F—244

IONOSPHERIC DATA IN JAPAN

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RADIO RESEARCH LABORATORIES

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CONTENTS

SITE OF THE RADIO WAVE OBSERVATORIES AND HIRAISO BRANCH

Ionospheric observation is carried out at the following four observatories in Japan.

	Latitude	Longitude	Site
Wakkanai	45°23.6′N.	141°41.1′E.	Midori-cho, Wakkanai-shi, Hokkaido
Akita	39°43.5′N.	140°08.2′E.	Tegata Sumiyoshi-cho, Akita-shi, Akita-ken
Kokubunji	35°42.4′N.	139°29.3′E.	Nukui-Kitamachi, Koganei-shi, Tokyo-to
Yamagawa	31°12.1′N.	130°37.1′E.	Yamagawa-machi, Ibusuki-gun, Kagoshima-ken

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

	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.

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

c. Distinctive Events

The phenomena are picked up on the following criteria:

1. Distinct from the prevailing kind of activity,
2. Correlated with other known solar phenomena,
3. Remarkable change-over from one situation to another.

Starting time and *Time of maximum* are given to nearest minute in general, but to nearest a tenth minute for short intense occurrences or clear commencements.

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

Descriptive type is denoted by the following symbols:

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

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

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

C. RADIO PROPAGATION CONDITIONS

a. Field Strengths of WWV and WWVH

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

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

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

Transmitter

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

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

Receiver

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

The meaning of *Descriptive symbols* is as follows:

C: Measurement influenced by, or impossible because of, any non-propagational reasons.

S: Measurement influenced by, or impossible because of, interferences or atmospherics.

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

E: Less than the following figure.

b. Radio Propagation Quality Figures

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

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

The tabulated circuits contain Hamburg (commercial circuit), WWV (10, 15 and 20 MHz frequencies broadcast from Fort Collins, Colorado), Lima (commercial circuit) and WWVH (10 and 15MHz frequencies broadcast from Hawaii), which are received at Hiraiso Branch.

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

N=normal
U=unstable
W=disturbed

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

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

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

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

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

CO.....WWV 20, 15 and 10 MHz (Fort Collins, Colorado)
LM .....Various frequencies of commercial circuit (Lima)
HA.....WWVH 15 and 10 MHz (Hawaii)
TO.....JJY 15 and 10 MHz (Tokyo)
SH.....BPV 15 and 10 MHz (Shanghai)
HB.....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

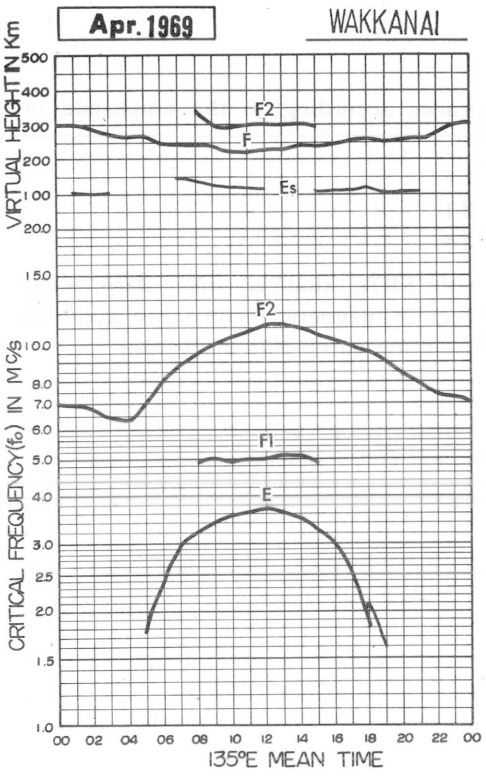
Importances

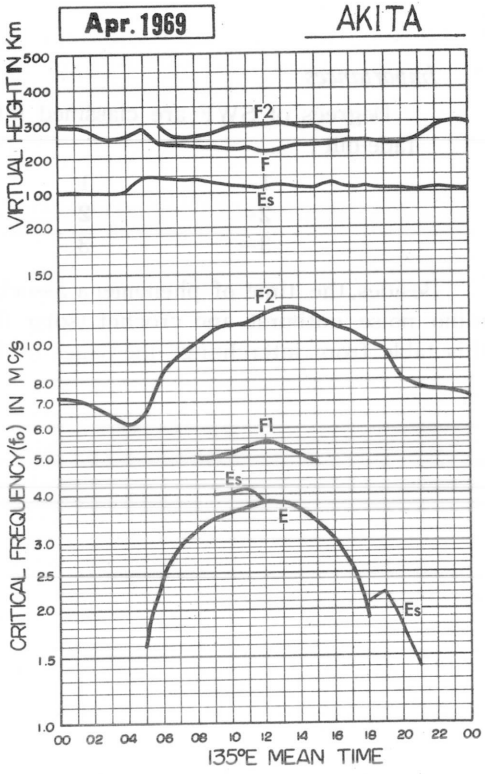
Degrees of SWF are classified into 9 grades according to the amplitude of fade-out ;

1−	1	1+
2−	2	2+
3−	3	3+

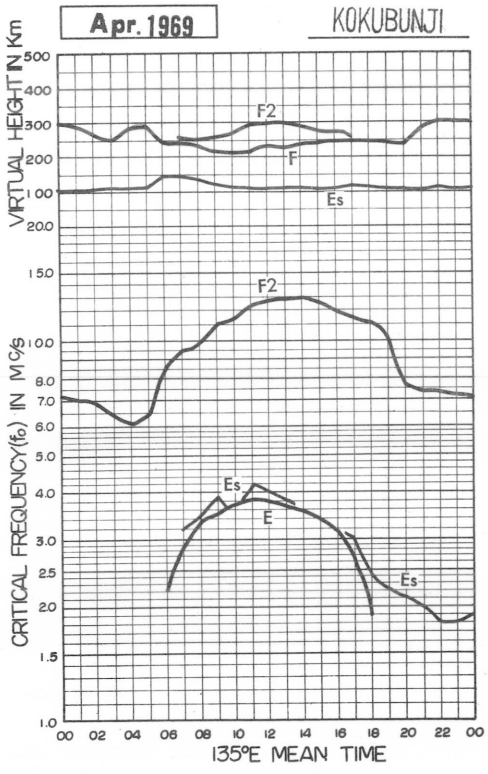
Besides, the time of phenomena associated with SID's, that is, solar flare, solar radio noise outburst and crochet (solar flare effect in magnetic record), are given in this table from interchange messages of IUWDS or measurements at Hiraiso.

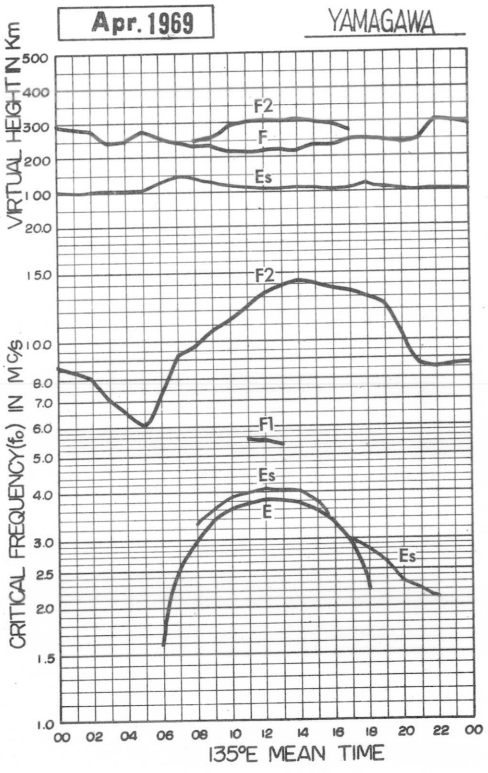
IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS





IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS





IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: WAKKANAI

Apr. 1969

135° E Mean Time (G.M.T. +9h)

CHAR	HR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
foF2	MED	071	069	068	065	063	069	080	088	095	100	105	109	111	112	110	106	102	098	096	090	083	078	074	073
	CNT	30	30	29	29	29	29	29	29	29	29	29	30	29	29	29	28	28	28	30	30	30	30	30	30
	Q R	006	006	005	008	007	008	017	019	019	027	017	019	016	014	016	013	014	014	018	010	008	007	005	005
foF1	MED							390	450	490L	500	490	500	500	510L	510	490	U460L							
	CNT							4	4	9	12	15	12	14	11	6	6	3							
foE	MED					E	178	240	295	320	340	355	365	372	362	350	325	300	250	180	E				
	CNT					14	18	29	29	29	29	29	27	28	28	28	28	27	27	15	10				
foEs	MED	E	E	E	E	E	E012G	G	G	G	039	G	038	G	G	G	G	E016G	E014G	021	016	E015E	E	E	E
	CNT	30	30	30	30	30	30	29	29	29	29	29	30	29	29	29	28	28	28	30	29	30	30	30	30
	Q R										006														
f-min	MED	E	E	E	E	E	E012E	012	012	017	018	020	020	020	020	019	017	013	012	E012E	E	E	E	E	E
	CNT	30	30	30	30	30	30	29	29	29	29	29	30	29	29	29	28	28	28	30	29	30	30	30	30
M (3000) F2	MED	260	258	260	260	260	275	300	300	295	290	290	280	280	280	285	290	290	295	295	290	280	275	262	260
	CNT	30	30	29	29	29	29	29	29	29	29	29	30	29	29	29	28	28	28	30	30	30	30	30	30
M (3000) F1	MED							325	335	345L	358	370	362	360	360L	358	358	U370L							
	CNT							3	4	9	12	15	12	14	11	6	6	3							
h'F2	MED							358	380	340	295	290	298	300	300	305	295	280							
	CNT							4	4	9	14	18	14	15	14	7	7	3							
h'F	MED	300	300	285	275	272	268	245	245	240	240	222	215	225	225	240	242	245	252	260	250	255	260	275	300
	CNT	30	30	30	30	30	30	28	28	28	28	28	30	29	29	29	28	28	28	30	30	30	30	30	30
h'Es	MED	112	112	105	105	105	105	125	150	140	125	122	120	115	110	110	110	110	112	120	110	115	110	112	135
	CNT	4	6	7	10	4	9	3	8	12	22	14	20	8	2	4	9	14	14	17	15	13	8	2	2
hpF2	MED																								
	CNT																								
ypF2	MED																								
	CNT																								

IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: AKITA

Apr. 1969

135° E Mean Time (G.M.T. +9h)

CHAR	HR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
foF2	MED	072	071	068	065	061	065	084	092	100	108	110	115	118	121	122	117	110	106	100	095	080	076	075	074
	CNT	30	30	30	30	29	30	30	30	30	30	30	29	29	29	29	28	27	27	28	29	30	30	30	30
	Q R	008	008	007	006	006	007	012	013	011	018	015	019	013	013	014	012	014	017	015	009	007	006	005	007
foF1	MED								450L	500L	500L	510L	540L	550L	530L	505L	485L	450							
	CNT								3	5	13	19	19	21	19	14	8	2							
foE	MED						160	242	290	325	345	360	370	385	380	360	335	305	260	188					
	CNT						14	30	30	30	29	25	23	24	28	28	27	28	27	18					
foEs	MED	014	E	E	E	E	E014G	G	G	E035G	040	040	041	038	G	G	G	G	G	021	J022X	J018X	014	E014S	E014S
	CNT	30	30	30	30	29	30	30	30	30	30	29	29	29	29	29	29	29	29	29	30	30	30	30	30
	Q R	D007									005	006	004								013	D006	D011	D007	D006
f-min	MED	E013S	E	E	E	E	E014S	014	014	015	016	016	017	018	019	017	015	014	014	013	E013S	E014S	E013S	E013S	E013S
	CNT	30	30	30	30	29	30	30	30	30	30	29	29	29	29	29	29	29	29	29	30	30	30	30	30
M (3000) F2	MED	265	270	275	275	270	275	310	300	300	300	290	285	285	285	285	290	295	295	305	300	285	270	268	265
	CNT	30	30	30	30	29	30	30	30	30	30	30	29	29	29	29	28	27	27	28	29	30	30	30	30
M (3000) F1	MED								340L	340L	365L	370L	365L	350L	350L	360L	352L	362							
	CNT								3	5	13	19	19	21	19	14	8	2							
h'F2	MED							290	260	265	270	280	290	295	300	290	290	270	275						
	CNT							5	19	30	30	30	29	29	29	29	29	25	7						
h'F	MED	295	290	275	255	265	280	240	240	230	230	222	230	220	225	230	235	240	250	255	240	240	260	280	295
	CNT	30	30	30	30	29	30	30	30	30	30	30	29	29	29	29	29	29	29	29	30	30	30	30	30
h'Es	MED	110	108	105	105	105	150	148	140	140	130	125	120	120	125	120	115	135	115	120	115	110	105	110	110
	CNT	9	8	7	7	6	9	9	13	15	25	25	23	15	11	12	9	6	8	20	23	17	14	10	9
hpF2	MED																								
	CNT																								
ypF2	MED																								
	CNT																								

IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: KOKUBUNJI

Apr. 1969

135° E Mean Time (G.M.T. +9h)

CHAR	HR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
foF2	MED	072R	070	069	064	061	064	086	095	098	110	112	121	126	129	130	126	119	114	112	102	077	073	073	072
	CNT	23	24	26	30	30	29	28	30	30	30	30	30	30	30	30	29	29	30	30	29	29	24	24	22
	Q R	005	005	004	006	006	007	014	011	013	013	017	015	010	008	013	012	014	016	013	014	012	004	005	004
foF1	MED								U500L		550	U560L	U575L	540L	U540L	U570L	500								
	CNT								1		2	1	4	1	5	2	1								
foE	MED						165	222	290	335	350	372	U385	380	372R	360	340	315	260	190					
	CNT						1	26	28	20	20	14	10	7	10	15	20	26	19	5					
foEs	MED	019	E016S	E016	E016	E016	E016S	G	032	035	039	036G	042	040	U038	035G	E022G	025G	030	024	022	021	020	018	018
	CNT	29	29	30	29	30	30	30	30	30	29	29	29	30	30	30	28	29	29	30	30	30	30	30	30
	Q R	D006	D006	D006	D009	D005							010						010	015	008	D009	D007	D013	D007
f-min	MED	E016S	E016S	E016S	E015E	E015S	E016S	016	016	017	025	026	026	026	027	026	019	016	016	016	E016S	E016S	E016S	E016S	E016S
	CNT	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	28	29	29	30	30	30	30	30	30
M (3000) F2	MED	275R	280	285	285	275	280	310	310	300	290	282	285	280	280	285	285	290	290	300	300	295	275	275	280
	CNT	23	24	26	30	30	29	28	30	30	30	30	30	30	30	30	29	29	30	30	30	29	24	24	22
M (3000) F1	MED								U340L		340	U340L	U340L	350L	U345L	U340L	360								
	CNT								1		2	1	4	1	5	2	1								
h'F2	MED							265	260	250	260	270	290	295	300	290	275	275	260						
	CNT							1	8	25	27	30	30	29	28	29	28	21	5						
h'F	MED	300	292	270	250	280	290	245	240	240	222	220	220	230	225	230	240	245	250	250	245	240	280	300	300
	CNT	30	30	30	30	30	30	30	30	30	30	30	28	28	27	29	29	29	29	30	30	30	29	29	29
h'Es	MED	110	110	105	108	110	115	150	150	140	125	115	112	110	110	110	110	110	115	118	110	110	105	110	108
	CNT	15	10	12	10	8	6	12	19	22	19	17	22	18	16	17	14	18	25	26	26	20	19	15	16
hpF2	MED	385R	378	350	370	390	380	300	300	310	330	350	352	360	355	352	350	345	338	320	312	330	375	380	370
	CNT	23	24	26	30	30	29	28	30	30	29	30	30	30	30	30	29	29	30	30	30	29	24	24	22
ypF2	MED	090R	080	090	100	098	100	092	090	100	100	102	100	098	095	095	100	100	100	095	100	090	090	090	080
	CNT	23	24	26	30	30	29	28	30	30	29	30	30	30	30	30	29	29	30	30	30	29	24	24	22

IONOSPHERIC DATA
LIST OF MEDIAN VALUES

OBSERVED AT: YAMAGAWA

Apr. 1969

135° E Mean Time (G.M.T. +9h)

CHAR	HR	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
foF2	MED	087S	084S	081S	070	065	060	072	092S	097S	106	112	122	133	138	142	140	135	133	130	122	102S	087S	085S	086S
	CNT	27	27	27	28	30	30	30	29	29	30	30	30	30	30	30	30	30	30	30	30	28	26	25	26
	Q R	015	011	011	010	008	008	019	013	017	015	019	010	011	011	010	013	014	013	007	008	015	016	016	017
foF1	MED									U550L	450	540	555L	555L	535L	555	485	505L							
	CNT									1	1	2	6	4	6	4	2	2							
foE	MED							160	250	302	340	360	370	380	380	375	358	330	290	220					
	CNT							8	27	26	28	27	27	26	23	25	28	29	29	26					
foEs	MED	E015S	E014E	E014B	E013E	E014E	E014B	E015S	G	033	036	039	040	041	040	040	038	030G	029	028	026	023	J022X	021	E015S
	CNT	30	30	30	30	30	30	30	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
	Q R	D009	D009	D007			D006	D007		005	004	007	007	011	009	011	013	015	010	014	017	020	D018	D010	D006
f-min	MED	E015S	E014S	012	011	E	012	E014S	E014S	015	016	018	018	020	020	019	017	015	015	014	E015S	E015S	E015S	E015S	E015S
	CNT	30	30	30	30	30	30	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
M (3000) F2	MED	265S	275S	285S	285	270	268	285	320S	305S	295	282	275	280	280	280	280	280	285	295	295	290S	265S	260S	262S
	CNT	27	27	27	28	30	30	30	29	29	30	30	30	30	30	30	30	30	30	30	30	28	26	25	26
M (3000) F1	MED									U355L	395	362	358L	360L	355L	352	372	350L							
	CNT									1	1	2	6	4	5	4	2	2							
h'F2	MED									250	255	290	302	305	302	305	300	290	275	272					
	CNT									11	28	30	30	30	30	30	30	30	28	4					
h'F	MED	290	278	258	240	245	275	258	240	235	230	220H	211H	220	220	220H	230	229	245	255	245	240	250	298	295
	CNT	30	30	30	30	30	30	30	29	29	29	29	28	27	25	29	29	30	28	30	30	30	30	30	30
h'Es	MED	105	102	105	105	105	105	130	145	140	130	120	115	110	110	115	110	105	108	125	110	105	105	105	105
	CNT	14	10	9	9	11	8	10	14	26	28	27	26	25	25	24	23	24	27	26	24	24	21	20	13
hpF2	MED																								
	CNT																								
ypF2	MED																								
	CNT																								

IONOSPHERIC DATA

APR. 1969 | foF2 (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	73	69	69	67	60	66	89	104	114	127	135	133	133	128	123	118	111	105	101	90	83	81	77	78
2	81	80	68	63	59	62	66	86	87	106	114	128	112	113	109	110	104	100	94	83	78	77	74	U F 73
3	F 71	F 68	F 70	F 63	F 63	F 70	83	88	87	110	116	120	128	123	116	110	105	106	107	93	84	82	75	F 66
4	F 67	69	F 66	F 60	F 60	F 58	63	70	86	96	107	114	110	108	105	109	110	106	103	88	76	75	74	73
5	70	74	65	F 60	F 58	69	81	96	112	121	117	116	121	116	117	111	103	103	103	84	76	73	73	69
6	70	70	70	65	63	67	83	90	100	104	110	111	116	110	110	105	103	94	85	81	76	76	75	76
7	74	68	70	69	58	64	74	91	95	113	116	113	110	116	114	111	102	102	103	92	81	75	74	73
8	71	70	73	66	64	69	85	104	111	110	114	114	115	123	126	120	108	98	96	87	78	78	77	74
9	70	71	70	69	67	73	84	93	108	114	118	119	122	125	124	114	104	104	101	90	86	78	70	69
10	67	66	63	61	56	59	63	65	66	64	78	77	85	R 85	84	84	85	83	84	77	60	60	60	60
11	60	F 55	F 55	F 50	F 49	54	66	73	80	83	95	98	102	103	95	96	90	84	81	87	77	F 74	F 68	F 70
12	70	F 60	F	F	F	F	73	87	95	100	95	90	94	98	101	98	92	90	93	86	77	74	70	67
13	F 65	F 65	F 63	F 58	F 58	F 64	83	93	103	108	102	106	111	121	118	111	99	91	104	99	91	800	76	73
14	64	65	F 65	F 63	F 63	69	87	91	96	105	102	106	113	112	117	106	98	97	103	100	91	83	74	74
15	75	74	71	67	66	69	76	85	91	95	112	112	116	122	114	107	107	103	103	98	87	77	77	78
16	81	76	70	69	68	74	C	C	C	C	C	123	121	123	118	120	113	109	104	93	80	81	76	74
17	75	70	67	66	66	71	82	90	95	99	105	111	114	117	122	108	96	98	95	94	84	80	73	72
18	70	69	63	56	55	63	63	60	74	75	83	95	99	108	103	100	91	93	95	96	86	78	72	71
19	71	71	71	68	65	73	85	103	108	110	110	110	112	112	107	105	101	100	96	96	83	79	74	77
20	S 73	73	70	68	66	76	81	85	96	99	109	109	113	110	114	111	106	100	103	100	87	78	79	80
21	79	76	75	71	65	70	80	89	99	111	105	H 96	106	110	110	103	103	104	101	103	88	80	73	73
22	72	72	71	69	65	75	85	85	95	100	104	109	112	114	113	112	110	104	111	99	95	90	83	76
23	81	69	69	66	59	64	60	58	60	58	59	65	68	72	74	73	74	78	83	85	83	79	71	67
24	65	66	65	56	56	66	80	92	97	97	96	105	97	99	100	98	97	96	97	93	83	83	81	79
25	71	70	66	64	64	78	87	94	98	103	104	100	105	114	114	97	91	88	90	93	88	83	73	73
26	71	69	68	69	68	73	83	91	90	96	105	110	104	111	108	103	97	93	91	91	86	80	77	74
27	73	75	68	68	67	70	76	73	79	78	83	83	85	92	98	91	87	89	84	86	75	73	71	71
28	67	66	63	60	53	50	60	53	56	57	60	65	70	73	75	C	C	C	80	87	83	72	57	F 53
29	F 50	55	59	51	48	50	56	55	55	53	59	62	69	H 70	80	79	77	77	79	83	78	72	66	66
30	62	60	58	52	50	52	58	56	62	60	60	65	C	C	C	C	C	C	78	I C 77	78	71	64	63
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	29	29	29	29	29	29	29	29	29	30	29	29	29	28	28	28	30	30	30	30	30	30
MED	71	69	68	65	63	69	80	88	95	100	105	109	111	112	110	106	102	98	96	90	83	78	74	73
UQ	73	72	70	68	65	71	83	92	99	110	112	114	115	117	117	111	106	104	103	96	86	81	76	74
LQ	67	66	65	60	58	63	66	73	80	83	95	95	99	103	101	98	92	90	85	86	78	74	71	69

IONOSPHERIC DATA

APR. 1969 | 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																								
2													U 500											
3														U 480										
4											U 500		U 500											
5																								
6													U 500											
7											U 500													
8												L			460									
9										L	470	500												
10									460	510	490	500	500	B										
11											L	500	510	500										
12										U 500	490			510										
13											480													
14																								
15																								
16									C	C	C		500											
17										U 500		500												
18									500			L	500											
19										U 500		490		U 500			500							
20									U 500		480	U 530		L	530	L								
21									U 580	510	500	500	500	U 500		510								
22										U 500	530		540	500	530	520	U 460							
23							U 380	440	470	480	490	510	550	520	500	U 480								
24									U 500	500	L	520	U 500	L	L									
25										500	500		L	U 520		480								
26											480			U 510										
27								U 460	490	520	U 500		530	530	510	U 500								
28							400	460	470	500	490	500	510	H 530		C	C							
29							380	A	A	A	480	510	510		H 510	L 480	U 460							
30							400	430	480	500	A	530	C	C	C	C	C							
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							4	4	9	12	15	12	14	11	6	6	3							
MED							390	450	L 490	500	490	500	500	L 510	510	490	U L 460							
UQ							400	460	U L 500	L 505	L 500	515	510	520	530	510	480							
LQ							380	435	470	500	480	500	L 500	U L 500	500	L 480	U L 460							

IONOSPHERIC DATA

APR. 1969 | 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						E	200	280	305	335	330	A	A	355	335	310	IA 290	235	S					
2						S	200	275	315	340	330	A	370	360	350	310	H 295	230	S					
3						E	205	285	310	340	340	340	375	370	A	320	300	235	145					
4						S	210	280	305	330	370	370	375	365	350	315	A	225	S					
5						S	205	285	305	325	330	365	380	370	340	325	290	240	A					
6						S	210	290	305	330	335	IA 335	380	360	350	325	290	235	145					
7						E	210	285	310	330	340	350	355	355	335	315	290	230	S					
8						E	220	290	315	335	345	365	360	355	325	325	295	245	A					
9						S	230	300	320	335	355	365	360	350	345	330	290	250	S					
10						A	220	285	305	335	365	370	340	IB 330	330	320	300	245	S	E				
11						S	230	295	320	340	360	355	335	340	325	320	300	250	S	E				
12						A	IA 225	295	320	340	IA 350	IA 370	370	370	355	325	290	255	185	E				
13						A	230	305	320	335	355	IA 345	370	350	350	335	IA 310	255	S	E				
14						S	230	300	335	370	380	365	380	350	370	340	305	255	175	S				
15						150	250	310	350	365	350	360	390	380	365	330	300	255	185	E				
16					E	180	C	C	C	C	C	A	390	385	355	335	IA 295	255	185	A				
17					E	S	245	300	325	345	370	370	370	380	360	335	300	245	175	E				
18					E	150	240	300	325	345	365	365	365	370	355	315	295	255	180	S				
19					E	S	240	290	325	345	350	370	370	355	350	325	300	235	A	S				
20					E	200	250	290	325	365	380	375	380	370	IR 350	320	300	260	A	A				
21					E	180	240	300	335	360	380	360	340	IR 325	315	300	315	255	160	S				
22					E	170	270	305	340	350	375	380	380	365	350	330	300	270	175					
23					E	165	250	300	320	345	350	350	375	IB 365	360	325	295	240	185	E				
24					E	175	255	295	330	340	370	370	380	B	390	365	315	285	210	E				
25					E	180	255	300	320	345	370	380	380	390	365	335	305	A	A	A				
26					E	190	265	305	325	355	360	375	IR 375	370	365	335	305	265	175	S				
27					E	200	270	305	325	350	355	345	IA 370	370	360	325	300	265	A	A				
28					E	200	265	300	325	350	360	365	375	355	330	C	C	C	200	E				
29					A	180	245	295	315	335	350	370	370	350	345	330	300	255	200	E				
30					E	200	250	295	315	335	340	335	C	C	C	C	C	C	A	C				
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT					14	18	29	29	29	29	29	27	28	28	28	28	27	27	15	10				
MED					E	178	240	295	320	340	355	365	372	362	350	325	300	250	180	E				
UQ					E	190	250	300	325	350	370	370	380	370	360	332	300	255	185	E				
LQ					E	150	220	290	315	335	345	352	368	352	338	320	295	238	175	E				

IONOSPHERIC DATA

APR. 1969

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	J X 21	E	E	E	E	E	G	G	G	39	43	J X 53	38	G	G	G	33	G	E S 15	E S 15	E S 15	E	E S 16	E
2	E	E	13	16	E	E S 12	G	31	38	38	40	37	G 34	G 30	G	G	G	G	19	21	E	E S 18	E	E
3	E	E	E	E	E	G	G	G	G	41	37	38	G	G	37	G 29	G	G	G	E	E	E	E	E
4	E	E	E	E	E	E S 14	G	G	G	G	G	G	G	G	G	G	J X 43	26	21	E S 15	E	E	E	E
5	E	E	E	13	E	E S 15	G	G	G	35	G	G	G	G	G	G	G 20	J X 28	J X 30	J X 23	E S 15	E	E	E
6	E	14	15	E	E	E S 16	G	G	G	38	G	J X 43	G	G	G	G	G	G	G	E	E	E S 16	E	E S 15
7	E	E S 15	E	E	E	G	G	G	G	G	G	G	G	G	G	G	G	G	E S 17	E	E	E	E	E
8	E	E	E	E	E	G	G	G	G	38	G	G 34	G	G	37	36	33	30	24	J X 53	J X 25	E	E	E
9	E	E	E	E	E	E S 15	G	G	G	38	G	J X 45	G	G	G	G	32	G	21	J X 40	20	E	E	E
10	E S 15	E	E	E	E	J X 28	G	G	G	G	G	40	38	E B 56	G	G	G	G	E S 18	E	E	E	E S 15	E
11	E	E	E	E	E	E S 17	G	G	35	44	40	G	G	G	G	G	G	G	J X 31	E	E	E	E	E
12	E	E	E	14	18	21	25	G	G	43	J X 43	43	G	G	G	G 20	G	G 19	G	E	E	E	E	E S 15
13	E	E	E	E	E	J X 22	G	G	G	G	G	37	G	G	G	G	33	G	E S 18	E	E	E	E	E
14	E S 15	E	E	E	E	G	G	G	G	G	G	40	G	G	G	G	G	G	G	E S 16	E S 16	E	E S 15	E
15	E S 15	E	E	E	E	G	G	G	G	G	G	G	G	G	G	G 25	G	G	G	E	E	E	E	E
16	E	E	18	15	16	20	C	C	C	C	C	40	G	G	G	G	33	G 14	23	16	16	E	E	E
17	E	E	E	E	E	G	G	G	G	G	G	G	G	G	G 30	G 25	G 20	G	G	19	E S 15	E S 15	E	E S 16
18	E	E	E	E	E	G	G	35	G	40	41	41	41	40	G	G	33	27	26	19	J X 24	21	E	E S 17
19	E S 12	20	J X 21	E	E	G	G	33	36	38	39	G	G	G	G	G 19	G 23	24	25	J X 23	E S 16	E S 16	E S 13	E S 12
20	E S 17	E S 13	E	E	E	G	G	33	38	40	G	40	G	G	G	G	G	G 15	23	J X 23	J X 23	23	E S 16	J X 23
21	20	20	J X 25	16	E	G	G	36	G	40	44	39	38	G	J X 51	J X 43	G	32	25	J X 35	23	J X 30	J X 33	E S 11
22	20	E	E	20	E	19	G	33	J X 46	41	G	G	G	G	G	G	G	35	31	J X 35	E S 12	26	17	21
23	30	J X 23	J X 23	J X 21	E	G	G	G	37	36	39	37	G	E B 44	G	G 23	G 21	G	G	E	J X 21	E	E S 17	E
24	E S 17	21	E	E	E	24	30	34	39	41	41	42	41	E B 42	G	G	G	G	G	20	17	17	E	E
25	E	E	E	15	E	22	G	G	36	41	43	42	G	G	G	G	G 24	J X 29	J X 25	J X 20	E	E	E	E
26	E	E	E	E	E	G	G	G	G	40	G	43	G	G	G	41	G 16	J X 43	24	E S 12	J X 24	J X 30	E S 15	E
27	E	E	E	E	E	G	G	G	39	41	39	G	39	G	G	G	G	40	J X 23	J X 20	22	J X 33	E S 13	E S 16
28	E	E	E	E	15	21	G	G	41	39	45	43	41	G	G	C	C	C	G	E	14	E	13	E
29	E	J X 21	J X 35	J X 43	J X 38	33	36	J X 52	J X 55	J X 53	G	G	G	G	G	G	36	40	29	21	J X 23	E	E S 13	E
30	E S 15	E	E	13	E	G	G	G	40	43	M 58	39	C	C	C	C	C	C	J X 34	C	J X 30	J X 38	E S 15	E S 15
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	29	29	29	29	29	30	29	29	29	28	28	28	30	29	30	30	30	30
MED	E	E	E	E	E	E G 12	G	G	G	39	G	38	G	G	G	G	E G 16	E G 14	21	16	E E 15	E	E	E
UQ	E E 15	E E 13	E	14	E	20	G	31	38	41	41	42	G 34	G	G	G 22	32	28	25	J X 21	22	18	E S 15	E S 15
LQ	E	E	E	E	E	G	G	G	G	35	G	G	G	G	G	G	G	G	G	E	E	E	E	E

IONOSPHERIC DATA

APR. 1969 | 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	15	E	E	E	E	E	G	G	G	G	G	42	38	G	G	G	29	G	E S 15	E S 15	E S 15	E	E S 16	E
2	E	E	E	16	E	E S 12	G	G	G	G	G	37	G 34	G 30	G	G	G	G	G	16	E	E S 18	E	E
3	E	E	E	E	E	G	G	G	G	G	G	G	G	G	36	G 28	G	G	G	E	E	E	E	E
4	E	E	E	E	E	E S 14	G	G	G	G	G	G	G	G	G	G	30	18	G	E S 15	E	E	E	E
5	E	E	E	E	E	E S 15	G	G	G	G	G	G	G	G	G	G	G 20	20	21	18	E S 15	E	E	E
6	E	E	E	E	E	E S 16	G	G	G	G	G	40	G	G	G	G	G	G	G	E	E	E S 16	E	E S 15
7	E	E S 15	E	E	E	G	G	G	G	G	G	G	G	G	G	G	G	G	E S 17	E	E	E	E	E
8	E	E	E	E	E	G	G	G	G	G	G	G 34	G	G	G	G	G	G	22	50	16	E	E	E
9	E	E	E	E	E	E S 15	G	G	G	G	G	G	G	G	G	G	G	G	G	35	20	E	E	E
10	E S 15	E	E	E	E	16	G	G	G	G	G	G	G	E B 56	G	G	G	G	E S 18	E	E	E	E S 15	E
11	E	E	E	E	E	E S 17	G	G	G	G	G	G	G	G	G	G	G	G	G	E	E	E	E	E
12	E	E	E	E	E	19	25	G	G	G	37	40	G	G	G	G 20	G	G 16	G	E	E	E	E	E S 15
13	E	E	E	E	E	17	G	G	G	G	G	37	G	G	G	G	30	G	E S 18	E	E	E	E	E
14	E S 15	E	E	E	E	G	G	G	G	G	G	G	G	G	G	G	G	G	G	E S 16	E S 16	E	E S 15	E
15	E S 15	E	E	E	E	G	G	G	G	G	G	G	G	G	G	G 25	G	G	G	E	E	E	E	E
16	E	E	E	E	E	G	C	C	C	C	C	40	G	G	G	G	30	G 13	15	15	15	E	E	E
17	E	E	E	E	E	G	G	G	G	G	G	G	G	G	G 20	G 25	G 20	G	G	16	E S 15	E S 15	E	E S 16
18	E	E	E	E	E	G	G	G	G	G	G	G	G	40	G	G	G	G	G	G	22	E S 16	E	E S 17
19	E S 12	E	E	E	E	G	G	G	G	G	G	G	G	G	G	G 19	G 23	23	22	20	E S 16	E S 16	E S 13	E S 12
20	E S 17	E S 13	E	E	E	G	G	G	G	G	G	G	G	G	G	G	G	G 15	20	17	19	17	E S 16	E
21	E	E	17	12	E	G	G	G	G	G	G	G	G	G	48	41	G	31	23	28	16	29	17	E S 11
22	E	E	E	E	E	G	G	G	43	40	G	G	G	G	G	G	G	G	28	34	E S 12	17	E S 17	18
23	17	15	12	13	E	G	G	G	36	G	G	G	G	E B 44	G	G 23	G 21	G	G	E	17	E	E S 16	E
24	E S 17	E	E	E	E	G	G	G	G	G	G	41	E R 41	E B 42	G	G	G	G	G	G	17	15	E	E
25	E	E	E	E	E	G	G	G	G	G	G	G	G	G	G	G	G 20	28	21	17	E	E	E	E
26	E	E	E	E	E	G	G	G	G	G	G	G	G	G	G	G 23	G 16	G	G	E S 12	12	22	E S 15	E
27	E	E	E	E	E	G	G	G	G	G	G	G	38	G	G	G	G	18	22	18	17	26	E S 13	E S 16
28	E	E	E	E	E	14	G	G	G	G	G	G	G	G	G	C	C	C	G	E	E	E	13	E
29	E	14	31	26	33	31	36	50	A	48	G	G	G	G	G	G	G	G	G	18	21	E	E S 13	E
30	E S 15	E	E	E	E	G	G	G	G	G	53	G	C	C	C	C	C	C	34	C	25	36	E S 15	E S 15
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	29	29	29	29	29	30	29	29	29	28	28	28	30	29	30	30	30	30
MED	E	E	E	E	E	G	G	G	G	G	G	G	G	G	G	G	G	G	G	E G 15	E E 15	E	E	E
UQ	E E 15	E	E	E	E	E G 15	G	G	G	G	G	G 34	G	G	G	G 20	G 20	G 16	21	18	17	E E 16	E S 15	E S 12
LQ	E	E	E	E	E	G	G	G	G	G	G	G	G	G	G	G	G	G	G	E	E	E	E	E

IONOSPHERIC DATA

APR. 1969 | 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

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E	E	E	E	E	E	12	12	17	17	20	18	18	18	17	11	13	12	Es 15	Es 15	Es 15	E	Es 16	E
2	E	E	E	E	E	Es 12	12	12	11	17	20	23	21	22	20	19	15	12	Es 15	E	E	Es 18	E	E
3	E	E	E	E	E	E	E	12	16	20	21	22	20	20	18	17	17	11	12	E	E	E	E	E
4	E	E	E	E	E	Es 14	E	E	12	18	20	21	22	20	20	17	12	E	Es 14	Es 15	E	E	E	E
5	E	E	E	E	E	Es 15	11	12	15	16	20	20	27	23	20	18	E	E	E	E	Es 15	E	E	E
6	E	E	E	E	E	Es 16	14	11	11	16	18	28	22	20	17	12	13	12	E	E	E	Es 16	E	Es 15
7	E	Es 15	E	E	E	E	E	E	11	17	16	21	20	20	17	17	13	E	Es 17	E	E	E	E	E
8	E	E	E	E	E	E	14	11	12	17	19	22	20	20	18	16	12	13	E	E	E	E	E	E
9	E	E	E	E	E	Es 15	13	E	17	17	17	20	17	22	20	18	15	12	Es 15	E	E	E	E	E
10	Es 15	E	E	E	E	E	12	12	17	19	18	18	16	56	27	12	11	16	Es 18	E	E	E	Es 15	E
11	E	E	E	E	E	Es 17	12	16	18	20	27	27	28	23	17	20	16	16	Es 14	E	E	E	E	E
12	E	E	E	E	E	E	12	14	17	18	18	20	18	20	18	12	12	E	14	E	E	E	E	Es 15
13	E	E	E	E	E	E	11	12	15	17	18	20	20	17	16	12	12	11	Es 18	E	E	E	E	E
14	Es 15	E	E	E	E	Es 12	12	13	17	20	19	20	18	16	25	20	18	11	12	Es 16	Es 16	E	Es 15	E
15	Es 15	E	E	E	E	E	12	16	17	20	22	23	24	23	20	20	E	12	E	E	E	E	E	E
16	E	E	E	E	E	12	C	C	C	C	C	35	20	20	20	17	12	E	E	E	E	E	E	E
17	E	E	E	E	E	Es 12	11	11	15	18	20	20	21	21	19	17	13	E	E	E	Es 15	Es 15	E	Es 16
18	E	E	E	E	E	E	E	E	17	21	17	20	21	23	20	19	14	11	13	Es 12	Es 15	Es 16	E	Es 17
19	Es 12	E	E	E	E	Es 16	17	16	16	17	18	19	22	18	15	12	11	E	15	Es 16	Es 16	Es 16	Es 13	Es 12
20	Es 17	Es 13	E	E	E	15	17	17	20	20	23	22	20	23	19	17	19	11	E	E	E	E	Es 16	Es 18
21	Es 18	Es 14	E	E	E	14	16	17	18	21	20	29	23	27	20	17	17	15	13	Es 13	E	Es 15	Es 15	Es 11
22	Es 16	E	E	E	E	13	13	17	20	21	25	23	22	21	20	18	16	12	16	E	Es 12	E	Es 17	Es 13
23	E	E	E	E	E	13	12	12	17	18	19	19	19	44	20	17	14	16	16	E	E	E	Es 16	E
24	Es 17	E	E	E	E	12	12	11	15	20	21	17	22	42	34	22	19	16	11	E	E	E	E	E
25	E	E	E	E	E	12	11	12	15	17	17	16	20	23	16	20	E	E	E	E	E	E	E	E
26	E	E	E	E	E	12	E	12	14	19	20	18	27	18	20	12	11	12	12	Es 12	E	E	Es 15	E
27	E	E	E	E	E	E	11	11	16	20	20	23	22	20	17	16	11	E	E	E	Es 12	E	Es 13	Es 16
28	E	E	E	E	E	E	E	16	17	20	20	20	18	20	18	C	C	C	12	E	E	E	E	E
29	E	E	E	E	E	E	13	16	18	18	21	17	19	16	17	17	13	12	12	E	E	E	Es 13	E
30	Es 15	E	E	E	E	12	11	16	17	20	20	20	C	C	C	C	C	C	E	C	Es 15	E	Es 15	Es 15
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	29	29	29	29	29	30	29	29	29	28	28	28	30	29	30	30	30	30
MED	E	E	E	E	E	E E 12	12	12	17	18	20	20	20	20	19	17	13	12	E E 12	E	E	E	E	E
UQ	Es 15	E	E	E	E	13	13	16	17	20	20	23	22	23	20	18	16	12	Es 15	E	Es 12	E	Es 15	Es 13
LQ	E	E	E	E	E	E	11	11	15	17	18	19	19	20	17	14	12	E	E	E	E	E	E	E

IONOSPHERIC DATA

APR. 1969

M(3000)F2(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	260	255	265	265	255	245	295	300	270	300	295	295	285	285	275	290	285	290	300	290	275	270	260	260
2	270	285	280	255	230	245	270	300	285	290	290	300	295	280	285	295	305	300	300	290	275	270	260	U F 260
3	F 255	F 255	F 255	F 255	F 255	F 255	300	295	300	290	280	275	285	280	275	280	285	290	300	290	275	275	265	255 F
4	F 250	255	F 250	F 250	F 255	F 275	310	315	310	300	300	305	290	285	285	285	290	295	300	300	280	260	260	250
5	260	285	275	F 265	F 260	265	310	300	295	300	290	285	285	285	295	290	300	295	300	290	275	260	265	260
6	260	265	260	265	265	270	310	300	270	295	290	280	285	280	285	290	290	290	300	285	275	265	270	275
7	270	255	255	265	255	270	285	300	295	290	295	285	280	280	280	290	285	275	295	290	280	265	260	250
8	245	255	260	275	260	260	305	310	315	290	280	280	280	285	290	300	295	295	300	295	270	270	275	260
9	255	260	255	260	260	275	305	300	315	300	290	285	280	290	290	300	290	290	300	295	280	280	255	255
10	260	260	260	260	260	275	290	285	260	285	285	290	305	R 310	310	310	310	300	305	300	270	250	250	250
11	255	F 250	F 255	F 250	F 245	270	290	300	305	280	300	290	300	305	295	305	305	310	295	285	275	F 270	F 265	F 255
12	270	F 275	F	F	F	F	300	300	305	310	305	290	290	295	290	305	305	295	300	300	285	285	265	265
13	F 260	F 250	F 265	F 260	F 245	F 280	320	300	280	285	275	265	270	280	290	295	295	290	290	295	285	285	275	275
14	250	245	F 255	F 255	F 245	275	300	300	300	295	300	285	280	275	290	290	295	295	290	290	290	280	270	260
15	265	265	260	255	260	275	305	300	295	285	275	275	275	285	280	280	290	285	295	285	280	265	260	255
16	270	280	255	260	260	295	C	C	C	C	C	275	270	280	270	275	275	285	300	290	265	270	250	245
17	255	255	255	255	255	260	285	290	295	275	280	275	275	270	290	290	285	285	285	280	275	275	255	250
18	240	245	245	250	245	280	275	265	285	285	265	275	265	270	275	300	295	295	285	285	280	275	255	255
19	260	265	270	275	270	290	305	290	315	320	290	300	275	280	280	285	295	300	290	290	285	280	260	265
20	S 270	260	265	275	265	295	310	310	295	285	290	285	280	280	280	285	285	290	295	300	300	275	265	265
21	265	275	285	280	270	285	310	290	295	300	290	H 275	275	275	280	280	275	290	285	300	305	275	260	260
22	255	260	270	275	275	310	315	305	285	300	290	280	275	280	280	280	275	280	290	285	295	280	265	250
23	305	255	270	275	275	270	280	265	270	260	240	255	280	275	295	295	295	305	295	285	290	285	275	265
24	255	260	285	265	255	280	310	305	300	300	280	295	280	275	280	280	290	290	290	295	275	280	275	285
25	270	260	270	270	260	295	300	290	295	295	285	270	265	280	290	295	290	295	290	285	285	300	285	265
26	270	255	260	270	270	295	295	300	300	280	290	290	280	280	295	300	295	305	290	290	290	285	275	255
27	250	255	260	260	260	265	280	290	285	275	290	275	270	275	290	295	290	295	300	290	280	260	260	260
28	255	260	265	275	270	260	285	265	270	250	255	270	285	290	285	C	C	C	265	285	275	285	245	F 245
29	F 235	225	245	260	250	250	265	265	265	220	270	280	280	H 270	300	305	310	310	295	300	290	280	260	260
30	255	250	255	250	250	270	280	300	290	295	265	260	C	C	C	C	C	C	295	I C 280	270	280	265	260
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	29	29	29	29	29	29	29	29	29	30	29	29	29	28	28	28	30	30	30	30	30	30
MED	260	258	260	260	260	275	300	300	295	290	290	280	280	280	285	290	290	295	295	290	280	275	262	260
UQ	270	265	270	270	265	280	310	300	300	300	290	290	285	285	290	300	295	298	300	295	285	280	270	265
LQ	255	255	255	255	255	265	285	290	285	285	280	275	275	275	280	285	285	290	290	285	275	270	260	255

IONOSPHERIC DATA

APR. 1969

M(3000)F1(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																								
2													U L 390											
3														U L 395										
4											U L 380		U L 400											
5																								
6													U L 360											
7											U L 360													
8												L			370 L									
9										L	390	365 L												
10									325 L	340 L	365 L	365	360	B										
11											L	360	360	370 L										
12										U L 370	365 L			375 L										
13											375													
14																								
15																								
16									C	C	C		370 L											
17										U L 375		390 L												
18									345 L			L	350											
19										U L 385		380		U L 380			375 L							
20									U L 380		375	U L 375			L	360	L							
21									U L 370	365	375	375	395	U L 375		365								
22										U L 375	380		345	360	355	345	U L 370							
23							U L 325	335	340	350	355	355	335	340	350	U L 355								
24									U L 375	375	L	360	U L 370	L	L									
25										350	370 L		L	U L 345		375								
26											380			U L 355										
27								U L 360	340	335	U L 360		345	335	355	U L 360								
28							330	325	320	320	350	350	370	H 340		C	C							
29							A	A	A	A	360	335	355		H 380	355 L	U L 370							
30							325	335	345	345	A	340	C	C	C	C	C							
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							3	4	9	12	15	12	14	11	6	6	3							
MED							325	335	345 L	358	370	362	360	360 L	358	358	U L 370							
UQ							328	348	U L 370	U L 375	378	375	U L 370	375 L	370	365	372 L							
LQ							325	330	340	342	360 L	352	350	342	355	355 L	U L 370							

IONOSPHERIC DATA

APR. 1969 | h'F2 (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

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																								
2													260											
3														250										
4											265		260											
5																								
6													275											
7											290													
8												270			280									
9										270	265	270												
10									350	370	320	315	305	300										
11											295	275	285	290										
12										265	270			290										
13											250													
14																								
15																								
16									C	C	C		260											
17										270		275												
18									340			U L 310	300											
19										260		285		270			275							
20									275		290	295		285	300	285								
21									290	290	270	260	255	280		300								
22										270	290		305	300	305	260	280							
23							350	415	440	465	415	475	385	370	325	310								
24									280	275	290	300	280	315	300									
25										300	290		320	310		265								
26											315			305										
27								300	325	360	320		360	345	310	305								
28							345	440	395	510	460	415	320	360		C	C							
29							375	A	A	615	415	395	365		320	295	290							
30							365	345	360	380	400	465	C	C	C	C	C							
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							4	4	9	14	18	14	15	14	7	7	3							
MED							358	380	340	295	290	298	300	300	305	295	280							
UQ							370	428	360	380	320	395	320	315	315	302	285							
LQ							348	322	290	270	270	275	268	285	300	275	278							

IONOSPHERIC DATA

APR. 1969 | 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	285	300	275	290	265	300	225	240	230	210	250	220	215	245	225	245	250	250	240	245	270	285	300	300
2	270	260	250	300	320	300	270	250	240	240	215	210	220	205	240	245	250	245	240	230	260	275	295	300
3	305	300	300	300	300	300	225	240	220	255	235	215	235	220	235	230	250	255	250	245	250	260	250	300
4	320	300	305	300	260	270	250	240	225	225	210	240	230	225	225	245	255	250	250	240	255	270	300	300
5	300	260	250	255	265	265	240	240	220	220	210	205	215	245	240	240	245	260	250	220	250	260	275	275
6	300	290	275	260	260	250	225	240	230	220	225	215	220	230	220	240	250	245	245	250	250	270	285	290
7	280	300	300	260	235	275	245	220	220	240	215	225	230	210	240	250	250	260	250	230	250	270	290	300
8	325	300	275	250	255	250	245	245	245	225	210	210	220	240	245	240	245	245	250	275 A	265	275	275	285
9	300	300	300	275	250	265	235	240	250	230	210	210	225	215	245	245	245	255	250	260	265	260	265	300
10	300	300	295	275	275	280	260	250	250	235	220	245	215	I 220 B	235	240	245	260	260	250	245	295	315	315
11	305	305	275	300	330	295	250	250	230	255	230	215	215	245	230	250	245	250	270	260	260	270	280	300
12	275	270	295	270	255	260	245	240	230	245	205	225	230	230	235	240	250	250	250	245	260	260	265	310
13	300	300	285	250	280	245	240	240	240	225	215	200	220	235	235	240	245	260	265	250	235	240	255	275
14	310	345	320	300	270	270	230	245	245	245	235	215	225	215	250	245	255	260	260	250	260	250	260	300
15	300	295	290	275	300	270	250	250	245	240	240	235	215	245	240	240	250	260	260	250	255	255	280	315
16	280	250	290	290	290	260	C	C	C	C	C	240	220	225	235	240	260	250	240	240	260	270	300	300
17	300	275	285	275	310	270	250	245	240	225	225	210	225	225	240	240	245	260	260	250	250	260	265	310
18	320	315	305	300	320	300	250	250	240	240	220 H	220	220	215	220	245	230	250	260	250	260	250	260	295
19	300	290	280	250	300	250	240	245	250	240	240	215	225	210	240	225	240	260	255	250	240	255	270	300
20	300	290	255	255	270	255	240	240	235	240	210	220	275	235	250	245	255	250	265	250	240	250	280	300
21	305	285	270	250	270	235	240 H	240	215	245	235	210	205	225 H	275	250	255	260	260	255	245	260	260	300
22	305	300	285	255	240	250	245	240	250	235	210	210 H	225	215	240	235	245	250	270	270	250	270	255	315
23	290	250	285	245	235	300	270	250	230	250	240	220	200 H	E 270 B	250	225	230	250	260	250	260	250	265	280
24	325	300	255	240	310	250	255	250	245	240	230	215	250	235	250	250	240	250	260	250	260	275	265	260
25	265	275	275	285	320	250	245	235	235	250	245	215	235	245	235	240	240	265	260	260	260	250	250	290
26	300	305	300	270	250	250	250	245	240	235	215	215 H	245	215	245	250	240	260	260	255	255	270	270	290
27	305	275	290	275	275	260	250	245	250	250	225	220	240	235	270	250	250	260	250	260	245	300	290	300
28	300	295	260	260	255	290	260	245	275	250	285	250	220	210 H	215	C	C	C	290	270	260	245	295	300
29	350	355	360	305	370 A	360 A	A	A	A	A	220	225	225	205 H	190 H	245	245	250	260	260	250	250	275	300
30	315	305	300	315	350	270	240	250	250	250	A	215	C	C	C	C	C	C	275	I C 270	280	295 A	280	300
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	28	28	28	28	28	30	29	29	29	28	28	28	30	30	30	30	30	30
MED	300	300	285	275	272	268	245	245	240	240	222	215	225	225	240	242	245	252	260	250	255	260	275	300
UQ	305	300	300	300	310	290	250	250	248	248	235	225	230	235	245	245	250	260	260	260	260	270	290	300
LQ	300	275	275	255	255	250	240	240	230	228	212	210	220	215	235	240	245	250	250	245	250	250	265	290

IONOSPHERIC DATA

APR. 1969 | h'Es (km) | 135° E Mean Time (G. M. T. + 9h)

Station WAKKANAI Lat. 45°23.6'N. Long. 141°41.1'E Sweep 1.0 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	E	E	E	E	E	G	G	G	125	115	110	110		G	G	G	110	G	S	S	S	E	S	E
2	E	E	105	105	E	S	G	150	135	125	115	110	110	105	G	G	G	G	125	115	E	S	E	E
3	E	E	E	E	E	G	G	G	G	115	120	115	G	G	110	110	G	G	G	E	E	E	E	E
4	E	E	E	E	E	S	G	G	G	G	G	G	G	G	G	G	105	105	140	S	E	E	E	E
5	E	E	E	100	E	S	G	G	G	120	G	G	G	G	G	G	100	100	100	100	S	E	E	E
6	E	110	105	E	E	S	G	G	G	120	G	110	G	G	G	G	G	G	G	E	E	S	E	S
7	E	S	E	E	E	G	G	G	G	G	G	G	G	G	G	G	G	G	S	E	E	E	E	E
8	E	E	E	E	E	G	G	G	G	125	G	110	G	G	125	160	150	150	120	115	110	E	E	E
9	E	E	E	E	E	S	G	G	G	115	G	125	G	G	G	G	150	G	135	110	110	E	E	E
10	S	E	E	E	E	105	G	G	G	G	G	120	115	B	G	G	G	G	S	E	E	E	S	E
11	E	E	E	E	E	S	G	G	145	135	140	G	G	G	G	G	G	G	125	E	E	E	E	E
12	E	E	E	120	110	105	115	G	G	115	110	110	G	G	G	105	G	100	G	E	E	E	E	S
13	E	E	E	E	E	110	G	G	G	G	G	110	G	G	G	G	110	G	S	E	E	E	E	E
14	S	E	E	E	E	G	G	G	G	G	G	115	G	G	G	G	G	G	G	S	S	E	S	E
15	S	E	E	E	E	G	G	G	G	G	G	G	G	G	G	110	G	G	G	E	E	E	E	E
16	E	E	105	100	100	100	C	C	C	C	C	110	G	G	G	G	110	100	100	100	100	E	E	E
17	E	E	E	E	E	G	G	G	G	G	G	G	G	G	110	110	105	G	G	125	S	S	E	S
18	E	E	E	E	E	G	G	140	G	135	125	120	115	115	G	G	155	160	130	125	115	120	E	S
19	S	115	100	E	E	G	G	155	150	140	135	G	G	G	G	100	100	100	100	100	S	S	S	S
20	S	S	E	E	E	G	G	155	140	135	G	135	G	G	G	G	G	105	155	100	100	100	S	135
21	115	110	105	105	E	G	G	150	G	130	115	125	120	G	110	110	G	130	120	110	115	110	110	S
22	110	E	E	115	E	155	G	155	115	115	G	G	G	G	G	G	G	135	125	115	S	105	S	135
23	125	115	110	105	E	G	G	G	115	120	115	120	G	B	G	110	110	G	G	E	115	E	S	E
24	S	110	E	E	E	100	155	150	140	140	135	130	125	B	G	G	G	G	G	120	115	110	E	E
25	E	E	E	135	E	155	G	G	150	140	135	125	G	G	G	G	100	100	100	100	E	E	E	E
26	E	E	E	E	E	G	G	G	G	140	G	125	G	G	G	140	100	120	125	S	115	110	S	E
27	E	E	E	E	E	G	G	G	140	120	125	G	105	G	G	G	G	145	100	100	110	110	S	S
28	E	E	E	E	100	100	G	G	135	140	125	120	125	G	G	C	C	C	G	E	115	E	115	E
29	E	150	140	120	115	120	125	120	115	115	G	G	G	G	G	G	145	145	120	120	120	E	S	E
30	S	E	E	105	E	G	G	G	140	125	110	120	C	C	C	C	C	C	100	C	115	110	S	S
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	4	6	7	10	4	9	3	8	12	22	14	20	8	2	4	9	14	14	17	15	13	8	2	2
MED	112	112	105	105	105	105	125	150	140	125	122	120	115	110	110	110	110	112	120	110	115	110	112	135
UQ	120	115	108	120	112	120	140	155	142	135	135	125	122		118	110	145	145	125	118	115	110		
LQ	110	110	105	105	100	100	120	145	125	120	115	110	110		110	110	100	100	100	100	110	108		

IONOSPHERIC DATA

APR. 1969 | **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									C 1	C 1	L 1	L 1				L 1							
2			F 1	F 1				H 1	H 1	C 1	C 1	L 1	L 1	L 1					C 1	F 1				
3										C 1	C 1	C 1			L 1	L 1								
4																	L 2	L 1	H 1					
5				F 1						C 1							L 1	L 1	L 2	F 1				
6		F 1	F 1							C 1		L 1												
7																								
8										C 1		L 1			C 1	H 1	H 1	H 1	CL 11	F 3	F 2			
9										C 1		C 1					H 1		H 2	F 3	F 2			
10						L 1						C 1	C 1											
11									H 1	H 1	H 1								C 2					
12				F 1	F 1	L 1	L 1			C 1	L 1	L 1				L 1		L 1						
13						L 1						L 1					L 1							
14												C 1												
15																L 1								
16			F 1	F 1	L 1	L 1						L 1					L 1	L 1	L 1	L 1	F 1			
17															L 1	L 1	L 1			C 1				
18								H 1		H 1	C 1	C 1	C 1	C 1			H 1	H 1	H 1	C 1	F 2	F 1		
19		F 1	F 1					H 1	H 1	H 1	H 1					L 1	L 1	L 2	L 1	F 1				
20								H 1	H 1	H 1		H 1						L 1	HL 11	L 1	F 3	F 1		F 1
21	F 1	F 1	F 4	F 1				H 1		H 1	C 1	C 1	C 1		C 2	C 2		H 1	C 1	L 3	F 1	F 4	F 3	
22	F 1			F 1		H 1		H 1	C 2	C 1								H 1	C 3	F 6		FF 21		FF 11
23	FF 11	F 1	F 1	F 2					C 1	C 1	C 1	C 1				L 1	L 1				F 3			
24		F 1				L 1	H 1	H 1	H 1	H 1	H 1	H 1	C 1							C 1	F 1	F 1		
25				F 1		H 1			H 1	H 1	H 1	C 1					L 1	L 3	L 2	L 1				
26										H 1		C 1				HL 11	L 1	C 2	C 1		F 1	F 2		
27									H 1	C 1	C 1		L 2					HL 11	L 1	L 1	F 1	F 2		
28					L 1	L 1			H 1	H 1	C 1	C 1	C 1								F 1		F 1	
29		F 1	F 5	F 4	L 3	C 3	C 2	C 3	C 2	C 2							H 1	H 1	C 2	C 1	F 1			
30				F 1					H 1	C 1	C 1	C 1							L 1		F 2	F 3		
31																								

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

IONOSPHERIC DATA

APR. 1969 | 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	73	72	74	68	61	62	89	103	115	123	138	140	134	133	129	126	119	109	109	93	79	80	81	79
2	82	81	71	60	59	65	71	104	117	119	128	138	128	126	128	117	I R 113	107	95	86	74	76	76	76
3	75	75	74	66	66	66	89	92	97	117	133	124	132	132	126	122	116	111	113	95	82	77	80	76
4	73	73	73	69	65	66	86	85	94	112	I C 115	116	118	116	116	117	115	117	113	93	71	75	76	76
5	74	78	73	62	61	62	87	99	113	118	114	121	123	126	124	117	108	112	111	86	74	76	74	72
6	68	71	66	66	F	62	79	93	103	109	115	117	119	115	113	114	111	110	96	82	74	73	76	76
7	72	68	67	64	60	60	76	91	101	108	111	115	119	124	123	116	111	106	111	101	80	68	72	72
8	68	69	70	61	I C 56	61	85	95	109	109	111	119	121	125	131	123	115	108	103	93	77	75	75	75
9	72	70	68	66	61	68	91	96	105	118	119	122	129	132	131	125	113	108	110	101	79	78	69	69
10	71	68	67	64	60	65	76	74	79	91	107	C	C	C	C	C	C	C	C	76	58	57	59	59
11	61	58	58	53	51	52	71	H 85	96	V 94	109	114	I R 110	110	101	99	99	86	84	86	79	74	71	69
12	72	71	66	60	60	60	77	91	96	101	94	99	109	I R 111	I R 107	102	103	98	98	92	79	73	68	69
13	68	66	66	63	58	63	87	94	100	104	100	102	I R 112	126	127	118	106	94	99	I R 99	96	81	76	75
14	65	64	63	62	61	64	94	98	101	111	116	116	112	I R 113	122	R	R	R	R	R	88	81	74	75
15	76	76	74	68	67	70	84	98	I R 106	107	114	126	I R 126	125	125	123	R	R	100	100	82	81	81	78
16	83	82	71	71	69	76	93	100	102	I R 112	I R 124	129	129	134	131	127	123	I R 116	I R 107	96	79	79	I R 76	72
17	73	S 77	I R 62	S 67	I R 66	68	90	I R 104	S 116	117	I R 112	121	122	126	131	124	107	101	100	95	83	77	73	69
18	68	66	63	60	62	63	66	I R 68	81	93	102	111	108	118	121	S 117	108	102	I R 98	S 97	84	71	71	73
19	72	71	70	65	60	68	86	I R 100	I R 114	I R 116	I R 110	111	115	117	I R 113	I R 112	110	109	I R 109	I R 96	80	74	76	75
20	76	71	68	66	64	70	84	90	100	109	106	114	118	122	120	124	115	102	I R 110	109	84	78	84	84
21	80	81	80	71	60	69	82	90	I R 104	I R 112	I R 110	107	116	119	I R 122	120	118	117	106	107	84	78	82	82
22	79	78	76	71	67	71	86	94	96	99	111	116	123	121	120	116	I R 116	I R 114	I R 114	100	I R 95	92	89	79
23	86	86	74	71	65	74	75	74	64	68	68	74	85	88	87	86	86	86	91	I R 90	88	78	75	71
24	I R 72	70	70	56	55	66	82	94	97	101	97	106	118	114	108	109	104	109	I R 102	I R 100	84	S 81	84	82
25	76	71	68	65	65	76	86	96	101	101	103	101	112	129	127	I R 112	97	92	101	I R 97	89	82	72	I R 70
26	S 73	68	66	67	63	70	88	95	96	100	R 106	116	121	124	124	118	117	99	93	95	87	76	76	I R 76
27	I R 73	72	71	65	60	64	89	84	90	92	97	97	105	109	R 115	110	97	91	95	92	75	69	72	70
28	68	65	I R 68	61	55	57	65	60	60	69	75	81	86	85	90	85	80	89	91	I R 90	I R 80	69	58	56
29	56	55	62	62	54	56	I R 65	64	72	78	78	88	90	91	94	99	R 99	87	88	86	79	I A 72	68	69
30	64	63	64	56	56	59	59	58	65	62	68	72	88	107	104	98	95	89	95	87	74	73	69	67
31																								
.	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	29	30	30	30	30	30	30	29	29	29	29	28	27	27	28	29	30	30	30	30
MED	72	71	68	65	61	65	84	92	100	108	110	115	118	121	122	117	110	106	100	95	80	76	75	74
UQ	76	76	73	67	65	69	88	98	105	112	115	121	123	126	127	122	115	110	110	99	84	79	76	76
LQ	68	68	66	61	59	62	76	85	94	94	100	102	110	113	113	110	101	93	95	90	77	73	71	69

IONOSPHERIC DATA

APR. 1969 | 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									L	L	L 500	L	L 510	L 550	L	L								
2									L	L	L	500	L 490	L 600	L	L								
3									L	L	U L 540	L	L 500	L 500	L	L								
4									L	L 460	I C 510	L	L	L	U L 550	L	L							
5									L	L	L 480	L 600	L 520	L	L	L	L							
6									L	L 460	U L 500	L 510	L 600	L 510	L 510	U L 490	L							
7									L	L 480	480	L 520	L 490	L 600	L	L	L							
8									L	L	L 500	L 540	L 540	L	L	L	L							
9									L	L	L 480	L 490	L 570	L 570	L 480	L	L							
10								L 480	L 470	L	L 470	C	C	C	C	C	C							
11								L	L	L 520	H 690	L 550	L 520	L 570	L 470	L	L							
12								L	L	U L 520	L 500	L	U L 600	L	L	L	L							
13								L	L	L	L	H 600	L 600	L 540	L	L	L							
14								L	L	L	L	U L 540	H 720	L 600	L	L	L							
15								L	L	L	L	U L 550	L	L 510	L	L	L							
16								L	L	L	L	L 500	L	L	L 520	L	L							
17								L	L	L	L	L	L	L 510	L 490	L	L							
18								L	L 510	L	L 550	L	570	L	L	L								
19								L	L	530	L	L	L	L 510	L	L	L							
20								L	L	L	530	550	L	480	L	460	L							
21									L	L 500	L	L 580	A	520	L 530	L	L 470	L						
22									L	L 470	L 570	L	580	L	L	L	L	L						
23							L	430	480	500	H 520	540	550	L	L 570	L	L							
24								L	L	U L 500	L	L 520	L 590	L	U L 540	U L 550	L							
25								L	L	L	L 510	L 570	L 570	L 580	L	L	L							
26								L	L	L	L	570	L 580	580	500	L 500	L	L						
27							L	L	L 520	L 530	L	L	L	530	L 480	460	430	L						
28							L	L	L	550	L 520	L	H 550	L	500	520	L	L						
29							A	L	500	520	H 590	500	510	500	H 500	L 470	L	L						
30							L	L 450	L	L	H 540	540	550	520	L 510	U L 480	L	L						
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								3	5	13	19	19	21	19	14	8	2							
MED								L 450	L 500	L 500	L 510	L 540	L 550	L 530	L 505	L 485	450							
UQ								L 465	L 510	L 520	540	L 560	L 580	L 575	L 530	L 510								
LQ								440	480	L 480	L 500	L 515	L 520	510	L 490	465								

IONOSPHERIC DATA

APR. 1969 | 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	225	280	325	340	350	375	385	390	355	335	I A 300	250	A					
2						S	225	290	330	340	350	I A 370	R 380	I A 370	375	340	305	265	190					
3						S	230	290	320	345	I A 370	390	395	380	360	A	A	A	A					
4						S	220	285	315	I A 335	I C 360	385	I A 395	390	I A 365	I A 330	295	245	180					
5						140	250	285	325	340	I A 355	I A 380	390	380	365	335	300	255	A					
6						140	225	275	320	345	A	A	A	385	355	335	310	A	A					
7						S	245	290	320	340	I A 350	355	I A 365	375	355	335	300	260	A					
8						140	225	280	315	340	A	A	A	380	350	330	300	260	A					
9						S	250	290	325	340	360	375	385	375	355	335	305	265	A					
10						S	235	300	325	355	A	C	C	C	C	C	C	C	C					
11						S	230	285	315	I A 340	I A 355	I A 370	385	380	360	330	305	255	A					
12						150	245	290	325	345	I A 360	I A 375	390	390	365	335	310	260	195					
13						S	235	295	335	I A 350	I A 360	A	A	385	370	340	310	270	195					
14						160	250	300	325	350	370	I A 380	R 390	380	360	335	320	275	195					
15						160	250	315	I A 345	A	A	A	I A 390	I A 395	380	350	320	270	195					
16						155	250	300	325	345	365	I A 390	400	390	370	345	315	270	200					
17						S	255	305	330	340	365	385	395	390	370	345	315	255	160					
18						S	245	290	330	350	360	365	365	360	350	I A 320	305	245	155					
19						S	230	285	320	355	370	365	380	375	355	325	305	250	165					
20						165	230	290	325	355	370	I A 370	380	375	I A 365	340	305	280	A					
21						170	225	280	320	360	370	A	A	A	A	A	300	270	170					
22						170	245	290	330	355	365	I A 370	380	370	360	340	310	270	A					
23						S	230	300	330	355	A	A	A	380	360	325	305	260	170					
24						S	240	290	325	355	370	380	390	395	390	375	335	290	A					
25						A	245	300	330	345	360	370	390	390	375	350	315	280	195					
26						A	255	300	335	355	360	365	375	375	365	340	305	255	170					
27						165	250	290	320	355	360	370	360	355	350	330	310	270	185					
28						170	245	285	315	350	360	370	370	365	350	325	295	255	190					
29						S	235	285	315	345	355	365	375	I A 365	355	340	310	260	A 180					
30						185	250	295	320	340	350	360	375	360	355	335	310	270	215					
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						14	30	30	30	29	25	23	24	28	28	27	28	27	18					
MED						160	242	290	325	345	360	370	385	380	360	335	305	260	188					
UQ						170	250	300	330	355	365	380	390	390	368	340	310	270	195					
LQ						140	230	285	320	340	355	368	375	372	355	330	302	255	170					

IONOSPHERIC DATA

APR. 1969 | 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 40	J X 28	J X 20	J X 26	J X 13	E	G	G	G	37	37	G	G	46	G	J G 31	J X 34	G	J X 20	J X 32	J X 18	E S 14	E S 14	E S 14
2	E S 14	E	E	E	E	E S 14	G	G	36	40	37	39	G	44	41	G	G	G	G	E S 14	E S 14	J X 20	E S 14	E S 14
3	E S 14	E	E	E	E	E S 14	G	G	G	40	37	G	G	G	G	J X 48	J X 53	J X 39	J X 23	J X 29	J X 23	E S 14	E S 14	E S 14
4	E S 14	E	E	E	E	E S 14	G	30	G	37	C	G	42	G	38	36	G	G	G	J X 20	J X 20	J X 25	E S 14	E S 14
5	E S 14	E	E	E	E	G	G	32	G	37	40	39	G	G	G	G	G	J X 33	J X 35	J X 24	J X 19	E S 14	E S 14	E S 14
6	E S 14	E	E	E	E	G	G	G	G	G	43	40	40	G	G	G	G	J X 35	J X 23	J X 18	E S 14	E S 14	E	E S 14
7	E S 14	E	E	J X 23	E	E S 14	G	G	G	G	J X 53	G	J X 38	G	38	G	G	G	J X 21	J X 20	J X 16	E S 14	E S 14	E S 14
8	E S 14	E S 14	E	E	C	G	G	34	38	42	37	J X 43	J X 39	G	J G 33	G	G	G	20	E	E S 14	J X 53	E S 14	J X 23
9	E S 14	E	E	E	E	E S 14	G	G	40	36	42	G	G	J X 38	J G 33	G	G	G	20	J X 22	J X 19	J X 24	J X 18	E
10	E S 14	E S 14	E S 14	E	E	E S 14	G	G	G	38	39	C	C	C	C	C	C	C	C	J X 23	J X 18	J X 18	E S 14	E S 14
11	J X 17	E S 14	E	E	E	E S 14	26	G	G	40	J X 38	41	G	G	G	36	G	J G 23	J X 23	J X 19	E	E	E S 14	E
12	E	E	E	E	E	G	G	G	36	41	J X 63	J X 48	G	G	G	G	G	G	G	E S 14	E S 14	E	E	E
13	E	E	E S 14	E	E	E S 14	J X 28	G	G	40	40	42	J X 44	G	G	G	G	G	G	E S 14	E S 14	E S 14	J X 20	E S 14
14	E	E S 14	E	E	E	G	G	G	G	G	G	40	G	G	G	G	G	G	G	E S 14	E S 14	E	E S 14	E S 14
15	E	E	E	E	E	G	G	G	39	40	40	J X 43	J X 48	J X 44	J G 34	G	G	G	G	J X 28	E S 14	E S 14	E	E
16	E	E	J X 19	J X 14	E	G	G	G	35	38	39	41	G	G	G	G	G	G	J X 38	J X 23	J X 20	J X 19	E S 14	E S 14
17	E	E S 14	E	E	J X 20	E S 17	G	G	G	38	G	G	G	G	G	37	G	G	22	J X 25	E	J X 21	E S 14	E S 14
18	E S 14	E	E	E	E	E S 14	G	J X 43	G	37	41	40	41	40	40	J X 35	G	38	27	18	J X 19	E S 13	J X 21	J X 18
19	J X 36	J X 18	E	E	E	E S 15	G	33	40	42	J X 65	J X 84	G	G	41	38	G	G	G	J X 26	J X 19	E S 13	J X 20	E S 13
20	E S 13	E	E	E	E	J X 26	28	35	39	47	46	41	G	G	38	G	G	G	28	J X 21	J X 43	J X 26	J X 25	J X 20
21	E S 12	J X 20	J X 19	E	E	G	G	G	G	43	G	48	J X 58	J X 54	J X 43	J X 43	G	G	20	J X 46	J X 26	J X 53	J X 43	J X 45
22	J X 28	J X 25	E S 12	E	J X 23	J X 20	G	G	G	44	43	J X 60	43	40	38	G	34	36	J X 38	J X 26	J X 24	E S 12	J X 20	E S 12
23	J X 19	J X 26	J X 20	E	E	22	30	35	J X 38	G	J X 44	J X 50	J X 46	42	G	G	G	G	19	E S 12	E S 12	E S 12	E S 12	E
24	E S 12	E	E	E	E	20	27	G	40	43	43	42	41	G	G	G	G	G	25	J X 33	J X 34	J X 25	E S 13	J X 19
25	E S 14	E	E	E	E	20	30	34	37	40	44	40	G	G	G	G	G	G	24	J X 17	J X 18	J X 23	E S 13	E S 13
26	J X 20	E	E	E	E	20	32	34	G	G	G	J X 48	41	G	G	39	J X 47	34	28	J X 30	E S 13	E S 13	E S 12	E S 13
27	J X 25	J X 25	J X 24	J X 32	J X 23	19	28	33	39	47	41	43	42	38	G	G	G	G	23	15	E S 12	J X 18	E S 13	J X 21
28	E S 12	E	E	J X 20	E	G	G	34	38	40	42	45	43	G	G	G	32	G	G	E S 13	E S 12	E S 13	J X 16	J X 20
29	J X 25	J X 25	J X 25	J X 26	J X 36	27	J X 43	38	38	39	43	42	44	43	G	G	40	J X 40	J X 50	J X 37	J X 50	J X 80	J X 53	J X 43
30	J X 53	J X 43	J X 18	J X 34	J X 19	23	G	33	39	44	40	41	G	40	37	G	G	G	G	J X 29	J X 28	J X 34	J X 39	J X 38
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	29	30	30	30	30	30	29	29	29	29	29	29	29	29	29	30	30	30	30	30
MED	14	E	E	E	E	E G 14	G	G	E G 35	40	40	41	38	G	G	G	G	G	21	J X 22	J X 18	14	E S 14	E S 14
UQ	J X 19	J X 18	14	E	E	20	27	34	38	42	43	43	42	40	38	35	G	G 23	J X 25	J X 28	J X 20	J X 24	J X 20	J X 19
LQ	E S 12	E	E	E	E	G	G	G	G	37	37	39	G	G	G	G	G	G	G	15	E S 14	E S 13	E S 13	E S 13

IONOSPHERIC DATA

APR. 1969

fbEs (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	18	16	14	14	E	E	G	G	G	37	37	G	G	G	G	G 30	32	G	20	22	17	E S 14	E S 14	E S 14
2	E S 14	E	E	E	E	E S 14	G	G	G	G	37	39	G	38	G	G	G	G	G	E S 14	E S 14	E	E S 14	E S 14
3	E S 14	E	E	E	E	E S 14	G	G	G	37	37	G	G	G	G	36	35	35	20	23	E	E S 14	E S 14	E S 14
4	E S 14	E	E	E	E	E S 14	G	G	G	35	C	G	40	G	37	32	G	G	G	15	14	E	E S 14	E S 14
5	E S 14	E	E	E	E	G	G	31	G	37	39	38	G	G	G	G	G	27	23	19	E	E S 14	E S 14	E S 14
6	E S 14	E	E	E	E	G	G	G	G	G	39	38	39	G	G	G	G	32	22	E	E S 14	E S 14	E	E S 14
7	E S 14	E	E	E	E	E S 14	G	G	G	G	37	G	38	G	38	G	G	G	19	E	E	E S 14	E S 14	E S 14
8	E S 14	E S 14	E	E	C	G	G	32	34	42	37	40	38	G	G 28	G	G	G	19	E	E S 14	21	E S 14	14
9	E S 14	E	E	E	E	E S 14	G	G	G	35	39	G	G	32	G 26	G	G	G	19	E	E	E	E	E
10	E S 14	E S 14	E S 14	E	E	E S 14	G	G	G	38	39	C	C	C	C	C	C	C	17	16	14	E S 14	E S 14
11	E	E S 14	E	E	E	E S 14	25	G	G	39	38	40	G	G	G	35	G	G 19	20	E	E	E	E S 14	E
12	E	E	E	E	E	G	G	G	36	40	42	42	G	G	G	G	G	G	G	E S 14	E S 14	E	E	E
13	E	E	E S 14	E	E	E S 14	25	G	G	39	38	41	41	G	G	G	G	G	G	E S 14	E S 14	E S 14	15	E S 14
14	E	E S 14	E	E	E	G	G	G	G	G	G	40	G	G	G	G	G	G	G	E S 14	E S 14	E	E S 14	E S 14
15	E	E	E	E	E	G	G	G	36	39	40	39	46	41	G 34	G	G	G	G	E	E S 14	E S 14	E	E
16	E	E	15	E	E	G	G	G	G	38	39	41	G	G	G	G	G	G	15	E	E	E	E S 14	E S 14
17	E	E S 14	E	E	E	E S 17	G	G	G	G	G	G	G	G	G	G	G	G	20	E	E	E	E S 14	E S 14
18	E S 14	E	E	E	E	E S 14	G	35	G	G	40	40	41	38	38	33	G	27	26	15	15	E S 13	14	13
19	16	13	E	E	E	E S 15	G	32	37	38	41	40	G	G	37	35	G	G	G	14	16	E S 13	14	E S 13
20	E S 13	E	E	E	E	18	27	34	36	43	44	41	G	G	37	G	G	G	23	15	18	17	16	15
21	E S 12	14	14	E	E	G	G	G	G	38	G	42	56	49	36	38	G	G	19	30	15	22	20	20
22	20	E	E S 12	E	E	E S 13	G	G	G	39	43	45	42	38	G	G	33	35	22	19	19	E S 12	18	E S 12
23	15	20	14	E	E	19	29	32	34	G	37	42	39	41	G	G	G	G	19	E S 12	E S 12	E S 12	E S 12	E
24	E S 12	E	E	E	E	18	25	G	35	42	40	41	41	G	G	G	G	G	23	19	18	19	E S 13	E
25	E S 14	E	E	E	E	20	29	33	36	38	43	39	G	G	G	G	G	G	G	E	E	16	E S 13	E S 13
26	E	E	E	E	E	18	29	G	G	G	G	40	G	G	G	36	37	28	25	26	E S 13	E S 13	E S 12	E S 13
27	17	20	15	19	13	19	27	32	36	45	39	41	U R 42	38	G	G	G	G	20	13	E S 12	15	E S 13	17
28	E S 12	E	E	E	E	G	G	31	35	38	42	45	42	G	G	G	G	G	G	E S 13	E S 12	E S 13	16	18
29	15	20	15	13	33	24	40	35	36	38	42	42	40	42	G	G	38	34	44	16	16	A	37	26
30	40	28	14	17	14	22	G	32	37	36	39	41	G	40	G	G	G	G	G	18	23	24	24	28
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	29	30	30	30	30	30	29	29	29	29	29	29	29	29	29	30	30	30	30	30
MED	14	E	E	E	E	E G 14	G	G	G	38	39	40	G	G	G	G	G	G	19	14	14	14	E S 14	E S 14
UQ	E S 14	14	14	E	E	18	25	32	36	39	40	41	41	38	G 28	G 30	G	G 19	22	18	16	15	14	E S 14
LQ	E	E	E	E	E	G	G	G	G	G	37	38	G	G	G	G	G	G	G	E	E	E	E S 13	E S 13

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

APR. 1969 | 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	E	E	E	E	E	E	14	15	16	15	16	20	19	21	15	14	14	13	E S 14	E S 14	E S 14	E S 14	E S 14
2	E S 14	E	E	E	E	E S 14	14	14	14	14	15	14	18	19	20	18	16	14	15	E S 14	E S 14	E S 14	E S 14	E S 14
3	E S 14	E	E	E	E	E S 14	15	14	15	18	16	21	24	21	19	14	15	16	13	E S 14	E S 14	E S 14	E S 14	E S 14
4	E S 14	E	E	E	E	E S 14	15	14	14	18	C	19	19	20	18	19	14	14	E	E	E	E	E S 14	E S 14
5	E S 14	E	E	E	E	E	14	14	14	16	20	19	19	21	22	14	14	12	12	E	E	E S 14	E S 14	E S 14
6	E S 14	E	E	E	E	E	14	14	14	15	18	19	15	20	18	16	14	14	E	E S 14	E S 14	E S 14	E	E S 14
7	E S 14	E	E	E	E	E S 14	14	15	15	15	14	21	20	19	14	14	14	13	13	E S 14	E	E S 14	E S 14	E S 14
8	E S 14	E S 14	E	E	C	E	14	14	15	15	16	23	24	21	20	16	14	14	14	E	E S 14	E S 14	E S 14	E
9	E S 14	E	E	E	E	E S 14	14	14	15	15	15	15	18	15	14	14	15	14	14	E S 14	E S 14	E S 14	E	E
10	E S 14	E S 14	E S 14	E	E	E S 14	14	15	16	18	18	C	C	C	C	C	C	C	C	E	E S 14	E	E S 14	E S 14
11	E S 14	E S 14	E	E	E	E S 14	15	15	13	18	20	23	20	19	15	15	14	14	E	E S 13	E	E	E S 14	E
12	E	E	E	E	E	E	14	14	15	17	15	21	21	18	15	14	15	14	13	E S 14	E S 14	E	E	E
13	E	E	E S 14	E	E	E S 14	14	14	15	14	15	15	18	23	18	16	14	14	14	E S 14	E S 14	E S 14	E	E S 14
14	E	E S 14	E	E	E	13	14	14	14	17	15	19	20	19	24	16	14	14	14	E S 14	E S 14	E	E S 14	E S 14
15	E	E	E	E	E	14	14	14	16	16	24	25	25	18	24	15	15	18	14	E	E S 14	E S 14	E	E
16	E	E	E	E	E	E	14	13	14	16	19	18	18	17	15	15	14	15	E	E S 14	E S 14	E S 14	E S 14	E S 14
17	E	E S 14	E	E	E	E S 17	14	14	14	14	14	18	18	15	14	13	14	14	E	E	E	E S 14	E S 14	E S 14
18	E S 14	E	E	E	E	E S 14	13	15	15	14	15	15	15	15	18	14	15	14	14	E S 13	E S 13	E S 13	E S 13	E
19	E S 14	E	E	E	E	E S 15	15	15	15	15	15	17	17	15	15	14	15	15	13	E S 12	E S 14	E S 13	E S 12	E S 13
20	E S 13	E	E	E	E	E S 12	14	15	16	18	18	17	18	20	17	16	13	15	15	E S 13	E S 12	E S 13	E S 13	E S 13
21	E S 12	E	E	E	E	E S 14	15	16	15	18	23	27	17	23	16	15	15	15	13	E S 14	E S 12	E S 12	E S 14	E S 14
22	E S 13	E	E S 12	E	E	E S 13	16	15	18	17	16	17	23	19	17	16	14	15	E S 14	E S 13	E S 12	E S 12	E S 13	E S 12
23	E S 14	E	E	E	E	E S 13	15	15	15	16	17	16	16	28	18	14	14	15	13	E S 12	E S 12	E S 12	E S 12	E
24	E S 12	E	E	E	E	E S 15	13	13	15	15	15	17	18	26	25	19	14	14	14	E	E S 14	E S 13	E S 13	E S 14
25	E S 14	E	E	E	E	E	14	14	15	14	15	15	15	17	14	15	14	15	12	E S 14	E S 14	E	E S 13	E S 13
26	E S 12	E	E	E	E	14	14	14	15	17	20	16	17	31	16	15	14	15	14	E S 13	E S 13	E S 13	E S 12	E S 13
27	E S 13	E	E	E	E	14	15	14	17	18	18	17	17	16	17	15	17	15	15	E S 12	E S 12	E S 13	E S 13	E S 12
28	E S 12	E	E	E	E	13	14	14	15	15	16	16	17	17	17	16	14	14	14	E S 13	E S 12	E S 13	E S 13	E S 12
29	E S 13	E	E	E	E	E S 15	15	17	16	14	15	16	16	16	13	13	16	14	13	E	E S 13	E S 14	E S 14	E S 13
30	E S 13	E	E	E	E	14	14	13	14	14	15	14	14	14	16	13	13	E	16	E S 14	E	E S 13	E S 13	E
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	29	30	30	30	30	30	29	29	29	29	29	29	29	29	29	30	30	30	30	30
MED	E S 13	E	E	E	E	E S 14	14	14	15	16	16	17	18	19	17	15	14	14	13	E S 13	E S 14	E S 13	E S 13	E S 13
UQ	E S 14	E	E	E	E	E S 14	15	15	15	17	18	19	20	21	19	16	15	15	14	E S 14	E S 14	E S 14	E S 14	E S 14
LQ	E S 12	E	E	E	E	E E 12	14	14	14	15	15	16	17	17	15	14	14	14	13	E	E S 12	E S 12	E S 12	E

IONOSPHERIC DATA

APR. 1969 | 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	270	280	275	260	310	305	295	300	290	295	285	280	285	285	295	305	305	305	280	265	265	265
2	275	295	290	260	245	255	285	290	315	305	285	295	290	285	290	300	IR 295	310	305	305	275	270	270	265
3	265	265	280	265	255	260	315	315	300	280	295	290	280	280	285	290	290	295	305	300	280	265	265	265
4	260	265	265	260	270	275	320	320	310	310	IC 305	295	295	280	285	290	290	295	305	305	265	265	270	270
5	265	295	295	275	265	275	310	315	300	300	295	285	285	290	290	300	295	295	305	300	270	275	280	275
6	265	280	275	290	F	270	315	315	305	305	290	300	285	285	285	290	290	310	305	305	275	275	270	275
7	275	265	275	270	270	280	315	310	300	295	300	290	295	285	290	295	280	290	305	300	305	265	270	270
8	260	275	285	295	IC 265	275	310	315	310	295	280	300	290	285	290	295	305	295	300	310	280	280	270	280
9	265	265	275	280	275	280	320	315	305	305	295	290	290	285	285	290	290	295	305	305	285	280	270	260
10	270	265	270	265	265	290	325	285	295	270	295	C	C	C	C	C	C	C	C	310	285	255	255	265
11	270	270	275	285	255	260	295	290H	300	295V	295	305	IR 310	305	300	295	305	305	300	290	280	275	255	260
12	265	270	275	280	265	285	305	310	315	305	300	285	295	IR 295	IR 300	305	305	305	310	305	290	285	265	265
13	265	265	275	285	270	275	310	310	305	310	300	280	IR 290	285	290	295	290	285	295	IR 300	305	285	275	280
14	260	245	255	260	265	270	300	300	300	310	285	290	270	IR 290	285	R	R	R	R	R	295	270	275	265
15	270	285	270	270	255	270	290	285	IR 300	300	290	290	IR 285	285	280	285	R	R	310	300	280	265	260	260
16	275	290	280	275	275	275	300	310	305	IR 305	IR 290	280	285	275	275	285	295	IR 295	IR 290	295	285	270	IR 260	265
17	265	S 280	IR 270	S 270	IR 260	270	310	IR 300	S 300	305	IR 290	280	285	285	285	290	290	295	305	295	275	265	275	260
18	255	260	255	250	255	275	290	IR 290	295	305	295	290	285	275	275	S 285	295	295	IR 320	S 295	295	275	265	270
19	270	275	280	265	275	275	310	IR 300	IR 310	IR 300	IR 300	285	290	285	IR 280	IR 285	290	295	IR 305	IR 300	295	265	265	275
20	275	265	290	275	270	285	305	300	305	305	300	285	280	285	280	285	295	305	IR 310	315	290	265	255	270
21	265	270	285	305	280	275	300	295	IR 300	IR 300	IR 290	275	275	280	IR 280	280	290	295	305	305	280	250	255	265
22	260	265	275	290	290	300	320	315	310	290	275	280	285	285	280	280	IR 280	IR 290	IR 265	295	IR 290	270	275	250
23	270	285	275	285	275	275	300	280	265	275	285	275	275	290	295	295	295	295	295	IR 300	305	275	260	260
24	IR 255	275	295	270	260	295	310	305	305	290	280	270	285	290	285	285	290	285	IR 300	IR 300	300	S 275	275	285
25	275	275	280	270	260	290	315	295	300	295	285	275	270	285	290	IR 290	300	295	285	IR 295	295	285	275	IR 270
26	S 280	265	275	285	280	295	310	295	300	280	R 285	280	280	285	295	295	305	320	295	295	295	275	270	IR 270
27	IR 270	275	280	270	270	300	295	305	290	295	285	280	275	275	R 285	295	300	290	295	295	285	255	265	270
28	265	260	IR 270	280	275	275	300	280	270	270	285	290	285	300	300	290	275	275	285	IR 290	IR 290	270	265	265
29	245	235	260	290	275	270	IR 290	285	275	280	270	300	290	285	300	295	R 310	300	305	305	295	IA 275	275	275
30	265	265	265	260	265	285	300	290	295	310	275	265	275	285	295	285	295	300	300	300	280	275	260	265
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	29	30	30	30	30	30	30	29	29	29	29	28	27	27	28	29	30	30	30	30
MED	265	270	275	275	270	275	310	300	300	300	290	285	285	285	285	290	295	295	305	300	285	270	268	265
UQ	270	275	280	285	275	285	315	310	305	305	295	290	290	285	290	295	298	302	305	305	295	275	275	270
LQ	265	265	270	265	260	270	300	290	295	290	285	280	280	285	285	285	290	295	295	295	280	265	260	265

IONOSPHERIC DATA

APR. 1969

M(3000)F1(0.01)

135° E Mean Time (G. M. T. + 9h)

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									L	L	L 380	L	L 375	L 345	L	L								
2									L	L	L	385	L 390	L 350	L	L								
3									L	L	U L 355	L	L 380	L 375	L	L								
4									L	L 375	I C 390	L	L	L	U L 365	L	L							
5									L	L	L 380	L 340	L 365	L	L	L	L							
6									L	L 380	U L 380	L 375	L 350	L 375	L 355	U L 350	L							
7									L	L 365	400	L 370	L 390	L 335	L	L	L							
8									L	L	L 380	L 370	L 355	L	L	L	L							
9									L	L	L 380	L 395	L 350	L 370	L 375	L	L							
10								L 340	L 345	L	L 365	C	C	C	C	C	C							
11								L	L	L 385	H 335	L 360	L 365	L 340	L 380	L	L							
12								L	L	U L 350	L 380	L	U L 340	L	L	L	L							
13								L	L	L	L	H 340	L 340	L 350	L	L	L							
14								L	L	L	L	U L 370	H 330	L 335	L	L	L							
15								L	L	L	L	U L 350	L	L 375	L	L	L							
16								L	L	L	L	L 380	L	L	L 350	L	L							
17								L	L	L	L	L	L	L 365	L 365	L	L							
18								L	L 335	L	L 365	L	350	L	L	L								
19								L	L	365	L	L	L	L 375	L	L	L							
20								L	L	L	375	365	L	390	L	380	L							
21									L	L 375	L	L 350	A	370	L 355	L	L 355	L						
22									L	L 390	L 350	L	340	L	L	L	L	L						
23							L	345	340	345	H 340	345	340	L	L 325	L	L							
24								L	L	U L 360	L	L 380	L 335	L	U L 355	U L 330	L							
25								L	L	L	L 370	L 335	L 335	L 330	L	L	L							
26								L	L	L	L	355	L 345	340	370	L 370	L	L						
27							L	L	L 355	L 365	L	L	L	340	L 365	365	370	L						
28							L	L	L	315	L 345	L	H 345	L	355	340	L	L						
29							A	L	325	330	H 325	375	370	380	H 380	L 355	L	L						
30							L	L 335	L	L	H 335	335	330	345	L 335	U L 350	L	L						
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								3	5	13	19	19	21	19	14	8	2							
MED								L 340	L 340	L 365	L 370	L 365	L 350	L 350	L 360	L 352	362							
UQ								342	L 345	L 375	L 380	L 375	L 365	L 375	L 370	368								
LQ								L 338	335	350	L 348	348	340	L 340	L 355	U L 345								

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IONOSPHERIC DATA

APR. 1969 | 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									255	255	270	260	265	280	290	270								
2									250	255	270	265	250	305	285	270								
3									250	280	270	260	290	270	290	290								
4									250	250	I C 255	275	255	275	290	285	265							
5									250	255	245	295	275	285	280	260	260							
6									255	250	255	280	295	280	290	280	265							
7									250	250	260	290	275	305	290	255	265							
8									250	255	270	290	280	295	290	260	255							
9									245	270	260	260	290	295	275	260	255							
10								310	310	270	280	C	C	C	C	C	C							
11								250	270	260	305	295	290	300	270	295	255							
12								255	260	280	260	300	305	285	290	280	270							
13								250	280	265	260	340	330	310	275	295	270							
14								250	250	265	280	280	350 L	315	300	280	270							
15								275	270	265	295	280	285	290	300	300	275							
16								250	280	280	295	275	310	315	295	300	270							
17								250	255	265	265	315	295	300	300	270	265							
18								295	305	295	275	280	300	300	260	280								
19								255	260	280	275	280	280	290	280	300	255							
20								255	250	280	280	290	285	290	270	290	270							
21									270	275	280	300	295	300	310	270	300	280						
22									260	250	305	290	305	310	275	300	290	280						
23							275	340	370	400	370	375	355	330	310	300	275							
24								265	270	285	290	300	320	300	305	305	295							
25								265	300	285	295	310	340	325	290	290	285							
26								250	295	260	295	330	325	320	290	290	290	265						
27							270	260	300	300	310	315	330	330	300	295	285	265						
28							290	300 L	370 L	390	330	330	325	305	320	330	325	305						
29							305	300	355	350	350	315	315	300	300	295	275	265						
30							300	315	320	290	395	365	370	320	300	300	295	275						
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							5	19	30	30	30	29	29	29	29	29	25	7						
MED							290	260	265	270	280	290	295	300	290	290	270	275						
UQ							300	298	300	285	295	315	325	310	300	300	285	280						
LQ							275	250	250	255	265	280	285	290	280	270	265	265						

IONOSPHERIC DATA

APR. 1969 | 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

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	290	280	255	240	340	235	210H	215	225	200	245	215	205	230	235	240	240	240	230	245	290	290	290
2	280	245	240	245	330	320	240	240	240	240	230	200	205	210	235	240	240	240	240	230	240	290	295	300
3	295	290	255	270	310	280	230	225	235	230	225	230	225	215	220	240	240	255	245	240	240	250	280	290
4	300	290	295	280	245	255	230	230	230	200	I C 190	230	200	230	225	230	240	245	240	225	230	290	295	280
5	280	255	245	245	265	280	240	240	230	H 220	210	210	210	240	240	235	240	255	240	225	265	275	275	265
6	290	275	255	250	255	290	225	240	230	220	220	215	230	220	215	230	245	255	240	240	245	260	280	280
7	270	295	290	245	265	290	240	240	230	225	215	225	200	220	245	230	240	250	255	225	215	265	295	290
8	305	290	270	225	C	290	230	230	230	235	215	230	220	225	240	235	230	245	245	240	230	A 260	265	260
9	290	290	285	255	245	290	235	240	230	225	210	210	205	H 230	200	235	230	245	245	235	230	260	260	305
10	305	300	295	265	245	265	245	230	225	245	210	C	C	C	C	C	C	C	C	230	220	295	310	295
11	290	290	270	255	325	305	245	235	220	215	H 230	230	230	225	225	230	245	240	250	270	245	255	270	295
12	290	275	265	245	270	255	245	235	240	230	215	235	195	240	240	230	240	250	250	235	240	245	270	290
13	295	290	275	255	255	280	240	240	225	230	215	H 195	245	230	235	220	240	255	275	245	235	235	275	270
14	295	340	320	280	290	280	240	245	240	240	230	230	H 240	225	240	245	245	245	265	240	235	245	270	295
15	295	285	265	265	290	270	250	245	240	235	230	225	240	215	230	245	245	250	255	245	235	260	295	295
16	285	245	270	275	270	265	240	240	225	230	230	210	H 210	230	220	245	240	250	245	240	225	270	290	290
17	295	285	265	260	295	270	245	230	230	230	220	230	230	225	225	245	235	255	245	240	230	255	255	300
18	320	315	295	295	295	290	245	250	215	230	210	240	220	220	240	240	240	265	260	240	240	265	280	290
19	295	280	275	240	265	265	240	240	245	240	240	240	H 205	200	240	235	235	250	250	230	230	250	295	295
20	295	280	255	250	260	265	235	240	240	245	230	210	210	225	230	225	240	250	260	235	240	260	305	295
21	285	290	255	235	240	255	240	240	230	240	240	225	I A 260	I A 250	H 220	245	240	270	255	245	230	290	330	310
22	300	300	285	245	240	245	230	240	225	240	H 205	250	230	225	H 220	235	235	250	270	240	250	260	260	295
23	300	265	275	245	245	290	260	245	235	240	H 230	225	220	225	H 205	235	245	255	270	245	240	250	245	295
24	300	295	240	215	305	275	245	245	240	230	240	230	245	255	240	230	240	265	260	250	245	265	265	250
25	265	275	280	260	295	255	240	235	235	235	240	225	235	240	230	220	240	250	265	245	245	230	240	295
26	295	295	280	260	250	255	245	230	230	220	205	220	240	200	240	240	245	245	250	250	240	245	275	290
27	305	295	280	285	275	265	250	245	240	245	235	240	230	245	230	240	240	245	255	250	245	285	300	300
28	290	300	275	245	255	285	250	245	240	240	230	245	H 230	H 225	200	235	250	245	290	255	240	250	270	305
29	355	A 390	310	245	A 270	300	I A 270	A 255	250	230	H 240	255	210	200	H 195	230	265	255	260	245	255	I A 270	I A 300	325
30	I A 340	355	285	320	310	280	255	240	245	230	H 215	230	220	225	225	230	245	240	255	245	260	295	320	325
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	29	30	30	30	30	30	30	29	29	29	29	29	29	29	29	30	30	30	30	30
MED	295	290	275	255	265	280	240	240	230	230	222	230	220	225	230	235	240	250	255	240	240	260	280	295
UQ	300	295	285	265	295	290	245	245	240	240	230	235	230	230	240	240	245	255	260	245	245	275	295	300
LQ	290	280	265	245	250	265	235	235	230	225	210	220	210	220	220	230	240	245	245	235	230	250	270	290

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

APR. 1969

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	105	105	105	105	105	E	G	G	G	130	130	G	G	120	G	105	100	G	100	105	100	S	S	S
2	S	E	E	E	E	S	G	G	130	130	135	110	G	130	130	G	G	G	G	S	S	105	S	S
3	S	E	E	E	E	S	G	G	G	120	130	G	G	G	G	110	105	105	105	100	105	S	S	S
4	S	E	E	E	E	S	G	140	G	130	C	G	120	G	120	115	G	G	G	100	100	100	S	S
5	S	E	E	E	E	G	G	155	G	130	120	110	G	G	G	G	G	100	100	100	100	S	S	S
6	S	E	E	E	E	G	G	G	G	G	120	120	120	G	G	G	G	100	100	105	S	S	E	S
7	S	E	E	115	E	S	G	G	G	G	105	G	105	G	140	G	G	G	105	110	110	S	S	S
8	S	S	E	E	C	G	G	140	140	130	120	110	110	G	105	G	G	G	115	E	S	105	S	110
9	S	E	E	E	E	S	G	G	130	150	140	G	G	105	100	G	G	G	140	120	110	105	105	E
10	S	S	S	E	E	S	G	G	G	130	130	C	C	C	C	C	C	C	C	100	100	100	S	S
11	105	S	E	E	E	S	E 155	G	G	115	110	110	G	G	G	155	G	100	100	100	E	E	S	E
12	E	E	E	E	E	G	G	G	145	120	110	105	G	G	G	G	G	G	G	S	S	E	E	E
13	E	E	S	E	E	S	110	G	G	120	120	110	105	G	G	G	G	G	G	S	S	S	110	S
14	E	S	E	E	E	G	G	G	G	G	G	120	G	G	G	G	G	G	G	S	S	E	S	S
15	E	E	E	E	E	G	G	G	140	120	120	115	110	105	105	G	G	G	G	120	S	S	E	E
16	E	E	100	100	E	G	G	G	140	130	120	120	G	G	G	G	G	G	100	100	100	100	S	S
17	E	S	E	E	105	S	G	G	G	140	G	G	G	G	G	120	G	G	120	105	E	100	S	S
18	S	E	E	E	E	S	G	130	G	140	125	130	125	125	120	110	G	140	135	130	125	S	120	115
19	110	110	E	E	E	S	G	140	140	135	125	125	G	G	125	130	G	G	G	115	100	S	105	S
20	S	E	E	E	E	105	150	145	140	130	125	115	G	G	120	G	G	G	120	120	110	110	105	100
21	S	100	100	E	E	G	G	G	G	135	G	115	110	110	115	110	G	G	145	120	120	105	110	110
22	105	100	S	E	105	100	G	G	G	125	120	115	120	125	125	G	160	125	120	120	115	S	120	S
23	115	110	115	E	E	145	130	145	140	G	115	110	110	145	G	G	G	G	145	S	S	S	S	E
24	S	E	E	E	E	150	160	G	140	135	140	140	140	G	G	G	G	G	140	115	105	105	S	105
25	S	E	E	E	E	155	145	150	150	140	130	130	G	G	G	G	G	G	140	115	115	115	S	S
26	110	E	E	E	E	160	150	145	G	G	G	130	145	G	G	140	125	125	130	125	S	S	S	S
27	110	105	105	105	105	165	150	140	140	130	140	130	130	130	G	G	G	G	140	125	S	120	S	110
28	S	E	E	100	E	G	G	140	145	140	130	130	135	G	G	G	150	G	G	S	S	S	115	110
29	110	110	105	110	125	135	135	135	140	135	130	130	125	120	G	G	145	140	120	120	120	110	110	110
30	110	110	110	110	105	150	G	150	140	130	130	140	G	140	140	G	G	G	G	120	110	110	110	105
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	9	8	7	7	6	9	9	13	15	25	25	23	15	11	12	9	6	8	20	23	17	14	10	9
MED	110	108	105	105	105	150	148	140	140	130	125	120	120	125	120	115	135	115	120	115	110	105	110	110
UQ	110	110	108	110	105	155	150	145	140	135	130	130	128	130	128	130	150	132	140	120	115	110	115	110
LQ	105	102	102	102	105	135	135	140	140	130	120	110	110	115	110	110	105	100	102	102	100	100	105	105

IONOSPHERIC DATA

APR. 1969 | 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	F 2	F 3	F 2	F 3	F 1					H 1	H 1			C 1		L 2	L 3		L 1	F 2	F 1			
2									H 2	H 1	H 1	L 2		H 1	H 1							F 1		
3										C 1	H 1					L 2	L 4	L 3	L 2	F 2	F 1			
4								H 1		H 1			C 1		C 2	C 1				F 2	F 1	F 1		
5								H 2		H 2	C 2	L 2						LH 22	L 3	F 3	F 1			
6											C 1	C 1	C 1					L 4	L 2	F 1				
7				F 1							L 1		L 2		H 1				L 1	F 1	F 1			
8								H 1	H 1	H 2	C 1	L 2	L 1		L 2				C 2			F 3		F 2
9									H 1	H 1	H 1			L 2	L 2				H 2	F 1	F 1	F 3	F 1	
10										H 1	H 1									F 1	F 1	F 1		
11	F 1						H 1			C 2	L 2	L 1				H 1		L 2	L 2	F 1				
12									H 2	C 1	L 2	L 2												
13							LH 21			C 2	C 1	L 1	L 2										F 2	
14												C 1												
15									H 1	C 1	C 1	C 1	L 2	L 2	L 2					F 1				
16			F 2	F 1					H 1	H 1	C 1	C 1							L 1	F 1	F 1	F 1		
17					F 1					H 1						C 1			C 2	F 1		F 1		
18								H 2		H 1	H 1	H 1	H 1	H 1	H 1	C 1		H 2	H 3	F 1	F 1		F 2	F 2
19	F 3	F 2						H 1	H 2	H 1	H 1	H 2			H 1	H 1				F 1	F 1		F 1	
20						LH 11	H 2	H 1	H 1	H 2	H 1	C 1			C 1				C 2	F 3	F 3	F 4	F 2	F 1
21		F 1	F 1							H 1		C 2	C 3	C 1	C 1	C 2			H 1	F 4	F 1	F 2	F 3	F 4
22	F 3	F 2			F 1	L 1				H 1	H 2	C 2	H 1	H 1	H 1		H 1	H 3	C 3	F 3	F 2		F 2	
23	F 2	F 6	F 2			H 2	H 2	H 1	H 1		H 1	C 2	C 1	H 1					H 1					
24						H 2	H 1		H 1	H 1	H 1	H 1	H 1						H 2	F 4	F 4	F 5		F 1
25						H 2	H 2	H 2	H 1	H 1	H 1	H 1							H 1	F 1	F 1	F 1		
26	F 2					H 1	H 2	H 1				H 1	H 1			H 2	H 2	H 2	H 2	FF 31				
27	F 3	F 5	F 3	F 4	F 2	H 1	H 2	H 2	H 1	H 1	H 1	H 1	H 1	H 1					H 1	F 1		F 2		F 3
28				F 1				H 1	H 2	H 1	H 1	H 2	H 1				H 1						F 1	F 2
29	F 3	F 6	F 2	F 3	F 5	H 5	H 3	H 2	H 1	H 1	H 1	H 2	H 1	Cl 11			H 2	H 2	C 4	F 1	F 5	F 6	F 4	F 4
30	F 4	F 6	F 2	F 3	F 1	H 2		H 1	H 2	H 1	H 1	H 2		H 1	H 1					F 4	F 6	F 6	F 4	F 6
31																								

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

IONOSPHERIC DATA

APR. 1969 | foF2 (0.1) | 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	I R 72	72	R 75	64	61	59	R	J R 103	112	122	131	144	140	141	134	129	121	120	116	R 100	73	76	R 79	R
2	R	C	70	56	58	60	R 73	J R 106	129	130	135	140	138	137	136	128	120	107	102	91	76	R	R	R
3	R	R	73	65	62	66	I R 83	92	R 103	121	141	130	131	138	136	129	122	120	121	104	R 76	74	R	R 69
4	I C 74	R 73	I R 70	I C 66	67	63	89	R 94	96	110	113	120	125	129	125	120	120	121	122	R 96	R 71	R	J R 78	R
5	R 73	R	R 72	R 56	56	57	R 84	99	108	110	114	124	131	137	134	127	119	120	114	90	73	U S 75	S 74	I R 72
6	70	U S 69	69	64	56	57	78	85	99	104	118	122	118	119	122	122	118	116	108	86	S 73	S 75	U S 75	I R 74
7	S 72	69	68	60	59	60	80	94	103	108	112	121	131	132	133	126	123	119	125	115	R	69	R 73	R
8	R 66	69	J R 66	59	J R 54	56	R	95	94	103	112	127	131	131	130	128	118	115	J R 106	95	R 75	73	I R 73	R 74
9	R 67	R 67	68	63	59	63	R 88	103	108	116	122	130	138	139	135	133	122	113	116	J R 106	70	R 73	R 71	70
10	R	70	R 69	62	R 62	65	J R 72	90	93	111	128	133	126	127	125	120	101	99	95	78	64	60	60	61
11	64	61	59	54	51	49	71	85	101	110	118	126	127	120	111	104	106	93	91	J R 85	I R 72	71	70	70
12	R 71	I R 72	R 73	58	59	60	I R 77	90	95	96	97	112	124	129	120	117	112	104	J R 106	S 99	U S 84	73	I R 70	S 70
13	S 69	69	69	67	59	60	84	96	107	110	109	113	126	131	136	126	113	104	110	119	107	J S 79	J S 73	S 79
14	68	63	63	62	60	64	90	101	96	111	123	126	119	126	128	132	121	117	116	110	86	J R 74	R 67	I R 74
15	I R 73	S 75	R 69	64	66	69	90	107	119	116	128	135	134	133	135	133	131	126	120	108	J R 85	R	R	R
16	R	R 87	R 73	70	R 61	J R 69	90	R 102	108	123	126	131	140	143	140	138	134	128	121	J R 102	81	R	R	R
17	R	R	R	R 64	66	I R 74	93	105	116	123	118	128	130	132	134	134	116	113	111	100	83	75	74	I R 72
18	R 72	I R 65	67	63	64	R 64	I R 73	84	90	113	115	123	123	126	132	131	129	116	115	J R 100	R 73	71	R 71	73
19	R 71	J R 73	R 71	R 64	61	65	90	R 101	119	123	110	114	121	120	123	122	122	120	120	101	I R 83	71	S 75	U S 79
20	U S 73	70	J R 68	66	64	69	88	J R 102	110	111	105	117	123	129	129	130	125	123	124	113	83	85	J R 77	I R 78
21	S	J R 88	95	72	62	65	85	95	105	108	105	113	123	125	132	134	131	131	125	106	81	R 75	A	R
22	R	R	R	R 75	J R 66	R	R 93	90	96	103	116	121	129	125	126	C	C	125	121	111	J R 104	I R 101	95	I R 92
23	R 86	I R 94	R	R 75	R 68	J R 72	88	93	83	95	96	R 107	106	109	104	98	100	H 99	J R 105	J R 104	J R 87	71	75	U S 73
24	S 73	U S 70	70	57	56	64	94	95	96	97	104	113	128	125	122	118	115	114	116	109	S 94	R	88	84
25	U S 81	76	70	69	71	R 73	90	98	96	100	107	111	122	137	135	120	106	104	J R 107	J R 106	J R 85	76	74	71
26	I R 73	71	R 66	64	65	68	87	95	97	105	107	116	127	132	135	130	123	110	J R 109	J R 105	90	R	R	R
27	74	R	R	R 63	J R 64	67	91	93	96	96	100	110	120	126	130	115	J R 105	J R 102	109	R 94	77	71	R 73	R 74
28	R 75	I C 70	R 70	R 63	57	60	R 75	R 77	72	84	100	100	98	103	102	96	92	97	107	113	72	66	64	60
29	59	57	63	66	57	63	74	84	93	103	101	106	106	113	110	113	108	95	94	90	74	68	67	65
30	R 65	I R 65	65	60	59	J R 66	63	63	60	67	78	85	100	121	121	110	108	107	111	93	70	70	70	J R 72
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	24	26	30	30	29	28	30	30	30	30	30	30	30	30	29	29	30	30	30	29	24	24	22
MED	R 72	70	69	64	61	64	86	95	98	110	112	121	126	129	130	126	119	114	112	102	77	73	73	72
UQ	73	73	R 71	66	64	67	90	101	108	116	122	128	131	133	135	130	122	120	120	108	85	75	75	U R 74
LQ	68	68	67	60	58	60	76	90	95	103	105	113	121	125	122	118	108	104	107	94	73	71	70	70

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IONOSPHERIC DATA

APR. 1969 | 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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L	L	L	L	L	L	L	L								
2										L	C	C	L	L	L	L	L							
3									L	C	L	L	L	L	L	L	L							
4										L	L	L	L	L	L		L	L						
5									L	L	L	L	L	L	L	L								
6									L	L	L	L	L	L	U L 600	L	L							
7									L	L	L	L	L	A	L	L	L	L						
8									L	L	L	L	L	L	L	L								
9									L		L	L	L	L	L	L	L							
10								L	L	L	L	L	L	B	L	L								
11										L	L	R	L	L	L	L								
12									L	L	A	A	L	L	L	L	L							
13									L	L	L	L	L	L	L	L								
14									L	L	L	L	L	U L 650	L	L								
15								L	L	L	L	L	L	L	L	L	L							
16									L	L	L	L	L	L	L	L	L							
17									L	L	L	L	L	L	L	L								
18										L	L	L	A	A	A	L	L							
19									L	L	L	L	L	L	L	L	L							
20								L	L	L	L	L	L	L	L	L	L							
21								L	L	L	L	L	L	L	R	L	L							
22									L	L	L	A	L	L	L	C	C	A						
23									L	550	L	U L 600	L	L	L	L	L							
24									L	L	L	U L 860	L	L	L	L	L							
25								L	L	L	L	L	L	U L 550	L	L	L							
26									L	L	L	L	L	L	L	L	L							
27								L	L		A	L	L	U L 510	L	C	L	C						
28										U L 550	L	U L 520	L	L 540	L	500	L	L						
29								L	L	L	L	A	A	L	L	L	L							
30							L	U L 500	L		U L 560	L 550	L 540	U L 530	U L 540	L	L	L						
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1		2	1	4	1	5	2	1								
MED								U L 500		550	U L 560	U L 575	L 540	U L 540	U L 570	500								
UQ												U L 730		U L 550										
LQ												L 535		U L 530										

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

APR. 1969 | 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							B	260	I R 320	345	R	R	A	R	R 350	A	300	260	B					
2							235	270	335	I R 350	I B 360	C	R	R	R	350	320	I R 260	B					
3							B	300	A	C	360	R	R	R	R	A	315	A	B					
4							220	265	R	R	I R 350	I R 355	A	I R 360	R	A	A	250	B					
5							185	285	I A 310	350	A	A	A	A	A	A	A	255	A					
6							180	290	A	A	R	A	A	A	A	A	300	240	170					
7							195	280	340	345	350	A	R	A	I A 360	R	315	A	B					
8							200	285	320	I R 340	I R 355	I R 360	365	I R 355	I R 350	I R 335	310	I R 240	B					
9							205	285	330	350	R	A	A	A	R	I R 330	I R 300	240	A					
10							210	295	A	R	R	R	365	I B 355	350	I R 335	305	A	B					
11							220	290	A	340	A	A	A	R	355	I R 340	310	250	B					
12							235	290	R	345	A	A	R	A	R	345	315	210	B					
13							220	290	330	350	R 370	I R 380	I R 380	R 375	I R 360	355	315	270	A					
14							220	290	340	365	380	I A 380	R	R	R	350	320	260	B					
15							250	315	A	A	A	A	A	R	A	A	R 310	270	B					
16							220	A	R	B	A	A	A	R	360	350	A	A	B					
17							225	300	R	A	R	R	A	R	I R 360	I R 360	I A 310	A	B					
18							220	290	320	350	R	A	A	A	A	340	320	260	B					
19							230	300	330	I R 350	R 380	385	390	R 380	I A 365	345	310	A	A					
20							260	310	345	365	R	B	A	A	A	340	310	A	A					
21						B	220	300	R 350	R	R	A	A	B	A	A	320	A	B					
22						B	A	A	R	A	A	A	A	B	A	C	C	A	A					
23							235	305	335	370	390	395	A	A	390	340	320	260	190					
24						B	250	305	345	370	385	I R 390	R	B	B	350	340	290	A					
25						B	250	305	340	370	390	I A 385	B	I R 370	360	345	335	260	B					
26						B	240	305	330	350	R	R	370	380	B	B	315	270	B					
27						B	R	310	340	A	A	A	R	A	360	I C 330	305	C	B					
28						B	230	290	I R 335	360	370	385	I A 380	I R 380	370	340	315	250	200					
29						B	250	290	340	355	375	A	A	370	360	340	315	245	170					
30						165	230	285	R 320	R 360	380	390	380	380	360	I R 330	310	A	205					
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	26	28	20	20	14	10	7	10	15	20	26	19	5					
MED						165	222	290	335	350	372	U 385	380	R 372	360	340	315	260	190					
UQ							235	302	340	362	380	390	380	R 380	360	350	320	260	200					
LQ							220	285	325	348	360	U R 380	368	U R 360	358	338	310	248	170					

IONOSPHERIC DATA

APR. 1969 | 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	E S 16	22	21	J X 25	J X 25	24	E B 18	G	G 30	36	G	G 35	43	G 35	G 31	42	G	G	19	J X 33	J X 27	J X 51	J X 34	24
2	E S 16	E C 26	20	E S 16	E S 15	E S 16	G	G	35	G	C	C	G	43	G	G	G	G	J X 24	21	E S 16	J X 24	E S 16	E S 16
3	21	21	E S 16	E S 16	E S 16	E S 16	E B 17	32	35	C	G	G 35	G	G 35	G 35	43	J G 28	31	J X 36	22	21	20	21	E S 15
4	C	E S 16	E S 16	C	E S 15	E S 15	J X 25	G	G	G	G	G	43	G	42	41	35	G 21	20	21	21	23	E S 16	21
5	E S 17	E S 16	E S 15	E S 15	E S 15	E S 16	25	31	34	39	41	42	39	39	38	34	34	35	J X 37	J X 26	21	22	21	E S 15
6	E S 16	E S 15	E B 13	E B 13	E B 12	E S 15	24	J G 28	35	36	G 35	J X 42	44	43	41	36	G	G	G	23	E S 16	E S 16	E S 16	E S 15
7	E S 16	E S 15	E S 15	E B 11	E B 14	E S 15	23	30	G	41	41	45	G	J X 51	43	35	G 30	31	J X 35	J X 41	J X 25	J X 21	21	E S 16
8	E S 16	E S 16	E S 16	E S 15	E S 16	E S 15	G	31	36	G	G 35	G 35	G	G	G	G	G	29	19	20	E S 16	E S 16	J X 36	23
9	E S 16	E S 16	E S 16	E S 15	E S 16	E S 16	G	35	36	38	G	40	41	39	G 35	G 21	G 25	30	22	22	21	18	30	21
10	20	20	E S 16	E S 15	E S 16	E S 16	G	G	35	G	G	G	G	E B 75	G	G 22	J G 24	30	18	22	21	20	21	17
11	E S 16	E S 16	E S 15	E	E S 16	E S 16	G	G	35	36	42	43	39	42	G	G	G 20	G 21	J X 24	J X 25	E S 16	E S 16	E S 16	E S 16
12	E S 16	E S 16	E S 16	E S 16	E B 11	E S 16	G	G	G	G	J X 61	77	G 36	44	G 35	G 31	32	24	20	E S 15	E S 15	E S 15	E S 16	E S 15
13	E S 16	E S 15	E B 13	E B 11	E S 15	E S 15	G	G	36	39	G	43	G	G	G	G	35	31	26	M 22	J X 19	E S 15	E S 15	J X 28
14	M 21	E S 15	E B 13	E B 13	E B 12	E S 15	28	32	G	G	G	40	G	G	G	G	G	29	22	J X 25	E S 16	E S 15	E S 16	E S 15
15	E S 15	E S 16	E B 12	E B 12	E S 15	E S 16	G	G	J X 43	41	41	44	46	G	42	57	J G 29	G 21	21	E S 16	E S 16	E S 16	E S 16	E S 16
16	E S 16	E S 16	E S 16	E S 15	E S 15	E S 16	G	35	35	E B 40	42	42	42	G	G	G	36	31	30	21	18	22	E S 16	E S 16
17	21	E S 16	E S 16	E S 16	E S 15	E S 16	G	G	G	41	G 36	39	41	G	G	42	41	J X 51	78	54	31	42	21	21
18	22	E S 16	E S 16	E S 16	E S 15	E S 16	G	35	41	43	G	J X 51	71	J X 107	J X 121	36	G	28	35	48	J X 24	22	E S 16	23
19	22	J X 24	23	22	21	21	G 21	33	36	G	43	G	G	G	J X 51	J X 42	36	36	J X 24	J X 41	J X 36	M 31	J X 37	J X 23
20	J X 22	E S 15	E S 15	J X 22	E B 11	E S 16	28	36	39	44	G	E B 52	43	43	44	G	36	J X 42	J X 62	J X 26	26	J X 26	J X 29	J X 28
21	E S 15	E S 15	20	E B 11	E B 14	E B 13	28	33	G	G	G	57	43	E B 50	36	41	G 29	35	35	19	J X 25	E S 16	60	J X 29
22	J X 29	J X 25	J X 25	J X 28	J X 24	22	30	35	G 34	42	49	48	56	E B 48	42	C	C	J X 57	57	J X 29	J X 24	23	E S 16	E S 16
23	23	J X 23	J X 23	J X 22	J X 23	E S 17	G	36	41	42	42	43	43	44	44	G	G 22	G 21	G	J X 24	E S 15	E S 15	E S 16	E S 16
24	E S 15	E S 15	21	M 22	20	E B 15	31	34	39	42	G	G	G	E B 45	48	G	G	G	57	J X 50	36	32	18	M 23
25	22	E S 15	E B 12	E B 12	M 20	21	30	35	41	43	47	46	E B 53	44	G	G	G	32	28	M 21	J X 18	21	J X 29	E S 15
26	23	18	23	E S 15	E B 12	E B 17	G	34	37	41	G	G	G	50	43	E B 40	35	30	30	21	32	19	E S 17	E S 16
27	19	21	E S 15	20	E S 16	E B 15	G	G	J X 41	46	54	42	G	39	G	C	G	C	23	J X 29	25	E S 15	19	J X 20
28	22	C	J X 25	22	22	21	G	G	G	43	49	G	42	G	G	G	G	31	G	E S 15	E S 16	E S 15	E S 15	19
29	23	J X 28	22	21	M 21	30	36	43	G	G	J X 46	56	J X 78	J X 43	G	G	G	28	29	21	E B 13	J X 28	M 35	J X 57
30	J X 41	J X 31	22	J X 24	E S 16	G	G	36	36	41	43	45	43	G	G	G	35	24	G	E S 15	23	21	E S 15	35
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	30	29	30	30	30	30	30	29	29	29	30	30	30	28	29	29	30	30	30	30	30	30
MED	19	E S 16	E 16	E 16	E 16	E S 16	G	32	35	39	G 36	42	40	U 38	G 35	E G 22	G 25	30	24	22	21	20	18	18
UQ	22	21	21	22	20	E S 17	25	35	37	42	43	45	43	44	42	40	35	31	35	J X 29	25	23	29	23
LQ	E S 16	E S 15	E S 15	E E 13	E S 15	E S 15	G	G	G	G	G	G 35	G	G	G	G	G	G 21	20	21	E S 16	E S 16	E S 16	E S 16

IONOSPHERIC DATA

APR. 1969 | 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	Es 16	E	E	E	E	E	Eb 18	G	Er 30	Er 36	G	Er 35	Er 43	Er 35	31	39	G	G	19	33	26	46	26	E
2	Es 16	Ec 26	E	Es 16	Es 15	Es 16	G	G	Er 35	G	C	C	G	40	G	G	G	G	21	E	Es 16	E	Es 16	Es 16
3	E	E	Es 16	Es 16	Es 16	Es 16	Eb 17	31	33	C	G	Er 35	G	Er 35	Er 35	40	G 26	27	33	E	E	E	E	Es 15
4	C	Es 16	Es 16	C	Es 15	Es 15	19	G	G	G	G	G	41	G	40	40	33	G 20	Er 20	E	E	E	Es 16	E
5	Es 17	Es 16	Es 15	Es 15	Es 15	Es 16	25	31	34	39	40	41	Er 39	Er 39	38	34	32	34	34	22	E	E	E	Es 15
6	Es 16	Es 15	Eb 13	Eb 13	Eb 12	Es 15	24	G 26	34	36	Er 35	42	44	40	40	Er 36	G	G	G	20	Es 16	Es 16	Es 16	Es 15
7	Es 16	Es 15	Es 15	Eb 11	Eb 14	Es 15	23	30	G	41	40	Er 45	G	51	40	30	G 26	26	30	37	19	20	E	Es 16
8	Es 16	Es 16	Es 16	Es 15	Es 16	Es 15	G	31	Er 36	G	Er 35	Er 35	G	G	G	G	G	26	18	E	Es 16	Es 16	E	E
9	Es 16	Es 16	Es 16	Es 15	Es 16	Es 16	G	32	34	38	G	Er 40	40	39	Er 35	Er 21	G 25	30	22	18	E	E	26	E
10	E	E	Es 16	Es 15	Es 16	Es 16	G	G	32	G	G	G	G	Eb 75	G	Er 22	G 24	26	17	E	E	E	E	E
11	Es 16	Es 16	Es 15	E	Es 16	Es 16	G	G	Er 35	Er 36	40	Er 43	Er 39	41	G	G	Er 20	G 19	19	17	Es 16	Es 16	Es 16	Es 16
12	Es 16	Es 16	Es 16	Es 16	Eb 11	Es 16	G	G	G	G	61	68	Er 36	41	Er 35	G 26	26	18	19	Es 15	Es 15	Es 15	Es 16	Es 15
13	Es 16	Es 15	Eb 13	Eb 11	Es 15	Es 15	G	G	35	38	G	41	G	G	G	G	35	30	25	17	E	Es 15	Es 15	17
14	E	Es 15	Eb 13	Eb 13	Eb 12	Es 15	26	32	G	G	G	40	G	G	G	G	G	28	20	22	Es 16	Es 15	Es 16	Es 15
15	Es 15	Es 16	Eb 12	Eb 12	Es 15	Es 16	G	G	38	40	41	41	46	G	Er 42	53	G 26	G 20	Er 21	Es 16	Es 16	Es 16	Es 16	Es 16
16	Es 16	Es 16	Es 16	Es 15	Es 15	Es 16	G	30	35	Eb 40	42	Er 42	40	G	G	G	32	26	26	E	E	E	Es 16	Es 16
17	E	Es 16	Es 16	Es 16	Es 15	Es 16	G	G	G	40	Er 36	39	40	G	G	42	41	46	75	51	25	40	E	E
18	E	Es 16	E	Es 16	Es 15	Es 16	G	32	40	40	G	41	66	100	80	Er 36	G	28	30	46	20	E	Es 16	E
19	E	E	E	E	E	E	G 21	32	Er 36	G	43	G	G	G	41	38	35	33	24	33	34	20	28	22
20	19	Es 15	Es 15	16	Eb 11	Es 16	28	35	38	43	G	Eb 52	43	41	44	G	33	30	26	19	25	19	22	25
21	Es 15	Es 15	E	Eb 11	Eb 14	Eb 13	28	32	G	G	G	54	Er 43	Eb 50	Er 36	37	G 29	33	33	16	E	Es 16	A	27
22	27	25	E	25	E	17	29	33	Er 34	40	45	48	50	Eb 48	40	C	C	53	52	24	E	17	Es 16	Es 16
23	E	E	18	20	19	Es 17	G	36	41	40	41	42	42	40	40	G	Er 22	G 19	G	19	Es 15	Es 15	Es 16	Es 16
24	Es 15	Es 15	E	15	E	Eb 15	31	33	38	41	G	G	G	Eb 45	45	G	G	G	51	40	25	25	16	17
25	E	Es 15	Eb 12	Eb 12	E	19	29	33	40	40	45	45	Eb 53	Er 44	G	G	G	30	26	E	E	E	19	Es 15
26	E	E	20	Es 15	Eb 12	Eb 17	G	34	37	40	G	G	G	50	41	Eb 40	35	28	25	E	27	E	Es 17	Es 16
27	E	E	Es 15	E	Es 16	Eb 15	G	G	40	45	52	41	G	39	G	C	G	C	19	27	20	Es 15	E	E
28	17	C	17	18	14	19	G	G	G	42	45	G	42	G	G	G	G	28	G	Es 15	Es 16	Es 15	Es 15	E
29	E	25	15	E	E	25	35	32	G	G	46	52	56	43	G	G	G	27	25	20	Eb 13	20	19	40
30	40	20	E	19	Es 16	G	G	36	36	40	43	45	42	G	G	G	33	22	G	Es 15	17	E	Es 15	25
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	30	29	30	30	30	30	30	29	29	29	30	30	30	28	29	29	30	30	30	30	30	30
MED	E 16	Es 15	E 15	E 15	E 15	Es 16	G	31	33	38	36	40	Eg 40	Eg 40	Eg 35	Eg 22	G 25	27	23	18	16	E 15	E 16	16
UQ	Es 16	Es 16	Es 16	Es 16	Es 16	Es 16	25	32	37	40	43	44	42	U 42	40	37	32	30	30	24	20	17	17	Es 16
LQ	E	Es 15	E	E 11	E 11	Es 15	G	G	G	G	G	Eg 35	G	G	G	G	G	G 20	18	E	E	E	Es 15	E

IONOSPHERIC DATA

APR. 1969 | 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 16	E S 16	E S 15	E S 16	E S 16	18	15	16	25	26	26	26	26	26	25	16	15	16	E S 16	E S 16	E S 16	E S 16	E S 16
2	E S 16	E C 26	E S 16	E S 16	E S 15	E S 16	16	16	16	20	E C 105	E C 105	26	28	26	26	16	16	16	E S 16	E S 16	E S 15	E S 16	E S 16
3	E S 16	E S 15	E S 16	E S 16	E S 16	E S 16	17	16	17	E C 105	26	27	28	28	31	20	17	15	15	E S 16	E S 16	E S 16	E S 16	E S 15
4	C	E S 16	E S 16	E C 26	E S 15	E S 15	15	15	16	18	26	28	30	28	26	18	18	16	16	E S 16	E S 16	E S 16	E S 16	E S 16
5	E S 17	E S 16	E S 15	E S 15	E S 15	E S 16	16	15	16	25	25	26	27	27	26	16	12	10	11	E S 15	E S 15	E S 15	E S 15	E S 15
6	E S 16	E S 15	13	13	12	E S 15	16	13	16	16	25	25	25	27	18	16	17	16	13	E S 15	E S 16	E S 16	E S 16	E S 15
7	E S 16	E S 15	E S 15	11	14	E S 15	15	16	16	26	26	26	27	27	27	26	16	16	16	E S 16	E S 16	E S 15	E S 16	E S 16
8	E S 16	E S 16	E S 16	E S 15	E S 16	E S 15	16	16	16	25	26	26	28	26	27	26	16	16	16	E S 16	E S 16	E S 16	E S 16	E S 16
9	E S 16	E S 16	E S 16	E S 15	E S 16	E S 16	16	16	17	16	19	27	29	23	27	16	16	16	10	E S 16	E S 16	E S 16	E S 16	E S 16
10	E S 16	E S 16	E S 16	E S 15	E S 16	E S 16	16	16	16	26	26	26	26	75	26	16	16	13	16	E S 16	E S 16	E S 16	E S 16	E S 16
11	E S 16	E S 16	E S 15	10	E S 16	E S 16	16	16	18	26	26	30	26	28	27	18	14	16	16	E S 15	E S 16	E S 16	E S 16	E S 16
12	E S 16	E S 16	E S 16	E S 16	11	E S 16	20	15	19	18	25	26	25	22	16	15	15	10	16	E S 15	E S 15	E S 15	E S 16	E S 15
13	E S 16	E S 15	13	11	E S 15	E S 15	16	16	17	18	19	26	20	23	22	25	19	16	15	E S 15	E S 15	E S 15	E S 15	E S 15
14	E S 15	E S 15	13	13	12	E S 15	15	16	16	25	19	26	25	29	30	26	25	15	16	E S 16	E S 16	E S 15	E S 16	E S 15
15	E S 15	E S 16	12	12	E S 15	E S 16	15	15	25	27	26	30	30	32	29	18	16	16	18	E S 16	E S 16	E S 16	E S 16	E S 16
16	E S 16	E S 16	E S 16	E S 15	E S 15	E S 16	15	16	18	40	26	26	25	27	26	27	16	16	16	E S 16	E S 16	E S 16	E S 16	E S 16
17	E S 16	E S 16	E S 16	E S 16	E S 15	E S 16	16	15	16	24	20	27	26	30	27	16	16	16	16	E S 16	E S 16	E S 16	E S 16	E S 16
18	E S 16	E S 16	E S 16	E S 16	E S 15	E S 16	16	16	16	26	26	27	26	20	20	25	16	16	16	E S 15	E S 16	E S 16	E S 16	E S 16
19	E S 16	E S 16	E S 16	E S 16	11	E S 15	15	16	18	25	18	25	27	26	25	18	19	15	15	E S 16	E S 16	E S 15	E S 15	E S 15
20	13	E S 15	E S 15	12	11	E S 16	16	17	19	25	26	52	25	22	26	25	16	15	14	E S 15	E S 15	E S 15	E S 16	E S 15
21	E S 15	E S 15	E S 15	11	14	13	15	17	22	26	27	30	25	50	29	20	25	25	16	E S 15	E S 15	E S 16	E S 16	E S 16
22	E S 16	E S 16	E S 16	E S 16	E S 15	13	16	19	25	25	25	25	30	48	26	C	C	16	16	14	E S 16	E S 16	E S 16	E S 16
23	E S 16	E S 16	E S 16	12	E S 15	E S 17	16	17	25	26	25	26	25	34	25	25	16	16	16	E S 15	E S 15	E S 15	E S 16	E S 16
24	E S 15	E S 15	E S 16	12	E S 15	15	16	16	26	26	26	28	48	45	40	26	26	19	15	E S 16	E S 15	E S 15	E S 15	E S 15
25	E S 15	E S 15	12	12	E S 15	15	15	15	16	16	24	27	53	28	25	18	16	15	16	E S 15	E S 15	E S 15	E S 15	E S 15
26	E S 15	12	12	E S 15	12	17	16	25	16	25	27	27	27	26	35	40	26	19	16	E S 16	E S 15	E S 16	E S 17	E S 16
27	E S 16	E S 16	E S 15	E S 15	E S 16	15	16	16	26	26	27	26	26	25	27	E C 55	26	E C 25	16	E S 16	E S 16	E S 15	E S 16	E S 16
28	E S 16	C	12	12	10	16	16	15	26	26	25	26	22	32	25	17	16	16	15	E S 15	E S 16	E S 15	E S 15	E S 16
29	E S 16	E S 15	12	14	12	15	15	16	19	25	26	25	26	27	26	17	16	16	15	E S 15	13	E S 16	E S 16	E S 16
30	E S 16	E S 16	E S 17	12	E S 16	15	16	15	25	16	25	26	26	22	26	18	18	15	16	E S 15	14	E S 15	E S 15	E S 16
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	30	30	30	30	30	30	30
MED	E S 16	E S 16	E S 16	E E 15	E S 15	E S 16	16	16	17	25	26	26	26	27	26	19	16	16	16	E S 16	E S 16	E S 16	E S 16	E S 16
UQ	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	16	22	26	26	27	28	30	27	26	18	16	16	E S 16	E S 16	E S 16	E S 16	E S 16
LQ	E S 16	E S 15	12	12	12	E S 15	15	15	16	20	25	26	25	26	25	17	16	15	15	E S 15	E S 15	E S 15	E S 16	E S 15

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

APR. 1969

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	I R 250	280	275 R	295	280	260	R	J R 310	300	295	280	295	295	285	285	280	280	285	300	310 R	280	265	270 R	R
2	R	C	315	275	250	265	300 R	J R 285	310	300	300	295	290	280	290	280	290	300	295	290	265	R	R	R
3	R	R	300	275	265	270	I R 300	315	280 R	280	300	285	265	260	280	280	285	285	300	305	305 R	270	R	290 R
4	I C 275	280 R	I R 290	I C 285	285	285	315	340 R	325	330	290	290	280	285	280	280	285	300	310	300 R	270 R	R	J R 270	R
5	290 R	R	310 R	285 R	270	280	310 R	315	310	285	285	285	280	280	295	285	285	290	305	290	285	U S 280	S 285	I R 290
6	280	U S 290	285	305	260	265	325	320	300	290	295	285	275	285	280	285	290	295	315	290	S 285	S 285	U S 290	I R 290
7	S 295	285	280	285	285	270	315	320	310	300	280	280	280	280	280	280	275	285	295	315	R	260	R 265	R
8	R 275	270	J R 295	295	J R 265	290	R	315	315	285	285	285	285	280	285	290	290	300	J R 300	295	R 305	275	I R 275	R 290
9	R 270	R 270	270	285	270	275	R 305	310	315	295	285	285	290	295	285	290	285	290	300	J R 295	315	R 285	R 270	255
10	R	270	R 270	280	R 290	290	J R 310	300	300	295	295	315	285	290	290	310	315	315	325	310	280	255	260	265
11	275	280	285	290	270	250	310	320	310	300	280	285	295	290	290	295	320	295	295	J R 280	I R 300	270	270	260
12	R 270	I R 280	R 290	280	275	285	I R 320	320	320	305	290	290	290	295	290	290	295	300	J R 290	S 305	U S 310	275	I R 275	S 285
13	S 280	275	285	285	275	280	310	325	305	285	275	265	270	275	285	280	290	285	280	300	300	J S 290	J S 290	S 290
14	265	255	270	275	280	265	310	315	300	285	290	285	270	275	275	285	290	290	300	310	310	J R 275	R 285	I R 280
15	I R 290	S 290	R 290	280	260	270	295	300	295	285	280	285	280	270	280	280	290	295	290	280	J R 280	R	R	R
16	R	R 300	R 295	270	R 290	J R 275	310	R 310	295	280	285	275	285	280	285	285	285	285	300	J R 285	295	R	R	R
17	R	R	R	R 285	275	I R 280	310	305	295	295	275	280	275	280	280	290	285	285	290	295	280	280	275	I R 265
18	R 255	I R 265	260	260	270	R 280	I R 290	310	290	305	295	285	275	275	280	280	295	295	305	J R 310	R 290	270	R 275	280
19	R 270	J R 290	R 285	R 295	275	275	305	R 305	305	310	300	280	290	275	280	280	290	290	310	290	I R 300	280	S 285	U S 280
20	U S 295	285	J R 285	285	275	280	320	J R 315	310	300	275	275	275	270	280	280	280	285	300	310	300	270	J R 285	I R 290
21	S	J R 285	315	320	275	290	305	305	305	290	280	275	275	270	280	280	290	285	305	320	285	R 270	A	R
22	R	R	R	R 295	J R 290	R	R 325	300	305	290	270	275	285	270	275	C	C	280	300	280	J R 280	I R 280	285	I R 285
23	R 285	I R 280	R	R 290	R 285	J R 280	295	285	275	275	270	R 270	280	285	295	290	290	H 305	J R 285	J R 300	J R 305	285	270	U S 265
24	S 275	U S 275	305	275	260	290	325	325	300	305	280	265	280	280	280	280	280	290	305	300	S 300	R	285	285
25	U S 295	280	285	275	290	R 305	315	305	300	290	270	270	270	285	295	285	285	280	J R 285	J R 295	J R 295	295	280	280
26	I R 275	280	R 285	285	285	305	310	325	280	280	280	270	280	285	290	285	295	295	J R 285	J R 300	290	R	R	R
27	270	R	R	R 275	J R 265	290	315	300	275	300	265	275	270	280	280	295	J R 295	J R 295	305	R 300	290	270	R 270	R 270
28	R 270	I C 260	R 285	R 280	280	285	R 315	R 300	290	285	290	290	280	285	285	290	285	270	290	310	305	265	260	270
29	255	240	265	285	290	305	310	300	290	290	280	290	290	300	295	305	305	305	300	310	300	265	265	270
30	R 265	I R 270	280	265	245	J R 305	320	270	320	285	290	295	270	290	305	280	285	290	305	300	300	280	275	J R 270
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	24	26	30	30	29	28	30	30	30	30	30	30	30	30	29	29	30	30	30	29	24	24	22
MED	R 275	280	285	285	275	280	310	310	300	290	282	285	280	280	285	285	290	290	300	300	295	275	275	280
UQ	282	285	295	290	285	290	315	320	310	300	290	290	285	285	290	290	290	295	305	310	300	280	285	R 290
LQ	R 270	270	280	275	265	270	305	300	295	285	280	275	275	275	280	280	285	285	290	290	285	270	270	270

IONOSPHERIC DATA

APR. 1969

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	L	L	L	L	L	L	L								
2										L	C	C	L	L	L	L	L							
3									L	C	L	L	L	L	L	L	L							
4										L	L	L	L	L	L		L	L						
5									L	L	L	L	L	L	L	L								
6									L	L	L	L	L	L	U L 330	L	L							
7									L	L	L	L	L	A	L	L	L	L						
8									L	L	L	L	L	L	L	L								
9									L		L	L	L	L	L	L	L							
10								L	L	L	L	L	L	B	L	L								
11										L	L	R	L	L	L	L								
12									L	L	A	A	L	L	L	L	L							
13									L	L	L	L	L	L	L	L								
14									L	L	L	L	L	U L 335	L	L								
15								L	L	L	L	L	L	L	L	L	L							
16									L	L	L	L	L	L	L	L	L							
17									L	L	L	L	L	L	L	L								
18										L	L	L	A	A	A	L	L							
19									L	L	L	L	L	L	L	L	L							
20								L	L	L	L	L	L	L	L	L	L							
21								L	L	L	L	L	L	L	R	L	L							
22									L	L	L	A	L	L	L	C	C	A						
23									L	345	L	U L 335	L	L	L	L	L							
24									L	L	L	U L 320	L	L	L	L	L							
25								L	L	L	L	L	L	U L 345	L	L	L							
26									L	L	L	L	L	L	L	L	L							
27								L	L		A	L	L	U L 370	L	C	L	C						
28										U L 335	L	U L 365	L	L 365	L	360	L	L						
29								L	L	L	L	A	A	L	L	L	L							
30							L	U L 340	L		U L 340	L 345	L 350	U L 345	U L 350	L	L	L						
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1		2	1	4	1	5	2	1								
MED								U L 340		340	U L 340	U L 340	L 350	U L 345	U L 340	360								
UQ												L 355		U L 365										
LQ												U L 328		U L 345										

IONOSPHERIC DATA

APR. 1969 | h'F2 (km) | 135° E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1.0 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									250	250	260	285	270	290	275	275								
2										265	I C 270	I C 265	260	260	290	260	260							
3									250	I C 260	275	285	300	260	265	270	265							
4										250	260	260	290	295	285		250	260						
5									250	250	260	300	265	275	275	255								
6									255	245	285	275	270	300	315	275	270							
7									245	255	260	285	295	280	290	265	285	260						
8									250	250	280	310	280	300	295	270								
9									250		285	290	280	290	280	275	250							
10								250	270	270	285	290	265	B	280	270								
11										265	280	280	290	275	285	265								
12									250	250	260	F A 310	290	300	260	270	260							
13									250	255	250	310	310	305	275	255								
14									245	250	270	270	260	330	300	270								
15								270	255	250	275	285	295	310	290	290	270							
16									250	285	270	320	300	300	285	295	275							
17									250	265	255	285	290	290	290	270								
18										275	265	275	A	A	A	275	275							
19									260	260	255	290	295	290	270	300	275							
20								255	260	255	255	325	280	310	290	300	280							
21								250	255	275	250	310	300	340	310	300	290							
22									250	275	295	290	310	295	310	C	C	A						
23									300	340	330	320	310	305	305	290	280							
24									255	260	270	350	310	300	300	290	290							
25								260	250	270	280	320	340	310	280	270	L 285							
26									260	265	285	290	300	310	300	290	275							
27								260	260		290	300	310	305	300	300	300	310						
28										325	305	300	310	305	300	300	300	310						
29								260	260	275	260	280	300	290	280	290	260							
30							265	370	255		345	330	350	300	290	295	290	250						
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1	8	25	27	30	30	29	28	29	28	21	5						
MED							265	260	250	260	270	290	295	300	290	275	275	260						
UQ								265	260	272	285	310	310	305	300	292	285	310						
LQ								252	250	250	260	285	280	290	280	270	265	260						

IONOSPHERIC DATA

APR. 1969 | 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	295	295	290	250	280	350	240	240	240	220	230H	225	I R 235	230	225	240	250	250	250	250	250	A	A 310	300
2	295	250	240	250	345	340	240	250	250	240	I C 245	I C 240	245	230	225	210H	250	245	240	240	245	295	300	300
3	295	285	250	270	325	285	230	240	240	I C 240	205	230	240	240	230	245	250	250	250	230	235	265	295	295
4	I C 300	295	295	280	260	245	245	240	240	220	225	200H	210	210	245	250	240	250	250	220	240	310	300	290
5	280	260	245	245	295	290	245	245	240	210	205H	205H	200H	200H	240	240	240	255	250	225	250	280	270	270
6	290	275	250	245	255	300	230	230	225	220	200H	205	250A	210	220	245	230H	250	240	240	245	295	290	270
7	275	295	275	245	255	290	245	240	240	230	210	I R 200	245	I A 245	245	240	240	250	265	240	225	300	315	300
8	300	300	280	210	300	300	250	240	240	240	210	210	230	240	220	250	245	250	245	240	245	285	290	290
9	300	300	290	255	285	290	250	250	240	245	210	245	210	210	210	240	240	250	250	240	220	280	A 300	330
10	320	300	300	260	260	255	245	240	240	210H	210H	240	240	B	220	240	245	250	250	240	245	300	340	325
11	295	295	285	250	320	320	250	245	245	240	200	R	240	215	220	240	250	250	255	280	250	250	290	315
12	300	275	260	240	290	290	245	245	240	210	I A 220	I A 215	200H	230	245	230	225	245	250	245	225	250	295	295
13	300	290	275	250	255	295	230	225	220	205	205H	200	230	225H	245	240	245	250	275	250	230	215	275	275
14	290	340	310	270	260	290	240	225	225	220	220	230	220	230	240	245	245	250	255	250	220	255	280	300
15	295	275	250	260	290	295	245	240	240	235	240	220	245	215H	I R 230	I A 245	250	250	250	245	245	295	310	300
16	300	255	250	260	280	295	245	240	245	230	240	I R 220	225	240	220	240	240	260	250	240	240	285	300	300
17	300	275	260	255	310	295	245	245	240	235	210	210	240	225	250	260	250	275A	295A	275	250	300	295	300
18	340	310	305	310	300	295	250	250	240	220	240	A	A	A	A	230	245	250	250	250	240	290	300	300
19	300	280	265	250	265	285	245	240	245	225	230	200	205	210	240	245	E A 250	250	250	245	250A	260	305	300
20	300	290	255	250	255	275	240	245	230	240A	220	I B 210	220	210	250A	210H	210H	260	260	250	230	300	310	290
21	290	280	255	205	230	275	240	230	225	230	240	I A 240	I R 220	280	I R 230	230	250	260	250	230	240	270	A	340
22	300	300	280	250	240	245	240	240	230	220	240	I A 255	250	250	220H	C	C	A	265	250	250	265	250	300
23	300	260	260	255	240	290	245	250	230	210	210	220	240	200	210	230	220H	210H	255	250	240	245	260	295
24	305	300	230	250	310	280	240	245	225	220	210	220	R	B	210	195H	255	260	260A	260A	250	300A	270	260
25	260	260	260	275	295	260	235	245	240	220	250A	240	I B 220	I R 225	240	240	245	260	255	245	240	245	260	295
26	300	295	290	250	270	255	230	240	225	210	210	210	245	250	225	245	250	245	250	250	250	250	290	295
27	300	290	260	250	295	260	250	240	250	270	I A 240	210	210	240	250	I C 235	245	I C 250	255	250A	225	300	300	300
28	295	I C 310	290	250	260	275	250	245	245	240	255	225	210	205	210	225	245	250	275	250	220	240	300	320
29	350	360A	305	260	255	250	250	240	240	225	250A	I A 245	I A 235	220H	205	245	240	245	250	250	245	270	300	A
30	350A	340	290	310	300	260	245	250	240	220	220	245	225	225	245	230	240	220	250	230	240	290	300	310
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	28	28	27	29	29	29	29	30	30	30	29	29	29
MED	300	292	270	250	280	290	245	240	240	222	220	220	230	225	230	240	245	250	250	245	240	280	300	300
UQ	300	300	290	260	300	295	245	245	240	240	240	240	240	240	245	245	250	250	255	250	250	295	300	300
LQ	295	275	255	250	255	260	240	240	230	220	210	210	215	210	220	230	240	250	250	240	230	255	290	295

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

APR. 1969 | h'Es (km) | 135° E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N, Long. 139° 29.3' E Sweep 1.0 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 110	115	100	105	110	B 110	G 140	G 110	140	G 110	110	110	105	105	G 140	G 110	110	110	110	105	105			
2	S 100	C	S	S	S	G 150	G	G	C	C	G 125	G	G	G	G	120	110	S 145	S	S				
3	105	100	S	S	S	S	B 160	145	C	G	110	G	110	110	110	110	110	100	100	100	100	100	S	
4	C	S	S	C	S	S 110	G	G	G	G	G	110	G	110	110	110	105	105	100	100	100	S	100	
5	S	S	S	S	S	S 150	150	110	125	110	110	110	110	125	110	125	140	125	115	100	100	105	S	
6	S	S	B	B	B	S 155	110	110	110	110	115	115	115	115	115	G	G	G	105	S	S	S	S	
7	S	S	S	B	B	S 160	170	G	130	115	110	G	110	110	105	105	100	100	110	100	100	100	S	
8	S	S	S	S	S	S	G 160	145	G	110	110	G	G	G	G	G	140	120	110	S	S	110	110	
9	S	S	S	S	S	S	G 155	150	160	G	110	110	110	110	105	105	150	100	100	100	100	100	100	
10	100	100	S	S	S	S	G	G	120	G	G	G	G	B	G	105	100	100	130	100	100	100	100	100
11	S	S	S	E	S	S	G	G	125	120	110	105	110	145	G	G	105	100	100	100	S	S	S	S
12	S	S	S	S	B	S	G	G	G	G	115	110	105	105	100	100	100	100	145	S	S	S	S	S
13	S	S	B	B	S	S	G	G	145	130	G	130	G	G	G	G	155	140	130	120	115	S	S	110
14	105	S	B	B	B	S	150	155	G	G	G	115	G	G	G	G	G	140	120	115	S	S	S	S
15	S	S	B	B	S	S	G	G	115	115	110	110	110	G	110	100	100	100	100	S	S	S	S	S
16	S	S	S	S	S	S	G	110	160	B	115	115	115	G	G	G	110	105	100	100	100	110	S	S
17	110	S	S	S	S	S	G	G	G	110	110	140	110	G	G	190	145	130	110	110	110	105	110	105
18	100	S	110	S	S	S	G	140	125	125	G	115	110	110	110	140	G	150	120	110	110	110	S	110
19	110	110	105	100	110	110	110	160	150	G	130	G	G	G	115	125	140	115	115	110	110	105	105	105
20	105	S	S	105	B	S	175	145	145	140	G	B	110	110	110	G	130	115	115	110	110	100	110	105
21	S	S	105	B	B	B	180	155	G	G	G	110	115	B	110	110	110	110	105	140	110	S	110	110
22	110	110	110	110	110	110	110	110	110	115	110	110	110	B	110	C	C	120	115	110	110	110	S	S
23	110	110	110	110	110	S	G	140	130	125	125	140	140	105	140	G	105	100	G	115	S	S	S	S
24	S	S	105	105	100	B	140	150	145	125	G	G	G	B	140	G	G	G	115	110	110	105	110	105
25	100	S	B	B	100	150	150	150	145	140	125	115	B	125	G	G	G	140	130	120	110	115	110	S
26	110	105	105	S	B	B	G	155	140	135	G	G	G	135	140	B	150	140	125	100	110	115	S	S
27	110	110	S	110	S	B	G	G	140	130	120	130	G	125	G	C	G	C	140	115	110	S	115	110
28	110	C	105	105	110	150	G	G	G	125	115	G	115	G	G	G	G	130	G	S	S	S	S	120
29	115	105	105	110	130	120	120	150	G	G	115	115	115	115	G	G	G	190	140	120	B	115	110	110
30	110	110	110	110	S	G	G	140	140	140	140	140	140	G	G	G	140	115	G	S	115	110	S	110
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	15	10	12	10	8	6	12	19	22	19	17	22	18	16	17	14	18	25	26	26	20	19	15	16
MED	110	110	105	108	110	115	150	150	140	125	115	112	110	110	110	110	110	115	118	110	110	105	110	108
UQ	110	110	110	110	110	150	158	155	145	138	120	115	115	125	115	115	140	140	130	115	110	110	110	110
LQ	105	105	105	105	102	110	115	140	120	122	110	110	110	110	110	105	105	105	105	100	100	100	102	105

IONOSPHERIC DATA

APR. 1969 | 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		F 1	F 2	F 2	F 2	F 1		*	C 1	H 1		L 1	L 1	L 1	L 1	L 2			H 1	F 3	F 3	F 3	F 4	F 1
2			F 1						H 1					H 1					L 1	F 2		F 1		
3	F 1	F 1						H 1	H 1			L 1		L 1	L 1	L 1	L 1	L 1	L 2	F 1	F 1	F 1	F 1	
4							L 1						L 1		L 1	L 1	L 1	L 1	L 1	F 1	F 1	F 1		F 1
5							H 1	HL 11	L 1	H 1	C 1	C 1	C 1	L 1	H 1	L 1	CL 12	HL 22	HL 42	FF 32	F 1	F 2	F 1	
6							H 1	L 1	L 1	L 1	L 1	C 1	C 1	C 2	C 1	C 1				F 2				
7							HL 11	H 1		H 1	C 1	C 2		L 2	L 1	L 1	L 1	L 2	L 2	FF 22	F 2	F 2	F 1	
8								H 1	H 1		L 1	L 1						H 1	L 1	F 1			F 1	F 1
9								H 1	H 1	H 1		L 1	L 1	L 1	L 1	L 1	L 1	H 1	L 2	F 2	F 1	F 1	F 2	F 1
10	F 1	F 1							H 1							L 1	L 1	L 2	L 1	F 2	F 1	F 1	F 1	F 1
11									H 1	H 1	C 1	L 1	L 1	HL 11			L 1	L 1	L 2	F 2				
12											C 2	L 2	L 1	L 2	L 1	L 1	L 2	L 1	H 1					
13									H 1	H 1		H 1					H 2	H 2	C 3	F 1	F 1			F 2
14	F 1						H 1	H 1				C 1						H 1	C 2	F 2				
15									C 1	C 1	C 1	L 1	L 1		L 1	L 2	L 1	L 1	L 1					
16								L 1	H 1		C 1	C 1	C 1				C 1	L 1	L 2	F 1	F 1	F 1		
17	F 1									L 1	L 1	H 1	L 1			H 1	H 2	H 2	L 4	F 2	F 4	F 3	F 2	F 1
18	F 2		F 1					H 1	H 1	H 1		C 1	C 1	L 2	L 3	H 1		H 1	L 2	F 4	F 2	F 1		F 2
19	F 2	F 1	F 2	F 2	F 2	F 1	L 1	H 1	H 1		H 1				C 1	H 1	H 1	C 2	C 2	F 3	F 4	F 3	F 4	F 2
20	F 3			F 1			H 1	H 2	H 1	H 2			L 2	L 1	L 1		H 1	C 2	C 2	F 4	F 2	F 2	FF 22	F 3
21			F 1				H 1	H 1				L 1	C 1		L 1	L 1	L 1	L 1	L 3	F 1	F 1		F 2	F 2
22	F 3	F 3	F 2	F 2	F 1	L 1	L 1	L 1	L 1	L 1	L 1	L 1	L 2		L 1			H 4	L 3	F 2	F 2	F 2		
23	F 2	F 2	F 2	F 2	F 2			H 1	H 1	H 1	H 1	H 1	HL 11	L 1	HL 11		L 1	L 2		FF 31				
24			F 1	F 2	F 1		H 2	H 1	H 1	H 1					H 1				CL 21	F 3	F 3	F 3	F 2	F 2
25	F 2				F 1	H 2	H 2	H 1	H 2	H 1	H 1	C 1		H 1				H 1	H 2	F 1	F 1	F 1	F 3	
26	F 2	F 1	F 1					H 1	H 1	H 1				H 1	H 1		H 1	H 1	H 1	F 1	F 4	F 1		
27	F 1	F 2		F 1					H 1	H 1	H 1	H 1		H 1					H 1	F 2	F 2		F 1	F 2
28	F 1		F 2	F 2	F 2	H 1				H 1	C 1		C 1					H 1						F 1
29	F 2	F 2	F 2	F 2	F 1	C 3	C 1	H 1			C 1	C 1	C 1	C 1				H 1	H 2	F 2		F 2	F 4	F 4
30	F 3	F 3	F 2	F 2				H 1	H 1	H 1	H 1	H 1	H 1				H 1	C 1			F 1	F 1		F 4
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
UQ																								
LQ																								

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

APR. 1969

hpF2 (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	I R 355	370	R 375	340	380	420	R	J R 325	330	340	360	310	365	360	355	350	350	350	315	R 300	350	400	R 390	R
2	R	C	300	395	450	410	R 300	J R 340	310	325	340	350	360	370	350	350	335	315	320	330	380	R	R	R
3	R	R	325	390	420	390	I R 320	300	R 390	R	340	350	390	380	365	360	360	340	310	310	R 320	390	R	R 360
4	I C 385	R 380	I R 365	I C 370	360	360	300	R 260	290	270	335	340	360	360	360	350	350	330	300	R 330	R 390	R	J R 395	R
5	R 350	R	R 300	R 380	400	370	R 300	300	310	320	340	350	355	350	345	350	350	320	300	340	355	U S 365	S 365	I R 350
6	370	U S 345	340	305	405	390	270	275	300	325	325	345	355	350	350	340	345	320	300	315	S 355	S 355	U S 355	I R 345
7	S 350	360	370	360	365	390	290	290	290	330	360	350	360	360	375	370	350	350	350	300	R	430	R 400	R
8	R 390	380	J R 350	350	J R 400	370	R	300	300	350	350	360	360	355	355	345	340	310	J R 330	340	R 310	395	I R 380	R 370
9	R 390	R 380	365	380	400	380	R 330	300	310	335	350	365	355	360	355	350	340	340	300	J R 310	300	R 350	R 390	430
10	R	400	R 400	370	R 370	350	J R 290	320	310	330	330	310	340	340	340	320	310	300	290	300	370	440	420	400
11	390	370	380	370	420	440	300	290	300	310	350	340	340	345	340	340	300	310	310	J R 360	I R 330	400	400	410
12	R 400	I R 380	R 340	380	390	380	I R 290	285	295	300	350	355	350	340	340	345	320	305	J R 320	S 305	U S 300	370	I R 385	S 375
13	S 385	390	350	345	370	380	280	295	305	320	350	390	380	355	350	345	340	350	370	310	310	J S 330	J S 355	S 355
14	390	430	400	395	380	385	300	295	310	345	330	340	365	360	355	350	340	335	325	305	300	J R 355	R 340	I R 360
15	I R 350	S 345	R 330	380	395	390	320	310	310	345	375	360	375	380	375	385	350	330	340	340	J R 360	R	R	R
16	R	R 325	R 320	380	R 370	J R 380	320	R 310	340	360	360	380	370	370	365	360	350	340	320	J R 340	310	R	R	R
17	R	R	R	R 370	400	I R 375	310	315	340	340	360	365	360	370	370	350	350	350	340	350	340	360	380	I R 400
18	R 430	I R 400	410	400	400	R 380	I R 330	300	360	310	350	350	380	375	360	370	340	330	315	J R 305	R 340	400	R 380	370
19	R 380	J R 350	R 350	R 350	390	400	300	R 310	310	300	300	350	345	350	355	355	330	320	300	315	I R 320	380	S 360	U S 360
20	U S 355	360	J R 345	345	380	350	290	J R 300	300	310	355	380	360	360	350	355	350	350	315	300	330	380	J R 355	I R 350
21	S	J R 355	310	290	360	340	300	305	305	340	360	360	380	380	375	350	350	340	340	300	350	R 390	A	R
22	R	R	R	R 340	J R 340	R	R 290	310	310	340	380	360	360	380	365	C	C	350	320	340	J R 360	I R 360	355	I R 370
23	R 380	I R 365	R	R 350	R 340	J R 380	340	340	350	365	360	R 360	355	350	340	330	340	H 305	J R 320	J R 305	J R 300	350	360	U S 380
24	S 380	U S 380	315	380	415	340	280	270	310	305	355	390	355	350	350	350	355	340	310	315	S 315	R	345	340
25	U S 315	350	350	365	370	R 315	290	305	300	340	370	390	395	355	330	350	350	350	J R 340	J R 315	J R 315	315	350	360
26	I R 380	375	R 355	350	350	310	300	290	350	340	360	395	360	355	350	345	320	340	J R 350	J R 350	340	R	R	R
27	390	R	R	R 380	J R 400	340	300	320	360	330	400	400	390	350	360	340	J R 350	J R 360	330	R 310	340	410	R 380	R 390
28	R 400	I C 405	R 360	R 380	390	380	R 300	R 300	350	350	340	330	360	345	350	350	350	370	340	300	300	405	410	405
29	445	490	405	350	340	310	290	315	340	330	350	320	340	320	320	310	300	305	310	305	310	370	390	390
30	R 400	I R 380	350	400	400	J R 300	290	400	300	340	350	340	380	330	305	350	335	320	305	320	330	370	380	J R 380
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	24	26	30	30	29	28	30	30	29	30	30	30	30	30	29	29	30	30	30	29	24	24	22
MED	R 385	378	350	370	390	380	300	300	310	330	350	352	360	355	352	350	345	338	320	312	330	375	380	370
UQ	390	385	370	380	400	390	305	315	340	340	360	365	375	370	360	350	350	350	340	340	350	400	R 390	390
LQ	362	358	330	350	370	350	290	295	300	320	340	340	355	350	345	345	335	320	310	305	310	358	355	U R 360

IONOSPHERIC DATA

APR. 1969 | YpF2 (km) | 135° E Mean Time (G. M. T. + 9h)

Station KOKUBUNJI TOKYO Lat. 35° 42.4' N. Long. 139° 29.3' E Sweep 1.0 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	I R 90	80	R 105	100	60	110	R	J R 95	80	100	90	105	85	90	95	100	100	100	95	R 100	100	90	R 100	R
2	R	C	90	105	100	100	R 100	J R 120	100	85	100	100	90	90	90	110	105	105	90	120	110	R	R	R
3	R	R	115	110	80	100	I R 90	90	R 100	R	100	90	90	80	95	100	100	100	100	100	R 120	100	R	R 90
4	I C 90	R 80	I R 85	I C 95	80	80	100	R 90	110	90	105	100	100	90	100	110	110	80	100	R 120	R 70	R	J R 85	R
5	R 90	R	R 90	R 110	110	90	R 90	90	100	155	105	105	90	95	75	105	95	125	95	85	70	U S 85	S 80	I R 70
6	85	U S 65	105	70	95	105	70	80	80	120	95	100	135	100	105	105	100	95	75	85	S 90	S 90	U S 45	I R 55
7	S 65	65	80	85	85	105	70	65	80	110	80	110	80	100	85	100	110	110	90	110	R	110	R 90	R
8	R 90	80	J R 110	140	J R 100	130	R	80	100	110	90	80	80	85	85	95	100	90	J R 80	100	R 90	95	I R 100	R 70
9	R 100	R 100	75	80	90	80	R 110	100	100	115	100	95	85	100	95	90	110	100	100	J R 110	100	R 90	R 90	80
10	R	90	R 90	110	R 110	90	J R 110	120	100	100	70	80	100	80	100	110	90	100	110	100	110	120	80	90
11	100	90	110	120	80	100	110	110	100	100	100	100	80	95	100	100	100	130	110	J R 80	I R 110	90	100	90
12	R 90	I R 80	R 90	100	100	110	I R 85	105	95	95	95	95	95	80	105	100	100	100	J R 95	S 65	U S 80	80	I R 80	S 65
13	S 65	75	65	100	90	70	95	55	70	125	125	110	120	120	80	110	90	100	90	95	95	J S 70	J S 60	S 85
14	85	70	90	100	70	85	70	55	105	100	120	110	130	95	100	90	105	110	85	90	80	J R 90	R 75	I R 75
15	I R 70	S 65	R 70	65	80	80	125	90	95	105	85	90	85	100	65	85	90	100	100	120	J R 120	R	R	R
16	R	R 85	R 90	120	R 110	J R 100	120	R 100	100	100	100	80	100	80	95	90	90	100	120	J R 110	90	R	R	R
17	R	R	R	R 70	100	I R 110	90	95	100	90	120	95	90	90	80	90	100	90	100	100	80	100	100	I R 90
18	R 100	I R 95	100	100	100	R 100	I R 100	100	120	120	120	100	120	105	80	110	100	100	95	J R 95	R 100	90	R 100	70
19	R 90	J R 100	R 90	R 90	100	90	100	R 90	100	95	110	105	100	110	105	100	110	110	95	100	I R 85	75	S 95	S 85
20	U S 50	85	J R 60	75	90	95	65	J R 70	95	95	145	90	110	95	90	95	95	95	95	95	110	90	J R 65	I R 60
21	S	J R 65	55	65	135	65	80	90	95	100	120	100	110	100	85	90	90	100	110	120	90	R 100	A	R
22	R	R	R	R 100	J R 100	R	R 60	130	90	110	100	120	100	110	95	C	C	110	110	110	J R 90	I R 95	105	I R 80
23	R 60	I R 80	R	R 90	R 70	J R 100	100	120	130	130	110	R 190	105	100	105	90	105	H 90	J R 90	J R 95	J R 70	70	120	U S 80
24	S 75	U S 75	75	95	85	100	70	75	90	90	105	105	95	120	120	110	90	100	90	90	S 80	R	105	75
25	U S 80	95	75	80	80	R 55	105	85	100	105	125	105	100	70	70	105	100	100	J R 105	J R 90	J R 85	85	95	85
26	I R 70	70	R 60	95	75	75	70	60	95	100	130	95	90	85	70	95	120	90	J R 110	J R 100	120	R	R	R
27	100	R	R	R 100	J R 100	80	100	120	130	110	100	100	90	100	100	90	J R 90	J R 100	110	R 100	110	90	R 90	R 90
28	R 100	I C 95	R 130	R 100	100	100	R 100	R 80	100	95	105	115	85	100	95	95	110	100	105	65	75	90	100	85
29	95	110	90	90	105	80	70	85	105	120	120	125	105	80	100	80	95	95	90	70	85	95	80	80
30	R 90	I R 95	90	100	100	J R 100	70	100	100	105	95	90	110	90	90	100	110	125	90	80	75	75	70	J R 75
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	24	26	30	30	29	28	30	30	29	30	30	30	30	30	29	29	30	30	30	29	24	24	22
MED	R 90	80	90	100	98	100	92	90	100	100	102	100	98	95	95	100	100	100	95	100	90	90	90	80
UQ	R 92	95	R 100	100	100	100	100	100	100	110	120	105	105	100	100	105	105	105	105	110	110	95	100	85
LQ	72	72	75	85	80	80	70	80	95	95	95	95	90	85	85	90	95	95	90	90	80	85	80	R 70

IONOSPHERIC DATA

APR. 1969 | foF2 (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	S 86	U S 82	S 83	S 76	61	S 53	S 58	C	C	S 112	127	135	146	147	142	140	136	136	130	S 116	S 93	S 87	I S 91	I S 91
2	J S 88	S 93	79	S 52	S 52	53	S 60	S 88	S 119	123	S 126	138	147	152	158	S 155	144	134	J R 127	J R 126	S	S	S	I S 98
3	S 98	I S 96	I S 90	70	62	63	S 69	J S 85	J S 100	J C 132	J C 137	124	136	S 154	161	154	S 148	146	J R 150	J R 141	I S 113	S	S	S
4	J S 106	S	S	S	J S 75	59	63	86	I S 97	102	S 110	115	135	145	144	136	134	133	136	I S 120	S 92	88	S	S
5	S	S 86	83	58	52	51	S 60	86	S 96	108	108	122	135	147	151	148	143	136	132	I R 122	J S 101	S 81	79	S 82
6	S 78	J S 78	U S 80	70	52	S 52	59	81	S 96	104	114	126	125	134	141	136	130	133	130	S 113	S 96	I S 90	I S 83	I S 84
7	I S 84	S 82	75	72	62	52	S 62	92	S 104	J S 101	105	125	142	148	145	148	144	S 141	144	S 140	I S 111	J S 87	I S 83	S 83
8	S 81	S 80	I S 76	66	57	57	S 61	I S 88	84	95	112	131	146	145	136	132	129	S 129	J R 126	I S 114	I S 98	S 80	78	82
9	S 79	J S 74	74	65	60	58	68	92	J S 102	S 114	116	127	146	145	S 149	141	134	J S 127	J R 125	S 116	I S 90	75	76	75
10	75	J S 75	S 72	69	63	56	J S 66	S 87	107	I S 118	129	135	147	152	155	144	124	106	J S 99	J S 99	75	J S 66	S 66	69
11	S 72	69	S 63	59	55	S 54	59	S 90	S 101	107	126	138	142	128	126	I C 122	I C 118	114	I R 108	J S 101	U S 94	S 81	S 84	S 85
12	S 86	U S 85	S 79	65	57	57	S 69	88	85	93	103	117	132	137	138	135	128	J S 126	R 128	J R 127	S 106	S 85	S 86	I S 86
13	U S 88	S 86	S 85	80	65	60	J S 74	J S 100	107	99	S 114	I S 120	128	140	149	145	142	135	R 133	152	132	S 115	I S 105	I S 100
14	S 94	83	81	76	69	60	76	S 96	92	106	123	124	126	136	141	142	139	132	J R 127	I R 121	S 102	S 81	S 85	U R 84
15	R 86	S 84	86	71	65	62	S 74	J S 98	S 120	S 119	S 118	127	131	134	141	143	142	144	134	I R 120	J S 104	I S 97	I S 96	I S 99
16	I S 96	J S 99	I S 92	75	65	61	S 72	S 95	S 96	112	S 122	127	139	145	146	144	144	137	J R 132	J S 121	J S 101	S 85	S 87	I S 89
17	I S 92	S 93	S 88	70	69	67	78	104	S 113	S 122	S 117	123	134	139	143	141	133	126	J R 129	S 122	J S 106	S 88	80	83
18	I S 78	76	73	71	67	64	75	S 95	93	112	S 124	130	139	138	142	146	142	140	J R 132	I S 121	S 93	I S 84	S 84	S 82
19	S 84	S 83	J S 86	78	70	69	85	J S 112	S 115	I S 121	107	115	130	134	140	138	145	S 148	R 135	J R 124	S	S	S	S
20	S	J S 90	S 87	S 78	68	62	S 84	S 102	S 109	S 102	100	118	129	137	145	144	141	144	145	J R 134	I S 118	R	R	R
21	R	S	S	S	76	63	82	106	106	S 102	100	112	F 127	129	140	150	146	143	135	U S 120	I S 108	103	I S 108	I S 116
22	J R 124	S	S	S 104	78	65	81	101	97	106	113	125	131	133	134	139	139	132	133	133	U S 122	112	107	I S 107
23	J S 102	U S 112	J S 105	91	83	69	81	U S 99	S 110	111	U S 115	122	127	128	126	128	129	S 125	R 123	U R 125	S 108	J S 98	I S 96	J S 100
24	92	U S 85	87	71	62	63	90	S 104	90	90	102	115	129	138	136	129	129	130	129	132	S 110	J S 101	U S 96	J S 102
25	I S 97	S 90	S 89	S 82	69	67	S 96	S 95	90	93	104	S 117	136	143	142	130	126	S 122	125	126	I S 102	93	S 93	93
26	S 87	J S 86	81	70	68	64	86	83	89	97	102	121	134	145	150	149	143	139	142	138	I S 120	I S 107	I S 105	J S 104
27	I S 98	I S 95	I S 96	72	71	S 70	80	93	S 88	96	100	119	131	136	144	138	127	S 125	R 128	S 119	I S 96	I S 90	S 89	I S 88
28	S 87	S 84	I S 81	70	66	57	70	82	81	94	101	106	112	123	123	125	U S 118	122	129	127	89	S 73	S 66	S 63
29	61	S 63	61	63	64	S 45	S 59	80	101	105	110	117	122	129	134	126	130	124	I S 117	110	86	81	77	S 74
30	S 73	69	72	67	62	62	S 73	76	V 69	82	86	100	S 121	139	R 134	130	128	137	134	J S 119	U S 94	78	S 84	I S 82
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	27	27	28	30	30	30	29	29	30	30	30	30	30	30	30	30	30	30	30	28	26	25	26
MED	S 87	S 84	S 81	70	65	60	72	S 92	S 97	106	112	122	133	138	142	140	135	133	130	122	S 102	S 87	S 85	S 86
UQ	S 95	S 90	S 87	76	69	64	81	S 99	S 107	112	122	127	139	145	146	145	143	139	134	127	S 109	S 97	U S 96	U S 99
LQ	S 80	S 79	76	66	61	56	S 62	86	90	97	103	117	128	134	136	132	129	126	R 127	S 119	S 94	S 81	S 80	S 82

IONOSPHERIC DATA

APR. 1969 | 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								C	C	L	L	L	L	L	L	L	L	L						
2										L	L	L	L	L	L	L	L	L						
3										L	L	L	L	L	L	L	L	L						
4											L	L	L	L	L	L	L	L						
5										L	L	L	L	L	L	L	L	L						
6									L	L	L	L	L	L	L	L	L	L						
7										L	L	L	L	L	L	L	L	L						
8										L	L	L	L	L	L	L	L							
9										450	L	630	500	L	L	H 470	L	L						
10										L	L	L	L	L	L	L	L							
11									L	L	L 540	L	L	L 520	L	L	L	L						
12										L	L	L	L	L	L	L	L	L						
13										L	L	L	L	L	L	L	L	L						
14									L	L	L	L	L	L	L	L	L	L						
15									L	L	L	L 520	L	L	L	L	L	L						
16										L	L	L	L	L 550	L	L	L	A						
17									L	L	L	L	L	L	L	L	L	L						
18									L	L	L	L	L	L	L	L	L	L						
19									L	L	L	L	L 550	L	L	L	L	L						
20									L	A	L	L	L	L	L	L	L	L	L					
21										L	L	H 620	L	L	H 640	L	L	L						
22									L	L	L	L	L 640	A	L 600	L	U L 500	A	L					
23									U L 550	L	540	U L 590	L 560	L	L	L	L	A						
24									L	L	L	L	L	L	L	L	L	L						
25											L	L	L	L	L	L	L 510	L						
26										L	L	L	L	L 540	L	L	L	L	L					
27										L	L	L	A	L	L	L	L	L						
28										L	A	L 520	L	H 570	H 500	500	L	L	L					
29										L	L	L	L	L 530	A	L	L	L						
30										A	L	L 510	L	L 530	L 510	L	L	L						
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									1	1	2	6	4	6	4	2	2							
MED									U L 550	450	540	L 555	L 555	L 535	555	485	L 505							
UQ												620	L 600	L 550	620									
LQ												L 520	525	L 530	505									

IONOSPHERIC DATA

APR. 1969 | foE (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	C	C	340	A	A	IA 375	350	365	360	330	280	H 210					
2							S	220	280	345	360	360	380	380	H 370	H 360	H 330	280	H 210					
3							S	H 240	290	R 330	350	R 370	IA 380	R 385	A	A	H 330	290	210					
4							S	230	290	330	360	380	380	365	IA 370	IA 355	335	A	A					
5							S	230	300	340	350	IA 360	370	IA 385	400	360	IA 320	300	H 210					
6							S	H 230	290	340	R 355	IA 370	R 380	360	H 370	H 345	330	280	220					
7							S	H 230	A	A	A	360	A	R	370	IA 355	325	280	H 210					
8							S	225	290	320	340	R 350	R 370	IR 370	370	360	320	280	205					
9							S	230	300	IA 335	360	IR 370	R 380	380	IR 360	340	320	280	215					
10							S	240	300	340	R 360	A	A	B	380	350	320	H 280	210					
11							S	240	300	330	IA 360	R	R	R	375	IC 355	330	280	210					
12							S	230	300	340	360	IR 360	360	IR 380	385	370	330	290	220					
13							S	H 250	H 310	340	370	380	390	IR 390	380	360	320	290	210					
14							155	H 260	310	350	365	IA 375	R 385	390	IR 390	370	340	280	H 230					
15							150	H 260	320	360	370	390	IA 390	IA 390	390	IA 370	H 340	290	230					
16							S	H 260	H 310	345	370	380	390	IA 385	IA 370	IA 355	IA 335	IA 285	225					
17							160	250	300	345	360	370	360	A	380	360	330	300	A					
18							S	250	305	350	365	385	IA 380	IA 390	380	350	320	290	220					
19							170	260	310	340	360	380	380	R 380	R 375	360	340	290	220					
20							S	H 260	310	H 350	360	370	A	A	A	370	340	290	A					
21							S	270	310	355	375	R 385	IA 380	R 380	A	A	A	300	230					
22							S	A	A	A	A	395	390	390	385	365	340	300	220					
23							S	A	A	340	360	R 375	380	R	A	355	330	IA 290	235					
24							175	270	310	340	360	IR 370	380	B	B	H 380	360	320	240					
25							150	260	320	350	370	385	390	385	380	350	325	290	H 230					
26							S	250	300	335	360	370	370	R 380	380	360	H 330	H 295	220					
27							S	250	310	350	370	380	380	365	IA 360	IA 350	IA 325	290	220					
28							175	H 260	310	335	355	370	375	370	355	350	330	280	230					
29							160	260	300	335	355	370	370	370	355	340	320	275	230					
30							S	265	305	330	350	355	IA 360	360	H 355	350	320	290	A					
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							8	27	26	28	27	27	26	23	25	28	29	29	26					
MED							160	250	302	340	360	370	380	380	375	358	330	290	220					
UQ							172	260	310	348	365	380	380	385	380	360	335	290	230					
LQ							152	230	300	335	358	370	370	370	370	350	320	280	210					

IONOSPHERIC DATA

APR. 1969

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	E S 14	E S 12	E B 15	E	E B 15	E S 14	22	C	C	G 33	37	39	J X 62	45	39	39	G 22	G 19	23	29	J X 29	J X 22	J X 19	17
2	E S 15	E S 15	E B 15	J X 27	J X 22	17	19	G	G 27	35	44	41	47	44	41	G 30	G 29	G 26	G 19	25	J X 37	J X 27	23	E S 15
3	22	E S 15	E B 14	E B 13	E B 13	E B 13	E S 14	G	G	36	44	G 35	42	G 38	J X 53	43	39	G 21	21	E S 15	J X 19	17	E S 15	E S 15
4	E S 15	E S 13	E B 11	E B 11	E	E B 14	E S 12	G	G	G	38	41	G	38	40	38	34	37	J X 40	J X 37	J X 39	J X 34	E B 15	E B 15
5	J X 22	E B 12	E B 11	E B 15	E	E B 12	E S 15	30	35	38	44	45	42	40	47	40	J X 54	30	30	J X 37	23	J X 27	20	E S 15
6	E S 15	E S 13	E B 13	E B 11	E	E B 14	E S 13	G	33	36	39	40	42	43	39	42	G 32	G 24	29	J X 41	J X 54	J X 34	J X 40	J X 27
7	J X 24	E B 13	E B 12	E	E	E B 12	E S 15	G	30	34	37	38	38	G 33	G	J X 42	34	J X 29	G	J X 40	J X 85	J X 26	24	20
8	E S 14	E S 14	E S 14	E	E	E S 14	E S 13	G	32	34	G 33	G 35	G 30	42	42	39	G	30	28	J X 36	22	E S 15	E S 15	E S 15
9	E S 13	E S 15	E B 11	E	E B 12	E B 13	E S 15	G	33	38	G	G 36	G 33	G 32	G 32	G 29	G 26	J G 26	25	J X 32	22	E S 15	E S 15	E S 15
10	E S 15	E S 14	E S 15	E B 13	J X 18	23	E S 16	G	34	38	38	38	38	E B 52	G	G 31	G 27	G 22	29	J X 27	20	E S 15	E S 15	E S 15
11	E S 15	E B 13	E B 13	E B 14	E B 14	E S 15	E S 15	G	J X 34	35	37	G 37	G 37	G 37	43	40	G 29	G 27	36	J X 22	J X 17	J X 18	19	E S 15
12	E S 15	E B 12	E B 11	E B 11	E	E B 13	E S 15	G	32	G 32	G 33	G 35	G 35	G 34	41	J G 31	G 22	31	30	E S 15	E S 14	E S 15	E S 15	E S 15
13	E S 15	E B 12	E B 11	E	E	E B 13	E S 15	G 23	33	36	40	G 36	G 37	G 39	G 31	38	34	32	27	18	25	J X 29	E S 15	E S 15
14	E S 15	17	E B 15	E B 11	E B 12	E B 12	20	31	36	39	39	40	J X 41	G 35	G 37	G 30	G 20	G 17	25	17	E S 14	E S 15	22	20
15	E S 14	E B 12	E B 14	E B 14	E	E S 15	G	G	35	39	39	44	45	40	G 39	J X 42	J X 37	G 27	G	E S 15	E S 15	E B 13	E S 15	E S 15
16	23	23	18	E	E	E B 12	E S 15	G	G	G	G	G	G	40	42	39	37	J X 74	27	E S 15	23	E S 15	E S 14	E S 14
17	E S 14	E S 14	E B 13	E	E	E S 15	G	G	33	36	G	39	40	40	40	G	G	32	J X 39	J X 29	J X 28	J X 33	J X 31	J X 28
18	J X 28	J X 18	E B 11	E B 11	J X 16	E B 15	E S 15	29	37	40	39	40	44	44	G	G	G 30	32	35	23	J X 54	J X 92	J X 38	E S 15
19	19	22	E B 11	E	E B 11	E B 12	G	J G 25	34	36	40	40	42	G	52	J X 54	G	37	31	J X 35	J X 37	J X 34	J X 29	24
20	24	E S 15	E B 15	23	18	J X 21	E S 14	32	42	J X 63	40	J X 55	47	J X 50	J X 50	G	37	40	J X 66	J X 33	J X 31	J X 51	J X 24	E S 15
21	23	22	E B 15	E	E	E B 11	24	30	34	38	G 37	G	J X 47	G	42	37	37	40	J X 53	J X 32	J X 46	J X 62	J X 99	J X 62
22	J X 59	J X 26	M 104	J X 62	J X 54	J X 45	J X 37	J X 50	J X 41	37	38	G	G	J X 64	45	J X 54	39	J X 59	J X 44	J X 62	J X 37	J X 61	J X 19	E S 14
23	E S 15	E S 13	22	J X 19	J X 17	J X 24	J X 30	J X 33	J X 41	37	42	52	47	51	42	J X 42	J X 55	J X 71	J X 37	J X 31	J X 39	J X 32	E S 15	E S 14
24	E S 15	E S 15	19	24	J X 26	J X 19	G	G	33	39	41	G	G	E B 49	E B 46	G	G	G	28	25	18	22	J X 25	J X 21
25	J X 25	J X 25	J X 20	E B 15	E B 15	E B 14	G	34	40	45	53	J X 59	J X 64	52	45	40	37	G 24	J X 56	J X 38	J X 51	J X 21	J X 36	J X 29
26	J X 34	J X 25	E B 14	E B 14	J X 21	E B 12	21	G	32	38	38	40	G	G	G	G	G	G	28	22	E S 14	E S 14	J X 24	E S 15
27	19	E S 12	J X 38	J X 35	J X 32	J X 26	25	32	39	49	49	53	J X 73	50	J X 62	J X 46	J X 55	G 26	G	E S 15	22	E S 14	J X 25	J X 32
28	J X 24	J X 24	22	J X 24	J X 28	E B 12	G	30	35	41	59	46	42	39	G 35	G	36	G	G	E S 15	E S 15	22	24	17
29	E S 15	E S 14	13	13	14	J X 24	J X 30	J X 48	J X 52	35	J X 51	49	J X 54	49	J X 65	J X 43	G	29	39	J X 28	E S 13	J X 33	J X 51	J X 29
30	J X 29	J X 22	22	19	E B 11	E B 11	27	J X 42	J X 49	J X 84	J X 66	40	43	41	G	G	J X 57	J X 48	J X 53	20	J X 105	J X 63	J X 36	J X 62
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	E S 15	E E 14	E B 14	E E 13	E E 12	E B 14	E G 15	G	34	37	39	40	42	40	40	38	33	29	29	J X 28	J X 24	J X 24	22	E S 15
UQ	J X 24	22	18	19	J X 18	17	21	31	37	39	44	44	47	U 46	45	42	37	37	J X 39	J X 35	J X 39	J X 34	J X 29	J X 24
LQ	E S 15	E S 13	E B 12	E	E	E B 12	E S 13	G	32	35	37	G 36	G 35	G 37	G 35	G 29	G 22	G 24	25	18	18	E S 15	E S 15	E S 15

IONOSPHERIC DATA

APR. 1969

f_bEs (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	E S 14	E S 12	E B 15	E	E B 15	E S 14	E	C	C	G 33	37	39	45	44	G	G	G 22	G 19	G	29	20	E	E	E
2	E S 15	E S 15	E B 15	20	19	E	G	G	G 27	G	38	G	43	40	G	G 29	G 28	G 24	G 19	16	30	20	E	E S 15
3	E	E S 15	E B 14	E B 13	E B 13	E B 13	E S 14	G	G	G	44	G 35	42	G 38	42	40	38	G 21	20	E S 15	E	E	E S 15	E S 15
4	E S 15	E S 13	E B 11	E B 11	E	E B 14	E S 12	G	G	G	G	G	G	E R 38	E R 40	E R 38	31	36	26	36	25	28	E B 15	E B 15
5	E	E B 12	E B 11	E B 15	E	E B 12	E S 15	G	G	G	G	45	42	E R 40	44	40	36	28	27	22	E	19	E	E S 15
6	E S 15	E S 13	E B 13	E B 11	E	E B 14	E S 13	G	G	G	39	40	42	43	E R 39	42	G 31	G 24	G	41	28	20	27	17
7	17	E B 13	E B 12	E	E	E B 12	E S 15	G	30	34	36	E R 38	E R 38	E G 33	G	38	G	25	G	34	41	16	18	E
8	E S 14	E S 14	E S 14	E	E	E S 14	E S 13	G	G	G	G 33	G 34	G 30	41	41	G	G	G	27	34	E	E S 15	E S 15	E S 15
9	E S 13	E S 15	E B 11	E	E B 12	E B 13	E S 15	G	33	35	G	E G 36	G 33	G 32	G 32	G 29	G 26	G 22	G	29	E	E S 15	E S 15	E S 15
10	E S 15	E S 14	E S 15	E B 13	15	E	E S 16	G	G	37	E R 38	E R 38	E R 38	E B 52	G	G 31	G 27	G 22	25	25	16	E S 15	E S 15	E S 15
11	E S 15	E B 13	E B 13	E B 14	E B 14	E S 15	E S 15	G	25	30	37	E G 37	E G 37	E G 37	42	40	G 27	G 27	G	18	E	E	E	E S 15
12	E S 15	E B 12	E B 11	E B 11	E	E B 13	E S 15	G	G	G 32	G 33	E G 35	G 34	E G 34	G	G 30	G 21	G	30	E S 15	E S 14	E S 15	E S 15	E S 15
13	E S 15	E B 12	E B 11	E	E	E B 11	E S 15	G 20	G	E R 36	39	G 36	G 37	E G 39	G 30	G	G	G	G	15	E	18	E S 15	E S 15
14	E S 15	E	E B 15	E B 11	E B 12	E B 12	G	G	34	38	39	40	36	G 35	E G 37	G 30	G 20	G 17	G	E	E S 14	E S 15	E	E
15	E S 14	E B 12	E B 14	E B 14	E	E S 15	G	G	G	G	E R 39	42	45	E R 40	G 36	39	27	G 23	G	E S 15	E S 15	E B 13	E S 15	E S 15
16	E	E	E	E	E	E B 12	E S 15	G	G	G	G	G	G	E R 40	42	38	33	49	G	E S 15	E	E S 15	E S 14	E S 14
17	E S 14	E S 14	E B 13	E	E	E S 15	G	G	G	G	G	E R 39	E R 40	E R 40	39	G	G	G	38	26	24	28	22	19
18	26	16	E B 11	E B 11	14	E B 15	E S 15	G	G	39	G	40	41	E R 44	G	G	G 29	G	31	21	39	50	25	E S 15
19	E	E	E B 11	E	E B 11	E B 12	G	G 22	G	G	G	G	G	G	50	51	G	36	30	33	34	25	20	E
20	E	E S 15	E B 15	E	E	E	E S 14	G	40	62	E R 40	46	45	43	41	G	36	40	30	29	E	48	19	E S 15
21	E	E	E B 15	E	E	E B 11	G	G	G	37	G 37	G	45	G	41	37	36	37	51	23	41	21	29	61
22	26	E	15	41	36	44	29	43	34	36	E R 38	G	G	E R 64	45	52	G	54	30	47	23	28	15	E S 14
23	E S 15	E S 13	E	15	15	18	26	30	38	37	41	47	47	49	41	33	28	50	21	29	31	20	E S 15	E S 14
24	E S 15	E S 15	E	16	18	13	G	G	G	37	41	G	G	E B 49	E B 46	G	G	G	G	23	17	E	16	16
25	E	E	E	E B 15	E B 15	E B 14	G	G	36	43	46	51	52	50	43	G	35	G 24	55	35	32	E	21	16
26	16	19	E B 14	E B 14	E	E B 12	G	G	G	37	G	G	G	G	G	G	G	G	28	21	E S 14	E S 14	20	E S 15
27	E	E S 12	20	21	26	19	G	31	36	46	46	47	71	49	51	38	33	G 22	G	E S 15	E	E S 14	E	18
28	19	E	E	14	12	E B 12	G	G	G	39	51	45	40	E R 39	G 35	G	G	G	G	E S 15	E S 15	E	17	17
29	E S 15	E S 14	13	12	14	23	28	45	42	G	48	48	51	48	62	43	G	G	G	15	E S 13	20	24	21
30	20	13	E	E	E B 11	E B 11	24	37	35	58	43	39	43	41	G	G	44	39	31	18	65	25	23	52
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	E S 15	E E 13	E B 13	E E 11	E E 12	E B 13		G	G	34	37	U 36	40	E G 40	U 38	G 30	G 27	G 22	20	22	16	16	15	E S 15
UQ	E S 15	E S 14	E B 15	E B 14	15	E 15	E S 15	G	34	37	41	42	45	42	42	39	33	36	30	29	30	21	20	16
LQ	E	E E 12	E B 11	E	E	E B 12	G	G	G	G	G	G	E G 33	E G 37	G	G	G	G	G	15	E	E S 14	E S 15	E S 15

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

APR. 1969 | 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	Es 14	Es 12	15	E	15	Es 14	Es 14	C	C	17	16	17	16	18	19	16	15	15	11	Es 15	Es 15	Es 15	Es 15	Es 15
2	Es 15	Es 15	15	12	E	14	Es 14	Es 14	14	15	17	16	18	17	18	16	15	15	Es 14	Es 15	Es 14	Es 15	Es 15	Es 15
3	Es 14	Es 15	14	13	13	13	Es 14	Es 15	15	15	18	19	19	18	17	17	15	15	Es 14	Es 15	Es 15	Es 15	Es 15	Es 15
4	Es 15	Es 13	11	11	E	14	Es 12	Es 15	14	15	17	17	20	19	18	17	16	14	13	Es 13	Es 15	Es 15	15	15
5	Es 15	12	11	15	E	12	Es 15	Es 14	15	16	16	17	23	19	19	16	14	15	11	Es 15	Es 15	Es 14	Es 15	Es 15
6	Es 15	Es 13	13	11	E	14	Es 13	Es 14	14	19	18	18	19	24	18	18	16	14	15	Es 15	Es 15	Es 14	Es 14	Es 15
7	Es 15	13	12	E	E	12	Es 15	Es 14	15	17	16	17	18	18	20	18	16	15	15	11	Es 13	Es 15	Es 16	Es 15
8	Es 14	Es 14	Es 14	E	E	Es 14	Es 13	Es 14	14	16	18	17	18	18	19	16	15	14	Es 15	Es 13	Es 15	Es 15	Es 15	Es 15
9	Es 13	Es 15	11	E	12	13	Es 15	Es 15	15	15	17	16	20	24	19	17	15	15	12	Es 15	Es 14	Es 15	Es 15	Es 15
10	Es 15	Es 14	Es 15	13	E	13	Es 16	Es 14	15	16	18	18	18	52	23	19	15	15	Es 15	Es 15	Es 15	Es 15	Es 15	Es 15
11	Es 15	13	13	14	14	Es 15	Es 15	Es 15	16	17	19	20	24	22	18	23	16	15	13	Es 13	Es 14	Es 15	Es 15	Es 15
12	Es 15	12	11	11	E	13	Es 15	14	14	16	16	17	17	17	16	16	14	14	14	Es 15	Es 14	Es 15	Es 15	Es 15
13	Es 15	12	11	E	E	13	Es 15	Es 14	15	17	16	17	21	19	18	17	16	14	Es 15	Es 14	Es 15	Es 14	Es 15	Es 15
14	Es 15	Es 15	15	11	12	12	Es 13	Es 14	14	16	15	17	18	19	28	17	17	12	14	Es 15	Es 14	Es 15	Es 15	Es 15
15	Es 14	12	14	14	E	Es 15	Es 13	Es 14	15	18	22	23	25	20	17	16	15	11	14	Es 15	Es 15	13	Es 15	Es 15
16	Es 13	Es 15	12	E	E	12	Es 15	Es 14	15	18	22	21	22	24	18	17	15	16	14	Es 15	Es 15	Es 15	Es 14	Es 14
17	Es 14	Es 14	13	E	E	Es 15	Es 14	Es 14	15	16	19	22	18	20	17	15	16	15	15	11	Es 15	Es 12	Es 15	Es 15
18	Es 14	Es 13	11	11	E	15	Es 15	Es 13	14	15	18	18	23	20	20	16	15	15	14	Es 15	Es 15	Es 14	Es 15	Es 15
19	Es 15	Es 13	11	E	11	12	Es 14	14	15	16	19	17	19	19	19	18	16	14	15	Es 15	Es 15	Es 15	Es 15	Es 14
20	Es 15	Es 15	15	14	14	13	Es 14	15	18	18	21	22	23	24	19	17	16	15	14	12	Es 15	Es 14	Es 15	Es 15
21	Es 15	Es 15	15	E	E	11	Es 13	Es 15	15	15	23	25	20	25	20	21	18	15	15	13	Es 15	Es 15	Es 13	Es 12
22	Es 14	Es 15	12	11	12	15	Es 14	15	16	18	23	24	24	24	20	16	15	15	14	13	13	Es 15	Es 13	Es 14
23	Es 15	Es 13	13	11	E	12	Es 13	15	16	18	18	21	22	34	24	20	16	15	13	Es 15	Es 15	Es 15	Es 15	Es 14
24	Es 15	Es 15	13	11	11	11	Es 15	14	15	16	20	20	22	49	46	27	21	17	14	12	Es 13	Es 14	Es 14	Es 12
25	Es 15	Es 14	14	15	15	14	Es 14	14	15	15	16	18	22	27	20	24	15	14	14	Es 14	Es 15	Es 15	Es 14	Es 14
26	Es 13	Es 15	14	14	12	12	Es 14	15	15	17	18	18	20	19	23	16	16	15	15	Es 12	Es 14	Es 14	Es 15	Es 15
27	Es 15	Es 12	11	12	13	E	Es 14	15	15	18	19	21	24	20	19	18	16	14	15	Es 15	Es 13	Es 14	Es 14	Es 13
28	Es 14	12	13	E	E	12	Es 15	15	15	16	17	18	18	19	17	18	15	14	14	Es 15	Es 15	Es 14	Es 14	Es 15
29	Es 15	Es 14	E	11	E	12	Es 15	14	16	15	20	18	21	19	18	17	15	14	15	13	Es 13	Es 13	Es 13	Es 13
30	Es 14	11	12	14	11	11	Es 15	13	17	16	17	16	19	20	20	19	15	14	13	11	Es 15	Es 15	Es 13	Es 13
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	Es 15	Es 14	12	11	E	12	Es 14	Es 14	15	16	18	18	20	20	19	17	15	15	14	Es 15	Es 15	Es 15	Es 15	Es 15
UQ	Es 15	Es 15	14	13	12	14	Es 15	15	15	17	19	21	22	24	20	18	16	15	15	Es 15	Es 15	Es 15	Es 15	Es 15
LQ	Es 14	12	11	E	E	12	Es 14	Es 14	15	15	17	17	18	19	18	16	15	14	14	12	Es 14	Es 14	Es 14	Es 14

IONOSPHERIC DATA

APR. 1969

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	S 265	U S 280	S 285	S 295	S 285	S 250	S 245	C	C	S 285	290	280	290	280	275	270	280	285	295	S 295	S 270	S 250	I S 270	I S 265
2	J S 275	S 310	320	S 285	S 240	245	S 265	S 305	S 305	310	S 270	280	280	275	280	S 275	280	285	J R 290	J R 290	S	S	S	I S 260
3	S 275	I S 290	I S 300	280	255	270	S 235	J S 300	J S 280	J C 305	J C 300	275	265	S 275	275	275	S 280	280	J R 285	J R 295	I S 275	S	S	S
4	J S 275	S	S	S	J S 275	280	285	325	I S 320	295	S 290	270	280	275	280	270	275	285	295	I S 295	S 270	255	S	S
5	S	S 290	315	300	270	275	S 285	315	S 335	295	285	270	275	285	280	275	280	295	290	I R 290	J S 280	S 265	265	S 275
6	S 275	J S 270	U S 300	310	250	S 250	290	320	S 310	305	290	285	270	270	275	280	275	285	305	S 290	S 280	I S 280	I S 270	I S 270
7	I S 280	S 280	265	275	280	260	S 275	325	S 310	J S 300	265	280	285	285	275	275	275	S 275	285	S 305	I S 290	J S 265	I S 260	S 265
8	S 265	S 270	I S 290	305	260	265	S 290	I S 330	320	295	275	280	295	295	280	280	285	S 295	J R 300	I S 300	I S 305	S 265	265	270
9	S 280	J S 270	290	285	270	275	280	305	J S 315	S 315	295	285	295	285	S 285	285	285	J S 290	J R 295	S 300	I S 295	265	255	260
10	260	J S 270	S 270	280	270	270	J S 290	S 320	290	I S 290	295	285	295	290	300	300	300	300	J S 310	J S 305	305	J S 250	S 245	255
11	S 270	285	S 275	275	255	S 240	270	S 325	S 305	300	295	290	295	280	280	I C 285	I C 280	290	I R 295	J S 290	U S 290	S 270	S 260	S 250
12	S 260	U S 280	S 305	305	280	280	S 310	335	320	300	290	275	285	285	285	290	285	J S 285	R 290	J R 305	S 310	S 260	S 260	I S 260
13	U S 265	S 275	S 280	300	275	260	J S 285	J S 320	310	305	265	I S 280	265	270	280	275	275	265	R 270	290	295	S 280	I S 275	I S 270
14	S 275	255	250	265	275	255	285	S 325	305	280	280	275	270	270	285	280	285	285	J R 290	I R 295	S 305	S 245	S 255	U R 260
15	R 265	S 285	290	280	265	265	S 270	J S 305	S 290	S 295	S 270	275	275	270	270	275	275	285	285	I R 290	J S 275	I S 265	I S 255	I S 260
16	I S 270	J S 295	I S 295	285	265	260	S 275	S 300	S 290	295	S 275	265	275	275	280	270	275	285	J R 285	I S 285	J S 290	S 245	S 245	I S 255
17	I S 265	S 285	S 285	270	260	255	270	305	S 295	S 305	S 280	265	270	275	275	275	280	280	J R 285	S 280	J S 285	S 275	250	255
18	I S 255	250	255	255	260	265	295	S 325	300	285	S 285	275	280	275	275	280	290	285	J R 300	I S 300	S 280	I S 250	S 260	S 265
19	S 260	S 275	J S 280	280	270	275	290	J S 315	S 305	I S 300	310	275	280	275	280	275	285	290	R 300	J R 295	S	S	S	S
20	S	J S 265	S 275	S 285	285	275	S 295	S 325	S 320	S 305	270	270	285	275	275	280	275	280	295	J R 275	I S 280	R	R	R
21	R	S	S	S	290	265	285	320	320	S 310	275	275	F 275	275	280	285	285	300	300	U S 290	I S 280	265	I S 265	I S 270
22	J R 280	S	S	S 305	320	285	290	325	300	290	290	275	275	280	270	280	280	290	295	295	U S 280	285	260	I S 260
23	J S 255	U S 305	J S 295	285	320	280	275	U S 295	S 295	295	U S 280	285	285	280	280	280	290	S 290	R 300	U R 310	S 305	J S 265	I S 270	J S 275
24	275	U S 265	295	290	270	270	315	S 330	330	300	275	270	275	285	285	270	280	285	285	295	S 290	J S 275	U S 275	J S 275
25	S 285	S 280	S 280	S 285	275	260	S 315	S 325	310	270	270	S 255	280	285	280	275	280	S 275	280	300	I S 295	270	S 270	260
26	S 260	J S 265	275	285	280	280	315	325	290	295	255	265	275	275	285	285	290	290	290	290	I S 290	I S 270	I S 265	J S 265
27	I S 255	I S 265	I S 295	275	265	S 275	285	325	S 305	285	260	270	280	285	285	290	285	S 280	R 295	S 305	I S 270	I S 255	S 265	I S 265
28	S 265	S 265	I S 280	300	275	265	300	310	275	285	290	280	280	285	290	280	U S 275	275	290	310	295	S 245	S 245	S 260
29	245	S 250	265	280	310	S 285	S 270	285	295	280	285	290	285	295	300	290	305	305	I S 300	315	310	260	260	S 260
30	S 270	265	270	260	265	270	S 315	340	V 290	300	285	275	S 275	295	R 290	285	280	295	305	J S 315	U S 255	255	S 260	I S 270
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	27	27	28	30	30	30	29	29	30	30	30	30	30	30	30	30	30	30	30	28	26	25	26
MED	S 265	S 275	S 285	S 285	270	268	285	S 320	S 305	295	282	275	280	280	280	280	280	285	295	295	S 290	S 265	S 260	S 262
UQ	S 275	S 285	S 295	298	280	275	295	325	S 315	305	290	280	285	285	285	285	285	290	300	S 305	S 295	S 270	U S 265	S 270
LQ	S 260	S 265	S 275	278	265	260	S 275	S 305	295	290	270	270	275	275	275	275	275	280	R 285	290	S 280	S 255	S 255	S 260

IONOSPHERIC DATA

APR. 1969

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								C	C	L	L	L	L	L	L	L	L	L						
2										L	L	L	L	L	L	L	L	L						
3										L	L	L	L	L	L	L	L	L						
4											L	L	L	L	L	L	L	L						
5										L	L	L	L	L	L	L	L	L						
6									L	L	L	L	L	L	L	L	L	L						
7										L	L	L	L	L	L	L	L	L						
8										L	L	L	L	L	L	L	L							
9										395	L	345	380	L	L	H 385	L	L						
10										L	L	L	L	L	L	L	L							
11									L	L	L 365	L	L	L 385	L	L	L	L						
12										L	L	L	L	L	L	L	L	L						
13										L	L	L	L	L	L	L	L	L						
14									L	L	L	L	L	L	L	L	L	L						
15									L	L	L	L 375	L	L	L	L	L	L						
16										L	L	L	L	L 360	L	L	L	A						
17									L	L	L	L	L	L	L	L	L	L						
18									L	L	L	L	L	L	L	L	L	L						
19									L	L	L	L	L 365	L	L	L	L	L						
20									L	A	L	L	L	L	L	L	L	L	L					
21										L	L	H 345	L	L	H 320	L	L	L						
22									L	L	L	L	L 330	A	L 345	L	U L 350	A	L					
23									U L 355	L	360	U L 345	L 355	L	L	L	L	A						
24									L	L	L	L	L	L	L	L	L	L						
25											L	L	L	L	L	L	L 350	L						
26										L	L	L	L	L 355	L	L	L	L	L					
27										L	L	L	A	L	L	L	L	L						
28										L	A	L 375	L	H 335	H 385	360	L	L	L					
29										L	L	L	L	A	A	L	L	L						
30										A	L	L 370	L	L 350	L 360	L	L	L						
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									1	1	2	6	4	5	4	2	2							
MED									U L 355	395	362	L 358	L 360	L 355	352	372	L 350							
UQ												L 375	372	L 360	372									
LQ												345	L 342	L 350	332									

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IONOSPHERIC DATA

APR. 1969 | 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								C	C	250	280	275	295	295	300	300	295	275						
2										255	300	275	305	300	305	300	255	250						
3										255	275	300	350	310	310	300	305	275						
4											255	305	310	320	300	300	280	280						
5										250	250	305	305	290	300	275	290	270						
6									250	250	275	300	325	300	305	280	290	275						
7										250	300	320	305	309	295	310	300	285						
8										250	285	300	290	290	300	295	300							
9										260	255	330	290	300	295	270	280	265						
10										280	270	295	300	300	285	270	250							
11									300	250	305	300	275	280	315	300	260	250						
12										245	300	310	305	290	300	285	260	275						
13										250	250	310	335	290	320	275	275	275						
14									250	250	300	300	275	330	310	300	290	275						
15									250	255	320	275	330	335	305	315	300	275						
16										275	300	325	300	295	320	300	300	275						
17									250	260	255	305	305	305	315	300	285	275						
18									250	280	280	300	300	300	310	300	275	275						
19									255	250	250	325	305	325	325	310	305	280						
20									250	260	250	330	300	340	320	305	300	290	265					
21										250	340	340	340	340	345	310	285	275						
22									270	270	290	280	330	305	340	325	290	280	285					
23									290	260	290	300	295	320	300	300	300	280						
24									235	270	300	315	330	315	305	305	305	290						
25											280	350	330	305	280	295	305	280						
26										270	295	350	325	315	310	295	290	275	260					
27										280	305	325	325	325	305	290	290	290						
28										270	290	300	325	320	300	300	300	305	280					
29										255	295	300	295	300	300	285	280	255						
30										305	330	300	320	300	280	295	300	285						
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									11	28	30	30	30	30	30	30	30	28	4					
MED									250	255	290	302	305	302	305	300	290	275	272					
UQ									262	270	300	325	325	329	315	300	300	280	282					
LQ									250	250	270	300	300	300	300	290	280	275	262					

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

APR. 1969 | 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

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	275	270	270	230	230	300H	300	C	C	225	215H	220	215	235H	205H	225H	225H	240	255	235	240	295	290	285
2	280	235	215	225	E A 350	355	290	245	240	235	225	220	225	220H	255H	235H	235	240	245	250	250	250	300	300
3	275	250	245	250	290	275	245	235	240	225	250	215H	210H	220	235H	240	240	245	260	240	205	255	295	280
4	275	270	265	250	210	225	255	230	240	230	220	205H	200H	200H	250	240H	240	255	265	230	245	310	310	280
5	265	250	225	220	220H	270	275	240	240	225	200H	225H	185H	250	240H	230	225H	255	250	230	225	255	285	280
6	275	280	250	230	200	295	260	230	235	230	205H	205H	220H	230H	220H	245	215H	265	250	E A 250	250	250	280	290
7	290	275	275	250	200	270	280	240	230	220	215H	230	225	205H	205H	225	215H	245	260	240	235	225H	310	300
8	305	290	255	210	255	300	270	230	225	210	205	205H	225	225	210H	240	245H	255	250	250	255	240	295	300
9	285	300	275	240	255H	290	270	235	240	220	245	240	200	225H	200H	205H	210	245	255	245	225	240	310	320
10	305	300	295	255	240	240	260	245	230	240	250	205	210	B	220	230	230	240	245	245	225	260	350	330
11	300	280	275	250	300	355	270	240	230H	220	200H	E B 250	245	215	215H	210H	225H	235	255	260	250	245	275	295
12	300	270	245	220	245	260	250	230	225	225	205H	205H	190H	255	230H	230H	220H	230	260	250	230	220	290	295
13	290	275	265	245	215	275	260	240	230	230	180H	195H	240H	225	215H	225	225	240	275	255	220	225	245	255
14	255	295	305	250	250	250	270	230	235	240	225H	205H	210	220	245	235	250	240	255	250	230	220	295	300
15	295	260	255	245	240	290	270	245	240	225	230H	220	240H	215H	225	230H	245	250	250	245	240	265	300	295
16	280	250	230	230	245	255	260	230	230	230	220H	230	220	210	230H	230H	230H	I A 250	255	240	240	245	305	325
17	290	255	255	240	285	290	250	240	240	230	225	210	220	220	225H	230H	230	245	265	250	245	250	300	305
18	330	310	305	275	260	280	260	245	220	225H	230	210H	215H	230	220H	225H	215	245	255	245	250	E A 350	315	280
19	295	280	255	235	245	260	255	245	240	230	225	210H	200	210H	I A 240	I A 225	245	250	250	245	250	250	300	280
20	285	295	275	240	245	255	250	240	245	I A 240	220	225H	230H	220H	220	230H	235	255	265	245	240	295	280	255
21	265	275	230	210	205	265	255	245	240	230	215H	205H	E A 250	230H	240H	220	200H	255	255	240	250	255	310	330
22	280	255	250	250	240	295	245	245	220	205H	205H	220H	235	A	235	A	225	A	270	255	250	255	250	300
23	310	255	245	250	215	250	260	230	230	240	220	250	E A 240	E A 250	220	220	250	A	255	250	245	240	250	270
24	275	295	250	230	290	300	250	230	230	225	210H	200H	240	E B 250	E B 250	250H	240H	250H	255	255	245	250	260	270
25	250	255	260	250	250	305	250	230	230	240	250	A	A	A	245	225	230	240H	E A 285	250	245	245	285	295
26	305	300	275	240	255	250	240	230	240	230	215	205H	200H	225	215H	245	225H	250	250	245	220	235	275	280
27	290	290	255	235	300	275	240	240	235	245	250H	E A 250	A	A	I A 220	205H	225H	230H	250	240	220	275	300	295
28	295	300	275	230	245	275	245	235	235	240	A	230	220H	215H	205H	210	245	240	260	260	205	210	325	325
29	350	305	290	260	250	245	250	260	255	230	E A 250	A	A	A	A	E A 250	210H	240	250	245	225	255	305	310
30	300	305	270	255	270	275	235	245	225	A	235H	200H	220H	220	215	230H	E A 265	E A 265	250	240	E A 305	315	310	320
31																								

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	29	29	29	29	28	27	25	29	29	30	28	30	30	30	30	30	30
MED	290	278	258	240	245	275	258	240	235	230	220H	211H	220	220	220H	230	229	245	255	245	240	250	298	295
UQ	300	295	275	250	258	295	270	245	240	235	230	225	226	228	238H	235	240	251	260	250	250	258	310	305
LQ	275	255	250	230	230	255	250	230	230	225	210H	205H	210H	215H	215H	225H	225H	240	250	240	225	240	280	280

IONOSPHERIC DATA

APR. 1969

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	S	S	B	E	B	S	105	C	C	105	105	130	105	110	130	130	100	100	140	110	100	100	100	100
2	S	S	B	100	100	105	115	G	105	150	120	125	120	125	140	100	100	100	100	100	105	100	95	S
3	100	S	B	B	B	B	S	G	G	150	115	105	105	105	105	110	115	105	105	S	100	100	S	S
4	S	S	B	B	E	B	S	G	G	G	150	145	G	120	110	115	105	145	135	125	120	100	B	B
5	F 125	B	B	B	E	B	S	150	145	150	130	110	120	105	120	120	115	110	130	120	95	95	100	S
6	S	S	B	B	E	B	S	G	150	150	150	150	145	120	125	120	105	105	140	115	110	100	105	100
7	100	B	B	E	E	B	S	G	105	105	130	140	105	100	G	105	130	100	G	110	105	105	100	100
8	S	S	S	E	E	S	S	G	150	145	105	100	100	150	140	185	G	160	125	105	105	S	S	S
9	S	S	B	E	B	B	S	G	175	150	G	100	100	105	105	100	100	100	150	115	100	S	S	S
10	S	S	S	B	110	110	S	G	150	150	150	105	105	B	G	105	105	105	120	110	105	S	S	S
11	S	B	B	B	B	S	S	G	105	105	105	105	105	105	130	140	105	105	120	100	100	100	100	S
12	S	B	B	B	E	B	S	G	160	110	105	105	105	100	165	100	100	150	130	S	S	S	S	S
13	S	B	B	E	E	B	S	110	145	130	140	105	105	105	105	135	130	150	130	125	120	110	S	S
14	S	100	B	B	B	B	150	145	135	130	125	110	105	105	105	100	100	100	135	115	S	S	105	105
15	S	B	B	B	E	S	G	G	140	125	120	110	110	105	100	100	100	100	G	S	S	B	S	S
16	105	105	105	E	E	B	S	G	G	G	G	G	G	120	110	105	105	125	130	S	100	S	S	S
17	S	S	B	E	E	S	G	G	150	150	G	135	120	105	120	G	G	125	120	110	105	105	100	105
18	100	100	B	B	105	B	S	150	135	125	140	125	110	110	G	G	105	E G 175	125	110	105	105	105	S
19	105	105	B	E	B	B	G	105	140	150	140	130	130	G	125	120	G	145	130	110	105	105	105	100
20	100	S	B	95	95	105	S	150	135	120	115	110	105	105	105	G	140	120	110	105	110	100	100	S
21	100	95	B	E	E	B	145	150	145	125	110	G	105	G	105	105	105	145	125	110	105	105	105	105
22	105	105	105	105	105	105	105	105	105	105	105	G	G	120	145	125	150	115	110	105	105	100	105	S
23	S	S	105	105	105	105	105	105	105	150	130	120	120	125	145	105	100	100	100	100	110	110	S	S
24	S	S	105	105	100	100	G	G	150	125	115	G	G	B	B	G	G	G	120	110	105	105	100	100
25	105	100	100	B	B	B	G	150	135	130	125	115	110	110	125	120	125	105	120	110	105	105	100	100
26	100	100	B	B	100	B	150	G	150	130	150	145	G	G	G	G	G	G	130	115	S	S	105	S
27	105	S	105	105	105	105	150	145	130	125	125	115	110	120	105	105	100	100	G	S	100	S	110	105
28	105	105	100	105	105	B	G	150	140	125	115	115	120	150	105	G	160	G	G	S	S	105	105	150
29	S	S	140	130	130	115	115	115	120	150	120	115	110	110	105	110	G	155	125	120	S	105	105	105
30	105	105	105	105	B	B	150	125	120	110	110	115	120	115	G	G	125	115	110	105	105	105	105	105
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	14	10	9	9	11	8	10	14	26	28	27	26	25	25	24	23	24	27	26	24	24	21	20	13
MED	105	102	105	105	105	105	130	145	140	130	120	115	110	110	115	110	105	108	125	110	105	105	105	105
UQ	105	105	105	105	105	108	150	150	150	150	135	130	120	120	130	120	125	140	130	115	105	105	105	105
LQ	100	100	105	105	100	105	105	110	120	122	112	105	105	105	105	105	100	100	120	105	100	100	100	100

IONOSPHERIC DATA

APR. 1969

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

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 2			L 1	L 1	HL 11	L 2	C 1	HL 11	HL 11	L 1	L 1	HL 11	FF 66	F 4	F 1	F 1	F 1
2				F 7	F 3	F 1	L 1		L 2	HL 11	C 1	C 1	C 1	CL 11	HL 11	L 1	L 2	L 3	L 1	F 2	F 7	F 3	F 1	
3	F 1									H 1	C 1	L 1	L 1	L 1	L 2	CL 11	CL 21	L 1	L 1		F 1	F 1		
4											H 1	H 1		C 1	C 1	C 1	L 2	HL 42	HL 44	FF 54	FF 24	F 5		
5	F 1							H 2	H 2	H 1	HL 11	CL 11	CL 11	L 1	CL 11	C 1	C 2	L 4	HL 22	FF 62	F 2	F 3	F 1	
6									HL 12	HL 11	HL 11	HL 11	H 1	C 1	H 1	C 1	L 1	L 1	H 3	FF 51	FF 31	F 4	FF 22	F 2
7	F 3								L 2	L 1	HL 11	H 1	L 1	L 1		L 1	H 1	L 4		F 3	F 4	F 2	F 3	F 1
8									H 1	H 1	L 1	L 1	L 1	HL 11	HL 11	HL 11		H 1	C 1	F 3	F 1			
9									H 1	HL 11		L 1	L 1	L 1	L 1	L 1	L 2	L 3	HL 21	FF 42	F 1			
10					F 2	F 1			H 1	H 1	H 1	L 1	L 1			L 1	L 1	L 1	C 1	F 6	F 1			
11									L 1	L 1	L 1	L 1	L 1	L 1	HL 11	HL 11	L 1	L 2	CL 31	F 2	F 1	F 1	F 1	
12									HL 11	L 1	L 1	L 1	L 1	L 2	HL 11	L 2	L 1	HL 22	H 3					
13								L 1	H 2	H 1	HL 11	L 1	L 1	L 1	L 1	HL 11	HL 11	HCL 12	H 2	F 1	F 3	F 4		
14		F 1					H 3	H 2	H 3	H 1	H 1	C 1	L 1	L 1	L 1	L 1	L 1	L 1	H 1	F 1			F 1	F 1
15									H 1	H 1	C 1	C 1	C 1	L 1	L 2	L 2	L 2	L 2						
16	F 2	F 1	F 1											C 1	L 1	L 2	L 2	HL 33	HL 12		F 1			
17									H 1	H 1		H 1	C 1	L 1	C 1			H 1	CL 31	F 6	F 5	F 6	F 3	F 2
18	F 6	F 2			F 1			H 2	H 2	H 1	H 1	H 1	C 1	C 1			L 1	H 1	H 3	FF 41	F 4	F 4	FF 42	
19	F 1	F 2						L 2	H 1	H 1	H 1	H 1	H 1		H 1	C 2		H 2	H 2	F 5	F 7	F 3	F 4	F 1
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22	F 4	F 2	F 3	F 4	F 4	F 5	L 5	L 3	L 3	L 1	L 1			H 1	HL 11	H 2	H 1	C 2	C 2	F 3	F 4	F 2	F 1	
23			F 1	F 2	F 2	F 4	L 3	L 2	L 3	HL 11	HL 11	C 1	C 1	H 1	HL 11	L 1	L 2	L 4	LC 22	FF 22	FF 31	FF 22		
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27	F 1		F 6	F 5	F 4	F 4	H 3	H 3	H 2	H 1	H 1	C 1	C 2	C 2	C 2	L 2	L 2	L 2			F 1		F 2	F 5
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31																								

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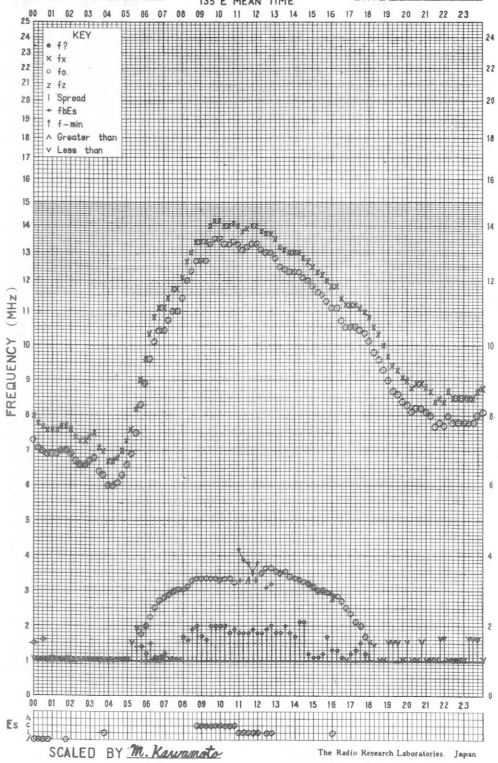
f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE APR. 1.1969

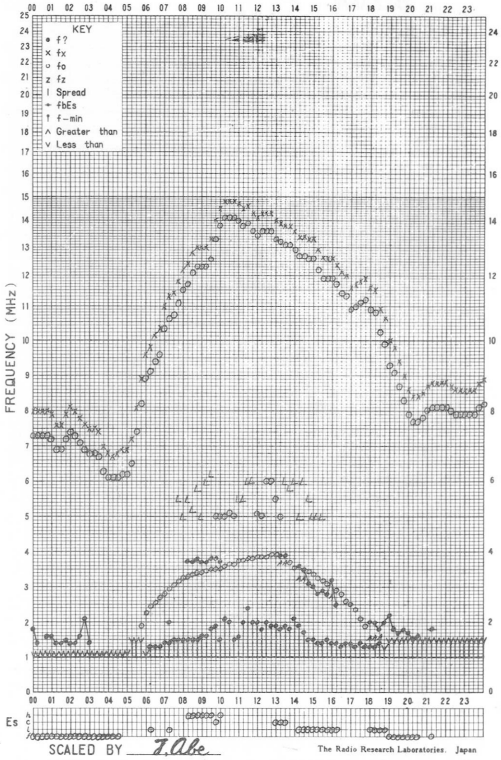


SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Apr. 1. 1969

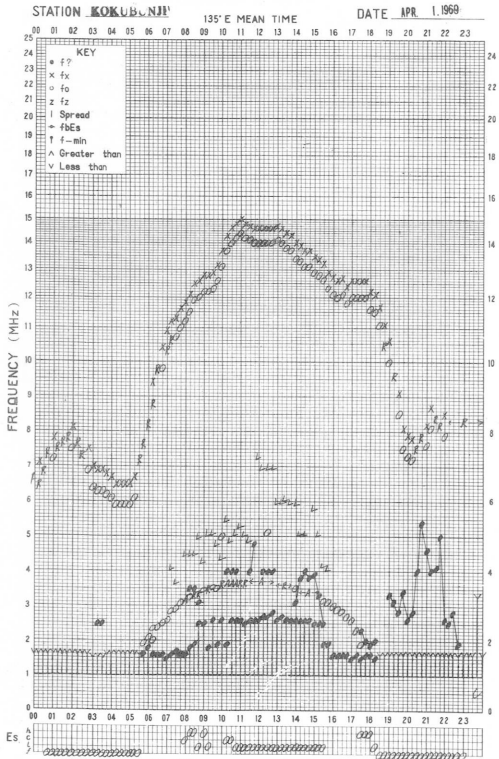


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE APR. 1.1969

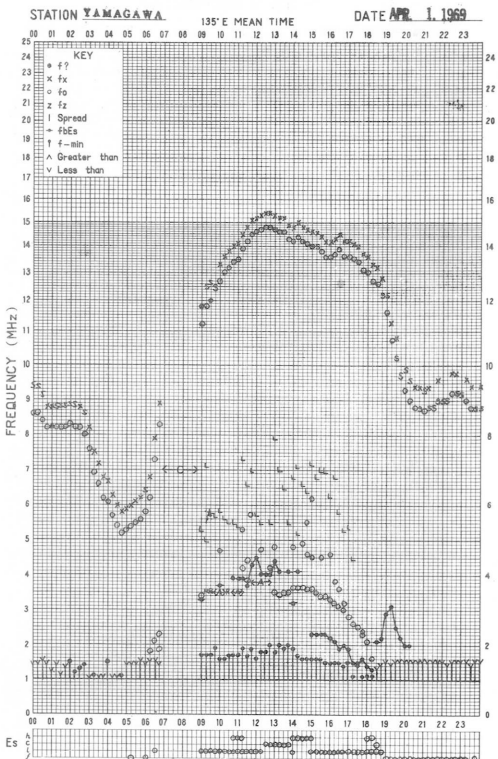


SCALED BY T. Chō

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE APR. 1. 1969



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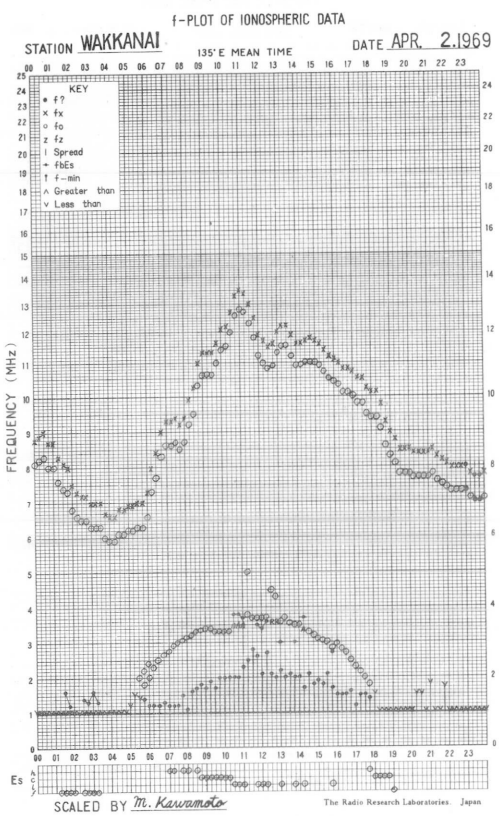
The Radio Research Laboratories. Japan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STATION WAKKANAI
135°E MEAN TIME
DATE APR. 2.1969
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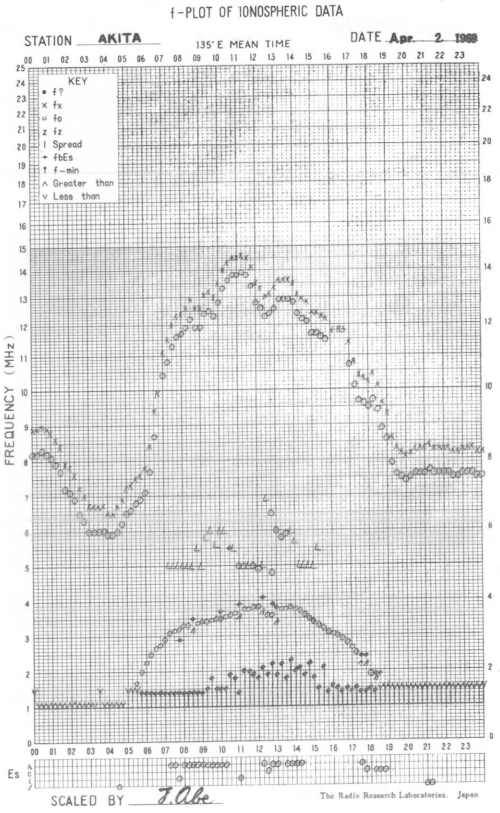
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan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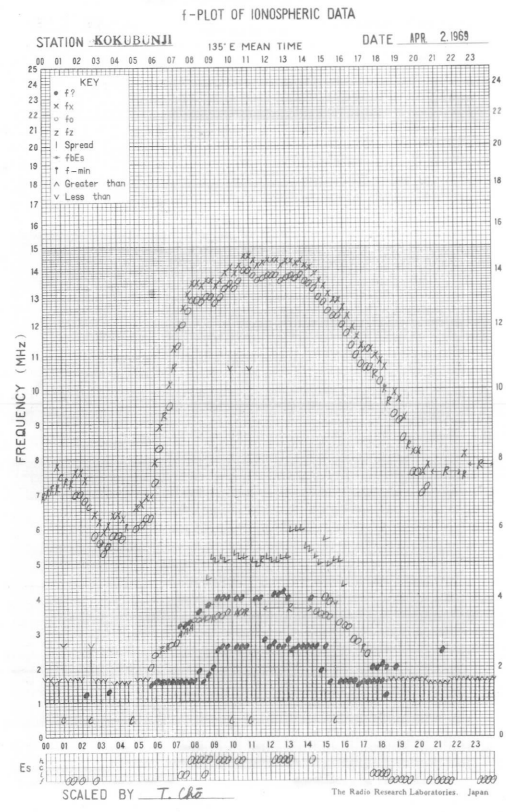
The Radio Research Laboratories. Japan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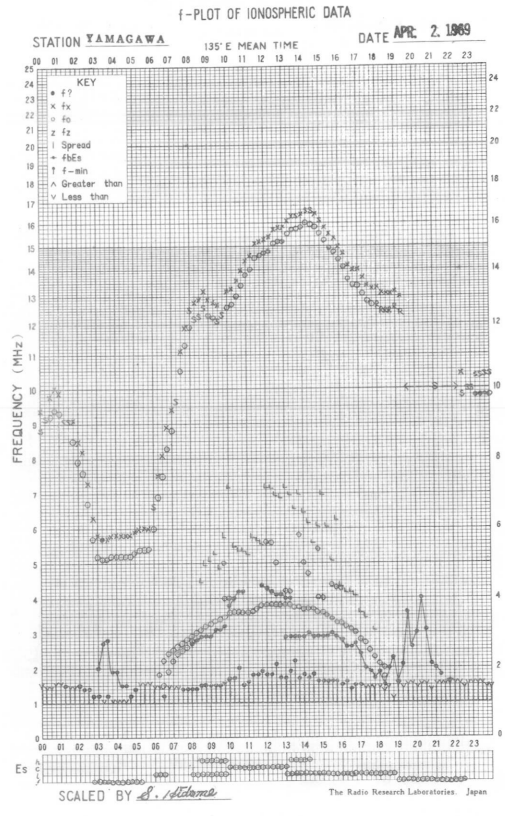
SCALED BY T. Chō
The Radio Research Laboratories. Japan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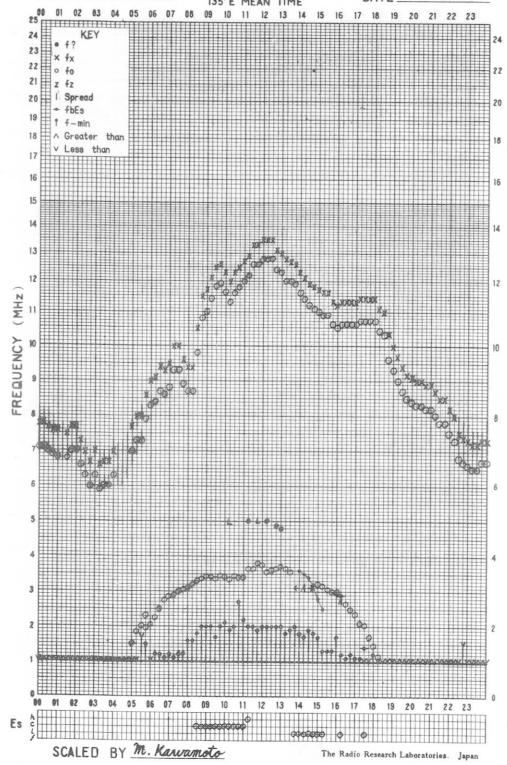
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135° E MEAN TIME DATE APR. 3.1969



SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

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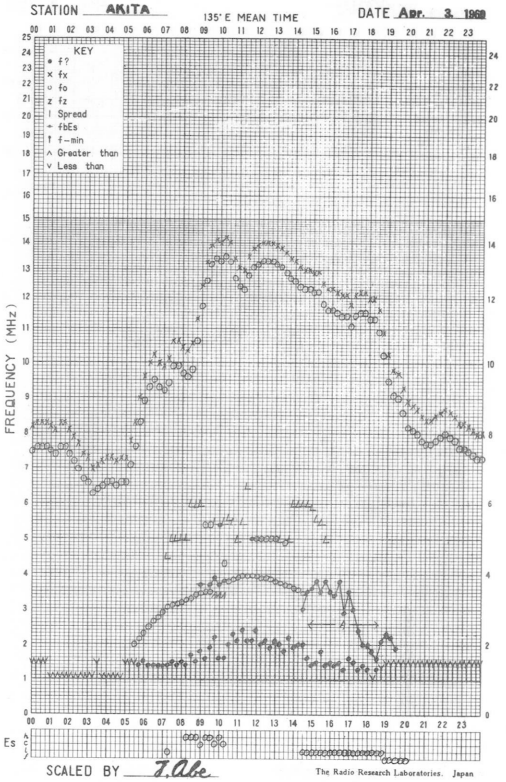

SCALED BY T. Abe

The Radio Research Laboratories. Japan

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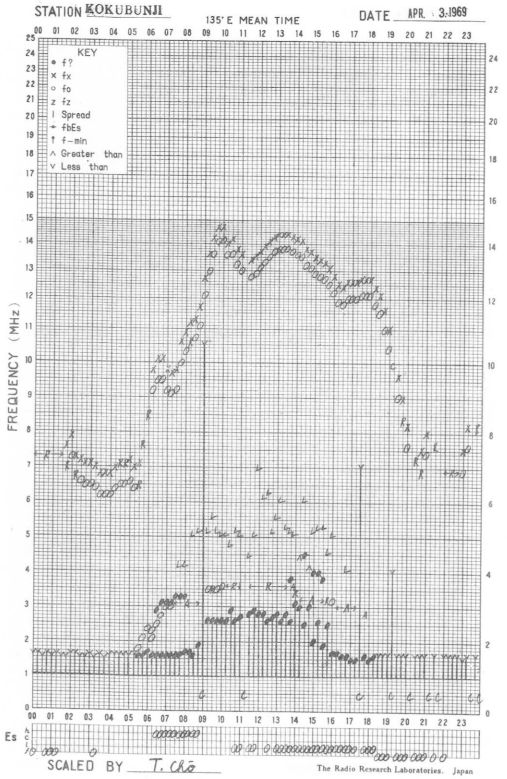

SCALED BY T. Chō

The Radio Research Laboratories. Japan

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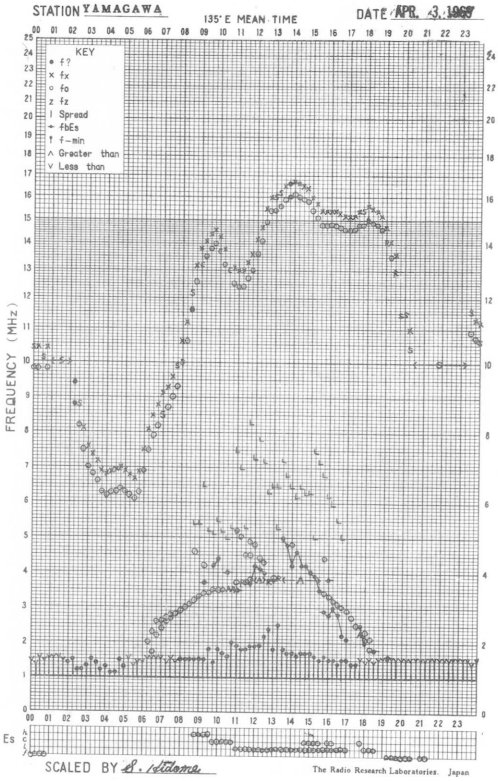
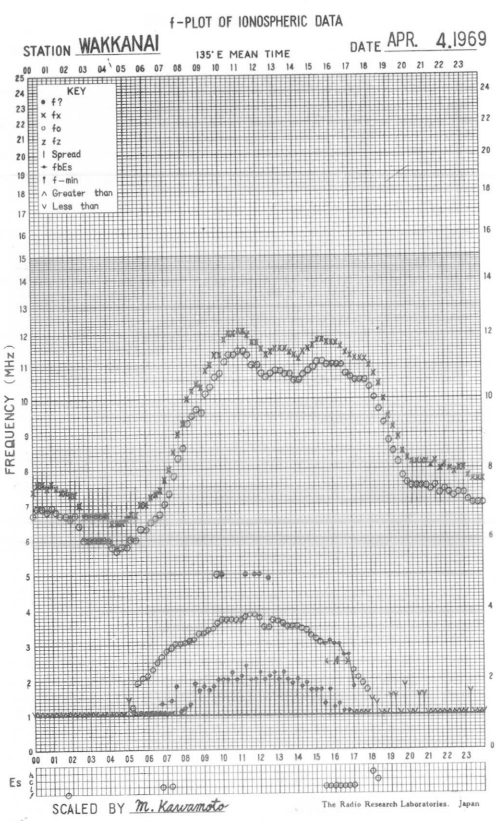


SCALED BY S. Kitamura

The Radio Research Laboratories. Japan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STATION WAKKANAI
135° E MEAN TIME
DATE APR. 4,1969
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FREQUENCY (MHz)
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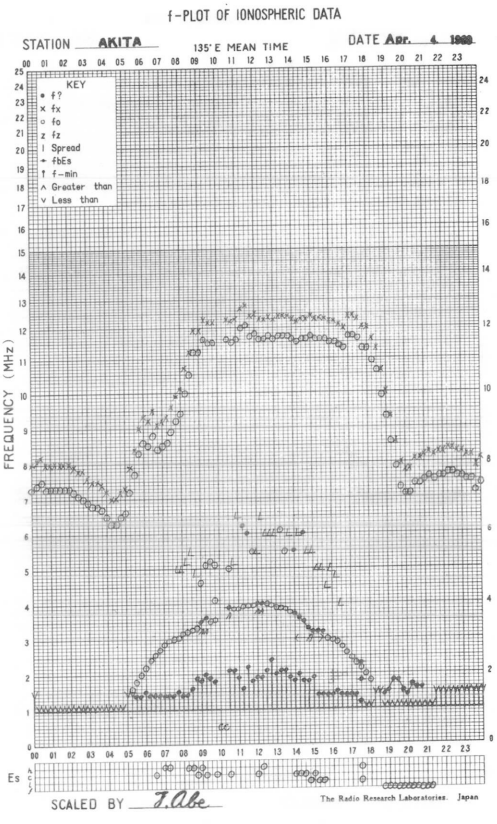
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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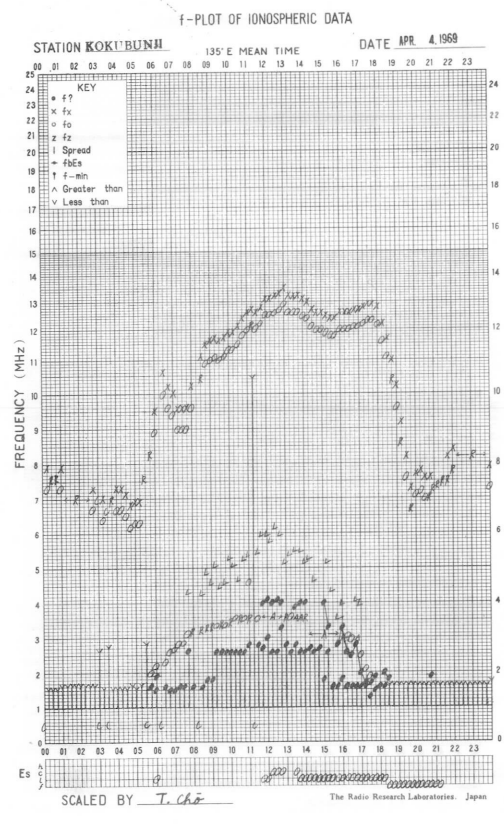
SCALED BY T. Abe
The Radio Research Laboratories. Japan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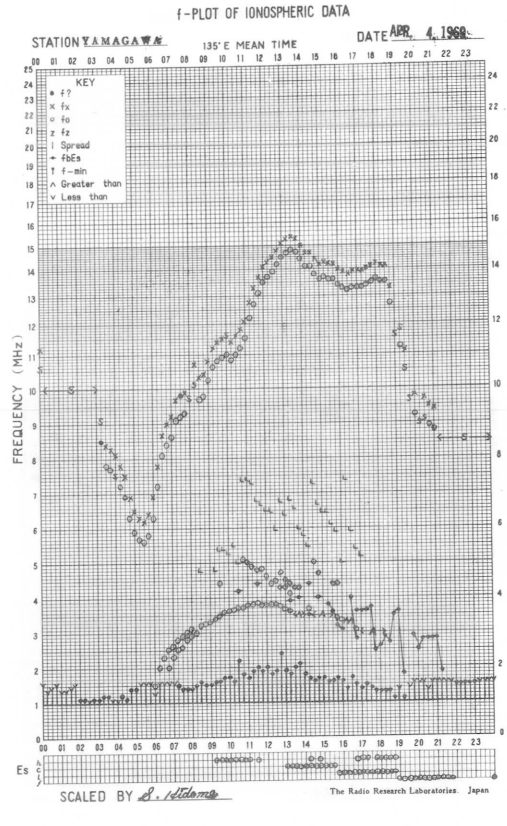
SCALED BY T. Chō
The Radio Research Laboratories. Japan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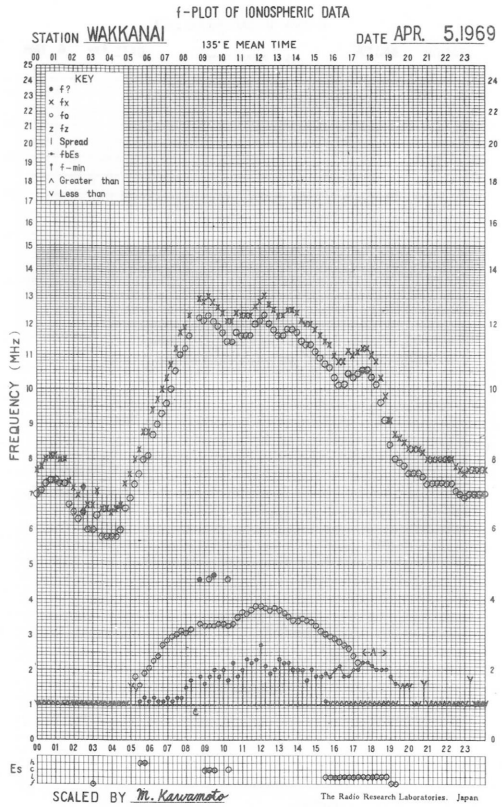
SCALED BY S. Iidaka
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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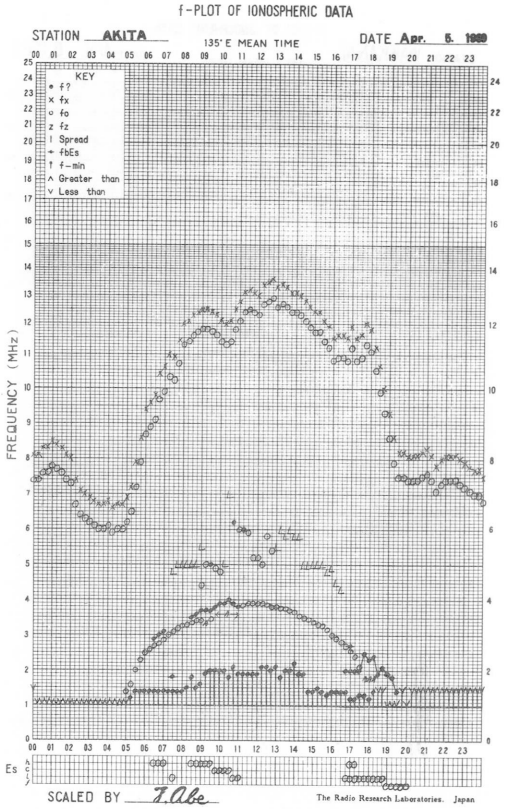
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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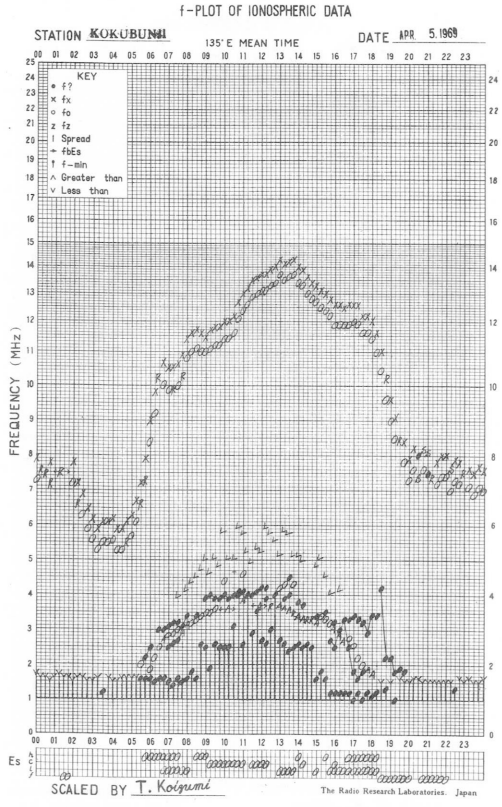
SCALED BY T. Abe
The Radio Research Laboratories. Japan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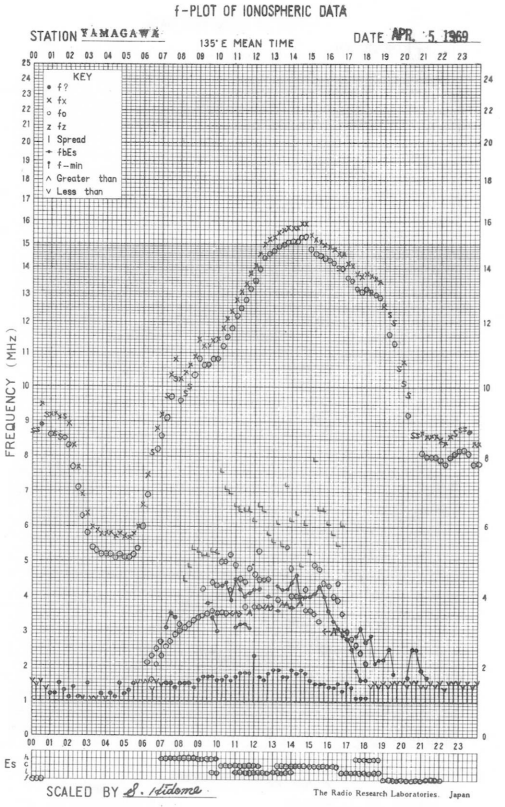
FREQUENCY (MHz)
Es
SCALED BY T. Koizumi
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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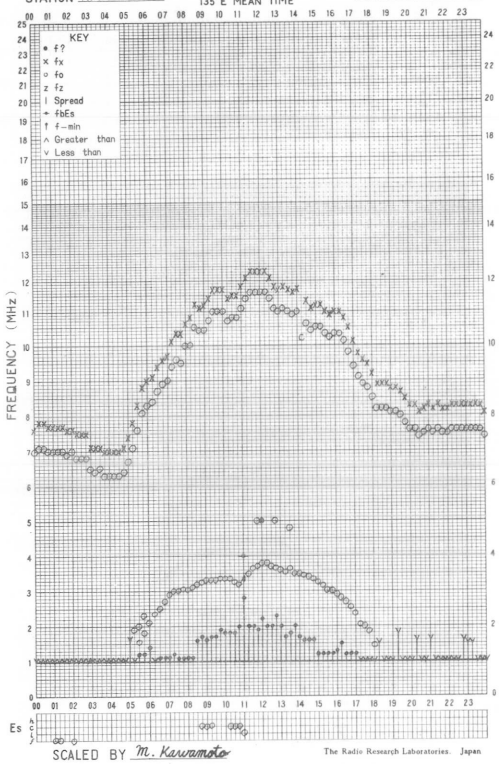
SCALED BY S. Ishitsuka
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE APR. 6.1969



SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

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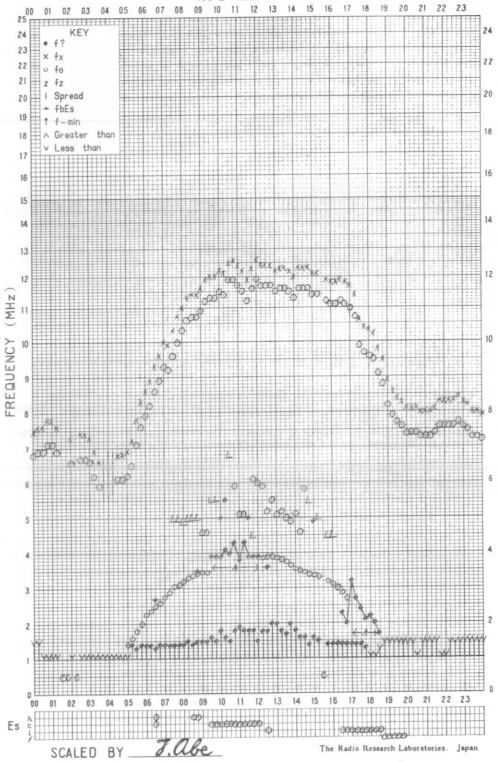

SCALED BY T. Abe

The Radio Research Laboratories. Japan

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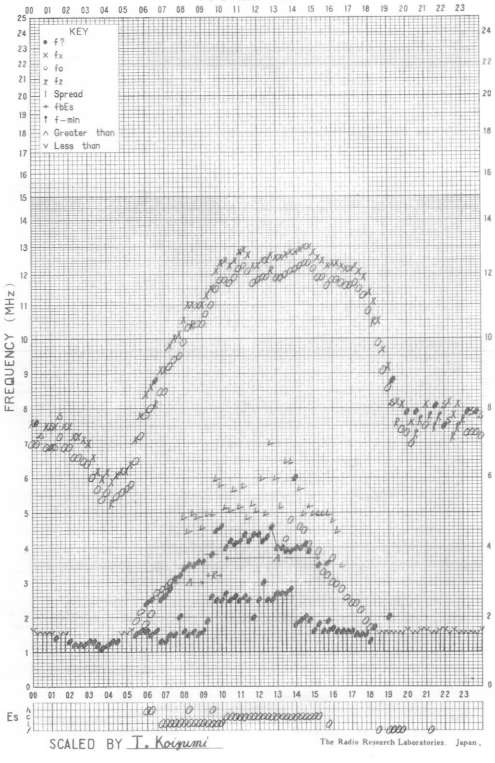

SCALED BY T. Koizumi

The Radio Research Laboratories. Japan.

f-PLOT OF IONOSPHERIC DATA

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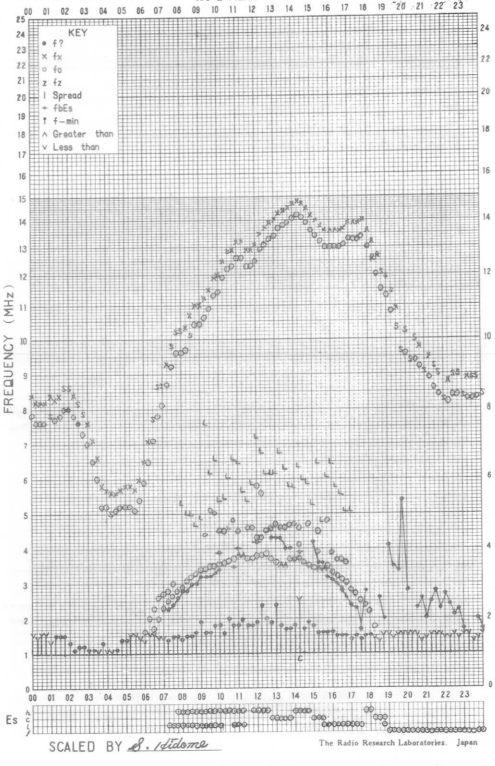
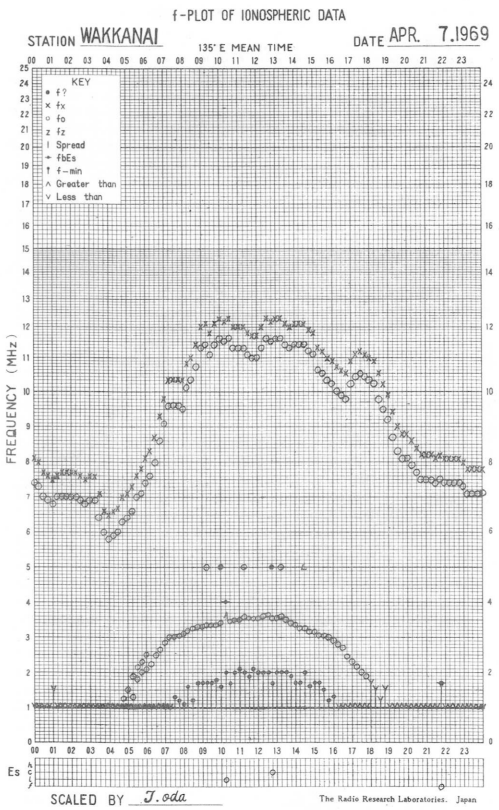


SCALED BY S. Uchioma

The Radio Research Laboratories. Japan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135° E MEAN TIME
DATE APR. 7.1969
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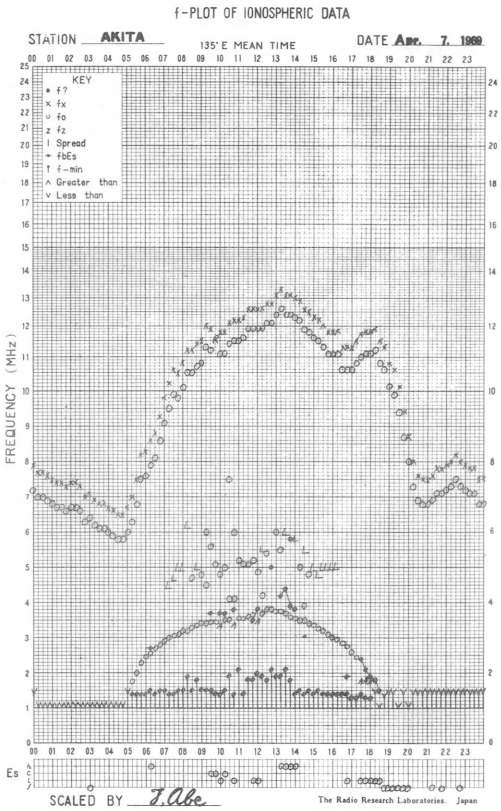
FREQUENCY (MHz)
Es
SCALED BY T. oda
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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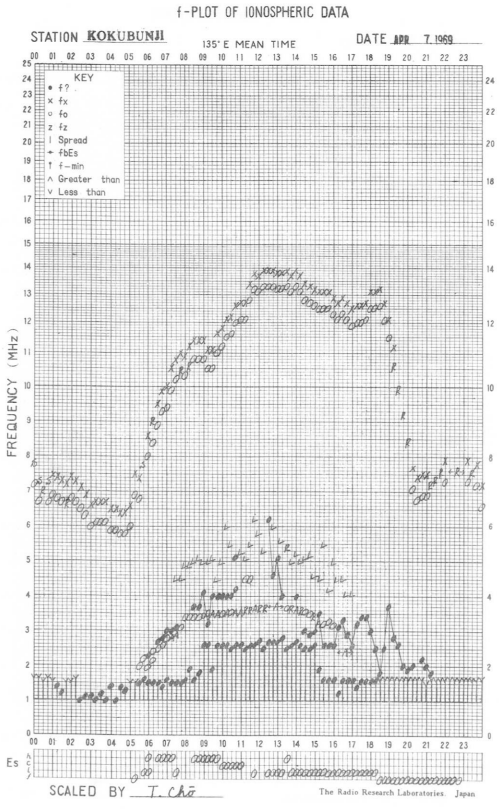
The Radio Research Laboratories. Japan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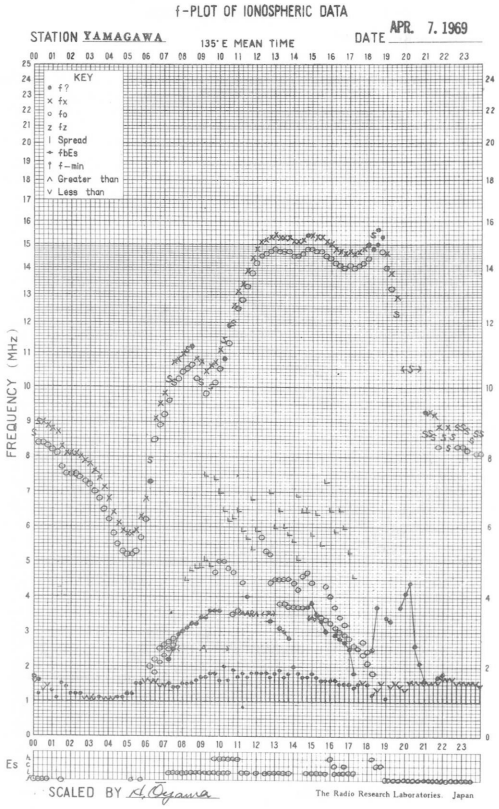
SCALED BY T. Chō
The Radio Research Laboratories. Japan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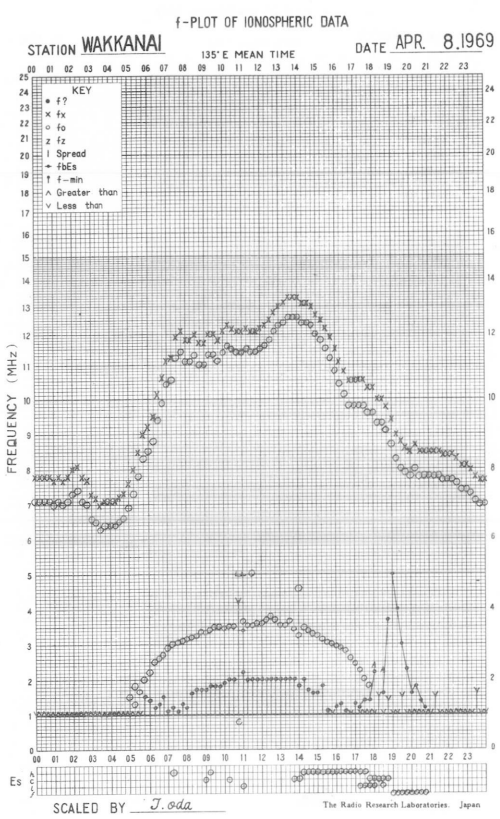
SCALED BY A. Oyama
The Radio Research Laboratories. Japan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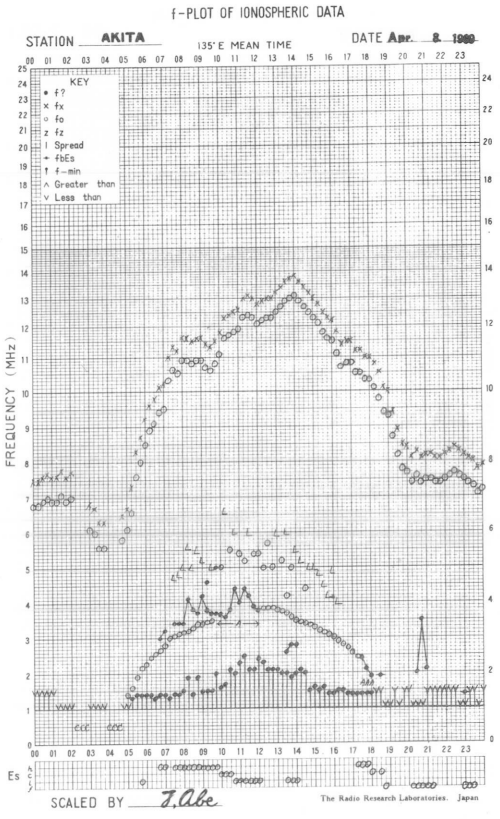
SCALED BY J. oda
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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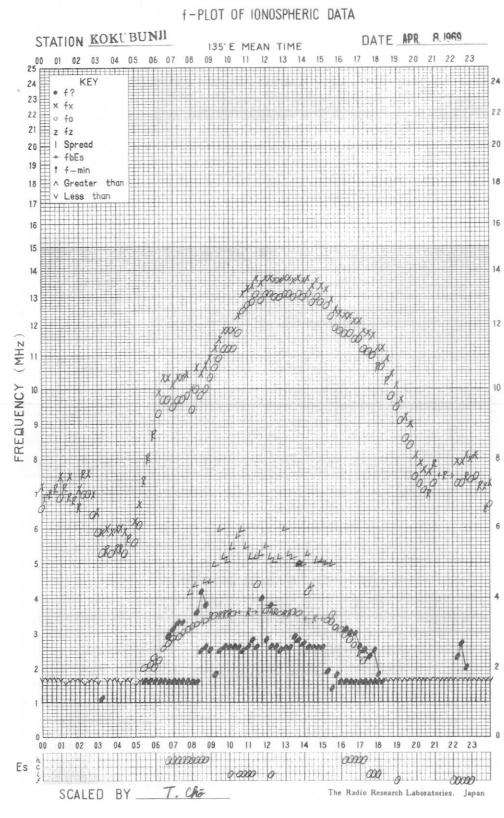
The Radio Research Laboratories. Japan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DATE APR 8 1969
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FREQUENCY (MHz)
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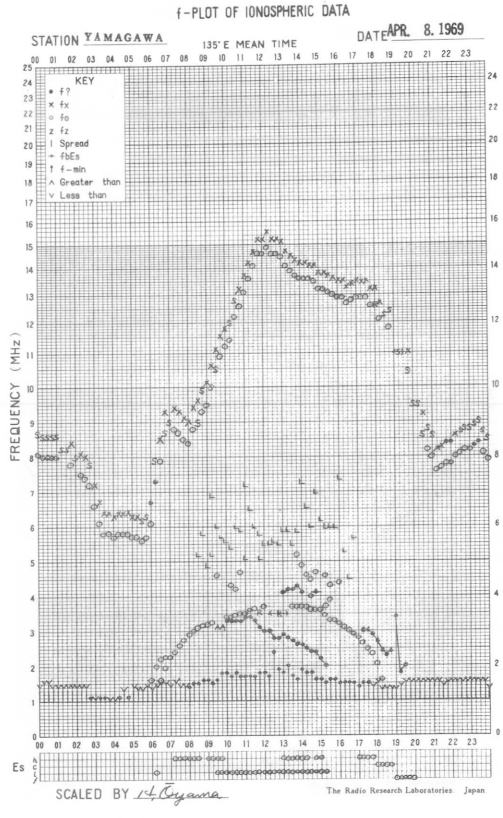
SCALED BY T. Oke
The Radio Research Laboratories. Japan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135°E MEAN TIME
DATE APR. 8. 1969
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FREQUENCY (MHz)
Es
SCALED BY H. Eyama
The Radio Research Laboratories. Japan

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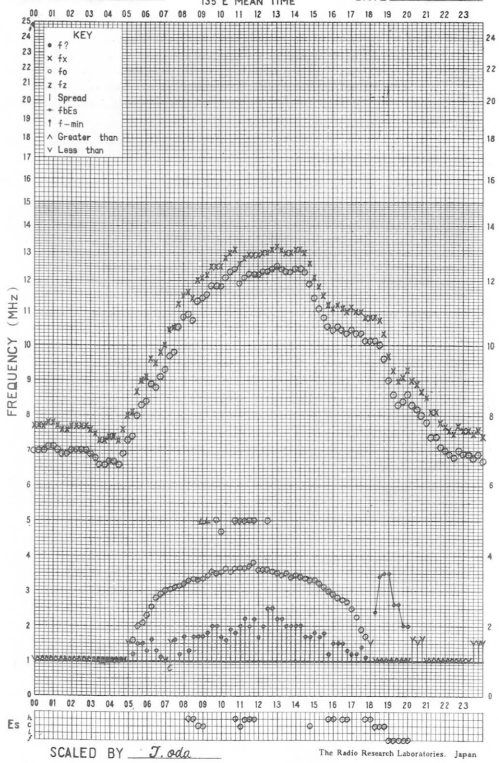
STATION WAKKANAI 135°E MEAN TIME DATE APR. 9.1969



SCALED BY T. oda

The Radio Research Laboratories. Japan

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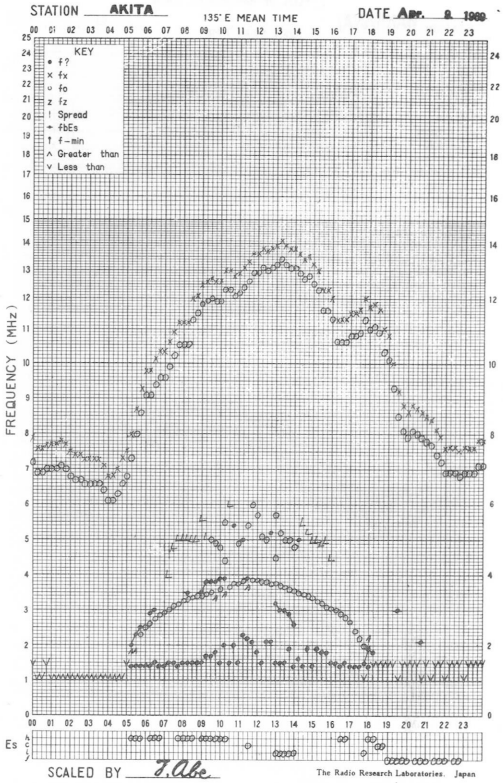

SCALED BY T. Abe

The Radio Research Laboratories. Japan

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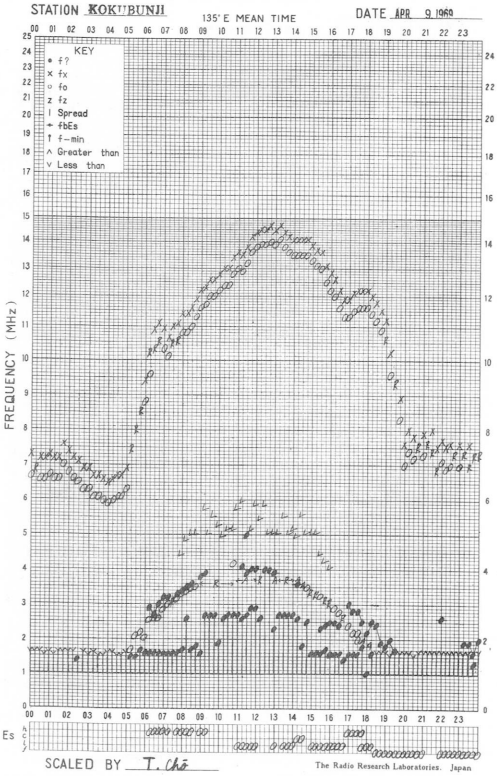

SCALED BY T. Cho

The Radio Research Laboratories. Japan

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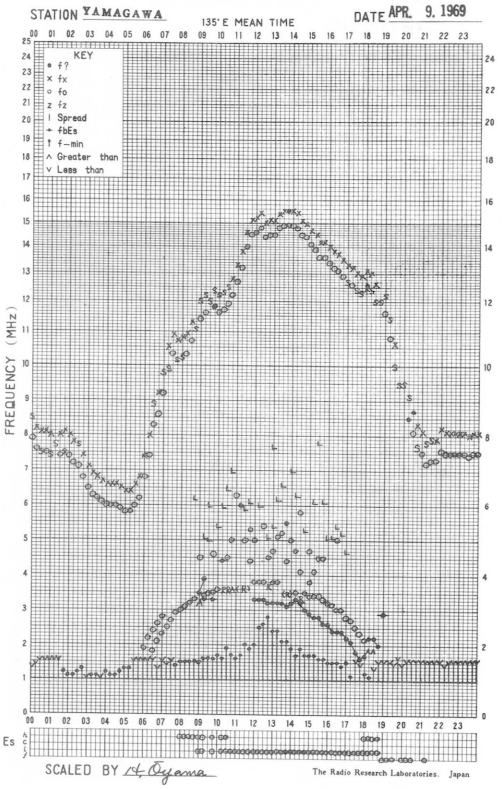

SCALED BY H. Oyama

The Radio Research Laboratories. Japan

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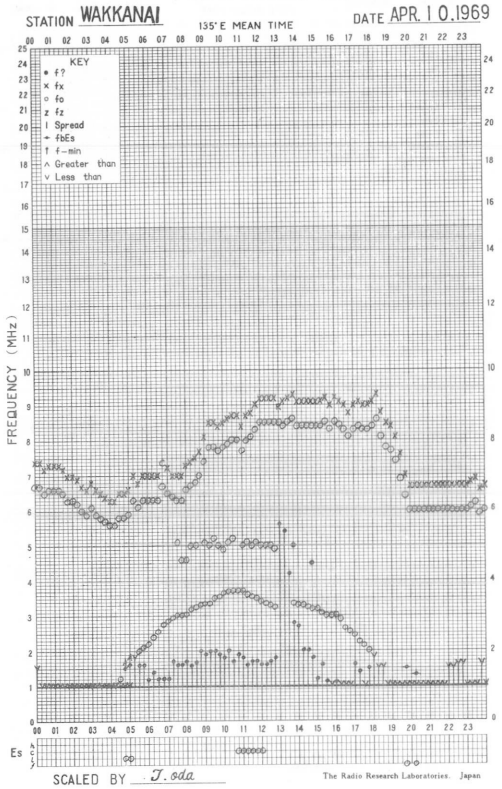

SCALED BY T. Oda

The Radio Research Laboratories. Japan

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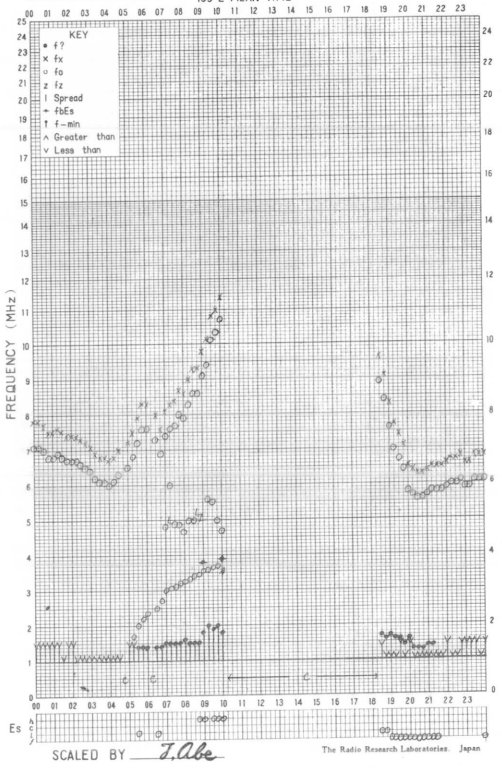

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The Radio Research Laboratories. Japan

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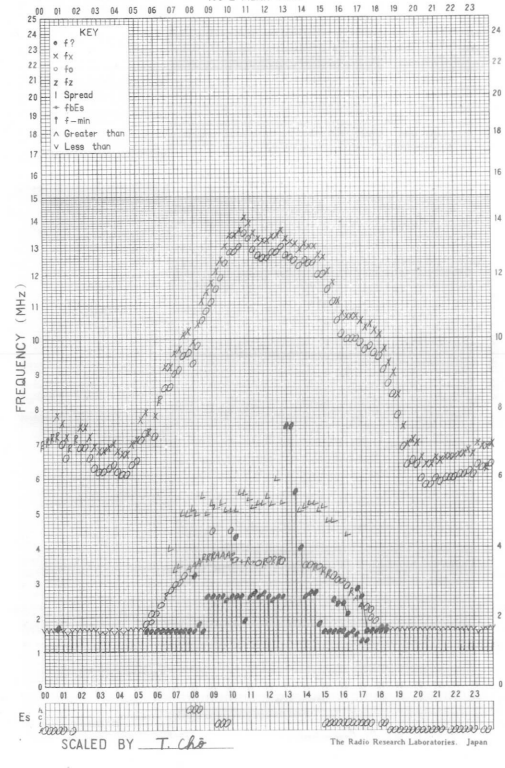

SCALED BY T. Chō

The Radio Research Laboratories. Japan

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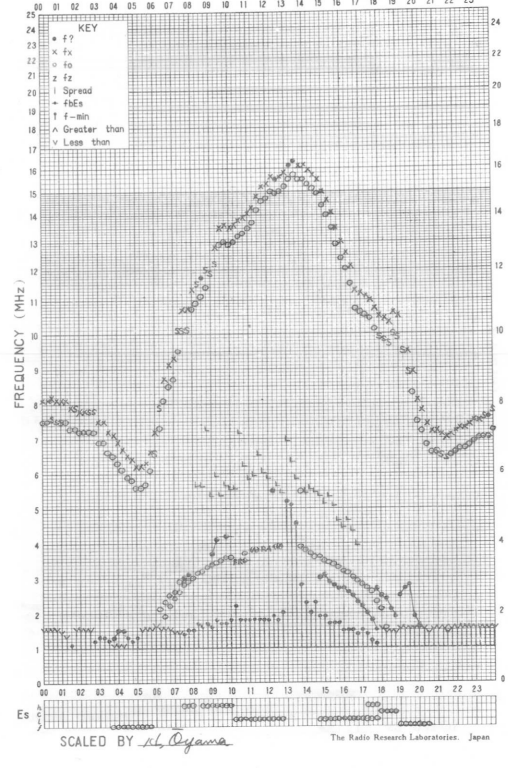

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The Radio Research Laboratories. Japan

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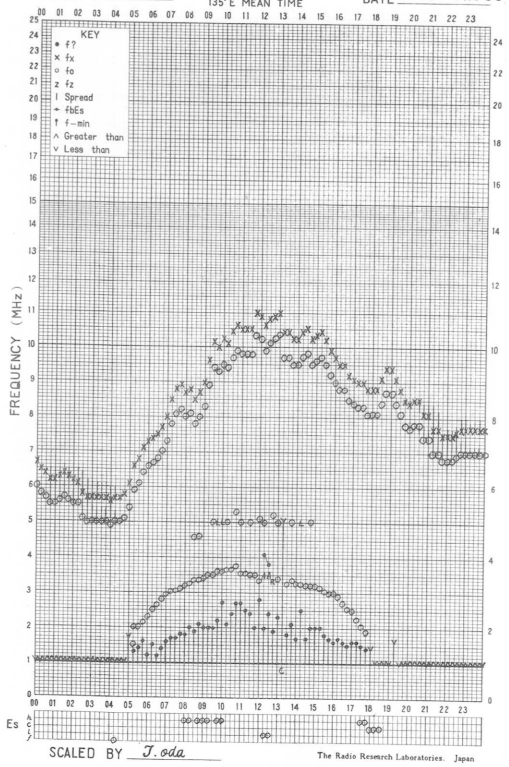

SCALED BY J. oda

The Radio Research Laboratories. Japan

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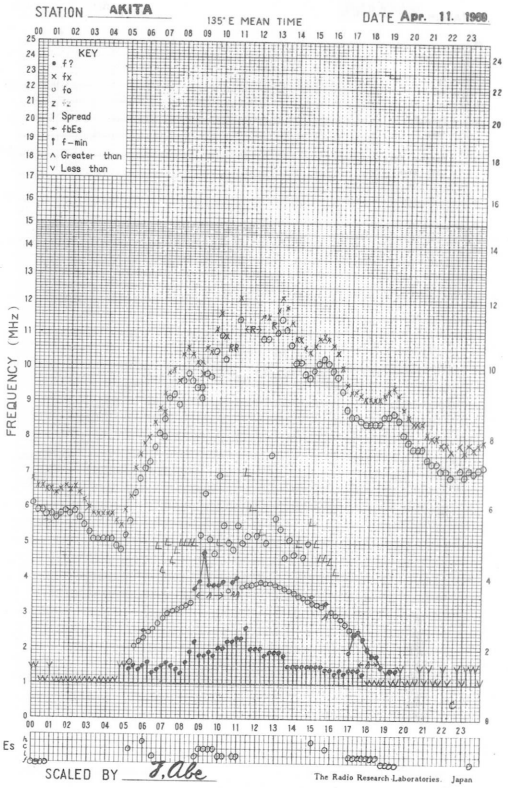

SCALED BY T. Abe

The Radio Research Laboratories. Japan

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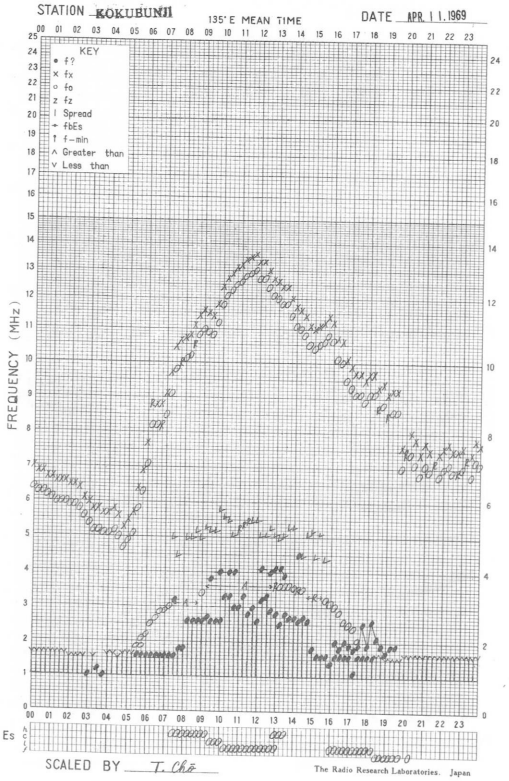

SCALED BY T. Cho

The Radio Research Laboratories. Japan

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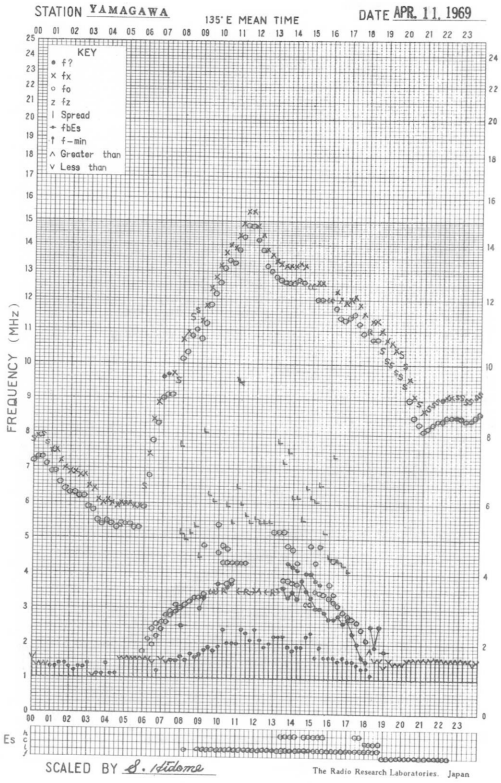

SCALED BY S. Hidoma

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE APR. 12.1969

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FREQUENCY (MHz)

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SCALED BY J. Oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE Apr. 12. 1969

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FREQUENCY (MHz)

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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 APR 12 1969

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FREQUENCY (MHz)

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SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE APR. 12 1969

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FREQUENCY (MHz)

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SCALED BY S. Uchioma

The Radio Research Laboratories. Japan

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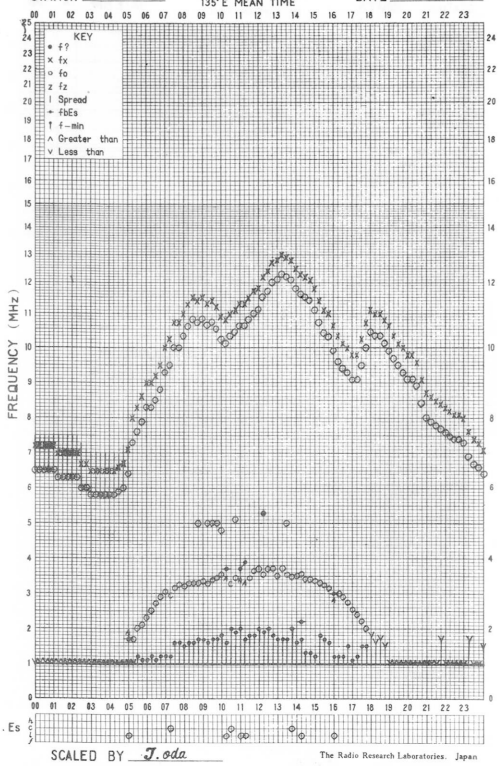

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The Radio Research Laboratories. Japan

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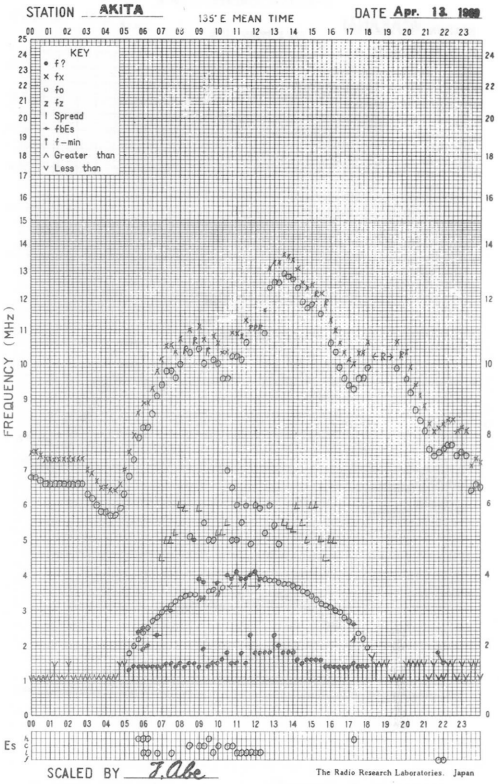

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The Radio Research Laboratories. Japan

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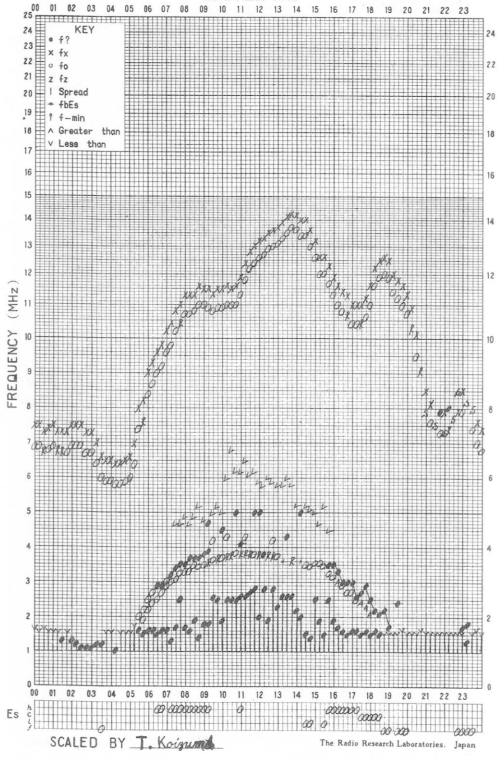

SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

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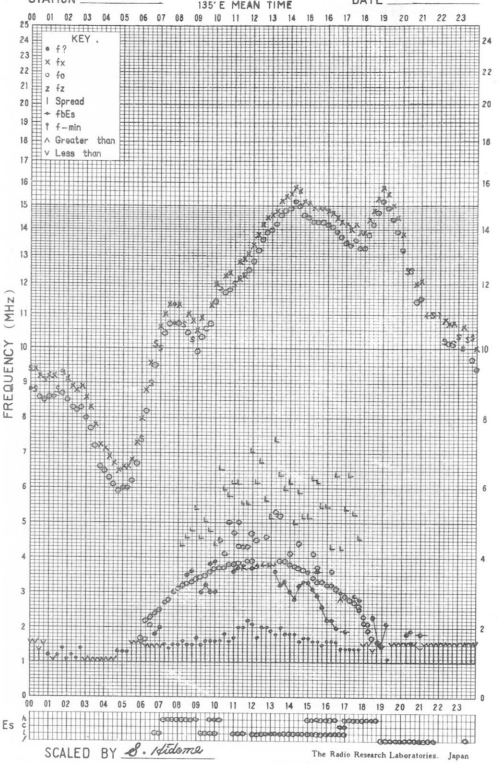
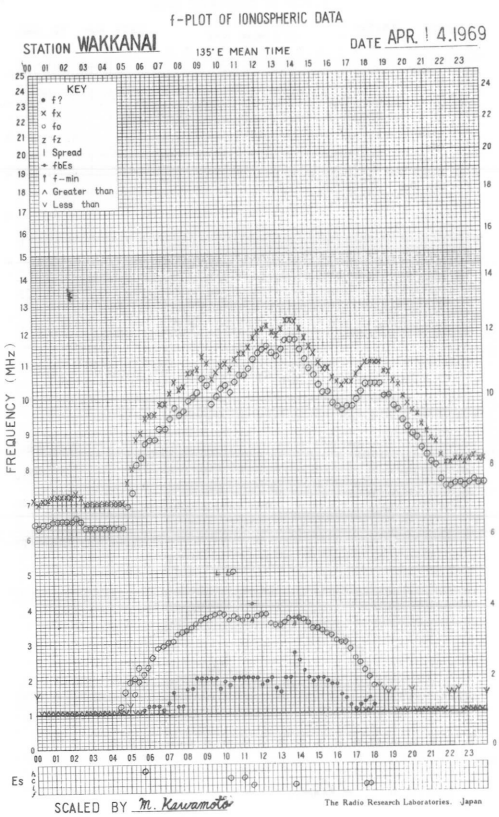


SCALED BY S. Ishidoma

The Radio Research Laboratories. Japan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135°E MEAN TIME
DATE APR. 14. 1969
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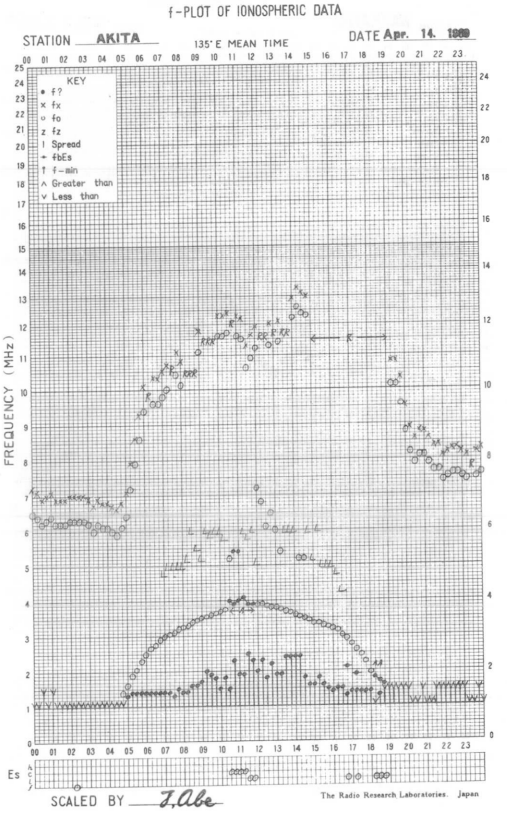
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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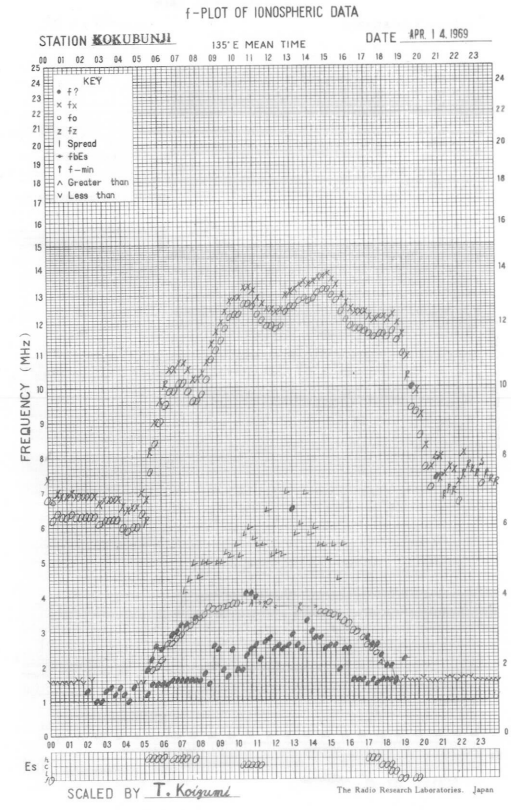
SCALED BY T. Abe
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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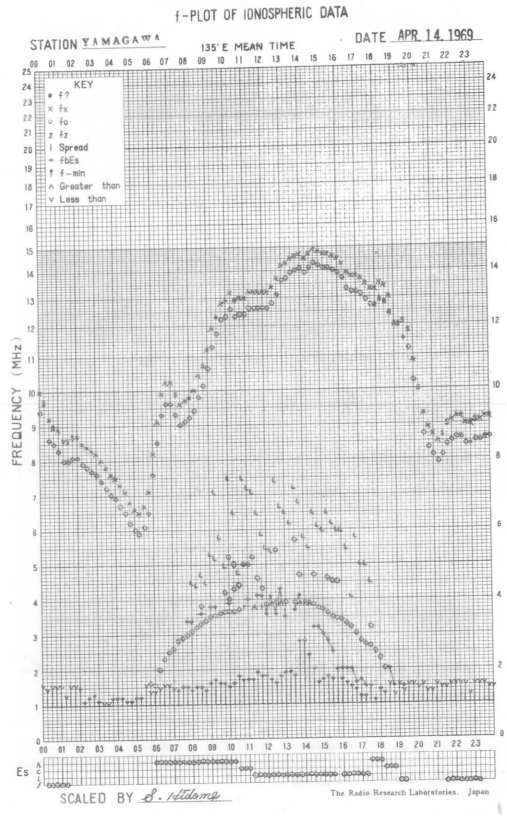
SCALED BY T. Koizumi
The Radio Research Laboratories. Japan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SCALED BY S. Uchoma
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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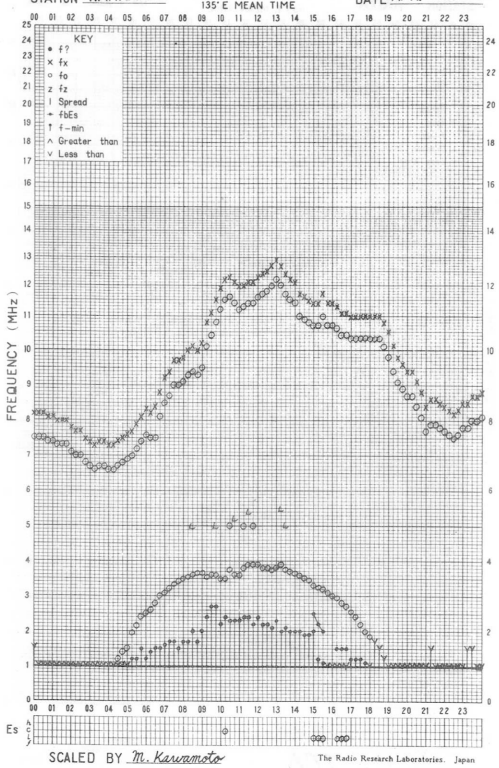

SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

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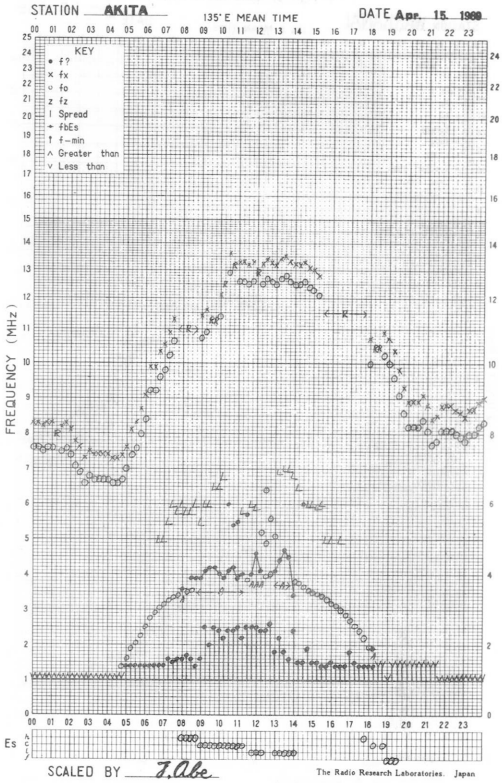

SCALED BY T. Abe

The Radio Research Laboratories. Japan

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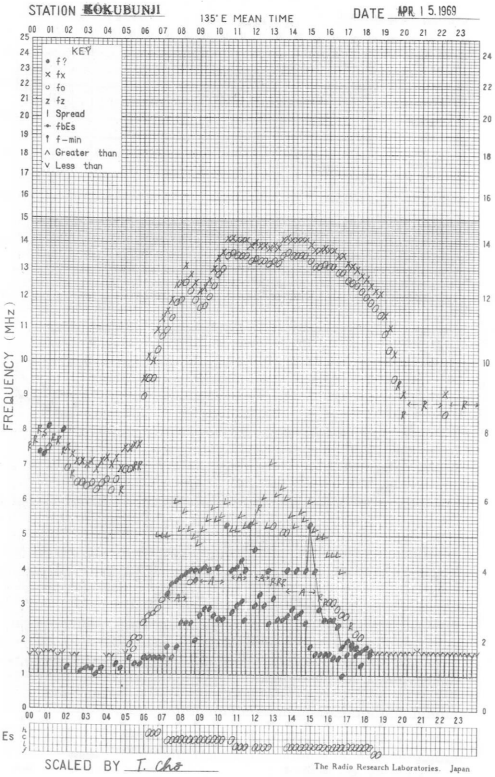

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The Radio Research Laboratories. Japan

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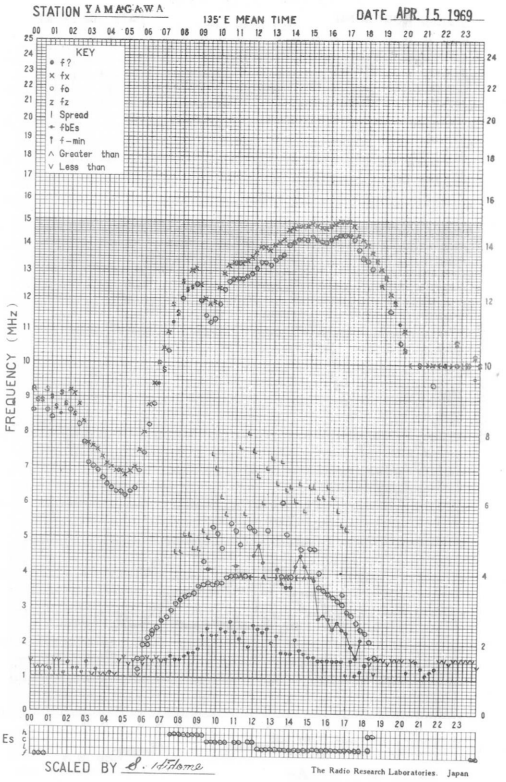

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The Radio Research Laboratories. Japan

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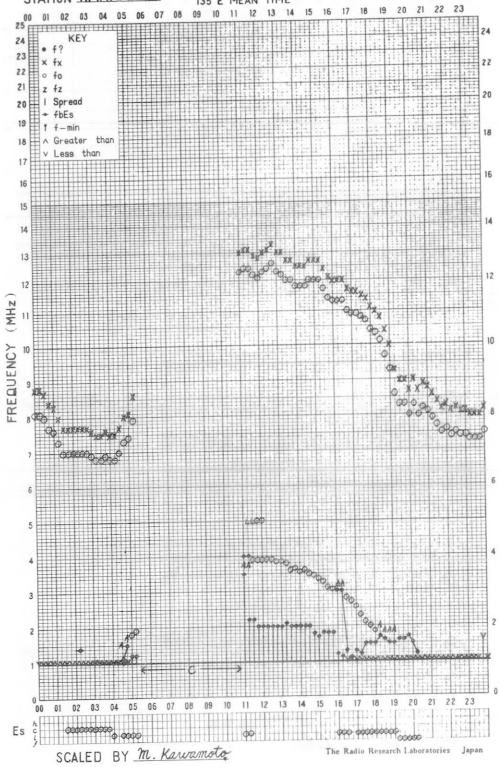

SCALED BY M. Kawamoto

The Radio Research Laboratories Japan

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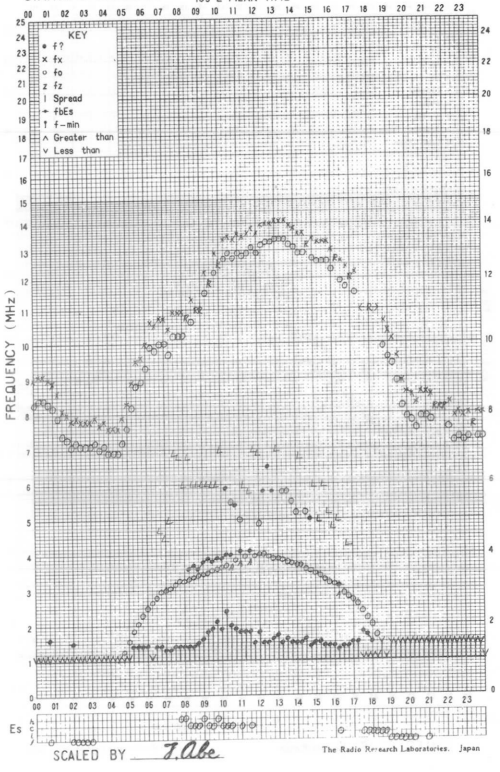

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The Radio Research Laboratories. Japan

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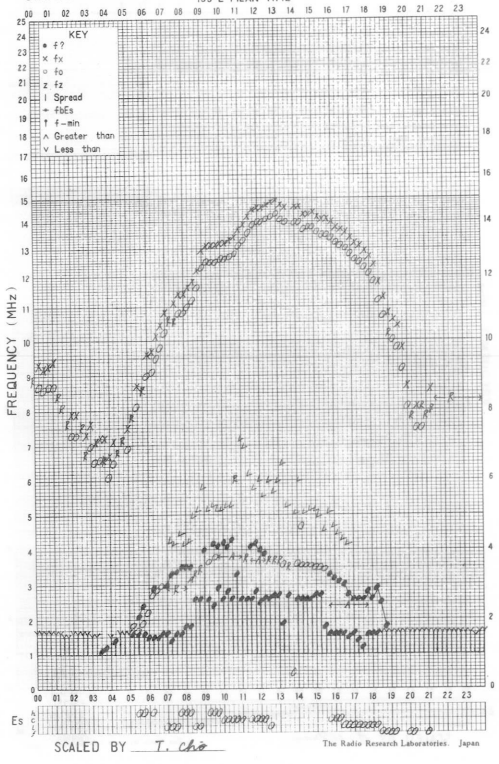

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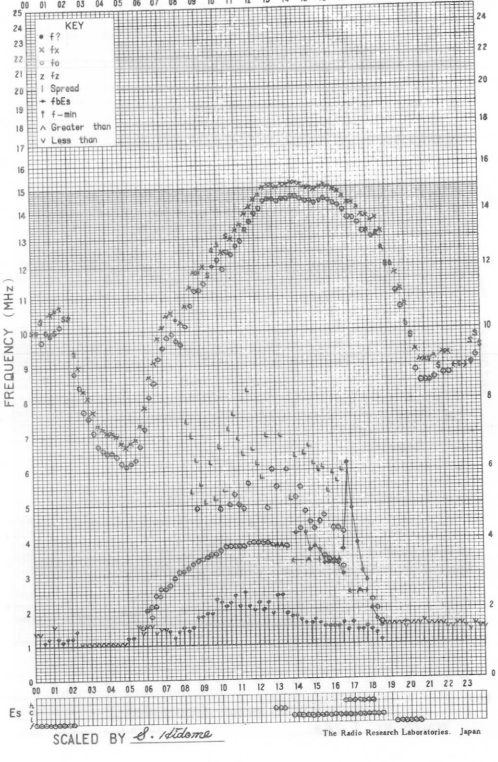

SCALED BY S. Ishioma

The Radio Research Laboratories. Japan

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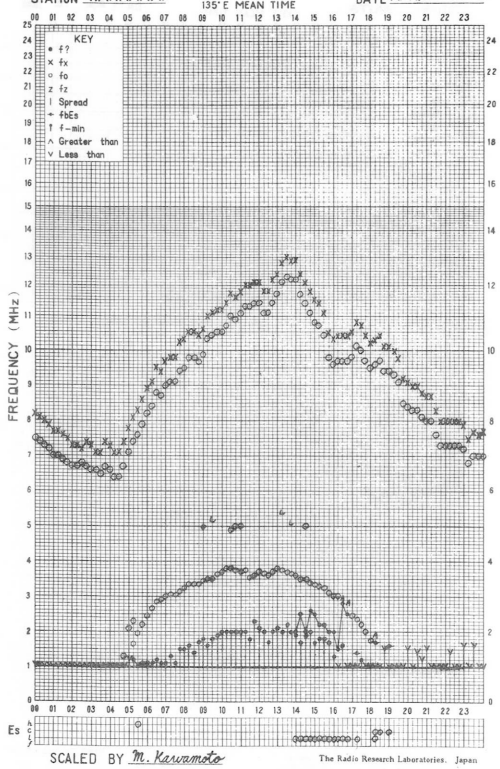

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The Radio Research Laboratories, Japan

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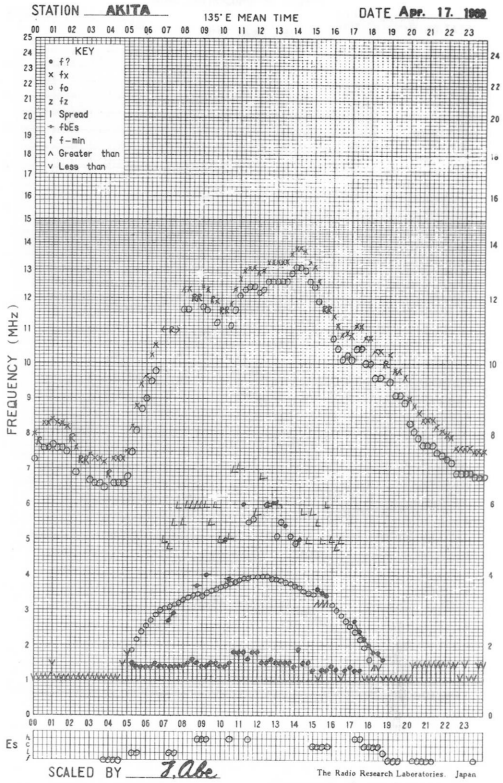

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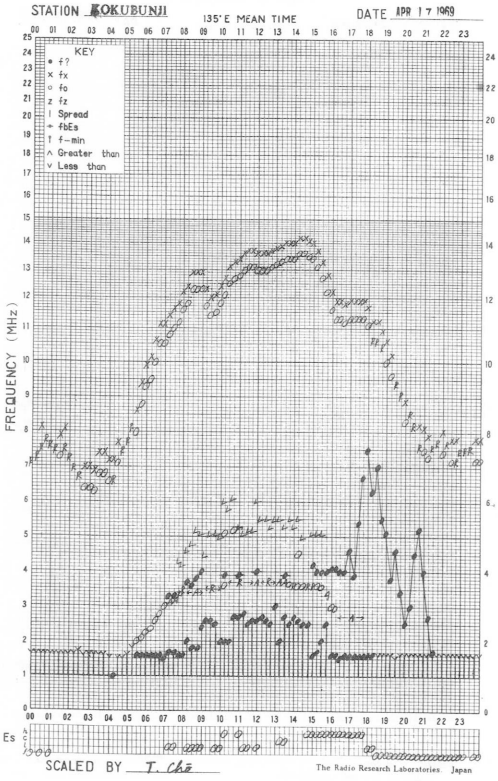

SCALED BY T. Chō

The Radio Research Laboratories, Japan

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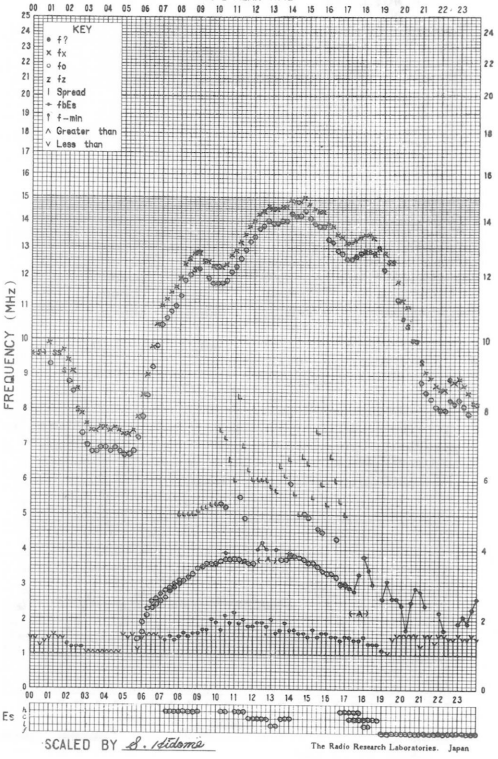
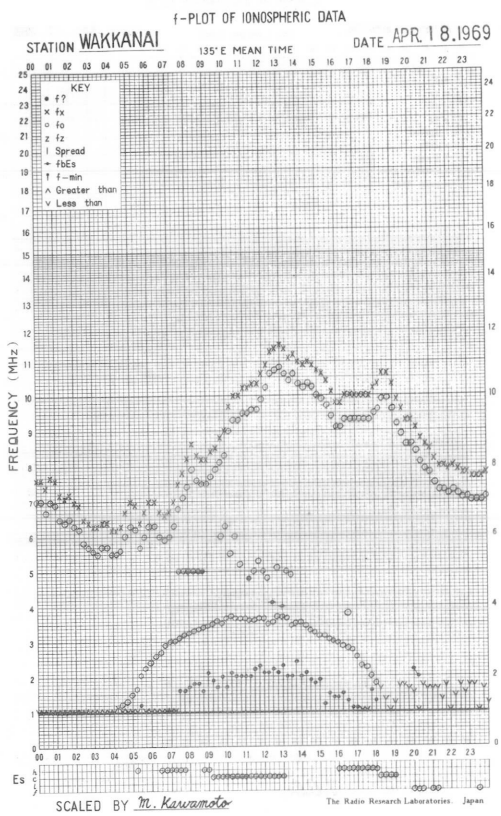


SCALED BY S. Iidaka

The Radio Research Laboratories, Japan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135°E MEAN TIME
DATE APR. 18.1969
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FREQUENCY (MHz)
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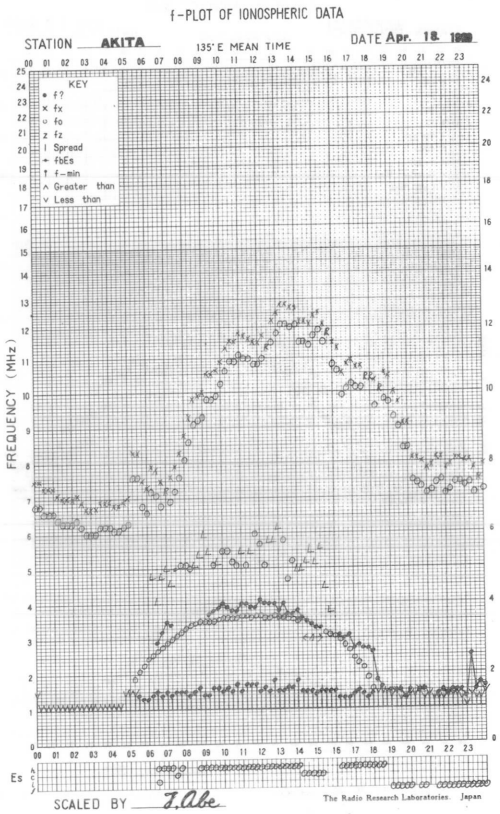
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan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DATE Apr. 18. 1969
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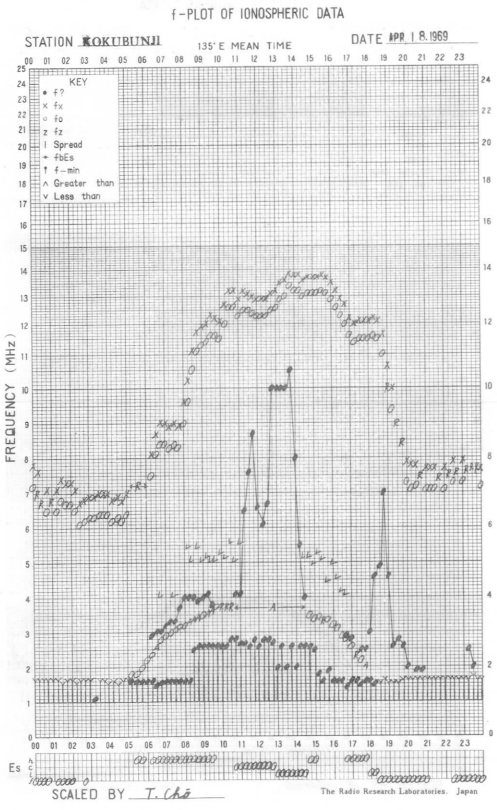
SCALED BY T. Abe
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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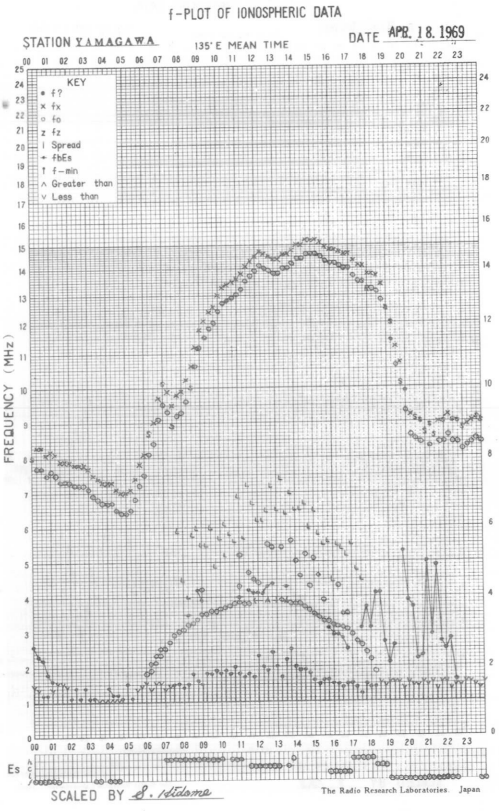
SCALED BY T. Ichi
The Radio Research Laboratories. Japan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DATE APR. 18. 1969
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FREQUENCY (MHz)
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SCALED BY S. Hidama
The Radio Research Laboratories. Japan

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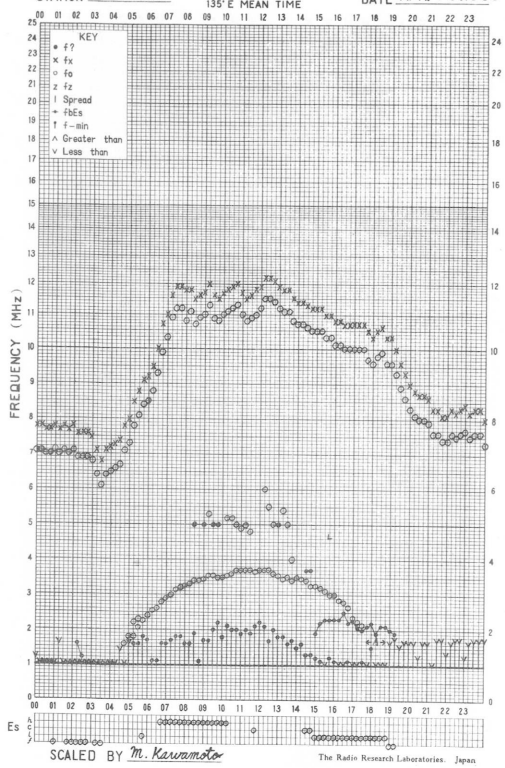

SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

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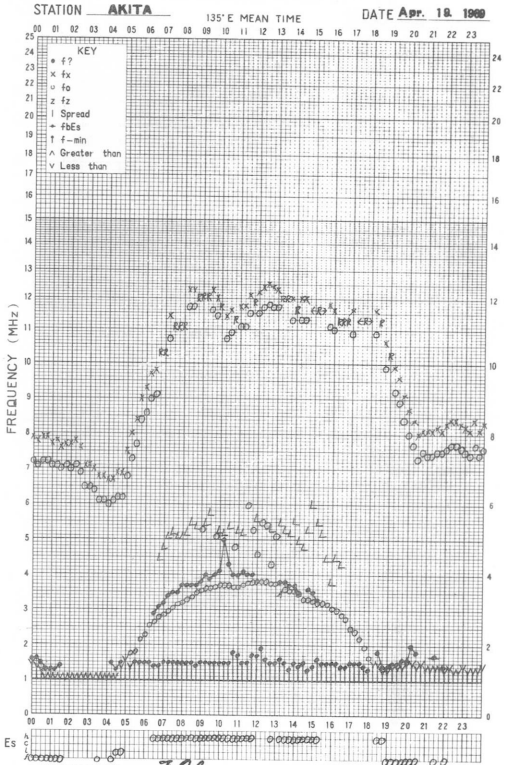
STATION AKITA 135°E MEAN TIME DATE Apr. 19. 1969



SCALED BY T. Abe

The Radio Research Laboratories. Japan

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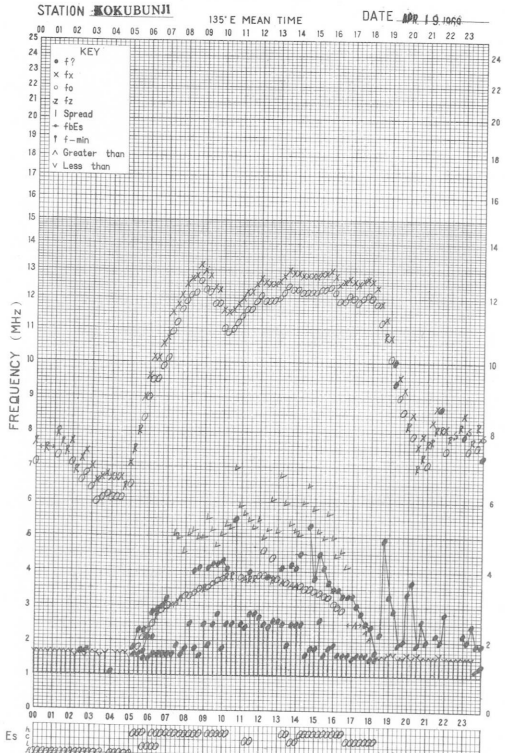
STATION KOKUBUNJI 135°E MEAN TIME DATE APR 19 1969



SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

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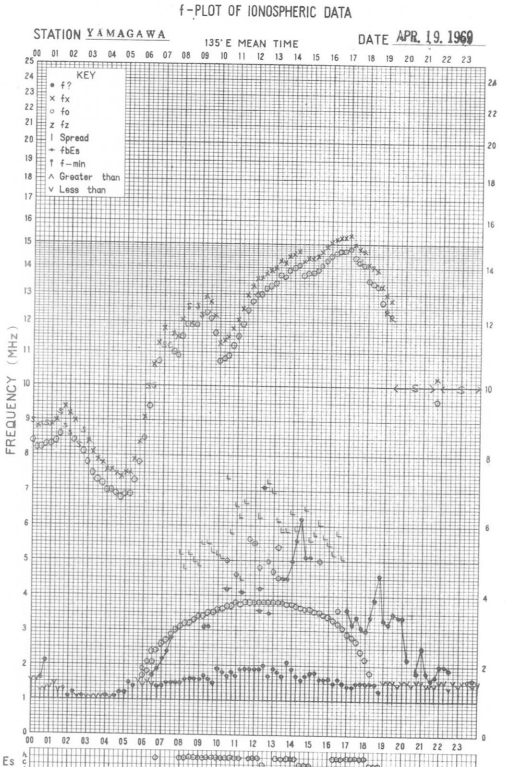

SCALED BY S. Kidoma

The Radio Research Laboratories. Japan

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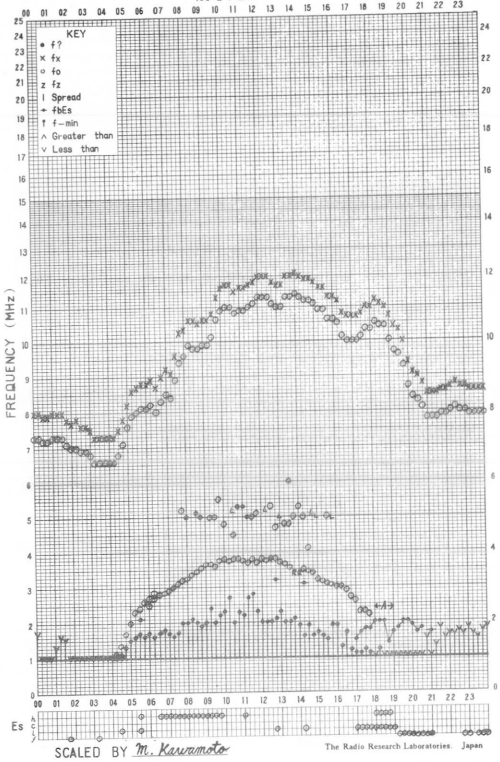
STATION WAKKANAI 135°E MEAN TIME DATE APR. 20. 1969



SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

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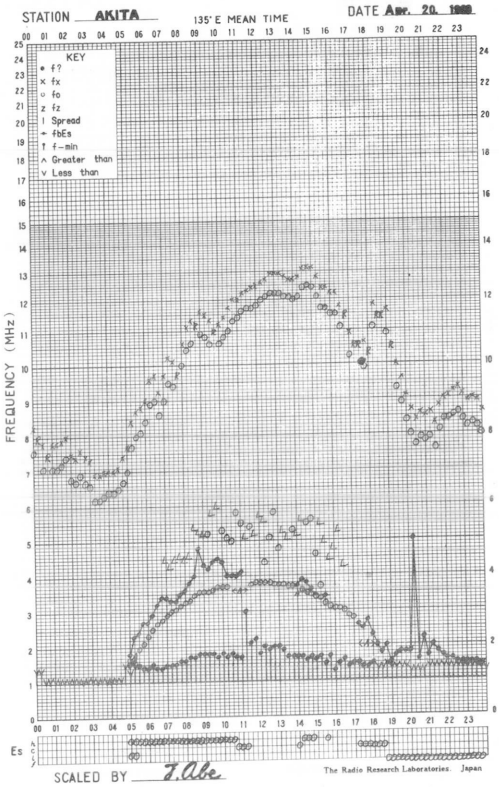

SCALED BY T. Abe

The Radio Research Laboratories. Japan

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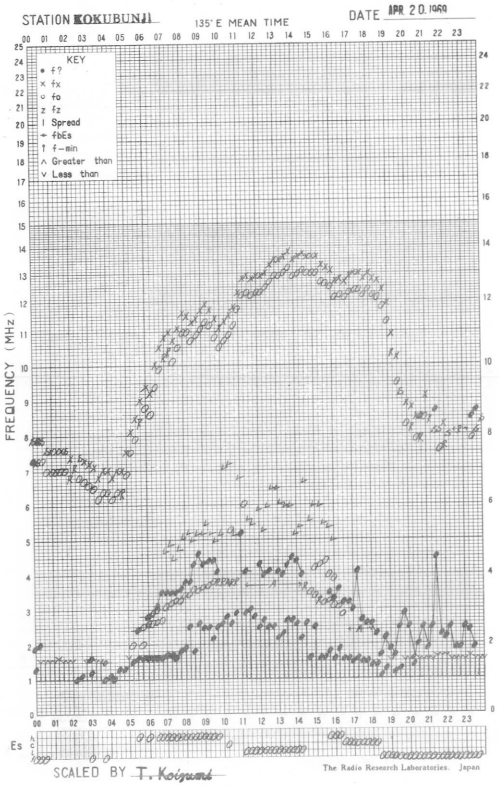

SCALED BY T. Koizumi

The Radio Research Laboratories. Japan

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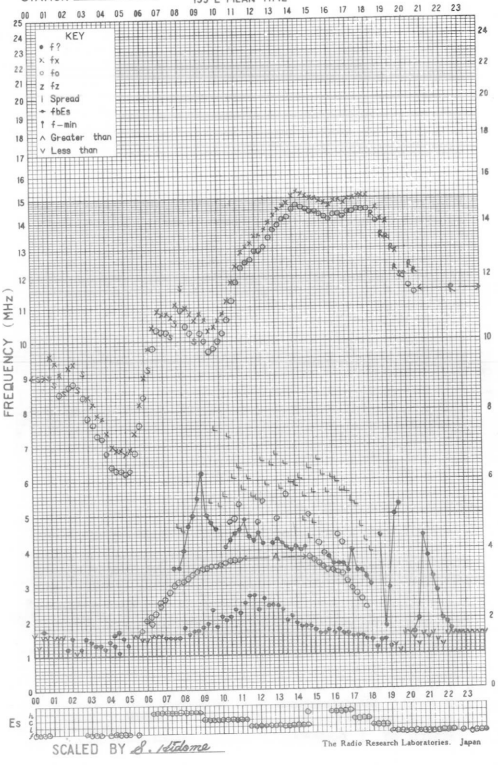

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The Radio Research Laboratories. Japan

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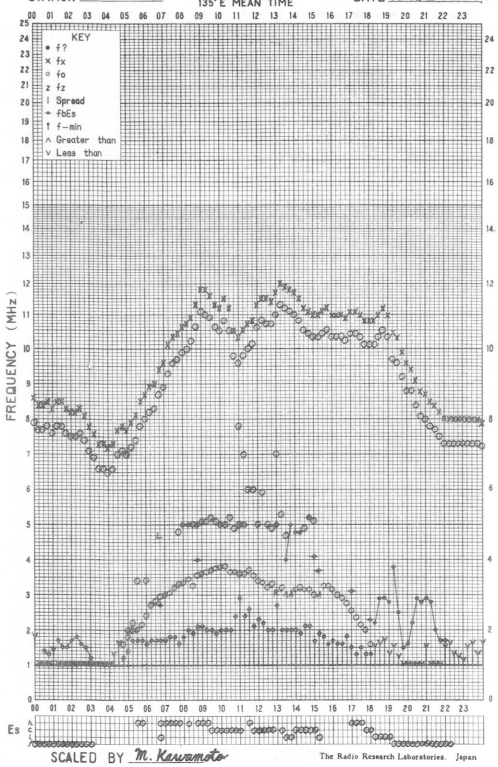

SCALED BY M. Kuwamoto The Radio Research Laboratories. Japan

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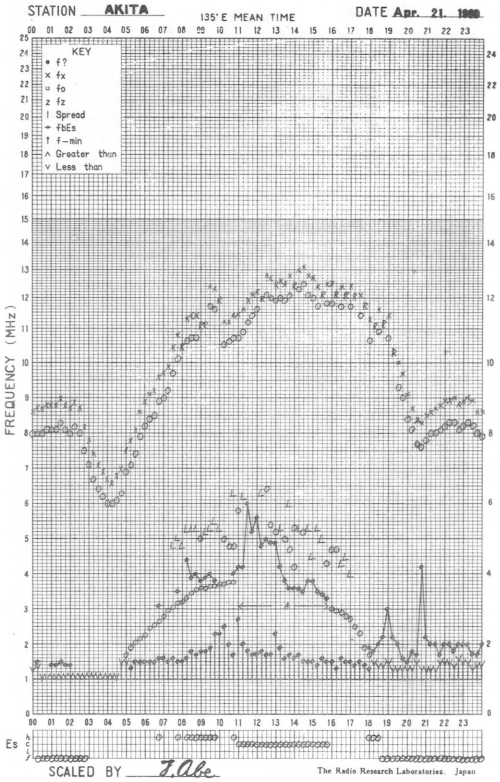

SCALED BY T. Abe The Radio Research Laboratories. Japan

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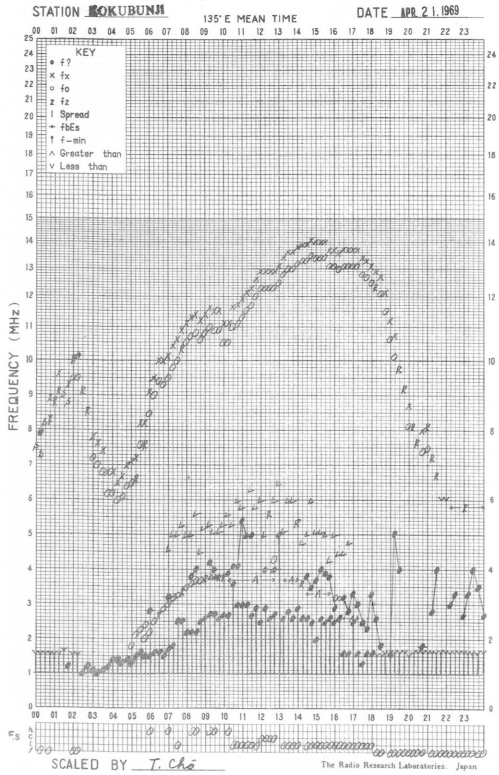

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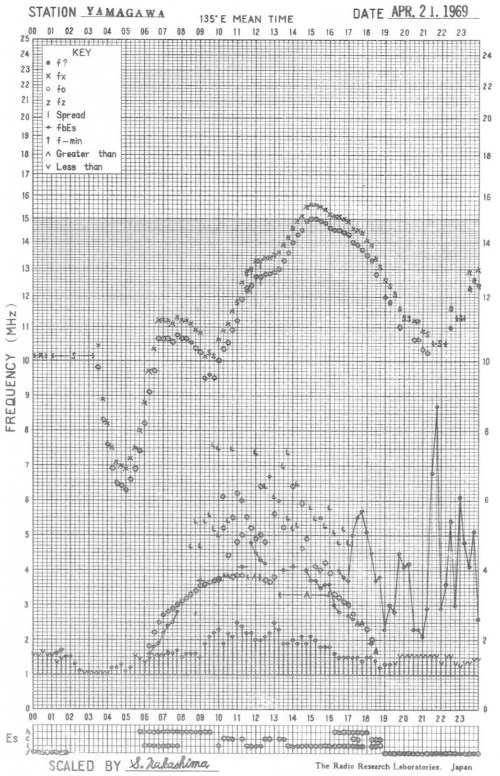
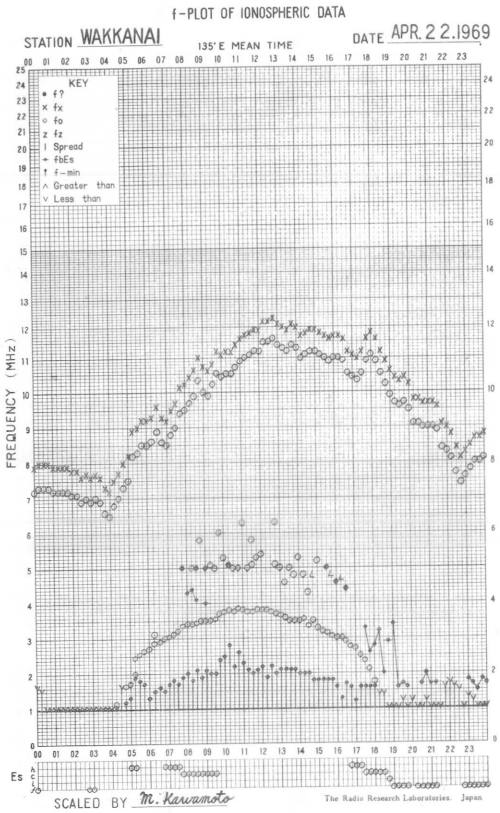


SCALED BY S. Takashima The Radio Research Laboratories. Japan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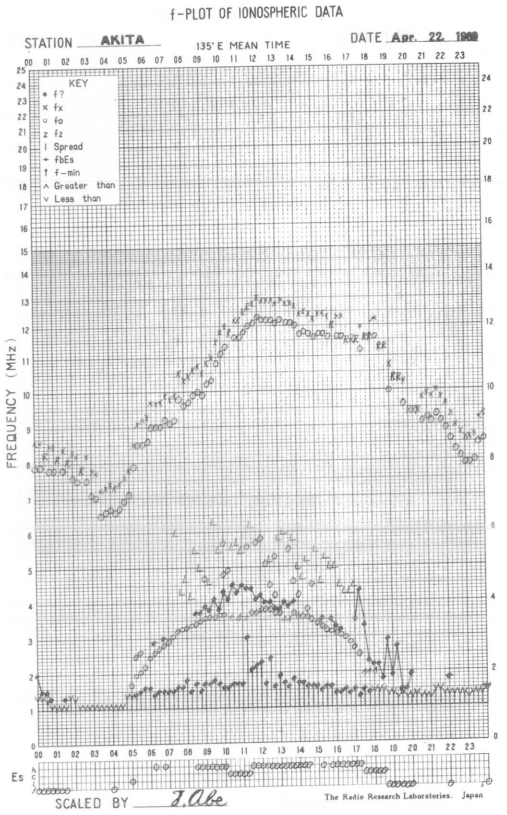
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan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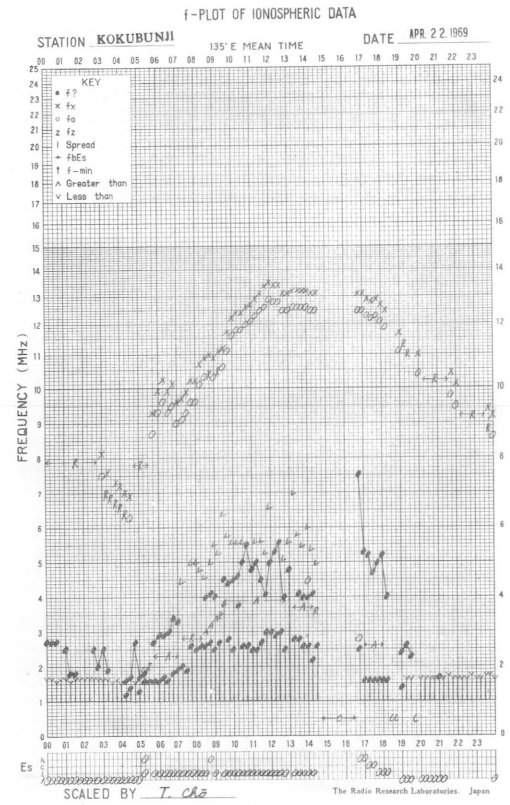
SCALED BY T. Abe
The Radio Research Laboratories. Japan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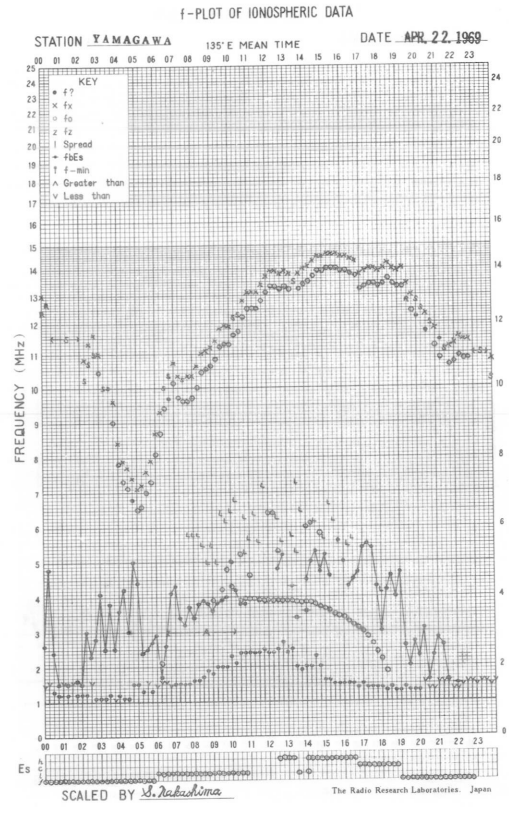
SCALED BY T. Chō
The Radio Research Laboratories. Japan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SCALED BY S. Nakashima
The Radio Research Laboratories. Japan

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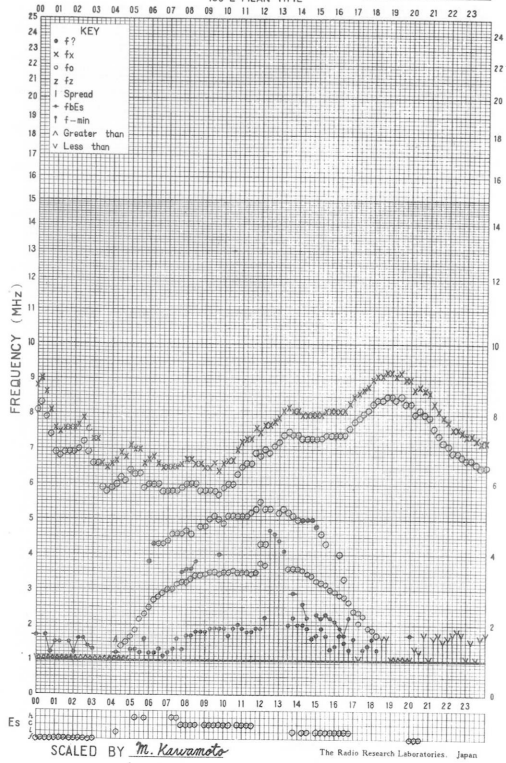

SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

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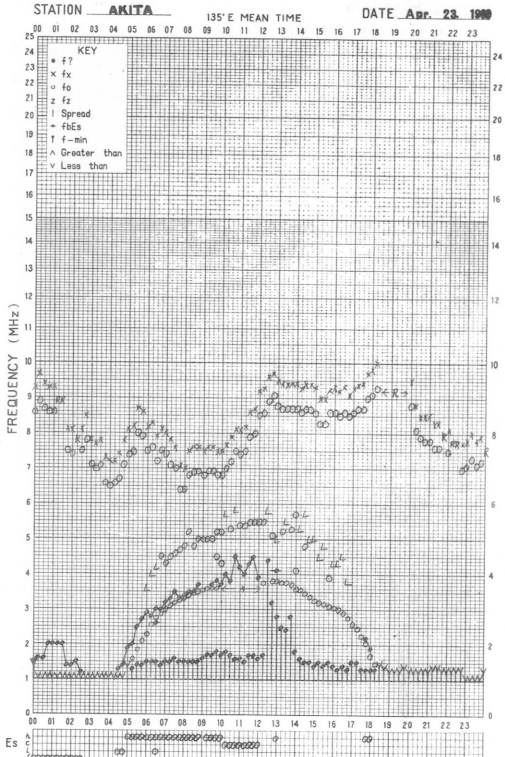

SCALED BY T. Abe

The Radio Research Laboratories. Japan

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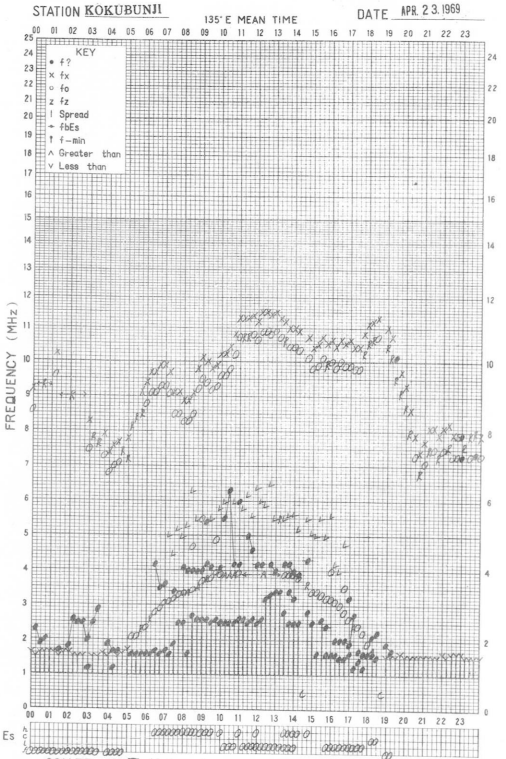

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The Radio Research Laboratories. Japan

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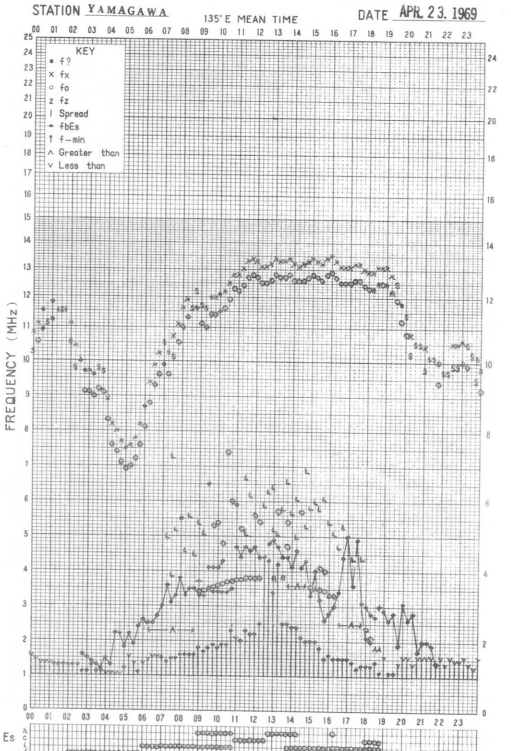

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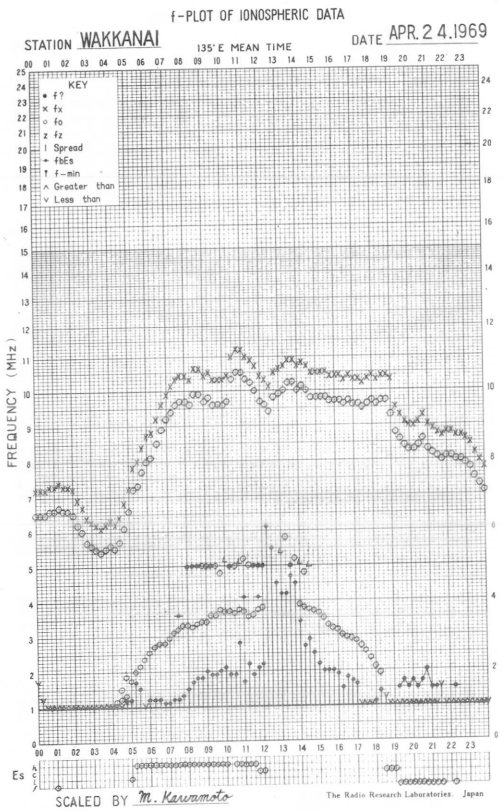
The Radio Research Laboratories. Japan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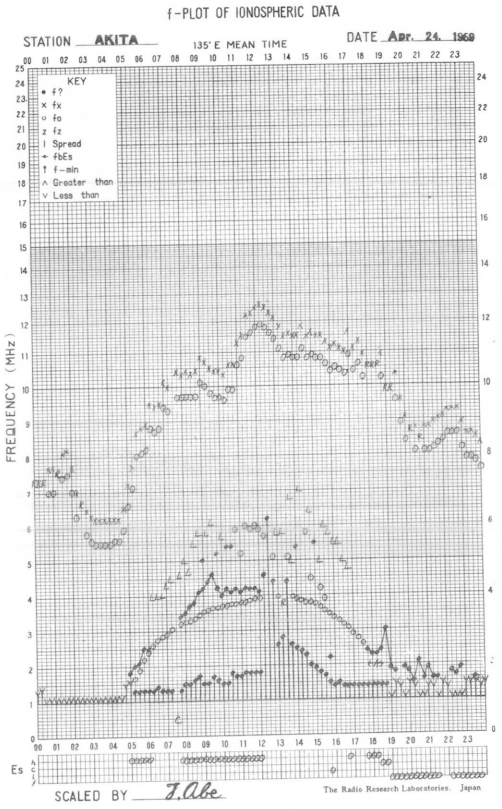
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan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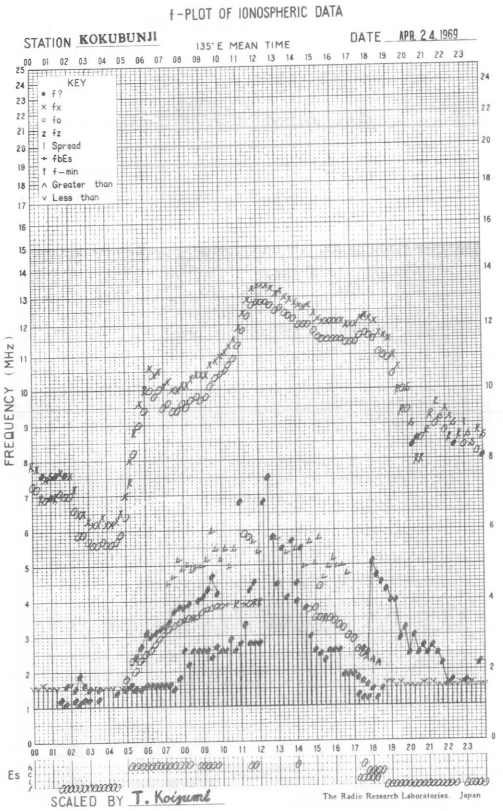
SCALED BY T. Abe
The Radio Research Laboratories. Japan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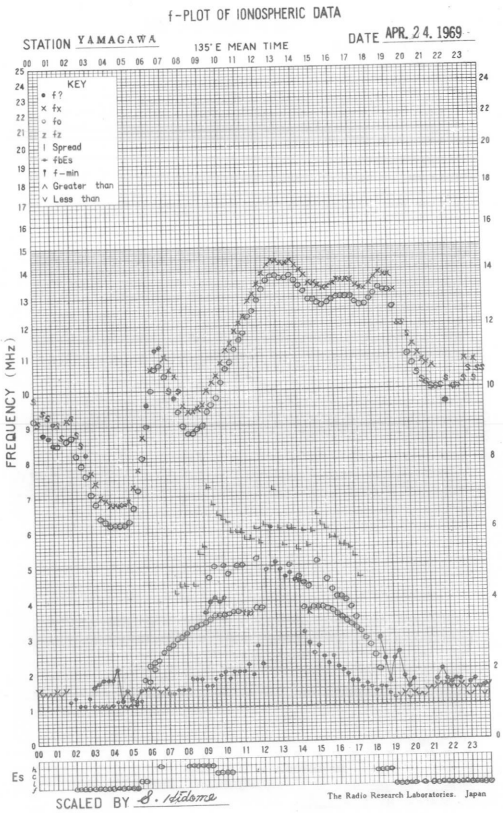
SCALED BY T. Koizumi
The Radio Research Laboratories. Japan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SCALED BY S. Iidaka
The Radio Research Laboratories. Japan

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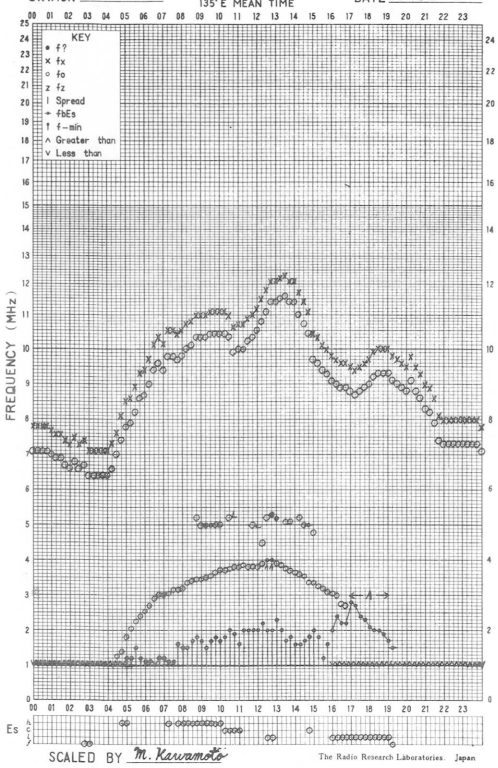

SCALED BY M. Kawamoto The Radio Research Laboratories. Japan

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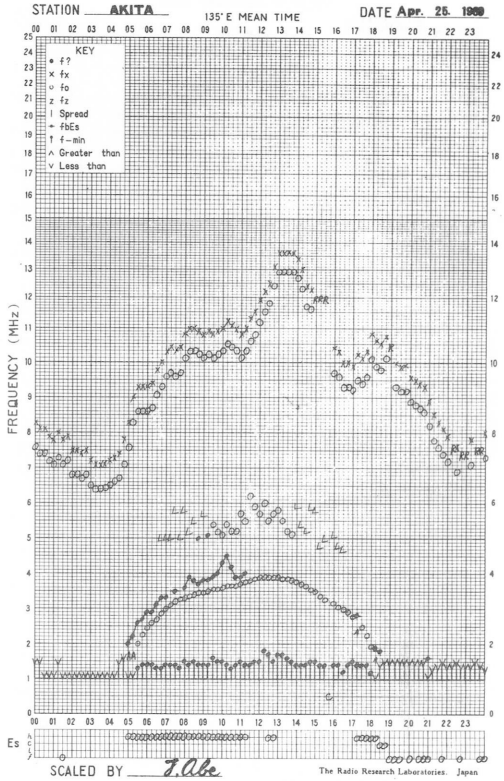

SCALED BY T. Abe The Radio Research Laboratories. Japan

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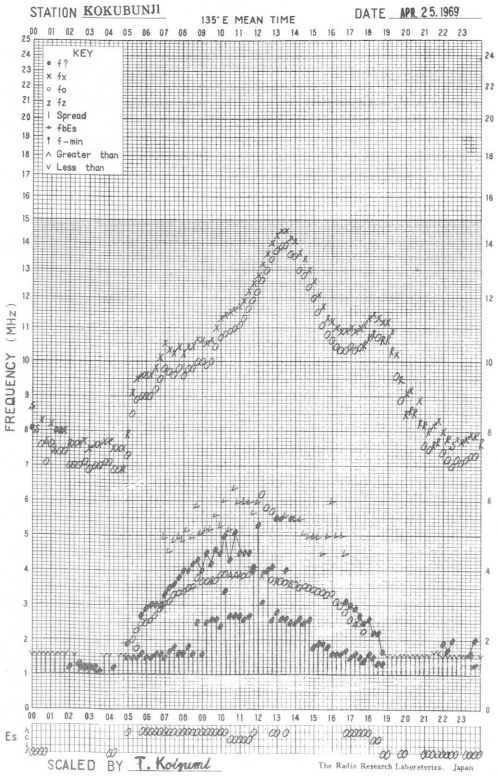

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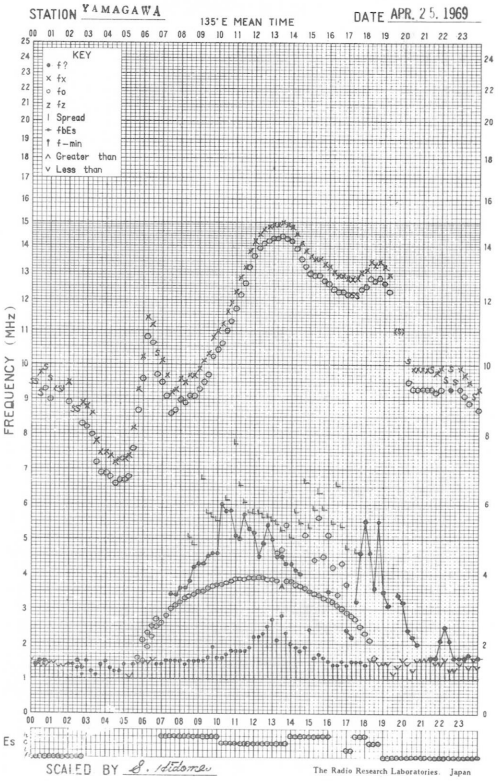
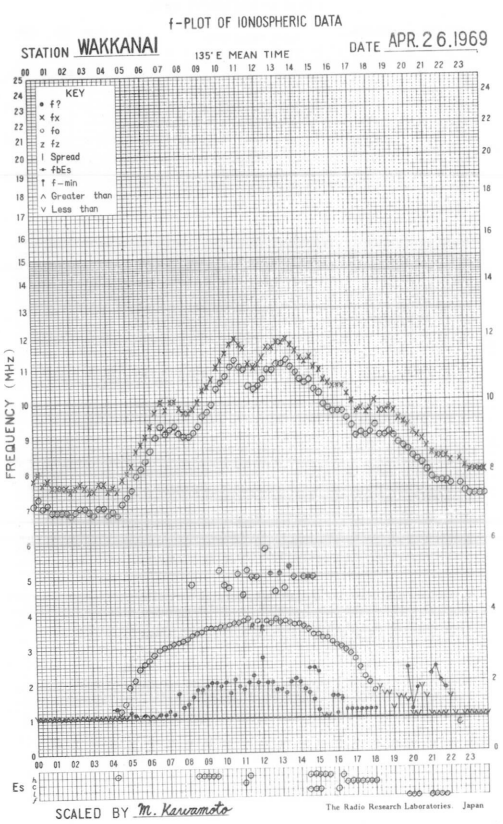


SCALED BY S. Ichimaru The Radio Research Laboratories. Japan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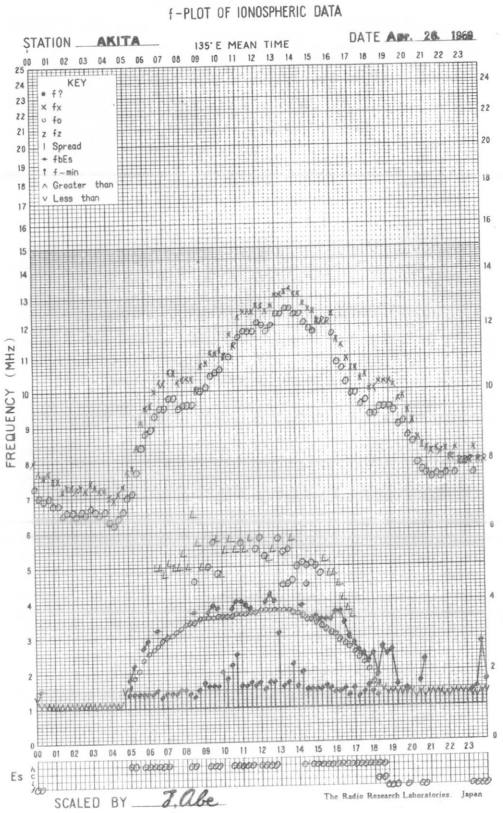
SCALED BY M. Kawamoto
The Radio Research Laboratories. Japan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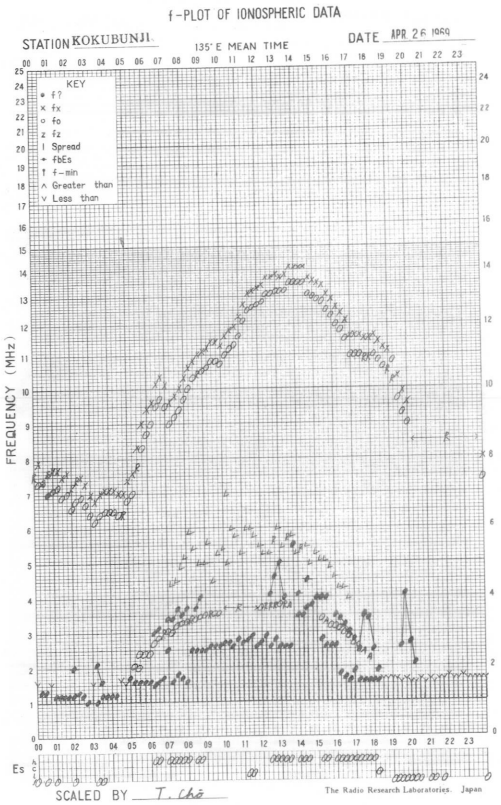
The Radio Research Laboratories. Japan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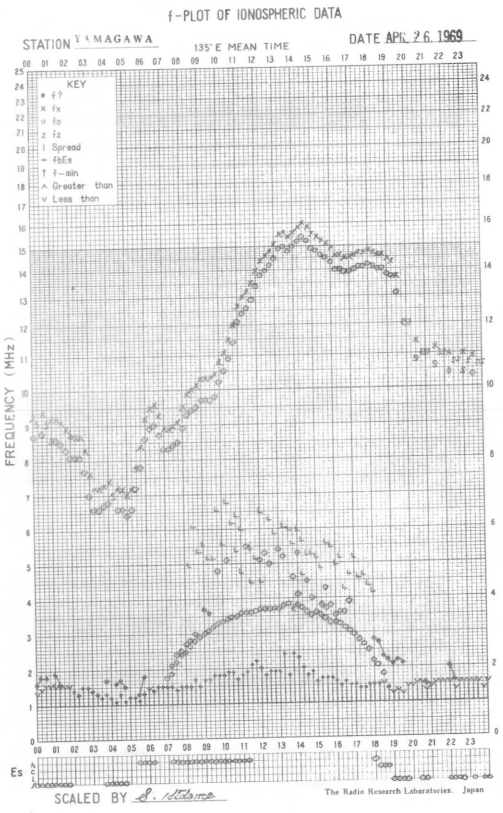
The Radio Research Laboratories. Japan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The Radio Research Laboratories. Japan

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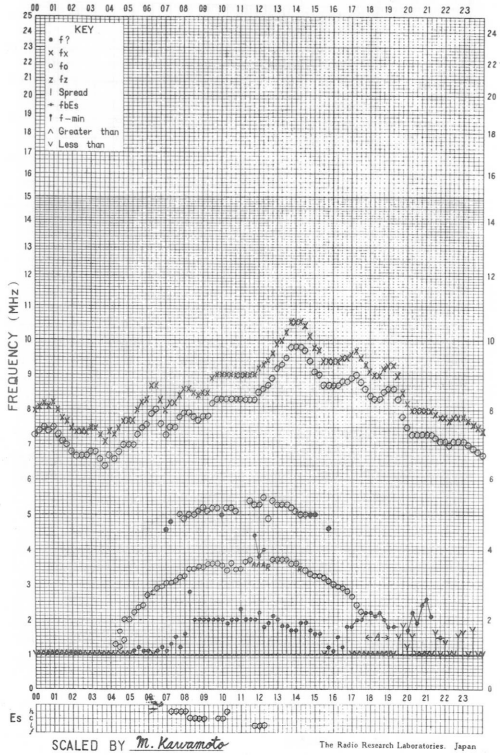

SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

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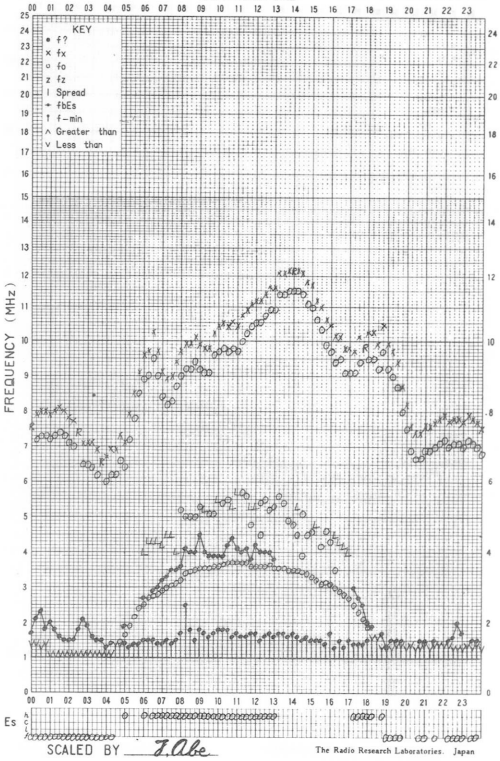

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The Radio Research Laboratories. Japan

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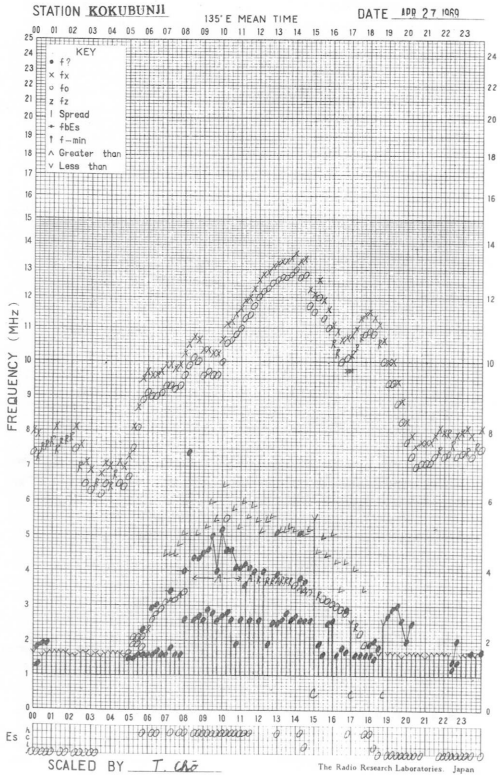

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The Radio Research Laboratories. Japan

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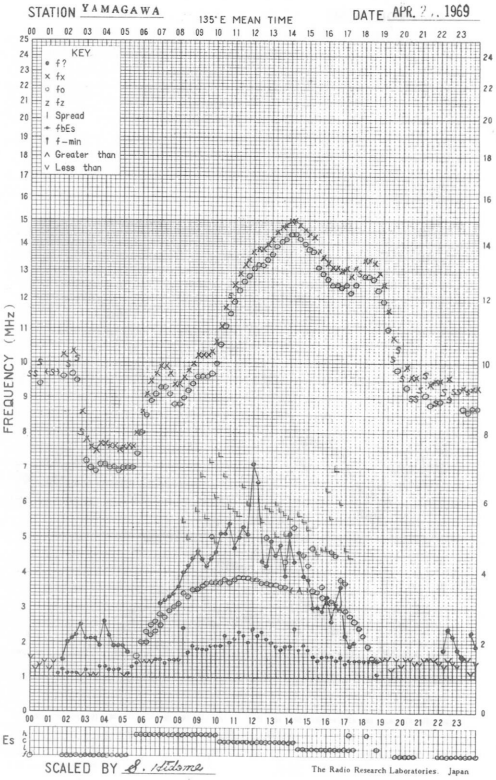

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The Radio Research Laboratories. Japan

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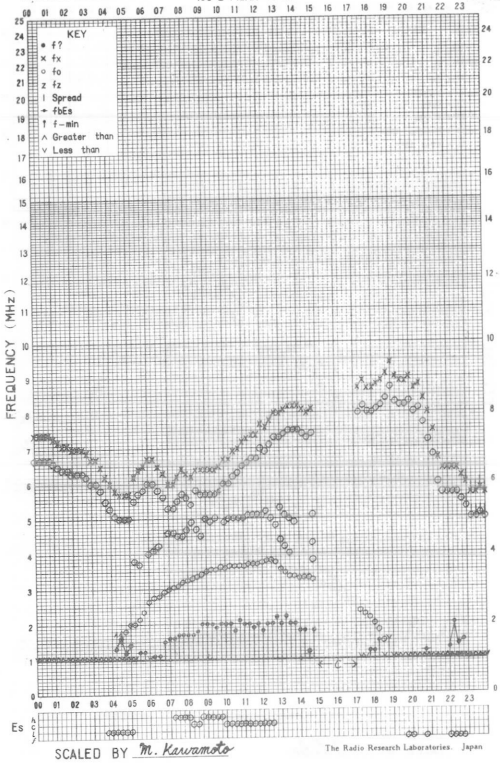

SCALED BY M. Kawamoto

The Radio Research Laboratories. Japan

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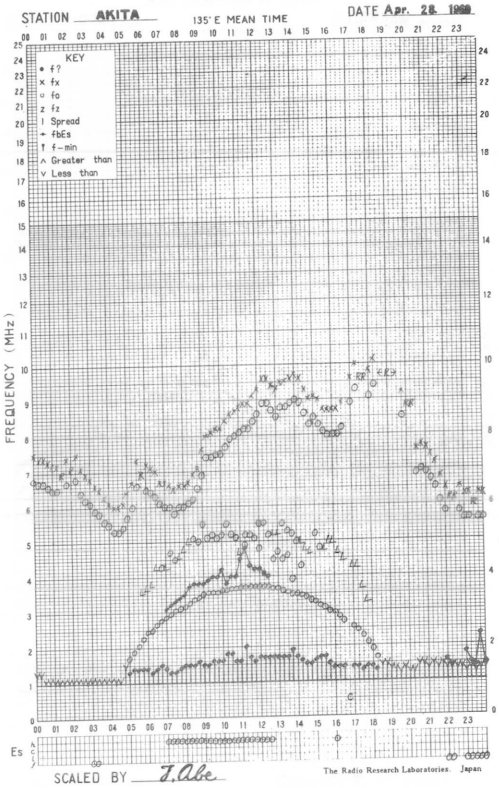

SCALED BY T. Abe

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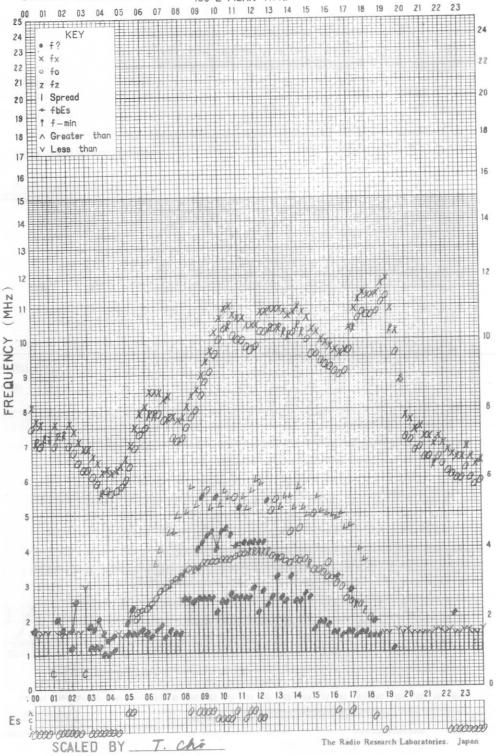

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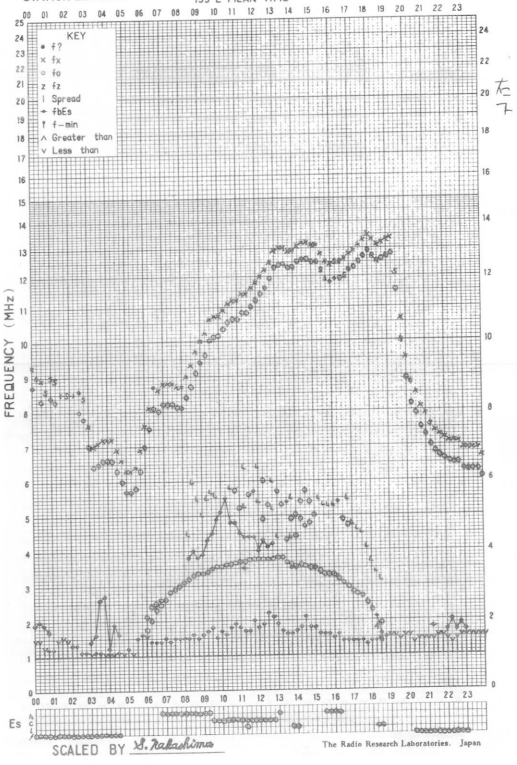

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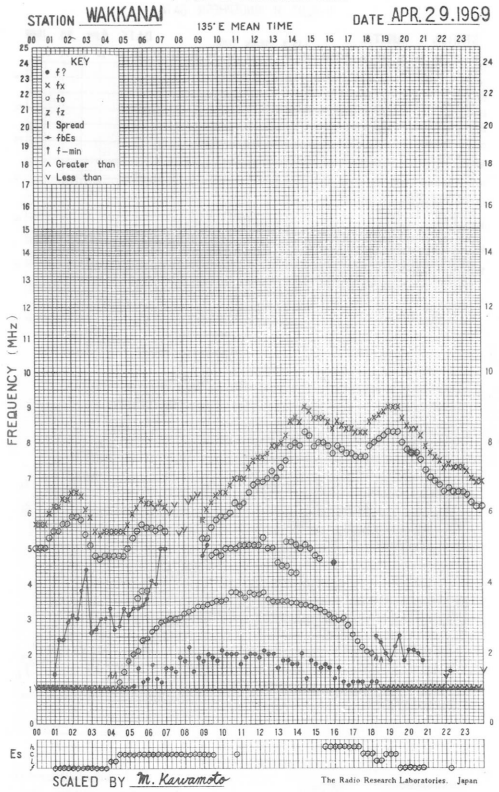

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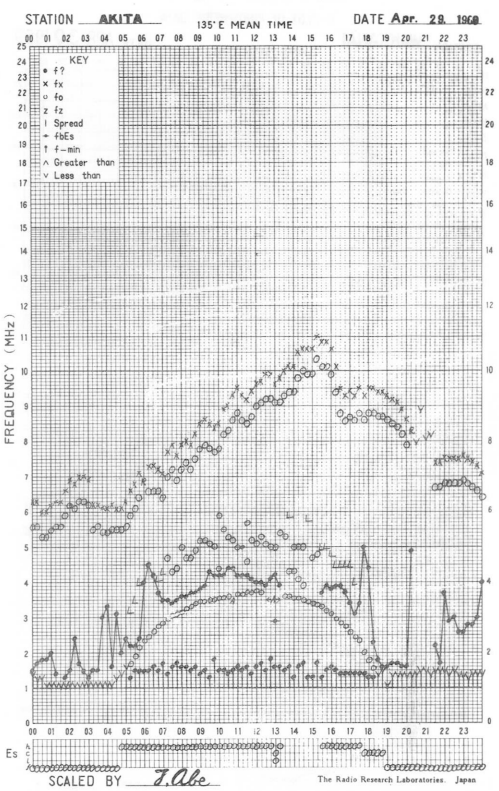
f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135° E MEAN TIME DATE Apr. 28. 1969

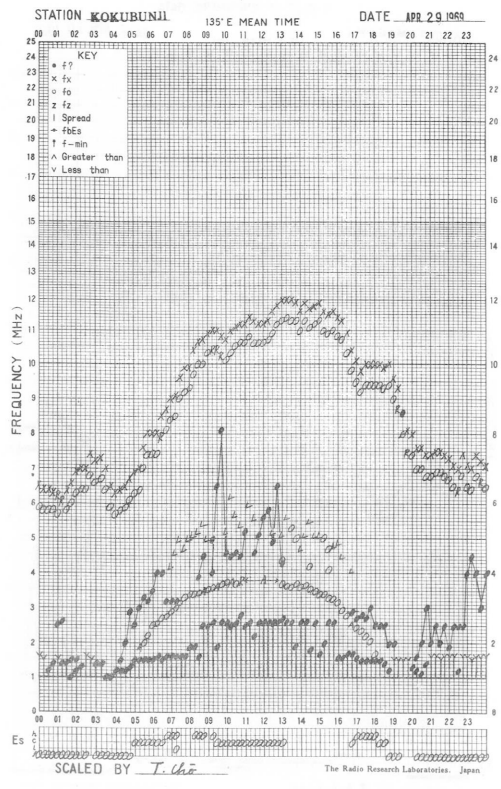


SCALED BY T. Abe

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135° E MEAN TIME DATE APR 29 1969

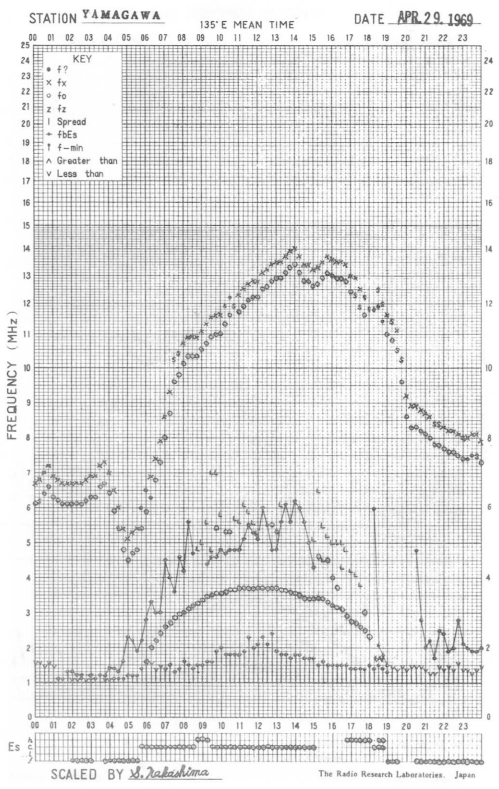


SCALED BY T. Ito

The Radio Research Laboratories. Japan

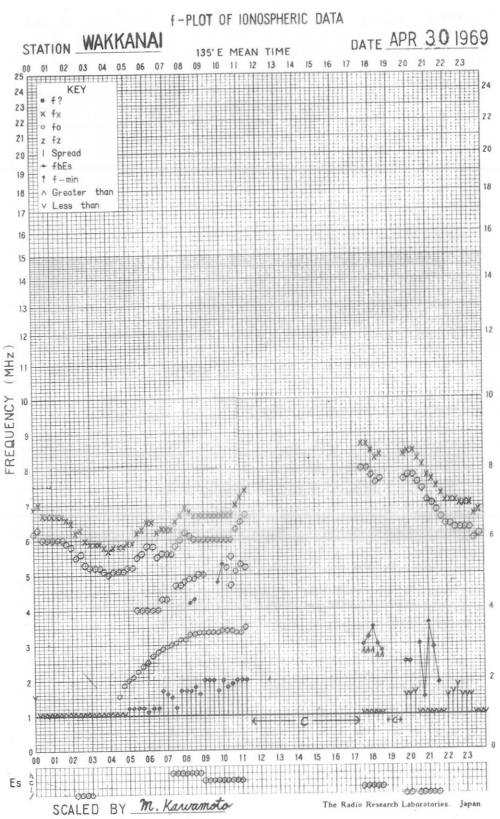
f-PLOT OF IONOSPHERIC DATA

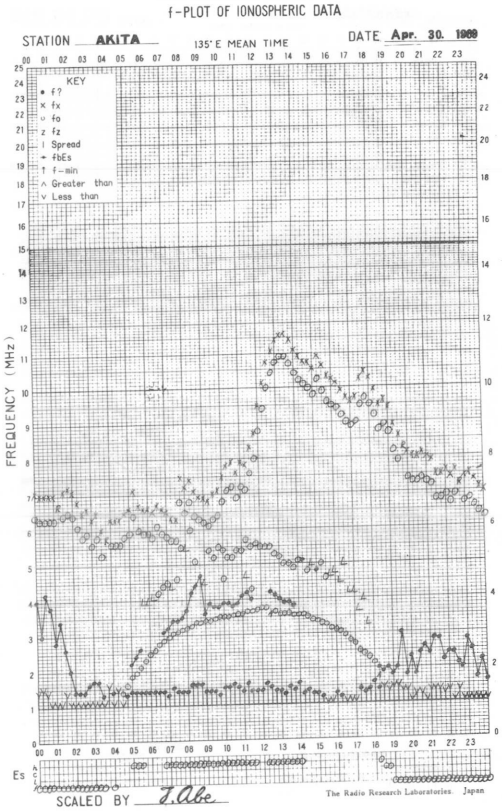
STATION YAMAGAWA 135° E MEAN TIME DATE APR. 29. 1969

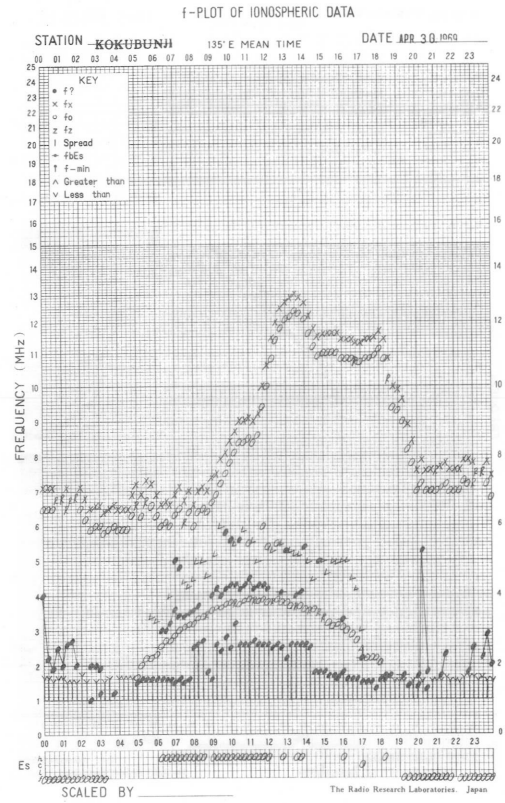


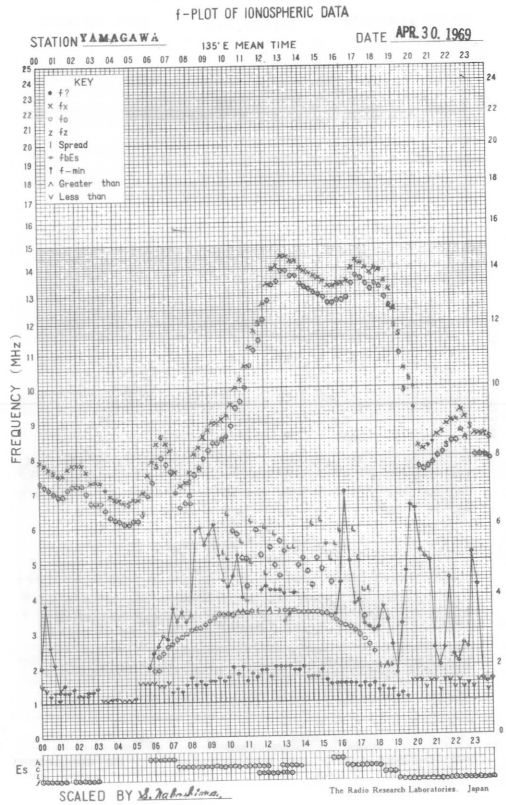
SCALED BY S. Nakashima

The Radio Research Laboratories. Japan


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


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


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


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

SOLAR RADIO EMISSION

Flux Density and Variability

Month: April 1969
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	6	7	6	7	0	0	1	0	0
2	6	6	6	6	6	0	0	0	0	0
3	6	7	7	7	6	0	0	0	0	0
4	7	7	7	7	7	0	0	1	0	0
5	6	6	6	8	6	0	0	0	0	0
6	8	8	10	8	8	0	0	1	1	0
7	7	7	7	7	7	1	0	1	0	1
8	7	6	7	7	7	1	0	1	0	0
9	6	6	6	7	6	0	1	1	0	1
10	7	7	7	7	7	1	1	0	0	0
11	7	7	6	7	7	0	0	0	0	0
12	6	6	6	6	6	0	0	0	0	0
13	6	6	6	7	6	0	0	1	0	0
14	6	6	6	7	6	1	0	0	0	0
15	6	6	6	7	6	0	0	1	1	0
16	7	8	9	7	7	1	1	1	0	1
17	7	6	6	6	7	1	0	0	0	0
18	6	6	6	5	6	0	0	1	0	0
19	6	7	6	7	6	0	0	0	0	0
20	7	7	6	7	7	0	0	0	0	0
21	9	7	8	8	8	1	1	1	0	1
22	7	7	6	7	7	0	0	0	0	0
23	6	6	6	6	7	0	0	0	0	0
24	6	6	6	-	6	0	0	0	-	0
25	6	6	6	6	6	0	0	0	0	0
26	6	6	6	6	6	0	0	0	0	0
27	6	6	6	9	6	0	1	1	1	0
28	7	7	6	6	7	0	0	1	0	0
29	6	6	5	6	6	0	0	0	0	0
30	6	5	6	5	6	0	0	0	0	0

Note No observations during the following periods:

23rd 0730- 0910
24th 2000- 2400
26th 0200- 0300
28th 0130- 0210

SOLAR RADIO EMISSION

Flux Density

Month: April 1969
Observing station: Hiraiso Frequency: 500 MHz

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

UT	00-03	03-06	06-09	21-24	Day
Date					
1	32	32	33	29	32
2	34	33	34	31	32
3	33	33	34	31	33
4	31	33	33	30	32
5	33	34	35	30	33
6	32	33	33	28	32
7	31	32	32	29	31
8	30	31	33	29	31
9	31	33	34	27	32
10	30	30	32	30	30
11	31	31	32	30	31
12	33	33	34	34	32
13	33	33	35	35	33
14	32	31	32	35	33
15	35	34	35	34	35
16	38	37	37	35	36
17	38	36	36	35	36
18	33	33	33	29	33
19	32	32	32	33	31
20	(36)	-	(33)	32	(34)
21	33	34	33	32	33
22	33	34	34	32	33
23	34	32	32	33	33
24	34	33	33	33	33
25	34	34	32	33	33
26	34	33	32	31	33
27	32	31	30	30	31
28	31	31	30	31	30
29	30	31	31	31	31
30	31	30	30	30	31

Note No observations during the following periods:

4th	2335-	5th	0020	19th	0135-		0220
8th	2000-		2135	20th	0100-		0700
9th	2000-		2135	21st	0830-		0910
14th	2325-	15th	0015	26th	0725-		0825
18th	2300-	19th	0015	27th	0625-		0705

Distinctive Events

(single-frequency observations)

Month: April 1969
Observing station: Hiraiso
Normal observing period: 2000 - 0910 (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	
10	500	0355.0	0408.5	27.0	C	120	20	
	200	0356.5	0357.8	13.0	C	780	70	
14	500	0232.0	0232.6	2.0	C	110	10	
	200	0233.0	0233.0	0.5	C	870	130	
26	500	2302.3	2303.0	28.0	C	450	20	
	200	2302.0	2307.0	13.0	C	2750	90	

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

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

MEASURED AT HIRAISO

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

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

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

MEASURED AT HIRAISO

UT DAY	00H 45M	01H 45M	02H 45M	03H 45M	04H 45M	05H 45M	06H 45M	07H 45M	08H 45M	09H 45M	10H 45M	11H 45M	12H 45M	13H 45M	14H 45M	15H 45M	16H 45M	17H 45M	18H 45M	19H 45M	20H 45M	21H 45M	22H 45M	23H 45M
1	ES -11	-12	-7	0	4	9	9	15	23	19	22	21	13	9	7	ES 2	ES -4	7	ES -31	-4	ES 13	-13	-9	ES -5
2	ES -8	-10	C	-2	8	13	16	17	24	24	21	12	8	17	-4	8	-9	24	-17	ES -5	ES 9	-11	ES -1	ES -8
3	ES -11	-13	-3	-1	8	12	16	13	14	20	27	24	3	ES 2	ES -4	ES 5	3	7	9	4	ES 14	1	-8	ES -10
4	ES 1	-3	-3	-1	10	12	11	21	25	26	26	22	16	8	9	-10	9	4	3	ES 0	ES 6	ES -6	ES 0	-3
5	ES -11	ES -9	ES -10	-7	3	3	8	10	8	14	27	23	23	17	ES 10	C	C	C	C	C	C	C	C	C
6	C	C	C	11	14	26	24	27	26	26	25	23	20	14	C	C	C	C	C	C	C	C	C	C
7	-8	ES -8	-7	1	6	14	18	22	19	23	23	22	18	21	10	3	4	8	-6	0	3	ES 11	ES -1	-7
8	-8	-11	-3	-1	15	13	18	16	18	18	-51	28	20	19	ES 11	ES -11	3	18	8	3	5	0	-5	-4
9	-6	-7	-2	-6	11	18	10	16	22	24	20	22	6	ES 20	S	C	C	C	C	C	C	C	C	C
10	-7	1	-6	-11	4	13	11	23	12	6	21	20	1	13	12	-10	-9	1	ES -5	-4	-6	ES 11	ES -3	ES -4
11	-14	ES -14	-9	-8	0	1	18	16	9	21	23	26	19	21	6	22	24	7	4	2	-3	4	ES -24	ES -24
12	ES -9	ES -14	ES -9	ES -8	5	12	17	18	13	25	26	22	17	7	ES 7	ES 3	19	13	-1	1	3	-1	-9	ES -2
13	ES -3	ES -12	ES -15	ES -16	4	8	21	15	17	27	18	23	7	1	ES 9	-20	-16	13	3	4	-7	-12	ES -13	ES 5
14	ES -10	-14	-5	-7	5	13	9	16	26	24	23	14	ES 4	8	ES -5	ES 6	17	7	1	ES -2	-8	ES -10	ES -6	ES -5
15	ES -9	ES -7	ES -7	C	C	C	C	C	17	23	22	25	16	11	12	13	19	8	0	-3	-4	-10	-7	ES -7
16	ES -22	ES -20	ES -22	-8	4	8	9	18	19	17	18	24	17	6	-3	4	13	5	-17	0	-15	-12	-2	-10
17	ES -12	-14	-14	-6	4	7	13	15	15	17	23	21	11	6	9	12	18	6	2	-10	-11	-17	-12	ES -29
18	-13	ES -28	-13	2	7	10	14	18	18	21	21	17	14	5	-9	1	3	4	-11	-4	-3	ES 0	-11	S
19	-11	-14	-11	-6	5	13	14	14	17	18	24	19	14	9	3	8	8	13	ES 3	ES 1	ES -20	ES -11	ES -11	ES -22
20	ES -32	ES -15	-22	-8	13	8	12	13	14	23	23	17	12	4	9	23	14	13	-8	-7	-15	-12	ES -14	ES -7
21	ES -8	-28	-14	-7	5	13	15	22	25	15	22	22	17	20	20	3	22	9	11	1	ES -30	-19	ES -17	ES -18
22	ES -10	-18	-10	-8	5	8	14	15	20	18	20	14	13	14	12	19	11	17	8	3	-1	ES -22	ES -17	ES -14
23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
26	C	C	C	-7	6	C	9	22	14	19	21	24	18	8	-10	5	7	24	-12	-6	-3	-5	-10	ES -16
27	-14	-12	-10	-4	-3	-3	7	-43	15	15	15	12	7	10	-1	-11	8	18	2	-7	-5	-3	-5	-11
28	ES -28	-22	-12	-13	3	3	6	11	24	13	25	25	8	13	13	20	12	8	12	13	7	-7	ES -10	-5
29	ES -12	-10	-6	-1	5	9	8	14	16	13	18	15	5	12	5	-10	6	ES -16	ES -28	4	-8	-5	-13	ES -6
30	-13	ES -15	-12	4	5	7	7	12	14	13	15	25	14	11	7	2	19	7	-1	-11	-14	-31	ES -22	ES -32
CNT	25	25	24	26	26	25	26	26	27	27	27	27	27	27	25	24	24	24	24	24	24	24	24	23
MED	ES -11	ES -13	ES -10	-6	5	10	12	16	17	19	22	22	14	US 11	ES 7	ES 4	8	8	US 0	ES 0	ES -4	ES -8	ES -10	ES -7
UD	ES -6	-7	-3	2	13	14	18	22	25	26	26	25	20	20	12	22	22	24	11	4	ES 13	ES 11	ES -1	ES -2
LD	ES -22	ES -22	ES -22	ES -11	3	3	7	11	12	13	15	14	ES 4	ES 4	ES -5	ES -11	ES -9	1	ES -28	ES -10	ES -20	ES -22	ES -22	ES -29

RADIO PROPAGATION QUALITY FIGURES

HIRAISO

Time in U.T.

Apr. 1969	Whole Day Index	H B 06 12 18 / 12 18 24	W W V 00 06 12 18 / 06 12 18 24	L M 00 06 12 18 / 06 12 18 24	W W V H 00 06 12 18 / 06 12 18 24	Warning 00 06 12 18 / 06 12 18 24	Principal magnetic storms Start	End	ΔH
1 △	4o	4 4 (4)	4 4 4 4	4 4 - 4	- 4 4 -	N N N N			
2 △	4o	4 4 (4)	4 5 C (4)	4 (4) - 4	- (4)(4) -	N N N N			
3 △	4o	4 5 4	4 4 4 4	4 (3) - 4	- 4 4 -	N N N N			
4	4o	4 4 4	4 4 4 4	4 4 - 4	- 4 4 -	N N N N			
5	4o	4 4 4	4 4 4 4	4 5 - -	- 4 4 -	N N N N			
6	5-	5 5 4	5 5 5 4	(4) - - -	- 5 4 -	N N N N			
7	4+	4 4 4	4 5 4 4	4 (5) - 4	- 5 4 -	N N N N			
8	4+	5 5 4	4 4 4 4	4 4 - 4	- 4 4 -	N N N N			
9	4o	4 4 3	4 4 (4) 4	4 5 - 4	- 4 5 -	N N N N			
10	4o	4 4 4	4 4 4 4	4 4 - 4	- 4 4 -	N N N N			
11	4o	4 4 4	4 4 4 4	4 4 - 4	- 4 4 -	N N N N			
12 △	4-	4 4 4	3 3 (3) 4	4 4 - -	- 4 4 -	N N N N	20.45	---	108γ
13 *△	4-	4 3 3	4 4 (4) 4	(4) - - -	- 4 (3) -	N N N N	---	---	
14 *△	4-	4 4 3	(3) 3 4 4	4 4 - (4)	- 4 4 -	N N N N	---	10xx	
(15) △	4-	3 4 4	(4) 4 4 4	4 (3) - 4	- 4 4 -	N N N N			
(16) △	3+	3 3 4	3 4 3 3	3 4 - 4	- 4 4 -	N N N N			
(17) △	4-	4 3 4	3 4 4 3	4 (4) - C	- 4 4 -	N N N N			
18	4-	4 4 4	3 3 4 (4)	4 4 - 4	- 4 4 -	N N N N			
19	4o	4 5 4	4 4 4 4	4 (4) - -	- 4 5 -	N N N N			
20	4+	5 5 4	4 5 4 4	(3) - - -	- 4 5 -	N N N N			
21	5-	5 5 4	5 5 5 5	4 (5) - 4	- 5 4 -	N N N N			
22	4o	5 4 4	5 4 4 3	4 (5) - 3	- 4 5 -	N N N N			
23	4-	3 4 4	(3) C C (4)	4 (4) - 4	- C C -	N N N N			
24	4o	3 4 4	(4) C C (4)	(4)(4) - 4	- C C -	N N N N			
25	4o	4 4 4	(4) C C (3)	4 (4) - 4	- C C -	N N N N			
26	4o	5 5 4	(3) 4 4 (4)	4 (4) - -	- 4 4 -	N N N N			
27	4-	4 4 4	4 4 (3) 3	(4) - - -	- 4 3 -	N N N N	18.32	---	167γ
28 *△	3+	4 3 4	(3) 3 3 2	4 (4) - 2	- 4 4 -	N U U U	---	---	
29 *△	3+	5 5 4	2 3 3 3	3 (4) - 3	- 4 3 -	U N N N	---	24xx	
30	3o	3 4 3	3 4 3 (2)	3 (3) - 3	- 4 4 -	N N N N			

IQSY GEOALERT and ADALERT (Western Pacific Region)

* = MAGSTORM

o = MAGCALME

△ = COSMIC EVENT

( ) = Regular World Day

\- = impossible to evaluate

( ) = inaccurate

C = artificial accident

--- = continuing magnetic storm

SUDDEN IONOSPHERIC DISTURBANCES

(S.I.D.)

HIRAISO

Time in U.T.

Apr. 1969	S W F										Correspondence		
	Drop-out Intensities (db)						Start-time	Dura-tion	Type	Imp.	Flare	Solar Noise	Mag.
	CO	LM	HA	TO	HB	SH							
10	>40	20	>30	15			03.58	22	S	3+	x	x	
	-"												
	-'												
21	15"	38					20.09	59	S	3-	x		
24		24					03.08	24	Slow	2-	x	x	
26	18				20		23.03	17	S	2-	x	x	x

IONOSPHERIC DATA IN JAPAN FOR APRIL 1969
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