ES -23	ES -29	ES -34	ES -35	ES -35	ES -35	ES -35	ES -35	ES -33	-3	ES -17	-7	ES -5

RADIO PROPAGATION QUALITY FIGURES

HIRAISO

Time in U.T.

Nov. 1969	Whole Day Index	H B 06 12 18 / 12 18 24	W W V 00 06 12 18 / 06 12 18 24	L M 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	4o	5 (4)(3)	5 4 4 4	4 4 - -	4 4 - 4	N N N N			
2△	4o	4 (4)(4)	4 4 4 4	(4) - - -	4 4 - 4	N N N N			
3	4+	5 (4)(4)	5 5 4 4	5 4 - 4	4 4 - 4	N N N N			
4△	4o	4 (4) 4	4 4 4 4	4 C - 4	4 4 - 4	N N N N			
5△	4-	4 (3) 4	4 3 (3) 4	4 4 - 4	4 3 - C	N N N N			
6	3+	4 4 4	(3) 3 3 4	3 3 - 4	(4)(3) - 4	N N N N	19.2	---	73γ
7	4o	4 4 4	4 4 4 4	4 4 - 4	4 4 - 4	N N N N	---	22xx	
8	4o	4 4 4	3 5 5 4	3 5 - -	4 (4) - (4)	N N N N	18.36	---	103γ
9	4o	3 3 (4)	4 5 4 4	(4) - - -	4 4 - 4	N N N N	---	---	
10△	4o	4 3 4	3 5 4 4	4 5 - 5	4 4 - 4	N N U U	---	23xx	
11	4-	3 3 (4)	4 4 4 4	4 4 - 4	4 4 - 4	N N N N			
12	4o	4 4 4	4 4 5 4	4 4 - 4	(4)(4) - 3	N N N N			
13	4o	4 4 (4)	4 3 4 4	4 4 - 4	4 4 - 4	N N N N			
14	4o	3 4 4	4 4 4 4	4 4 - 4	4 3 - 4	N N N N			
15	4o	4 4 4	4 4 4 4	4 4 - -	3 4 - (4)	N N N N			
16	4o	4 4 4	4 3 4 4	(4) - - -	4 4 - 4	N N N N			
17	4+	5 4 4	4 4 5 4	4 (4) - 4	4 4 - 4	N N N N			
(18)	4+	5 4 5	4 4 4 4	4 4 - 4	4 5 - (4)	N N N N			
(19)	4o	4 4 (3)	4 4 4 4	4 4 - 4	4 5 - 4	N N N N			
(20)	4-	4 (3)(3)	4 4 3 4	5 4 - 4	4 4 - (4)	N N N N			
21	4-	(3) 4 5	4 4 3 (4)	4 4 - 3	(4) 4 - (4)	N N N N			
22	4o	4 5 4	4 4 3 4	4 4 - -	5 4 - 4	N N N N			
23	4o	4 4 (4)	4 4 4 4	(4) - - -	4 4 - 4	N N N N			
24	4o	(3) 4 4	4 4 4 4	4 4 - 4	4 4 - 5	N N N N			
25	4o	4 4 5	4 4 4 4	4 4 - 4	4 4 - 4	N N N N			
26	4+	4 5 4	5 5 4 (4)	4 4 - 4	4 5 - 4	N N N N	15.07	---	77γ
27	4o	4 4 (3)	4 5 4 (4)	4 4 - 4	4 5 - 4	N N N N	---	21xx	
28	4-	4 (4)(3)	4 4 4 4	4 4 - 3	4 4 - (3)	N N N N			
29	4-	4 4 (4)	4 3 3 4	(3) 3 - -	4 5 - 4	N N N N			
30	4o	3 4 (4)	4 5 4 (4)	(5) - - -	4 4 - (4)	N N N N			

IQSY GEOALERT and ADALERT (Western Pacific Region)

* = MAGSTORM

o = 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.

Nov. 1969	S W F										Correspondence		
	Drop-out Intensities (db)						Start-time	Dura-tion	Type	Imp.	Flare	Solar Noise	Mag.
	CO	LM	HA	TO	HB	SH							
4	-	-	-	-	32		04.13	11	S	3	x	x	
4		27					21.27	19	S	2-	x	x	
18	-						16.xx	xx	x	x	x	x	
18		38					21.22	27	Slow	3	x		
18	-	28			-		23.22	22	Slow	2	x	x	
19	-						04.10	xx	x	x			
19	-				20		05.37	13	S	2	x	x	
21	25'		-'				16.20	xx	G	2			
21	20	43	25				21.25	60	S	3	x		
21	15	18	10		-		23.08	30	S	1+	x	x	
22	19"		>40				22.22	25	S	1			
23			13			-	02.40	10	S	2	x	x	
			20'										
24					8		05.20	25	G	1-			
24					12		09.17	33	G	1	x	x	
27	>22		-				19.28	40	Slow	2	x	x	
	-'		-'										

INUBO

1969	S			P		A				
Nov.	Phase Advance (degrees)						Time (U.T.)			Remarks
DATE	GBR	WWVL	NAA	NWC	NPM	HA2	Start	End	Maximum	
2				24	—	11	0149	0222	0158	
3					—	40	2149	2310	2208	
4					—	9	0220	0340	0232	X
4	70	14	54	128	—	88	0414	0622	0420	X
4					—	83	2128	2315	2145	
5	20	11		64	—	40	0334	0540	0340	X
6				12	—	—	0249	0330	0257	
14				8	—	—	0440	0520	0446	
15				8	—	—	0102	0140	0112	
15				16	—	—	0347	0430	0357	
16				12	—	—	0107	0120	0112	
16		—32			—	—	2143	2213	2151	X
16		—24	14	0	—	—	2227	2247	2236	
18				4	—	—	0047	0110	0050	
18				16	—	—	0238	0320	0247	X
18		32		44	—	—	0329	0425	0347	X
18				12	—	—	0712	0757D	0720	X
18					80	—	2123	2250	2127	X
18	—		88	108	101	—	2323	0051	2330	
19	20	22	16	32	19	—	0103	0136	0110	X
19	44	—133	63	85	55	—	0146	0257	0201	X
19	67	20	46	96	34	—	0417	0458	0427	X
19	55		16	64		—	0455	0528	0503	X
19	110	—	38	140		—	0528	0650	0542	X
19	60			60		—	0706	0730	0713	X
20			15	28	17	—	0104	0139	0115	X
20				8		—	0243	0320	0250	X
20					13	—	2315	0000	2325	X
21			6	16	24	—	0001	0038	0010	X
21			19	56	46	—	0109	0200	0122	X

1969	S				P	A			
Nov.	Phase Advance (degrees)					Time (U.T.)			Remarks
DATE	GBR	WWVL	NAA	NWC	NPM	HA2	Start	End	Maximum	
21			19	32	27	—	0209	0253	0214	X
21				16		—	0449	0527	0500	X
21				8		—	0654	0730	0700	X
21		28			90	—	2121	2247	2145	X
21	25	54	48	88	73	—	2300	2352	2317	X
22				12	17	—	0046	0114	0055	X
22	15	25	35	36		—	0241	0306	0302	
22				52		—	0317	0452	0343	
22					93	—	2125	2321	2135	X
22			24	44	49	—	2321	0040	2327	X
23	30	—	45	88	67	—	0241	0353	0247	X
23				8		—	0406	0434	0415	X
23				8		—	0537	0604	0542	X
24		—		24		—	0623	0730	0632	X
24	75	48		56		—	0912	1019	0925	X
25				12		—	0222	0325	0234	X
25				12		—	0605	0654	0615	
25					55	—	2222	2350	2235	X
26				16		—	0505	0558	0520	
26					34	—	2242	0000	2307	X
27					21	—	2135		2140	
27					20	—	2220		2224	
28					17	—	0020	0055	0040	
28			16	36	29	—	0104	0218	0130	
28			19	24	21	—	0248	0350	0257	X
28	45		19	48		—	0525	0642	0534	X

NOTE: The letter E or D attached to a time shows that the pertinent time is earlier or more delayed than the given time, respectively.

IONOSPHERIC DATA IN JAPAN FOR NOVEMBER 1969

第21巻 第11号

1970年2月20日 印 刷
1970年2月25日 発 行

編集兼
発行人 今野清恒
東京都小金井市貫井北町4丁目2—1

発行所 郵政省電波研究所
184 東京都小金井市貫井北町4丁目2—1
電話国分寺(0423)(21)1211(代)

印刷所 有限会社 研文社
160 東京都新宿区四谷3丁目6
電話(353)8358・(351)0046