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IONOSPHERIC DATA IN JAPAN

FOR JULY 1968

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RADIO RESEARCH LABORATORIES

NUKUI-KITAMACHI, KOGANEI-SHI, TOKYO, JAPAN

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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.

	Latitude	Longitude	Site
Hiraiso	36°22.0′N.	140°37.5′E.	Isozaki-machi, Nakaminato-shi, Ibaraki-ken

SYMBOLS AND TERMINOLOGY

A. IONOSPHERE

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

Terminology

f_0F2, f_0F1, f_0E — The ordinary wave critical frequency for the $F2$, $F1$ and E layers, respectively.

f_0Es — The ordinary wave top frequency corresponding to highest frequency at which a mainly continuous trace is observed.

f_bEs — The lowest ordinary wave frequency at which the Es 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.

$h'Es$ — The lowest virtual height of the trace used to give the f_0Es.

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

a. Descriptive Letters

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

A Measurement influenced by, or impossible because of, the presence of a lower thin layer, for example *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.

Bracet 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), San Francisco (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 San Francisco.

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.)

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)
S F .....Various frequencies of commercial circuit (San Francisco)
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

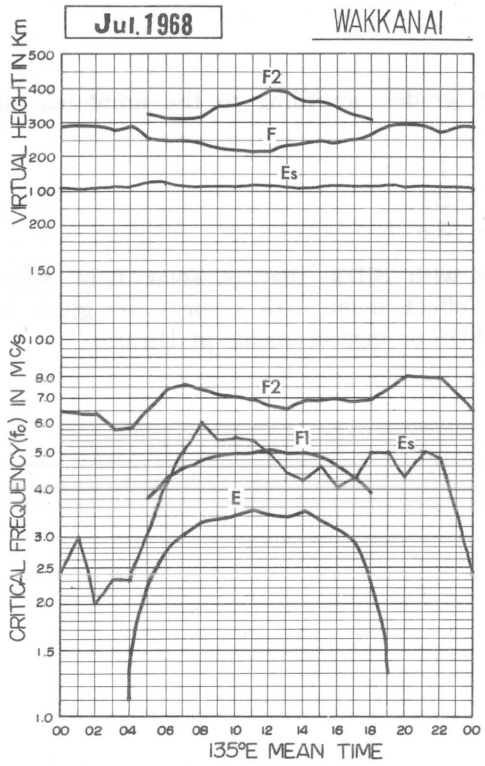
Importances

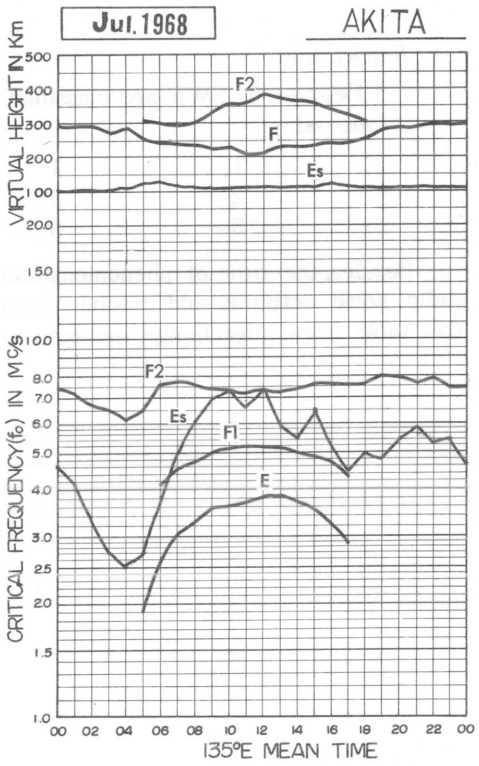
Degrees of SWF are classified into 9 grades according to the amplitude of fade-out ;

1−	1	1+
2−	2	2+
3−	3	3+

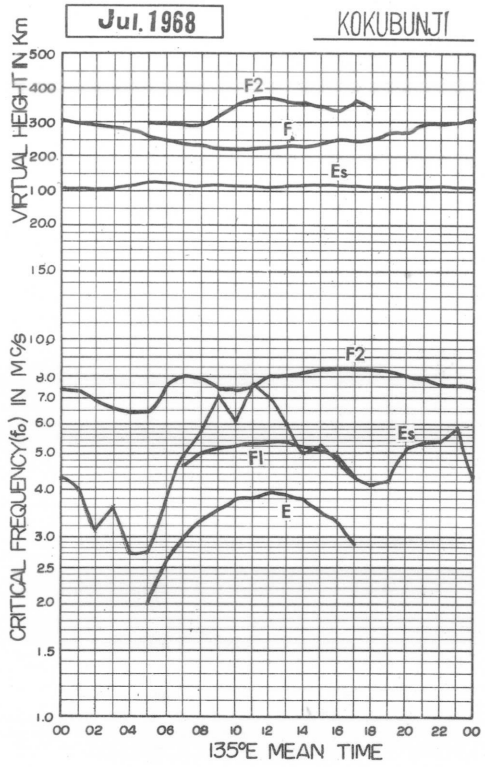
Besides, the time of phenomena associated with SID's, that is, solar flare, solar radio noise outburst and crochet (solar flare effect in magnetic record), are given in this table from interchange messages of IUWDS or measurements at Hiraiso.

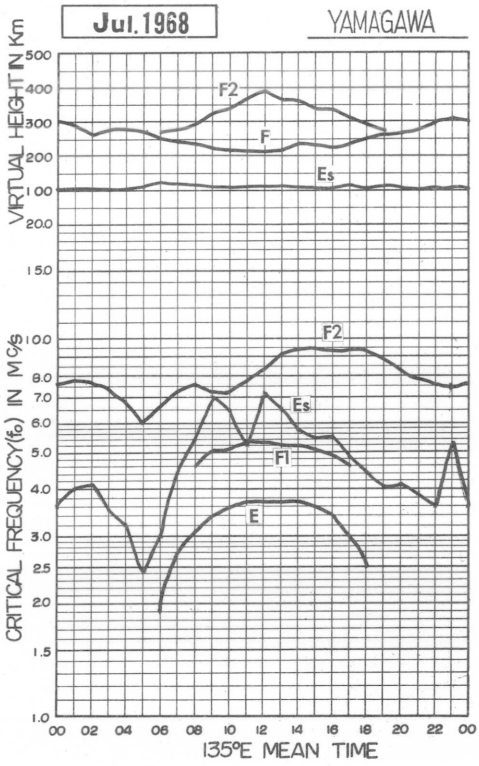
IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS





IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS





IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: WAKKANAI

JUL. 1968

135° E Mean Time (G. M. T. +9h)

CHAR	HR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
foF2	MED	65	64	64	58	58	65	74	76	74	72	70	69	67	66	69	68	70	68	68	74	80	80	80	72
	CNT	21	24	24	27	25	27	28	28	24	26	24	22	26	24	26	28	28	28	27	27	29	27	26	23
	Q R	10	8	10	7	7	7	12	13	13	11	11	8	10	7	9	9	10	6	8	7	7	7	10	10
foF1	MED					300	380	430	460	480	490	500	500	510	500	500	490	460	430	390L	300				
	CNT					1	13	14	13	8	13	13	17	19	22	23	21	21	22	5	1				
foE	MED					110	215	275	305	325	330	340	350	340	338	350	330	312	290	220	130				
	CNT					17	25	27	27	28	27	27	25	21	18	19	18	18	19	21	10				
foEs	MED	J24X	J30X	20	J23X	23	30	41	50	J61X	54	55	54	50	44	42	46	40	43	J50X	J50X	J43X	J50X	J48X	J35X
	CNT	29	27	29	28	28	28	27	28	27	27	27	28	28	27	28	28	27	28	27	28	29	29	28	29
	Q R	33	15		D17	10	14	14	17	16	14	30	26	24	17	19	27	6	17	28	34	29	29	36	31
f-min	MED	E	E	E	E	E	E11E	11	16	17	18	19	20	20	20	18	18	17	12	E	E	E	E	E	E
	CNT	29	27	29	28	28	28	27	28	27	27	27	28	28	27	28	28	27	28	27	28	29	29	28	29
M (3000) F2	MED	270	270	270	275	275	280	282	288	290	280	282	275	270	270	275	275	282	285	280	280	275	275	275	275
	CNT	21	24	24	27	25	27	28	28	24	26	24	23	26	24	26	28	28	28	27	27	29	27	26	23
M (3000) F1	MED					335	330	350	350	360	358	365	370	358	350	345	342	340	340	345L	315				
	CNT					1	13	13	10	7	12	11	16	18	21	21	20	19	18	5	1				
h'F2	MED					315	325	315	310	315	350	350	368	395	390	365	360	340	322	308	310				
	CNT					1	15	22	21	22	25	19	22	24	24	26	26	25	28	12	1				
h'F	MED	278	292	285	275	286	260	250	250	240	225	222	210	215	232	235	250	245	250	260	285A	290A	290	270	280
	CNT	26	28	29	29	28	26	19	15	9	12	14	16	19	20	20	21	21	21	13	17	21	21	21	25
h'Es	MED	105	105	105	110	110	125	122	120	115	115	110	110	110	110	110	112	115	115	115	115	110	110	110	110
	CNT	21	22	19	21	23	22	26	27	26	26	26	28	25	24	23	26	24	25	27	28	28	29	25	24
hpF2	MED																								
	CNT																								
ypF2	MED																								
	CNT																								

IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: AKITA

JUL. 1968

135° E Mean Time (G. M. T. +9h)

CHAR	HR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
foF2	MED	74	72	67	65	61	65	76	77	76	74	73	72	73	72	74	76	76	75	76	80	79	76	78	74
	CNT	16	16	16	22	19	28	30	29	28	30	31	30	29	30	30	30	30	31	30	30	29	27	19	17
	Q R	14	11	11	10	4	10	11	12	10	10	12	11	10	12	11	9	11	10	9	7	6	7	5	6
foF1	MED						340L	410	450	470	500	515	520	520	515	500	490	470	430L	370L					
	CNT						4	6	16	16	17	20	22	22	24	24	19	22	9	3					
foE	MED					E	190	255	305	325	355	360	368	380	385	370	350	320	285	228	170				
	CNT					19	14	16	13	12	9	8	4	5	6	13	13	13	13	4	1				
foEs	MED	J46X	J41X	J33X	J27X	J25X	27	38	J50X	J61X	J70X	J73X	J66X	J74X	J59X	J54X	J65X	J51X	J45X	J50X	J48X	J54X	J58X	J52X	J54X
	CNT	30	30	30	31	30	30	30	29	29	31	31	31	31	31	30	31	31	31	30	31	30	30	30	31
	Q R	36	29	18	20	21	11	11	22	18	27	26	24	30	26	33	25	22	31	37	28	33	36	39	42
f-min	MED	E13S	E	E	E	E	13	16	17	17	18	19	20	20	20	18	18	18	17	14	12	E13S	E13S	E13S	E13S
	CNT	30	30	30	31	30	30	30	29	29	31	31	31	31	31	30	31	31	31	30	31	30	30	30	31
M (3000) F2	MED	275	275	280	285	280	290	288	300	300	290	285	280	278	278	275	280	285	290	290	285	280	275	280	280
	CNT	16	16	16	22	19	28	30	29	28	30	31	29	28	30	30	30	29	30	29	30	29	27	19	17
M (3000) F1	MED						328L	340	355	360	360	365	365	365	355	350	348	340	335L	330L					
	CNT						4	6	15	14	15	18	21	20	21	23	18	21	8	3					
h'F2	MED						305	300	290	300	330	360	360	380	375	368	360	340	320	300	290				
	CNT						15	28	27	27	25	28	27	27	28	30	28	29	29	26	1				
h'F	MED	290	290	288	270	282	255	245	235	230	220	230	205	210	228	230	230	240	240	255	275	280	280	290	285
	CNT	28	29	30	31	30	29	25	18	14	15	15	15	17	18	18	16	18	18	18	28	29	28	29	29
h'Es	MED	110	105	105	105	110	125	128	120	115	115	115	115	115	115	115	115	122	120	115	115	110	110	110	110
	CNT	27	28	28	31	26	27	30	29	29	31	31	31	31	31	27	31	30	31	29	30	30	30	30	31
hpF2	MED																								
	CNT																								
ypF2	MED																								
	CNT																								

IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: KOKUBUNJI

JUL. 1968

135° E Mean Time (G. M. T. +9h)

CHAR \ HR		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
foF2	MED	74	73	69	66	64	64	76	80	79	74	73	75	80	80	82	83	84	84	83	82	80	79	76	76
	CNT	22	24	25	24	26	30	30	29	28	28	28	28	28	29	30	30	29	31	30	29	30	27	25	22
	Q R	12	15	8	10	11	13	12	13	13	10	12	10	12	15	12	13	15	10	10	9	12	9	7	10
foF1	MED							400	U460L	500L	510L	520	530	530	530	515	505	U490L	435L	360L					
	CNT							2	6	10	7	13	5	5	11	12	16	14	8	1					
foE	MED						200	260	300	U330A	355	U380	380	392	388	380	350	328	288	220					
	CNT						7	9	9	7	3	5	5	4	6	9	13	14	12	1					
foEs	MED	J43X	J40X	J31X	J36X	J27X	J27X	J37X	J49X	J57X	J72X	J61X	J76X	J71X	60	56	J52X	J48X	J43X	41	J42X	J51X	J53X	J53X	J58X
	CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	31	31	31	31	31	31	31	31
	Q R	22	26	26	17	15	14	11	21	33	45	40	38	34	37	40	40	24	26	23	28	37	28	28	24
f-min	MED	E15S	E15S	12	11	10	14	14	15	16	20	25	26	26	26	25	25	16	15	14	13	E15S	E15S	E15S	E15S
	CNT	31	31	31	31	31	31	3*	31	31	31	31	31	31	31	30	30	31	31	31	31	31	31	31	31
M (3000) F2	MED	270	280	285	285	280	295	300	300	300	290	280	278	275	280	280	280	285	290	290	290	280	275	265	272
	CNT	22	24	25	24	26	30	30	29	28	27	27	28	27	29	30	30	29	31	29	29	29	27	25	22
M (3000) F1	MED							352	U350L	355L	368	365	370	355	350	350	340	U330L	350L	335L					
	CNT							2	5	9	6	12	4	5	10	12	15	12	6	1					
h'F2	MED						300	295	288	290	318	355	370	372	360	358	350	330	315	290					
	CNT						6	25	28	25	25	28	24	23	29	28	30	29	31	27					
h'F	MED	310	295	290	280	275	260	250	240	228	218	220	218	226A	228	228	242	250	245	250	271	270	295	295	300
	CNT	29	31	31	31	31	29	27	17	15	14	13	8	8	12	14	17	19	16	15	28	29	29	27	29
h'Es	MED	110	105	105	105	110	125	125	120	115	115	110	110	110	110	115	115	115	115	110	110	110	110	110	110
	CNT	31	31	31	31	29	27	31	31	30	31	29	31	31	31	29	28	30	31	31	31	31	31	31	31
hpF2	MED	375	360	350	355	358	322	310	305	310	340	370	380	380	370	368	360	352	345	338	330	350	370	380	368
	CNT	22	24	25	24	26	30	29	29	26	25	19	20	19	24	24	30	28	29	28	28	29	27	25	22
ypF2	MED	100	100	95	100	100	100	100	95	100	90	95	95	95	100	100	98	105	105	108	112	115	105	115	100
	CNT	22	24	25	24	26	30	29	29	26	25	19	20	19	24	24	30	28	29	28	28	29	27	25	22

IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: YAMAGAWA

JUL. 1968

135° E Mean Time (G. M. T. +9h)

CHAR \ HR		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
foF2	MED	76	78	77	74	68	60F	66	73	76	72	72	77	84	92	94	95	94	94	94	88	82	78	75	74S
	CNT	19	16	15	17	15	24	30	31	30	30	30	29	31	30	30	30	30	31	31	30	30	30	26	20
	Q R	14	14	10	15	18	17	14	14	11	9	10	10	9	12	12	14	12	11	13	8	12	8	9	10
foF1	MED								440	460	505	510	530	530	520	520	510	490	460	405					
	CNT								2	11	8	19	21	19	21	23	17	17	21	4					
foE	MED						E	190	268	310	340	355	370	370	372	370	360	340	302	230					
	CNT						2	18	30	27	24	26	21	22	22	20	19	19	20	18					
foEs	MED	J36X	J40X	J41X	J35X	J32X	J24X	30	J44X	J54X	J71X	65	52	72	65	57	J54X	J55X	J48X	J44X	J40X	J41X	J39X	J36X	J52X
	CNT	30	31	31	30	30	31	30	31	30	29	31	31	31	31	31	31	31	31	31	29	31	31	31	31
	Q R	32	32	32	21	25	9	11	21	16	36	39	36	46	38	35	23	42	35	22	47	31	37	35	36
f-min	MED	E15S	E14S	13	E	E	12	E15S	15	15	15	18	19	19	19	18	18	16	15	15	12	E15S	E15S	E15S	E15S
	CNT	30	31	31	30	30	31	30	31	30	29	31	31	31	31	31	31	31	31	31	29	31	31	31	31
M (3000) F2	MED	270	280	290	295	285	282F	305	310	308	295	285	268	265	265	270	272	280	285	290	290	285	270	265	270S
	CNT	19	16	15	17	15	24	30	31	30	30	29	28	30	29	30	30	30	31	31	30	30	30	26	20
M (3000) F1	MED								350	365L	350	360	360	365	360	348	355	350	338	332					
	CNT								2	9	4	15	17	15	14	16	11	14	18	4					
h'F2	MED							270	275	285	320	338	368	388	360	360	340	340	310	290	275				
	CNT							12	29	29	25	27	27	30	28	29	29	29	31	29	9				
h'F	MED	300	290	260	275	275	270	250	239	230	220	212	U210	206	209	232	230	225	238	250	265	258	274	298	305
	CNT	30	31	31	31	29	30	29	24	18	11	18	16	16	16	13	13	13	17	18	23	31	28	31	31
h'Es	MED	105	105	105	100	105	105	125	120	115	110	110	110	110	110	110	110	105	115	105	110	105	100	105	105
	CNT	29	30	31	29	26	27	30	31	30	29	30	30	30	30	31	30	31	31	31	29	31	31	30	31
hpF2	MED																								
	CNT																								
ypF2	MED																								
	CNT																								

IONOSPHERIC DATA

JUL. 1968 | foF2 (0.1) | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N, Long. 141° 41.1' E Sweep 1.0 Mc to 20.0 Mc 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	80	78	F 75	67	55	58	68	63	62	61	63	A	64	64	65	68	72	67	I C 69	S 73	S 76	80	81	F
2	U F 77	U F 73	F 73	F 76	U F 76	71	83	85	84	76	79	81	83	86	89	81	79	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	68	73	80	80	75	73	72
5	F	68	F	U F 51	F 50	49	57	61	60	60	60	A	55	53	A	56	55	59	58	62	71	U F 73	68	63
6	F 60	U F 58	U F 57	F 57	55	63	76	81	76	74	69	63	60	63	68	63	62	63	65	74	81	78	F	U F 80
7	F 64	58	57	46	48	58	I A 61	62	63	63	57	W	53	52	48	53	55	I A 58	63	73	81	80	70	62
8	58	U F 55	U F 54	U F 50	F 53	70	I C 80	71	A	I A 63	62	65	66	65	60	H 64	66	65	64	74	83	83	80	75
9	63	57	56	57	57	65	70	75	74	63	58	56	54	55	56	59	61	63	67	I C 74	74	74	73	68
10	64	I C 63	61	58	58	76	88	88	83	76	I A 80	81	70	67	69	73	86	87	I A 86	I A 81	77	U F 83	U F 80	67
11	U F 64	F 70	49	45	43	48	52	62	63	56	R	R	56	R	53	59	56	60	66	68	73	71	67	67
12	63	U F 63	U F 58	I C 58	F 58	65	70	77	80	74	73	67	69	75	72	70	73	71	75	80	84	83	83	80
13	77	74	71	64	63	63	69	78	I R 74	73	66	67	66	64	66	65	69	69	74	83	87	U S 91	I A 93	F 83
14	F	F 66	65	F 56	C	C	C	C	C	C	C	71	A	C	93	84	69	65	63	64	73	78	77	U F 78
15	F	F	68	64	F 57	65	83	89	88	83	A	A	A	A	73	76	74	72	R	A	86	88	U F 89	A
16	F	F	F	U F 65	F 66	65	68	I A 69	82	70	I A 74	I A 71	I A 72	79	76	73	70	73	73	73	78	83	U F 81	F
17	79	78	81	67	F 65	70	63	68	68	72	63	66	73	71	74	71	63	67	66	A	72	F	U F 83	F
18	F	C	F	U F 63	F	63	63	69	I C 78	73	71	76	73	71	74	74	72	70	74	80	83	80	C	U F 83
19	U F 68	F	U F 73	F 62	F	75	74	96	89	73	67	66	65	A	A	62	I C 62	62	66	73	80	F	U F 84	68
20	62	60	57	57	61	71	78	70	A	C	C	C	C	C	C	C	C	C	C	76	78	78	69	67
21	65	F 64	F 63	F 60	59	63	68	74	A	A	I A 71	I A 66	62	67	69	I A 70	73	70	68	72	80	80	83	74
22	73	67	68	66	61	73	83	83	78	I A 73	H 67	70	77	75	76	75	70	74	73	80	85	82	85	83
23	73	63	60	F 57	F	70	74	74	I A 70	72	73	70	68	70	67	67	67	69	70	79	F 77	U F 73	F 70	I A 69
24	F 67	F 65	F	U F 57	F 53	F 64	78	81	73	62	A	A	56	55	56	56	56	58	63	73	77	78	73	67
25	63	60	60	58	56	63	77	79	80	80	78	75	67	64	70	69	73	78	81	86	81	75	68	69
26	65	60	64	63	63	76	83	H 73	69	I A 65	65	I A 66	68	65	61	66	71	69	68	75	80	F 74	F 73	F
27	F	F	U F 67	U F 69	F 61	F 63	I A 70	65	63	74	75	73	69	69	69	73	75	76	73	75	84	90	86	72
28	67	67	65	63	62	65	66	76	74	68	70	68	67	66	68	I A 68	68	70	68	73	83	U F 80	83	73
29	A	U F 65	U F 64	F	U F 70	F	97	85	A	61	62	62	63	64	72	68	64	64	65	67	76	78	F	F
30	F	F 65	F	F	U F 55	65	75	76	74	75	76	I A 74	73	73	70	71	72	68	65	71	I A 76	F 80	U F 82	F 73
31	F 68	F 63	F 60	F 57	F 60	F 70	80	88	93	80	78	79	80	71	78	76	72	69	66	73	79	83	S 80	78
	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	21	24	24	27	25	27	28	28	24	26	24	22	26	24	26	28	28	28	27	27	29	27	26	23
MED	65	64	64	58	58	65	74	76	74	72	70	69	67	66	69	68	70	68	68	74	80	80	80	72
UQ	73	68	68	64	62	70	80	82	81	74	74	74	72	71	74	73	72	70	73	80	83	83	83	78
LQ	63	60	58	57	55	63	68	69	68	63	63	66	62	64	65	64	62	64	65	73	76	76	73	68

IONOSPHERIC DATA

JUL. 1968 | foF1 (0.01) | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1.0 Mc to 20.0 Mc 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						390	400		A	510	A	A	520	500	490	500	460	430	C					
2						360	L 460	460	490	530	A	580	500	570	500	470	480	C	C					
3						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
4						C	C	C	C	C	C	C	C	C	C	C	C	430	A					
5							A	A	450	A	A	A	A	A	A	470	450	410	L 390					
6							430		480	470	490	520	510	I A 490	470	460	430	420	380					
7						380	A	420	A	460	470	480	480	470	470	460	440	A	A	300				
8						370	C	A	A	A	480	490	510	490	490	A	450	430						
9						L 380	420	460	460	480	480	480	500	490	490	480	460	430	A					
10					300	L 410	A	A	490	A	A	500	510	500	H 510	I A 480	A	A	A					
11						A	410	430	440	A	500	480	480	490	480	460	480	420	A					
12								I A 460	A	A	510	500	510	I A 500	500	A	470	430	L 390					
13						400	430	460	R	490	500	510	530	500	500	510	A	440	A					
14						C	C	C	C	C	C	A	A	C	A	I A 490		L 430	A					
15						400	430	I A 460	A	A	A	A	A	A	500	I A 500	480	A	A					
16						L 410	440	A	A	A	A	A	A	A	A	490	480	440	L					
17							L	A	A	A	500	520	510	520	490	500	430	410						
18							A	480	I C 480	490	H 510	510	520	520	500	510	460	A						
19							A	450	A	460	I A 520	A	A	A	A	A	C	440						
20							420		A	C	C	C	C	C	C	C	C	C	C					
21							440	460	A	A	A	A	A	500	500	I A 480	450	430	A					
22						360		A	A	A		520	500	540	500	A	A	A						
23						400		A	A	H 500	510	510	500	510	I A 510	A	470	420						
24						380	A	A	A	500	A	A	500	490	490	H 490	450	I A 440	400					
25							L 420		490	510	510	510	530	530	500	490	480	450	L 360					
26							400		A	A	A	A	A	I A 510	500	500	450	L 420						
27							A	480		510	500	490	520	510	520	490	I A 480	I A 430						
28						330	430	430	A	A	A	500	510	500	500	A	A	420						
29							A	440	A	A	A	490	I A 510	510	490	490	A	A	A						
30						A	A	A	A	A	A	A	A	510	I A 500	A	450	420						
31							U L 430	A	A	490	A	A	A	A	A	480	450	400						
	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	13	14	13	8	13	13	17	19	22	23	21	21	22	5	1				
MED					300	380	430	460	480	490	500	500	510	500	500	490	460	430	L 390	300				
UQ						400	430	460	490	510	510	510	515	510	500	500	480	430	L 390					
LQ						370	420	440	455	480	490	490	500	490	490	480	450	420	L 380					

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

JUL. 1968

foE (0.01)

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

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1.0 Mc to 20.0 Mc 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	215	290	305	325	340	350	355	I A 340	I A 335	I A 330	300	320	290	I C 225	S				
2					A	I A 230	I A 280	310	330	360	375	350	385	370	350	320	310	C	C	C				
3					C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
4					C	C	C	C	C	C	C	C	C	C	C	C	C	285	225	120				
5					A	210	270	300	330	340	365	355	350	315	330	315	I A 310	290	230	150				
6					150	220	280	310	320	330	350	350	355	A	A	A	310	I A 295	230	B				
7					130	215	270	305	325	340	350	335	330	350	350	330	310	280	215	A				
8					130	215	I C 275	300	320	330	350	350	330	340	330	320	300	I A 275	I A 220	A				
9					150	230	295	315	335	330	335	A	375	390	385	340	310	285	A	C				
10					A	235	290	305	320	340	330	345	A	A	370	345	I A 300	I A 285	235	150				
11					120	205	250	290	325	335	340	350	360	315	I A 320	335	315	280	225	S				
12					A	215	285	300	325	330	365	I A 350	345	A	A	310	A	A	225	A				
13					125	220	280	300	335	335	330	A	A	385	370	345	325	295	225	135				
14					C	C	C	C	C	C	C	350	320	I C 300	315	300	A	A	A	150				
15					115	215	270	305	325	330	325	A	A	A	A	345	325	295	230	S				
16					A	A	290	305	325	350	360	350	350	340	310	A	A	A	A	150				
17					I A 135	I A 215	275	310	335	340	355	350	350	315	A	A	A	A	235	A				
18					A	220	280	305	I C 330	365	370	385	355	365	370	350	310	270	I A 200	S				
19					A	205	260	290	320	325	355	355	A	A	A	A	C	285	215	125				
20					A	210	275	310	340	C	C	C	C	C	C	C	C	C	C	S				
21					A	A	A	A	325	325	335	320	A	A	385	330	320	A	A	A				
22					A	190	270	310	320	335	355	340	335	365	335	325	A	A	220	A				
23					E	200	275	300	315	335	335	340	325	320	300	A	A	300	A	A				
24					E	215	270	300	325	330	330	320	320	365	370	A	320	295	215	A				
25					110	205	250	300	305	320	325	310	A	A	A	335	315	290	205	S				
26					E	S	265	305	325	320	320	315	A	A	360	A	A	A	215	E				
27					E	205	250	300	315	325	315	310	320	A	A	A	A	A	A	A				
28					E	200	270	305	320	325	330	320	380	325	370	350	315	290	210	S				
29					105	200	255	300	315	325	320	325	300	310	310	330	315	285	205	E				
30					E	200	275	300	315	330	325	325	I A 320	A	A	A	A	A	A	A				
31					E	205	290	310	325	345	355	370	330	300	A	A	305	290	205	120				
	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	25	27	27	28	27	27	25	21	18	19	18	18	19	21	10				
MED					110	215	275	305	325	330	340	350	340	338	350	330	312	290	220	130				
UQ					130	215	280	308	328	340	355	350	355	365	370	345	320	292	225	150				
LQ					E	205	270	300	320	328	330	325	325	315	325	320	310	285	215	120				

IONOSPHERIC DATA

JUL. 1968 | foEs (0.1) | 135 E Mean Time (G. M. T. + 9 h)

Station WAKKANAI Lat. 45° 23.6' N, Long. 141° 41.1' E Sweep 1.0 Mc to 20.0 Mc 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	Es 17	Fx 33	E	E	Fx 30	34	38	Fx 123	Fx 65	Fx 93	Fx 63	Fx 71	Fx 63	53	40	40	G	G	C	Fx 74	Fx 60	Fx 51	Fx 63	Fx 30
2	Fx 50	Fx 30	20	Fx 23	21	27	Fx 43	43	41	49	53	Fx 53	49	52	48	Fx 55	39	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	50	41	41	Fx 31	Fx 33	Fx 60	Fx 33
5	Fx 50	30	20	Fx 23	23	30	Fx 69	51	49	Fx 54	57	Fx 63	Fx 64	Fx 73	Fx 65	41	42	G	31	Fx 63	Fx 64	Fx 61	Fx 33	20
6	E	E	E	E	G	G	35	43	Fx 63	40	46	47	G	Fx 83	43	40	G	33	35	63	Fx 36	Fx 63	Fx 53	Fx 53
7	Fx 23	18	14	E	24	32	M 68	40	Fx 53	41	42	38	40	G	G	G	37	Fx 60	Fx 61	25	Fx 24	Fx 24	E	E
8	E	E	E	23	G	40	C	Fx 83	130	Fx 65	G	40	Fx 54	41	40	45	40	40	Fx 33	20	Fx 35	Fx 33	Fx 33	Fx 35
9	Fx 21	Fx 33	Fx 23	E	G	G	40	37	G	38	40	38	G	52	Fx 94	46	40	38	Fx 54	C	Fx 23	22	19	E
10	Fx 24	C	E	Fx 28	16	G	48	Fx 63	Fx 63	59	113	48	Fx 63	44	G	Fx 71	40	Fx 70	Fx 103	Fx 131	Fx 83	Fx 66	Fx 25	Fx 35
11	Es 15	E	E	Fx 24	26	Fx 43	40	40	39	54	40	51	40	43	40	G	36	40	Fx 45	Fx 45	Fx 30	Fx 28	Fx 30	Fx 55
12	Fx 40	Fx 23	Fx 25	C	Fx 23	30	42	Fx 71	Fx 61	Fx 55	51	Fx 55	49	Fx 58	Fx 46	Fx 73	Fx 43	30	28	53	Fx 38	Fx 51	Es 16	E
13	E	E	E	E	G	G	G	36	40	42	43	43	40	G	G	Fx 74	Fx 48	Fx 43	Fx 68	118	Fx 25	Fx 54	Fx 125	18
14	E	Fx 25	Fx 23	Fx 24	C	C	C	C	C	C	C	Fx 64	Fx 75	C	Fx 65	Fx 65	Fx 51	43	Fx 48	Fx 53	Fx 51	Fx 43	Fx 21	Fx 41
15	Fx 51	Fx 21	E	Fx 20	17	29	40	Fx 61	Fx 80	147	Fx 180	Fx 133	Fx 116	Fx 120	43	Fx 65	G	Fx 63	Fx 63	Fx 73	Fx 34	Fx 73	Fx 83	Fx 105
16	Fx 63	Fx 33	18	Fx 23	Fx 25	30	42	Fx 76	Fx 61	58	83	Fx 73	Fx 110	Fx 60	Fx 93	41	Fx 38	Fx 40	Fx 53	22	Fx 43	Fx 40	Fx 33	Fx 31
17	Fx 25	17	E	E	20	30	40	44	Fx 63	Fx 55	47	43	42	43	37	36	Fx 43	Fx 40	Fx 65	D	Fx 45	Fx 53	Fx 73	Fx 43
18	Fx 51	C	Fx 65	Fx 60	Fx 43	23	Fx 53	Fx 53	C	G	44	44	44	45	48	44	Fx 74	Fx 60	Fx 68	Fx 63	Fx 100	131	C	Fx 63
19	Fx 61	Fx 51	63	Fx 41	Fx 26	28	Fx 66	Fx 71	Fx 56	61	Fx 63	60	63	Fx 141	122	Fx 71	C	53	Fx 51	Fx 50	110	Fx 62	Fx 63	Fx 31
20	Fx 36	Fx 30	40	21	Fx 26	Fx 43	Fx 55	Fx 54	70	C	C	C	C	C	C	C	C	C	C	Fx 68	Fx 53	Fx 50	Fx 40	Fx 31
21	Fx 33	Fx 43	Fx 33	Fx 35	28	Fx 33	31	41	Fx 74	Fx 78	Fx 91	Fx 83	Fx 58	Fx 44	41	Fx 80	36	Fx 62	Fx 63	20	20	Fx 70	Fx 43	Fx 55
22	Fx 40	Fx 35	Fx 31	88	43	46	41	51	Fx 66	Fx 73	43	46	40	41	43	Fx 73	Fx 65	Fx 50	30	22	Fx 50	Fx 40	Fx 61	E
23	Es 16	Fx 30	18	Fx 22	15	23	36	50	Fx 100	49	Fx 55	51	40	41	Fx 71	Fx 64	Fx 40	G	Fx 55	Fx 43	Fx 65	Fx 63	Fx 94	Fx 125
24	Fx 24	18	Fx 24	Fx 21	Fx 25	G	Fx 53	Fx 55	53	50	Fx 95	Fx 153	44	G	G	42	40	53	50	53	Fx 60	Fx 70	Fx 53	22
25	Fx 24	21	Fx 33	Fx 21	G	G	40	41	Fx 71	Fx 54	Fx 45	Fx 63	50	39	40	40	40	Fx 43	33	30	Es 15	19	E	Es 16
26	Es 16	E	E	E	19	34	33	G	Fx 58	Fx 153	Fx 74	Fx 117	65	Fx 56	40	42	41	Fx 53	35	Fx 35	Fx 43	Fx 50	Fx 63	Fx 43
27	Fx 63	Fx 46	Fx 93	Fx 43	20	51	Fx 90	38	50	Fx 53	40	45	41	40	40	Fx 51	Fx 56	Fx 50	Fx 43	Fx 30	31	Fx 31	Fx 30	Fx 33
28	Fx 24	Fx 23	E	15	14	27	41	41	53	53	69	40	G	39	G	Fx 163	Fx 128	Fx 100	Fx 63	Fx 70	Fx 140	Fx 40	Fx 70	Fx 100
29	Fx 80	Fx 73	Fx 60	Fx 33	Fx 34	Fx 51	Fx 93	41	Fx 70	Fx 71	Fx 93	60	Fx 65	40	40	41	44	45	Fx 70	Fx 43	Fx 35	26	Fx 83	Fx 83
30	Fx 28	Fx 53	Fx 43	Fx 33	23	Fx 46	43	51	Fx 55	Fx 63	Fx 73	Fx 80	Fx 70	Fx 51	Fx 65	Fx 58	43	Fx 33	Fx 35	50	Fx 103	Fx 50	Fx 90	Fx 43
31	Fx 24	Fx 33	Fx 41	Fx 31	Fx 23	30	38	Fx 53	50	50	Fx 73	68	Fx 73	Fx 81	Fx 53	42	40	34	Fx 41	Fx 33	37	Fx 43	Fx 43	Fx 43
	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	27	29	28	28	28	27	28	27	27	27	28	28	27	28	28	27	28	27	28	29	29	28	29
MED	Fx 24	Fx 30	20	Fx 23	23	30	41	50	Fx 61	54	55	54	50	44	42	46	40	43	Fx 50	Fx 50	Fx 43	Fx 50	Fx 48	Fx 35
UQ	Fx 50	Fx 33	Fx 33	Fx 32	Fx 26	37	Fx 53	Fx 58	Fx 68	Fx 64	Fx 74	Fx 70	Fx 64	Fx 57	Fx 59	Fx 68	Fx 44	Fx 53	Fx 63	Fx 66	Fx 60	Fx 62	Fx 66	Fx 53
LQ	17	18	E	E E 15	16	23	39	41	52	50	44	44	40	40	40	41	38	36	35	32	Fx 31	Fx 33	Fx 30	22

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

JUL. 1968 | f_bEs (0.1) | 135° E Mean Time (G. M. T. + 9 h)

Station WAKKANAI Lat. 45° 23.6' N, Long. 141° 41.1' E Sweep 1.0 Mc to 20.0 Mc 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	E	E	18	G	G	G	53	G	50	A	40	42	37	G	G	G	C	46	40	25	17	21
2	17	12	16	13	16	25	31	41	G	G	52	G	G	50	45	G	G	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	40	39	37	25	17	27	26
5	27	18	15	E	18	G	44	42	G	47	56	A	50	50	A	G	34	G	G	50	60	44	22	E
6	E	E	E	E	G	G	G	36	G	G	43	G	G	51	39	35	G	30	G	63	22	50	46	38
7	17	13	11	E	G	G	A	40	45	G	G	G	G	G	G	G	G	A	50	20	22	12	E	E
8	E	E	E	E	G	30	C	63	A	A	G	G	G	G	G	45	40	35	24	18	30	18	17	22
9	17	20	17	E	G	G	G	G	G	G	G	37	G	G	G	G	G	G	45	C	19	17	18	E
10	17	C	E	E	16	G	47	60	48	52	A	48	47	42	G	51	47	45	A	A	60	50	17	25
11	E	E	E	E	G	37	37	G	G	52	G	G	G	42	40	G	G	G	42	40	30	26	20	20
12	36	12	17	C	15	G	G	52	57	50	50	44	45	53	45	50	39	29	G 20	34	E S 38	46	E	E
13	E	E	E	E	G	G	G	G	E R 40	G	G	40	40	G	G	50	47	G	60	42	20	50	A	17
14	E	E	18	16	C	C	C	C	C	C	C	64	A	C	58	60	38	31	33	50	32	18	17	18
15	30	12	E	E	G	G	G	50	52	57	A	A	A	A	40	50	G	46	E R 63	A	35	52	50	A
16	40	13	E	E	22	25	G	A	61	56	A	A	A	50	53	36	38	37	26	G	37	27	28	17
17	12	14	E	E	17	25	G	43	50	52	G	G	G	G	37	42	36	34	45	A	40	35	25	17
18	19	C	33	21	35	20	46	G	C	G	G	G	G	G	46	G	40	53	66	58	66	68	C	30
19	42	36	30	28	20	26	63	40	50	G	55	58	52	A	A	56	C	G 23	42	30	65	50	32	20
20	32	20	30	16	20	35	40	40	A	C	C	C	C	C	C	C	C	C	C	33	32	40	36	20
21	20	30	21	22	21	26	29	40	A	A	A	A	51	41	G	A	G 29	40	33	16	19	20	31	34
22	23	21	20	17	23	G	G	48	65	A	G	G	G	G	G	70	57	45	G	19	40	30	47	E
23	E	27	15	17	G	G	G	45	A	G	G	45	G	G	60	50	36	G	50	41	40	47	51	A
24	16	14	18	12	18	G	40	45	48	G	A	A	G	G	G	36	G	48	G	40	52	47	35	E
25	20	16	30	16	G	G	37	39	G	G	G	G	40	38	36	G	G	40	G	27	E	17	E	E
26	E	E	E	E	G	32	G	G	53	A	57	A	50	56	33	40	38	35	35	33	46	30	25	40
27	40	E	40	19	16	48	A	G	G	G	G	G	G	38	40	40	54	45	38	20	29	28	22	20
28	20	12	E	E	G	G	40	36	45	50	51	G	G	G	G	A	52	38	40	34	55	30	43	60
29	A	50	28	22	18	41	42	G	A	50	60	G	56	G	G	G	45	42	45	34	30	18	40	40
30	18	45	20	18	11	45	41	50	54	60	50	A	51	47	60	50	40	30	23	48	A	32	55	20
31	23	19	24	18	12	28	31	50	48	45	71	60	50	65	52	35	G	G	40	30	30	20	37	26
	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	27	29	28	28	28	27	28	27	27	27	28	28	27	28	28	27	28	27	28	29	29	28	29
MED	18	13	16	E E 12	16	E G 20	31	40	50	47	50	42	40	41	38	40	36	35	38	36	34	30	28	20
UQ	27	20	21	18	18	29	42	49	59	54	58	A	50	50	49	50	40	44	45	49	46	47	42	30
LQ	E	E	E	E	G	G	G	G	E G 40	G	G	G	G	G	G	G	G	E G 23	24	28	29	20	18	17

IONOSPHERIC DATA

JUL. 1968 | f-min (0.1) | 135° E Mean Time (G. M. T. + 9 h)

Station WAKKANAI Lat. 45° 23.6' N, Long. 141° 41.1' E Sweep 1.0 Mc to 20.0 Mc 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 17	E	E	E	E	14	E	12	16	17	16	17	12	20	18	18	17	17	C	E S 14	E	E	E	E
2	E	E	E	E	E	E	11	16	16	17	20	19	20	20	16	16	17	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	15	13	E	E	E	E	E
5	E	E	E	E	E	12	11	12	17	18	22	18	19	18	18	17	16	17	E	E	E	E	E	E S 15
6	E	E	E	E	E	11	15	16	17	17	20	20	20	20	18	17	16	12	E	20	E	E	E	E
7	E	E	E	E	E	11	12	16	16	20	17	17	19	17	18	12	11	E	11	E	E	E	E	E
8	E	E	E	E	E	12	C	12	18	17	21	19	20	21	17	16	16	11	E	E	E	E	E	E
9	E	E	E	E	E	E	E	12	17	18	23	17	16	18	18	17	17	12	E	C	E	E S 16	E	E
10	E	C	E	E	E	E	16	16	18	17	18	20	20	20	18	18	18	16	11	E	E	E	E	E S 15
11	E S 15	E	E	E	E	E	11	12	18	18	19	18	20	17	18	18	16	E	E	E S 15	E	E	E	E
12	E	E	E	C	E	12	E	16	17	12	27	29	28	20	23	17	16	15	11	E	E	E	E S 16	E
13	E	E	E	E	E	E	11	16	20	20	18	18	20	22	19	16	17	17	11	E	E	E	E	E
14	E	E	E	E	C	C	C	C	C	C	C	18	20	C	19	19	17	17	E	E	E	E	E	E
15	E	E	E	E	E	12	16	17	18	17	19	20	19	17	20	18	16	17	17	E S 16	E	E S 12	E	E
16	E	E	E	E	E	12	13	17	17	16	22	19	20	20	18	17	17	12	E	E	E	E	E	E
17	E	E	E	E	E	E	12	18	17	17	20	22	20	20	17	17	11	11	11	E	E	E	E	E
18	E	C	E	E	E	E	E	11	C	17	17	17	18	16	20	19	17	12	E	E S 14	E	E	C	E
19	E	E	E	E	E	12	11	17	17	19	16	22	20	20	21	18	C	11	E	E	E	E	E	E
20	E	E	E	E	E	12	E	12	12	C	C	C	C	C	C	C	C	C	C	E S 15	E	E	E S 15	E
21	E	E	E	E	E	E	12	17	18	20	20	22	29	18	20	18	20	E	E	E	E	E S 15	E	E
22	E	E	E	E	E	E	E	12	12	20	20	28	20	20	20	18	18	12	11	E	E	E S 16	E	E
23	E S 16	E	E	E	E	14	12	16	18	17	17	23	20	20	18	17	17	E	E	E	E	E	E	E
24	E	E	E	E	E	E	11	11	18	18	19	19	20	20	19	18	12	11	E	E	E S 15	E	E	E S 15
25	E	E	E	E	E	E	E	12	E	18	18	20	25	20	17	18	12	12	E	E S 15	E S 15	E	E	E S 16
26	E S 16	E	E	E	E	E S 16	17	16	18	18	20	20	20	20	15	17	18	E	11	E	E	E	E	E S 15
27	E	E	E	E	E	12	15	18	17	18	19	20	20	20	20	20	18	E	E	E	E	E	E	E
28	E S 16	E	E	E	E	E	E	12	17	17	18	18	20	20	20	11	12	12	11	E S 15	E	E S 15	E	E
29	E	E	E	E	E	12	11	18	11	18	17	18	18	17	18	17	17	12	E	E	E	E	E	E S 15
30	E S 15	E	E	E	E	E	11	17	18	18	18	20	26	20	13	18	11	E	E	E	E S 15	E	E	E
31	E	E	E	E	E	14	13	17	19	20	20	22	17	18	19	18	E	11	E	E	E S 17	E S 15	E	E S 15
	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	27	29	28	28	28	27	28	27	27	27	28	28	27	28	28	27	28	27	28	29	29	28	29
MED	E	E	E	E	E	E E 11	11	16	17	18	19	20	20	20	18	18	17	12	E	E	E	E	E	E
UQ	E	E	E	E	E	12	12	17	18	18	20	21	20	20	20	18	17	15	11	E E 14	E	E	E	E
LQ	E	E	E	E	E	E	E	12	16	17	18	18	19	18	18	17	14	E E 11	E	E	E	E	E	E

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IONOSPHERIC DATA

JUL. 1968

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 1.0 Mc to 20.0 Mc 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	275	270	F 280	280	260	255	305	270	280	265	280	A	265	275	280	270	285	295	I C 270	S 290	S 280	270	280	F
2	U F 270	U F 275	F 275	F 295	U F 315	270	290	295	300	280	295	280	275	280	295	295	285	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	270	275	280	285	290	275	265
5	F	280	F	U F 275	F 315	275	255	280	255	270	285	A	245	255	A	265	260	290	275	260	270	U F 280	280	275
6	F 270	U F 280	U F 265	E 285	270	265	285	275	290	285	290	275	270	270	280	285	285	285	285	285	285	270	F	U F 300
7	F 265	275	300	265	275	290	I A 270	275	265	290	290	W	240	245	275	260	260	I A 275	275	265	285	290	275	275
8	275	U F 255	U F 280	U F 270	F 265	285	I C 300	280	A	I A 295	285	285	280	280	275	H 275	290	285	280	275	270	275	300	295
9	285	280	270	290	265	270	265	290	295	285	285	275	270	260	255	275	275	285	290	I C 275	285	275	275	265
10	280	I C 270	275	285	275	270	300	295	290	275	I A 285	290	305	270	255	260	285	290	I A 310	I A 290	275	U F 280	U F 290	270
11	U F 265	F 270	280	280	280	255	240	265	300	255	R	R	265	R	220	280	250	280	285	280	270	270	255	270
12	265	U F 260	U F 260	I C 270	F 275	300	275	290	300	285	305	285	260	285	280	275	300	290	285	285	285	270	275	S 280
13	285	270	270	280	285	305	310	310	I R 310	310	300	285	270	280	280	285	280	275	275	280	285	U S 275	I A 290	F 315
14	F	F 275	285	F 250	C	C	C	C	C	C	C	270	A	C	260	285	285	290	280	280	260	260	270	U F 255
15	F	F	270	265	F 270	250	280	295	295	300	A	A	A	A	270	290	290	280	R	A	280	280	U F 270	A
16	F	F	F	U F 275	F 265	325	310	I A 280	315	255	I A 295	I A 275	I A 270	305	290	280	275	295	275	280	280	265	U F 260	F
17	280	270	295	260	F 265	315	295	310	285	320	315	270	275	275	295	280	280	280	280	A	265	F	U F 275	F
18	F	C	F	U F 265	F	305	290	270	I C 295	300	270	295	265	280	275	285	290	285	285	280	275	265	C	U F 275
19	U F 260	F	U F 260	F 260	F	290	275	290	305	290	270	265	260	A	A	260	I C 275	275	275	265	265	F	U F 290	265
20	270	270	260	260	280	315	320	285	A	C	C	C	C	C	C	C	C	C	C	265	280	270	260	260
21	265	F 260	F 270	F 280	290	270	280	290	A	A	I A 280	I A 280	275	265	270	I A 270	290	290	280	255	275	270	275	275
22	275	280	270	275	255	255	265	290	280	I A 280	H 260	255	280	270	275	I A 275	270	275	275	265	280	265	275	290
23	280	270	255	F 265	F	285	275	285	I A 280	265	260	275	280	285	265	270	270	290	265	290	F 275	U F 275	F 260	I A 260
24	F 265	F 265	F	U F 275	F 285	F 275	270	290	295	265	A	A	270	255	255	265	275	265	270	280	285	280	275	270
25	265	265	270	275	285	285	285	270	290	280	280	265	265	265	265	270	275	280	285	290	275	275	265	265
26	265	265	265	265	260	280	300	H 275	270	I A 270	275	I A 270	270	270	260	270	280	295	280	285	290	F 270	F 260	F
27	F	F	U F 255	U F 275	F 280	F 285	I A 280	290	275	290	280	280	260	265	265	270	285	290	275	275	275	285	290	280
28	255	265	265	270	270	290	260	290	285	280	285	295	285	280	275	I A 275	280	295	280	275	265	U F 280	300	260
29	A	U F 260	U F 255	F	U F 255	F	285	310	A	270	I A 280	265	265	265	280	275	285	280	275	270	265	265	F	F
30	F	F 265	F	F	U F 280	275	295	285	285	280	275	I A 280	285	285	275	285	290	295	290	280	I A 275	F 275	U F 295	F 290
31	F 280	F 270	F 265	F 275	F 265	F 270	275	285	295	295	280	280	295	270	290	290	290	295	280	275	270	275	S 300	280
	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	21	24	24	27	25	27	28	28	24	26	24	23	26	24	26	28	28	28	27	27	29	27	26	23
MED	270	270	270	275	275	280	282	288	290	280	282	275	270	270	275	275	282	285	280	280	275	275	275	275
UQ	280	275	278	280	280	290	298	290	298	290	290	282	280	280	280	285	288	290	285	282	285	280	290	280
LQ	265	F 265	262	265	F 265	270	272	278	280	270	278	270	265	265	265	270	275	280	275	272	270	270	270	265

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IONOSPHERIC DATA

JUL. 1968

M(3000) F 1(0.01)

135° E Mean Time (G. M. T. + 9 h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1.0 Mc to 20.0 Mc 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						320	340		A 350		A	A	345	370	365	340	350	350	C					
2						345	L 350	I A 355	360	340	A	325	365	I A 365	I A 360	360	350	C	C					
3						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
4						C	C	C	C	C	C	C	C	C	C	C	C	A	A					
5							A	A	355	A	A	A	A	A	A	355	355	340	L 335					
6							350		365	390	I A 375	375	370	I A 385	380	370	375	340	365					
7						325	A	A	A	385	385	375	380	385	360	350	340	A	A	315				
8						330	C	A	A	A	380	365	355	365	365	A	355	350						
9						L 340	355	325	390	375	395	395	375	375	355	360	325	350	A					
10					335	L 325	A	A	A	A	A	A	A	350	H 345	A	A	A	A					
11						A	I A 320	350	380	A	360	375	375	355	365	365	345	335	A					
12								I A 350	A	A	A	375	345	I A 345	I A 345	A	360	350	L 345					
13						370	355	350	R	365	365	370	345	360	350	I A 335	A	335	A					
14						C	C	C	C	C	C	A	A	C	A	I A 340		L 350	A					
15						325	340	I A 360	A	A	A	A	A	A	340	I A 350	355	A	A					
16						L 365	345	A	A	A	A	A	A	A	A	350	340	340	L					
17							L	A	A	A	360	365	355	335	365	325	370	355						
18							A	345	I C 350	365	H 380	375	365	345	I A 345	335	A	A						
19							A	A	A	385	A	A	A	A	A	A	C	325						
20							A		A	C	C	C	C	C	C	C	C	C	C					
21							345	A	A	A	A	A	A	350	340	I A 345	335	A	A					
22						320		A	A	A		330	360	300	355	A	A	A						
23						325		A	A	H 345	335	I A 330	350	335	A	A	320	320						
24						345	A	A	A	345	A	A	360	345	340	H 325	340	I A 330	325					
25							L 365		325	335	355	360	325	320	335	345	315	I A 330	L 360					
26							375		A	A	A	A	A	I A 360	330	320	335	A						
27							A	335		335	345	365	345	350	325	325	I A 330	A						
28						365	I A 355	350	A	A	A	370	345	340	335	A	A	I A 335						
29							A	340	A	A	A	400	I A 365	340	345	330	A	A	A					
30						A	A	A	A	A	A	A	A	A	A	A	A	335						
31							U L 350	A	A	A	A	A	A	A	A	335	340	365						
	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	13	13	10	7	12	11	16	18	21	21	20	19	18	5	1				
MED					335	330	350	350	360	358	365	370	358	350	345	342	340	340	L 345	315				
UQ						345	355	U A 350	372	380	380	375	365	365	360	352	355	350	L 360					
LQ						325	345	340	352	342	358	362	345	340	340	332	335	335	L 335					

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IONOSPHERIC DATA

JUL. 1968 | h'F2 (km) | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1.0 Mc to 20.0 Mc 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						420	320		395	450	410	A	440	400	390	400	345	325	C					
2						305	310	290	305	345	340	370	325	365	315	300	330	C	C					
3						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
4						C	C	C	C	C	C	C	C	C	C	C	C	360	320					
5							430	375	450	420	A	A	520	520	A	435	460	350	340					
6							300		330	325	340	420	450	420	365	350	360	345	310					
7						325	A	395	400	355	400	W	560	540	450	465	450	I A 395	A	310				
8						310	I C 285	A	A	I A 335	390	365	380	375	365	H 300	330	340						
9						325	360	315	335	365	400	435	450	470	470	420	385	350	310					
10					315	345	270	300	315	340	I A 350	320	355	400	435	400	320	300	A					
11						420	500	410	315	475	R	R	460	R	660	410	500	365	325					
12								325	305	350	340	370	410	360	360	370	320	315	300					
13						275	300	300	I R 300	300	315	360	410	385	375	400	345	360	A					
14						C	C	C	C	C	C	410	A	C	350	320		310	300					
15						395	315	275	300	300	A	A	A	A	330	350	320	320	A					
16						295	320	A	300	A	A	I A 360	A	325	350	350	365	320	300					
17							L 350	300	360	300	310	410	370	390	345	335	280	315						
18							345	380	I C 320	310	395	350	395	375	385	360	325	345						
19							A	275	290	300	A	420	440	A	A	A	C	375						
20							275		A	C	C	C	C	C	C	C	C	C	C					
21							315	295	A	A	A	A	375	395	360	I A 355	345	315	300					
22						340		310	A	I A 365		410	365	375	360	A	A	300						
23						315		300	I A 275	365	400	360	360	360	I A 390	380	350	325						
24						330	320	340	305	425	A	A	450	510	525	485	420	400	350					
25							300		310	345	350	350	400	440	365	360	350	320	285					
26							270		365	I A 375	390	I A 380	375	400	450	405	340	300						
27							A	325		360	350	325	395	390	410	360	340	300						
28						285	L 320	315	330	360	340	350	350	370	350	I A 360	340	310						
29							305	275	A	335	I A 385	445	A	440	360	340	340	325	305					
30						325	265	320	320	350	350	I A 345	340	360	I A 355	340	320	305						
31							315	305	275	290	I A 355	330	310	I A 360	330	320	320	290						
	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	15	22	21	22	25	19	22	24	24	26	26	25	28	12	1				
MED					315	325	315	310	315	350	350	368	395	390	365	360	340	322	308	310				
UQ						342	320	325	335	365	392	410	445	430	410	400	360	350	322					
LQ						308	300	300	300	325	340	350	362	368	350	340	325	310	300					

IONOSPHERIC DATA

JUL. 1968 | $h'F$ (km) | 135° E Mean Time (G. M. T. + 9 h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1.0 Mc to 20.0 Mc 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	295	275	250	250	260	230	260	250	A	225	A	A	220	215	220	225	235	250	C	A	A	A 300	275	290
2	300	290	275	265	240	250	245	I A 250	220	220	I A 245	225	235	A	A	235	250	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	A	A	260	260	275	300
5	310	260	260	250	240	245	A	A	250	A	A	A	A	A	A	230	230	240	250	A	I A 295	A	260	280
6	280	260	265	270	275	245	290	245	240	200	I A 235	225	200	I A 205	215	220	235	240	275	I A 285	275	A	A	A 260
7	260	275	260	245	300	295	A	A	A	225	215	205	210	205	235	240	235	A	A	285	265	250	235	250
8	270	275	275	245	290	A 275	C	A	A	A	200	200	215	245	225	I A 240	A 270	250	245	265	300	270	250	260
9	250	300	290	255	300	260	245	250	210	205	200	195	200	215	250	250	260	250	A	I C 265	250	265	265	250
10	260	I C 270	260	270	275	250	A	A	A	A	A	A	A	250	H 225	A	A	A	A	A	A	A	250	300
11	300	260	215	280	300	I A 280	A	240	225	A	220	240	210	A 245	240	245	240	260	A	A	A 295	275	300	295
12	I A 335	300	300	I C 300	260	260	250	I A 250	A	A	A	235	A 275	I A 240	I A 250	I A 250	245	235	250	A 290	I A 265	I A 260	250	250
13	260	275	275	250	250	250	250	245	I R 230	235	225	210	210	205	225	A	A	250	A	A	260	I A 260	I A 260	225
14	225	295	275	310	C	C	C	C	C	C	C	A	A	C	A	I A 260	260	250	A	a	A 315	290	300	305
15	300	250	260	275	290	260	260	I A 255	A	A	A	A	A	A	245	I A 250	220	A	A	A	A 285	A	A	A
16	A 275	270	285	275	260	250	270	A	A	A	A	A	A	A	A	240	240	260	260	260	A	320	A 305	265
17	260	300	260	260	315	260	245	A	A	A	240	200	215	240	225	A 270	215	250	A	A	A	A 350	280	285
18	270	I C 255	I A 280	310	E A 300	260	I A 265	235	I C 240	220	H 195	205	200	245	I A 245	250	A	A	A	A	A	A	C	300
19	A	A 360	A 300	A 300	300	245	I A 250	A	A	225	A	A	A	A	A	A	C	260	A 320	A 300	A	A	A 270	250
20	A 305	315	A 340	305	300	A 265	A	250	A	C	C	C	C	C	C	C	C	C	A	290	A 300	A 285	A 290	305
21	310	A 350	295	265	250	250	245	A	A	A	A	A	I A 240	225	235	I A 255	250	A	A	275	275	295	285	A 305
22	295	300	300	260	A 315	260	250	A	A	A	H 260	255	220	230	235	A	A	I A 265	260	290	A	A 310	A	250
23	250	285	300	290	285	260	250	A	A	H 215	220	I A 240	225	225	A	A	255	250	A	A	I A 290	A	A	A
24	270	300	285	270	285	260	I A 250	A	A	235	A	A	225	225	220	H 250	255	I A 295	300	A	A	A	A 280	260
25	300	300	315	285	260	250	A 270	260	250	250	210	210	215	235	235	225	235	I A 260	250	270	240	250	250	280
26	280	305	300	275	300	265	250	H 240	A	A	A	A	A	I A 225	245	265	260	I A 255	I A 270	I A 280	I A 280	A 300	300	I A 330
27	A	295	I A 320	270	285	A	A	235	250	250	230	240	210	240	230	260	I A 260	A	A	285	A 295	A 290	260	250
28	285	300	280	295	305	260	I A 250	245	A	A	A	200	240	240	240	A	A	I A 255	A	A 300	I A 300	A 300	A	A
29	A	A	A 350	A 345	325	A 335	A	250	A	A	A	190	I A 230	250	215	290	I A 250	I A 250	I A 270	A 295	A 300	280	A	A
30	275	I A 310	300	275	260	A	A	A	A	A	I A 225	A	A	A	A	A	A	240	255	I A 285	I A 295	A 315	A	250
31	260	290	325	300	310	265	250	A	A	A	A	A	A	A	A	245	235	250	I A 280	A 270	A 300	295	270	300
	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	26	28	29	29	28	26	19	15	9	12	14	16	19	20	20	21	21	21	13	17	21	21	21	25
MED	278	292	285	275	286	260	250	250	240	225	222	210	215	232	235	250	245	250	260	285	A 290	290	270	280
UQ	300	300	300	295	300	265	260	250	250	235	235	238	228	242	242	255	255	260	275	A 290	A 300	A 300	285	300
LQ	260	272	265	260	260	250	250	242	225	218	210	200	210	220	225	240	235	250	250	270	265	265	260	250

IONOSPHERIC DATA

JUL. 1968

$h'Es$ (km)

135° E Mean Time (G. M. T. + 9 h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1.0 Mc to 20.0 Mc 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	125	E	E	100	125	140	120	115	115	110	110	110	105	105	110	G	G	C	110	110	110	105	105
2	110	105	105	105	105	105	105	120	120	120	115	115	115	115	110	115	120	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	120	115	115	110	110	110	105
5	105	105	105	105	105	145	110	125	120	120	110	110	110	110	110	115	105	G	125	115	110	115	105	110
6	E	E	E	E	G	G	140	125	115	125	110	110	G	105	105	105	G	105	120	115	110	110	110	105
7	105	105	105	E	140	140	115	120	115	115	115	115	110	G	G	G	140	115	110	110	110	110	E	E
8	E	E	E	110	G	115	C	110	110	110	G	120	110	115	110	115	115	110	105	110	115	110	100	105
9	105	105	100	E	G	G	115	125	G	115	110	110	G	125	120	145	125	120	115	C	100	100	110	E
10	105	C	E	110	105	G	120	115	115	110	105	110	105	105	G	115	110	120	110	110	115	110	110	105
11	S	E	E	105	115	115	110	115	120	110	115	110	115	110	105	G	125	115	110	110	110	110	105	105
12	105	105	105	C	110	140	125	115	110	110	110	110	110	105	105	110	105	110	125	110	110	110	S	E
13	E	E	E	E	G	G	G	125	115	115	110	105	105	G	G	110	120	115	110	115	110	110	110	105
14	E	115	100	100	C	C	C	C	C	C	C	110	105	C	110	110	105	120	110	110	110	110	110	105
15	105	105	E	100	150	150	125	115	110	110	105	105	105	105	110	120	G	120	115	115	110	110	110	110
16	105	105	105	100	100	115	140	115	115	115	110	110	110	110	110	110	105	105	105	140	110	110	110	105
17	105	100	E	E	105	105	140	135	115	110	110	115	115	110	110	110	105	105	110	110	115	120	110	110
18	110	C	105	105	100	105	120	120	C	G	120	120	115	115	110	115	110	110	110	115	110	110	C	110
19	105	105	115	100	105	115	115	110	110	110	110	110	110	105	105	105	C	120	120	110	110	110	110	105
20	105	105	135	105	110	120	120	115	115	C	C	C	C	C	C	C	C	C	C	110	105	105	105	100
21	105	105	105	105	110	110	115	115	115	110	110	110	110	110	140	115	140	110	110	110	110	115	115	110
22	110	110	105	125	120	125	145	140	125	120	135	135	135	140	125	120	115	110	135	140	115	120	120	E
23	S	110	110	110	115	135	125	125	120	135	125	120	130	120	115	110	110	G	115	110	115	115	110	110
24	110	110	110	110	110	G	125	130	125	125	120	110	115	G	G	115	120	135	125	120	110	110	110	110
25	110	110	110	110	G	G	120	120	115	115	115	110	110	110	110	145	145	125	120	120	S	110	E	S
26	S	E	E	E	125	120	140	G	125	115	115	110	110	110	110	105	110	110	125	115	110	110	110	110
27	110	110	110	110	125	125	120	125	125	115	120	110	115	110	110	110	110	110	110	110	120	115	110	110
28	110	110	E	110	150	135	120	120	115	115	110	115	G	120	G	120	115	120	120	120	115	115	110	110
29	110	110	110	110	135	125	125	125	120	115	115	115	115	120	120	145	145	120	120	115	110	110	115	110
30	110	110	110	110	105	140	140	125	120	115	115	110	110	105	105	105	105	110	110	120	120	115	110	110
31	105	105	110	110	110	140	140	125	120	120	110	110	110	110	110	110	125	135	120	125	115	115	110	110
	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	21	22	19	21	23	22	26	27	26	26	26	28	25	24	23	26	24	25	27	28	28	29	25	24
MED	105	105	105	110	110	125	122	120	115	115	110	110	110	110	110	112	115	115	115	115	110	110	110	110
UQ	110	110	110	110	122	140	140	125	120	120	115	115	115	115	110	115	125	120	120	118	115	115	110	110
LQ	105	105	105	105	105	115	115	115	115	110	110	110	110	105	108	110	108	110	110	110	110	110	110	105

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IONOSPHERIC DATA

JUL. 1968 | Types of Es | 135° E Mean Time (G. M. T. + 9 h)

Station WAKKANAI Lat. 45° 23.6' N. Long. 141° 41.1' E Sweep 1.0 Mc to 20.0 Mc 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		F 1			L 2	C 1	H 1	C 1	C 1	C 1	C 2	C 3	L 1	L 1	L 1	C 1				C 3	F 4	F 4	F 2	F 2
2	F 2	F 2	F 2	F 2	L 1	L 2	L 2	C 2	C 1	C 1	C 1	C 1	C 1	C 2	C 2	C 2	C 1							
3																								
4																		C 3	C 2	C 3	F 6	F 1	F 3	F 4
5	F 6	F 2	F 2	F 1	L 2	H 1	LC 11	C 2	C 1	C 1	C 2	C 2	C 2	C 2	C 3	C 1	L 1		C 1	C 5	F 4	F 3	F 2	F 1
6							H 1	C 1	C 1	C 1	C 1	C 2		L 2	L 1	L 1		L 2	C 2	C 2	F 3	F 7	F 3	F 6
7	F 2	F 1	F 1		H 1	H 1	C 4	C 1	C 2	C 1	C 1	C 1	C 1				H 1	C 3	C 4	L 1	F 4	F 1		
8				F 1		C 2		C 3	C 6	C 2		C 1	C 1	C 1	C 1	C 2	C 1	L 2	L 1	L 1	F 4	F 2	F 1	F 3
9	F 2	F 2	F 2				C 1	C 1		C 1	C 1	L 1		C 1	C 2	H 1	C 1	C 2	CL 21		F 1	F 1	F 1	
10	F 2			F 1	L 1		C 2	C 2	C 2	C 2	C 3	C 1	L 2	L 1		C 2	LH 11	CL 21	C 4	C 6	F 4	F 4	F 1	F 2
11				F 1	C 2	C 5	C 2	C 1	C 1	C 1	C 1	C 1	C 1	C 1	L 1		C 1	C 2	C 4	C 4	F 2	F 2	F 4	F 3
12	F 6	F 2	F 2		L 1	H 1	C 1	C 2	C 2	C 3	C 1	C 1	C 2	L 2	L 1	C 3	L 2	L 1	CL 11	CL 31	F 4	F 4		
13								C 1	C 1	C 1	C 1	L 1	L 1			C 2	C 2	C 2	C 6	C 4	F 3	F 6	F 3	F 1
14		F 1	F 2	F 1								C 2	C 2		C 2	C 2	L 2	CL 12	L 2	C 3	F 6	F 2	F 2	F 2
15	F 2	F 1		F 1	H 1	H 1	C 1	C 3	C 2	C 3	C 2	L 2	L 2	L 3	L 1	C 2		C 2	C 1	C 2	F 3	F 4	F 6	F 7
16	F 3	F 2	F 1	F 2	L 2	L 1	H 1	C 4	C 1	C 2	C 3	C 2	C 3	C 2	C 2	L 1	L 2	L 3	L 2	H 1	F 4	F 4	F 4	F 3
17	F 2	F 1			L 1	L 2	H 1	H 1	C 1	C 2	C 1	C 1	C 1	C 1	L 1	L 1	L 2	L 3	C 4	CL 33	F 2	F 4	F 4	F 2
18	F 2		F 3	F 3	L 2	L 1	C 3	C 1			C 1	C 1	C 1	C 1	C 1	C 1	C 2	C 3	L 4	C 6	F 6	F 3		F 4
19	F 4	F 4	FF 22	F 2	L 2	C 1	C 2	C 2	C 1	C 1	C 2	C 3	L 1	L 4	L 3	L 3		CL 11	C 3	C 3	F 4	F 6	F 4	F 2
20	F 4	F 3	FF 42	F 1	L 2	C 2	C 3	C 1	C 3											C 2	F 3	F 2	F 3	F 2
21	F 2	F 3	F 2	F 5	L 2	L 2	L 1	L 1	C 4	C 3	C 2	C 3	L 2	L 2	H 1	C 3	HL 11	L 2	L 3	L 1	F 1	F 2	F 3	F 3
22	F 3	F 3	F 2	FF 11	CL 21	C 1	H 1	H 2	C 2	C 2	H 1	H 1	H 1	H 1	C 1	C 2	L 2	L 2	HL 11	HL 11	F 3	F 2	F 3	
23		F 4	F 1	F 2	C 1	H 1	C 1	C 2	C 4	H 1	C 1	C 1	H 1	C 1	C 2	L 2	L 2		L 3	L 2	F 2	F 6	F 3	F 3
24	F 2	F 1	F 1	F 1	L 1		C 2	H 2	C 1	C 1	C 2	C 2	C 2			L 1	C 1	HL 22	C 2	CL 31	F 6	F 4	F 2	F 1
25	F 2	F 1	F 3	F 1			C 2	C 1	C 2	C 2	C 1	C 1	L 1	L 1	L 1	H 1	H 1	C 2	C 2	C 3		F 1		
26					C 1	C 2	H 1		C 2	C 4	C 2	C 4	L 2	L 3	L 1	L 1	L 3	L 2	C 2	C 3	F 3	F 3	F 4	F 3
27	F 3	F 1	F 2	F 2	C 1	C 3	C 3	C 1	C 1	C 2	C 1	C 1	C 1	L 1	L 1	L 1	L 2	L 3	L 5	L 1	FF 21	F 3	F 5	F 2
28	F 2	F 1		F 1	H 1	H 1	C 2	C 1	C 2	C 2	C 2	C 1		C 1		C 2	C 2	C 3	C 3	C 4	F 5	F 4	F 4	F 4
29	F 1	F 6	F 3	F 2	C 3	C 3	C 3	C 1	C 2	C 2	C 2	C 1	C 2	C 1	C 1	H 1	H 1	C 2	C 4	C 5	F 4	F 1	F 3	F 4
30	F 2	F 4	F 4	F 2	L 1	H 4	H 2	C 2	C 2	C 2	C 2	C 4	L 2	L 2	L 2	L 3	L 2	L 2	L 2	CL 32	F 4	F 4	F 4	F 2
31	F 4	F 2	F 2	F 2	L 1	H 1	H 1	C 2	C 1	C 1	C 3	C 3	C 2	C 3	L 2	L 1	C 1	H 1	C 3	C 3	F 5	F 2	F 6	F 4
	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

IONOSPHERIC DATA

JUL. 1968 | foF2 (0.1) | 135° E Mean Time (G. M. T. + 9 h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 8.2' E Sweep 1.0 Mc to 20.0 Mc in 15 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	82	77	76	68	61	65	70	68	61	70	I A 64	67	67	70	68	72	81	78	75	81	81	77	81	80
2	80	80	83	84	I R 78	74	87	86	82	I A 82	82	91	91	100	93	I A 92	88	86	86	89	R	R	R	I R 82
3	86	83	75	68	68	73	75	85	I R 92	91	92	84	86	77	80	79	73	78	83	95	I R 88	I R 75	F	F
4	F	F	F	F	F	71	76	I A 74	I A 72	I A 70	66	74	74	64	68	65	70	78	I A 80	85	84	76	77	73
5	F	F	76	I R 66	F	47	53	59	58	63	59	I A 58	61	57	59	60	57	59	62	64	70	F 72	F 70	F 67
6	F 62	61	57	55	F 54	58	71	82	84	80	79	70	68	73	79	73	70	70	79	83	85	81	F 69	F
7	F 74	F	F 61	F 50	F 51	59	69	66	70	66	58	56	54	55	56	I A 55	I R 58	I A 63	I A 68	75	81	S 71	F	F
8	F	F	F	F 52	F 51	V 70	80	73	74	I A 70	I A 73	A	A	I A 70	67	A	A	68	I A 72	79	83	81	I R 78	74
9	64	63	61	57	56	65	78	84	81	64	59	63	63	57	I R 62	63	64	72	73	81	81	81	78	75
10	71	67	67	60	60	75	87	82	76	I A 76	78	77	81	I A 79	78	78	87	R 95	I A 85	79	74	F	A	F
11	A	F	F	F 52	F 43	44	54	65	A	A	E G 48	54	56	60	56	61	61	I A 66	70	68	67	70	F	F
12	64	65	60	59	59	61	66	73	80	73	74	70	67	77	80	84	83	78	79	80	76	80	78	I R 83
13	80	72	67	63	59	62	73	81	88	80	69	66	66	68	71	71	68	74	81	84	81	I R 83	R	R
14	S 81	F	F	F	F	64	79	C	C	79	77	78	77	90	R 109	95	82	71	62	66	70	73	73	73
15	76	F	F	F	62	65	86	I R 94	76	74	78	73	73	71	76	79	83	81	79	77	82	78	78	A
16	F	R	R	I R 80	78	77	75	77	76	I A 88	76	76	I A 78	81	87	87	86	84	79	77	76	76	F	F
17	F	81	F	F	F	S 66	66	68	70	66	I A 70	66	74	84	75	73	70	I A 74	73	73	74	I R 79	85	F
18	F	F	F	73	F	70	70	77	77	74	82	88	86	83	I C 77	78	79	83	C	A	C	C	C	F
19	C	C	C	73	C	C	C	C	C	74	75	I A 66	I A 68	I A 65	67	66	66	65	70	I A 76	82	76	F	79
20	F	71	F	S 61	F	F	S 78	75	72	I A 67	I A 71	I A 72	76	77	68	I A 72	73	73	77	81	80	73	75	77
21	77	76	F	74	61	61	64	71	73	73	67	I A 66	I A 70	72	I A 74	77	77	73	67	73	79	84	78	74
22	70	72	68	65	62	67	81	84	75	74	70	74	I A 78	I A 82	85	84	76	82	78	81	86	77	I R 80	F 74
23	F	71	65	65	64	73	H 81	70	76	71	I A 73	77	75	72	76	75	78	79	78	81	79	76	71	63
24	F	F	F	F	F	56	84	81	77	60	61	60	A	A	A	62	61	64	71	78	76	72	F	F
25	F	73	71	69	63	65	69	77	84	83	80	72	72	67	73	73	77	85	91	91	76	72	72	70
26	67	65	62	F	62	77	80	85	87	69	73	77	75	76	73	78	81	81	79	86	73	70	73	73
27	74	F	S 68	66	62	64	61	72	I A 76	93	74	67	72	74	75	81	81	80	83	81	81	82	F	F
28	F	F	F	F	F	63	73	82	68	71	78	79	72	I A 72	I R 73	70	76	75	72	80	85	84	79	I A 68
29	62	61	F	64	F	F 78	I R 98	106	H 77	66	60	64	68	71	76	76	73	69	74	71	73	I A 73	S 74	F
30	F	F	F	F	F	F	77	79	79	75	74	79	I A 80	80	74	78	83	78	70	74	79	I R 80	S 81	F
31	F	F	62	F	F	62	77	94	101	79	I R 72	74	87	89	81	82	79	74	69	72	76	F	F	80
	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	16	16	22	19	28	30	29	28	30	31	30	29	30	30	30	30	31	30	30	29	27	19	17
MED	74	72	67	65	61	65	76	77	76	74	73	72	73	72	74	76	76	75	76	80	79	76	78	74
UQ	80	76	73	69	62	72	80	84	82	79	78	77	78	80	79	79	81	80	79	81	82	80	78	79
LQ	66	65	62	59	58	62	69	72	72	69	66	66	68	68	68	70	70	70	70	74	76	73	73	73

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IONOSPHERIC DATA

JUL. 1968 | foF1 (0.01) | 135° E Mean Time (G. M. T. + 9 h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 8.2' E Sweep 1.0 Mc to 20.0 Mc in 15 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						UL 360	L	450	L 460	A	A	510	520	510	520	500	L 470	L 450	L					
2							A	A	L 510	A	A	A	A	A	A	A	A	A	L					
3							L 580	L 480	480	510	IA 520	540	510	IA 510	490	IA 480	460	440	L					
4						L	A	A	A	A	560	500	490	500	500	500	470	A	A					
5						UL 350	A	430	IA 440	IA 450	460	A	A	480	460	450	450	420	370	L				
6						L	410	L 450	470	520	H 500	510	510	480	480	L 490	H 470	430	A					
7							410	IA 430	IA 450	IA 460	490	480	480	470	460	IA 460	450	A	A					
8						L 320	L	A	A	A	A	A	A	A	500	A	A	A	A					
9						L	UL 420	450	470	520	500	500	500	IA 500	490	A	A	A	A					
10						L	L	L 450	A	A	A	L 520	IA 510	IA 520	500	IA 480	470	A	A					
11						330	IA 380	A	A	A	480	490	480	480	480	480	A	A	L					
12							L	L 450	470	A	A	520	550	500	510	490	470	L	L					
13						L	L	L 460	IA 480	500	A	A	L 530	L 510	520	IA 500	IA 480	L 450	UL 360					
14							L	C	C	530	540	520	520	530	IA 490	470	470	L	L					
15						L	L	UL 460	A	480	IA 520	L 540	540	530	500	500	L 480	L 430	A					
16							L	A	A	A	A	A	A	530	500	500	500	L	L					
17							L	L	IA 470	IA 500	IA 510	520	IA 520	530	510	470	A	A	A					
18								A	A	H 600	520	540	540	540	IC 540	IA 500	A	A	C					
19								C	C	A	A	A	A	A	500	IA 490	L 490	L	L					
20								A	L	A	A	A	530	520	520	A	A	A	L 400					
21							L	450	460	510	A	A	A	A	A	A	460	A	A					
22						L	L	460	L 490	520	510	A	A	A	A	A	490	430	A					
23						L	L	410	500	IA 540	IA 520	IA 520	520	530	520	A	A	L	A					
24							L	440	470	480	510	510	A	A	A	A	480	L 430	L					
25							L	L	L	500	520	530	540	520	510	510	470	A	A					
26						L	L	L	L	A	IA 530	520	A	A	A	A	460	L	L					
27						L	L	A	A	A	A	540	IA 530	520	510	A	A	L 430	L					
28							A	A	530	IA 500	IA 500	H 520	IA 520	IA 520	IA 520	520	470	L	A					
29						L	IA 400	450	470	500	500	530	510	520	500	490	480	L	A					
30							L	A	A	A	L 570	L 520	IA 510	500	A	A	470	L	L					
31							L	L 450	A	A	IA 570	580	IA 510	500	A	A	L 460	L						
	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	6	16	16	17	20	22	22	24	24	19	22	9	3					
MED						L 340	410	450	470	500	515	520	520	515	500	490	470	L 430	L 370					
UQ						UL 355	L 420	L 455	485	520	525	530	530	525	515	500	480	L 440	385					
LQ						325	UA 400	445	465	500	500	510	510	500	490	480	460	L 430	365					

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IONOSPHERIC DATA

JUL. 1968 | foE (0.01) | 135° E Mean Time (G. M. T. + 9 h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 8.2' E Sweep 1.0 Mc to 20.0 Mc in 15 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	A	280	I A 305	325	355	370	A	A	A	A	A	320	I A 290	A	A				
2					A	A	A	A	A	A	A	A	I A 380	385	A	A	A	A	A	A				
3					A	I A 190	255	300	I A 330	A	A	A	A	A	A	A	A	A	A	A				
4					A	210	255	A	A	A	A	A	A	A	A	A	325	285	A	A				
5					A	I A 210	265	300	I A 325	355	360	365	375	360	345	A	A	A	A	A				
6					E	180	270	305	320	355	365	A	A	A	350	I A 335	315	290	235	B				
7					110	205	270	305	325	355	360	A	A	A	355	350	315	280	225	B				
8					E	190	260	305	330	A	A	A	A	A	A	A	A	A	A	S				
9					A	A	A	A	A	A	A	A	A	385	375	350	310	285	A	B				
10					A	A	A	A	A	350	360	I A 370	I A 380	380	370	345	320	300	A	B				
11					110	175	255	280	320	I A 340	360	365	A	A	365	350	320	285	225	B				
12					A	A	250	305	330	A	A	A	A	A	370	A	A	A	A	A				
13					E	200	A	A	A	A	A	A	A	A	385	355	I A 320	I A 280	A	B				
14					A	A	A	C	C	A	A	A	A	A	A	A	A	A	A	S				
15					A	180	255	A	A	A	A	A	A	A	360	335	320	290	A	S				
16					E	190	260	I A 300	I A 330	350	360	A	A	A	A	A	A	A	230	170				
17					E	210	255	305	340	I A 355	I A 370	375	A	A	A	A	A	A	A	S				
18					E	A	270	A	A	A	A	A	A	A	C	350	A	A	C	S				
19					C	C	C	C	C	A	A	A	380	I A 390	370	I A 340	I A 310	275	A	A				
20					E	I A 170	I A 255	A	A	A	A	A	A	A	A	A	A	A	A	S				
21					E	A	A	A	A	A	A	A	A	A	A	355	A	A	A	S				
22					E	190	A	A	A	345	A	A	A	A	385	355	320	275	A	B				
23					E	A	A	A	325	A	A	A	A	A	A	A	A	A	A	S				
24					E	A	A	A	A	A	A	A	A	A	A	A	A	A	A	S				
25					E	A	A	A	A	A	A	A	385	I A 390	370	A	A	270	A	S				
26					E	A	A	A	A	A	A	A	A	A	A	A	A	A	A	S				
27					E	I A 175	I A 255	A 305	A	A	A	A	A	A	A	A	A	A	A	S				
28					E	A	A	A	A	A	A	A	A	A	360	350	320	280	A	B				
29						A	250	280	320	A	A	A	A	A	A	350	315	A	A	S				
30					E	A	A	300	A	A	A	A	A	A	A	A	A	A	A	S				
31						A	A	A	A	A	A	A	A	A	A	A	A	A	A	A				

	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	14	16	13	12	9	8	4	5	6	13	13	13	13	4	1				
MED					E	190	255	305	325	355	360	368	380	385	370	350	320	285	228	170				
UQ					E	205	268	305	330	355	368	372	U A 380	U A 390	370	350	320	290	232					
LQ					E	180	255	300	322	350	360	365	380	380	360	345	315	280	225					

IONOSPHERIC DATA

JUL. 1968 | foEs (0.1) | 135° E Mean Time (G. M. T. + 9 h)

Station AKITA Lat. 39° 43.5' N, Long. 140° 8.2' E Sweep 1.0 Mc to 20.0 Mc in 15 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 43	J X 29	J X 79	J X 65	J X 68	J X 63	38	J X 63	J X 73	J X 73	J X 69	J X 68	J X 52	39	39	J X 40	G	31	29	J X 65	J X 58	J X 40	J X 33	J X 35
2	E S 13	J X 38	J X 39	J X 23	J X 88	J X 70	J X 45	J X 50	J X 50	J X 98	J X 83	J X 84	J X 66	J X 83	J X 138	J X 99	J X 89	J X 69	J X 49	J X 48	J X 70	J X 67	J X 83	J X 73
3	J X 58	J X 40	J X 38	J X 16	J X 25	J X 30	33	39	J X 43	J X 53	J X 65	43	J X 84	J X 73	J X 54	J X 60	J X 34	34	J X 45	J X 48	J X 55	J X 82	J X 70	J X 84
4	J X 54	J X 58	J X 30	J X 43	J X 34	G	J X 64	J X 102	J X 115	J X 163	J X 78	46	J X 71	J X 55	J X 40	41	36	J X 52	J X 84	J X 40	J X 38	J X 27	J X 29	J X 54
5	J X 69	J X 44	J X 40	J X 67	J X 65	J X 33	41	J X 48	J X 71	J X 50	42	J X 68	J X 66	J X 83	J X 66	J X 65	J X 66	J X 38	J X 43	J X 23	J X 30	J X 60	J X 72	J X 31
6	J X 24	J X 23	E	J X 64	E	23	34	J X 79	J X 71	41	43	J X 53	J X 158	40	G	J X 65	42	37	J X 50	J X 63	J X 65	J X 53	J X 56	J X 54
7	J X 38	J X 42	J X 33	J X 28	G	23	32	J X 55	J X 53	J X 70	J X 55	J X 50	J X 43	J X 50	40	J X 61	J X 63	J X 73	J X 70	J X 63	J X 40	J X 60	J X 82	J X 81
8	J X 73	J X 63	J X 43	J X 27	18	23	35	J X 56	J X 64	J X 77	J X 144	J X 145	J X 86	J X 75	J X 54	J X 98	J X 88	J X 169	J X 103	J X 73	J X 71	J X 33	J X 83	J X 25
9	J X 22	J X 33	J X 30	J X 21	J X 22	26	34	J X 41	39	J X 45	42	J X 44	J X 44	J X 56	J X 79	J X 53	J X 58	J X 70	J X 67	J X 46	J X 56	J X 38	J X 29	J X 20
10	E S 13	E	J X 19	J X 26	J X 34	J X 28	33	J X 42	J X 75	J X 163	J X 68	48	J X 56	J X 80	44	J X 55	J X 40	J X 60	J X 105	J X 83	J X 78	J X 73	J X 85	J X 73
11	J X 81	J X 17	J X 25	J X 15	14	27	J X 50	J X 65	J X 76	J X 118	45	J X 63	J X 53	J X 73	J X 65	J X 55	J X 50	J X 83	30	J X 31	J X 40	J X 30	J X 28	J X 18
12	J X 50	J X 40	J X 32	J X 20	J X 25	J X 42	J X 39	J X 43	J X 62	J X 69	J X 78	J X 44	J X 56	41	G	J X 45	J X 44	J X 45	J X 60	J X 38	J X 23	J X 69	J X 50	J X 44
13	J X 64	J X 18	J X 19	J X 23	J X 23	G 19	37	J X 42	J X 56	J X 58	J X 63	J X 74	J X 77	J X 45	J X 64	J X 78	J X 77	31	27	J X 44	J X 74	J X 77	J X 78	J X 79
14	J X 23	J X 45	J X 35	J X 44	J X 40	J X 44	36	C	C	J X 62	J X 87	J X 74	J X 55	J X 43	J X 69	J X 73	J X 42	J X 32	J X 35	J X 37	J X 50	J X 44	J X 48	J X 83
15	J X 98	J X 73	J X 74	J X 44	J X 22	33	38	41	J X 73	J X 80	J X 88	J X 74	J X 60	46	46	40	38	40	J X 59	J X 60	J X 54	J X 54	J X 64	J X 84
16	J X 66	J X 64	J X 74	J X 43	J X 22	27	J X 49	J X 60	J X 58	J X 108	J X 73	J X 74	J X 140	J X 78	40	37	J X 51	34	G	G	J X 25	J X 22	J X 46	J X 57
17	J X 43	J X 79	J X 29	J X 30	J X 18	G	38	J X 48	J X 55	J X 64	J X 89	J X 64	J X 74	J X 57	J X 48	J X 50	J X 55	J X 103	J X 68	J X 81	J X 64	J X 30	J X 32	J X 51
18	J X 64	J X 29	J X 83	J X 73	J X 60	J X 34	J X 40	J X 96	J X 88	J X 84	J X 50	J X 50	J X 43	J X 59	C	J X 98	J X 88	J X 75	C	J X 105	C	C	C	J X 64
19	C	C	C	J X 25	C	C	C	C	C	J X 64	J X 110	J X 83	J X 124	J X 134	41	J X 54	35	35	J X 36	J X 80	J X 74	J X 84	J X 33	J X 65
20	J X 78	J X 55	J X 37	J X 24	J X 20	36	J X 64	J X 79	J X 68	J X 78	J X 130	J X 89	J X 99	J X 59	48	J X 90	J X 80	J X 77	J X 84	J X 65	J X 84	J X 64	J X 43	J X 44
21	J X 40	J X 43	J X 39	J X 25	J X 30	24	J X 35	J X 73	J X 41	41	J X 70	J X 124	J X 105	J X 59	J X 132	J X 73	J X 47	J X 59	J X 50	J X 49	J X 44	J X 59	J X 40	J X 36
22	J X 55	J X 43	J X 25	J X 29	J X 33	G	28	J X 39	41	J X 48	J X 109	J X 66	J X 77	J X 155	J X 80	J X 78	J X 49	40	J X 44	J X 36	J X 33	J X 28	J X 51	J X 73
23	J X 40	J X 37	J X 20	J X 33	J X 23	J X 23	J X 31	J X 36	J X 55	J X 89	J X 120	J X 82	J X 62	J X 54	J X 62	J X 84	J X 77	J X 54	J X 59	J X 53	J X 32	J X 56	J X 74	J X 77
24	J X 74	J X 64	J X 68	J X 53	J X 30	J X 33	J X 40	J X 83	J X 60	J X 48	J X 56	J X 55	J X 140	J X 170	J X 78	J X 66	J X 58	J X 47	30	J X 25	J X 25	J X 63	J X 66	J X 36
25	J X 23	E	E	J X 39	E	21	31	J X 46	J X 65	J X 60	J X 62	J X 48	J X 76	J X 69	G	38	J X 48	J X 53	J X 65	J X 58	J X 80	J X 65	J X 29	J X 28
26	J X 30	J X 20	J X 23	J X 20	E	25	J X 38	J X 44	J X 49	J X 50	J X 66	J X 74	J X 57	J X 70	J X 73	J X 76	36	37	J X 28	J X 40	J X 38	J X 41	J X 30	M 20
27	E S 13	J X 32	J X 25	J X 19	J X 19	20	J X 53	J X 56	J X 98	J X 80	J X 83	J X 56	J X 59	J X 50	J X 52	J X 74	J X 76	J X 40	J X 37	J X 20	J X 31	J X 24	J X 32	J X 33
28	J X 43	J X 43	J X 24	J X 19	J X 54	J X 38	J X 55	J X 50	J X 58	J X 75	J X 128	J X 75	J X 96	J X 136	J X 88	J X 72	J X 63	J X 66	J X 53	J X 23	J X 40	J X 33	J X 63	J X 74
29	J X 35	J X 35	J X 33	J X 26	J X 40	J X 40	J X 78	J X 90	J X 76	J X 77	J X 74	J X 44	J X 83	J X 47	39	42	44	J X 44	J X 77	J X 64	J X 78	J X 110	J X 79	J X 80
30	J X 83	J X 78	J X 60	J X 24	J X 34	J X 31	J X 41	J X 62	J X 57	J X 53	J X 63	J X 53	J X 85	J X 50	J X 80	J X 90	J X 54	32	25	J X 25	J X 78	J X 75	J X 54	J X 78
31	J X 57	J X 59	J X 53	J X 43	J X 45	22	37	J X 48	J X 61	J X 77	J X 111	J X 103	J X 80	J X 53	J X 72	J X 60	J X 63	J X 38	J X 26	J X 35	J X 69	J X 73	J X 72	J X 71
	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	31	30	30	30	29	29	31	31	31	31	31	30	31	31	31	30	31	30	30	30	31
MED	J X 46	J X 41	J X 33	J X 27	J X 25	27	38	J X 50	J X 61	J X 70	J X 73	J X 66	J X 74	J X 59	J X 54	J X 65	J X 51	J X 45	J X 50	J X 48	J X 54	J X 58	J X 52	J X 54
UQ	J X 66	J X 58	J X 43	J X 43	J X 40	J X 34	J X 45	J X 65	J X 73	J X 80	J X 88	J X 74	J X 86	J X 76	J X 73	J X 77	J X 64	J X 68	J X 67	J X 64	J X 71	J X 69	J X 72	J X 76
LQ	J X 30	J X 29	J X 25	J X 23	J X 19	23	34	J X 43	J X 55	J X 53	J X 62	J X 50	J X 56	J X 50	40	J X 52	J X 42	37	J X 30	J X 36	J X 38	J X 33	J X 33	J X 34

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

JUL. 1968 | f_bEs (0.1) | 135° E Mean Time (G. M. T. + 9 h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 8.2' E Sweep 1.0 Mc to 20.0 Mc in 15 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	28	17	50	23	20	27	36	33	37	53	A	46	45	39	39	36	G	30	27	23	24	18	20	23
2	E S 13	E	23	E	24	25	44	47	44	A	58	64	61	56	54	A	84	52	34	31	42	24	51	37
3	28	19	24	E	14	27	31	35	35	45	58	43	48	60	46	57	34	31	27	34	55	50	19	18
4	25	25	22	28	18	G	50	A	A	A	42	44	40	39	37	35	34	47	A	36	34	23	16	19
5	24	17	28	35	24	23	41	40	56	47	42	A	48	43	38	37	36	34	27	18	17	16	16	16
6	16	13	E	12	E	23	30	40	45	38	42	41	41	38	G	33	35	30	38	42	48	22	22	23
7	18	17	17	20	G	G	28	47	52	61	45	40	38	38	38	A	43	A	A	52	25	25	25	53
8	16	25	20	12	13	21	31	48	57	A	A	A	A	A	45	A	A	60	A	39	45	26	51	E
9	18	21	20	E	16	23	30	31	36	37	38	40	42	52	41	48	58	45	62	38	20	20	20	16
10	S	E	E	16	20	24	29	39	56	A	61	48	56	A	42	52	40	60	A	75	51	37	A	45
11	A	13	E	E	13	25	45	56	A	A	38	40	42	47	39	43	U R 50	A	28	30	35	24	22	17
12	31	24	18	15	19	28	32	35	42	58	56	42	46	40	G	38	45	41	28	34	23	31	38	22
13	44	13	14	E	E	G 18	34	40	55	40	60	60	48	40	44	54	60	31	26	45	35	35	38	52
14	E	23	18	23	26	25	34	C	C	40	45	40	41	42	61	44	41	30	29	35	48	33	44	31
15	44	23	41	19	14	32	37	39	50	41	58	45	42	40	43	40	37	38	59	55	30	51	54	A
16	55	46	28	28	E	G	36	51	50	A	64	61	A	46	40	37	45	32	G	G	20	18	24	26
17	35	18	E	13	E	G	32	45	51	59	A	46	54	49	43	44	51	A	40	30	25	26	21	16
18	26	18	25	39	33	25	38	66	49	45	42	43	41	42	C	65	65	59	C	A	C	C	C	21
19	C	C	C	18	C	C	C	C	C	58	68	A	A	A	41	51	34	34	30	A	58	24	25	35
20	45	26	24	15	15	22	40	69	40	A	A	A	45	43	41	A	65	60	32	44	64	33	35	35
21	25	25	19	20	19	22	34	42	38	39	59	A	A	58	A	60	36	56	50	30	28	48	32	18
22	20	24	18	16	18	G	28	38	41	45	42	64	A	A	77	51	47	40	42	30	30	16	27	28
23	25	23	15	16	12	21	27	33	35	59	A	60	42	42	47	58	58	40	35	42	19	19	50	39
24	34	23	44	25	18	30	36	40	38	38	42	45	A	A	A	58	39	38	26	24	20	30	25	16
25	17	E	E	18	E	21	28	40	46	42	40	43	35	42	G	37	40	49	45	30	38	34	24	19
26	E	16	E	17	E	22	28	32	42	U R 50	64	46	53	59	61	54	36	34	24	23	25	16	17	E
27	E S 13	17	19	17	14	20	36	54	A	60	63	43	57	47	45	54	55	30	30	19	29	17	21	17
28	19	16	18	E	20	33	55	49	47	61	63	40	56	A	55	40	34	36	38	16	25	25	19	A
29	20	17	15	16	18	31	72	38	38	38	47	41	46	44	39	39	39	37	65	26	26	A	18	57
30	45	27	24	E	12	29	34	47	55	49	54	48	A	44	55	68	34	30	24	18	25	35	21	24
31	18	24	30	23	19	22	34	39	55	66	58	41	53	47	68	58	39	38	25	30	48	46	29	16
	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	30	30	31	30	30	30	29	29	31	31	31	31	31	30	31	31	31	30	31	30	30	30	31
MED	25	18	19	16	16	23	34	40	47	53	58	45	48	46	43	51	40	38	33	31	30	26	24	23
UQ	34	24	24	22	19	27	38	48	55	64	64	60	59	58	55	58	53	54	50	42	45	35	38	36
LQ	18	16	15	12	12	21	30	38	40	42	42	42	42	42	39	40	36	33	27	25	25	20	20	17

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

JUL. 1968 | f-min (0.1) | 135° E Mean Time (G. M. T. + 9 h)

Station AKITA Lat. 39° 43.5' N, Long. 140° 8.2' E Sweep 1.0 Mc to 20.0 Mc in 15 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 13	E	E	E	E	E	17	17	17	15	18	18	18	19	19	18	18	17	16	12	E	E S 13	E S 13	E S 13
2	E S 13	E	E	E	E	13	16	17	18	18	18	21	23	18	19	18	17	17	16	13	E S 14	E S 13	E S 12	E S 13
3	E S 13	E	E	E	E	16	13	14	17	17	18	18	18	18	18	17	18	18	15	13	E S 13	E S 12	E S 13	E S 12
4	E S 12	E	E	E	E	14	15	16	18	17	18	21	19	23	19	18	18	15	15	13	E S 12	E S 12	E S 12	E S 13
5	E S 13	E	E	E	E	12	17	14	17	17	20	18	17	18	17	16	17	15	13	12	E S 15	E S 15	E S 12	E S 15
6	E S 15	E	E	E	E	15	16	14	16	17	16	26	20	23	19	18	17	18	13	17	E S 16	E	E S 16	E S 12
7	E S 13	E	E	E	E	14	14	17	17	17	18	18	17	19	16	16	16	17	15	14	E S 16	E S 13	E S 13	E S 13
8	E	E S 13	E	E	E	14	15	15	17	17	19	21	20	19	18	17	17	14	17	E S 13	E S 14	E S 13	E S 12	E S 12
9	E S 12	E S 12	E	E S 14	E S 13	13	15	14	17	18	19	18	22	19	18	18	18	17	13	17	E S 13	E S 13	E S 12	E S 12
10	E S 13	E	E	E	E	12	17	18	18	18	18	21	24	24	21	17	18	17	16	13	E S 13	E S 15	E S 12	E S 13
11	E S 12	E	E	E	E	14	15	14	17	19	20	20	20	22	17	18	17	18	15	15	E S 12	E S 12	E S 15	E S 16
12	E S 12	E	E	E	E	E	18	17	17	17	25	24	25	22	20	18	18	17	13	13	E S 12	E S 13	E S 13	E S 13
13	E S 12	E	E	E	E	13	16	17	18	20	19	22	23	19	21	18	24	17	14	17	16	E S 12	E S 14	E S 13
14	E S 13	E	E	E	E	14	18	C	C	17	23	20	20	20	19	18	18	19	13	E S 12	E S 13	E S 13	E S 13	E S 14
15	E S 13	E	E	E	E	13	14	17	20	20	18	20	22	22	18	19	18	19	14	E S 14	E	E	E S 13	E S 14
16	E S 13	E S 12	E	E	E	14	15	17	18	18	20	23	24	21	20	18	19	14	13	13	E S 13	E S 12	E S 13	E S 13
17	E S 13	E	E	E	E	18	17	18	19	21	19	20	18	17	20	17	18	18	17	E S 13	E	E S 13	E S 13	E S 14
18	E S 14	E	E	E	E	14	14	14	16	17	18	22	18	18	C	18	18	17	C	E S 13	C	C	C	E S 12
19	C	C	C	E	C	C	C	C	C	18	18	20	23	21	20	18	18	16	13	13	E S 13	E S 13	E S 13	E S 13
20	E S 13	E	E	E	E	13	17	17	18	18	19	25	18	21	20	19	17	17	14	E S 12	E S 13	E S 12	E S 13	E S 13
21	E S 13	E	E	E	E	13	16	16	17	18	17	23	23	21	18	18	18	18	13	E S 13	E	E S 13	E S 13	E S 13
22	E S 13	E	E	E	E	14	18	16	17	17	24	19	21	18	20	19	18	18	15	13	E S 13	E S 14	E S 13	E S 13
23	E S 13	E	E	E	E	12	16	16	16	18	18	20	23	21	18	17	17	17	13	E S 13	E S 13	E S 13	E S 13	E S 13
24	E S 13	E	E	E	E	13	15	17	18	18	18	18	18	19	18	18	17	17	13	E S 12	E S 13	E S 13	E S 13	E S 13
25	E S 13	E	E	E	E	13	13	13	18	18	18	18	21	20	18	16	19	17	17	E S 13	E S 13	E S 14	E S 13	E S 13
26	E S 13	E	E S 13	E	E	14	18	17	19	19	21	20	19	23	18	20	18	17	14	E S 13	E S 12	E S 13	E S 13	E S 13
27	E S 13	E	E	E	E	14	18	17	18	19	20	23	19	21	21	18	18	15	14	E S 14	E S 12	E S 12	E S 13	E S 13
28	E	E	E	E	E	13	16	17	17	17	19	20	25	24	23	18	17	17	16	12	E S 13	E S 15	E S 14	E S 15
29	E S 13	E	E	E	E	13	16	16	17	18	18	20	19	20	18	18	18	14	14	E S 13	E	E S 13	E S 12	E S 13
30	E S 13	E	E	E	E	14	16	18	19	18	20	24	25	23	18	18	17	17	13	E S 12	E S 12	E S 13	E S 13	E S 13
31	E	E	E	E	E	13	15	17	17	18	19	24	19	20	18	18	18	17	14	E S 13	E S 12	E S 14	E S 13	E S 13
	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	31	30	30	30	29	29	31	31	31	31	31	30	31	31	31	30	31	30	30	30	31
MED	E S 13	E	E	E	E	13	16	17	17	18	19	20	20	20	18	18	18	17	14	12	E S 13	E S 13	E S 13	E S 13
UQ	E S 13	E	E	E	E	14	17	17	18	18	20	22	23	22	20	18	18	18	15	13	E S 13	E S 13	E S 13	E S 13
LQ	E S 12	E	E	E	E	13	15	15	17	17	18	20	18	19	18	18	17	17	13	E S 13	E S 12	E S 12	E S 13	E S 13

IONOSPHERIC DATA

JUL. 1968

M(3000) F2(0.01)

135° E Mean Time (G. M. T. + 9 h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 8.2' E Sweep 1.0 Mc to 20.0 Mc in 15 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	275	275	280	285	265	270	300	310	280	285	I A 275	285	270	275	270	265	285	285	280	275	280	275	270	270
2	275	270	280	285	I R 300	295	285	305	295	I A 295	275	275	275	280	275	I A 280	I A 285	285	280	285	R	R	R	I R 275
3	285	290	285	280	275	285	275	295	I R 290	290	285	275	290	275	275	270	260	270	265	295	I R 305	I R 290	F	F
4	F	F	F	F	F	285	280	I A 300	I A 320	I A 310	260	295	300	290	280	280	270	285	I A 285	285	305	270	280	275
5	F	F	290	I R 290	F	300	270	290	275	275	255	I A 260	270	265	265	280	270	285	290	280	275	F 260	F 270	F 280
6	F 285	290	285	280	F 275	265	285	290	305	285	295	290	270	280	290	290	285	290	285	285	290	295	F 265	F
7	F 275	F	F 295	F 295	F 275	275	275	275	285	290	245	250	250	260	280	I A 270	R	A	A	275	285	S 290	F	F
8	F	F	F	F 290	F 280	V 310	355	295	315	I A 295	I A 285	A	A	I A 285	270	A	A	295	I A 285	280	280	285	I R 280	290
9	275	305	280	300	270	285	280	285	300	280	285	280	290	275	I R 285	280	280	295	275	295	280	285	290	285
10	280	285	305	285	275	280	300	295	275	I A 280	265	260	285	I A 270	275	265	265	R 300	I A 300	I A 280	260	F	A	F
11	A	F	F	F 290	F 290	240	255	290	A	A	G	225	250	285	260	280	280	I A 285	295	290	265	265	F	F
12	260	270	280	265	285	320	290	295	315	300	305	285	255	275	275	290	290	290	295	285	280	275	275	I R 280
13	280	285	285	285	285	300	295	295	320	315	305	305	270	285	285	275	265	280	285	290	275	I R 285	R	R
14	S 285	F	F	F	F	270	265	C	C	285	275	275	245	255	R 275	305	285	305	290	285	270	260	250	280
15	290	F	F	F	280	275	280	I R 310	315	295	310	295	285	270	270	280	290	295	295	290	280	285	285	A
16	F	R	R	I R 295	295	300	290	310	285	I A 290	290	290	I A 280	280	285	290	280	290	285	290	270	265	F	F
17	F	295	F	F	F	S 310	310	325	320	275	I A 280	275	270	285	290	285	285	I A 290	305	290	280	I R 265	285	F
18	F	F	F	275	F	305	285	290	300	255	280	280	280	280	I C 275	285	280	285	C	A	C	C	C	F
19	C	C	C	275	C	C	C	C	C	300	280	I A 280	I A 265	I A 260	265	275	285	280	285	I A 280	285	275	F	290
20	F	265	F	S 265	F	F	S 310	300	310	I A 280	I A 270	I A 265	265	300	270	I A 275	285	280	285	285	290	275	270	275
21	275	275	F	305	295	295	315	310	295	280	290	A	A	280	I A 280	285	300	295	285	275	265	280	290	285
22	275	270	270	280	280	285	290	300	300	305	285	270	I A 280	I A 275	285	295	285	295	280	265	275	270	I R 280	F 275
23	F	275	290	280	285	295	H 315	325	300	275	I A 280	285	290	265	285	280	290	295	310	285	285	275	265	270
24	F	F	F	F	F	270	285	300	300	285	265	255	A	A	A	280	280	285	285	285	285	260	F	F
25	F	280	280	285	295	310	275	280	285	290	290	285	280	275	275	280	280	285	300	310	295	265	270	280
26	275	275	270	F	280	300	300	300	315	265	290	285	270	280	275	280	285	285	295	305	300	255	260	265
27	275	F	S 270	275	285	315	295	320	I A 290	305	315	270	275	270	275	285	290	285	295	295	280	270	F	F
28	F	F	F	F	F	295	285	310	295	290	290	310	290	I A 295	I R 295	285	295	300	295	280	285	290	285	I A 280
29	265	275	F	270	F	F 250	I R 300	310	H 300	290	310	270	280	275	285	290	290	290	300	300	275	I A 280	S 285	F
30	F	F	F	F	F	F	300	305	290	300	270	290	I A 285	300	280	290	295	310	290	285	290	I R 285	S 280	F
31	F	F	275	F	F	280	275	295	315	305	I R 285	265	285	305	295	295	305	300	305	290	280	F	F	285

	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	16	16	22	19	28	30	29	28	30	31	29	28	30	30	30	29	30	29	30	29	27	19	17
MED	275	275	280	285	280	290	288	300	300	290	285	280	278	278	275	280	285	290	290	285	280	275	280	280
UQ	282	288	288	290	288	300	300	310	315	300	290	285	285	285	285	290	290	295	295	290	285	285	285	285
LQ	275	272	278	275	275	275	280	295	290	280	272	270	270	270	275	280	280	285	285	280	275	265	270	275

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IONOSPHERIC DATA

JUL. 1968

M(3000) F1(0.01)

135° E Mean Time (G. M. T. + 9 h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 8.2' E Sweep 1.0 Mc to 20.0 Mc in 15 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						U L 315	L	360	L 355	A	A	355	345	355	330	340	L 340	L 335	L					
2							A	A	L 355	A	A	A	A	A	A	A	A	A	L					
3							L 315	L 355	360	355	I A 350	350	I A 360	I A 340	I A 330	I A 335	350	345	L					
4						L	A	A	A	A	335	370	390	370	365	340	340	A	A					
5						U L 335	A	345	I A 360	I A 370	375	A	A	365	375	370	345	335	330	L				
6						L	345	I A 345	I A 365	375	H 355	390	365	395	360	L 345	H 345	330	A					
7							315	A	A	A	A	395	380	375	365	A	A	A	A					
8						L 360	L	A	A	A	A	A	A	A	340	A	A	A	A					
9						L	U L 340	355	355	375	405	400	380	I A 360	365	A	A	A	A					
10						L	L	L 370	A	A	A	A	A	A	350	I A 360	320	A	A					
11						320	I A 340	A	A	A	365	385	375	I A 350	370	350	A	A	L					
12							L	L 355	355	A	A	385	325	355	335	345	I A 350	L	L					
13						L	L	L 355	I A 360	395	A	A	L 325	L 375	350	I A 340	I A 345	L 325	U L 345					
14							L	C	C	340	380	385	370	345	I A 350	360	365	L	L					
15						L	L	U L 355	A	395	I A 345	L 340	355	360	360	340	L 335	L 350	A					
16							L	A	A	A	A	A	A	355	360	360	I A 350	L	L					
17							L	L	A	A	A	365	I A 370	I A 350	355	375	A	A	A					
18								A	A	H 320	365	365	370	355	I C 335	I A 340	A	A	C					
19								C	C	A	A	A	A	A	360	I A 350	L 340	L	L					
20								A	L	A	A	A	365	345	340	A	A	A	L 325					
21							L	350	370	355		A	A	A	A	A	365	A	A					
22						L	L	375	L 365	340	370	A	A	A	A	A	I A 335	A	A					
23						L	L	380	360	I A 350	I A 365	I A 355	365	345	325	A	A	L	A					
24							L	365	370	395	360	355	A	A	A	A	335	L 330	L					
25							L	L	L	360	365	380	370	350	355	350	325	A	A					
26						L	L	L	L	A	I A 335	345	A	A	A	A	350	L	L					
27						L	L	A	A	A	A	350	I A 355	345	335	A	A	L 335	L					
28							A	A	355	I A 360	I A 370	H 365	A	A	A	325	330	L	A					
29						L	I A 345	340	370	380	375	360	355	360	350	355	335	L	A					
30							L	A	A	A	L 335	L 345	I A 350	360	A	A	335	L	L					
31							L	L 350	A	A	I A 330	330	I A 380	A	A	A	L 350	L						
	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	6	15	14	15	18	21	20	21	23	18	21	8	3					
MED						L 328	340	355	360	360	365	365	365	355	350	348	340	L 335	L 330					
UQ						L 348	U 345	362	365	378	370	385	372	360	360	360	350	340	338					
LQ						318	315	350	355	352	345	350	355	350	338	340	335	L 330	328					

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

JUL. 1968 | h'F2 (km) | 135° E Mean Time (G. M. T. + 9 h)

Station AKITA Lat. 39° 43.5' N, Long. 140° 8.2' E Sweep 1.0 Mc to 20.0 Mc in 15 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						340	290	305	320 L	360	A	375	405	380	390	395	315	325	300					
2							290	260	300	I A 300	360	345	350	330	340	A	A	300	300					
3							370	315	305	310	315	370	330	355	380	365	330	355	280					
4						300	340	A	A	A	455	330	320	340	365	380	380	325	A					
5						320	405	370	I A 435	405	475	I A 455	430	460	450	400	410	375	325	290				
6						295 L	320	300	310	340	320	335	395	375	340	350	350	345	325					
7							345	370	345	A	540	520	535	495	435	I A 440	425	A	A					
8						280	245	290	325	A	I A 375	A	A	A	400	A	A	340	I A 340					
9						315	330	330	290	390	375	395	380	I A 400	350	390	I A 365	330	I A 320					
10						300	275	250	300	I A 340	A 390	350	345	I A 380	370	385	370	300	A					
11						490	440	A	A	A	G	680	525	400	465	420	I A 390	A	300					
12							260	300	290	330	305	360	465	375	355	320	325	305	300					
13						305	280	295	290	280	330	A	425	370	375	370	I A 365	345	305					
14							320	C	C	330	380	360	420	410	340	280	305	280	280					
15						340	310	270	255	310	310	335	370	375	395	370	335	295	300					
16							270	305	300	I A 370	360	350	I A 370	380	330	330	330	315	290					
17							280	290	295	A	I A 370	370	405	340	335	320	350	I A 325	280					
18								I A 310	290	455	345	345	335	345	I C 370	350	365	330	C					
19								C	C	315	A	A	A	A	420	400	380	345	320					
20								I A 335	295	A	I A 380	I A 400	405	330	400	I A 375	I A 355	340	315					
21							270	280	285	325	A	A	A	380	I A 360	350	320	310	325					
22						310	275	290	280	320	340	A 410	I A 360	I A 370	I A 340	320	350	310	330					
23						300	265	250	345	385	I A 365	380	350	400	360	360	340	330	280					
24							315	280	305	350	465	490	A	A	A	A	400	340	325					
25							260	325	305	305	290	360	390	380	390	360	340	320	285					
26						270	270	250	280	370	I A 360	355	385	355	390	370	330	320	280					
27						280	310	285	I A 300	295	290	340 L	395	380	380	340	320	310	280					
28							310	290	355	I A 340	345	305	370	I A 350	355	355	325	290	290					
29						350	320	285	265	350	320	430	380	385	355	340	330	300	I A 290					
30							270	265	310	310	355	340	I A 350	325	360	I A 350	315	280	290					
31							325	300	260	310	370	410	340	300	A 340	325	300	290						
	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						15	28	27	27	25	28	27	27	28	30	28	29	29	26	1				
MED						305	300	290	300	330	360	360	380	375	368	360	340	320	300	290				
UQ						330	322	308	310	360	380	405	405	382	390	382	365	340	320					
LQ						298	270	280	290	310	325	345	350	348	350	340	325	300	285					

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IONOSPHERIC DATA

JUL. 1968 | $h'F$ (km) | 135° E Mean Time (G. M. T. + 9 h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 8.2' E Sweep 1.0 Mc to 20.0 Mc in 15 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	270	270	I A 290	240	310	280	I A 250	230	210	A	A	A	I A 230	205	200	225	240	230	255	280	270	280	290	290
2	290	280	290	240	250	250	I A 240	I A 230	A 240	A	A	A	A	A	A	A	A	A	A	265	285	280	I A 295	310
3	290	270	280	255	290	245	230	220	240	245	I A 240	240	I A 220	A	A	A	230	230	255	265	I A 260	I A 275	300	300
4	290	300	280	280	280	255	A	A	A	A	230	A 205	210	215	210	215	230	A	A	275	250	280	275	275
5	305	270	270	240	240	230	A	A	A	A	230	A	A	240	240	235	245	A 245	250	285	280	275	275	280
6	275	270	260	290	300	255	240	I A 260	I A 240	210	H 230	200	200	210	230	215	H 240	235	I A 260	A 290	280	255	300	A 280
7	250	280	265	250	295	250	245	A	A	A	A	205	210	225	245	A	A	A	A	A	270	250	A 295	I A 280
8	260	290	280	270	320	255	245	I A 230	A	A	A	A	A	A	A	A	A	A	A	290	295	265	A 290	230
9	245	295	295	245	315	270	240	225	240	205	190	195	200	I A 235	230	I A 230	A	A	A	270	245	280	255	265
10	270	280	255	280	305	250	240	I A 235	A	A	A	A	A	A	240	I A 230	A	A	A	A	I A 280	I A 305	A	A
11	A	280	250	245	290	250	I A 245	A	A	A	240	235	225	I A 245	230	A	A	A	A	275	A 305	290	325	285
12	I A 330	300	290	290	275	260	240	250	A	A	A	200	I A 220	230	235	230	I A 230	I A 235	240	265	260	310	320	300
13	290	280	255	255	260	240	250	I A 240	I A 230	220	A	A	A	210	240	I A 240	I A 240	240	225	280	280	295	290	I A 280
14	280	290	270	290	350	255	250	C	C	230	190	195	195	235	A	A	240	235	230	285	I A 310	325	I A 320	295
15	290	305	I A 300	305	270	I A 280	I A 270	245	I A 250	205	A	A	220	205	230	260	245	I A 270	I A 280	300	280	A	A	A
16	A	A	280	250	240	240	250	A	A	A	A	A	A	A	230	220	I A 240	230	240	260	280	285	330	330
17	310	280	230	290	290	230	240	I A 235	A	A	A	A	I A 210	I A 220	240	I A 240	A	A	A	260	280	320	280	265
18	310	285	290	300	270	260	280	A	A	H 230	200	210	240	240	I C 240	I A 240	A	A	C	A	C	I C 285	I C 300	305
19	C	C	C	270	C	C	C	C	C	A	A	A	A	A	215	I A 250	230	255	255	I A 265	I A 275	270	320	270
20	I A 280	290	305	295	290	265	280	A	A	A	A	A	220	230	230	A	A	A	A	275	I A 285	280	A 300	315
21	310	315	285	230	255	245	I A 230	I A 250	215	205	A	A	A	A	A	A	240	I A 250	I A 255	285	280	I A 290	270	260
22	290	315	275	255	285	265	230	215	230	245	210	A	A	A	A	A	A	I A 250	I A 270	285	260	280	290	A 290
23	A 290	295	290	285	270	285	245	235	205	I A 215	I A 230	I A 220	210	230	A	A	A	A	A	280	255	270	I A 310	310
24	325	300	I A 315	270	260	270	240	I A 235	225	195	205	A	A	A	A	A	255	I A 240	265	270	255	A	290	285
25	270	280	280	270	250	255	230	260	I A 240	225	210	215	200	220	230	230	A	A	A	250	240	300	290	280
26	270	290	290	270	270	265	235	230	I A 215	I A 230	I A 230	A	A	A	A	A	240	250	250	250	230	290	320	290
27	290	290	290	285	250	260	I A 250	A	A	A	A	230	A	A	A	A	A	260	I A 260	260	280	310	280	245
28	310	290	290	275	290	265	A	A	A	I A 220	I A 210	H 200	A	A	A	A 250	240	I A 245	I A 260	280	285	270	255	I A 290
29	325	310	325	315	310	A	A	A	220	215	I A 240	210	I A 210	225	200	225	230	A	A	260	290	I A 290	255	I A 290
30	I A 285	285	310	290	280	260	A	A	A	A	A	A	A	230	A	A	230	240	255	280	265	280	260	250
31	250	290	295	300	290	260	250	240	A	A	A	205	I A 195	A	A	A	A 240	230	255	265	A	A	300	245
	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	31	30	29	25	18	14	15	15	15	17	18	18	16	18	18	18	28	29	28	29	29
MED	290	290	288	270	282	255	245	235	230	220	230	205	210	228	230	230	240	240	255	275	280	280	290	285
UQ	308	295	290	290	295	265	250	U A 245	U A 240	230	230	218	220	235	240	U A 240	240	A 250	U A 260	282	280	292	300	295
LQ	270	280	270	252	260	250	240	230	215	208	208	200	200	215	230	225	230	235	250	265	260	275	280	270

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IONOSPHERIC DATA

JUL. 1968 | $h'Es$ (km) | 135° E Mean Time (G. M. T. + 9 h)

Station AKITA Lat. 39° 43.5' N, Long. 140° 8.2' E Sweep 1.0 Mc to 20.0 Mc in 15 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	105	105	105	105	105	130	125	120	120	120	115	115	115	115	115	G	150	125	115	110	110	110	110
2	S	110	105	110	105	110	105	105	110	115	115	115	115	115	115	115	115	115	120	120	115	115	115	115
3	110	105	105	120	120	115	140	125	120	120	115	130	115	115	110	110	120	120	110	105	115	110	105	105
4	105	105	105	105	110	G	120	115	115	110	110	115	110	115	115	120	130	115	115	115	110	110	110	105
5	105	105	105	105	105	110	130	130	125	125	125	115	120	115	115	115	145	120	110	105	105	105	110	110
6	110	110	E	105	E	150	130	125	120	130	120	115	110	115	G	105	130	140	130	120	115	115	110	110
7	110	110	110	110	G	155	140	130	125	115	115	115	115	115	160	135	130	125	120	115	115	110	115	110
8	105	100	100	105	125	140	130	110	120	110	110	110	110	110	110	110	110	110	110	110	105	105	110	110
9	100	100	100	105	105	130	125	115	125	115	115	110	120	130	125	125	125	120	115	115	115	105	105	105
10	S	E	105	105	100	130	130	120	115	115	115	110	120	125	140	120	120	135	120	130	125	120	115	110
11	110	110	115	110	140	130	125	115	120	115	120	120	115	110	140	140	135	125	125	120	115	115	110	110
12	105	105	110	110	100	120	135	120	120	115	115	120	115	115	G	115	105	105	105	105	105	105	115	115
13	105	110	105	110	110	105	140	120	115	115	110	105	110	110	125	115	125	125	125	115	110	115	110	110
14	110	140	120	105	105	105	130	C	C	120	115	115	115	115	110	110	115	110	105	105	110	120	115	110
15	110	105	105	105	110	130	130	125	115	115	110	110	110	110	140	160	145	130	115	115	120	110	110	110
16	110	105	110	105	110	160	130	130	120	115	115	115	115	110	125	115	120	125	G	G	105	105	105	115
17	110	105	120	105	110	G	150	125	125	115	115	115	115	115	115	110	110	115	115	115	110	130	120	115
18	115	110	105	105	105	110	125	115	110	110	115	120	115	115	C	110	115	110	C	110	C	C	C	105
19	C	C	C	115	C	C	C	C	C	110	110	110	115	115	140	115	160	140	125	115	115	110	110	105
20	105	105	105	100	115	140	120	115	115	115	115	115	110	115	125	115	115	115	115	110	105	105	100	100
21	100	105	100	105	110	115	110	105	115	125	115	115	115	115	115	115	125	115	110	105	105	105	105	100
22	100	100	105	100	105	G	110	115	115	115	110	110	115	140	130	125	130	130	115	130	110	110	110	110
23	110	110	110	110	110	110	115	125	140	115	115	110	110	110	110	110	110	110	105	105	105	105	105	110
24	110	105	105	105	105	120	125	110	115	115	115	115	110	110	105	110	110	120	120	110	110	110	110	110
25	105	E	E	100	E	140	140	120	115	110	110	110	105	100	G	140	130	120	115	110	110	110	105	105
26	110	100	100	105	E	120	110	115	115	115	110	110	110	105	110	110	140	130	120	120	110	110	110	115
27	S	105	100	100	100	130	130	120	115	115	115	120	110	110	110	105	105	110	125	125	115	120	110	105
28	110	105	105	105	110	120	125	120	115	115	115	145	110	110	135	130	135	130	120	125	120	110	110	110
29	110	105	110	110	140	125	120	115	145	115	115	115	110	115	115	150	135	125	120	115	115	115	110	110
30	110	110	100	120	140	130	125	120	120	115	110	110	110	105	105	105	115	145	130	110	105	110	110	110
31	110	100	105	110	105	130	125	125	115	115	110	115	110	110	105	105	105	110	115	115	120	110	110	110
	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	27	28	28	31	26	27	30	29	29	31	31	31	31	31	27	31	30	31	29	30	30	30	30	31
MED	110	105	105	105	110	125	128	120	115	115	115	115	115	115	115	115	122	120	115	115	110	110	110	110
UQ	110	110	110	110	110	130	130	125	120	115	115	115	115	115	128	122	130	130	120	120	115	115	110	110
LQ	105	105	105	105	105	112	120	115	115	115	110	110	110	110	110	110	115	115	115	110	105	105	110	105

IONOSPHERIC DATA

JUL. 1968

Types of Es

135° E Mean Time (G. M. T. + 9 h)

Station AKITA Lat. 39° 43.5' N. Long. 140° 8.2' E Sweep 1.0 Mc to 20.0 Mc in 15 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	F4	F2	F6	F3	L3	L2	H3	H1	H2	H2	H2	H2	C2	C1	C1	C1		H1	C2	C3	F3	F3	F2	F3
2		F2	F3	F1	L3	C2	L4	L3	C3	C4	C2	C3	C3	C2	C2	C4	C3	C4	C3	C4	F3	F3	F3	F3
3	F4	F3	F6	F2	C1	C3	HL22	H2	H1	H2	H3	H1	H2	H3	C3	C2	H1	C2	C2	L4	F5	F3	F2	F2
4	F2	F3	F4	F5	L2		H4	C3	C4	C3	C2	C2	C2	CH12	C1	H2	H1	C4	C5	C5	F5	F4	F3	F3
5	F2	F3	F4	F3	L4	L2	H2	H2	H3	H2	H2	H2	H2	H2	H2	C2	HC12	C2	C4	L2	F4	F2	F3	F2
6	F2	F1		F2		H1	H2	H3	H2	H1	H1	C1	C2	H1		L2	H1	H1	HL22	C2	F4	F7	F5	F2
7	F3	F2	F4	F6		H1	H1	H4	H3	H4	C2	C2	C1	C1	HH11	H2	H2	H5	C6	C6	F3	F2	F3	F3
8	F2	F3	F2	F1	C1	H2	H2	C3	H3	C3	C3	C4	C4	C4	C2	C5	C5	C3	C5	C3	F5	F7	F3	F3
9	F3	F4	F3	F2	L1	H2	H2	H2	H2	H1	H2	C2	C1	H2	H3	H2	H2	H2	C3	C3	F3	F3	F3	F2
10			F1	F1	L3	H2	H1	H2	H2	C3	C3	C2	C2	H2	H1	H2	H2	H2	H5	H5	F3	F3	F6	F4
11	F6	F2	F1	F1	H1	H2	H3	C4	H5	C2	H1	H1	C2	C2	HL11	H2	H2	H4	H4	C3	F6	F4	F4	F1
12	F5	F4	F4	F3	L2	CL21	HH21	H2	H3	C3	C2	H1	C2	C1		C2	L2	L3	L3	L4	F6	F6	F5	F5
13	F5	F1	F2	F2	L1	L1	HL22	H2	C3	C2	C2	C3	C3	C2	H2	C3	H2	C1	C3	C4	F4	F4	F4	F4
14	F2	F4	F3	F4	L3	L2	H2			C1	C2	C1	C2	C2	C2	C2	C2	C3	L2	L5	F6	F6	F5	F4
15	F4	F2	F4	F2	L1	H2	H3	H2	C3	C2	C2	C2	C2	HC11	H2	H1	H2	H2	C6	C5	F5	F6	F4	F5
16	F5	F4	F3	F4	L1	H1	H2	H3	C3	C3	C2	C2	C3	C2	H1	C2	H2	H2			F3	F4	F3	F5
17	F4	F2	F1	F2	L1		H2	H2	H2	C3	C4	C2	C2	C2	C2	C2	C4	C3	C3	C3	F3	F5	F4	F2
18	F4	F4	F4	F5	L3	L2	H3	C4	C3	L2	C2	C1	C1	C1		C2	C2	C3		C6				F2
19				F4						C3	C3	C3	C2	C3	H1	C4	H1	H2	H3	C5	F4	F3	F4	F4
20	F5	F4	F3	F2	C1	H1	C3	C4	C2	C3	C3	C3	C2	C2	H1	C5	C2	C4	C3	C4	F4	F5	F4	F4
21	F4	F2	F2	F3	L3	C2	C5	C2	C2	H2	C3	C4	C3	C3	C2	C2	H1	C3	C4	L3	F6	F4	F3	F2
22	F3	F3	F1	F1	L3		L2	C2	C2	C2	C2	C5	C4	H1	H3	H3	H2	HL22	H2	H3	F4	F2	F3	F3
23	F2	F3	F2	F2	C1	C3	C2	H2	H1	C3	C3	C3	C2	C2	C3	C3	C3	C3	L2	L3	F3	F3	F3	F5
24	F3	F2	F4	F3	L2	C3	H2	C2	C2	C2	C2	C2	C4	C4	L3	C4	C2	H1	H4	C2	F3	F4	F4	F3
25	F2			F2		H2	H2	C3	C3	C2	C1	C2	L2	L2		H1	H2	C6	C3	C5	F3	F4	F4	F2
26	F2	F1	F1	F2		C1	C2	C2	C3	C2	C2	C2	C2	C3	C3	C2	H1	H2	C2	C3	F3	F2	F2	F1
27		F2	F2	F2	L1	H1	H2	C4	C4	C2	C2	C2	C2	C2	C2	L3	L2	C1	H2	C2	F4	F3	F3	F3
28	F3	F2	F3	F1	L3	C5	H4	C4	C3	H3	C4	HC11	C2	C2	H2	H2	H1	H2	C2	C2	F3	F5	F3	F4
29	F4	F2	F2	F2	F3	C5	C3	C3	HH12	C2	C3	C2	C2	C2	C1	H1	H2	H2	C6	C4	F3	F5	F3	F5
30	F4	F3	F2	F2	H2	H2	H4	H3	H3	C3	C2	C2	C2	C2	L2	L3	C2	H1	H1	C2	F3	F3	F2	F3
31	F3	F3	F3	F4	F3	H2	H2	H3	C2	C4	C3	C1	C2	C2	L3	L3	L4	C2	C2	C4	F4	F4	F4	F2
	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

IONOSPHERIC DATA

JUL. 1968 | f_0F2 (0.1) | 135° E Mean Time (G. M. T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1.0 Mc to 20.0 Mc 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	86	86	76	70	F 64	67	74	A	63	67	65	72	72	75	76	78	90	86	83	86	85	I R 84	86	88
2	88	87	I R 84	R	F 83	71	A	88	85	80	84	I A 94	102	A	A	107	I A 100	95	95	91	I R 86	J R 87	90	I R 93
3	95	97	I R 94	I R 85	83	81	90	88	95	93	92	A	A	82	80	86	80	87	92	96	92	73	77	R
4	F	R	71	F	F 59	U S 73	73	84	80	70	J R 81	I A 80	81	78	68	71	75	87	83	88	I A 81	I R 80	80	I R 77
5	73	70	70	65	F	52	54	58	59	60	61	60	I A 62	62	64	62	I A 61	I A 62	68	69	69	64	68	69
6	64	64	59	55	F 54	57	70	80	84	74	73	I A 75	J R 76	83	85	80	75	78	86	92	89	82	73	F
7	F 74	F 75	66	62	Z 57	60	69	75	I A 74	69	U R 58	59	I A 62	60	61	A	A	66	A	A	79	A	71	78
8	F	R	U F 58	F 62	54	69	70	Z 75	67	I A 73	85	86	78	I A 78	78	74	78	78	78	I R 84	84	88	R	R
9	79	F	F	56	F 59	60	78	88	V 83	69	63	68	66	63	I A 65	I A 64	66	74	I S 78	I A 82	J R 87	I R 84	I R 79	75
10	I R 74	72	I R 70	F	F 67	71	83	78	68	72	71	77	87	91	90	82	92	102	85	82	U R 77	S	J R 83	R
11	A	U R 64	68	J R 56	47	I A 46	56	62	61	A	A	63	I R 63	66	60	65	73	85	I R 80	71	66	71	71	R
12	U R 81	71	63	I R 60	63	57	70	J R 74	78	74	72	I A 70	68	80	90	94	91	85	84	74	J S 79	Z 80	79	F 85
13	J R 91	J R 82	J F 76	60	61	66	75	80	96	79	69	69	73	I A 74	76	72	74	82	85	88	78	79	S 76	U S 66
14	F	J R 83	F 64	F 62	F 52	64	76	91	A	85	83	85	83	101	110	104	96	78	74	70	71	73	75	J R 76
15	70	I A 68	65	F 61	64	64	86	98	V 77	I A 72	80	72	80	76	76	85	94	93	92	82	I R 80	79	72	74
16	86	84	85	88	78	85	81	77	72	80	75	81	85	89	98	99	98	95	90	80	75	76	74	R
17	84	R	73	79	F	68	68	72	63	63	74	71	A	91	83	76	77	81	80	82	77	78	78	85
18	73	88	R	F	F	F	78	A	A	I A 78	88	96	I A 96	I A 95	86	84	A	95	88	A	A	A	R	F
19	F	F	R	83	73	J R 78	82	88	97	81	73	77	A	67	69	73	72	73	72	74	82	79	A	F
20	75	F 64	F 62	64	Z 64	71	70	78	75	A	A	79	86	92	86	R 82	79	80	85	85	J R 71	J F 74	78	F
21	F	J F 86	J R 85	68	56	58	66	70	77	70	69	68	74	79	83	86	79	75	76	79	S 88	80	76	I S 73
22	70	69	69	68	63	64	J R 74	79	V 77	72	72	75	84	91	95	95	82	82	85	90	87	J R 79	R	70
23	69	69	R	F	71	75	85	80	78	V 78	73	A	83	A	84	84	89	88	80	82	80	73	73	I R 73
24	70	I R 74	69	F 59	F 51	54	89	88	82	I A 64	62	69	70	69	I C 67	I C 66	67	I C 75	78	82	74	61	71	I R 83
25	J R 76	J R 75	73	72	63	57	H 62	77	85	89	78	74	74	74	74	81	85	91	97	94	71	72	77	73
26	72	69	68	70	69	71	88	83	86	73	79	79	82	85	85	90	87	94	91	91	60	67	J R 68	F 72
27	72	70	71	68	65	58	60	70	88	94	74	I A 70	80	I A 82	86	87	85	89	96	84	J S 74	81	F	J R 85
28	F	J R 78	U R 64	U R 68	J F 68	64	79	83	A	A	76	84	81	82	79	80	84	84	82	88	86	84	82	72
29	72	71	68	66	68	70	104	111	89	I A 69	68	R	I R 72	78	82	86	86	80	81	76	71	A	A	78
30	A	R	F	F	F	55	76	77	84	75	A	81	83	86	82	87	95	84	77	84	87	I A 82	I R 72	76
31	R	R	R	F	R	65	81	105	97	78	67	J R 75	90	101	I A 93	I A 87	85	84	75	73	I R 80	J R 79	I R 78	I R 78
	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	22	24	25	24	26	30	30	29	28	28	28	28	28	29	30	30	29	31	30	29	30	27	25	22
MED	74	73	69	66	64	64	76	80	79	74	73	75	80	80	82	83	84	84	83	82	80	79	76	76
UQ	84	84	73	70	68	71	82	88	86	80	80	80	84	89	86	87	90	88	88	88	86	82	79	R 83
LQ	72	69	65	60	57	58	70	75	73	70	68	70	72	74	74	74	75	78	78	79	74	73	72	73

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IONOSPHERIC DATA

JUL. 1968 | foF1 (0.01) | 135° E Mean Time (G. M. T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1.0 Mc to 20.0 Mc 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	A	A	A	A	A	530	L	L 490	L	L					
2							A	A	A	A	A	A	A	A	A	A	A	A	A					
3							A	L	L 510	A	A	A	A	A	500	490	L	L	A					
4						L	L	L	L	L	500	A	A	L 510	500	490	L	L	L					
5							L	A	A	A	A	A	A	A	A	A	A	A	L 360					
6							L	L	L 460	H 490	520	A	A	A	A	L 520	U L 500	L 430	A					
7								A	A	L 510	500	U R 500	A	A	500	A	A	A	A					
8						L	L	A	A	A	A	A	A	A	A	A	A	A	A					
9						L	L	A	L	490	520	530	A	I R 500	A	A	A	A	A					
10						L	A	L	450	R	550	L	A	A	L 500	A	A	L	A					
11						A	390	R 430	A	A	A	A	510	510	510	R	A	410	A					
12							L	L 460	L	A	A	A	A	540	530	L 520	L	L	L					
13							L	U L 490	470	L 530	A	A	A	A	L 520	I A 520	L 490	U L 460	L					
14							L	A	A	A	520	A	540	A	A	A	L	A	L					
15						L	L	A		A	500	A	A	L 550	R	500	A	L	A					
16								A	A	A	A	A	A	A	A	510	U L 490	A	L					
17								A	A	A	A	A	A	A	A	A	A	L	L					
18								A	A	A	A	A	A	A	A	A	A	A	A					
19							L	L	U L 500	L	L 550	540	A	530	A	520	L 490	L 460	L					
20							L	U L 460	U L 530	A	A	A	A	A	A	L 520	U L 560	L 450	A					
21							L	L	U L 500	L 490	L 540	A	530	A	A	510	L	A	L					
22							L	L	L	L	A	U L 550	R	A	L	A	U L 510	L	A					
23							L	U L 500	U L 460	U L 570	510	A	A	A	A	500	U L 480	L	A					
24							U L 410	U L 450	A	A	R 550	A	A	530	C	C	500	L 440	L					
25								L	L 500	A	U L 510	A	R	U L 530	510	U L 500	U L 490	U L 420	L					
26							L	L	U L 520	520	A	L	580	530	520	500	L 490	L 420	A					
27							L	L	A	A	A	A	A	A	A	A	A	A	A					
28							A	A	A	A	A	A	L	A	U L 520	L 520	U L 490	L	A					
29						L	L	A	L	A	A	A	A	A	A	500	U L 460	A	A					
30									L	A	A	A	L 510	520	520	500	U L 480	L	L					
31							L	A	A	A	500	520	A	500	A	A	A	L	A					
	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	6	10	7	13	5	5	11	12	16	14	8	1					
MED							400	U L 460	L 500	L 510	520	530	530	530	515	505	U L 490	L 435	L 360					
UQ								U L 490	U L 510	L 525	540	540	540	530	520	520	U L 500	L 455						
LQ								U L 450	L 460	490	500	520	510	510	500	500	U L 490	L 420						

IONOSPHERIC DATA

JUL. 1968 | foE (0.01) | 135° E Mean Time (G. M. T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1.0 Mc to 20.0 Mc 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						200	280	I A 310	A	A	A	A	A	A	A	A	A	A	A					
2						A	A	A	A	A	A	A	A	A	A	345	A	A	A					
3						A	A	A	A	A	A	A	A	A	A	A	A	A	A					
4						A	A	A	A	A	R	A	A	A	A	A	A	270	A					
5						A	A	A	A	A	I A 370	380	I A 380	I A 370	350	340	A	A	A					
6						I A 185	270	305	I A 340	A	A	A	A	A	A	R 365	325	290	A					
7						200	260	315	335	355	A	A	A	A	A	355	320	280	A					
8						A	A	300	I A 320	A	A	A	A	A	A	A	A	A	A					
9						A	A	A	A	A	A	A	A	A	A	350	325	A	A					
10						A	A	A	A	355	U R 380	R	B	I R 390	375	A	A	A	A					
11						A	260	I A 295	I A 320	A	A	A	A	A	A	A	A	A	A					
12						A	A	A	A	A	A	A	A	A	A	A	A	A	A					
13						200	I A 270	A	A	A	A	A	A	370	385	365	340	300	A					
14						A	255	A	A	A	380	I A 380	A	A	A	A	A	A	A					
15						180	255	A	A	A	A	A	A	A	A	R	I A 330	290	A					
16						200	A	A	A	A	A	A	A	A	A	A	A	A	A					
17						A	A	A	A	A	A	A	A	A	A	A	A	A	A					
18						A	A	A	A	A	A	A	A	A	I R 380	I R 350	I R 320	A	A					
19						A	A	300	A	A	I A 385	I A 390	400	390	370	350	330	290	A					
20						170	260	300	330	A	A	A	A	A	385	I A 360	320	280	A					
21						A	A	A	A	A	380	380	385	I A 385	I A 375	I A 360	335	A	220					
22						B	A	A	A	A	A	R	R	R	R	A	R	A	A					
23						A	A	A	R	A	A	R	A	A	A	A	R	A	A					
24						A	A	A	A	A	A	A	A	A	C	I C 350	330	300	A					
25						B	A	A	A	A	A	A	A	A	A	A	A	R	A					
26						B	A	A	A	A	A	A	A	A	R 380	370	I A 335	280	A					
27						B	240	I A 305	I A 335	I A 355	A	A	A	A	A	A	325	270	A					
28						A	A	A	A	A	A	400	405	395	380	350	325	290	A					
29						A	A	A	A	A	A	A	A	A	A	A	U R 330	U R 285	A					
30						A	A	A	A	A	A	A	A	A	A	A	A	A	R					
31						A	A	U R 300	I A 330	A	A	A	A	A	A	A	A	A	A					
	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						7	9	9	7	3	5	5	4	6	9	13	14	12	1					
MED						200	260	300	U A 330	355	U 380	380	392	388	380	350	328	288	220					
UQ						200	270	305	335	355	U 380	390	402	390	380	360	330	290						
LQ						182	255	300	U A 325	355	380	380	382	U A 370	375	350	325	280						

IONOSPHERIC DATA

JUL. 1968

foEs (0.1)

135° E Mean Time (G. M. T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1.0 Mc to 20.0 Mc 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	M 42	M 48	J X 42	J X 68	J X 114	J X 41	J X 41	J X 96	M 74	44	J X 60	J X 62	J X 61	60	J X 42	J X 42	J X 37	35	J X 36	J X 41	J X 36	M 58	J X 36	J X 41
2	J X 25	J X 25	J X 29	J X 66	J X 110	J X 55	J X 165	J X 89	J X 77	J X 59	48	J X 114	M 112	J X 112	M 107	M 90	J X 103	J X 138	57	J X 63	J X 50	M 68	42	J X 53
3	J X 53	M 57	J X 58	J X 41	31	31	J X 60	36	39	J X 54	J X 118	J X 145	J X 148	J X 60	J X 48	J X 42	J X 81	J X 41	32	24	J X 37	J X 41	J X 106	J X 122
4	J X 79	32	29	21	23	25	31	35	35	44	G	J X 190	J X 84	J X 42	43	40	36	36	29	J X 25	J X 83	M 58	J X 54	M 56
5	M 58	M 31	J X 24	J X 58	J X 43	J X 54	M 31	J X 64	J X 53	J X 74	M 56	J X 56	91	M 81	J X 51	M 68	J X 94	M 72	M 30	M 43	J X 67	M 35	J X 43	J X 29
6	J X 34	J X 30	24	21	J X 16	23	35	47	J X 41	38	J X 43	95	J X 90	J X 81	J X 93	G	37	39	35	M 57	J X 64	J X 68	J X 95	J X 62
7	J X 54	J X 64	J X 84	J X 56	J X 36	G	39	J X 51	77	44	47	48	M 78	M 77	J X 60	J X 83	J X 82	J X 79	M 100	J X 123	J X 145	J X 89	J X 70	J X 84
8	J X 60	J X 55	J X 42	J X 26	J X 24	J X 26	J X 36	58	94	J X 123	J X 122	M 91	J X 81	J X 82	M 60	J X 74	J X 54	60	M 57	J X 62	J X 62	J X 37	J X 63	J X 58
9	J X 52	J X 29	J X 30	J X 38	J X 26	J X 29	J X 48	M 67	J X 37	J X 41	42	44	J X 50	42	J X 76	J X 88	48	56	J X 71	M 85	J X 89	J X 52	J X 55	J X 73
10	J X 29	J X 40	J X 51	J X 52	J X 24	J X 25	J X 41	J X 40	J X 40	44	J X 60	Y 81	82	M 60	44	J X 83	J X 72	J X 44	M 59	M 49	J X 70	J X 53	J X 82	J X 53
11	J X 78	J X 43	J X 26	23	J X 30	J X 63	J X 42	J X 42	J X 56	J X 95	J X 96	J X 54	44	42	42	44	J X 53	J X 50	57	J X 40	J X 29	J X 36	M 57	M 67
12	J X 72	J X 61	J X 25	J X 42	J X 33	J X 29	J X 52	J X 36	J X 43	M 81	J X 71	J X 126	M 71	42	43	J X 42	J X 54	J X 33	J X 36	24	J X 41	J X 72	J X 53	J X 41
13	J X 51	J X 57	M 21	J X 29	J X 16	G	M 35	J X 36	43	J X 60	J X 117	J X 85	J X 61	M 79	48	J X 53	J X 43	J X 83	J X 31	60	M 35	J X 62	J X 94	J X 90
14	J X 46	32	M 49	J X 42	J X 66	48	32	J X 49	J X 144	91	G	M 90	48	J X 71	M 97	J X 70	J X 48	58	36	J X 25	J X 51	J X 42	J X 58	J X 58
15	J X 120	J X 107	J X 69	J X 38	J X 15	J X 49	J X 38	J X 74	Y 102	J X 106	M 47	M 57	M 60	47	48	G	54	J X 41	48	J X 42	J X 62	J X 53	J X 67	J X 78
16	J X 43	J X 63	J X 53	J X 42	J X 25	27	35	J X 53	J X 57	J X 70	M 68	J X 76	J X 78	J X 108	J X 84	47	36	J X 33	28	J X 23	J X 25	21	30	J X 42
17	J X 38	J X 62	J X 62	J X 43	J X 42	27	J X 49	J X 43	58	59	J X 58	J X 72	144	J X 120	79	J X 96	J X 61	J X 36	J X 42	J X 36	J X 30	J X 84	J X 29	J X 55
18	J X 28	J X 56	J X 124	J X 57	J X 48	25	J X 52	J X 89	J X 105	J X 146	J X 80	J X 89	J X 140	J X 147	M 67	J X 78	J X 137	J X 64	J X 85	J X 137	J X 85	J X 138	J X 89	J X 79
19	J X 28	J X 76	J X 49	J X 42	J X 29	J X 29	J X 29	32	J X 51	J X 53	J X 110	G 39	M 70	46	M 68	J X 52	36	33	J X 34	J X 30	J X 89	J X 84	J X 84	J X 64
20	J X 52	J X 36	31	J X 36	24	G	30	J X 41	J X 54	M 87	M 95	J X 128	J X 95	M 90	J X 81	J X 164	J X 86	J X 43	M 48	J X 89	59	J X 52	J X 49	35
21	J X 30	J X 30	J X 42	J X 36	M 36	21	J X 37	J X 41	59	J X 37	43	J X 64	J X 51	57	J X 51	43	J X 43	J X 65	24	48	J X 72	J X 53	J X 26	M 21
22	22	21	23	J X 29	14	J X 23	J X 28	J X 46	J X 42	J X 62	M 60	42	47	M 60	47	J X 77	G	35	J X 40	57	J X 29	J X 51	J X 29	J X 29
23	J X 41	J X 29	M 58	J X 58	J X 25	J X 28	J X 32	49	G	J X 77	43	J X 130	J X 117	J X 114	J X 95	M 47	49	35	40	J X 42	J X 29	J X 80	22	J X 52
24	M 57	J X 28	J X 30	M 31	J X 27	J X 27	J X 43	J X 90	J X 62	M 99	48	M 78	M 64	44	C	C	43	J X 41	J X 41	J X 30	J X 28	32	J X 51	J X 63
25	J X 42	J X 25	22	M 22	19	24	30	J X 43	J X 71	J X 95	J X 61	J X 106	46	43	43	43	J X 42	M 44	J X 28	M 97	M 68	J X 54	J X 40	J X 41
26	M 35	J X 24	21	J X 29	J X 24	E B 16	J X 35	J X 53	M 47	J X 42	J X 74	49	J X 50	47	G	40	36	37	J X 48	J X 19	J X 33	J X 43	J X 41	J X 52
27	J X 42	J X 29	M 29	M 22	E	20	30	J X 42	J X 70	J X 130	M 90	91	J X 80	M 96	J X 85	109	48	J X 51	J X 74	J X 38	M 31	J X 28	J X 41	J X 61
28	J X 32	J X 30	J X 56	J X 35	J X 42	J X 29	M 65	59	J X 119	M 111	J X 61	J X 53	J X 62	J X 57	J X 42	J X 65	39	J X 90	J X 79	57	J X 50	J X 30	23	J X 25
29	J X 35	J X 42	J X 30	22	J X 28	J X 51	J X 43	J X 77	J X 54	J X 89	J X 89	J X 51	J X 63	J X 80	J X 88	M 43	39	J X 66	J X 71	J X 51	J X 86	J X 73	J X 83	J X 129
30	J X 75	J X 52	J X 27	21	E	J X 36	J X 41	J X 41	J X 85	72	J X 88	75	M 47	44	47	44	M 42	J X 33	33	J X 36	M 30	J X 87	J X 53	J X 62
31	J X 53	J X 41	44	J X 24	J X 42	J X 43	J X 37	59	J X 62	J X 89	J X 78	J X 62	J X 119	44	J X 105	J X 94	J X 65	J X 41	J X 48	J X 29	J X 61	J X 52	M 42	J X 62
	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	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	31	31	31	31	31	31	31	31
MED	J X 43	J X 40	J X 31	J X 36	J X 27	J X 27	J X 37	J X 49	J X 57	J X 72	J X 61	J X 76	J X 71	60	56	J X 52	J X 48	J X 43	41	J X 42	J X 51	J X 53	J X 53	J X 58
UQ	J X 56	J X 56	J X 52	J X 42	J X 39	J X 38	J X 43	J X 62	J X 76	J X 93	J X 88	J X 93	J X 90	J X 82	J X 84	J X 83	J X 63	J X 62	J X 57	58	J X 69	J X 70	J X 68	J X 66
LQ	J X 34	J X 30	26	25	J X 24	24	32	J X 41	J X 43	J X 48	48	J X 55	56	45	44	43	39	J X 36	34	J X 30	J X 32	J X 42	J X 40	J X 42

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IONOSPHERIC DATA

JUL. 1968

f_bEs (0.1)

135° E Mean Time (G. M. T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1.0 Mc to 20.0 Mc 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	38	40	30	19	29	26	40	A	50	E R 44	56	58	58	59	39	38	30	34	29	26	28	40	25	26
2	18	20	E	26	45	41	A	53	40	55	E R 48	A	88	A	A	85	A	80	53	45	41	25	E	34
3	28	42	40	26	20	25	54	32	39	53	80	A	A	55	46	40	40	34	28	18	25	30	40	19
4	29	25	20	17	16	22	28	32	34	40	G	A	54	41	38	38	34	30	29	18	A	26	22	20
5	19	18	16	40	16	26	30	41	53	53	50	55	A	52	51	52	A	A	25	34	40	25	20	E
6	15	16	E	E	12	21	30	40	39	38	43	A	65	58	63	G	37	35	35	53	53	25	55	54
7	30	48	46	36	17	G	30	46	A	44	40	48	A	53	38	A	A	56	A	A	50	A	24	40
8	32	41	26	18	15	23	26	48	55	A	55	74	74	A	56	61	50	46	53	53	40	36	40	50
9	28	17	25	22	19	25	39	52	34	39	39	40	50	E R 42	A	A	46	51	71	A	52	29	E	40
10	17	20	28	29	16	19	40	38	40	42	47	53	78	55	40	55	65	38	41	39	51	41	45	25
11	A	39	19	17	19	A	32	40	47	A	A	54	41	40	40	41	52	30	53	24	25	28	19	40
12	37	22	23	33	29	20	39	32	40	55	62	A	59	41	41	42	45	32	27	17	30	19	41	40
13	34	19	E	16	E	G	30	34	40	47	59	55	57	A	46	51	43	40	28	41	16	28	55	52
14	40	25	34	26	28	28	29	45	A	70	G	59	45	67	92	56	44	46	25	19	46	40	49	50
15	16	A	54	25	E	34	36	74	42	53	42	53	56	43	E R 48	G	50	40	43	41	40	40	54	56
16	40	25	39	20	20	26	34	53	53	58	64	70	75	61	62	45	E R 36	33	25	21	19	E	26	40
17	32	53	40	38	25	25	46	40	52	53	56	51	A	75	75	59	53	36	31	28	26	16	18	27
18	20	30	46	28	25	24	40	A	A	A	54	66	A	A	64	58	A	64	80	A	A	A	27	26
19	25	22	40	18	15	26	28	32	40	40	44	G 39	A	45	59	47	35	33	32	25	52	30	A	54
20	29	20	16	19	16	G	27	37	45	A	A	65	76	61	77	40	53	41	45	37	51	25	26	25
21	26	25	22	26	25	20	29	32	46	37	41	64	47	52	51	43	42	62	17	30	64	40	22	16
22	E	16	15	16	14	16	26	41	39	43	53	42	E R 47	58	46	66	G	32	40	53	26	40	20	20
23	27	22	41	37	15	21	28	45	G	43	41	A	78	A	78	41	45	32	40	28	20	26	19	29
24	38	18	20	16	12	25	34	41	46	A	45	62	61	44	C	C	40	39	27	21	25	19	39	54
25	41	15	E	E	E	19	29	40	41	53	40	56	E R 46	E R 43	40	40	41	40	26	55	34	20	26	27
26	26	E	20	E	17	E B 16	27	40	40	39	62	48	49	45	G	40	36	36	45	18	31	32	29	37
27	25	20	19	E	E	16	28	41	59	73	61	A	76	A	71	65	47	46	73	34	22	E	40	19
28	16	20	22	21	28	25	59	48	A	A	53	53	53	56	42	41	34	38	54	51	20	18	E	16
29	28	37	19	14	12	19	35	52	42	A	53	A	A	54	66	40	34	51	38	28	27	A	A	26
30	A	27	26	E	E	25	41	40	42	70	A	75	41	40	42	40	37	30	26	32	16	A	26	40
31	40	29	40	19	30	32	33	53	55	53	42	40	55	40	A	A	55	37	46	25	28	40	30	17
	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	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	31	31	31	31	31	31	31	31
MED	28	22	23	19	16	24	32	41	42	53	53	59	61	55	51	44	44	38	38	32	31	29	26	29
UQ	38	34	40	26	25	26	40	50	53	72	60	D A 75	83	64	71	59	52	46	50	48	50	40	40	40
LQ	22	20	19	16	13	19	28	39	40	42	42	53	52	44	40	40	36	34	28	24	25	25	21	22

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IONOSPHERIC DATA

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f-min (0.1)

135° E Mean Time (G. M. T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1.0 Mc to 20.0 Mc 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 16	E S 15	12	11	E	13	14	16	25	20	26	26	27	26	25	27	18	16	14	14	E S 16	E S 16	E S 16	E S 16
2	E S 16	E S 15	E S 15	E S 16	E S 16	15	13	16	26	26	25	27	27	28	25	26	17	16	15	15	E S 16	E S 16	E S 16	E S 16
3	E S 16	E S 15	14	E S 15	12	16	12	16	16	26	28	26	26	25	28	25	18	16	16	12	E S 16	E S 16	E S 16	E S 16
4	E S 16	E S 16	E S 16	E S 15	E S 15	15	17	16	25	26	26	27	28	26	27	25	25	16	14	15	E S 16	E S 16	E S 16	E S 16
5	E S 16	E S 15	E S 15	14	E S 15	15	15	16	16	18	16	18	19	27	16	16	14	15	12	10	E S 15	14	13	E S 15
6	11	12	14	12	10	14	13	15	18	16	25	25	25	25	25	22	16	14	12	13	13	13	E S 15	13
7	13	E S 15	14	10	E	15	13	15	18	26	19	16	25	25	19	15	16	14	14	12	E S 15	E S 15	E S 15	E S 15
8	E S 15	E S 15	12	10	E	15	12	18	15	26	26	27	27	27	26	26	14	14	16	14	E S 16	E S 16	E S 16	E S 16
9	E S 15	E S 15	14	12	E S 15	15	16	16	16	16	16	19	26	26	19	18	16	16	15	15	E S 16	E S 16	E S 16	E S 16
10	E S 16	13	13	13	12	14	16	17	26	26	25	30	40	25	25	19	18	15	12	14	E S 15	11	E S 15	11
11	E S 15	14	11	11	10	13	14	18	16	19	19	17	16	26	25	26	16	16	16	E S 16	13	E S 15	E S 16	E S 16
12	E S 16	E S 15	E S 15	E S 15	15	14	17	15	16	19	28	25	25	28	25	19	16	15	12	13	E S 15	E S 15	13	E S 16
13	12	14	12	11	11	15	14	15	16	18	18	25	26	25	25	25	16	16	12	12	E S 15	11	E S 15	12
14	E S 15	14	10	10	E	14	14	15	15	16	19	25	26	27	19	26	16	14	10	13	13	13	13	E S 15
15	E S 15	13	13	10	10	14	14	13	15	19	26	28	27	26	27	18	19	14	16	E S 16	E S 16	13	E S 16	14
16	E S 15	E S 15	14	12	10	16	16	15	16	17	24	25	26	28	26	26	16	16	12	11	13	E S 16	E S 15	E S 15
17	E S 16	E S 15	E S 15	E S 15	14	15	15	16	25	25	26	26	26	26	26	26	17	15	15	E S 15	E S 16	14	E S 15	E S 16
18	E S 16	E S 16	E S 15	11	11	14	14	15	16	17	18	27	25	27	27	25	16	16	14	E S 15	10	E S 15	E S 16	E S 16
19	E S 16	10	E S 16	E S 15	10	14	15	16	18	16	25	25	25	26	26	18	20	14	16	E S 15	13	E S 15	E S 15	E S 15
20	E S 15	10	12	11	10	12	13	14	15	25	25	25	25	25	25	25	16	16	12	12	E S 15	E S 15	14	E S 15
21	E S 15	11	14	E S 15	11	14	14	15	15	18	22	25	25	25	19	20	15	15	14	12	13	14	14	14
22	14	E S 15	13	10	10	14	14	18	16	16	26	27	26	27	16	26	18	16	15	E S 15	E S 16	E S 16	E S 16	E S 16
23	E S 16	E S 15	12	E S 15	11	13	14	15	19	25	18	27	27	27	26	26	16	16	16	14	E S 16	E S 16	E S 16	E S 16
24	E S 16	13	E S 15	14	10	15	14	15	16	16	25	26	25	26	C	C	17	15	13	12	E S 15	12	12	14
25	14	12	13	14	14	14	15	14	14	26	27	26	26	27	27	26	17	16	14	E S 16	14	14	E S 16	E S 15
26	E S 16	E S 16	E S 16	E S 16	11	16	16	17	25	26	26	25	26	26	26	24	16	15	12	13	14	E S 15	E S 15	E S 15
27	E S 15	E S 15	10	13	10	15	15	15	15	26	26	25	25	26	25	19	16	14	12	12	E S 15	E S 15	E S 15	E S 15
28	13	14	12	10	11	12	15	15	18	25	22	26	26	25	18	16	17	14	12	12	E S 15	14	E S 15	E S 15
29	E S 15	E S 15	13	10	10	14	16	15	15	18	25	27	27	26	25	26	16	16	12	E S 15	E S 16	E S 16	E S 16	E S 16
30	E S 15	E S 16	12	11	10	14	15	16	17	26	27	25	27	29	26	25	17	14	14	E S 16	E S 15	14	E S 15	E S 16
31	E S 16	14	11	E S 15	14	15	16	14	17	26	26	27	27	26	25	25	17	16	15	E S 16	E S 16	E S 16	E S 16	E S 15
	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	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	31	31	31	31	31	31	31	31
MED	E S 15	E S 15	12	11	10	14	14	15	16	20	25	26	26	26	25	25	16	15	14	13	E S 15	E S 15	E S 15	E S 15
UQ	E S 16	E S 15	E S 15	E S 15	12	15	16	16	18	26	26	27	27	27	26	26	17	16	15	E S 15	E S 16	E S 16	E S 16	E S 16
LQ	E S 15	13	12	11	10	14	14	15	16	18	20	25	25	26	25	19	16	14	12	12	13	14	E S 15	E S 15

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IONOSPHERIC DATA

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M(3000) F2 (0.01)

135° E Mean Time (G. M. T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1.0 Mc to 20.0 Mc 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	280	305	285	F 275	295	300	A	285	285	290	280	280	270	285	280	280	290	280	290	275	I R 270	255	265
2	270	280	I R 285	R	F 275	285	A	280	280	270	270	I A 270	275	A	A	285	I A 285	285	290	285	I R 280	U R 270	260	I R 260
3	270	280	I R 280	I R 280	265	280	290	270	280	290	A	A	A	270	265	280	270	265	280	285	315	260	250	R
4	F	R	270	F	F 275	U S 260	290	285	310	260	J R 285	I A 295	295	280	270	280	275	290	285	290	I A 285	I R 270	265	I R 275
5	265	280	300	295	F	290	290	280	280	265	265	265	I A 260	275	280	275	I A 280	I A 280	285	290	275	275	265	280
6	280	280	295	285	F 275	295	315	300	320	300	275	I A 270	J R 275	275	285	275	285	275	285	295	290	285	270	F
7	F 295	F 280	285	305	Z 280	280	260	295	I A 300	275	U R 265	250	I A 270	280	285	A	A	280	A	A	285	A	280	270
8	F	R	U F 270	F 285	280	305	305	Z 305	265	I A 285	280	300	I A 285	I A 290	300	285	295	295	285	I R 275	275	295	R	R
9	270	F	F	270	F 260	290	285	295	V 290	320	265	280	285	285	I A 285	I A 275	280	290	I S 295	I A 280	R	I R 280	I R 270	265
10	I R 280	285	I R 290	F	F 270	300	315	335	330	280	260	260	270	280	290	265	275	305	300	290	U R 280	S	J R 285	R
11	A	U R 265	295	J R 290	280	I A 265	270	275	290	A	A	270	I R 260	280	280	265	285	305	I R 300	295	265	265	265	R
12	U R 270	270	270	I R 280	280	320	300	J R 305	315	295	295	I A 280	265	265	280	290	295	300	290	285	J S 275	Z 275	265	F 260
13	J R 295	J R 290	J F 285	300	280	305	310	295	325	320	285	290	285	I A 280	285	290	285	280	295	295	275	275	S 280	U S 270
14	F	J R 300	F 290	F 275	F 275	265	310	300	A	300	250	275	240	255	275	275	290	285	285	270	280	265	260	J R 280
15	275	I A 285	290	F 270	280	295	290	315	V 300	I A 300	295	280	265	280	265	280	280	280	285	275	I R 270	285	265	255
16	245	270	285	295	295	305	310	310	295	290	270	285	275	270	275	275	285	275	290	290	275	265	265	R
17	270	R	275	275	F	325	340	335	I A 325	290	285	280	A	295	280	280	285	290	290	305	285	275	295	270
18	255	265	R	F	F	F	295	A	A	I A 260	265	265	I A 275	I A 275	270	275	A	285	A	A	A	A	R	F
19	F	F	R	285	270	J R 260	280	285	290	310	260	280	A	265	260	275	270	285	290	270	265	315	A	F
20	280	F 280	F 290	270	Z 290	325	300	305	305	A	A	265	295	280	285	R 280	280	290	295	295	J R 300	J F 265	275	F
21	F	J F 275	J R 295	310	305	310	320	315	310	300	285	I A 275	275	275	270	290	290	290	285	285	S 275	300	280	I S 280
22	270	275	290	290	290	295	J R 315	290	V 285	280	300	265	275	270	275	285	285	280	270	280	270	J R 270	R	280
23	260	280	R	F	290	290	315	325	280	V 290	280	A	A	A	280	285	295	295	300	290	275	275	280	I R 260
24	275	I R 275	290	F 290	F 275	270	290	295	320	I A 280	235	275	285	290	I C 280	I C 275	280	I C 290	295	305	290	295	265	I R 285
25	J R 270	J R 270	285	295	290	300	H 275	305	285	290	285	280	275	265	270	285	285	295	290	320	270	260	275	275
26	270	275	260	280	275	300	310	300	310	290	275	280	255	275	270	280	275	305	305	310	320	250	J R 260	F 260
27	275	280	275	280	320	310	285	280	305	300	295	I A 260	I A 270	I A 280	280	275	280	280	290	285	J S 285	265	F	J R 275
28	F	J R 275	U R 285	U R 270	J F 290	295	290	325	A	A	290	300	290	295	290	285	295	305	280	275	290	275	285	285
29	265	270	270	270	280	270	315	310	315	I A 290	315	R	I R 280	280	275	285	300	295	295	295	285	A	A	295
30	A	R	F	F	F	300	315	310	300	A	A	I A 280	270	290	275	285	285	300	290	275	290	I A 285	I R 295	280
31	R	R	R	F	R	275	275	315	310	305	315	J R 260	270	290	I A 290	I A 285	295	300	295	280	I R 290	J R 280	I R 265	I R 270
	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	22	24	25	24	26	30	30	29	28	27	27	28	27	29	30	30	29	31	29	29	29	27	25	22
MED	270	280	285	285	280	295	300	300	300	290	280	278	275	280	280	280	285	290	290	290	280	275	265	274
UQ	275	280	290	292	290	305	315	310	312	300	290	280	280	280	285	285	290	295	295	295	290	282	280	280
LQ	265	272	275	275	F 275	280	290	290	285	280	265	265	268	270	270	275	280	280	285	280	275	265	265	265

IONOSPHERIC DATA

JUL. 1968

M(3000) F1(0.01)

135° E Mean Time (G. M. T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1.0 Mc to 20.0 Mc 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	A	A	A	A	A	360	L	L 320	L	L					
2							A	A	A	A	A	A	A	A	A	A	A	A	A					
3							A	L	L 340	A	A	A	A	A	370	365	L	L	A					
4						L	L	L	L	L	365	A	A	L 355	360	355	L	L	L					
5							L	A	A	A	A	A	A	A	A	A	A	A	L 335					
6							L	L	L 390	H 370	355	A	A	A	A	L 330	U L 325	A	A					
7								A	A	A	360	A	A	A	345	A	A	A	A					
8						L	L	A	A	A	A	A	A	A	A	A	A	A	A					
9						L	L	A	L	365	380	385	A	I R 360	A	A	A	A	A					
10						L	A	L	410	R	A	L	A	A	L 365	A	A	L	A					
11						A	365	A	A	A	A	A	365	360	340	R	A	360	A					
12							L	L 370	L	A	A	A	A	335	340	L 330	L	L	L					
13							L	U L 345	380	L 380	A	A	A	A	L 350	I A 335	A	U L 325	L					
14							L	A	A	A	365	A	355	A	A	A	L	A	L					
15						L	L	A		A	390	A	A	L 345	R	340	A	L	A					
16								A	A	A	A	A	A	A	A	355	U L 330	A	L					
17								A	A	A	A	A	A	A	A	A	A	L	L					
18								A	A	A	A	A	A	A	A	A	A	A	A					
19							L	L	U L 355	L	L 360	360	A	A	A	A	L 330	L 345	L					
20							L	U L 350	U L 330	A	A	A	A	A	A	L 325	A	A	A					
21							L	L	A	L 370	L 360	A	350	A	A	330	L	A	L					
22							L	L	L	L	A	U L 340	R	A	L	A	U L 320	L	A					
23							L	U L 335	U L 385	U L 345	375	A	A	A	A	345	U L 335	L	A					
24							U L 340	U L 355	A	A	R 325	A	A	325	C	C	345	L 360	L					
25								L	L 345	A	U L 375	A	R	U L 340	355	U L 345	U L 325	U L 305	L					
26							L	L	U L 330	365	A	L	310	325	350	340	L 345	L 355	A					
27							L	L	A	A	A	A	A	A	A	A	A	A	A					
28							A	A	A	A	A	A	L	A	U L 350	L 340	U L 330	L	A					
29						L	L	A	L	A	A	A	A	A	A	360	U L 350	A	A					
30									L	A	A	A	L 365	365	350	345	U L 335	L	L					
31							L	A	A	A	385	380	A	360	A	A	A	L	A					
	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	5	9	6	12	4	5	10	12	15	12	6	1					
MED							352	U L 350	L 355	368	365	370	355	350	350	340	U L 330	L 350	L 335					
UQ								U L 355	L 385	L 370	378	382	365	360	360	350	U L 340	L 360						
LQ								U L 345	U L 340	365	360	350	350	335	348	332	U L 325	U L 325						

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IONOSPHERIC DATA

JUL. 1968 | h'F2 (km) | 135° E Mean Time (G. M. T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1.0 Mc to 20.0 Mc 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	A	380	350	380	375	400	400	360	355	350	295	300					
2							I A 310	320	250	370	365	I A 360	E A 380	A	A	340	I A 350	A 350	290					
3							300	280	320	300	I A 340	A	A	375	350	345	330	350	300					
4						300	295	325	295	400	335	I A 325	330	350	420	375	365	315	300					
5							340	385	E A 405	E A 450	445	495	I A 440	420	395	395	I A 390	I A 370	310					
6							270	300	275	260	350	I A 365	390	360	A 340	350	345	340	300					
7								300	I A 330	355	350	520	A	A 400	395	A	A	E A 380	A					
8						270	250	255	A	I A 355	345	E A 340	I A 345	I A 350	340	355	325	320	315					
9						315	310	295	290	285	450	370	335	A 385	I A 380	I A 395	385	335	A					
10						285	260	250	280	380	430	400	A	345	330	350	365	270	260					
11						A	405	400	310	A	A	420	R	390	435	415	355	300	300					
12							320	300	290	300	360	A	E A 450	395	345	310	300	300	280					
13							255	315	260	280	E A 350	360	360	I A 390	355	350	355	330	290					
14							270	270	A	310	400	350	450	400	E A 390	310	300	310	300					
15						300	300	A 270		I A 325	345	320	365	370	400	360	325	320	265					
16								A 270	A	310	A 390	A	A 350	360	350	330	300	310	270					
17								250	285	370	365	350	A	340	I A 345	375	350	320	295					
18								A	A	A	350	365	I A 365	I A 360	A 360	355	A	310	A					
19							255	295	310	275	410	405	A	425	450	380	355	350	300					
20							255	300	310	A	A	E A 400	I A 385	345	A	350	355	320	280					
21							255	260	290	290	370	I A 390	380	360	355	325	310	E A 350	300					
22							255	280	290	360	330	380	375	350	340	320	330	340	295					
23							250	290	265	365	380	A	A	A	A	345	315	300	280					
24							300	285	270	A	560	420	E A 425	370	I C 370	I C 385	390	325	290					
25								290	320	300	345	385	390	395	375	345	340	300	275					
26							290	280	290	340	380	340	410	355	375	350	325	290	270					
27							320	330	310	300	A 340	A	A	I A 365	E A 360	A 350	325	320	E A 310					
28							A 300	250	A	I A 330	345	320	345	340	345	340	310	290	A					
29						350	290	270	270	A	330	A	I A 395	360	355	340	300	305	280					
30									285	A	A	A	E A 375	340	360	345	315	285	275					
31							300	260	265	300	300	415	360	335	I A 325	I A 330	325	290	280					
	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						6	25	28	25	25	28	24	23	29	28	30	29	31	27					
MED						300	295	288	290	318	355	370	372	360	358	350	330	315	290					
UQ						315	300	300	310	358	385	402	394	390	382	360	355	333	300					
LQ						285	255	270	275	300	344	350	354	350	345	340	315	300	280					

IONOSPHERIC DATA

JUL. 1968 | $h'F$ (km) | 135° E Mean Time (G. M. T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1.0 Mc to 20.0 Mc 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	315	300	250	260	310	270	A	A	A	A	A	A	A	I A 220	220	220	250	245	A	275	280	320	300	300
2	300	280	255	280	280	300	A	A	A	A	A	A	A	A	A	A	A	A	A	295	300	300	300	315
3	300	300	290	270	295	260	I A 250	235	230	A	A	A	A	A	250	220	250	250	I A 240	265	250	A 300	A 340	300
4	310	290	285	275	260	260	245	230	220	H 245	225	I A 220	I A 220	220	225	220	225	245	250	280	A	290	285	305
5	285	285	250	A 290	275	260	250	A	A	A	A	A	A	A	A	A	I A 250	I A 245	255	270	A 300	300	310	290
6	270	295	255	260	290	260	250	A 250	205	H 205	A 250	A	A	A	A	240	255	I A 255	A	A 280	E A 290	255	A	A
7	A 300	A 310	A 320	A 270	270	260	250	A	A	A	A 250	A	A	A	220	A	A	A	A	A	E A 300	I A 250	295	A 290
8	A 350	A 300	305	270	280	A 260	220	I A 230	A	A	A	A	A	A	A	A	A	A	A	295	300	270	305	A 320
9	295	300	290	305	300	280	I A 250	A	215	220	210	195	A	I R 240	A	A	A	A	A	A	295	255	250	A 300
10	275	285	285	305	300	250	I A 240	240	215	200	A	A	A	A	230	A	A	A	A	285	E A 320	E A 350	E A 310	290
11	A	A 350	260	240	260	A	A 270	A	A	A	A	A	235	220	230	250	I A 250	240	I A 250	260	305	335	295	A 360
12	335	300	290	335	275	245	285	220	220	A	A	A	A	225	225	250	I A 240	225	A 250	250	300	255	E A 340	A 350
13	295	255	255	250	275	245	240	245	230	235	A	A	A	I A 245	A 250	I A 240	A	A	A 250	A 260	245	290	A	A
14	A 340	250	290	280	A 350	270	240	A	A	A	210	I A 220	225	I A 230	A	A	A 260	I A 240	250	270	E A 330	340	E A 380	E A 360
15	250	I A 275	E A 350	A 300	285	A	E A 280	A	250	I A 235	215	A	A	220	I A 240	235	I A 250	A	A	275	305	300	E A 320	380
16	360	320	305	255	250	240	250	A	A	A	A	A	A	A	A	A	240	240	250	250	260	295	290	A 350
17	310	A 320	300	300	320	245	250	A	A	A	A	A	A	A	A	A	A	A	A	265	255	295	275	265
18	350	300	E A 345	280	275	250	265	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E A 330	E A 330
19	305	305	300	260	275	260	250	235	240	H 210	220	200	A	A	A	A	250	250	A	275	I A 295	255	A	E A 350
20	290	295	300	305	270	255	230	245	A	A	A	A	A	A	A	245	A	A	I A 270	260	A 300	345	310	310
21	310	300	260	245	250	250	205	240	I A 245	205	200	I A 250	E A 260	A	A	E A 290	I A 250	I A 245	250	275	E A 310	280	270	250
22	280	290	275	255	255	250	H 205	230	225	A 240	I A 245	230	A	A	A	A	H 215	A 265	I A 290	A 310	260	A 310	275	280
23	A 340	290	A 370	325	255	290	235	I A 240	220	260	215	A	A	A	A	250	A	A	A	275	250	285	275	310
24	310	290	285	250	270	A 280	A	A	A	I A 210	A 260	A	A	A 250	I C 220	I C 205	A 250	A 250	260	255	250	270	A 360	A 300
25	A 350	270	255	250	250	240	H 240	E A 260	A 250	I A 255	260	I A 215	I A 210	255	220	235	I A 240	I A 245	250	260	A 250	300	305	300
26	310	290	305	285	250	250	260	245	I A 245	215	A	A	I A 235	I A 250	205	245	245	250	I A 265	245	210	A 370	A 350	A 350
27	300	300	290	270	240	250	250	E A 270	A	A	A	A	A	A	A	A	A	A	A	A 250	270	295	A 360	290
28	310	295	295	295	270	250	A	A	A	A	A	A	A	A	255	245	225	A	A	E A 300	250	270	255	270
29	310	A 320	315	300	260	270	A 270	I A 245	E A 260	I A 210	A	A	A	A	A	250	235	A	A	250	265	A	A	250
30	A	275	A 310	300	270	260	250	250	A	A	A	A	235	215	245	245	250	250	250	280	250	I A 270	255	A 300
31	A 310	305	A 340	300	310	300	250	A	A	A	215	200	I A 210	A	A	A	A	A	A	275	275	300	295	270
	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	31	31	31	31	29	27	17	15	14	13	8	8	12	14	17	19	16	15	28	29	29	27	29
MED	310	295	290	280	275	260	250	240	228	218	220	218	A 226	228	228	242	250	245	250	271	270	295	295	300
UQ	315	300	304	300	288	270	250	245	244	240	A 250	U A 225	235	U A 248	245	248	A 250	250	A 258	279	A 298	300	A 315	A 320
LQ	295	288	268	260	260	250	240	235	220	210	215	200	U A 215	220	220	235	240	242	250	260	250	270	280	290

IONOSPHERIC DATA

JUL. 1968 | $h'Es$ (km) | 135° E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1.0 Mc to 20.0 Mc 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	110	105	105	105	110	125	115	115	115	115	115	110	110	110	110	110	110	110	110	105	110	110	110
2	100	110	105	110	110	110	105	110	110	110	110	115	120	115	115	115	110	110	115	115	110	110	110	115
3	110	110	110	105	105	125	125	140	135	115	110	110	110	115	120	115	110	110	110	110	100	100	110	110
4	110	105	100	100	120	140	130	130	125	130	G	110	115	110	120	130	125	120	120	110	110	110	115	110
5	115	110	110	110	110	110	140	130	130	120	115	120	115	115	115	115	110	110	105	105	100	100	110	110
6	105	105	105	100	105	145	140	125	115	125	110	105	105	110	105	G	130	130	105	110	110	110	110	105
7	105	105	105	100	100	G	140	125	115	115	110	110	110	110	110	125	115	115	115	110	105	110	105	110
8	105	105	100	100	100	100	115	115	110	110	110	110	110	110	115	110	110	110	105	105	105	105	105	110
9	110	100	105	105	105	115	120	110	120	115	110	115	115	115	130	125	130	115	115	115	115	110	110	105
10	105	105	100	100	100	130	120	120	120	120	115	115	110	120	125	110	110	110	105	105	115	120	115	110
11	105	105	105	105	115	120	125	120	115	110	110	110	110	110	115	130	120	120	110	110	120	115	110	110
12	110	110	105	100	100	100	120	115	110	110	110	110	110	120	115	110	105	105	105	100	100	120	115	110
13	110	105	105	105	110	G	115	125	115	110	125	110	110	120	145	125	125	120	115	110	110	110	110	110
14	110	100	100	100	125	125	140	110	110	110	G	115	125	110	110	110	110	105	105	105	110	120	115	110
15	110	110	105	105	155	140	130	120	110	110	110	135	135	145	135	G	135	130	115	115	115	115	110	110
16	110	110	110	110	110	150	140	130	130	115	115	115	115	110	110	115	135	130	130	105	100	100	100	110
17	110	110	110	105	110	145	140	135	130	125	125	115	110	110	110	115	115	125	115	110	110	115	110	110
18	110	110	110	105	105	130	125	110	110	110	110	110	110	110	125	120	110	110	110	110	110	110	110	115
19	110	115	110	110	110	110	115	130	130	120	125	110	130	130	120	125	155	145	115	115	115	110	110	110
20	105	105	105	105	110	G	150	130	115	115	115	115	110	110	120	115	115	110	110	110	100	100	105	100
21	100	100	105	105	105	110	110	110	110	110	125	115	125	120	120	120	115	110	110	105	105	100	100	100
22	100	100	100	100	105	110	110	105	110	115	110	175	130	130	130	125	G	140	105	105	100	115	115	110
23	110	110	110	110	110	110	115	110	G	130	140	110	105	110	110	110	110	105	105	100	100	120	100	115
24	110	110	110	110	110	130	125	115	115	110	110	110	110	110	C	C	140	125	120	105	105	105	105	105
25	105	105	105	100	105	140	130	115	110	115	115	115	115	115	115	140	125	125	110	110	115	110	105	100
26	100	100	100	100	110	B	110	110	110	110	110	110	110	110	G	175	125	130	110	105	105	100	100	105
27	105	100	100	100	E	145	130	120	115	115	110	110	110	110	105	105	140	125	115	115	110	110	115	110
28	105	105	105	105	105	115	115	110	110	110	110	140	140	140	140	130	140	115	110	110	110	110	110	100
29	100	100	100	100	115	115	115	110	110	110	110	110	110	110	110	110	145	130	120	125	115	125	115	135
30	115	110	110	100	E	125	130	120	115	110	110	110	110	110	110	110	110	110	110	105	100	115	115	115
31	110	110	100	100	110	130	135	125	120	115	115	110	115	110	110	105	110	105	105	105	125	115	115	115
	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	31	31	31	31	29	27	31	31	30	31	29	31	31	31	29	28	30	31	31	31	31	31	31	31
MED	110	105	105	105	110	125	125	120	115	115	110	110	110	110	115	115	115	115	110	110	110	110	110	110
UQ	110	110	110	105	110	135	132	125	120	115	115	115	115	118	120	125	130	125	115	110	112	115	115	110
LQ	105	105	100	100	105	110	115	110	110	110	110	110	110	110	110	110	110	110	105	105	102	108	105	108

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IONOSPHERIC DATA

JUL. 1968 | Types of Es | 135° E Mean Time (G. M. T. +9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1.0 Mc to 20.0 Mc 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	F5	F5	F4	F3	F3	L H 2	H2	C3	C2	C1	C2	C2	L2	L2	L1	L1	L1	L2	L2	F2	F3	F2	F3	F3
2	F3	F3	F4	F4	F4	L3	L3	L2	L2	L1	L1	C3	C1	C2	C2	C2	C3	C2	C2	F4	F5	F3	F2	F4
3	F4	F4	F3	F3	F3	C1	H3	H1	H1	C1	C2	C3	C2	C2	C2	C1	C2	L2	L2	F2	F4	F3	F3	F2
4	F3	F3	F3	F3	F2	H1	H1	H1	H1	H1		L2	L2	L1	L1	H1	H1	H1	H1	F2	F4	F4	F4	F4
5	F3	F3	F3	F3	F1	L2	H1	H2	H2	C2	C1	C1	C3	C2	C2	C3	C2	C3	L3	F5	F4	F4	F3	F2
6	F2	F2	F2	F1	F1	H2	H2	H2	C1	H1	C1	C2	C2	C2	L2		H1	HL 22	L2	F3	F4	F4	F4	F4
7	F4	F4	F5	F4	F3		H2	H3	C3	C2	C2	C2	C2	C2	C1	H2	C3	C3	C4	F4	F4	F4	F4	F4
8	F3	F3	F2	F2	F2	L1	CL 11	C2	C2	C1	C1	C2	C2	C2	C2	C2	C2	C3	L3	F4	F4	F5	F4	F5
9	F4	F4	F6	F4	F3	L2	H3	C2	C1	C1	C1	C1	C1	C1	H2	H2	H2	C2	C3	F4	F4	F3	F3	F3
10	F3	F3	F3	F2	F2	HL 11	H3	H1	H1	H1	C1	C2	L2	H1	H1	C2	C3	C2	L3	F4	F3	F4	F3	F4
11	F3	F3	F4	F1	F3	C3	H2	H2	C2	C1	C1	C1	C1	C1	C1	H1	H1	H1	L4	F3	F3	F5	F3	F3
12	F5	F5	F3	F3	F2	L1	H2	H2	C1	C3	C2	C4	C3	C1	C1	C2	L3	L3	L3	F2	F3	FF 22	FF 53	F3
13	F6	F3	F1	F2	F1		LH 21	HL 12	C1	C2	HC 22	C2	C2	H2	H1	H2	H2	C3	C2	F4	F2	FF 32	F3	F5
14	F4	F4	F4	F4	FF 23	HL 22	H2	C3	C3	C2		C2	H1	C2	C3	C3	C3	L3	L2	F3	FF 45	FF 25	F4	F4
15	F3	F4	F4	F4	F1	H4	H3	H3	C2	C2	C1	HL 11	HL 11	HL 11	H1		H2	H2	C4	FF 23	FF 22	F5	F2	F5
16	F4	F5	F5	F3	F5	H1	H1	H1	H2	C1	C2	C2	C2	C1	C2	C2	H1	H2	H1	F3	F3	F2	F5	F3
17	F5	F5	F3	F5	F4	H1	H2	H1	H1	H1	H1	C1	C2	C2	C2	C2	C2	C1	C2	F3	F5	F4	F5	F4
18	F4	F3	F4	F4	F5	H1	H1	C3	C3	C2	C2	C2	C4	C3	H2	H2	C2	C3	C3	F4	F7	F2	F2	F4
19	F3	F4	F5	F2	F4	L3	C1	H1	H1	C1	H1	L1	H1	H1	H2	H2	H1	H2	C2	F4	F3	F4	F4	F3
20	F3	F3	F2	F4	F3		H1	H2	C2	C2	C2	C2	C3	C2	H2	C2	C2	C2	C4	F3	F4	F3	F4	F4
21	F3	F2	FF 22	F3	F4	L3	L1	L2	L3	C1	H1	C1	H1	H1	HL 12	H2	C3	C3	L2	F4	F3	F4	F3	F2
22	F2	F1	F2	F2	F1	L1	L1	L2	C1	C2	C2	H1	H1	H1	H1	H2		HL 11	L4	F3	F3	F3	F2	F2
23	F2	F4	F5	F5	F3	L4	C2	C3		H1	H1	C3	C2	L2	C2	C2	C3	L2	L4	F4	F4	FF 11	F2	F2
24	F3	F2	F2	F1	F2	H2	H2	C2	C2	C2	C2	C2	C1	C2			H2	H2	C2	F2	F2	F3	F5	F4
25	F4	F2	F2	F2	F1	HL 21	H2	C2	C2	C2	C1	C1	C2	C2	C1	HC 11	H2	H3	C2	F4	F3	F3	F2	F3
26	F3	F3	F1	F1	F3		L1	L2	C2	C1	C2	C3	C2	C1		H1	H2	H2	C4	F2	F5	F5	F3	F4
27	F3	F2	F3	F1		H1	H2	C3	C3	C3	C3	C2	C2	C2	L3	L3	HL 22	H4	C5	F5	F5	F2	F4	F3
28	FF 21	F3	F3	F4	F3	C2	C3	C3	C3	C3	C2	H2	H1	H1	H1	H2	H1	C2	C3	F3	F2	F3	F2	F3
29	F3	F3	F2	F2	F3	C2	C4	C2	C3	C1	C2	C1	C1	C2	C2	C1	HL 11	H2	C3	FF 22	F2	FF 42	F2	F3
30	F5	F3	F5	F1		H2	H2	C2	C2	C2	C2	C1	C1	C1	C2	C2	C2	C2	C1	F2	F3	F2	F3	F2
31	F2	F3	F2	F1	F3	H2	H2	H3	H2	C2	C1	C1	C1	C1	C2	C3	C2	C2	C3	F4	FF 33	F3	F4	F2

	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

IONOSPHERIC DATA

JUL. 1968 | h_pF2 (km) | 135° E Mean Time (G. M. T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1.0 Mc to 20.0 Mc 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	395	350	300	355	F 390	310	310	A	380	360	A	380	G	400	360	360	360	320	340	320	355	I R 400	405	400
2	375	350	I R 340	R	F 350	330	A	340	360	380	380	I A 380	380	A	A	340	A	A	345	340	I R 350	J R 375	400	I R 390
3	370	360	I R 355	I R 355	370	345	320	370	350	330	A	A	A	390	380	360	400	390	350	340	300	405	415	R
4	F	R	365	F	F 380	U S 385	335	350	300	400	J R 350	I A 330	330	355	420	375	370	340	340	330	I A 350	I R 365	395	I R 370
5	370	365	330	330	F	330	350	385	A	A	G	A	A	A	G	400	I A 390	I A 375	345	320	360	385	400	360
6	360	365	340	360	F 385	345	300	315	295	315	370	I A 385	J R 390	370	350	360	355	360	345	330	320	320	380	F
7	F 355	F 355	350	310	Z 355	360	385	315	I A 330	380	G	G	A	A	G	A	A	A	A	A	360	A	350	360
8	F	R	U F 380	F 355	350	300	305	Z 300	A	I A 355	350	A	I A 350	I A 350	340	365	340	340	340	I R 360	360	315	R	R
9	390	F	F	390	F 390	340	330	330	V 320	300	A	370	360	A	I A 380	I A 395	390	340	S	A	R	I R 350	I R 360	390
10	I R 350	350	I R 330	F	F 380	310	300	270	280	380	430	400	A	360	350	390	380	305	315	330	U R 360	S	J R 350	R
11	A	U R 395	320	J R 340	360	I A 390	G	400	355	A	A	A	R	390	A	415	360	310	I R 320	330	390	390	390	R
12	U R 380	390	390	I R 375	350	290	320	J R 310	300	320	A	A	A	400	360	345	320	310	320	340	J S 360	Z 370	380	F 410
13	J R 350	J R 340	J F 345	340	360	300	300	350	290	290	A	360	360	I A 390	360	350	360	360	315	305	360	350	S 360	U S 385
14	F	J R 310	F 330	F 355	F 400	390	300	305	A	320	415	360	460	415	390	370	340	345	340	370	350	390	415	J R 380
15	360	I A 330	355	F 390	360	320	345	295	V 305	I A 340	345	350	390	370	410	360	340	350	350	350	I R 350	350	390	400
16	440	375	350	340	320	300	300	300	310	330	A	A	I A 365	390	370	360	340	350	310	345	360	400	380	R
17	370	R	350	360	F	280	270	275	I A 285	I A 370	370	360	A	340	I A 350	385	360	345	335	310	340	370	320	365
18	410	380	R	F	F	F	310	A	A	I A 400	400	400	I A 370	I A 365	380	380	A	345	A	A	A	A	R	F
19	F	F	R	335	365	J R 395	350	345	345	300	410	405	A	G	A	380	365	355	345	360	390	300	A	F
20	350	F 355	F 370	380	Z 345	290	305	305	310	A	A	400	I A 410	360	A	R 365	360	350	310	315	J R 320	J F 400	375	F
21	F	J F 385	J R 340	300	335	300	300	300	300	300	370	I A 390	380	370	370	340	340	355	350	345	S 345	330	355	I S 355
22	380	370	345	340	340	310	J R 300	350	V 340	380	335	385	375	385	355	340	350	355	360	370	370	J R 370	R	350
23	410	360	R	F	340	330	300	290	350	V 365	380	A	A	A	A	350	330	335	310	330	350	365	360	I R 400
24	380	I R 365	335	F 350	F 390	380	320	310	290	A	G	A	A	G	I C 380	I C 385	395	I C 345	310	300	335	340	405	I R 350
25	J R 405	J R 360	350	315	335	305	H 385	305	345	325	350	385	395	400	380	360	350	325	345	290	385	405	370	375
26	375	375	405	360	360	325	290	300	310	350	385	355	415	360	380	365	355	305	300	295	270	440	J R 405	F 405
27	360	355	365	360	300	305	350	355	320	310	350	A	A	I A 380	365	365	350	350	320	320	J S 340	390	F	J R 360
28	F	J R 360	U R 355	U R 355	J F 355	310	310	275	A	A	350	325	350	340	350	350	340	305	350	355	340	355	340	355
29	400	380	390	390	390	395	310	295	300	I A 345	330	R	I R 395	360	360	350	325	325	325	315	350	A	A	325
30	A	R	F	F	F	310	290	300	305	A	A	I A 370	395	340	370	360	350	315	330	355	340	I A 335	I R 330	355
31	R	R	R	F	R	365	355	300	300	315	300	J R 415	395	350	I A 350	I A 345	350	305	320	355	I R 340	J R 350	I R 390	I R 365
	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	22	24	25	24	26	30	29	29	26	25	19	20	19	24	24	30	28	29	28	28	29	27	25	22
MED	375	360	350	355	358	322	310	305	310	340	370	380	380	370	368	360	352	345	338	330	350	370	380	368
UQ	395	375	365	360	F 380	360	335	345	345	370	382	395	395	390	380	380	362	350	345	352	360	390	400	390
LQ	360	352	340	340	345	305	300	300	300	315	350	360	362	358	352	350	340	320	318	318	340	350	360	355

IONOSPHERIC DATA

JUL. 1968 | ypF2 (km) | 135° E Mean Time (G. M. T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1.0 Mc to 20.0 Mc 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	75	85	90	F 80	100	85	A	50	120	A	95	G	70	80	105	125	120	120	135	150	I R 90	125	115
2	125	110	I R 150	R	F 155	155	A	130	105	115	125	I A 110	85	A	A	125	A	A	105	135	I R 115	J R 135	120	I R 115
3	130	125	I R 150	I R 140	150	120	120	170	105	135	A	A	A	115	115	105	100	145	115	115	150	135	135	R
4	F	R	140	F	F 125	U S 155	135	140	100	90	J R 125	I A 125	110	95	60	95	95	110	110	130	I A 145	I R 125	125	I R 125
5	135	140	115	150	F	155	135	85	A	A	G	A	A	A	G	95	I A 70	I A 100	100	90	95	70	70	85
6	95	90	60	95	F 100	100	95	85	75	80	120	I A 70	J R 80	110	90	120	90	105	110	115	85	120	115	F
7	F 65	F 100	95	95	Z 100	95	110	85	I A 95	75	G	G	A	A	G	A	A	A	A	A	95	A	110	125
8	F	R	U F 115	F 100	95	80	95	Z 95	A	I A 120	115	A	I A 115	I A 110	80	105	125	100	110	I R 100	120	135	R	R
9	100	F	F	115	F 100	135	135	135	V 125	140	A	90	105	A	I A 75	I A 75	70	95	S	A	R	I R 120	I R 130	115
10	I R 115	105	I R 110	F	F 105	115	135	75	85	85	75	100	A	115	140	115	130	155	125	125	U R 120	S	J R 120	R
11	A	U R 80	135	J R 120	135	I A 100	G	80	105	A	A	A	R	90	A	75	85	135	I R 125	155	115	105	110	R
12	U R 120	110	90	I R 100	105	100	90	J R 100	120	90	A	A	A	100	125	85	125	90	100	120	J S 100	Z 80	105	F 95
13	J R 55	J R 75	J F 80	65	85	95	85	75	60	60	A	90	90	I A 70	100	95	85	135	90	100	95	105	S 95	U S 70
14	F	J R 90	F 95	F 100	F 95	100	95	105	A	130	125	110	135	130	80	105	105	95	105	125	95	95	85	J R 85
15	100	I A 100	90	F 100	95	85	100	100	V 90	I A 90	65	90	110	100	100	90	135	110	110	130	I R 145	110	100	100
16	90	115	100	115	170	130	100	120	150	150	A	A	I A 100	100	130	105	120	140	150	115	135	80	125	R
17	170	R	140	160	F	120	100	115	I A 120	I A 60	70	90	A	100	I A 95	90	115	95	105	140	110	115	140	135
18	120	120	R	F	F	F 135	A	A	I A 110	140	130	I A 120	I A 115	135	120	A 110	A	A	A	A	A	R	F
19	F	F	R	155	120	J R 135	125	115	120	85	90	95	A	G	A	75	110	100	100	95	100	75	A	F
20	95	F 100	F 75	80	Z 60	65	95	80	85	A	A	95	I A 95	100	A	R 80	85	95	90	90	J R 75	J F 100	80	F
21	F	J F 70	J R 70	85	110	85	70	95	85	110	75	I A 85	75	85	125	75	105	90	95	100	S 110	70	100	I S 100
22	105	85	60	105	60	100	J R 95	95	V 90	110	145	115	95	115	120	110	135	130	140	95	145	J R 115	R	95
23	100	85	R	F	120	135	120	80	100	V 65	70	A	A	A	A	100	115	110	120	110	130	110	130	I R 100
24	105	I R 130	115	F 135	F 110	120	130	125	105	A	G	A	A	G	I C 70	I C 70	65	I C 95	90	95	110	55	90	I R 75
25	J R 90	J R 100	95	85	70	90	H 105	90	100	125	105	80	105	100	105	115	100	105	105	105	115	95	115	120
26	125	125	95	95	135	125	115	115	90	65	75	100	90	110	120	95	110	90	95	85	115	105	J R 90	F 90
27	95	100	90	95	85	75	95	90	75	90	50	A	A	I A 90	100	130	105	105	90	105	J S 105	105	F	J R 95
28	F	J R 95	U R 90	U R 110	J F 90	90	100	70	A	A	95	70	95	65	95	95	65	95	95	100	105	90	105	90
29	95	90	80	75	95	85	85	55	65	I A 70	40	R	I R 85	90	140	95	125	125	115	125	130	A	A	130
30	A	R	F	F	F	125	120	140	115	A	A	I A 110	85	115	110	100	115	110	135	145	115	I A 125	I R 120	145
31	R	R	R	F	R	130	130	100	145	130	145	J R 90	85	100	I A 100	I A 130	95	100	140	95	I R 120	J R 160	I R 150	I R 130
	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	22	24	25	24	26	30	29	29	26	25	19	20	19	24	24	30	28	29	28	28	29	27	25	22
MED	100	100	95	100	100	100	100	95	100	90	95	95	95	100	100	98	105	105	108	112	115	105	115	100
UQ	120	112	115	118	120	130	125	115	115	120	125	110	108	112	122	110	122	120	120	128	130	120	125	125
LQ	95	88	85	92	90	90	95	85	85	80	72	90	85	90	85	90	88	95	98	98	100	90	100	90

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IONOSPHERIC DATA

JUL. 1968 | foF2 (0.1) | 135° E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1.0 Mc to 20.0 Mc 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	86	S 84	80	I S 80	76	77	71	62	68	73	74	76	82	89	J R 96	96	S 103	S 110	104	J S 101	I S 95	I S 88	91	J S 99
2	F	J S 100	J S 101	97	U S 87	69	69	80	74	V 77	U R 86	94	99	J R 98	102	108	U S 104	S 95	J R 85	87	I S 90	90	I S 92	S 96
3	J S 101	102	U S 89	80	78	79	S 87	92	U S 96	I A 93	93	90	J R 87	R 92	93	96	100	S 97	100	S 97	92	I A 78	80	F
4	91	88	F 72	F 66	Z 68	F 63	68	S 79	80	83	88	82	87	88	88	93	97	102	98	88	82	F 81	F	I S 82
5	S 76	F	F	F 63	I S 50	F 56	55	F 63	63	I A 60	I A 59	I A 61	58	64	61	I A 60	I A 62	67	73	65	59	I S 64	F	I S 66
6	F 61	F	F 64	C	F	F	F 62	U S 69	72	62	64	72	79	84	87	88	90	92	92	R 92	88	S 74	68	A
7	S	S	S	S	A	F 48	F 55	66	75	74	69	72	75	82	77	I A 78	I A 82	86	R 92	90	85	83	F	F
8	S 81	S	F	F 53	50	F 41	F 51	F 66	F 66	78	R 87	82	77	84	R 93	89	91	R 89	R 91	U R 89	R 87	U S 82	S 75	69
9	F	F	F	F	F	F	70	78	81	70	77	66	73	69	71	A	A	79	I A 80	I A 88	I S 90	79	R 75	S
10	A	F	77	F	F	F	U F 65	V 70	67	63	70	I A 76	I A 84	I A 92	J R 98	95	90	101	U R 91	I C 84	R 83	I A 73	S	S
11	S	R	R	F	C	45	I C 52	I A 59	C	A	A	A	66	A	A	73	I A 91	I S 94	76	64	64	F	F	S 68
12	F 62	I S 64	F	S	S	F 53	F	73	72	72	67	R	73	I A 85	I A 100	106	94	S 95	80	75	S 74	78	79	S 75
13	F	S	S	F	F	F 64	68	81	82	82	76	72	80	87	87	83	86	90	R 91	78	78	S 74	S 67	F
14	I C 72	I S 79	S	F 58	S	F	F 88	F 67	68	I A 74	79	I A 78	83	100	107	108	97	99	I A 92	I R 90	S 78	77	73	I S 74
15	F	I S 70	60	F	F	F 71	F 74	82	77	71	72	79	83	R 93	R 95	106	R 114	S 110	J R 99	I R 86	U R 81	U F 75	75	R
16	S	F 76	F	U R 77	F 68	F 65	F 68	69	72	I C 72	R 77	R 84	89	R 92	R 101	103	I A 104	105	J R 100	I R 88	78	U R 75	R 82	U R 83
17	J S 76	77	F	F	F	F	F 72	62	63	65	79	R 79	I A 85	89	J R 91	R 93	R 93	R 93	J R 97	R	R	U R 86	J R 86	R
18	R	R	F	F	F	F 69	F 62	68	81	77	83	98	99	96	94	96	104	105	95	86	81	78	U S 78	S 79
19	83	F 79	J S 81	74	70	F 66	75	92	104	98	97	93	93	98	102	93	92	91	83	80	I S 86	U S 82	S 71	S
20	S	S	F	F	F	S 64	F 73	68	I A 69	I A 72	70	81	93	103	103	103	100	106	107	I C 98	I S 86	87	96	I S 94
21	I S 92	F	I S 95	79	I A 60	45	54	70	75	66	63	74	78	84	95	95	87	85	83	I S 90	I S 96	77	73	74
22	73	S 74	S 73	73	64	54	56	68	74	71	70	80	R 86	J S 98	102	S 94	89	93	J R 99	J S 101	J S 96	U S 81	70	U S 72
23	S 69	72	S 74	63	F	F 56	60	S 73	70	76	70	75	R 86	91	92	103	102	91	89	92	86	S 76	R 76	U S 73
24	I S 70	F	F	F 65	S 61	57	F 64	84	S 81	66	67	71	77	83	86	83	88	91	R 95	S 86	72	67	67	F 68
25	F 75	Z 84	R 80	F	F 56	F 50	F 58	73	77	79	73	74	83	84	92	S 95	91	97	98	81	69	68	69	U S 74
26	71	70	69	78	J S 85	72	U S 87	89	79	I C 68	70	77	87	96	104	104	108	105	112	91	69	68	71	74
27	72	73	77	70	58	48	60	85	91	69	I A 66	68	I A 86	98	91	91	S 94	92	104	93	S 78	74	S 79	I S 81
28	I S 86	F	F	F 81	F	F	F 77	S 81	F 80	76	79	81	90	96	98	97	90	91	101	J S 107	S 101	J S 91	86	J S 87
29	87	88	S 83	83	S 89	V 82	92	106	77	V 67	69	71	S 79	82	84	R 88	92	87	R 82	R 89	S 75	U S 70	J S 73	S
30	F	S	S	S	F	F 58	U S 63	F 70	S 86	J R 86	84	R 85	91	95	J S 98	102	105	104	R 100	J S 99	U S 93	78	Z 61	S
31	S	F	F	F	F	S	59	82	88	I A 77	I A 70	76	86	R 94	93	89	S 98	S 97	R 94	81	S 79	S 76	S 71	74
	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	16	15	17	15	24	30	31	30	30	30	29	31	30	30	30	30	31	31	30	30	30	26	20
MED	76	78	77	74	68	F 60	66	73	76	72	72	77	84	92	94	95	94	94	94	88	82	78	75	S 74
UQ	S 86	86	S 82	80	77	69	73	82	81	77	79	82	87	96	100	103	102	102	100	92	S 90	82	80	S 82
LQ	72	72	72	F 65	59	F 52	59	68	70	68	69	72	78	84	88	89	90	91	87	84	78	74	71	72

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IONOSPHERIC DATA

JUL. 1968 | foF1 (0.01) | 135° E Mean Time (G. M. T. + 9 h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1.0 Mc to 20.0 Mc 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	L	A	A	H 550	520	I A 520	A	A	A	I A 470	A					
2								L	L	L 530	500	A	A	A	L 510	I A 520	A	L 470	L					
3								U L 430	A	A	530	500	580	I A 520	520	A	A	450	L					
4								L	L	490	500	500	500	H 510	I A 510	A	H 460	H 450	410	L				
5								A	A	A	A	A	A	R 490	470	A	A	A	A	L				
6							L	A	A	490	H 500	500	510	H 500	520	480	460	450	400					
7							L	A	L	A	510	I A 510	A	A	A	A	A	450	A	A				
8							L	L	490	480	L 500	I A 520	560	510	I A 510	A	A	A	A	L				
9							L	A	A	A	R 500	530	500	500	A	A	A	A	A					
10							L	L	A	A	A	A	A	A	A	H 490	L 510	440	A					
11							C	A	C	A	A	A	A	A	A	A	A	440	A					
12								L	A	A	A	L	A	A	A	A	A	L	A	A				
13								L	A	500	L	A	H 540	I A 530	520	510	I A 490	460	A					
14							L	L	R 460	A	A	A	A	H 530	I A 520	500	530	A	A					
15								L	L	L	500	530	540	530	540	A	A	A	A					
16									L	C	520	L 530	I A 530	530	A	A	A	A	A					
17									A	A	510	L 530	I A 550	I A 530	530	A	I A 510	L 490	L					
18								L	L 480	L	560	I R 500	540	530	540	I A 490	I A 490	440	L					
19								L	A	L	510	550	H 570	520	540	H 520	I A 490	L 480	L	A				
20								L	A	A	R 520	520	510	510	520	520	A	A	I A 400	C				
21								L	L 460	L	L	L 530	520	530	500	500	H 520	L	L	A				
22							L	L	L	L 510	540	530	550	H 520	500	L	L	I A 470	L					
23								L	U L 520	A	A	510	A	A	A	520	490	L 480	A					
24								L	L 460	L	L 540	530	530	520	510	520	480	H 460	U L 420					
25								L	L 460	A	L	540	530	540	510	500	500	I A 460	L					
26								L	450	C	540	R 520	540	520	I A 510	H 510	H 490	460	L	L				
27							L	450	I A 460	L	A	A	A	A	I A 520	A	A	470	L	A				
28							L	A	L	A	530	A	A	A	530	510	I A 510	A	A	A				
29							L	L	450	L 520	510	H 550	520	L 530	530	510	L 490	L 450	L					
30							A	L	I A 490	I A 510	I A 530	510	A	A	530	510	500	L 470	L					
31							L	L	A	A	A	A	A	A	510	R 490	490	L 460	L					
	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	11	8	19	21	19	21	23	17	17	21	4					
MED								440	460	505	510	530	530	520	520	510	490	460	405					
UQ									485	L 515	530	530	545	530	530	520	510	470	415					
LQ									460	490	500	510	520	510	510	500	490	450	400					

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

JUL. 1968 | f_0E (0.01) | 135° E Mean Time (G. M. T. + 9 h)

Station YAMAGAWA Lat. 31° 12.1' N, Long. 130° 37.1' E Sweep 1.0 Mc to 20.0 Mc 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	230	280	320	345	355	360	360	A	A	A	A	A	A	A				
2						B	A	280	A	A	365	R 375	390	R 385	375	360	315	I A 290	A	A				
3						A	220	270	310	A	A	A	380	380	375	360	340	295	255	S				
4						B	190	275	310	I R 340	350	350	I R 370	370	A	A	340	300	A	A				
5						S	A	270	310	I A 330	355	370	370	360	360	350	A	A	A	S				
6						B	190	260	310	340	350	I A 355	I A 365	I A 370	I A 370	I A 355	340	310	260	B				
7						S	170	270	315	330	345	350	350	360	340	345	335	300	250	S				
8						B	A	260	300	345	360	370	I A 370	I A 370	365	A	A	A	A	A				
9						B	200	260	I A 300	330	350	I A 370	R 370	R 375	I A 380	360	345	315	245	B				
10						B	170	270	320	335	R 355	R 360	R 365	I R 370	370	R 355	340	285	255	C				
11						B	C	265	I C 315	340	345	A	A	A	A	A	A	A	260	B				
12						B	205	270	310	A	A	A	A	A	A	A	A	A	A	A				
13						B	210	260	A	A	360	370	I R 360	I R 365	I R 370	H 360	345	310	260	B				
14						B	160	260	305	330	340	A	A	360	360	A	A	A	A	B				
15						B	170	260	320	345	R 370	A	A	A	K	365	340	305	260	A				
16						B	185	275	315	I C 340	360	365	R	A	A	A	A	A	A	A				
17						B	A	A	325	350	I A 370	A	A	380	R 365	R 360	345	310	260	A				
18						B	A	280	315	335	350	360	I A 365	I A 375	380	370	330	305	A	A				
19						S	H 210	270	310	340	I R 365	380	R 390	R 390	I R 380	360	340	305	250	A				
20						B	190	260	300	I A 320	340	360	390	390	385	I R 370	340	300	245	C				
21						S	200	265	H 310	I A 345	370	380	380	380	370	A	A	A	A	A				
22						E	A	230	290	345	360	380	385	380	370	355	I A 335	I A 300	250	B				
23						B	A	280	320	340	360	375	380	360	A	A	A	A	A	A				
24						B	A	250	300	A	A	A	370	I A 370	I A 365	355	330	H 310	250	A				
25						S	A	270	310	340	360	370	360	I A 360	360	350	345	I A 295	250	A				
26						B	A	230	A	C	A	A	A	390	385	U R 380	340	H 300	H 240	B				
27						B	160	270	310	330	A	A	A	A	A	A	A	A	A	A				
28						S	S	250	I A 300	345	375	R 390	U R 390	R 390	390	370	340	310	240	A				
29						E	160	240	A	A	350	A	A	A	A	350	335	I A 305	250	B				
30						S	S	275	310	330	350	355	355	A	A	A	A	300	250	A				
31						S	175	260	310	335	350	370	375	A	A	A	A	A	A	A				
	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	18	30	27	24	26	21	22	22	20	19	19	20	18					
MED						E	190	268	310	340	355	370	370	372	370	360	340	302	250					
UQ							205	270	315	345	360	375	380	380	380	362	340	310	260					
LQ							170	260	308	330	350	360	365	U 365	365	355	335	300	250					

IONOSPHERIC DATA

JUL. 1968

foEs (0.1)

135° E Mean Time (G. M. T. + 9 h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1.0 Mc to 20.0 Mc 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 38	J X 26	17	J X 18	J X 17	J X 25	J X 34	J X 64	J X 52	J X 85	M 70	J X 52	54	J X 61	J X 84	J X 102	J X 86	J X 84	J X 65	J X 64	J X 52	J X 37	J X 36	J X 52
2	J X 35	J X 40	J X 59	J X 29	J X 33	J X 26	25	34	J X 53	57	J X 53	52	J X 77	J X 70	50	J X 62	J X 75	M 38	M 39	J X 34	J X 19	J X 21	J X 33	J X 61
3	J X 40	J X 40	J X 28	J X 30	J X 32	J X 21	J X 36	J X 49	J X 57	M 144	J X 79	J X 51	J X 128	J X 83	42	J X 104	J X 83	38	37	25	J X 62	J X 104	J X 61	J X 33
4	J X 62	J X 52	J X 64	J X 86	J X 86	J X 24	J X 46	J X 49	53	J X 65	40	J X 51	43	41	175	J X 69	J X 36	J X 38	35	28	J X 26	J X 101	J X 99	J X 62
5	20	J X 24	J X 30	J X 34	J X 62	J X 62	J X 78	J X 52	J X 59	J X 86	J X 65	91	72	104	55	J X 103	93	74	46	J X 29	J X 61	J X 41	J X 45	J X 72
6	40	J X 40	60	C	J X 39	J X 29	32	J X 57	J X 97	J X 64	J X 62	J X 85	42	40	J X 81	37	J G 33	34	31	25	50	J X 26	J X 65	95
7	J X 41	J X 97	70	J X 64	J X 74	J X 28	30	J X 58	J X 50	J X 74	J X 65	J X 84	74	142	145	83	104	45	J X 53	J X 76	J X 41	20	J X 50	J X 66
8	J X 39	J X 96	J X 29	J X 23	E	E B 12	24	J X 44	J X 65	J X 53	J X 66	J X 83	M 89	J X 63	J X 69	J X 49	J X 63	J X 54	J X 100	J X 41	J X 29	J X 29	J X 22	J X 33
9	J X 35	J X 39	J X 41	J X 50	J X 29	J X 33	J X 32	J X 65	J X 66	J X 66	J X 84	J X 84	43	43	J X 69	M 108	J X 102	J X 72	J X 121	J X 99	J X 100	J X 62	J X 72	J X 87
10	J X 86	J X 58	J X 42	J X 55	28	J X 22	25	J X 39	J X 49	J X 72	J X 61	J X 96	J X 99	J X 147	J X 88	40	45	33	J X 56	C	J X 32	J X 73	78	J X 62
11	J X 63	J X 71	J X 41	J X 66	C	J X 40	C	J X 72	C	107	J X 148	J X 94	J X 85	120	146	92	J X 114	77	J X 49	90	J X 92	J X 59	J X 84	J X 83
12	J X 60	J X 45	J X 58	J X 30	J X 20	23	24	38	71	90	90	J X 56	J X 83	176	J X 146	J X 69	J X 59	J X 50	58	41	J X 35	J X 29	J X 24	J X 50
13	J X 54	J X 70	J X 64	J X 39	J X 20	J X 24	25	34	J X 69	J X 53	44	69	G	64	45	44	51	40	J X 44	J X 60	J X 41	J X 64	J X 36	J X 31
14	C	J X 61	63	J X 42	J X 24	E B 15	30	33	J X 54	136	J X 86	195	J X 124	65	137	37	J X 42	J X 85	J X 104	80	72	43	J X 23	9 U
15	J X 64	J X 74	J X 44	J X 34	J X 34	20	34	J X 62	35	45	42	48	42	47	44	J X 66	J X 55	J X 61	J X 62	76	J X 60	J X 64	J X 49	J X 66
16	24	J X 63	J X 61	J X 32	J X 38	J X 38	28	J X 49	J X 50	C	44	44	M 81	J X 65	J X 81	J X 79	J X 161	J X 162	80	82	J X 49	J X 28	J X 19	20
17	J X 28	J X 28	J X 62	J X 36	J X 35	J X 25	29	J X 45	J X 65	60	J X 71	J X 52	J X 138	J X 66	J X 62	J X 69	J X 61	J X 47	J X 40	J X 50	J X 35	J X 40	J X 52	J X 65
18	J X 33	J X 34	J X 31	J X 29	J X 23	J X 24	23	36	41	71	47	49	143	J X 65	46	J X 54	82	48	J X 27	J X 26	J X 31	J X 17	J X 21	J X 20
19	J X 30	J X 48	J X 41	J X 43	J X 48	J X 28	28	32	J X 64	46	G	46	45	G	45	G 32	J X 68	39	32	J X 40	J X 59	J X 39	J X 30	J X 44
20	J X 32	J X 50	J X 32	J X 48	J X 59	J X 28	J X 38	J X 48	J X 85	J X 102	62	46	44	J X 64	45	50	J X 94	92	J X 59	C	J X 39	68	33	35
21	J X 34	J X 40	61	J X 68	J X 72	J X 29	23	30	36	40	40	G	42	46	47	J X 57	J X 43	J X 44	J X 39	J X 85	J X 41	J X 29	J X 29	J X 26
22	J X 23	J X 22	J X 24	J X 40	J X 24	13	19	28	45	36	42	40	47	41	57	48	47	J X 61	J X 36	36	J X 28	J X 20	J X 34	J X 22
23	J X 26	J X 24	J X 24	J X 29	J X 43	23	J X 30	34	J X 47	J X 88	M 105	50	J X 142	J X 88	J X 72	J X 51	J X 43	J X 45	J X 62	J X 32	J X 27	J X 19	E S 15	J X 51
24	J X 85	J X 45	J X 72	J X 39	J X 30	J X 29	J X 49	28	35	39	83	42	39	J X 61	44	G	G 29	33	27	J X 35	J X 29	20	J X 25	23
25	J X 41	J X 33	J X 36	J X 29	J X 30	J X 17	J X 45	35	J X 63	95	J X 91	95	110	74	46	39	36	92	J X 44	27	58	J X 92	J X 62	J X 34
26	28	J X 32	J X 27	J X 21	E B 15	E B 13	J X 28	109	J X 55	C	J X 50	J X 51	J X 46	48	54	45	37	49	32	25	68	60	46	J X 33
27	J X 27	23	20	20	E B 12	E B 14	28	33	J X 53	J X 69	J X 149	136	J X 91	J X 70	J X 62	J X 64	96	J X 45	55	80	J X 29	J X 30	J X 30	J X 53
28	J X 63	J X 63	73	J X 114	60	J X 58	J X 40	J X 66	J X 62	J X 89	46	J X 73	52	J X 63	51	47	J X 55	J X 62	J X 51	J X 32	J X 33	J X 60	90	72
29	E S 14	E B 14	18	E	E	13	19	28	J X 36	42	42	42	J X 49	38	J X 61	J X 50	J X 35	J X 84	J X 38	J X 29	J X 61	J X 73	J X 30	J X 78
30	J X 82	J X 63	J X 62	J X 107	J X 60	J X 35	J X 53	J X 53	71	J X 84	J X 82	J X 52	65	J X 131	J X 50	J X 61	J X 37	G 30	26	J X 29	J X 18	J X 18	J X 62	J X 85
31	J X 28	J X 29	J X 33	J X 26	J X 33	J X 22	21	J X 39	J X 85	J X 127	94	J X 63	J X 81	J X 100	J X 53	J X 48	J X 48	J X 38	J X 37	J X 51	J X 27	J X 26	J X 24	J X 27
	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	31	31	30	30	31	30	31	30	29	31	31	31	31	31	31	31	31	31	29	31	31	31	31
MED	J X 36	J X 40	J X 41	J X 35	J X 32	J X 24	30	J X 44	J X 54	J X 71	65	52	72	65	57	J X 54	J X 55	J X 48	J X 44	J X 40	J X 41	J X 39	J X 36	J X 52
UQ	J X 60	J X 62	J X 62	J X 50	J X 48	J X 29	J X 36	J X 55	J X 65	J X 89	J X 84	J X 84	J X 90	J X 86	J X 81	J X 69	J X 84	J X 73	J X 58	J X 76	J X 60	J X 63	J X 62	J X 69
LQ	J X 28	J X 30	J X 30	J X 29	J X 23	20	25	34	J X 49	53	45	48	44	48	46	46	J X 42	38	36	J X 29	J X 29	J X 26	J X 27	J X 33

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

JUL. 1968 | f_bE_s (0.1) | 135° E Mean Time (G. M. T. +9 h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1.0 Mc to 20.0 Mc 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	23	15	E	16	12	20	27	52	42	66	64	50	46	54	64	54	62	47	64	61	47	33	36	45
2	33	15	50	25	29	23	23	30	41	50	46	51	58	66	50	57	72	32	35	31	17	19	E	29
3	28	31	16	18	25	14	28	33	53	A	47	45	54	53	42	88	51	33	29	22	47	A	28	27
4	23	22	30	30	20	19	43	39	42	45	G	44	41	40	62	50	30	26	28	26	20	31	41	18
5	E	E	18	22	19	50	35	51	52	A	A	A	49	41	41	A	A	55	41	27	47	30	E	23
6	E	22	15	C	24	20	28	45	62	44	44	44	41	E R 40	42	37	G 29	G 27	31	25	50	E	18	A
7	19	16	50	50	A	24	24	46	47	54	40	62	53	68	62	A	A	35	40	48	E S 41	14	28	53
8	19	35	E	15	E	E B 12	22	32	39	47	47	76	50	48	65	E R 49	62	50	63	18	19	24	18	33
9	24	36	29	20	26	25	26	60	53	60	43	49	E R 43	G	63	A	A	67	A	A	52	49	61	64
10	A	44	31	35	23	16	24	32	42	54	61	A	A	A	78	E R 40	44	32	53	C	26	A	58	19
11	56	29	37	52	C	36	C	A	C	A	A	A	50	A	A	48	A	42	47	30	51	19	50	50
12	37	28	26	25	19	20	G	33	53	59	51	48	68	A	A	54	50	44	46	41	31	16	19	E
13	46	27	25	25	13	15	16	33	62	42	41	58	G	62	43	44	50	37	44	50	29	25	E	22
14	C	23	26	30	18	E B 15	G	32	40	A	49	A	67	42	67	E R 37	40	48	A	60	55	30	E	18
15	19	20	24	21	16	15	30	34	G	43	42	46	E R 42	47	E R 44	64	55	59	62	74	60	50	33	65
16	E	18	43	31	32	30	27	48	46	C	E R 44	44	79	50	67	I R 79	A	87	77	E R 82	E R 49	25	19	E
17	E	18	48	15	15	20	28	36	59	51	50	48	A	64	47	63	58	45	38	33	18	E R 40	41	55
18	27	30	30	25	18	18	23	32	36	60	44	E R 49	46	46	44	51	76	34	27	E R 26	27	15	21	E
19	21	46	32	41	40	18	25	G	57	45	G	46	45	G	E R 45	G 32	60	38	32	25	51	25	27	29
20	18	40	15	22	47	15	28	38	A	A	45	E R 46	42	44	44	48	63	59	57	C	E S 39	19	22	18
21	23	22	23	34	A	13	16	23	G	39	39	G	41	45	46	46	38	41	37	E S 85	30	26	23	20
22	E	E	15	24	16	12	19	28	G	G	40	40	46	41	44	47	38	50	21	36	22	16	28	16
23	17	17	18	22	24	18	22	31	37	62	64	48	77	69	52	48	42	41	52	27	23	E	E S 15	16
24	31	29	50	24	13	23	46	G	34	35	50	42	E R 39	47	43	G	G 29	33	G	34	18	E	19	E
25	31	25	27	20	30	16	37	35	40	51	42	45	46	42	42	G	G	52	33	19	30	41	40	19
26	E	20	18	14	E B 15	E B 13	22	33	33	C	43	43	41	46	53	42	G 30	40	29	18	39	51	30	16
27	19	E	E	E	E B 12	E B 14	26	31	46	50	A	63	A	57	54	51	76	39	37	64	20	25	E	42
28	27	43	18	52	42	19	25	50	39	50	45	60	E R 52	61	50	46	54	61	51	32	30	56	15	25
29	E S 14	E B 14	E	E	E	12	G	G	34	35	41	42	44	E R 38	42	34	30	35	23	17	27	22	23	18
30	46	28	47	31	15	16	46	49	55	71	65	49	57	93	48	44	37	G 28	21	24	E	16	18	47
31	16	E	21	17	17	15	G	30	85	A	A	60	55	63	49	43	44	31	33	40	22	19	18	16
	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	31	31	30	30	31	30	31	30	29	31	31	31	31	31	31	31	31	31	29	31	31	31	31
MED	22	22	25	24	19	18	25	33	42	51	45	48	48	48	49	48	51	41	38	31	U 28	25	22	22
UQ	31	30	32	31	29	20	28	46	53	66	56	60	58	64	62	56	68	50	52	U 46	47	U 34	32	44
LQ	16	16	17	18	15	15	22	31	37	45	42	44	42	42	44	42	38	34	30	25	22	18	18	17

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

JUL. 1968

f-min (0.1)

135° E Mean Time (G. M. T. + 9h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1.0 Mc to 20.0 Mc 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 14	E S 11	E	E	E	E S 12	15	11	15	15	17	18	19	20	17	18	17	15	14	14	E S 14	E S 15	E S 15	E S 15
2	E S 12	13	12	E	11	11	E S 14	14	15	16	17	19	18	19	19	17	15	14	15	13	11	E S 15	E S 15	E S 15
3	E S 15	12	13	E	E	E	E S 14	15	15	15	17	19	17	25	18	18	18	15	15	E S 15	E S 15	E S 15	E S 15	E S 15
4	E S 15	15	15	E	11	11	E S 15	15	17	16	19	16	20	18	18	17	17	14	12	E S 13	E S 14	E S 15	E S 14	E S 14
5	E S 15	E S 13	E	E	E	E S 12	E S 13	14	12	14	17	19	18	17	21	16	15	14	12	15	E S 11	E S 15	E S 15	E S 12
6	E S 15	E S 11	11	C	E	11	E S 15	15	15	16	18	18	17	22	18	19	16	15	16	13	E S 15	E S 15	11	E S 12
7	E S 15	E S 12	12	E	E	E S 12	E S 15	12	15	15	18	17	18	19	17	17	18	15	15	E S 15	E S 14	E S 13	E S 15	E S 15
8	E S 14	E S 14	E S 15	E	E	12	E S 14	15	16	19	22	24	27	25	23	20	17	15	15	11	E S 14	E S 15	E S 15	E S 15
9	E S 15	13	15	12	E	11	15	11	15	15	16	20	20	18	16	18	18	16	16	14	13	E S 15	E S 15	E S 15
10	E S 15	16	13	14	14	12	15	16	16	18	20	26	27	31	23	22	18	15	18	C	13	E S 15	E S 15	E S 15
11	E S 15	15	E	E	C	15	C	15	C	17	15	18	17	25	17	18	15	13	15	11	E S 15	E S 15	E S 15	E S 15
12	E S 15	E S 15	15	E	E	14	E S 15	13	15	15	22	26	25	25	22	19	15	14	14	11	E S 15	E S 15	E S 15	E S 15
13	E S 15	E S 15	13	E	E	12	E S 13	14	15	16	18	19	20	19	19	18	16	15	14	14	E S 15	E S 13	E S 15	E S 15
14	C	E S 13	12	E	E	15	E S 15	15	15	15	19	18	18	17	17	17	16	15	11	13	E S 15	E S 15	E S 15	14
15	E S 14	13	14	E	E	11	15	13	15	15	19	19	20	23	25	21	18	15	19	11	E S 15	E S 15	E S 15	E S 15
16	E S 15	14	14	E	E	15	E S 15	16	16	C	18	25	22	20	20	18	18	15	15	15	E S 15	E S 15	E S 15	E S 15
17	E S 15	12	12	E	E	13	E S 15	15	16	17	18	20	21	22	20	20	19	15	15	11	E S 15	E S 15	E S 15	E S 15
18	E S 15	14	14	E	E	11	E S 15	15	15	14	15	19	18	17	18	16	16	15	14	11	E S 13	E S 13	E S 12	E S 15
19	E S 13	E S 12	12	14	E	E S 11	14	15	14	15	17	17	21	19	24	18	16	15	15	13	E S 13	E S 15	E S 14	E S 15
20	E S 15	E S 13	13	E	E	11	13	14	14	16	18	19	21	22	18	16	15	12	13	C	E S 14	E S 15	E S 15	E S 15
21	E S 15	12	14	13	13	E S 11	E S 13	13	15	15	15	16	16	16	16	18	14	15	13	15	E S 15	E S 15	E S 13	E S 15
22	E S 15	E S 15	E	E	E	E	E S 14	12	11	15	17	18	19	20	19	18	16	16	15	15	E S 15	E S 15	E S 15	E S 15
23	E S 15	E S 15	15	13	E	11	E S 15	15	15	15	18	18	17	18	18	16	15	12	12	11	E S 13	E S 15	E S 15	E S 15
24	E S 13	12	12	E	E	12	E S 15	E S 15	15	17	20	20	23	21	26	19	16	15	16	E	E S 15	E S 15	E S 15	E S 15
25	E S 15	E S 15	13	E	E	E S 15	E S 15	E S 15	15	15	15	17	16	15	15	15	16	15	14	E S 12	E S 14	E S 14	E S 15	E S 14
26	E S 15	E S 15	13	E	15	13	E S 15	14	16	C	16	18	17	18	17	16	15	14	11	11	E S 15	E S 15	E S 15	E S 15
27	E S 15	E S 14	15	12	12	14	E S 14	15	14	15	16	16	23	17	18	16	16	15	12	12	E S 15	E S 14	E S 15	E S 15
28	E S 13	E S 14	12	E	E	E S 15	E S 13	14	15	16	15	15	17	17	17	16	15	15	17	13	12	E S 15	13	E S 14
29	E S 14	14	15	E	E	E	E S 14	E S 15	14	15	17	19	18	26	20	17	17	15	15	15	E S 15	E S 15	E S 15	E S 14
30	E S 15	15	14	13	11	E S 15	E S 15	15	15	16	20	21	23	22	19	20	15	15	14	12	E S 15	E S 15	E S 15	E S 15
31	E S 15	E S 15	13	14	13	E S 14	E S 15	15	15	18	20	22	22	18	19	18	17	15	12	15	E S 14	E S 15	E S 15	E S 15
	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	31	31	30	30	31	30	31	30	29	31	31	31	31	31	31	31	31	31	29	31	31	31	31
MED	E S 15	E S 14	13	E	E	12	E S 15	15	15	15	18	19	19	19	18	18	16	15	15	12	E S 15	E S 15	E S 15	E S 15
UQ	E S 15	E S 15	14	12	11	13	E S 15	15	15	16	19	20	22	22	20	18	17	15	15	15	E S 15	E S 15	E S 15	E S 15
LQ	E S 14	E S 12	12	E	E	E E 11	E S 14	14	15	15	16	18	18	18	17	16	15	14	13	11	E S 14	E S 15	E S 15	E S 14

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

JUL. 1968

M(3000) F2 (0.01)

135° E Mean Time (G. M. T. +9 h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1.0 Mc to 20.0 Mc 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	270	S 270	265	I S 270	285	285	325	325	285	290	295	275	275	275	J R 275	275	S 275	S 290	280	J S 295	I S 280	I S 270	270	J S 265
2	F	J S 285	J S 295	310	U S 310	295	305	305	335	V 280	U R 290	275	285	J R 265	270	280	U S 285	S 295	J R 280	260	I S 280	275	I S 260	S 275
3	J S 290	300	U S 305	285	280	290	S 300	310	U S 290	I A 300	285	290	J R 255	R 260	260	245	270	S 275	270	S 290	305	I A 270	270	F
4	300	305	F 310	F 280	Z 280	F 280	310	S 310	285	295	290	280	275	250	250	270	270	285	300	280	280	F 275	F	I S 270
5	S 265	F	F	F 315	I S 285	F 270	315	F 290	300	I A 280	I A 260	I A 255	250	275	270	I A 285	I A 275	285	300	300	260	I S 255	F	I S 280
6	F 285	F	F 285	C	F	F	F 295	U S 305	320	290	280	285	280	265	265	265	270	285	285	R 285	305	S 265	275	A
7	S	S	S	S	A	F 300	F 275	305	300	300	265	265	255	285	280	I A 270	I A 275	280	R 285	290	285	275	F	F
8	S 285	S	F	F 310	320	F 280	F 295	F 310	F 275	280	R 295	305	250	255	R 275	290	285	R 285	R 285	U R 295	R 295	U S 295	S 295	275
9	F	F	F	F	F	F	300	315	310	285	305	270	290	280	280	A	A	285	I A 280	I A 285	I S 310	280	R 255	S
10	A	F	310	F	F	F	U F 315	V 295	315	275	280	I A 260	A	I A 265	J R 275	275	255	290	U R 295	I C 290	R 290	I A 270	S	S
11	S	R	R	F	C	280	I C 260	I A 270	C	A	A	A	270	A	A	265	I A 285	I S 300	305	280	265	F	F	S 270
12	F 260	I S 270	F	S	S	F 270	F	320	295	320	290	R	260	I A 265	I A 275	290	290	S 285	290	280	S 270	270	280	S 280
13	F	S	S	F	F	F 295	325	320	300	310	305	265	265	275	275	260	280	290	R 305	285	280	S 270	S 275	F
14	I C 295	I S 300	S	F 295	S	F	F 340	F 285	325	I A 295	290	I A 255	240	255	255	270	270	275	I A 270	I R 280	S 280	260	265	I S 260
15	F	I S 290	265	F	F	F 280	F 310	315	285	285	285	290	275	R 280	R 260	265	R 280	S 300	J R 290	I R 285	U R 285	U F 265	265	R
16	S	F 315	F	U R 305	F 310	F 290	F 335	315	315	I C 285	R 275	R 280	260	R 265	R 270	270	I A 275	280	J R 290	I R 290	280	U R 265	R 265	U R 280
17	J S 265	275	F	F	F	F	F 335	345	315	290	305	R 285	I A 280	275	J R 275	R 280	R 280	R 280	J R 290	R	R	U R 285	J R 265	R
18	R	R	F	F	F	F 295	F 300	290	300	265	240	275	265	265	255	265	280	290	290	280	265	250	U S 260	S 255
19	255	F 265	J S 260	310	270	F 260	275	280	285	265	270	270	240	245	250	260	275	285	280	265	I S 270	U S 280	S 280	S
20	S	S	F	F	F	S 280	F 325	340	I A 290	I A 290	250	245	255	260	265	260	265	285	295	I C 280	I S 260	260	255	I S 265
21	I S 275	F	I S 305	305	I A 310	290	300	315	325	305	305	260	270	265	265	285	270	270	265	I S 280	I S 290	280	260	265
22	260	S 270	S 290	310	315	280	320	325	315	310	275	260	R 260	J S 270	285	S 265	265	270	J R 270	J S 285	J S 295	U S 300	270	U R 270
23	S 275	285	S 310	295	F	F 280	330	S 345	305	315	270	275	R 280	290	265	280	285	285	285	295	295	S 265	R 260	U S 275
24	I S 300	F	F	F 280	S 295	295	F 305	325	S 310	300	270	265	270	280	280	280	295	300	R 315	S 325	295	265	270	F 265
25	F 270	Z 290	R 285	F	F 270	F 285	F 285	310	310	295	280	265	265	250	265	S 285	275	290	310	310	285	255	260	U S 270
26	270	270	260	270	J S 295	305	U S 305	265	340	I C 320	275	265	255	250	265	260	280	285	305	325	265	240	245	255
27	265	275	300	275	270	275	290	295	340	300	A	A	I A 260	270	275	270	S 280	270	290	305	S 295	260	S 265	I S 265
28	I S 290	F	F	F 300	F	F	F 300	S 320	F 300	315	290	280	285	275	265	275	290	285	275	J S 290	S 295	J S 295	265	J S 275
29	265	265	S 260	265	S 275	V 280	310	330	330	V 305	300	260	S 295	270	275	R 280	295	305	R 290	R 305	S 290	U S 270	J S 285	S
30	F	S	S	S	F	F 310	U S 305	F 290	S 305	J R 305	290	R 265	265	A	J S 265	280	280	285	R 295	J S 300	U S 310	300	Z 310	S
31	S	F	F	F	F	S	290	325	355	I A 310	I A 280	265	265	R 285	280	275	S 280	S 290	R 300	300	S 290	S 280	S 270	275
	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	16	15	17	15	24	30	31	30	30	29	28	30	29	30	30	30	31	31	30	30	30	26	20
MED	270	280	290	295	285	F 282	305	310	308	295	285	268	265	265	270	272	280	285	290	290	285	270	265	S 270
UQ	S 288	295	S 305	310	310	295	320	322	320	305	290	280	275	275	275	280	285	290	298	300	S 295	280	275	S 275
LQ	265	270	265	280	278	F 280	295	295	295	285	275	262	255	260	265	265	270	282	280	280	280	265	260	S 265

IONOSPHERIC DATA

JUL. 1968 | M(3000)F1(0.01) | 135° E Mean Time (G. M. T. + 9 h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1.0 Mc to 20.0 Mc 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	L	A	A	H 335	370	A	A	A	A	I A 335	A					
2								L	L	A	380	A	A	A	A	A	A	L 340	L					
3								U L 365	A	A	335	400	A	A	345	A	A	335	L					
4								L	L	335	360	360	380	H 355	A	A	H 360	H 335	320	L				
5								A	A	A	A	A	A	R 400	385	A	A	A	A	L				
6							L	A	A	365	H 380	400	380	H 370	360	375	350	335	325					
7							L	A	L	A	360	A	A	A	A	A	A	335	A	A				
8							L	L	340	A	A	I A 345	A	A	I A 360	A	A	A	A	L				
9							L	A	A	A	R 390	A	A	360	A	A	A	A	A					
10							L	L	A	A	A	A	A	A	A	H 365	L 385	345	A					
11							C	A	C	A	A	A	A	A	A	A	A	A	A					
12								L	A	A	A	L	A	A	A	A	A	L	A	A				
13								L	A	360	L	A	H 350	A	335	345	A	335	A					
14							L	L	R 370	A	A	A	A	H 370	I A 340	360	340	A	A					
15								L	L	L	380	370	350	A	345	A	A	A	A					
16									L	C	365	L 355	A	A	A	A	A	A	A					
17									A	A	A	L 340	I A 350	A	355	A	A	A	L					
18								L	L 350	L	340	R	355	370	345	A	I A 340	345	L					
19								L	A	L	390	345	H 315	400	335	H 345	I A 340	L 335	L	A				
20								L	A	A	R 290	345	365	360	345	A	A	A	I A 340	C				
21								L	L 350	L	L	L 370	365	360	380	A	H 335	L	L	A				
22							L	L	L	L	335	355	345	H 310	A	L	L	I A 340	L					
23								L	U L 350	A	A	375	A	A	A	A	345	L 345	A					
24								L	L 365	L	A	375	370	350	375	355	370	H 345	U L 355					
25								L	L 365	A	L	360	380	370	370	360	340	A	L					
26								L	380	C	355	R 365	370	360	A	H 355	H 365	350	L	L				
27							L	335	A	L	A	A	A	A	A	A	A	335	L	A				
28							L	A	L	A	345	A	A	A	A	A	A	A	A	A				
29							L	L	380	L 340	375	H 330	405	L 305	350	355	L 360	L 345	L					
30							A	L	A	A	A	A	A	A	340	350	350	L 330	L					
31							L	L	A	A	A	A	A	A	A	R 365	355	L 340	L					
	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	9	4	15	17	15	14	16	11	14	18	4					
MED								350	L 365	350	360	360	365	360	348	355	350	338	332					
UQ									370	362	380	370	375	370	365	362	360	345	U 348					
LQ									L 350	338	342	345	350	355	342	352	340	335	322					

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IONOSPHERIC DATA

JUL. 1968 | $h'F2$ (km) | 135° E Mean Time (G. M. T. + 9 h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1.0 Mc to 20.0 Mc 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	350	E A 360	350	400	350	355	345	335	345	300	300					
2								295	255	340	340	325	320	370	350	330	320	300	285					
3								270	300	I A 305	325	305	410	375	375	I A 380	345	315	320					
4								290	305	310	310	320	355	350	410	345	340	310	290	275				
5								330	340	A	A	A	495	410	410	A	A	355	310	275				
6							270	250	305	350	400	375	360	370	370	370	350	325	305					
7							340	285	305	300	400	E A 400	390	350	365	I A 380	I A 350	325	285	275				
8							290	280	360	355	310	E A 360	450	385	350	340	345	315	305	280				
9							270	275	270	375	340	385	360	355	400	A	A	375	A					
10							265	240	250	415	400	I A 400	I A 410	I A 360	375	325	390	285	290					
11							C	I A 370	C	A	A	A	410	A	A	400	I A 330	290	265					
12								275	280	E A 280	300	L 600	E A 470	A	A	310	295	315	265	270				
13								255	E A 300	280	325	400	395	355	345	390	355	310	285					
14							240	230	275	I A 400	345	A	450	380	380	335	325	310	A					
15								265	260	355	305	350	370	350	395	360	325	290	300					
16									290	C	325	355	E A 450	370	355	400	I A 380	350	320					
17									350	300	320	350	I A 360	355	350	335	340	330	295					
18								340	300	440	445	340	350	350	385	360	350	285	290					
19								300	280	350	310	340	410	380	390	360	345	315	290	270				
20								250	A	A	465	420	390	360	340	340	345	310	275	C				
21								275	270	500	590	360	390	390	350	320	360	325	315	A				
22							250	275	280	320	370	395	405	355	320	375	365	335	300					
23								250	310	305	E A 435	395	400	330	370	340	305	315	300					
24								270	265	255	405	420	380	370	350	355	335	305	275					
25								300	265	320	320	360	380	405	365	330	330	300	275					
26								275	250	C	350	365	400	390	360	340	325	300	275	230				
27							300	305	255	350	A	A	A	335	345	350	355	330	290	275				
28							265	250	290	290	325	370	340	325	345	325	325	325	310	270				
29							260	240	260	285	315	430	330	380	370	335	305	290	300					
30							E A 270	315	295	E A 320	335	330	350	A	350	340	320	310	290					
31							290	255	E A 300	A	A	390	390	325	335	355	330	300	280					
	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	29	29	25	27	27	30	28	29	29	29	31	29	9				
MED							270	275	285	320	338	368	388	360	360	340	340	310	290	275				
UQ							290	300	305	355	392	400	408	380	375	360	350	325	300	275				
LQ							258	255	265	300	320	348	360	350	350	335	325	300	285	270				

IONOSPHERIC DATA

JUL. 1968 | $h'F$ (km) | 135° E Mean Time (G. M. T. + 9 h)

Station YAMAGAWA Lat. 31° 12.1' N, Long. 130° 37.1' E Sweep 1.0 Mc to 20.0 Mc 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	275	280	280	265	275	230	A	260	A	A	A	E A 245	A	A	A	A	A	I A 270	295	275	300	310	320
2	310	265	270	230	235	245	245	H 235	E A 250	A	E A 255	A	A	A	A	A	A	250	E A 255	275	255	275	350	320
3	300	270	245	270	280	270	255	240	A	A	E A 270	210	I A 210	I A 220	220	A	A	255	250	255	255	A	300	350
4	275	255	250	300	280	290	255	E A 270	E A 255	A	220	E A 250	200	H 200	A	A	H 205	H 205	245	270	255	290	E A 320	280
5	295	275	250	250	285	A	250	A	A	A	A	A	A	200	240	A	A	A	A	A	E A 390	350	330	275
6	265	260	260	I C 295	300	305	E A 250	A	A	E A 250	H 215	200	200	H 200	225	200	235	230	250	295	270	230	250	I A 350
7	270	250	350	280	I A 290	275	240	I A 230	A	A	205	A	A	A	A	A	A	E A 250	A	A	275	260	305	310
8	275	280	235	245	245	240	235	245	E A 245	I A 230	I A 245	A	A	A	A	A	A	A	I A 255	250	255	260	235	305
9	305	320	280	290	280	270	250	A	A	A	205	A	I A 200	E A 270	A	A	A	A	A	A	265	275	E A 400	E A 395
10	A	310	250	290	280	260	240	225	A	A	A	A	A	A	H 230	A	225	A	I C 265	250	A	E A 360	300	
11	380	305	260	260	C	360	C	A	C	A	A	A	A	A	A	A	A	A	A	280	E A 370	290	E A 370	E A 360
12	E A 350	350	300	300	300	290	250	245	A	A	A	E A 260	A	A	A	A	A	A	A	A	280	300	275	270
13	375	275	245	250	265	255	245	240	A	230	H 200	A	E A 250	A	250	250	A	250	I A 260	275	270	250	270	305
14	I C 320	295	250	255	370	305	240	225	240	A	A	A	A	H 205	A	E A 250	230	A	A	E A 310	310	315	295	305
15	300	260	310	330	340	270	250	240	H 215	E A 245	220	E A 255	E A 260	E A 270	270	A	A	A	A	320	325	E A 350	325	E A 400
16	270	255	360	265	250	270	225	270	E A 270	C	255	240	A	A	A	A	A	A	A	A	315	310	305	285
17	330	255	E A 355	270	290	275	215	230	A	A	A	E A 260	A	A	E A 260	A	A	A	A	255	255	300	325	375
18	300	300	245	250	245	245	225	H 215	200	A	245	I A 220	255	220	255	I A 225	A	240	H 250	260	270	280	300	305
19	305	350	320	250	325	325	255	240	I A 250	255	205	E A 245	H 220	200	A	H 245	I A 250	250	250	A	305	260	270	400
20	300	315	275	295	E A 300	245	250	A	A	A	A	A	215	215	250	A	A	A	A	I C 240	250	295	300	285
21	300	290	250	240	A	275	245	225	225	H 220	H 205	H 200	210	E A 250	E A 250	A	H 230	A	280	I A 270	250	250	280	300
22	300	300	255	255	225	245	230	H 200	H 200	H 195	205	205	E A 250	H 220	I A 215	E A 225	H 220	A	250	275	260	240	305	300
23	300	285	255	275	270	235	240	235	235	A	A	E A 260	A	A	A	A	E A 255	265	I A 250	260	240	255	290	300
24	305	315	E A 325	280	250	270	295	250	215	200	A	210	200	E A 255	220	250	230	H 220	245	255	250	225	295	310
25	325	275	250	245	305	275	300	255	230	A	220	215	E A 250	215	215	215	230	I A 245	250	230	265	E A 350	350	290
26	280	300	300	280	245	245	250	220	225	I C 210	210	220	200	E A 250	A	H 240	H 215	E A 250	H 250	240	E A 250	A	350	305
27	310	290	260	245	215	295	270	250	I A 235	A	A	A	A	A	A	A	A	250	A	A	250	300	295	350
28	305	300	250	295	250	290	250	I A 245	240	I A 245	E A 250	A	A	A	A	A	A	A	A	A	250	265	280	290
29	295	290	295	300	270	260	250	230	225	H 205	200	H 200	200	H 210	230	230	220	230	240	265	250	300	290	320
30	290	305	355	330	250	255	A	A	A	A	A	A	A	A	A	E A 255	220	230	245	270	235	235	250	E A 340
31	255	270	260	290	305	295	250	240	A	A	A	A	A	A	A	230	E A 275	E A 235	E A 255	265	270	260	295	305
	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	31	31	31	29	30	29	24	18	11	18	16	16	16	13	13	13	17	18	23	31	28	31	31
MED	300	290	260	275	275	270	250	239	230	220	212	U 210	206	209	232	230	225	238	250	265	258	274	298	305
UQ	308	302	294	292	300	290	250	245	A 242	A 238	U 232	E A 252	E A 250	E A 250	250	245	232	250	A 255	275	272	300	315	330
LQ	290	272	250	250	250	255	240	228	225	208	205	208	200	202	220	225	220	230	250	255	250	258	285	300

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IONOSPHERIC DATA

JUL. 1968

$h'Es$ (km)

135° E Mean Time (G. M. T. +9 h)

Station YAMAGAWA Lat. 31° 12.1' N, Long. 130° 37.1' E Sweep 1.0 Mc to 20.0 Mc 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	100	100	100	125	120	115	110	110	110	110	105	105	105	105	100	100	100	100	95	95	105
2	105	100	100	100	100	100	145	140	105	105	115	115	110	110	115	110	105	105	105	100	115	110	105	105
3	105	105	100	105	100	100	130	120	115	105	105	105	110	110	120	115	110	160	130	120	110	105	105	100
4	115	110	105	110	105	105	125	120	120	120	125	115	130	145	115	100	100	100	100	120	110	120	110	105
5	110	125	100	100	100	105	105	125	120	120	115	110	120	110	110	110	105	110	105	105	120	100	115	115
6	110	105	105	C	105	105	115	110	115	115	110	105	100	105	105	150	105	150	130	125	110	110	105	105
7	105	110	100	100	105	105	125	125	120	110	110	110	110	110	110	110	110	130	115	110	105	105	105	105
8	100	95	95	100	E	B	120	115	110	115	105	105	105	105	105	110	105	105	105	105	100	100	100	100
9	100	105	100	100	120	95	115	110	105	105	110	110	120	150	145	125	120	120	110	115	110	105	110	100
10	100	100	95	95	105	95	120	120	125	115	115	115	110	110	110	120	120	110	115	C	105	110	110	105
11	105	105	105	100	C	100	C	115	C	110	105	105	105	100	125	120	105	120	130	120	115	110	110	110
12	105	100	110	95	95	110	150	120	110	105	110	110	105	110	100	100	105	100	100	100	100	110	100	115
13	110	105	105	105	105	105	150	125	120	110	115	110	G	140	150	145	125	125	115	110	110	110	105	100
14	C	105	105	100	100	B	130	125	125	115	120	105	125	125	110	110	105	110	100	100	95	95	95	110
15	110	105	105	100	105	150	125	130	150	135	145	105	105	105	160	125	120	115	115	115	115	110	110	110
16	105	105	105	110	105	105	145	125	125	C	115	120	115	115	105	105	100	100	100	100	100	100	100	100
17	100	105	105	105	105	105	140	105	120	115	115	120	105	110	120	120	115	120	115	105	105	100	105	105
18	100	100	100	95	95	100	145	135	130	115	110	110	130	110	110	130	110	120	100	100	110	100	95	100
19	100	105	105	105	105	105	130	130	115	115	G	120	125	G	155	105	120	125	120	110	105	100	100	110
20	105	105	105	105	105	105	120	115	110	110	110	110	145	125	130	130	115	115	110	C	100	110	110	105
21	100	110	105	105	105	105	145	145	140	125	130	G	130	120	115	105	105	105	100	100	100	100	100	95
22	100	100	100	105	105	120	110	110	115	150	130	145	125	145	125	125	125	115	100	120	100	100	105	105
23	105	105	105	100	105	130	105	140	125	115	115	120	110	105	105	105	105	100	100	100	100	100	S	105
24	105	105	105	105	105	105	110	120	115	110	105	105	115	105	105	G	105	140	130	110	105	100	105	100
25	100	100	95	95	95	100	120	115	110	115	110	110	110	105	110	120	140	105	110	110	105	105	105	105
26	105	100	100	100	B	B	115	105	105	C	105	105	110	125	120	150	E G 170	125	115	110	105	95	95	95
27	95	95	95	95	B	B	130	125	110	105	105	100	100	100	100	100	100	100	100	100	100	100	95	105
28	105	105	105	105	105	105	110	105	110	110	130	130	135	130	130	130	125	120	115	110	105	100	110	105
29	S	B	120	E	E	120	110	115	105	105	105	105	105	115	105	105	105	125	100	115	110	110	105	105
30	120	105	105	105	105	105	120	115	110	105	105	105	105	105	105	105	105	105	100	100	100	100	105	110
31	110	105	105	110	110	115	140	120	110	105	105	105	105	105	105	105	105	105	100	100	100	95	100	115
	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	30	31	29	26	27	30	31	30	29	30	30	30	30	31	30	31	31	31	29	31	31	30	31
MED	105	105	105	100	105	105	125	120	115	110	110	110	110	110	110	110	105	115	105	110	105	100	105	105
UQ	105	105	105	105	105	105	140	125	120	115	115	115	125	125	122	125	119	122	115	115	110	110	110	108
LQ	100	100	100	100	100	100	115	115	110	105	105	105	105	105	105	105	105	105	100	100	100	100	100	100

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IONOSPHERIC DATA

JUL. 1968 | Types of Es | 135° E Mean Time (G. M. T. + 9 h)

Station YAMAGAWA Lat. 31° 12.1' N. Long. 130° 37.1' E Sweep 1.0 Mc to 20.0 Mc 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	F 4	F 2	F 1	F 1	F 1	L 2	H 4	C 4	C 2	C 4	C 3	C 2	C 1	C 2	C 2	L 2	L 4	L 2	L 3	L 2	F 5	F 6	F 5	FF 24
2	FF 13	F 2	F 3	F 3	F 3	L 3	HL 12	HL 32	C 2	C 3	C 1	C 2	C 2	C 2	C 1	C 3	C 3	L 3	LH 22	L 4	FF 22	F 2	F 2	F 3
3	F 4	F 6	F 3	F 3	F 4	L 1	HC 42	C 4	C 3	C 3	L 1	L 1	C 2	C 2	C 1	C 3	C 3	HL 11	HL 11	CL 21	F 4	F 4	F 2	F 2
4	FF 22	F 2	F 3	FF 41	F 4	L 2	H 4	C 3	C 2	C 2	C 1	C 1	H 1	H 1	CL 12	L 2	L 2	L 2	LH 21	CL 22	FF 61	FF 13	F 4	F 3
5	F 1	F 1	F 2	F 2	F 2	L 5	L 5	H 4	H 4	CL 52	C 3	C 2	C 2	C 1	CL 11	C 4	L 5	CL 72	CL 31	L 6	FF 67	F 4	FF 21	FF 24
6	FF 22	F 3	F 3		F 2	L 3	C 5	C 4	C 2	C 2	C 1	L 1	L 1	L 1	L 1	HL 11	L 1	HL 22	HL 21	C 1	F 2	FF 21	F 3	F 5
7	F 5	FF 13	F 4	F 4	FF 31	L 4	H 2	H 3	H 3	C 3	C 1	C 3	C 3	C 4	C 2	C 3	C 5	H 1	C 3	L 3	F 6	F 1	F 5	F 7
8	F 3	F 6	F 3	F 1			C 3	C 3	C 2	C 2	C 2	C 2	C 1	C 2	C 2	C 2	C 4	C 2	L 2	L 3	F 6	F 3	F 2	F 5
9	F 4	F 5	F 5	F 4	FF 35	L 3	C 3	C 3	C 3	C 4	C 1	C 2	C 1	H 1	HC 31	H 4	CL 31	C 2	C 2	C 5	F 3	F 4	FF 14	F 3
10	F 2	F 3	F 3	F 3	FF 13	L 1	C 1	C 2	H 2	C 2	C 1	C 2	C 2	C 3	C 2	C 1	C 1	C 1	C 1		F 3	F 3	F 4	F 5
11	F 4	F 2	F 4	F 3		L 4		C 2		C 3	C 2	L 2	L 1	L 2	CL 12	HL 11	L 4	HL 23	HL 31	CL 22	FF 43	FF 21	F 4	F 4
12	F 5	F 4	FF 12	F 2	F 1	L 2	H 1	C 3	C 2	L 3	CL 11	L 1	L 3	CL 13	L 4	L 2	L 2	L 2	L 1	L 3	F 4	FF 22	F 1	FF 22
13	F 6	F 4	F 3	F 4	F 1	L 3	HL 22	H 4	CL 23	CL 11	C 1	C 2		H 2	H 1	H 1	H 1	H 1	C 2	L 3	F 3	FF 31	FF 31	F 3
14		FF 12	FF 23	F 2	F 2		H 2	H 3	H 1	C 3	C 2	C 4	HC 22	HC 11	C 2	C 1	L 2	CL 22	L 2	L 3	F 3	F 4	F 2	FF 22
15	FF 31	F 4	F 5	F 6	F 5	H 2	H 6	H 3	H 1	H 1	H 1	L 1	L 1	L 1	H 1	HL 21	CL 11	CL 51	C 2	CL 21	F 3	F 4	F 4	F 6
16	F 2	F 4	F 2	FF 22	FF 31	L 3	H 3	HL 41	H 1		C 1	C 1	C 2	C 1	C 3	L 3	L 4	L 3	L 3	L 4	F 6	F 3	F 2	F 2
17	F 2	F 3	F 4	F 3	F 3	L 4	HL 32	LH 31	C 2	C 1	C 2	C 1	C 2	C 1	C 1	C 2	C 1	C 1	C 1	L 2	F 3	F 7	F 3	F 4
18	F 3	F 3	F 3	F 4	F 4	L 2	HL 11	H 3	H 2	C 2	C 1	C 1	HC 11	L 1	C 1	HL 11	C 3	CL 12	L 2	L 3	FF 13	F 2	F 5	F 2
19	F 3	F 6	F 5	F 6	F 6	L 2	H 3	H 3	C 2	C 2		C 1	C 1		H 1	L 1	HL 21	HL 21	CL 11	C 4	F 6	F 2	F 4	FF 41
20	FF 21	F 3	F 2	F 4	F 3	L 4	H 4	C 3	C 5	C 3	C 2	C 1	H 1	H 1	H 1	H 1	C 2	C 5	CL 11		F 5	FF 33	FF 43	FF 22
21	F 3	FF 12	FF 31	FF 41	F 4	L 3	HL 32	HL 22	H 2	HL 11	H 1		H 1	C 1	C 1	L 2	L 2	L 5	L 3	L 4	F 8	F 8	F 4	F 2
22	F 1	F 2	F 2	FF 41	F 3	C 1	C 1	C 3	C 2	H 1	H 1	H 1	H 1	H 1	HL 11	HL 12	HL 12	CL 23	L 2	CL 13	F 5	F 2	F 4	F 2
23	F 2	F 2	F 2	F 3	F 3	HL 12	LH 33	H 3	H 2	C 2	C 3	C 1	C 3	C 4	C 2	L 2	L 3	L 4	L 3	L 4	F 5	F 2		F 2
24	F 3	F 6	F 6	F 3	F 2	L 4	L 4	C 1	C 2	C 1	L 3	L 2	C 1	L 2	L 2		L 1	HL 11	H 1	CL 51	F 3	F 1	F 3	F 2
25	F 4	F 4	F 6	F 5	F 5	L 1	CL 41	C 4	C 2	C 3	C 2	C 1	C 1	C 1	C 2	C 1	H 1	C 4	C 2	C 2	F 5	F 4	F 3	F 3
26	FF 21	F 2	F 2	F 1			C 3	C 3	L 2		C 2	C 1	C 1	H 1	C 1	HL 11	HL 11	H 2	C 2	CL 31	FF 32	F 5	F 4	F 2
27	F 3	F 2	F 1	F 1			H 2	H 2	C 2	C 2	C 4	L 3	L 2	L 2	L 3	L 3	L 6	L 4	L 5	L 3	F 6	F 6	F 2	FF 33
28	FF 21	F 4	F 3	F 5	F 5	L 4	L 4	C 3	C 2	C 4	H 1	H 2	H 1	H 1	H 1	H 1	H 2	C 2	C 3	C 6	F 7	F 8	FF 22	F 4
29			F 1			C 1	C 2	C 3	C 2	L 2	C 1	C 1	L 1	C 1	L 2	LH 21	LH 21	HL 13	LC 21	C 2	FF 31	FF 21	FF 21	FF 23
30	FF 13	F 2	F 3	F 3	F 3	L 3	C 3	C 4	C 4	C 3	C 3	C 1	C 2	C 3	L 2	L 2	L 2	L 2	L 2	L 2	F 2	F 2	F 2	F 3
31	F 3	F 1	F 4	F 2	F 2	C 1	H 1	C 2	C 6	C 4	C 3	C 2	C 2	C 2	L 3	L 2	L 3	L 5	L 3	L 4	F 3	F 2	F 2	FF 23
	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																								

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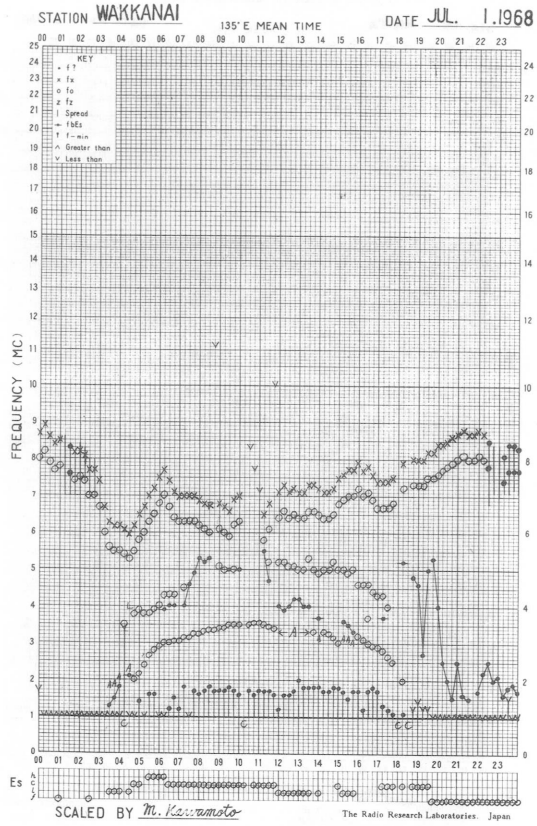
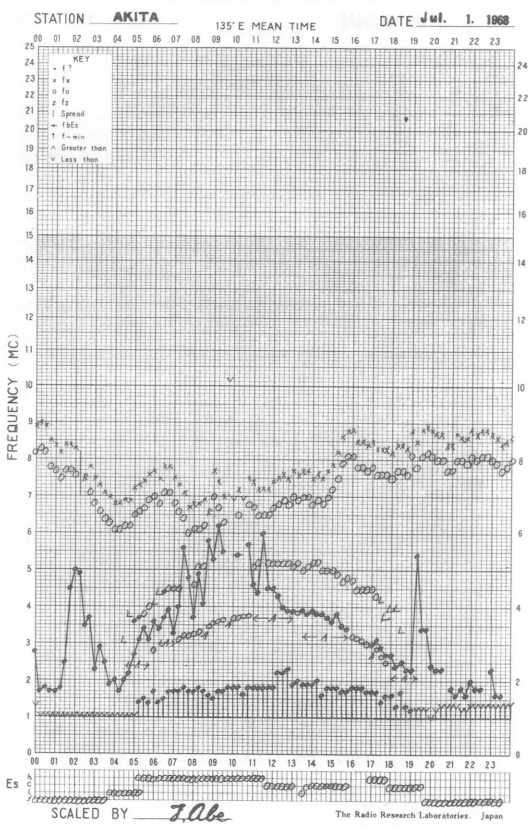
f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135° E MEAN TIME DATE JUL. 1.1968



f-PLOT OF IONOSPHERIC DATA

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



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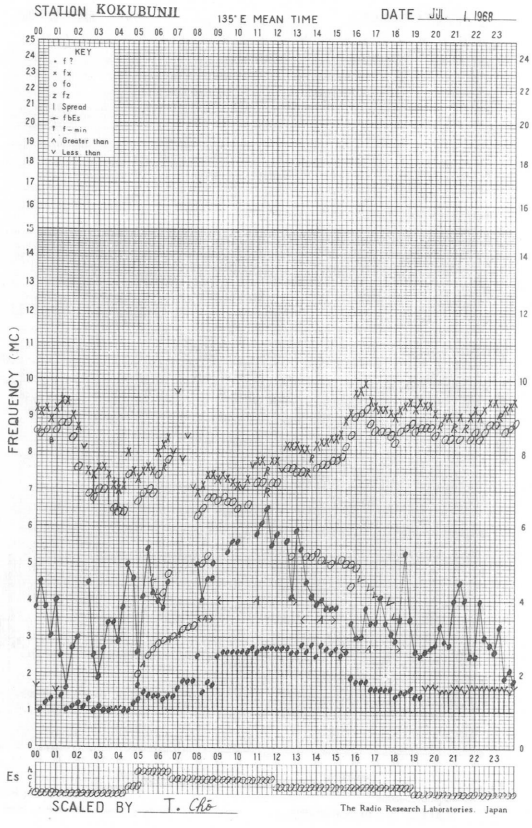

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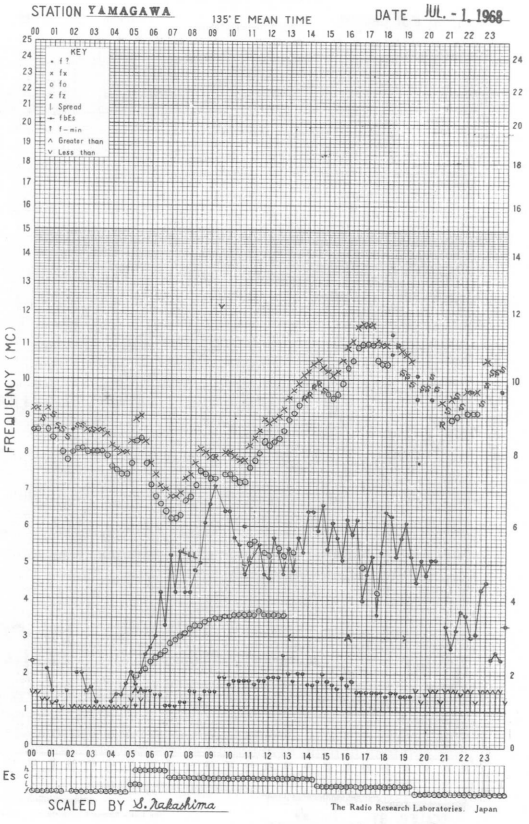
STATION YAMAGAWA 135° E MEAN TIME DATE JUL. - 1. 1968



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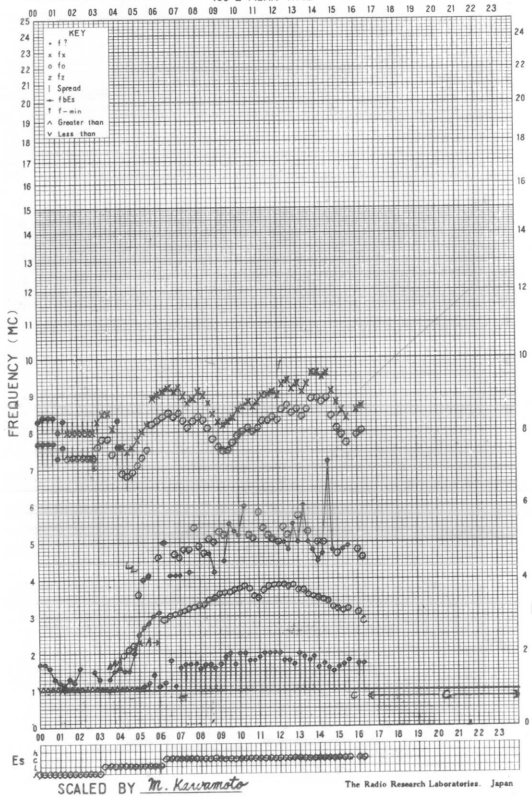

SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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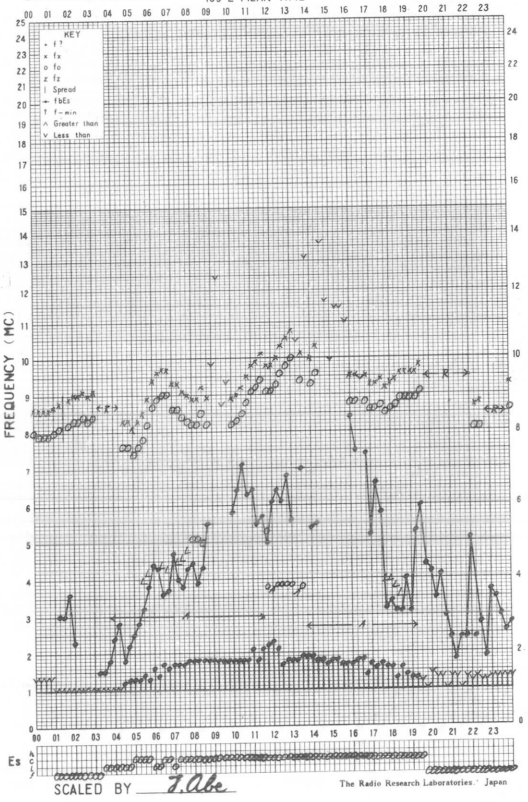

SCALED BY J. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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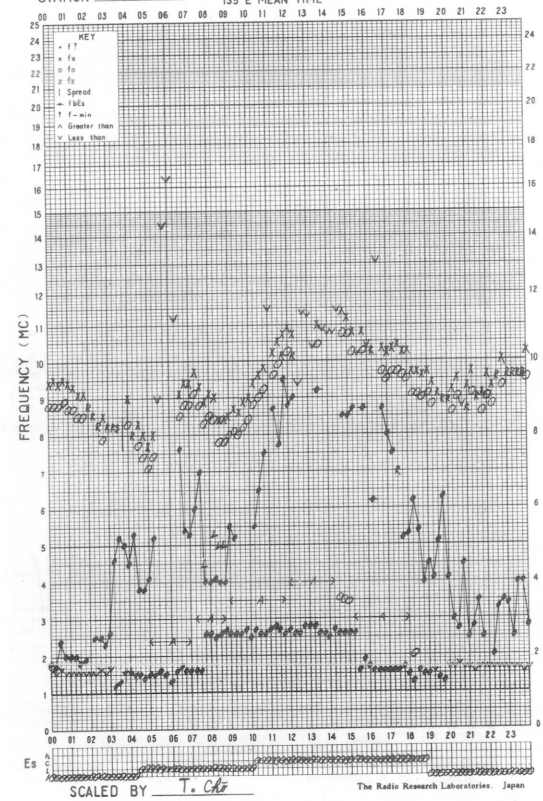
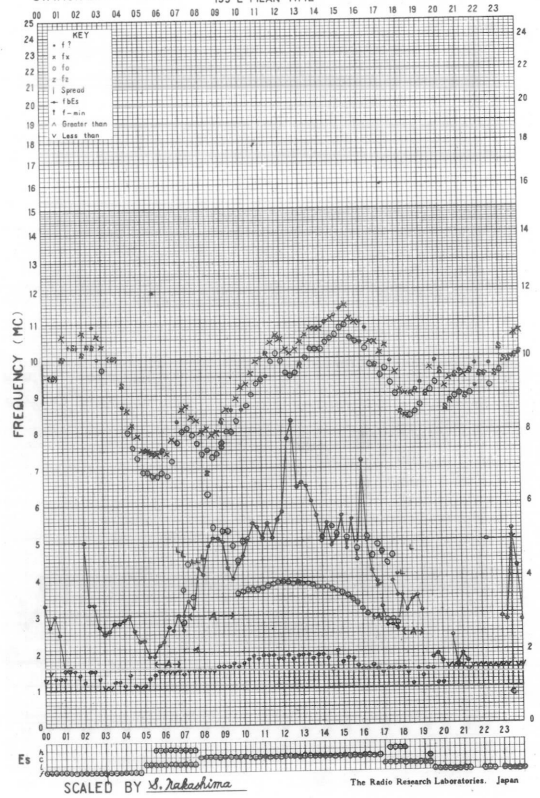


SCALED BY T. Ohto

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE JUL. 2 1968

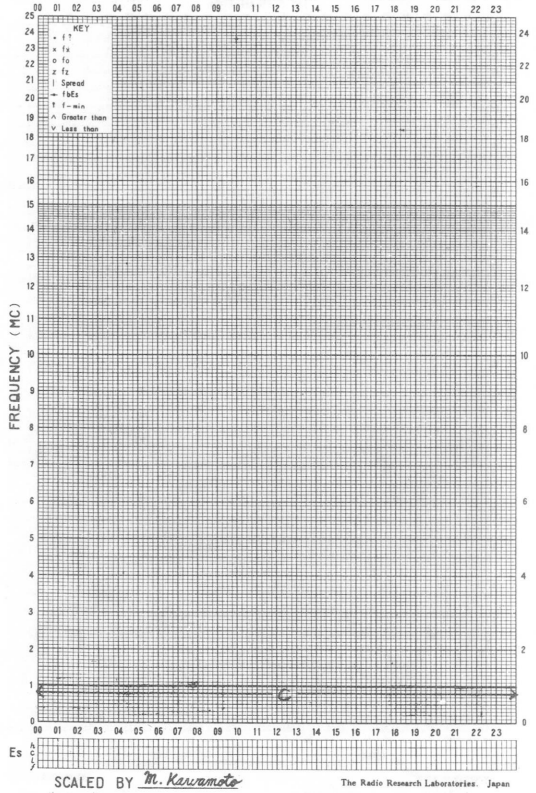


SCALED BY S. Takashima

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JUL. 3.1968



SCALED BY M. Kawamoto The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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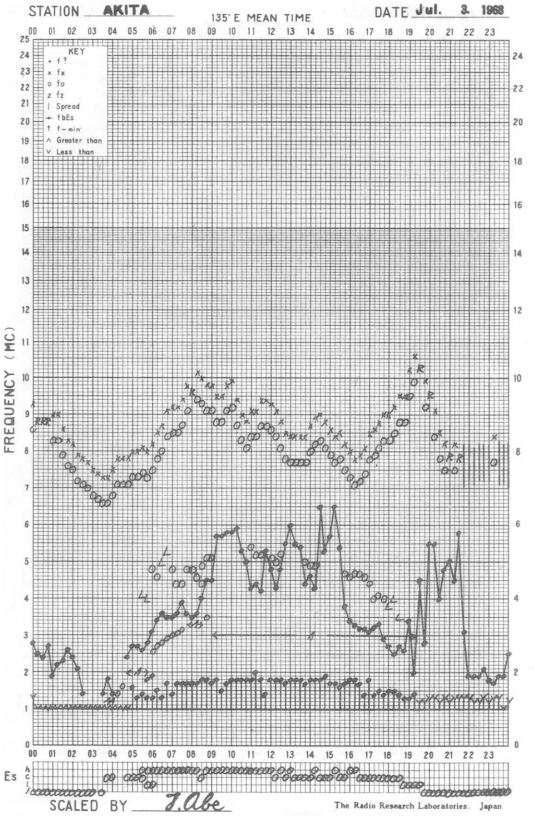
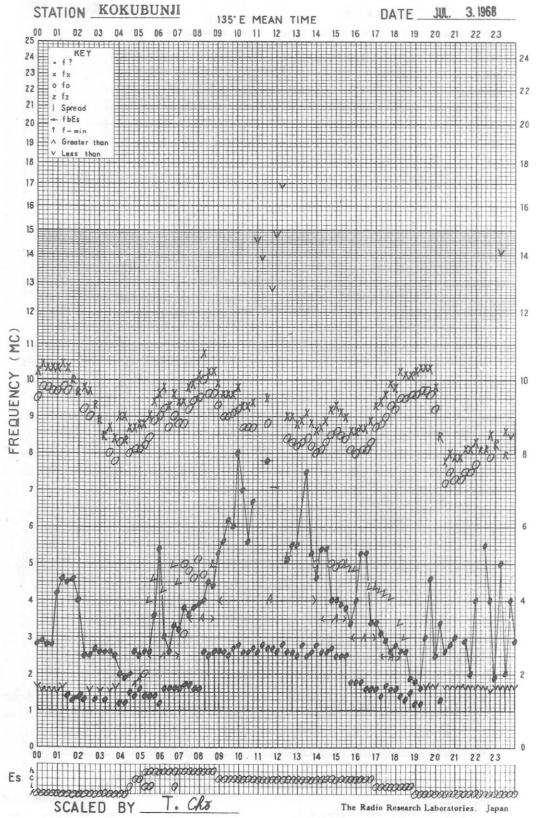


SCALED BY T. Abe The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JUL. 3.1968



SCALED BY T. Ohs The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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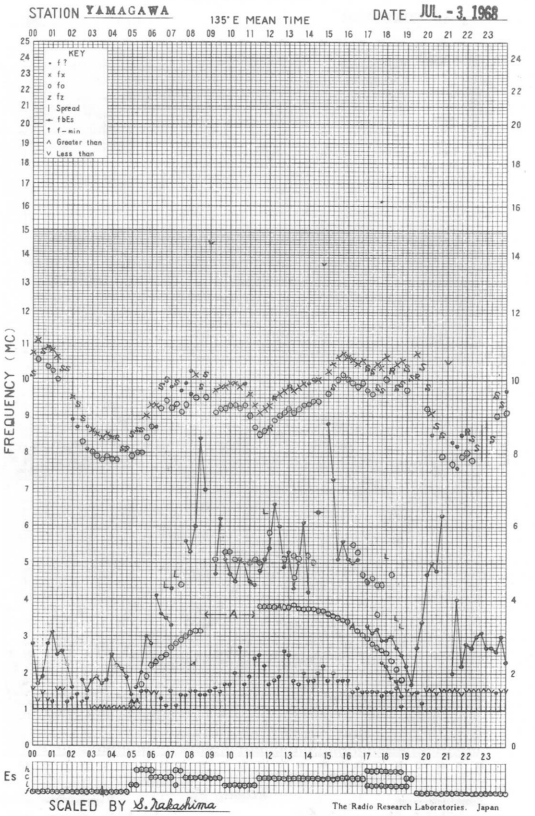
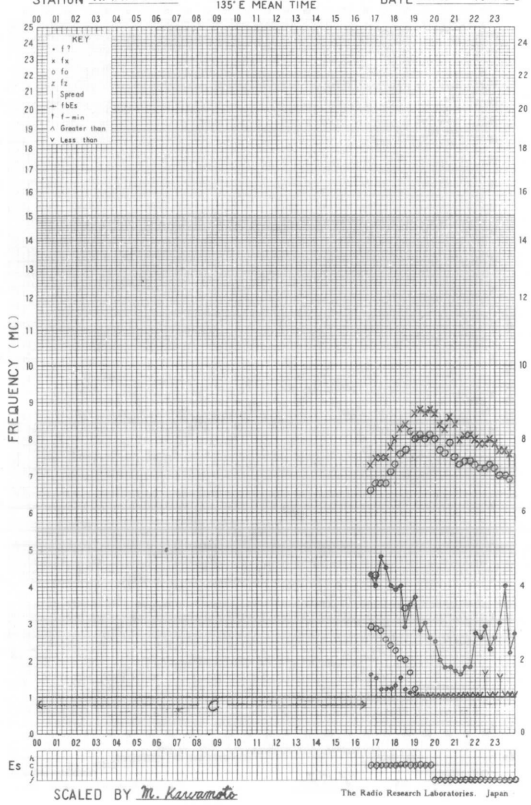


SCALED BY S. Takashima The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JUL. 4.1968



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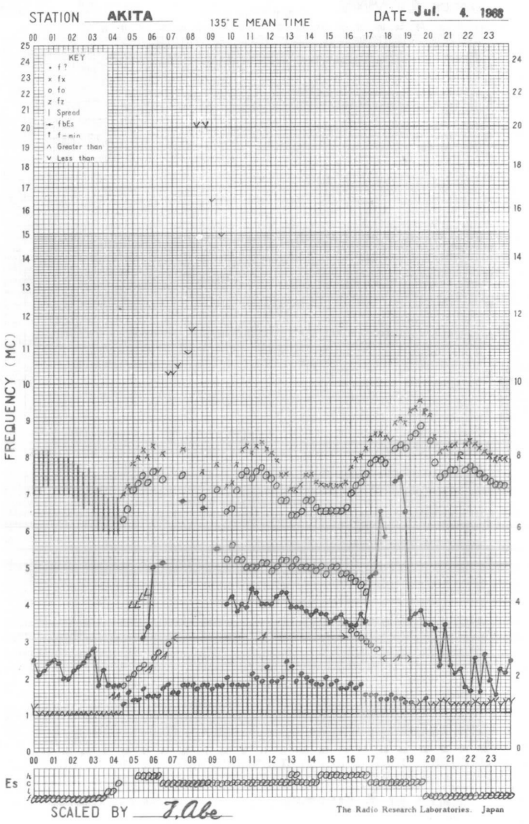

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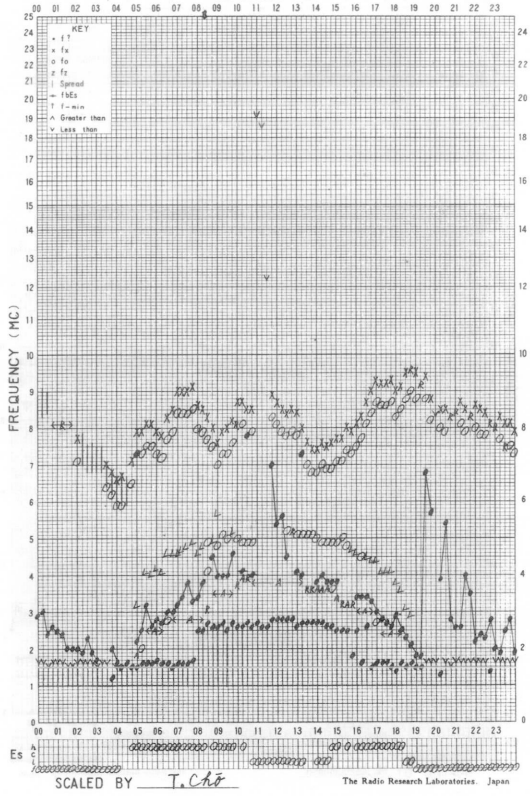
STATION KOKUBUNJI 135°E MEAN TIME DATE JUL. 4 1968



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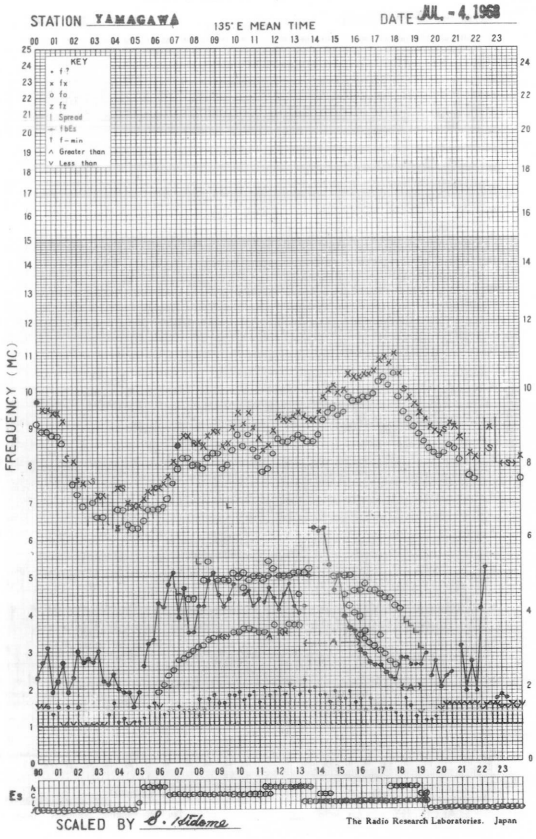

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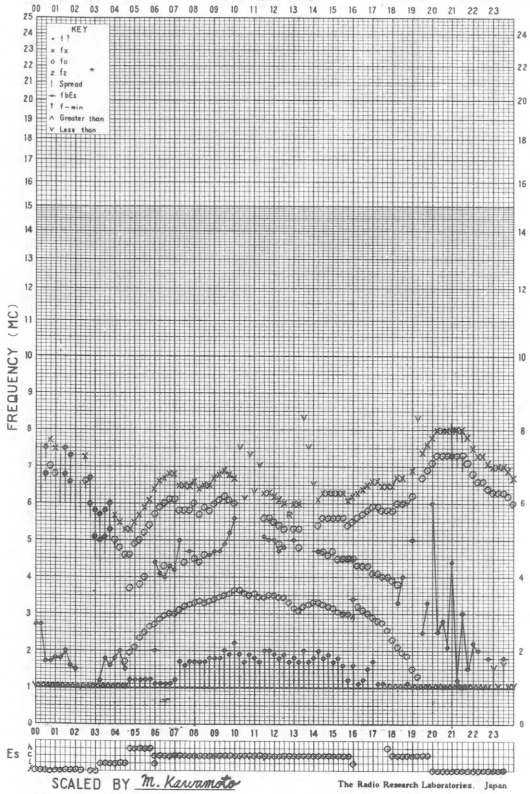

SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

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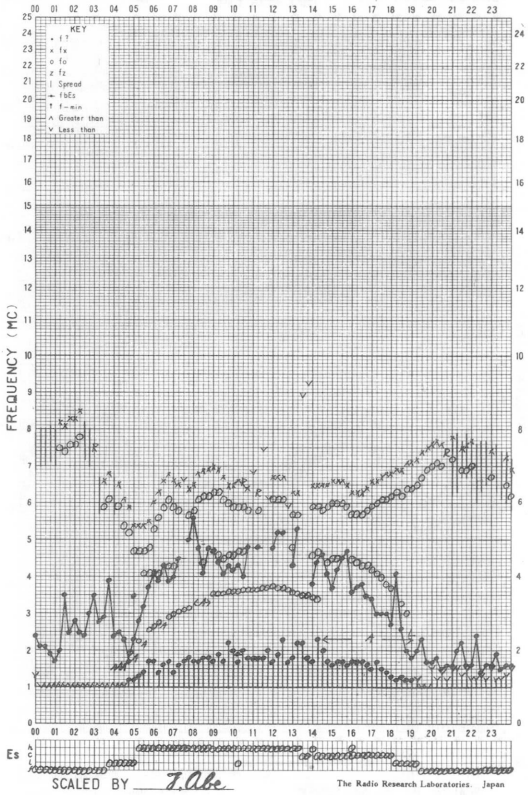

SCALED BY T. Abe

The Radio Research Laboratories. Japan

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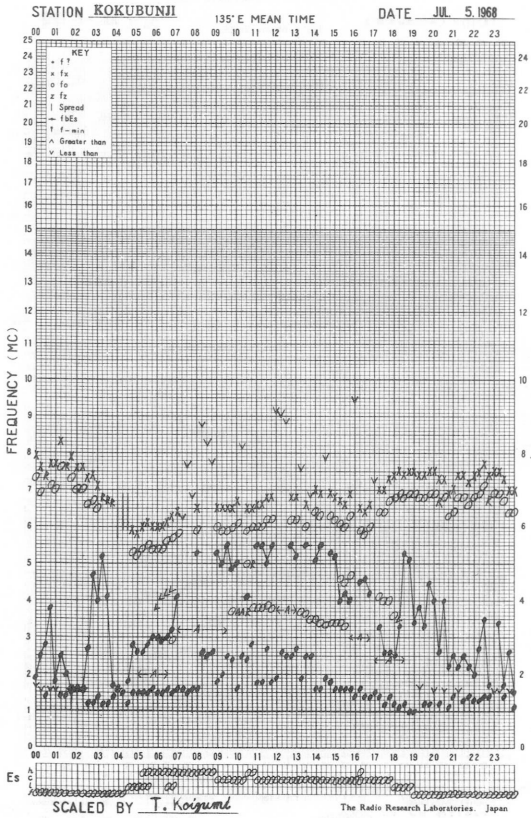

SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

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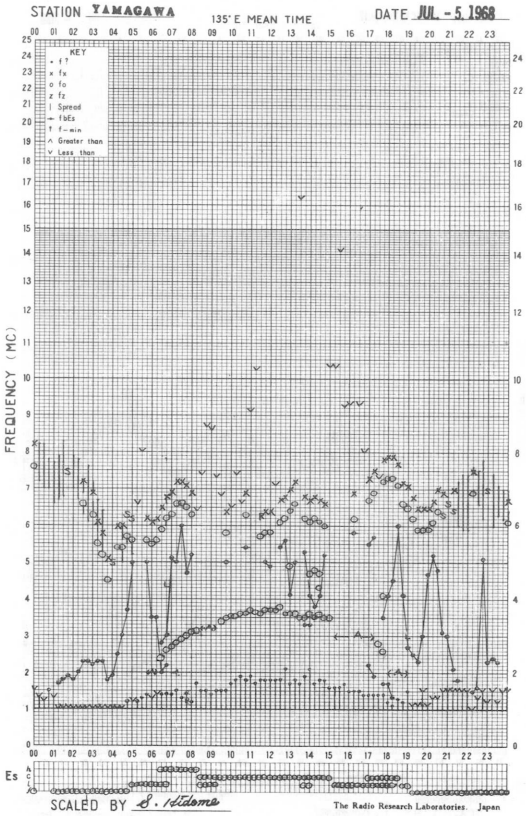

SCALED BY S. Uchioma

The Radio Research Laboratories. Japan

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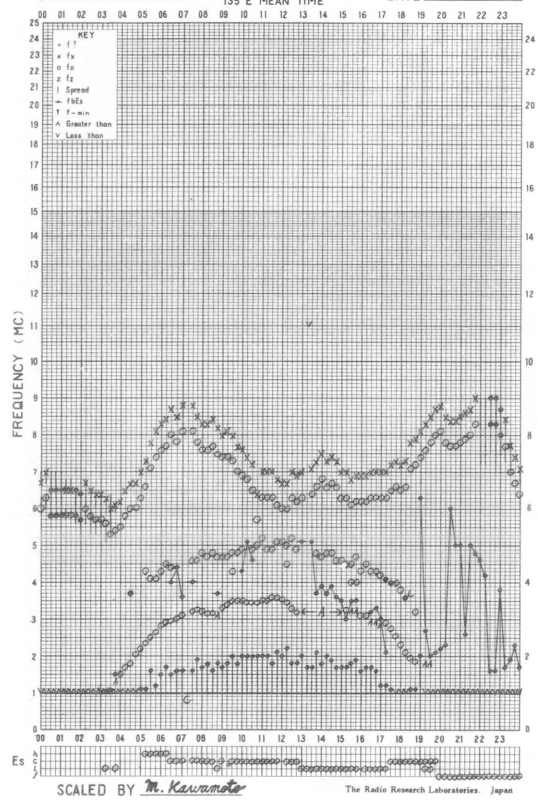

SCALED BY M. Kawamoto The Radio Research Laboratories. Japan

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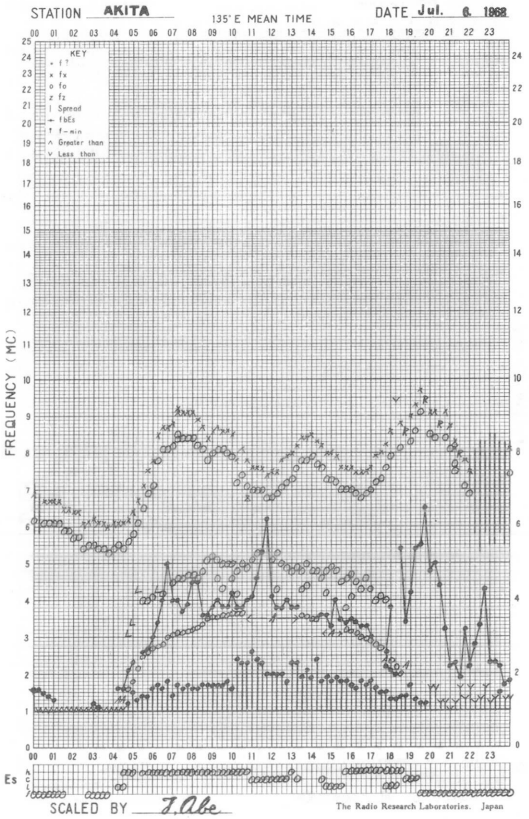

SCALED BY T. Abe The Radio Research Laboratories. Japan

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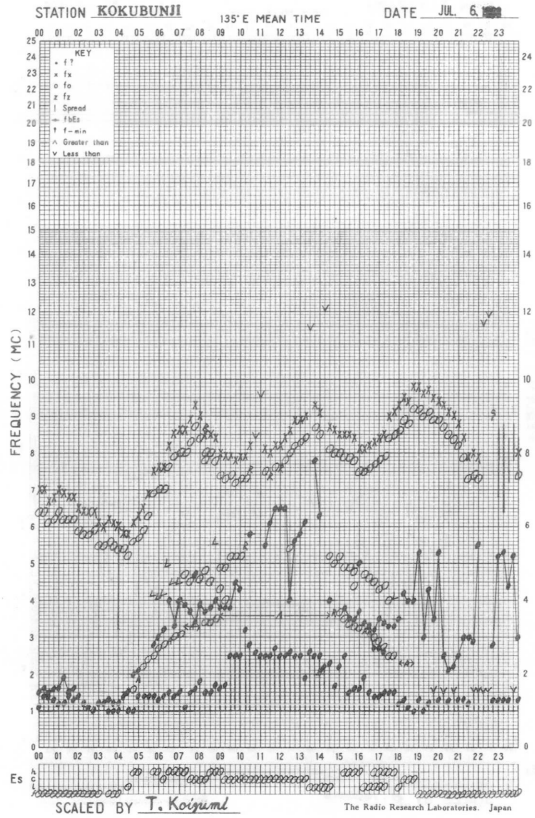

SCALED BY T. Koizumi The Radio Research Laboratories. Japan

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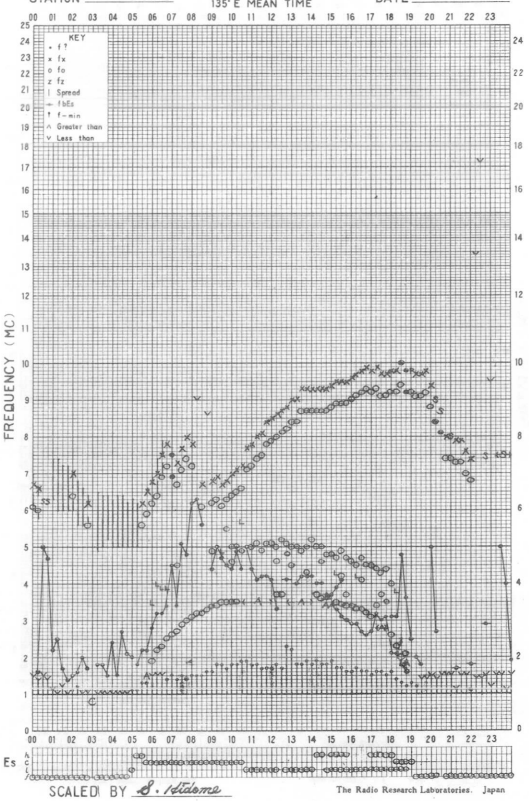

SCALED BY S. Ishiloma The Radio Research Laboratories. Japan

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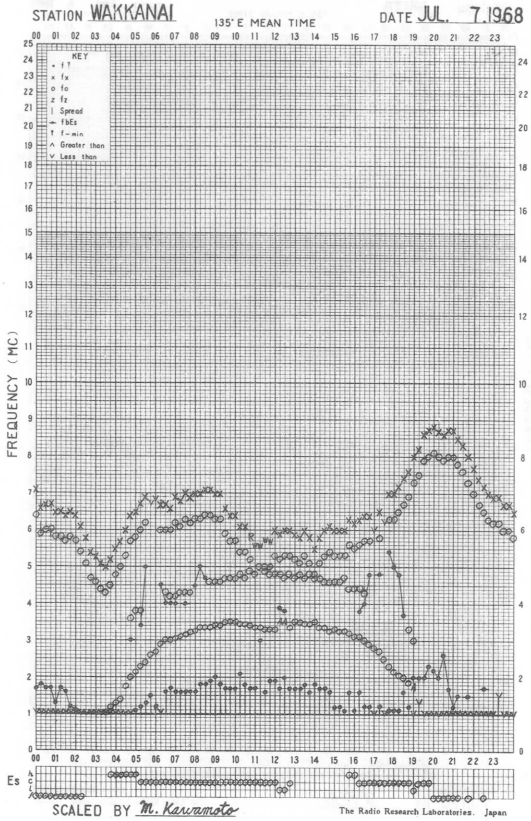

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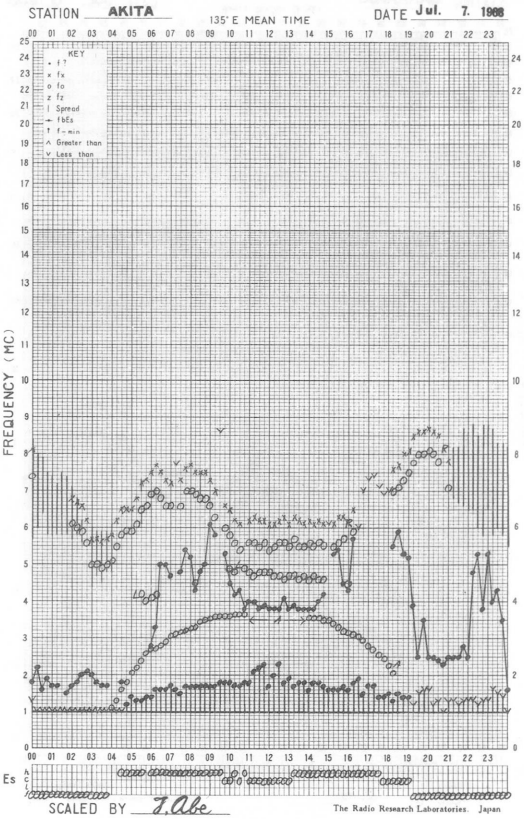

SCALED BY T. Abe The Radio Research Laboratories. Japan

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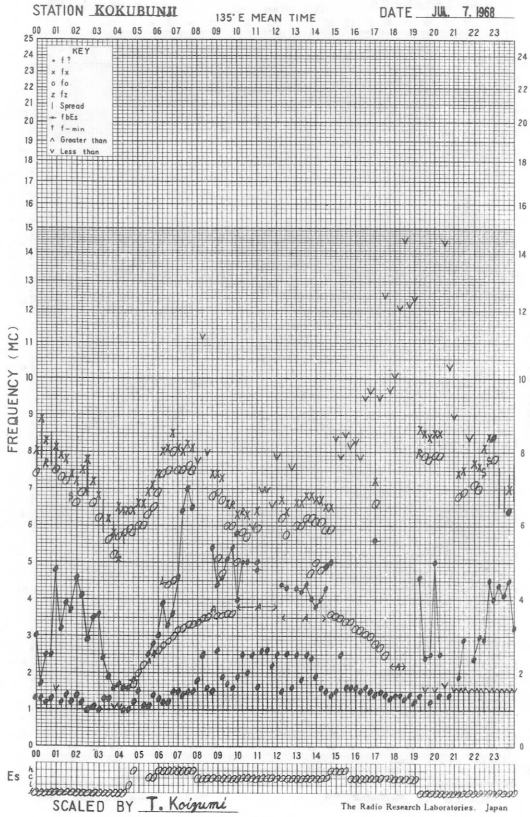

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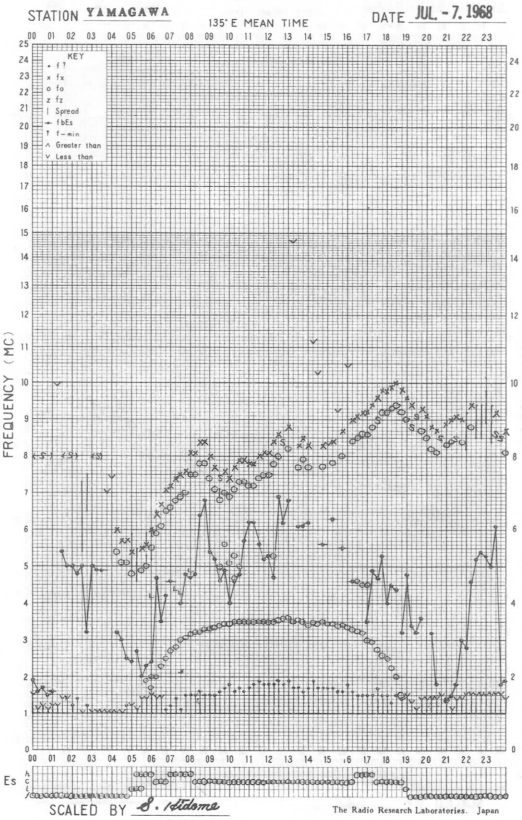

SCALED BY S. Akiyama The Radio Research Laboratories. Japan

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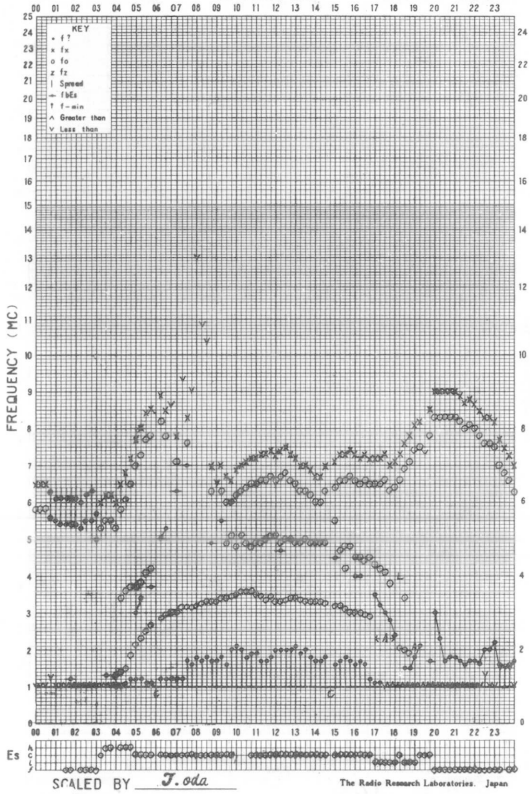

SCALED BY T. Oda

The Radio Research Laboratories. Japan

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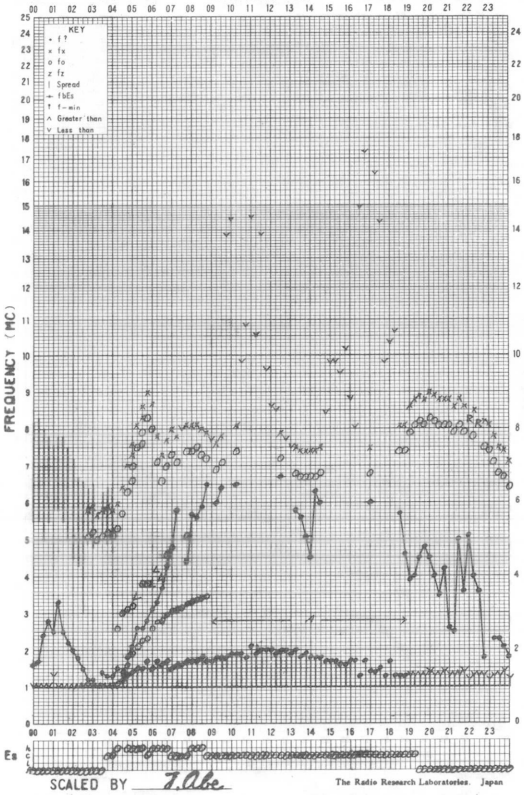

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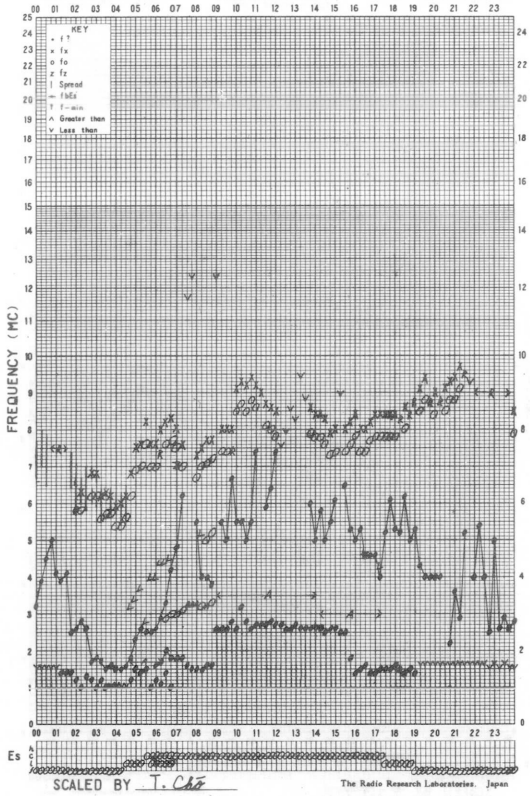

SCALED BY T. Chō

The Radio Research Laboratories. Japan

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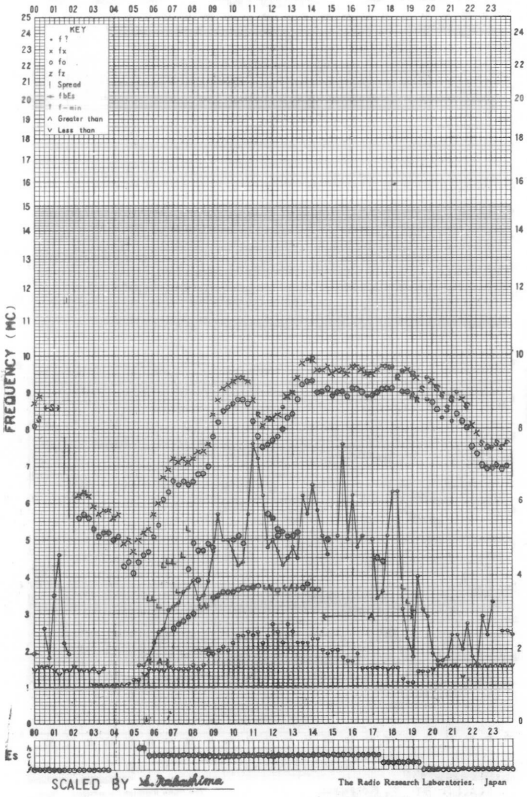

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The Radio Research Laboratories. Japan

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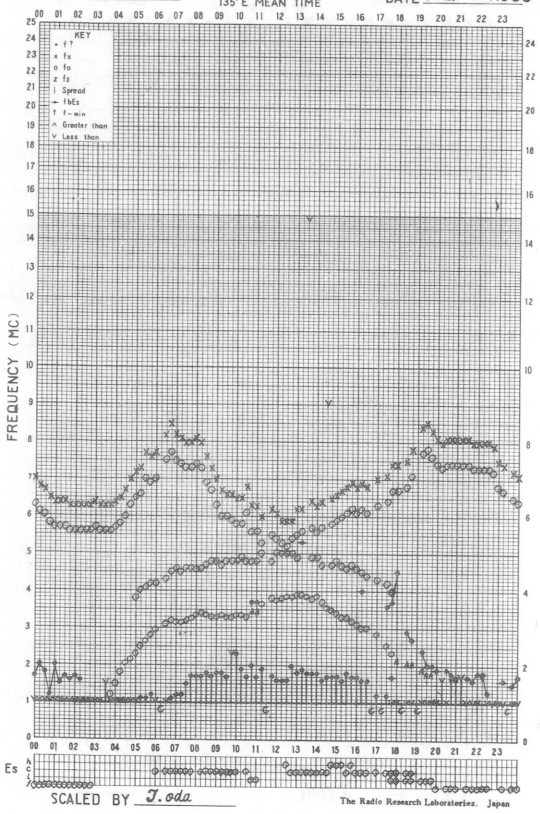

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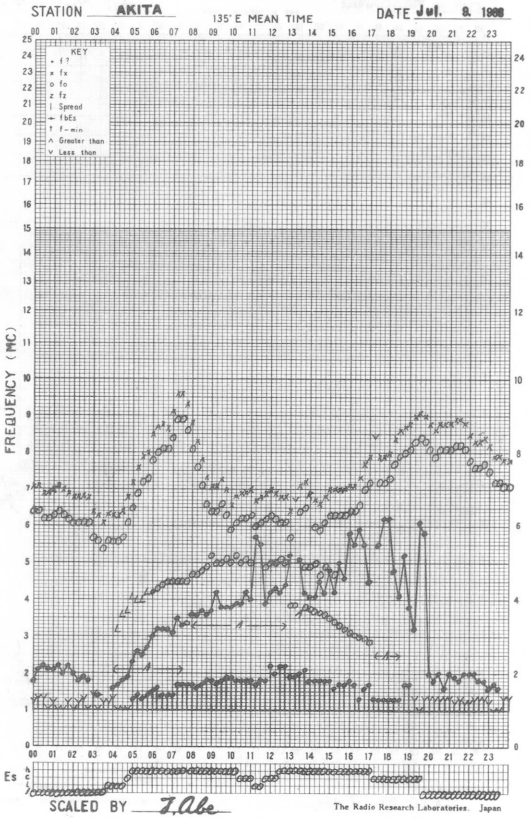

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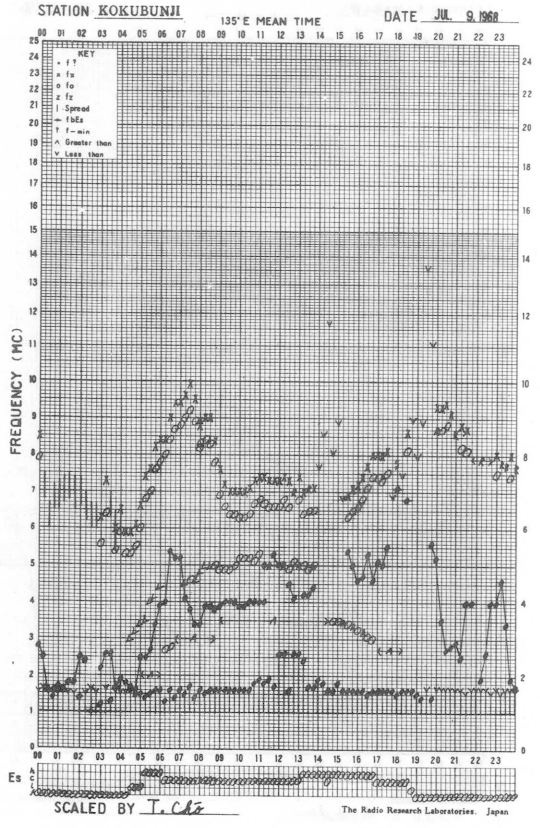

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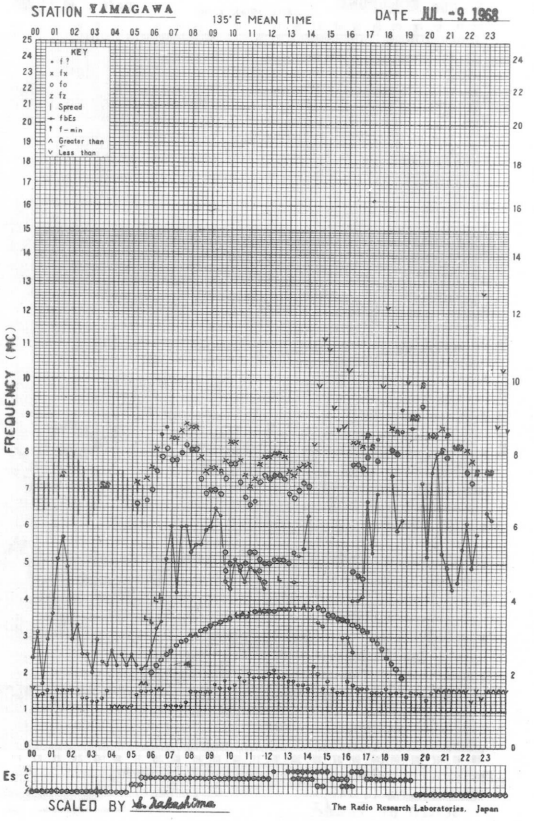

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The Radio Research Laboratories, Japan

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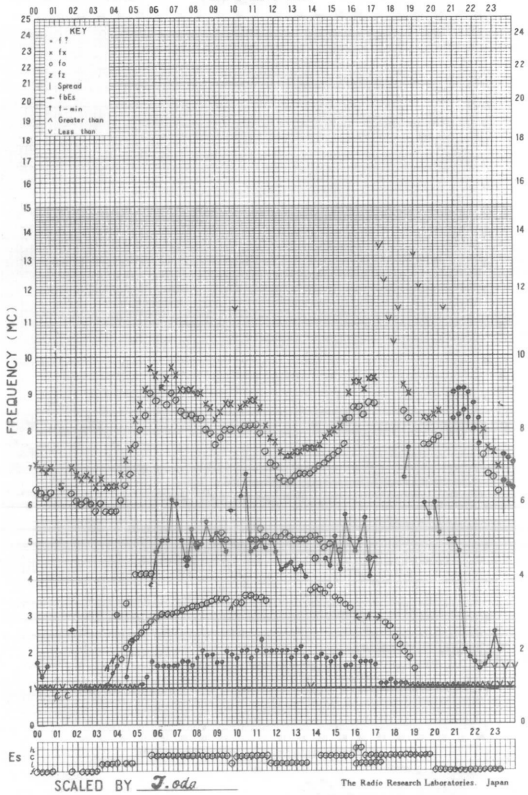

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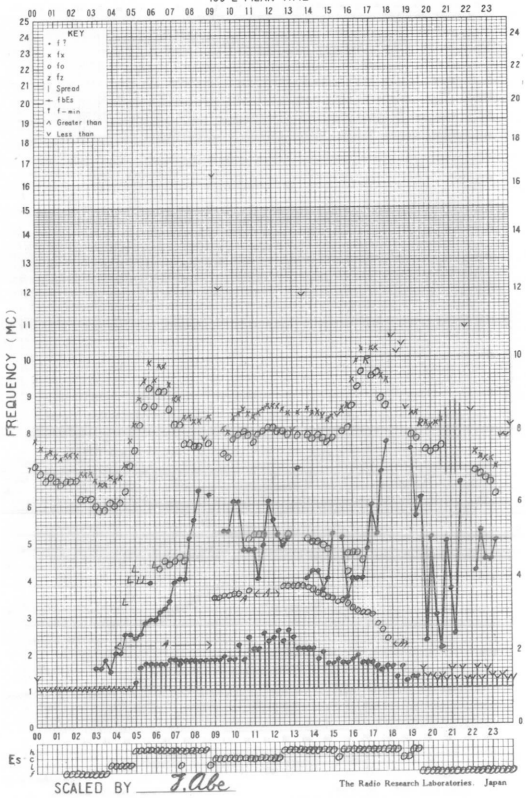

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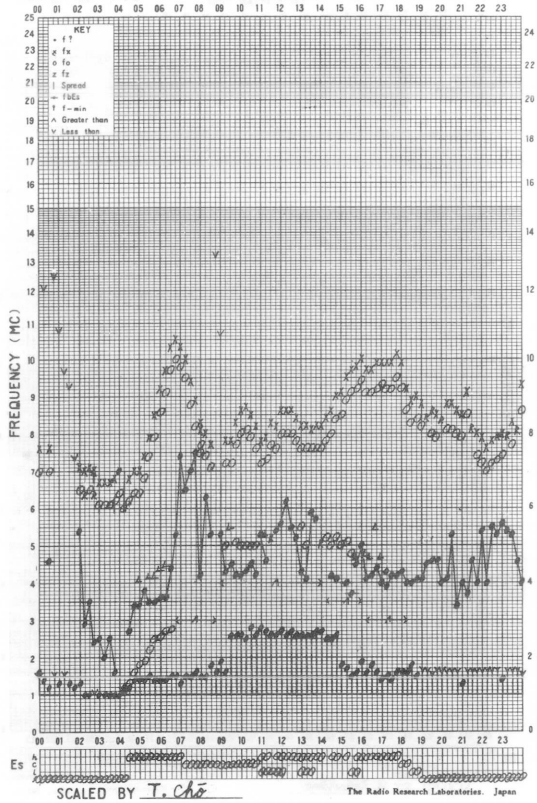

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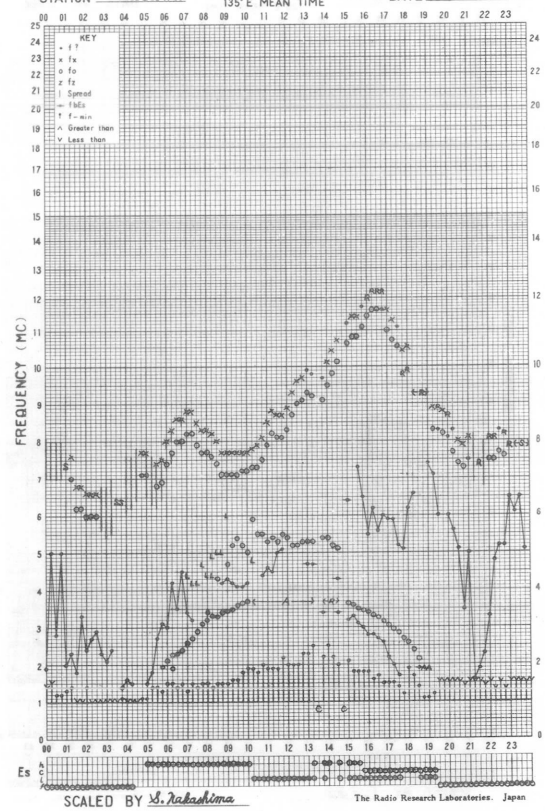

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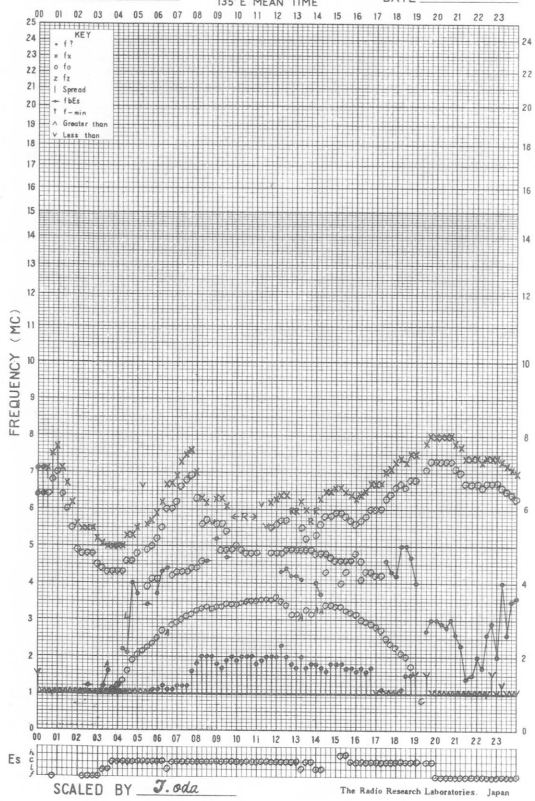

SCALED BY J. oda

The Radio Research Laboratories. Japan

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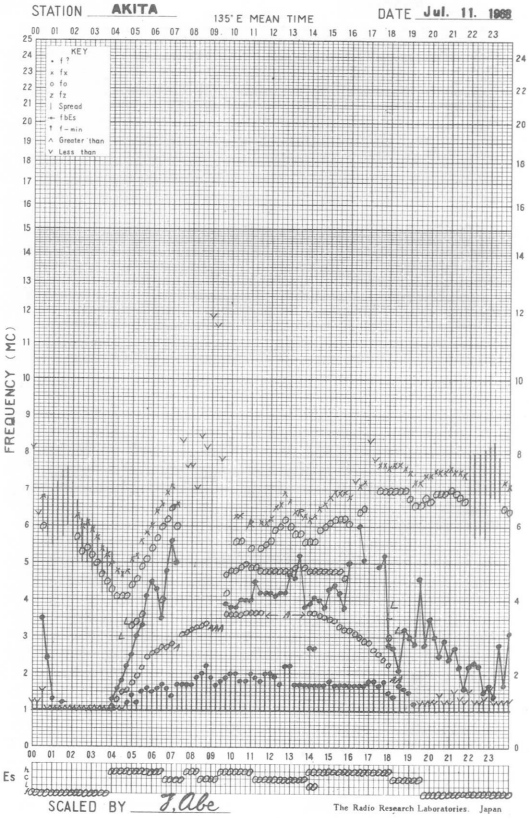

SCALED BY J. Abe

The Radio Research Laboratories. Japan

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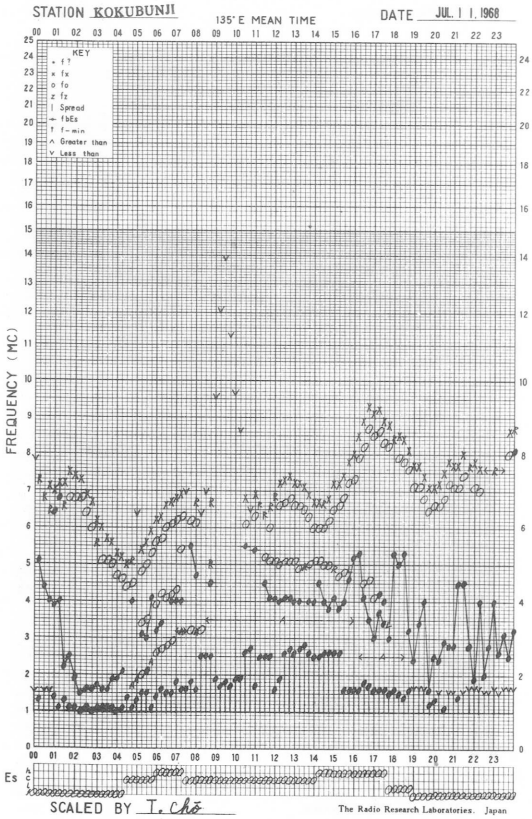

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The Radio Research Laboratories. Japan

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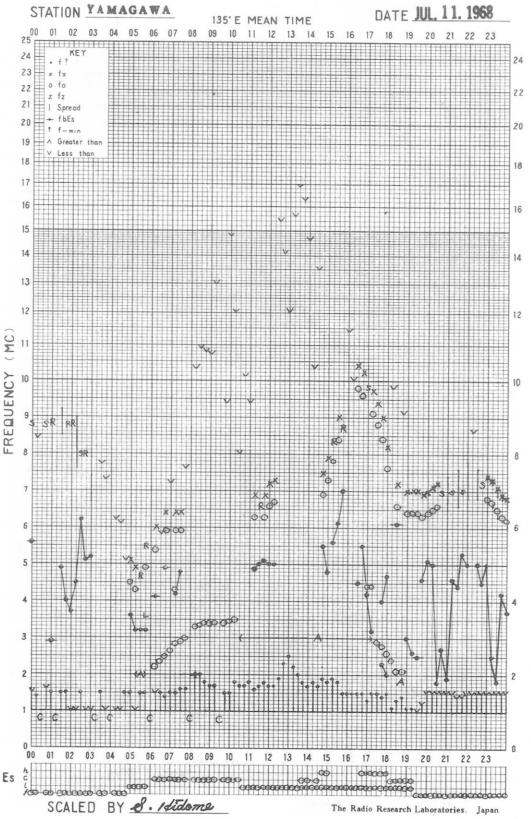

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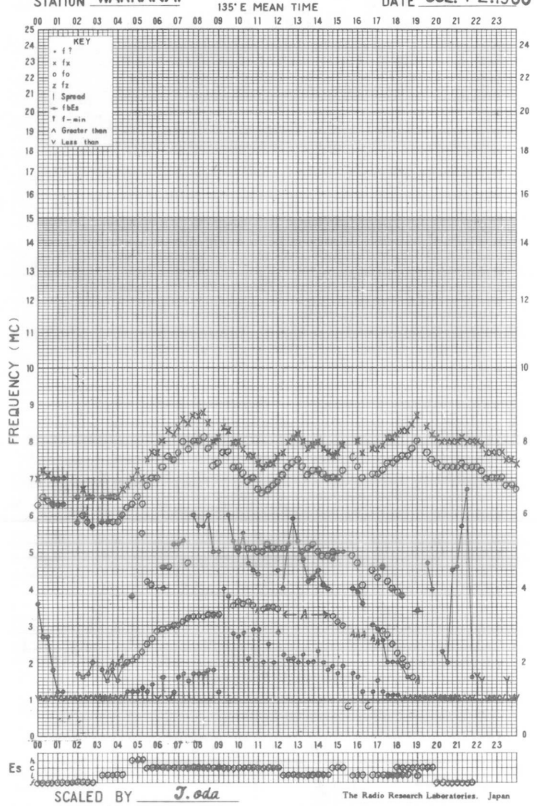

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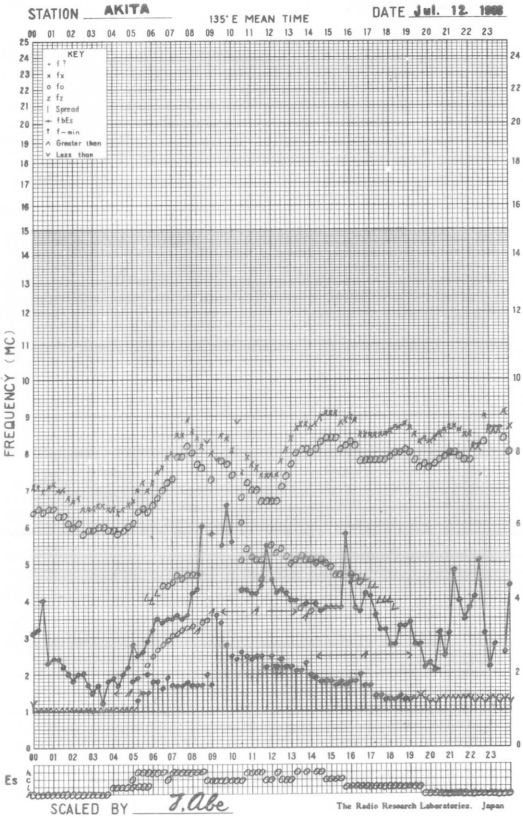

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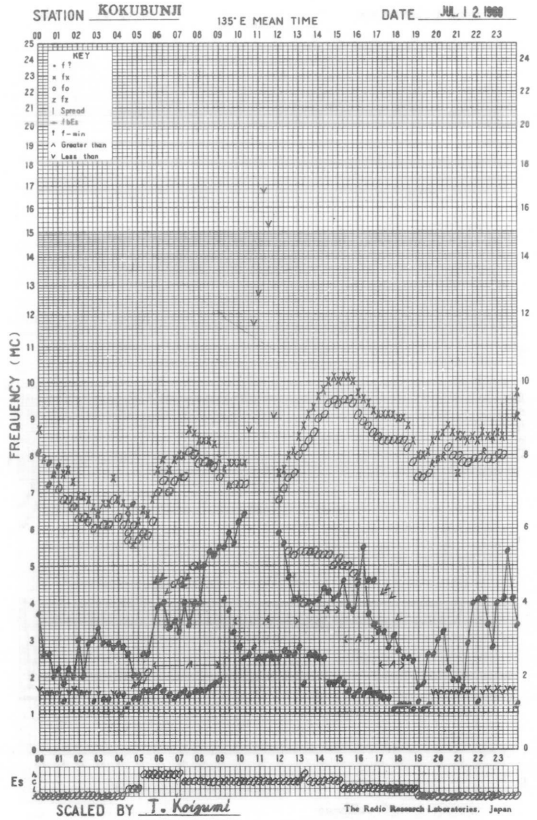

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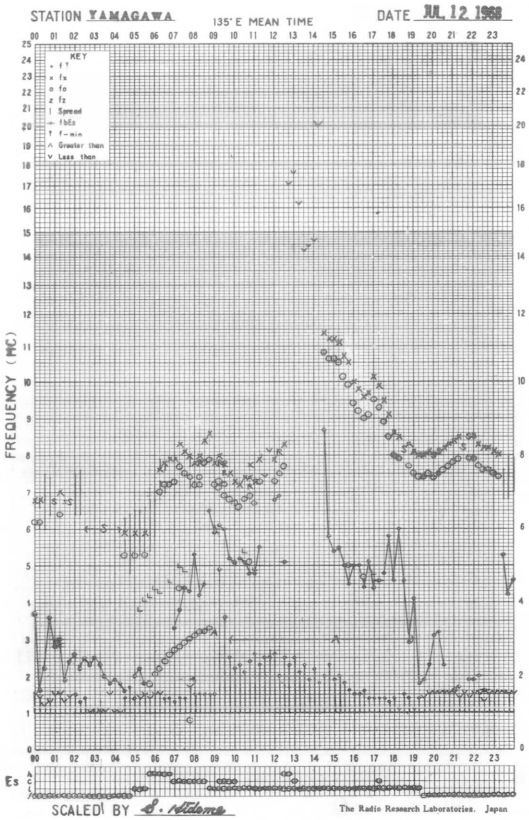

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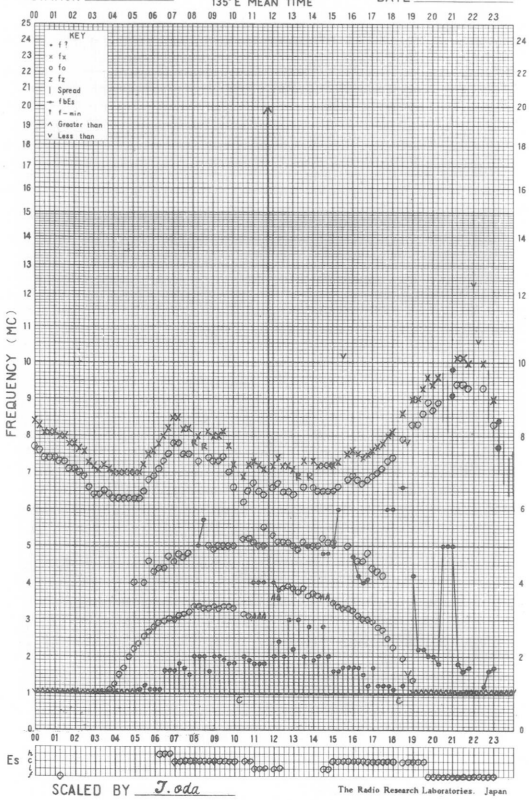

SCALED BY T. Oda

The Radio Research Laboratories. Japan

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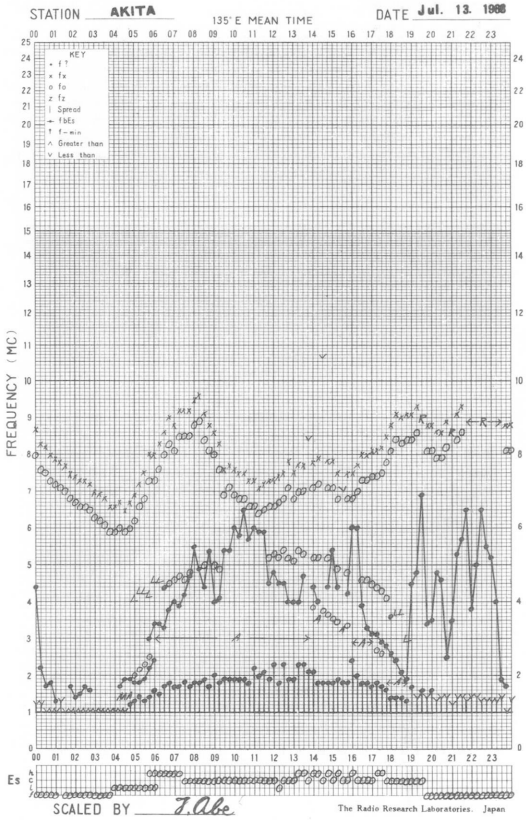

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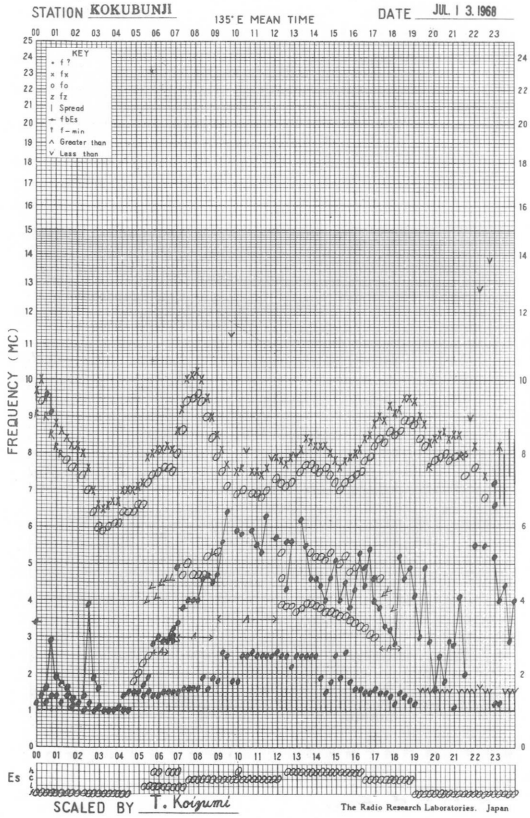

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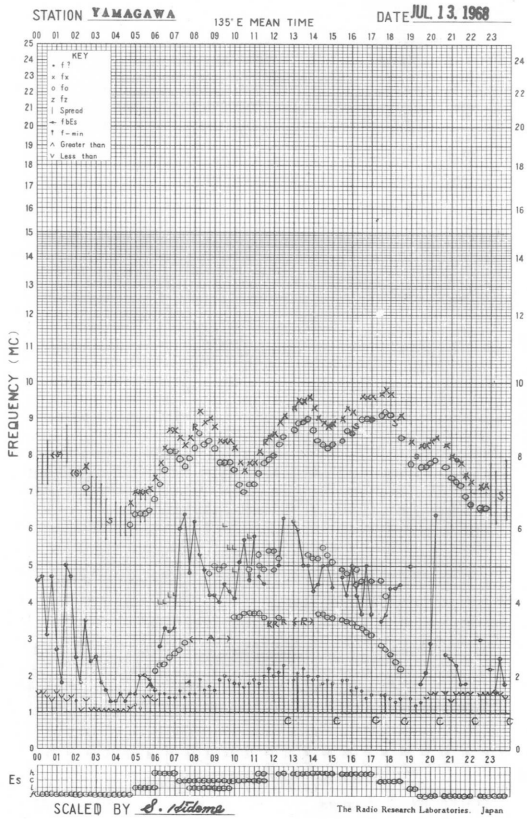

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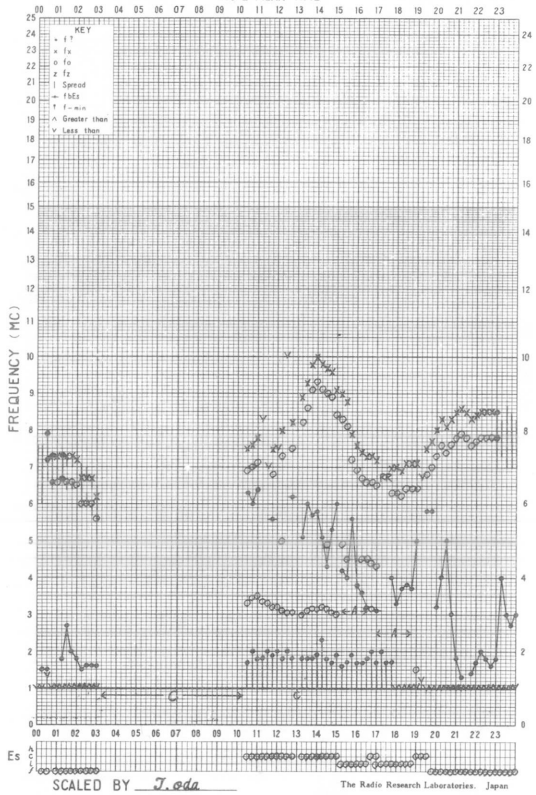

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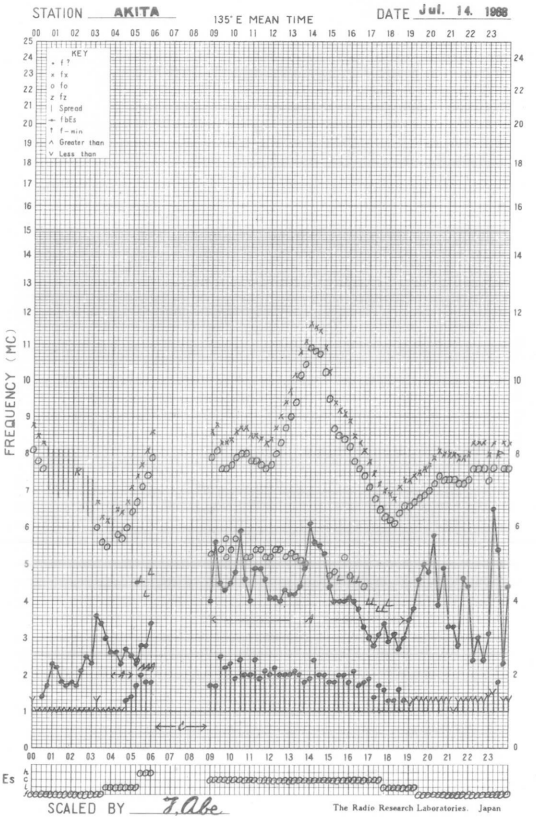

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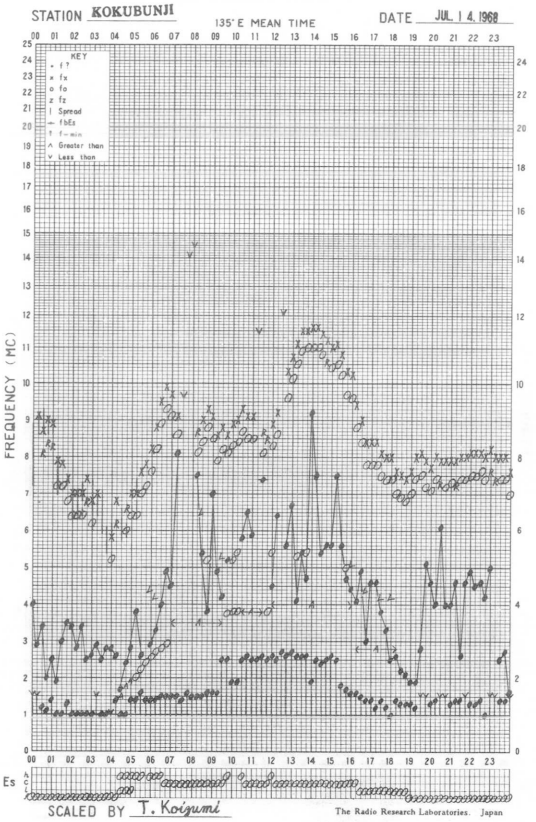

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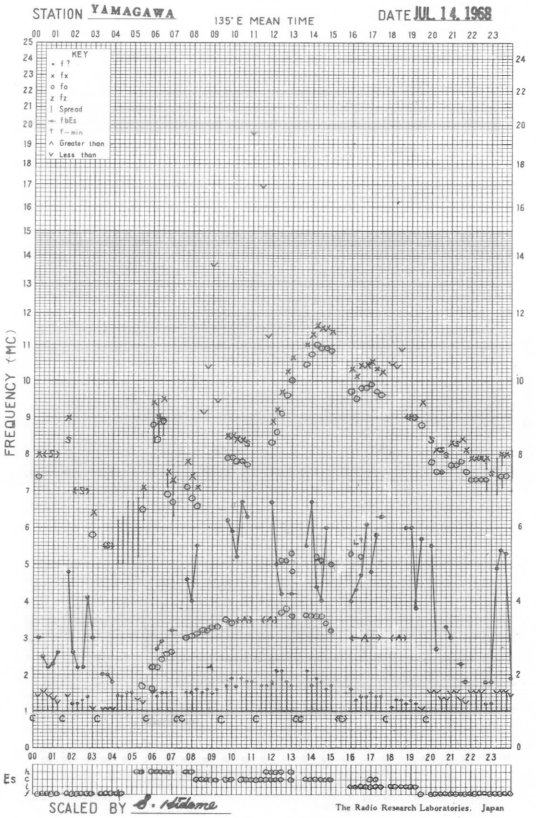

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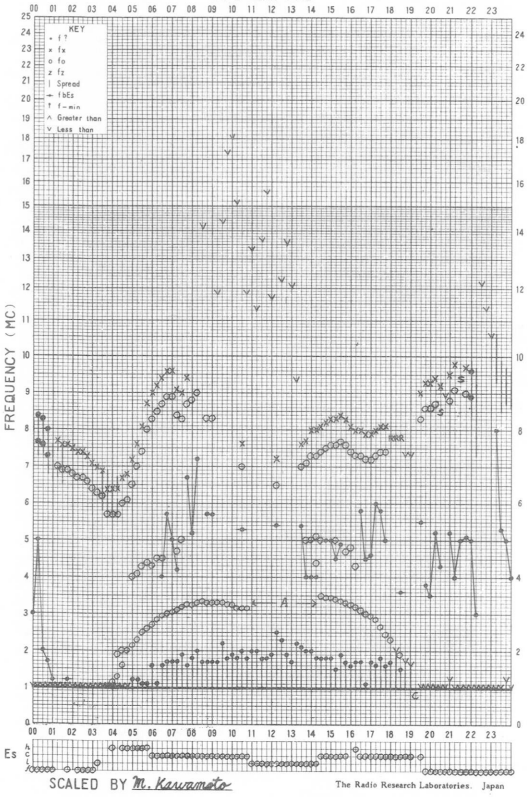

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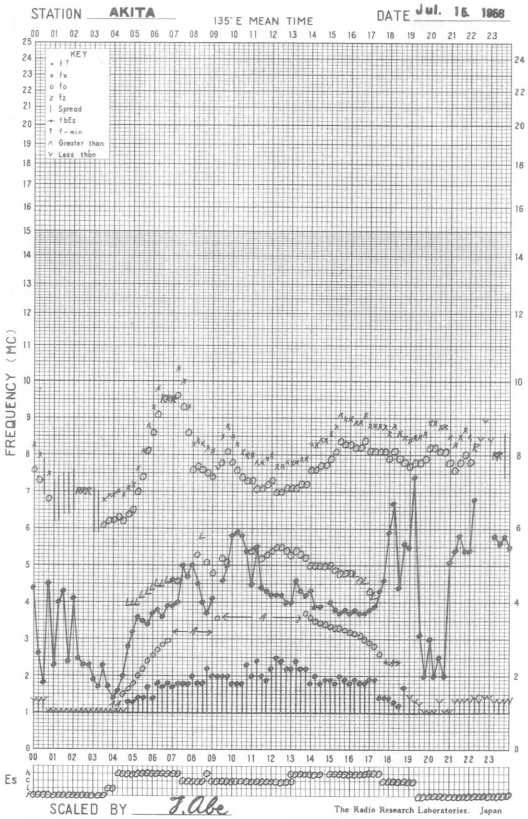

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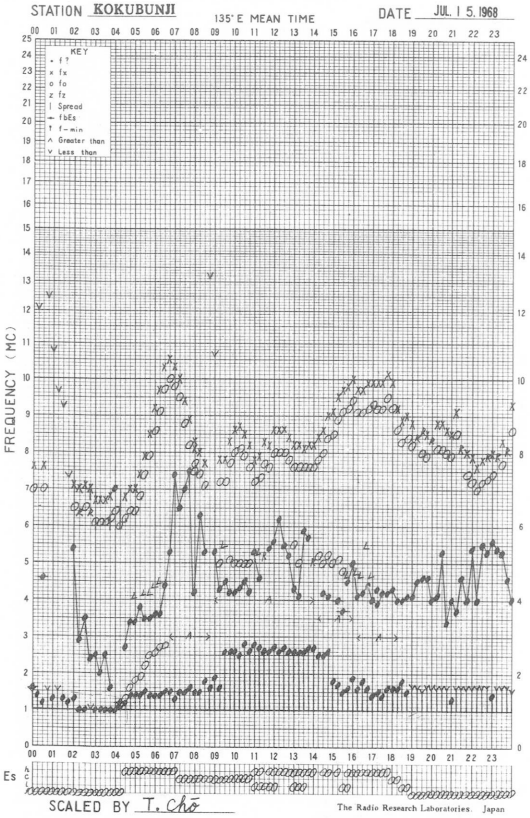

SCALED BY T. Chō

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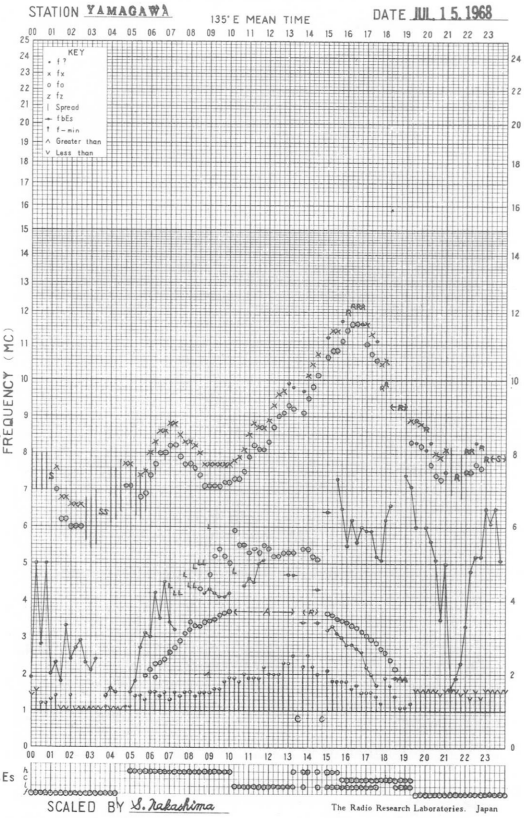
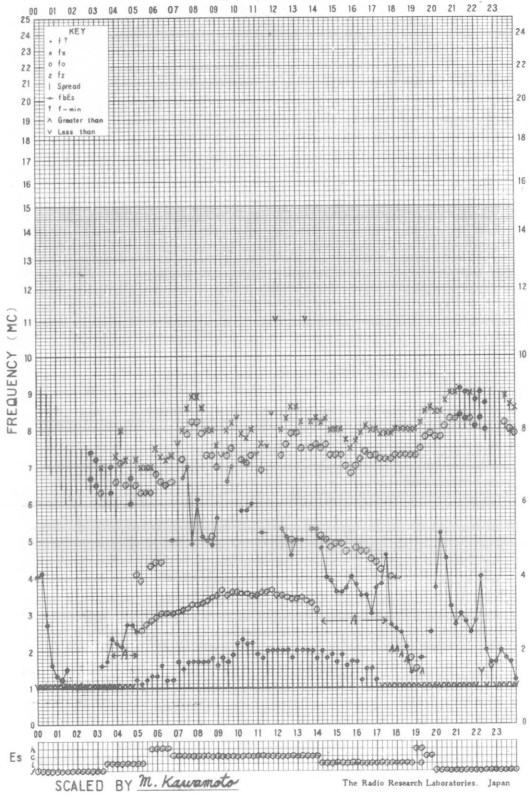


SCALED BY S. Nakashima

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JUL. 16.1968



SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

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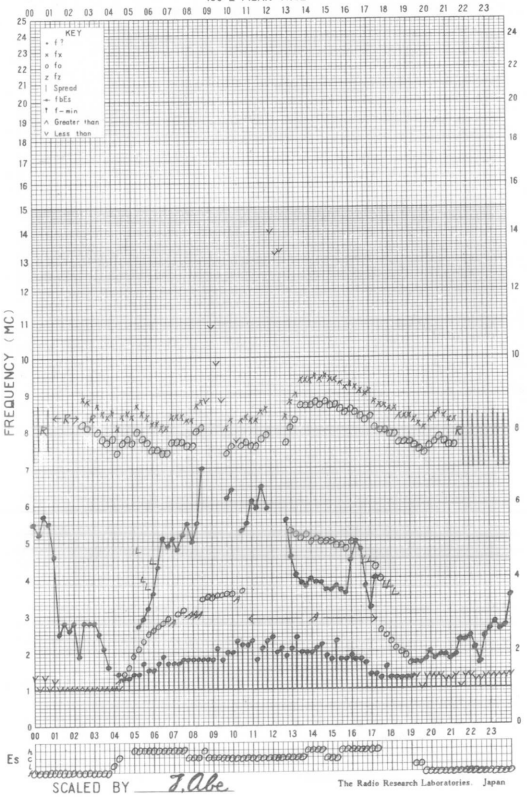

SCALED BY T. Abe

The Radio Research Laboratories. Japan

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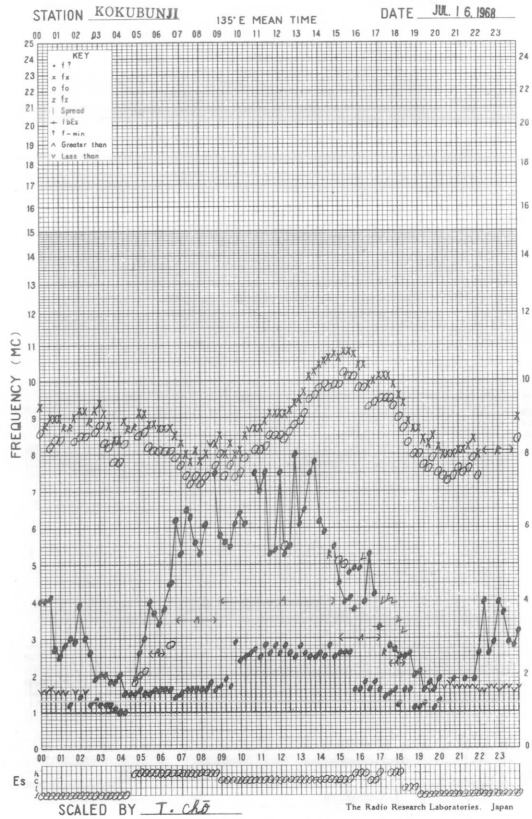

SCALED BY T. Chō

The Radio Research Laboratories. Japan

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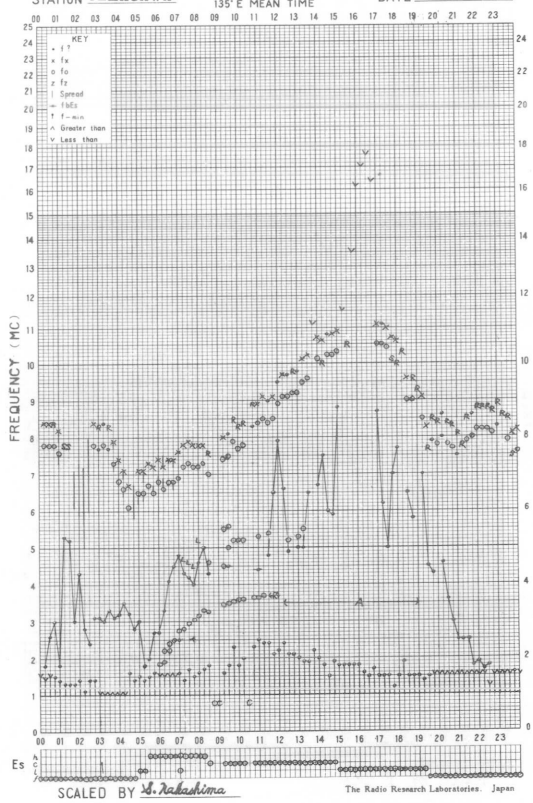

SCALED BY S. Nakashima

The Radio Research Laboratories. Japan

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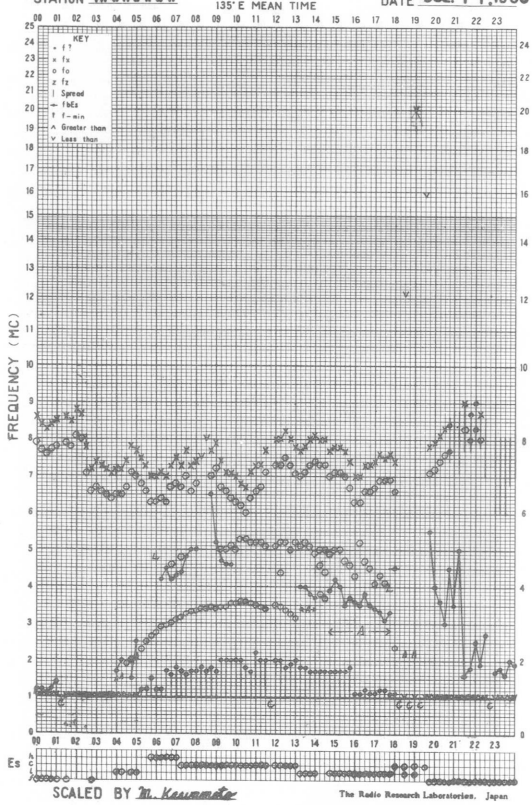

SCALED BY M. Kawamata

The Radio Research Laboratories, Japan

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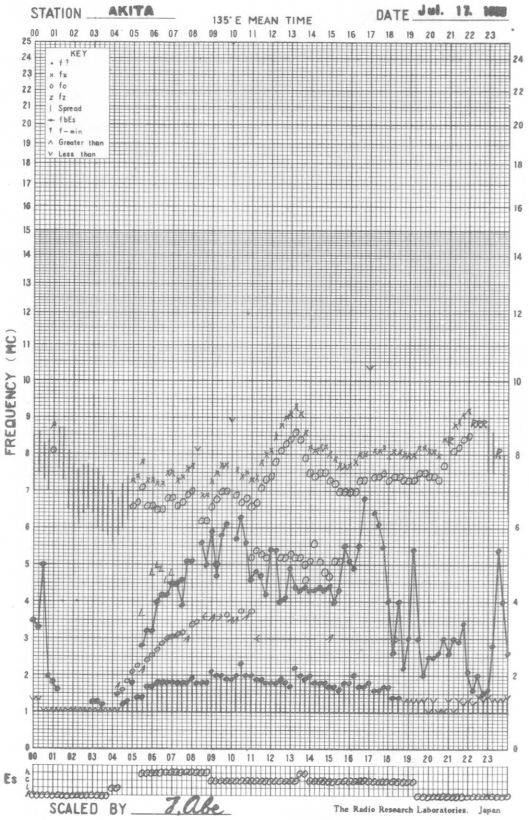

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The Radio Research Laboratories, Japan

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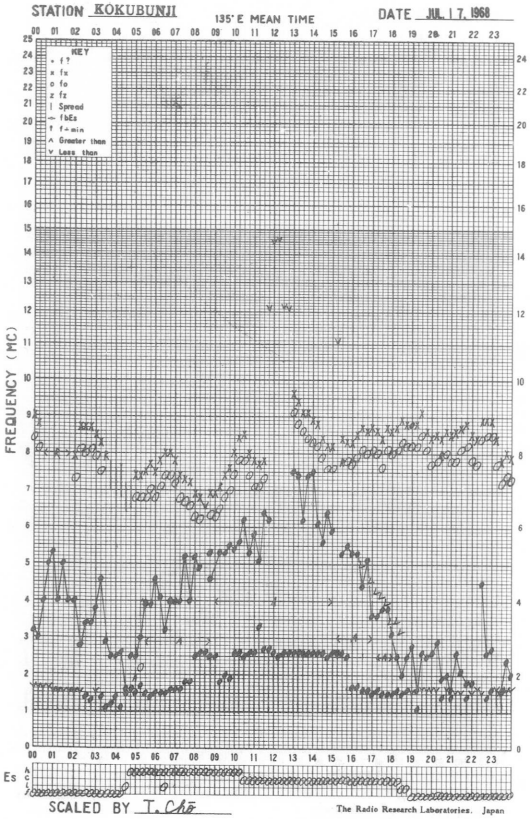

SCALED BY T. Chō

The Radio Research Laboratories, Japan

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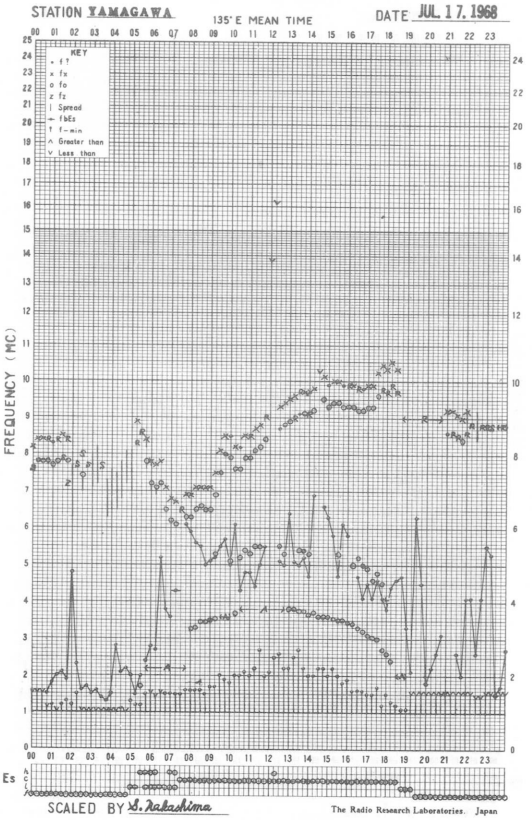

SCALED BY S. Takashima

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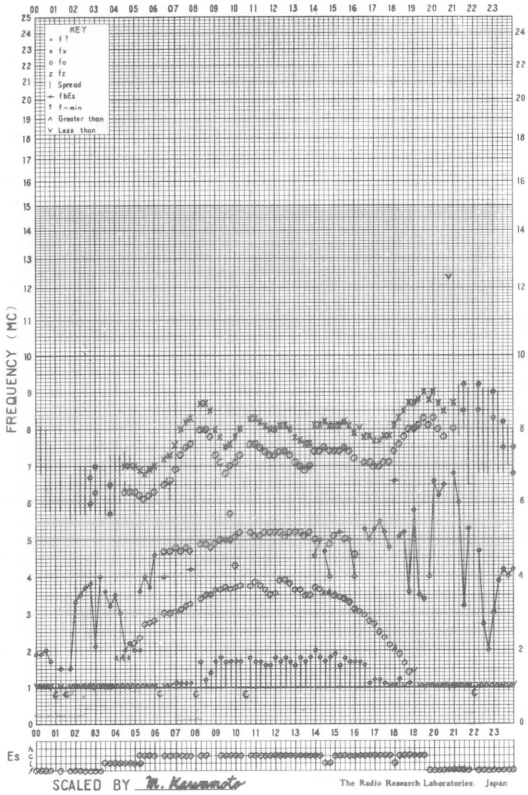

SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

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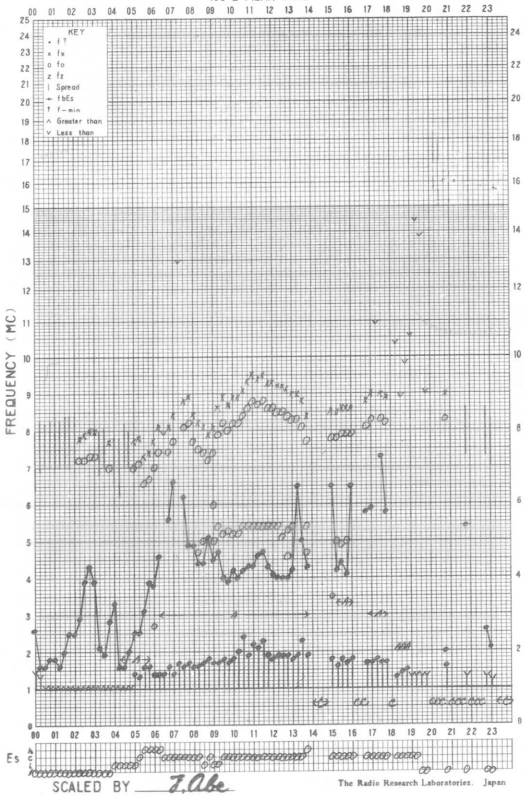

SCALED BY T. Abe

The Radio Research Laboratories. Japan

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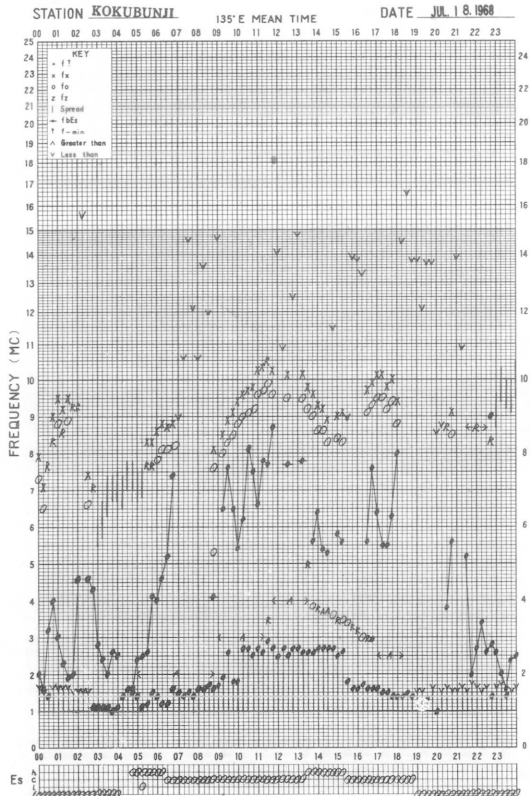

SCALED BY T. Chô

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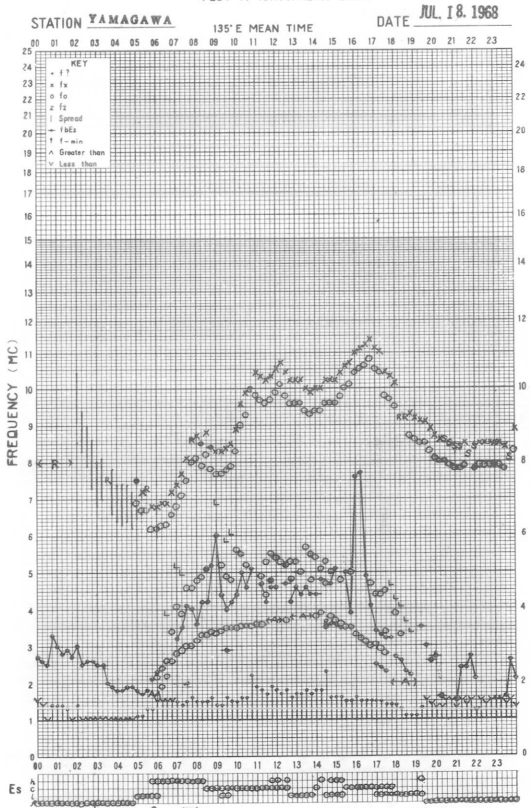

SCALED BY S. Ichidome

The Radio Research Laboratories. Japan

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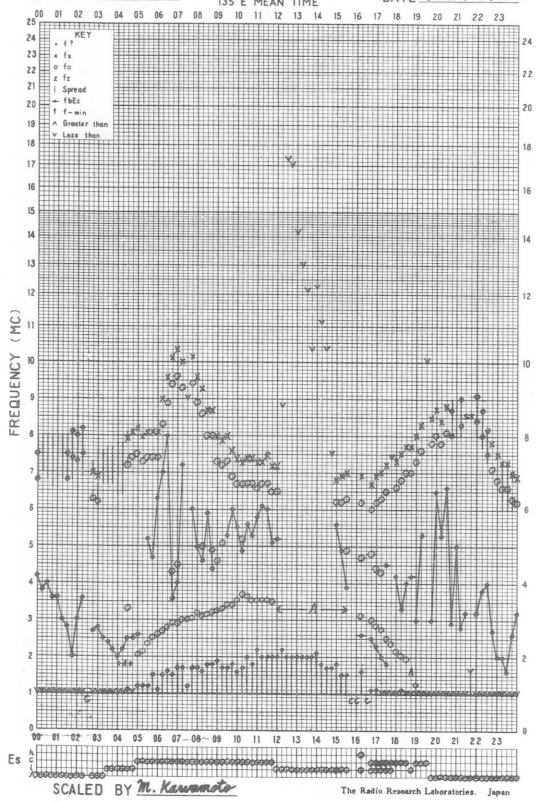

SCALED BY M. Kawamoto The Radio Research Laboratories. Japan

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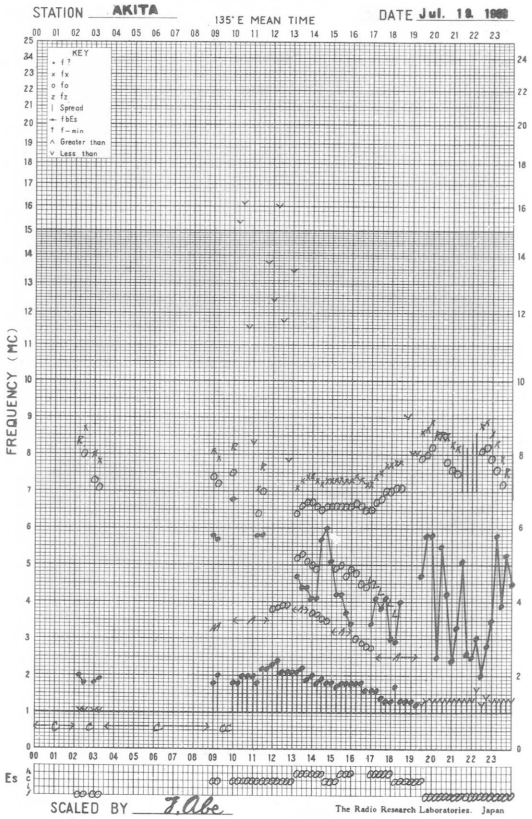

SCALED BY T. Abe The Radio Research Laboratories. Japan

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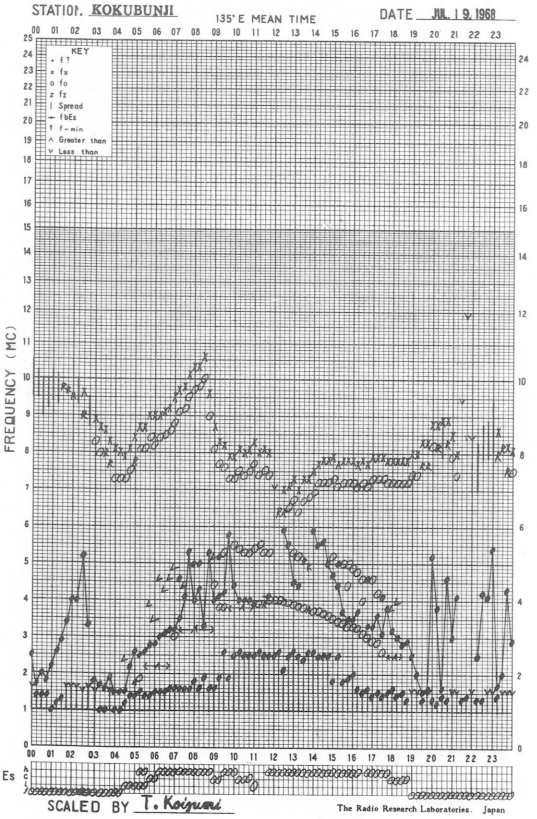

SCALED BY T. Koizumi The Radio Research Laboratories. Japan

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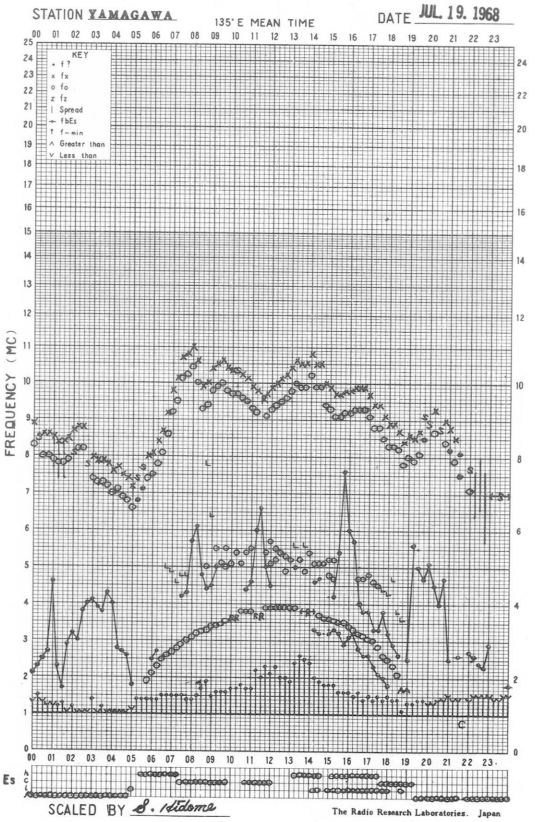

SCALED BY S. Aldoma The Radio Research Laboratories. Japan

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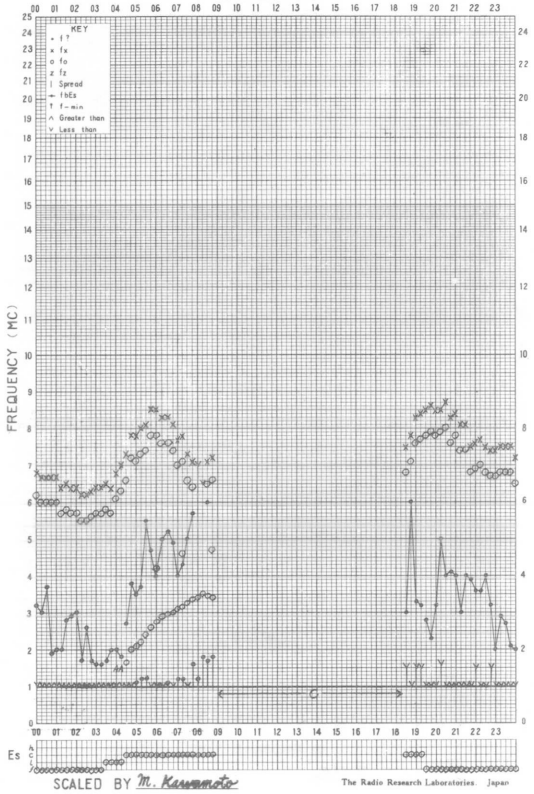

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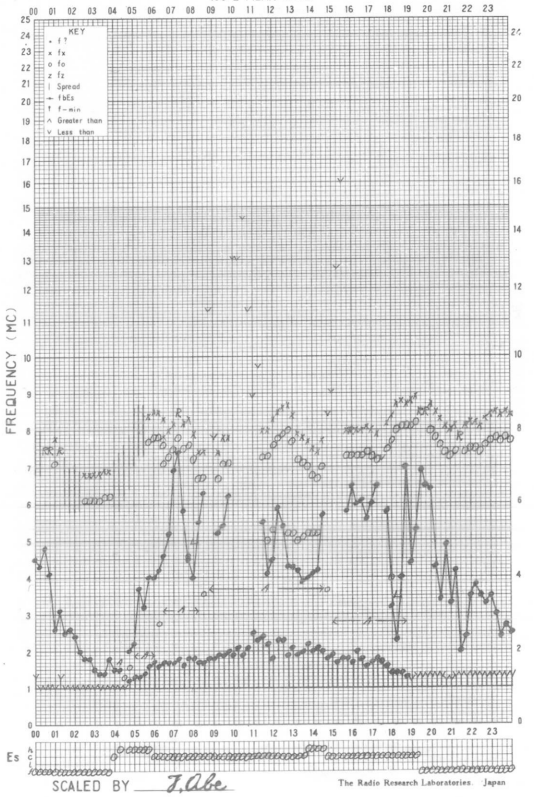

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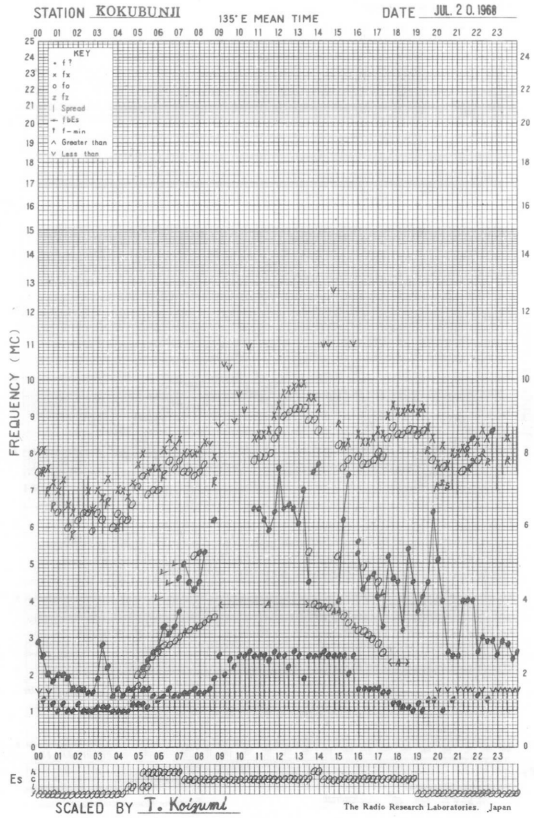

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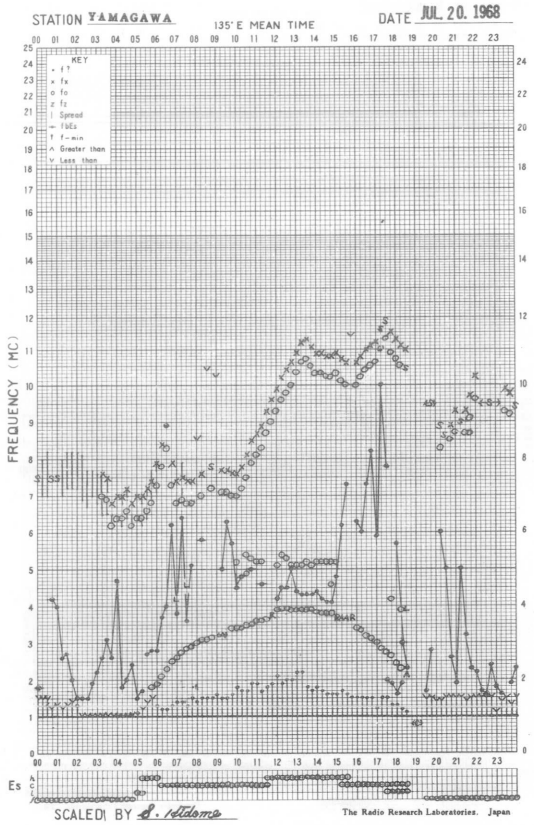

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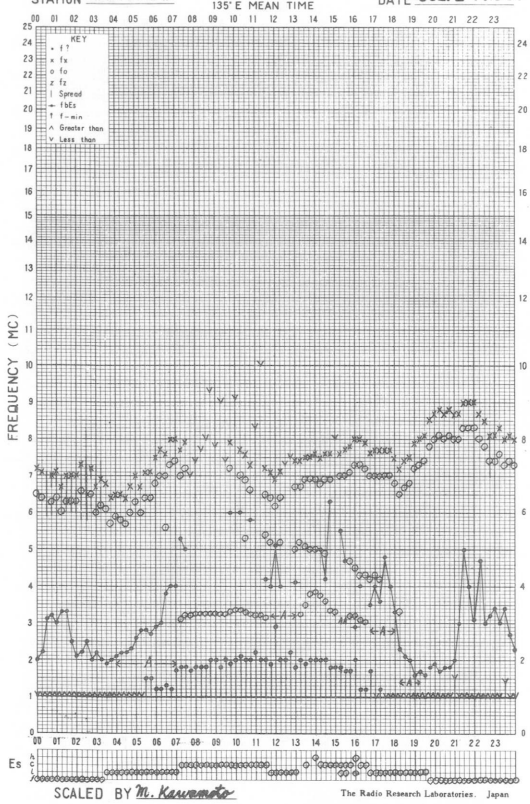

SCALED BY M. Kawamoto The Radio Research Laboratories. Japan

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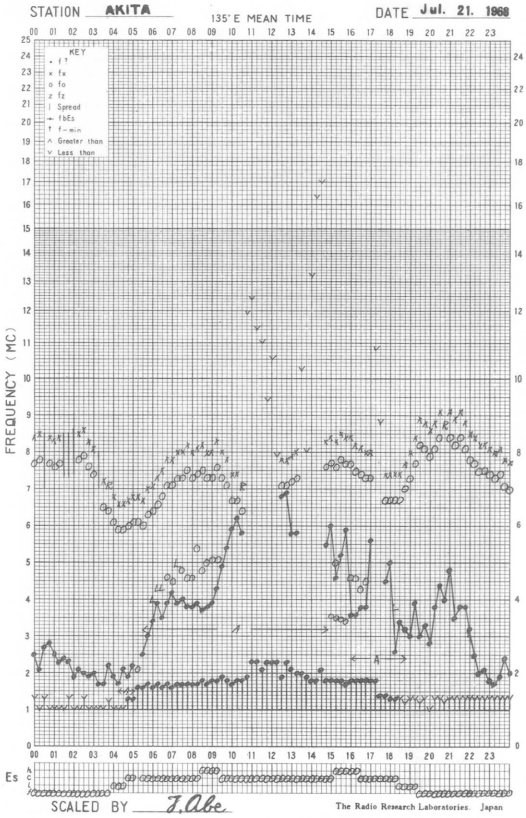

SCALED BY J. Abe The Radio Research Laboratories. Japan

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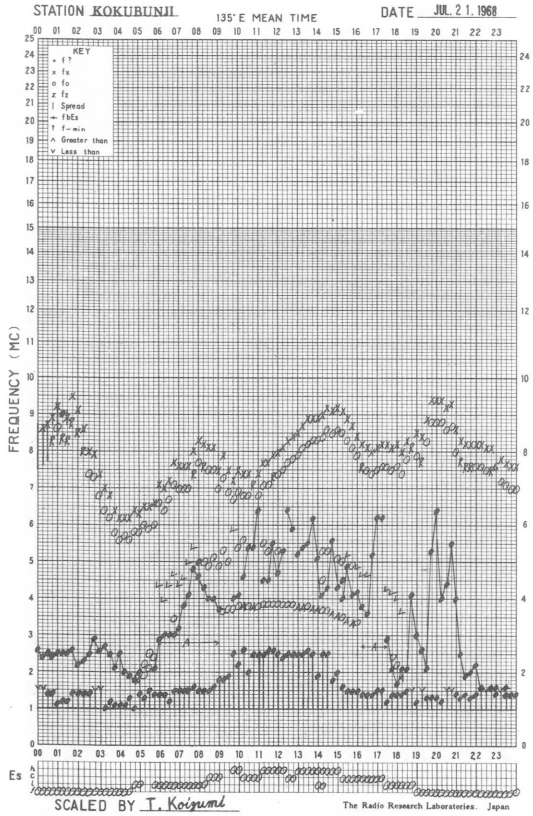

SCALED BY T. Koizumi The Radio Research Laboratories. Japan

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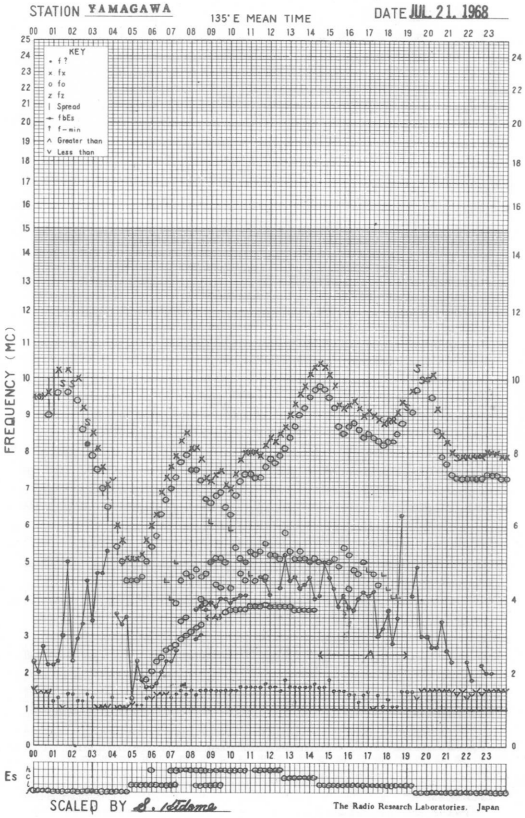

SCALED BY S. Ichidama The Radio Research Laboratories. Japan

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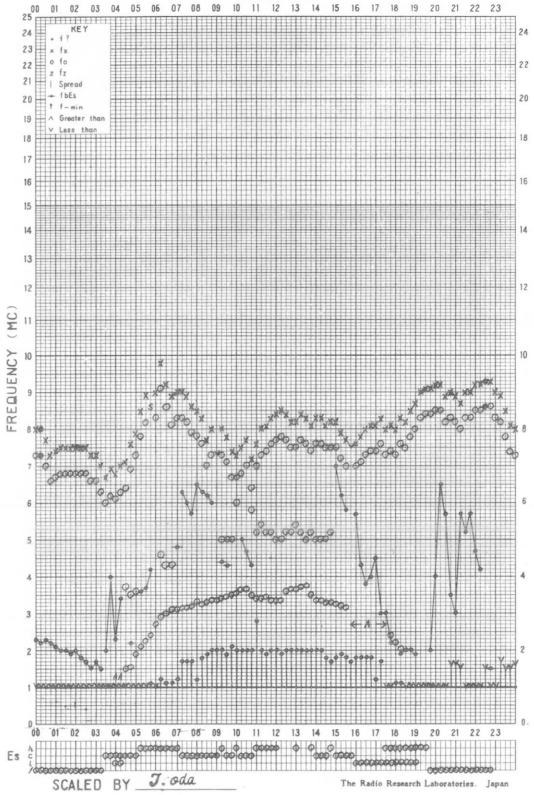

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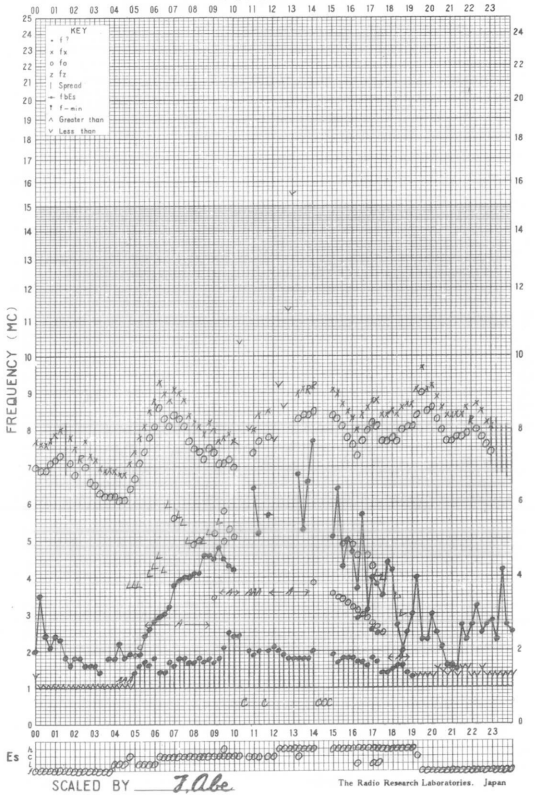

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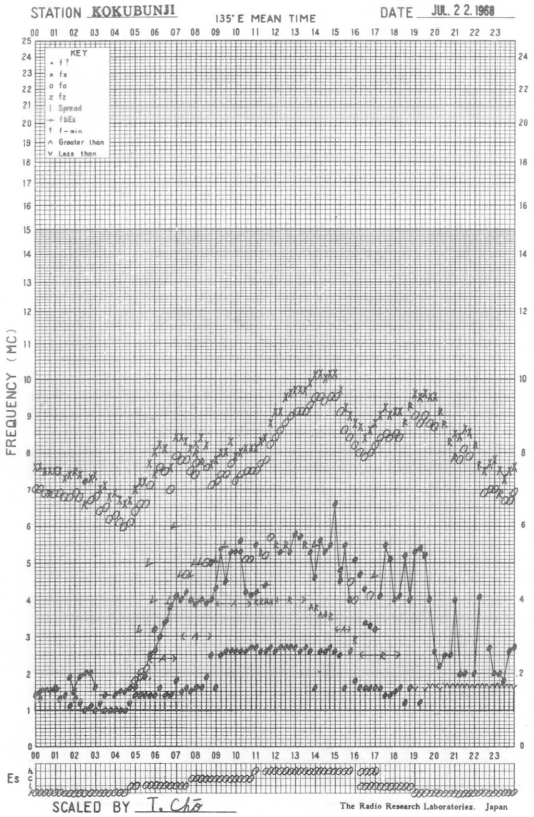

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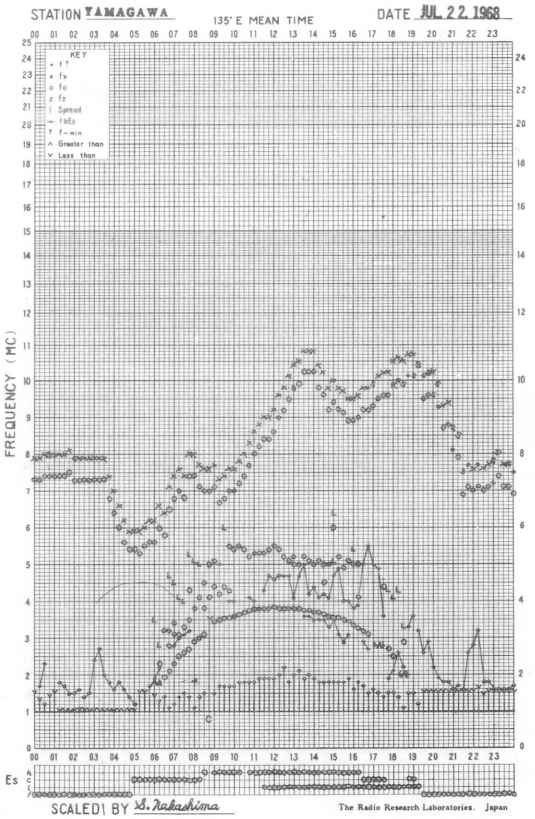

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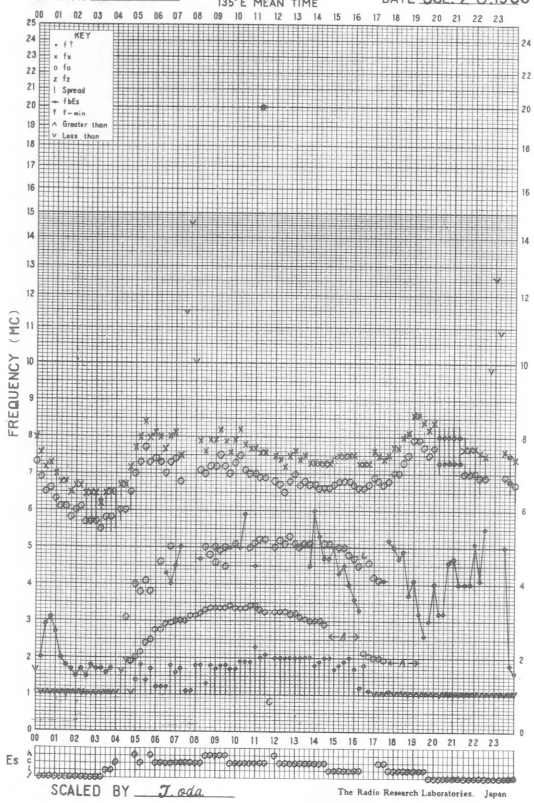

SCALED BY T. Oda

The Radio Research Laboratories. Japan

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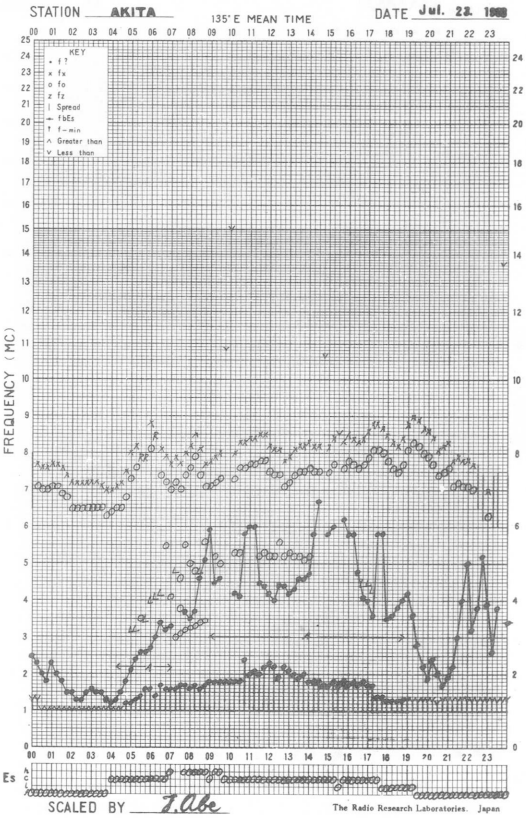

SCALED BY T. Abe

The Radio Research Laboratories. Japan

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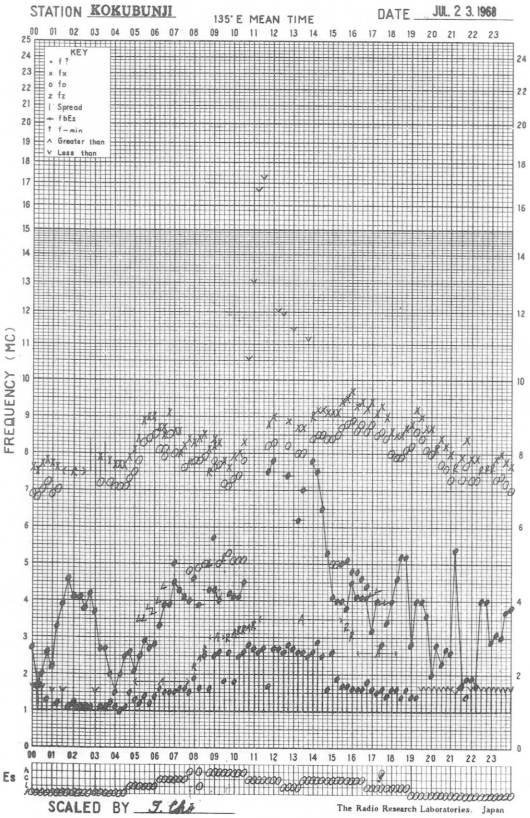

SCALED BY T. Ichi

The Radio Research Laboratories. Japan

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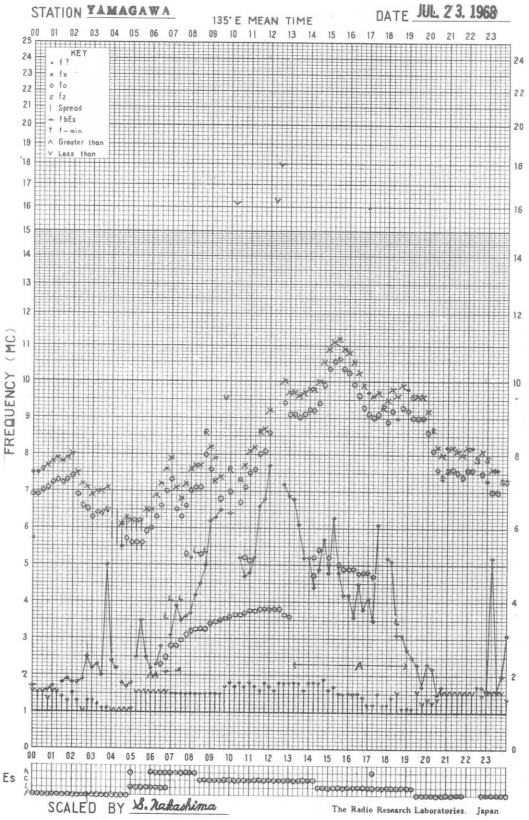

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The Radio Research Laboratories. Japan

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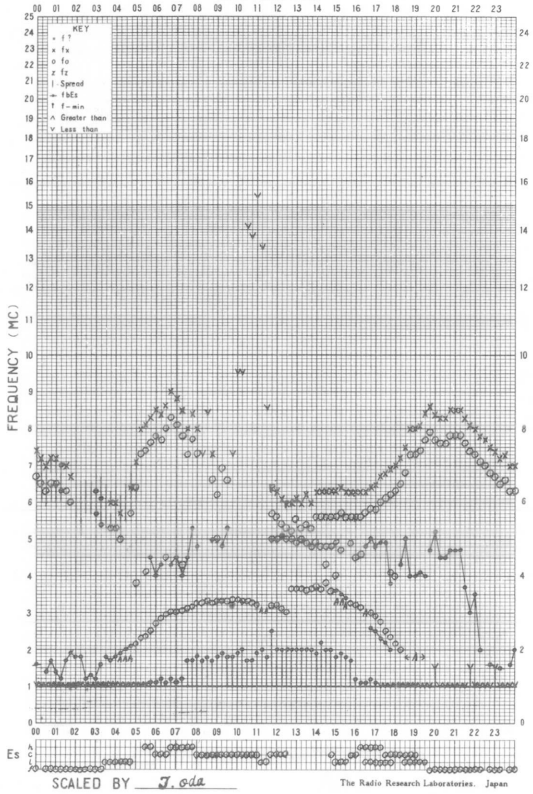

SCALED BY J. oda

The Radio Research Laboratories. Japan

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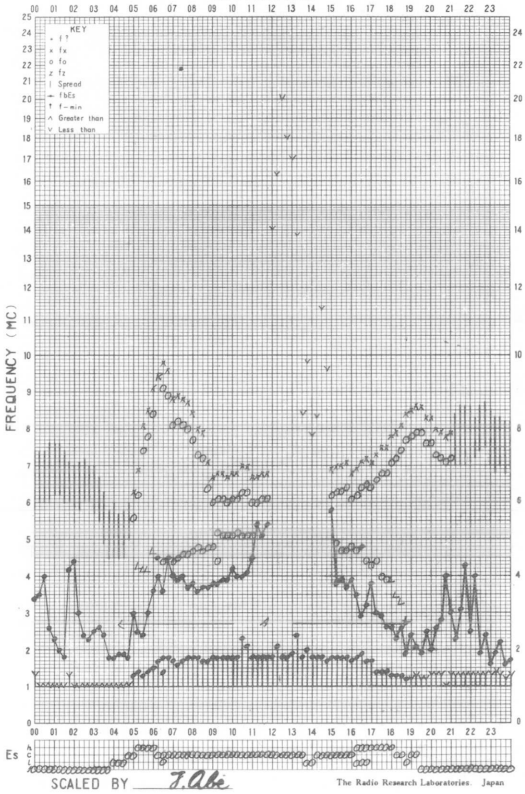

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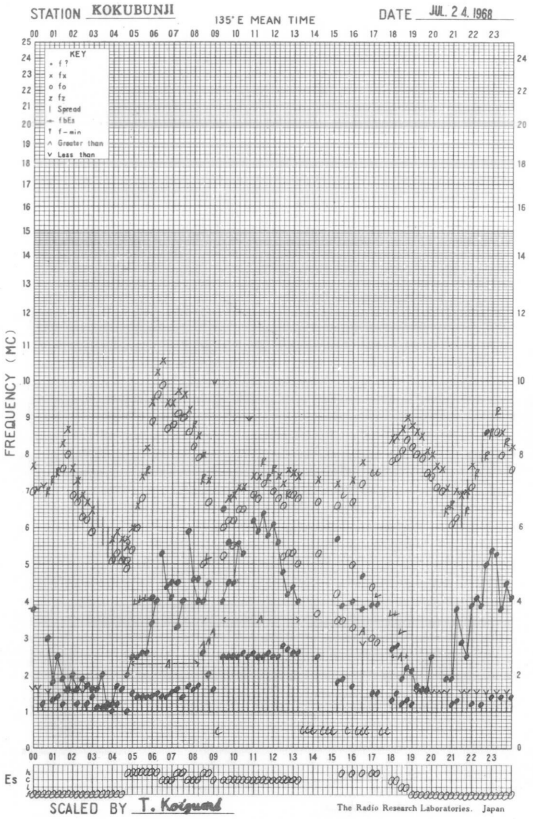

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The Radio Research Laboratories. Japan

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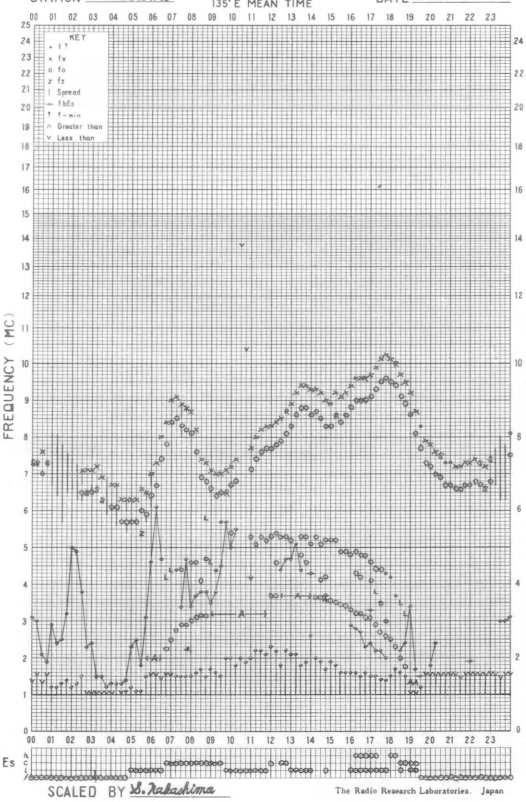

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The Radio Research Laboratories. Japan

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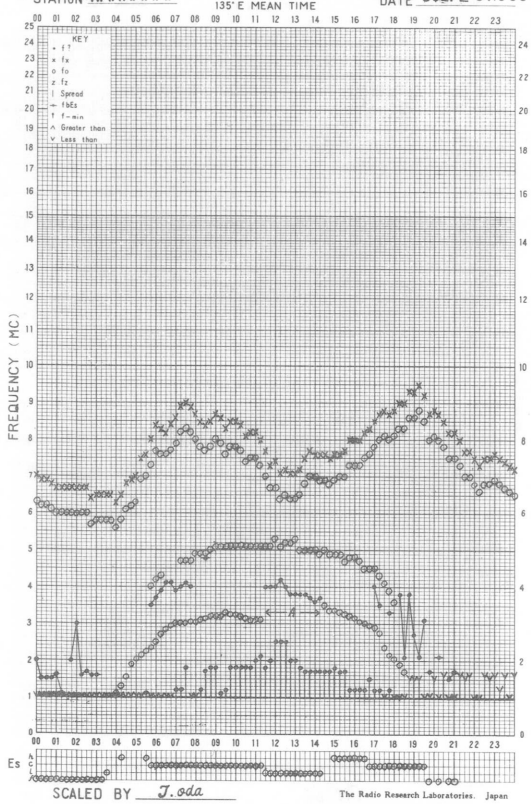

SCALED BY J. oda

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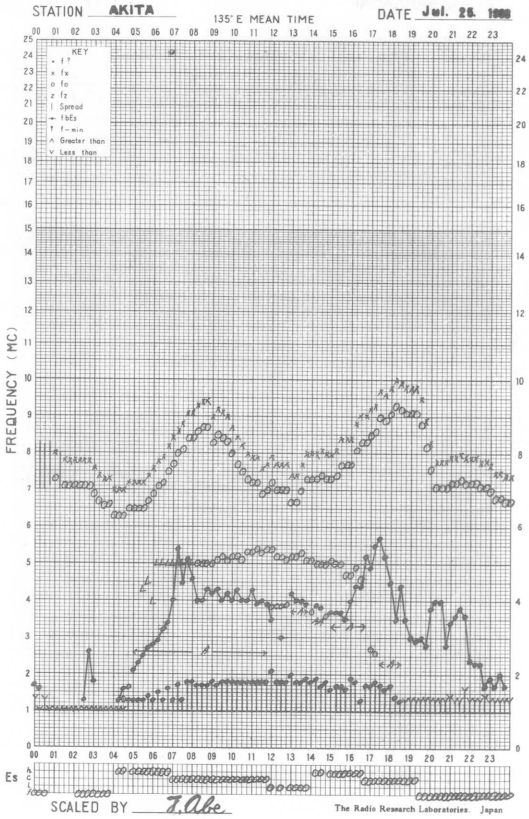

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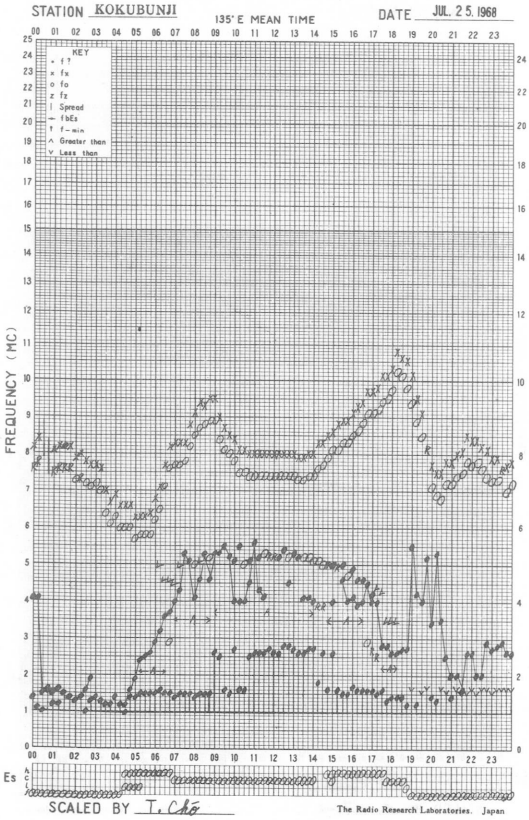

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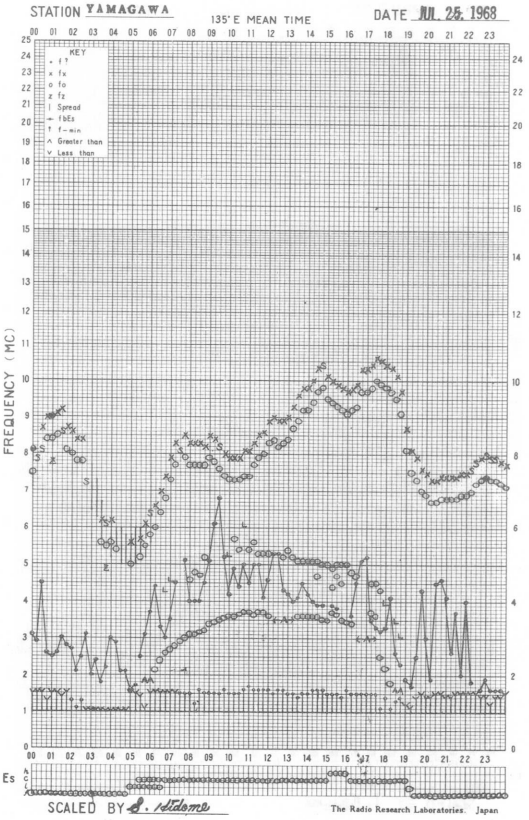

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The Radio Research Laboratories. Japan

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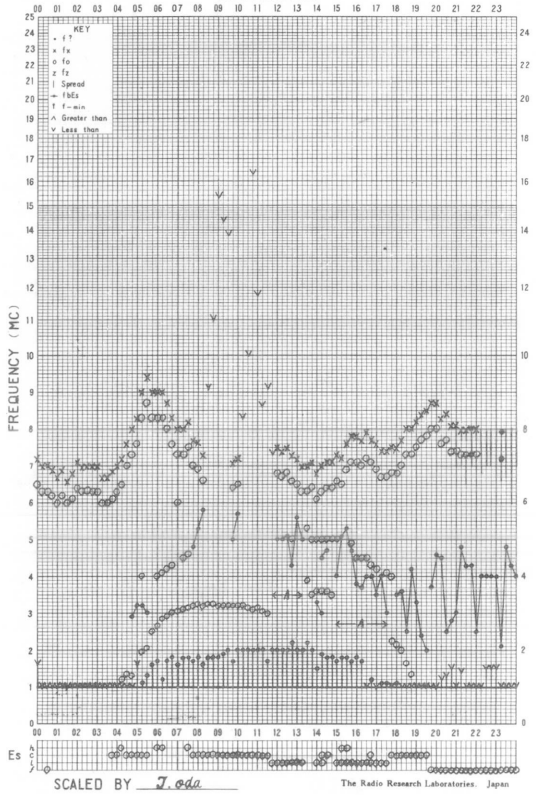

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The Radio Research Laboratories. Japan

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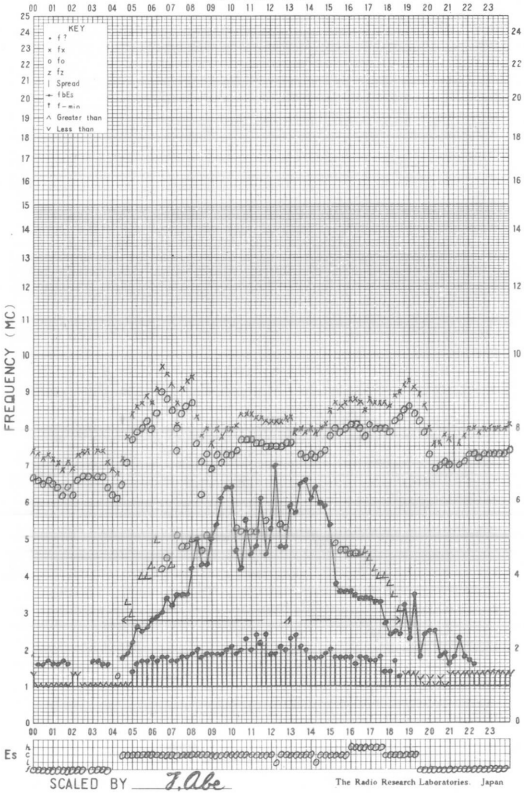

SCALED BY T. Abe

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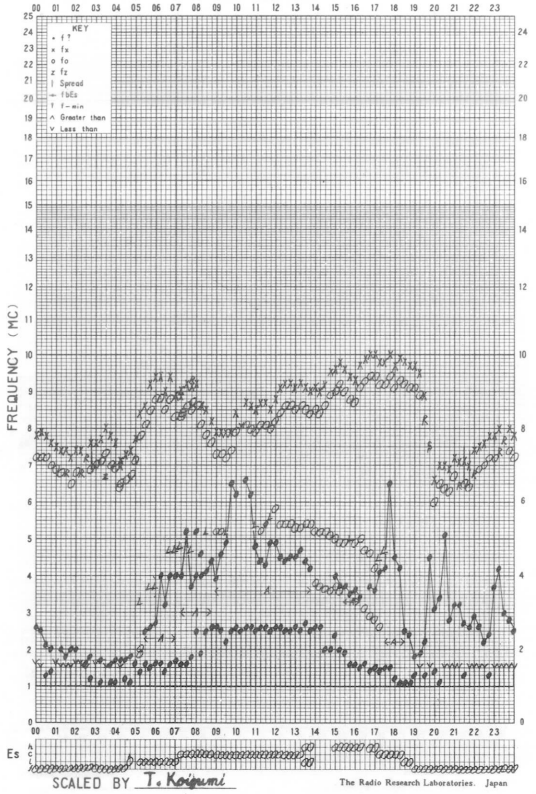

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The Radio Research Laboratories. Japan

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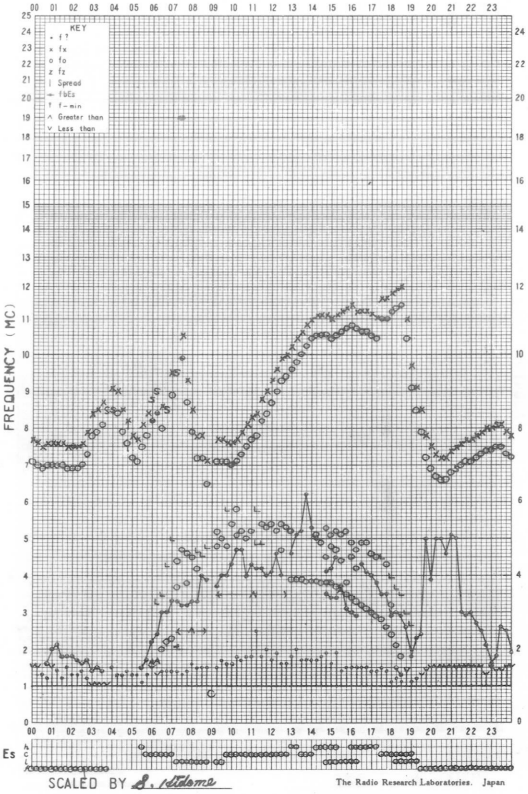
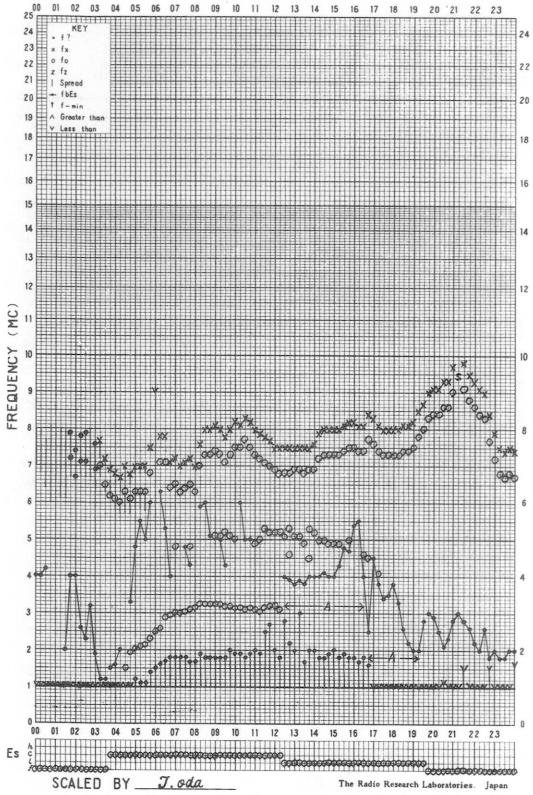


SCALED BY S. Ichijima

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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

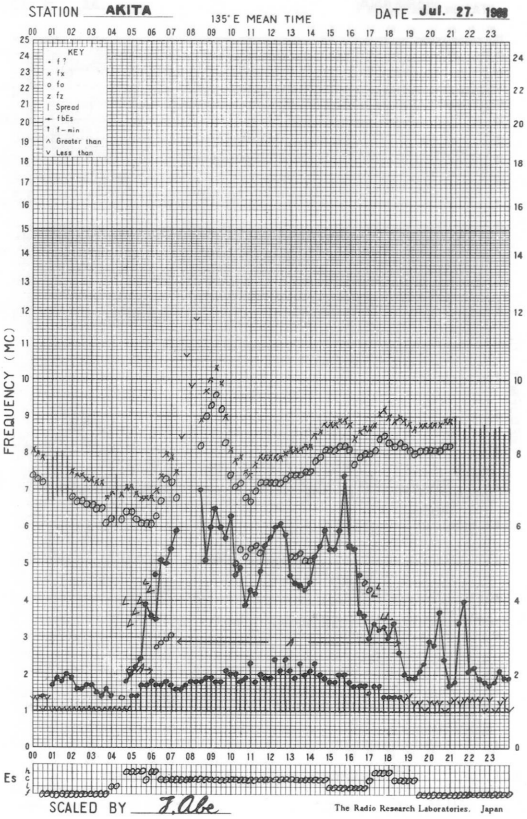


SCALED BY T. Oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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

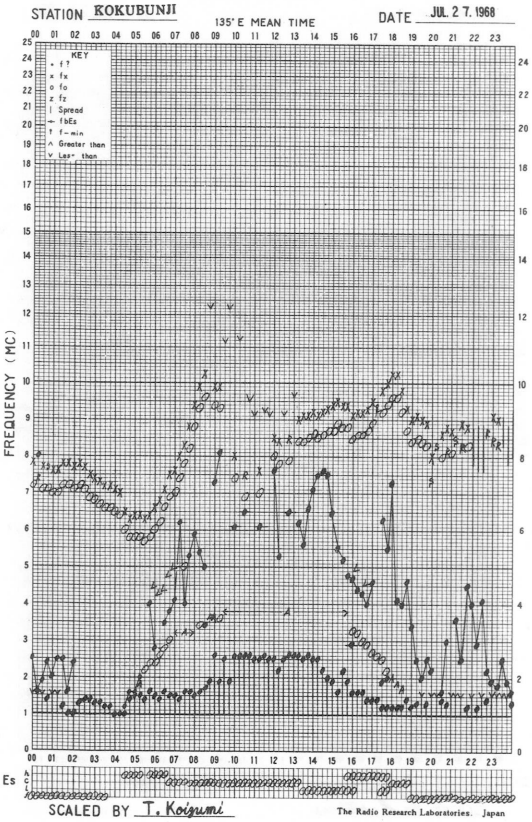


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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

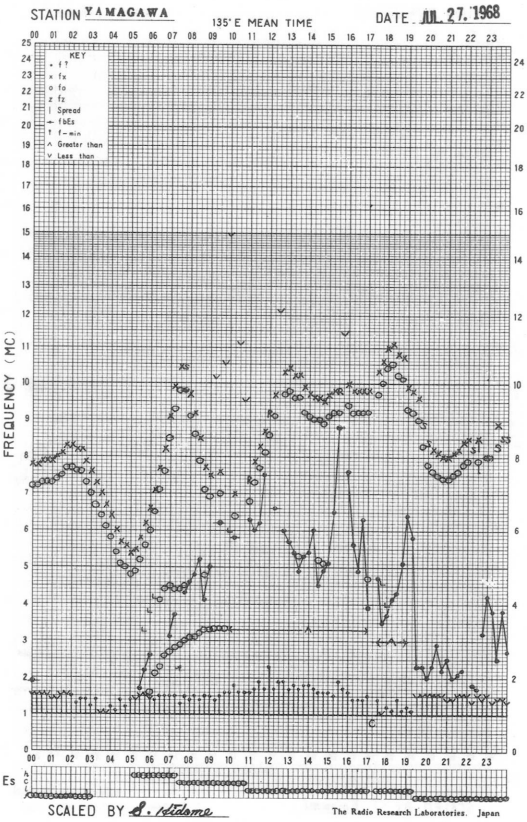


SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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

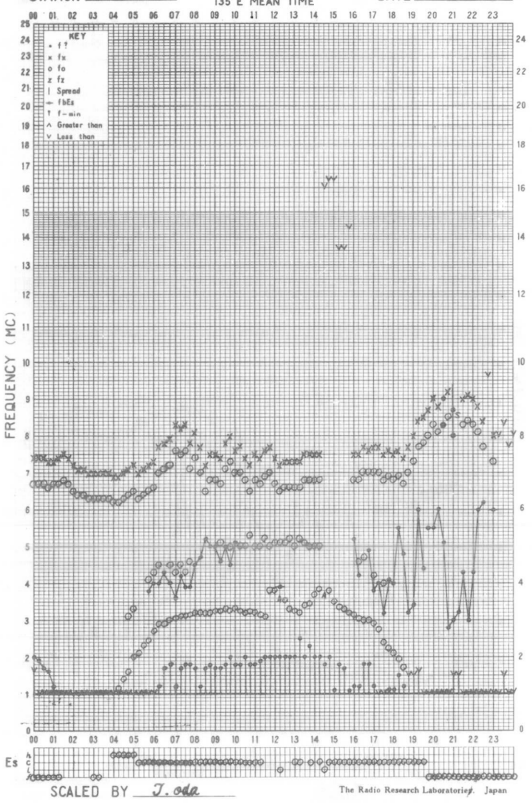


SCALED BY S. Ishidome

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JUL. 28.1968

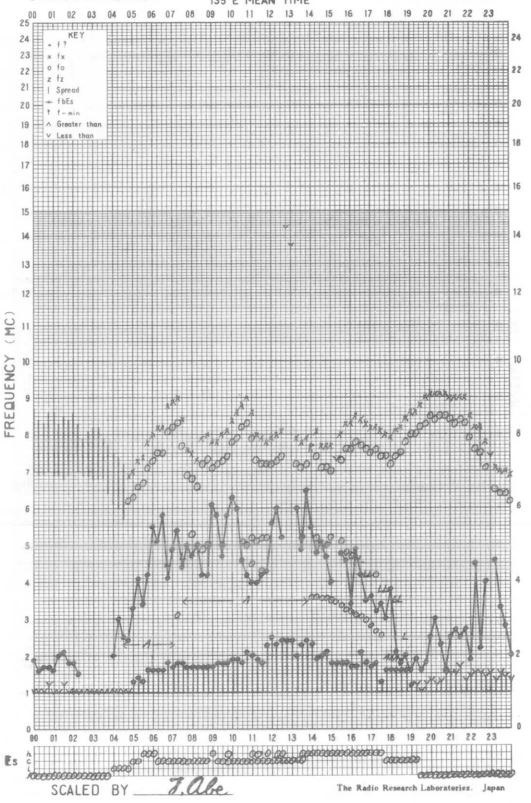


SCALED BY T. Oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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

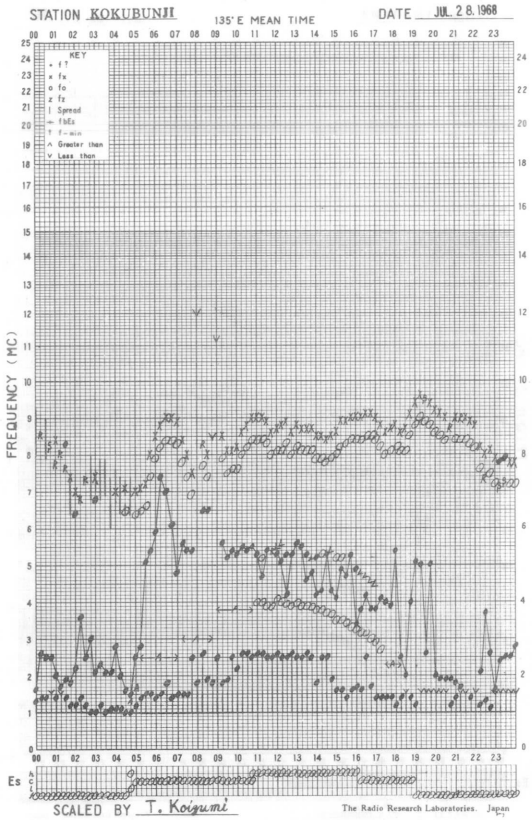


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JUL. 28.1968

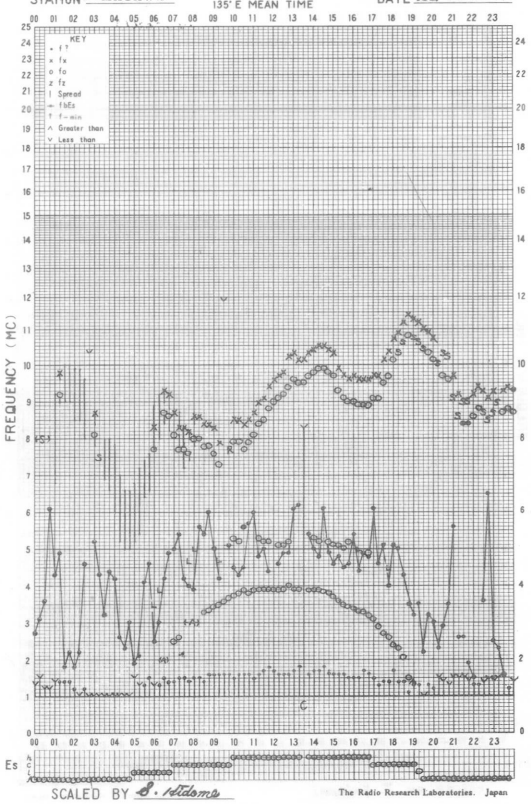


SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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

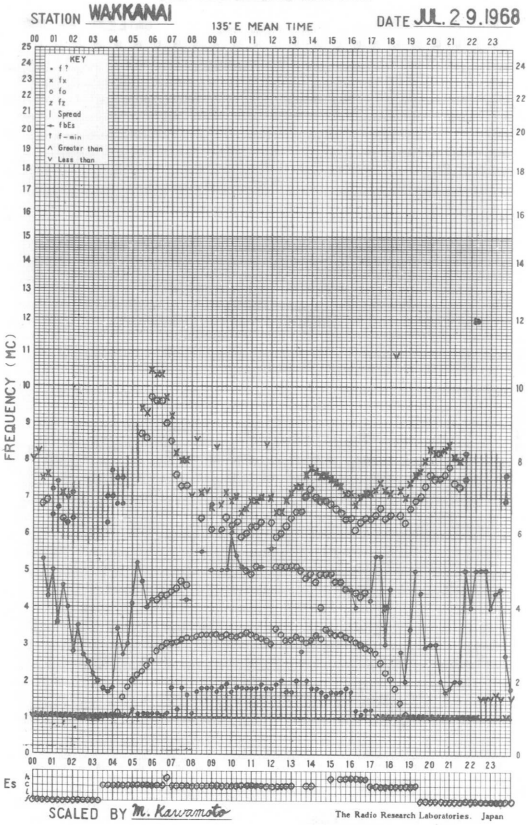


SCALED BY S. Nitoma

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JUL. 29.1968



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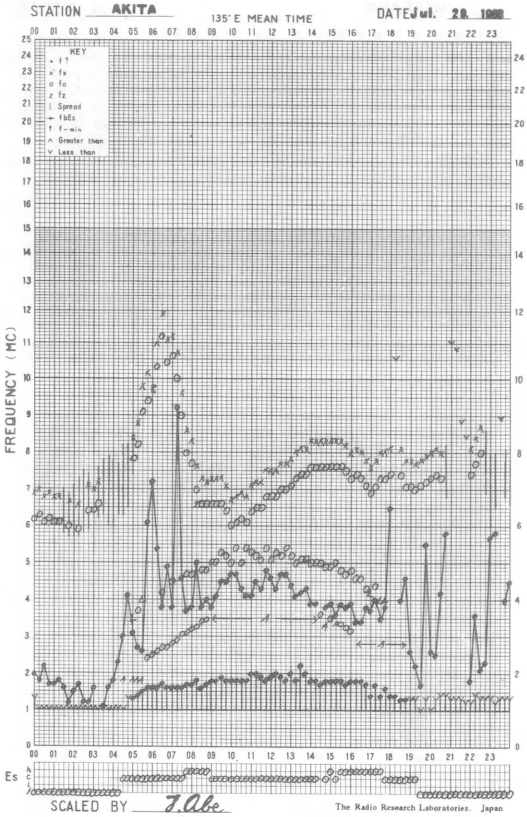
STATION AKITA 135°E MEAN TIME DATE Jul. 29. 1968



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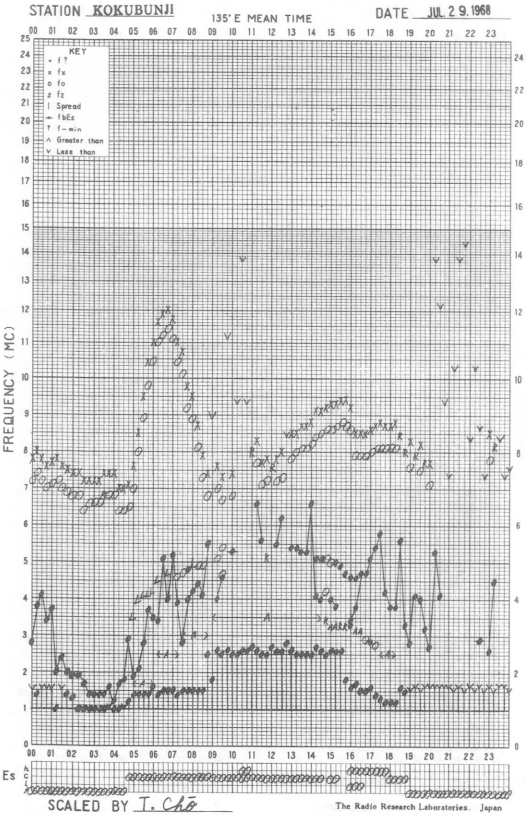
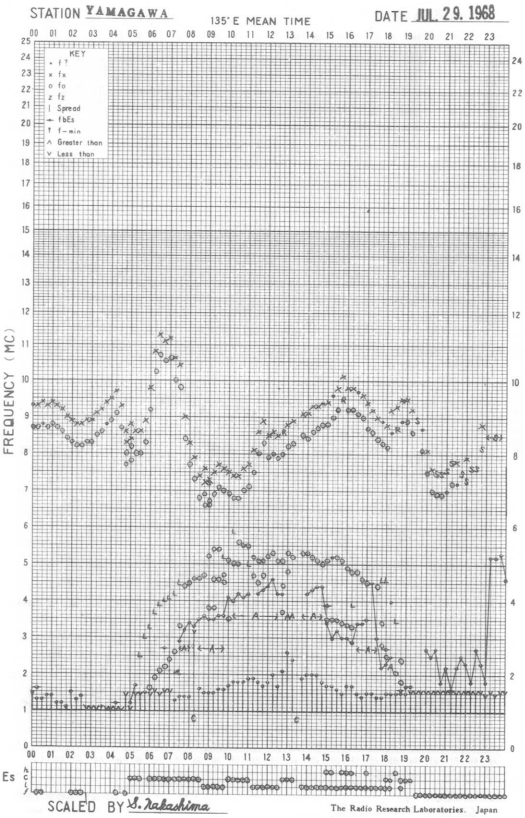
STATION KOKUBUNJI 135°E MEAN TIME DATE JUL. 29.1968



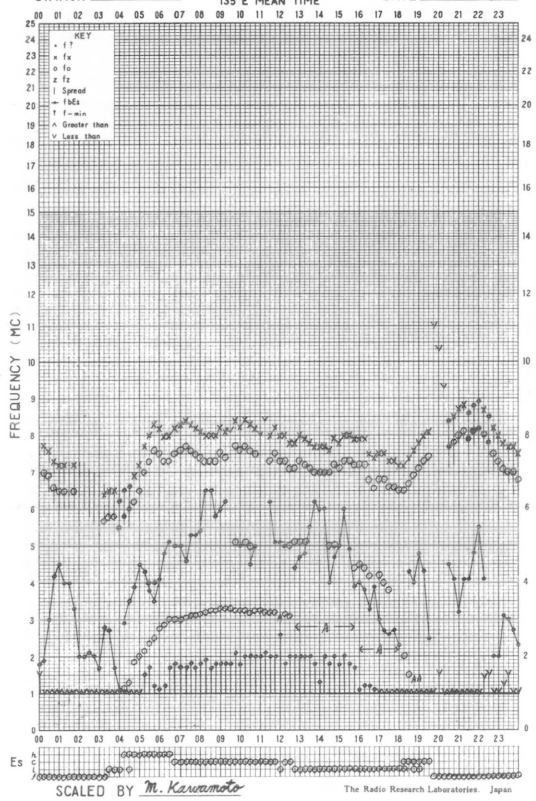
f-PLOT OF IONOSPHERIC DATA

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



f-PLOT OF IONOSPHERIC DATA

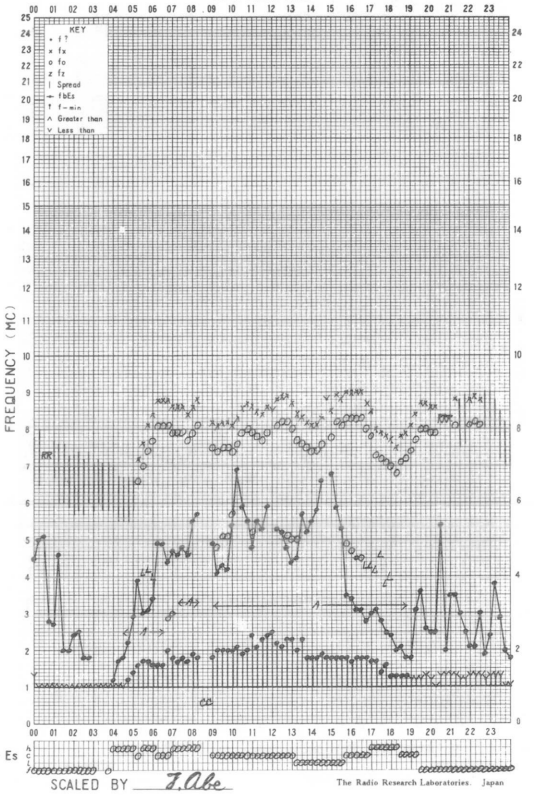
STATION WAKKANAI 135°E MEAN TIME DATE JUL. 30, 1968



SCALED BY M. Kawamoto The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

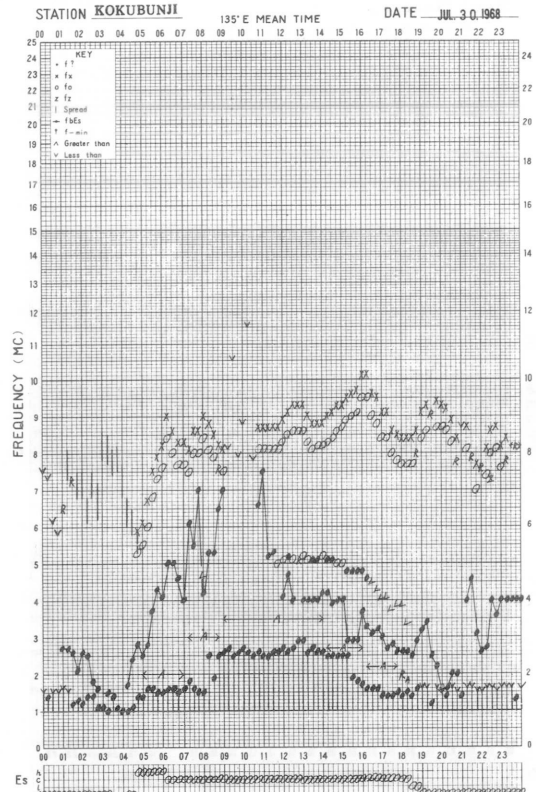
STATION AKITA 135°E MEAN TIME DATE Jul. 30, 1968



SCALED BY T. Abe The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

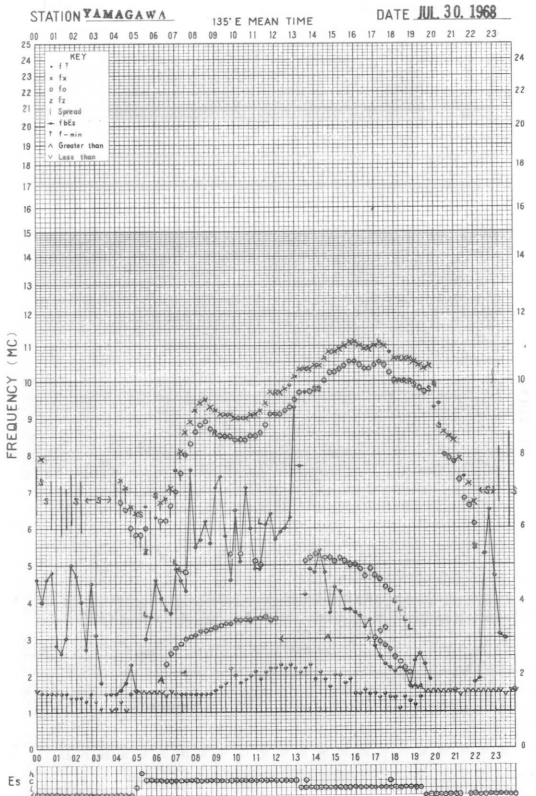
STATION KOKUBUNJI 135°E MEAN TIME DATE JUL. 30. 1968



SCALED BY T. Chō The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

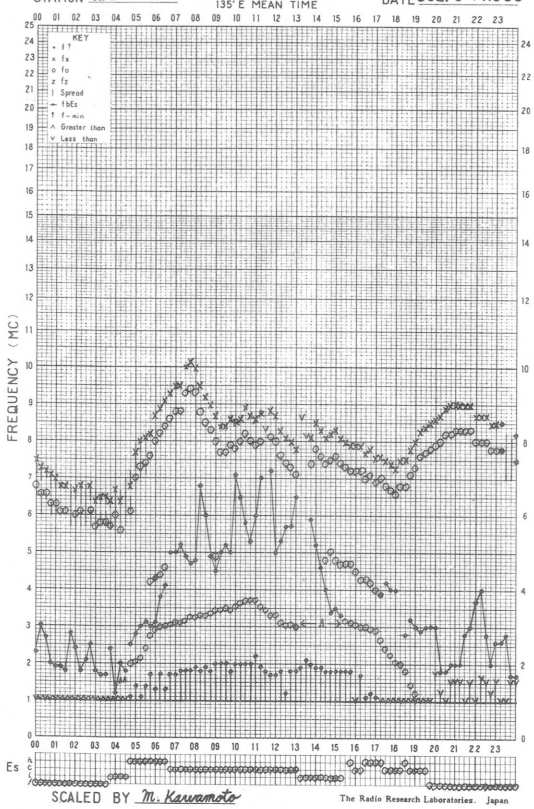
STATION YAMAGAWA 135°E MEAN TIME DATE JUL. 30, 1968



SCALED BY S. Takashima The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

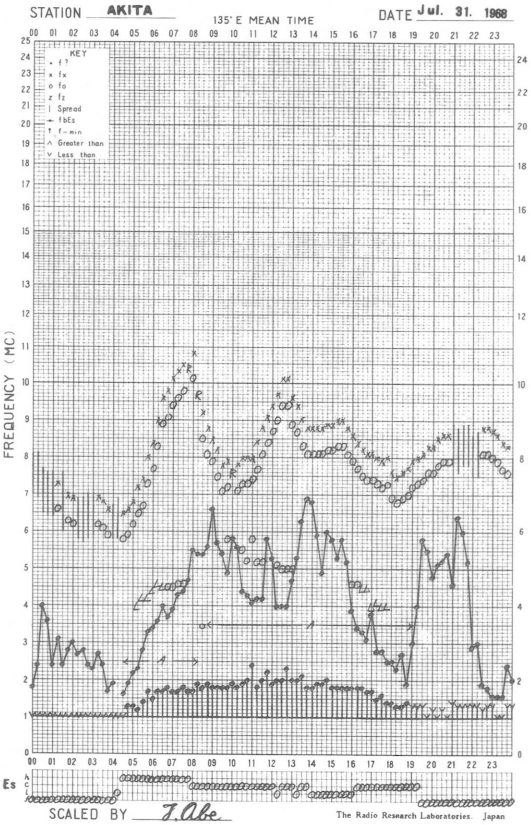
STATION WAKKANAI 135°E MEAN TIME DATE JUL. 31.1968



SCALED BY M. Kawamoto The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

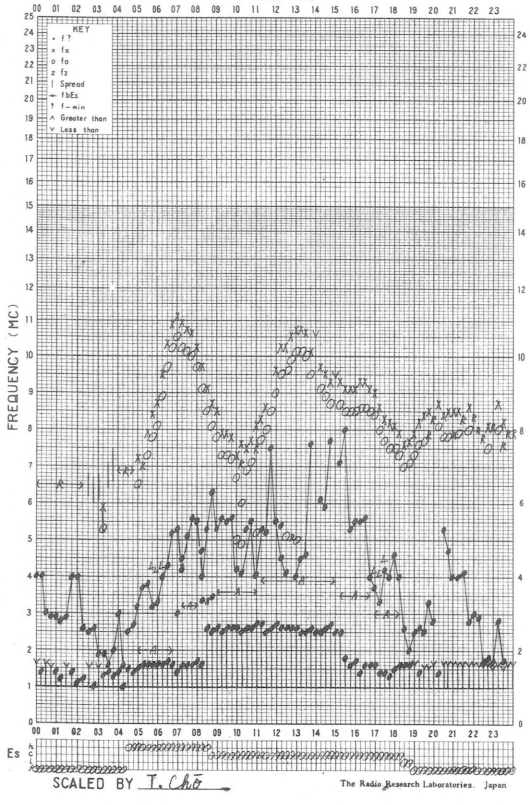
STATION AKITA 135°E MEAN TIME DATE Jul. 31. 1968



SCALED BY T. Abe The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

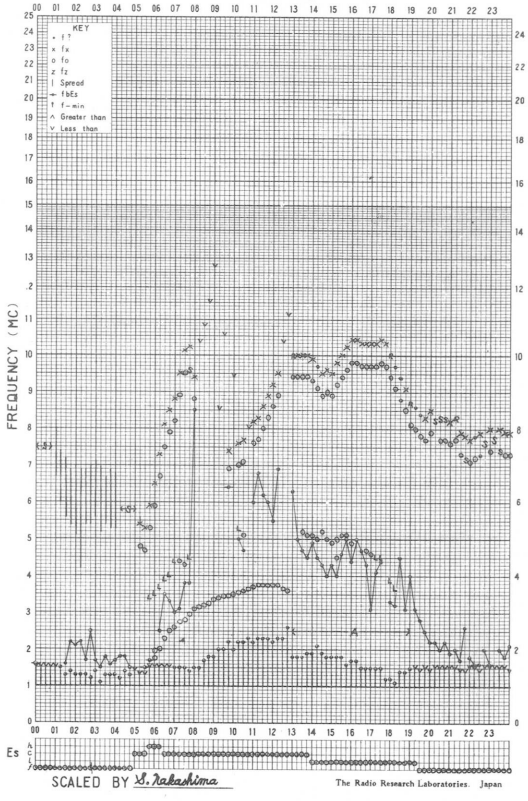
STATION KOKUBUNJI 135°E MEAN TIME DATE JUL. 31.1968



SCALED BY T. Chō The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE JUL. 31.1968



SCALED BY S. Nakashima The Radio Research Laboratories. Japan

SOLAR RADIO EMISSION

Flux Density and Variability

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

	Flux density $10^{-22}Wm^{-2}(Hz)^{-1}$					Variability 0 to 3				
UT	00-03	03-06	06-09	21-24	Day	00-03	03-06	06-09	21-24	Day
Date										
1	7	7	7	7	7	1	0	0	0	1
2	(6)	6	6	7	7	(0)	0	0	1	0
3	7	7	7	8	7	0	0	0	0	0
4	7	7	7	7	7	0	0	0	0	0
5	7	7	7	-	7	0	1	1	-	1
6	8	7	7	-	7	1	0	1	-	1
7	8	8	8	-	8	1	1	1	-	1
8	7	7	7	-	7	1	1	1	-	1
9	13	7	7	11	9	1	1	1	1	1
10	9	9	11	7	10	1	1	1	1	1
11	7	7	7	9	7	1	1	1	1	1
12	12	9	10	19	10	1	1	1	1	1
13	19	17	15	9	18	1	1	1	1	1
14	8	8	7	6	8	1	1	1	0	1
15	6	6	6	5	6	0	1	1	0	1
16	6	6	6	7	6	1	1	1	1	1
17	7	7	6	9	7	0	0	0	1	0
18	8	6	6	5	7	1	1	1	1	1
19	6	6	6	6	6	0	0	0	0	0
20	7	7	6	6	6	0	1	0	0	0
21	6	5	5	6	6	0	0	0	0	0
22	6	5	5	6	6	0	0	1	1	0
23	6	6	6	10	6	1	1	0	1	1
24	8	10	8	8	9	1	1	1	1	1
25	8	8	8	10	8	1	1	1	1	1
26	10	(11)	9	10	10	1	(1)	1	1	1
27	10	9	9	7	10	1	1	1	1	1
28	7	7	6	-	7	1	1	1	-	1
29	9	7	6	6	7	2	1	0	0	1
30	6	6	(6)	8	6	1	1	(0)	1	1
31	7	6	6	7	7	1	1	1	1	1

Note No observations during the following periods:

2nd	0100-	0300	24th	0500-		0700
5th	1930-	2400	25th	0600-		0700
6th	1930-	2400	26th	0400-		0600
7th	1930-	2400	28th	1930-	29th	0100
8th	1930-	2400	29th	0500-		0600
14th	0300-	0410	29th	1930-		2210
16th	0000-	0100	30th	0700-		0950

SOLAR RADIO EMISSION

Flux Density

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

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

UT	00-03	03-06	06-09	21-24	Day
Date					
1	28	29	28	26	28
2	27	28	25	26	26
3	-	-	26	-	(26)
4	-	27	26	28	(26)
5	-	-	-	-	(28)
6	28	26	25	27	26
7	25	24	23	27	25
8	27	26	25	30	26
9	30	26	25	28	28
10	26	24	26	27	26
11	26	24	24	28	25
12	27	26	25	29	26
13	28	25	25	34	27
14	29	27	28	27	30
15	25	25	28	27	26
16	27	26	26	28	27
17	27	28	28	27	28
18	27	28	28	29	27
19	29	30	29	28	29
20	29	29	28	27	28
21	26	26	24	27	26
22	-	27	27	29	27
23	29	29	-	28	29
24	30	29	28	29	29
25	28	28	28	28	28
26	30	31	30	28	30
27	27	27	26	25	27
28	25	25	25	-	25
29	26	24	25	30	25
30	29	30	31	32	30
31	31	31	32	31	31

Note No observations during the following periods:

2nd	0130-		0200	22nd	0850-		2100
3rd	0000-		0700	23rd	0600-		0800
3rd	1930-	4th	0300	23rd	1930-		2040
4th	2300-	5th	2400	25th	0735-		0800
14th	0300-		0400	28th	1930-	29th	0020
22nd	0000-		0245	30th	1930-		2030

Distinctive Events

(single-frequency observations)

Month: July 1968
Observing station: Hiraiso
Normal observing period: 1930 - 0950 (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	
6	200	0720.5	0721.8	2.5	C	1300	210	
	500	0944.6	0948.0	>7.4	C	>365	>70	
	200	0944.6	0946.0	>13.0	C	>1930	>210	
8	200	0947.0	0947.0	1.0	C	1040	100	
9	200	2240.0	2241.9	4.0	C	500	30	
10	200	0207.0	0207.0	1.5	C	640	90	
	500	0439.5	0508.0	110.5	RF	13	5	
20	500	0817.5	0820.4	18.5	C	5	1	
	200	0811.0	0833.0	25.0	C	6	2	
30	500	0517.5	0518.4	2.5	C	130	10	
	200	0518.0	0518.0	0.8	C	130	20	

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

JUL 1968 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	1	-2	5	6	12	8	1	-1	-2	0	14	10	10	13	12	15	13	12	ES 19	9	-7	14	11	16
2	-1	4	1	2	0	15	18	2	-6	-4	0	10	4	13	16	9	15	14	3	0	1	6	2	6
3	7	5	0	6	7	18	10	-3	-2	3	16	1	5	16	13	11	15	14	7	14	11	2	5	-1
4	4	-3	0	13	16	15	13	-6	-1	ES 13	1	ES 2	5	16	8	2	15	15	7	7	0	3	1	4
5	1	-4	-5	-10	2	0	10	12	0	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	5	8	-1	0	8	11	14	18	12	10	1	3	-3	2	19	6	5	12	6	11	11	4	1	4
7	-4	-2	-4	-10	1	14	3	10	9	4	-2	5	7	22	25	14	17	13	3	10	9	8	4	3
8	0	-7	-9	ES -5	-4	8	10	14	0	2	3	2	7	23	13	11	16	ES -16	-8	-3	0	1	3	7
9	4	0	-6	4	2	12	11	11	7	11	-3	1	ES 10	26	17	8	15	12	-7	1	7	8	4	2
10	-3	1	-10	0	8	11	-10	24	9	8	1	-5	11	26	16	13	8	5	-4	-3	1	1	1	-5
11	-5	ES -19	-18	-4	9	0	-8	3	-2	-13	-7	ES -7	ES -8	0	19	6	8	6	-2	-5	5	2	2	3
12	ES -29	-11	-2	-3	6	10	12	14	13	8	10	15	16	23	17	17	13	7	5	6	-7	1	-2	-3
13	-3	-2	-5	5	6	14	16	14	16	17	15	10	11	24	19	8	8	10	3	8	14	1	12	12
14	5	-4	-6	-3	5	-4	10	0	ES 2	ES -16	ES 3	ES -3	ES -2	-1	17	14	3	-3	-13	ES -11	16	8	7	7
15	1	C	-2	6	13	9	1	ES -14	-9	-4	-2	ES 8	ES 20	ES 17	ES 24	ES 13	13	17	9	9	6	4	4	3
16	1	-4	2	4	10	16	4	4	4	11	14	ES 3	ES 4	18	24	15	23	14	6	9	3	2	-11	1
17	-6	ES -2	-2	-1	13	10	11	14	15	16	19	6	21	24	17	18	10	12	5	4	3	4	-4	-6
18	ES -8	-4	0	-3	14	15	15	18	21	23	17	ES -1	ES 9	23	19	11	10	16	16	5	4	3	5	3
19	-10	-6	5	2	6	10	16	11	9	-7	6	5	ES 10	20	17	15	6	3	3	1	4	8	1	-4
20	6	-5	-1	2	9	4	10	0	9	5	9	18	18	20	15	13	10	14	9	7	7	2	0	-2
21	0	-4	2	2	5	13	16	17	4	-2	4	0	ES 15	16	21	19	20	15	5	9	6	0	4	8
22	-2	-10	10	-2	1	13	8	3	2	ES 5	C	ES 4	ES 12	0	19	11	1	ES 1	4	-18	7	-1	7	19
23	-8	-11	5	-1	4	9	7	14	6	0	10	2	8	1	10	1	9	17	12	4	6	5	5	-3
24	-8	-9	-1	1	0	9	4	1	3	4	5	0	ES 5	20	3	0	5	13	4	8	3	5	1	2
25	5	3	2	8	9	12	16	17	0	-2	-6	ES -2	ES 1	8	17	6	15	9	5	4	3	6	4	4
26	4	-4	-4	3	1	8	14	17	20	18	3	-4	ES 4	18	18	12	17	8	7	9	4	-2	4	-5
27	-1	-6	-3	1	1	9	16	11	17	24	13	ES -1	-4	5	21	6	6	7	2	-2	5	-5	ES -4	-2
28	0	1	-5	-2	11	14	13	12	14	15	6	3	6	14	19	C	C	11	1	3	8	9	4	1
29	4	5	3	3	6	16	12	-11	-6	ES 3	ES 1	-11	ES 9	18	16	17	14	12	7	11	0	0	-3	-5
30	0	-4	-6	-2	5	13	13	15	12	ES 2	ES -1	4	ES 3	23	19	14	4	-4	-5	2	1	1	2	1
31	0	-4	-3	0	5	15	18	22	17	3	10	ES 2	ES 7	21	14	15	16	14	9	6	4	4	-2	0
CNT	31	30	31	31	31	31	31	31	31	30	29	30	30	30	30	29	29	30	30	30	30	30	30	30
MED	0	US -4	-2	1	6	11	11	11	6	US 4	4	ES 2	ES 7	18	US 17	US 12	13	12	US 5	6	4	3	2	2
UD	5	5	5	6	13	16	16	18	17	18	16	10	ES 18	24	ES 24	17	17	16	ES 12	11	11	8	7	12
LD	ES -8	ES -11	-9	ES -5	0	0	1	-6	ES -6	ES -7	ES -3	ES -5	ES -3	ES 0	ES 10	ES 2	4	ES -3	ES -7	-5	0	-1	-4	-5

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

JUL 1968 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	ES -10	-3	0	5	14	17	17	17	19	23	25	24	22	21	21	20	20	18	ES 13	-1	2	-4	2	4
2	0	C	-9	3	8	13	18	21	26	26	24	25	21	23	18	17	15	13	9	3	2	1	-1	-1
3	-4	2	2	8	9	11	19	18	23	21	18	21	17	21	22	15	18	12	7	6	7	4	0	-7
4	-4	-1	-1	3	9	18	20	20	20	24	23	20	19	18	13	20	19	17	5	-2	0	2	-6	-8
5	ES -19	ES -29	-5	2	8	14	21	25	23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	-3	9	0	5	9	13	15	20	23	19	25	20	21	22	17	9	14	6	5	10	5	-2	-2	-4
7	ES -14	-22	-4	8	9	7	14	20	24	20	23	25	20	27	5	5	9	5	9	6	9	4	5	-1
8	-1	2	-8	4	10	17	18	23	23	19	20	20	22	23	16	9	9	3	2	9	4	1	0	-2
9	-15	-5	-3	4	8	10	9	19	24	21	18	20	24	18	20	18	18	12	8	8	4	0	-6	-9
10	-16	-6	-5	7	8	13	20	24	23	27	21	20	24	27	14	15	15	12	-5	2	1	0	-3	ES -12
11	-7	-14	1	-3	9	15	13	19	19	17	17	17	15	10	4	-8	11	15	2	4	1	-2	-5	-4
12	ES -29	ES -8	-5	3	12	14	17	17	22	17	16	17	15	17	22	25	20	15	7	2	5	-1	-2	-5
13	-10	-11	-10	2	11	12	16	21	26	22	19	20	13	3	1	ES 2	20	13	-2	5	14	1	4	-8
14	-16	-5	2	5	11	12	18	7	14	23	15	16	17	15	15	16	14	5	3	2	2	3	-6	-6
15	-9	C	-5	6	14	15	18	19	19	20	19	17	19	13	ES 28	4	15	23	14	11	7	3	-6	-4
16	-6	-10	-2	4	9	15	18	18	23	23	18	15	15	15	14	19	20	13	21	4	-2	0	ES -9	ES -12
17	ES -15	ES -11	1	4	6	10	16	21	16	23	20	20	23	21	15	19	18	18	12	9	0	-5	-5	ES -6
18	ES -6	-10	-7	4	11	13	16	20	26	26	23	21	15	18	17	-2	10	16	16	6	14	6	3	-5
19	-5	-3	3	2	9	10	17	20	25	21	19	27	20	19	19	15	19	13	6	11	4	2	-1	-7
20	-6	-3	-1	0	5	13	19	22	21	21	19	14	11	14	9	10	17	14	6	13	2	-2	-2	-3
21	-1	-3	0	7	12	16	20	19	20	18	20	25	19	16	-1	-6	18	19	5	8	3	4	ES -3	-5
22	-6	ES -12	2	3	10	15	15	23	19	19	26	20	16	19	16	19	18	17	5	9	6	2	ES -5	ES -6
23	-9	-9	-3	6	11	11	15	16	17	14	13	16	13	13	ES 2	-5	4	11	9	-1	0	2	-2	-4
24	-16	-4	-4	0	8	12	14	16	20	18	18	19	16	18	18	2	18	13	4	6	5	-1	-3	-4
25	-9	-11	-2	2	14	18	17	19	24	17	17	18	11	9	14	5	19	6	3	9	8	4	0	-1
26	-6	-6	-4	1	4	16	15	18	20	20	18	17	15	15	17	17	10	17	10	9	-6	-4	ES -4	-5
27	-2	-12	-7	-2	8	16	16	18	19	22	19	21	19	23	17	15	19	13	5	14	3	1	ES -6	-5
28	-11	-5	-4	3	10	14	18	19	21	20	20	19	13	5	-1	C	11	16	0	8	10	10	-3	-9
29	-6	-7	0	3	13	16	17	18	19	19	14	18	17	17	2	8	26	15	9	6	2	0	-1	-12
30	-19	-7	-6	1	6	10	16	16	14	22	19	17	17	17	22	15	13	7	11	0	-1	-3	-3	-5
31	-4	-2	1	2	7	16	18	20	20	22	17	19	17	13	20	18	13	8	11	6	-1	3	0	-3
CNT	31	29	31	31	31	31	31	31	31	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30
MED	US -7	-6	-3	3	9	14	17	19	21	21	19	20	17	18	US 16	15	18	13	US 6	6	3	1	-2	-5
UD	-1	2	2	7	14	17	20	23	26	26	25	25	23	23	ES 22	20	20	18	14	11	10	4	3	-1
LD	ES -19	ES -14	-8	0	6	10	14	16	16	17	15	16	13	9	ES 1	ES -5	9	5	ES 0	-1	-1	-4	ES -6	ES -12

RADIO PROPAGATION QUALITY FIGURES

HIRAISO

Time in U.T.

Jul. 1968	Whole Day Index	H B 06 12 18 / 12 18 24	W W V 00 06 12 18 / 06 12 18 24	S F 00 06 12 18 / 06 12 18 24	W W V H 00 06 12 18 / 06 12 18 24	Warning 00 06 12 18 / 06 12 18 24	Principal magnetic storms Start	End	ΔH
1	4o	4 (3) 4	4 4 4 4	4 5 5 4	4 5 4 4	N N N N			
2	4o	4 4 4	4 3 4 5	4 4 C 4	4 4 4 4	N N N N			
3	4o	4 4 4	4 (4) 4 4	4 (4)(4) 4	4 4 4 4	N N N N			
4	4o	4 4 4	4 4 4 4	(4)(4) C (4)	4 4 4 3	N N N N			
5	4o	3 4 4	3 (4) 4(4)	C 5 (4) 4	(3)(4)(4) 4	N N N N			
6	4o	4 5 5	4 4 4 3	4 4 4 C	4 4 4 4	N N N N			
7	4+	5 5 (5)	3 4 4 4	C C C C	4 4 3 4	N N N N			
8	4o	5 4 5	3 4 4 4	C C C C	4 4 4 3	N N N N			
9	5-	5 5 5	4 4 C C	C C C C	4 (4) C C	N N N N	21.55	---	88γ
10*	4-	4 4 3	3 4 4 4	(4)(4) 4 4	4 4 4 4	N N N N	---	---	
11*	3+	3 3 3	3 3 3 3	4 5 C C	4 4 4 4	N N N N	---	---	
12	4+	5 4 5	4 5 5 4	C 4 C (4)	5 4 5 4	N N N N	---	9xx	
13	4+	4 4 3	4 5 5 5	4 4 (4)(4)	4 4 3 4	N N N N	16.12	---	116γ
14*	3+	3 3 (4)	3 3 3 3	(4) 4 (4)(3)	4 4 4 4	N N N N	---	---	
15	4+	4 5 4	4 3 4 5	(4)(4) 4 (5)	4 4 4 4	N N N N	---	04xx	
(16)	4+	3 4 4	4 5 5 5	(5)(5)(4) 4	4 4 4 4	N N N N			
(17)	5-	5 4 4	5 5 5 5	4 5 C 5	4 4 5 4	N N N N			
(18)	5-	4 5 5	5 5 4 4	5 4 C 5	4 4 4 4	N N N N			
19	4+	4 4 3	4 4 (4) 4	5 5 5 5	4 4 4 4	N N N N			
20	4+	4 4 4	4 4 4 5	5 4 4 4	4 4 4 4	N N N N			
21	4+	3 4 (4)	5 4 4 5	5 5 5 5	4 4 3 4	N N N N			
22	4-	3 4 4	4 4 4 3	4 4 (3) 4	4 4 4 4	N N N N			
23	4o	4 4 (5)	3 4 4 3	4 4 C 4	4 4 4 4	N N N N			
24	4-	3 4 4	3 4 3 4	4 4 C 4	4 4 4 4	N N N N			
25	4o	4 4 4	4 4 4 4	4 4 C 4	4 4 4 4	N N N N			
26	4o	4 4 4	4 4 4 4	4 4 (4) 4	4 4 4 3	N N N N			
27	4+	4 4 5	4 5 4 4	4 5 C 4	4 4 4 4	N N N N			
28	4o	4 (4)(4)	4 4 4 4	4 5 C 4	4 4 (3) 4	N N N N			
29	4+	4 5 4	5 4 4 4	4 4 C C	4 4 4 4	N N N N			
30	4o	4 5 3	5 4 4 4	C C C C	4 4 4 3	N N N N			
31	4+	4 4 4	5 4 5 4	C C C C	4 4 4 4	N N N N			

IQSY GEOALERT and ADALERT (Western Pacific Region)

* = MAGSTORM

o = MAGCALME

Δ = COSMIC EVENT

( ) = Regular World Day

\- = impossible to evaluate

( ) = inaccurate

C = artificial accident

--- = continuing magnetic storm

SUDDEN IONOSPHERIC DISTURBANCES

(S.I.D.)

HIRAISO

Time in U.T.

July 1968	S W F										Correspondence		
	Drop-out Intensities (db)						Start-time	Dura-tion	Type	Imp.	Flare	Solar Noise	Mag.
	CO	SF	HA	TO	HB	SH							
3		13			13		23.30	30	S	1			
6					>30		09.43	64	S	3	x	x	
8		-	28		28		17.09	58	S	2+	x	x	
9	13	-	12				18.12	35	Slow	2-	x	x	
12	23	-		12'	-		00.00	60	Slow	2-	x	x	
28					14		07.20	25	S	1	x		

IONOSPHERIC DATA IN JAPAN FOR JULY 1968

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