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ION. ANT.— 55

IONOSPHERIC DATA AT SYOWA STATION

(ANTARCTICA)

July 1990—December 1990

CONTENTS

COMMUNICATIONS RESEARCH LABORATORY

MINISTRY OF POSTS AND TELECOMMUNICATIONS

TOKYO, JAPAN

INTRODUCTION

This data book gives summarized results for vertical soundings of the ionosphere at Syowa Station. Antarctica in 1990. The observations were conducted by the Communications Research Laboratory under the sponsorship of the National Institute of Polar Research of Japan. The location of the station, specifications of the ionosonde and symbols used in this data book are as follows:

LOCATION OF SYOWA STATION

Geographic		Geomagnetic	
Latitude	Longitude	Latitude	Longitude
69° 00.4'S	39° 35.4'E	-69.8°	78.2°

SPECIFICATIONS OF THE IONOSONDE USED AT SYOWA STATION

Items	Specifications
Frequency Range	400 kHz-15 MHz
Transmitting Power	10 kW (peak value)
Duration of Sweep	20 sec
Transmitted Pulse Width	80 μ sec
Recurrence Frequency of Transmitted Pulse	50 Hz (by power source frequency)
Frequency Scale	every 1 MHz
Height Range	900 km
Height Scale	every 50 km
Total Receiver Gain	120 dB
Recording Method	35 mm film and video fax for ionograms
Power Supply	1000 volt AC, 2.0 kVA
Transmitting Antenna and Receiving Antenna	30 m height vertical delta terminated by 600 Ω respectively

DESCRIPTION

a. 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)"

b. Ionograms data are printed in the quarter hourly of every days.

c. Characteristics of Ionosphere

fxI	Top frequency of spread F traces or oblique traces.
foF2	Ordinary wave critical frequency for the F2 layer.
fEs(ftEs)	Top frequency of Es layer as reflected overhead.
fmin	Lowest frequency showing vertical ionospheric reflection.
h'F	Minimum virtual height of the ordinary wave F trace as a whole.

Symbols

(1) 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.

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

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 made accurately.

H Measurement influenced by, or impossible because of, the presence of stratification.

K Presence of particle E layer.

L Measurement influenced by 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 perturbation of parameters-Presence of polar spur 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.

D Greater than.

E Less than.

J Ordinary component characteristic deduced from the extraordinary component.

M Mode interpretation uncertain.

O Extraordinary component characteristic deduced from the ordinary component.

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.

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 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.

IONOSPHERIC DATA STATION SHOWA ST.

JUL. 1990 FXI (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	51	S	A	A	32	42	47	60	53	44	X 61	B	B	O X 91	X 72	X 53	60	36	B	B	B	A	A
2	A	A	A	B	F	B	B	B	B	B	A	S	O X 86	96	105	81	80	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	X 48	67	X 76	O X 86	X 90	76	O X 76	48	A	B	B	B	B	B
10	A	S	X 27	52	45	46	50	51	51	B	O X 42	65	O X 82	X 111	O X 98	O X 100	O X 96	X 92	66	B	B	B	B	A
11	A	A	B	56	56	B	B	B	B	32	43	B	72	O X 96	81	X 73	X 70	66	S	28	B	B	A	B
12	A	42	A	A	A	A	A	A	B	B	B	B	B	B	O X 96	B	B	B	S	B	S	A	B	B
13	A	A	A	A	B	A	B	B	A	B	B	B	B	C	B	O X 75	O X 62	O X 61	51	B	B	B	A	B
14	A	A	A	A	A	A	A	34	33	38	X 54	X 71	X 76	O X 96	O X 86	X 86	71	B	B	B	B	B	B	B
15	A	A	A	A	A	B	B	A	B	B	B	O X 51	62	80	96	80	X 70	72	B	B	B	B	A	A
16	A	A	A	B	B	A	A	34	B	B	51	68	X 76	O X 86	X 91	71	62	66	S	B	B	B	B	B
17	S	58	56	O X 56	65	62	66	70	A	B	51	71	88	73	84	76	56	56	36	O X 26	O X 24	B	B	A
18	A	66	B	A	A	A	A	43	53	46	52	X 64	80	81	X 86	X 80	76	55	O X 44	A	B	A	A	A
19	A	A	A	A	27	31	X 33	A	B	B	56	80	80	X 81	X 76	O X 76	B	B	100	B	B	A	A	A
20	A	A	A	A	A	A	S	F	B	B	B	B	B	B	B	70	71	B	B	B	A	A	A	B
21	A	B	A	A	S	B	A	A	32	41	50	X 61	X 74	O X 76	B	O X 76	65	X 74	60	S	B	A	A	32
22	A	A	A	A	B	A	A	A	46	51	59	B	X 80	76	X 88	84	X 62	X 71	X 61	33	B	B	B	B
23	A	A	A	A	A	36	35	A	F	51	60	X 70	71	O X 82	X 90	X 82	58	68	X 54	S	B	B	B	A
24	A	A	A	A	O X 38	30	31	31	A	B	56	82	90	80	94	71	70	58	56	30	A	B	A	A
25	B	A	A	A	X 26	O X 55	58	58	60	70	71	X 73	O X 84	O X 96	90	X 86	O X 75	50	50	X 32	S	B	B	B
26	B	B	B	36	42	48	57	66	A	42	70	71	X 85	O X 100	O X 97	O X 87	62	48	X 57	32	A	A	B	B
27	A	76	A	A	A	43	56	60	44	42	52	76	80	O X 91	101	91	71	53	61	36	B	B	A	A
28	A	A	A	A	A	A	48	52	48	B	B	B	41	B	91	70	X 76	B	B	A	S	A	A	A
29	A	A	A	B	A	B	B	A	A	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A
30	A	A	A	A	A	A	A	A	A	36	X 53	B	O X 86	X 76	B	F	70	X 55	X 43	B	B	B	B	A
31	A	A	A	60	A	A	A	A	X 58	53	X 54	B	B	O X 101	X 100	X 90	X 95	90	X 70	B	B	B	B	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		5	2	5	7	9	10	11	10	12	18	15	19	19	20	22	22	18	15	7	1			1
MED		58	42	56	42	43	49	51	50	44	52	70	X 80	O X 86	X 91	X 78	70	60	56	32	O X 24			32
U Q		71		58	56	52	57	60	58	52	56	73	X 85	O X 96	X 96	X 86	X 76	X 71	61	33				
L Q		46		44	27	32	35	34	44	40	50	X 64	74	80	X 87	73	62	55	44	28				

IONOSPHERIC DATA STATION SHOWA ST.

JUL. 1990 FOF2 (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT. 69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	F 45	S	A	A	F 26	F 32	F	F 54	F	F 38	55	B	B	U R 85	66	47	F 45	F 30	B	B	B	A	A
2	A	A	A	B	F	B	B	B	B	B	A	S	80	F 90	F 99	F 75	F 74	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	42	F 61	70	U R 80	J S 84	F 70	U R 70	F 42	A	B	B	B	B	B
10	A	S	21	F	F 39	F 40	F 44	F 45	F 45	B	36	F 55	76	95	92	94	D R 90	86	F 60	B	B	B	B	A
11	A	A	B	F 50	F 50	B	B	B	B	F 26	F 37	B	F 66	90	F 75	67	64	F 60	S	F 22	B	B	A	B
12	A	F 36	A	A	A	A	A	A	B	B	B	B	B	B	D R 90	B	B	B	S	B	S	A	B	B
13	A	A	A	A	B	A	B	B	A	B	B	B	B	C	B	69	56	U S 55	F 45	B	B	B	A	B
14	A	A	A	A	A	A	A	F 28	F 27	F 32	48	65	70	D R 90	80	80	F 65	B	B	B	B	B	B	B
15	A	A	A	A	A	B	B	A	B	B	B	45	F 56	F 74	F 90	F 74	64	F	B	B	B	B	A	A
16	A	A	A	B	B	A	A	F 28	B	B	F 45	F 62	70	U R 80	R 85	F 64	F 56	F 60	S	B	B	B	B	B
17	S	F	F 50	U S 50	F 59	F 56	F 60	F	A	B	F 45	F 60	F 82	F 60	F 78	F 70	F 50	F 50	F 30	R 20	R 18	B	B	A
18	A	F 60	B	A	A	A	A	F 37	F 47	F 40	F 46	58	F 74	F 75	81	74	F 70	F 49	38	A	B	A	A	A
19	A	A	A	A	F 21	F 25	27	A	B	B	F 50	F 70	F 70	75	70	U R 70	B	B	F 90	B	B	A	A	A
20	A	A	A	A	A	A	S	F	B	B	B	B	B	B	B	F 60	F 65	B	B	B	A	A	A	B
21	A	B	A	A	S	B	A	A	F 22	F 25	F 44	55	68	70	B	R 70	F 59	68	F 49	S	B	A	A	F 26
22	A	A	A	A	B	A	A	A	F 40	F 45	F 53	B	74	F 70	82	78	56	65	55	F 27	B	B	B	B
23	A	A	A	A	A	F 30	F 29	A	F	F 45	F 50	64	F 65	76	84	76	F 52	F 62	J S 48	S	B	B	B	A
24	A	A	A	A	32	F 24	F 25	F 25	A	B	F 50	F 72	F 84	F 72	F 88	F 60	F 60	F 50	F 50	F 24	A	B	A	A
25	B	A	A	A	20	R 49	F	F 48	F 50	F 64	F 65	67	78	89	F 84	80	69	F 44	F 44	28	S	B	B	B
26	B	B	B	F 30	F	F	F 51	F 60	A	F 36	F 64	F 65	79	R 94	91	81	F 56	F 42	51	F 26	A	A	B	B
27	A	F 70	A	A	A	F 37	F 50	F 46	F 38	F 36	F 46	F 70	F 74	U R 85	F 95	F 85	F 65	F 47	F 55	F 30	B	B	A	A
28	A	A	A	A	A	A	F 42	F 46	F 42	B	B	B	F 35	B	F 85	F 64	70	B	B	A	S	A	A	A
29	A	A	A	B	A	B	B	A	A	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A
30	A	A	A	A	A	A	A	A	A	F 30	J S 47	B	80	70	B	F	F	R 49	37	B	B	B	B	A
31	A	A	A	F 50	A	A	A	A	52	F 47	48	B	B	R 95	R 94	84	89	F 84	64	B	B	B	B	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	2	4	6	8	9	9	10	11	18	15	19	19	20	22	21	17	15	7	1			1
MED		F 52	36	F 50	F 36	F 34	F 42	F 45	F 44	F 36	F 46	F 62	74	80	85	72	F 64	F 50	F 49	F 26	R 18			F 26
U Q		F 65		50	F 50	F 44	F 50	F 47	F 50	F 45	F 50	F 67	79	R 90	90	80	70	64	F 55	28				
L Q		F 40		F 40	21	F 26	F 28	F 28	F 38	F 30	F 44	55	F 68	F 72	82	F 67	56	F 46	38	22				

IONOSPHERIC DATA STATION SHOWA ST.

JUL. 1990 FES (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B 45	35 65	30 70	37 B	31 25	15 B	52 B	22 B	E B 18 B	E B 14 B	E B 16	E B 24 E 30	B	B	E B 51 E 30	E B 29 E 15	E B 25 E 15	E B 20 C	E B 20 C	B C	B C	B C	51 C	36 C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	E B 16	E B 19	E B 17	E B 20	35	18	E B 12	E B 18	25	B	B	B	B	B
10	16	E B 16	20	45	30	41	30	36	31	B	21	E B 24	21	20	16	12	E B 19	E B 20	E B 23	B	B	B	B	18
11	70	30	B	16	32	B	B	B	B	18	E B 15	B	E B 27	E B 21	E B 20	45	E B 20	41	E B 30	E B 15	B	B	27	B
12	35	26	130	46	52	57	66	69	B	B	B	B	B	B	E B 60	B	B	B	E B 30	B	E B 15	18	B	B
13	58	57	70	72	B	100	B	B	46	B	B	B	B	C	B	E B 55	E B 30	E B 30	E B 20	B	B	B	30	B
14	40	40	36	31	49	43	31	E B 22	E B 18	E B 16	E B 17	20	E B 21	E B 19	E B 18	E B 20	E B 16	B	B	B	B	B	B	B
15	41	51	70	31	61	B	B	62	B	B	B	E B 35	E B 35	E B 25	E B 29	E B 23	E B 23	E B 30	B	B	B	B	32	40
16	41	41	44	B	B	47	45	32	B	B	23	20	E B 19	E B 20	21	E B 14	E B 16	E B 24	E B 16	B	B	B	B	B
17	27	18	18	19	18	16	11	E B 13	33	B	33	E B 21	28	25	E B 19	16	E B 13	E B 14	E B 12	E B 13	E B 14	B	B	31
18	40	70	B	37	62	40	63	47	31	18	16	E B 17	E B 30	E B 21	22	20	E B 12	E B 13	E B 12	16	B	27	28	31
19	35	31	27	45	27	27	56	55	B	B	E B 30	27	E B 24	E B 22	E B 17	E B 50	B	B	E B 40	B	B	38	30	36
20	34	90	70	40	45	40	32	31	B	B	B	B	B	B	B	E B 35	E B 50	B	B	B	25	31	36	B
21	41	B	46	41	E B 30	B	32	32	19	E B 12	E B 16	E B 23	28	E B 51	B	E B 52	E B 26	E B 40	27	E B 15	B	31	36	33
22	41	51	37	46	B	51	41	46	40	27	18	B	E B 26	E B 30	31	E B 20	E B 18	E B 10	E B 20	E B 15	B	B	B	B
23	32	56	39	48	26	35	31	31	40	36	E B 15	E B 18	E B 20	31	26	E B 14	E B 20	E B 11	E B 14	40	B	B	B	31
24	37	40	32	30	25	14	36	E B 15	31	B	40	E B 24	E B 23	E B 41	E B 19	16	31	26	25	32	55	B	50	25
25	B	60	105	43	31	37	41	38	25	19	21	E B 30	E B 24	E B 23	33	33	28	38	E B 45	E B 12	E B 14	B	B	B
26	B	B	B	19	32	36	70	70	25	E B 20	31	27	E B 24	E B 22	E B 22	41	32	16	34	31	58	44	B	B
27	62	40	36	46	41	51	44	E B 18	E B 18	E B 23	E B 30	E B 24	E B 22	E B 49	E B 31	E B 50	E B 24	E B 20	E B 14	E B 14	B	B	29	90
28	44	40	41	33	36	47	36	46	34	B	B	B	E B 22	B	E B 30	E B 30	E B 31	B	B	70	41	41	47	60
29	61	34	45	B	34	B	B	72	45	B	B	B	B	B	B	B	B	B	B	B	45	49	45	40
30	51	71	41	41	31	35	35	33	21	E B 16	E B 25	B	E B 38	E B 30	B	E B 50	E B 22	E B 29	E B 15	B	B	B	B	35
31	34	70	60	34	41	41	31	46	33	29	E B 24	B	B	E B 60	E B 31	E B 24	E B 20	E B 24	E B 20	B	B	B	B	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	21	22	21	21	21	19	19	21	17	12	19	16	19	19	20	23	22	18	19	11	8	8	12	13
MED	41	40	41	40	32	40	36	36	31	18	E B 21	E B 24	E B 24	E B 25	E B 24	E B 24	E B 21	E B 22	E B 20	E B 15	33	34	34	35
U Q	48	60	70	46	43	47	52	51	37	25	30	E B 27	E B 28	E B 31	31	E B 45	28	E B 30	E B 30	32	50	42	46	40
L Q	34	34	34	31	28	35	31	E B 26	E B 20	E B 16	E B 16	E B 20	E B 21	E B 21	E B 19	16	E B 16	E B 16	E B 15	E B 14	E B 14	29	30	31

JUL. 1990 FES (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

JUL. 1990 FMIN (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B 14	10	8	12	11	11	15	12	18	14	16	24	B 30	B 30	51	29	25	20	20	B	B	B	12	10
2	14	14	30	B	15	B	B	B	B	B	25	30	30	30	18	15	15	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	16	19	17	20	13	12	12	18	12	B	B	B	B	B
10	12	16	10	9	9	10	10	10	10	B	16	24	13	14	13	10	19	20	23	B	B	B	B	10
11	21	20	B	11	20	B	B	B	B	13	15	B	27	21	20	20	20	14	30	15	B	B	9	B
12	23	13	15	15	23	24	24	24	B	B	B	B	B	B	60	B	B	B	30	B	15	10	B	B
13	18	17	10	24	B	41	B	B	25	B	B	B	B	C	B	55	30	30	20	B	B	B	15	B
14	19	20	20	24	30	24	20	22	18	16	17	18	20	19	18	20	16	B	B	B	B	B	B	B
15	25	20	25	22	18	B	B	24	B	B	B	35	35	25	29	23	23	30	B	B	B	B	9	10
16	10	17	15	B	B	17	17	14	B	B	19	15	19	20	14	14	16	24	16	B	B	B	B	B
17	9	13	13	10	10	10	9	13	14	B	20	21	12	15	19	10	13	14	12	13	14	B	B	8
18	9	10	B	18	17	30	24	12	9	10	12	17	30	21	14	13	12	13	12	10	B	9	9	11
19	9	9	9	9	10	10	13	19	B	B	30	20	24	22	17	50	B	B	40	B	B	9	9	15
20	10	13	30	10	15	14	10	13	B	B	B	B	B	B	B	35	50	B	B	B	9	8	20	B
21	13	B	17	20	30	B	20	18	10	12	16	23	19	51	B	52	26	40	10	15	B	10	9	11
22	20	18	22	14	B	19	21	14	12	10	12	B	26	30	18	20	18	10	20	15	B	B	B	B
23	10	10	13	12	14	15	12	20	15	14	15	18	20	19	14	14	20	11	14	10	B	B	B	8
24	9	14	9	12	13	10	9	15	15	B	24	24	23	41	19	11	11	10	11	9	10	B	10	9
25	B	21	11	10	9	10	10	10	13	9	13	30	24	23	20	13	14	14	45	12	14	B	B	B
26	B	B	B	14	15	20	17	15	15	20	17	21	24	22	22	11	10	11	12	10	10	10	B	B
27	15	20	21	24	23	16	14	18	18	23	30	24	22	49	31	50	24	20	14	14	B	B	19	20
28	18	21	15	20	29	23	18	14	11	B	B	B	22	B	30	30	31	B	B	25	22	23	18	25
29	24	19	20	B	22	B	B	30	30	B	B	B	B	B	B	B	B	B	B	B	15	15	16	18
30	14	34	24	16	19	14	14	13	13	16	25	B	38	30	B	50	22	29	15	B	B	B	B	12
31	13	22	21	14	15	22	19	18	13	13	24	B	B	60	31	24	20	24	20	B	B	B	B	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	24	24	24	24	24	24	24	24	24	24	25	25	25	24	25	25	25	24	24	24	24	24	24	24
MED	14	18	18	14	18	20	18	16	16	B	20	24	24	28	20	20	20	22	20	B	B	B	B	22
U Q	22	20	24	23	26	B 36	B 24	23	B	B	B	B	B	B 56	B 56	50	28	B	B 42	B	B	B	B	B
L Q	10	13	12	12	14	12	12	13	13	14	16	20	20	20	18	13	14	14	13	14	15	12	11	10

JUL. 1990 FMIN (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

JUL. 1990 H'F (KM) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	A	E A 260	A	A	E A 420	E A 375	E A 350	E A 300	E B 295	E B 305	280	B	B	E B 245	B 240	B 225	250	B 240	B	B	B	A	A
2	A	A	A	B	E A 380	B	B	B	B	B	A	E B 320	230	240	215	200	225	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	245	220	200	215	200	200	200	200	A	B	B	B	B	B
10	A	A	A	E A 325	A	A	E A 380	340	E A 350	B	E A 320	250	225	230	210	240	210	220	210	B	B	B	B	A
11	A	A	B	A	E A 425	B	B	B	B	E A 340	295	B	200	220	205	215	200	E A 250	250	250	B	B	A	B
12	A	E A 325	A	A	A	A	A	A	B	B	B	B	B	B	E B 260	B	B	B	E B 250	B	E B 310	A	B	B
13	A	A	A	A	B	A	B	B	A	B	B	B	B	C	B	E B 280	250	E B 260	240	B	B	B	A	B
14	A	A	A	A	A	A	A	E B 390	E B 300	E B 300	250	210	215	215	240	250	250	B	B	B	B	B	B	B
15	A	A	A	A	A	B	B	A	B	B	B	E B 345	E B 260	245	240	220	230	240	B	B	B	B	A	A
16	A	A	A	B	B	A	A	E A 400	B	B	275	225	220	215	220	195	230	225	E B 280	B	B	B	B	B
17	E A 350	E A 350	A	A	A	E A 370	E A 370	E B 350	A	B	E A 300	250	220	205	230	200	190	205	230	E B 260	E B 300	B	B	A
18	A	190	B	A	A	A	A	A	E A 305	E A 260	250	250	225	230	200	190	200	200	200	A	B	A	A	A
19	A	A	A	A	A	A	A	A	B	B	290	250	210	220	250	E B 390	B	B	250	B	B	B	A	A
20	A	A	A	A	A	A	245	F	B	B	B	B	B	B	B	E B 275	E B 375	B	B	B	A	A	A	B
21	A	B	A	A	240	B	A	A	Q 350	275	230	215	220	E B 250	B	E B 250	230	E B 250	250	E B 270	B	A	A	B
22	A	A	A	A	B	A	A	A	E A 320	270	245	B	225	230	220	210	215	225	200	230	B	B	B	B
23	A	A	A	A	A	A	A	A	F	E A 250	225	210	200	210	210	200	B 205	E B 220	215	E A 250	B	B	B	A
24	A	A	A	A	A	E A 360	E A 375	E B 325	A	B	275	230	205	200	215	200	210	230	200	E A 270	A	B	A	A
25	B	A	A	A	E A 420	A	Q 340	E A 350	E A 350	E A 255	240	225	210	220	220	210	215	220	225	220	E B 250	B	B	B
26	B	B	B	A	A	E A 400	E A 420	E A 410	A	E B 290	225	225	225	225	205	200	195	225	205	E A 250	A	A	B	B
27	A	225	A	A	A	E A 400	E A 355	E A 330	E B 410	E B 355	E B 310	240	240	B 245	230	B 240	220	B 220	220	220	B	B	A	A
28	A	A	A	A	A	A	A	A	E A 430	B	B	B	E B 300	B	240	E B 260	B 245	B	B	A	240	A	A	A
29	A	A	A	B	A	B	B	A	A	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A
30	A	A	A	A	A	A	A	A	A	240	E B 280	B	245	220	B	230	225	E B 260	225	B	B	B	B	A
31	A	A	A	A	A	A	A	A	E A 290	250	290	B	B	E B 240	205	215	230	230	220	B	B	B	B	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	1	4	1	1	4	5	8	9	10	12	18	16	19	19	20	23	22	18	18	9	4			
MED	E A 350	275	E A 260	E A 325	E A 400	E A 400	E A 372	E A 350	E A 335	E 272	U 258	230	220	220	218	208	220	222	222	E 250	E B 275			
U Q		E A 338			E A 422	E A 410	E A 378	E A 395	E 350	E B 298	E 295	250	230	B 240	240	E B 250	230	E B 250	250	E B 265	E B 305			
L Q		208			310	E A 365	348	E 335	E A 300	252	245	222	210	215	208	200	205	220	210	225	245			

JUL. 1990 H'F (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

AUG. 1990 FXI (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H / D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	S	A	O X 41	A	A	40	41	46	51	66	O X 96	B	X 90	X 106	O X 102	X 90	X 75	B	B	B	B	B	B
2	B	B	B	B	B	B	B	B	B	O X 46	B	B	B	B	R	O X 86	76	70	49	B	B	A	B	B
3	B	B	A	B	B	A	A	O X 51	58	60	S	X 78	95	96	110	O X 116	B	96	O X 86	S	B	A	A	A
4	A	A	A	B	B	B	A	A	O X 44	O X 46	B	B	85	O X 96	O X 96	X 96	O X 86	S	X 66	S	B	B	A	B
5	A	A	S	A	A	B	A	41	45	50	X 68	88	92	94	91	95	96	O X 86	X 72	O X 49	A	A	A	B
6	S	B	A	B	B	B	A	B	B	O X 59	66	X 90	X 90	X 86	X 96	X 91	O X 79	86	76	S	B	A	A	A
7	A	B	A	A	B	B	B	46	52	O X 49	X 61	X 70	X 72	X 80	X 87	O X 90	X 80	82	O X 81	46	B	B	B	B
8	B	A	A	A	A	B	B	B	B	B	B	X 68	X 80	O X 84	106	X 102	X 101	64	61	B	B	B	B	B
9	B	B	B	A	A	A	B	A	60	X 61	65	O X 85	X 93	103	100	X 100	X 91	O X 75	X 45	B	B	B	A	A
10	A	A	A	A	B	B	56	66	B	O X 51	64	X 90	C	103	X 96	X 106	O X 96	O X 81	S	39	31	25	A	A
11	A	A	A	A	A	A	45	46	B	O X 54	X 62	B	O X 77	X 101	X 102	X 101	81	O X 96	71	B	B	B	B	A
12	A	A	A	A	A	A	A	B	B	A	51	70	75	X 90	96	X 91	X 91	84	56	32	O X 26	B	O X 25	A
13	A	A	A	A	A	A	A	B	B	B	B	B	X 75	O X 85	B	O X 105	O X 96	85	80	A	A	A	A	A
14	A	A	A	38	B	A	B	A	B	B	X 66	B	B	B	R	X 110	X 90	86	80	S	A	A	A	A
15	A	A	A	A	A	B	A	B	B	B	75	O X 81	X 102	X 106	O X 91	B	X 105	X 115	B	S	A	71	A	A
16	A	A	B	A	A	O X 61	O X 56	A	A	B	B	B	B	B	85	B	X 100	95	80	A	A	A	A	A
17	B	A	A	B	B	B	A	B	B	O X 51	B	B	B	X 90	X 96	X 90	96	91	O X 86	O X 39	A	A	A	B
18	A	A	A	A	B	B	45	B	B	B	B	80	B	X 109	X 106	X 116	X 110	X 110	O X 90	65	S	A	A	A
19	O X 37	A	A	A	B	B	B	B	B	B	O X 76	O X 76	O X 81	X 105	X 115	X 115	X 110	X 110	O X 102	73	34	A	A	A
20	A	A	A	A	A	B	S	B	A	B	B	B	B	O X 86	S	O X 96	O X 107	S	90	A	A	A	A	A
21	A	A	A	A	40	A	A	58	60	B	B	B	O X 76	O X 83	B	O X 96	O X 116	X 122	A	A	A	A	A	A
22	A	B	A	70	A	A	37	B	B	B	B	B	39	A	F	96	B	61	A	A	A	A	A	A
23	A	A	A	B	A	A	A	B	B	B	B	B	B	80	120	O X 146	111	66	A	A	A	A	B	A
24	A	A	41	A	A	A	A	B	B	B	A	B	B	O X 86	96	X 111	X 116	103	B	B	O X 35	A	A	A
25	A	A	A	A	B	A	A	41	57	O X 61	O X 86	O X 96	O X 116	O X 121	O X 126	X 126	X 116	O X 111	111	101	70	B	A	A
26	A	A	A	45	B	58	60	60	66	B	B	B	B	B	B	80	95	71	A	A	A	A	A	A
27	39	38	S	A	A	A	36	A	O X 48	X 56	X 66	X 78	O X 86	X 96	X 108	X 96	90	X 101	X 68	X 67	X 46	X 37	X 31	28
28	40	41	45	51	42	45	X 35	58	X 52	X 72	X 82	X 100	X 114	X 114	X 115	O X 118	X 120	X 96	O X 86	X 76	X 52	X 44	X 28	23
29	24	A	O X 38	O X 39	A	52	58	36	51	O X 76	X 78	X 90	112	X 113	X 111	X 116	121	X 116	O X 110	X 96	76	56	A	A
30	A	O X 49	B	A	A	A	A	A	B	B	B	B	72	B	B	S	O X 111	X 126	S	40	A	A	36	A
31	A	55	A	B	B	B	B	A	A	B	B	B	O X 76	86	B	O X 111	O X 108	106	95	B	O X 56	33	A	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	4	4	3	6	2	4	10	11	12	15	15	16	20	25	22	28	29	29	22	12	9	6	4	2
MED	38	45	41	43	41	55	45	46	52	O X 54	X 66	X 83	X 83	X 94	X 101	X 102	X 96	91	80	57	X 46	40	X 30	26
U Q	40	52	45	51		60	56	58	59	X 61	X 76	X 90	X 94	X 104	X 110	X 113	X 110	X 108	90	74	63	56	34	
L Q	30	40	O X 38	39		48	37	41	47	O X 50	64	X 77	76	X 86	96	X 96	X 90	78	68	40	32	33	X 26	

AUG. 1990 FXI (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

AUG. 1990 FOF2 (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H / D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	S	A	35	A	A	F 30	F 35	F 40	F 45	F 60	90	B	84	100	R 96	84	69	B	B	B	B	B	B
2	B	B	B	B	B	B	B	B	B	U S 40	B	B	B	B	R	D R 80	F 70	F 64	F 43	B	B	A	B	B
3	B	B	A	B	B	A	A	R 45	F	F 54	S	72	F 88	F 90	F 100	D R 110	B	F 90	R 80	S	B	A	A	A
4	A	A	A	B	B	B	A	A	38	40	B	B	F 79	90	90	90	80	S	R 60	S	B	B	A	B
5	A	A	S	A	A	B	A	F 35	F 39	F 44	62	F 80	F 86	F 88	F 85	F 89	F 90	80	66	43	A	A	A	B
6	S	B	A	B	B	B	A	B	B	53	F 60	84	84	80	90	85	U R 73	F 80	F 70	S	B	A	A	A
7	A	B	A	A	B	B	B	F 40	F 42	R 43	55	64	66	74	81	U R 84	74	F 76	U R 75	F 41	B	B	B	B
8	B	A	A	A	A	B	B	B	B	B	B	62	74	U R 78	F 100	96	95	F 58	F 55	B	B	B	B	B
9	B	B	B	A	A	A	B	A	F 54	55	F 59	79	87	F 97	F 94	94	85	69	39	B	B	B	A	A
10	A	A	A	A	B	B	F 50	F 60	B	U S 45	F 58	R 84	C	F 97	90	J S 100	D R 90	U S 75	S	F 33	F 25	F 19	A	A
11	A	A	A	A	A	A	F 39	F 40	B	D S 48	56	B	R 71	95	96	95	F 75	90	F 60	B	B	B	B	A
12	A	A	A	A	A	A	A	B	B	A	F 45	F 64	F 69	R 84	F 90	85	85	F 78	F 50	F 26	R 20	B	R 19	A
13	A	A	A	A	A	A	A	B	B	B	B	B	69	79	B	99	D R 90	F 79	F 70	A	A	A	A	A
14	A	A	A	F 32	B	A	B	A	B	B	60	B	B	B	R	104	84	F 80	F 74	S	A	A	A	A
15	A	A	A	A	A	B	A	B	B	B	F 69	75	96	100	U R 85	B	99	109	B	S	A	F 65	A	A
16	A	A	B	A	A	D R 55	U R 50	A	A	B	B	B	B	B	F 79	B	94	F 89	F 74	A	A	A	A	A
17	B	A	A	B	B	B	A	B	B	R 45	B	B	B	84	90	84	F 90	85	R 80	U S 33	A	A	A	B
18	A	A	A	A	B	B	F 39	B	B	B	B	F 74	B	103	100	110	104	104	U S 84	F 59	S	A	A	A
19	31	A	A	A	B	B	B	B	B	B	70	70	U R 75	99	109	109	104	J S 104	96	F 65	F 28	A	A	A
20	A	A	A	A	A	B	S	B	A	B	B	B	B	80	S	D S 90	101	S	F 80	A	A	A	A	A
21	A	A	A	A	F 34	A	A	48	F 54	B	B	B	70	77	B	D S 90	110	J S 116	A	A	A	A	A	A
22	A	B	A	F	A	A	F 31	B	B	B	B	B	F 33	A	F	F 90	B	F 55	A	A	A	A	A	A
23	A	A	A	B	A	A	A	B	B	B	B	B	B	F	F	140	F 105	F 60	A	A	A	A	B	A
24	A	A	F 35	A	A	A	A	B	B	B	A	B	B	82	F 90	105	115	F 97	B	B	R 29	A	A	A
25	A	A	A	A	B	A	A	F 35	F 51	U R 55	80	90	110	115	R 120	120	110	105	F 105	F 95	F	B	A	A
26	A	A	A	F 35	B	F 50	F 50	F 50	F 60	B	B	B	B	B	B	F 70	F 89	F 65	A	A	A	A	A	A
27	F 33	F 32	S	A	A	A	F 30	A	42	50	60	72	R 80	90	102	90	F 84	95	62	61	40	31	25	F 22
28	F 34	F 35	F 39	F 45	F 32	F 35	29	F	46	66	76	94	108	108	109	112	114	90	80	70	46	38	22	F 17
29	F 18	A	32	33	A	F	F 52	F 30	F 45	70	72	84	F 106	107	105	110	F 115	110	104	90	F 70	F 50	A	A
30	A	R 43	B	A	A	A	A	A	B	B	B	B	F 66	B	B	S	105	J S 120	S	F 34	A	A	F 30	A
31	A	F 49	A	B	B	B	B	A	A	B	B	B	R 70	F 80	B	105	102	F 100	F 89	B	D S 50	F 27	A	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	4	4	3	5	2	3	10	10	11	15	15	16	20	24	21	28	29	29	22	12	8	6	4	2
MED	F 32	F 39	F 35	F 35	F 33	F 50	F 39	F 40	F 45	48	60	77	77	89	94	98	90	85	74	F 51	34	F 34	24	F 20
U Q	F 34	46	F 39	F 40		D R 55	F 50	F 48	F 54	55	70	84	88	98	101	107	104	102	80	68	48	F 50	28	
L Q	24	F 34	32	32		F 35	F 30	F 35	F 40	44	58	71	70	80	90	90	84	F 72	F 60	F 34	F 26	F 27	20	

IONOSPHERIC DATA STATION SHOWA ST.

AUG. 1990 FES (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

D/H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B 31	33	37	37	37	32	20	E B 16	E B 13	E B 17	E B 30	E B 24	B E 34	B E 25	B E 25	B E 20	E B 20	E B 24	B	B	B	B	B	B
2	B 25	B	B	B	B	B	B	B	B	E B 25	B	B	B	B E 55	E B 52	E B 39	E B 25	E B 25	B	B	B	28	B	B
3	B 27	B 42	B	35	36	39	E B 23	E B 24	E B 51	E B 55	E B 50	E B 40	E B 60	B	E B 35	E B 55	E B 35	B	26	31	38			
4	31	31	71	B	B	B 41	60	28	32	B	B	E B 35	E B 55	E B 56	E B 24	E B 24	E B 34	E B 25	E B 16	B	B 26	B		
5	16	22	27	32	31	B 37	21	E B 15	E B 15	23	E B 22	E B 24	E B 24	E B 22	E B 21	E B 24	62	E B 17	E B 14	25	30	27	B	
6	38	B 44	B	B	B	B 43	B	B	E B 35	E B 30	E B 32	E B 33	E B 72	E B 54	E B 29	E B 36	E B 32	E B 33	E B 18	B	40	40	71	
7	51	B 51	41	B	B	B	27	E B 23	E B 23	E B 25	E B 26	E B 33	E B 23	E B 24	E B 23	E B 17	E B 21	E B 18	E B 19	B	B	B	B	
8	B 39	40	40	44	B	B	B	B	B	B	E B 50	E B 52	E B 50	E B 35	E B 24	E B 38	E B 34	E B 22	B	B	B	B	B	
9	B	B	B 44	41	44	B 46	27	E B 24	E B 35	E B 40	E B 50	E B 50	E B 32	E B 22	E B 22	E B 19	E B 18	B	B	B	27	25		
10	33	42	37	36	B	B E B 22	26	B	E B 22	E B 22	26	C E B 24	E B 31	E B 30	E B 30	41	16	E B 14	E B 11	31	60	17		
11	27	27	32	70	42	42	28	21	B	25	E B 23	B	E B 52	E B 51	E B 24	E B 25	E B 17	E B 30	41	B	B	B	B	32
12	26	36	43	41	56	42	51	B	B	52	40	E B 23	E B 25	E B 30	E B 35	E B 31	E B 23	E B 25	E B 24	E B 19	E B 13	B	E B 14	26
13	35	47	45	41	33	37	40	B	B	B	B	B	E B 30	E B 30	B	E B 55	E B 50	E B 24	E B 19	36	29	36	46	24
14	31	31	36	33	B	41	B	51	B	B	E B 25	B	B	B	E B 55	E B 50	E B 30	E B 19	E B 20	E B 24	36	31	41	40
15	70	70	31	41	34	B	48	B	B	B	E B 35	E B 30	E B 32	26	E B 60	B	E B 50	E B 25	B	20	36	70	83	48
16	61	90	B	60	38	40	30	42	41	B	B	B	B	B	E B 31	B	30	E B 24	25	38	20	32	42	41
17	B	81	41	B	B	B	40	B	B	E B 30	B	B	B	E B 30	E B 30	E B 24	16	16	E B 24	E B 15	36	42	42	B
18	45	47	41	39	B	B	31	B	B	B	B	E B 31	B	E B 55	E B 60	E B 30	E B 30	E B 14	26	E B 12	E B 13	31	41	41
19	37	39	36	70	B	B	B	B	B	B	E B 55	E B 55	E B 55	E B 55	E B 40	E B 30	E B 40	E B 17	E B 21	E B 18	28	36	25	39
20	45	70	49	41	31	B 60	B	41	B	B	B	B	B	E B 51	E B 55	E B 60	E B 30	27	31	27	36	46	34	46
21	36	33	41	59	45	52	51	36	44	B	B	B	E B 51	E B 50	B	E B 35	E B 35	31	38	40	42	60	42	56
22	70	B 40	52	49	41	21	B	B	B	B	B	B	26	27	E B 30	E B 30	B	35	25	31	36	45	71	45
23	60	51	77	B	39	36	31	B	B	B	B	B	B	E B 30	26	E B 30	E B 30	24	31	41	40	38	B	51
24	41	41	36	115	73	40	39	B	B	B	39	B	B	E B 51	E B 30	E B 24	E B 23	36	B	B	26	33	31	31
25	31	31	34	33	B	36	35	28	19	E B 50	E B 30	E B 30	E B 30	E B 30	E B 30	E B 30	E B 23	E B 20	E B 23	E B 20	E B 25	B	36	80
26	32	41	78	80	B	27	19	E B 21	E B 30	B	B	B	B	B	B E 30	E B	E B 50	E B 14	27	32	34	70	40	41
27	36	28	16	40	51	39	41	46	30	25	23	24	24	26	26	24	38	21	12	16	16	27	31	28
28	30	31	28	30	27	30	28	10	16	E B 22	E B 27	E B 30	E B 29	E B 30	E B 30	E B 29	E B 28	E B 17	11	E B 10	E B 10	E B 10	E B 10	E B 11
29	16	26	26	22	16	12	E B 12	11	26	E B 55	E B 50	E B 30	E B 30	E B 35	E B 35	E B 31	E B 25	E B 21	E B 19	E B 21	E B 10	E B 10	42	25
30	36	40	B	36	42	47	46	41	B	B	B	B	E B 40	B	B	E B 55	E B 24	33	E B 39	32	41	47	35	41
31	51	41	45	B	B	B	B	36	36	B	B	B	E B 52	E B 29	B	E B 55	E B 35	E B 52	E B 24	B	E B 25	22	26	60
	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	25	27	24	18	18	24	18	15	16	17	16	20	26	26	29	29	31	28	24	22	23	25	24
MED	36	39	40	41	40	40	36	32	27	E B 25	E B 30	E B 30	E B 33	E B 32	E B 32	E B 30	E B 30	E B 25	E B 24	E B 20	27	33	36	40
U Q	48	47	45	56	45	42	42	42	36	E B 34	E B 37	E B 36	E B 52	E B 51	E B 54	E B 42	E B 37	34	29	32	36	45	42	47
L Q	31	31	34	36	33	35	28	21	19	E B 22	E B 24	E B 25	E B 30	E B 29	E B 30	E B 24	E B 23	E B 20	E B 19	E B 16	E B 16	28	27	27

AUG. 1990 FES (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

AUG. 1990 FMIN (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	14	14	15	18	17	14	16	13	17	30	24	B	34	25	25	20	24	B	B	B	B	B	B
2	B	B	B	B	B	B	B	B	B	25	B	B	B	B	55	52	39	25	25	B	B	19	B	B
3	B	B	23	B	B	24	23	23	23	23	24	51	55	50	40	60	B	35	55	35	B	15	15	16
4	23	14	15	B	B	B	25	42	24	23	B	B	35	55	56	24	24	34	25	16	B	B	13	B
5	13	11	10	14	20	B	15	13	15	15	21	22	24	24	22	21	24	21	17	14	17	10	21	B
6	19	B	33	B	B	B	36	B	B	35	30	32	33	72	54	29	36	32	33	18	B	19	22	23
7	22	B	31	35	B	B	B	19	23	23	25	26	33	23	24	23	17	21	18	19	B	B	B	B
8	B	16	18	20	14	B	B	B	B	B	B	50	52	50	35	24	38	34	22	B	B	B	B	B
9	B	B	B	22	18	28	B	32	19	24	35	40	50	50	32	22	22	19	18	B	B	B	18	17
10	19	20	17	18	B	B	22	16	B	22	22	19	C	24	23	30	30	19	14	14	11	22	21	9
11	9	9	20	14	16	15	15	13	B	17	23	B	52	51	24	25	17	30	24	B	B	B	B	9
12	13	10	15	22	16	15	25	B	B	25	18	23	25	30	35	31	23	25	24	19	13	B	14	9
13	10	14	15	20	24	23	30	B	B	B	B	B	30	30	B	55	50	24	19	25	18	17	15	18
14	15	20	15	14	B	14	B	24	B	B	25	B	B	B	55	50	30	19	20	24	14	12	13	14
15	20	20	20	13	25	B	23	B	B	B	35	30	32	22	60	B	50	25	B	14	20	14	18	15
16	14	13	B	30	24	15	19	24	24	B	B	B	B	B	31	B	30	24	19	10	15	14	10	11
17	B	10	20	B	B	B	25	B	B	30	B	B	B	30	30	24	10	10	24	15	10	10	10	B
18	14	15	8	14	B	B	12	B	B	B	B	31	B	55	60	30	30	14	10	12	13	10	15	11
19	10	9	13	9	B	B	B	B	B	B	55	55	55	55	40	30	40	17	21	18	18	10	10	9
20	9	41	13	24	14	B	20	B	30	B	B	B	B	51	55	60	30	20	14	10	10	10	10	14
21	12	17	14	14	20	20	14	11	10	B	B	B	51	50	B	35	35	10	10	14	10	14	9	10
22	16	B	14	15	10	24	12	B	B	B	B	B	23	19	30	30	B	11	9	14	9	13	15	11
23	10	20	10	B	30	25	20	B	B	B	B	B	B	30	22	30	30	10	10	9	10	9	B	23
24	9	11	9	14	24	10	14	B	B	B	24	B	B	51	30	24	23	9	B	B	9	8	9	10
25	11	10	10	20	B	25	20	13	13	50	30	30	30	30	30	30	23	20	23	20	25	B	20	15
26	18	14	14	13	B	20	14	21	30	B	B	B	B	B	B	30	50	14	20	20	15	21	13	11
27	8	10	9	11	15	10	10	12	14	15	18	19	21	16	15	15	10	10	8	8	9	9	8	8
28	9	9	10	9	9	8	8	9	9	22	27	30	29	30	30	29	28	17	10	10	10	10	10	11
29	9	10	9	9	8	8	12	9	18	55	50	30	30	35	35	31	25	21	19	21	10	10	13	19
30	25	12	B	25	13	15	14	15	B	B	B	B	40	B	B	55	24	14	39	9	15	10	9	10
31	14	11	10	B	B	B	B	23	31	B	B	B	52	29	B	55	35	52	24	B	25	12	11	10
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31
MED	14	14	15	20	24	25	20	24	B	55	50	55	52	50	35	30	30	20	20	18	15	14	15	14
U Q	B 23	B 20	20	B 35	B	B	B 36	B	B	B	B	B	B	B 55	B 56	52	38	25	25	B 35	B	B	B 21	B 23
L Q	10	10	10	14	16	15	14	15	19	23	25	30	30	30	30	24	23	14	14	14	10	10	10	10

AUG. 1990 FMIN (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

AUG. 1990 H'F (KM) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	E A 280	A	E A 380	A	A	E A 400	E B 340	270	250	240	235	B	B 230	205	220	275	280	B	B	B	B	B	B
2	B	B	B	B	B	B	B	B	B	E B 340	B	B	B	B	E B 270	E B 260	B 225	225	E B 250	B	B	A	B	B
3	B	B	A	B	B	A	A	A	O 300	E B 270	250	E B 275	E B 270	E B 270	270	E B 290	B	E B 245	E B 250	E B 300	B	A	A	A
4	A	A	A	B	B	B	A	A	E A 400	E A 340	B	B	250	250	E B 250	215	220	E B 250	240	235	B	B	A	B
5	A	A	230	A	A	B	A	A	E A 300	E B 260	240	230	220	215	220	240	210	200	225	225	A	A	A	B
6	E A 330	B	A	B	B	B	A	B	B	E B 300	250	240	220	E B 310	240	225	B 220	245	230	245	B	A	A	A
7	A	B	A	A	B	B	B	E A 450	E B 340	280	275	245	240	225	220	205	220	240	200	240	B	B	B	B
8	B	A	A	A	A	B	B	B	B	B	B	E B 320	E B 250	E B 250	B 230	225	240	B 215	200	B	B	B	B	B
9	B	B	B	A	A	A	B	A	350	240	B 230	B 240	E B 250	B 225	210	225	205	205	205	B	B	B	A	A
10	A	A	A	A	B	B	E B 375	A	B	245	215	210	C	210	210	225	225	210	205	205	245	240	A	A
11	A	A	A	A	A	A	E A 370	E A 350	B	E A 280	220	B	E B 270	E B 250	220	230	220	260	190	B	B	B	B	A
12	A	A	A	A	A	A	A	B	B	A	240	240	230	240	B 245	B 220	210	225	220	B 225	E B 245	B	E B 300	A
13	A	A	A	A	A	A	A	B	B	B	B	B	250	260	B	B 250	B 250	250	240	A	A	A	A	A
14	A	A	A	A	B	A	B	A	B	B	250	B	B	B	E B 245	B 245	220	260	225	E B 270	A	A	A	A
15	A	A	A	A	A	B	A	B	B	B	250	210	240	215	E B 300	B	E B 300	275	B	E A 310	A	205	A	A
16	A	A	B	A	A	E A 425	E A 390	A	A	B	B	B	B	B	280	B	245	255	E A 280	A	A	A	A	A
17	B	A	A	B	B	B	A	B	B	E B 290	B	B	B	230	225	220	225	200	220	E B 250	A	A	A	B
18	A	A	A	A	B	B	A	B	B	B	B	250	B	E B 275	B 230	225	220	230	200	220	E B 270	A	A	A
19	A	A	A	A	B	B	B	B	B	B	E B 320	E B 290	E B 280	E B 275	240	240	225	215	200	210	E A 260	A	A	A
20	A	A	A	A	A	B	E A 375	B	A	B	B	B	B	E B 320	E B 275	E B 305	250	270	270	A	A	A	A	A
21	A	A	A	A	E A 305	A	A	E A 350	E A 325	B	B	B	E B 310	E B 300	B	250	260	260	A	A	A	A	A	A
22	A	B	A	E A 410	A	A	E A 350	B	B	B	B	B	E A 270	A	F	E B 330	B	E A 315	A	A	A	A	A	A
23	A	A	A	B	A	A	A	B	B	B	B	B	B	E B 290	E A 350	280	270	E A 400	A	A	A	A	B	A
24	A	A	A	A	A	A	A	B	B	B	A	B	B	E B 290	225	270	240	240	B	B	A	A	A	A
25	A	A	A	A	B	A	A	E A 400	290	E B 300	245	230	240	225	B 220	225	225	200	B 240	210	230	B	A	A
26	A	A	A	E A 375	B	E A 390	E A 340	E B 320	E B 325	B	B	B	B	B	B	E B 280	E B 400	E B 390	A	A	A	A	A	A
27	A 250	250	220	A	A	A	A	A	A	A	250	240	230	230	220	220	205	230	215	215	200	225	E A 270	E A 290
28	A	A	E A 300	A	195	A	A	240	A 225	245	230	240	230	230	230	230	240	200	200	210	200	210	250	E B 310
29	E A 300	A	A	A	A	A	B	260	E A 300	E B 340	275	220	230	250	240	240	220	230	220	240	205	205	A	A
30	A	A	B	A	A	A	A	A	B	B	B	B	E B 270	B	B	E B 340	E B 260	E B 280	255	A	A	A	E A 390	A
31	A	E A 320	A	B	B	B	B	A	A	B	B	B	E B 320	225	B	E B 250	225	245	225	B	250	E A 275	A	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	3	3	3	3	2	2	7	8	11	14	16	16	20	25	25	29	29	31	24	16	9	6	4	2
MED	E A 300	E A 280	225	E A 380	250	E A 408	E A 375	E A 345	E 300	E 280	245	236	240	U 238	225	232	225	238	220	221	U 225	213	E 285	E 300
U Q	E A 330	E A 320	E A 300	E A 410			E A 390	E A 375	E 340	E B 300	250	E B 248	E B 270	E B 275	E B 260	E B 265	250	260	240	E B 248	E 255	240	E 345	
L Q	A 250	250	220	E A 375			E A 350	290	290	250	235	230	230	225	220	225	220	215	202	212	202	205	260	

AUG. 1990 H'F (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

SEP. 1990 FXI (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT. 69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H / D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	A	A	A	A	A	A	A	A	B	66	X 78	X 93	X 102	X 111	X 113	O X 116	B	O X 116	96	34	46	A	A	A
2	A	S	A	A	41	45	45	51	X 60	O X 82	X 92	X 106	X 113	X 121	X 126	122	103	O X 101	90	66	60	35	O X 22	B
3	A	A	A	A	A	A	27	42	60	X 72	X 76	X 91	X 116	X 116	X 111	X 106	O X 116	106	X 110	X 80	X 64	34	27	22
4	20	O X 22	O X 22	21	22	26	31	40	X 65	X 78	O X 98	O X 111	X 116	X 116	O X 110	O X 116	X 115	X 112	X 111	X 90	A	A	A	A
5	A	34	A	A	A	A	B	B	B	B	B	B	O X 79	B	90	X 98	X 100	X 96	84	60	26	B	A	A
6	A	S	A	F	X 45	A	A	42	X 49	X 53	X 61	X 66	B	O X 86	X 96	O X 86	X 89	O X 96	X 90	O X 66	O X 66	O X 33	A	A
7	A	A	B	38	A	A	A	A	X 52	X 53	B	B	X 61	B	O X 74	B	O X 116	O X 96	O X 76	S	A	A	A	A
8	O X 66	S	A	A	A	A	A	41	60	X 68	O X 76	O X 81	110	O X 116	X 115	112	O X 126	O X 126	115	81	43	31	B	A
9	A	A	A	A	A	A	A	46	65	70	80	X 95	X 96	X 106	111	X 113	O X 116	O X 111	102	O X 96	A	S	A	A
10	A	A	A	B	B	B	O X 56	54	60	B	O X 56	71	76	80	O X 84	X 95	X 99	S	O X 96	82	60	46	45	31
11	70	A	B	A	A	A	B	A	A	X 69	75	X 79	73	O X 89	X 98	X 101	X 120	X 105	83	76	A	A	A	A
12	39	B	B	B	B	A	B	B	B	B	B	B	B	68	X 79	O X 86	X 89	B	X 81	81	A	A	A	A
13	A	A	55	49	A	56	A	B	O X 61	71	O X 84	X 90	X 100	X 106	O X 111	X 113	X 106	X 106	101	70	A	A	A	A
14	A	A	A	A	62	B	A	45	S	B	B	73	X 85	B	X 100	X 106	106	X 103	X 86	X 76	A	A	A	66
15	A	A	A	O X 46	56	S	A	A	F	B	71	O X 76	O X 86	X 101	X 96	X 100	O X 111	O X 116	O X 116	S	A	A	A	A
16	A	61	59	55	45	B	B	B	A	70	71	B	B	O X 86	B	B	X 110	O X 96	70	70	70	A	A	40
17	A	A	A	A	70	70	65	71	72	81	80	80	B	O X 111	O X 111	O X 111	O X 116	O X 116	116	S	70	A	A	A
18	A	B	70	70	70	70	70	65	66	B	B	80	80	S	B	O X 136	O X 126	O X 111	O X 81	A	A	A	47	A
19	A	A	63	55	A	B	A	A	B	X 66	B	B	O X 81	O X 80	X 93	X 95	X 96	O X 100	96	80	A	A	A	A
20	B	A	A	B	B	61	82	76	81	80	O X 86	X 91	X 93	X 95	X 97	X 105	X 106	O X 112	X 108	O X 96	A	A	A	A
21	A	A	A	A	55	70	63	70	71	B	70	B	S	90	X 100	106	X 111	X 108	100	B	S	A	A	A
22	A	47	55	A	B	A	B	B	B	B	B	B	66	X 80	O X 86	X 91	X 97	90	X 74	41	A	A	A	A
23	A	A	70	A	A	B	70	B	A	A	B	B	B	O X 101	X 110	X 105	O X 116	X 106	O X 96	70	B	31	A	A
24	A	A	41	56	A	65	66	71	X 71	B	S	B	B	B	O X 111	111	110	B	80	70	A	32	A	S
25	A	A	42	A	46	65	B	A	A	B	71	O X 76	X 91	X 101	O X 117	O X 120	O X 119	O X 116	O X 99	83	71	51	A	A
26	A	A	A	B	A	66	64	A	70	80	80	X 86	X 93	X 96	X 98	X 102	X 101	X 101	O X 96	70	46	31	A	A
27	A	A	B	51	A	60	B	B	65	B	B	O X 76	O X 81	O X 86	X 88	X 95	X 97	O X 101	O X 96	X 80	X 61	46	42	37
28	A	A	A	A	36	61	A	A	X 63	71	83	X 91	X 101	X 106	X 110	X 108	X 115	X 115	105	96	85	70	40	35
29	A	36	A	A	A	A	A	70	76	X 80	X 90	O X 100	X 106	O X 111	X 116	X 116	X 116	X 106	O X 100	X 84	O X 76	X 56	X 46	A
30	A	A	A	B	O X 49	54	64	71	X 80	X 86	X 91	X 96	X 106	X 110	X 115	X 110	X 105	O X 106	O X 100	X 78	70	X 60	O X 60	44
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	4	5	9	9	12	13	12	15	19	18	20	21	23	25	28	28	29	27	30	25	15	13	8	7
MED	52	36	55	51	48	61	64	54	65	X 71	X 79	X 86	X 93	X 101	X 105	X 106	X 110	O X 106	X 96	78	64	35	44	37
U Q	68	54	66	56	59	68	68	71	71	X 80	X 85	X 94	X 106	X 111	X 111	X 113	O X 116	O X 112	102	X 82	70	54	X 46	44
L Q	30	28	42	42	43	55	50	42	60	X 68	71	X 76	80	O X 86	X 94	X 99	X 100	O X 101	84	70	46	32	34	31

SEP. 1990 FXI (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

SEP. 1990 FOF2 (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	A	A	A	A	A	A	A	A	B	F 60	72	87	96	105	107	U R 110	B	110	F 90	F 28	F 40	A	A	A
2	A	S	A	A	F 35	F	F	F 45	54	76	86	100	107	115	120	F 116	F 97	U S 95	F 84	F 60	F 54	F 29	16	B
3	A	A	A	A	A	A	F 21	F 36	F 54	66	70	85	110	110	105	R 100	110	F 100	J S 104	74	J S 58	F 28	F 21	F 16
4	F 14	16	16	F 15	F 16	F 19	F 24	F 34	59	72	U R 92	105	110	110	104	U R 110	109	R 106	105	84	A	A	A	A
5	A	F 28	A	A	A	A	B	B	B	B	B	B	R 73	B	84	92	94	90	F 78	F 50	F 20	B	A	A
6	A	S	A	F	J S 39	A	A	F 36	43	47	55	60	B	80	90	D R 80	83	90	84	60	60	R 27	A	A
7	A	A	B	F 32	A	A	A	A	46	47	B	B	55	B	68	B	U R 110	90	70	S	A	A	A	A
8	D R 60	S	A	A	A	A	A	F 35	F 52	62	70	U R 75	F 104	D R 110	R 109	F 106	120	120	F 109	F 75	F 37	F 25	B	A
9	A	A	A	A	A	A	A	F 40	F 55	F 60	F 74	89	90	100	F 105	107	R 110	105	F 92	90	A	S	A	A
10	A	A	A	B	B	B	U S 50	F 48	F 54	B	U R 50	F 65	F 70	F 70	78	J S 89	93	S	90	F 76	F	F 40	F 39	F 25
11	F 64	A	B	A	A	A	B	A	A	63	F 69	73	F 67	83	J S 92	95	J S 114	99	F 77	F 70	A	A	A	A
12	F 33	B	B	B	B	A	B	B	B	B	B	B	B	F 62	U R 73	80	83	B	75	F 75	A	A	A	A
13	A	A	F	F 43	A	F 50	A	B	R 55	F 65	78	84	94	100	U R 105	R 107	R 100	100	F 95	F 51	A	A	A	A
14	A	A	A	A	F 56	B	A	F 39	S	B	B	F 67	79	B	94	100	F 100	97	80	70	A	A	A	F 60
15	A	A	A	U R 40	F 50	S	A	A	F	B	F 65	70	80	95	90	94	U R 105	U R 110	110	S	A	A	A	A
16	A	F 55	F	F 49	F 39	B	B	B	A	F 60	F 65	B	B	80	B	B	104	90	F 60	F 48	F 60	A	A	F
17	A	A	A	A	F	F 64	F 59	F 65	F 66	F 75	F 70	F 74	B	105	105	105	R 110	R 110	F 110	S	F 60	A	A	A
18	A	B	F 60	F	F	F	F 60	F 55	F 60	B	B	F 70	F 70	S	B	U R 130	120	R 105	R 75	A	A	A	F 41	A
19	A	A	F	F 45	A	B	A	A	B	60	B	B	U R 75	74	J S 87	J S 89	90	94	F 90	F 70	A	A	A	A
20	B	A	A	B	B	F 55	F 76	F 74	F 75	F 70	80	85	87	89	91	99	J S 100	J S 106	J S 102	90	A	A	A	A
21	A	A	A	A	F	F 60	F 57	F 64	F 65	B	F 60	B	S	F 84	J S 94	F 100	105	102	F 94	B	S	A	A	A
22	A	F 41	F 45	A	B	A	B	B	B	B	B	B	F 60	J S 74	80	85	91	F 84	68	F 35	A	A	A	A
23	A	A	F 60	A	A	B	F 55	B	A	A	B	B	B	U R 95	104	D R 99	U R 110	100	U R 90	F 64	B	F 25	A	A
24	A	A	F 35	F 50	A	F 59	F 60	F 65	64	B	S	B	B	B	105	F 105	F 104	B	F 70	F 60	A	F 26	A	S
25	A	A	F 36	A	F 40	F	B	A	A	B	F 65	70	85	95	111	114	113	110	R 93	F 77	F 65	F 45	A	A
26	A	A	A	B	A	F 60	F 58	A	F 60	F 70	F 72	80	87	90	92	96	95	R 95	90	F 64	F 40	F 25	A	A
27	A	A	B	F 45	A	F	B	B	F 55	B	B	U R 70	U R 75	80	82	89	91	D R 95	D R 90	74	55	F 40	F 34	F 31
28	A	A	A	A	F 30	F 55	A	A	57	F 65	F 77	85	95	100	104	102	109	109	F 99	F 90	F 79	F 60	F 34	F 29
29	A	F 30	A	A	A	A	A	F 60	F 70	74	R 84	94	100	105	110	110	J S 110	J S 100	94	78	70	50	40	A
30	A	A	A	B	43	F 48	F 58	F 65	R 74	80	J S 85	90	100	104	109	104	99	U S 100	U S 94	72	F 64	54	54	F 38
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	4	5	6	8	9	9	11	15	19	18	20	21	23	25	28	28	29	27	30	25	14	13	8	6
MED	F 46	F 30	F 40	F 44	F 39	F 55	F 58	F 48	F 57	65	71	80	87	95	99	102	104	100	90	F 70	F 59	F 29	F 36	F 30
U Q	62	F 48	F 60	F 47	F 46	F 60	F 60	F 65	F 65	72	79	88	100	105	105	107	110	106	95	76	F 64	48	40	F 38
L Q	F 24	22	35	F 36	F 32	F 49	F 50	F 36	54	60	F 65	70	F 73	80	88	93	94	95	78	F 60	F 40	F 26	F 28	F 25

SEP. 1990 FOF2 (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

SEP. 1990 FES (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

HD	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	34	33	34	41	48	42	42	23	B	30	E B 28	E B 30	26	E B 30	26	E B 26	B	26	22	E B 20	31	40	38	38
2	38	31	31	31	31	32	20	14	21	22	25	28	E B 30	30	27	25	22	16	15	11	15	26	E B 11	B
3	12	14	28	16	28	11	11	11	18	23	22	E B 30	E B 30	E B 30	E B 29	25	31	E B 18	E B 15	E B 13	E B 12	12	E B 23	16
4	E B 10	16	15	22	15	17	12	E B 15	E B 20	E B 25	E B 26	31	26	62	26	31	46	89	60	E B 10	34	41	41	41
5	38	36	46	47	41	41	B	B	B	B	B	B	E B 52	B	E B 30	E B 29	E B 24	E B 24	E B 30	E B 23	21	B	16	36
6	51	31	34	33	26	41	41	40	20	22	23	25	B	E B 55	E B 30	E B 50	24	E B 31	E B 36	E B 14	E B 12	40	33	39
7	70	52	B	32	58	34	31	36	29	31	B	B	E B 30	B	E B 56	B	E B 56	E B 29	26	35	31	22	34	38
8	37	E B 28	70	36	40	41	46	35	32	31	50	E B 55	E B 50	E B 56	E B 30	E B 34	E B 40	E B 30	E B 50	E B 30	E B 25	E B 18	B	36
9	70	41	35	44	45	42	42	E B 30	32	22	26	31	32	32	26	26	E B 34	E B 30	E B 24	E B 15	34	26	32	38
10	90	31	32	B	B	B	46	25	21	B	E B 35	E B 40	36	31	36	26	20	E B 20	E B 20	E B 14	E B 24	E B 20	E B 13	16
11	31	46	B	41	44	58	B	51	35	E B 31	26	25	27	E B 52	E B 30	E B 30	E B 31	E B 27	33	32	40	80	41	45
12	28	B	B	B	B	40	B	B	B	B	B	B	B	E B 50	E B 35	E B 35	E B 30	B	E B 30	E B 25	36	39	42	86
13	47	46	33	28	44	42	40	B	46	31	E B 30	26	30	E B 51	E B 51	E B 30	E B 30	25	18	28	45	43	47	58
14	90	59	80	80	42	B	60	35	31	B	B	E B 32	E B 30	B	E B 55	25	26	E B 30	E B 40	27	31	39	40	80
15	46	41	41	31	E B 31	80	51	41	40	B	E B 40	E B 55	E B 56	E B 55	E B 31	E B 30	E B 65	E B 76	E B 24	32	19	39	46	41
16	45	40	40	46	37	B	B	B	36	58	E B 35	B	B	E B 50	B	B	E B 30	31	E B 21	20	31	34	36	36
17	34	32	41	71	36	32	31	41	27	27	26	E B 30	B	E B 55	31	E B 30	E B 30	E B 50	E B 20	E B 55	E B 30	37	31	46
18	59	B	36	38	34	25	22	19	32	B	B	E B 35	E B 40	E B 50	B	E B 31	E B 30	E B 30	36	18	32	32	35	53
19	92	41	41	27	106	B	34	41	B	35	B	B	E B 38	E B 34	E B 35	E B 30	E B 25	E B 24	E B 20	E B 22	35	40	39	70
20	B	51	70	B	B	31	32	33	40	25	26	31	31	32	30	24	26	E B 24	18	13	35	41	40	57
21	28	51	51	46	72	E B 35	35	37	36	B	E B 30	B	E B 57	E B 35	E B 65	E B 55	E B 37	E B 24	E B 23	B	27	40	36	70
22	41	45	37	80	B	40	B	B	B	B	B	B	31	E B 33	27	E B 50	E B 30	E B 30	24	37	40	33	36	35
23	79	65	37	70	40	B	32	B	40	36	B	B	B	E B 51	E B 40	E B 50	E B 40	E B 30	20	28	B	32	42	34
24	33	35	34	32	40	44	35	E B 55	41	B	33	B	B	B	E B 55	E B 30	32	B	E B 30	E B 23	36	28	36	40
25	41	43	36	26	59	19	B	45	46	B	E B 31	E B 55	E B 50	E B 35	28	27	25	E B 14	E B 20	14	E B 10	16	41	103
26	42	39	28	B	40	31	31	44	28	27	34	34	27	33	36	34	27	22	18	14	26	31	43	47
27	41	34	B	26	42	24	B	B	31	B	B	E B 55	E B 56	E B 51	E B 32	26	E B 31	E B 51	E B 45	E B 30	E B 20	16	25	31
28	46	56	41	40	31	23	33	36	50	31	32	31	32	29	32	33	E B 15	E B 24	E B 30	E B 17	E B 30	E B 17	E B 22	26
29	32	35	41	51	36	51	42	24	22	25	26	E B 50	E B 33	E B 31	27	E B 30	E B 30	22	23	E B 19	E B 15	E B 10	11	32
30	36	41	42	B	33	21	E B 20	21	23	31	32	30	31	41	41	33	31	27	70	15	12	E B 10	12	E B 10
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	28	26	25	26	25	23	23	25	19	21	21	24	26	28	28	29	28	30	29	29	29	29	29
MED	41	40	37	38	40	35	34	35	32	28	28	E B 31	E B 32	E B 38	E B 31	E B 30	E B 30	E B 27	E B 24	E B 20	30	32	36	39
U Q	55	46	41	46	44	42	42	41	40	31	34	E B 45	E B 45	E B 51	E B 38	E B 34	E B 33	E B 30	33	29	34	40	41	55
L Q	34	32	34	30	33	24	31	23	22	25	26	30	30	32	28	26	26	E B 24	20	14	E B 20	E B 19	24	34

SEP. 1990 FES (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

SEP. 1990 FMIN (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

D/H	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	10	10	10	23	15	14	15	20	B	23	28	30	20	30	20	26	B	19	13	20	9	9	10	8
2	10	10	15	22	13	12	10	9	11	18	18	20	30	15	15	15	14	12	9	10	9	10	11	B
3	8	8	10	9	10	8	9	10	15	13	20	30	30	30	29	18	17	18	15	13	12	10	23	10
4	10	9	9	8	8	8	9	15	20	25	26	16	24	16	18	20	20	10	13	10	9	9	9	12
5	8	8	10	22	24	20	B	B	B	B	B	B	52	B	30	29	24	24	30	23	10	B	10	9
6	14	25	25	14	8	15	15	9	11	13	14	15	B	55	30	50	15	31	36	14	12	9	9	10
7	10	17	B	9	9	10	16	17	14	19	B	B	30	B	56	B	56	29	19	11	12	10	9	8
8	9	28	20	30	25	22	10	13	22	24	50	55	50	56	30	34	40	30	50	30	25	18	B	10
9	15	30	22	24	23	19	25	30	16	18	10	18	15	18	19	19	34	30	24	15	8	8	10	9
10	15	24	16	B	B	B	13	13	14	B	35	40	24	20	15	14	17	20	20	14	24	20	13	9
11	19	9	B	16	23	20	B	24	23	31	15	14	14	52	30	30	31	27	10	10	9	14	8	8
12	9	B	B	B	B	14	B	B	B	B	B	B	B	50	35	35	30	B	30	25	14	9	10	10
13	13	21	10	8	23	15	30	B	16	24	30	22	22	51	51	30	30	12	12	10	9	13	12	8
14	9	8	17	34	15	B	30	14	17	B	B	32	30	B	55	17	17	30	40	9	9	8	10	9
15	12	15	17	18	31	23	10	30	18	B	40	55	56	55	31	30	65	76	24	10	11	10	17	11
16	9	9	8	8	13	B	B	B	24	23	35	B	B	50	B	B	30	17	21	11	15	8	8	9
17	10	18	8	19	10	10	10	24	20	20	21	30	B	55	24	30	30	50	20	55	30	9	13	10
18	13	B	24	15	13	15	12	10	18	B	B	35	40	50	B	31	30	30	12	9	9	9	9	9
19	10	8	9	10	15	B	20	30	B	23	B	B	38	34	35	30	25	24	20	22	9	9	10	20
20	B	9	10	B	B	24	18	21	20	18	21	17	19	20	20	14	13	24	12	9	9	9	12	10
21	9	24	24	23	10	35	20	13	14	B	30	B	57	35	65	55	37	24	23	B	20	10	9	10
22	8	12	10	13	B	16	B	B	B	B	B	B	22	33	22	50	30	30	13	13	15	14	8	9
23	15	30	15	23	17	B	13	B	24	24	B	B	B	51	40	50	40	30	12	8	B	17	9	10
24	10	10	10	17	23	11	22	55	20	B	23	B	B	B	55	30	15	B	30	23	8	10	9	11
25	10	13	14	16	11	8	B	24	25	B	31	55	50	35	24	14	14	14	20	10	10	8	10	10
26	24	15	13	B	24	19	19	30	21	20	14	15	17	15	15	14	15	13	12	9	9	15	8	15
27	20	22	B	10	15	10	B	B	21	B	B	55	56	51	32	17	31	51	45	30	20	10	9	8
28	10	23	15	13	10	12	24	23	20	15	15	15	17	15	13	15	15	24	30	17	30	17	22	10
29	8	15	17	20	19	24	20	25	15	17	15	50	33	31	17	30	30	15	12	19	15	10	9	8
30	9	10	20	B	20	15	20	12	12	13	15	18	19	19	15	15	13	12	13	11	9	10	8	10
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	10	15	15	18	16	16	20	24	20	24	30	38	32	42	30	30	30	24	20	13	10	10	10	10
U Q	14	24	22	B 24	24	B 24	B 30	B 55	B 24	B	B	B	B 56	55	40	34	31	30	30	22	15	14	12	10
L Q	9	9	10	13	11	12	13	13	15	18	18	18	22	20	19	17	15	17	12	10	9	9	9	9

SEP. 1990 FMIN (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

SEP. 1990 H'F (KM) 45°E MEAN TIME (G.M.T. + 3H)

LAT. 69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	A	A	A	A	A	A	A	A	B	250	240	225	230	240	230	E B 265	B	250	235	E B 325	A	A	A	A
2	A	A	A	A	A	A	A	A	190	250	230	240	225	230	225	215	205	220	220	210	200	210	E B 300	B
3	A	A	A	A	A	A	E A 375	240	H 220	225	225	240	245	230	215	220	210	220	210	200	205	210	240	E A 275
4	O 320	E A 350	E A 450	A	E A 430	E A 380	E A 375	290	240	225	220	220	230	230	215	220	230	210	200	210	A	A	A	A
5	A	A	A	A	A	A	B	B	B	B	B	B	E B 325	B	250	240	240	225	240	245	A	B	A	A
6	A	200	A	F	A	A	A	A	275	250	240	H 210	B	E B 350	250	E B 250	215	230	240	220	250	A	A	A
7	A	A	B	E A 325	A	A	A	A	E A 290	260	B	B	B 250	B	E B 345	B	E B 250	270	E A 350	E A 425	A	A	A	A
8	B 245	200	A	A	A	A	A	A	E A 300	250	E B 290	E B 260	250	E B 260	250	230	230	225	240	240	250	250	B	A
9	A	A	A	A	A	A	A	E B 400	275	H 240	240	250	E A 240	210	230	230	225	230	230	230	A	E A 380	A	A
10	A	A	A	B	B	B	E A 450	E A 340	260	B	E B 300	E B 275	230	245	230	230	220	210	240	210	B 220	230	255	260
11	195	A	B	A	A	A	B	A	A	E B 300	250	H 220	225	E B 300	250	250	275	270	280	E A 325	A	A	A	A
12	280	B	B	B	B	A	B	B	B	B	B	B	B	E B 410	E B 275	260	250	B	250	260	A	A	A	A
13	A	A	E A 375	A	A	E A 390	A	B	E A 390	E A 250	H 230	240	240	E B 290	E B 275	250	240	225	230	A	A	A	A	A
14	A	A	A	A	A	B	A	A	A	B	B	260	260	B	E B 280	230	220	230	E B 250	240	A	A	A	E A 260
15	A	A	A	B	B	A	A	A	F	B	E B 300	E B 300	E B 290	E B 280	240	260	E B 270	E B 275	230	E A 380	A	A	A	A
16	A	A	A	E A 310	A	B	B	B	A	E A 240	E B 300	B	B	E A 400	B	B	230	250	270	E A 300	E A 305	A	A	E A 390
17	A	A	A	A	E A 410	E A 390	E A 390	A	E A 290	265	240	240	B	E B 280	240	245	230	E B 250	220	E B 270	E B 255	A	A	A
18	A	B	A	A	A	E A 355	E A 330	270	E A 290	B	B	E B 250	E B 250	E B 300	B	B 240	250	250	E A 300	A	A	A	A	A
19	A	A	A	225	A	B	A	A	B	E A 300	B	B	280	250	240	240	250	240	230	225	A	A	A	A
20	B	A	A	B	B	A	A	A	280	220	240	240	A 230	230	225	230	220	230	220	225	A	A	A	A
21	A	A	A	A	A	B	A	A	E A 325	B	250	B	E B 325	E B 250	E B 350	E B 300	B 250	250	260	B	A	A	A	A
22	A	E A 340	E A 290	A	B	A	B	B	B	B	B	B	250	240	240	E B 280	250	250	250	A	A	A	A	A
23	A	A	A	A	A	B	A	B	A	A	B	B	B	E B 300	E B 250	E B 240	240	225	230	E A 330	B	E A 290	A	A
24	A	A	A	A	A	A	A	B	B	B	E A 300	B	B	B	E B 325	245	270	B	290	275	A	A	A	A
25	A	A	A	A	A	290	B	A	A	B	250	E B 320	E B 300	B 230	225	230	230	225	220	210	225	250	A	A
26	A	A	A	B	A	E A 350	A	A	280	225	215	220	225	225	225	225	240	230	240	245	E A 320	E A 330	A	A
27	A	A	B	A	A	A	B	B	E A 290	B	B	E B 400	E B 340	E B 310	250	240	250	E B 250	B 250	230	230	245	E A 300	E A 375
28	A	A	A	A	A	E A 300	A	A	A	240	225	230	230	210	230	230	230	210	220	215	250	220	E B 260	E A 275
29	A	E A 350	A	A	A	A	A	260	230	250	240	E B 345	240	225	230	230	225	220	215	210	200	210	225	A
30	A	A	A	B	A	A	E B 270	240	240	H 220	230	225	225	A 230	220	225	225	225	210	200	205	205	225	220
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	4	5	3	3	2	7	6	7	17	18	21	21	24	26	28	28	29	28	30	26	13	12	7	7
MED	262	E A 340	E A 375	E A 310	E A 420	E A 355	E A 375	U 255	U 250	245	235	230	236	U 229	234	235	230	228	234	U 222	U 218	U 224	U 240	E A 275
U Q	300	E A 350	E A 450	E A 325		E A 390	E A 390	E 340	E A 290	250	E B 270	E B 268	E B 270	E B 300	E B 250	250	250	250	250	E A 275	E 252	E A 270	E 300	E A 375
L Q	220	200	E A 290	225		300	E 330	240	240	225	230	225	230	230	228	230	225	225	220	210	205	210	225	260

SEP. 1990 H'F (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

OCT. 1990 FXI (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H / D	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 41	56 41	50 41	A 45	47 X 60	60 55	X 73 55	B 66	71 X 75	82 79	96 X 95	X 101 X 106	X 104 X 106	X 115 X 116	X 111 0 X 116	X 112 0 X 116	0 X 106 0 X 114	X 100 0 X 101	X 92 110	X 80 105	X 74 0 X 86	X 60 68	51 51	46 38
2	28	A 55	A 51	0 X 47 66	55	51	66	66	A	75	91	96	X 105	X 107	X 105	0 X 115	X 108	0 X 107	X 96	X 85	X 76	56	44	0 X 47
3	A 47	A	A 48	A X 56	A	48	X 56	65	X 69	65	B	80	71	66	X 69	72	71	X 67	X 72	0 X 52	36	A	B	A
4	A	A 68	B	70	47	68	B	B	B	0 X 58	R	B	0 X 67	X 72	X 79	0 X 84	B	X 88	X 82	X 74	B	56	51	42
5	32	A	A	A	51	56	64	X 68	X 71	0 X 76	B	0 X 84	B	B	X 120	120	106	0 X 111	85	71	70	A	A	A
6	A	A	A	A	B	55	A	61	70	X 80	X 84	X 90	X 86	0 X 106	0 X 106	X 111	X 102	X 98	X 85	X 80	X 66	X 51	A	40
7	A	A	A	C	C	C	C	C	C	X 92	X 91	X 96	X 102	X 110	X 113	X 106	X 105	X 96	91	X 90	0 X 83	75	X 66	X 55
8	41	39	A	A	0 X 51	A	0 X 54	X 62	71	X 91	X 96	105	0 X 111	0 X 113	0 X 116	S	X 101	X 102	102	0 X 101	90	F	A	A
9	A	60	56	A	B	A	B	A	B	B	42	B	A	0 X 46	B	B	X 60	X 49	B	51	X 51	A	A	A
10	A	40	46	55	B	B	B	B	B	B	B	B	B	0 X 68	X 68	X 81	X 91	X 93	66	A	A	A	B	56
11	A	39	61	A	B	60	S	B	B	B	B	B	B	B	S	65	X 69	X 61	X 62	X 54	47	A	A	A
12	46	51	70	70	B	61	B	B	B	B	B	B	B	0 X 76	B	0 X 76	0 X 78	X 73	X 71	B	B	45	0 X 38	A
13	45	51	B	71	71	60	B	B	70	A	B	B	0 X 86	0 X 91	X 91	B	X 90	0 X 91	X 80	X 61	X 46	A	A	A
14	A	45	B	B	B	62	80	80	A	X 72	B	B	B	X 80	86	86	X 86	65	51	A	A	A	A	A
15	A	A	56	70	A	65	B	65	70	69	B	B	B	B	B	0 X 76	X 80	X 76	74	X 72	X 66	70	65	A
16	A	A	A	80	B	B	73	90	96	95	B	B	0 X 96	0 X 102	X 101	0 X 101	X 91	X 88	X 81	X 80	X 76	70	X 64	X 60
17	61	X 57	56	52	70	81	96	96	110	X 121	X 120	X 121	X 125	X 125	123	121	0 X 118	0 X 114	X 90	0 X 76	53	A	65	58
18	A	A	70	70	66	X 65	B	A	A	X 77	0 X 77	0 X 79	0 X 84	X 90	X 93	X 99	0 X 101	0 X 101	0 X 96	0 X 86	81	X 80	X 76	A
19	A	46	60	70	71	71	71	65	B	X 76	80	84	X 90	0 X 94	0 X 61	X 105	X 106	X 92	A	A	60	52	A	A
20	A	65	S	70	0 X 58	52	A	X 59	X 62	B	A	S	S	B	S	X 86	0 X 77	B	66	66	66	61	58	56
21	45	41	X 48	58	A	72	71	A	A	X 90	0 X 89	0 X 86	90	X 88	X 91	X 90	0 X 86	X 87	X 80	70	X 61	0 X 61	X 55	X 53
22	51	51	55	71	71	76	85	90	X 96	X 96	X 96	0 X 95	X 96	X 93	X 91	X 86	X 86	0 X 81	X 81	X 78	78	X 72	66	A
23	56	A	56	A	60	A	B	A	44	A	A	S	0 X 65	X 71	B	X 65	X 67	S	55	X 55	X 52	46	A	0 X 37
24	32	45	X 48	A	B	A	A	B	B	0 X 62	X 64	X 65	X 68	0 X 72	B	X 74	X 76	X 79	X 79	X 74	0 X 74	X 75	71	60
25	59	40	0 X 50	A	60	70	X 75	0 X 82	X 90	X 91	X 86	X 84	0 X 84	X 80	X 78	X 80	X 76	X 73	X 80	0 X 76	X 65	41	A	A
26	A	A	A	46	45	0 X 55	X 61	B	B	B	B	A	B	70	0 X 80	X 81	B	X 80	X 76	X 70	X 56	X 44	X 44	43
27	41	46	56	B	61	71	75	X 85	X 83	80	81	X 81	0 X 75	X 72	72	X 75	X 70	X 69	X 70	X 70	X 66	X 64	66	X 65
28	66	68	0 X 76	X 80	X 80	0 X 86	0 X 81	X 95	X 95	X 100	0 X 98	X 96	X 96	0 X 86	0 X 88	B	0 X 82	X 79	X 76	X 72	X 61	X 52	45	45
29	A	A	A	A	A	B	B	A	B	S	63	B	B	B	B	X 57	S	X 55	X 51	54	X 54	46	A	A
30	A	A	0 X 48	A	36	0 X 53	60	A	A	B	B	B	B	B	B	B	B	62	X 53	X 51	0 X 51	51	A	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	14	19	18	16	18	23	17	16	16	21	17	17	20	25	22	26	27	29	29	27	27	22	17	16
MED	45	46	56	70	60	61	71	67	71	X 80	X 89	X 90	X 90	X 88	X 91	X 86	X 86	X 87	X 80	X 72	X 66	58	58	50
U Q	56	56	60	70	70	71	78	88	X 92	X 92	X 96	X 98	X 103	X 106	X 111	X 106	X 105	0 X 99	X 88	X 80	X 76	70	66	57
L Q	41	41	X 48	54	51	55	X 60	65	70	74	78	X 82	0 X 80	X 72	X 79	X 76	X 76	X 71	68	X 61	X 53	51	48	42

OCT. 1990 FXI (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

OCT. 1990 FOF2 (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

D \ H	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	F 50	F	A	F 41	F 50	67	B	F 65	F 76	F 90	95	98	109	105	106	100	94	86	J S 74	68	54	F 45	F 40
2	F 35	F 35	F 35	F 39	54	F 46	F 45	60	69	F 73	89	100	100	110	D R 110	U R 110	108	R 95	F 104	F 99	80	F 62	F 45	F 32
3	F 22	A	A	41	F 49	F 45	F	F 60	A	F 69	F 85	F 90	99	101	99	109	102	101	90	79	70	F 50	F 38	R 41
4	A	F 41	A	A	A	F 42	J S 50	F 59	J S 63	F 59	B	F 70	F 65	F 60	63	F 66	F 65	61	66	46	F 30	A	B	A
5	A	A	B	F	F 41	F 58	B	B	B	52	R	B	61	66	R 73	U R 78	B	82	76	68	B	F 50	F 45	F 35
6	F 26	A	A	A	F 45	F 50	F 56	62	65	R 70	B	D R 78	B	B	114	F	F 100	105	F 79	F 65	F 60	A	A	A
7	A	A	A	A	B	F	A	F 55	F 64	74	78	84	80	100	U R 100	105	96	92	79	74	60	45	A	F 34
8	A	A	A	C	C	C	C	C	C	86	85	90	96	104	107	100	99	90	F 85	84	R 77	F 69	60	R 49
9	F 35	F 33	A	A	U R 45	A	R 48	R 56	F 65	U R 85	90	F 99	105	107	R 110	S	95	96	F 96	U R 95	F 84	F	A	A
10	A	F 50	F 50	A	B	A	B	A	B	B	F 36	B	A	40	B	B	54	43	B	F 45	45	A	A	A
11	A	F 34	F 40	F 49	B	B	B	B	B	B	B	B	B	62	62	75	85	87	F 60	A	A	A	B	F 50
12	A	F 33	F 55	A	B	F 54	S	B	B	B	B	B	B	B	S	F 59	63	55	56	48	F 41	A	A	A
13	F 40	F 45	F	F 64	B	F 55	B	B	B	B	B	B	B	U R 70	B	70	72	67	65	B	B	F 35	32	A
14	F 39	F 45	B	F 65	F 65	F 54	B	B	F 64	A	B	B	80	D R 85	85	B	84	85	74	55	40	A	A	A
15	A	F 35	B	B	B	F 56	F 74	F 70	A	66	B	B	B	74	F 80	F 80	80	F 59	F 45	A	A	A	A	A
16	A	A	F 50	F	A	F 59	B	F 59	F 64	F 63	B	B	B	B	B	70	74	70	F 68	66	60	F 64	F 55	A
17	A	A	A	F	B	B	F 67	F 84	F 90	F 89	B	B	D S 90	U R 96	95	95	85	82	75	74	70	F 64	58	54
18	F 55	51	F 50	F 46	F 60	F 75	F 90	F 90	F 104	115	J S 114	R 115	119	J S 119	F 117	F 115	112	108	84	70	F 45	A	F 50	F 52
19	A	A	F	F 60	F 60	59	B	A	A	71	R 71	73	78	84	87	93	R 95	95	D S 90	80	F 75	74	70	A
20	A	F 40	F 50	F 60	F 65	F 65	F 65	F 59	B	70	F 74	F 78	84	88	85	J S 99	J S 100	J S 86	A	A	F 52	F 46	A	A
21	A	F	S	F	52	F 46	A	53	56	B	A	S	S	B	S	80	71	B	F 60	F 60	F 58	F 55	F 50	F 50
22	F	F 34	42	F 50	A	F 66	F 65	A	A	84	U R 83	R 80	F 84	U R 82	85	84	80	81	74	F 64	55	55	49	47
23	F 45	F 45	F 45	F 65	U S 65	F 70	F 79	F 80	90	R 90	90	R 89	90	87	R 85	80	80	D S 75	75	72	F 72	66	F 60	A
24	F 45	A	F 50	A	F 50	A	B	A	F 38	A	A	S	R 59	65	B	59	61	S	F 49	49	46	F 40	A	31
25	F 26	F 39	42	A	B	A	A	B	B	56	58	59	62	66	B	68	70	73	73	68	68	69	F 65	F 54
26	F 53	F 34	44	A	F 54	F 60	69	76	84	85	80	78	R 78	J S 74	J S 72	R 74	70	67	74	70	59	F	A	A
27	A	A	A	F 40	F 39	49	55	B	B	B	B	A	B	F 64	U R 74	75	B	R 74	70	64	50	F 38	38	F 37
28	F 35	F 40	F 50	B	F 55	F 65	F 69	79	77	F 70	F 75	75	69	66	F 66	69	64	63	64	64	60	58	F 60	59
29	F 60	F 62	70	74	74	D S 80	U S 85	J S 89	J S 89	94	92	J S 90	J S 90	D S 80	D S 82	B	U R 76	73	70	66	55	46	F 39	F 39
30	A	A	A	A	A	B	B	A	B	S	F 57	B	B	B	B	51	S	49	45	F 48	F 48	F 40	A	A
31	A	A	42	A	F 30	47	F 59	A	A	B	B	B	B	B	B	B	B	F 56	J S 47	45	45	F 45	A	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	13	18	15	12	18	22	16	16	16	21	17	17	20	25	22	25	27	29	29	27	27	21	17	16
MED	F 39	F 40	F 50	F 55	F 53	F 56	F 66	F 61	65	73	83	U 86	84	83	86	80	80	82	74	66	59	F 54	F 50	F 44
U Q	F 49	F 45	F 50	F 64	F 60	F 65	F 72	F 80	86	86	90	92	97	100	105	100	99	93	82	74	70	64	F 60	F 51
L Q	F 30	F 34	42	F 44	F 45	F 49	56	F 59	F 64	68	F 72	76	74	66	74	70	70	65	62	55	46	F 45	F 42	F 36

OCT. 1990 FOF2 (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

OCT. 1990 FES (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

D \ H	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	37	31	26	41	39	28	36	B	41	33	26	36	65	38	36	33	32	22	20	15	E B 10	E B 10	E B 8	E B 8
2	E B 8	26	E B 10	E B 10	11	11	17	26	25	33	34	33	36	32	E B 51	27	32	25	22	E B 19	E B 13	12	34	34
3	31	32	36	41	41	36	32	41	36	40	31	32	33	39	36	34	31	31	28	27	32	33	27	40
4	38	33	90	70	46	40	50	40	34	E B 37	B	32	31	30	E B 30	28	27	23	28	27	34	40	B	40
5	32	62	B	43	E B 30	E B 44	B	B	B	43	E B 35	B	E B 38	27	31	E B 54	B	E B 30	E B 30	E B 40	B	E B 30	E B 24	25
6	32	70	31	47	44	38	15	27	25	E B 55	B	E B 35	B	B	E B 50	E B 55	E B 54	E B 30	E B 39	E B 36	E B 23	34	40	36
7	50	43	45	57	B	20	56	50	26	34	31	32	35	42	40	47	40	28	22	20	24	15	40	26
8	21	41	41	C	C	C	C	C	C	33	32	34	32	31	28	31	28	25	21	18	E B 20	E B 19	E B 13	11
9	E B 12	32	35	34	38	40	45	34	32	34	34	33	34	35	32	E B 55	32	32	27	21	26	80	34	51
10	45	40	51	45	B	40	B	65	B	B	34	B	56	31	B	B	26	31	B	40	41	37	29	40
11	37	32	42	32	B	B	B	B	B	B	B	B	B	E B 60	E B 50	E B 32	E B 51	25	28	31	74	28	B	57
12	51	44	40	52	B	40	E B 30	B	B	B	B	B	B	B	E B 33	E B 30	32	33	26	26	36	36	70	43
13	59	31	31	34	B	31	B	B	B	B	B	B	B	E B 55	B	28	27	E B 52	24	B	B	26	E B 18	45
14	56	39	B	27	31	23	B	B	41	39	B	B	E B 55	E B 47	E B 35	B	E B 30	31	E B 30	25	32	39	37	67
15	40	41	B	B	B	32	27	E B 40	43	38	B	B	B	E B 55	39	E B 34	28	39	40	40	36	37	40	62
16	55	35	33	34	36	27	B	40	42	41	B	B	B	B	B	E B 39	E B 31	27	26	E B 24	20	26	15	36
17	56	41	41	32	B	B	31	32	28	31	B	B	E B 60	E B 35	33	31	31	28	22	24	16	16	E B 12	E B 12
18	39	31	36	36	19	21	26	53	57	33	40	32	E B 36	E B 52	35	34	31	32	E B 30	30	32	40	36	36
19	42	43	39	33	32	32	B	42	63	51	32	E B 55	32	32	E B 47	E B 34	E B 33	E B 55	E B 54	E B 30	26	21	27	39
20	59	51	40	29	31	32	32	40	B	40	32	39	32	32	E B 55	32	32	31	41	41	36	35	41	57
21	40	26	71	47	60	36	46	41	44	B	32	33	E B 35	B	E B 54	E B 32	E B 55	B	E B 31	40	E B 30	31	18	33
22	25	31	E B 30	E B 24	41	43	E B 50	51	62	40	E B 53	32	22	32	32	31	34	32	22	16	20	25	27	26
23	30	34	32	E B 33	E B 38	28	27	31	33	27	31	31	32	36	32	64	28	E B 30	25	16	16	E B 17	16	37
24	20	57	39	44	42	57	B	31	30	36	34	31	36	E B 35	B	27	27	25	36	34	32	35	34	23
25	31	36	26	56	B	51	28	B	B	32	32	31	31	E B 55	B	E B 31	30	32	25	E B 24	E B 30	E B 19	E B 15	26
26	36	34	46	45	27	25	23	32	33	35	34	32	31	31	31	31	27	32	31	27	32	30	39	36
27	45	46	41	35	41	40	33	B	B	B	B	32	B	31	31	28	B	E B 30	E B 30	24	19	31	31	34
28	31	51	40	B	40	33	41	40	40	37	32	31	E B 55	E B 55	31	28	27	E B 30	23	19	16	E B 17	14	12
29	12	12	27	22	25	26	31	32	32	33	32	32	35	35	31	B	E B 55	27	E B 30	21	26	20	36	36
30	102	45	59	57	55	B	B	51	B	E B 38	28	B	B	B	B	30	28	31	27	25	27	28	35	39
31	41	45	45	42	32	33	33	35	41	B	B	B	B	B	B	B	B	E B 30	26	35	36	49	41	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	31	31	28	28	22	27	21	22	21	24	20	20	22	25	24	27	28	30	30	30	29	31	29	30
MED	38	39	40	38	38	32	32	40	36	35	32	32	34	33	32	31	30	30	26	25	26	30	31	36
U Q	50	45	44	46	41	40	43	42	42	40	34	34	E B 38	E B 50	E B 44	E B 34	E B 32	32	30	34	33	36	38	40
L Q	31	32	32	32	31	27	27	32	31	33	32	32	32	32	31	30	28	27	24	21	20	E B 19	E B 17	26

OCT. 1990 FOES (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

OCT. 1990 FMIN (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT. 69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

D \ H	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	9	8	8	18	10	10	10	B	14	13	14	10	13	13	12	10	10	10	12	11	10	10	8	8
2	8	10	10	10	8	8	9	10	12	10	10	11	10	23	51	17	13	20	15	19	13	8	9	10
3	13	12	8	12	10	10	12	18	20	14	20	15	18	15	10	12	10	10	10	8	8	8	10	8
4	10	9	10	15	13	15	13	15	20	37	B	25	20	19	30	20	17	20	12	21	14	10	B	15
5	25	20	B	15	30	44	B	B	B	15	35	B	38	15	20	54	B	30	30	40	B	30	24	10
6	8	25	18	15	15	14	10	10	10	55	B	35	B	B	50	55	54	30	39	36	23	10	8	10
7	14	24	13	18	B	14	18	14	14	14	15	14	20	31	25	23	15	12	12	15	24	9	10	8
8	17	30	30	C	C	C	C	C	C	15	19	18	18	19	12	17	17	15	12	13	20	19	13	9
9	12	9	11	10	24	20	23	20	13	14	15	15	18	20	15	55	13	13	15	13	13	9	8	9
10	10	10	10	19	B	17	B	15	B	B	16	B	23	20	B	B	12	25	B	12	11	10	8	10
11	9	9	8	9	B	B	B	B	B	B	B	B	B	60	50	32	51	20	24	20	20	8	B	10
12	24	19	10	25	B	20	30	B	B	B	B	B	B	B	33	30	23	25	24	15	9	10	13	8
13	14	24	23	20	B	24	B	B	B	B	B	B	B	55	B	23	13	52	20	B	B	10	18	9
14	11	8	B	19	12	12	B	B	20	30	B	B	55	47	35	B	30	19	30	16	10	10	15	8
15	22	15	B	B	B	18	15	40	25	30	B	B	B	55	24	34	16	19	15	18	11	10	15	10
16	20	14	10	12	30	15	B	18	22	23	B	B	B	B	B	39	31	19	14	24	10	9	10	9
17	21	24	30	14	B	B	24	15	17	10	B	B	60	35	24	25	24	15	14	14	11	10	12	12
18	11	10	12	19	13	10	12	14	15	15	18	20	36	52	20	21	15	14	30	30	20	18	10	13
19	15	14	14	14	20	21	B	30	20	18	20	55	24	20	47	34	33	55	54	30	18	14	9	10
20	10	10	10	9	10	10	11	16	B	19	20	13	19	23	55	17	20	24	15	15	10	10	9	10
21	10	10	15	13	10	15	10	14	24	B	22	20	35	B	54	32	55	B	31	20	30	12	10	9
22	8	8	30	24	20	25	50	30	25	19	53	24	20	20	13	19	12	15	10	10	15	10	10	8
23	8	8	11	19	38	18	19	10	15	15	15	19	15	15	18	14	15	30	12	10	11	17	10	11
24	10	23	15	20	19	23	B	18	18	18	24	19	24	35	B	20	15	15	13	14	14	10	9	19
25	11	15	15	39	B	19	14	B	B	25	20	18	21	55	B	31	15	11	15	24	30	19	15	8
26	10	10	15	25	14	17	15	14	13	10	14	17	23	17	20	20	20	11	10	12	10	10	10	24
27	15	23	18	20	13	13	11	B	B	B	B	24	B	24	14	14	B	30	30	10	12	9	19	10
28	10	10	12	B	15	19	13	14	15	15	20	24	55	55	24	18	14	30	18	15	13	17	10	9
29	8	10	14	10	9	10	12	14	10	12	15	18	20	30	20	B	55	18	30	15	10	10	15	10
30	19	10	10	10	9	B	B	22	B	38	15	B	B	B	B	15	19	14	11	10	14	10	8	8
31	14	9	15	19	11	11	20	15	15	B	B	B	B	B	B	B	B	30	22	23	13	9	12	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	31	31	31	30	30	30	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	11	10	14	18	17	17	18	18	20	19	20	24	24	31	30	23	17	19	15	15	13	10	10	10
U Q	15	20	18	20	B	21	B	B	B	B 55	B	B	B	B 55	B 55	39	33	30	30	23	20	12	15	10
L Q	10	9	10	12	11	12	12	14	15	14	15	18	20	20	20	17	14	14	12	12	10	9	9	8

OCT. 1990 FMIN (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

OCT. 1990 H'F (KM) 45°E MEAN TIME (G.M.T. + 3H)

LAT. 69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H / D	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	E A 300	A	A	A	E A 340	E A 310	B	270	H 215	225	220	230	225	230	225	225	215	215	210	210	205	225	230
2	250	275	E B 310	E B 340	E A 345	E A 320	270	230	225	225	225	225	225	230	E B 270	230	230	225	215	220	220	225	E A 310	250
3	E A 350	A	A	A	A	A	F	A	A	E A 310	225	225	240	230	230	230	240	240	225	225	E A 235	225	E A 290	A
4	A	270	A	A	A	A	E A 275	E A 250	E A 300	E B 330	B	240	230	250	240	240	245	250	270	260	E A 400	A	B	A
5	A	A	B	E A 400	E B 400	B	B	B	B	E B 320	E B 275	B	E B 275	240	240	E B 275	B	245	230	245	B	B 250	270	280
6	A	A	A	A	A	E A 380	A	260	230	B	B	B 240	B	B	E B 300	250	E B 270	250	240	B 250	250	A	A	A
7	A	A	A	A	B	E A 350	A	E A 330	260	230	230	230	E A 250	E A 260	250	250	230	240	220	230	225	245	A	E A 300
8	A	A	A	C	C	C	C	C	C	230	225	240	230	240	230	230	240	220	220	210	240	210	225	240
9	260	E A 350	A	A	E A 300	A	A	E A 310	230	H 225	230	230	220	230	230	E B 280	240	245	230	220	250	F	A	A
10	A	E A 325	E A 390	A	B	A	B	A	B	B	A 220	B	A	E A 290	B	B	E A 255	E A 290	B	E A 390	E A 350	A	A	A
11	A	A	E A 300	250	B	B	B	B	B	B	B	B	B	E B 500	E B 500	260	E B 320	250	E A 270	A	A	A	B	E A 400
12	A	E A 430	240	A	B	E A 425	E B 340	B	B	B	B	B	B	B	B 240	240	A 250	A 270	280	260	E A 375	A	A	A
13	E A 400	B	E A 410	E A 420	B	E A 350	B	B	B	B	B	B	B	E B 400	B	230	230	E B 340	270	B	B	E B 300	E B 340	A
14	A	E A 310	B	E A 370	E A 275	E A 290	B	B	B	A	B	B	E B 380	E B 290	B 230	B	225	240	230	250	E A 340	A	A	A
15	A	E B 280	B	B	B	E A 400	E A 325	B	A	A	B	B	B	B	240	B 250	250	E A 350	E A 350	A	A	A	A	A
16	A	A	A	E A 350	A	E A 310	B	A	A	A	B	B	B	B	B	E B 250	240	A 230	230	240	230	255	230	A
17	A	A	A	Q 340	B	B	A	235	225	240	B	B	B	E B 240	230	240	240	245	240	240	235	230	240	250
18	280	E A 325	E A 390	A	A	275	250	245	230	230	225	225	230	E B 300	240	230	225	220	250	260	E A 350	A	E A 300	270
19	A	A	A	E A 310	E A 330	E A 350	B	A	A	265	A 250	B	240	240	E B 270	250	250	E B 280	E B 290	245	260	260	270	A
20	A	A	A	E A 350	E A 325	E A 300	260	E A 300	B	275	240	240	240	A 260	B	250	250	270	A	A	E A 320	A	A	A
21	A	E A 325	A	Q 350	A	A	A	220	A	B	A	E A 260	250	B	B	250	B	B	260	275	260	280	275	E A 340
22	A	A	B	290	A	A	B	A	A	E A 250	B	E A 230	225	215	245	230	240	230	240	250	240	270	240	260
23	E A 290	E A 360	E A 400	E A 310	E B 290	A	250	235	230	225	H 220	220	225	225	240	230	230	250	240	230	230	245	250	A
24	250	A	B	A	A	A	B	A	240	A	A	240	260	240	B	240	240	E A 280	E A 325	E A 315	E A 295	E A 330	A	A
25	A	A	E A 390	A	B	A	A	B	B	A 230	E A 260	225	E A 300	E B 420	B	240	240	230	235	240	250	235	240	E A 270
26	A	A	A	A	E A 380	E A 290	250	245	245	230	230	A 230	E A 240	A 225	240	210	240	240	245	245	E A 310	A	A	A
27	A	A	A	A	A	A	A	B	B	B	B	A	B	220	250	245	B	E B 245	250	250	270	E A 365	E A 350	A
28	E A 350	E A 400	E A 255	B	A	A	E A 325	A 225	A	220	E A 240	230	E B 430	E B 400	240	225	230	240	245	250	240	245	250	270
29	250	250	290	290	300	260	260	240	220	H 210	A 200	225	225	230	E A 255	B	E B 300	230	250	245	255	320	A	E A 350
30	A	A	A	A	A	B	B	A	B	E B 260	H 200	B	B	B	B	225	240	250	250	260	270	320	A	A
31	A	A	A	A	E A 360	A	A	A	A	B	B	B	B	B	B	B	B	250	E A 310	E A 350	A	A	A	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	9	13	10	13	10	14	11	13	12	19	17	18	20	24	22	27	27	30	29	27	26	19	16	13
MED	U 265	E A 325	E A 350	E A 340	E A 328	E A 330	260	238	230	228	225	230	234	232	238	235	240	242	240	245	242	248	U 248	260
U Q	E A 350	E A 355	E A 390	E A 360	E A 360	E A 350	E A 325	E A 280	252	E 265	E A 240	240	E 255	E B 290	E B 250	250	E 250	E 250	E 270	260	E A 310	E 300	E A 295	E A 320
L Q	250	278	290	300	E A 300	290	250	232	228	225	222	225	228	230	230	230	230	230	230	230	235	230	240	250

OCT. 1990 H'F (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

NOV. 1990 FXI (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	A	B	O X 49	40	55	S	O X 61	67	X 73	B	X 77	80	X 75	X 72	X 75	O X 72	X 65	X 67	X 68	X 63	X 60	57	X 56
2	40	A	B	O X 51	A	B	A	A	B	O X 56	B	S	A	O X 64	X 65	X 64	X 65	X 63	X 65	X 62	O X 61	X 56	X 50	A
3	A	A	A	B	S	B	A	A	71	X 77	X 80	X 80	X 78	X 79	X 80	X 80	X 74	71	X 68	X 70	X 71	X 66	O X 62	45
4	41	A	47	46	46	A	65	A	X 63	70	74	X 76	X 76	X 78	X 80	74	X 78	74	73	X 77	X 70	71	60	59
5	50	61	70	72	72	O X 83	X 90	X 90	X 95	X 93	X 97	X 96	X 91	X 90	O X 91	O X 85	X 85	X 81	O X 85	75	X 81	75	O X 72	71
6	70	61	X 58	70	71	80	86	80	94	95	X 91	X 89	X 86	O X 86	X 80	O X 84	80	80	75	71	O X 72	73	67	66
7	66	62	70	70	75	B	X 91	X 96	X 98	X 100	X 96	X 97	X 96	X 96	X 93	X 91	X 81	X 76	O X 72	65	B	56	X 56	67
8	56	A	A	A	O X 65	76	X 90	X 96	X 101	O X 101	105	96	X 99	X 96	O X 97	O X 96	O X 86	X 86	O X 86	X 82	O X 74	A	A	56
9	57	47	A	X 55	70	A	A	A	A	O X 66	X 66	X 70	B	B	O X 73	X 74	X 76	X 76	X 72	X 70	X 58	48	O X 49	X 51
10	X 53	X 51	X 52	62	B	B	70	A	65	70	75	O X 76	B	O X 74	O X 71	O X 75	X 76	X 71	X 64	X 51	X 52	O X 49	O X 48	46
11	50	60	A	A	B	60	O X 51	A	B	A	B	B	B	B	O X 69	O X 70	B	X 66	X 62	B	O X 64	62	57	X 52
12	46	60	A	70	70	71	80	X 72	X 81	O X 90	X 92	B	O X 90	X 86	X 82	X 81	X 80	X 78	X 80	O X 76	X 76	X 76	65	X 66
13	66	X 54	O X 58	B	72	76	X 90	X 96	O X 101	X 100	O X 101	X 96	X 95	X 88	O X 86	X 80	X 76	X 75	X 74	X 74	O X 74	O X 73	X 70	X 70
14	X 70	X 66	63	80	X 80	70	78	90	X 103	X 98	X 104	X 99	X 100	X 91	O X 86	O X 85	X 80	X 76	X 72	O X 73	O X 75	X 80	X 79	78
15	66	81	84	X 92	80	O X 86	O X 97	104	105	X 102	95	X 100	X 91	86	X 80	X 79	X 78	X 74	X 71	X 71	71	74	70	70
16	S	A	70	70	79	80	76	72	70	A	B	B	70	B	O X 92	O X 77	A	A	61	X 58	53	50	O X 52	O X 49
17	51	A	59	60	60	60	66	A	A	58	S	B	X 72	80	O X 79	O X 76	69	S	A	X 53	O X 52	A	A	A
18	46	A	51	A	A	66	71	X 80	X 72	B	71	71	78	B	83	O X 82	X 78	X 61	A	A	52	O X 54	A	A
19	A	51	58	58	A	74	72	A	A	70	X 78	X 80	X 81	O X 76	X 85	X 81	X 81	X 80	76	X 71	X 70	X 60	X 55	X 49
20	X 51	O X 63	O X 60	B	70	70	74	O X 69	O X 76	72	74	90	76	O X 78	X 80	X 80	X 80	X 78	X 74	X 70	X 70	X 70	X 68	58
21	54	58	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
24	C	C	C	C	C	A	71	X 81	X 96	X 96	X 90	X 94	X 96	X 90	O X 86	X 80	X 75	X 76	O X 73	X 72	O X 74	O X 75	X 70	71
25	X 80	X 76	X 80	X 80	80	X 92	92	X 102	105	105	X 102	X 100	X 96	X 86	X 86	X 85	76	72	O X 73	70	71	66	X 58	O X 46
26	56	X 59	O X 65	X 66	X 65	A	A	A	X 71	71	81	X 84	X 72	X 73	X 71	X 72	X 71	X 66	X 60	X 61	65	O X 66	O X 66	64
27	63	68	70	65	A	60	A	X 56	S	S	B	S	S	S	S	X 60	O X 66	S	A	S	65	O X 59	F	A
28	S	A	F	45	36	41	45	A	46	A	A	B	S	S	S	X 62	X 65	X 65	X 60	X 57	X 55	X 51	53	B
29	O X 50	B	60	X 55	B	X 57	A	A	69	71	70	X 71	X 70	X 71	O X 66	X 69	X 67	X 67	X 64	X 62	X 61	X 61	X 60	X 56
30	55	57	A	A	B	B	B	A	X 67	X 71	X 65	X 66	O X 66	X 65	X 70	X 72	X 72	O X 71	X 65	A	O X 51	X 52	X 58	58
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	22	17	17	19	17	18	19	15	21	22	20	20	21	21	25	27	25	24	24	23	26	25	23	22
MED	54	60	60	65	70	70	76	X 81	X 76	X 75	X 86	X 86	X 81	X 80	X 80	X 79	X 76	X 74	X 72	X 70	X 68	X 62	X 60	58
U Q	66	X 64	70	70	77	X 80	X 90	X 96	X 100	X 98	X 96	X 96	X 96	X 89	O X 86	O X 82	X 80	X 77	X 74	X 73	O X 72	X 73	X 68	67
L Q	50	56	58	X 55	62	60	70	X 72	68	70	74	X 76	X 74	X 74	X 72	X 72	X 72	X 66	X 64	X 62	X 58	X 55	X 55	X 51

NOV. 1990 FXI (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

NOV. 1990 FOF2 (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	A	B	43	F 34	F 49	S	R 55	F 61	67	B	71	F 74	69	66	69	66	J S 59	61	62	57	54	F 51	50
2	F 34	A	B	R 45	A	B	A	A	B	U R 50	B	S	A	58	59	58	59	57	59	56	55	J S 50	44	A
3	A	A	A	B	S	B	A	A	F 65	71	74	74	72	73	74	74	68	F 65	62	64	65	60	56	F 39
4	F 35	A	F 41	F 40	F 40	A	F 59	A	57	F 64	F 68	70	70	72	74	F 68	72	F 68	F 67	71	64	F 65	F 54	F 53
5	F 44	F 55	F 60	F 66	F 66	77	U R 84	J S 84	89	87	91	90	85	J S 84	U R 85	R 79	79	75	79	F 69	75	F 69	66	F 65
6	F 64	F 55	J S 52	F 64	F 65	F 74	F 80	F 70	F 88	F 89	85	J S 83	80	80	J S 74	78	74	J S 73	F 69	F 65	66	F 67	F 61	F 60
7	F 60	F 56	F 60	F 64	F 69	B	85	90	92	94	J S 90	91	90	90	87	85	75	70	66	F 57	B	F 48	50	F 60
8	F 50	A	A	A	59	F 70	84	90	95	95	F 99	F 90	93	90	91	90	80	80	80	76	68	A	A	F 50
9	F 45	F 41	A	49	F 60	A	A	A	A	60	60	64	B	B	67	68	70	70	66	64	52	F 42	R 43	45
10	47	45	46	F 56	B	B	F 60	A	F 59	F 60	F 66	70	B	68	65	69	70	65	58	45	46	43	42	F 40
11	F 44	F 50	A	A	B	F 54	45	A	B	A	B	B	B	B	U R 63	64	B	60	56	B	58	F 56	F 48	46
12	F 40	F 50	A	F 55	F 60	F 65	F 70	66	75	84	86	B	D R 84	80	76	75	74	72	74	70	70	70	F 59	60
13	F 56	R 48	U R 52	B	F 66	F 70	J S 84	90	95	94	95	90	89	82	80	74	70	69	68	68	68	67	64	64
14	64	60	F 57	F 70	J S 74	F 60	F 72	F 84	97	R 92	98	93	94	85	80	79	J S 74	70	66	67	69	J S 74	J S 73	F 72
15	F 60	F 75	F 78	J S 86	F 70	80	91	F 98	F 99	D R 98	F 89	94	85	F 80	J S 74	73	72	68	65	65	F 65	68	F 64	F 60
16	S	A	F 64	F 60	F 72	F	F 70	F 66	F 64	A	B	B	F 64	B	86	71	A	A	F 55	52	F 47	F 44	R 46	43
17	F 45	A	F 53	F 54	F 50	F 54	F 60	A	A	F 52	S	B	66	F 74	73	70	F 63	S	A	47	46	A	A	A
18	F 40	A	F 45	A	A	F 60	F 65	74	R 66	B	F 65	F 65	F 72	B	F 77	76	72	55	A	A	F 46	48	A	A
19	A	F 45	F 52	F 50	A	F 68	F 66	A	A	F 64	72	74	75	U R 70	79	75	75	74	F 70	65	64	54	49	43
20	45	57	54	B	F 64	F 60	F 68	63	70	F 66	F 68	F 80	F 70	U R 72	74	74	74	71	68	64	64	64	62	F 52
21	F 48	F 52	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
24	C	C	C	C	C	A	F 65	75	90	90	84	88	90	J S 84	80	74	69	70	67	66	68	69	64	F 65
25	U R 74	70	J S 74	J S 74	F 70	86	F 85	U R 96	F 99	F 99	U R 96	94	90	80	80	79	F 70	F 66	67	F 64	F 65	F 60	52	40
26	F 50	J S 53	59	60	59	A	A	A	65	F 65	F 75	78	66	67	65	66	65	60	U R 54	55	F 59	R 60	60	F 54
27	F 54	F 56	F 60	F 55	A	F 50	A	U R 50	S	S	B	S	S	S	S	54	60	S	A	S	F 55	53	F	A
28	S	A	F	F 39	F 30	F 35	F 39	A	F 40	A	A	B	S	S	S	56	59	59	54	51	49	45	F 47	B
29	44	B	F 54	R 49	B	51	A	A	F 63	F 65	F 64	65	64	65	60	63	61	61	58	56	55	55	54	50
30	F 49	F 51	A	A	B	B	B	A	61	65	59	60	60	59	64	66	66	65	59	A	45	46	52	F 50
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	22	17	17	19	17	17	19	15	21	22	20	20	21	21	25	27	25	24	24	23	26	25	23	22
MED	F 48	F 53	F 54	F 55	F 64	F 60	F 70	75	70	69	80	79	75	74	74	73	70	68	66	64	62	56	54	F 51
U Q	F 56	56	F 60	F 64	F 70	72	84	90	94	92	90	90	90	83	80	76	74	70	68	67	66	67	62	F 60
L Q	F 44	F 49	F 52	49	F 54	F 52	F 60	66	F 62	F 64	F 67	70	68	68	66	66	66	60	58	56	52	48	48	45

IONOSPHERIC DATA STATION SHOWA ST.

NOV. 1990 FES (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT. 69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H / D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	41	B	32	26	23	31	40	31	30	B	31	32	31	32	31	E B 54	E B 50	E B 39	24	22	E B 18	15	30
2	32	47	B	E B 30	41	B	61	34	B	31	B	32	31	31	29	31	26	32	28	25	28	16	26	41
3	90	33	40	B	31	B	43	45	34	35	36	31	32	32	31	31	32	32	30	27	21	18	31	32
4	36	47	45	45	32	45	42	41	36	31	37	31	33	40	32	38	47	60	32	28	27	27	13	20
5	21	11	27	17	27	31	32	33	36	38	39	33	32	45	36	37	32	33	31	27	25	16	22	31
6	36	32	36	41	35	27	32	35	32	39	39	40	41	36	36	34	36	27	32	31	27	26	21	26
7	11	E B 17	27	28	32	B	40	34	36	36	35	45	38	41	46	53	40	40	31	26	B	40	36	31
8	36	90	70	56	47	45	31	36	36	E B 56	33	33	35	E B 38	40	36	31	E B 30	26	31	41	42	47	45
9	38	41	82	41	42	60	34	46	60	53	37	34	B	B	E B 52	31	31	28	27	21	41	40	26	23
10	21	29	40	60	B	B	32	41	41	46	33	E B 52	B	E B 55	E B 56	E B 60	E B 35	26	40	40	40	49	41	48
11	39	35	41	47	B	34	31	33	B	40	B	B	B	B	E B 39	E B 52	B	29	25	B	E B 39	26	24	35
12	27	32	41	42	31	31	31	32	31	32	33	B	E B 54	41	51	46	34	37	26	23	30	20	E B 16	13
13	23	31	41	B	37	31	32	36	35	32	32	33	36	36	34	33	33	30	36	22	20	16	16	14
14	28	32	40	35	42	41	36	32	36	36	35	34	36	37	36	40	36	31	32	26	31	27	26	20
15	13	12	20	27	32	42	79	32	32	34	34	34	35	40	37	33	36	32	26	22	25	22	17	29
16	E B 24	31	39	40	42	51	46	40	31	58	B	B	33	B	E B 51	38	32	32	32	37	44	42	47	42
17	42	90	35	37	36	38	33	41	43	38	32	B	E B 39	32	E B 56	31	40	32	27	28	38	40	40	46
18	46	32	34	42	40	31	31	40	36	B	E B 50	E B 55	E B 55	B	E B 55	E B 55	E B 52	32	40	44	45	45	43	51
19	45	57	39	32	60	32	E B 50	45	40	E B 55	E B 55	33	37	E B 53	35	38	32	31	26	28	27	26	16	19
20	25	32	36	B	38	40	26	E B 52	35	36	26	40	40	E B 52	E B 37	32	28	28	32	35	36	29	25	28
21	31	31	69	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
24	C	C	C	C	C	47	41	32	34	36	32	32	36	31	34	31	27	28	27	34	31	40	36	27
25	15	16	16	26	33	31	32	37	35	37	32	40	62	48	35	32	31	31	26	26	33	21	27	32
26	45	35	45	31	40	41	48	71	65	40	32	36	41	36	40	37	36	33	31	26	27	E B 30	E B 30	27
27	22	21	26	39	46	36	45	36	40	42	B	34	33	37	31	32	16	27	26	23	65	40	90	47
28	32	48	35	36	32	28	27	31	32	59	41	B	31	31	32	32	30	30	32	31	34	41	51	B
29	32	B	33	33	B	26	41	42	35	27	32	31	27	32	31	32	30	26	28	31	24	21	26	26
30	32	51	33	36	B	B	B	40	32	32	33	32	36	33	33	31	32	E B 34	27	26	40	34	37	36
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	26	25	23	22	22	26	27	25	26	22	22	24	23	27	27	26	27	27	26	26	27	27	26
MED	32	32	39	36	36	35	33	36	35	36	34	34	35	35	34	32	32	31	29	27	30	27	26	30
U Q	38	47	41	42	42	42	43	41	38	42	37	40	40	41	E B 46	38	36	33	32	31	40	40	40	41
L Q	23	31	33	31	32	31	31	33	32	32	32	32	32	32	32	31	31	28	26	25	27	21	21	26

NOV. 1990 FOES (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

NOV. 1990 FMIN (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B 11	20 15	B	20 30	10 25	10	21 23	25 15	18 B	24 23	B	20 44	22 17	15 21	15 18	22 18	54 15	50 10	39 10	10 10	14 11	18 11	10 10	8 10
2	15	24	20	B 18	B 18	B	25	20	15	15	15	20	18	15	13	8	14	10	9	12	12	12	8	9
3	9	12	11	10	10	11	15	24	13	16	13	14	15	15	15	11	10	12	11	11	10	9	10	8
4	9	10	8	9	15	10	10	10	10	10	10	14	15	15	15	15	11	10	10	9	10	9	8	8
5	10	8	15	10	9	9	10	10	10	12	20	15	15	15	15	17	15	15	10	10	9	8	8	8
6	8	17	18	12	9	B	10	10	12	12	17	15	18	15	20	18	18	19	22	10	B	14	12	10
7	9	20	14	14	15	12	11	11	13	56	18	23	23	38	22	24	17	30	17	13	10	10	13	13
8	9	12	10	8	15	11	18	20	22	18	15	18	B	B 52	18	15	18	15	12	10	15	10	11	
9	8	15	15	18	B	B	18	30	22	19	23	52	B	55	56	60	35	19	10	10	9	10	14	9
10	8	9	24	25	B	12	22	24	B	20	B	B	B	B	39	52	B	15	13	B	39	22	12	10
11	18	10	30	14	18	17	10	12	10	18	24	B	54	20	12	10	10	12	17	16	10	12	16	9
12	8	10	21	B	11	15	11	12	15	15	15	14	14	18	15	15	10	9	15	10	10	10	10	9
13	9	10	10	10	25	19	12	15	13	12	21	18	20	15	22	20	15	10	10	11	10	9	10	8
14	8	10	9	10	11	10	15	18	24	20	18	21	20	15	15	15	14	12	17	12	10	10	12	9
15	24	19	9	15	8	8	13	12	10	20	B	B	18	B	51	18	15	10	10	10	13	8	15	11
16	14	23	10	15	11	8	14	10	18	20	24	B	39	30	56	24	15	12	11	10	8	14	17	10
17	9	24	8	21	21	21	17	23	17	B	50	55	55	B	55	55	52	15	12	10	10	14	17	15
18	20	10	10	10	19	24	50	20	22	55	55	21	20	53	27	21	15	18	17	22	10	15	12	10
19	9	10	30	B	20	10	18	52	24	24	20	15	20	52	37	24	20	13	13	10	10	9	10	10
20	10	10	20	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	C	C	C	C	C	23	20	12	12	10	14	15	17	18	22	17	15	15	14	10	9	9	9	9
24	8	10	9	10	10	10	10	14	10	14	13	15	18	17	15	18	15	18	20	18	15	10	13	20
25	10	15	14	10	18	23	18	15	15	19	15	15	15	15	15	13	13	15	15	16	16	30	30	14
26	14	15	18	17	18	10	15	10	13	19	B	18	19	15	19	12	10	16	12	10	10	15	8	10
27	10	8	8	10	10	10	10	15	10	18	23	B	22	17	22	18	23	15	10	10	10	10	8	B
28	24	B 12	10		B	16	30	20	18	12	19	20	20	30	15	13	14	21	11	9	10	12	8	8
29	18	15	21	25	B	B	B	19	15	20	15	15	15	15	15	18	15	34	14	15	14	15	10	13
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	27	27	26	26	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
MED	10	12	14	14	16	12	15	15	15	19	20	20	20	18	19	18	15	15	13	10	10	11	10	10
U Q	15	19	21	21	B 21	B 23	21	20	22	20	B 50	B 52	23	B 52	37	22	18	18	17	13	13	15	13	11
L Q	9	10	10	10	10	10	11	12	12	14	15	15	17	15	15	15	14	12	10	10	10	9	9	9

IONOSPHERIC DATA STATION SHOWA ST.

NOV. 1990 H'F (KM) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

HD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	A	B	A	A	A	E A 320	A	A	250	B	230	225	230	225	220	E B 350	E B 310	255	250	240	250	270	280
2	A	A	B	E B 300	A	B	A	A	B	240	B	230	A	250	205	H 220	230	230	240	255	260	270	290	A
3	A	A	A	B	A	B	A	A	225	H 210	225	230	210	E A 225	230	225	225	220	240	245	250	250	E A 290	E A 360
4	E A 350	A	A	E A 310	A	A	A	A	E A 300	220	220	225	H 210	E A 240	225	220	220	E A 250	225	230	230	240	245	270
5	270	290	290	300	270	255	240	220	H 200	240	A 215	205	210	E A 275	H 200	215	215	H 210	240	225	235	225	230	225
6	240	E A 290	E A 325	E A 340	E A 300	260	250	230	250	A 240	E A 250	A 240	A 240	H 220	250	220	220	230	230	235	240	240	230	240
7	255	E B 340	E B 350	E A 300	E A 260	B	255	230	230	220	220	210	220	A 225	E A 245	A	240	240	240	260	B	E A 340	310	270
8	E A 320	A	A	A	A	A	E A 300	240	230	B	225	240	225	B 230	230	220	225	240	240	250	E A 280	A	A	A
9	E A 375	E A 400	A	A	A	A	A	A	A	A	H 210	A 250	B	B	B	230	225	250	230	250	E A 340	A	E A 320	280
10	265	E A 350	E A 400	A	B	B	E A 340	A	A	A	240	B	B	B	B	B	230	240	275	E A 290	A	E A 310	A	A
11	A	A	A	A	B	E A 290	E A 270	A	B	A	B	B	B	B	E B 250	B	B	240	E A 255	B	E B 320	270	300	A
12	E A 360	E A 305	A	Q 290	290	E A 300	240	215	230	210	230	B	B	A 225	A 225	220	220	230	245	240	250	260	245	270
13	E A 300	E A 300	A	B	E A 350	290	240	230	H 210	H 200	200	225	E B 230	A 220	225	240	230	220	240	250	250	245	250	250
14	270	290	300	290	290	E A 350	260	240	220	225	230	A 210	240	H 220	220	220	210	220	240	245	240	250	240	250
15	260	275	280	290	A 260	E A 270	B 250	240	220	225	A	A	220	220	225	220	225	220	230	240	240	240	260	270
16	E B 310	A	A	A	E A 300	E A 275	E A 275	E A 250	A 220	A	B	B	A 225	B	B	E A 275	A	A	270	255	E A 275	A	A	A
17	A	A	E A 340	A	A	H 220	H 225	A	A	A 230	A 220	B	E B 250	E A 255	B	E A 250	230	260	A	A 250	A	A	A	A
18	A	A	A	A	A	A	E B 300	E B 340	A	B	B	B	B	B	B	B	B	250	A	A	A	A	A	A
19	A	E A 345	275	260	A	E A 290	B	A	A	B	B	210	B	B	230	230	225	230	240	250	250	260	245	260
20	E A 320	A	E A 325	B	E A 370	E A 325	250	B	A 250	A	220	220	E A 240	B	225	225	215	240	230	240	250	255	250	280
21	275	A	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
24	C	C	C	C	C	A	A	250	215	200	210	A 210	200	H 190	220	215	220	230	245	245	240	240	240	255
25	270	250	280	320	280	250	240	225	225	225	220	A 210	A	E A 275	220	225	225	225	A 220	240	A 250	240	275	A
26	A	A	A	275	A	A	A	A	A	A	210	200	205	220	H 220	220	230	225	275	255	265	E B 300	E B 255	260
27	220	275	300	250	A	A 255	A	E A 275	E A 270	E A 250	B	200	215	225	225	H 225	230	250	A	250	Q 300	E A 325	F	A
28	A	A	F	E A 290	A	E A 300	A	A	E A 320	A	A	B	250	250	240	230	230	240	230	A 240	250	A	E A 260	B
29	E A 350	B	E A 330	E A 290	B	275	A	A	E A 260	210	200	A	215	230	220	205	215	E A 240	240	240	230	255	255	E A 300
30	A	E A 325	A	A	B	B	B	A	255	A 220	225	220	200	225	A	245	230	240	210	A	250	E A 340	275	A
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	17	13	12	14	10	15	16	13	18	17	18	18	19	20	21	23	24	26	24	24	23	21	21	16
MED	U 248	E A 300	312	286	U 275	E A 275	246	235	225	222	220	220	218	224	225	220	225	235	240	246	245	248	252	265
U Q	E A 335	E A 342	E A 335	300	E A 300	E A 300	E A 288	E 250	E A 255	240	225	230	240	E A 245	230	230	230	240	245	250	E 265	E A 285	282	280
L Q	262	282	285	290	A 270	255	240	228	220	210	210	210	210	220	220	220	220	225	230	240	240	240	245	252

NOV. 1990 H'F (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

DEC. 1990 FXI (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

D \ H	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	53	48	S	A	A	A	S	A	A	S	X 60	S	S	S	O X 67	X 61	X 60	X 60	X 62	X 60	B	O X 61	X 60	X 59
2	X 59	X 62	X 63	X 70	X 76	X 76	X 78	X 84	X 91	X 85	X 85	X 80	X 80	X 74	X 74	X 71	70	X 71	X 70	X 68	X 68	O X 56	45	O X 53
3	X 60	B	O X 59	56	A	A	O X 65	X 70	X 78	81	X 81	X 79	X 76	O X 73	X 69	X 70	X 66	X 66	X 65	X 62	X 56	O X 51	A	A
4	A	60	F	A	A	A	A	A	A	A	A	A	A	X 64	B	X 71	X 70	X 62	50	A	X 55	X 53	X 62	X 58
5	S	52	A	O X 61	A	B	A	70	X 78	X 80	X 76	O X 83	B	80	O X 76	X 76	S	X 64	X 59	B	X 60	X 54	X 59	X 54
6	51	56	65	B	X 67	S	B	71	75	74	75	X 76	X 74	X 76	X 78	O X 76	X 78	X 71	X 69	X 66	X 60	O X 51	X 55	X 60
7	63	O X 61	65	A	A	64	70	O X 71	X 78	X 76	X 80	X 76	X 74	X 74	X 72	X 69	X 67	X 66	62	64	X 62	X 66	X 65	X 65
8	X 64	65	70	70	71	75	X 78	O X 94	O X 94	O X 86	B	76	74	O X 80	O X 86	84	80	X 75	X 68	X 61	O X 66	X 54	X 63	X 56
9	56	60	X 64	X 70	75	71	71	71	X 72	X 75	X 80	X 84	X 84	X 83	X 80	O X 76	73	X 71	64	X 58	X 59	X 60	X 57	X 57
10	X 60	X 63	56	64	66	71	81	86	X 95	X 91	X 89	B	X 81	X 81	X 76	X 73	X 72	X 71	X 71	X 70	O X 74	O X 73	X 69	O X 62
11	X 63	X 65	71	74	81	O X 94	O X 96	X 101	X 105	X 105	O X 101	X 99	X 96	X 88	X 81	O X 80	A	X 75	X 71	X 70	X 71	X 70	X 70	X 71
12	X 72	X 75	X 79	X 85	X 90	92	X 93	86	X 100	X 100	X 93	B	O X 86	X 81	O X 78	X 76	X 74	X 74	X 72	X 66	X 68	B	55	64
13	56	O X 50	56	60	A	O X 51	A	B	A	A	S	B	B	B	B	O X 66	B	B	X 62	A	O X 60	X 60	X 57	X 59
14	X 59	60	59	65	65	66	S	A	A	65	68	72	X 75	X 74	X 73	X 71	X 72	X 71	X 71	X 66	X 65	63	X 60	X 65
15	X 60	O X 72	X 70	70	70	68	70	70	X 79	81	75	80	O X 81	X 82	O X 84	X 81	X 78	78	X 77	X 78	X 76	64	X 60	O X 64
16	X 62	68	60	65	75	66	B	A	72	80	X 85	X 86	X 82	X 81	X 76	X 75	O X 73	O X 73	X 65	C	C	C	C	C
17	C	C	C	C	C	C	C	C	C	83	X 80	X 81	X 79	X 76	X 72	X 72	X 70	66	68	X 69	X 67	X 52	B	X 59
18	65	65	69	56	A	O X 66	70	71	81	X 96	O X 96	O X 86	X 80	X 83	X 81	O X 82	X 80	X 76	70	X 60	X 60	65	X 65	X 64
19	65	70	73	82	84	O X 100	104	105	102	101	X 102	X 96	X 93	X 89	X 85	X 80	X 78	X 75	X 74	X 72	O X 74	O X 75	O X 79	X 75
20	X 71	X 76	X 80	X 90	X 86	O X 86	74	75	72	O X 66	70	71	75	X 84	O X 84	76	80	X 77	62	S	O X 51	A	A	B
21	B	60	O X 53	X 57	65	69	X 66	75	80	81	74	75	X 75	O X 70	O X 69	X 68	O X 68	X 67	X 67	X 65	X 62	O X 61	X 61	X 63
22	62	62	X 65	70	75	O X 71	72	X 82	90	X 95	X 102	X 98	O X 87	X 78	X 77	X 76	X 72	X 71	X 70	X 69	X 68	X 66	X 68	X 70
23	O X 74	X 76	O X 85	X 86	X 90	X 96	X 104	X 106	X 111	O X 111	X 106	O X 103	X 106	B	O X 84	X 77	O X 74	69	X 71	69	66	70	71	O X 74
24	O X 73	68	48	A	70	75	85	60	A	A	A	S	62	S	O X 64	X 68	X 68	X 66	O X 57	O X 52	64	68	69	A
25	A	46	A	A	O X 53	A	S	A	S	A	B	B	B	B	B	S	S	O X 66	X 58	X 54	A	O X 61	S	S
26	A	O X 51	A	B	X 52	B	O X 66	O X 70	76	X 81	X 80	X 79	X 76	X 74	X 70	X 68	O X 70	O X 64	66	X 67	67	65	X 66	X 70
27	X 70	X 71	O X 76	X 80	X 90	85	68	71	72	80	76	75	76	75	75	X 70	X 69	X 68	X 70	B	X 65	X 66	65	66
28	71	62	65	70	F	70	81	90	90	91	90	85	X 85	X 80	X 76	X 75	X 75	X 73	X 70	X 67	X 70	X 69	X 67	X 55
29	61	O X 65	O X 62	61	62	A	S	66	X 76	X 76	X 77	X 80	X 76	O X 74	X 72	O X 71	O X 71	X 69	X 68	X 66	X 70	67	55	61
30	X 65	O X 64	O X 65	67	63	A	A	A	68	X 76	X 79	X 65	X 76	X 73	O X 71	S	O X 67	X 65	65	70	X 64	X 60	X 63	X 60
31	X 60	X 59	61	65	80	80	84	X 85	O X 86	X 90	X 84	X 85	X 84	O X 80	X 81	X 80	O X 82	X 78	S	B	S	64	O X 61	70
	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	29	25	23	22	21	20	23	24	26	26	24	26	26	28	29	27	30	30	24	27	28	26	26
MED	X 62	62	65	70	73	71	76	75	X 80	X 81	X 80	X 80	X 80	X 79	X 76	X 75	X 72	X 71	X 68	X 66	X 65	X 64	X 62	X 62
U O	X 68	X 68	X 70	X 74	X 81	X 86	84	86	X 92	X 91	X 90	X 86	X 84	X 81	X 81	X 76	X 78	X 74	X 70	X 69	X 68	X 66	X 67	X 66
L O	60	60	60	61	65	67	70	70	76	X 76	76	76	X 75	X 74	X 72	X 70	X 69	X 66	X 62	X 62	X 60	X 58	X 59	X 59

DEC. 1990 FXI (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

DEC. 1990 FOF2 (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H / D	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 47	F 42	S	A	A	A	S	A	A	S	54	S	S	S	R 61	55	J S 54	J S 54	56	54	B	55	54	53
2	53	56	57	64	70	70	72	78	85	79	79	74	74	68	68	65	F 64	65	64	62	62	U S 50	F 39	U S 47
3	54	B	R 53	F 50	A	A	59	64	72	F 75	75	73	70	67	63	64	60	60	59	56	50	U R 45	A	A
4	A	F 54	F	A	A	A	A	A	A	A	A	A	A	58	B	65	64	56	F 44	A	49	47	56	52
5	S	F 46	A	55	A	B	A	F 64	72	74	70	U R 77	B	F 74	70	70	S	58	53	B	54	48	53	48
6	F 45	F 50	F 55	B	60	S	B	F 65	F 65	F 68	F 69	70	68	70	J S 72	71	72	65	63	60	54	45	R 49	54
7	F 57	55	F 50	A	A	F 58	F 64	R 65	72	70	74	70	68	68	66	63	61	60	F 56	F 58	56	60	59	59
8	58	F 59	F 60	F 64	F 65	F 69	72	88	88	D R 80	B	F 70	F 68	U R 74	D R 80	F 78	F 74	69	62	55	60	J S 48	R 57	J S 50
9	F 50	F 50	58	U R 64	F 69	F 65	F 65	F 65	66	69	74	78	78	J S 77	74	R 70	F 67	65	F 58	52	53	54	51	51
10	54	57	F 50	F 58	F 60	F 65	F 75	F 80	89	85	83	B	75	75	70	67	66	65	65	64	68	67	J S 63	56
11	57	59	F 65	F 68	F 75	U S 88	90	96	99	99	95	93	90	82	J S 75	U S 74	A	69	65	64	65	64	64	65
12	66	69	J S 73	79	84	F 82	87	F 80	94	94	87	B	D R 80	75	U R 72	70	68	68	66	60	62	B	F 45	F 58
13	F 50	44	F	F 50	A	45	A	B	A	A	S	B	B	B	B	R 60	B	B	R 56	A	54	54	51	53
14	53	F 54	F 53	F 55	F 59	F 60	S	A	A	F 59	F 62	F 66	69	68	67	65	66	65	65	60	59	F 57	54	59
15	54	R 66	64	F 64	F 64	F 60	F 62	F 60	72	F 75	F 65	F 74	75	76	78	75	72	71	71	72	70	F 58	54	58
16	56	F 62	F 54	F 55	F 69	F 60	B	A	F 66	F 74	79	80	76	75	70	69	67	67	59	C	C	C	C	C
17	C	C	C	C	C	C	C	C	C	F 77	74	75	73	70	66	66	64	F 60	F 62	63	61	46	B	U R 53
18	F 59	F 59	F 59	F 50	A	D S 60	F 60	F 65	F 75	90	90	80	J S 74	77	J S 75	R 76	R 74	70	F 62	54	54	F 59	59	58
19	F 59	F 60	F 67	F 76	F 78	94	F 98	F 99	F 96	F 95	96	90	87	83	79	74	72	69	68	66	68	69	U R 72	69
20	65	R 70	J S 74	84	80	U S 80	F 68	F 60	F 60	60	F 64	F 65	F 68	J S 78	D S 78	F 70	F 70	71	F 56	S	45	A	A	B
21	B	F 54	D R 47	J S 51	F 59	F 63	J S 60	F 69	F 65	F 75	F 68	F 69	69	64	63	62	62	60	60	59	56	55	55	57
22	F 56	F 56	59	F 58	F 69	U S 65	F 66	76	F 80	89	96	92	81	72	71	70	66	65	64	63	62	60	62	64
23	U S 68	70	79	80	84	90	98	100	105	U R 105	100	97	100	B	78	71	R 68	F 63	65	F 63	F 60	F 64	F 65	68
24	67	F 60	F 42	A	F 64	F 69	F 79	F 54	A	A	A	S	F 56	S	58	62	62	60	R 51	46	F 58	F 46	F 63	A
25	A	F 40	A	A	47	A	S	A	S	A	B	B	B	B	B	S	S	60	52	48	A	R 55	S	S
26	A	45	A	B	46	B	60	U R 64	F 70	75	74	73	70	68	64	62	64	58	F 60	61	F 61	F 59	60	64
27	64	65	70	74	84	F 70	F 62	F 65	F 62	F 68	F 70	F 69	F 70	F 69	F 69	64	63	62	64	B	59	60	F 59	F 60
28	F 65	F 56	F 59	F 64	F	F 64	F 75	F 84	F 80	F 85	F 80	F 75	79	74	70	69	69	67	64	61	64	63	61	49
29	F 55	59	56	F 55	F 56	A	S	F 60	70	70	71	74	70	R 68	66	65	65	63	62	60	64	F 59	F 49	F 55
30	59	58	59	F 55	F 55	A	A	A	F 60	70	73	J S 69	U R 70	67	R 65	S	61	59	59	64	58	54	57	54
31	54	53	F 55	F 59	F 65	F 70	F 78	79	D R 80	84	78	79	U R 78	R 74	J S 75	J S 74	U R 76	72	S	B	S	F 55	55	F 64
	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	29	24	23	22	21	20	23	24	26	26	24	26	26	28	29	27	30	30	24	27	28	26	26
MED	56	F 56	58	F 59	F 65	F 67	F 70	F 65	72	75	74	74	74	73	70	69	66	65	62	60	59	55	56	56
U Q	62	60	64	68	75	75	78	80	86	85	83	80	78	75	75	71	70	68	64	63	62	60	61	60
L Q	F 54	F 52	F 54	F 55	F 59	F 60	62	F 64	F 66	70	F 70	F 70	69	68	66	64	63	60	56	56	54	49	53	53

DEC. 1990 FOF2 (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

DEC. 1990 FES (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

D/H	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	32	38	40	42	40	41	33	40	40	34	34	33	36	39	34	36	32	27	27	27	B	E B 30	26	34
2	28	26	26	36	32	32	45	32	40	32	40	45	61	55	40	58	37	32	32	28	27	28	27	26
3	26	B	42	40	33	40	48	41	35	31	33	40	41	36	38	60	32	32	31	31	27	31	45	45
4	51	32	59	62	51	45	41	31	51	51	33	35	33	35	B	32	38	31	28	36	36	40	38	39
5	E B 42	36	71	40	41	B	42	40	35	36	36	E B 55	B	E B 56	36	36	31	38	33	B	42	42	31	38
6	41	32	35	B	38	32	B	40	34	33	34	34	40	33	40	32	28	28	28	41	34	35	41	40
7	47	41	35	70	46	35	47	51	41	35	33	34	38	34	36	40	37	35	32	32	26	31	28	21
8	29	31	32	27	34	31	28	35	32	36	B	66	65	44	82	45	40	41	30	26	E B 40	41	41	41
9	34	40	40	32	33	40	41	36	38	38	40	40	41	60	41	37	35	36	31	32	33	34	40	34
10	39	26	26	29	33	32	36	36	39	68	40	B	41	33	38	36	46	41	33	31	36	31	22	17
11	21	20	20	23	32	36	36	51	39	46	94	41	93	89	45	41	74	51	41	34	41	22	31	21
12	27	27	31	33	36	40	40	39	41	61	71	B	46	60	40	37	42	36	47	32	37	B	31	45
13	37	41	40	59	52	28	31	B	31	47	34	B	B	B	B	E B 40	B	B	41	51	80	41	41	36
14	41	31	51	45	48	40	37	40	42	32	34	34	33	35	35	34	41	36	34	32	27	26	23	25
15	26	26	30	32	31	41	42	36	41	34	41	41	32	36	33	33	32	37	41	31	31	30	41	36
16	28	30	26	40	32	38	B	57	41	33	33	33	36	33	33	38	31	30	42	C	C	C	C	C
17	C	C	C	C	C	C	C	C	C	37	32	38	35	36	40	40	39	36	33	47	16	33	B	29
18	37	32	36	65	70	43	40	32	32	32	36	34	33	34	36	34	32	E B 35	E B 31	41	28	60	58	65
19	114	70	71	51	32	26	26	40	42	32	33	51	44	38	41	42	40	51	E B 35	26	28	35	44	43
20	35	45	37	26	30	50	63	45	32	45	36	40	36	40	45	51	E B 54	E B 35	32	31	32	46	41	B
21	B	35	36	22	31	31	32	34	42	36	36	E B 51	34	44	37	58	32	37	40	31	26	E B 25	21	20
22	27	50	31	31	31	33	40	31	36	40	34	35	41	36	45	45	62	34	32	31	23	25	31	25
23	31	26	23	26	25	32	42	41	39	33	33	37	40	B	33	32	33	39	40	E B 30	E B 30	20	25	22
24	19	31	36	44	34	34	26	37	48	42	41	37	35	35	33	31	32	31	32	26	36	32	36	70
25	41	46	40	36	31	31	37	36	31	32	B	B	B	B	B	32	E B 39	32	38	32	31	42	34	40
26	47	41	62	B	33	B	31	41	32	33	35	35	34	34	31	37	37	E B 39	31	E B 30	31	21	34	21
27	36	58	45	26	40	34	32	41	34	32	32	34	34	35	40	32	32	32	33	B	35	35	31	21
28	32	31	42	31	46	45	31	40	51	51	31	35	32	36	33	38	45	33	46	40	40	65	26	27
29	27	26	32	36	42	44	51	36	32	33	36	41	35	41	34	41	41	40	34	32	32	32	31	22
30	31	34	32	40	33	51	51	43	40	33	28	33	37	34	33	34	33	39	41	31	27	32	26	20
31	27	39	36	32	32	41	51	31	32	36	41	41	61	39	41	35	40	31	32	B	43	44	41	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	29	29	30	28	30	28	28	29	30	31	29	27	28	28	28	31	30	30	31	27	29	29	29	29
MED	32	32	36	36	33	37	40	40	39	35	34	36	36	36	38	37	36	36	33	31	32	32	31	34
U Q	41	41	42	43	41	41	44	41	41	42	40	41	41	42	40	41	41	39	40	34	36	41	41	40
L Q	27	28	31	30	32	32	32	36	32	33	33	34	34	34	34	34	32	32	31	30	27	29	26	22

DEC. 1990 FOES (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

IONOSPHERIC DATA STATION SHOWA ST.

DEC. 1990 FMIN (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H / D	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	10	15	10	20	18	13	18	15	24	21	15	15	13	15	15	14	15	11	10	12	B	30	20	15
2	10	10	10	10	10	10	10	10	11	11	12	15	17	24	15	10	10	13	12	14	10	18	10	10
3	14	B	21	10	23	30	15	15	14	18	20	23	20	20	12	10	15	13	10	10	10	24	17	15
4	30	10	9	17	10	10	20	23	11	18	10	15	15	19	B	24	12	14	14	10	10	10	9	10
5	42	8	31	20	15	B	18	14	10	10	17	55	B	56	25	18	15	15	10	B	10	10	10	10
6	14	18	15	B	15	24	B	15	15	10	13	18	15	14	15	15	17	12	11	10	11	18	10	8
7	10	20	9	25	17	10	15	12	19	18	18	17	17	17	12	10	11	12	13	9	10	10	8	8
8	8	10	10	10	10	10	10	10	19	30	B	25	25	31	30	19	17	14	24	17	40	10	10	15
9	12	9	10	8	10	10	9	14	19	20	18	20	24	15	15	13	10	10	10	10	8	8	8	8
10	9	15	15	18	10	10	9	9	9	14	18	B	17	15	18	10	10	12	10	11	10	10	8	14
11	10	9	9	10	10	10	10	10	13	14	12	12	17	24	20	23	13	12	9	10	10	9	8	13
12	10	8	9	9	10	9	10	21	18	15	18	B	19	18	18	18	18	15	15	10	14	B	11	10
13	15	9	8	10	15	10	15	B	23	23	20	B	B	B	B	40	B	B	24	30	31	24	9	9
14	10	20	9	9	10	10	15	18	16	20	15	15	20	15	20	13	12	10	10	10	13	10	18	9
15	8	10	10	11	14	15	10	10	10	14	15	14	18	10	10	20	10	10	12	13	9	10	8	10
16	21	23	19	17	11	19	B	18	12	15	10	10	10	10	10	12	24	20	12	C	C	C	C	C
17	C	C	C	C	C	C	C	C	C	13	20	17	10	10	13	15	10	10	10	9	8	8	B	10
18	10	13	11	14	19	13	13	15	17	17	17	15	20	20	22	24	19	35	31	10	14	17	10	10
19	12	15	8	8	10	16	15	10	20	15	15	14	12	15	15	15	15	10	35	10	10	10	9	8
20	9	8	8	8	8	10	10	10	10	19	15	9	14	20	23	20	54	35	10	10	23	10	20	B
21	B	18	12	10	10	10	10	14	10	17	20	51	24	19	16	21	20	19	19	18	17	25	16	9
22	8	9	10	9	8	10	10	10	14	11	17	14	15	10	20	18	15	15	15	20	14	10	10	8
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24	15	15	19	13	14	15	10	18	22	18	12	15	15	19	15	19	15	17	13	19	30	12	14	13
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26	20	15	19	B	18	B	20	31	13	13	15	20	19	19	20	15	10	39	13	30	13	15	19	14
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	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	31	31	31	31	31	31	31	31	31	31	30	30	30	30	30
MED	10	10	10	10	10	10	13	14	14	15	17	15	17	17	16	15	15	14	12	12	10	10	10	10
U Q	15	18	18	18	15	15	18	18	19	18	20	23	20	20	20	20	19	18	15	20	17	18	16	14
L Q	9	9	9	9	10	10	10	10	10	13	13	14	14	15	13	13	11	10	10	10	10	10	9	9

DEC. 1990 FMIN (0.1MHZ) COMMUNICATIONS RESEARCH LABORATORY, JAPAN

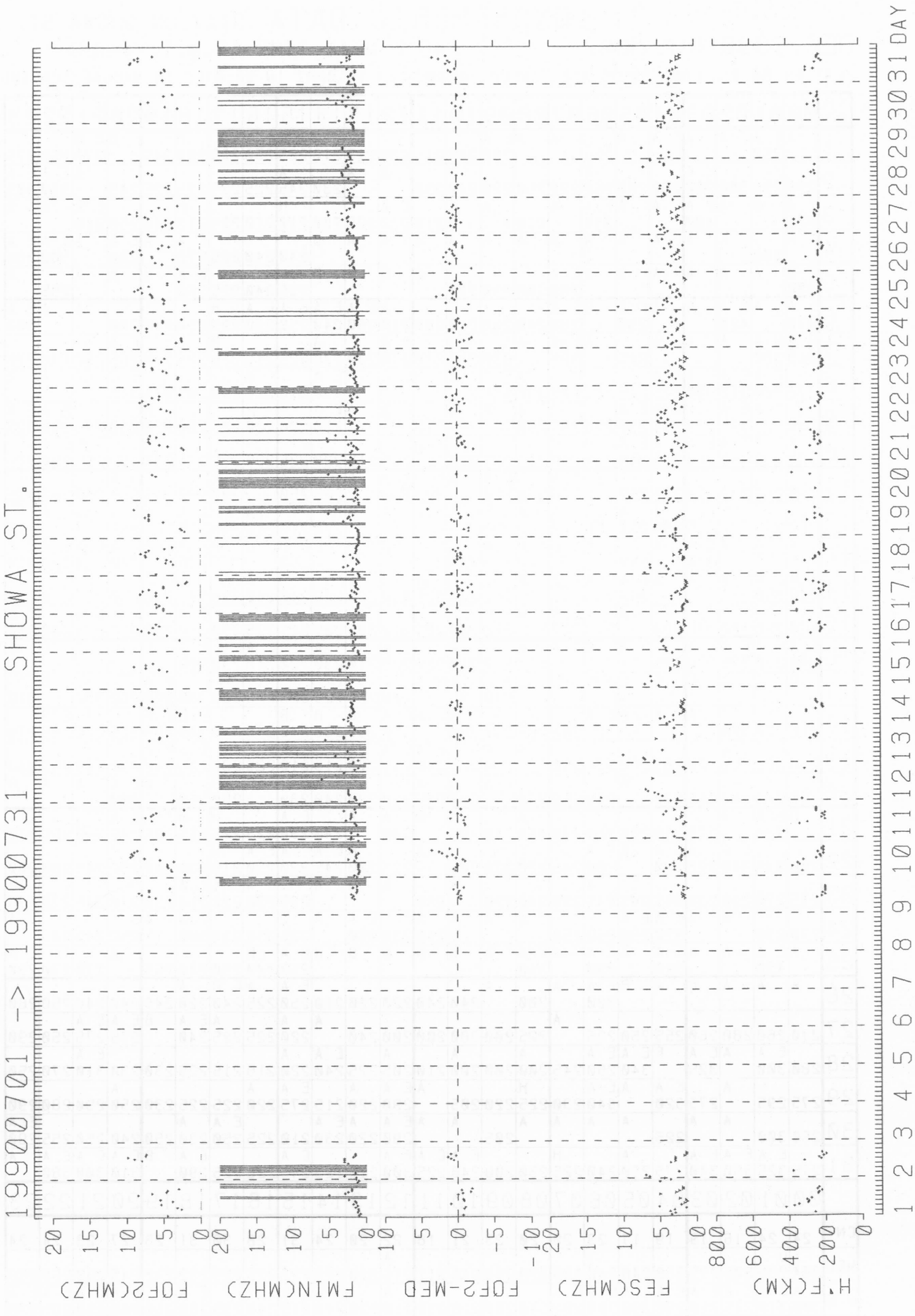
IONOSPHERIC DATA STATION SHOWA ST.

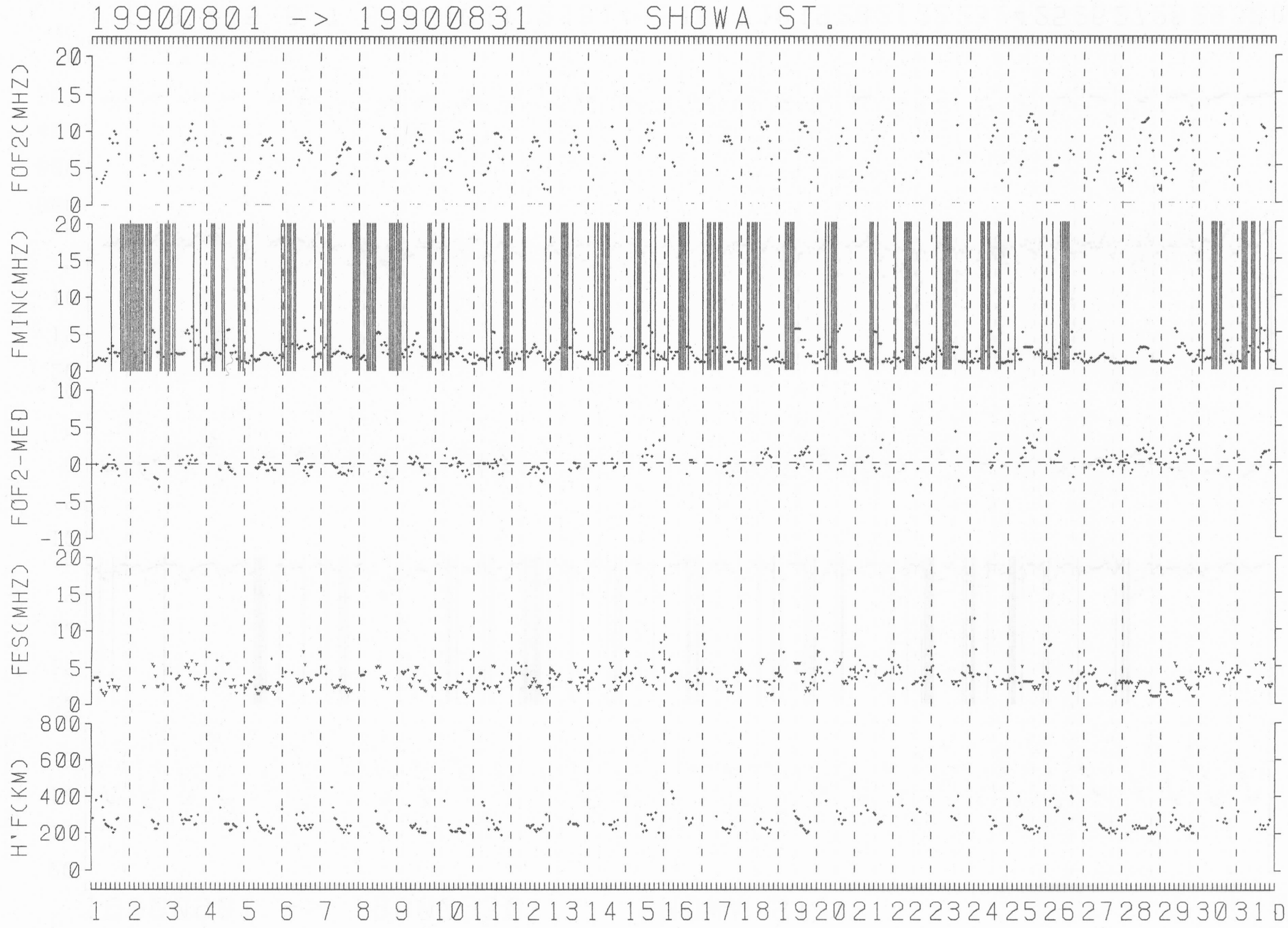
DEC. 1990 H'F (KM) 45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

D \ H	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	E A 350	A	A	A	A	250	A	A	E A 240	200	215	230	215	210	H 225	E A 250	225	H 200	245	B	E B 270	260	275
2	290	290	300	E A 280	260	250	A 250	220	250	220	240	230	A	A	230	A 245	225	225	225	225	245	A	E A 310	E A 305
3	E A 325	B	A	E A 400	A	A	E A 340	A	210	A	A	210	E A 220	220	200	H 210	210	225	H 210	240	250	E A 340	A	A
4	A	300	F	A	A	A	A	A	A	A	A	A	A	A	B	240	240	225	E A 270	A	E A 280	A	E A 300	E A 280
5	E B 330	A	A	A	A	B	A	E A 280	205	230	210	B	B	B	B	225	240	225	E A 260	B	A	A	255	A
6	E A 370	A	E A 420	B	A	E A 290	B	E A 280	240	220	210	200	A 210	E A 250	E A 240	E A 250	E A 230	H 225	250	245	260	A	A	E A 300
7	E A 315	E A 300	A	A	A	245	A	E A 325	A	230	210	210	E A 270	230	A 230	225	215	H 210	225	220	E A 265	250	270	270
8	270	E A 300	E A 310	E A 300	E A 275	245	225	225	A 230	E A 460	B	B	A	A	E A 430	210	A 220	240	245	245	E B 340	A	A	A
9	260	A	E A 375	275	E A 275	E A 290	270	255	A 250	A	A	210	A	A	E A 250	220	220	225	260	H 220	250	275	E A 290	E A 325
10	E A 305	E A 330	E A 350	E A 360	E A 275	E A 260	H 230	230	225	225	220	B	225	215	220	225	220	235	225	H 230	250	255	E A 290	275
11	290	280	270	280	255	250	225	E A 230	230	E A 250	A	230	E A 250	A	225	E A 250	A	E A 290	230	245	A 250	260	260	255
12	280	275	275	275	A 250	A 250	250	A 250	A 230	230	A	B	A	A	210	210	A 240	240	E A 270	H 225	E A 255	B	A	270
13	A	A	A	E A 310	A	250	A	B	A	A	225	B	B	B	B	E B 250	B	B	E A 270	A	E A 340	E A 280	E A 320	E A 370
14	E A 320	E A 350	A	A	A	E A 300	E A 325	A	A	225	230	A 225	230	225	220	240	A 240	220	240	250	250	255	260	255
15	270	290	300	270	290	A	220	E A 300	A	210	230	205	210	225	225	225	225	230	E A 250	250	250	E A 295	240	E B 280
16	E A 260	E A 290	E A 325	E A 290	225	A	B	A	A	210	210	210	A 220	210	A 230	220	E A 240	230	E A 300	C	C	C	C	C
17	C	C	C	C	C	C	C	C	C	240	A 225	A	200	205	225	225	225	230	230	E A 290	260	300	B	310
18	310	300	300	A	A	A	E A 325	240	225	230	H 200	A	E A 250	B 230	B 230	B 240	240	240	B 220	E A 250	225	240	E B 255	270
19	280	E A 300	E A 310	300	265	260	250	A 250	A	A 230	225	E A 240	E A 250	A 220	215	A 210	225	220	E B 225	E A 240	H 230	240	255	260
20	260	270	280	265	270	A	240	250	230	A	220	A 225	220	A 220	E A 240	230	B	B 250	250	A	E A 300	A	A	B
21	B	E A 320	A	270	270	280	280	270	A 245	230	A 220	B	A 200	A	240	E A 250	225	H 225	H 225	225	E A 245	255	265	275
22	260	275	E A 340	A 275	E A 290	A	E A 300	245	220	220	H 205	A	225	H 200	E A 245	A 220	E A 250	H 210	230	240	250	245	260	260
23	275	270	290	290	265	245	A 245	220	240	220	A	230	A	B	A	225	A 220	A 220	E A 250	250	240	245	270	270
24	270	230	A	A	E A 320	E A 290	250	250	A	A	A	A 210	230	E A 250	A	225	230	230	E A 300	A	250	245	245	A
25	A	E A 450	A	A	E A 320	A	E A 290	A	E A 240	A	B	B	B	B	B	E A 250	B 240	230	240	255	A	270	270	E A 290
26	A	A	A	B	A	B	E A 320	A	200	A	240	240	220	220	210	E A 250	A 225	E B 240	A 220	245	240	240	250	260
27	270	260	280	260	255	250	225	A	225	200	200	200	200	240	A	A 220	225	A 225	E A 240	B	E A 275	E A 275	250	290
28	280	E A 300	A	E A 325	F	E A 340	E A 250	245	A 200	200	A 200	210	A 205	225	E A 240	A 220	215	215	225	230	230	E A 310	270	250
29	275	295	A	275	E A 320	A	E A 340	230	H 225	220	205	A	E A 290	A 220	215	E A 275	A 220	225	225	230	A 250	290	280	290
30	260	300	A	A	225	A	A	A	A	205	A	A	E A 290	A E 220	E A 230	210	225	E A 250	A 230	250	240	250	255	E A 290
31	275	E A 325	E A 350	E A 340	275	A 250	240	H 225	230	200	E A 240	E A 225	E A 300	210	225	E A 245	220	225	E A 290	B	E A 310	E A 300	E A 380	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	24	24	16	19	19	17	23	20	20	23	21	18	22	20	24	31	28	30	31	23	27	23	24	24
MED	274	U 289	305	275	260	248	240	239	229	222	215	211	A 216	220	222	222	225	225	232	242	245	252	258	268
U Q	E A 308	E A 310	E A 345	E A 310	E A 290	E A 290	E A 300	E A 262	240	A 230	228	230	E A 250	228	E A 240	E A 245	240	235	E A 260	250	E A 265	E A 290	E A 285	E A 290
L Q	270	278	285	275	255	250	240	230	222	210	205	210	210	215	218	220	220	225	225	230	245	245	255	265

DEC. 1990 H'F (KM) COMMUNICATIONS RESEARCH LABORATORY, JAPAN


19900701 -> 19900731 SHOWA ST.
FOF2(MHZ)
FMIN(MHZ)
FOF2-MED
FES(MHZ)
H'F(KM)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 DAY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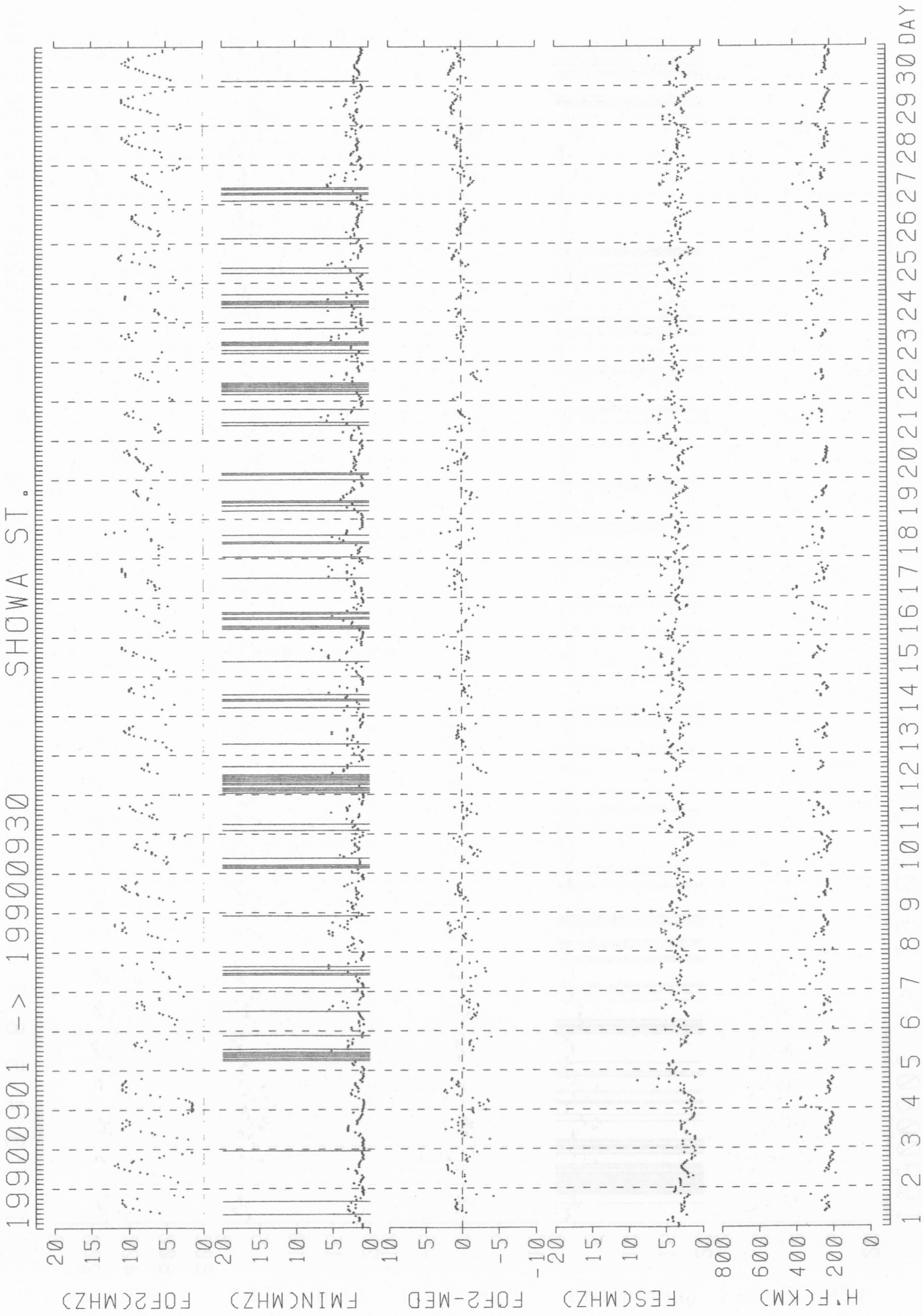
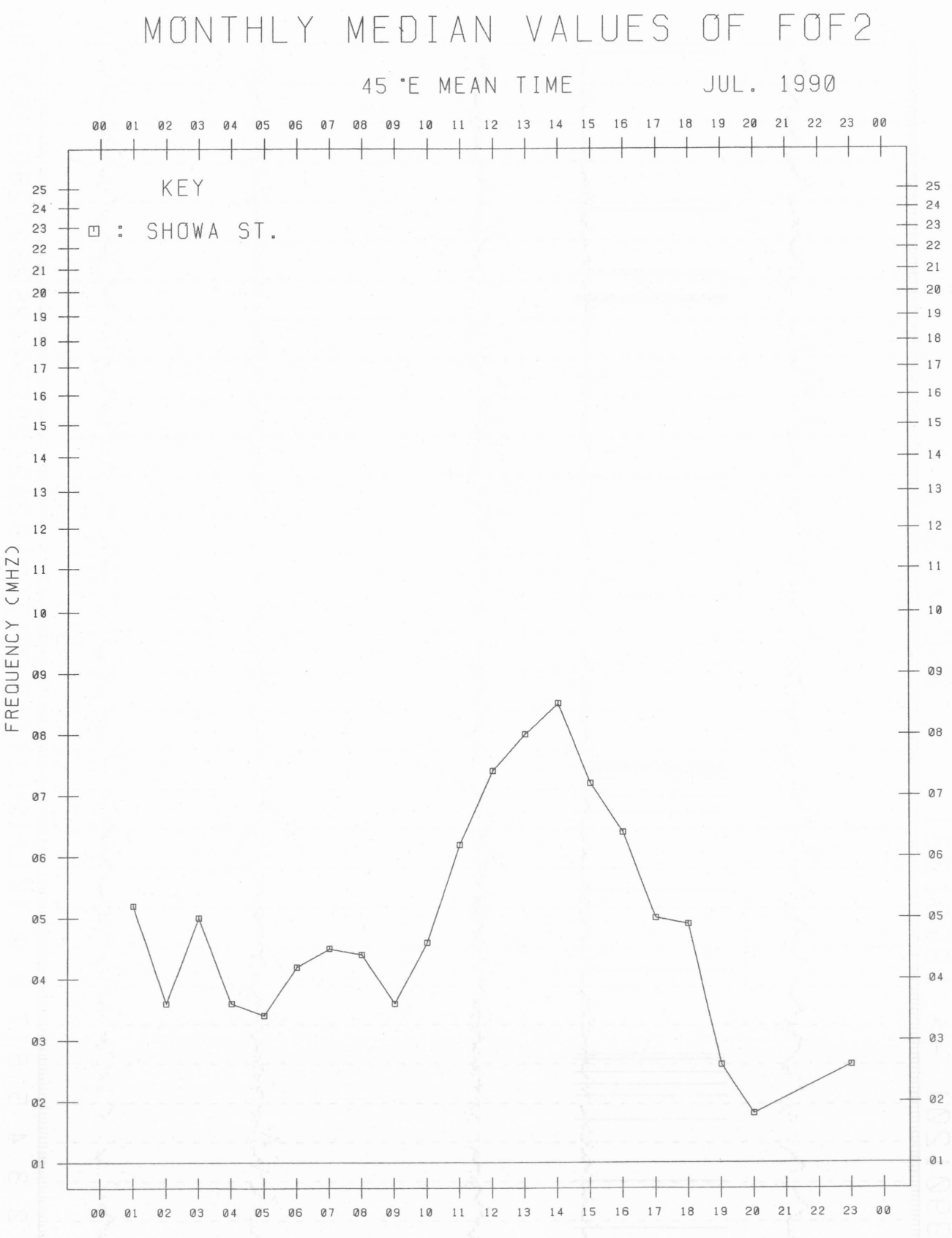
FOF2(MHZ)
FMIN(MHZ)
FOF2-MED
FES(MHZ)
H'F(KM)
DAY


19900901 -> 19900930 SHOWA ST.
FOF2(MHZ)
FMIN(MHZ)
FOF2-MED
FES(MHZ)
H'F(KM)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 DAY


19901001 -> 19901031 SHOWA ST.
FOF2(MHZ)
FMIN(MHZ)
FOF2-MED
FES(MHZ)
H'F(KM)
DAY

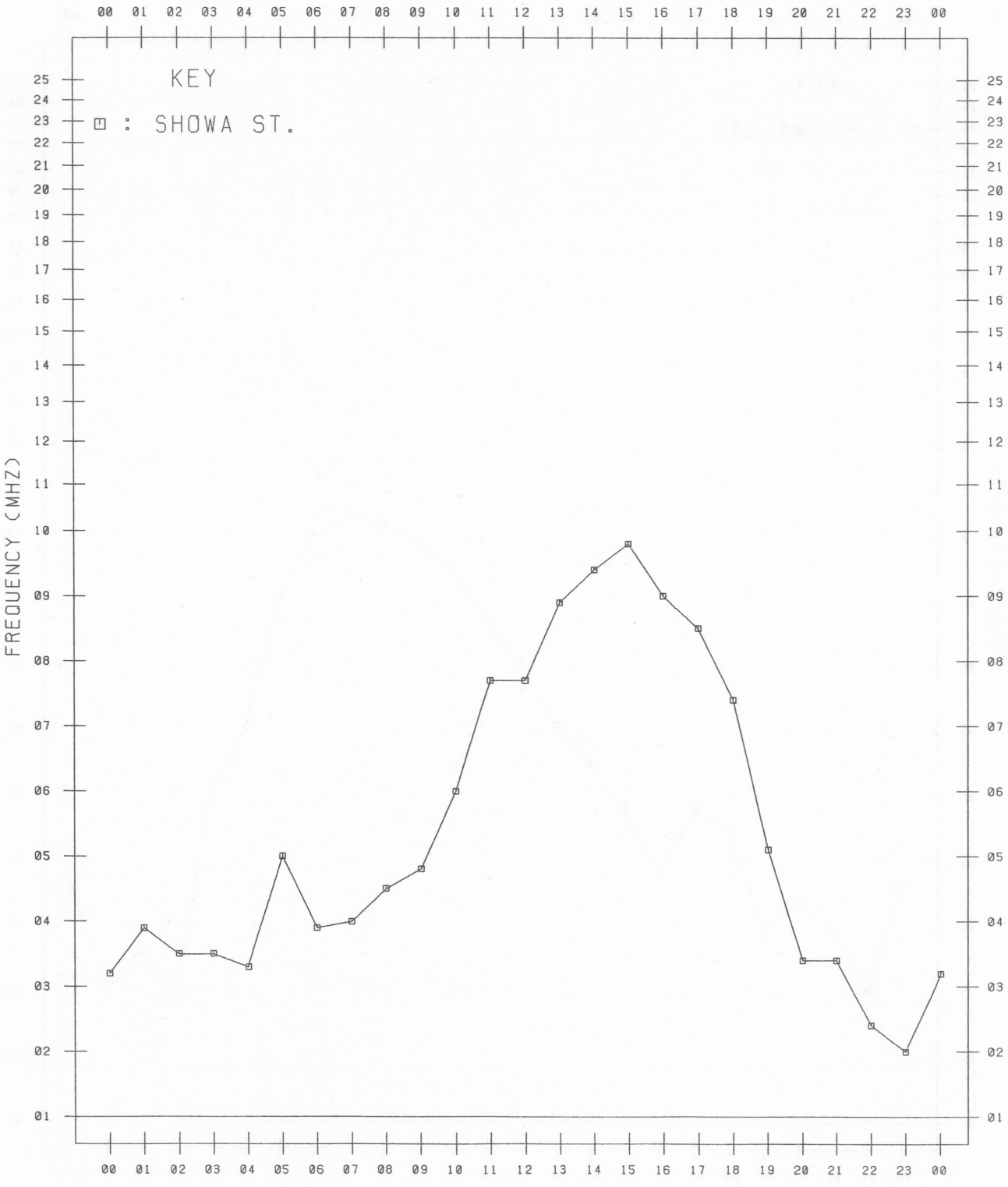

19901101 -> 19901130 SHOWA ST.
FOF2(MHZ)
FMIN(MHZ)
FOF2-MED
FES(MHZ)
H'F(KM)
DAY


19901201 -> 19901231 SHOWA ST.
FOF2(MHZ)
FMIN(MHZ)
FOF2-MED
FES(MHZ)
H'F(KM)
DAY


MONTHLY MEDIAN VALUES OF FOF2
45 °E MEAN TIME
JUL. 1990
KEY
□ : SHOWA ST.
FREQUENCY (MHZ)
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 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 24 25

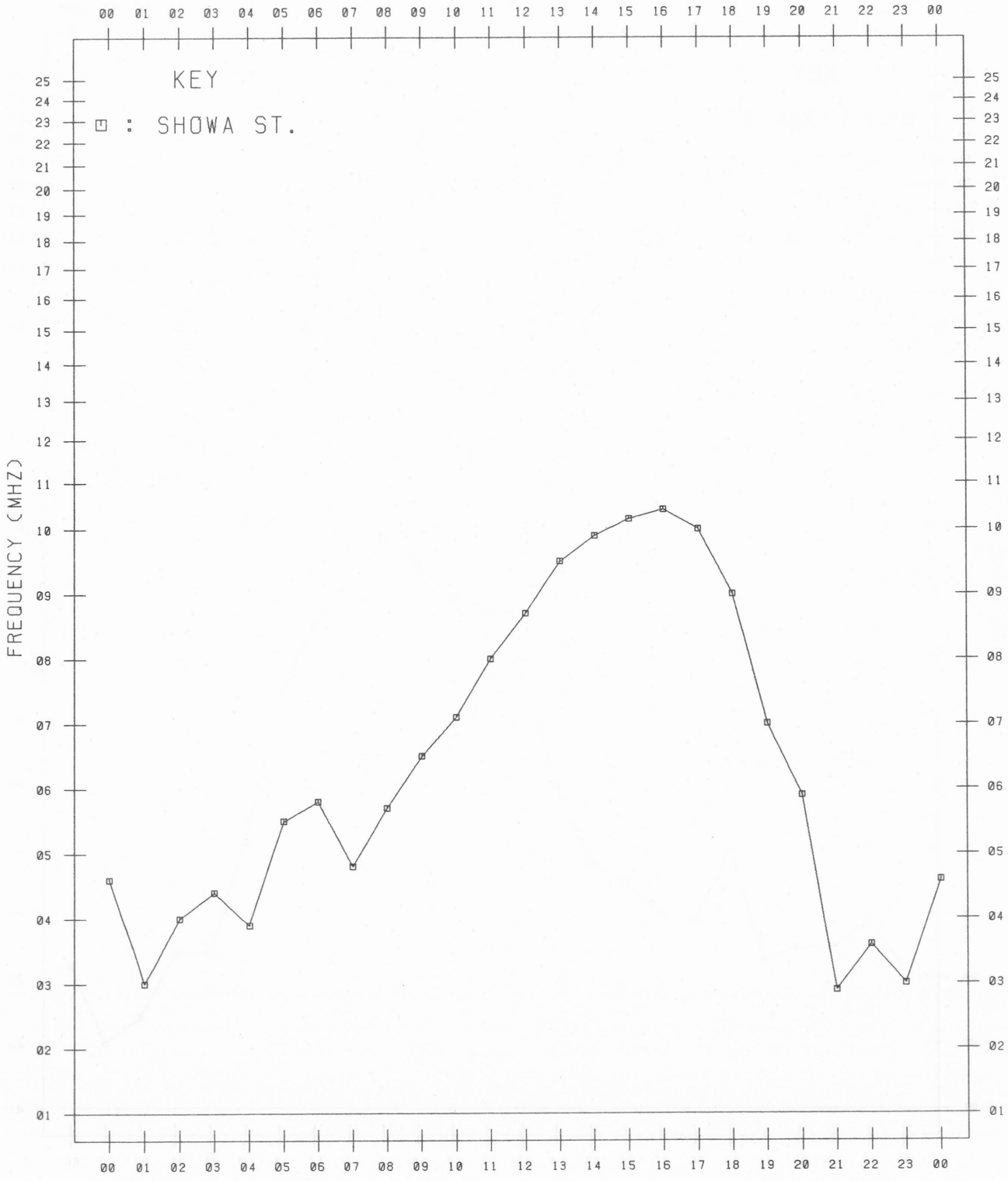
MONTHLY MEDIAN VALUES OF FOF2

45°E MEAN TIME AUG. 1990



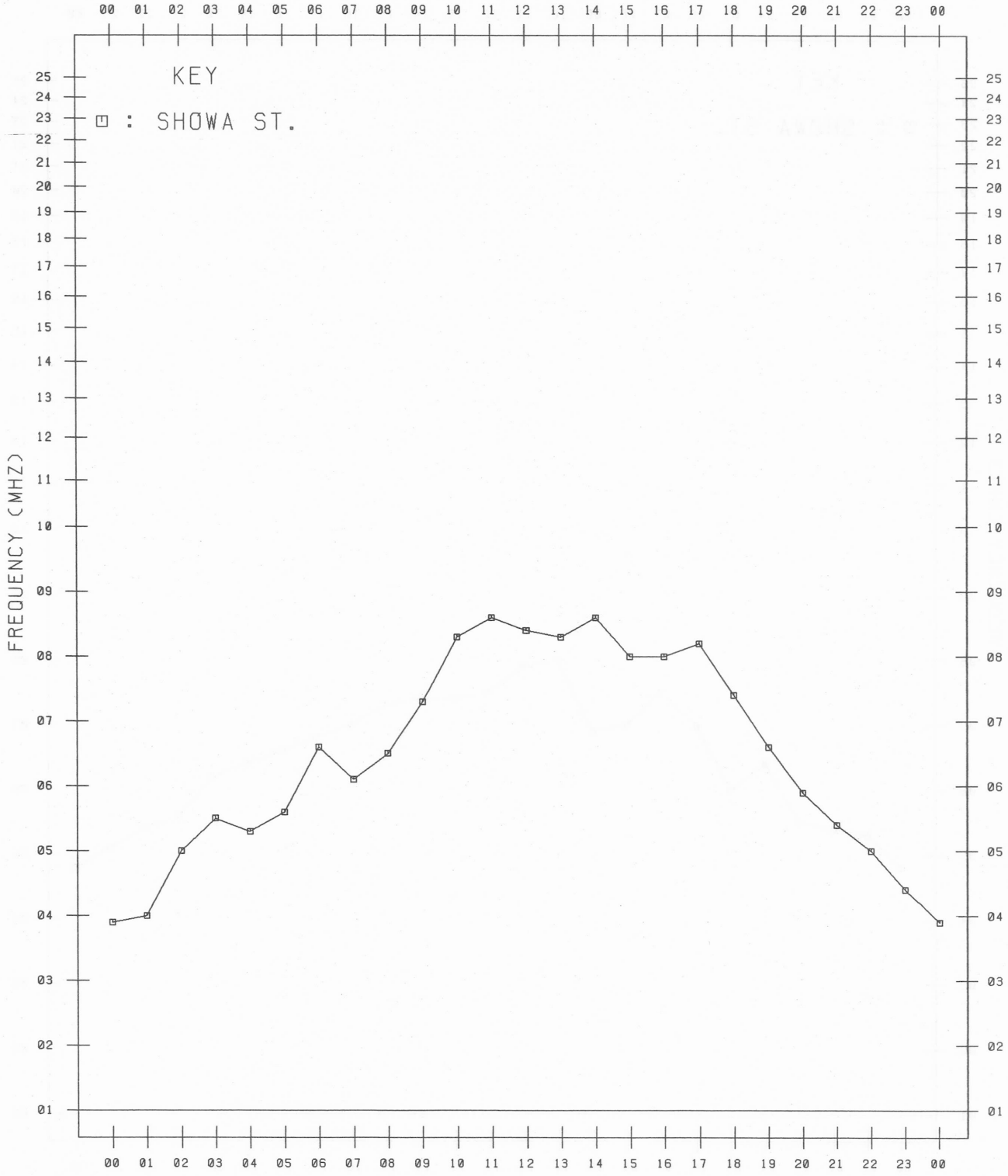
MONTHLY MEDIAN VALUES OF FOF2

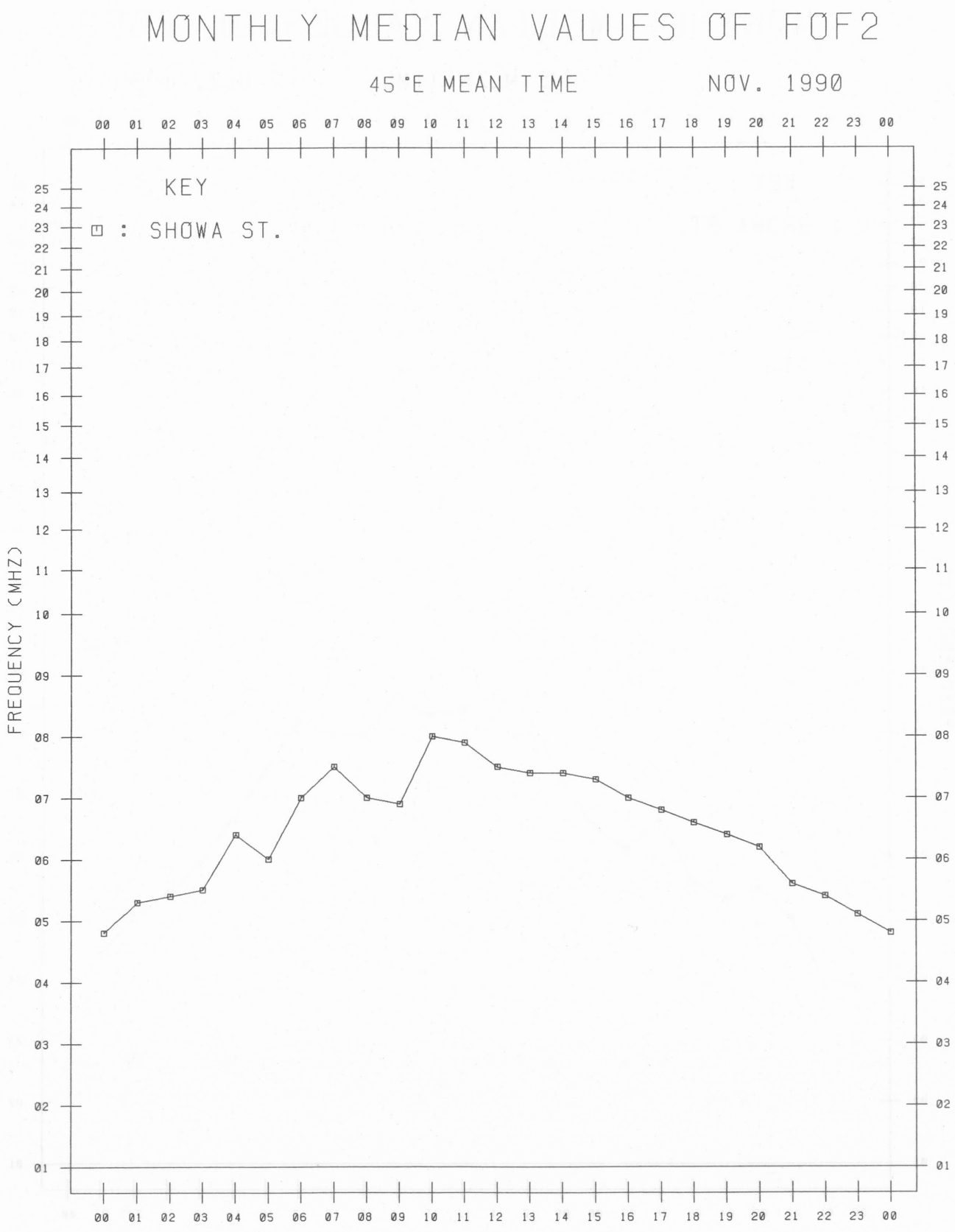
45°E MEAN TIME SEP. 1990



MONTHLY MEDIAN VALUES OF FOF2

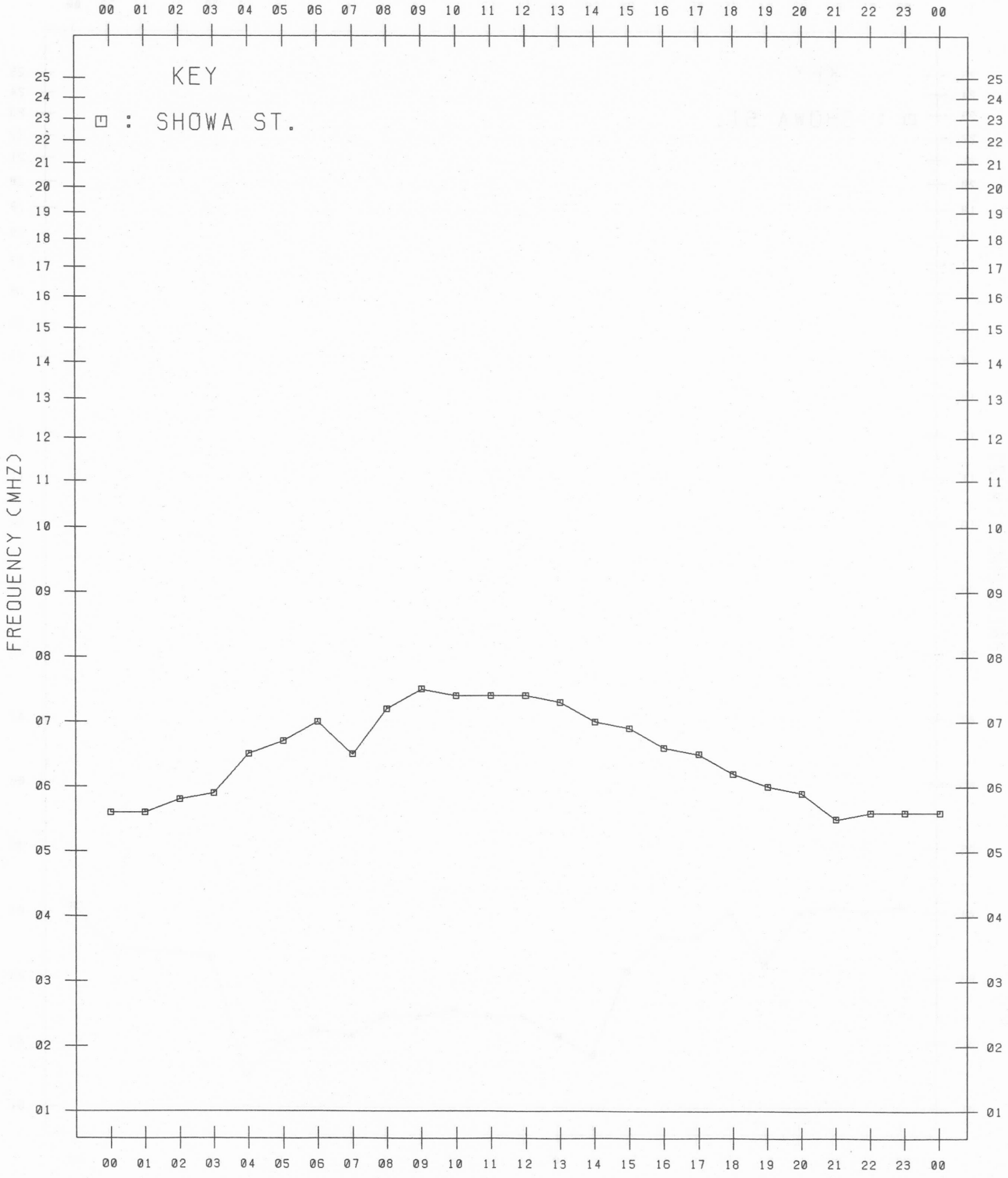
45°E MEAN TIME OCT. 1990

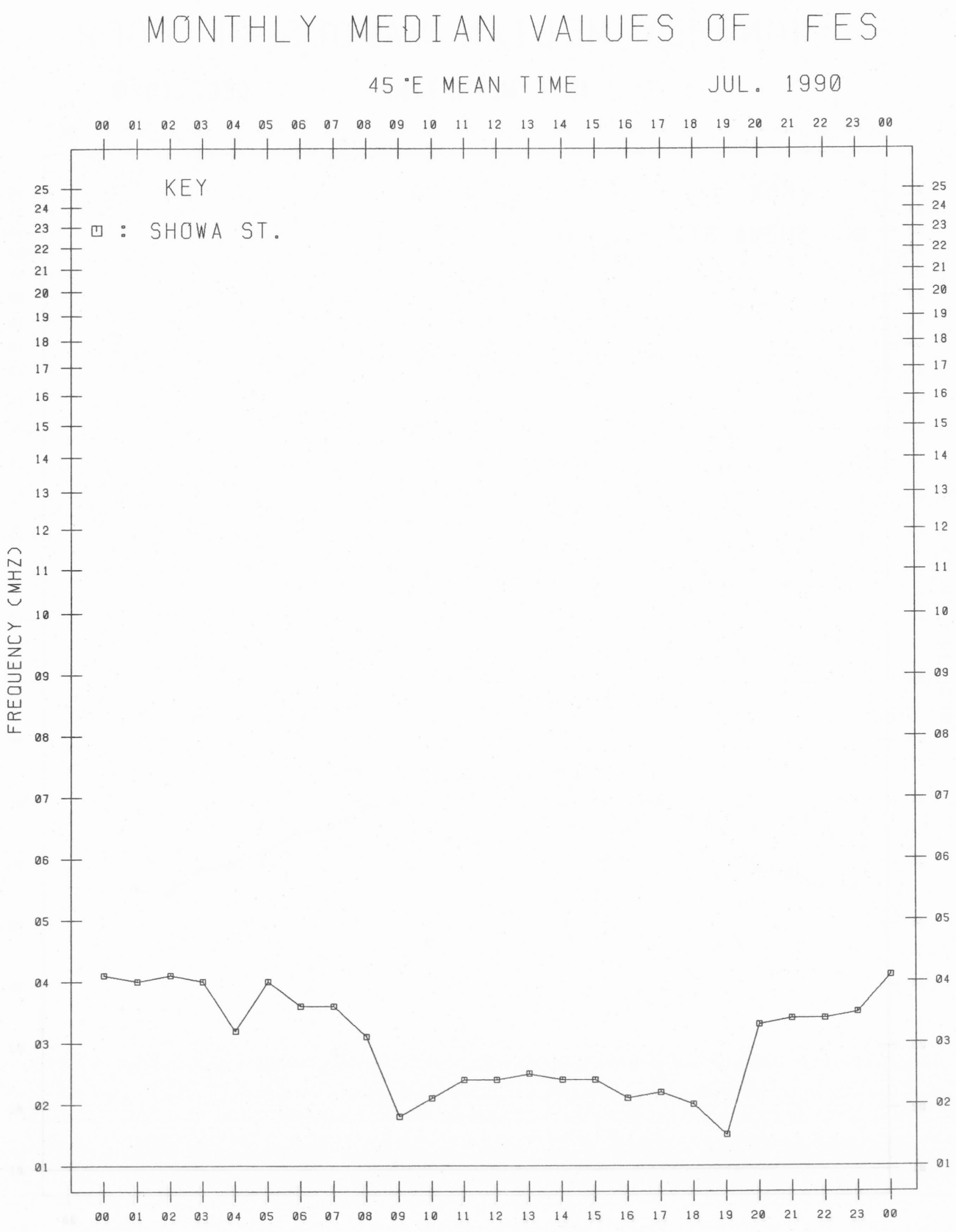



MONTHLY MEDIAN VALUES OF FOF2
45°E MEAN TIME
NOV. 1990
KEY
□ : SHOWA ST.
FREQUENCY (MHZ)
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00
25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 09 08 07 06 05 04 03 02 01

MONTHLY MEDIAN VALUES OF FOF2

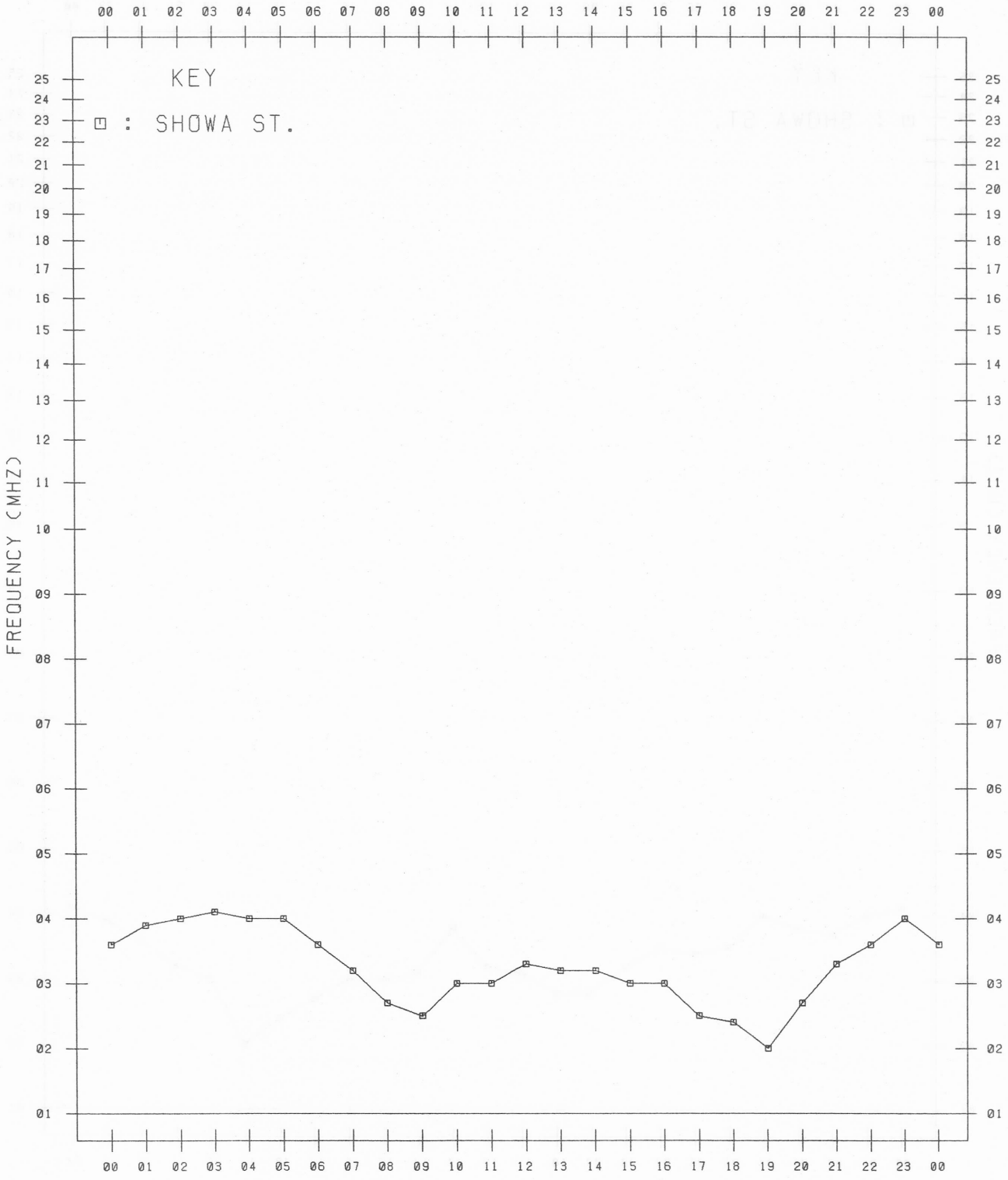
45 °E MEAN TIME DEC. 1990




MONTHLY MEDIAN VALUES OF FES
45°E MEAN TIME
JUL. 1990
KEY
□ : SHOWA ST.
FREQUENCY (MHZ)
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 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 24 25

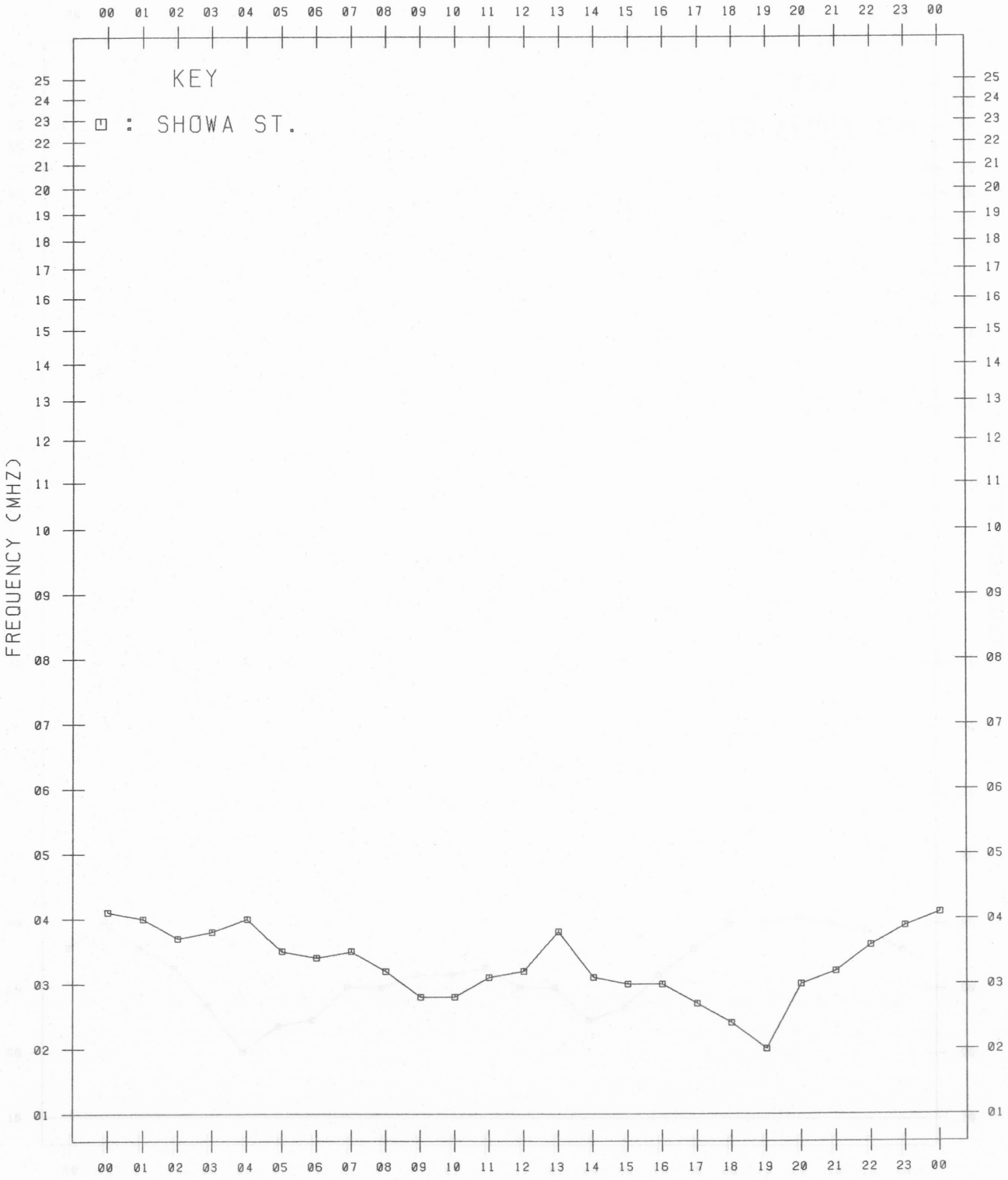
MONTHLY MEDIAN VALUES OF FES

45°E MEAN TIME AUG. 1990



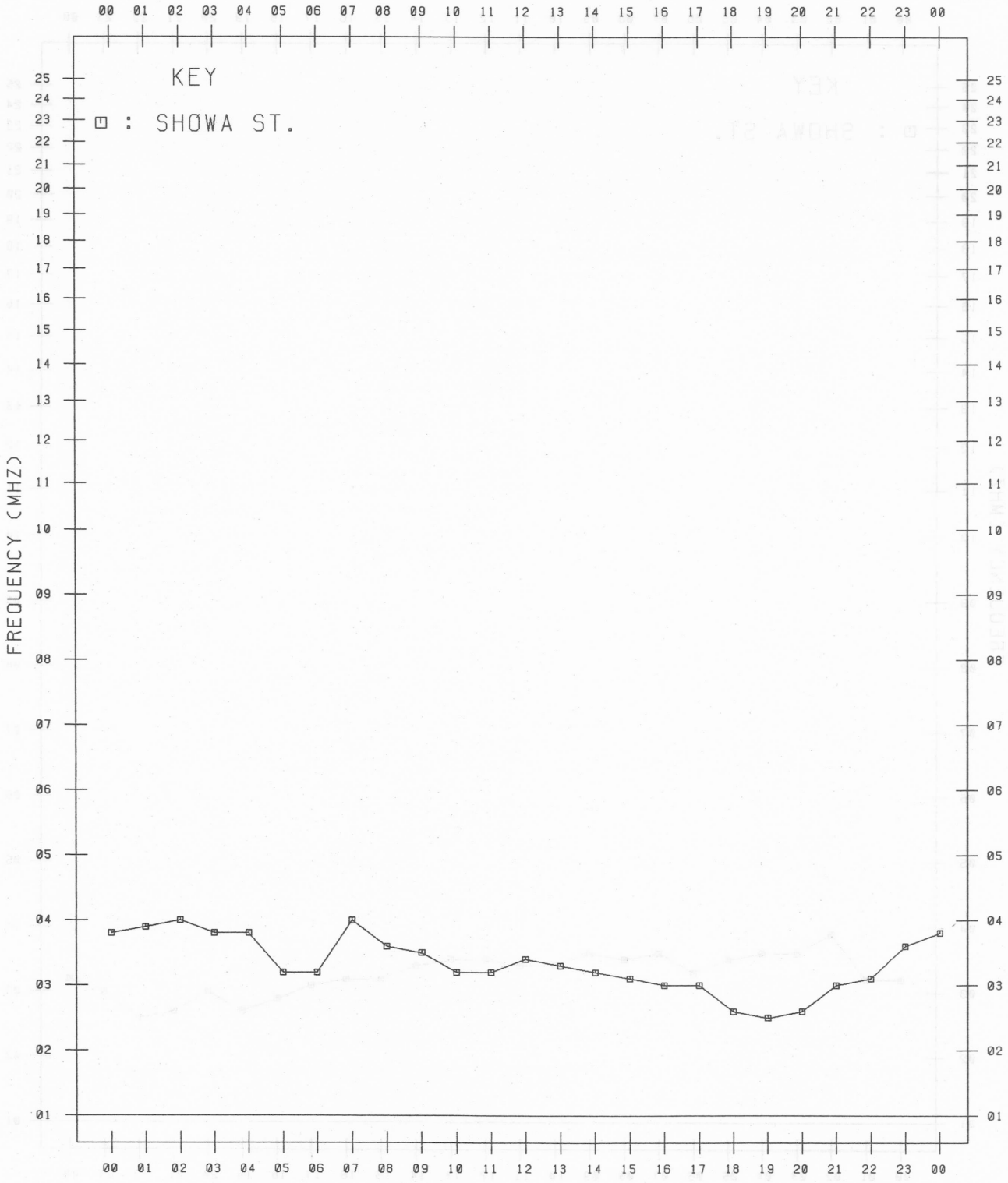
MONTHLY MEDIAN VALUES OF FES

45°E MEAN TIME SEP. 1990



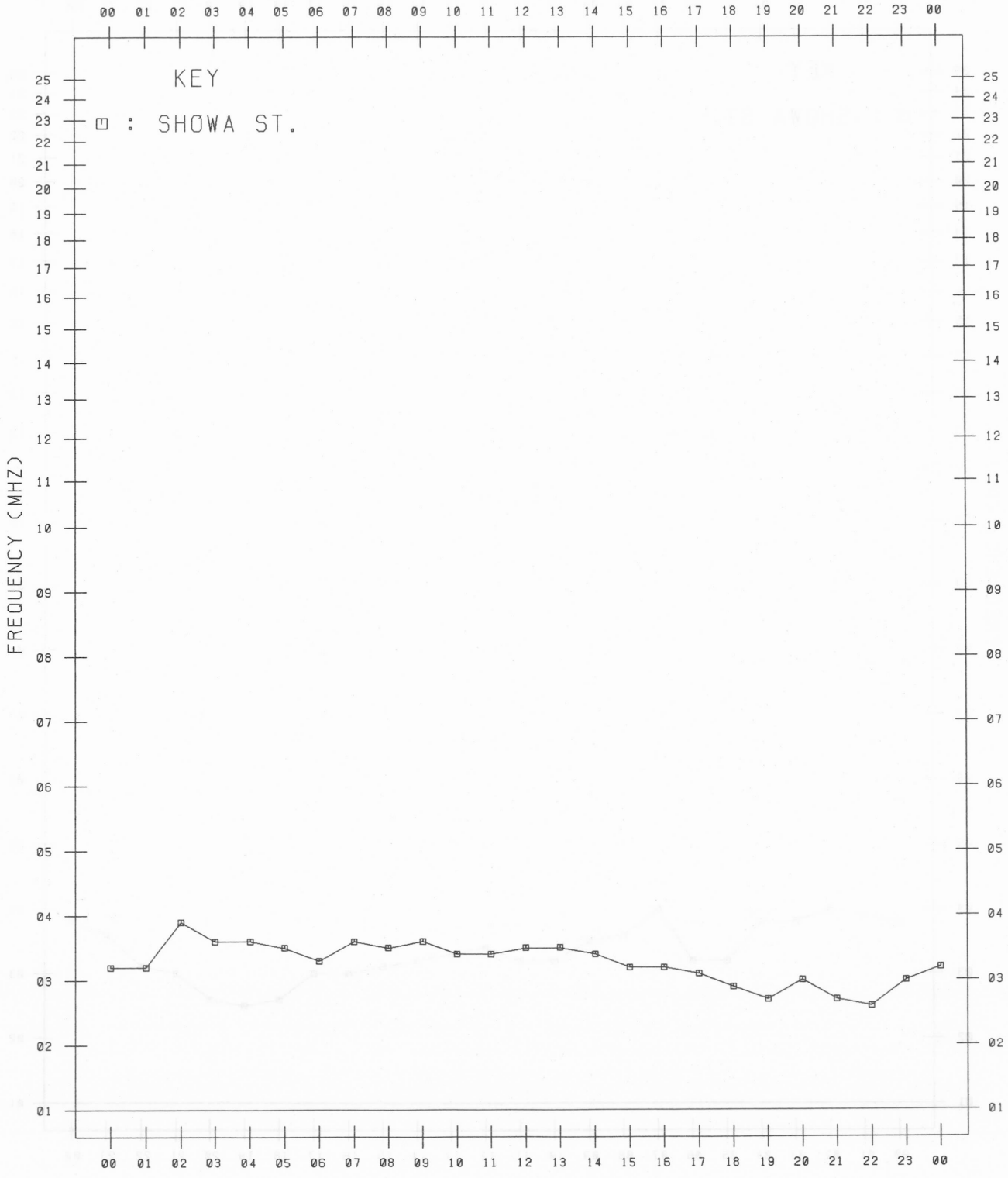
MONTHLY MEDIAN VALUES OF FES

45°E MEAN TIME OCT. 1990



MONTHLY MEDIAN VALUES OF FES

45°E MEAN TIME NOV. 1990



MONTHLY MEDIAN VALUES OF FES

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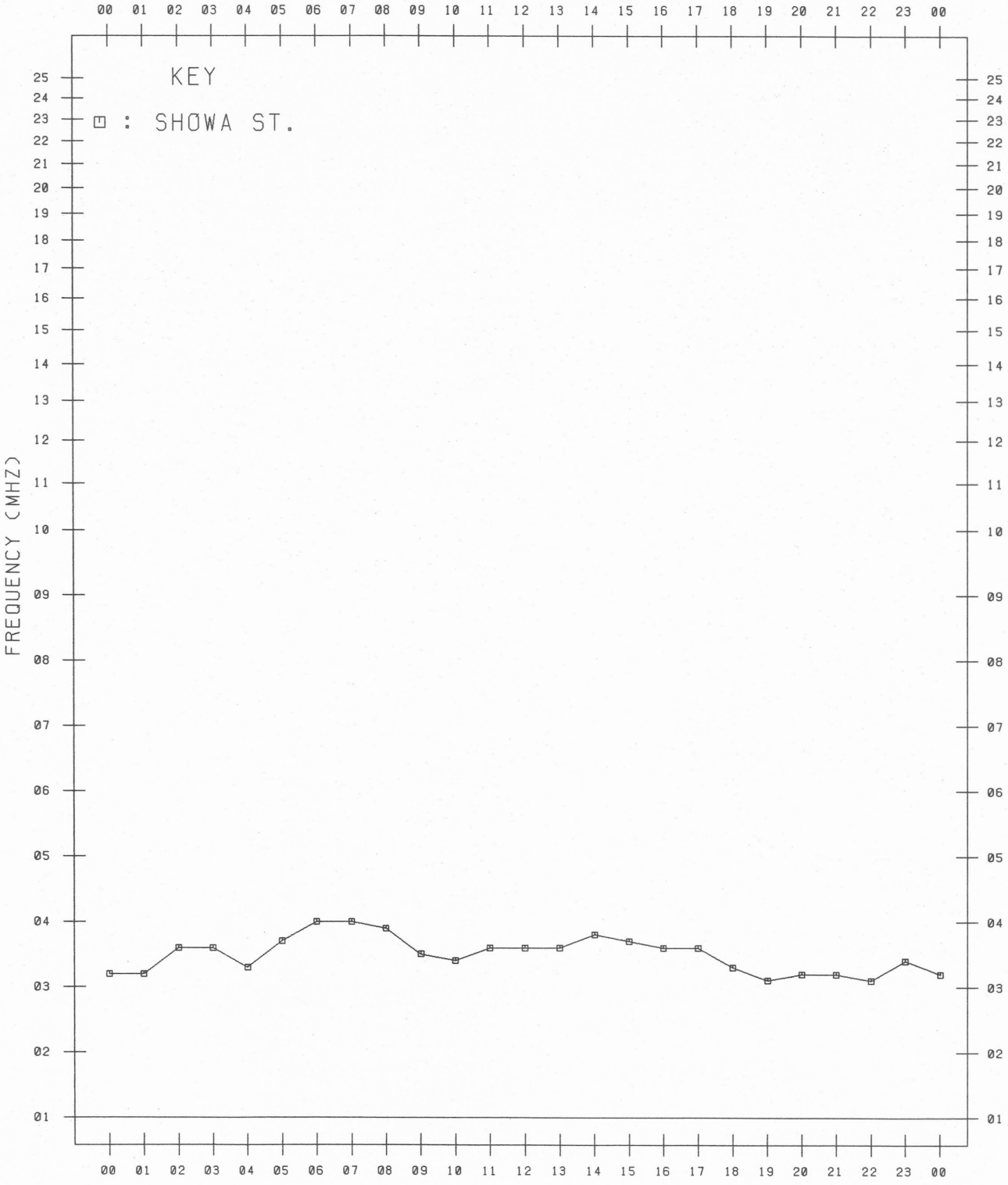

IONOSPHERIC DATA AT SYOWA STATION (ANTARCTICA)
ION. ANT. — 55 July 1990—December 1990 (Not for Sale)

昭和基地電離層資料（南極）

（1990年7月—1990年12月）

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☎ 0423（21）1211（代）

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