F−337

IONOSPHERIC DATA IN JAPAN

FOR JANUARY 1977

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CONTENTS

RADIO RESEARCH LABORATORIES
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INTRODUCTION

This Series contains data on ionosphere (I), solar radio emission (S) and radio propagation (P) obtained at the following stations under the Radio Research Laboratories, Ministry of Posts and Telecommunications of Japan.

Station	Geographic		Geomagnetic		Technical Method
	Latitude	Longitude	Latitude	Longitude	
Wakkanai	45°23.6'N	141°41.1'E	35.3°N	206.0	Vertical Sounding (I)
Akita	39°43.5'N	140°08.2'E	29.5°N	205.4	" (I)
Kokubunji	35°42.4'N	139°29.3'E	25.4°N	205.4	" (I)
Yamagawa	31°12.1'N	130°37.1'E	20.3°N	197.8	" (I)
Hiraiso	36°22.0'N	140°37.5'E	26.2°N	206.3	Radio Receiving (S, P)
Inubo	35°42.2'N	140°51.5'E	26.0°N	206.8	" (P)

A. IONOSPHERE

Ionospheric observations are carried out at five stations in Japan by means of vertical sounding method.

The published data consist of tabulations of hourly values of the ionospheric characteristics and figures of daily *f*-plot.

All symbols and terminology in the tables or figures of ionospheric data are used in accordance with the "URSI Handbook of Ionogram Interpretation and Reduction (Second Edition) 1972".

a. Characteristics of Ionosphere

fxI — Top frequency of spread *F* trace

foF2, *foF1*, *foE*, *foEs* — Ordinary wave critical frequency for the *F2*, *F1*, *E* and *Es* including particle *E* layers respectively

fbEs — Blanketing frequency of the *Es* layer, e.g. the lowest ordinary wave frequency visible through *Es*

fmin — Lowest frequency which shows vertical ionospheric reflections

M(3000)F2, *M(3000)F1* — Maximum usable frequency factor for a path of 3000 km for transmission by *F2* and *F1* layers respectively

h'F2, *h'F*, *h'E*, *h'Es* — Minimum virtual height on the ordinary wave for the *F2*, whole *F*, *E* and *Es* layers respectively

Types of *Es* — See below A. b. (iii)

b. Symbols

(i) 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 *fmin*.

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 in use.

E Measurement influenced by, or impossible because of, the lower limit of the normal frequency range in use.

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.

K Presence of particle *E* layer.

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.

P Man-made perturebation of parameters-Presence of polar spure traces.

Q Range spread present.

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 Lacuna phenomena, severe layer tilt.

Z Third magneto-electronic component present.

(ii) Qualifying Letters

The following letters are entered in the first column before a numerical value on the monthly tabulation sheets.

A Less than. Used only when *fbEs* is deduced from *foEs* because total blanketing of higher layer is present.

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.

M Mode interpretation uncertain.

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-electronic component.

(iii) Description of Types of *Es*

When more than one type of *Es* trace is present on the ionogram, the type for the trace used to determine *foEs* must be written first. The number of multiple traces is indicated after the type letter.

The types are:

f An *Es* trace which shows no appreciable increase of height with frequency.

l A flat *Es* trace at or below normal *E* layer minimum virtual height or below the particle *E* layer minimum virtual height.

c An *Es* trace showing a relatively symmetrical cusp at or below *foE*. (Usually a daytime type.)

h An *Es* trace showing a discontinuity in height with the normal *E* layer trace at or above *foE*. 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.

r An *Es* trace showing an increase in virtual height at the high frequency end similar to group retardation.

a An *Es* trace having a well-defined flat or gradually rising lower edge with stratified and

diffuse traces present above it.

s A diffuse *Es* trace which rises steadily with frequency and usually emerges from another type *Es* trace.

d A weak diffuse trace at heights below 95 km associated with high absorption and large *fmin*.

n The designation 'n' is used to denote an *Es* trace which cannot be classified into one of the standard types.

k The designation k is used to show the presence of particle *E*. When *foEs*>*foE* (particle *E*) the *Es* type precedes k.

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.

B. SOLAR RADIO EMISSION

Solar radio observations are carried out on 100, 200 and 500 MHz at Hiraiso. Observation equipments are: a 5 meter parabolic reflector with a total-power receiver for 500 MHz and a 10 meter parabolic reflector with two polarimeters for 100 and 200 MHz. Observations are feasible almost from sunrise to sunset.

Time is expressed in hours, minutes and tenths of minutes U. T. and the unit of flux density is 10^{-22} Wm^{-2} Hz^{-1} for both components of polarization.

All symbols and terminology in the table of data are used in accordance with the "Descriptive Text of Solar-Geophysical Data, NOAA" and "Instruction Manual Monthly Report for Solar Radio Emission, WDC-C2".

a. 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 mean flux level is counted.

Daily data with parenthesis mean that observation time does not exceed one third of the period.

b. Outstanding Occurrences

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.

Type is denoted by numerical code and letter symbol in parallel as follows:

SGD Cord	Letter Symbol	Morphological Classification
1	S	Simple 1
2	S/F	Simple 1F
3	S	Simple 2
4	S/F	Simple 2F
5	S	Simple
6	S	Minor
7	C	Minor+
8	S	Spike
20	GRF	Simple 3
21	GRF	Simple 3A
22	GRF	Simple 3F
23	GRF	Simple 3AF
24	R	Rise
25	R	Rise A
26	FAL	Fall
27	RF	Rise and Fall
28	PRE	Precursor
29	PBI	Post Burst Increase
30	PBI	Post Burst Increase A
31	ABS	Post Burst Decrease
32	ABS	Absorption
40	F	Fluctuations
41	F	Group of Bursts
42	SER	Series of Bursts
43	NS	Onset of Noise Storm
44	NS	Noise Storm in progress
45	C	Complex
46	C	Complex F
47	GB	Great Burst
48	C	Major
49	GB	Major+

Flux density is the increase of flux over the level at which daily flux is calculated, or the increase of flux over the underlying burst when the event is superposed on another burst of long duration.

Polarization is expressed by the polarization degree and sence as follows:

R or L	right- or left-handed polarization,
W, M or S	weak, moderate or strong polarization,
0	almost zero or unable to detect polarization deu to small increase of flux.
00	polarization degree of less than 1 percent.

The following symbols may be attached after numerical values in table, if necessary.

D	greater than, or later than,
E	less than, or earlier than,
U	approximate, or uncertain.

C. RADIO PROPAGATION

a. Measurement of H. F. Field Strength

Field strength observation of 15 MHz standard waves transmitted from WWV and WWVH stations which are located respectively at Fort Collins, Colorado and Kauai, Hawaii, is carried out at Hiraiso. In order to avoid interference among the same frequency waves, the upper side-band of WWV or WWVH with the audio tone 600 Hz is picked up by the use of a narrow band pass filter with 80 Hz band width. Particulars of the transmitters and the receiver are summarized in the following table.

Characteristics	Transmitter		Receiver
Station Call	WWV	WWVH	
Location	Fort Collins, Colorado	Kauai, Hawaii	Hiraiso, Ibaraki
latitude	40°41'N	22°00'N	36°22'N
longitude	105°02'W	159°46'W	140°38'E
Distance	9150 km	5910 km	-
Carrier Power	10 kW	10 kW	-
Modulation	50 %	50 %	-
Antenna	λ /2 vertical	λ /2 vertical	4.5 m vertical rod
Bandwidth	-	-	80 Hz for upper side-band
Calibration	-	-	Every an hour

The tabulated *field strength* in dB above one microvolt per meter is the peak average of the incident upper side-band field intensity in 45 seconds after the universal time indicated on the table. Abbreviated symbols are as follows:

CNT	number of observed values,
MED	median,
UD	value of the uppermost decile when they are ranked according to magnitude,
LD	value of the lowest decile when they are ranked according to magnitude,
U	uncertain,
E	less than,
C	influenced by, or impossible because of, any artificial accident,
S	influenced by, or impossible because of, interferences or atmospherics.

b. Radio Propagation Quality Figures

The tabulated six-hourly quality figures are calculated for standard waves WWV transmitted from Fort Collins and standard waves WWVH transmitted from Kauai.

Quality figures expressing radio propagation conditions are ranged over five grades as follows:

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

Whole day quality figure ranged in grades of 1_0, 1+, 2-, 2_0, 2+, 3-, 3_0, 3+, 4-, 4_0, 4+, 5-, 5_0 stands for an average of six-hourly ones of the two circuits. Abbreviated symbols are as follows:

C	artificial accident,
S	propagational accident,
U	inaccurate.

Radio propagation conditions which can be described with a code in the following

N	normal,
U	unstable,
W	disturbed

are forecast 12 hours in advance and broadcast twice per an hour from JJY Station.

Data on a *geomagnetic storm* correlated with a radio propagation disturbance are tabulated from observation at Kakioka Magnetic Observatory, Japan Meteorological Agency. *Time* (U.T.) is expressed in unit of hour and minute (or tenth of hour), and *range* in gamma. When they are uncertain quantitatively, /'s are replaced with them. Continuation of a geomagnetic storm is denoted by ---.

c. Sudden Ionospheric Disturbances

(i) SWF

The table of short wave fade-out (SWF) is prepared from the record of field intensities measured at Hiraiso.

Drop-out intensities of the 10 MHz, the 20 MHz, and the 25 MHz waves are respectively distinguished by marks ', '' and ''' from these of the 15 MHz wave for WWV and WWVH. Values of *start*, *duration*, *type*, and *importance* are obtained from data of the circuit whose drop-out intensity in dB is underlined as xx. When these quantities are not given correctly, they are accompanied by the following symbols.

D	greater than,
E	less than,
U	uncertain or doubtful.

Types of fade-out are as follows:

S	sudden drop-out and gradual recovery,
SL	slow drop-out taking 5 to 15 minutes and gradual recovery,
G	gradual and irregular in both drop-out and recovery.

Importance of fade-out is scaled according to its amplitude into nine ascending grades as 1-, 1, 1+, 2-, 2, 2+, 3-, 3, 3+.

Correspondence of solar optical flare, solar radio burst, and geomagnetic crochet to SWF is marked by X in accordance with interchange messages of IUWDS and observations at Hiraiso.

(ii) SPA

Data of sudden phase anomaly (SPA) are prepared from the records of phase measurement of VLF radio waves received at Inubo. The transmitting stations are listed in the following table.

Phase advance is shown in unit of degree at its maximum stage. No transmission or no reception during the period is indicated by —, and indistinguishable record is spaced out, and multi-peak event is marked by *.

Out of more than two circuits on which the same SPA event is observed, the *phase advance* on the circuit on which the SPA is the most remarkable or distinct is underlined. As for the underlined, *phase advance*, *start*, *end* and *maximum* times are obtained.

In table (i) SWF and (II) SPA, *date* indicates the day to which *start-time* of event belongs.

The following letters may be attached to the value, if necessary.

D	greater than,
E	less than,
U	uncertain or doubtful.

Transmitting Stations

Name	Location (Geographic Coordinate)		Call Sign	Frequency (kHz)	Radiation Power (kW)	Arc Distance from Inubo (km)
Rugby	52°22'N	001°11'W	GBR	16.0	40	9550
Cutler	44°38'N	067°17'W	NAA	17.8	1000	10640
Jim Creek	48°12'N	121°55'W	NPG	18.6	250	7620
North West Cape	21°48'S	114°09'E	NWC	22.3	1000	6990
Aldra	66°25'N	013°08'E	AL3	13.6	10	7820
Reunion	20°58'S	055°17'E	RE3	13.6	10	10970
North Dakota	46°22'N	098°20'W	ND3	13.6	10	9140
Haiku	21°24'N	157°50'W	HA3	13.6	10	6100

IONOSPHERIC DATA

JAN. 1977 | FXI (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	x 40	x 40	x 40	x 52	52	33	38	x 47									x 57	A	A	A	x 36	x 40	x 40	x 36
2	x 39	x 35	x 34	x 36	x 37	x 30	x 34	x 48									x 53	x 49	x 39	x 33	35	41	40	38
3	37	C	x 38	S 42	x 46	x 39	x 37	x 42									x 55	x 43	x 36	x 37	F 40	C	C	x 39
4	x 42	x 42	x 41	x 41	x 48	x 46	x 36	x 40									x 49	x 39	x 43	x 38	S 44	C	43	40
5	41	50	S	x 35	33	34	34	x 42									x 55	x 42	x 38	A	A	38	38	40
6	39	x 36	x 37	x 40	35	30	x 34	x 41									x 52	x 48	A	47	C	C	63	C
7	60	C	C	C	55	58	60	x 60									x 47	A	x 44	x 47	x 42	43	41	46
8	41	44	43	40	46	x 40	x 42	x 42										x 44	A	x 30	x 33	x 37	C	x 39
9	C	x 35	C	S	x 40	x 34	x 27	x 36										x 40	x 37	x 37	x 33	x 35	37	37
10	36	37	44	x 44	x 41	x 39	x 29	x 41										x 45	x 46	x 40	x 43	C	x 46	C
11	C	C	x 40	x 42	x 46	37	x 30	x 39										x 43	x 42	x 43	S	x 53	x 48	C
12	x 51	x 52	x 50	C	50	42	43	x 46										x 40	x 41	x 37	x 40	x 44	C	x 40
13	C	C	C	x 39	C	C	x 30	x 39										x 47	x 37	x 31	x 37	x 42	x 45	x 44
14	x 47	x 48	x 47	43	45	x 40	A	A										x 38	x 39	x 40	x 35	x 36	40	36
15	38	34	x 39	x 47	43	34	x 27	x 38										x 45	x 38	x 32	x 38	x 43	x 45	38
16	40	41	42	42	44	39	x 33	x 40										x 42	A	x 35	x 33	x 38	C	41
17	41	40	39	43	41	35	x 30	x 40										x 44	x 43	x 34	x 32	x 37	x 39	x 41
18	x 40	x 35	x 35	x 35	x 37	x 36	x 30	x 42										x 47	x 40	x 41	x 38	x 32	x 37	x 41
19	x 38	x 35	x 40	S 42	x 44	x 41	x 40	S 47										x 40	A	x 33	x 33	x 38	x 39	x 40
20	x 38	x 35	x 36	x 35	x 40	x 41	x 38	x 50										x 55	A	x 41	x 34	x 39	x 44	x 45
21	x 42	x 44	x 42	x 42	x 49	x 38	x 31	x 44										A	x 44	x 43	x 34	A	x 40	x 40
22	C	x 39	x 40	x 40	x 41	x 48	x 30	x 43										x 41	x 35	x 40	x 33	x 35	C	x 36
23	x 37	x 36	x 40	x 39	x 32	x 34	x 30	x 43										x 36	x 35	x 35	x 33	x 35	x 38	x 40
24	x 40	x 39	x 37	x 39	x 39	x 39	x 37	x 49										x 42	x 37	x 40	x 35	x 34	x 37	x 39
25	x 37	x 37	x 37	x 38	x 42	x 35	x 38	x 47										x 40	x 37	x 42	x 43	x 40	x 43	x 41
26	43	42	42	x 43	x 47	x 30	C	x 41										x 43	x 37	x 37	x 39	x 42	x 43	x 43
27	x 44	x 47	x 46	x 46	x 42	x 41	x 36	x 44										x 38	x 37	x 40	S	x 44	x 42	x 42
28	x 43	x 44	x 43	x 41	x 40	x 40	x 41											x 56	x 34	x 38	x 39	x 43	x 41	x 44
29	x 47	x 42	x 42	C	x 42	x 45	x 41											x 54	x 57	x 63	x 48	x 40	x 50	x 50
30	x 49	x 49	x 47	x 49	x 44	x 43	x 33											x 53	A	A	x 40	x 42	x 40	x 39
31	x 38	x 40	x 38	A	x 38	x 34	A											x 61	x 51	x 40	x 40	x 42	x 44	x 41
	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	26	30	30	28	26									7	28	24	28	27	26	26	28
MED	x 40	x 40	x 40	x 42	x 42	x 39	x 34	x 42									x 53	x 43	x 38	x 39	x 37	x 40	x 41	x 40
UQ	x 43	x 44	x 42	x 43	x 46	x 41	x 38	x 47									x 55	x 48	x 43	x 41	x 40	x 42	x 44	x 42
LQ	x 38	x 36	x 38	x 39	x 40	x 34	x 30	x 40									x 50	x 40	x 37	x 35	x 34	x 37	x 39	x 39

The Radio Research Laboratories, Japan

JAN. 1977 | FXI (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1977 | FOF2 (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	33	33	33	45	F	F 23	F	40	49	73	77	65	H 55	67	57	56	50	A	A	A	29	33	33	29
2	32	28	27	29	30	23	27	41	56	73	61	60	64	63	53	43	46	42	32	26	F 25	F 32	F	F 27
3	F 30	C	31	S 35	39	32	30	35	59	77	70	69	60	63	61	50	48	36	29	30	F 33	C	C	32
4	35	35	34	34	41	39	29	33	52	68	58	67	54	53	A	A	42	32	36	31	S 37	C	F	F 33
5	F	F 43	S	28	F 22	F 25	F	35	68	97	86	66	63	56	C	50	48	35	31	A	A	F	F 28	F 30
6	F 30	29	30	33	F 25	F 23	27	34	57	55	72	65	66	63	57	52	45	41	A	U F 37	C	C	F	C
7	F	C	C	C	F 42	F	F 53	53	65	63	70	73	63	63	53	48	40	A	37	40	35	F 33	F	F 36
8	F	F 34	F	F	F	33	35	35	56	68	82	84	60	53	50	51	40	37	A	23	26	30	I C 32	32
9	C	28	C	S	33	27	21	29	47	C	65	60	56	57	54	50	47	33	30	30	26	28	F	F
10	F 29	F 28	F 35	37	34	32	22	34	50	63	70	61	62	59	47	43	43	38	39	33	36	C	39	C
11	C	C	33	35	39	F 27	23	32	48	57	58	62	54	65	57	46	46	36	35	36	S	46	41	I C 43
12	44	45	43	C	F	F	F	39	53	67	85	77	63	63	56	50	40	33	34	30	33	37	C	33
13	C	C	C	32	C	C	23	32	C	C	59	62	56	53	55	48	38	40	30	24	30	35	38	37
14	40	41	40	F 34	F 38	33	A	A	50	62	69	63	54	60	54	43	43	31	32	33	28	29	F	F
15	F 28	F	32	40	F	F 25	20	31	60	C	52	70	54	63	67	52	46	38	31	25	31	36	38	F
16	F 33	F	F 33	F 31	F	F	26	33	46	60	61	60	55	63	59	49	40	35	A	28	26	31	C	F 30
17	F 30	F 30	F 30	F 34	F 32	F 28	23	33	51	58	59	63	63	54	54	47	41	37	36	27	25	30	32	34
18	33	28	28	28	30	29	23	35	49	56	55	58	72	60	65	51	45	40	33	34	31	25	30	34
19	31	28	33	S 35	37	34	33	S 40	61	63	67	61	56	53	50	50	40	33	A	26	26	31	32	33
20	31	28	29	28	33	34	31	43	53	C	64	65	61	61	59	56	49	48	A	34	27	32	37	38
21	35	37	35	35	42	31	24	37	55	69	67	91	69	62	52	54	34	A	37	36	27	A	33	33
22	C	32	33	33	34	41	23	36	49	57	63	67	65	60	56	50	46	34	28	33	26	26	I C 29	29
23	30	29	33	32	25	27	23	36	50	56	75	73	65	57	59	55	C	29	28	28	26	28	31	33
24	33	32	30	32	32	32	30	42	47	53	64	76	69	55	50	57	52	35	30	33	28	27	30	32
25	30	30	30	31	35	28	31	40	57	58	61	70	59	54	60	63	46	33	30	35	36	33	36	34
26	F 33	F	F	36	40	23	C	34	57	69	68	81	H 66	69	60	54	56	36	30	30	32	35	36	36
27	37	40	39	39	35	34	29	37	46	53	58	67	76	64	62	59	52	31	30	33	S	37	35	35
28	36	37	36	34	33	33	34	39	56	60	64	69	60	63	62	56	53	50	27	31	32	36	34	37
29	40	35	35	C	35	38	34	44	50	65	71	60	91	58	56	57	58	47	50	56	41	33	43	43
30	42	42	40	42	37	36	26	43	54	61	67	76	67	C	59	73	60	46	A	A	33	35	33	32
31	31	33	31	A	31	27	A	39	45	82	83	76	77	66	60	64	56	54	44	33	33	35	37	34
	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	24	24	25	25	25	27	25	30	30	27	31	31	31	30	29	30	30	28	24	28	27	25	22	26
MED	33	32	33	34	34	31	27	36	52	63	67	67	63	60	57	51	46	36	32	32	30	33	34	33
UQ	36	37	35	35	38	34	31	40	57	68	70	73	66	63	60	56	50	40	36	34	33	35	37	36
LQ	30	28	30	32	32	27	23	34	49	58	61	62	56	56	54	49	41	33	30	28	26	30	32	32

The Radio Research Laboratories, Japan

JAN. 1977 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1977 | FOF1 (0.01 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											A	L												
2											A													
3											L	U L 400												
4												L	A											
5										L	370	380	350											
6													B	A										
7											U L 370	390	L											
8											U L 380	390	380											
9											L	390	L 380											
10											L	L 400	380	350										
11												U L 380	380											
12											L	L	L											
13												L 400	L 380											
14											380	380	L 360											
15												U L 370												
16												L 380	A											
17											L	L	L	L 380										
18													L	L										
19														L										
20											L		400											
21											L	L 410	L											
22												400	380	L 360										
23												L 400	390	L 370										
24												400	L 400											
25											L	L 400	L											
26											L		400	L										
27												L	L	L 400										
28												L 400	L	L										
29													400											
30												400	L 400	C	360									
31											L	L	L 400	B										
	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	18	15	5	1									
MED											375	L 400	380	L 370	360									
UQ											380	L 400	400	L 380										
LQ											370	380	380	L 360										

JAN. 1977 | FOF1 (0.01 MHZ)

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

JAN. 1977 | FOE (0.01 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									S	B	A	B	B	B	B	S								
2									S	210	A	A	A	A	A	A								
3									195	220	245	A	265	260	240	200								
4									190	225	245	255	235	250	210	S								
5									A	205	230	245	240	250	C	S								
6									B	B	B	B	B	B	B	B								
7									S	225	245	250	260	240	215	A								
8									A	215	245	255	250	245	230	200	S							
9									200	230	255	260	255	250	230	200	S							
10									A	220	B	B	B	B	B	B	S							
11									C	230	250	265	B	B	230	A	S							
12									A	240	245	275	280	260	225	185	S							
13									C	C	245	270	265	245	220	185	S							
14									195	235	250	270	265	255	225	200	S							
15									A	235	260	270	260	265	230	190	S							
16									190	230	250	265	255	245	220	A	S							
17									200	B	B	B	260	B	225	205	S							
18									190	225	265	275	270	260	235	210	E							
19									190	230	260	275	280	270	250	205	A							
20									S	C	A	275	275	270	250	205	A							
21									200	240	260	280	285	B	B	B	S							
22									S	A	B	270	270	260	245	210	S							
23									A	240	265	285	280	270	245	210	S							
24									A	235	270	280	280	265	250	220	S							
25									A	A	270	285	290	280	250	225	S							
26									195	250	275	285	290	275	235	215	S							
27									200	245	265	280	280	280	250	225	S							
28								S	S	B	B	B	290	285	B	220	S							
29								S	205	240	270	295	285	265	A	220	190							
30								S	205	230	255	280	280	C	250	220	S							
31								S	A	B	B	B	B	B	B	A	S							
	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									13	22	22	23	25	22	22	20	2							
MED									195	230	255	275	270	260	232	208	E E 190							
UQ									200	240	265	280	280	270	250	220								
LQ									190	225	245	265	260	250	225	200								

The Radio Research Laboratories, Japan

JAN. 1977 | FOE (0.01 MHZ)

IONOSPHERIC DATA

JAN. 1977 | FOES (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	25	E	E	25	E S 15	E S 15	E S 15	E S 15	23	29	39	E B 30	E B 28	E B 31	29	J A 41	J A 60	J A 90	J A 52	42	25	J A 31	28	E S 15
2	26	25	23	27	28	26	E S 15	E S 12	22	27	J A 48	41	J A 53	34	40	35	J A 30	33	E S 14	25	J A 33	J A 30	E S 15	E S 15
3	E S 15	C	J A 25	E	J A 31	27	23	J A 23	24	29	G	32	31	30	G	G	E S 15	E S 16	E S 14	E S 15	J A 30	C	C	30
4	E S 15	23	22	23	E S 15	22	E S 15	E S 14	30	26	33	37	J A 50	J A 47	J A 65	J A 112	J A 40	J A 35	34	J A 33	E S 15	C	E S 15	E S 15
5	E S 16	E S 15	E	E S 15	E S 15	28	J A 35	J A 43	J A 40	30	28	30	30	G	C	26	J A 31	24	J A 25	41	J A 55	E S 15	26	28
6	E S 15	J A 24	J A 35	J A 28	E	J A 24	E S 14	E S 14	24	E B 30	E B 31	36	E B 48	41	35	54	J A 36	J A 83	J A 58	31	C	C	E S 16	C
7	E S 15	C	C	C	J A 32	28	24	24	21	G	G	G	G	G	30	J A 38	J A 63	J A 54	J A 40	25	22	24	23	E S 15
8	E S 15	E S 15	E S 15	15	J A 20	J A 33	35	J A 30	20	23	G	G	G	G	G	G	E S 15	32	38	30	26	E S 16	C	E S 14
9	C	E S 15	C	22	J A 24	24	E S 16	26	26	G	33	32	34	G	G	26	24	25	31	34	25	E S 16	E S 16	E S 15
10	E S 15	E S 14	E	J A 25	J A 28	23	22	27	22	27	E B 32	E B 31	E B 32	E B 30	E B 25	E B 25	J A 30	J A 30	J A 23	E S 15	E S 13	C	E S 15	C
11	C	C	E S 15	E S 13	E	30	J A 30	28	E C 23	G	G	G	E B 30	E B 31	30	J A 60	J A 51	J A 30	E S 15	E	E S 15	E S 15	E S 15	C
12	E S 15	E	E	C	E S 15	E S 16	J A 30	30	28	G 19	G	G	G	G	G	G	E S 15	E S 13	E S 15	E S 15	24	26	C	26
13	C	C	C	E S 15	C	C	23	24	C	C	28	G	G	G	G	G	24	J A 25	28	28	28	26	E S 15	E S 14
14	E S 15	E S 14	E	E S 15	E	28	J A 60	44	34	G	G	G	G	G	G	G	F S 16	E S 15	E S 15	E S 15	21	24	E S 15	E S 15
15	E S 15	E S 16	E S 16	E S 14	E	E S 16	E S 18	E S 15	21	D C 25	G	G	G	31	G	22	F S 17	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15
16	E S 14	E	E	E	E S 15	28	E S 15	23	G	G	G	G	43	35	29	22	20	J A 73	J A 58	J A 31	33	26	E S 15	E S 15
17	E S 15	E S 15	E S 15	E S 14	E	24	E S 15	E S 14	G	E B 28	E B 28	E B 29	G	E B 30	G	G	21	J A 31	26	E S 15	E S 15	E S 16	E S 15	26
18	E S 15	E S 15	E S 15	20	21	24	24	27	G	G	G	G 17	G	G	29	29	J A 28	E	E	E S 16	E S 16	E S 15	E S 15	E S 16
19	E S 16	E S 14	E S 16	E S 15	E	21	E S 15	E S 15	22	G	G	G	G	G	30	35	J A 35	31	J A 51	J A 26	26	E S 15	24	E S 15
20	E S 15	E S 15	E S 15	E S 15	23	E S 12	28	19	G	C	J A 43	33	G	G	33	33	J A 25	J A 25	J A 60	28	22	22	E S 16	E S 16
21	E S 16	26	E S 15	J A 25	J A 31	23	E S 15	E S 14	G	29	34	G	G	31	40	J A 61	J A 44	J A 43	J A 29	J A 28	32	33	34	30
22	C	E S 15	25	16	25	19	33	33	22	39	E B 27	G	G 21	G	G	24	20	E S 15	35	E S 15	J A 23	26	C	E S 15
23	E S 14	E S 14	E S 15	15	J A 21	E	22	E S 15	J A 48	G	G	G	G	G	G	G	E S 19	E S 15	E S 15	25	26	28	22	28
24	23	22	24	24	J A 21	25	24	J A 21	32	G	G	G	G 20	G	G	G	E S 18	E S 14	E S 15	30	33	E S 14	E S 15	E S 15
25	E S 15	E S 15	E	E S 13	E	27	24	E S 15	J A 35	J A 36	34	G	G	G	G	G	21	J A 33	E S 14	J A 25	E S 16	27	30	J A 28
26	E S 15	26	23	24	E S 15	E S 14	C	E S 15	G	G	G	G	G	G 23	G 22	G	20	E S 15	E S 15	E S 15	27	32	J A 30	28
27	E S 15	E S 18	24	E S 15	E	J A 20	22	E S 15	23	G	G	32	G	G	G	G	E S 18	E S 15	E S 15	E S 15	E S 15	E S 16	E S 15	E S 15
28	E S 15	E S 14	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	23	E B 28	E B 30	34	G	G	E B 26	24	20	E S 15	E S 15	J A 26	E S 15	E S 14	E S 15	E S 15
29	E S 15	E S 15	E S 15	E	E	20	23	E S 15	G	G 19	G 21	G	G	30	28	G 18	21	28	E S 15	E S 15	32	35	26	28
30	E S 15	E S 12	22	E S 15	E S 15	E S 15	28	25	G	G	G	G	G	C	G	26	23	J A 43	J A 54	J A 51	31	30	E S 15	E S 16
31	E S 15	24	J A 24	39	J A 30	J A 59	40	33	30	E B 30	E B 31	E B 31	E B 32	E B 41	E B 33	25	23	30	E S 16	E S 15	E S 15	E S 15	E S 15	E S 16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	27	28	29	30	30	30	31	30	29	31	31	31	30	30	31	31	31	31	31	30	27	27	28
MED	E S 15	E S 15	E E 15	15	15	24	23	21	22	E G 23	E G 21	G	G	G	E G 24	24	23	28	23	25	24	24	E S 15	E S 15
UQ	E S 15	20	23	24	J A 24	27	28	27	28	28	32	32	U 25	30	30	34	J A 30	J A 33	J A 36	30	30	28	24	27
LQ	E S 15	E S 14	E E 15	E S 15	E	16	E S 15	E S 15	G	G	G	G	G	G	G	G	20	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15

JAN. 1977 | FOES (0.1 MHZ)

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

JAN. 1977 | FBES (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E	E	E	E	Es 15	Es 15	Es 15	Es 15	G	G	38	Eb 30	Eb 28	Fb 31	G	40	38	A 90	A 52	A 42	E	E	E	Es 15
2	E	E	E	E	E	E	Es 15	Es 12	G	G	43	34	33	30	30	23	25	F	Es 14	E	E	E	Es 15	Es 15
3	Es 15	C	E	E	E	E	E	E	G	G	G	29	G	G	G	G	Es 15	Es 16	Es 14	Es 15	E	C	C	E
4	Es 15	E	E	E	Es 15	E	Es 15	Es 14	G	G	G	35	40	40	A 65	A 112	E	F	E	25	Es 15	C	Es 15	Es 15
5	Es 16	Es 15	E	Es 15	Es 15	E	E	22	40	26	G	G	G	G	C	25	19	F	E	A 41	A 55	Es 15	E	E
6	Es 15	E	E	E	E	E	Es 14	Es 14	G	Eb 30	Eb 31	35	Eb 48	41	35	47	34	29	A 58	E	C	C	Es 16	C
7	Es 15	C	C	C	24	E	E	E	20	G	G	G	G	G	G	35	32	A 54	24	E	E	E	E	Es 15
8	Es 15	Es 15	Es 15	E	E	E	E	20	18	G	G	G	G	G	G	G	Fs 15	F	A 38	E	E	Es 16	C	Es 14
9	C	Es 15	C	E	E	E	Es 16	20	G	G	G	G	33	G	G	G	20	E	E	E	E	Es 16	Es 16	Es 15
10	Es 15	Es 14	E	E	E	E	E	E	20	G	Eb 32	Eb 31	Eb 32	Eb 30	Eb 25	Eb 25	E	E	E	Es 15	Es 13	C	Es 15	C
11	C	C	Es 15	Es 13	E	E	E	E	Ec 23	G	G	G	Eb 30	Eb 31	G	20	17	25	Es 15	E	Es 15	Es 15	Es 15	C
12	Es 15	E	E	C	Es 15	Es 16	E	22	20	G 15	G	G	G	G	G	G	Es 15	Es 13	Es 15	Es 15	E	E	C	E
13	C	C	C	Es 15	C	C	E	E	C	C	G	G	G	G	G	G	19	E	E	E	E	E	Es 15	Es 14
14	Es 15	Es 14	E	Es 15	E	E	A 60	A 44	G	G	G	G	G	G	G	G	Es 16	Es 15	Es 15	Es 15	E	E	Es 15	Es 15
15	Es 15	Es 16	Es 16	Es 14	E	Es 16	Es 18	Es 15	20	18	G	G	G	G	G	G	Es 17	Es 15	Es 15	Es 15	Es 15	Es 15	Es 15	Es 15
16	Es 14	E	E	E	Es 15	E	Es 15	E	G	G	G	G	40	35	G	22	20	20	A 58	E	E	E	Es 15	Es 15
17	Es 15	Es 15	Es 15	Es 14	E	E	Es 15	Es 14	G	Eb 28	Eb 28	Eb 29	G	Eb 30	G	G	18	E	E	Es 15	Es 15	Es 16	Es 15	E
18	Es 15	Es 15	Es 15	E	E	E	E	E	G	G	G	G 16	G	G	G	G	21	E	E	Es 16	Es 16	Es 15	Es 15	Es 16
19	Es 16	Es 14	Es 16	Es 15	E	E	Es 15	Es 15	G	G	G	G	G	G	G	34	30	24	A 51	E	E	Es 15	E	Es 15
20	Es 15	Es 15	Es 15	Es 15	E	Es 12	E	E	G	C	32	G	G	G	G	G	23	E	A 60	E	E	E	Es 16	Es 16
21	Es 16	E	Es 15	E	E	E	Es 15	Es 14	G	G	G	G	G	G	39	38	27	A 43	21	E	E	A 33	E	E
22	C	Es 15	E	E	E	E	E	18	G	30	Eb 27	G	G 20	G	G	G	G	Es 15	E	Es 15	E	E	C	Es 15
23	Es 14	Es 14	Es 15	E	E	E	E	Es 15	28	G	G	G	G	G	G	G	Es 19	Es 15	Es 15	E	E	E	E	E
24	E	E	E	E	E	E	E	E	21	G	G	G	G 19	G	G	G	Fs 18	Es 14	Es 15	20	E	Es 14	Es 15	Es 15
25	Es 15	Es 15	E	Es 13	E	E	E	Es 15	25	26	20	G	G	G	G	G	20	F	Es 14	E	Es 16	E	E	E
26	Es 15	E	E	E	Es 15	Es 14	C	Es 15	G	G	G	G	G	G 21	G 20	G	G	Es 15	Es 15	Es 15	E	E	E	E
27	Es 15	Es 18	E	Es 15	E	E	E	Es 15	G	G	G	G	G	G	G	G	Es 18	Es 15	Es 15	Es 15	Es 15	Es 16	Es 15	Es 15
28	Es 15	Es 14	Es 15	Es 15	Es 15	Es 15	Es 15	Es 15	G	Eb 28	Eb 30	G	G	G	Eb 26	G	20	Es 15	Es 15	E	Es 15	Es 14	Es 15	Es 15
29	Es 15	Es 15	Es 15	E	E	E	E	Es 15	G	G 19	G 20	G	G	G	26	G 17	G	F	Es 15	Es 15	E	E	E	E
30	Es 15	Es 12	E	Es 15	Es 15	Es 15	E	20	G	G	G	G	G	C	G	G	G	31	A 54	A 51	26	E	Es 15	Es 16
31	Es 15	E	E	A 39	28	E	A 40	20	25	Eb 30	Eb 31	Eb 31	Eb 32	Eb 41	Eb 33	25	23	F	Es 16	Es 15	Es 15	Es 15	Es 15	Es 16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	27	28	29	30	30	30	31	30	29	31	31	31	30	30	31	31	31	31	31	30	27	27	28
MED	Es 15	Es 14	E	E	E	E	E	15	G	G	G	G	G	G	G	G	19	Ef 15	Ef 15	Ef 15	E	E	Es 15	Es 15
UQ	Es 15	Es 15	Es 15	Es 15	Es 15	E	Es 15	16	20	Eg 19	Eg 28	Eg 22	Eg 29	Eg 30	Eg 25	25	22	18	22	Es 15	Es 15	Es 15	Es 15	Es 15
LQ	Es 15	E	E	E	E	E	E	E	G	G	G	G	G	G	G	G	Ef 15	F	Ef 14	E	E	E	E	E

The Radio Research Laboratories, Japan

JAN. 1977 | FBES (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1977 | F-MIN (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E S 15	E	E	E	E S 15	E S 15	E S 15	E S 15	E S 18	23	20	30	28	31	23	E S 18	F S 16	E	E S 15	E S 15	E S 15	E S 15	E S 16	E S 15
2	E S 15	E S 16	E S 16	E S 16	E	E	E S 15	E S 12	E S 18	18	16	14	14	16	13	15	F S 13	E S 15	E S 14	E S 16	E S 15	E S 15	E S 15	E S 15
3	E S 15	C	E	E	E	E S 15	E S 12	E	17	18	18	19	20	18	16	15	E S 15	E S 16	E S 14	E S 15	E S 15	C	C	E S 15
4	E S 15	E S 13	E S 15	E S 15	E S 15	E	E S 15	E S 14	14	16	14	16	19	18	18	E S 15	E S 13	E S 15	E	E S 14	E	E S 15	C	E S 15	E S 15
5	E S 16	E S 15	E	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	17	18	20	20	17	C	E S 17	E S 12	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 16
6	E S 15	E	E	E	E	E	E S 14	E S 14	20	30	31	30	48	31	27	22	E S 15	E S 17	E S 15	E S 15	C	C	E S 16	C
7	E S 15	C	C	C	E	E S 15	E S 17	E S 15	E S 17	17	21	20	19	18	16	13	E	E	E S 17	E S 15	E S 15	E S 15	E S 15	E S 15
8	E S 15	E S 15	E S 15	E	E	E	E S 15	E S 15	12	15	18	18	17	17	16	12	E S 15	E S 15	E S 15	E S 16	E S 15	E S 16	C	E S 14
9	C	E S 15	C	E S 14	E	E	E S 16	E S 15	15	17	18	18	20	19	18	16	E S 15	E S 15	E S 15	E S 15	E S 15	E S 16	E S 16	E S 15
10	E S 15	E S 14	E	E	E	E S 15	E S 17	E S 15	16	19	32	31	32	30	25	25	E S 15	E S 15	E S 15	E S 15	E S 13	C	E S 15	C
11	C	C	E S 15	E S 15	E	E S 15	E S 15	E S 15	E C 23	E S 16	19	20	30	31	20	17	E S 15	E	E S 15	E	E S 15	E S 15	E S 15	C
12	E S 15	E	E	C	E S 15	E S 16	E S 15	E	E	11	15	17	13	13	10	11	F S 15	E S 13	E S 15	E S 15	E S 15	E S 15	C	E S 15
13	C	C	C	E S 15	C	C	E S 15	E S 15	C	C	15	17	17	16	15	13	E S 14	E S 12	E S 15	E S 15	E S 15	E S 16	E S 15	E S 14
14	E S 15	E S 14	E	E S 15	E	E S 15	E S 15	E S 15	15	17	17	17	16	18	16	15	E S 16	E S 15	E S 15	E S 15	E S 14	E S 15	E S 15	E S 15
15	E S 15	E S 16	E S 16	E S 14	E	E S 16	E S 18	E S 15	11	11	12	16	17	17	17	17	E S 17	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15
16	E S 14	E	E	E	E S 15	E S 15	E S 15	E S 15	13	12	15	15	16	14	14	14	F S 12	E S 15	E S 15	E S 16	E S 15	E S 15	E S 15	E S 15
17	E S 15	E S 15	E S 15	E S 14	E	E S 14	E S 15	E S 14	15	28	28	29	20	30	20	16	E S 14	E S 15	E S 15	E S 15	E S 15	E S 16	E S 15	E S 15
18	E S 15	E S 15	E S 15	E	E	E S 15	E S 15	E S 15	14	11	11	11	14	16	11	12	F	F	E	E S 16	E S 16	E S 15	E S 15	E S 16
19	E S 16	E S 14	E S 16	E S 15	E	E	E S 15	E S 15	14	10	15	15	15	19	15	12	10	E	E S 15	E	E S 15	E S 15	E S 15	E S 15
20	E S 15	E S 15	E S 15	E S 15	E S 15	E S 12	E S 15	E S 15	E S 18	C	10	10	13	19	15	12	10	E	E S 15	E S 15	E S 14	E S 15	E S 16	E S 16
21	E S 16	E S 15	E S 15	E	E	E S 17	E S 15	E S 14	15	17	16	17	18	28	26	20	E S 16	F	E	E S 15	E S 15	E S 15	E S 16	E S 15
22	C	E S 15	E S 15	E	E	E	E S 15	E	E S 19	18	27	21	16	20	20	16	E S 16	E S 15	E	E S 15	E S 15	E S 15	C	E S 15
23	E S 14	E S 14	E S 15	E	E	E	E	E S 15	15	16	16	20	17	17	15	17	E S 19	E S 15	E S 15	E S 15	E S 15	E S 13	E S 15	E S 15
24	E S 15	E S 15	E S 15	E	E	E	E S 15	E	11	12	14	15	12	15	14	10	E S 18	E S 14	E S 15	E S 15	E S 15	E S 14	E S 15	E S 15
25	E S 15	E S 15	E	E S 13	E	E S 15	E S 14	E S 15	12	15	16	17	17	16	17	E S 15	F S 15	F	E S 14	E S 15	E S 16	E S 15	E S 16	E S 15
26	E S 15	E S 15	E S 15	E S 16	E S 15	E S 14	C	E S 15	15	16	17	17	18	17	18	17	F S 15	E S 15	E S 15	E S 15	E S 16	E S 15	E S 15	E S 15
27	E S 15	E S 18	E S 15	E S 15	E	E	E S 15	E S 15	15	16	15	16	14	15	15	16	E S 18	E S 15	E S 15	E S 15	E S 15	E S 16	E S 15	E S 15
28	E S 15	E S 14	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 20	28	30	28	25	20	26	16	F S 15	E S 15	E S 15	E S 15	E S 15	E S 14	E S 15	E S 15
29	E S 15	E S 15	E S 15	E	E	E	E S 15	E S 15	11	11	12	14	17	18	16	10	14	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15
30	E S 15	E S 12	E	E S 15	E S 15	E S 15	E	E S 15	12	16	11	12	16	C	17	14	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 16
31	E S 15	E S 14	E	E	E	E S 16	E	E S 15	16	30	31	31	32	41	33	20	E S 16	E S 15	E S 16	E S 15	E S 15	E S 15	E S 15	E S 16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	27	28	29	30	30	30	31	30	29	31	31	31	30	30	31	31	31	31	31	30	27	27	28
MED	E S 15	E S 15	E S 15	E S 13	E	E S 15	E S 15	E S 15	14	16	16	17	17	18	16	15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15
UQ	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	16	18	20	20	20	20	20	16	E S 16	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15
LQ	E S 15	E S 14	E	E	E	E	E S 15	E S 14	12	14	15	16	16	16	15	12	E S 14	E S 12	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15

JAN. 1977 | F-MIN (0.1 MHZ)

The Radio Research Laboratories, Japan

IONOSPHERIC DATA

JAN. 1977 | 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 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	290	305	305	335	F	F 305	F	325	330	350	365	375	H 315	360	350	340	340	A	A	A	285	325	295	295
2	305	310	295	310	365	335	335	340	330	355	360	360	375	365	340	380	350	340	345	355	F 270	F 280	F	F 295
3	F 300	C	305	S 315	330	345	310	315	340	350	370	350	355	340	375	360	310	340	330	325	F 270	C	C	305
4	310	310	295	315	315	320	345	335	340	370	335	375	370	360	A	A	350	295	340	320	S 325	C	F	F 325
5	F	F 300	S	355	F 320	F 280	F	315	340	355	360	320	355	375	C	340	350	325	355	A	A	F	F 280	F 295
6	F 295	275	300	335	F 320	F 290	295	295	335	310	345	370	350	365	370	355	355	340	A	U F 320	C	C	F	C
7	F	C	C	C	F 310	F	F 300	320	345	340	345	360	350	350	360	365	330	A	320	325	340	F 295	F	F 330
8	F	F 325	F	F	F	365	335	315	340	335	345	370	365	360	360	350	350	335	A	315	305	300	I C 290	300
9	C	305	C	S	335	335	335	325	345	C	340	365	355	335	360	370	350	335	345	350	355	295	F	F
10	F 310	F 260	F 335	350	345	355	295	340	340	350	350	355	370	370	385	370	370	330	335	335	305	C	305	C
11	C	C	310	320	330	F 350	345	355	370	340	360	355	350	365	350	380	360	340	355	335	S	305	305	I C 290
12	300	335	295	C	F	F	F	360	340	330	365	365	365	325	340	350	350	305	325	315	300	305	C	305
13	C	C	C	320	C	C	305	345	C	C	340	340	355	340	355	360	340	325	335	305	300	310	310	315
14	305	305	310	F 325	F 320	305	A	A	350	350	375	360	380	345	355	350	350	310	310	335	350	305	F	F
15	F 320	F	305	335	F	F 285	320	325	365	C	330	365	350	350	360	365	350	325	330	300	280	305	315	F
16	F 300	F	F 300	F 310	F	F	345	350	370	350	325	365	365	350	370	375	325	315	A	340	305	305	C	F 315
17	F 300	F 320	F 325	F 325	F 370	F 350	325	335	360	380	355	335	365	340	360	360	390	325	345	335	300	300	275	295
18	305	315	320	320	325	355	335	350	365	375	380	330	370	355	360	370	315	330	325	330	340	280	305	315
19	320	320	305	S 315	335	350	335	S 325	360	355	370	360	355	360	360	350	350	310	A	335	305	305	330	325
20	340	285	295	320	305	325	325	350	375	C	370	355	360	355	370	355	345	340	A	350	345	295	295	305
21	315	310	300	315	335	355	315	350	365	360	375	330	375	365	345	360	350	A	325	335	340	A	305	295
22	C	295	295	295	325	345	360	350	365	370	365	370	370	355	355	350	365	315	320	335	345	305	I C 320	305
23	300	310	305	345	330	340	345	345	355	325	345	365	375	365	365	335	C	340	325	320	360	320	315	295
24	305	295	300	305	310	295	335	355	380	355	345	370	375	380	345	335	350	320	305	350	335	300	300	290
25	300	300	300	300	340	320	350	350	345	345	360	355	380	315	350	350	375	305	305	330	315	305	290	300
26	F 305	F	F	315	350	350	C	360	335	360	365	365	H 320	370	350	360	355	350	315	325	310	315	330	310
27	295	305	305	315	315	325	345	370	370	360	345	375	365	375	375	335	350	320	315	305	S	325	310	315
28	315	310	310	325	305	310	350	360	375	330	365	365	355	365	355	340	350	340	345	310	330	310	310	305
29	310	300	295	C	315	330	330	350	370	325	355	350	380	370	345	335	345	340	310	340	340	295	285	300
30	295	290	300	295	330	335	340	320	350	360	345	350	360	C	320	355	355	355	A	A	295	280	285	280
31	290	285	300	A	320	330	A	330	355	335	355	350	375	355	350	350	320	345	340	305	300	315	310	295
	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	24	24	25	25	25	27	25	30	30	27	31	31	31	30	29	30	30	28	24	28	27	25	22	26
MED	305	305	300	320	325	335	335	342	352	350	355	360	365	360	355	355	350	330	328	330	310	305	305	302
UQ	310	310	305	325	335	350	345	350	365	360	365	365	372	365	360	365	355	340	342	335	340	310	310	315
LQ	300	295	300	315	315	315	320	325	340	338	345	350	355	350	350	350	345	318	318	318	300	295	290	295

The Radio Research Laboratories, Japan

JAN. 1977 | M(3000)F2 (0.01)

IONOSPHERIC DATA

JAN. 1977 | 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 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											A	L												
2											A													
3											L	U L 400												
4												L	A											
5										L	400	395	400											
6													B	A										
7											U L 380	375	L											
8											U L 385	385	395											
9											L	395	L 395											
10											L	L 375	385	400										
11												U L 395	390											
12											L	L	L											
13												L 370	L 380											
14											395	395	L 415											
15												U L 380												
16												L 395	A											
17											L	L	L	L 400										
18													L	L										
19														L										
20											L		400											
21											L	L 410	L											
22												375	395	L 410										
23												L 400	385	L 405										
24												400	L 410											
25											L	L 400	L											
26											L		425	L										
27												L	L	L 400										
28												L 400	L	L										
29													400											
30												375	L 400	C	400									
31											L	L	L 395	B										
	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	18	15	5	1									
MED											390	L 395	395	L 400	400									
UQ											398	L 400	400	L 405										
LQ											U L 382	375	392	L 400										

The Radio Research Laboratories, Japan

JAN. 1977 | M(3000)F1 (0.01)

IONOSPHERIC DATA

JAN. 1977 | 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 MHz to 20 MHz in 20 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											225	250												
2											235													
3											230	250												
4												225	230											
5										225	215	250	235											
6													B	240										
7											250	240	235											
8											245	225	225											
9											250	230	245											
10											250	235	235	225										
11												240	250											
12											230	235	220											
13												260	250											
14											220	220	215											
15												235												
16												245	220											
17											240	250	245	260										
18													230	230										
19														240										
20											230		225											
21											225	225	225											
22												235	230	250										
23												235	245	240										
24												240	225											
25											225	250	220											
26											230		215	250										
27												250	240	230										
28												250	245	245										
29													225											
30												250	240	C	245									
31											245	245	230	240										
	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	16	24	25	11	1									
MED										225	230	240	230	240	245									
UQ											245	250	240	248										
LQ											225	235	225	235										

The Radio Research Laboratories, Japan

JAN. 1977 | H'F2 (KM)

IONOSPHERIC DATA

JAN. 1977 | 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 MHz to 20 MHz in 20 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	300	265	265	215	200	200	250	225	220	235	A	220	205	240	225	A	A	A	A	A	300	250	275	270
2	270	255	300	290	210	250	235	210	225	225	A	A	A 240	A 230	A 225	205	230	210	220	205	270	310	310	300
3	285	C	255	225	220	200	225	250	230	240	225	210	220	230	230	215	215	205	240	240	300	C	C	250
4	265	270	280	260	240	225	205	225	215	220	220	A	A	A	A	A	215	275	225	250	250	C	310	230
5	275	260	225	200	215	295	260	265	A	225	205	200	200	210	C	225	220	220	240	A	A	300	300	300
6	290	300	280	240	210	300	260	250	225	230	245	230	B	A	A 230	A	A	A 240	A	245	C	C	260	C
7	230	C	C	C	235	250	250	235	225	215	215	210	220	225	220	A	A	A	280	240	205	275	210	210
8	250	240	275	215	230	205	250	250	240	225	220	220	200	220	210	215	205	225	A	285	295	290	I C 290	265
9	C	265	C	225	210	245	250	250	215	240	240	230	210	230	225	215	215	240	225	210	210	260	300	300
10	255	265	225	215	220	200	300	230	220	235	240	215	225	210	205	220	205	225	215	225	270	C	245	C
11	C	C	260	250	220	220	245	210	205	220	225	230	205	230	225	200	210	225	205	225	250	250	230	I C 260
12	250	210	260	C	210	250	205	205	210	220	220	225	205	200	225	215	205	260	250	250	265	265	C	250
13	C	C	C	250	C	C	270	200	C	C	245	220	240	215	210	210	205	215	225	265	295	275	250	260
14	250	250	235	215	210	215	A	A	210	245	215	200	200	220	230	205	220	250	250	220	210	290	265	260
15	260	280	260	210	245	275	S 270	230	215	C	230	235	210	260	245	215	210	235	245	255	305	265	240	230
16	265	260	255	250	235	240	220	200	200	215	225	220	A	A	230	210	210	245	A	240	270	270	250	250
17	300	270	250	240	195	205	250	230	205	220	220	225	240	210	210	220	200	250	220	225	300	285	330	275
18	245	250	265	255	225	200	250	210	205	215	210	235	210	215	205	210	210	210	245	230	210	305	270	250
19	235	255	270	240	210	205	205	220	225	225	220	210	220	200	215	A	A	260	A	250	275	250	240	250
20	225	280	300	260	255	240	250	210	200	C	210	230	215	225	240	230	220	220	A	215	215	265	275	280
21	265	250	255	260	215	205	275	205	205	240	225	225	225	225	A	A	240	A	255	260	250	A	290	275
22	C	270	300	285	240	205	250	225	205	A 230	210	205	205	200	230	215	210	205	280	225	215	275	I C 290	300
23	300	265	255	205	260	220	225	210	205	200	245	230	215	200	230	230	215	230	250	250	225	260	265	275
24	275	280	270	250	245	275	230	200	200	200	240	220	220	210	205	250	210	230	245	215	250	270	275	280
25	260	265	280	260	220	250	215	200	215	210	200	230	210	200	235	230	200	240	255	250	240	260	285	250
26	260	270	300	250	200	215	C	200	220	225	220	230	205	200	225	225	215	200	240	240	260	250	250	265
27	275	265	255	250	250	250	200	200	200	195	220	230	240	210	210	200	210	210	235	250	250	245	275	250
28	260	260	250	265	250	250	205	200	210	215	225	240	200	205	205	210	210	215	215	250	245	250	285	250
29	245	280	290	260	250	220	230	205	200	230	220	225	225	210	200	200	220	205	250	220	200	300	270	250
30	250	260	280	260	270	230	260	215	215	220	205	205	210	C	210	230	220	A	A	A	305	300	300	300
31	265	275	290	A	A 315	250	A	250	220	250	245	230	230	B	225	215	245	205	205	250	250	250	270	270
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	27	28	28	30	30	28	30	29	28	29	29	28	26	28	25	27	27	24	28	29	26	29	29
MED	260	265	265	250	222	228	250	212	215	225	220	225	212	212	225	215	210	225	240	240	250	268	275	260
UQ	275	270	280	260	245	250	255	230	220	232	230	230	225	225	230	225	220	240	250	250	275	290	290	275
LQ	250	258	255	220	210	205	222	205	205	215	215	215	205	205	210	210	210	210	222	225	225	250	250	250

JAN. 1977 | H'F (KM)

IONOSPHERIC DATA

JAN. 1977 | H'E (KM) | 135° E Mean Time (G. M. T. + 9 h)

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

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									S	B	A	B	B	B	B	S								
2									S	120	A	A	A	A	A	A								
3									150	120	110	A	115	120	120	125								
4									120	115	110	110	110	110	110	S								
5									A	115	115	110	110	115	C	S								
6									B	B	B	B	B	B	B	B								
7									S	125	125	120	115	110	110	A								
8									A	125	115	115	115	115	110	115	S							
9									145	125	115	115	115	115	110	140	S							
10									A	120	B	B	B	B	B	B	S							
11									C	120	120	115	B	B	120	A	S							
12									A	120	110	115	110	110	110	110	S							
13									C	C	110	110	110	110	110	110	S							
14									115	115	115	110	110	110	110	125	S							
15									A	115	110	110	110	110	110	115	S							
16									125	110	110	110	110	110	110	A	S							
17									125	B	B	B	110	B	115	110	S							
18									125	110	105	110	110	110	110	115	E							
19									115	110	110	110	110	115	110	110	A							
20									S	C	A	110	110	110	110	110	A							
21									135	120	115	110	110	B	B	B	S							
22									S	A	B	115	110	110	115	125	S							
23									A	105	110	115	110	115	110	115	S							
24									A	105	105	105	110	105	110	125	S							
25									A	A	110	110	110	110	110	110	S							
26									120	115	110	110	110	115	110	120	S							
27									130	110	105	105	105	110	110	115	S							
28								S	S	B	B	B	125	120	B	115	S							
29								S	115	115	115	110	110	110	A	110	150							
30								S	120	110	105	110	110	C	110	115	S							
31								S	A	B	B	B	B	B	B	A	S							
	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									13	22	22	23	25	22	22	20	1							
MED									125	115	110	110	110	110	110	115	150							
UQ									130	120	115	115	110	115	110	122								
LQ									120	110	110	110	110	110	110	110								

The Radio Research Laboratories, Japan

JAN. 1977 | H'E (KM)

IONOSPHERIC DATA

JAN. 1977 | H'ES (KM) | 135° E Mean Time (G. M. T. + 9 h)

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

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

JAN. 1977 | H'ES (KM)

IONOSPHERIC DATA

JAN. 1977 | 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 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 1			F 1					C 1	C 1	L 1				C 1	C 2	F 3	F 2	F 2	F 3	F 1	F 1	F 1	
2	F 1	F 1	F 1	F 1	F 1	F 2			C 1	C 1	L 2	L 2	L 1	C L 11	C L 11	L 1	F 2	F 1		F 1	F 1	F 2		
3			F 2		F 2	F 1	F 1	F 2	C 1	H 1		L 1	C 1	C L 11							F 2			F 2
4		F 1	F 1	F 1		F 1			C 1	H 1	H 1	C 1	C 2	C 2	C 2	C 3	F 1	F 2	F 2	F 2				
5						F 1	F 2	F 2	L 2	C 2	C 1	C 1	C 1			C 2	F 1	F 1	F 2	F 3	F 2		F 1	F 2
6		F 1	F 2	F 1		F 1			C 1			C 1		C 1	C 1	C 1	F 2	F 2	F 3	F 1				
7					F 2	F 2	F 1	F 1	C 1						C 1	L 2	F 2	F 3	F 2	F 1	F 1	F 1	F 1	
8				F 1	F 2	F 1	F 2	F 2	L 1	L 1								F 1	F 2	F 1	F 1			
9				F 1	F 1	F 1		F 1	C 1		C 1	C 1	C 1			C 1	L 1	F 1	F 1	F 1	F 1			
10				F 1	F 1	F 1	F 1	F 1	L 1	H 1							L 1	F 1	F 1					
11						F 1	F 2	F 1							C 1	L 1	L 1	F 2						
12							F 2	F 2	L 1	L 1											F 1	F 1		F 1
13							F 1	F 1			H 1						C 1	F 1	F 1	F 1	F 1	F 1		
14						F 1	F 3	F 3	L 1												F 1	F 1		
15									L 1	L 1				H 1		C 1								
16						F 1		F 1					C 2	C 2	C 1	L 2	L 1	F 2	F 2	F 1	F 1	F 1		
17						F 1											L 1	F 2	F 1					F 1
18				F 1	F 1	F 1	F 1	F 1				L 1			H 1	C 1	C 2							
19						F 1			H 1						C 1	C 2	L 2	F 2	F 3	F 2	F 1		F 1	
20					F 1		F 1	F 1			L 2	H L 11			C 2	C 2	L 2	F 2	F 3	F 2	F 1	F 1		
21		F 1		F 2	F 1	F 1				C 1	C 1			H 1	C 2	C 2	C 2	F 3	F 3	F 2	F 2	F 2	F 1	F 1
22			F 1	F 1	F 1	F 1	F 2	F 2	H 1	L 1			L 1			C 1	C 1		F 2		F 1	F 1		
23				F 1	F 2		F 1		L 2											F 1	F 1	F 1	F 1	F 1
24	F 1	F 1	F 1	F 1	F 2	F 2	F 1	F 1	L 1				L 1							F 2	F 2			
25						F 1	F 1		L 2	L 1	L 1						C 1	F 2		F 2		F 1	F 2	F 2
26		F 1	F 1	F 1										L 1	L 1		C 1				F 1	F 2	F 2	F 1
27			F 1			F 1	F 1		L 1			H 1												
28									H 1			C 1				C 1	C 1			F 2				
29						F 1	F 1			L 1	L 1			C 1	L 1	L 1	L 1	F 1			F 1	F 2	F 1	F 1
30			F 1				F 2	L 1								H 1	C 2	F 2	F 3	F 3	F 2	F 1		
31		F 1	F 2	F 3	F 3	F 1	F 2	L 1	L 1							L 1	L 1	F 1						
	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

JAN. 1977 | TYPES OF ES

IONOSPHERIC DATA

JAN. 1977 | FXI (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	x 42	43	x 40	x 39	x 31	35	35											x 50	x 36	x 40	x 36	45	36	37
2	A	x 36	x 33	37	x 31	x 30	x 34											x 54	x 43	A	A	x 32	x 35	x 33
3	x 34	x 33	x 36	x 41	x 34	x 35	x 34											x 43	x 42	x 30	x 35	x 37	x 42	x 40
4	x 38	x 39	x 37	x 42	x 36	36	x 39											x 41	x 38	A	A	x 39	39	39
5	36	40	40	x 34	29	27	x 32											x 50	A	A	A	36	x 36	38
6	x 36	x 36	x 39	A	x 28	29	28											A	A	A	A	A	49	53
7	53	48	47	55	61	59	60											x 45	x 44	x 44	39	x 40	x 42	x 38
8	x 33	x 35	x 40	x 43	x 46	x 34	x 32											x 38	x 33	x 30	A	x 33	x 34	x 35
9	x 35	x 33	x 31	x 36	x 24	x 25	x 26											x 39	x 46	x 41	x 30	x 36	x 32	38
10	35	x 35	49	47	x 32	x 32	x 25											x 42	x 43	x 42	x 43	x 43	x 37	x 33
11	x 34	x 33	x 37	x 42	x 42	x 40	x 27											x 44	x 38	x 38	x 38	x 43	x 43	x 45
12	x 44	x 45	x 42	43	45	37	29											x 38	x 45	x 51	x 46	x 46	x 43	x 37
13	x 33	x 35	x 36	x 34	x 32	x 30	x 29											x 43	x 41	x 34	x 32	x 36	40	37
14	38	40	42	x 39	x 35	x 37	x 31											x 46	x 38	x 41	x 35	36	36	36
15	x 33	x 34	x 36	x 34	x 34	x 32	x 25											x 42	x 46	x 32	x 33	x 37	x 42	x 36
16	x 34	x 36	x 38	x 36	x 40	x 40	x 36												x 44	x 39	A	x 34	x 40	x 36
17	x 33	x 35	x 37	x 42	x 35	x 26	x 28												x 45	x 48	x 33	x 36	x 38	x 40
18	x 39	x 37	x 36	x 36	x 36	x 34	x 32												x 52	x 54	x 43	x 32	x 34	x 40
19	x 41	x 40	x 36	x 37	x 41	x 44	x 34												x 38	x 40	x 38	x 37	x 39	x 39
20	x 34	x 32	x 33	x 33	x 34	x 35	x 47												x 51	x 44	x 34	x 37	x 40	x 45
21	x 43	x 44	x 39	x 38	x 42	x 28	32												x 37	x 44	x 44	x 34	x 35	x 37
22	x 37	x 36	x 38	x 35	x 40	x 36	x 30												x 37	x 36	x 31	x 32	x 35	x 35
23	x 35	x 36	x 35	x 38	x 34	x 28	x 28												x 31	x 34	x 39	x 32	x 34	x 36
24	x 37	x 36	x 36	x 36	x 38	x 33	A												x 39	x 44	x 40	x 30	x 32	x 36
25	x 37	x 37	x 36	x 38	x 38	x 33	x 32												x 35	x 39	x 43	x 41	x 38	x 38
26	x 39	x 38	x 40	x 43	x 39	x 30	x 28												x 34	x 37	x 38	x 41	x 37	x 36
27	x 39	x 39	x 39	x 41	x 40	x 38	x 32												x 36	x 42	x 43	x 46	x 41	x 42
28	x 41	x 41	x 43	x 39	x 39	x 36	x 36												x 46	x 35	x 37	x 40	x 39	x 40
29	x 40	x 38	x 38	x 38	x 40	x 40	x 32												x 47	x 59	x 42	x 34	x 39	x 42
30	x 42	x 40	x 39	x 44	x 42	x 40	x 35												x 40	x 35	x 41	x 38	x 40	x 40
31	x 40	x 40	x 41	x 36	x 35	x 34	x 29												x 51	x 43	x 43	x 37	x 38	x 38
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	30	31	31	30											14	29	27	25	30	31	31
MED	x 37	x 37	x 38	x 38	x 36	x 34	x 32											x 43	x 41	x 40	x 38	x 37	x 38	x 38
UQ	x 40	x 40	x 40	x 42	x 40	x 37	x 34											x 46	x 45	x 44	x 43	x 40	x 40	x 40
LQ	x 34	x 35	x 36	x 36	x 34	x 30	x 28											x 41	x 37	x 36	x 35	x 34	x 36	x 36

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JAN. 1977 | FXI (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1977 | FOF2 (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	36	F 33	34	33	25	F 26	F	39	54	64	95	71	58	Z 59	66	56	54	44	30	34	30	F	F 27	F
2	A	30	27	F	25	24	28	38	47	66	84	69	H 59	59	60	52	47	48	37	A	A	26	29	27
3	28	27	30	35	28	29	28	38	54	65	76	66	60	63	62	59	48	37	36	24	29	31	36	34
4	32	33	31	36	30	F	33	34	48	57	71	71	59	52	52	51	44	35	32	A	A	33	F	F
5	F	F	F	28	F	F	26	37	64	97	125	60	60	54	54	48	50	43	A	A	A	F 26	30	F 31
6	30	30	32	A	22	F 22	F 21	34	55	65	78	64	57	66	59	57	46	A	A	A	A	A	F	F
7	F	F 46	F	F	F	F 51	F	39	61	75	84	79	66	63	60	51	44	39	38	38	F	34	36	32
8	27	29	34	37	40	28	26	36	52	71	83	76	64	58	49	50	46	32	27	23	A	27	28	29
9	29	27	25	30	19	19	20	32	40	59	73	74	59	58	54	50	39	32	40	35	23	30	25	F
10	F 27	28	F	F	26	26	19	34	47	66	74	74	60	54	50	45	41	36	37	36	37	37	31	27
11	28	27	31	36	36	34	21	37	52	49	65	64	63	54	67	58	43	38	32	32	32	37	37	39
12	38	39	36	F	F	F	F	46	49	66	72	66	63	55	60	53	43	32	39	45	40	40	37	31
13	27	29	30	28	26	24	23	33	49	C	C	C	63	57	55	50	40	37	35	28	26	30	F	F
14	F	F	F	33	29	31	25	34	44	59	88	70	55	51	60	51	41	40	32	35	29	F	F	F
15	27	28	30	28	28	26	19	31	50	69	52	70	56	51	66	59	48	36	40	26	27	31	36	30
16	28	30	32	30	34	34	30	38	49	51	79	78	69	51	60	52	43	37	38	33	A	28	34	30
17	27	29	31	36	29	20	22	39	49	52	63	65	60	56	49	50	48	30	39	42	27	30	32	34
18	33	31	30	30	30	28	26	44	59	56	56	66	66	68	55	59	46	39	46	48	37	26	28	34
19	35	34	30	31	35	38	28	42	60	60	H 66	69	61	60	65	53	45	38	32	34	32	31	33	33
20	28	26	27	27	28	29	41	49	58	53	61	74	69	58	56	57	58	42	45	38	28	31	34	39
21	37	38	33	32	36	22	F 24	40	59	56	76	82	69	59	53	55	49	34	31	38	38	28	29	31
22	31	30	30	29	34	30	24	39	55	61	67	70	57	60	55	56	50	38	31	30	25	26	29	29
23	29	30	29	32	28	22	22	42	56	52	62	91	74	59	56	60	51	37	25	28	33	26	28	30
24	31	30	30	30	32	27	A	50	58	54	57	77	65	66	55	54	66	41	33	38	34	24	26	30
25	31	31	30	32	32	27	26	A	53	53	62	58	66	59	66	60	59	34	29	33	37	35	32	32
26	33	32	34	37	33	24	22	47	52	66	80	73	69	57	63	64	59	39	28	31	32	35	31	30
27	33	33	33	35	34	32	26	43	57	49	58	64	69	71	59	51	54	42	30	36	37	40	35	36
28	35	35	37	33	33	30	30	51	50	H 59	64	79	72	64	60	57	51	48	40	29	31	34	33	34
29	34	32	32	32	34	34	26	42	64	56	81	76	71	64	61	57	58	59	41	53	36	28	33	36
30	36	34	33	38	36	34	29	47	62	68	68	79	74	65	68	74	70	52	34	29	35	32	34	34
31	34	34	35	30	29	28	23	41	55	86	70	74	79	69	61	I C 68	72	49	45	37	37	31	32	32
	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	29	27	26	28	28	27	30	31	30	30	30	31	31	31	31	31	30	29	27	24	28	27	25
MED	31	30	31	32	30	28	26	39	54	60	72	71	63	59	60	55	48	38	35	34	32	31	32	32
UQ	34	33	33	35	34	32	28	43	58	66	80	76	69	64	62	58	54	42	39	38	37	34	34	34
LQ	28	29	30	30	28	24	22	36	49	54	63	66	60	56	55	51	44	36	31	30	28	28	29	30

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JAN. 1977 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1977 | FOF1 (0.01 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										410	L	L	380	L	L									
2										L	L	L	L	L	L									
3										L	L	L	L	A	L									
4											370	L	L 450	380	L	L								
5										L	390	L	360	330	L	290								
6										L	A	A	A	L 400	A	A								
7										L	L	400	370	L	L	L								
8										L	390	400	L 380	H 380	H 330	270								
9										L	390	390	390	H 380	L									
10										L	L	H 390	L 390	380	L									
11										L	390	L	390	H 420	H 370	L								
12										L	L 390	400	L	380	370	L								
13										C	C	C	390	390	L	L								
14									L	L 400	390	L 400	L	H 390	370									
15										L	L	400	L	370	360	L								
16											L	390	L 390	390	L	L	L							
17									L	L	L	L	L	L	L	L	L							
18										L	H 380	L	L	L	L	300								
19										L	L	L 410	L 420	L 400	L	L								
20									L	L	H 420	L	L	L	L	L								
21											L	L	400	L	420	L								
22									260	H 400	H 410	400	410	H 400	L 360	L								
23										L	420	L	L	410	L	L								
24										L	H 420	410	400	H 400	L	L								
25										L	L 400	L 410	L	L 400	400	A								
26										L	H 400	L	L	L	L	L								
27									L	L	L	420	H 420	L	L	L	L							
28									L	L	H 480	H 420	L 410	L 420	L	L 340								
29									L	340	L	L 440	L	L	L	L								
30									L	L	L	400	420	L	L	L 360	L							
31									L	L	L	410	410	L	370	C								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									1	4	15	17	18	18	9	5								
MED									260	400	390	400	395	390	370	300								
UQ										405	H 415	410	410	400	370	L 340								
LQ										370	390	400	390	380	360	290								

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JAN. 1977 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

JAN. 1977 | FOE (0.01 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								S	200	240	260	270	280	270	245	A	B							
2								S	205	240	260	270	280	270	250	A	A							
3								S	A 255	260	270	280	A	260	225	A								
4								S	A 240	255	270	285	A	A	A	A								
5								S	180	A 245	A	A	A	A	A	A								
6								S	B 235	B	A	A	A	A	A	B								
7								S	A	A	A	B 290	280	250	A	A								
8								S	A 235	255	275	280	270	240	205	B								
9								S	185	235	265	280	275	270	245	220	B							
10								S	205	240	255	270	285	275	255	220	B							
11								S	A 245	265	285	290	280	250	A	175								
12								S	200	245	265	280	290	275	255	220	170							
13								S	200	C	C	C 290	280	255	215	A								
14								S	A	A	A 280	290	275	255	220	A								
15								S	A	A 270	285	290	280	A	225	A								
16								S	A 245	265	280	290	280	260	225	170	S							
17								S	215	250	270	A	A	A	A	A	A	S						
18								S	205	250	260	275	A	285	270	230	A	S						
19								B	205	250	265	280	290	285	265	A	185	S						
20								S	210	250	265	280	290	285	270	A	A	S						
21								S	210	245	265	285	295	290	270	A	A	S						
22								S	205	250	A	A 295	285	270	235	205	S							
23								S	210	250	275	A 295	285	270	240	A	B							
24								A	A 250	270	285	290	285	265	245	205	S							
25								A	A 255	275	290	A	295	275	A	A	S							
26								B	215	255	270	290	295	290	280	250	205	S						
27								A	215	255	275	290	300	285	270	240	200	S						
28								B	205	250	270	290	310	285	275	255	A	S						
29								B	A 250	270	290	300	290	275	250	A	S							
30								B	210	250	270	285	295	280	270	245	200	S						
31								B	A 245	A	285	295	290	270	C	A	S							
	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									18	26	25	24	26	26	26	18	9							
MED									205	250	265	280	290	282	265	228	200							
UQ									210	250	270	285	295	285	270	245	205							
LQ									200	240	260	275	285	275	255	220	175							

The Radio Research Laboratories, Japan

JAN. 1977 | FOE (0.01 MHZ)

IONOSPHERIC DATA

JAN. 1977 | FOES (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E S 15	E S 15	J A 27	E S 15	E S 14	J A 22	E S 16	J A 18	25	30	32	33	32	33	J A 38	J A 30	F B 18	J A 18	E S 16	J A 26	E S 15	E S 16	J A 19	J A 33
2	J A 29	J A 19	E S 15	E S 15	J A 21	J A 19	J A 21	E S 16	G	27	32	G	G	34	J A 38	25	J A 44	J A 34	J A 28	J A 59	J A 34	J A 20	M 20	E S 16
3	E S 15	E S 13	M 19	J A 17	J A 21	J A 25	J A 18	E S 16	24	J A 28	33	37	J A 40	J A 45	33	27	J A 33	J A 20	E S 15	E S 16	J A 28	J A 17	E S 16	J A 34
4	E S 16	J A 25	E S 14	E S 15	M 20	E S 13	J A 20	J A 25	29	32	33	35	G	33	J A 28	25	J A 29	J A 64	J A 33	J A 87	J A 69	J A 33	E S 16	E S 16
5	E S 16	E S 15	E S 13	E S 16	J A 20	J A 25	J A 20	J A 27	J A 39	J A 39	J A 36	J A 40	J A 46	J A 32	26	J A 27	J A 38	J A 74	J A 88	J A 80	J A 44	E S 16	J A 24	J A 26
6	J A 20	J A 21	J A 30	J A 45	J A 28	E S 15	E S 16	E S 16	E B 23	26	41	41	J A 46	35	37	J A 47	J A 54	J A 122	J A 84	J A 51	J A 39	J A 41	J A 35	J A 20
7	E S 16	E S 16	M 22	E S 13	E S 15	M 19	J A 52	J A 52	J A 47	J A 41	J A 35	E B 30	G	G	J A 26	23	J A 37	J A 45	J A 51	J A 33	J A 37	J A 19	E S 16	E S 16
8	E S 16	E S 16	E S 15	J A 17	M 20	J A 30	J A 36	J A 19	J A 54	G	G 18	G 18	G	G	J A 52	G	G	E S 16	J A 27	J A 27	J A 42	J A 32	E S 15	J A 25
9	J A 20	M 21	E S 15	E S 15	E S 15	E S 16	E S 16	E S 16	24	29	29	30	30	G	G	G	24	E S 16	J A 40	J A 35	J A 26	J A 18	E S 16	M 22
10	E S 16	E S 15	E S 16	M 20	J A 19	J A 21	J A 18	E S 17	24	29	28	G	G	G	G	J A 37	J A 25	J A 24	J A 31	J A 25	J A 19	E S 16	E S 16	M 21
11	E S 16	M 21	M 20	M 19	M 21	M 21	M 21	J A 23	24	G	G	30	G	G	27	26	G	J A 24	J A 49	J A 25	J A 21	J A 18	J A 20	E S 16
12	E S 16	E S 15	E S 16	E S 15	E S 16	E S 15	J A 18	J A 19	25	J A 33	G	G	G	G	G	G	G	22	E S 16	E S 16	J A 19	J A 19	M 21	J A 25
13	J A 20	J A 23	J A 19	E S 16	E S 16	E S 16	M 21	J A 36	24	C	C	C	G	G	27	24	22	J A 27	J A 27	E S 16	J A 25	J A 20	J A 17	J A 19
14	E S 16	E S 15	E S 13	E S 16	J A 17	E S 16	M 21	J A 27	J A 44	J A 80	J A 36	30	G	G	G	G	23	J A 18	M 20	J A 19	E S 16	E S 16	M 21	M 19
15	E S 16	M 21	E S 15	E S 16	E S 16	E S 16	J A 18	20	28	31	J A 28	G	J G 26	G	J A 35	G	20	E S 16	J A 18	J A 20	J A 25	E S 16	E S 16	J A 17
16	E S 16	J A 18	E S 14	J A 25	J A 17	J A 23	J A 17	J A 24	J A 30	30	33	36	G	G	G	G	G	J A 25	E S 16	E S 16	J A 55	J A 20	J A 29	J A 26
17	M 21	E S 16	E S 15	E S 14	E S 16	M 20	J A 18	E S 16	G	G	G	J A 34	J A 73	J A 49	J A 45	J A 49	J A 25	J A 17	J A 18	J A 20	M 20	J A 17	E S 16	E S 14
18	E S 13	E S 13	E S 15	E S 15	E S 15	J A 17	M 20	E S 16	J A 22	G	J A 27	35	38	J A 40	J A 51	35	J A 29	E S 16	J A 35	J A 37	J A 20	J A 17	E S 15	E S 16
19	E S 15	E S 16	E S 13	E S 15	M 20	M 20	E S 16	E B 16	G	G	33	35	35	33	29	29	24	E S 15	E S 15	J A 27	J A 28	J A 43	M 22	J A 18
20	M 21	M 20	E S 13	E S 15	E S 15	M 19	J A 26	J A 40	23	G	G 20	37	G	32	37	J A 74	J A 43	J A 45	J A 24	J A 25	J A 20	J A 26	J A 25	J A 24
21	J A 19	E S 15	E S 13	E S 16	E S 13	E S 15	J A 26	J A 19	G	28	32	G	34	J A 34	J A 39	J A 52	J A 27	J A 35	J A 22	J A 25	J A 26	J A 24	J A 20	J A 29
22	J A 20	M 21	E S 15	E S 15	E S 15	J A 17	M 20	20	G	G	J A 29	J A 34	G 23	G	G	G	25	J A 53	J A 24	J A 27	J A 20	J A 30	E S 15	M 18
23	J A 18	M 18	E S 15	J A 19	M 20	J A 21	J A 24	E S 16	G	G	G	J A 40	G	G	G	G	23	E B 16	J A 20	J A 27	J A 17	J A 19	J A 19	J A 38
24	J A 27	J A 21	J A 18	M 20	E S 13	J A 24	J A 39	J A 30	J A 58	G	G	G	J G 24	J G 20	J G 26	G	G	J A 25	J A 17	J A 25	J A 29	J A 22	J A 19	J A 20
25	J A 20	J A 20	J A 18	M 18	J A 19	J A 20	J A 21	J A 65	J A 26	29	30	33	34	34	J A 41	J A 41	J A 33	J A 24	J A 27	J A 33	J A 26	J A 29	J A 19	M 19
26	J A 20	E S 14	E S 16	E S 14	M 18	J A 18	M 20	J A 18	G	G	G	J G 23	G	G 19	G	G	J A 25	J A 25	J A 18	E S 16	E S 15	E S 15	E S 16	E S 15
27	E S 15	E S 14	J A 24	J A 17	E S 15	M 19	J A 36	J A 27	J A 23	J A 33	J G 23	G	G	G	G	G	J A 25	J A 19	J A 19	E S 15	J A 18	J A 25	J A 27	E S 16
28	E S 15	E S 15	M 21	E S 15	E S 15	E S 13	E S 13	E B 16	G	J A 33	J A 33	J A 33	G	31	31	29	23	J A 18	J A 20	E S 16	E S 15	J A 25	J A 18	E S 14
29	M 20	J A 17	E S 14	E S 16	E S 15	E S 15	J A 20	J A 24	J A 22	32	G	36	J A 42	33	32	J A 26	24	20	J A 28	J A 27	J A 24	J A 34	J A 24	J A 30
30	J A 27	J A 30	J A 24	M 20	E S 14	E S 15	E S 16	E B 17	G	G	34	G	G	G	32	G	G	E S 15	J A 19	E S 15	E S 16	E S 16	E S 15	E S 16
31	E S 15	J A 20	J A 19	J A 24	J A 27	J A 45	J A 25	J A 20	J A 28	J A 33	J A 32	J G 24	G	33	G	C	J A 33	J A 25	J A 32	J A 33	J A 18	M 20	J A 18	J A 34
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	30	30	30	31	31	31	30	31	31	31	31	31	31	31	31
MED	E S 16	17	E S 15	E S 16	E S 16	19	J A 20	J A 19	24	28	30	32	G	G 20	28	25	25	J A 24	J A 24	J A 25	J A 24	J A 20	19	J A 19
UQ	J A 20	J A 21	19	18	J A 20	J A 21	J A 22	J A 26	28	32	33	35	34	33	J A 37	J A 30	J A 31	J A 30	J A 32	J A 33	J A 28	J A 26	J A 21	J A 26
LQ	E S 16	E S 15	E S 14	E S 15	E S 15	E S 16	18	E E 16	G	G	G 18	G	G	G	G	G	21	18	J A 18	18	J A 18	17	E S 16	E S 16

The Radio Research Laboratories, Japan

JAN. 1977 | FOES (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1977 | FBES (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E S 15	E S 15	E	E S 15	E S 14	E	E S 16	G	24	30	32	30	30	32	33	27	E B 18	F	E S 16	E	E S 15	E S 16	E	E
2	A A 29	E	E S 15	E S 15	E	E	E	E S 16	G	26	30	G	G	33	35	25	21	27	24	A A 59	A A 34	19	E	E S 16
3	E S 15	E S 13	E	E	E	19	E	E S 16	20	23	31	35	38	44	G	26	28	20	E S 15	E S 16	E	E	E S 16	25
4	E S 16	18	E S 14	E S 15	E	E S 13	18	21	28	30	31	34	G	29	26	23	25	F	24	A A 87	A A 69	23	E S 16	E S 16
5	E S 16	E S 15	E S 13	E S 16	E	E	20	21	34	29	33	35	29	27	25	25	19	28	A A 88	A A 80	A A 44	E S 16	E	E
6	E	18	28	A A 45	16	E S 15	E S 16	E S 16	E B 23	26	40	40	42	34	36	45	42	A A 122	A A 84	A A 51	A A 39	A A 41	29	20
7	E S 16	E S 16	E	E S 13	E S 15	E	30	21	37	29	35	E B 30	G	G	23	23	32	22	18	E	24	E	E S 16	E S 16
8	E S 16	E S 16	E S 15	E	E	20	E	G	35	G	G 18	G 18	G	G	G	G	G	E S 16	22	E	A A 42	19	E S 15	E
9	E	E	E S 15	E S 15	E S 15	E S 16	E S 16	E S 16	23	29	28	30	30	G	G	G	24	E S 16	20	25	18	E	E S 16	E
10	E S 16	E S 15	E S 16	E	E	E	E	E S 17	24	27	28	G	G	G	G	26	G	F	20	E	E	E S 16	E S 16	E
11	E S 16	E	E	E	E	E	E	G	24	G	G	30	G	G	27	25	G	F	E	E	E	E	E	E S 16
12	E S 16	E S 15	E S 16	E S 15	E S 16	E S 15	E	18	25	21	G	G	G	G	G	G	G	F	E S 16	E S 16	E	E	E	E
13	E	E	E	E S 16	E S 16	E S 16	E	23	24	C	C	C	G	G	27	24	18	24	E	E S 16	E	E	E	E
14	E S 16	E S 15	E S 13	E S 16	E	E S 16	E	24	21	26	31	30	G	G	G	G	23	F	E	E	E S 16	E S 16	E	E
15	E S 16	E	E S 15	E S 16	E S 16	E S 16	E	18	26	29	20	G	G 21	G	33	G	20	E S 16	E	E	E	E S 16	E S 16	E
16	E S 16	E	E S 14	E	E	E	E	18	23	30	33	32	G	G	G	G	G	G	E S 16	E S 16	A A 55	E	20	19
17	E	E S 16	E S 15	E S 14	E S 16	E	E	E S 16	G	G	G	32	37	38	32	27	18	G	E	E	E	E	E S 16	E S 14
18	E S 13	E S 13	E S 15	E S 15	E S 15	E	E	E S 16	G	G	24	32	33	38	29	26	22	E S 16	25	E	E	E	E S 15	E S 16
19	E S 15	E S 16	E S 13	E S 15	E	E	E S 16	E B 16	G	G	32	34	34	31	28	26	23	E S 15	E S 15	E	E	E	E	E
20	E	E	E S 13	E S 15	E S 15	E	E	G	19	G	G 18	35	G	32	30	27	21	19	E	E	E	20	E	E
21	E	E S 15	E S 13	E S 16	E S 13	E S 15	E	G	G	26	31	G	31	G	36	28	21	22	E	17	23	E	E	19
22	E	E	E S 15	E S 15	E S 15	E	E	18	G	G	29	30	G 22	G	G	G	G	28	E	E	E	E	E S 15	E
23	E	E	E S 15	E	E	E	E	E S 16	G	G	G	33	G	G	G	G	23	F B 16	E	18	E	E	E	18
24	E	E	E	E	E S 13	E	A A 39	23	35	G	G	G	G 19	G 19	G 19	G	G	G	E	22	20	E	E	E
25	E	E	E	E	E	E	E	A A 65	20	27	29	32	32	32	35	38	24	18	18	18	19	E	E	E
26	E	E S 14	E S 16	E S 14	E	E	E	G	G	G	G	G 20	G	G 18	G	G	19	16	E	E S 16	E S 15	E S 15	E S 16	E S 15
27	E S 15	E S 14	E	E	E S 15	E	E	18	18	20	G 20	G	G	G	G	G	16	G	E	E S 15	E	E	18	E S 16
28	E S 15	E S 15	E	E S 15	E S 15	E S 13	E S 13	E B 16	G	23	25	25	G	31	30	27	23	18	E	E S 16	E S 15	E	E	E S 14
29	E	E	E S 14	E S 16	E S 15	E S 15	E	G	22	G	G	35	36	33	29	22	23	G	22	19	E	E	18	19
30	22	E	E	E	E S 14	E S 15	E S 16	E B 17	G	G	34	G	G	G	30	G	G	E S 15	E	E S 15	E S 16	E S 16	E S 15	E S 16
31	E S 15	17	18	19	E	E	E	G	21	22	31	G 24	G	33	G	C	30	G	22	28	E	E	E	E
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	30	30	30	31	31	31	30	31	31	31	31	31	31	31	31
MED	E S 15	E E 14	E S 14	E S 15	E S 13	E	E	E G 16	21	22	28	30	G	G 18	26	24	21	16	E E 15	16	E E 15	E	E E 15	E E 14
UQ	E S 16	E S 15	E S 15	E S 16	E S 15	F S 15	16	18	24	27	31	33	30	32	30	26	23	20	21	18	22	16	E S 16	E S 16
LQ	E	E	E	E	E	E	E	E G 16	G	G	G 18	G	G	G	G	G	F G 16		E	E	E	E	E	E

The Radio Research Laboratories, Japan

JAN. 1977 | FBES (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1977 | F-MIN (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

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

JAN. 1977 | F-MIN (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1977 | M(3000)F2 (0.01) | 135° E Mean Time (G. M. T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	295	F 295	320	355	330	F 310	F	325	350	300	340	365	350	Z 340	335	345	345	335	300	320	300	F	F 300	F
2	A	300	280	F	285	310	335	340	330	310	340	365	H 325	335	340	330	355	345	350	A	A	290	290	280
3	290	295	305	350	335	320	315	340	335	345	350	360	340	355	340	360	350	325	345	330	290	295	330	300
4	305	295	290	320	320	F	330	345	350	330	350	355	330	345	350	365	370	350	335	A	A	300	F	F
5	F	F	F	355	F	F	300	320	310	310	360	350	335	340	360	350	330	330	A	A	A	F 285	285	F 285
6	290	300	335	A	330	F 280	F 280	320	325	330	330	350	340	335	340	340	370	A	A	A	A	A	F	F
7	F	F 335	F	F	F	F 315	F	300	320	330	350	360	350	345	355	350	335	315	340	340	F	305	325	335
8	310	315	300	325	350	330	315	320	310	320	320	335	340	360	345	350	345	340	340	325	A	290	310	280
9	295	305	295	345	320	295	330	330	330	340	330	350	340	355	350	360	350	330	325	345	275	315	280	F
10	F 295	320	F	F	325	305	330	330	345	335	340	355	350	355	365	375	350	340	335	335	310	325	310	300
11	305	300	325	335	335	350	290	330	340	335	335	315	350	350	350	370	365	340	330	345	300	305	305	305
12	305	315	325	F	F	F	F	365	340	345	330	340	350	340	340	350	350	325	330	340	320	315	345	310
13	305	310	315	325	325	300	330	350	350	C	C	C	350	345	355	350	345	350	335	350	300	295	F	F
14	F	F	F	335	305	310	345	345	360	320	345	360	320	325	335	340	345	345	315	340	365	F	F	F
15	310	300	305	310	325	330	290	325	320	350	350	345	350	345	340	350	355	325	335	335	290	285	315	340
16	295	290	325	315	325	310	345	355	360	345	345	350	350	345	350	355	355	330	345	340	A	305	330	325
17	295	305	300	335	375	300	325	365	355	325	350	350	345	350	345	335	345	320	325	355	300	295	300	290
18	315	320	310	315	320	350	310	340	360	345	345	340	350	340	370	360	375	310	325	345	355	295	300	310
19	325	320	320	290	325	340	310	340	350	345	H 310	350	335	345	330	365	365	345	325	325	325	305	315	335
20	330	295	290	295	300	300	350	365	375	350	325	355	365	350	345	335	345	340	345	345	315	290	295	310
21	330	325	300	310	320	340	F 295	340	375	330	350	350	325	365	325	325	350	345	300	330	340	315	300	290
22	295	295	290	295	330	315	345	340	355	345	330	340	345	340	355	360	355	340	350	340	325	295	300	295
23	295	305	310	340	380	295	315	345	370	345	310	355	375	340	345	350	355	380	315	310	330	305	290	310
24	300	290	300	310	335	290	A	360	375	355	335	345	320	350	355	335	345	330	325	335	360	300	285	300
25	305	290	300	315	345	310	315	A	345	355	345	355	335	345	340	345	365	350	320	315	325	330	315	290
26	300	280	295	330	340	310	320	350	345	330	355	355	335	315	350	350	355	345	305	315	315	320	315	300
27	310	305	295	310	325	305	310	350	370	350	345	320	330	345	355	345	335	345	300	310	295	305	305	295
28	295	305	300	295	295	300	330	355	370	H 315	305	345	335	340	360	345	340	350	345	320	320	325	320	295
29	305	295	305	300	305	345	325	335	350	315	345	345	345	355	365	330	340	340	300	335	335	295	295	300
30	310	325	290	295	305	305	340	330	355	355	335	350	335	350	355	335	365	345	335	295	305	310	285	295
31	285	290	310	330	280	295	285	315	355	330	325	305	350	340	315	I C 330	350	330	320	315	315	285	290	290
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	29	27	26	28	28	27	30	31	30	30	30	31	31	31	31	31	30	29	27	24	28	27	25
MED	305	300	300	318	325	310	320	340	350	335	340	350	340	345	350	350	350	340	330	335	315	302	300	300
UQ	310	315	312	335	335	325	330	350	360	345	350	355	350	350	355	358	355	345	340	340	328	312	315	310
LQ	295	295	295	310	312	300	310	330	338	325	330	345	335	340	340	338	345	330	320	320	300	295	292	290

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JAN. 1977 | M(3000)F2 (0.01)

IONOSPHERIC DATA

JAN. 1977 | M(3000)F1 (0.01) | 135° E Mean Time (G. M. T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										350	L	L	380	L	L									
2										L	L	L	L	L	L									
3										L	L	L	L	A	L									
4											380	L	L 365	385	L	L								
5										L	360	L	400	395	L	390								
6										L	A	A	A	L 365	A	A								
7										L	L	385	390	L	L	L								
8										L	355	360	L 370	H 375	H 400	395								
9										L	350	375	370	H 375	L									
10										L	L	H 370	L 380	385	L									
11										L	365	L	375	H 380	H 370	L								
12										L	L 375	370	L	365	365	L								
13										C	C	C	370	375	L	L								
14									L	L 360	380	L 370	L	H 375	375									
15										L	L	370	L	390	365	L								
16											L	370	L 370	380	L	L	L							
17									L	L	L	L	L	L	L	L	L							
18										L	H 375	L	L	L	L	385								
19										L	L	L 375	L 370	L 380	L	L								
20									L	L	H 370	L	L	L	L	L								
21											L	L	375	L	360	L								
22									380	H 380	H 380	405	395	H 385	L 390	L								
23										L	370	L	L	385	L	L								
24										L	H 375	375	380	H 385	L	L								
25										L	L 370	L 375	L	L 380	360	A								
26										L	H 370	L	L	L	L	L								
27									L	L	L	380	H 375	L	L	L	L							
28									L	L	H 340	H 365	L 370	L 370	L	L 375								
29									L	410	L	L 365	L	L	L	L								
30									L	L	L	385	375	L	L	L 380	L							
31									L	L	L	365	365	L	390	C								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									1	4	15	17	18	18	9	5								
MED									380	370	370	370	375	380	370	385								
UQ										395	375	375	380	385	390	390								
LQ										355	362	370	L 370	375	365	L 380								

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JAN. 1977 | M(3000)F1 (0.01)

IONOSPHERIC DATA

JAN. 1977 | H'F2 (KM) | 135° E Mean Time (G. M. T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										290	250	225	235	235	265									
2										265	235	225	225	240	255									
3										235	245	230	265	235	250									
4											250	235	260	235	230	220								
5										260	220	235	245	245	240	235								
6										255	245	230	255	255	245	240								
7										245	235	235	235	235	235	230								
8										260	250	245	250	230	230	240								
9										270	255	240	245	230	245									
10										255	245	240	235	235	230									
11										225	275	245	250	265	250	230								
12										255	255	235	235	250	260	230								
13										C	C	C	250	250	235	230								
14									220	235	240	220	225	275	265									
15										235	250	255	245	250	265	240								
16											245	235	240	245	240	225	220							
17									220	235	250	245	255	235	225	230	215							
18										225	245	250	240	245	225	235								
19										235	240	250	265	245	225	225								
20									210	220	285	235	240	250	235	230								
21											245	235	250	240	290	235								
22									235	250	265	250	240	255	235	235								
23										220	305	240	230	255	240	235								
24										225	265	245	235	250	245	240								
25										225	240	240	235	245	250	235								
26										230	240	225	250	230	240	245								
27									215	215	250	255	255	240	230	215	215							
28									205	220	295	250	250	250	225	235								
29									220	250	240	250	235	245	225	230								
30									220	230	250	240	250	230	235	260	220							
31									225	255	250	255	240	245	235	C								
	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	27	30	30	31	31	31	24	4							
MED									220	235	250	240	245	245	240	235	218							
UQ									220	255	255	250	250	250	250	238	220							
LQ									215	225	240	235	235	235	230	230	215							

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JAN. 1977 | H'F2 (KM)

IONOSPHERIC DATA

JAN. 1977 | H'F (KM) | 135° E Mean Time (G. M. T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	250	250	235	205	235	230	275	235	215	235	240	220	200	230	A	230	220	210	230	240	275	235	260	290
2	A	250	300	250	300	265	245	230	H 200	H 200	230	225	H 200	210	A	235	215	230	205	A	A	310	310	315
3	305	285	255	215	215	260	275	230	235	235	235	A	A	A	230	230	215	240	215	235	300	265	240	A
4	265	290	300	245	220	275	235	225	220	235	225	230	210	205	210	215	225	215	250	A	A	300	245	250
5	300	270	230	200	270	E S 320	A	260	275	240	235	225	205	195	H 220	235	230	230	A	A	A	305	290	295
6	280	285	A	A	240	E S 330	305	240	240	240	A	A	A	245	A	A	A	A	A	A	A	A	A	280
7	220	220	235	230	230	240	A	260	255	235	A	205	185	225	H 205	200	225	250	230	230	A	250	230	215
8	250	235	270	245	205	265	245	235	265	240	230	200	200	H 195	H 200	200	210	205	A 250	240	A	A 290	255	290
9	270	260	280	220	E S 255	E S 300	255	230	220	265	235	220	205	H 200	H 195	220	220	220	240	230	A	245	275	295
10	270	245	220	205	235	245	270	220	235	240	235	H 190	205	200	H 190	215	225	220	230	230	250	240	235	265
11	285	275	245	225	215	220	E S 290	215	220	210	210	240	210	H 190	H 200	230	205	205	215	215	240	250	240	265
12	250	230	240	315	265	230	E S 300	215	230	250	220	205	225	210	205	190	225	240	250	225	245	245	200	250
13	250	295	250	245	235	285	250	225	235	C	C	C	220	220	220	220	H 200	235	235	210	290	295	280	290
14	260	250	230	215	230	250	215	230	200	200	230	195	195	H 190	200	225	230	215	250	220	200	295	280	270
15	270	285	250	240	245	245	E S 350	215	240	A	230	225	220	210	A	230	215	215	220	215	295	300	255	210
16	285	295	245	245	235	260	215	200	215	225	A	215	220	195	H 200	220	195	235	220	220	A	290	250	255
17	295	280	275	230	200	E S 320	255	215	180	H 180	H 185	235	A	A	210	205	215	225	245	205	255	290	275	280
18	230	245	255	245	250	200	255	235	225	220	H 180	H 190	230	A	225	200	205	255	250	225	205	280	270	245
19	235	240	230	285	225	200	265	235	225	H 180	215	215	215	210	210	200	215	220	240	235	235	275	250	225
20	240	275	295	295	280	275	215	205	205	195	H 180	A	H 190	230	230	210	220	205	210	210	245	295	255	255
21	240	235	250	255	230	195	275	235	210	220	235	245	215	235	230	A	230	215	255	240	225	260	270	300
22	280	285	295	290	235	205	220	225	190	H 185	H 190	190	200	H 190	200	235	220	240	205	210	235	285	275	280
23	290	265	250	225	200	E S 315	270	225	220	195	195	230	H 195	200	220	225	225	195	275	260	225	240	290	275
24	275	285	275	255	230	300	A	205	205	200	H 190	205	200	H 190	H 205	H 180	235	210	230	235	210	270	300	285
25	265	270	270	245	220	245	250	A	225	215	205	215	H 200	210	230	A	215	200	250	265	250	230	245	280
26	290	290	285	240	205	225	245	225	220	200	H 190	215	225	205	230	H 190	225	200	235	240	235	230	245	260
27	250	255	265	250	240	250	220	210	215	205	H 180	185	H 190	H 180	H 180	H 180	180	205	255	245	265	240	260	275
28	275	255	265	280	275	255	235	210	205	190	H 190	H 180	225	220	210	190	235	235	215	235	235	245	245	285
29	255	260	280	275	260	215	225	225	205	190	H 180	225	A	220	215	220	225	220	250	235	210	255	290	290
30	270	245	300	275	265	250	215	220	190	190	240	205	205	200	225	210	230	200	205	255	250	260	305	270
31	300	300	255	260	300	295	310	240	180	H 180	235	205	225	225	195	I C 210	235	205	235	A	230	245	295	285
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	30	30	31	31	28	30	31	29	27	27	27	28	27	28	30	30	29	26	23	30	30	30
MED	270	265	255	245	235	248	248	225	220	210	220	215	205	208	210	215	220	218	235	232	240	262	260	278
UQ	285	285	280	260	258	270	272	235	232	235	235	225	220	220	222	228	225	235	250	240	252	290	280	290
LQ	250	248	245	225	222	230	230	215	205	195	H 190	202	200	195	H 200	200	215	205	220	220	228	245	245	255

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JAN. 1977 | H'F (KM)

IONOSPHERIC DATA

JAN. 1977 | H'E (KM) | 135° E Mean Time (G. M. T. + 9 h)

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

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

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JAN. 1977 | H'E (KM)

IONOSPHERIC DATA

JAN. 1977 | H'ES (KM) | 135° E Mean Time (G. M. T. + 9 h)

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

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	S	S	100	S	S	110	S	110	155	150	135	130	125	125	120	115	B	100	S	105	S	S	100	100
2	100	100	S	S	110	110	110	S	G	140	125	G	G	125	115	115	105	100	105	105	100	100	100	S
3	S	S	125	115	115	110	110	S	110	105	145	130	125	100	140	120	115	110	S	S	110	110	S	105
4	S	105	S	S	110	S	115	110	155	125	150	125	G	120	115	115	110	110	105	105	105	105	S	S
5	S	S	S	S	155	150	130	120	120	120	125	115	110	115	110	105	105	110	105	105	100	S	105	110
6	140	130	120	115	110	S	S	S	B	145	120	120	120	120	120	110	110	105	100	100	100	100	100	100
7	S	S	110	S	S	110	105	100	100	100	100	B	G	G	110	110	105	105	100	100	100	100	S	S
8	S	S	S	100	115	110	110	110	100	G	105	105	G	G	140	G	G	S	110	105	105	110	S	115
9	110	110	S	S	S	S	S	S	150	150	145	135	140	G	G	G	165	S	105	105	105	100	S	100
10	S	S	S	120	115	120	115	S	155	150	150	G	G	G	G	120	110	105	100	100	100	S	S	105
11	S	110	110	125	120	120	120	105	135	G	G	130	G	G	150	110	G	115	110	100	100	105	100	S
12	S	S	S	S	S	S	130	120	150	100	G	G	G	G	G	G	G	150	S	S	105	105	110	100
13	100	100	100	S	S	S	115	110	160	C	C	C	G	G	130	130	120	110	110	S	105	105	105	100
14	S	S	S	S	115	S	135	110	105	100	100	125	G	G	G	G	165	140	100	105	S	S	105	105
15	S	100	S	S	S	S	130	120	120	115	100	G	100	G	115	G	120	S	110	110	105	S	S	105
16	S	110	S	110	110	110	110	110	110	165	130	125	G	G	G	G	G	100	S	S	105	100	105	100
17	100	S	S	S	S	105	100	S	G	G	G	115	115	110	110	110	105	105	105	100	100	100	S	S
18	S	S	S	S	S	110	110	S	105	G	100	125	120	115	130	125	115	S	100	100	100	100	S	S
19	S	S	S	S	110	110	S	B	G	G	155	140	130	125	120	115	155	S	S	110	105	100	100	105
20	105	100	S	S	S	120	115	110	110	G	100	155	G	150	130	110	105	105	100	100	100	100	100	100
21	95	S	S	S	S	S	115	110	G	135	125	G	135	120	115	115	115	110	105	100	100	100	100	105
22	105	110	S	S	S	120	115	110	G	G	100	100	100	G	G	G	130	115	110	105	110	105	S	105
23	100	100	S	120	120	120	110	S	G	G	G	105	G	G	G	G	120	B	120	110	110	115	110	105
24	105	105	105	110	S	120	115	110	105	G	G	G	100	100	100	G	G	100	100	105	105	100	105	105
25	105	100	110	120	115	110	110	110	105	155	155	130	115	125	115	115	110	105	105	100	100	100	100	100
26	100	S	S	S	120	115	115	110	G	G	G	100	G	100	G	G	100	100	100	S	S	S	S	S
27	S	S	100	100	S	115	110	105	105	100	100	G	G	G	G	G	100	100	100	S	100	105	105	S
28	S	S	100	S	S	S	S	B	G	105	100	100	G	130	130	125	115	150	105	S	S	100	105	S
29	100	100	S	S	S	S	110	100	105	115	G	140	115	155	140	105	130	105	100	100	110	110	105	105
30	100	100	100	105	S	S	S	B	G	G	165	G	G	G	165	G	G	S	110	S	S	S	S	S
31	S	135	125	110	105	105	105	105	100	100	100	100	G	125	G	C	110	105	105	105	105	105	100	100
	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	16	12	12	15	20	25	20	21	19	23	21	14	17	21	18	24	24	26	23	26	24	19	21
MED	100	102	108	112	115	110	115	110	110	120	125	125	118	120	120	115	112	105	105	105	105	100	105	105
UQ	105	110	115	120	118	120	115	110	150	148	145	130	125	125	130	120	120	110	110	105	105	105	105	105
LQ	100	100	100	108	110	110	110	108	105	102	100	105	110	115	115	110	105	102	100	100	100	100	100	100

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JAN. 1977 | H'ES (KM)

IONOSPHERIC DATA

JAN. 1977 | TYPES OF ES | 135° E Mean Time (G. M. T. + 9 h)

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

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1			F2			F2		L1	H1	H2	HL22	HL11	HL22	H2	C2	C2		F1		F2			F2	F2
2	F2	F2			F2	F1	F1			H1	H1			H2	C2	C2	L1	F2	F2	F2	F2	F1	F1	
3			F1	F1	F1	F3	F1		L1	L2	H1	H2	HL22	L3	H1	C2	C4	F1			F1	F1		F5
4		F3			F1		F2	L3	HL23	H2	H1	H2		C1	C1	C2	L3	F1	F3	F3	F3	F2		
5					F1	F1	F2	C2	C3	C2	H2	C2	C2	C1	L2	L2	L1	F4	F4	F2	F2		F1	F1
6	F1	F2	F3	F3	F2					H1	C1	C1	C2	C1	C1	C2	L2	F3	F3	F2	F2	F1	F1	F1
7			F1			F1	F2	L2	L2	L1	L1				L2	L2	L3	F2	F2	F2	F2	F1		
8				F1	F1	F3	F2	L1	L2		L1	L1			H1				F2	F2	F2	F2		F1
9	F2	F1							H1	H1	H1	H1	H1				H2		F2	F2	F1	F2		F1
10				F1	F3	F2	F1		H1	H1	H1					C2	LH11	F1	F2	F1	F1			F1
11		F1	F1	F1	F1	F1	F1	L1	H2			H1			H1	L2		F1	F2	F1	F1	F1	F1	
12							F2	C2	H2	L1								F1			F1	F1	F1	F2
13	F2	F2	F2				F2	L3	H2						H1	H1	C2	F3	F1		F2	F1	F1	F1
14					F1		F1	L3	LH42	LH31	L2	HL11					H2	F1	F1	F1			F1	F1
15		F1					F2	C3	C4	C3	L1		L1		C2		C2		F1	F1	F1			F1
16		F1		F2	F2	F2	F1	L2	L2	H2	H2	H2						L1			F3	F1	F2	F2
17	F1					F1	F1					C1	C2	C2	C2	L2	L2	L1	F1	F1	F2	F1		
18						F1	F1		L1		L2	H2	C2	C2	H2	H2	C3		F3	F2	F3	F1		
19					F1	F1					H2	H2	H2	HL21	C1	C4	HL22			F1	F2	F3	F1	F1
20	F1	F1				F1	F1	L1	L3		L1	H2		H1	H2	L3	L3	L2	F1	F2	F2	F4	F2	F2
21	F2						F2	L1		H1	H2		H1	C1	C2	C2	C2	L3	F1	F2	F3	F2	F2	F3
22	F3	F1				F1	F1	L2			L1	L1	L1				H2	C3	F4	F1	F1	F2		F1
23	F1	F1		F1	F1	F5	F2					L3					C2		F2	F3	F1	F2	F2	F3
24	F2	F2	F1	F1		F4	F3	L3	L2				L2	L2	L2			L1	F1	F3	F2	F2	F1	F2
25	F2	F2	F1	F1	F1	F2	F2	L3	LH12	HL11	H1	H2	C2	H2	C2	C2	L2	L2	F3	F3	F3	F2	F1	F1
26	F2				F1	F1	F1	L1				L1		L1				L2	L3	F2				
27			F2	F2		F1	F2	L2	L2	L2	L1						L1	L1	F1		F1	F2	F3	
28			F1							L2	L2	L2		H1	H1	H2	C3	H2	F1			F2	F1	
29	F1	F1					F1	L1	L2	C1		H2	C2	H2	H1	L3	H2	L1	F3	F2	F1	F3	F3	F4
30	F4	F2	F2	F1							HL22				H1				F1					
31		F2	F3	F5	F3	F4	F3	L1	L2	L1	L1	L1		H1			L4	L1	F3	F3	F1	F1	F2	F2
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
UQ																								
LQ																								

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JAN. 1977 | TYPES OF ES

IONOSPHERIC DATA

JAN. 1977 | FXI (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	S 42	S 43	S 46	X 29	C 26	S 28	X 29											X 53	X 38	C	S 38	S	47	S
2	37	S 37	40	35	S 32	S 31	S 33											X 54	S	A	S	S 32	S 33	X 34
3	X 33	X 33	S 35	S 36	S 28	S 28	X 30											X 43	X 37	X 39	38	37	40	X 39
4	A	A	X 37	44	A	X 35	39											X 41	X 34	A	A	S 41	O S 37	S 37
5	X 39	X 39	S 38	S 27	A	31	X 29											X 59	A	X 39	O S 29	X 32	37	X 36
6	X 37	X 37	X 41	X 34	X 29	A	X 26											R 39	A	X 36	O S 38	S	S	O S 45
7	S	S	33	40	O S 45	S	S 40											X 48	S 49	X 48	A	X 39	X 35	X 31
8	S 31	S 33	S 35	X 37	X 34	37	S 34											X 46	X 34	X 35	X 35	X 31	X 32	X 34
9	X 34	X 36	X 33	X 35	X 23	X 25	X 25											X 48	X 39	S	A	X 35	A	33
10	35	38	X 41	A	X 27	X 27	X 26											X 43	X 41	S 42	X 41	X 42	S 34	S 32
11	X 33	X 34	S 35	X 38	S 38	X 35	A											X 41	S 42	S 38	S 33	38	O S 38	S 35
12	38	S 45	S 41	36	37	29	A											X 43	X 40	X 48	X 39	X 38	X 33	O S 35
13	X 32	X 33	X 36	X 36	S 29	X 27	X 27											X 40	X 43	S 41	X 30	X 33	S 35	S 35
14	X 34	X 36	S 39	S	34	X 35	X 32											X 50	X 36	X 41	X 33	X 29	O S 34	34
15	S 36	X 31	S 34	X 32	X 31	S 29	X 26												O S 39	S 36	A	S 36	39	S 40
16	S 37	X 36	X 38	X 36	S 32	X 35	S 34												X 44	X 39	X 30	X 32	S 35	X 35
17	X 33	S 35	X 33	X 35	X 38	X 26	X 28												X 39	X 48	X 38	X 36	X 38	X 39
18	S 41	X 35	X 36	X 34	X 35	X 30	X 32												X 51	X 58	38	X 32	X 32	X 37
19	X 40	S 41	X 33	X 34	X 39	S 29	X 31												X 38	S 44	S 45	X 36	X 37	X 37
20	X 34	S 32	X 31	X 31	S 33	X 33	X 37												X 41	S 40	X 36	X 35	S 37	X 41
21	S 42	X 38	X 38	X 39	X 37	O S 30	X 29												X 35	X 43	X 47	X 34	X 34	X 36
22	X 36	X 36	X 36	X 35	X 39	X 28	X 29												X 38	X 32	O S 32	S 33	S 34	X 34
23	X 35	X 36	X 37	S 35	X 25	X 23	S 24												A	X 33	X 35	X 38	X 36	X 36
24	X 36	X 37	X 36	X 36	X 40	X 29	X 29												X 40	X 39	S 40	X 30	X 30	S 34
25	S 36	X 35	X 35	X 38	X 33	X 29	X 28												X 34	X 35	X 43	X 44	A	X 36
26	X 36	X 37	S 40	X 40	X 37	X 34	X 27												X 33	X 38	X 42	X 38	X 34	X 35
27	X 36	X 38	X 37	X 37	X 38	X 31	X 31												S 35	X 40	S 42	O S 42	X 39	S 38
28	X 38	S 39	S 40	X 38	X 38	X 35	X 33												S 44	S 46	X 36	X 37	X 37	S 37
29	S 38	O S 39	S 36	X 37	S 43	X 40	X 30												X 55	X 50	X 46	X 36	X 33	X 38
30	O S 42	X 40	S 38	S 40	X 39	X 40	X 37												X 39	X 38	S 41	X 39	X 39	X 40
31	X 39	X 40	X 44	S 38	O S 31	X 35	X 31												C 48	C 47	C 50	C 36	C 35	C 36
	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	31	29	29	29	29											14	27	27	26	29	28	30
MED	X 36	X 37	X 37	X 36	X 34	X 30	X 30											X 44	X 39	X 40	X 38	X 36	35	X 36
UQ	38	X 39	40	X 38	X 38	X 35	X 33											X 50	X 42	X 45	42	X 38	38	X 38
LQ	X 34	X 35	X 35	X 35	31	X 28	X 28											X 41	X 36	X 38	X 35	X 33	34	34

JAN. 1977 | FXI (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1977 | FOF2 (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	S 36	S 37	S 40	23	20	S 22	S 23	C	C	56	84	101	65	58	R 64	63	53	47	S 32	I C 34	S 32	S	F	S
2	F	S 31	30	F 26	26	25	S 27	42	47	59	106	74	C	H 53	59	60	52	48	I S 32	A	S	26	27	28
3	27	27	29	30	S 22	S 22	S 24	S 41	45	66	H 61	73	61	61	66	59	A	S 37	31	33	F	F	F	J S 33
4	A	A	J S 31	F 35	A	29	F	40	48	53	J R 75	73	R 62	54	52	51	44	35	28	A	A	J S 35	S 31	J S 31
5	S 33	33	32	21	A	F 22	23	40	63	R 98	129	89	59	61	64	A	49	53	A	33	23	26	F	30
6	31	31	35	28	23	A	20	39	50	74	94	68	56	63	66	61	48	33	A	30	S 32	S	S	U S 39
7	S	S	F	F	39	I S 37	S 34	37	62	75	98	80	60	59	57	50	47	42	S 43	S 42	A	33	29	25
8	25	27	S 29	31	28	F 27	28	37	49	66	84	92	77	64	54	52	47	40	28	29	29	25	26	28
9	28	30	27	29	J S 17	19	19	34	45	52	78	82	68	54	55	50	44	42	33	I S 36	A	29	A	F
10	F	F 29	35	A	21	21	20	34	47	64	88	86	64	54	51	45	38	37	35	36	35	36	28	26
11	27	28	29	32	32	29	A	33	52	49	57	69	67	51	55	65	44	35	S 36	S 32	S 27	F	S 32	S 29
12	F	J S 39	S 35	F	F	F	A	47	52	58	80	72	62	55	57	54	43	37	34	42	33	32	27	29
13	26	27	30	30	23	21	21	35	44	51	57	65	65	63	57	49	41	34	37	35	24	27	S 29	29
14	28	30	33	S	F 23	29	26	40	46	49	82	79	54	55	58	57	44	44	30	35	27	23	S 28	F
15	30	25	28	26	S 25	S 23	20	35	42	64	H 79	65	65	56	55	65	54	39	S 33	30	A	30	33	34
16	S 31	30	32	30	C 26	29	28	38	49	48	69	80	72	60	50	55	45	37	38	33	24	C 26	S 29	29
17	27	29	27	29	32	20	22	S 42	I C 47	52	60	65	66	58	52	48	49	37	33	42	32	30	32	33
18	J S 35	29	30	28	29	24	26	42	66	58	54	72	64	61	60	56	46	36	45	52	F 28	26	26	31
19	34	S 35	27	28	33	23	25	41	62	59	58	80	62	65	54	55	46	36	32	S 38	S 39	30	31	S 31
20	28	C 26	25	25	S 27	27	31	49	54	51	57	85	62	62	58	57	65	47	35	S 34	30	29	31	35
21	S 36	S 32	32	33	31	U S 24	23	45	66	H 57	64	86	77	59	H 56	H 51	54	41	29	37	S 41	28	28	30
22	30	30	30	29	33	22	23	43	55	63	72	72	61	58	59	57	55	42	32	26	C 26	27	S 28	28
23	29	30	31	29	19	17	18	44	59	56	59	83	77	65	63	60	55	41	A	27	29	32	30	30
24	30	31	30	30	34	23	23	51	55	54	55	70	64	63	59	55	61	57	34	33	S 34	24	24	28
25	30	29	29	32	27	23	22	44	53	59	H 57	67	62	67	57	56	59	43	28	29	37	38	A	30
26	30	31	S 34	34	31	28	21	42	J S 63	64	80	67	H 62	72	63	57	64	47	27	32	36	32	28	29
27	30	32	31	31	32	25	25	46	61	54	56	71	64	68	R 63	55	48	49	29	34	36	36	33	32
28	32	33	34	32	32	29	27	53	56	53	57	73	74	R 75	66	54	57	46	38	S 40	30	31	31	31
29	S 32	S 33	S 30	31	S 37	34	24	43	C	C	C	C	C	67	60	65	57	59	49	44	40	30	27	S 32
30	S 36	34	32	34	S 33	34	31	48	58	62	80	88	75	74	68	68	R 74	50	33	32	35	33	33	34
31	33	34	38	32	S 25	29	25	51	J S 79	77	77	C 74	C 84	C 72	C 67	C 62	C 70	C 54	C 42	C 41	C 44	C 30	C 29	C 30
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	29	30	27	28	29	28	30	29	30	30	30	29	31	31	30	30	31	28	29	25	27	25	28
MED	30	30	30	30	28	24	24	42	53	58	74	74	64	61	58	56	49	42	33	34	32	30	29	30
UQ	S 33	33	33	32	32	29	26	45	61	64	82	83	68	65	63	60	57	47	36	38	36	32	31	32
LQ	28	29	29	28	23	22	22	38	47	53	57	70	62	57	55	52	45	37	30	32	28	26	28	29

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JAN. 1977 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1977 | FOF1 (0.01 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

Station KOKUBUNJI TOKYO Lat. 35° 42·4′ N, Long. 139° 29.3′ E Sweep 1 MHz to 20 MHz in 20 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									C	L	L 400	L	L	L	A	L								
2										L	L	L	C	L 360	U L 370	L								
3										L	L	L	A	L	L	L								
4										L	L	L	L	L	L									
5									A	L	A	A	A	A	A	A								
6									L	L	A	A	L	L	A	A	L							
7									L	L	L	L	L	L	L	A								
8										L	U L 410	L	U L 410	L	L	280								
9									L	L	410	L	L 410	L	L	L								
10										L	L 400	L 410	L	L	L	L								
11									L	L	410	H 410	H 410	L	A	L								
12										L	L	L	L	L	L	L								
13										L	L	L	L	L	L	L								
14										L	L	L	L	L	L									
15										L	L	L	L	L	420	L	L							
16											L	L	L	L	L	L								
17										L	L	L	L	L	L		L							
18									L	L	L	L	L	L	A	L								
19									270	L	L	L	L	L	L	L								
20									L	L	L	L	L	L	L	L								
21									L	L	400	L	L	L	L	L								
22									L	L	U L 410	L	L	L	L	L								
23									L	L	L	L	L	L	L	L								
24										L	L	L	L	L	L	L								
25										L	L	L	L	L	L	L	A							
26										L	L	L	L	420	L	L	250							
27										L	L	L	L 410	L	L	L								
28									L	L	L	U L 420	L	L	L	L								
29									C	C	C	C	C	L	L	L								
30									L	L	L	L	L	L	L	L								
31										L	L	L	L	L	L	L								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									1		7	3	4	2	2	1	1							
MED									270		L 410	L 410	L 410	390	395	280	250							
UQ											410	L 415	L 410											
LQ											L 400	410	410											

The Radio Research Laboratories, Japan

JAN. 1977 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

JAN. 1977 | FOE (0.01 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								C	C	C 260	A	A	295	290	260	A	A							
2								S	190	265	280	300	I C 295	280	270	A	A							
3								S	240	27?	290	295	300	29?	280	250	S							
4								S	210	A	290	A	A	290	A	A	A							
5								S	A	A	A	A	A	A	A	A	A							
6								S	A	A	280	290	300	A	A	A	A							
7								S	220	26?	290	300	300	A	A	A	A							
8								A	A	A	280	295	290	285	A	240	A							
9								S	220	260	285	290	295	290	270	235	S							
10								B	220	260	290	300	295	290	270	240	A							
11								S	230	C 260	28?	295	300	295	A	250	170							
12								S	210	A	290	300	295	285	270	240	180							
13								S	A	270	285	300	300	295	275	240	170							
14								S	A	A	28?	295	300	280	270	250	190							
15								B	210	260	270	285	A	295	285	250	A	P						
16								S	220	270	295	A	A	A	270	235	B	S						
17								S	I C 220	270	290	295	300	300	280	C 250	200	S						
18								S	220	280	290	290	R 300	300	285	26?	A	S						
19								S	220	C 260	280	305	310	305	285	A	B	S						
20								S	210	260	290	305	305	310	295	A	A	S						
21								S	230	270	290	295	310	300	A	A	A	S						
22								A	225	270	285	290	305	A	A	240	180	S						
23								S	220	A	300	305	310	A	A	A	A	B						
24								A	A	270	290	295	300	300	280	250	A	S						
25								A	210	260	290	A	A	A	A	A	A	S						
26								S	230	270	290	290	295	H 300	285	260	215	S						
27								S	230	A	A	300	310	300	280	245	A	S						
28								S	220	260	285	A	A	310	295	270	210	S						
29								S	C	C	C	C	C	A	A	260	195	S						
30								S	200	280	290	300	310	300	280	260	215	P						
31								A	A	A	A	C 300	C 300	A	A	C 250	A	S						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									22	21	26	24	24	22	19	20	10							
MED									220	265	290	295	300	295	280	250	192							
UQ									225	270	290	300	305	300	285	255	210							
LQ									210	260	285	292	295	290	270	240	180							

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JAN. 1977 | FOE (0.01 MHZ)

IONOSPHERIC DATA

JAN. 1977 | FOES (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	23	E B 13	24	J A 24	J A 28	E B 13	J A 22	C	C	31	J A 61	40	37	J A 43	J A 100	J A 40	J A 30	J A 26	F S 16	C	J A 31	24	23	25
2	J A 23	J A 21	22	25	24	23	23	E S 16	G	31	35	G	C	32	31	J A 31	J A 30	J A 27	J A 38	J A 27	23	24	25	24
3	E S 16	E S 16	22	23	24	J A 26	22	J A 24	J A 26	31	J A 42	J A 44	J A 47	J A 42	32	28	J A 52	J A 26	J A 20	22	E B 14	J A 28	27	26
4	J A 42	J A 44	J A 24	J A 27	44	25	25	25	28	J A 37	34	J A 33	31	36	34	J A 33	24	J A 37	J A 33	J A 34	J A 51	J A 27	J A 26	26
5	23	24	20	E S 16	27	J A 27	J A 25	19	J A 73	J A 36	J A 112	J A 74	J A 63	J A 50	J A 42	J A 53	J A 62	J A 51	J A 64	J A 41	J A 26	25	J A 26	23
6	23	E B 14	23	J A 42	J A 54	42	J A 30	E S 16	25	30	31	J A 50	36	38	J A 44	J A 58	J A 54	J A 40	J A 78	J A 35	J A 42	J A 26	22	E S 16
7	E S 16	E S 15	E S 16	E S 16	21	20	23	23	25	30	35	G	G	32	J A 30	J A 35	J A 36	J A 30	J A 66	J A 52	J A 33	J A 24	J A 27	25
8	23	J A 22	23	E S 16	E S 16	22	J A 30	J A 44	J A 26	J A 47	36	G 23	J A 30	J A 31	J A 30	J A 25	J A 26	J A 24	J A 24	J A 27	25	J A 26	J A 25	26
9	J A 33	22	22	18	E S 16	E S 15	21	E S 16	27	30	30	31	35	31	32	28	E S 16	J A 26	J A 19	J A 64	J A 32	J A 26	J A 27	25
10	22	19	22	25	25	23	25	J A 26	G	34	J A 30	G	G	G	G	G	J A 26	24	22	J A 30	25	23	23	24
11	25	20	23	20	24	25	J A 25	E S 16	26	G	G	G	G	G	J A 42	J A 43	J A 40	J A 30	J A 42	J A 52	J A 31	25	24	E S 16
12	24	22	E S 16	E S 16	22	E S 16	27	21	25	J A 36	J A 30	J G 29	G 21	32	G	28	22	19	22	24	23	23	23	J A 27
13	25	25	23	18	20	E S 16	E S 16	25	J A 30	J A 30	G	J G 24	J A 30	G	33	28	J A 37	E S 16	J A 21	J A 52	20	23	J A 26	J A 23
14	25	20	22	25	20	E S 16	E S 16	J A 20	28	J A 68	34	J A 43	G	G	G	28	23	22	J A 25	24	25	J A 24	23	E S 16
15	E S 16	19	23	E B 15	E B 14	23	23	21	28	G	33	J A 30	J A 31	J G 23	G 22	G 24	19	J A 34	J A 52	J A 30	J A 37	23	J A 27	J A 30
16	J A 24	J A 26	25	22	J A 21	J A 20	J A 22	22	G	31	J A 41	J A 42	33	J A 36	G	G	J A 22	22	E S 16	E S 16	E S 16	E S 16	23	23
17	22	E S 16	E B 14	E S 16	E S 16	20	E S 16	E S 16	C	G	G	G	33	G	G	G	22	J A 25	25	J A 24	25	23	25	23
18	E B 14	19	19	18	22	23	22	22	G	G	30	37	37	37	J A 54	G	J A 25	25	22	26	24	J A 24	25	23
19	22	22	22	22	E S 16	E S 16	21	24	G	G	32	39	37	37	36	J A 30	J A 44	E S 16	J A 25	E S 16	E S 16	E S 16	E S 16	25
20	22	21	E S 16	E S 16	E S 16	E S 15	20	E S 16	G	J G 25	35	G	G	39	39	J A 45	J A 36	J A 30	25	J A 22	J A 24	J A 25	J A 22	20
21	E S 16	E S 15	20	E S 16	E B 15	E S 16	E S 16	J A 24	J A 30	J A 30	32	31	36	G	37	28	25	E S 16	J A 26	25	21	E S 16	E S 16	E S 16
22	E S 16	25	20	E S 16	E S 16	E S 16	21	J A 22	J A 26	G	G	30	J G 30	J A 43	28	G	30	20	22	J A 65	J A 30	J A 34	J A 24	24
23	23	21	E S 16	E B 14	E B 13	23	J A 26	J A 36	30	30	G	G	G	J A 32	J A 31	J A 33	J A 30	J A 24	J A 74	J A 31	J A 26	23	25	E S 16
24	25	23	22	22	22	J A 24	J A 42	J A 31	J A 32	J A 30	G	G	G	J A 30	J A 30	J A 29	J A 32	J A 30	J A 24	22	J A 31	23	J A 24	23
25	22	22	25	23	E S 16	25	J A 25	J A 31	G 20	32	J A 42	J A 37	32	32	34	J A 72	J A 54	J A 63	J A 26	J A 23	19	23	J A 36	J A 29
26	J A 24	25	E S 16	E B 14	24	E S 16	J A 21	18	G	G	G 22	J A 30	G 20	33	J A 30	G 24	J A 30	24	22	E S 16	24	E S 16	E S 16	18
27	18	E S 15	21	E S 16	21	19	23	25	J A 24	J A 66	J A 51	31	J G 30	G	G	28	J A 25	J A 23	J A 24	25	21	23	J A 30	J A 26
28	J A 26	J A 24	J A 24	J A 24	E S 16	21	23	E S 16	G 18	G	G	J A 36	J A 33	J G 29	33	30	24	22	J A 24	21	23	E S 16	E S 16	23
29	J A 30	21	21	E B 14	E S 16	E S 16	E S 16	E S 16	C	C	C	C	C	37	34	J G 25	25	E S 16	24	21	20	J A 24	J A 53	J A 22
30	J A 54	J A 30	24	25	E S 16	E S 16	E S 16	E S 16	23	G	G	G	35	G	G	39	G	J A 24	23	J A 25	20	E S 16	24	E S 16
31	19	J A 19	23	25	J A 26	J A 24	J A 24	J A 50	J A 31	J A 32	J A 30	J C 30	C 36	J A 32	J C 31	G	J C 36	J C 19	J C 26	J C 24	E S 16	J C 24	C 24	C 23
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	30	28	30	30	30	29	31	31	31	31	31	31	30	31	31	31	31
MED	23	21	22	18	21	20	23	22	26	30	32	30	31	32	31	28	J A 30	J A 24	J A 24	J A 25	24	24	24	23
UQ	25	24	23	24	24	24	25	J A 25	J A 28	32	35	J A 37	36	37	35	J A 34	J A 36	J A 30	J A 30	J A 34	J A 30	J A 25	J A 26	25
LQ	20	19	20	E S 16	E S 16	E S 16	21	E S 16	E G 18	G	G	G	G 20	F G 23	25	G 24	24	22	22	22	20	23	23	21

The Radio Research Laboratories, Japan

JAN. 1977 | FOES (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1977 | FBES (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E	E B 13	E	E	E	E B 13	E	C	C	30	32	38	33	34	42	27	20	F	E S 16	C	E	E	E	E
2	E	E	E	E	E	E	E	E S 16	G	30	30	G	C	31	28	26	18	19	28	A A 27	E	E	E	E
3	E S 16	E S 16	E	E	E	E	E	G	G	30	28	40	44	33	31	G	A A 52	24	19	E	E B 14	18	16	E
4	A A 42	A A 44	17	19	A A 44	E	E	G	26	29	32	30	30	33	28	28	18	23	17	A A 34	A A 51	17	22	17
5	E	E	E	E S 16	A A 27	E	17	18	41	32	107	65	54	41	40	A A 53	30	34	A A 64	22	19	19	18	E
6	E	E B 14	E	17	17	A A 42	16	E S 16	22	29	31	44	34	38	42	56	19	28	A A 78	E	25	19	E	E S 16
7	E S 16	E S 15	E S 16	E S 16	E	E	E	G	24	29	31	G	G	31	27	30	27	18	32	26	A A 33	E	20	E
8	E	E	E	E S 16	E S 16	E	E	24	24	29	23	G 21	28	27	28	23	22	20	18	17	17	20	E	17
9	17	E	17	E	E S 16	E S 15	E	E S 16	27	29	30	31	33	G	29	G	E S 16	24	E	30	A A 32	E	A A 27	E
10	E	E	E	A A 25	16	E	E	18	G	33	28	G	G	G	G	G	17	E	E	E	E	E	E	E
11	E	E	E	E	E	E	A A 25	E S 16	25	G	G	G	G	G	40	32	33	E	25	24	20	E	E	E S 16
12	E	E	E S 16	E S 16	E	E S 16	A A 27	19	24	28	18	G 20	G 20	32	G	28	22	18	F	E	E	E	E	18
13	E	16	E	17	E	E S 16	E S 16	17	25	G	G	G	19	G	32	26	28	E S 16	E	25	E	E	E	E
14	E	E	E	E	E	E S 16	E S 16	G	27	32	33	29	G	G	G	28	23	F	22	E	E	E	E	E S 16
15	E S 16	E	E	E B 15	E B 14	E	E	18	25	G	31	23	31	G 21	G 18	G 20	19	27	23	E	A A 37	E	27	E
16	E	E	16	E	E	E	E	G	G	30	G	32	30	30	G	G	G	G	E S 16	E S 16	E S 16	E S 16	E	E
17	E	E S 16	E B 14	E S 16	E S 16	E	E S 16	E S 16	C	G	G	G	33	G	G	G	21	G	17	E	E	E	17	E
18	E B 14	E	E	E	E	16	E	G	G	G	30	36	35	35	38	G	23	G	E	18	17	17	E	E
19	E	E	E	E	E S 16	E S 16	E	G	G	G	32	38	36	37	34	26	36	E S 16	E	E S 16	E S 16	E S 16	E S 16	E
20	E	E	E S 16	E S 16	E S 16	E S 15	E	E S 16	G	G 21	35	G	G	35	35	37	27	20	E	E	E	E	E	E
21	E S 16	E S 15	E	E S 16	E B 15	E S 16	E S 16	G	20	26	32	G	G	G	33	27	22	E S 16	E	E	E	E S 16	E S 16	E S 16
22	E S 16	E	E	E S 16	E S 16	E S 16	E	17	G	G	G	28	G 29	37	28	G	G	G	E	E	22	E	E	E
23	E	E	E S 16	E B 14	E B 13	E	E	18	G	28	G	G	G	31	28	27	24	G	A A 74	18	E	E	E	E S 16
24	E	E	E	E	E	18	E	18	26	23	G	G	G	21	G	20	28	20	20	E	23	E	E	E
25	E	E	E	E	E S 16	E	E	23	G 18	31	27	32	32	31	30	28	26	G	23	21	E	E	A A 36	21
26	20	E	E S 16	E B 14	E	E S 16	17	G	G	G	G 21	26	G 18	32	19	G 18	19	G	E	E S 16	E	E S 16	E S 16	E
27	E	E S 15	E	E S 16	E	E	E	G	20	27	30	26	G 24	G	G	28	18	G	E	E	E	E	E	E
28	E	E	E	E	E S 16	E	E	E S 16	G	G	G	29	33	G 27	G	29	G	G	E	E	E	E S 16	E S 16	E
29	19	E	E	E B 14	E S 16	E S 16	E S 16	E S 16	C	C	C	C	C	36	31	G 24	24	E S 16	E	E	E	19	E	19
30	22	E	E	E	E S 16	E S 16	E S 16	E S 16	22	G	G	G	34	G	G	35	G	19	E	20	E	E S 16	E	E S 16
31	E	E	E	19	22	17	E	46	27	28	30	23	33	30	30	G	C 31	C 18	C 20	E	E S 16	E	E	E
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	30	28	30	30	30	29	31	31	31	31	31	31	30	31	31	31	31
MED	E	E	E	E E 14	E E 15	E E 13	E	16	21	28	29	24	30	31	28	26	22	16	16	E E 16	E	E	E	E
UQ	16	E E 14	E E 15	E S 16	E S 16	E S 16	16	18	25	30	31	32	33	34	32	28	27	20	22	21	20	16	16	16
LQ	E	E	E	E	E	E	E	G	G	G	G	G	G	G	G	E G 18	18	G	E	E	E	E	E	E

The Radio Research Laboratories, Japan

JAN. 1977 | FBES (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1977 | F-MIN (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

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

The Radio Research Laboratories, Japan

JAN. 1977 | F-MIN (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1977 | 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 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	S 305	S 340	S 375	390	350	S 320	S 305	C	C	355	320	355	370	345	R 360	380	360	360	S 330	I C 330	S 285	S	F	S
2	F	S 305	320	F 290	300	320	S 320	380	360	370	370	365	C	H 360	340	355	355	345	I S 365	A	S	290	280	290
3	295	295	340	355	S 330	S 280	S 315	S 355	335	360	H 320	360	330	355	360	365	A	S 345	320	345	F	F	F	J S 315
4	A	A	J S 320	F 355	A	305	F	365	375	340	J R 360	360	R 370	350	365	350	365	335	320	A	A	J S 320	S 305	J S 320
5	S 310	365	345	285	A	F 295	280	325	315	R 315	370	370	340	335	365	A	340	360	A	365	305	295	F	300
6	295	300	350	395	295	A	300	360	300	330	340	350	340	335	350	370	375	340	A	315	A	S	S	U S 310
7	S	S	F	F	330	I S 320	S 280	315	355	335	350	380	365	345	370	370	360	345	S 350	S 355	A	320	310	300
8	320	305	S 305	330	375	F 335	320	350	325	350	340	360	350	375	370	365	370	350	345	345	365	295	305	305
9	305	325	345	365	J S 270	315	335	350	335	310	330	360	370	360	380	350	360	360	340	I S 370	A	345	A	F
10	F	F 325	370	A	320	320	310	350	350	335	345	350	360	350	360	380	360	330	335	335	340	360	330	280
11	310	315	330	345	345	330	A	340	365	345	315	335	360	360	340	370	375	340	S 360	S 360	S 305	F	S 295	S 295
12	F	J S 335	S 340	F	F	F	A	360	365	330	355	365	340	350	335	360	350	290	315	340	335	330	370	295
13	310	295	330	335	315	285	350	360	370	335	550	340	340	350	360	365	365	325	350	340	310	295	S 310	310
14	305	305	340	S	F 315	310	345	360	370	305	355	375	325	320	330	370	350	355	325	350	360	305	S 310	F
15	300	320	320	340	S 360	S 305	360	370	340	330	H 345	340	355	380	325	355	355	360	S 305	365	A	300	310	325
16	S 295	300	320	340	C 305	310	340	365	385	355	335	335	370	385	350	365	365	350	330	340	335	C 300	S 310	325
17	295	310	315	345	390	310	320	S 370	I C 380	365	350	340	345	365	350	375	355	350	300	355	325	300	295	305
18	J S 330	320	325	330	350	320	305	340	365	380	560	365	360	345	360	380	350	335	310	350	F 365	325	285	305
19	325	S 340	300	300	355	345	290	350	360	365	330	375	355	340	350	370	375	350	310	S 340	S 335	335	315	S 330
20	340	C 305	290	305	S 295	305	355	355	390	370	315	370	340	370	355	355	360	340	340	S 340	335	310	295	315
21	S 315	S 330	320	335	320	U S 335	305	355	365	H 340	335	350	350	345	H 355	H 350	380	325	305	325	S 340	340	295	300
22	300	300	300	300	365	320	315	350	350	370	360	375	350	335	355	350	365	380	350	325	C 320	305	S 290	305
23	295	305	335	350	385	295	S	340	365	355	340	335	355	370	335	350	380	365	A	315	310	320	300	300
24	305	305	305	335	360	300	305	375	370	370	345	340	360	340	360	345	345	370	350	340	S 380	310	290	285
25	315	295	310	345	350	315	295	360	375	355	H 340	360	350	360	355	325	365	375	315	330	365	340	A	300
26	300	290	S 310	335	355	365	325	340	J S 365	335	355	345	H 350	355	335	370	365	370	295	315	340	335	295	305
27	315	325	320	325	335	295	320	355	380	350	355	350	345	340	R 380	385	380	350	310	315	290	335	335	295
28	295	305	310	295	310	310	300	360	375	365	340	340	350	R 350	365	380	350	370	325	S 335	335	310	320	300
29	S 300	S 285	S 300	300	S 330	360	295	335	C	C	C	C	C	330	335	345	360	355	345	310	350	335	295	S 295
30	S 265	310	295	300	S 305	300	345	375	380	330	340	340	335	350	350	340	R 365	365	320	325	300	300	280	295
31	270	290	330	345	A	280	305	A	J S 360	350	370	C 350	C 370	C 355	C 345	C 350	C 350	C 360	C 315	C 335	C 325	C 345	C 285	C 295
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	29	30	27	27	29	27	29	29	30	30	30	29	31	31	30	30	31	28	29	24	27	25	28
MED	305	305	320	335	330	310	315	355	365	350	345	352	350	350	355	365	360	350	325	340	335	320	300	300
UQ	315	325	340	345	355	320	330	360	375	365	355	365	360	360	360	370	365	360	345	350	345	335	310	310
LQ	295	300	310	302	312	300	302	350	350	335	335	340	340	342	342	350	355	340	312	325	310	300	295	295

The Radio Research Laboratories, Japan

JAN. 1977 | M(3000)F2 (0.01)

IONOSPHERIC DATA

JAN. 1977 | 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 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									C	L	L 400	L	L	L	A	L								
2										L	L	L	C	L 415	U L 405	L								
3										L	L	L	A	L	L	L								
4										L	L	L	L	L	L									
5									A	L	A	A	A	A	A	A								
6									L	L	A	A	L	L	A	A	L							
7									L	L	L	L	L	L	L	A								
8										L	U L 365	L	U L 400	L	L	440								
9									L	L	365	L	L 390	L	L	L								
10										L	L 400	L 390	L	L	L	L								
11									L	L	365	H 380	H 365	L	A	L								
12										L	L	L	L	L	L	L								
13										L	L	L	L	L	L	L								
14										L	L	L	L	L	L									
15										L	L	L	L	L	360	L	L							
16											L	L	L	L	L	L								
17										L	L	L	L	L	L		L							
18									L	L	L	L	L	L	A	L								
19									445	L	L	L	L	L	L	L								
20									L	L	L	L	L	L	L	L								
21									L	L	400	L	L	L	L	L								
22									L	L	U L 395	L	L	L	L	L								
23									L	L	L	L	L	L	L	L								
24										L	L	L	L	L	L	L								
25										L	L	L	L	L	L	L	A							
26										L	L	L	L 380		L	L	440							
27										L	L	L	L 415	L	L	L								
28									L	L	L	U L 390	L	L	L	L								
29									C	C	C	C	C	L	L	L								
30									L	L	L	L	L	L	L	L								
31										L	L	L	L	L	L	L								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									1		7	3	4	2	2	1	1							
MED									445		L 395	L 390	L 395	398	382	440	440							
UQ											L 400	L 390	L 408											
LQ											365	385	378											

The Radio Research Laboratories, Japan

JAN. 1977 | M(3000)F1 (0.01)

IONOSPHERIC DATA

JAN. 1977 | H'F2 (KM) | 135° E Mean Time (G. M. T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									C	240	290	240	240	250	245	240								
2										300	245	230	C	235	275	240								
3										255	275	240	270	250	250	235								
4										260	250	240	240	250	250									
5									290	290	E A 240	230	E A 300	265	245	A								
6									240	290	245	245	255	275	250	E A 250	200							
7									245	260	245	230	235	250	240	235								
8										260	260	240	245	235	240	235								
9									290	300	270	230	240	250	235	235								
10										270	250	240	240	250	245	230								
11									250	295	320	280	255	275	280	235								
12										275	250	240	260	255	275	240								
13										290	275	275	270	250	240	240								
14										350	250	240	255	270	300									
15										285	250	270	250	240	310	250	240							
16											290	250	245	235	250	240								
17										245	270	280	250	245	250		230							
18									240	220	240	245	250	250	250	230								
19									240	240	250	245	250	275	240	230								
20									210	225	320	240	260	250	250	250								
21									245	245	275	250	250	250	240	240								
22									230	245	250	230	245	255	255	255								
23									240	245	280	255	245	240	270	240								
24										230	250	250	245	260	250	255								
25										240	240	245	280	245	250	240	225							
26										250	245	250	250	260	255	230	230							
27										245	250	255	250	275	235	230								
28									220	230	250	275	250	250	245	230								
29									C	C	C	C	C	240	250	250								
30									225	250	270	255	230	255	255	235								
31										255	245	C 240	C 240	C 245	C 250	C 285								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									13	29	30	30	29	31	31	27	5							
MED									240	255	250	245	250	250	250	240	230							
UQ									245	285	275	255	255	258	255	242	230							
LQ									230	245	245	240	245	245	245	235	225							

The Radio Research Laboratories, Japan

JAN. 1977 | H'F2 (KM)

IONOSPHERIC DATA

JAN. 1977 | 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 MHz to 20 MHz in 20 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	275	255	200	205	255	260	260	C	C	235	200	A	230	245	A	200	220	210	220	I C 245	290	245	250	285
2	300	270	240	300	290	260	250	210	H 200	245	245	220	C	200	190	245	215	225	E A 250	A	430	290	315	310
3	300	290	245	215	235	300	275	230	215	240	230	A	A	225	230	230	A	240	225	225	290	320	290	255
4	A	A	280	230	A	285	250	210	220	215	220	225	220	220	H 200	220	230	240	250	A	A	280	300	290
5	260	240	215	E S 250	A	E S 280	E S 360	250	A	245	A	A	A	A	A	A	240	235	A	220	E A 330	335	330	300
6	300	280	230	200	E A 335	A	E A 340	220	200	H 225	245	A	230	A	A	A	215	E A 250	A	270	A	280	275	250
7	235	200	290	250	245	225	300	240	240	235	H 210	205	195	H 200	H 175	A	225	225	250	245	A	255	260	275
8	250	275	275	250	195	245	250	250	H 200	H 210	H 180	200	195	200	200	200	220	230	240	245	220	320	E S 290	280
9	300	255	245	210	S	E S 300	E S 300	H 210	250	230	H 230	225	210	210	220	H 200	H 180	240	225	230	A	230	A	295
10	280	245	210	A	E A 270	E S 300	E S 300	240	230	250	215	H 200	H 195	200	H 195	200	210	225	240	240	245	220	230	310
11	290	270	250	220	220	240	A	215	240	220	215	200	210	200	A	A	225	225	235	250	300	285	275	295
12	250	245	240	340	300	200	A	240	240	230	220	210	H 190	230	225	A	230	230	250	230	240	250	210	275
13	240	300	255	210	275	E S 320	250	230	230	210	H 190	195	225	225	230	200	210	240	235	245	255	310	300	290
14	290	270	240	240	275	260	225	215	230	240	H 250	210	195	H 190	H 200	230	230	240	250	225	205	295	300	300
15	250	270	255	235	215	255	245	215	230	235	250	225	225	225	200	240	235	225	E A 300	205	A	300	295	255
16	295	300	255	240	280	265	240	210	H 200	235	240	240	200	H 195	195	195	H 200	240	240	220	225	295	240	250
17	255	265	290	225	210	E S 305	270	210	I C 210	200	H 185	H 185	240	220	205	240	205	205	270	230	225	275	300	290
18	230	240	245	240	235	260	290	240	215	H 200	H 195	A	245	235	A	230	210	235	260	230	220	250	E S 300	285
19	260	230	240	290	225	200	E S 300	240	185	H 210	205	A	240	230	225	215	240	240	240	240	230	240	255	245
20	240	250	300	300	275	275	215	240	210	200	230	H 195	H 190	240	245	A	245	230	200	205	240	260	275	250
21	245	240	255	245	240	240	290	245	240	210	200	H 180	205	205	220	200	220	240	300	250	215	220	285	275
22	290	290	295	285	225	E S 225	260	240	210	205	200	H 200	200	A	200	H 225	225	205	200	230	E A 300	270	300	295
23	295	275	235	220	200	E S 400	S	235	235	220	200	200	195	H 195	195	230	210	205	A	270	250	250	275	280
24	275	275	290	250	215	E A 320	300	225	220	210	200	200	195	200	230	235	250	205	240	220	215	255	325	300
25	250	295	280	230	215	265	300	240	220	235	220	205	H 180	H 180	215	210	A	205	E A 290	E A 290	260	225	A	320
26	330	300	265	235	210	215	E S 300	235	240	H 215	215	200	H 195	210	H 200	210	200	205	E S 230	250	230	220	260	275
27	270	250	250	250	240	250	255	230	230	H 175	205	190	190	H 190	H 190	230	H 195	220	250	250	265	250	240	285
28	300	275	260	290	275	250	255	225	H 190	H 200	200	190	H 185	230	225	205	H 190	210	240	215	225	250	240	270
29	300	295	290	270	240	205	295	240	C	C	C	C	C	200	225	195	240	225	205	245	210	240	295	300
30	330	260	300	290	255	255	225	225	H 190	210	H 200	H 175	230	H 190	H 190	A	H 205	200	205	250	260	290	295	295
31	300	300	250	240	A	320	260	A	235	250	245	C 225	C 210	C 195	C 205	C 195	C 230	C 210	C 260	C 240	C 250	C 200	E S 300	E S 280
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	31	30	27	30	28	29	28	30	29	24	27	28	26	24	29	31	28	29	26	31	29	31
MED	278	270	255	240	238	251	258	230	220	220	215	200	200	202	202	212	220	225	240	240	238	255	282	285
UQ	300	290	280	270	270	U 280	286	240	235	235	230	215	225	225	225	230	230	239	250	248	262	290	300	295
LQ	250	250	240	225	218	240	250	215	205	210	200	195	195	198	H 195	200	210	210	226	225	225	242	258	274

JAN. 1977 | H'F (KM)

IONOSPHERIC DATA

JAN. 1977 | H'E (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 MHz to 20 MHz in 20 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								C	C	E A 125	105	110	E A 115	E A 115	E A 125	A	A							
2								S	125	115	115	115	I C 110	E A 130	E A 125	A	A							
3								S	120	A	A	A	A	A	120	120	S							
4								S	115	110	A	A	A	A	110	110	A							
5								S	E B 120	115	110	110	110	A	A	A	A							
6								S	A	125	E B 125	E B 125	E B 125	E B 125	B	B	A							
7								S	130	125	120	115	120	115	A	A	A							
8								A	A	A	A	A	A	A	A	A	A							
9								S	125	120	115	115	110	110	110	105	S							
10								B	120	115	A	110	110	110	110	105	A							
11								S	125	100	110	115	110	110	110	110	125							
12								S	120	A	A	115	115	115	110	110	120							
13								S	A	110	110	110	E A 115	110	110	110	F B 125							
14								S	A	A	105	A	105	110	110	115	125							
15								B	120	110	110	E A 115	A	E A 115	E A 115	E A 125	A	P						
16								S	120	110	110	110	105	A	105	110	B	S						
17								S	I C 120	115	110	110	110	110	110	H 110	120	S						
18								S	120	115	110	105	105	110	110	110	A	S						
19								S	120	110	110	110	105	110	E A 115	110	B	S						
20								S	115	E A 115	110	110	105	105	105	110	A	S						
21								S	E A 125	A	110	110	110	110	110	110	A	S						
22								A	125	B	B	A	A	A	110	110	A	S						
23								S	115	115	110	110	110	A	110	110	A	P						
24								A	A	E A 125	105	105	105	E A 120	115	E A 115	A	S						
25								A	E A 125	A	A	110	110	110	110	110	A	S						
26								S	115	110	110	A	110	110	A	120	A	S						
27								S	A	A	A	E A 120	E A 125	105	105	E A 120	A	S						
28								S	120	110	110	A	A	A	E A 120	115	120	S						
29								S	C	C	C	C	C	105	A	A	A	S						
30								S	115	110	105	105	105	105	105	110	120	P						
31								A	A	A	A	A	A	A	C 110	C 110	S	S						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									22	21	21	22	23	22	25	24	7							
MED									120	112	110	110	110	110	110	110	120							
UQ									125	115	110	112	111	112	112	112	125							
LQ									120	110	110	110	105	110	110	110	120							

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JAN. 1977 | H'E (KM)

IONOSPHERIC DATA

JAN. 1977 | H'ES (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 MHz to 20 MHz in 20 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	100	B	100	100	100	B	125	C	C	155	140	145	135	125	115	115	95	95	S	C	100	100	100	100
2	100	100	100	100	100	100	110	S	G	160	125	G	C	145	140	105	105	100	100	100	100	100	100	100
3	S	S	125	120	110	110	100	100	105	150	105	130	130	135	170	150	115	110	110	100	B	105	100	150
4	100	100	100	100	130	100	100	100	130	110	140	110	110	150	115	110	110	110	110	110	105	100	100	100
5	100	100	100	S	125	150	150	150	120	120	110	110	110	105	100	100	105	105	105	100	100	100	100	100
6	100	B	115	110	105	100	105	S	115	120	145	120	140	120	110	110	105	105	100	100	100	100	100	S
7	S	S	S	S	100	100	100	100	140	130	125	G	G	120	110	105	100	105	100	100	100	100	100	100
8	100	100	100	S	S	110	105	100	100	100	100	100	100	100	100	100	100	100	100	100	95	110	110	110
9	110	110	105	105	S	S	110	S	170	150	150	130	135	145	120	115	S	140	110	100	100	100	100	100
10	105	110	130	115	115	115	150	110	G	140	110	G	G	G	G	G	110	105	110	100	100	100	100	100
11	100	105	100	130	125	125	120	S	150	G	G	G	G	G	110	115	130	110	105	100	100	100	100	S
12	100	100	S	S	100	S	135	130	130	105	100	100	100	170	G	140	140	120	110	105	100	100	100	100
13	100	100	100	100	125	S	S	110	100	100	G	100	100	G	125	120	110	S	105	100	100	100	100	100
14	100	100	100	100	120	S	S	110	165	100	145	100	G	G	G	185	155	100	100	100	100	100	100	S
15	S	100	100	B	B	120	140	135	125	G	125	100	100	100	100	100	115	105	100	100	100	100	110	110
16	110	110	110	110	105	105	120	125	G	155	140	115	115	105	G	G	100	100	S	S	S	S	100	100
17	100	S	B	S	S	100	S	S	C	G	G	G	170	G	G	G	160	105	100	100	100	100	100	100
18	B	100	100	100	100	100	100	105	G	G	150	160	140	150	130	G	110	105	130	105	100	100	100	100
19	100	100	95	95	S	S	110	100	G	G	170	140	140	130	115	110	105	S	100	S	S	S	S	130
20	115	100	S	S	S	S	130	S	G	105	175	G	G	150	140	120	105	100	100	100	100	100	100	100
21	S	S	140	S	B	S	S	110	105	110	145	145	140	G	120	110	110	S	100	100	100	S	S	S
22	S	110	105	S	S	S	115	105	100	G	G	100	100	100	120	G	120	120	110	110	105	105	100	100
23	100	100	S	B	B	125	120	115	115	125	G	G	G	110	110	105	105	100	110	110	100	105	105	S
24	105	105	110	105	140	125	120	110	105	105	G	G	G	100	100	100	100	95	120	120	100	105	100	100
25	100	105	105	100	S	115	110	105	105	160	100	120	125	120	115	110	110	110	105	105	100	100	100	100
26	95	95	S	B	115	S	115	115	G	G	100	100	100	150	100	100	100	100	100	S	100	S	S	100
27	100	S	100	S	100	115	115	105	105	105	105	100	100	G	G	150	100	100	100	100	100	110	105	100
28	100	100	100	100	S	110	100	S	105	G	G	100	100	100	135	130	120	100	100	100	105	S	S	100
29	105	100	100	B	S	S	S	S	C	C	C	C	C	175	160	105	125	S	105	105	105	105	110	100
30	105	100	105	100	S	S	S	S	140	G	G	G	150	G	G	140	G	110	105	105	155	S	100	S
31	155	145	135	120	110	110	110	105	100	105	105	C 100	C 150	C 125	C 125	G	C 105	C 100	C 105	C 100	S	C 100	C 100	C 100
	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	25	24	25	18	18	19	25	21	21	21	22	21	22	23	24	25	29	27	29	27	27	25	27	25
MED	100	100	100	100	110	110	115	110	115	120	125	110	120	125	115	110	110	105	105	100	100	100	100	100
UQ	105	105	110	110	125	118	120	115	130	150	145	130	140	148	128	120	115	110	110	105	100	105	100	100
LQ	100	100	100	100	100	100	105	105	105	105	105	100	100	105	110	105	105	100	100	100	100	100	100	100

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JAN. 1977 | H'ES (KM)

IONOSPHERIC DATA

JAN. 1977 | 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 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F1		F1	F2	F1		F2			HL 33	HC 22	CC 32	CL 22	CL 32	CL 32	CL 11	L 2	F 2			F 2	F 2	F 2	F 3
2	F 3	F 2	F 1	F 2	F 2	F 2	F 1			H 2	C 2			HL 22	CL 22	L 2	L 2	F 2	F 5	F 6	F 1	F 2	F 1	F 2
3			F 1	F 1	F 1	F 2	F 2	L 1	L 1	CL 31	LC 32	CL 22	CL 22	CL 22	HL 11	HL 12	CL 41	FF 32	F 2	F 1		F 7	F 2	F 1
4	F 5	F 3	F 5	F 4	FF 13	F 2	F 1	L 1	CL 31	C 3	CL 21	L 2	L 1	HL 11	C 1	C 2	L 1	F 4	F 3	F 4	F 3	F 2	F 2	F 2
5	F 1	F 1	F 1		FF 21	F 1	F 2	H 1	C 4	C 4	C 3	C 5	C 4	L 3	L 4	L 3	L 4	F 3	F 5	F 3	F 2	F 2	F 1	F 1
6	F 1		F 1	F 1	F 3	F 2	F 2		L 1	C 1	C 1	C 2	C 1	C 2	C 2	C 2	L 2	F 3	F 4	F 3	F 4	F 2	F 1	
7					F 1	F 1	F 1	L 1	C 2	C 2	C 2			C 2	L 1	L 3	L 4	F 4	F 4	F 4	F 6	F 2	F 2	F 1
8	F 1	F 2	F 1			F 2	F 3	L 4	L 4	L 2	L 2	L 2	L 2	L 2	L 2	L 3	L 5	F 5	F 3	F 3	F 3	FF 31	FF 21	F 3
9	F 2	F 2	F 3	F 1			F 1		H 2	HL 31	H 2	C 1	C 2	C 1	C 2	C 1		F 5	F 2	F 3	F 2	F 2	F 3	F 2
10	F 1	F 1	FF 61	F 6	F 3	F 2	F 1	L 2		H 3	L 1						C 2	F 1	F 1	F 3	F 1	F 1	F 1	F 2
11	F 1	F 2	F 1	F 2	F 3	F 1	F 6		H 2						C 3	C 3	C 5	F 2	F 3	F 3	F 2	F 1	F 1	
12	F 1	F 1			F 1		F 5	C 4	CL 31	L 3	L 1	L 1	L 1	HL 11		H 1	H 2	F 3	F 1	F 2	F 2	F 1	F 1	F 2
13	F 2	F 3	F 2	F 2	F 2			L 2	L 2	L 1		L 1	L 1		C 3	C 2	C 4		F 3	F 3	F 1	F 1	F 2	F 2
14	F 1	F 1	F 1	F 1	F 1			LH 12	HL 24	L 3	H 2	L 2				H 1	H 3	F 1	F 6	F 2	F 2	F 2	F 1	
15		F 1	F 1			F 1	F 2	C 3	C 4		C 3	L 1	L 2	L 1	L 1	L 2	L 2	L 5	F 3	F 1	F 5	F 2	F 4	F 3
16	F 1	F 2	F 3	F 2	F 3	F 2	F 1	C 1		H 2	C 2	C 2	C 2	L 2			L 1	L 1					F 1	F 1
17	F 1					F 1							H 1				HL 11	L 1	F 2	F 3	F 2	F 1	F 2	F 1
18		F 1	F 1	F 1	F 3	F 2	F 2	L 1			H 1	HC 22	C 2	H 3	C 2		L 3	L 3	FF 11	F 5	F 3	F 3	F 4	F 1
19	F 1	F 1	F 2	F 1			F 2	L 2			H 2	H 2	H 2	C 2	CL 21	C 2	L 3		F 1					F 1
20	F 1	F 1					F 1			L 2	H 2			H 2	C 2	C 4	L 3	L 3	F 1	F 1	F 3	F 2	F 2	F 1
21			F 1					L 1	L 3	L 2	C 1	C 1	C 1		C 2	C 2	C 2		F 3	F 1	F 1			
22		F 1	F 2				F 2	L 3	L 1			L 1	L 1	L 2	C 1		CL 21	CL 22	F 1	F 2	F 6	F 2	F 2	F 2
23	F 2	F 1				F 2	F 4	L 2	C 1	C 1				CL 22	CL 12	C 2	L 3	L 1	F 5	F 3	F 2	F 2	F 2	
24	F 2	F 2	F 1	F 2	F 1	F 3	F 3	L 3	L 4	L 2				L 2	L 1	L 3	L 4	L 2	F 3	F 1	F 3	F 1	F 3	F 1
25	F 1	F 2	F 4	F 1		F 2	F 2	L 2	L 1	HL 22	LH 21	CL 11	C 2	C 2	C 2	C 2	L 2	L 1	F 4	F 5	F 1	F 2	F 4	F 3
26	F 5	F 1			F 1		F 3	C 1			L 1	L 2	L 1	H 1	L 2	L 1	L 2	L 1	F 1		F 2			F 1
27	F 2		F 1		F 1	F 2	F 2	L 2	L 3	L 2	L 3	L 2	L 1			HL 11	LC 21	L 1	F 2	F 2	F 2	F 2	F 2	F 3
28	F 2	F 2	F 2	F 2		F 1	F 2		L 2			L 2	L 2	L 2	CL 22	C 2	CL 21	L 1	F 1	F 1	F 1			F 2
29	F 2	F 1	F 1											HC 22	HL 12	L 3	CL 22		F 1	F 2	F 1	F 4	F 3	F 3
30	F 3	F 3	F 2	F 2					C 2				H 2			C 4		C 4	F 1	F 3	F 1		F 2	
31	F 1	F 2	F 1	F 2	F 6	F 3	F 2	L 5	L 4	L 3	L 2	L 1	HL 11	CL 11	CL 11		C 4	L 2	F 4	F 2		F 1	F 2	F 1
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
UQ																								
LQ																								

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JAN. 1977 | TYPES OF ES

IONOSPHERIC DATA

JAN. 1977 | FXI (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	X 39	40	O S 40	X 27	X 25	X 28														X 51	X 44	X 45	X 30	S 28
2	33	34	S 58	32	31	S 31														A	A	X 27	O S 31	34
3	X 34	X 34	X 40	X 30	X 29	X 26														X 37	X 42	40	40	37
4	X 41	X 37	X 38	X 40	X 26	S 33														X 42	O S 42	A	S 37	S 34
5	S 39	X 46	X 44	A	24	29	30													X 53	S	S	O S 32	O S 36
6	X 31	X 33	X 54	X 29	O S 23	X 27														X 37	X 39	X 32	S 35	X 37
7	X 42	X 36	X 30	X 27	S 36	38	39													X 55	X 46	X 42	X 46	X 36
8	X 37	X 37	X 36	X 32	X 33	X 26	29													X 35	X 37	X 32	X 29	X 30
9	X 33	X 36	X 37	X 35	X 27	X 21														X 40	S	A	O S 29	O S 31
10	A	S	S	S	X 24	A														X 43	X 37	38	X 34	X 31
11	X 31	S 31	35	35	X 33	X 25														A	A	A	O S 31	33
12	X 33	X 35	X 36	33	34	X 30														S	X 45	X 34	X 34	X 30
13	34	X 29	S 32	X 32	X 22	X 25	24													X 42	X 34	X 31	O S 31	37
14	S 34	S	S 35	X 30	29	29	27													X 37	X 38	X 34	X 30	35
15	34	35	35	X 35	36	26														A	S 48	S	S	S
16	36	36	35	35	38	X 33														X 39	X 44	X 38	34	33
17	35	X 33	X 32	X 37	X 34	23														X 38	O S 51	X 33	X 30	X 34
18	X 34	X 37	X 30	X 35	X 33	X 26														X 59	X 54	X 36	X 29	S 29
19	X 33	X 35	31	29	X 33	X 35														X 46	X 49	X 37	X 33	X 33
20	X 34	X 34	X 34	X 31	X 36	X 35														X 36	X 37	36	S 37	X 36
21	X 38	X 34	X 34	X 30	X 33	35														A	X 53	S	X 37	X 38
22	X 40	O S 40	O S 40	X 37	X 42	X 31														X 33	X 35	X 33	C	C
23	C	C	C	C	C	C														A	X 38	S	X 41	X 41
24	X 41	X 38	X 36	X 36	X 39	X 30														X 39	A	X 33	X 32	S
25	X 33	X 35	X 37	X 34	O S 38	X 30														X 31	X 36	X 43	X 35	X 29
26	X 30	X 32	X 34	X 38	X 34	X 27														X 35	O S 41	X 37	X 32	X 34
27	X 34	X 36	X 34	X 34	X 34	X 31														X 39	X 37	X 37	X 38	S
28	X 34	X 35	S 36	X 36	X 39	X 34	27													X 45	X 45	X 34	X 37	X 40
29	S 35	X 36	X 36	S	X 39	S 35														X 42	S	X 52	A	X 31
30	X 35	X 41	O S 38	X 38	O S 41	S														O S 51	O S 39	X 42	O S 42	X 39
31	X 39	X 39	X 44	X 46	X 34	X 35														X 60	X 59	X 59	X 33	X 34
	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	28	29	27	30	28	6													25	25	24	28	27
MED	X 34	X 36	X 36	X 34	X 34	X 30	28													X 40	X 42	X 36	X 34	X 34
UQ	X 38	X 37	X 38	X 36	X 36	X 34	30													X 46	X 46	X 41	X 37	X 36
LQ	X 33	X 34	X 34	X 30	X 29	X 26	27													X 37	X 37	X 33	X 31	X 31

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JAN. 1977 | FXI (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1977 | FOF2 (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	33	F 34	U S 34	20	19	S 22	25	32	54	I C 58	60	92	103	80	65	64	64	54	48	45	38	S 39	24	S 22
2	F 26	F	S 52	F 26	F 25	S 25	25	29	52	65	103	118	78	54	S 62	74	62	52	A	A	A	21	25	F 26
3	28	28	34	24	23	19	22	I S 31	48	53	71	62	69	69	62	61	58	48	29	31	S 36	F	F	F
4	S 35	S 31	S 32	S 34	20	S 27	S 32	29	S 49	52	67	102	S 119	93	58	55	51	47	37	S 36	S 36	A	S 31	S 28
5	U S 33	S 40	J S 38	A	F 16	F 23	F 20	27	54	S 74	128	109	89	69	60	55	47	50	55	47	A	A	26	S 30
6	25	27	48	23	17	21	23	26	45	69	S 102	113	90	68	67	72	59	44	34	31	33	26	S 29	31
7	36	30	24	21	S 30	F 28	F	24	54	70	100	111	96	85	H 78	59	50	55	43	J S 49	40	36	S 40	30
8	31	31	30	26	27	20	F 23	26	50	58	79	108	107	104	88	62	50	44	32	29	31	26	23	24
9	S 27	30	31	29	21	J S 15	J S 15	24	52	46	58	99	89	59	58	53	47	46	S 45	S 34	S	A	23	25
10	A	S	S	S	18	A	21	28	46	52	77	113	110	85	67	52	43	43	S 30	S 37	S 31	F	S 28	25
11	25	S 25	F	F	27	19	19	26	S 41	48	56	84	91	H 85	64	59	54	S 44	31	A	A	A	S 25	F 27
12	27	29	30	F 27	F	24	A	28	54	48	68	95	88	71	77	58	47	44	J S 42	I S 42	S 39	28	28	24
13	F	23	S 28	26	16	19	F 18	28	52	53	S 50	61	76	73	63	54	47	44	J S 30	36	28	25	S 25	F
14	S 28	I S 29	J S 29	24	F 22	F	F 21	30	55	S 55	53	75	92	H 84	91	82	60	46	39	31	32	27	24	F
15	F	F	F	29	F 30	F 20	19	26	46	53	55	79	104	56	50	58	64	55	30	A	S 42	S	S	S
16	F	F 30	F	F	F 32	27	22	30	55	55	54	66	106	59	52	50	52	50	41	33	U S 38	S 32	F 28	F 27
17	F 29	27	26	31	28	F 16	19	27	49	56	52	59	79	64	64	52	48	S 52	S 37	S 32	U S 45	S 27	24	S 28
18	28	S 31	S 24	29	27	20	21	26	S 63	64	63	60	62	61	67	58	48	47	S 42	53	48	30	23	S 23
19	27	29	F 24	23	27	J S 29	25	25	54	66	73	82	84	S 74	72	58	53	45	I C 40	S 40	J S 43	31	27	27
20	28	28	28	25	30	29	22	32	51	52	57	67	64	62	61	57	52	56	44	30	31	F 30	S 31	30
21	S 32	28	28	24	27	F 26	25	29	56	68	70	H 71	86	105	82	66	65	75	A	A	S 47	I S 43	31	S 32
22	34	S 34	S 34	S 31	36	25	18	26	55	63	73	78	V 84	S 98	R 90	84	57	60	41	27	29	S 27	C	C
23	C	C	C	C	C	C	C	C	C	C	73	80	V 84	H 101	86	88	H 76	56	A	A	32	A	S 35	35
24	35	32	S 30	30	33	24	22	30	60	S 56	53	64	64	65	65	70	57	S 73	47	S 33	A	27	26	A
25	S 27	29	31	28	U S 32	24	22	29	58	57	64	S 63	62	68	S 64	75	60	58	38	25	30	37	29	23
26	24	26	28	32	S 28	21	20	29	56	66	71	70	75	69	S 72	75	53	63	37	29	U S 35	S 31	S 26	S 28
27	J S 28	30	28	28	28	25	24	31	52	J S 63	58	56	60	68	63	57	55	54	S 49	33	31	31	32	I S 30
28	28	29	S 30	30	S 33	U S 28	F	32	51	60	60	58	65	79	82	63	55	50	46	39	S 39	S 28	S 31	34
29	S 29	S 30	30	I S 30	33	S 29	21	30	59	60	73	76	V 62	74	79	76	63	59	66	36	I S 45	S 46	A	25
30	29	H 35	32	32	S 35	A	28	S 37	56	59	70	84	87	75	84	71	70	63	49	S 45	S 33	36	S 36	33
31	S 33	S 33	38	S 40	28	29	28	40	81	H 60	72	81	87	78	73	69	73	68	S 58	54	S 53	53	27	28
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	27	26	26	29	27	27	30	30	30	31	31	31	31	31	31	31	31	28	26	26	23	27	25
MED	28	30	30	28	27	24	22	29	54	58	68	79	86	73	67	61	55	52	41	35	S 36	30	27	28
UQ	33	31	34	30	30	27	24	30	56	64	73	97	92	84	78	72	61	57	46	42	S 42	36	S 31	30
LQ	27	28	28	24	22	20	20	26	50	53	58	65	72	66	62	57	50	46	36	31	31	27	25	25

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JAN. 1977 | FOF2 (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1977 | FOF1 (0.01 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										C	L	L 420	L 440	L	L	L	L							
2									230	L	L	L 410	L	L 400	L	L								
3										L	L	L	L	L	L	L	L							
4										L	A	U L 420	U L 440	L	L	L	L							
5									L	U L 420	A	A	A	L	A	A	A							
6										L	U L 420	U L 420	A	A	A	L	U L 320							
7									L	L	L 410	L 420	L 420	L	L	L	L							
8									L	L	L 410	L 420	L 430	L 430	L 400	L	A							
9										L	L 410	L 390	L 430	L 410	L 390	L	H 300							
10										A	L 390	L 380	L	L	L	L	L							
11									L	L 390	H 400	L	H 420	H 410	L 410	L 380	A							
12										L	400	L	L	U L 450	L	L	L							
13										L	L	L 430	420	L	L 410	L	L							
14										L	H 440	400	L	L 420	L 420	L	L							
15										L	430	400	L	L 410	L	L 400	L							
16											L	390	380	L	L 400	L	L							
17										L	L	L	L	L	L	L	L							
18									L	L	L 410	U L 420	U L 410	L 410	A	L	310							
19									L	L	L	L 430	440	L 430	430	L	A							
20									L	L	L	420	L	L	L	L	L							
21									L 250	L	L	L 420	L 430	L	L	L 420	L 370							
22										L	L 390	L	L 420	L	L 420	L	L							
23									C	C	L 420	420	L 450	L 430	L	L	L							
24										L	L	L	L	L	L	L								
25										L	L	440	L 430	L 440	L	L	L 320							
26										L	L	L	U L 430	L 440	L	L	L	L 240						
27									L	L	L	L 410	U L 430	U L 460	L	L	L							
28										L 320	L	L 420	L 450	L 430	L 440	L	L							
29										L	L	L	L	L	L 430	L	L							
30										L 330	L	L 450	L	L	L	L	L							
31										L	L	L	L	A	L	L	A							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									2	4	12	21	17	14	10	3	5	1						
MED									240	L 360	L 410	L 420	L 430	L 430	L 415	L 400	L 320	L 240						
UQ										L 405	L 420	L 420	L 440	L 440	L 430	L 410	L 320							
LQ										L 325	L 400	L 410	420	L 410	L 400	L 390	310							

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JAN. 1977 | FOF1 (0.01 MHZ)

IONOSPHERIC DATA

JAN. 1977 | FOE (0.01 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							S	S	180	I C 250	290	300	310	310	290	A	240	S	S					
2							S	S	170	250	280	300	300	300	A	A	230	S	S					
3							S	S	160	240	270	300	300	300	H 295	A	230	S	S					
4							S	S	S	250	285	A	A	A	A	A	230	S	S					
5							S	S	H 175	250	A	A	A	A	A	A	A	S	S					
6							S	S	200	270	A	295	310	310	295	A	235	S	S					
7							S	S	165	250	A	300	305	305	290	260	220	160	S					
8							S	S	A	A	A	A	300	300	290	260	A	S	S					
9							S	S	160	230	270	300	300	300	295	270	230	S	S					
10							S	S	A	250	A	300	310	305	295	275	220	S	S					
11							S	S	175	250	280	300	305	300	290	270	240	155	S					
12							S	S	A	A	285	300	305	305	290	275	230	S	S					
13							S	S	A	A	280	300	305	305	290	280	250	S	S					
14							S	S	175	250	270	290	300	300	300	270	H 230	S	S					
15							S	S	160	240	260	280	300	300	H 300	270	230	150	S					
16							S	S	A	250	A	290	300	300	290	250	240	160	S					
17							S	S	180	250	280	300	A	305	300	A	245	S	S					
18							S	S	170	250	275	300	305	310	A	270	250	A	S					
19							S	S	180	250	280	300	305	310	A	A	A	A	C					
20							S	S	180	H 250	270	290	300	300	290	A	250	A	S					
21							S	S	190	H 255	270	300	310	310	A	A	A	S	S					
22							S	S	180	H 250	H 275	300	300	305	300	A	A	A	S					
23							C	C	C	C	A	310	320	A	A	A	A	S	S					
24							S	S	200	260	290	A	A	305	300	R 275	240	160	S					
25							S	S	A	265	290	300	300	300	A	A	A	A	S					
26							S	S	175	255	280	295	A	305	300	A	245	H 180	S					
27							S	S	190	260	A	A	305	A	290	A	A	A	S					
28							S	S	180	H 240	R 275	300	310	305	300	280	250	170	S					
29							S	S	170	250	280	300	300	310	A	290	250	A	S					
30							S	S	180	230	280	300	310	305	300	290	260	160	S					
31							S	S	170	250	290	305	315	310	300	280	A	S	S					
	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	27	23	26	26	27	22	16	22	8						
MED									175	250	280	300	305	305	295	272	240	160						
UQ									180	250	282	300	310	308	300	280	250	165						
LQ									170	250	272	300	300	300	290	270	230	158						

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JAN. 1977 | FOE (0.01 MHZ)

IONOSPHERIC DATA

JAN. 1977 | FOES (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	24	E S 15	19	21	J A 21	21	E S 15	E S 15	G	C	32	G	34	J A 53	38	J A 31	G	J A 31	24	E S 15	E S 14	E S 15	E S 15	E S 15
2	16	25	20	E B 15	E B 15	J A 32	E S 15	20	20	G	30	34	G 24	G	32	37	31	30	J A 52	J A 58	43	21	21	E S 15
3	E S 15	22	17	19	16	E S 15	J A 26	33	G	J A 41	32	39	42	40	37	74	35	22	19	E S 15	E S 15	E S 15	16	E S 15
4	20	17	23	22	20	27	27	18	19	33	J A 46	J A 46	J A 60	J A 39	J A 35	J A 31	J A 38	17	J A 21	J A 24	22	J A 80	J A 27	22
5	J A 27	J A 24	J A 37	J A 29	21	20	E S 15	E S 15	G	32	J A 87	J A 71	J A 91	J A 42	J A 56	47	J A 45	23	J A 21	J A 24	J A 34	J A 29	J A 22	J A 22
6	J A 21	20	22	E S 15	22	22	24	J A 21	G	J A 36	J A 60	J A 53	J A 71	J A 86	J A 86	J A 36	J A 30	J A 36	J A 25	18	E S 15	E S 15	E S 15	21
7	E S 14	J A 21	21	20	E S 15	E S 15	E S 15	E S 15	G	28	36	J A 30	J A 31	G 21	G 23	G 22	G 21	21	J A 24	J A 29	22	22	J A 25	21
8	21	E S 15	21	E B 15	17	20	20	J A 24	J A 48	J A 30	J A 45	J A 39	G 25	G 24	G 20	29	J A 29	33	J A 26	20	J A 23	E S 15	E S 15	E S 15
9	J A 30	J A 46	J A 54	22	20	20	19	18	25	27	37	32	42	34	40	G	G	23	20	J A 32	J A 32	31	29	J A 28
10	J A 32	25	E S 15	23	22	30	24	25	J A 39	J A 50	58	G	G 27	G	G 24	G	G	20	E S 15	30	25	26	21	21
11	E S 15	E S 15	E S 15	E S 15	17	23	22	21	G	G	G 22	J A 34	G	G	G	30	J A 51	J A 39	J A 29	J A 29	J A 85	J A 52	J A 32	22
12	20	19	E S 15	E S 15	22	E S 15	25	24	J A 24	J A 32	G 25	G	G	G	31	28	26	20	J A 26	J A 33	J A 52	21	J A 21	J A 26
13	22	J A 19	21	22	E S 15	E S 15	E S 15	J A 21	J A 25	J A 41	32	J A 42	36	36	37	30	G 20	J A 27	23	J A 22	22	J A 29	J A 26	25
14	J A 24	J A 29	22	J A 25	20	21	E S 15	17	25	30	33	34	40	32	G	G	G	21	J A 18	J A 29	21	16	20	20
15	23	20	22	20	E B 15	E S 14	17	20	22	26	30	32	J A 30	G	G	G	25	20	J A 27	J A 65	J A 54	38	40	31
16	35	30	22	21	20	22	24	20	20	25	32	G 26	33	32	G 23	G	J A 27	24	J A 21	22	21	21	E S 15	E S 15
17	E S 15	21	E B 15	E B 15	E B 15	E S 15	E S 15	17	G	G	29	35	33	32	31	29	G 22	J A 27	23	28	21	E S 15	E S 15	E S 15
18	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	G	G	J G 26	32	J A 46	J A 57	J A 61	33	26	J A 37	J A 24	J A 22	J A 29	23	E S 15	E S 15
19	E S 15	E S 15	21	J A 29	J A 27	21	J A 21	19	25	G	31	38	34	33	33	J A 32	J A 36	J A 31	C	J A 27	20	22	20	E S 15
20	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	22	E S 15	G	G	34	38	J A 53	35	37	J A 38	G 20	J A 30	21	22	22	21	21	E S 15
21	E S 15	E S 15	19	18	19	23	19	E S 15	22	27	J A 51	32	G	38	40	J A 52	J A 55	58	J A 88	60	E S 15	E S 14	E S 14	E S 15
22	E S 15	E S 15	22	J A 20	E B 15	18	18	20	G	G 21	G 17	G 18	G	G	G 28	31	28	22	21	E S 15	J A 24	21	C	C
23	C	C	C	C	C	C	C	C	C	C	J A 39	J A 32	37	32	31	39	31	25	45	56	J A 24	39	E S 15	E S 15
24	E S 15	E S 15	E S 15	E B 14	E B 14	E S 15	E S 15	E S 15	G	G 25	G 22	32	32	32	G	34	32	28	23	J A 29	37	27	30	26
25	21	26	21	25	17	21	21	25	22	33	J A 53	J A 44	34	35	31	J A 48	J A 32	J A 50	J A 29	J A 22	E S 15	J A 52	J A 27	24
26	20	20	J A 21	J A 24	20	18	E S 15	19	21	G 22	28	G	32	G 29	G 27	J A 35	G	G	19	18	E S 15	E S 15	E S 15	E S 15
27	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	17	20	G	27	30	J A 34	J A 33	J A 51	G 25	J A 40	J A 31	J A 37	19	17	17	19	E S 15	J A 24
28	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	G	G	33	32	33	35	36	30	30	25	J A 20	23	20	E S 15	J A 20	25
29	20	E S 15	21	E B 15	E B 15	20	E S 15	22	25	G	32	35	37	36	33	38	45	26	22	E S 15	E S 14	20	J A 39	45
30	20	21	23	23	J A 30	J A 34	17	E S 14	G	27	33	G 21	35	35	G 17	32	30	25	20	J A 31	20	E S 15	J A 27	19
31	23	E S 15	J A 29	J A 18	16	21	E S 15	E S 15	G	G	34	35	37	42	36	G	60	57	55	60	25	50	21	17
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	29	31	31	31	31	31	31	31	31	30	31	31	31	30	30
MED	20	19	21	20	17	20	17	19	E G 19	27	32	34	34	34	31	31	30	26	23	24	22	21	21	20
UQ	23	22	22	22	20	22	22	21	24	32	38	38	38	38	37	38	34	J A 32	J A 26	J A 32	J A 27	29	J A 27	24
LQ	E S 15	E S 15	E S 15	E 15	E 15	E S 15	E S 15	E S 15	G	G	30	31	30	G 26	G 24	28	G 22	22	20	21	18	E S 15	E S 15	E S 15

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JAN. 1977 | FOES (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1977 | FBES (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E	E S 15	E	E	E	E	E S 15	E S 15	G	C	G	G	G	33	34	29	G	23	G	E S 15	E S 14	E S 15	E S 15	E S 15
2	E	E	E	E B 15	E B 15	20	E S 15	G	G	G	G	32	G 24	G	30	33	30	30	A A 52	A A 58	A A 43	E	18	E S 15
3	E S 15	E	E	E	E	E S 15	G	19	G	23	G	37	41	39	34	33	25	20	G	E S 15	E S 15	E S 15	E	E S 15
4	E	E	E	E	E	20	19	G	G	29	43	36	35	32	30	28	19	G	G	19	E	A A 80	E	E
5	E	E	28	A A 29	E	E	E S 15	E S 15	G	28	42	40	48	35	46	35	30	22	G	18	A A 34	A A 29	22	22
6	E	E	E	E S 15	E	E	G	G	G	24	30	39	60	57	43	28	16	G	G	E	E S 15	E S 15	E S 15	E
7	E S 14	16	E	E	E S 15	E S 15	E S 15	E S 15	G	G	32	28	29	G 21	G 22	G 22	G 20	G	G	21	E	E	E	E
8	E	E S 15	E	E B 15	E	E	G	19	27	30	31	36	G 25	G 24	G 20	G	29	17	G	E	E	E S 15	E S 15	E S 15
9	22	E	E	E	18	S	S	G	G	G	35	32	41	34	36	G	G	21	G	27	23	A A 31	E	20
10	A A 32	E	E S 15	E	E	A A 30	18	G	24	45	35	G	G 26	G	G 24	G	G	20	E S 15	20	17	E	E	E
11	E S 15	E S 15	E S 15	E S 15	E	E	G	G	G	G	G 22	24	G	G	G	G	42	25	G	A A 129	A A 85	A A 52	19	17
12	E	E	E S 15	E S 15	E	E S 15	A A 25	G	20	27	G 24	G	G	G	G	G	26	G	20	E	E	E	E	E
13	E	E	E	E	E S 15	E S 15	E S 15	G	20	27	G	24	34	36	36	G	G 18	20	G	E	E	E	16	E
14	E	20	E	E	E	E	E S 15	G	23	23	32	32	32	G	G	G	G	20	G	24	E	E	E	E
15	E	E	E	E	E B 15	E S 14	G	G	G	G	G	30	27	G	G	G	25	G	16	A A 65	19	20	20	E
16	E	E	E	E	E	E	G	G	19	23	27	G 26	33	G	G 23	G	20	15	G	E	E	E	E S 15	E S 15
17	E S 15	E	E B 15	E B 15	E B 15	E S 15	E S 15	G	G	G	29	32	31	32	31	29	G 20	20	18	21	E	E S 15	E S 15	E S 15
18	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	G	G	G 25	G	G	37	43	31	G	21	21	16	20	E	E S 15	E S 15
19	E S 15	E S 15	E	E	E	E	G	G	G	G	G	37	34	33	32	29	33	31	C	20	E	E	E	E S 15
20	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	G	E S 15	G	G	34	37	34	34	32	30	G 20	20	G	E	E	E	E	E S 15
21	E S 15	E S 15	E	E	E	E	G	E S 15	G	G	35	G	G	35	33	31	27	28	A A 88	A A 60	E S 15	E S 14	E S 14	E S 15
22	E S 15	E S 15	E	E	E B 15	E	G	G	G	G 21	G 17	G 18	G	G	G 28	30	28	22	G	E S 15	17	E	C	C
23	C	C	C	C	C	C	C	C	C	C	30	27	28	32	31	38	30	25	A A 45	A A 56	E	A A 39	E S 15	E S 15
24	E S 15	E S 15	E S 15	E B 14	E B 14	E S 15	E S 15	E S 15	G	G	G 22	31	32	32	G	34	32	28	22	27	A A 37	16	18	A A 26
25	E	E	E	E	E	E	G	G	22	29	37	36	33	34	31	29	28	42	21	E	E S 15	21	E	16
26	E	E	E	17	E	E	E S 15	G	20	G 21	27	G	32	G 28	G 26	29	G	G	G	E	E S 15	E S 15	E S 15	E S 15
27	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	G	G	G	G	30	30	27	32	G 25	37	30	29	17	E	E	E	E S 15	17
28	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	G	G	33	32	33	33	35	30	30	25	G	E	E	E S 15	E	E
29	E	E S 15	E	E B 15	E B 15	E	E S 15	G	25	G	G	35	37	36	31	37	G	23	G	E S 15	E S 14	E	A A 39	E
30	E	E	E	E	23	A A 34	G	E S 14	G	27	33	G 21	35	34	G 17	G	G	23	16	29	E	E S 15	21	E
31	E	E S 15	21	14	E	E	E S 15	E S 15	G	G	34	34	35	42	34	G	49	55	54	E	E	30	E	E
	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	29	29	30	30	29	31	31	31	31	31	31	31	31	30	31	31	31	30	30
MED	E	E E 15	E	E E 14	E	E E 14	15	G	G	G	30	31	32	32	31	29	25	21	G	16	E E 14	15	15	15
UQ	E S 15	E S 15	E S 15	E 15	E 15	E S 15	E S 15	E S 15	20	27	34	36	34	34	34	31	30	25	20	26	17	18	16	E S 15
LQ	E	E	E	E	E	E	G	G	G	G	G 20	G 22	G 26	E G 21	G 22	G	E G 16	18	G	E	E	E	E	E

The Radio Research Laboratories, Japan

JAN. 1977 | FBES (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1977 | F-MIN (0.1 MHZ) | 135° E Mean Time (G. M. T. + 9 h)

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

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

The Radio Research Laboratories, Japan

JAN. 1977 | F-MIN (0.1 MHZ)

IONOSPHERIC DATA

JAN. 1977 | 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 MHz to 20 MHz in 20 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	315	F 335	U S 365	350	262	S 280	290	315	360	I C 340	305	320	350	345	355	345	360	355	325	315	320	S 350	290	S 280
2	F 275	F	S 345	F 310	F 320	S 325	350	315	345	310	340	355	370	335	S 315	350	355	385	A	A	A	285	300	F 275
3	290	320	355	335	310	305	295	I S 320	355	360	360	345	335	350	360	355	360	385	360	320	S 320	F	F	F
4	S 330	S 315	S 330	S 350	315	S 295	S 305	325	S 345	320	310	335	S 340	365	345	355	365	365	350	S 330	S 335	A	S 325	S 290
5	U S 310	S 345	J S 370	A	F 275	F 295	F 300	320	350	S 310	330	345	335	335	360	360	345	315	360	360	A	A	330	S 345
6	310	315	385	390	S	305	305	315	300	290	S 325	355	345	335	335	370	375	380	320	325	350	320	S 315	320
7	335	345	360	305	S 310	F 285	F	285	345	315	320	345	335	330	H 305	355	355	345	315	J S 345	350	310	S 350	300
8	305	325	315	310	370	290	F 315	325	340	310	315	350	345	335	365	340	380	350	375	325	325	345	275	295
9	S 265	300	320	345	355	S	S	315	365	370	310	345	345	375	360	355	360	340	S 355	S 335	S	A	285	250
10	A	S	S	S	345	A	280	320	335	320	325	350	350	325	360	380	370	350	S 325	S 335	S 330	F	S 315	305
11	290	S 300	F	F	350	315	335	330	S 375	320	315	315	350	H 330	360	365	365	S 385	340	A	A	A	S 340	F 295
12	310	325	350	F 300	F	340	A	340	390	345	310	345	355	305	320	355	370	340	J S 335	I S 350	S 370	355	365	305
13	F	340	S 330	395	S	265	F 305	350	370	385	S 345	325	350	350	355	385	350	350	J S 315	355	310	320	S 280	F
14	S 305	I S 280	J S 315	310	F 330	F	F 305	325	385	S 365	305	305	350	H 275	295	345	355	370	345	325	330	370	295	F
15	F	F	F	315	F 335	F 280	310	325	350	340	275	315	355	355	320	330	350	375	350	A	S 310	S	S	S
16	F	F 300	F	F	F 315	335	315	315	365	365	350	325	375	370	355	355	345	360	345	320	U S 340	S 320	F 280	F 300
17	F 305	310	305	355	390	S	295	335	350	380	360	310	350	350	350	360	345	S 335	S 335	S 295	U S 345	S 335	290	S 265
18	285	S 310	S 340	305	340	285	295	295	S 375	370	370	360	345	360	355	365	360	355	S 320	340	385	335	325	S 285
19	310	335	F 305	315	325	J S 360	315	380	345	350	330	345	335	S 325	350	360	355	365	I C 330	S 340	J S 340	340	320	310
20	320	325	315	320	325	375	325	330	365	355	365	355	350	345	340	355	355	375	340	325	335	F 295	S 305	310
21	S 305	330	335	315	340	F 315	340	310	350	365	355	H 335	320	335	355	345	355	360	A	A	S 320	I S 330	310	S 300
22	295	S 295	S 295	S 305	335	360	285	310	345	365	365	360	V 310	S 315	R 300	335	360	375	365	370	275	S 295	C	C
23	C	C	C	C	C	C	C	C	C	C	330	335	V 315	H 315	300	330	H 345	340	A	A	295	A	S 285	295
24	300	315	S 300	315	335	300	295	315	385	S 370	375	335	340	335	330	330	325	S 350	340	S 340	A	295	305	A
25	S 295	305	305	330	U S 330	305	290	325	370	360	375	S 365	335	345	S 345	360	365	375	375	315	295	345	345	290
26	290	295	305	330	S 345	315	285	325	360	360	360	335	360	335	S 345	355	345	380	365	295	U S 350	S 345	S 305	S 320
27	J S 325	325	325	325	330	335	315	320	365	J S 365	375	355	320	340	345	335	375	355	S 355	365	340	320	320	I S 330
28	300	300	S 310	315	S 315	U S 365	F	330	365	365	365	345	325	340	340	315	365	340	345	320	S 330	S 290	S 315	325
29	S 310	S 300	305	I S 300	290	S 345	S 305	305	340	355	340	365	V 355	325	330	340	350	340	350	280	I S 305	S 325	A	285
30	285	H 290	280	280	S 315	A	305	S 340	395	340	345	310	370	335	345	360	350	390	325	S 300	S 305	295	S 275	280
31	S 275	S 305	290	S 300	320	280	295	300	385	H 340	355	340	350	335	340	355	335	350	A	315	S 300	360	290	320
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	27	26	26	27	25	26	30	30	30	31	31	31	31	31	31	31	31	27	26	26	23	27	25
MED	305	315	318	315	330	305	305	320	360	355	340	345	345	335	345	355	355	355	345	325	S 330	325	305	300
UQ	310	325	345	335	340	335	315	330	370	365	360	352	350	348	355	360	365	375	355	S 340	S 340	345	322	310
LQ	290	300	305	305	315	290	295	315	345	320	318	330	335	330	330	342	350	348	328	315	S 310	302	290	285

The Radio Research Laboratories, Japan

JAN. 1977 | M(3000)F2 (0.01)

IONOSPHERIC DATA

JAN. 1977 | 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 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										C	L	L 355	L 350	L	L	L	L							
2									415	L	L	L 390	L	L 425	L	L								
3										L	L	L	L	L	L	L	L							
4										L	A	U L 355	U L 345	L	L	L	L							
5									L	U L 330	A	A	A	L	A	A	A							
6										L	U L 345	A	A	A	A	L	U L 405							
7									L	L	L 365	L 355	L 380	L	L	L	L							
8									L	L	L 365	A	L 375	L 375	L 375	L	A							
9										L	L 365	L 385	A	L 390	A	L	H 465							
10										A	L 410	L 420	L	L	L	L	L							
11									L	L 375	H 380	L	H 370	H 385	L 380	L 385	A							
12										L	380	L	L	U L 355	L	L	L							
13										L	L	L 355	385	L	L 380	L	L							
14										L	H 365	425	L	L 380	L 360	L	L							
15										L	360	375	L	L 385	L	L 375	L							
16											L	410	420	L	L 400	L	L							
17										L	L	L	L	L	L	L	L							
18									L	L	L 385	U L 380	U L 405	A	A	L	445							
19									L	L	L	L 370	375	L 380	360	L	A							
20									L	L	L	385	L	L	L	L	L							
21									L 410	L	L	L 380	L 380	L	L	L 360	L 380							
22										L	L 395	L	L 405	L	L 405	L	L							
23									C	C	L 380	390	L 375	L 370	L	L	L							
24										L	L	L	L	L	L	L								
25										L	L	385	L 365	L 385	L	L	L 415							
26										L	L	L	U L 385	L 365	L	L	L	L 400						
27									L	L	L	L 395	U L 410	U L 340	L	L	L							
28										L 410	L	L 405	L 375	L 395	L 385	L	L							
29										L	L	L	L	L	L 350	L	L							
30										L 405	L	L 385	L	L	L	L	L							
31										L	L	L	L	A	L	L	A							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									2	4	12	19	16	13	9	3	5	1						
MED									412	L 390	L 372	L 385	L 378	L 380	L 380	L 375	L 415	L 400						
UQ										L 408	L 382	392	L 395	L 385	L 385	L 380	445							
LQ										L 352	L 365	L 372	L 372	L 370	L 360	L 368	L 405							

JAN. 1977 | M(3000)F1 (0.01)

IONOSPHERIC DATA

JAN. 1977 | 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 MHz to 20 MHz in 20 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										C	295	280	245	240	245	250	215							
2									235	280	255	230	220	250	255	245								
3										245	245	260	270	250	250	250	240							
4										300	295	255	240	230	265	240	230							
5									235	315	255	205	245	255	245	230	225							
6										305	275	225	250	285	260	240	225							
7									250	250	255	235	235	250	255	245	240							
8									255	250	260	245	230	240	225	230	220							
9										225	305	250	235	240	245	240	230							
10										300	270	240	215	245	245	230	215							
11									205	295	325	285	240	240	235	245	235							
12										235	300	250	240	275	270	245	230							
13										225	240	300	255	250	245	225	230							
14										215	345	295	230	275	265	240	235							
15										245	390	295	235	255	330	280	250							
16											250	290	240	240	255	255	245							
17										230	245	305	255	250	250	235	240							
18									230	225	240	245	260	250	260	235	235							
19									245	250	270	250	250	245	250	240	225							
20									225	235	245	250	240	270	265	245	230							
21									245	240	260	255	275	225	230	270	270							
22										230	245	240	245	245	245	240	240							
23									C	C	245	250	255	245	245	245	215							
24										235	250	275	255	250	285	255								
25										250	240	250	270	250	245	240	240							
26										245	245	255	235	280	250	250	225	220						
27									235	235	235	245	260	265	265	250	225							
28										235	240	255	275	265	255	250	225							
29										245	240	235	250	280	255	250	230							
30										240	250	275	230	270	255	225	240							
31										240	230	270	240	240	245	230	255							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									10	28	31	31	31	31	31	31	29	1						
MED									235	242	250	250	245	250	250	245	230	220						
UQ									245	250	272	275	255	265	260	250	240							
LQ									230	235	245	245	235	242	245	238	225							

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JAN. 1977 | H'F2 (KM)

IONOSPHERIC DATA

JAN. 1977 | 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 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	250	235	200	220	S	E S 300	E S 290	250	H 220	I C 230	225	H 200	215	225	225	195	225	220	205	220	230	220	E S 250	E S 350
2	310	260	205	225	255	275	240	250	200	H 210	H 200	200	235	200	H 200	A	240	215	A	A	A	E S 320	E A 300	E S 300
3	280	255	225	225	E S 245	E S 315	E S 290	240	H 225	225	225	A	A	A	230	225	230	205	200	250	230	F 265	F 210	F 305
4	240	265	250	190	E S 280	E A 300	300	250	205	220	A	E A 250	225	215	H 200	H 200	215	220	205	245	220	A	265	300
5	280	230	220	A	S	265	295	260	225	225	A	A	A	H 210	A	A	A	230	210	210	A	A	E A 300	E A 260
6	275	280	205	165	S	E S 280	290	265	250	235	230	A	A	A	A	H 200	210	205	215	255	215	250	280	260
7	235	220	205	305	225	275	275	E S 300	210	H 220	220	200	H 200	H 185	H 200	H 200	H 195	230	205	220	210	245	200	250
8	250	235	245	250	195	E S 305	255	E A 275	220	H 210	H 180	A	H 190	H 175	H 180	205	A	210	200	240	230	225	E S 315	E S 300
9	A	270	230	215	200	S	S	250	230	225	230	200	A	205	A	H 200	H 190	225	220	E A 240	220	A	E A 320	A
10	A	280	215	200	220	A	A	245	230	A	210	190	H 180	H 175	H 170	H 200	H 180	225	215	245	230	250	240	280
11	300	295	F 250	F 225	205	E S 250	E S 250	235	H 190	H 190	H 190	H 185	H 180	H 175	H 200	210	A	205	205	A	A	A	E A 275	E A 300
12	275	260	240	275	E S 300	240	A	250	210	210	200	H 180	240	215	225	225	225	230	225	210	205	220	210	300
13	320	255	260	200	S	S	E S 320	220	220	225	220	H 175	225	A	E A 240	210	210	225	220	230	235	255	E A 350	300
14	295	E A 340	250	250	255	E S 300	290	250	225	220	H 200	200	H 190	H 195	H 225	225	235	H 215	205	255	210	205	E S 295	270
15	300	300	250	225	210	S	S	245	230	225	200	200	H 210	210	H 205	205	240	H 215	200	A	240	E A 290	E A 310	265
16	245	250	255	270	245	205	255	240	225	H 230	205	200	195	220	200	H 190	H 210	225	205	240	235	230	E S 290	275
17	255	250	285	240	200	S	E S 300	245	225	215	205	H 200	H 185	205	220	215	205	230	205	E A 300	220	210	E S 290	310
18	295	245	225	250	215	E S 300	E S 315	270	225	225	205	H 200	185	E A 250	A	230	200	240	E A 245	240	210	240	250	E S 310
19	290	240	240	290	250	210	265	250	200	235	220	E A 240	225	205	200	200	A	215	I C 230	230	225	235	235	255
20	255	255	260	290	250	200	255	230	225	220	220	200	H 190	225	215	220	210	220	200	210	245	290	270	250
21	220	240	250	E S 250	245	255	240	260	205	230	220	H 195	H 195	H 205	230	210	200	230	A	A	245	215	240	270
22	250	285	290	270	225	195	E S 300	255	H 230	H 180	200	H 180	H 180	H 170	200	H 230	225	225	190	200	260	250	C	C
23	C	C	C	C	C	C	C	C	C	C	210	195	H 190	H 180	H 190	A	225	210	A	A	250	A	290	270
24	250	260	275	250	225	250	E S 300	250	H 210	200	200	H 190	H 190	H 180	H 180	A	250	225	210	E A 250	A	250	275	A
25	280	255	250	245	215	E S 295	E S 330	250	220	H 215	A	215	H 180	210	200	H 190	205	225	200	210	275	250	205	E A 310
26	330	305	275	230	225	E S 250	E S 310	250	240	225	H 195	H 200	H 180	200	H 200	200	210	220	195	265	220	220	260	250
27	255	245	255	250	245	245	270	240	220	H 200	205	200	190	190	190	E A 240	220	220	205	200	235	250	230	250
28	270	285	270	265	245	205	E S 260	235	210	H 175	235	200	H 200	H 195	235	205	225	210	210	240	205	255	255	245
29	270	260	275	290	245	200	E S 300	250	245	230	220	220	A	A	H 195	E A 240	230	220	210	220	245	220	A	E S 300
30	290	260	250	300	255	A	265	210	H 210	200	245	H 195	245	H 210	225	225	200	210	220	240	255	250	250	295
31	300	300	275	245	225	300	290	260	H 220	200	A	225	245	A	220	200	A	E A 250	A	220	230	200	E S 295	270
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	30	30	29	26	24	26	30	30	29	27	27	26	26	27	27	26	31	27	26	27	26	29	28
MED	275	259	250	250	230	U 230	U 265	250	220	220	210	200	H 192	204	200	205	212	220	205	232	230	243	U 240	268
UQ	295	280	260	270	248	E S 300	E S 300	252	225	225	220	200	225	210	224	222	225	225	214	242	242	250	E E 295	290
LQ	250	245	225	225	215	215	258	240	210	H 210	200	H 195	H 185	H 185	H 200	200	205	215	202	215	220	220	240	260

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JAN. 1977 | H'F (KM)

IONOSPHERIC DATA

JAN. 1977 | H'E (KM) | 135° E Mean Time (G. M. T. + 9 h)

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

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							S	S	125	I C 110	105	105	105	105	105	105	105	S	S					
2							S	S	125	110	E A 120	E A 115	E A 110	105	105	105	E A 120	S	S					
3							S	S	E S 135	E A 130	E A 115	E A 115	105	105	105	A	F A 115	S	S					
4							S	S	S	105	105	105	105	A	A	A	E A 120	S	S					
5							S	S	120	110	105	105	105	105	105	A	A	S	S					
6							S	S	115	110	110	110	110	E B 110	105	A	105	S	S					
7							S	S	120	105	105	E A 120	E A 115	E A 105	E A 110	E A 110	E A 120	120	S					
8							S	S	A	A	A	A	E A 110	E A 110	E A 105	E A 120	A	S	S					
9							S	S	130	105	105	105	105	105	105	105	105	S	S					
10							S	S	A	105	A	105	E A 115	100	E A 110	105	100	S	S					
11							S	S	110	105	E A 110	E A 120	105	105	105	105	110	E S 130	S					
12							S	S	A	A	E A 120	105	100	105	100	105	105	S	S					
13							S	S	A	A	100	E A 120	E A 120	E A 115	110	110	115	S	S					
14							S	S	120	E A 130	105	100	100	100	100	105	105	S	S					
15							S	S	125	105	100	100	E A 125	105	105	105	105	110	S					
16							S	S	A	E A 125	A	110	100	110	110	100	E A 120	E A 140	S					
17							S	S	125	105	105	105	A	E A 115	E A 115	A	E A 115	S	S					
18							S	S	125	105	E A 125	105	105	E A 110	A	105	105	A	S					
19							S	S	E A 150	105	105	100	100	105	105	105	A	A	C					
20							S	S	125	105	105	105	105	105	105	105	105	A	S					
21							S	S	115	E A 125	105	105	105	105	105	105	A	S	S					
22							S	S	115	110	105	105	100	105	E A 120	A	A	A	S					
23							C	C	C	C	105	E A 120	E A 120	100	105	A	A	S	S					
24							S	S	125	105	E A 115	E A 115	E A 115	E A 115	105	E A 110	105	E S 125	S					
25							S	S	A	110	105	105	105	105	105	105	A	A	S					
26							S	S	115	E A 120	E A 130	105	A	E A 130	E A 120	A	105	110	S					
27							S	S	115	105	105	A	E A 120	A	E A 110	A	A	A	S					
28							S	S	120	105	100	100	100	100	E A 110	105	105	115	S					
29							S	S	110	105	100	100	100	A	A	105	105	A	S					
30							S	S	115	105	105	105	105	100	105	100	105	110	S					
31							S	S	115	105	A	A	100	100	100	100	100	S	S					
	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	27	27	28	29	28	28	22	23	8						
MED									120	105	105	105	102	104	105	105	105	114						
UQ									125	108	108	108	E A 110	108	108	105	110	E E 128						
LQ									115	105	105	105	100	105	105	105	105	110						

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JAN. 1977 | H'E (KM)

IONOSPHERIC DATA

JAN. 1977 | 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 MHz to 20 MHz in 20 sec in automatic operation

Day \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	100	S	100	95	95	95	S	S	G	C	120	G	125	115	115	110	G	100	100	S	S	S	S	S
2	145	100	100	B	B	100	S	100	155	G	175	125	100	G	110	175	155	135	120	120	110	95	95	S
3	S	100	125	105	120	S	105	105	G	115	140	135	120	120	110	105	105	105	100	S	S	S	100	S
4	125	125	115	95	95	95	95	100	130	125	115	110	105	105	105	105	100	105	100	105	105	100	100	105
5	100	100	100	100	95	115	S	S	G	120	105	105	105	105	105	105	100	155	100	100	95	95	95	90
6	95	95	90	S	105	105	100	100	G	110	115	110	110	110	110	105	100	100	100	100	S	S	S	90
7	S	100	100	100	S	S	S	S	G	125	110	105	100	100	100	100	100	100	100	100	100	95	95	95
8	95	S	100	B	115	110	105	100	100	100	100	100	100	100	100	170	100	100	100	100	110	S	S	S
9	105	105	100	100	100	150	150	150	150	150	125	125	140	140	130	G	G	150	135	100	100	100	100	100
10	100	100	S	110	110	110	110	110	105	110	105	G	105	G	100	G	G	145	S	100	100	100	95	95
11	S	S	S	S	120	110	115	115	G	G	105	100	G	G	G	150	115	115	110	105	100	100	100	100
12	100	100	S	S	110	S	140	125	110	105	105	G	G	G	150	155	140	140	115	105	100	100	100	100
13	100	100	95	95	S	S	S	110	105	105	150	100	130	130	120	120	95	110	110	110	110	100	100	125
14	120	110	100	115	100	100	S	140	135	110	135	130	125	140	G	G	G	100	100	100	100	100	100	105
15	100	100	100	100	B	S	100	145	145	150	135	120	100	G	G	G	130	120	105	100	100	100	100	100
16	100	100	100	100	100	125	110	120	110	100	100	100	175	175	100	G	100	100	100	135	130	100	S	S
17	S	100	B	B	B	S	S	125	G	G	140	115	105	165	150	130	100	100	100	100	100	S	S	S
18	S	S	S	S	S	S	S	S	G	G	100	150	120	120	110	110	155	100	150	145	125	125	S	S
19	S	S	115	105	105	100	100	100	100	G	170	125	125	125	115	105	105	100	C	100	100	100	100	S
20	S	S	S	S	S	S	110	S	G	G	130	125	120	165	125	115	100	100	100	100	100	95	100	S
21	S	S	130	120	120	115	110	S	115	155	105	120	G	120	115	105	105	100	100	100	S	S	S	S
22	S	S	100	100	B	100	115	110	G	105	100	100	G	G	100	155	140	115	100	S	100	100	C	C
23	C	C	C	C	C	C	C	C	C	C	110	105	100	105	145	150	150	155	125	105	100	135	S	S
24	S	S	S	B	B	S	S	S	G	105	100	125	120	125	G	155	155	145	140	120	110	110	105	100
25	100	105	110	100	105	100	100	110	105	115	110	105	105	110	105	105	105	100	100	100	S	105	105	100
26	105	100	105	100	100	100	S	120	120	105	105	G	100	100	100	100	G	G	100	100	S	S	S	S
27	S	S	S	S	S	S	110	110	G	110	105	105	105	100	100	100	100	100	100	120	110	110	S	100
28	S	S	S	S	S	S	S	S	G	G	150	150	140	130	130	140	115	110	95	95	95	S	105	100
29	100	S	100	B	B	100	S	150	150	G	160	150	130	150	100	125	110	105	150	S	S	105	100	100
30	105	100	100	100	100	100	100	S	G	120	170	100	155	125	100	150	145	110	105	100	100	S	100	100
31	130	S	110	110	105	105	S	S	G	G	150	150	145	125	120	G	105	105	100	100	95	100	100	100
	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	18	17	21	18	18	19	17	20	15	20	31	27	27	25	27	25	26	30	29	27	24	22	20	18
MED	100	100	100	100	105	100	110	110	115	110	115	115	120	120	110	115	105	105	100	100	100	100	100	100
UQ	105	100	110	105	110	110	110	125	140	122	140	125	128	130	120	150	140	120	110	105	110	105	100	100
LQ	100	100	100	100	100	100	100	102	105	105	105	105	105	105	100	105	100	100	100	100	100	100	100	100

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JAN. 1977 | H'ES (KM)

IONOSPHERIC DATA

JAN. 1977 | 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 MHz to 20 MHz in 20 sec in automatic operation

Hour / Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 2		F 1	F 1	F 3	F 2					C 1		H 1	C 1	C 2	C 2		L 2	L 1					
2	F 1	F 1	F 1			F 4		L 1	H 1		HL 11	HL 11	L 1		C 1	HC 21	HL 22	HL 14	CL 52	FF 52	FF 33	F 3	F 3	
3		F 2	F 1	F 1	F 1		L 2	L 3		LH 11	HL 21	HL 21	C 2	C 3	C 2	L 2	L 2	L 3	L 1				F 1	
4	F 1	F 1	F 2	F 1	F 1	F 3	L 3	L 1	C 1	H 2	C 3	C 2	C 2	L 2	L 2	L 2	L 2	L 1	L 3	F 3	F 1	F 3	F 2	F 1
5	F 2	F 2	F 2	F 3	F 1	F 1				C 1	C 3	CL 21	C 3	C 2	C 4	L 4	L 4	HL 11	L 1	F 2	F 5	F 3	F 2	F 3
6	F 1	F 1	FF 11		F 1	F 1	L 3	L 2		CH 21	C 2	C 2	C 3	C 3	C 3	L 2	LH 11	L 1	L 2	F 2				F 1
7		F 1	F 1	F 1						H 1	C 3	L 1	L 2	L 1	L 1	L 1	L 2	L 1	L 2	F 3	F 1	F 3	F 3	F 3
8	F 1		F 1		F 1	F 1	L 1	L 6	L 2	L 3	L 3	L 3	L 1	L 1	L 1	HL 12	L 4	LH 33	L 1	F 1	F 1			
9	F 3	F 2	F 2	F 1	F 1	F 2	H 2	H 1	H 3	H 2	H 3	H 3	HC 11	HC 11	H 2			H 4	H 1	F 3	F 3	F 2	F 1	F 2
10	F 4	F 2		F 1	F 1	F 3	C 2	C 3	L 3	C 4	L 2		L 1		L 1			H 1		F 3	F 3	F 2	F 1	F 1
11					F 1	F 1	L 2	L 1			L 1	L 1				H 1	C 3	C 2	L 3	F 3	F 4	F 1	F 2	F 1
12	F 1	F 1			F 2		C 5	C 2	L 3	L 3	L 2				H 1	HL 11	HL 11	H 1	L 2	F 2	F 1	F 1	F 3	F 2
13	F 1	F 2	F 1	F 2				L 1	L 4	L 2	H 1	LH 11	HL 21	HL 12	HL 21	CL 23	L 1	LL 21	L 1	FF 11	F 1	F 3	F 3	FF 11
14	FF 21	F 3	F 2	FF 12	F 1	F 1		H 1	H 2	CH 21	HL 11	H 1	H 1	H 1				L 1	L 2	F 4	F 1	F 1	F 1	F 1
15	F 1	F 1	F 2	F 1			L 1	H 1	HL 21	H 1	H 1	C 1	L 1				H 2	C 1	L 4	F 4	F 3	F 2	F 3	FF 21
16	F 3	F 2	F 2	F 2	F 2	F 1	C 2	C 1	L 1	L 1	L 1	L 1	H 1	HL 11	L 1		L 1	L 1	L 3	FF 11	F 1	F 1		
17		F 1						C 1			H 1	C 1	L 2	HL 11	HL 11	CL 11	L 1	L 2	L 3	F 4	F 1			
18											L 1	H 1	H 2	CL 21	CL 22	C 2	HL 11	LH 21	HL 23	FF 23	FF 42	FF 11		
19			F 1	F 3	F 2	F 1	L 3	L 2	L 1		H 1	H 1	H 1	H 1	C 1	C 2	L 2	L 3		F 2	F 1	F 1	F 1	
20							L 1				H 1	H 1	C 2	HC 11	H 1	C 1	L 1	L 2	L 1	F 1	F 2	F 1	F 1	
21			F 1	F 1	F 1	F 1	L 1		C 1	HC 11	C 2	C 1		C 1	C 1	C 1	L 2	L 2	L 3	F 4				
22			F 1	F 1		F 1	C 1	C 1		L 2	L 1	L 1			L 1	HCL 11	HCL 11	CL 11	L 1		F 2	F 1		
23											C 1	C 1	L 1	C 1	HC 11	HCL 12	HCL 23	HHL 11	C 5	F 4	F 1	F 5		
24										L 2	L 1	HL 11	CL 12	CL 11		HL 21	HL 11	H 2	C 2	F 3	F 4	F 4	F 2	F 4
25	F 2	F 2	FF 11	F 1	F 1	F 2	L 2	LL 21	L 1	C 1	C 2	C 2	C 1	C 2	C 2	C 2	L 2	L 3	L 4	F 2		F 3	F 1	F 1
26	F 1	F 1	F 2	F 2	F 2	F 1		C 1	C 1	L 2	L 1		L 1	L 1	L 1	L 2			L 1	F 1				
27							L 1	L 1		C 1	C 1	L 1	L 1	L 2	L 1	L 3	L 2	L 2	L 1	F 1	F 1	F 1		F 2
28											H 1	H 1	H 1	H 1	HL 11	HL 11	CL 11	C 2	LC 21	F 2	F 2		FF 11	F 1
29	F 1		F 1			F 1		H 1	H 3		H 1	H 1	H 1	HC 21	L 2	H 1	C 1	L 3	H 1			F 1	F 4	F 2
30	F 2	F 2	F 3	F 2	F 5	F 4	L 2			C 1	HL 21	L 1	HHL 11	H 1	L 1	H 1	H 1	C 5	C 1	F 3	F 1		F 4	F 1
31	FF 11		FF 52	F 3	F 1	F 2					HL 11	HL 11	H 1	C 2	C 2		C 5	L 5	L 3	F 3	F 2	F 5	F 2	F 1
	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																								

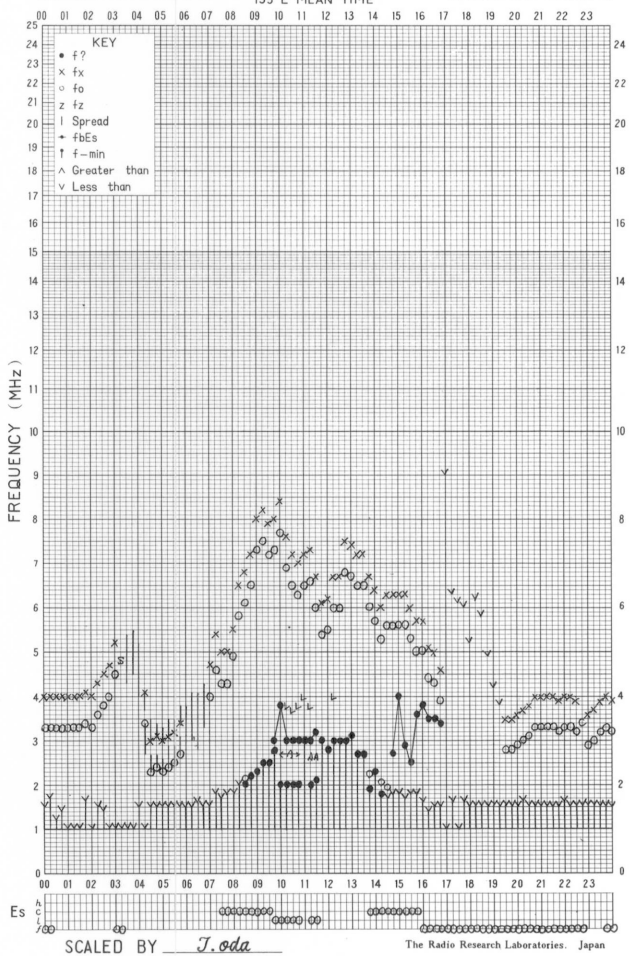
The Radio Research Laboratories, Japan

JAN. 1977 | TYPES OF ES

f-PLOTS OF IONOSPHERIC DATA

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN 1 1977



SCALED BY J. oda

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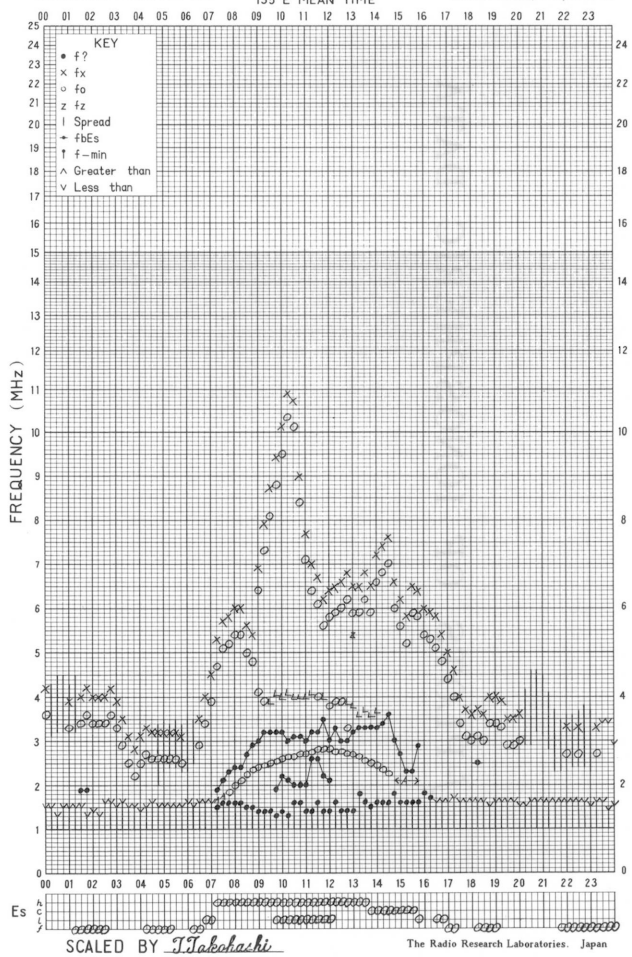
f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE JAN, 1, 1977



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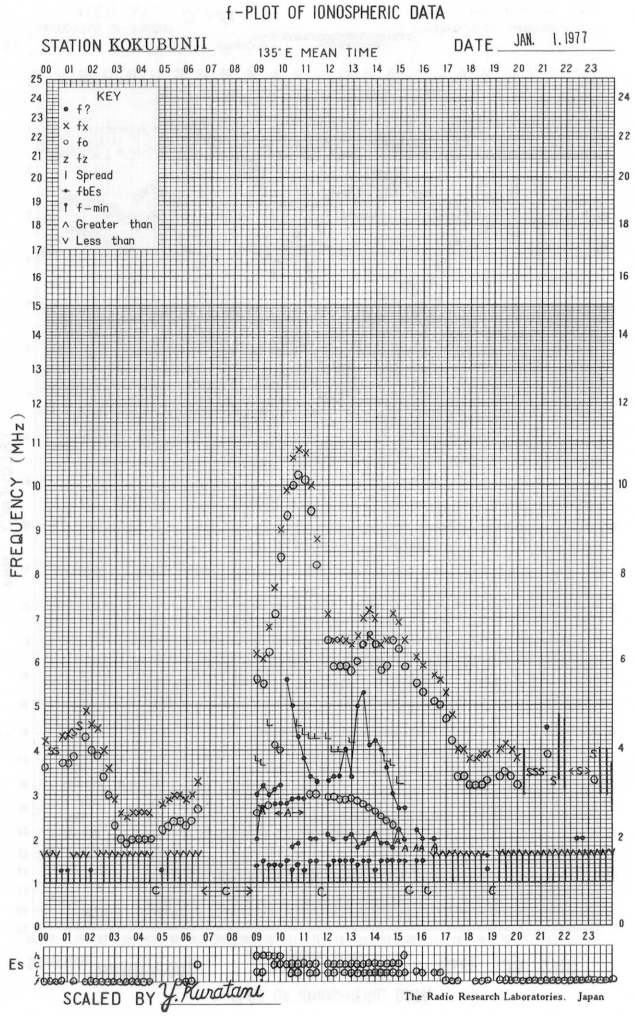
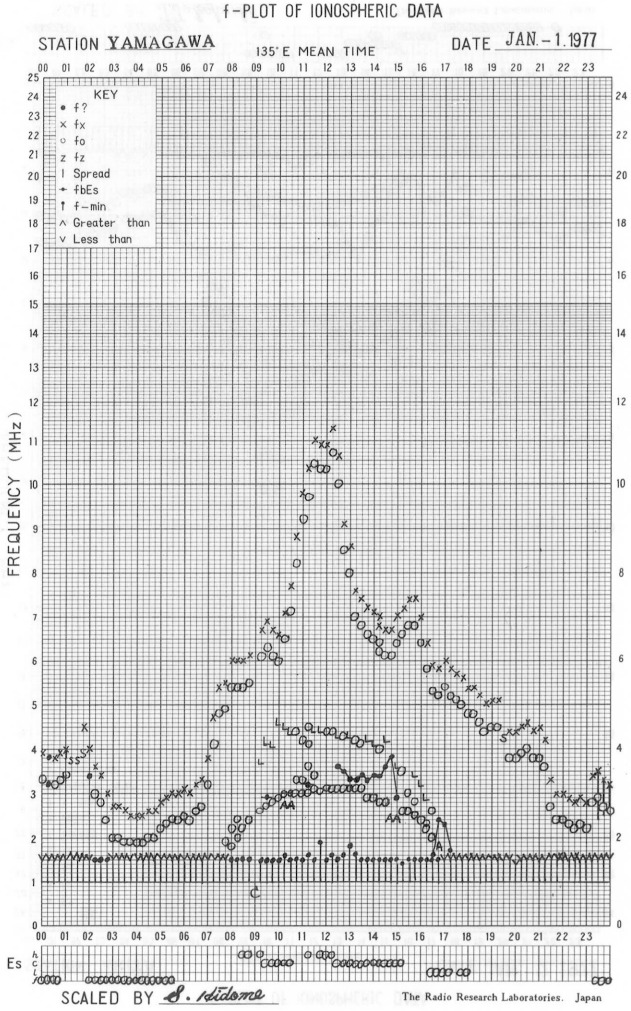

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135° E MEAN TIME
DATE JAN. 1, 1977
KEY
• f?
× fx
○ fo
z fz
I Spread
⊸ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY Y. Furatani
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135° E MEAN TIME
DATE JAN.-1.1977
KEY
• f?
× fx
○ fo
z fz
I Spread
⊸ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Iidoma
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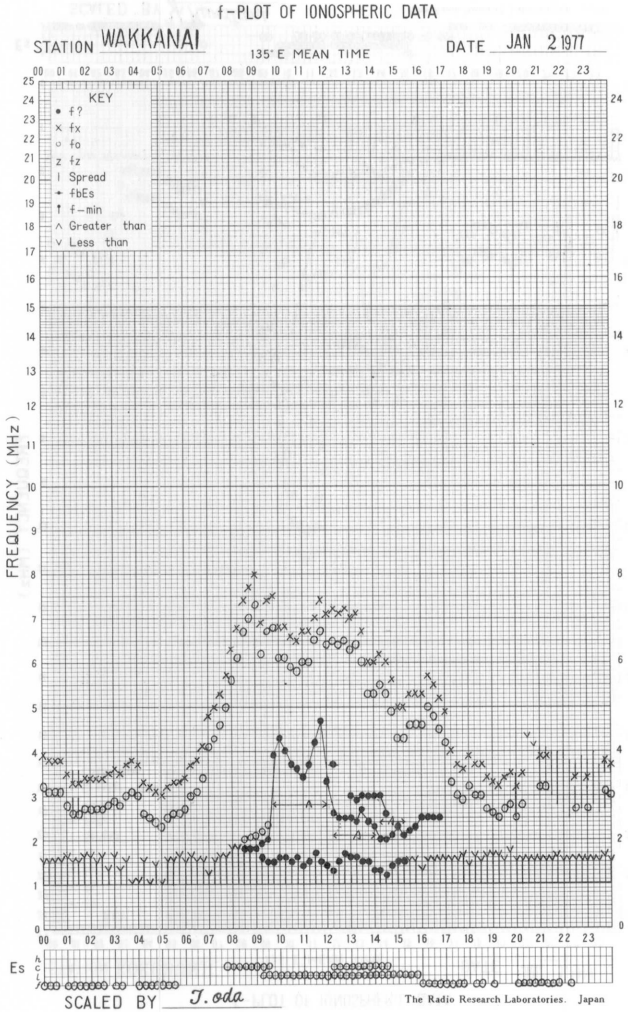
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135°E MEAN TIME
DATE JAN 2 1977
KEY
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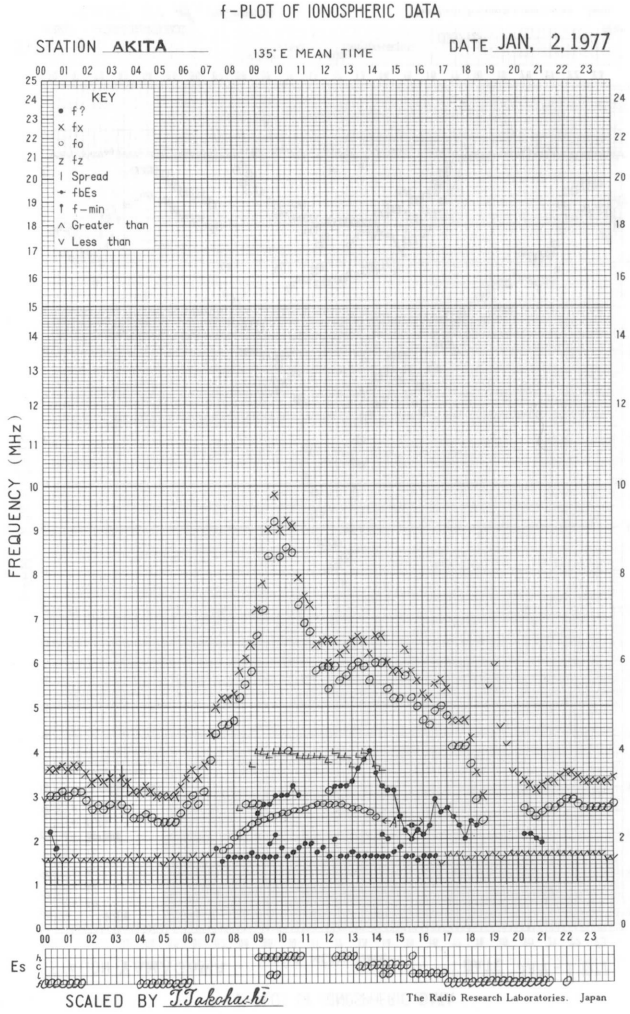
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY T. oda
The Radio Research Laboratories. Japan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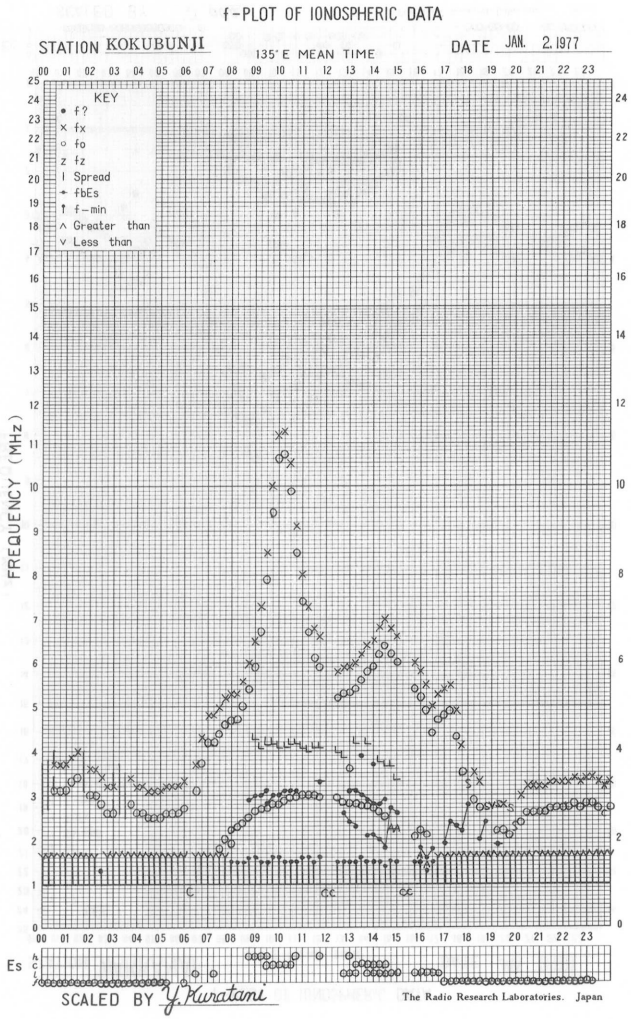
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan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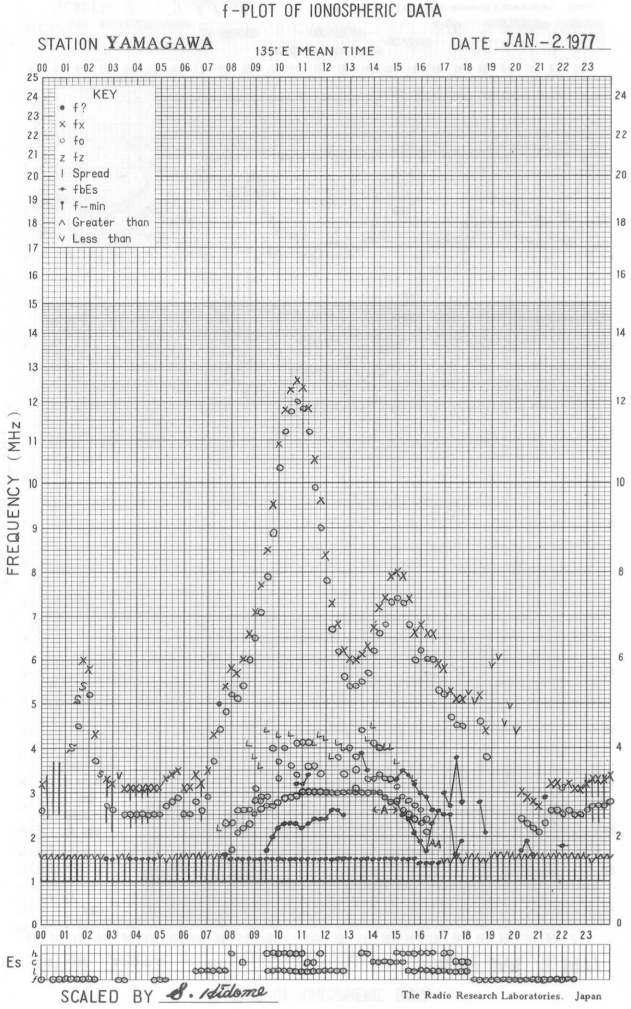
v Less than
FREQUENCY (MHz)
Es
SCALED BY Y. Kuratani
The Radio Research Laboratories. Japan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v Less than
FREQUENCY (MHz)
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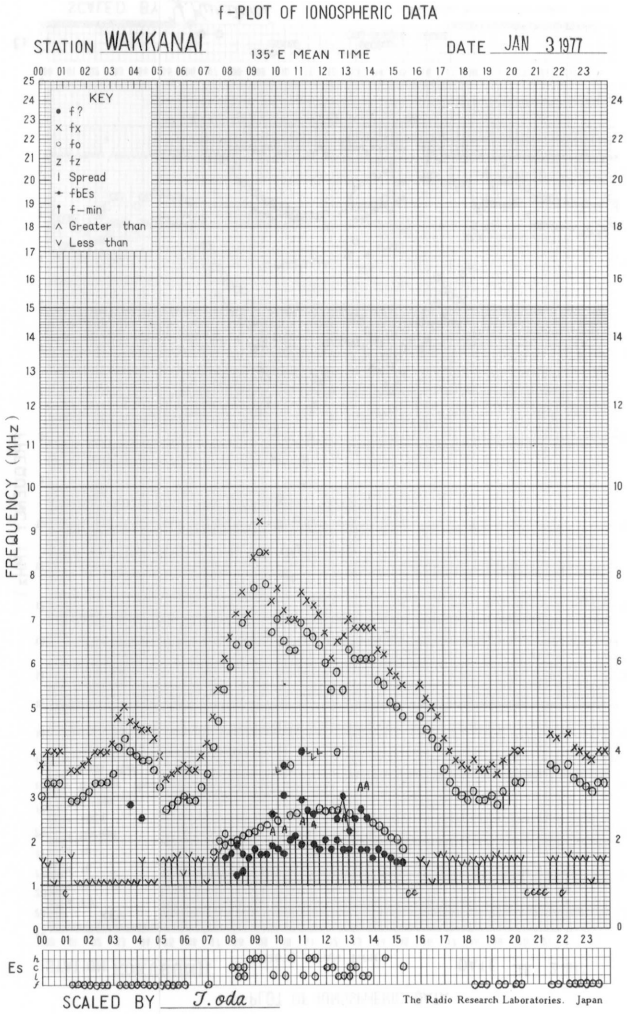
SCALED BY S. Hidome
The Radio Research Laboratories. Japan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DATE JAN 3 1977
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| Spread
+ fbEs
↑ f-min
^ Greater than
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FREQUENCY (MHz)
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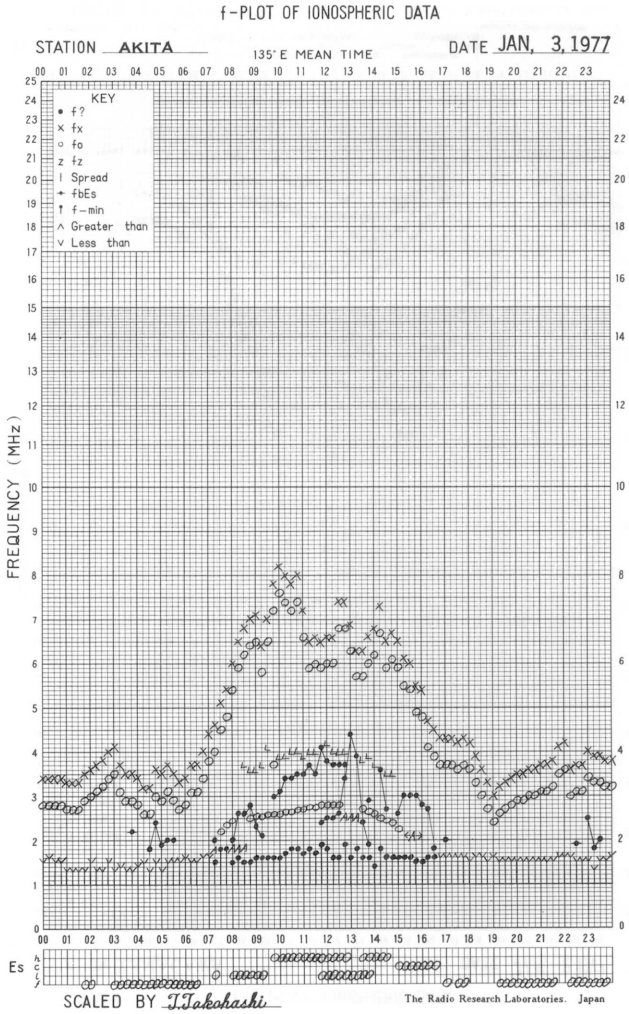
SCALED BY T. oda
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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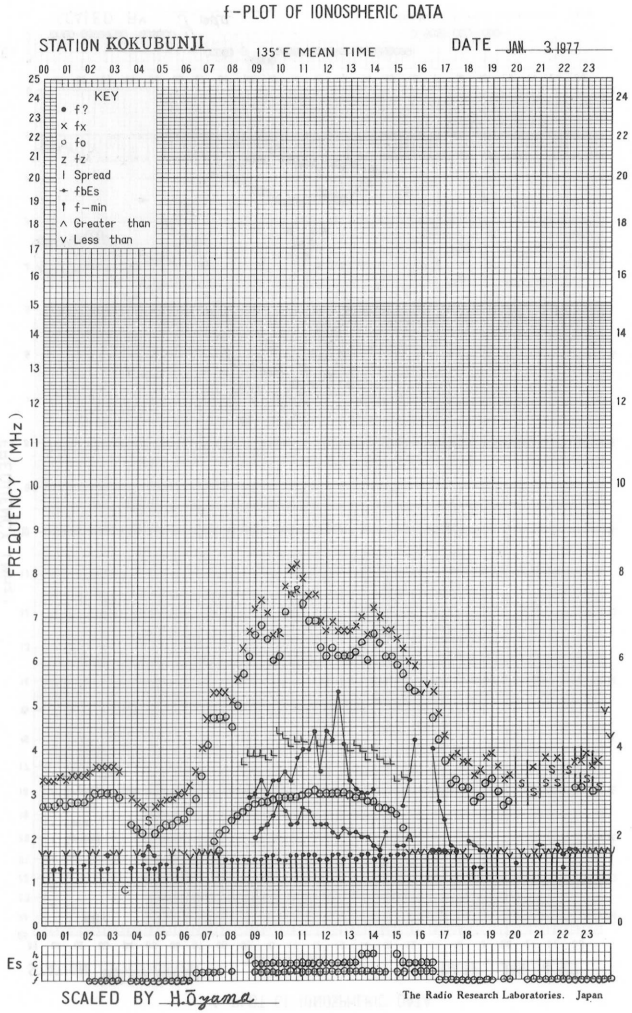
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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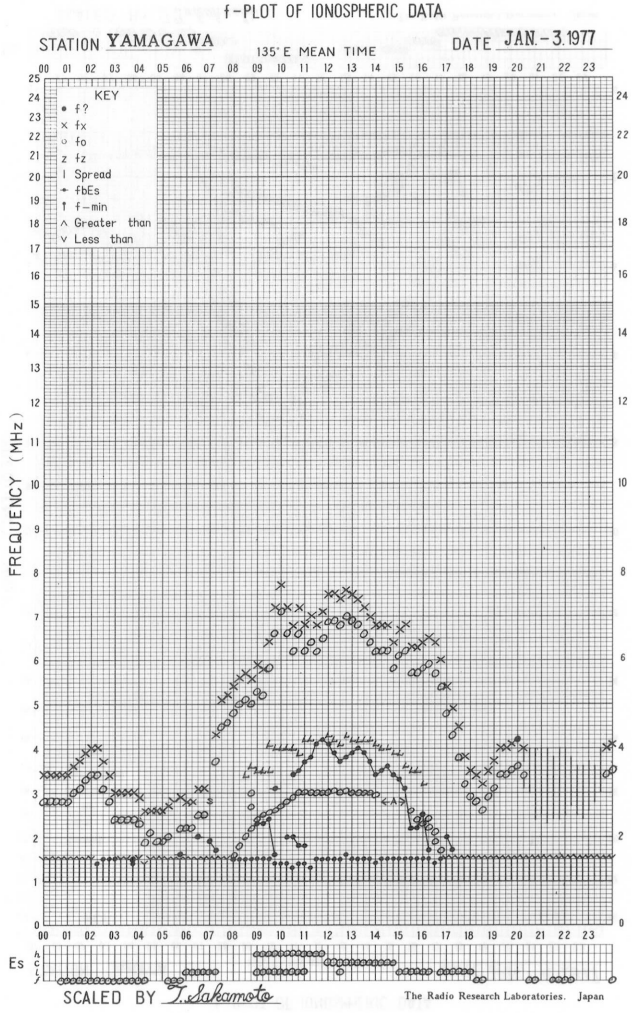
SCALED BY H.Ōyama
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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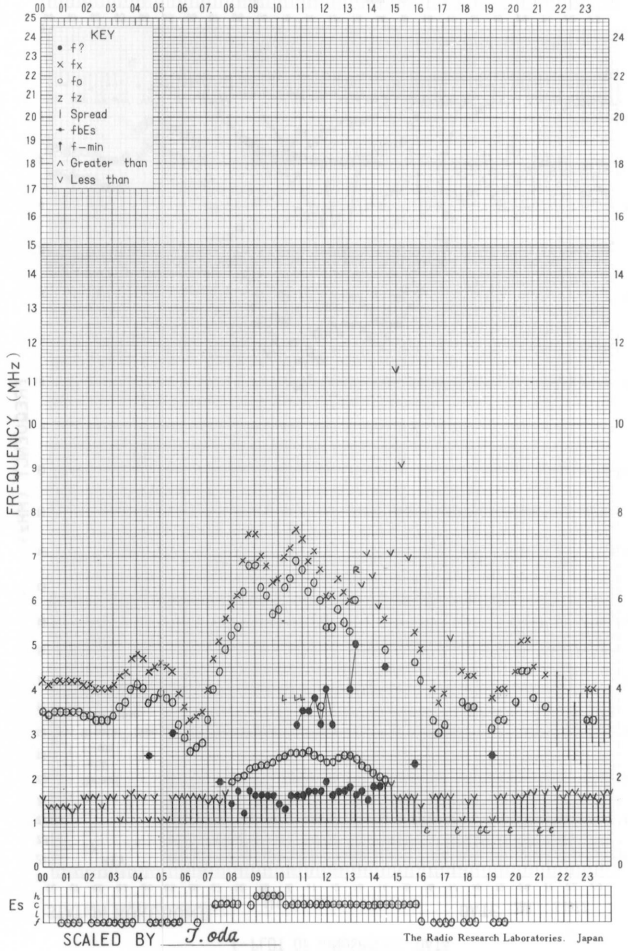
SCALED BY T.Sakamoto
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135° E MEAN TIME DATE JAN 4 1977

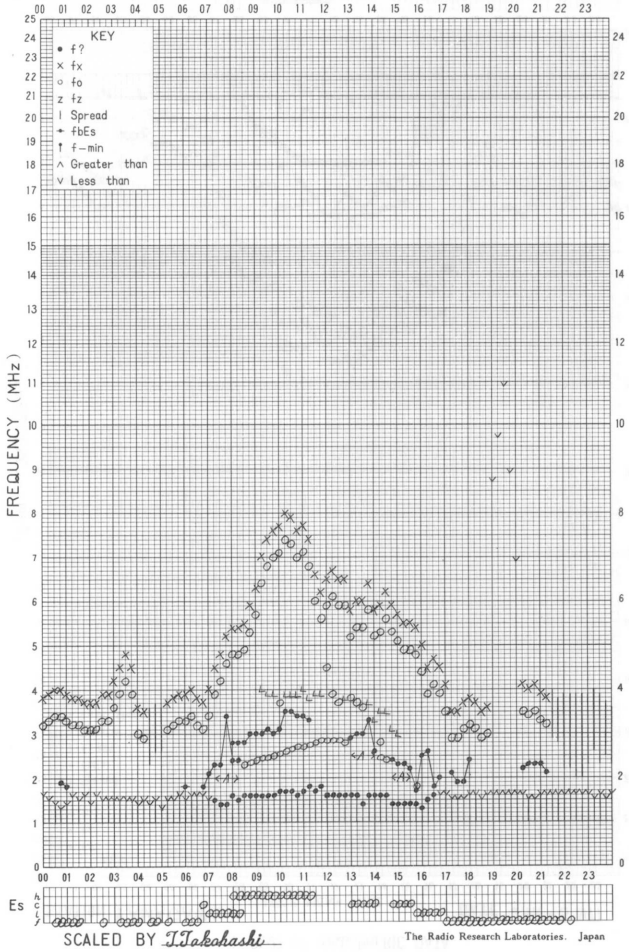


SCALED BY T. oda

The Radio Research Laboratories. Japan

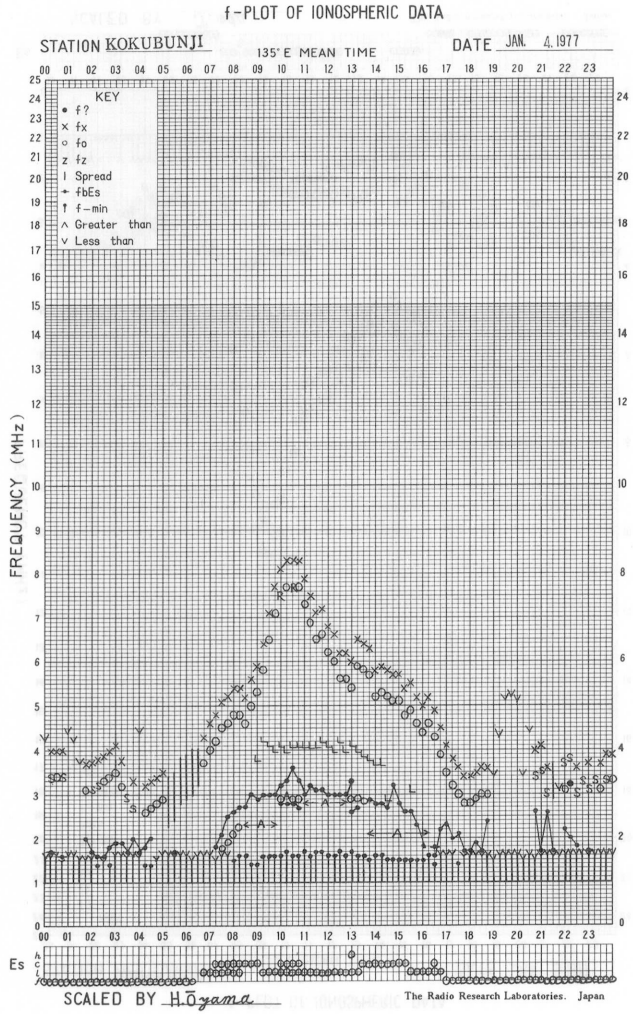
f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135° E MEAN TIME DATE JAN, 4, 1977



SCALED BY T. Takahashi

The Radio Research Laboratories. Japan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DATE JAN. 4, 1977
KEY
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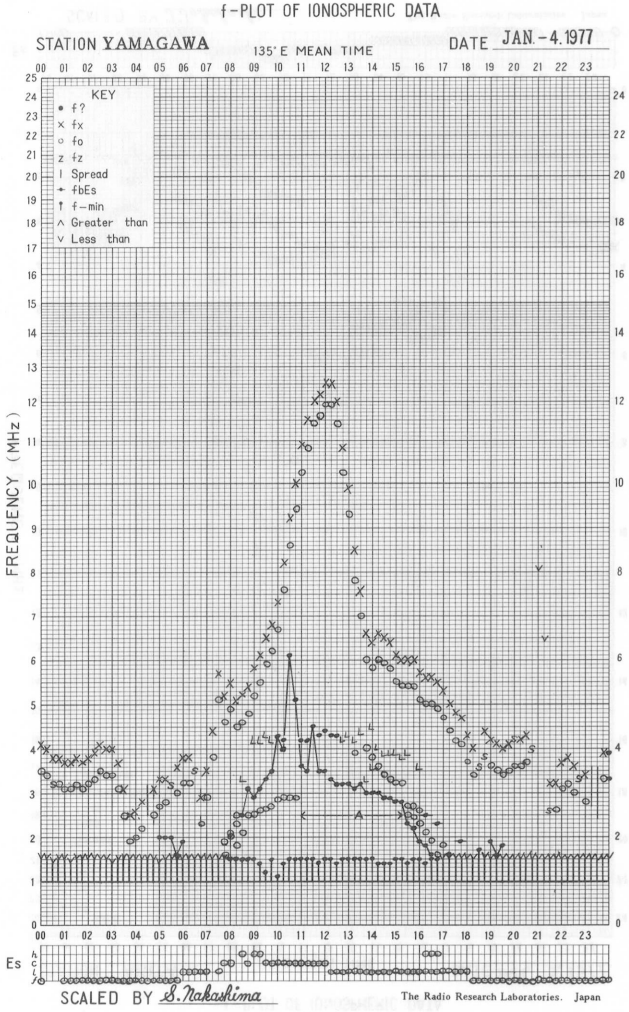
FREQUENCY (MHz)
Es
SCALED BY H.Ōzama
The Radio Research Laboratories. Japan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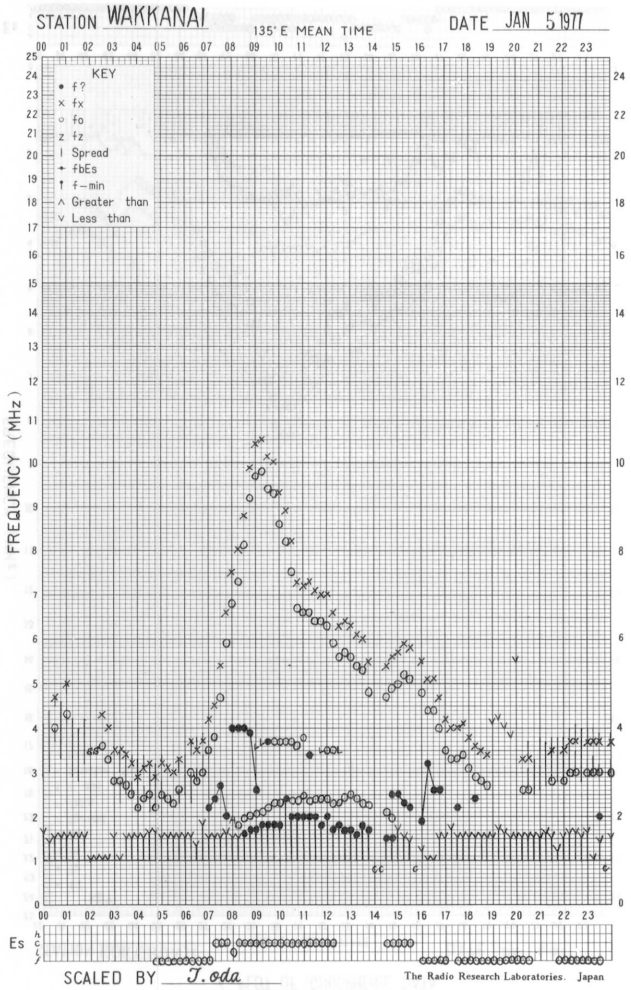
| Spread
+ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN 5 1977



SCALED BY T. oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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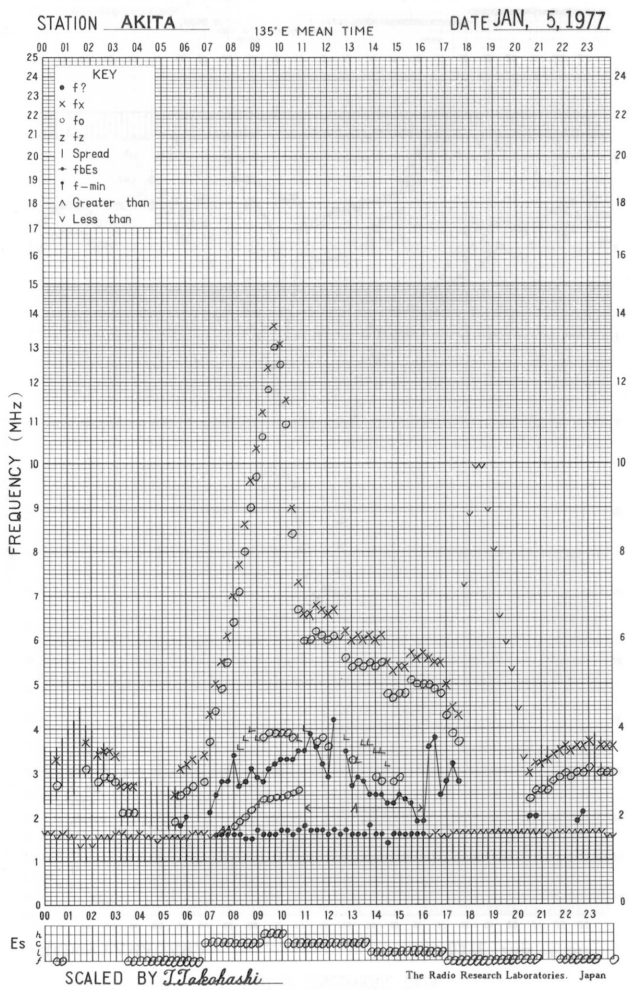
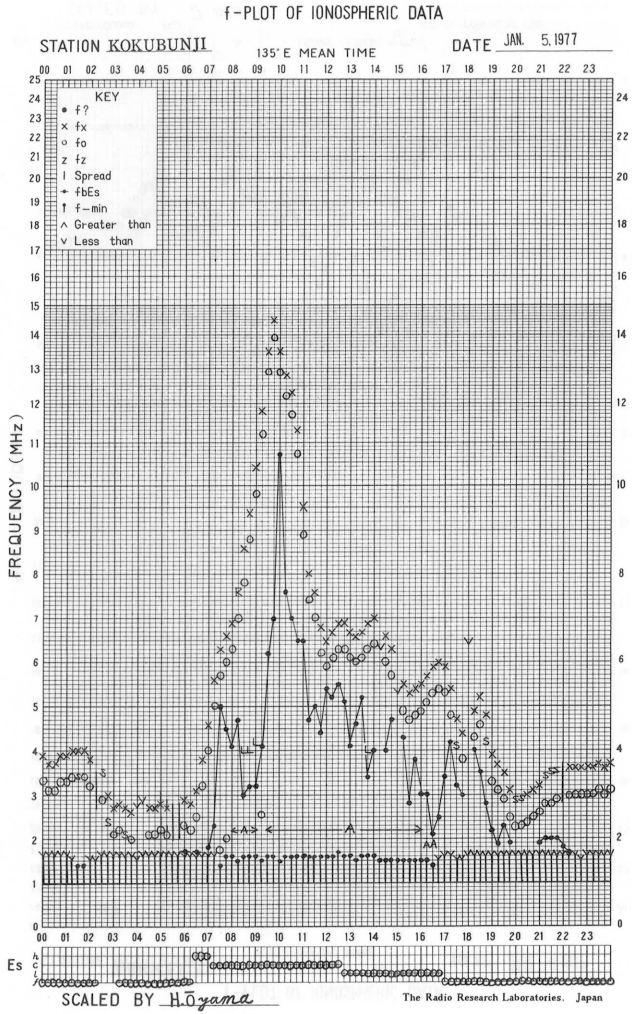


SCALED BY T. Takahashi

The Radio Research Laboratories. Japan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DATE JAN. 5, 1977
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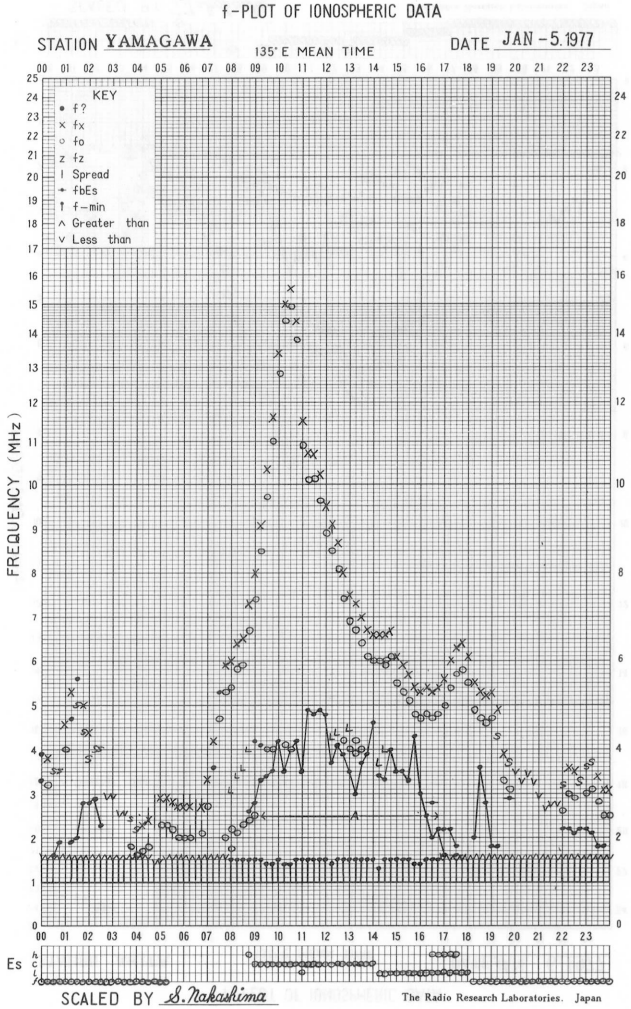
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY H.Ōyama
The Radio Research Laboratories, Japan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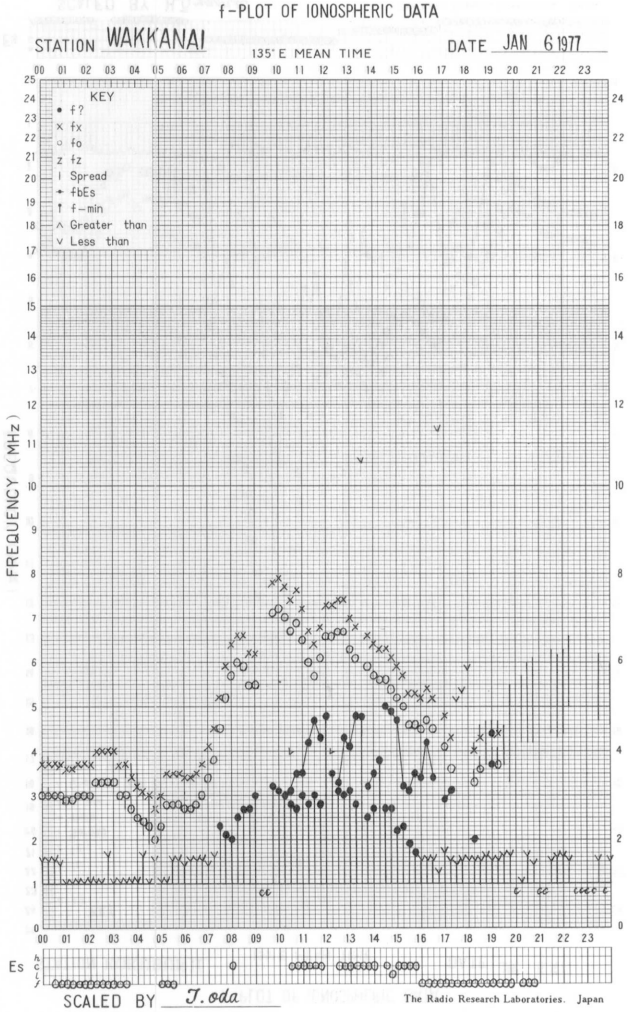
SCALED BY S. Nakashima
The Radio Research Laboratories, Japan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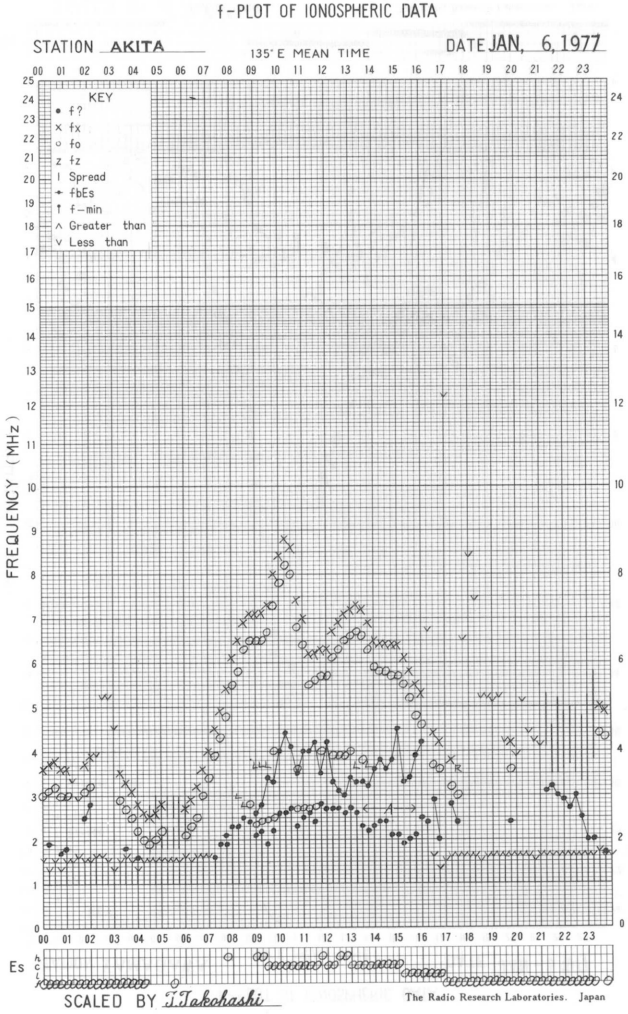
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY J. oda
The Radio Research Laboratories. Japan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Less than
FREQUENCY (MHz)
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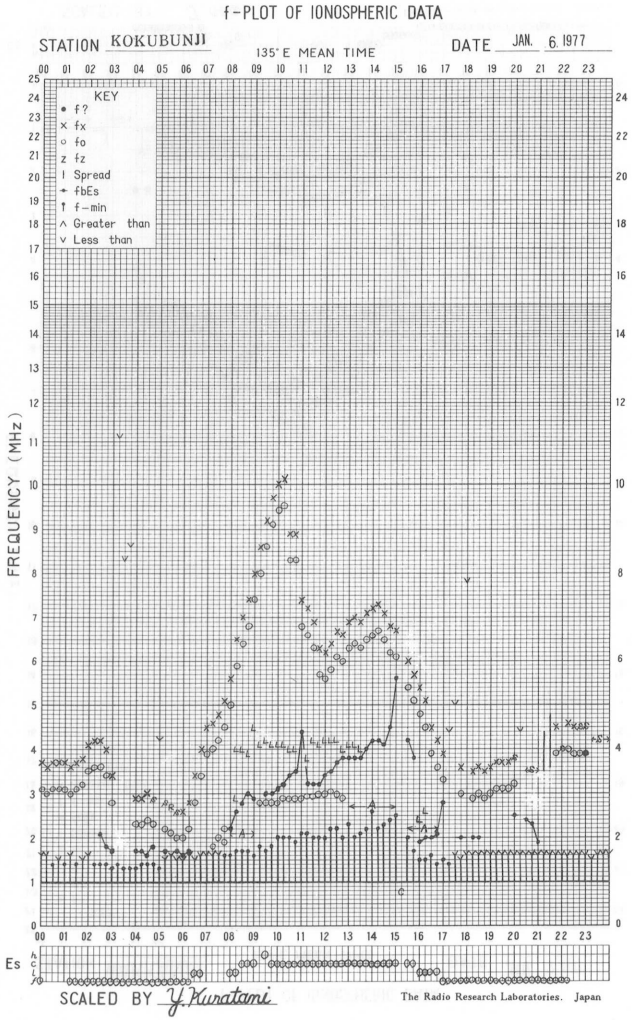
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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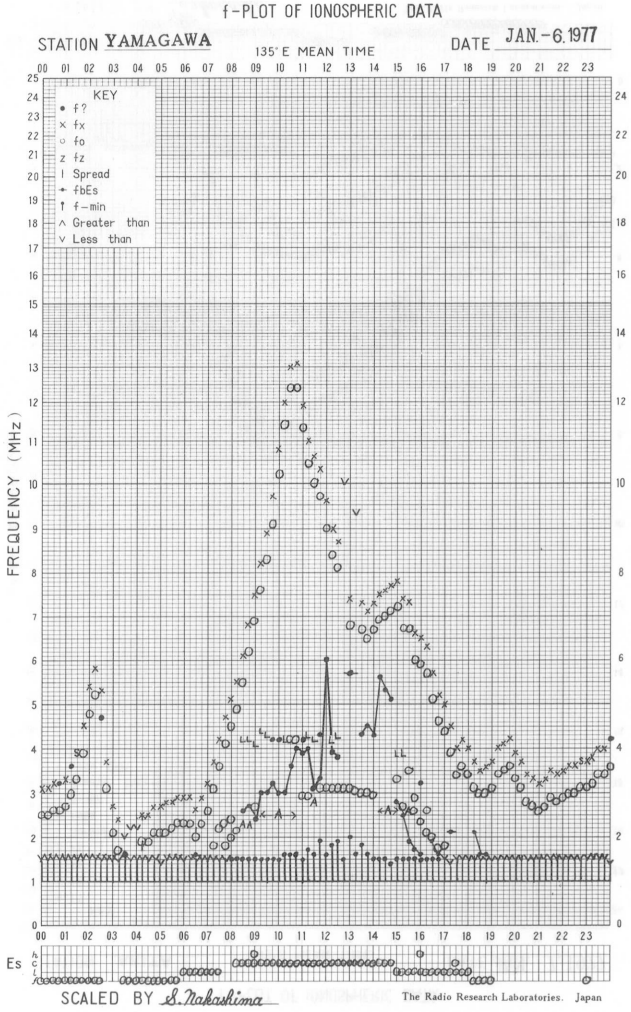
SCALED BY Y. Kuratani
The Radio Research Laboratories. Japan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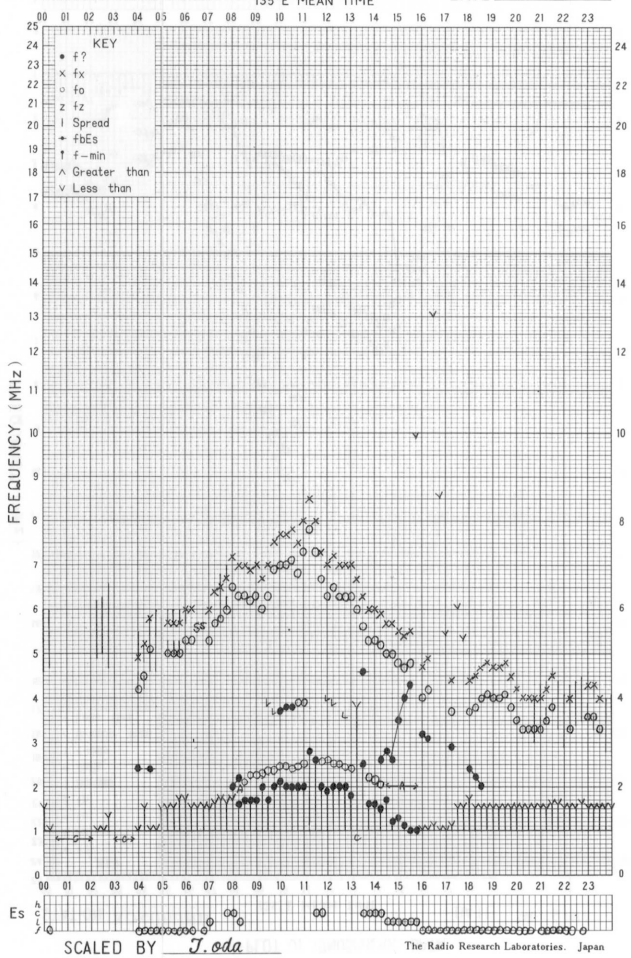
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN 7 1977



SCALED BY T. oda

The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

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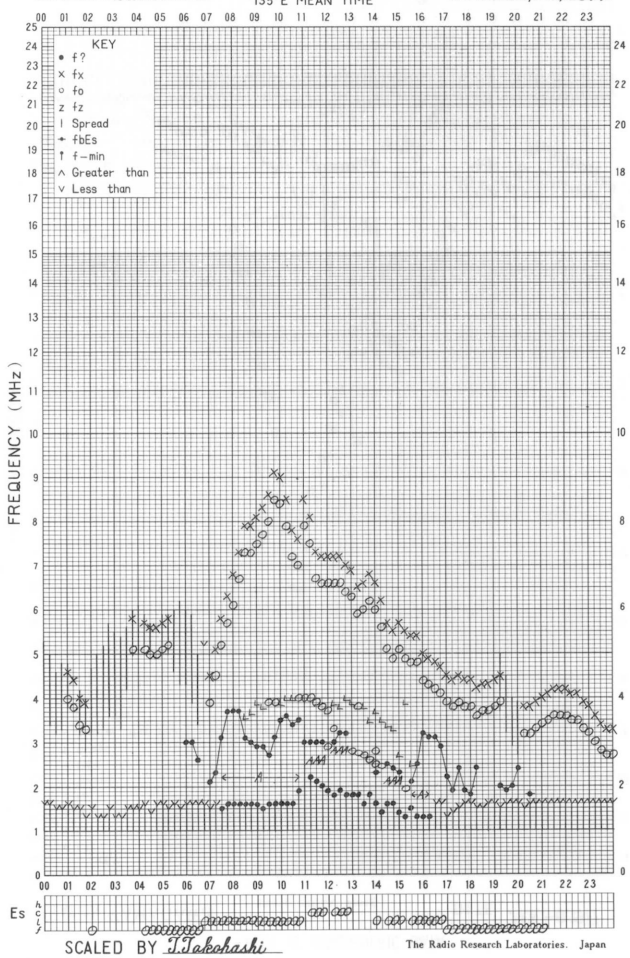
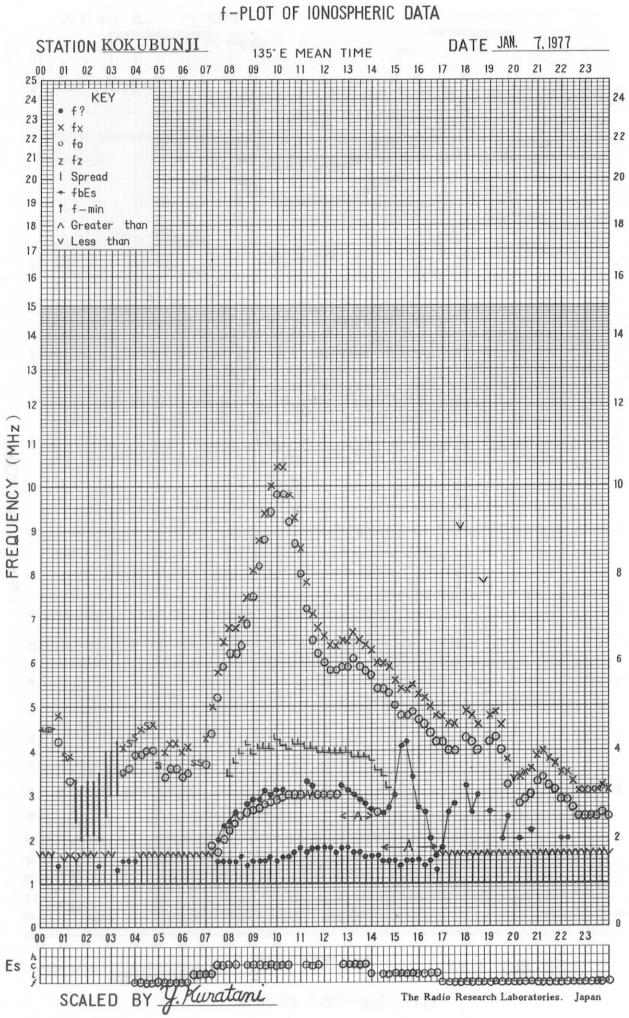


SCALED BY T. Takahashi

The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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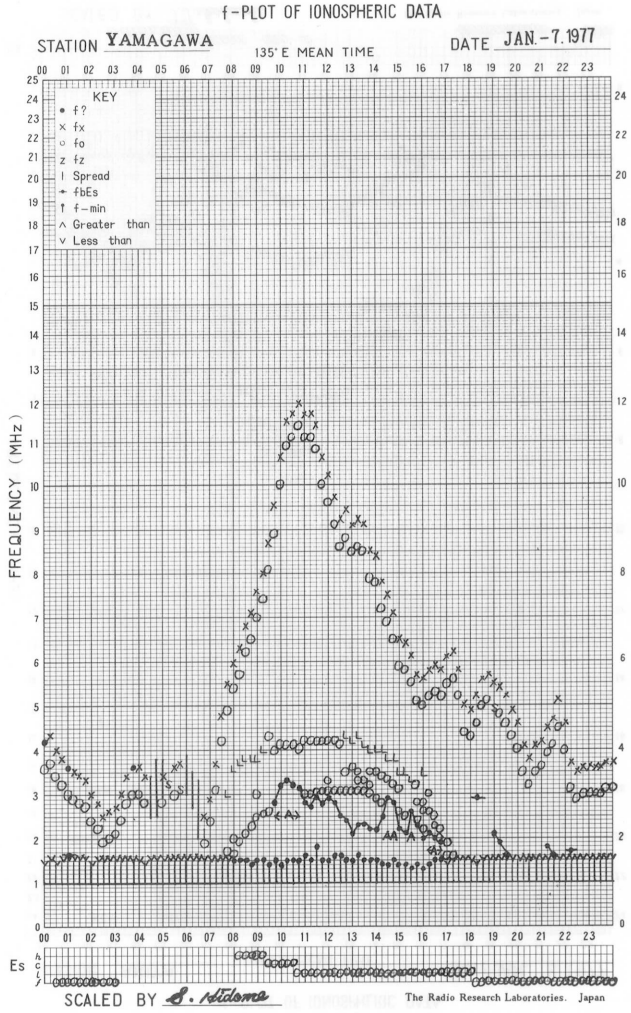
SCALED BY J. Kuratani
The Radio Research Laboratories. Japan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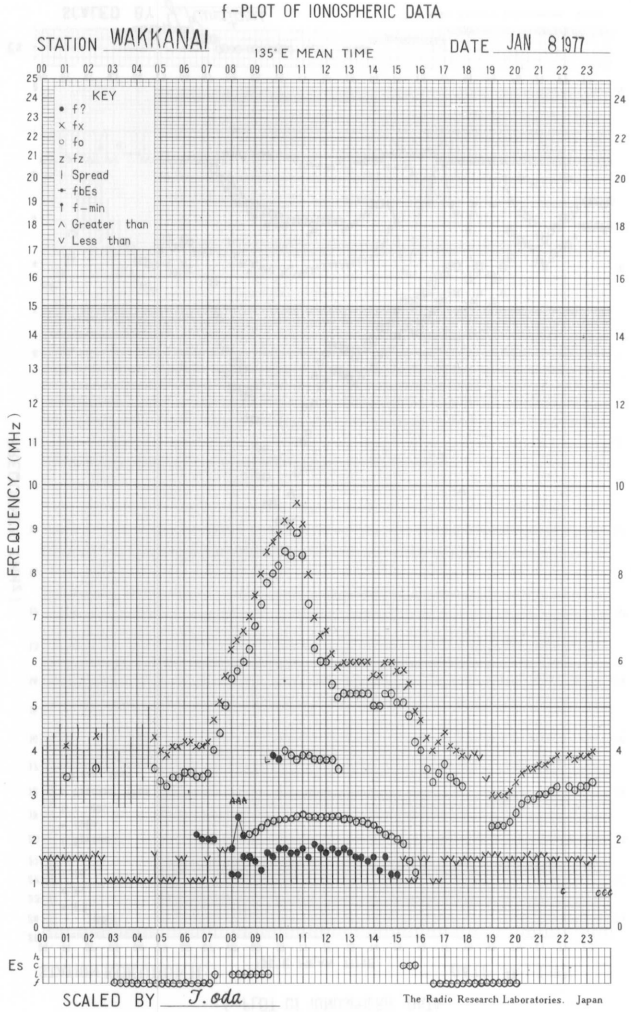
SCALED BY S. Kitsuma
The Radio Research Laboratories. Japan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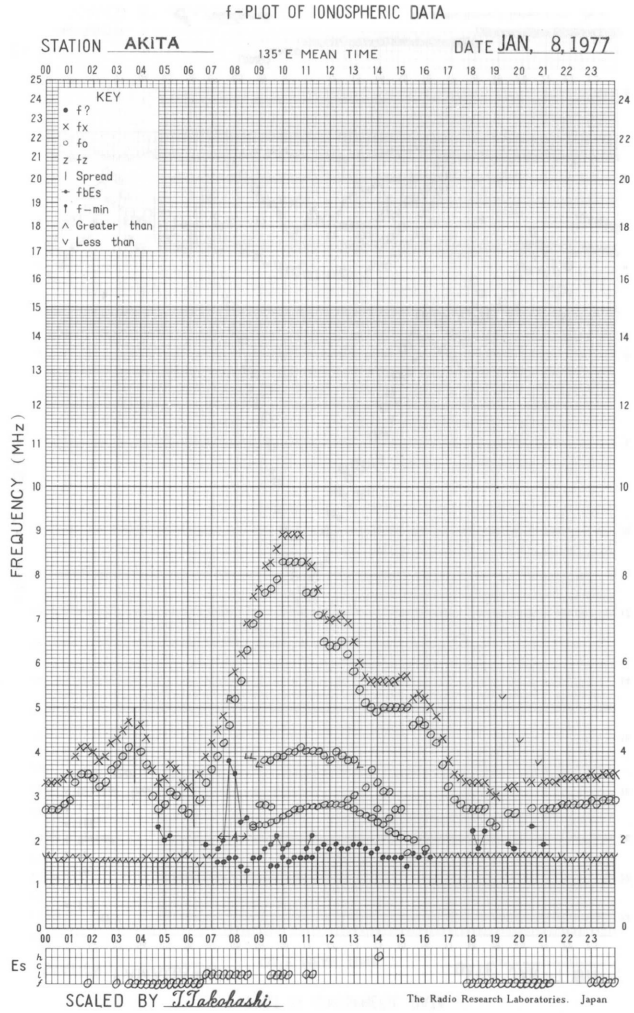
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. oda
The Radio Research Laboratories. Japan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+ fbEs
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v Less than
FREQUENCY (MHz)
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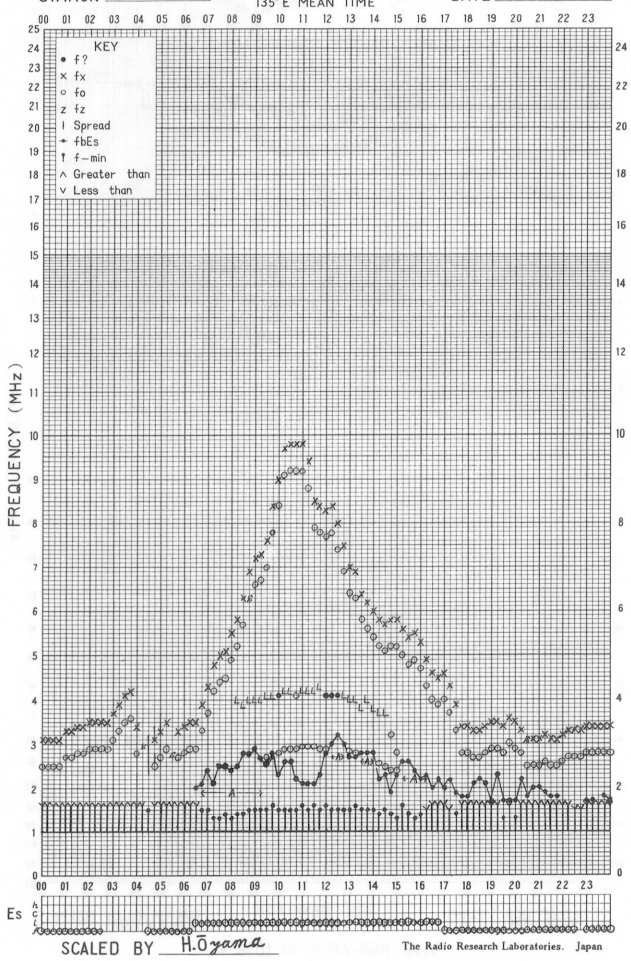
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 8. 1977



SCALED BY H.Ōyama

The Radio Research Laboratories. Japan

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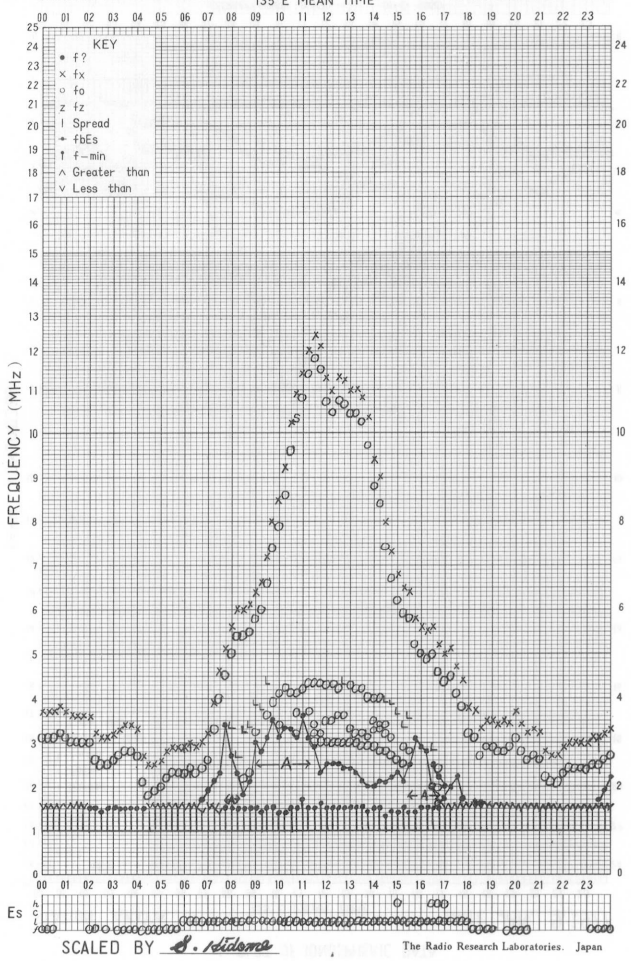
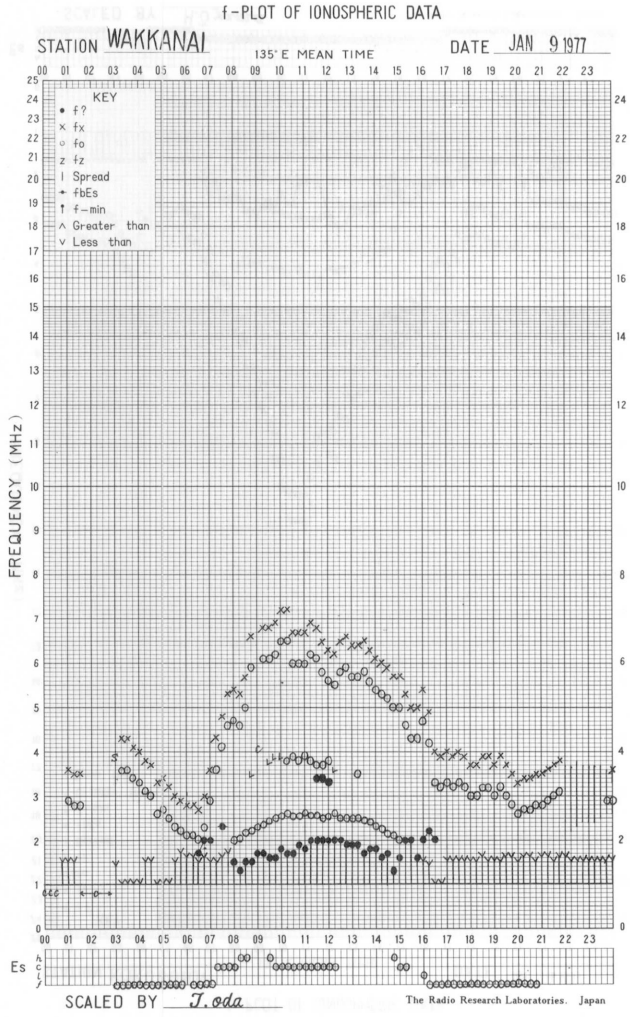


SCALED BY S. Ishidoma

The Radio Research Laboratories. Japan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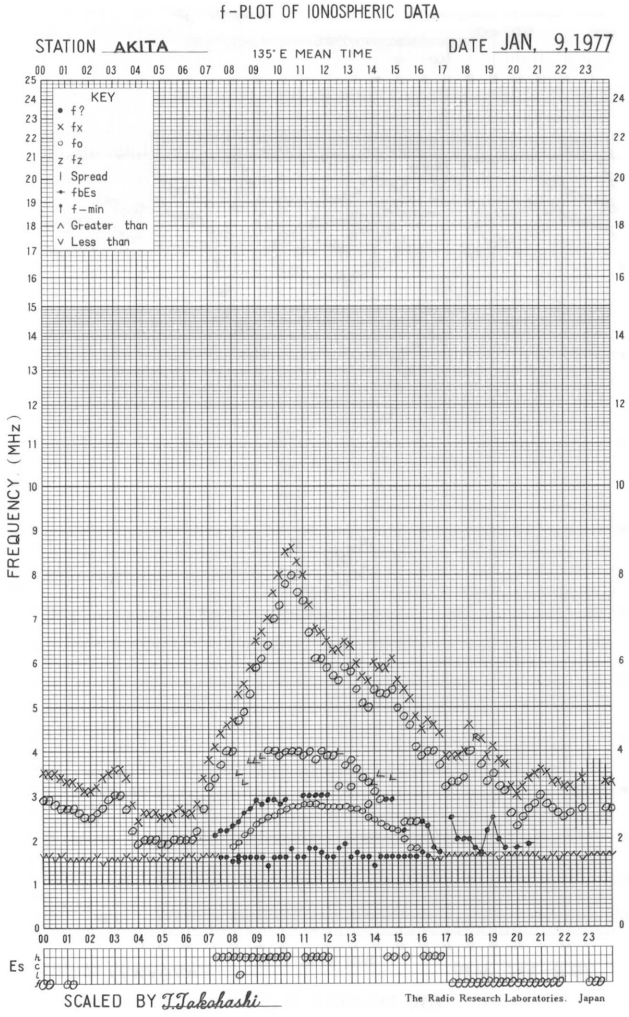
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. oda
The Radio Research Laboratories. Japan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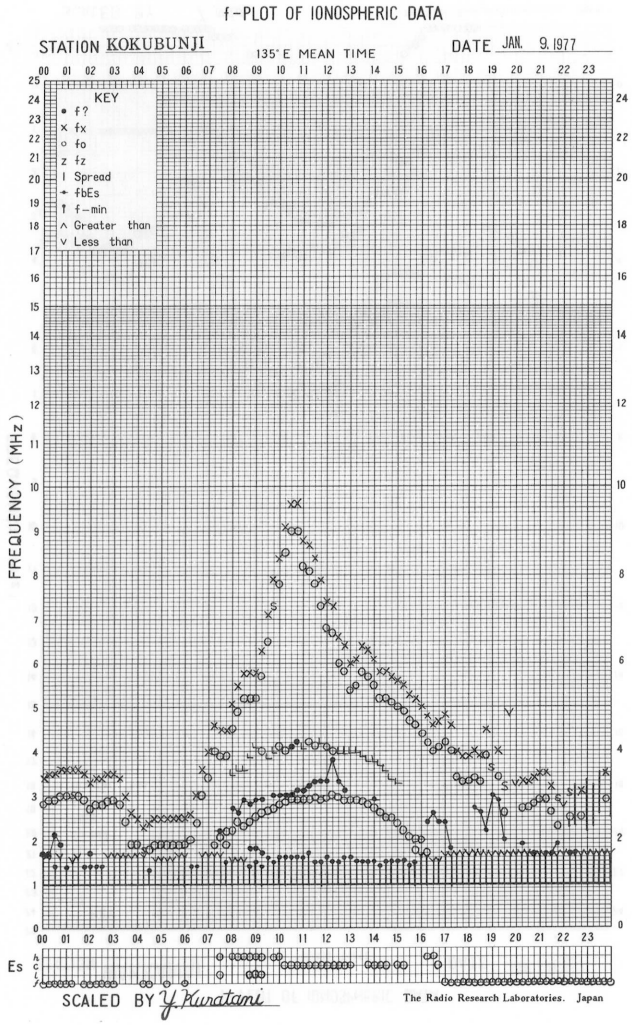
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan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Less than
FREQUENCY (MHz)
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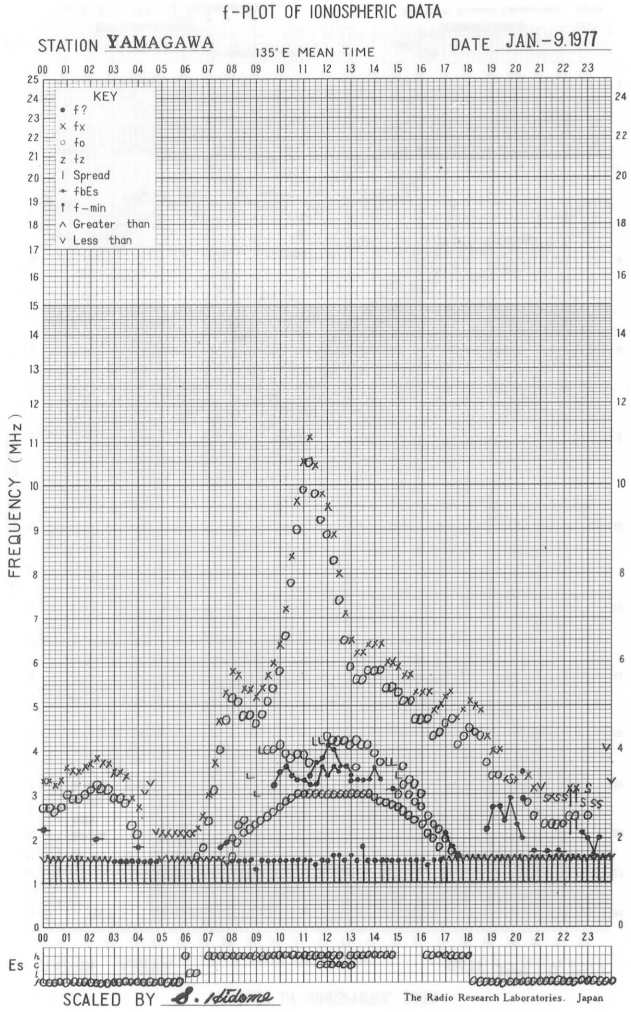
SCALED BY Y. Kuratani
The Radio Research Laboratories. Japan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Greater than
Less than
FREQUENCY (MHz)
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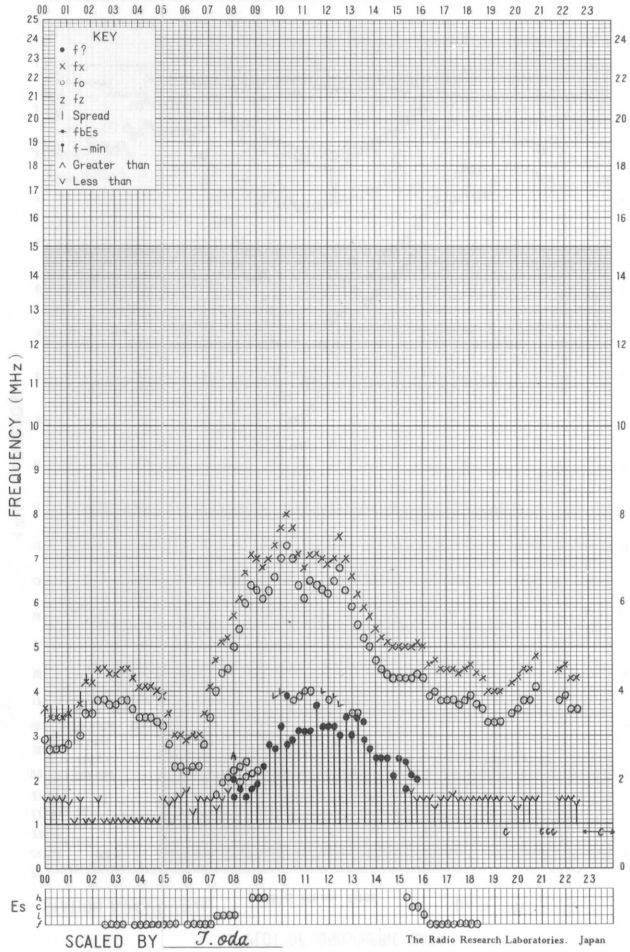
SCALED BY S. Ishioma
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN 10 1977

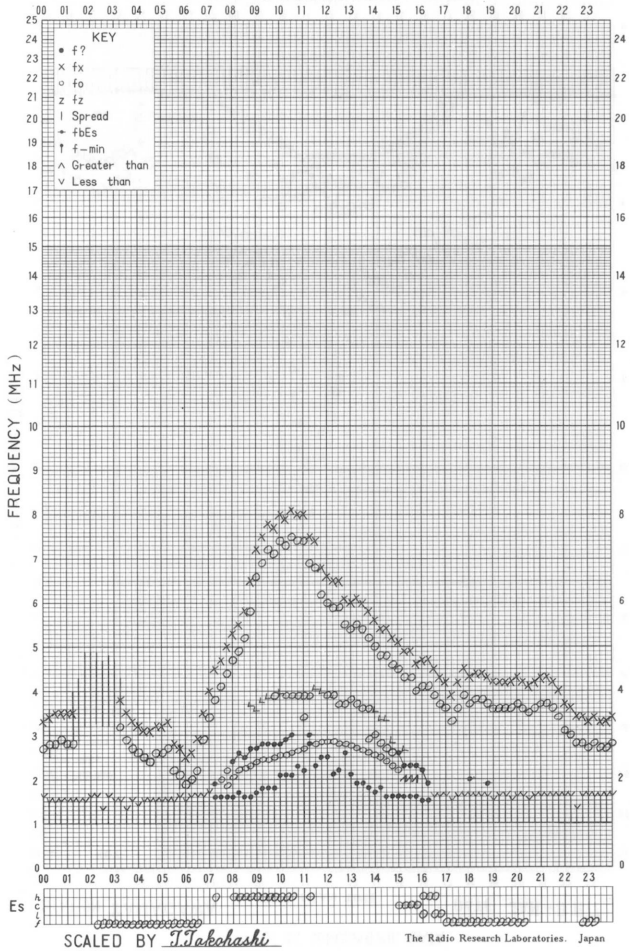


SCALED BY T. oda

The Radio Research Laboratories. Japan

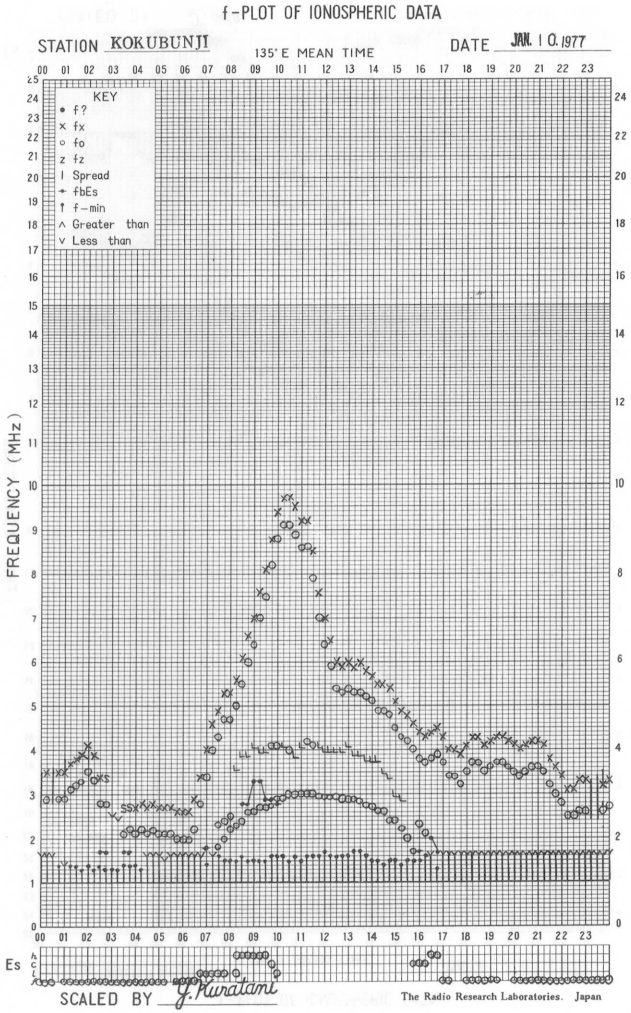
f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE JAN, 10, 1977



SCALED BY T. Takahashi

The Radio Research Laboratories. Japan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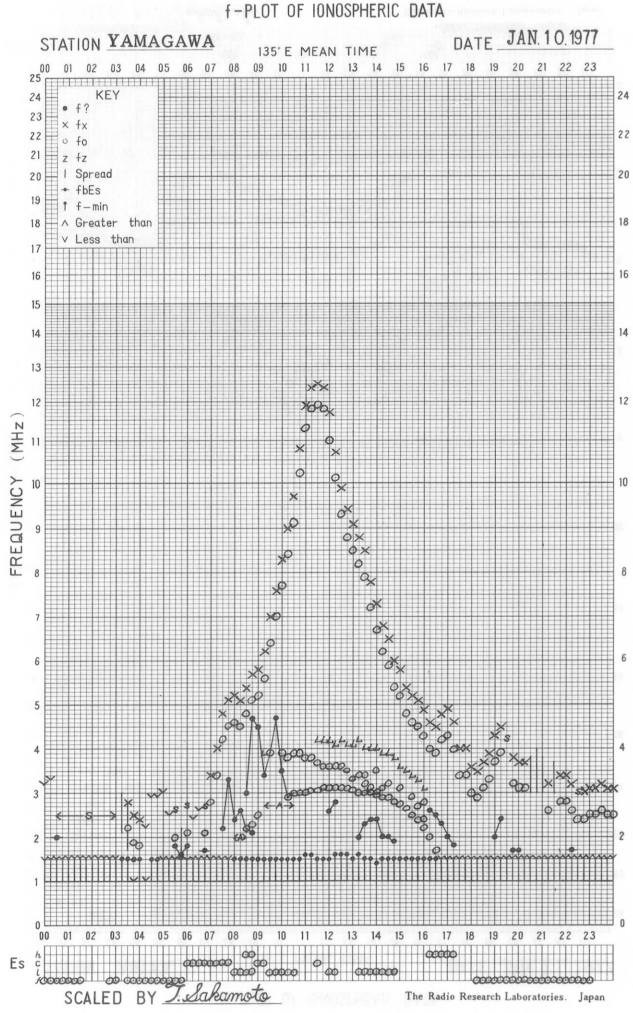
→ fbEs
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY J. Kuratani
The Radio Research Laboratories. Japan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135° E MEAN TIME
DATE JAN. 10. 1977
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○ fo
z fz
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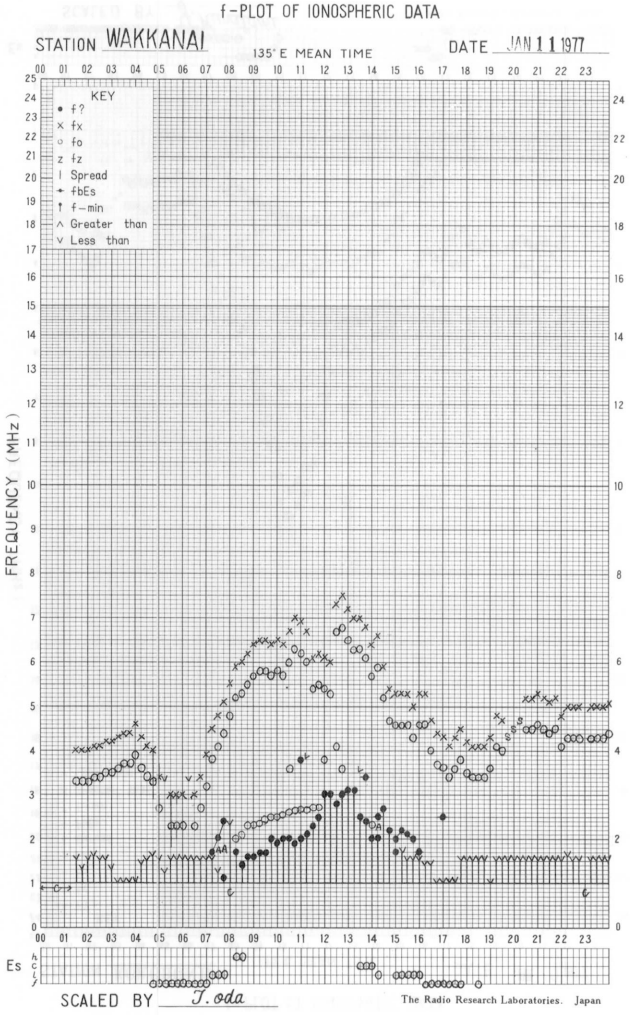
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY T. Sakamoto
The Radio Research Laboratories. Japan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DATE JAN 11 1977
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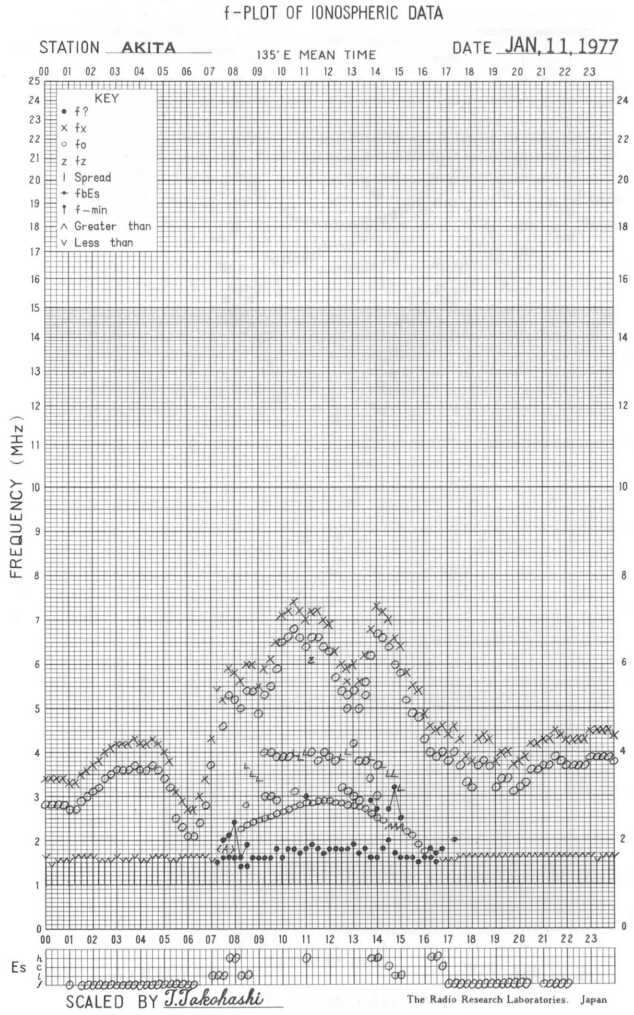
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY T. oda
The Radio Research Laboratories. Japan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Spread
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Greater than
Less than
FREQUENCY (MHz)
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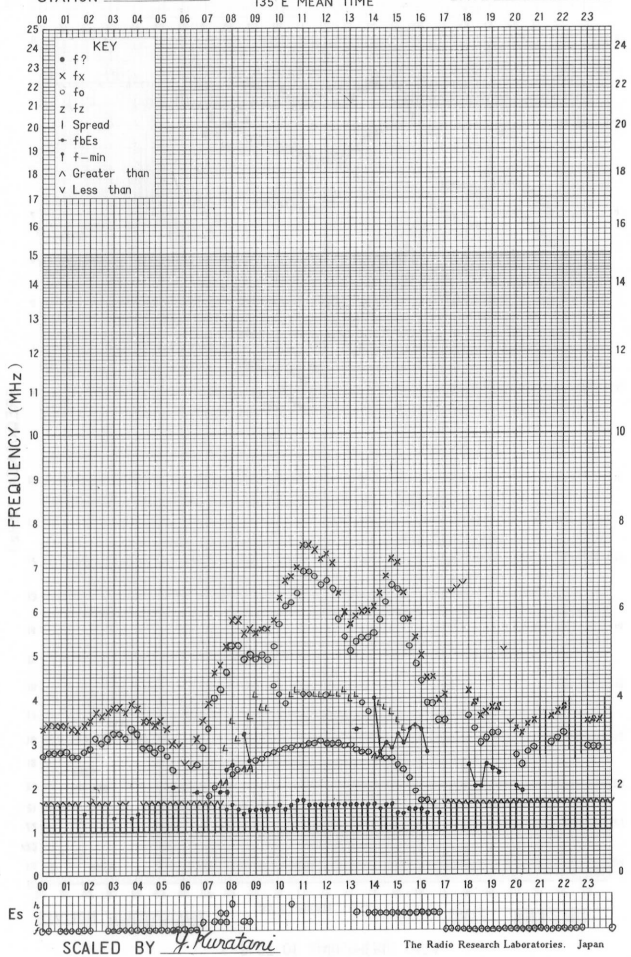
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION KOKUBUNJI 135°E MEAN TIME DATE JAN. 11. 1977

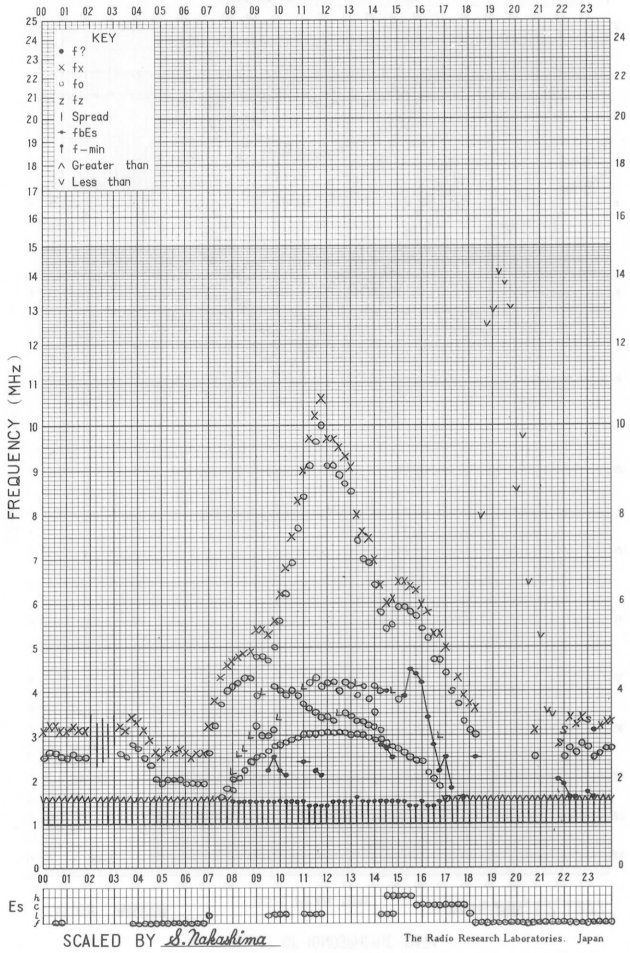


SCALED BY T. Kuratani

The Radio Research Laboratories. Japan

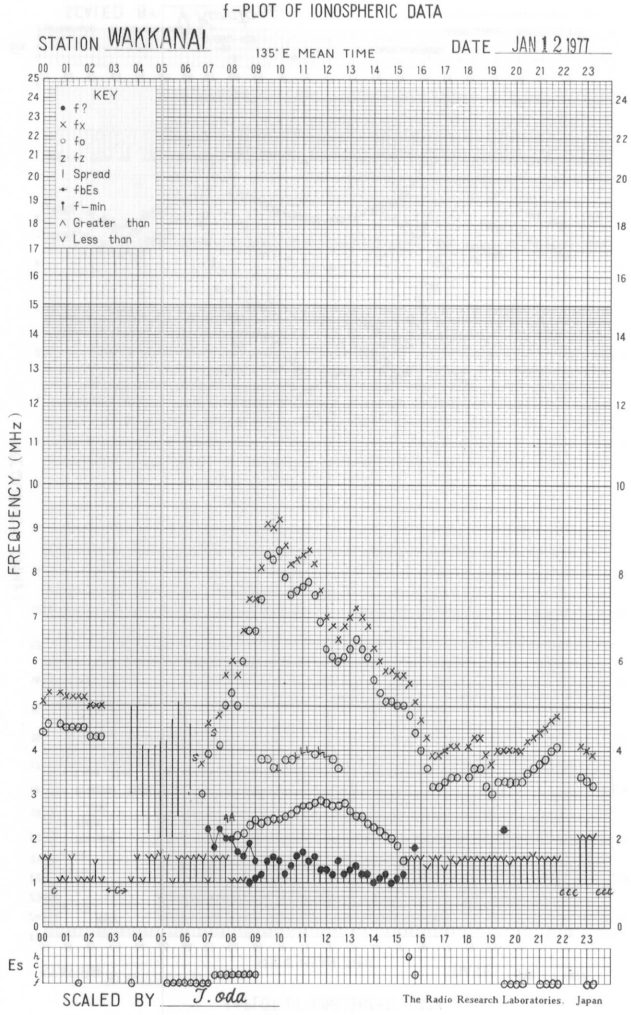
f-PLOT OF IONOSPHERIC DATA

STATION YAMAGAWA 135°E MEAN TIME DATE JAN. 11. 1977



SCALED BY S. Nakashima

The Radio Research Laboratories. Japan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DATE JAN 12 1977
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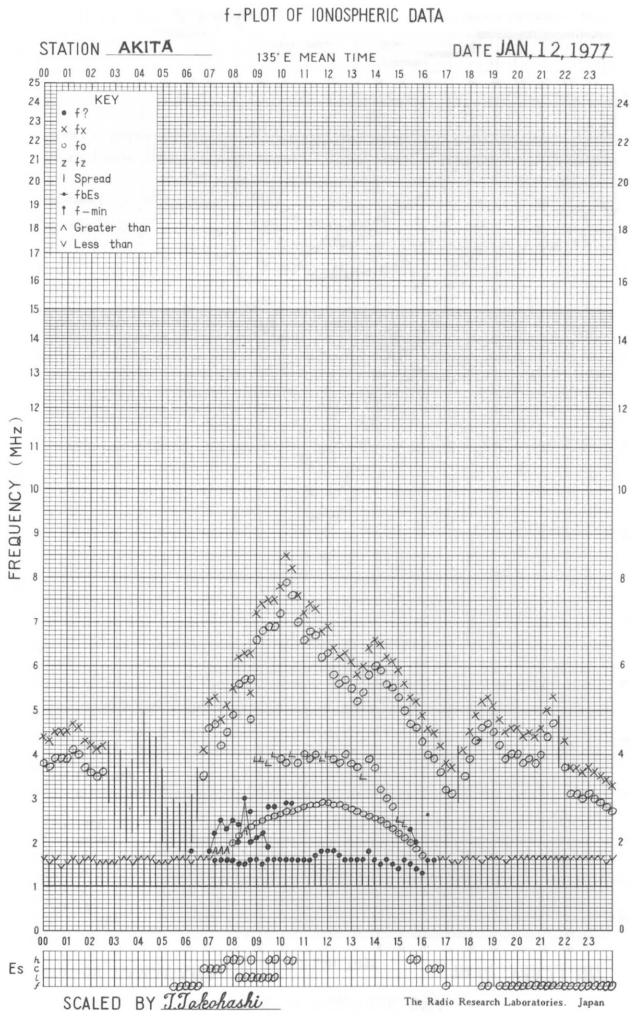
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY T. oda
The Radio Research Laboratories. Japan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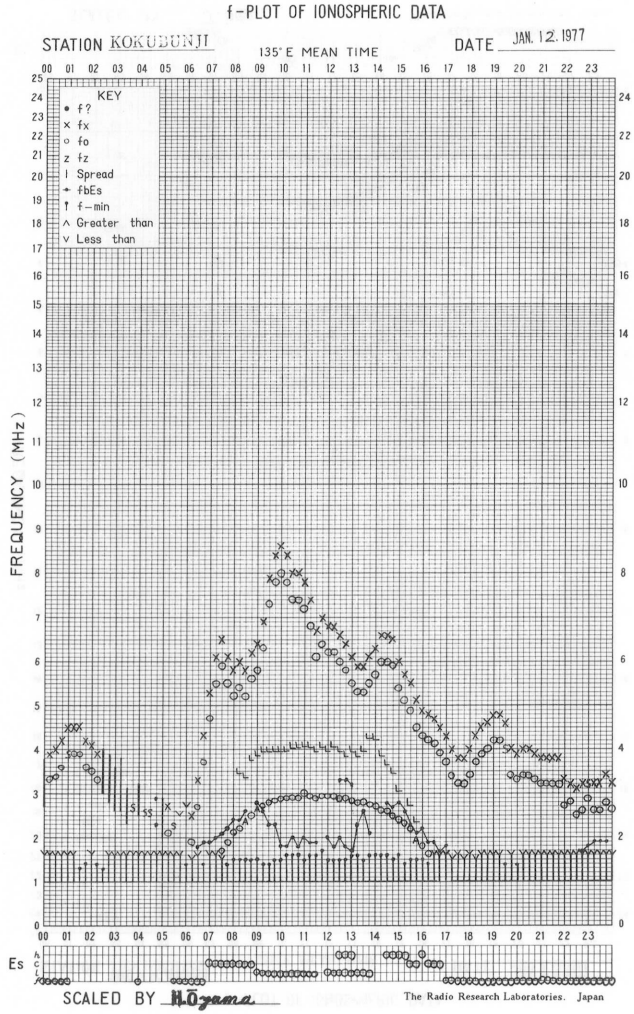
Less than
FREQUENCY (MHz)
Es
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan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v Less than
FREQUENCY (MHz)
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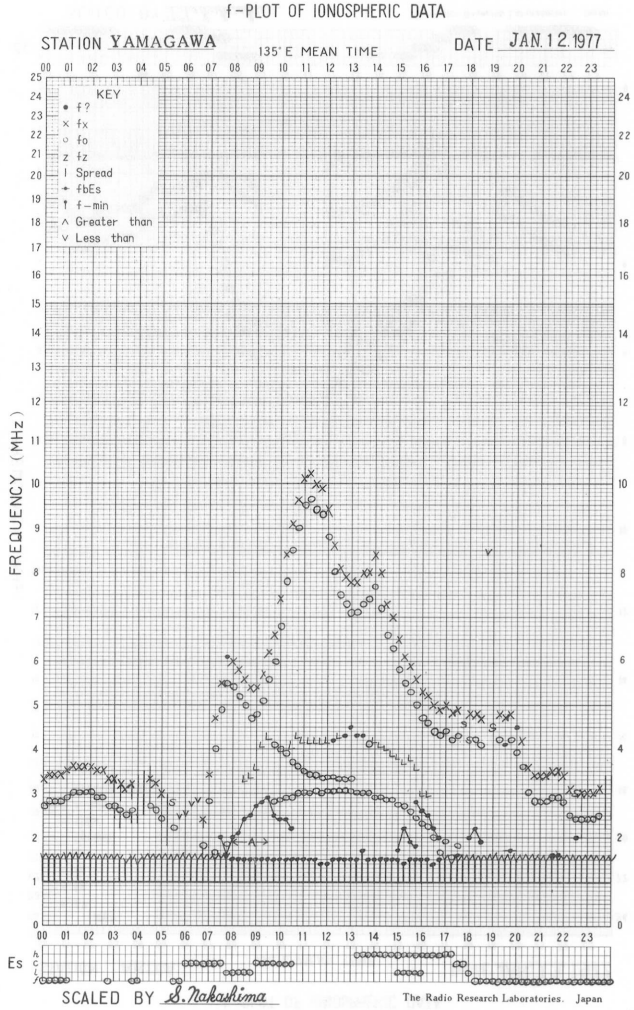
SCALED BY H.Ōzama.
The Radio Research Laboratories. Japan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○ fo
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v Less than
FREQUENCY (MHz)
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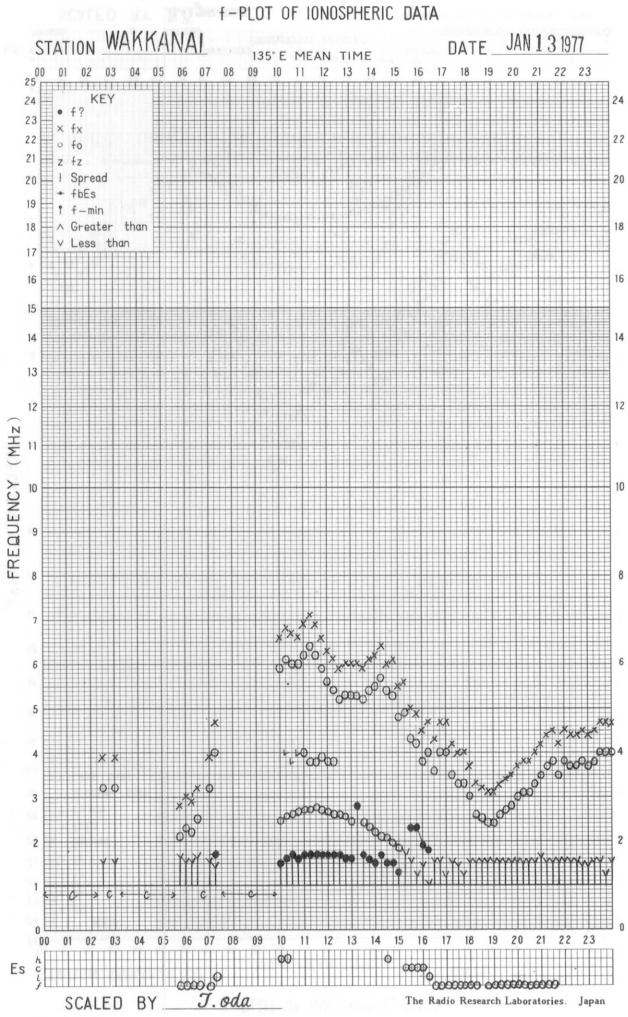
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan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○ fo
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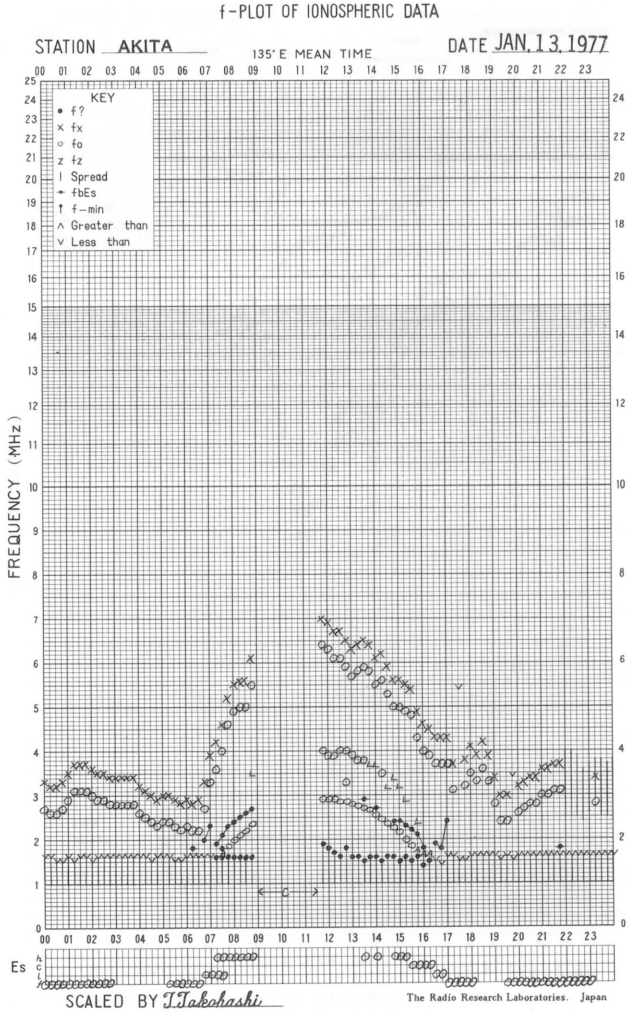
+ fbEs
† f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY J. oda
The Radio Research Laboratories. Japan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DATE JAN. 13, 1977
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○ fo
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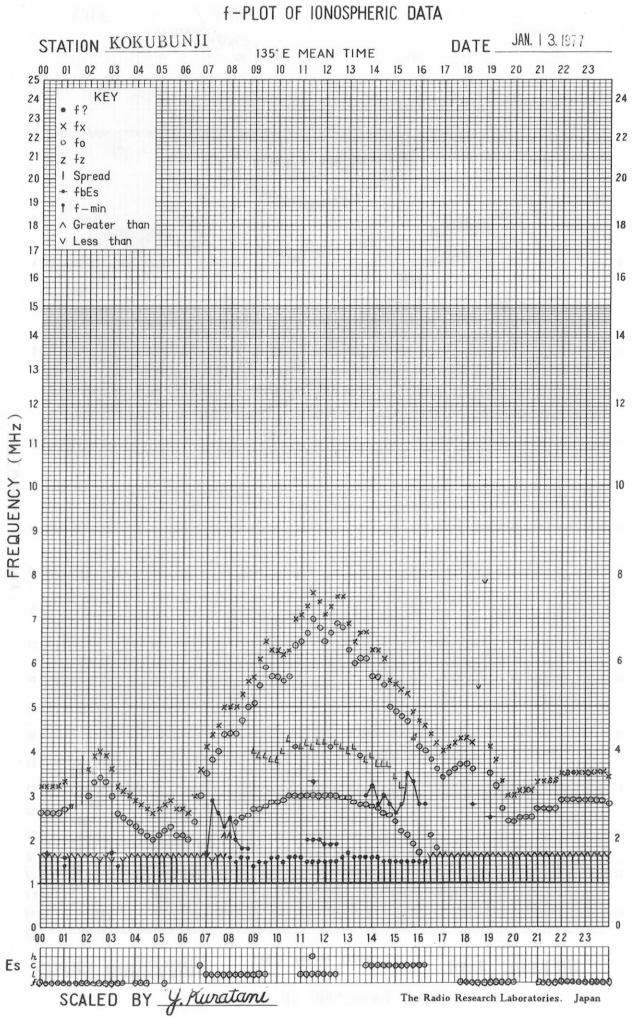
+ fbEs
† f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan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○ fo
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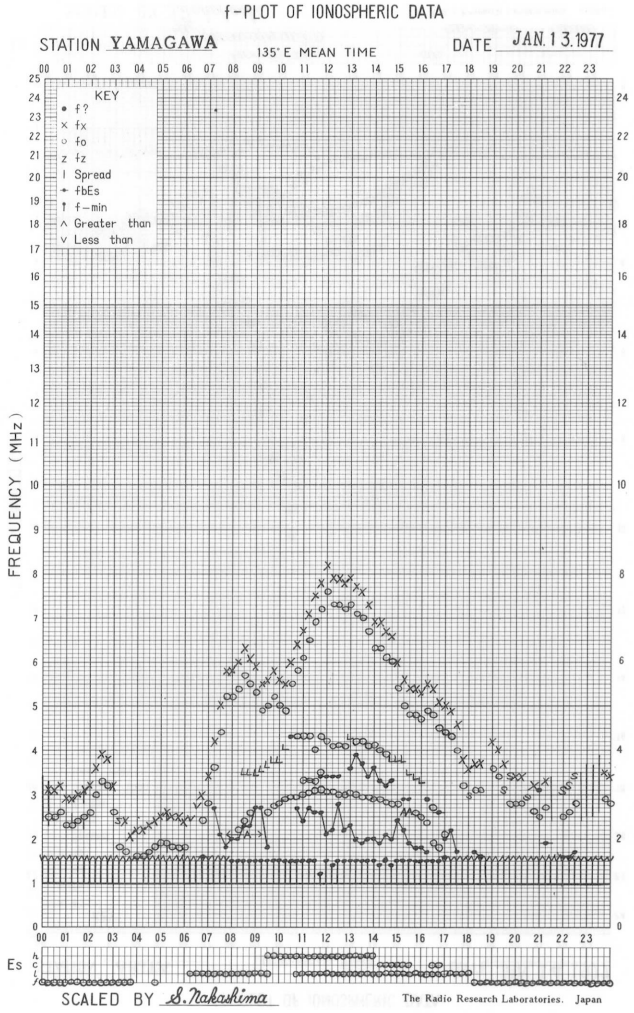
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY Y. Kuratani
The Radio Research Laboratories. Japan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○ fo
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v Less than
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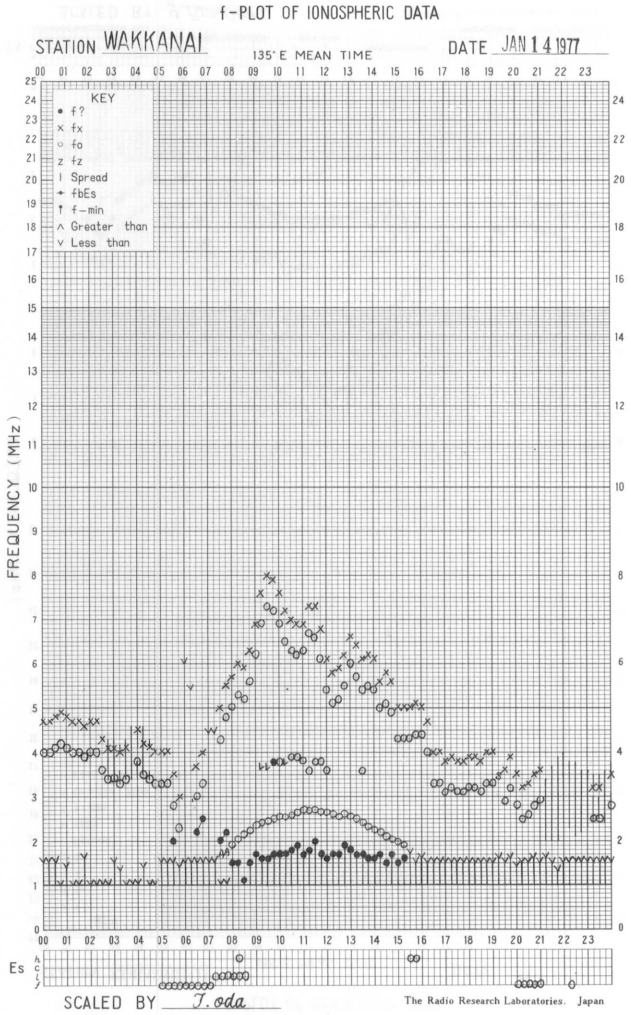
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan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DATE JAN 14 1977
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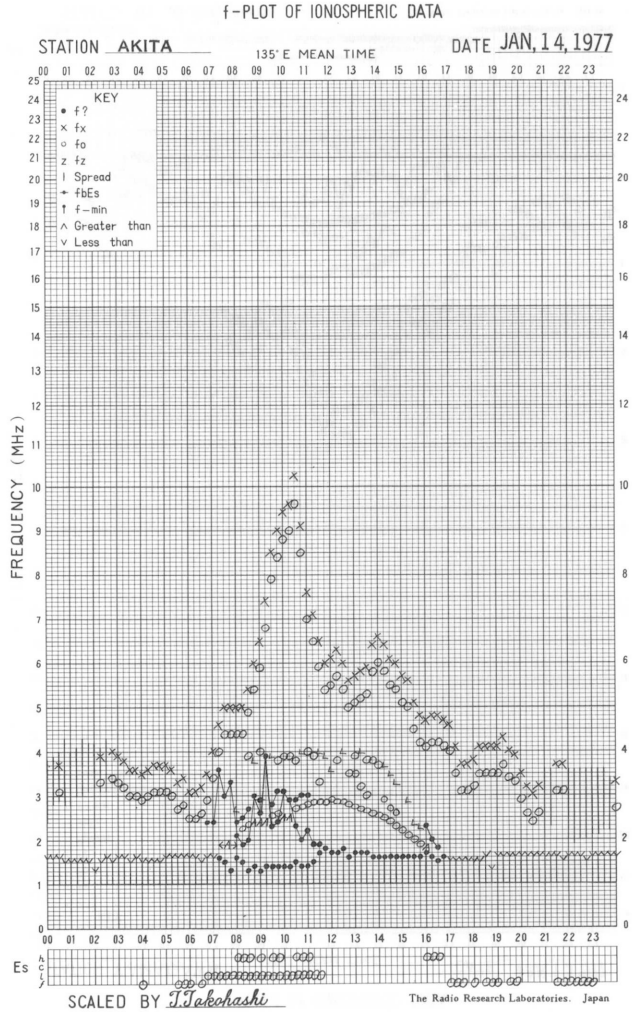
Spread
fbEs
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY J. oda
The Radio Research Laboratories. Japan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KEY
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f-min
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Less than
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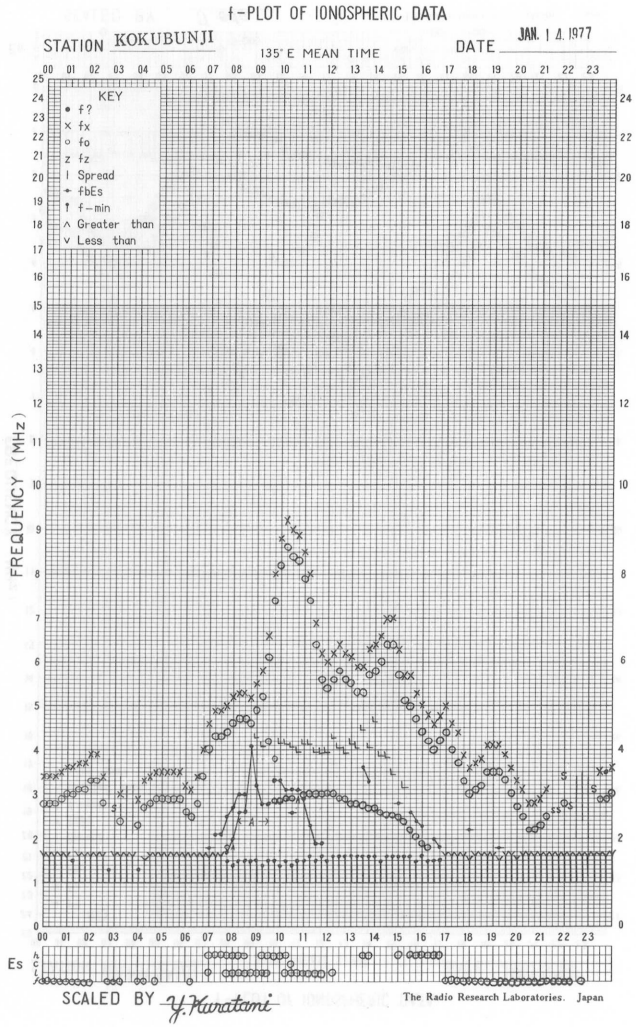
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan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DATE JAN. 14. 1977
KEY
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○ fo
z fz
| Spread
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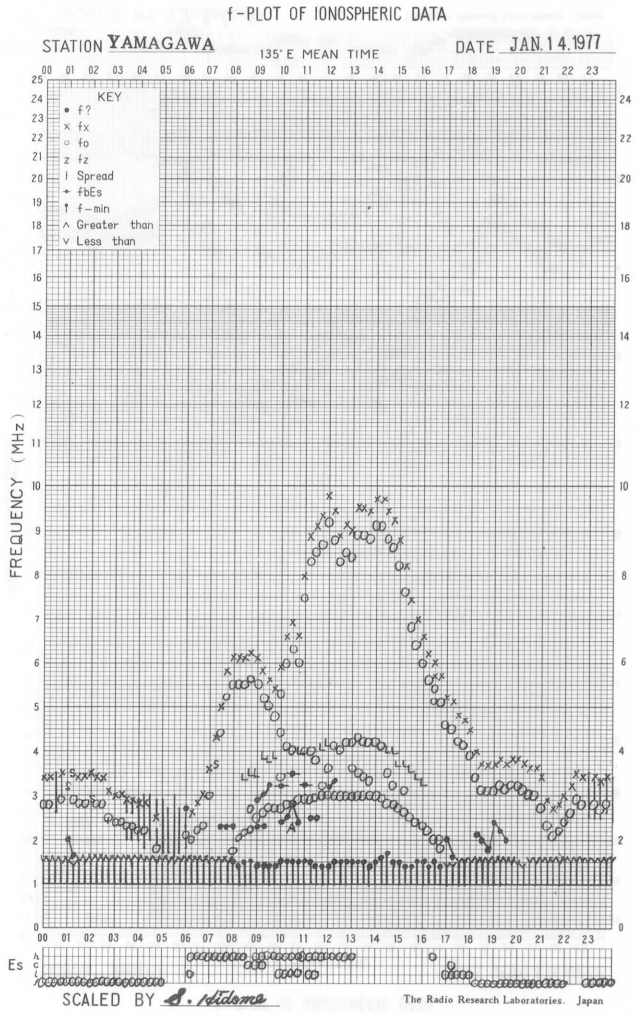
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY Y. Kuratani
The Radio Research Laboratories. Japan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DATE JAN. 14. 1977
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| Spread
+ fbEs
↑ f-min
∧ Greater than
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FREQUENCY (MHz)
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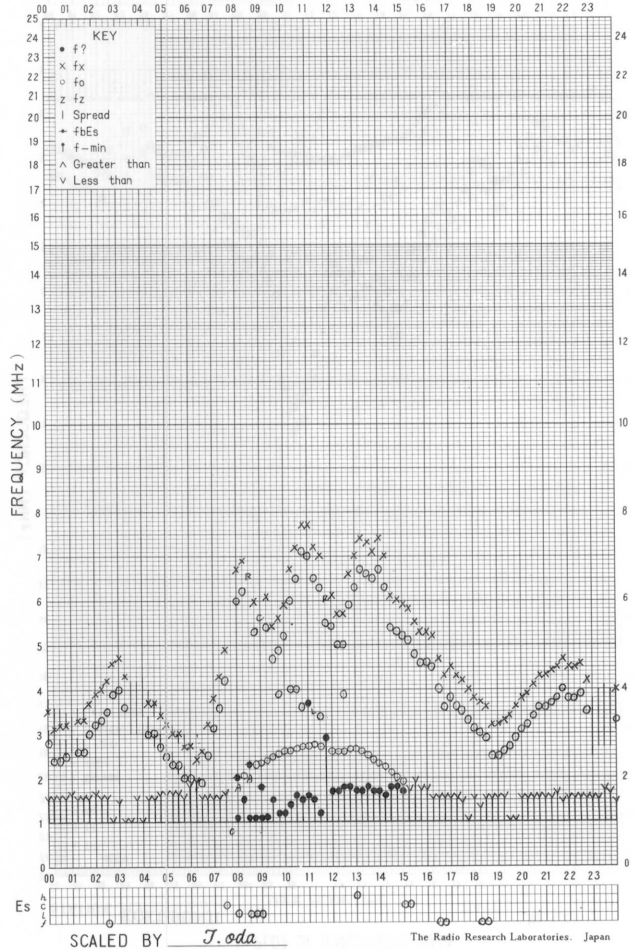
SCALED BY S. Iidoma
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135° E MEAN TIME DATE JAN 15 1977

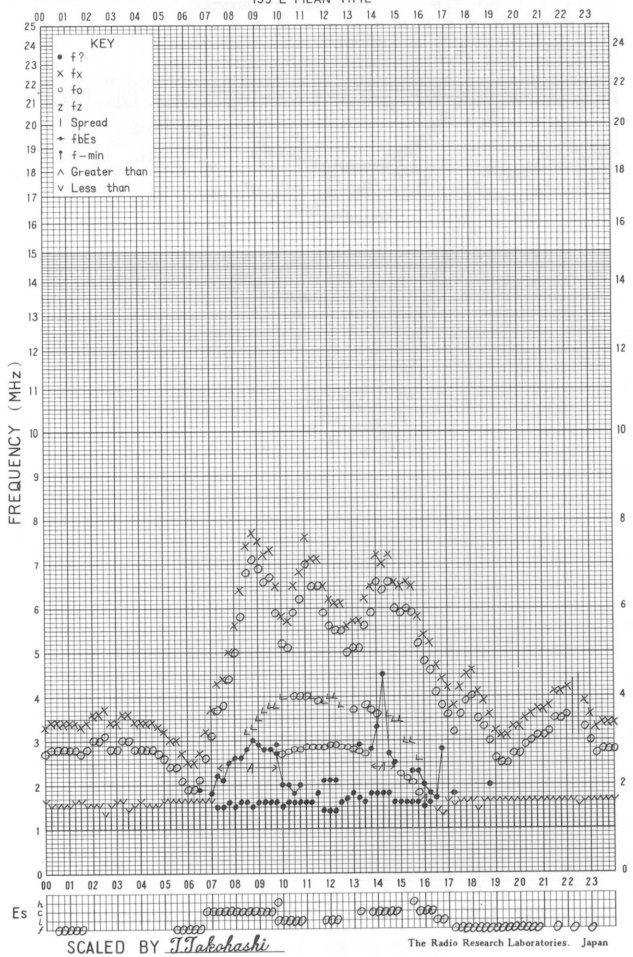


SCALED BY J. oda

The Radio Research Laboratories. Japan

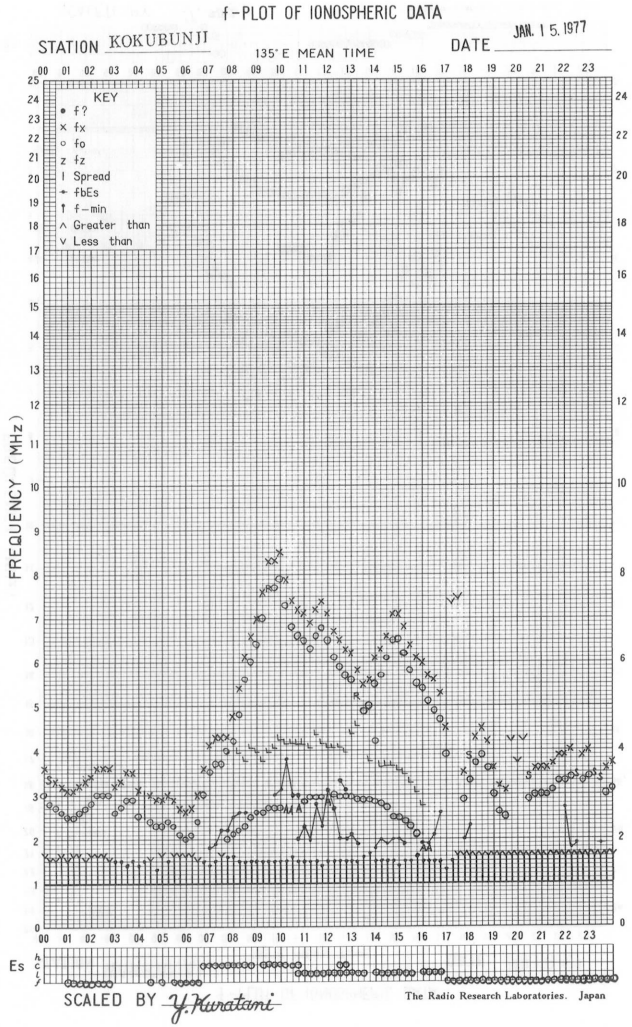
f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135° E MEAN TIME DATE JAN, 15, 1977



SCALED BY T. Takahashi

The Radio Research Laboratories. Japan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KEY
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f-min
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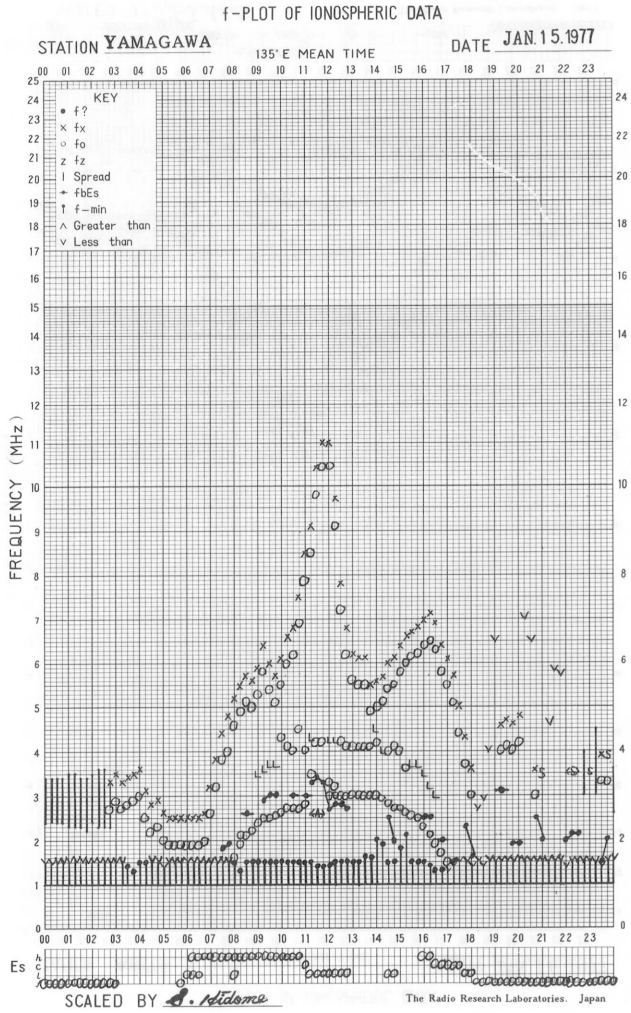
FREQUENCY (MHz)
Es
SCALED BY Y. Kuratani
The Radio Research Laboratories. Japan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Greater than
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FREQUENCY (MHz)
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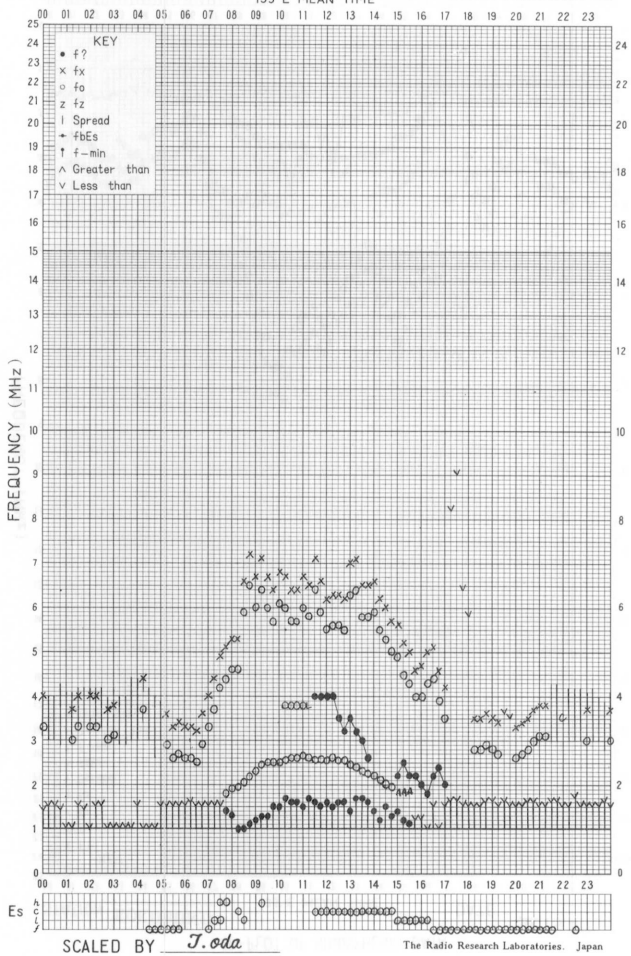
SCALED BY S. Ishidome
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN 16 1977

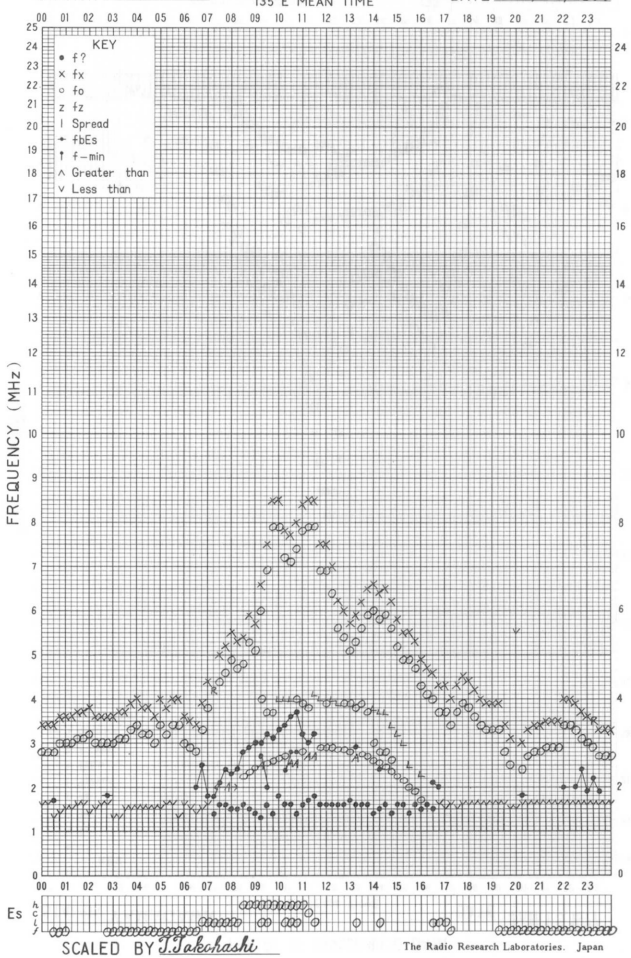


SCALED BY T. oda

The Radio Research Laboratories. Japan

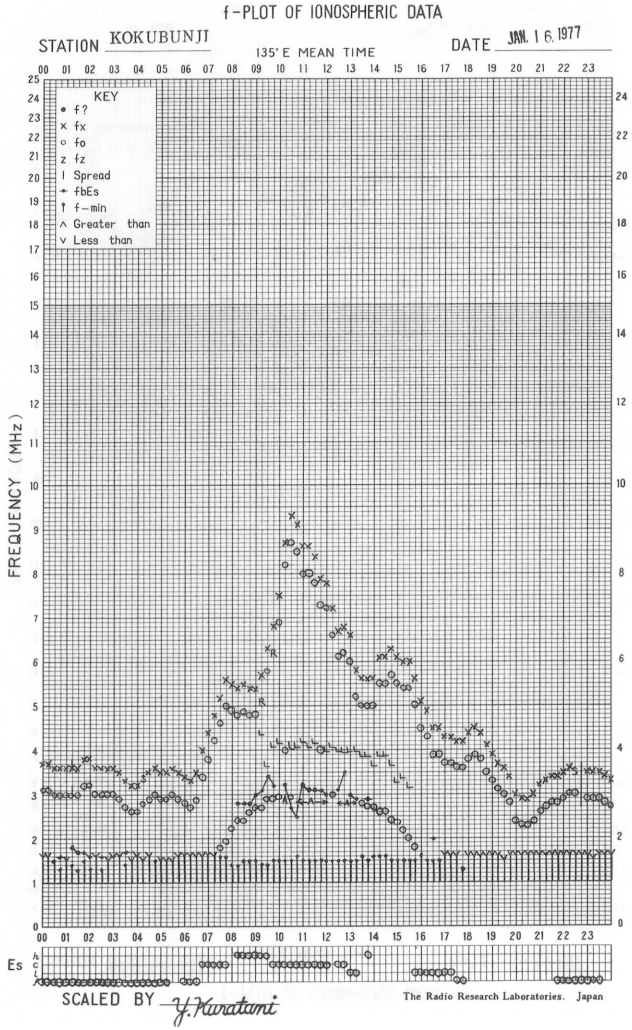
f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE JAN, 16, 1977



SCALED BY T. Takahashi

The Radio Research Laboratories. Japan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KEY
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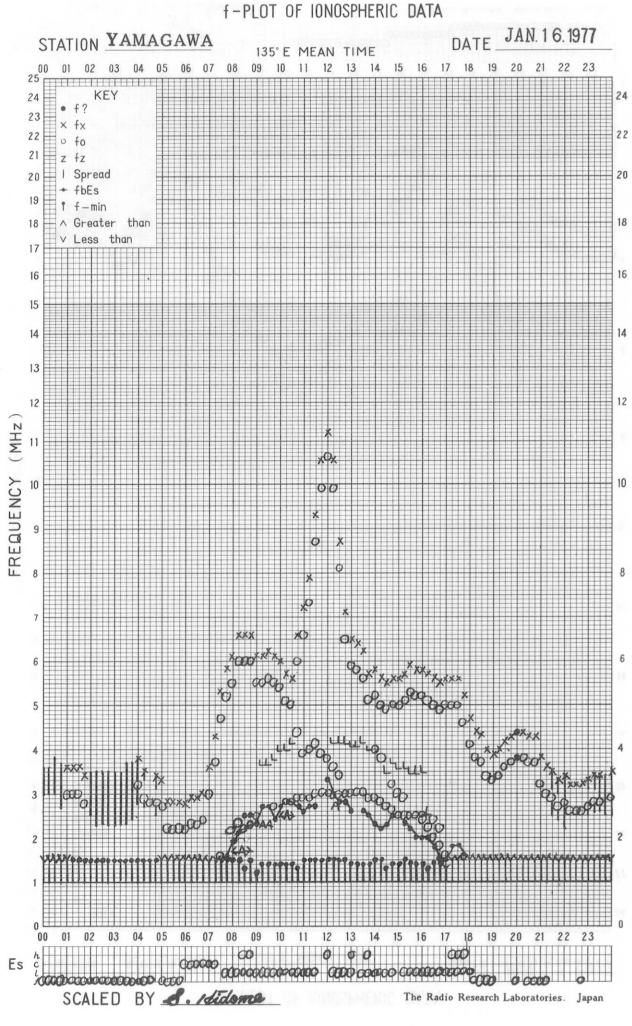
FREQUENCY (MHz)
Es
SCALED BY Y. Kuratani
The Radio Research Laboratories. Japan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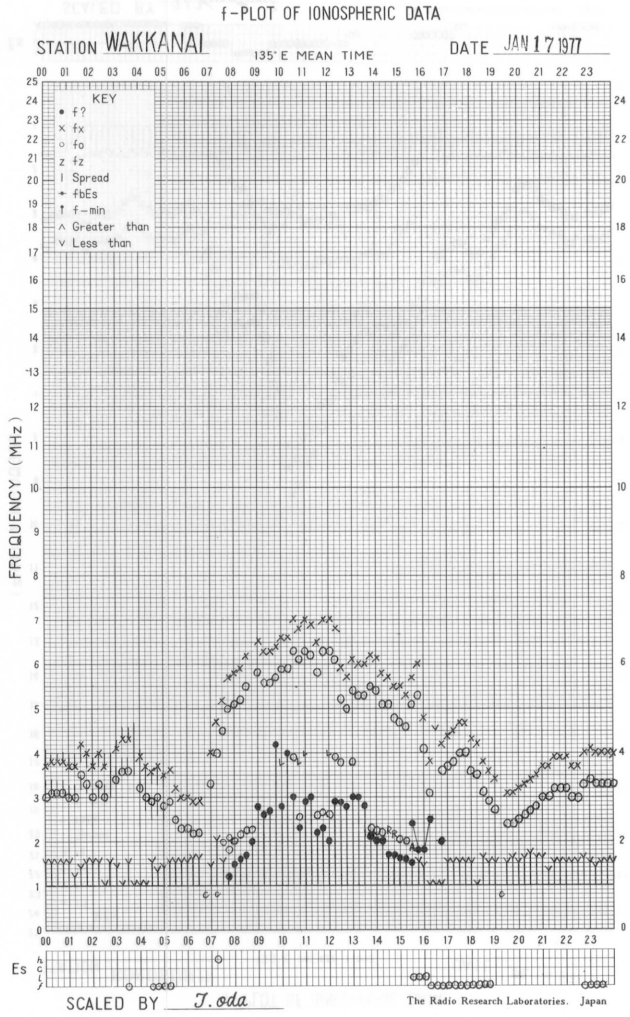
FREQUENCY (MHz)
Es
SCALED BY S. Iidoma
The Radio Research Laboratories. Japan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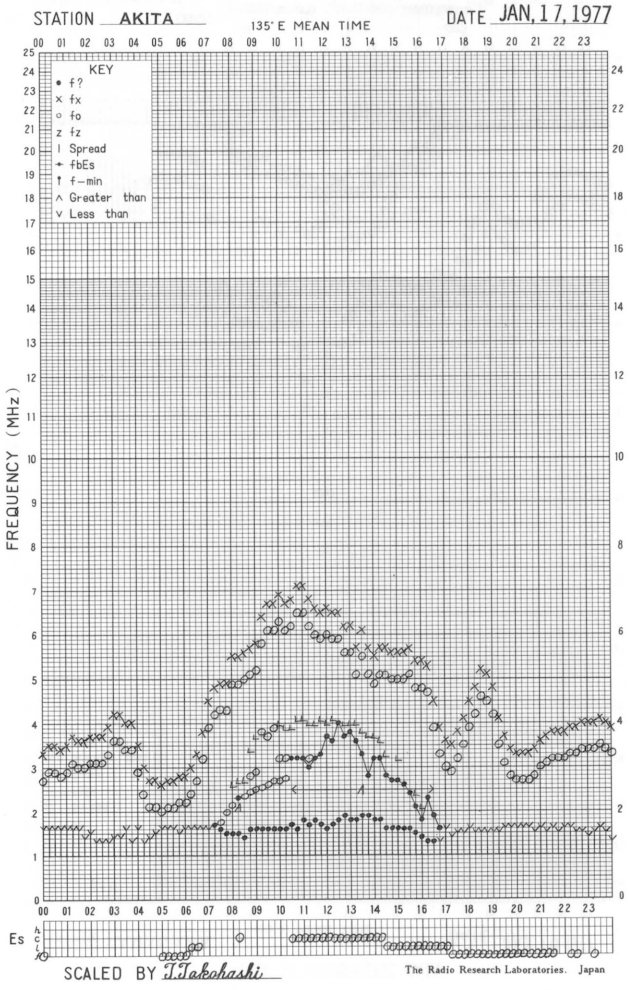
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY T. oda
The Radio Research Laboratories. Japan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DATE JAN, 17, 1977
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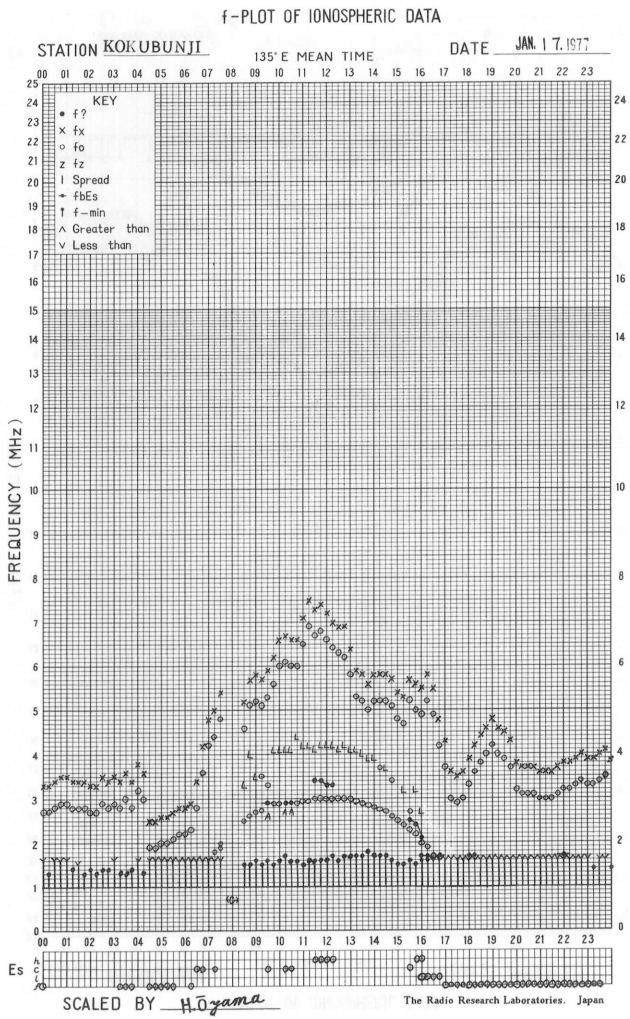
FREQUENCY (MHz)
Es
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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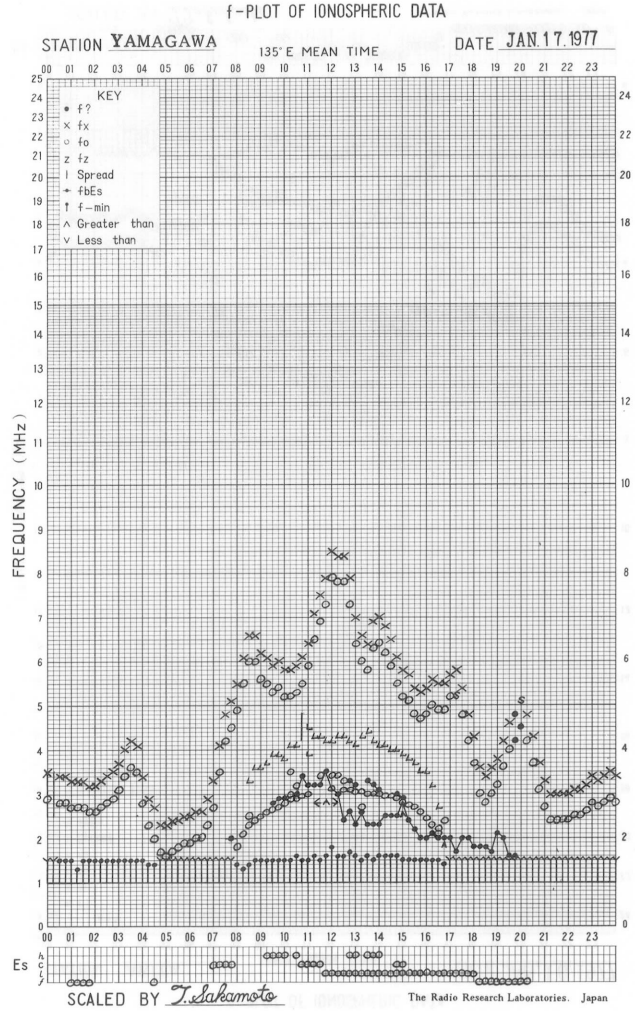
SCALED BY H. Ōzama
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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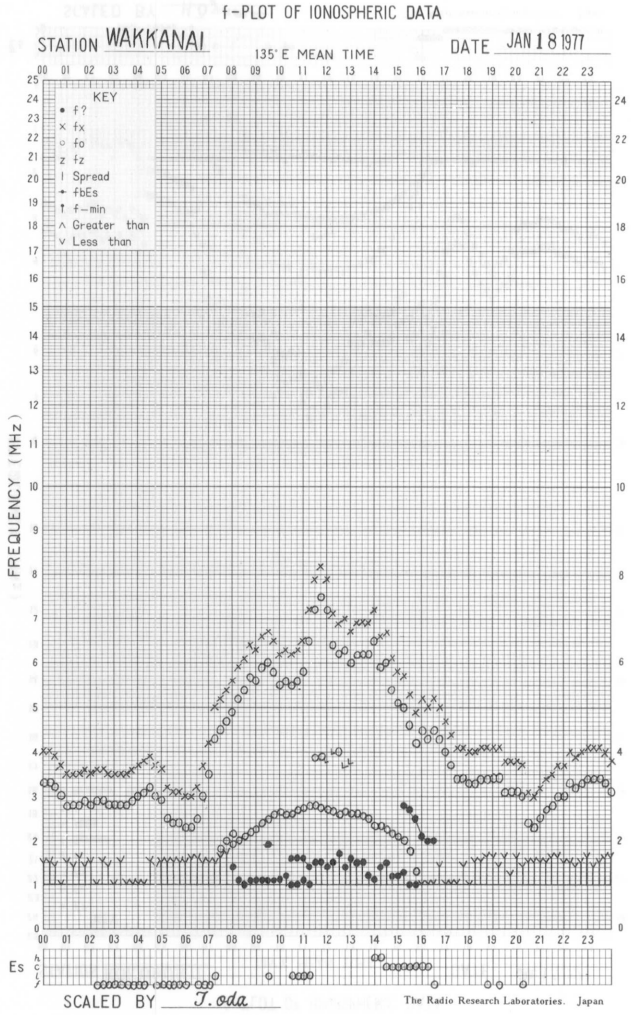
SCALED BY T. Sakamoto
The Radio Research Laboratories. Japan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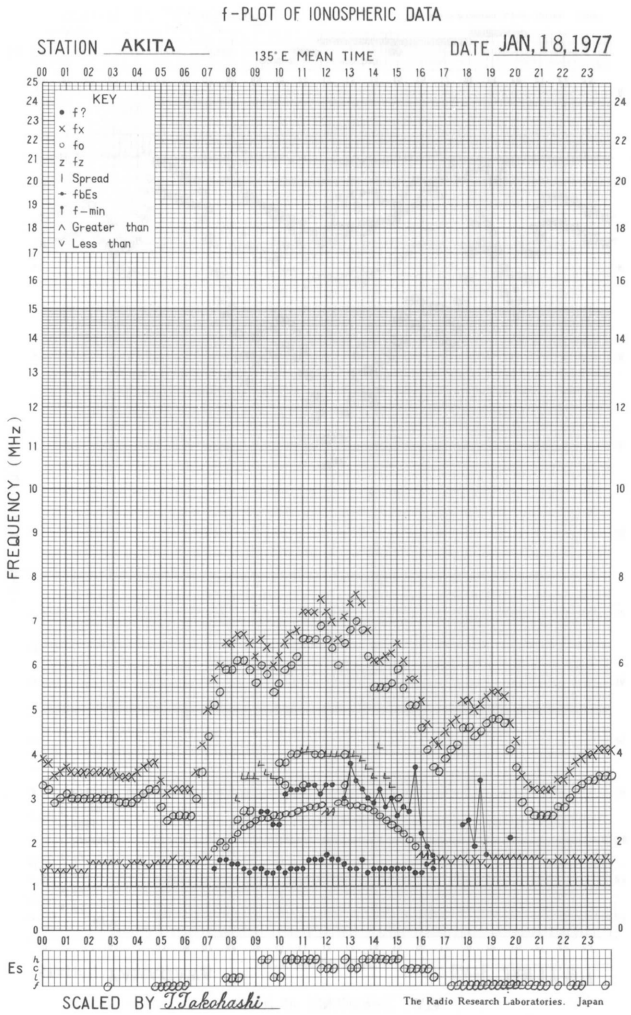
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY T. oda
The Radio Research Laboratories. Japan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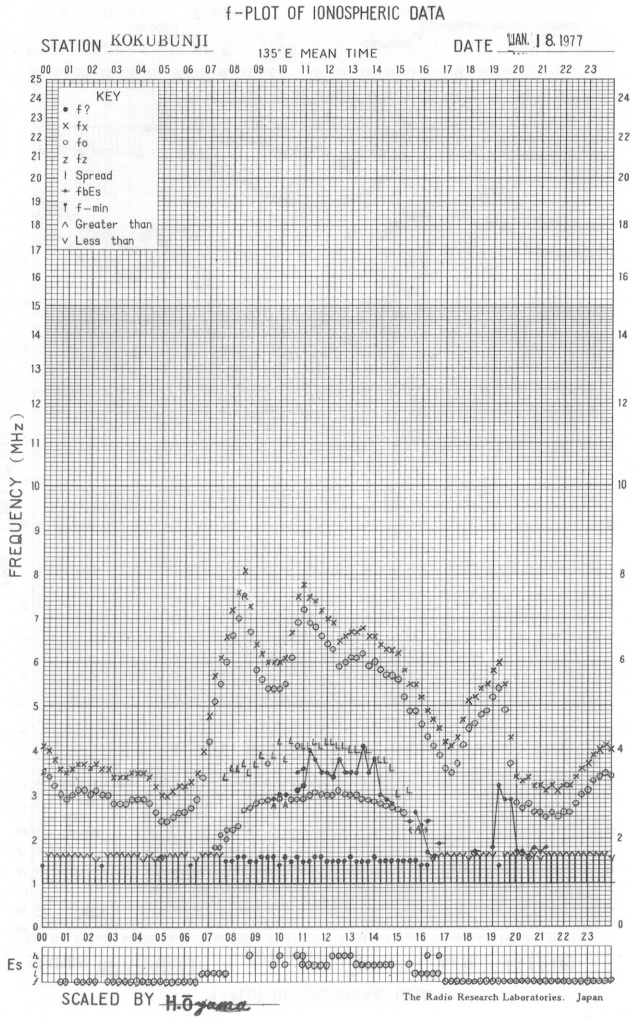
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan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∨ Less than
FREQUENCY (MHz)
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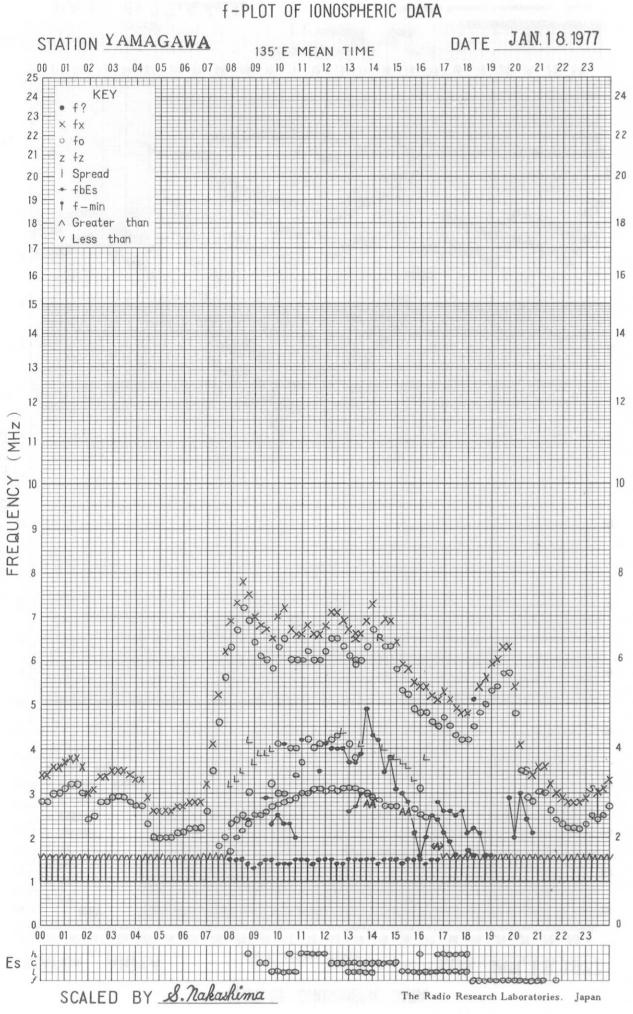
SCALED BY H. Ōzima
The Radio Research Laboratories. Japan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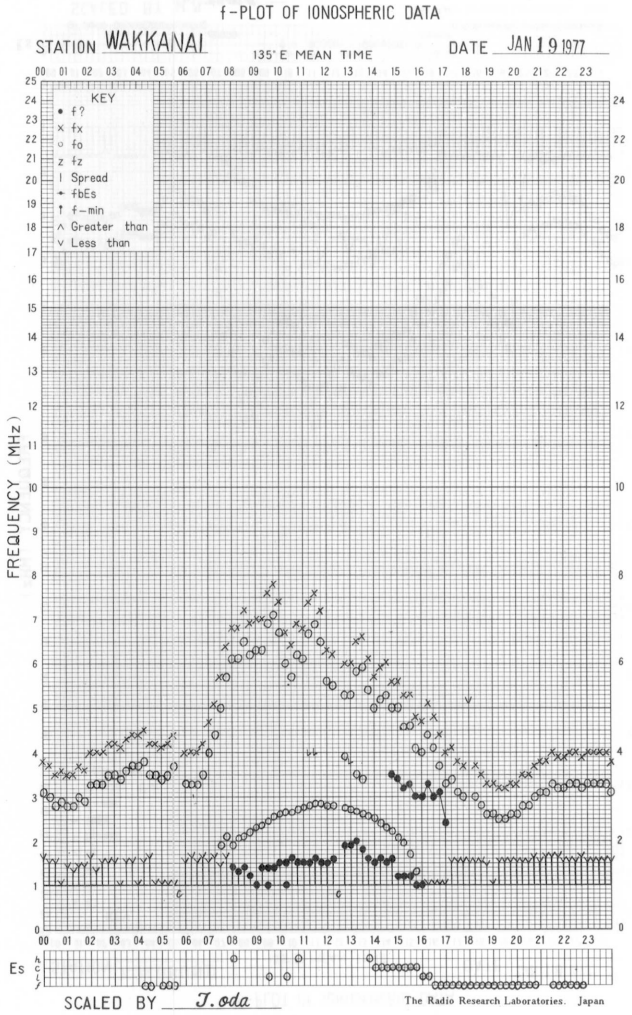
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan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○ fo
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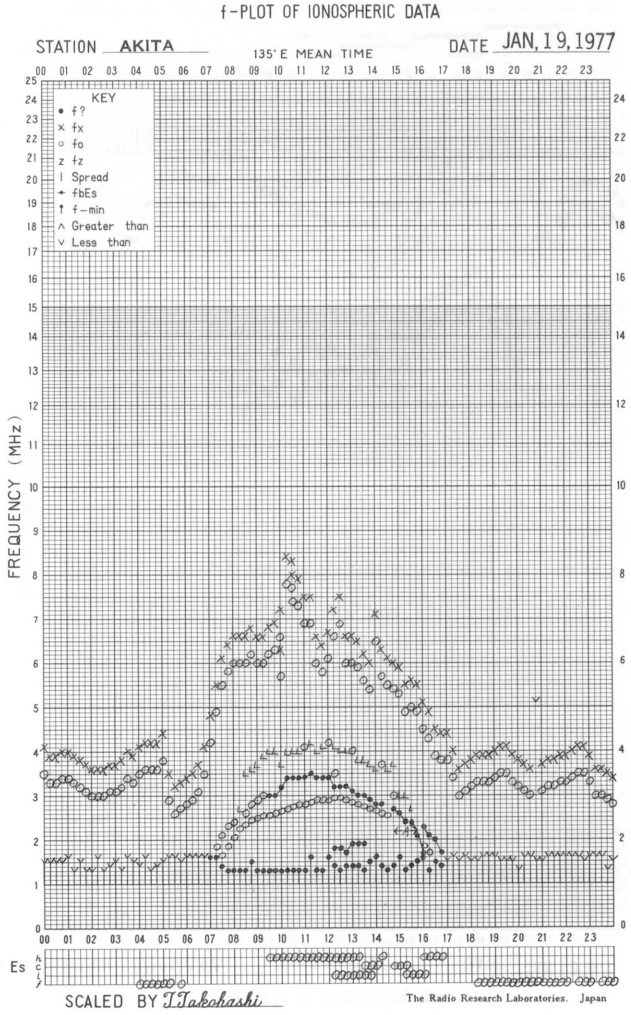
| Spread
+ fbEs
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY J. oda
The Radio Research Laboratories. Japan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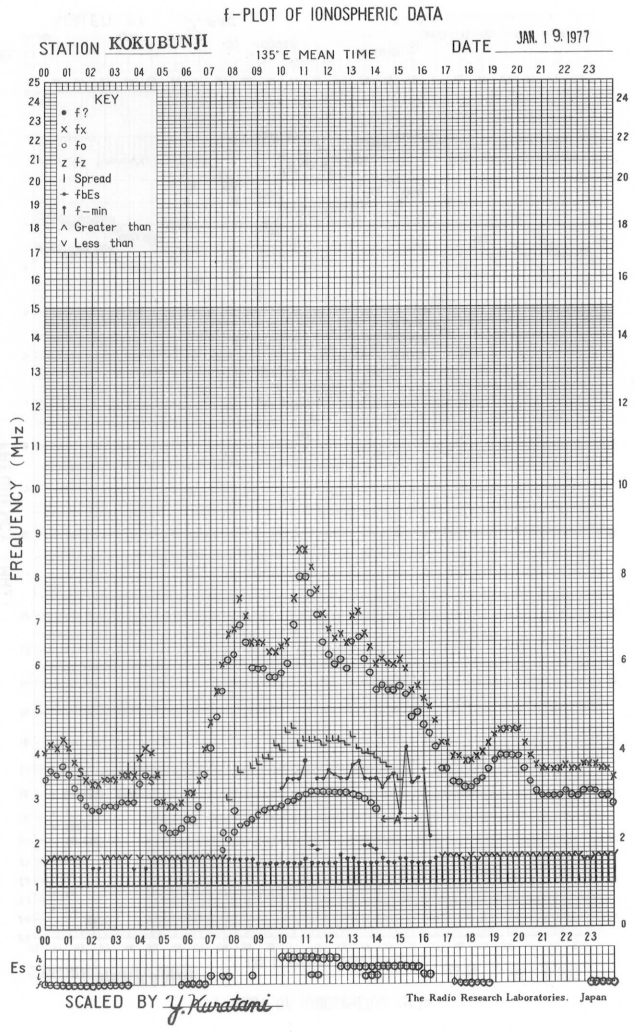
STATION AKITA
135°E MEAN TIME
DATE JAN, 19, 1977
KEY
• f?
× fx
○ fo
z fz
| Spread
+ fbEs
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY T Takahashi
The Radio Research Laboratories. Japan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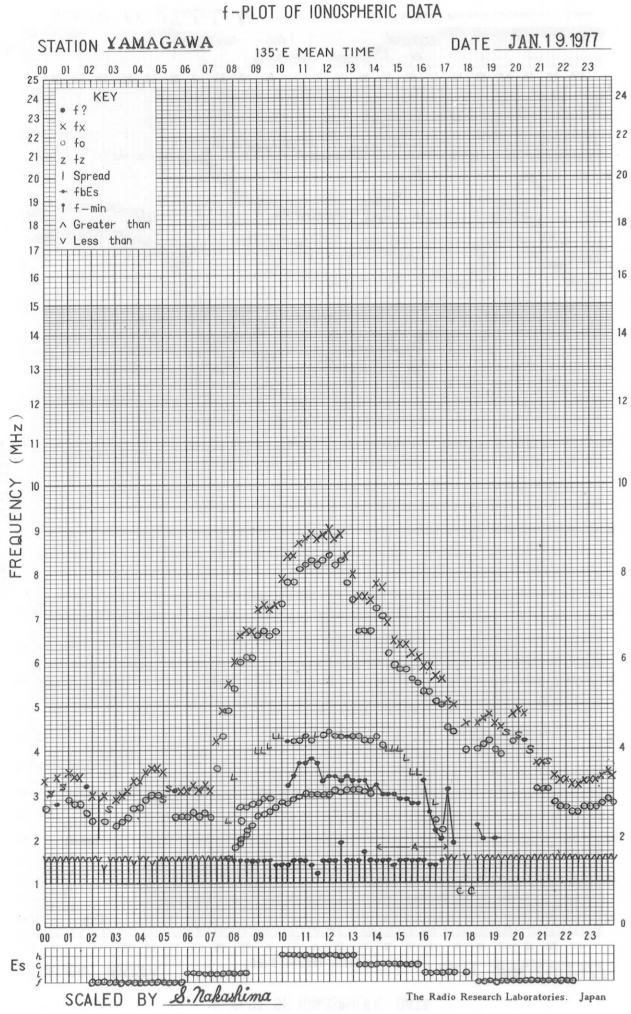
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY Y. Kuratani
The Radio Research Laboratories. Japan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DATE JAN. 19. 1977
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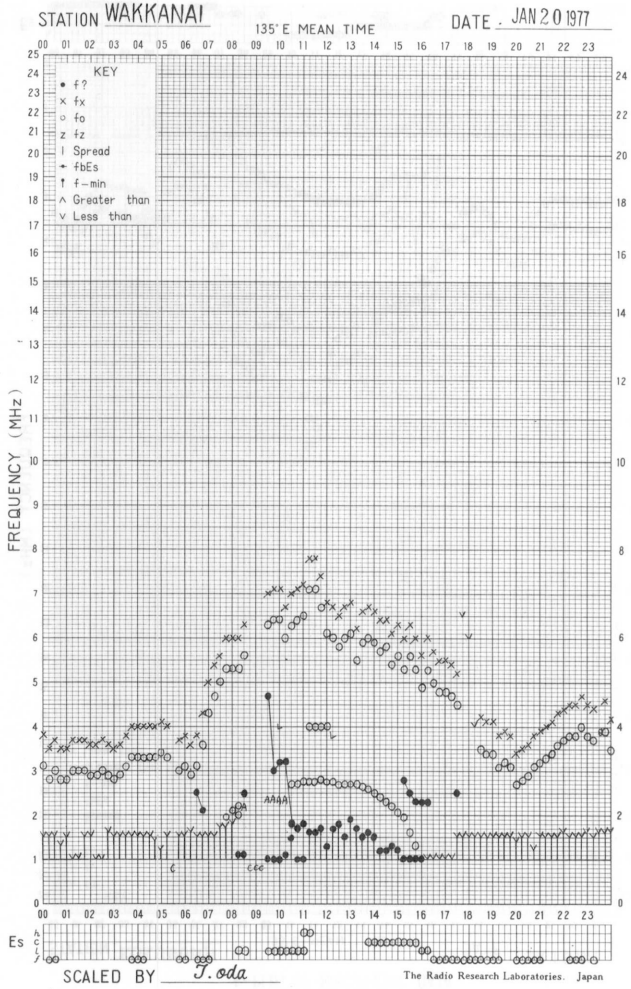
z fz
| Spread
+ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135°E MEAN TIME DATE JAN 20 1977

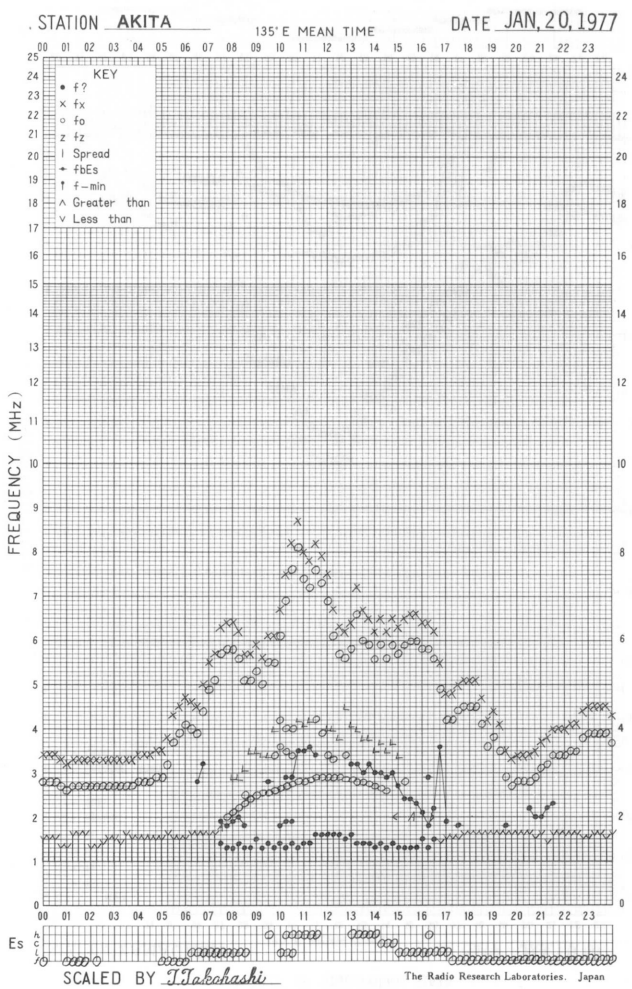


SCALED BY J. oda

The Radio Research Laboratories. Japan

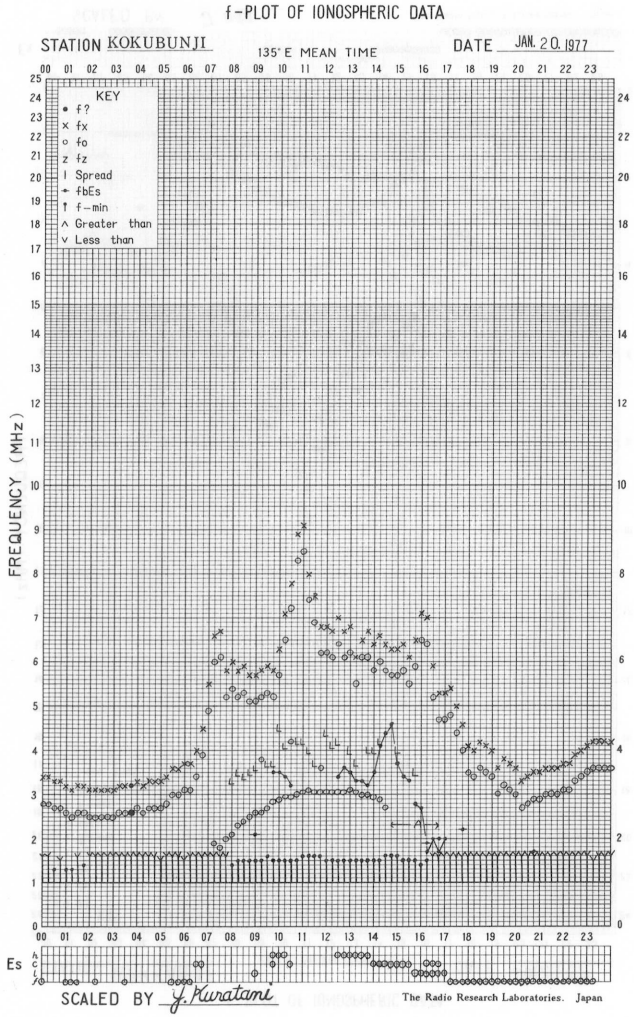
f-PLOT OF IONOSPHERIC DATA

STATION AKITA 135°E MEAN TIME DATE JAN, 20, 1977



SCALED BY T. Takahashi

The Radio Research Laboratories. Japan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Greater than
Less than
FREQUENCY (MHz)
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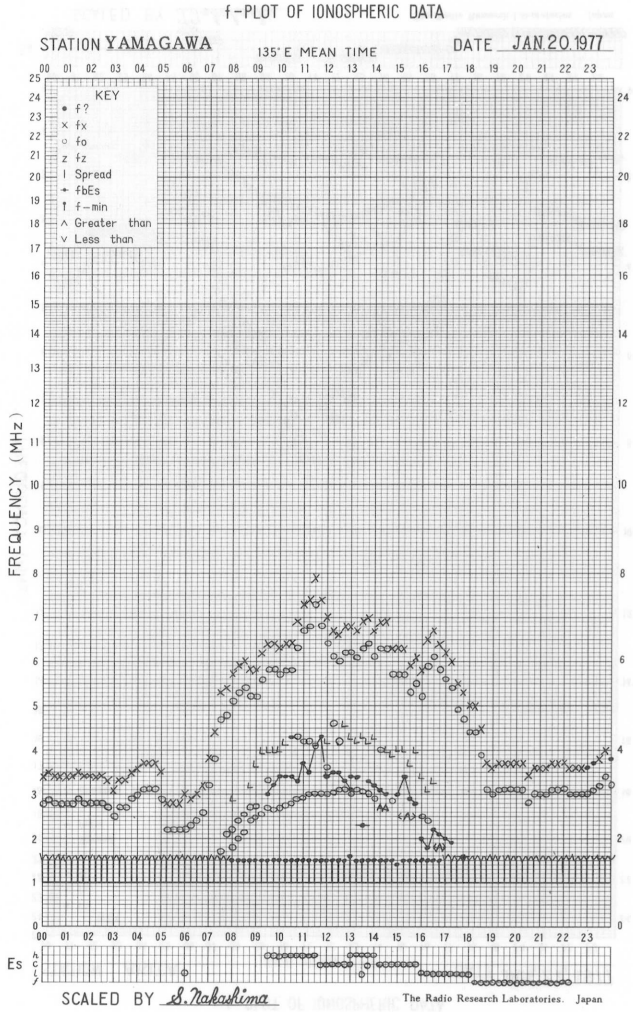
SCALED BY J. Kuratani
The Radio Research Laboratories. Japan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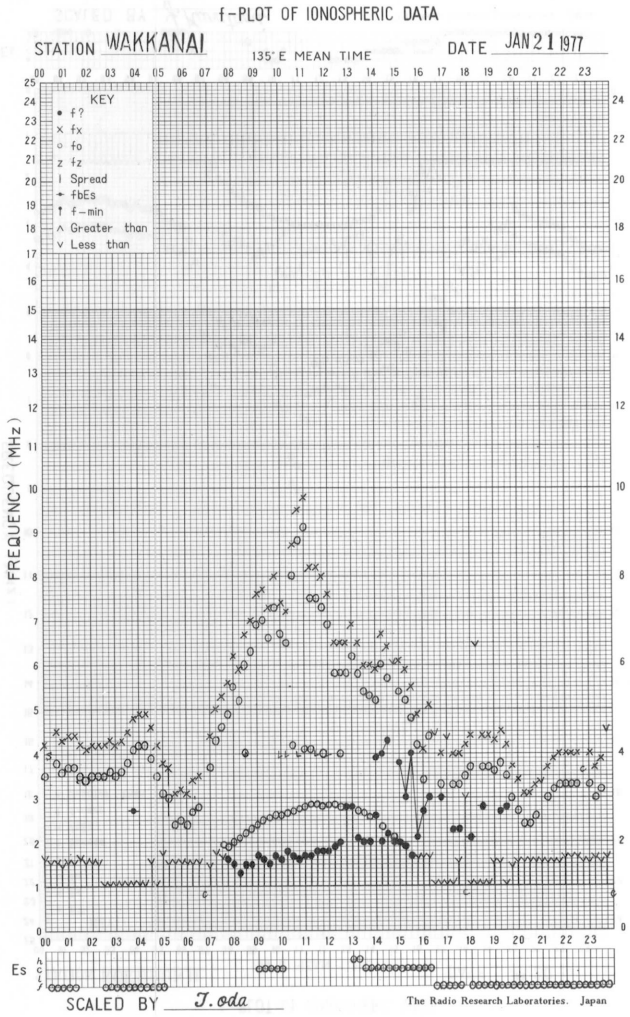
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan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DATE JAN 21 1977
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○ fo
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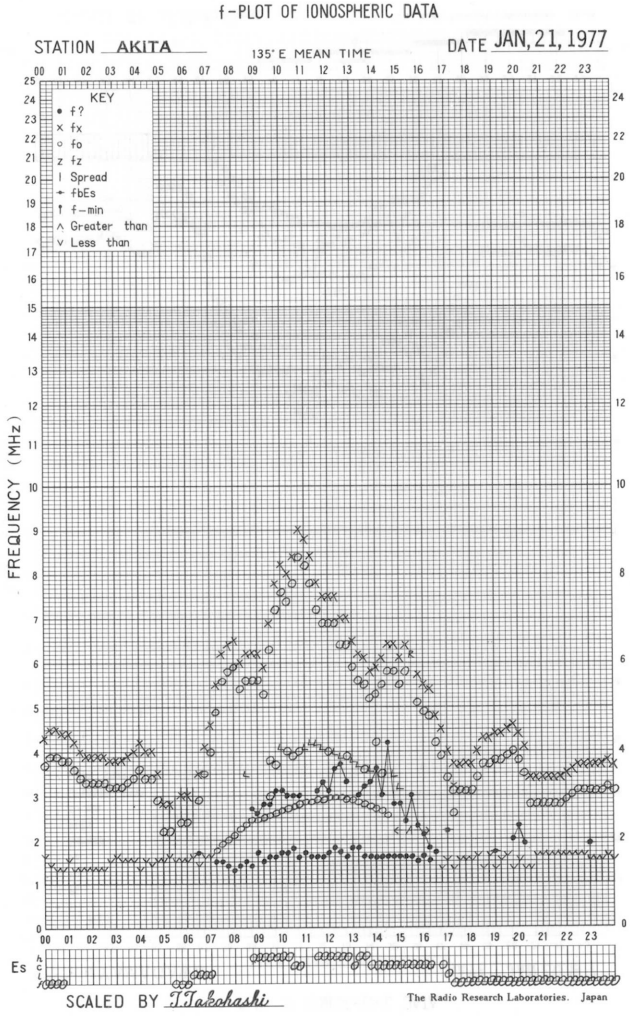
† f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
Activity
SCALED BY J. oda
The Radio Research Laboratories. Japan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DATE JAN, 21, 1977
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○ fo
z fz
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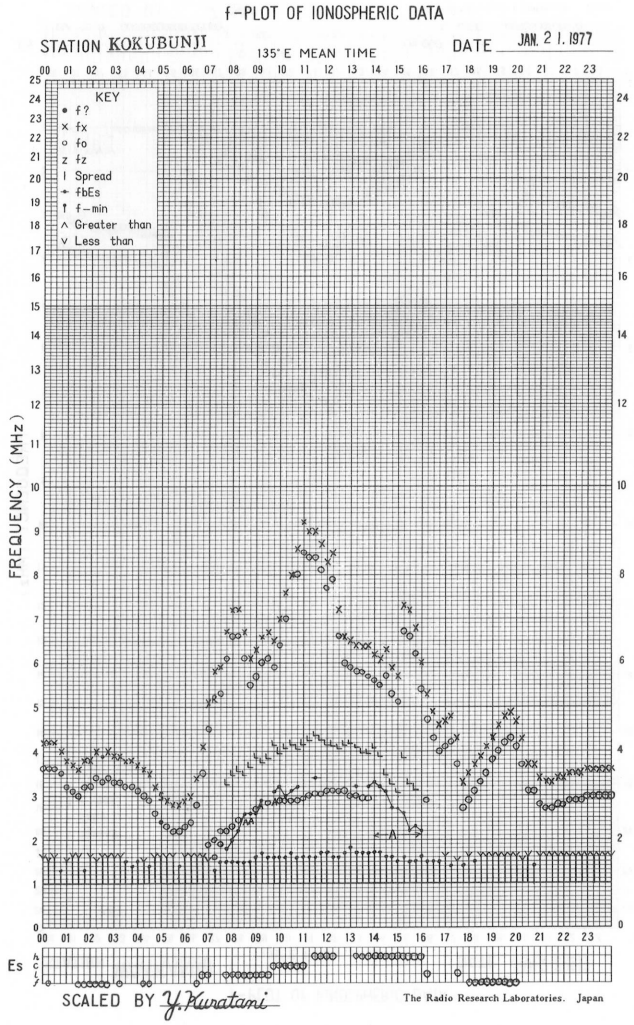
^ Greater than
v Less than
FREQUENCY (MHz)
Es
Activity
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan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DATE JAN. 21. 1977
KEY
f?
fx
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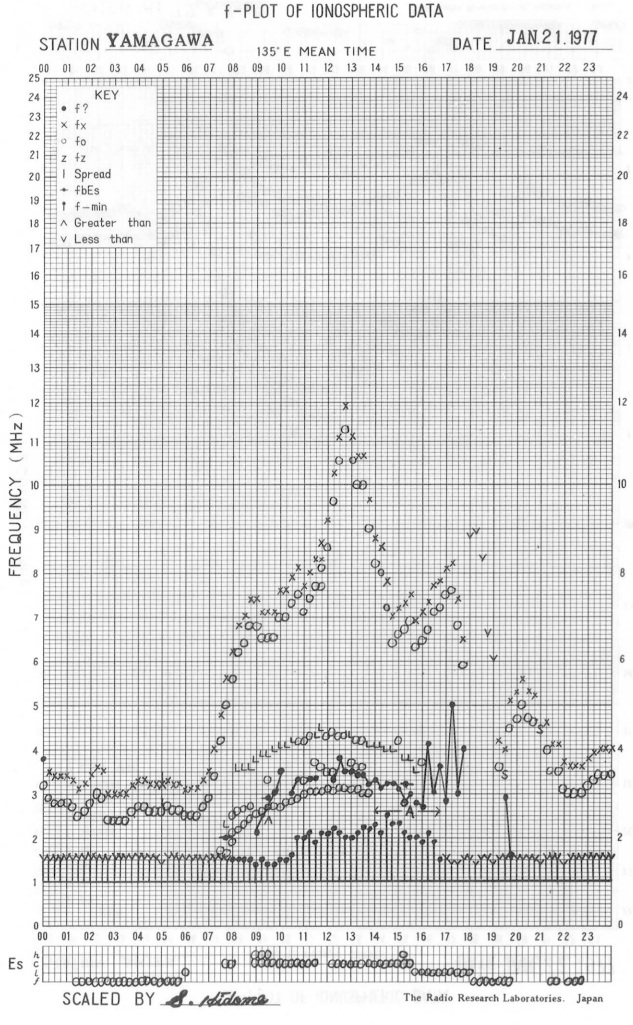
Spread
fbEs
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY Y. Kuratani
The Radio Research Laboratories. Japan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FREQUENCY (MHz)
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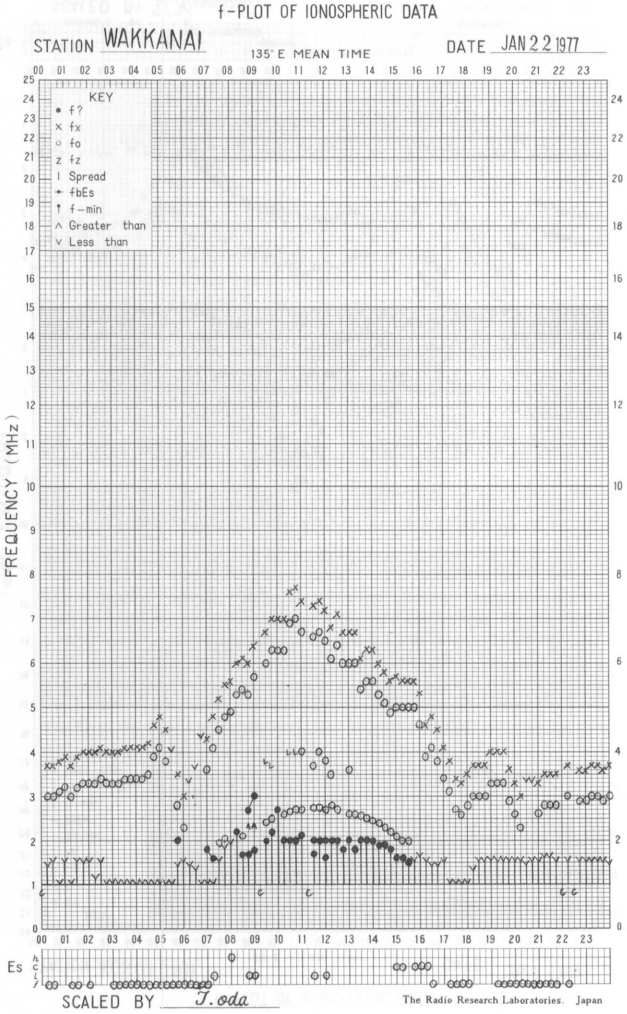
The Radio Research Laboratories. Japan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135°E MEAN TIME
DATE JAN 22 1977
KEY
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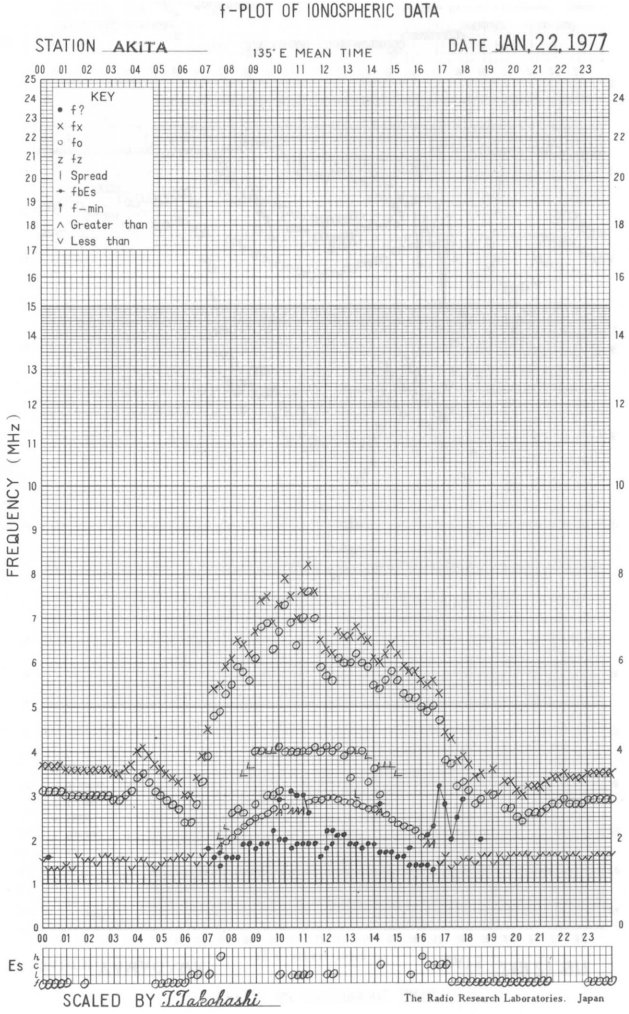
Spread
fbEs
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY T. oda
The Radio Research Laboratories. Japan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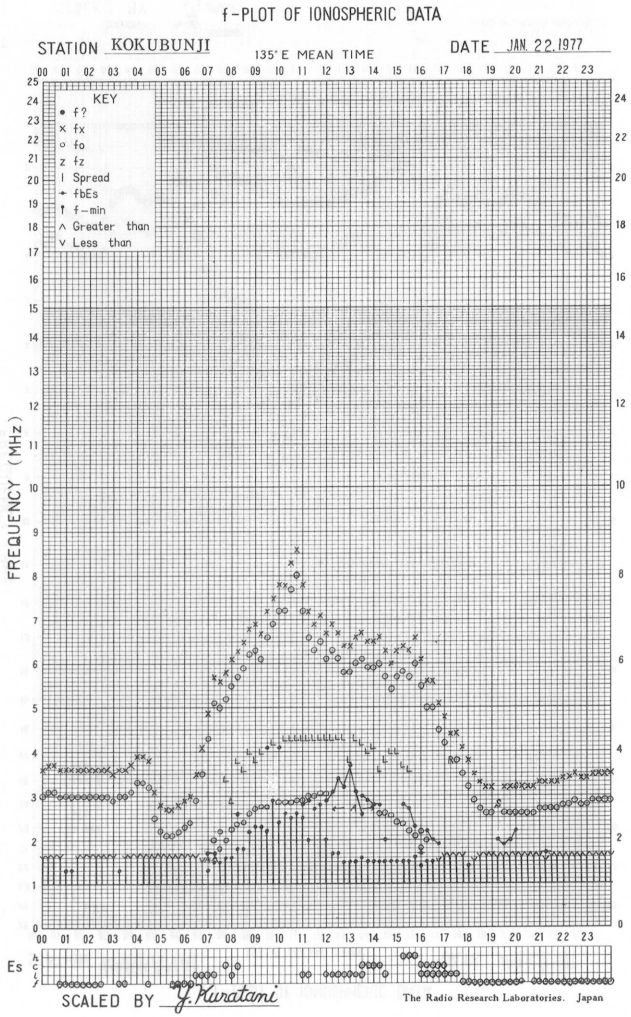
Spread
fbEs
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan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KEY
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× fx
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z fz
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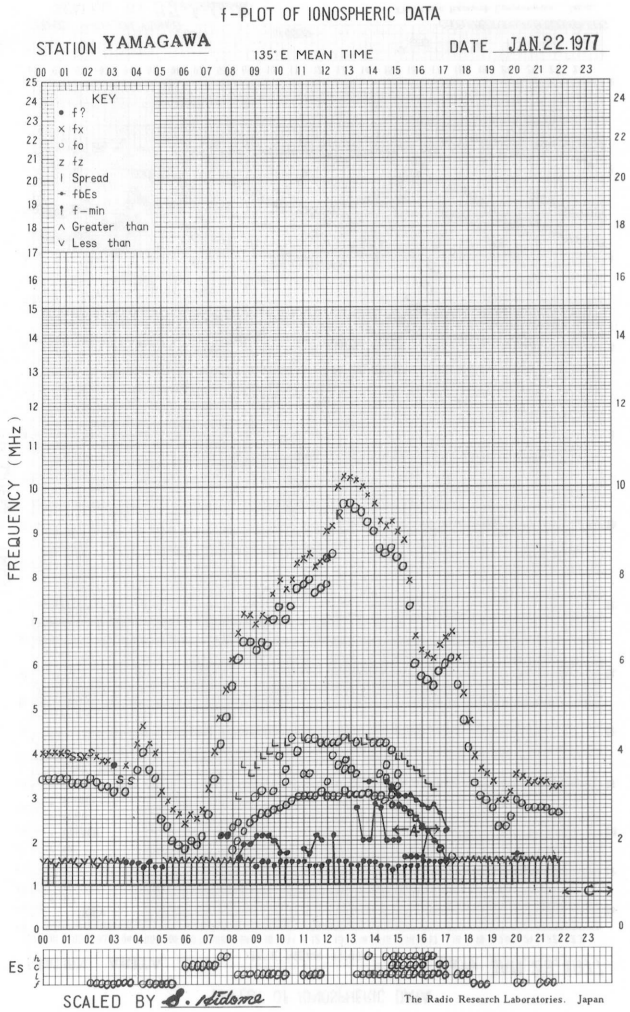
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY J. Furatani
The Radio Research Laboratories. Japan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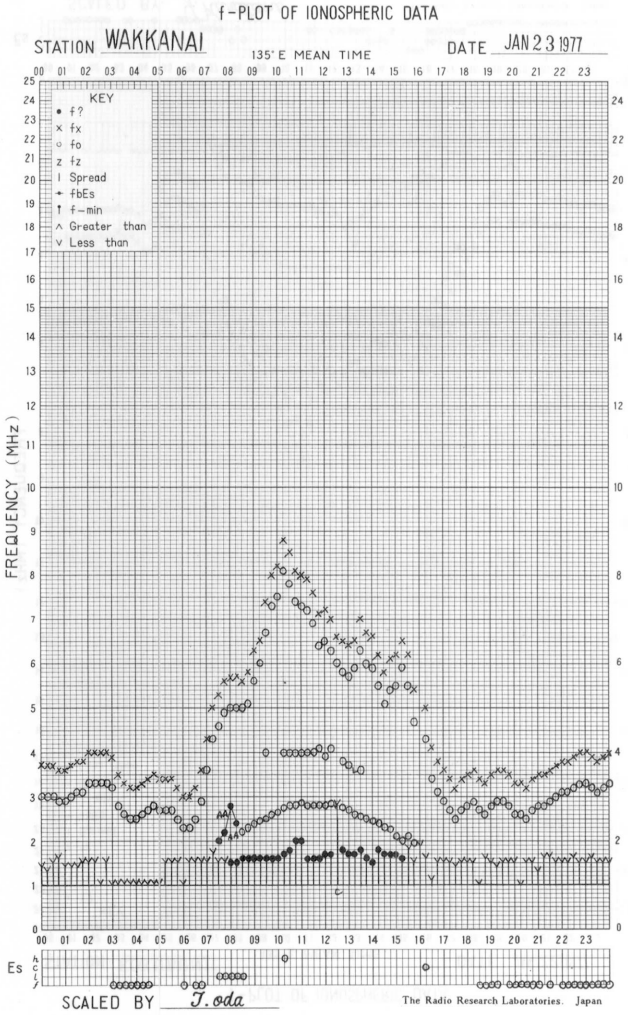
FREQUENCY (MHz)
Es
SCALED BY S. Nidoma
The Radio Research Laboratories. Japan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DATE JAN 23 1977
KEY
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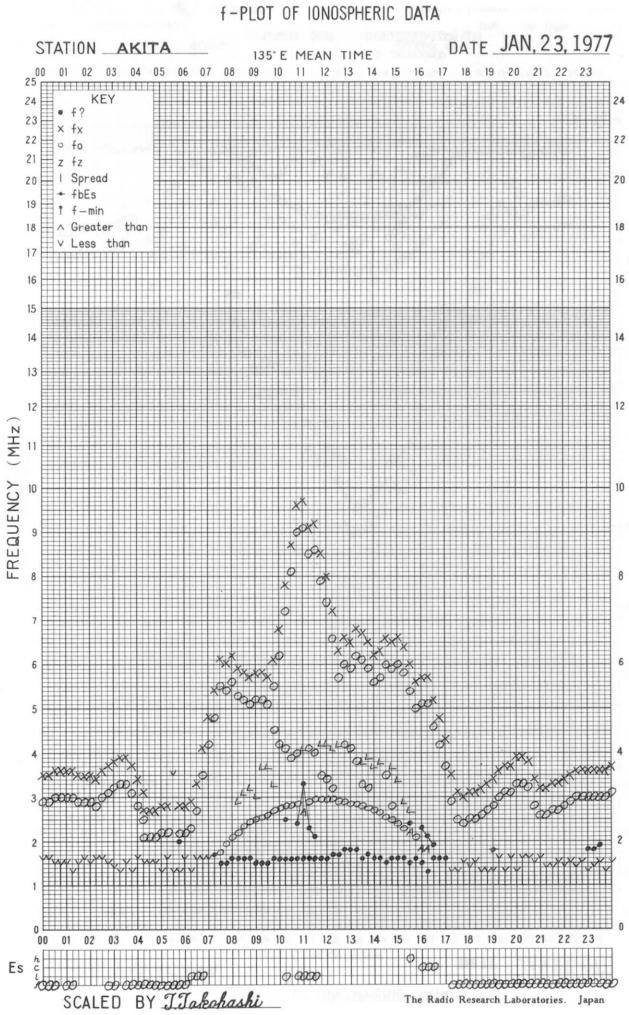
Spread
fbEs
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY T. oda
The Radio Research Laboratories. Japan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KEY
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Greater than
Less than
FREQUENCY (MHz)
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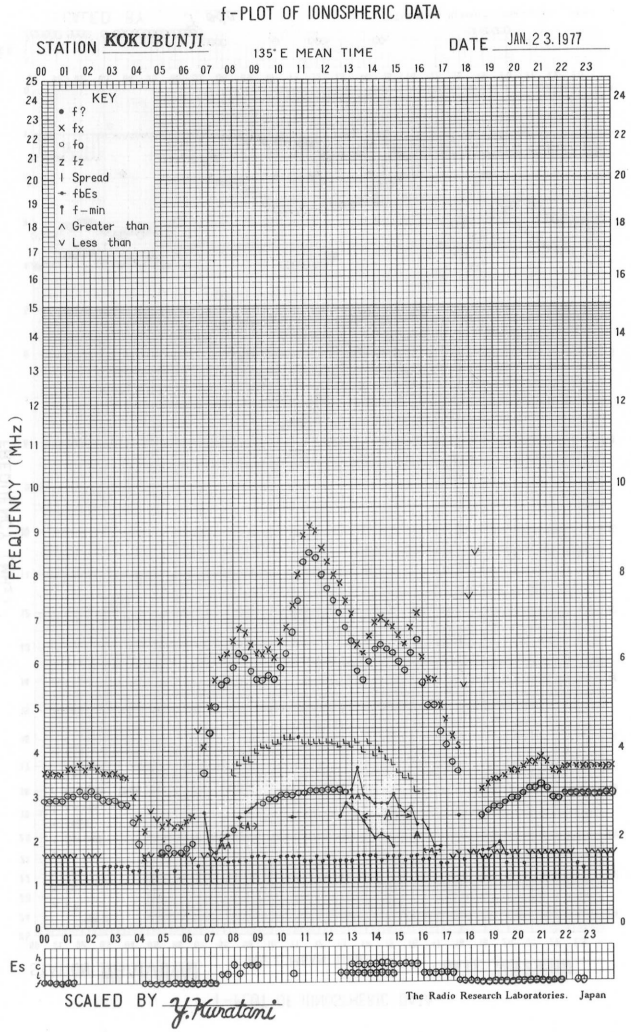
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan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KEY
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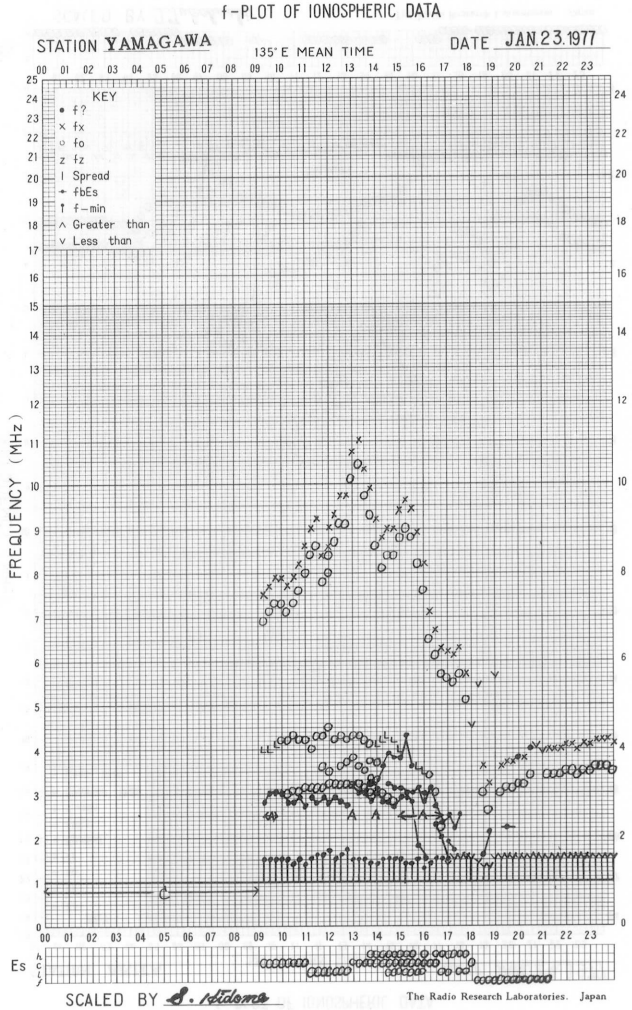
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY Y. Kuratani
The Radio Research Laboratories. Japan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KEY
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Spread
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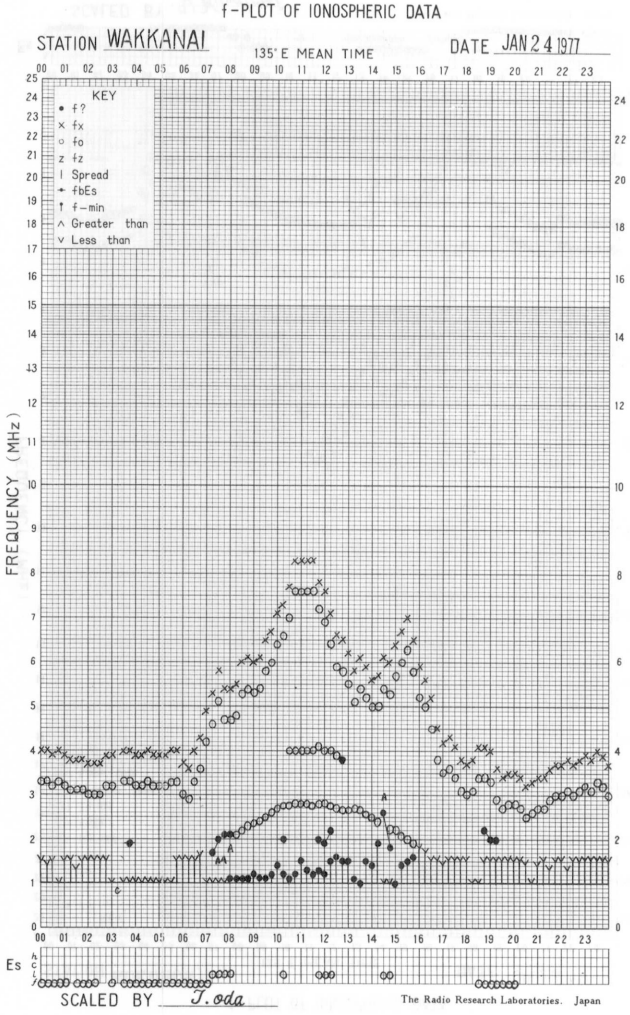
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY S. Kitdoma
The Radio Research Laboratories. Japan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KEY
• f?
× fx
○ fo
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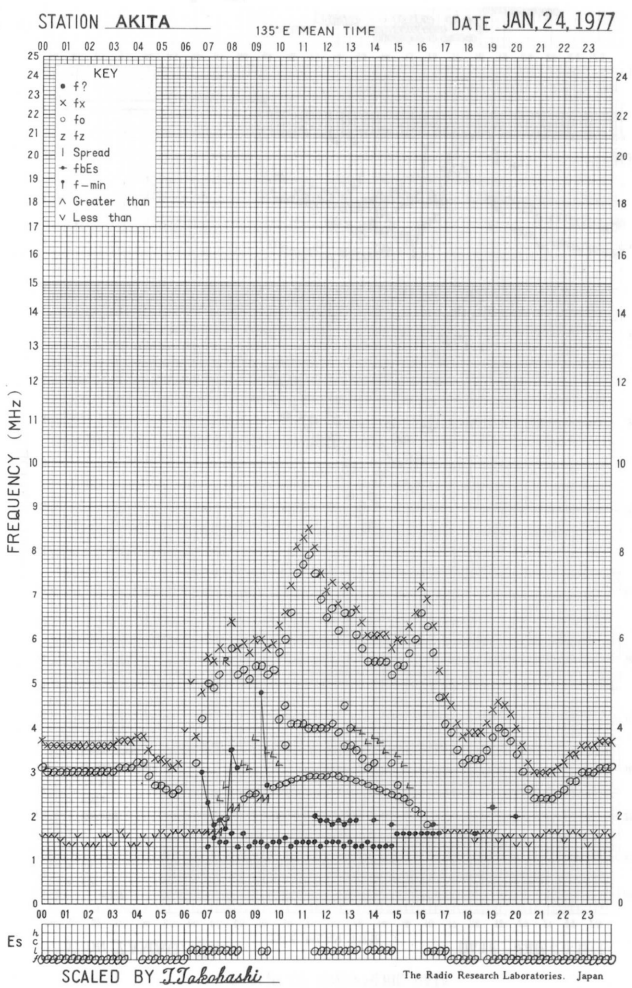
| Spread
+ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. oda
The Radio Research Laboratories. Japan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○ fo
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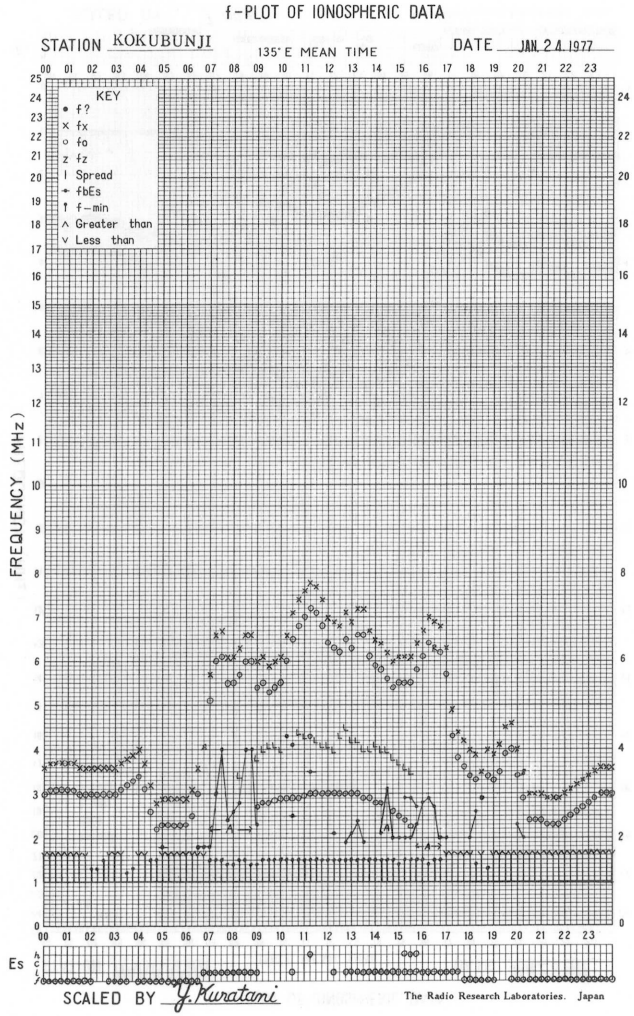
+ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan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○ fo
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^ Greater than
v Less than
FREQUENCY (MHz)
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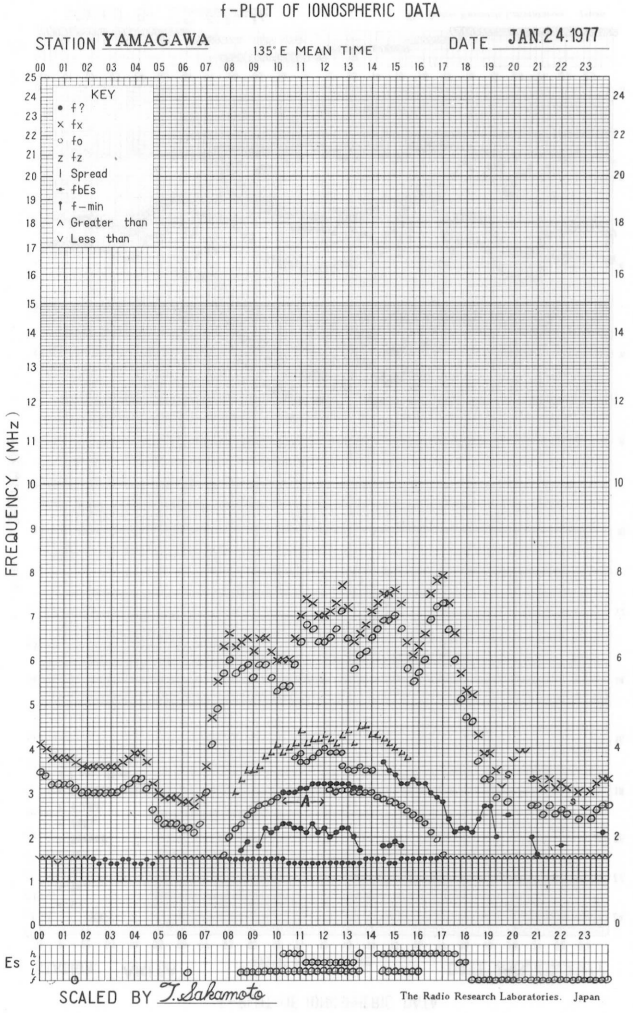
SCALED BY J. Kuratani
The Radio Research Laboratories. Japan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○ fo
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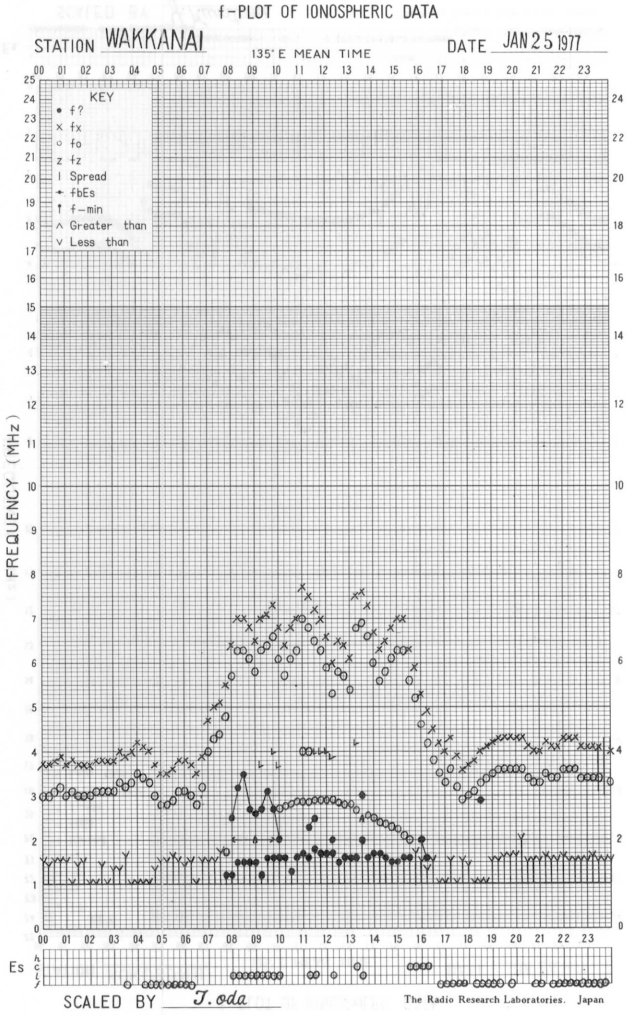
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Takamoto
The Radio Research Laboratories. Japan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135° E MEAN TIME
DATE JAN 25 1977
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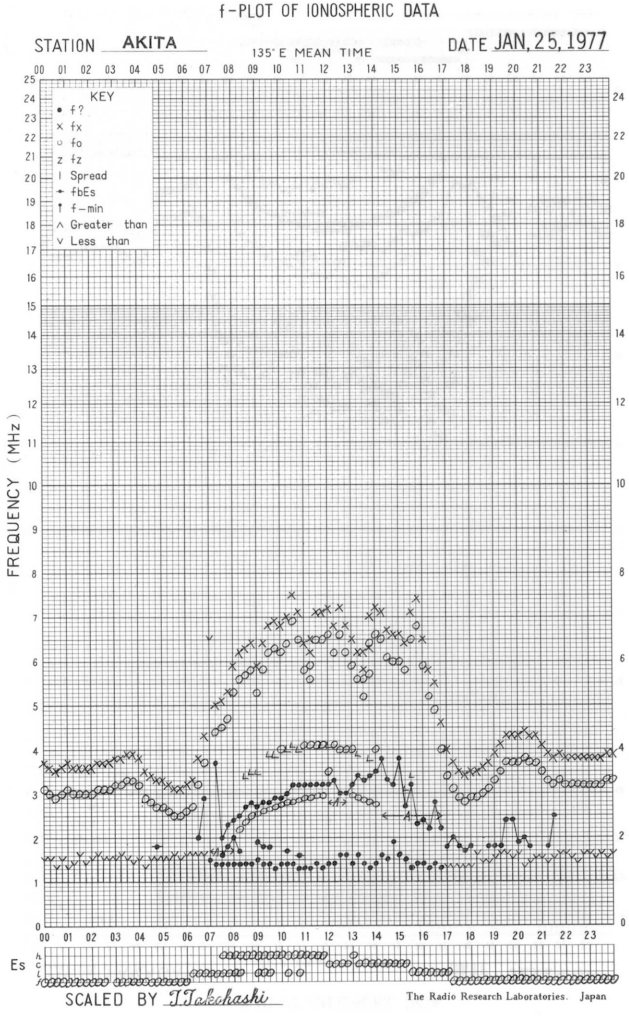
○ fo
z fz
| Spread
⊸ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY J. oda
The Radio Research Laboratories. Japan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KEY
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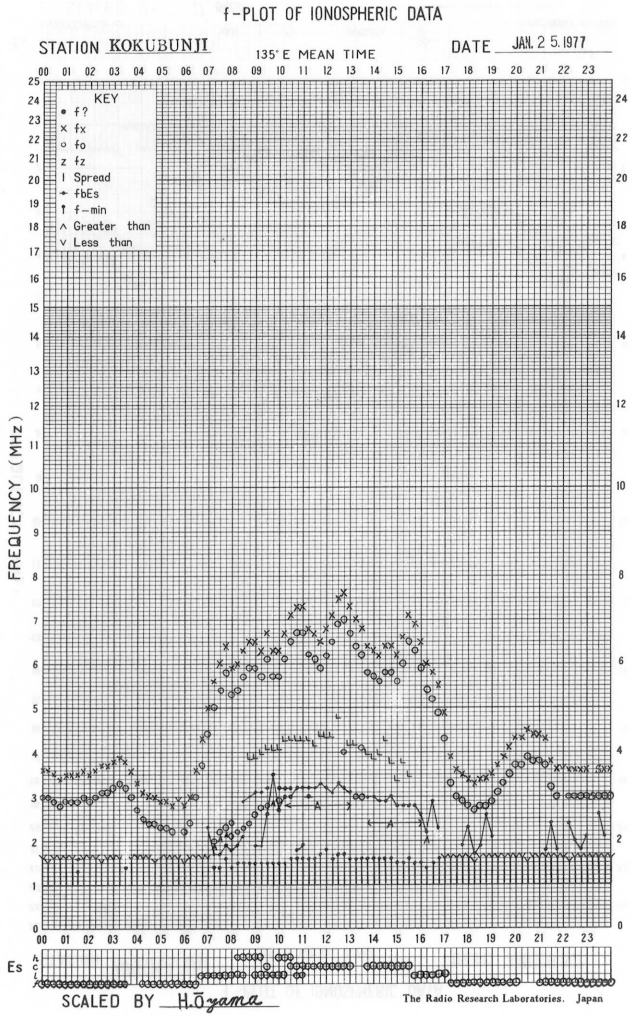
○ fo
z fz
| Spread
⊸ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan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135° E MEAN TIME
DATE JAN. 2 5. 1977
KEY
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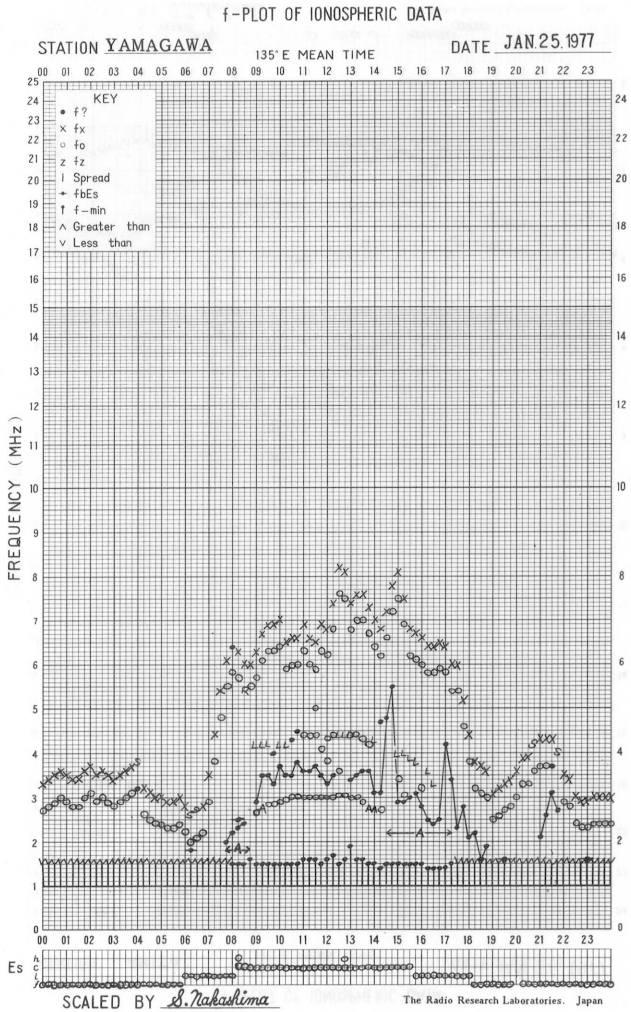
○ fo
z fz
| Spread
+ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY H.Ōyama
The Radio Research Laboratories. Japan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○ fo
z fz
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+ fbEs
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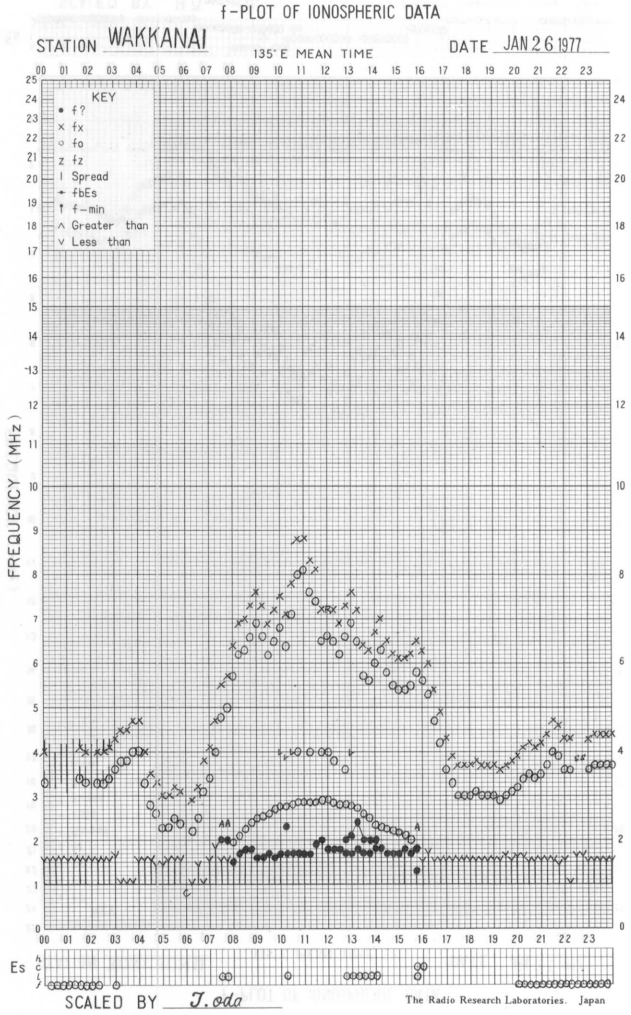
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan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135° E MEAN TIME
DATE JAN 26 1977
KEY
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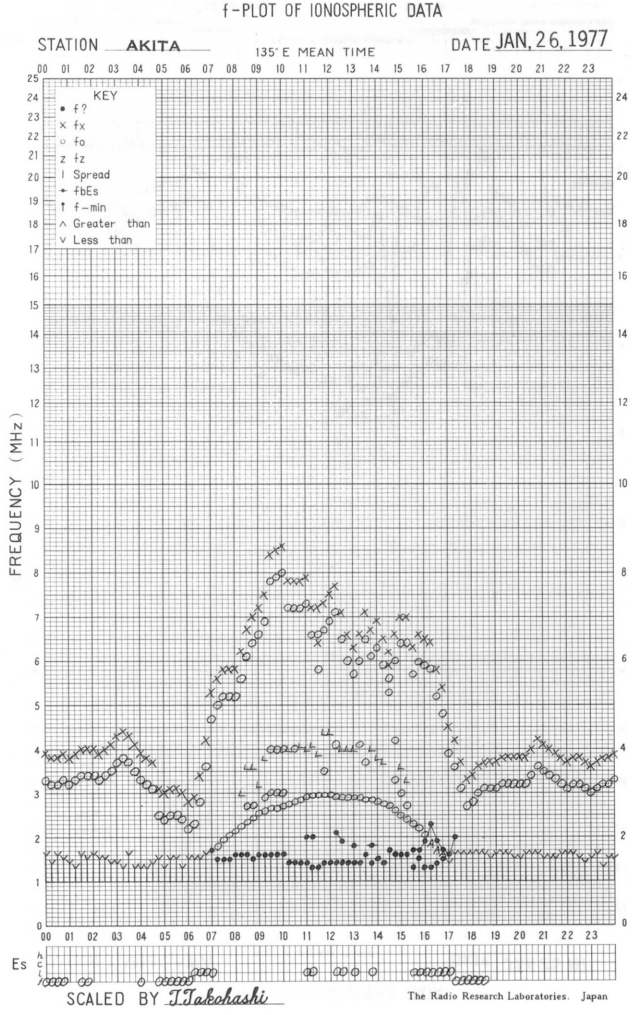
fo
fz
Spread
fbEs
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY T. oda
The Radio Research Laboratories. Japan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Spread
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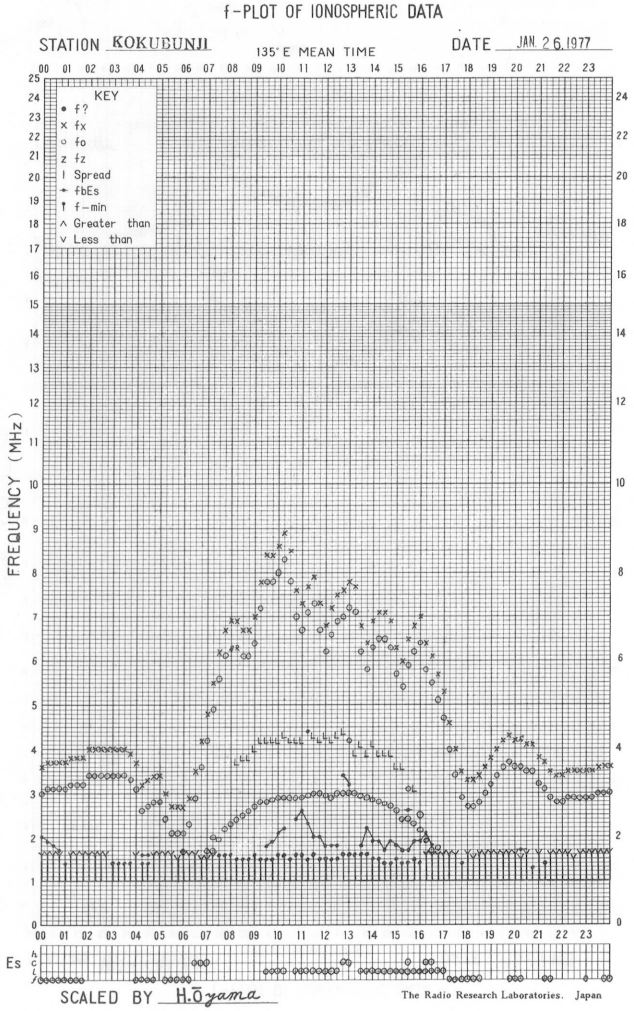
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan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○ fo
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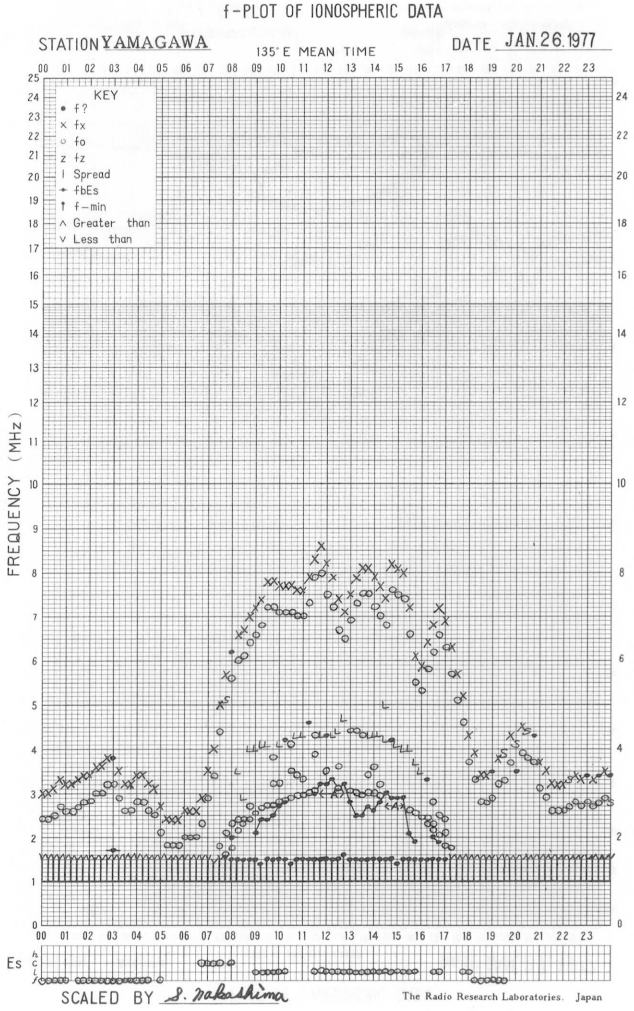
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY H.Ōyama
The Radio Research Laboratories. Japan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○ fo
z fz
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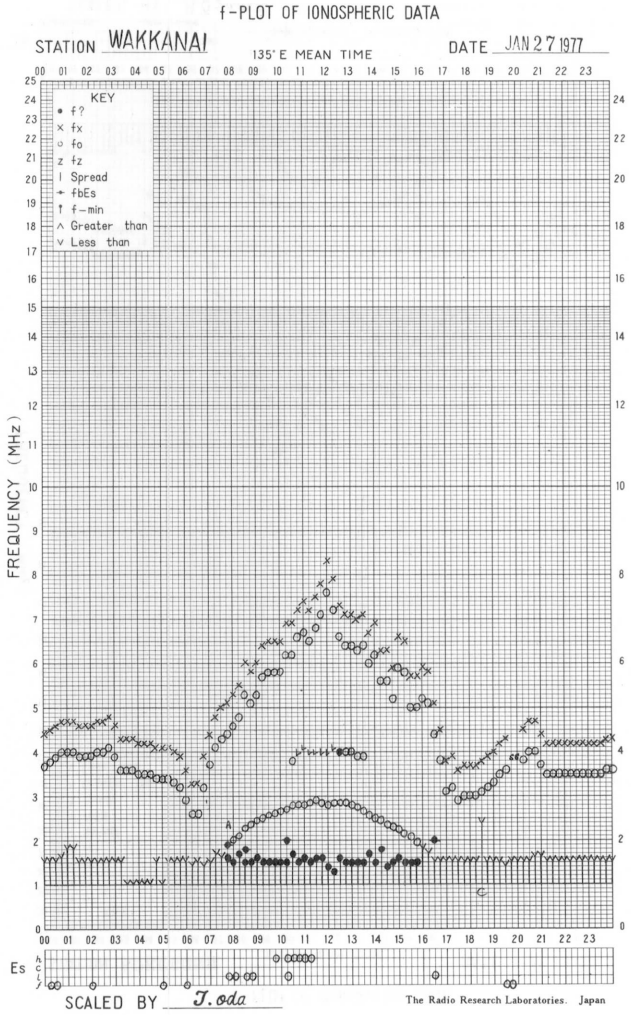
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
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DATE JAN 27 1977
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○ fo
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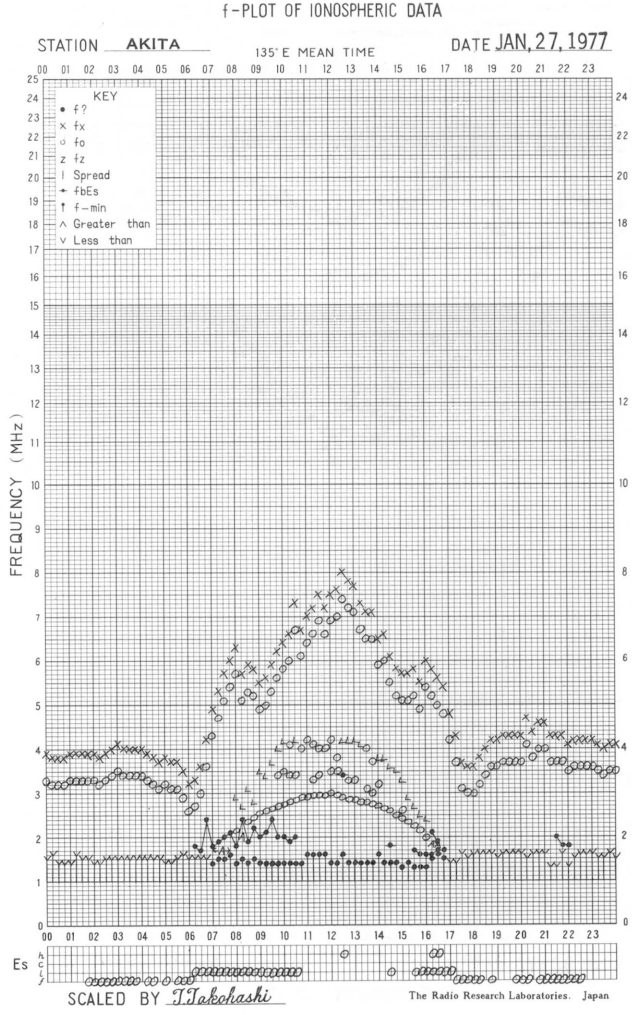
+ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY J. oda
The Radio Research Laboratories. Japan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○ fo
z fz
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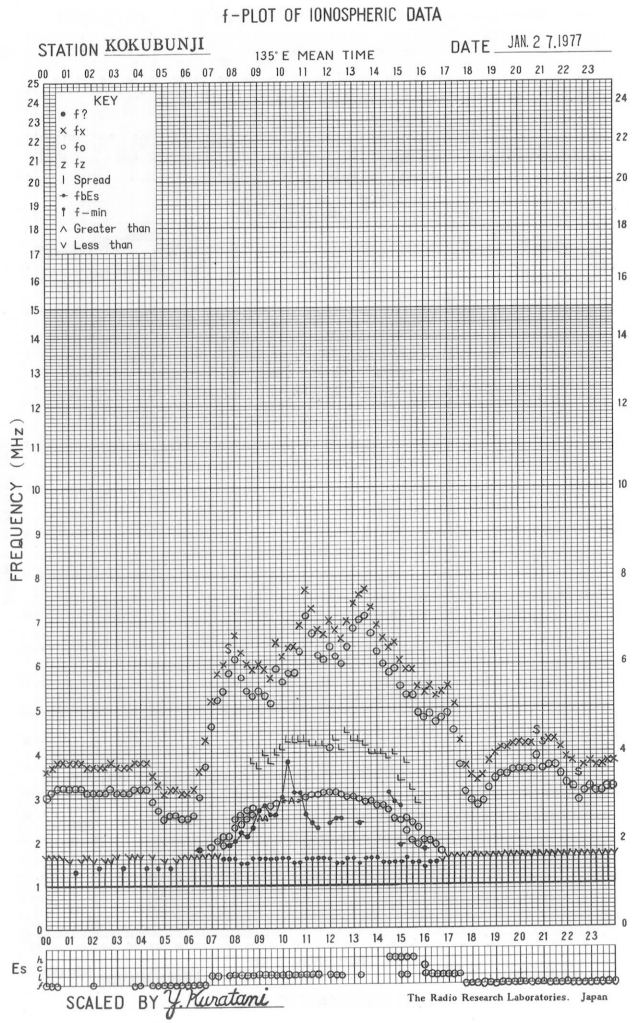
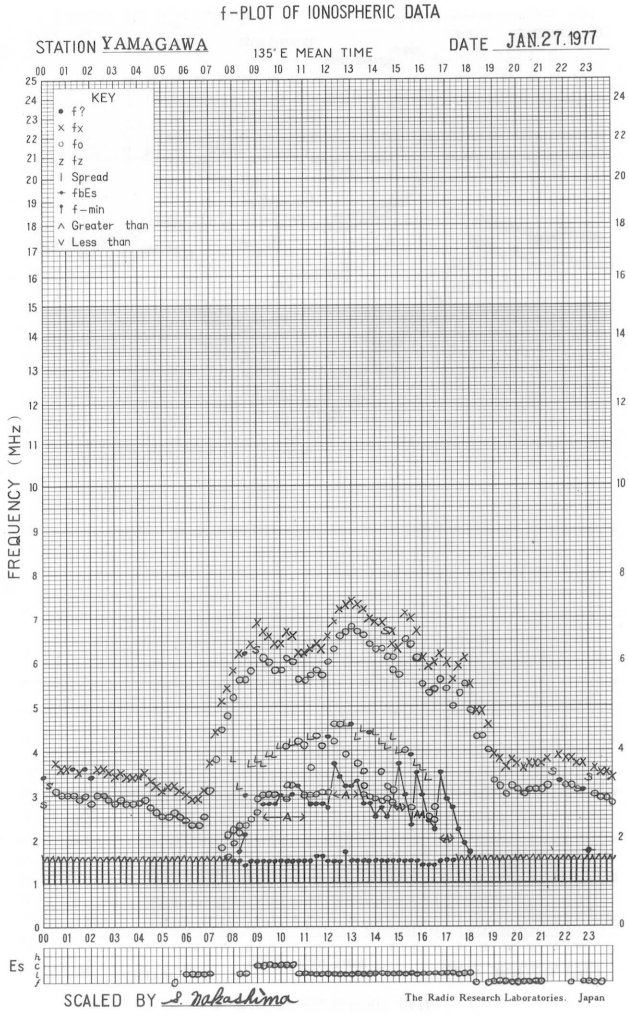
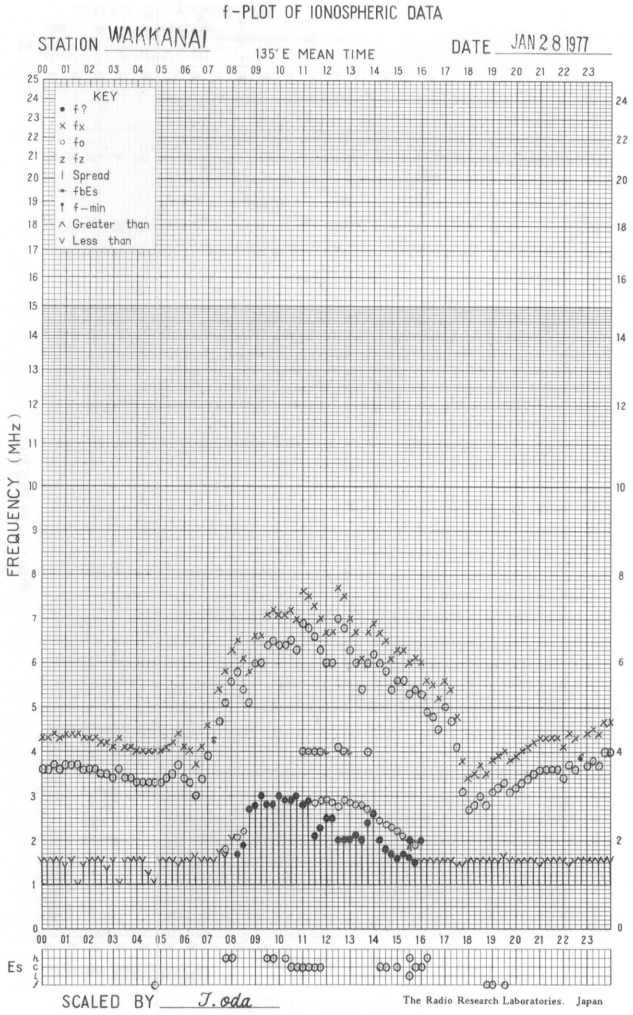
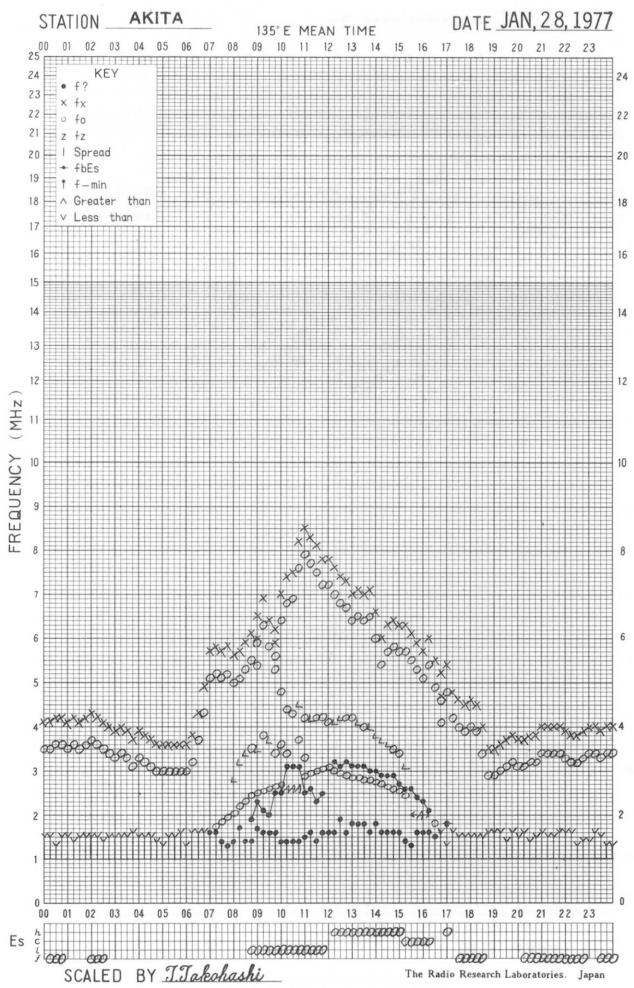
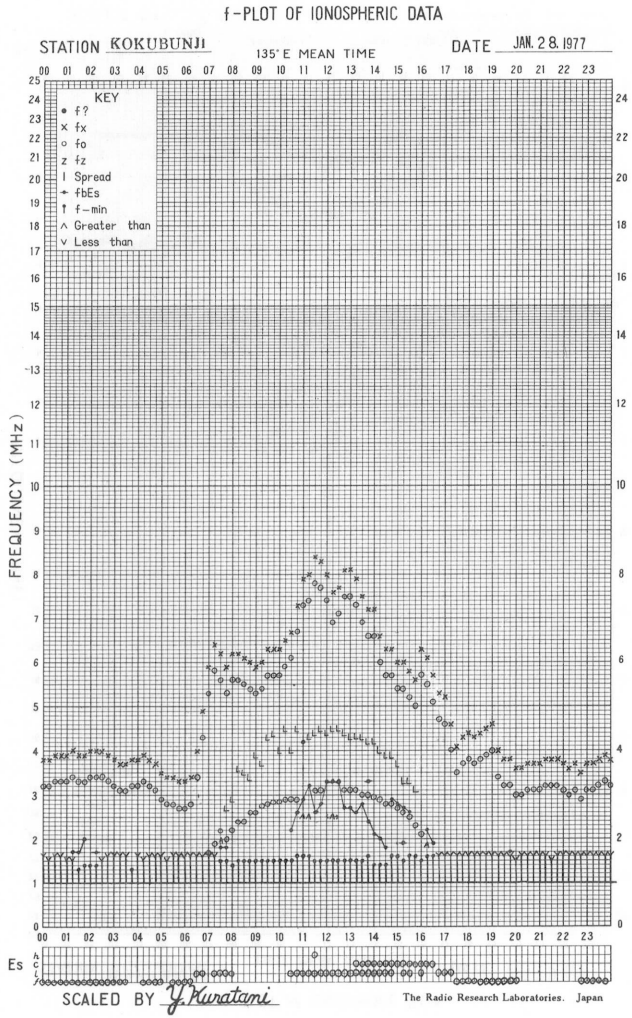
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan

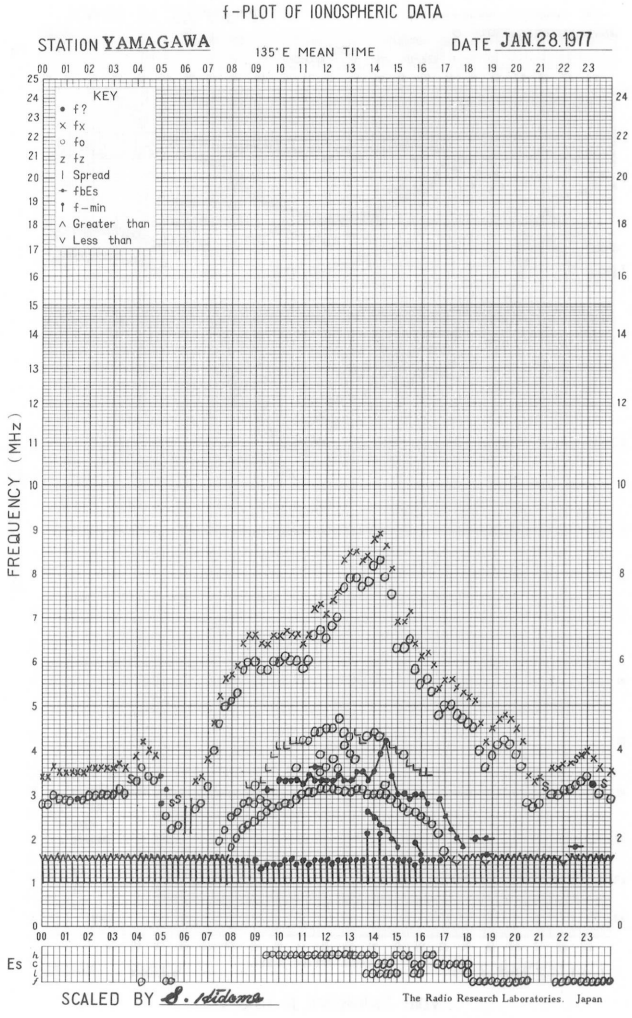

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135° E MEAN TIME
DATE JAN. 2 7. 1977
KEY
● f?
× fx
○ fo
z fz
| Spread
⊣ fbEs
† f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY Y. Kuratani
The Radio Research Laboratories. Japan

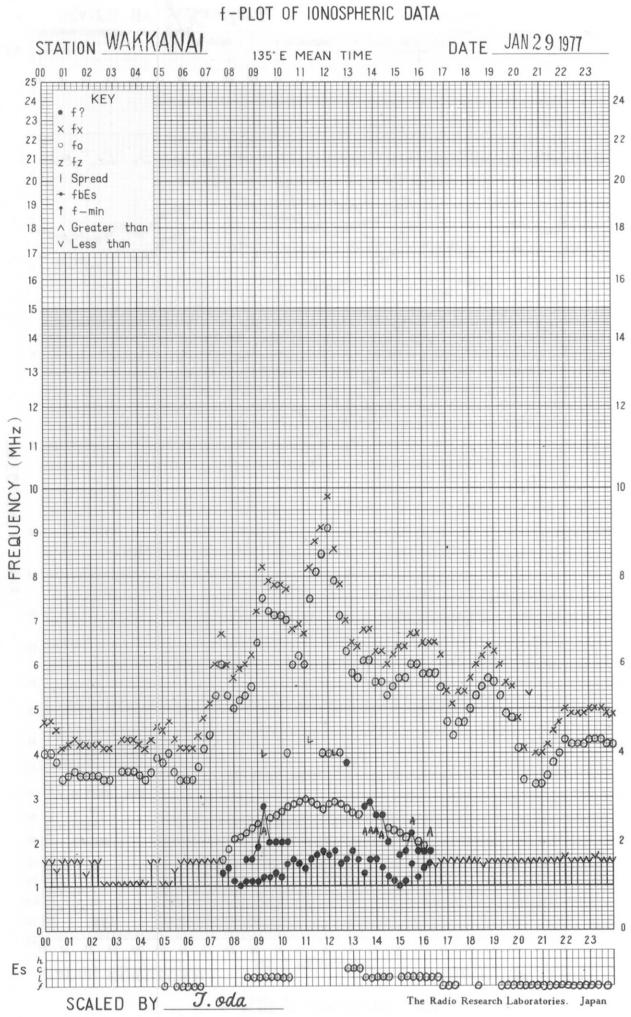

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135° E MEAN TIME
DATE JAN. 27. 1977
KEY
● f?
× fx
○ fo
z fz
| Spread
⊣ fbEs
† f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY S. Nakashima
The Radio Research Laboratories. Japan

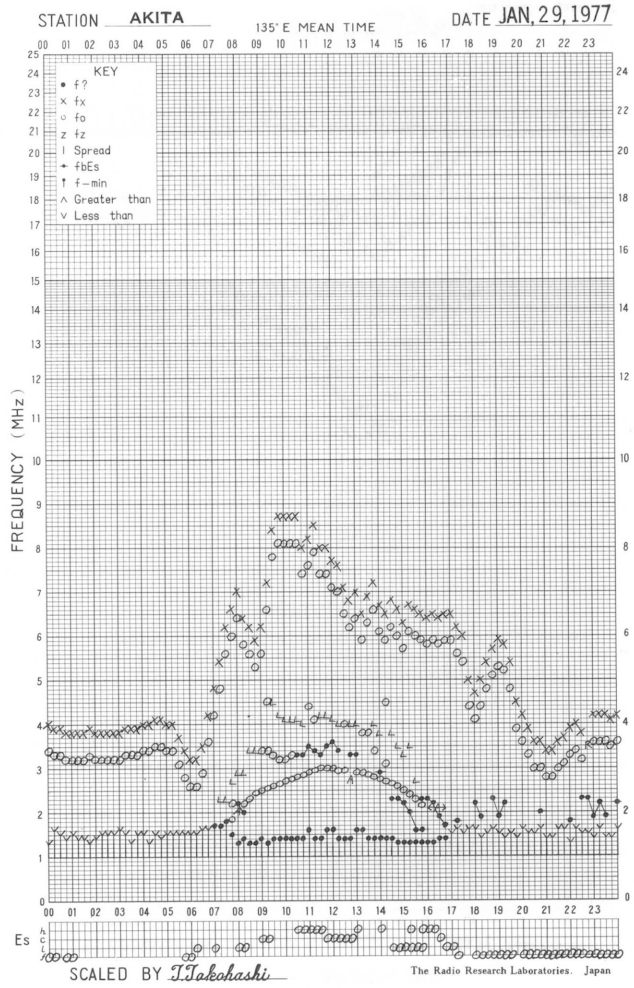

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE JAN 28 1977
KEY
• f?
× fx
○ fo
z fz
| Spread
+ fbEs
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY T. oda
The Radio Research Laboratories. Japan

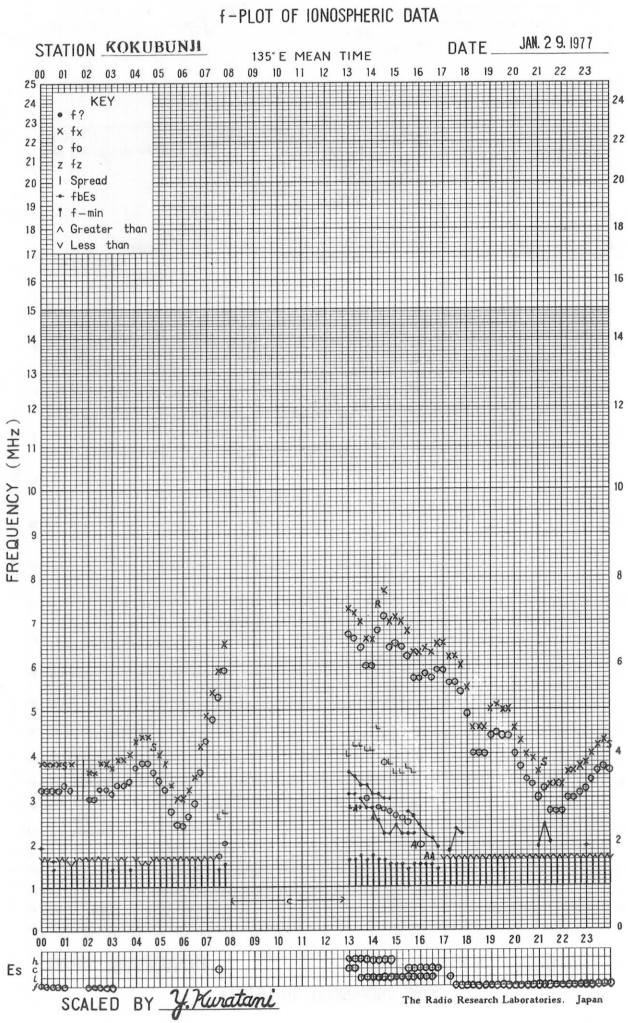

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE JAN, 28, 1977
KEY
• f?
× fx
○ fo
z fz
| Spread
+ fbEs
↑ f-min
∧ Greater than
∨ Less than
FREQUENCY (MHz)
Es
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan

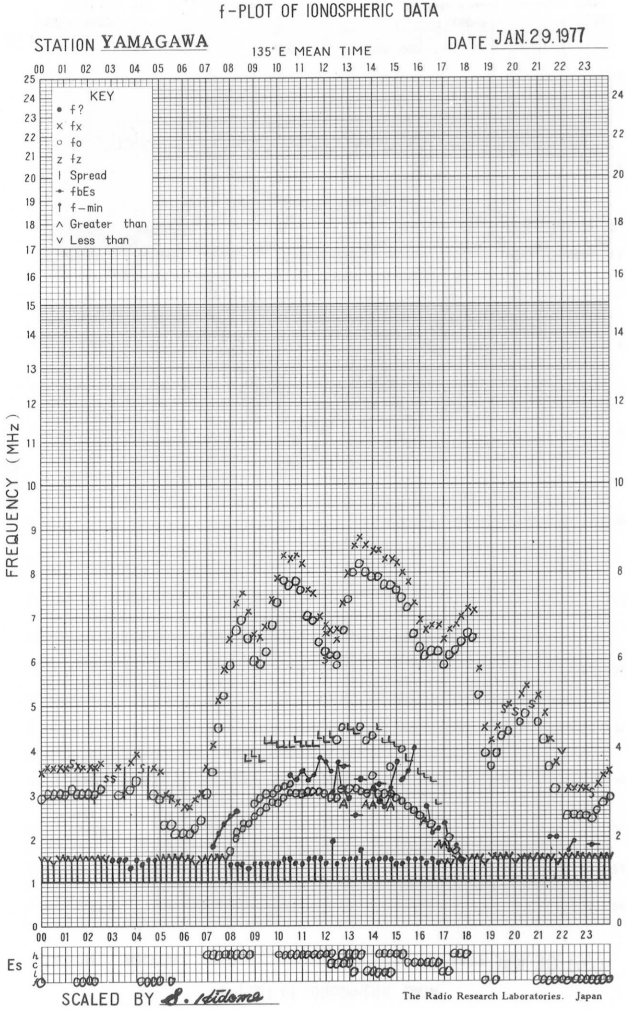

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135°E MEAN TIME
DATE JAN. 28. 1977
KEY
f?
fx
fo
fz
Spread
fbEs
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY Y. Kuratani
The Radio Research Laboratories. Japan

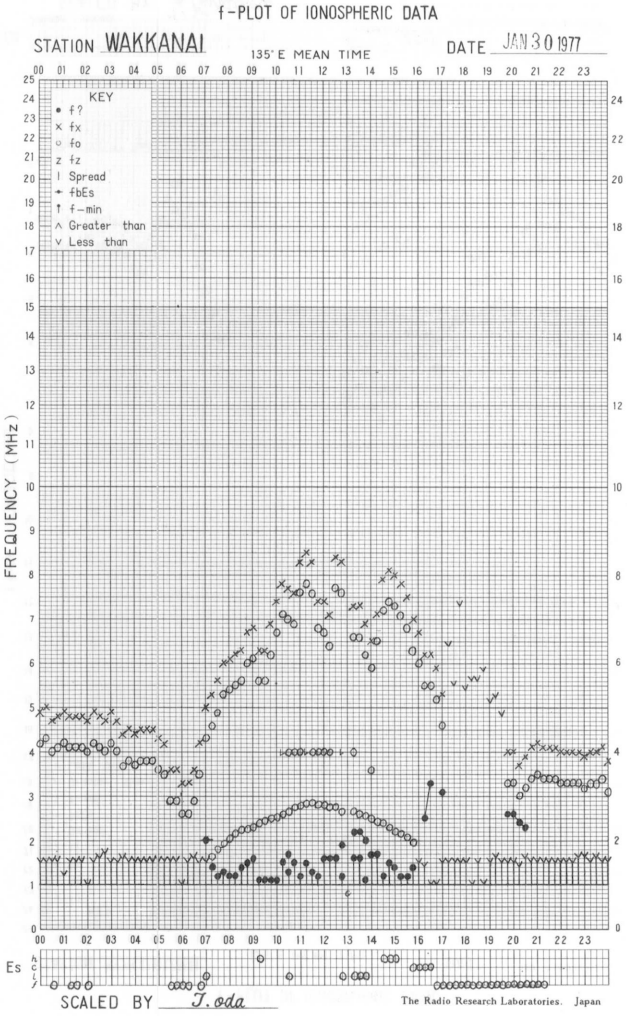

f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135°E MEAN TIME
DATE JAN. 28. 1977
KEY
f?
fx
fo
fz
Spread
fbEs
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY S. Iidoma
The Radio Research Laboratories. Japan

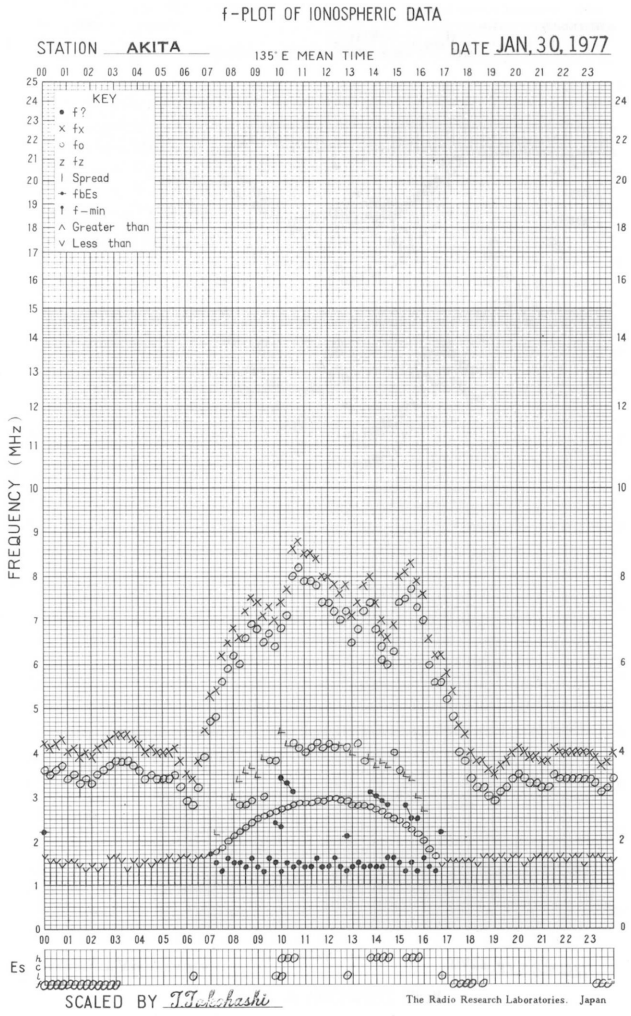

f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE JAN 29 1977
KEY
f?
fx
fo
fz
Spread
fbEs
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY T. oda
The Radio Research Laboratories. Japan

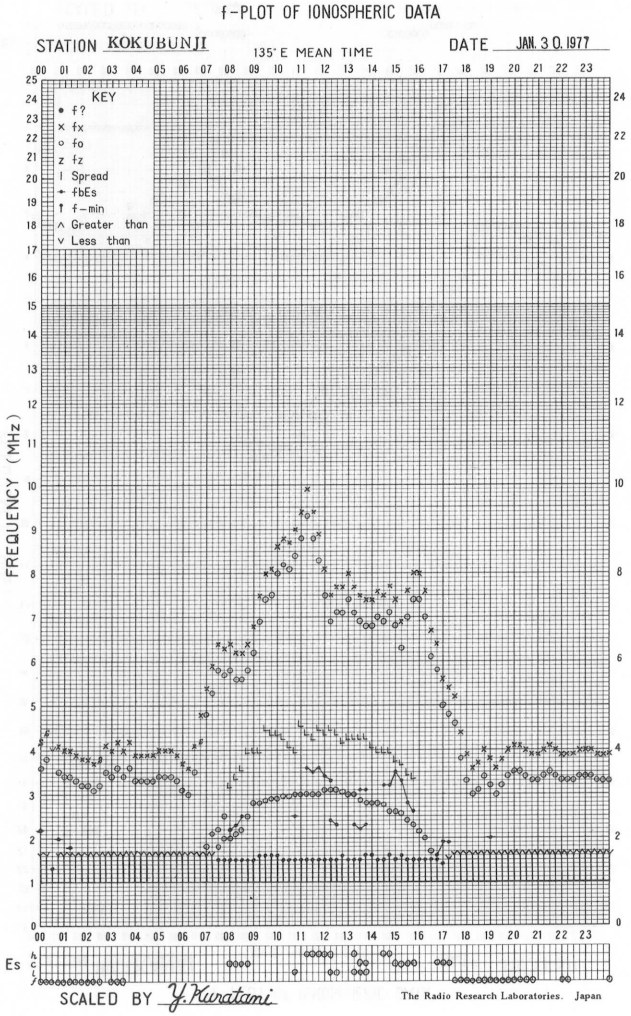

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE JAN, 29, 1977
KEY
f?
fx
fo
fz
Spread
fbEs
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY T. Takahashi
The Radio Research Laboratories. Japan

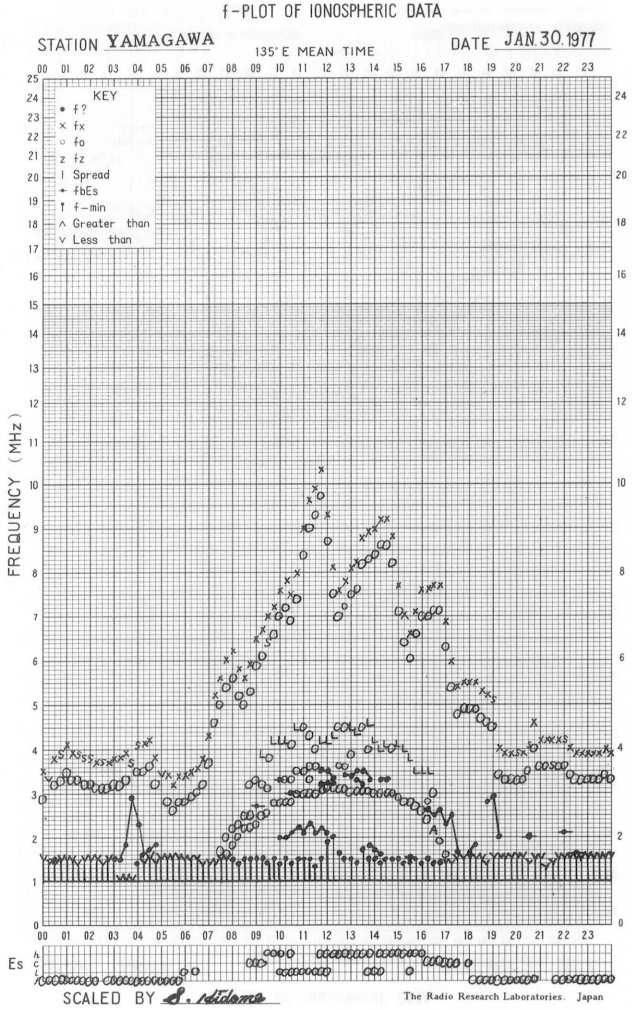

f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135° E MEAN TIME
DATE JAN. 29. 1977
KEY
• f?
× fx
○ fo
z fz
! Spread
⊸ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY Y. Kuratani
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135° E MEAN TIME
DATE JAN. 29. 1977
KEY
• f?
× fx
○ fo
z fz
! Spread
⊸ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY S. Iidaka
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION WAKKANAI
135°E MEAN TIME
DATE JAN 30 1977
KEY
f?
fx
fo
fz
Spread
fbEs
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY T. oda
The Radio Research Laboratories. Japan

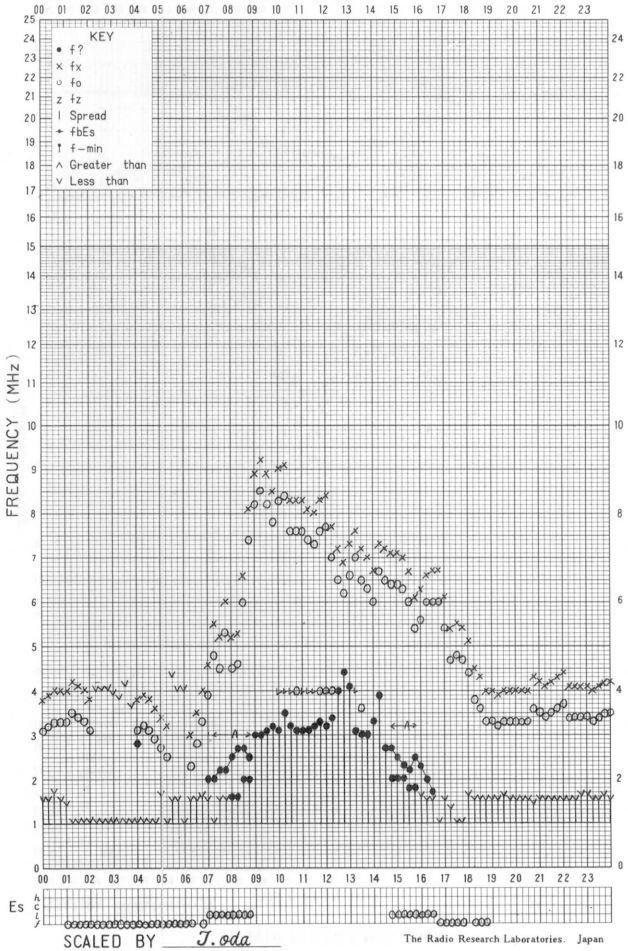

f-PLOT OF IONOSPHERIC DATA
STATION AKITA
135°E MEAN TIME
DATE JAN, 30, 1977
KEY
f?
fx
fo
fz
Spread
fbEs
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY T. Ichihashi
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135° E MEAN TIME
DATE JAN. 30. 1977
KEY
f?
fx
fo
fz
Spread
fbEs
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY Y. Kuratani
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135° E MEAN TIME
DATE JAN. 30. 1977
KEY
f?
fx
fo
fz
Spread
fbEs
f-min
Greater than
Less than
FREQUENCY (MHz)
Es
SCALED BY S. Ishizuka
The Radio Research Laboratories. Japan

f-PLOT OF IONOSPHERIC DATA

STATION WAKKANAI 135° E MEAN TIME DATE JAN 31 1977

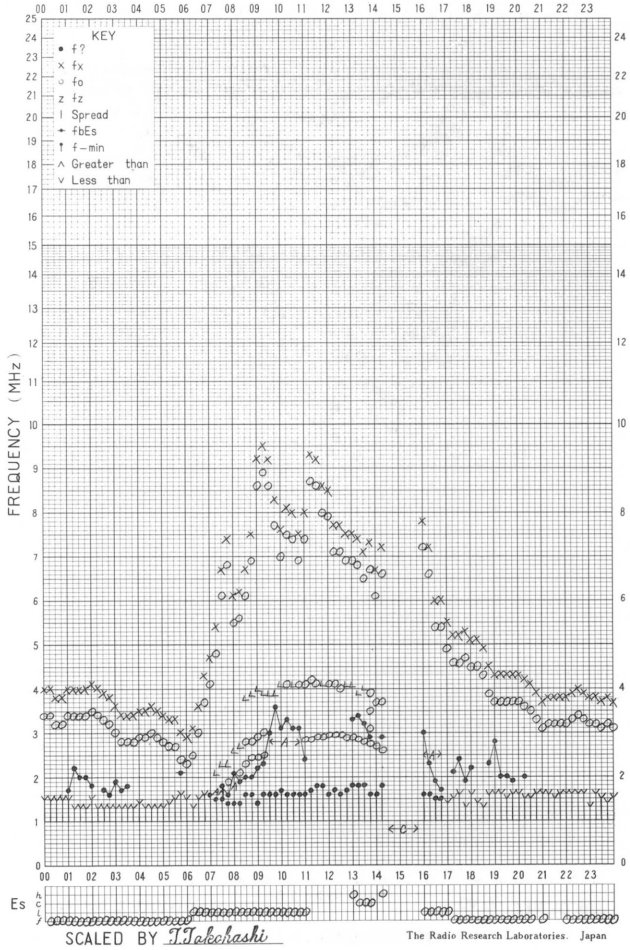


SCALED BY T. oda

The Radio Research Laboratories. Japan

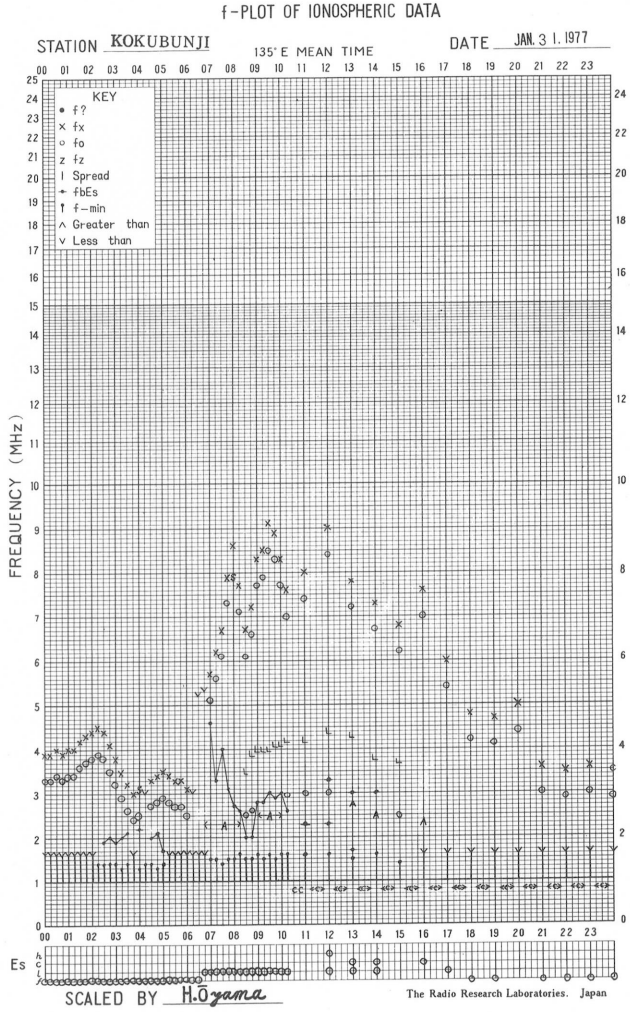
f-PLOT OF IONOSPHERIC DATA

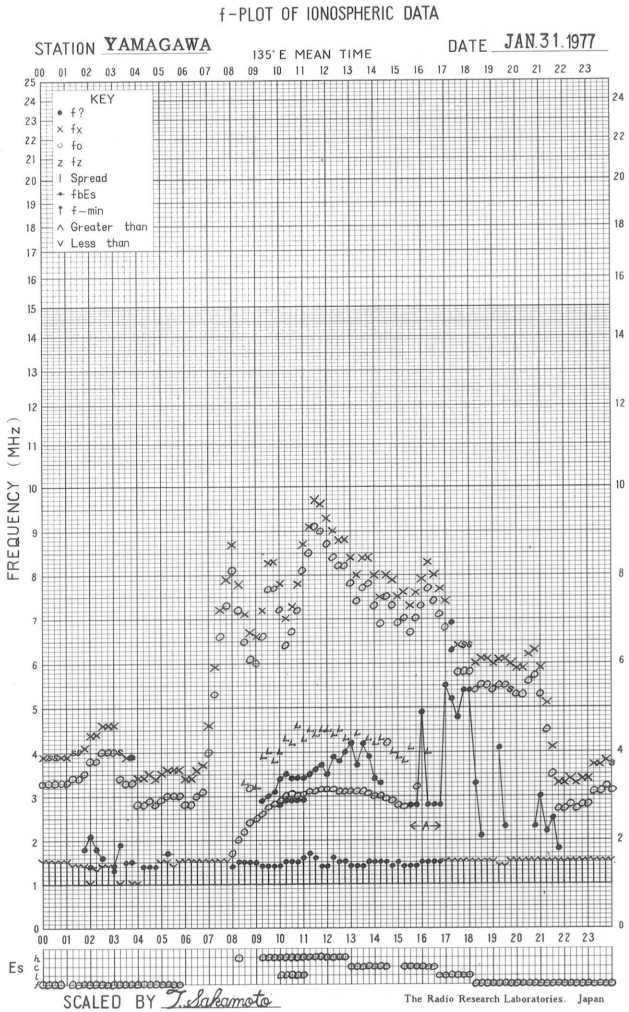
STATION AKITA 135° E MEAN TIME DATE JAN. 31, 1977



SCALED BY T. Takahashi

The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION KOKUBUNJI
135° E MEAN TIME
DATE JAN. 3 1. 1977
KEY
• f?
× fx
○ fo
z fz
| Spread
+ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY H.Ozama
The Radio Research Laboratories. Japan


f-PLOT OF IONOSPHERIC DATA
STATION YAMAGAWA
135° E MEAN TIME
DATE JAN.31.1977
KEY
• f?
× fx
○ fo
z fz
| Spread
+ fbEs
↑ f-min
^ Greater than
v Less than
FREQUENCY (MHz)
Es
SCALED BY T. Sakamoto
The Radio Research Laboratories. Japan

SOLAR RADIO EMISSION

HIRAISO (HIRA)

36.37N 140.62E

Hiraiso Branch, R.R.L.,
Nakaminato, Ibaraki,
311-12 JAPAN

January 1977

Single-frequency total flux observations at 200 MHz										
Flux density: 10^{-22} $Wm^{-2}Hz^{-1}$						Variability: 0 to 3				
UT	00-03	03-06	06-09	21-24	Day	00-03	03-06	06-09	21-24	Day
Date										
1	7	7	(7)	7	7	0	0	(0)	0	0
2	7	7	(6)	9	7	0	0	(0)	1	0
3	9	7	(7)	8	8	0	0	(0)	1	0
4	9	7	(8)	7	8	1	1	(1)	0	1
5	7	7	(8)	7	7	0	0	(0)	1	0
6	7	7	(7)	7	7	0	0	(1)	0	0
7	6	6	(6)	6	6	0	0	(0)	0	0
8	7	7	(6)	7	7	0	0	(0)	0	0
9	7	7	(7)	7	7	0	0	(0)	0	0
10	7	7	(6)	7	7	0	0	(0)	0	0
11	7	7	(7)	7	7	0	0	(0)	0	0
12	7	7	(7)	7	7	0	0	(0)	1	0
13	7	7	(7)	7	7	2	2	(3)	3	2
14	7	7	(7)	12	7	2	2	(2)	2	2
15	9	9	(9)	8	10	1	1	(1)	0	1
16	8	7	(10)	7	8	1	0	(1)	0	0
17	7	7	(7)	8	7	0	0	(0)	1	0
18	9	9	(8)	13	9	1	1	(1)	2	1
19	11	8	(8)	10	10	1	0	(0)	1	1
20	10	8	(10)	7	9	1	1	(1)	0	1
21	7	7	(7)	7	7	0	0	(0)	0	0
22	7	7	(7)	8	7	0	0	(0)	0	0
23	9	9	(8)	6	9	1	0	(0)	0	0
24	7	7	(7)	7	7	0	0	(0)	0	0
25	7	7	(7)	q	7	0	0	(0)	0	0
26	q	q	(q)	7	q	0	0	(0)	0	0
27	7	7	(7)	7	7	0	0	(0)	0	0
28	7	7	(7)	8	7	0	0	(0)	1	0
29	7	7	(8)	7	8	0	0	(0)	0	0
30	7	7	(7)	7	7	0	0	(0)	0	0
31	7	7	(8)	7	7	0	0	(0)	0	0

q: likely quiet.

SOLAR RADIO EMISSION

HIRAISO (HIRA)

36.37N 140.62E

Hiraiso Branch, R.R.L.,
Nakaminato, Ibaraki,
311-12 JAPAN

January 1977

Single-frequency total flux observations at 500 MHz

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

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

Note No observations during the following periods:

10th 0140 - 12th 0220
22nd 2150 - 23rd 0020

SOLAR RADIO EMISSION

HIRAISO (HIRA)

36.37N 140.62E

Hiraiso Branch, R.R.L.,
Nakaminato, Ibaraki,
311-12 JAPAN

January 1977

Outstanding Occurrences

(single-frequency observations)

Normal observing period: 2150 - 0740 (sunrise to sunset)

JAN. 1977	FREQ	STATION	TYPE	START TIME UT	TIME OF MAXIMUM UT	DUR MIN	FLUX DENSITY		POLARIZATION POSITION REMARKS
							PEAK	MEAN	
2	100	HIRA	45 C	0145.3	0146.2	1.0	850	200	WR
	200		45 C	0145.5	0146.1	1.2	170	15	WR
12	200		44 NS	2150E	2310	600D	40	15	SR
13	200		44 NS	2150E	2255	600D	70	40	SR
16	100		45 C	0639.4	0639.6	0.8	1100	500	WRWL
	200		45 C	0639.5	0639.6	0.2	100	60	WR
17	200		45 C	0308.5	0308.8	1.3	450	60	WR

RADIO PROPAGATION

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

JAN 1977 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	-10	ES -20	-16	-12	ES -6	ES -20	ES -18	ES -17	ES -25	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-21	-9	-10
2	-10	-15	ES -20	ES -18	ES -18	ES -17	ES -25	ES -15	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-10	-7
3	-9	ES -20	ES -20	ES -20	-9	-17	ES -20	ES -20	ES -11	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-10	-7
4	-12	ES -17	-12	ES -18	ES -20	ES -20	ES -18	ES -18	ES -25	ES -20	ES -20	ES -29	ES -14	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-20	-1	-2
5	ES -23	ES -20	ES -20	ES -20	ES -14	ES -16	ES -25	ES -20	ES -16	ES -20	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-8	-7	-4
6	-5	ES -20	ES -20	ES -23	ES -12	ES -17	ES -20	ES -23	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-15	ES -29	-12	-10	-5
7	-4	ES -20	ES -20	ES -20	ES -20	ES -20	ES -20	ES -20	ES -29	ES -25	ES -25	ES -29	ES -8	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-14	ES -29	ES -29	-4	-7
8	-8	ES -20	ES -25	ES -25	ES -18	ES -20	ES -20	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	7	-4
9	-5	ES -10	ES -4	ES -7	ES -18	ES -25	ES -18	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -25	1	-4
10	-12	ES -23	ES -23	ES -21	ES -7	ES -25	ES -20	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-7	-4	-11
11	ES -29	ES -16	ES -23	ES -17	ES -2	ES -23	ES -23	ES -16	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-21	ES -29	ES -29	-15	ES -29	-10	-5	-4
12	-8	-10	ES -23	ES -23	ES -20	ES -12	ES -20	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -23	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-20	-9	-4
13	-8	ES -29	ES -20	ES -20	ES -19	ES -17	ES -24	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-7	-3
14	-5	-9	ES -15	ES -16	ES -15	ES -15	ES -15	ES -29	ES -25	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-10	C
15	-7	C	-16	C	C	C	ES -20	ES -20	ES -29	ES -29	ES -29	ES -29	ES -25	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-18	-4	-7	-14	-17
16	-18	ES -20	ES -25	ES -20	ES -11	ES -29	ES -8	ES -15	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-11	-15
17	-23	-20	ES -29	C	ES -29	ES -29	ES -29	ES -23	ES -29	ES -29	ES -29	ES -29	ES -23	ES -15	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-7	-8
18	-17	-15	ES -25	ES -17	ES -20	ES -21	ES -20	ES -29	ES -29	ES -29	ES -20	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-2	-8
19	-4	ES -20	ES -15	ES -29	ES -29	ES -25	ES -25	ES -15	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-25	-1	2
20	-3	-5	ES -21	ES -23	ES -9	ES -20	ES -18	ES -20	ES -23	ES -28	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -25	2	-2
21	-9	-8	ES -21	ES -20	ES -20	ES -7	ES -10	ES -10	ES -14	ES -28	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-4	-11
22	-17	ES -15	ES -12	ES -12	ES -12	ES -11	ES -20	ES -9	ES -12	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-25	ES -29	ES -29	-20	-8	-11
23	-5	ES -20	ES -20	ES -20	ES -16	ES -20	ES -20	ES -23	ES -20	ES -20	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-14	-20	-9	-10
24	-7	ES -17	ES -29	ES -17	ES -8	ES -20	ES -23	ES -20	ES -11	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-18	-5	-3
25	-3	ES -10	ES -10	ES -11	ES -11	ES -11	ES -20	ES -15	ES -14	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-20	-11	-10
26	-10	ES -20	ES -20	ES -25	ES -15	ES -23	ES -20	C	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -25	-14	-6
27	-4	-8	ES -20	ES -17	ES -20	ES -20	ES -20	ES -20	ES -15	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-20	-11	-15
28	-15	ES -20	ES -29	ES -20	ES -20	ES -25	ES -20	ES -20	ES -20	ES -25	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-8	-10
29	-7	-6	-2	-11	ES -4	ES -17	ES -17	ES -20	ES -20	ES -20	ES -18	ES -29	ES -11	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-10	-3	-5
30	-9	-10	-8	ES -25	ES -4	ES -20	ES -20	ES -16	ES -20	ES -20	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-17	-10
31	ES -25	ES -23	ES -21	ES -20	ES -20	ES -25	ES -20	ES -14	ES -20	ES -25	ES -29	ES -29	ES -12	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-11	-20
CNT	31	30	31	29	30	30	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30
MED	-9	ES -18	ES -20	ES -20	ES -16	ES -20	ES -20	ES -20	ES -25	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	US -25	-8	-7
UD	-4	-8	ES -8	ES -11	ES -4	ES -11	ES -15	ES -14	ES -12	ES -20	ES -20	ES -29	ES -12	ES -28	ES -29	ES -29	ES -29	ES -29	ES -29	-15	ES -28	-8	1	-2
LD	ES -23	ES -23	ES -29	ES -25	ES -20	ES -25	ES -25	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-14	-15

RADIO PROPAGATION

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

JAN 1977 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	7	11	8	8	9	9	11	-4	-7	-3	-9	-18	ES -25	ES -29	ES -29	ES -29	ES -29	ES -29	-21	ES -29	ES -29	7	5	12
2	8	14	8	11	7	2	-1	-20	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-9	-20	6	12	9
3	6	17	11	6	10	10	-2	ES -20	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	3	ES -29	-20	8	-1	0
4	-3	10	3	7	7	2	-3	-11	-6	-17	ES -20	ES -29	ES -8	ES -29	ES -29	ES -29	ES -29	ES -29	-20	-10	ES -29	17	15	11
5	8	13	8	14	8	7	1	-11	ES -20	ES -20	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-5	-12	14	6	5
6	5	6	8	5	-10	13	1	ES -23	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-1	-9	-15	9	8	12
7	7	3	7	7	2	-11	-9	-5	-11	ES -25	ES -25	ES -29	ES -7	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	8	7	11
8	9	10	2	10	-20	ES -20	ES -20	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	7	9	10
9	14	7	10	9	ES 6	-1	2	ES -29	ES -29	ES -25	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-8	ES -29	-9	3	3	8
10	6	2	7	14	2	-7	-4	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-5	3	4	10
11	5	8	3	6	2	4	-4	ES -23	ES -28	ES -28	ES -29	ES -28	ES -28	ES -29	ES -29	ES -29	ES -28	ES -28	-18	ES -28	ES -29	7	15	10
12	8	6	8	12	16	-14	ES -23	ES -29	ES -29	ES -29	ES -29	ES -29	ES -9	ES -23	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-4	8	12
13	10	9	6	13	5	-19	ES -19	ES -28	ES -28	ES -28	ES -28	ES -28	ES -19	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	1	7	11
14	10	6	8	6	ES -15	ES -15	ES -25	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-3	3	C
15	8	C	10	C	10	10	-5	ES -20	ES -29	ES -18	ES -29	ES -29	-25	ES -29	ES -29	ES -28	ES -29	ES -28	ES -29	ES -29	-1	6	7	7
16	5	1	6	3	6	-20	ES -12	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	-1	6	3
17	7	1	-1	9	-12	ES -29	1	ES -29	ES -29	ES -29	ES -29	ES -20	ES -20	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-12	-8	3	4	4
18	5	7	6	10	8	8	1	ES -29	ES -29	ES -15	ES -21	ES -29	ES -10	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-20	16	10	11
19	1	13	4	4	-25	ES -25	ES -23	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	6	22	10	2
20	9	9	3	17	8	9	2	ES -12	ES -23	ES -21	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-20	-8	-4	9	3	C
21	6	6	6	8	10	-1	1	ES -14	-15	-14	ES -29	ES -28	ES -28	ES -29	ES -28	ES -28	ES -28	ES -28	ES -28	-25	-4	10	3	10
22	3	4	2	1	ES -3	4	7	ES -8	-8	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-4	8	11	8
23	3	8	12	6	-4	-2	ES -17	ES -20	ES -20	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-20	6	9	6
24	8	8	12	14	7	-4	-1	-11	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-11	10	8	11
25	13	12	4	5	7	-18	ES -20	ES -12	ES -21	ES -28	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-20	8	8	16
26	11	7	6	8	10	8	C	C	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-6	7	7	7
27	8	11	5	6	6	ES -14	ES -20	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-8	14	6	5
28	8	7	16	6	3	6	-4	ES -18	ES -25	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-11	3	11	6
29	13	11	11	7	12	13	-7	-8	ES -20	ES -25	ES -20	ES -29	ES -11	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	5	9	16	13
30	12	12	9	11	11	17	11	-8	ES -20	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-7	2	9	14	13
31	11	12	10	12	12	5	2	-7	-20	ES -20	ES -29	ES -28	ES -14	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	ES -28	7	9	12	11
CNT	31	30	31	30	31	31	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	29
MED	8	8	7	8	7	2	-4	ES -20	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-12	8	8	10
UD	13	13	12	14	12	13	7	-7	-8	ES -15	ES -20	ES -28	ES -9	ES -29	ES -29	ES -29	ES -29	ES -29	-8	-8	5	16	15	13
LD	3	2	2	4	ES -15	ES -20	ES -23	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	ES -29	-1	3	3

RADIO PROPAGATION

RADIO PROPAGATION QUALITY FIGURES

HIRAISO

Time in U.T.

Jan. 1977	Whole Day Figure	W W V 00 06 12 18 / 06 12 18 24	W W V H 00 06 12 18 / 06 12 18 24	Condition 00 06 12 18 / 06 12 18 24	Principal Geomagnetic Storms Start	End	Range
1	4+	4U S S 4	4 5U S 4	U U U U			
2	4o	4U S S 4U	4 4U S 4	U U U U			
3	4-	4U S S 4U	4 S S 3	N N N N			
4	4+	4U S S 4U	4 5U S 5	N N N N			
5	4o	S S S 4	4 4U S 4	N N N N			
6	4o	S S S 4	4 S S 4	N N N N			
7	4-	S S S 4U	3 4U S 4	N N N N			
8	4-	S S S 4U	3 S S 4U	N N N N			
9	4o	S S S 4U	4 S S 4	N N N N			
10	4o	S S S 4U	4U S S 4	N N N N			
11	4o	S S S 4	4 S S 4	N N N N			
12	3+	4U S S 4	3U S S 3U	N N N N			
13	4o	S S S 4U	4 S S 4U	N N N N			
14	3+	4U S S 4U	3U S S 3U	N N N N			
15	4o	4U S S 4	4 4U S 4U	N N N N			
16	3o	S S S 3U	3 S S 3	N N N N			
17	3+	3U S S 4U	3 S S 4	U U U U			
18	4-	3U S S 4U	4 S S 4	N N N N			
19	4o	S S S 5	3 S S 4	N N N N			
20	4+	5U S S 4U	4 S S 4	N N N N			
21	4+	4U S S 4U	4 5U S 4	N N N N			
22	4+	S S S 4	4 5U S 4	N N N N			
23	4o	S S S 4	4 S S 4	N N N N			
24	4o	S S S 4	4 4U S 4	N N N N			
25	4o	S S S 4	4 S S 4	N N N N			
26	4o	S S S 4U	4 C S 4	N N N N			
27	4-	4U S S 4U	3 S S 4	N N N N			
28	4o	S S S 4U	4 S S 4	N N N N			
29	5-	5U S S 5U	4 4U S 5	N N U U			
30	5-	5U S S 3U	5 5U S 5	N N U U	00.1	---	76
31	4+	S S S 4U	4 5U S 4	U U U U	---	23.0	

RADIO PROPAGATION

SUDDEN IONOSPHERIC DISTURBANCE

HIRAISO

No Sudden Ionospheric Disturbance was observed during January, 1977

RADIO PROPAGATION

Sudden Ionospheric Disturbance (SPA)

I N U B O

Jan.	S P A										
1977	Phase Advance (degrees)								Time (U.T.)		
Date	GBR	NAA	NPG	NWC	AL3	ND3	HA3	RE3	Start	End	Maximum
12		—	13	—		—	55		2157	2250	2208
13		—	27	—	17*	26	47	55	0114	0243	0131
13		—		—			10	19	0346	0415	0354
28		—		—				35	0724	0804	0732
								35	0622	0716	0628

IONOSPHERIC DATA IN JAPAN FOR JANUARY 1977
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