

ION.ANT.—51

**IONOSPHERIC DATA AT SYOWA STATION**  
**(ANTARCTICA)**

July 1988 —December 1988

**CONTENTS**

	Page
Introduction .....	1
Tables .....	4
Monthly plots of foF2, fmin, fEs and h'F .....	34
Monthly median plots of foF2 .....	40
Monthly median plots of fEs .....	46

**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 1988. 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 $\mu$ 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 $\Omega$ 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  $f_{min}$ .
- C Measurement influenced by, or impossible because of, any non-ionospheric reason.
- D Measurement influenced by, or impossible because of, the upper limit of the normal frequency range.
- 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 be 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 atmospheric effects.
- 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.1988 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	B	A	A	A	A	A	A	B	B	B	78	76	B	B	0	X	B	B	B	A	A	A		
2	A	A	B	B	B	B	B	B	B	B	B	B	66	B	B	0	X	0	X	B	B	B	B	A	A		
3	28	A	A	A	A	A	A	B	B			X	X	X	X	0	X	0	X	B	B	A	A	A	A		
4	A	B	A	B	A	A	B	A		30	32	42	52	57	61	68	53	34	30	25		B	A	B	A	A	
5	A	X	X		X	X			X	X	X	X	X	X	X	X	X	X			B	B	B	B	B		
6	A	A			A	0	X	A	A		45	53	60	80	X	B	X	X	X	B	B	B	A	A	A		
7	A	A	A	A	A	A	A	A	A	A	X	B	B	B	X	B	0	X	B	B	B	A	A	A	A		
8	A	A	A	A	A	A	A	A	A	A	B	B	0	X	B	X	X		B	B	B	B	A	A	A		
9	A	A	A	A	A	A	A	X	X		X	X	X	A	X			0	X		A	A	A	A	A		
10	A	A	A	A	0	X	0	X		32	31	32	44	57	63		52	63	35	41	26		A	A	B	A	
11	A		A	A	0	X	A	A	A	A		46	46	B	B	B	63	55	62	50	A	A	A	A	A		
12	A	A	A	A	A	A	A	A	A	A	0	X	B	B	B	B	0	X	0	X	0	X	X	B	B	A	A
13	A	A	A	A	B	A	A	A	B	A		X	X	X	X						B	A	A	B	19		
14	A	A	A	A	A	A	B	A		33	35			55	66	78	53	42	36	30		A	A	A	A	A	
15	A	A	A	A	B	B	A	A	A		0	X		X	X	X	X			0	X		A	A	A	A	
16	A	A	A	A	A	A	A	A			36	44	52	62	62	72	80	70	54	46	37		A	A	A	A	
17	A	A	A	A	A	A	A	A	A	A		42	35	65	56	66	74	76	76		A	A	A	A	A	A	
18	A	A	A	A	A	A	A	A	A	A		43	67	65	71	65	55	50	66	46		A	A	A	A	A	
19	A	A	A	A	A	A	A	A		25	41		39	46	53							B	B	A	A	A	
20	A	A	A	A	X	X						X	X			X				0	X		A	A	B	A	
21	A	A		A	A	A		0	X		0	X	B	B	X	B		X		A	A	A	A	A	A	A	
22	A	A	A	A	A	A	A	B	A	B	B	B	B	B	B		66	64	65	55	A	A	A	A	B	A	
23	B	B	B	A	A	B	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
24	A	A	A	A	A	A	A	A	B	B	0	X	0	X	X	0	X	0	X	X	X	X	B	B	B	A	
25	A	A	A	A	A	A	A	0	X		C	C	X	X	X	0	X	X	X			B	B	B	B	B	
26	B	A	A	A	A	A		A	B	B	B	B	B	B	B	B	B	B			B	B	A	A	A	A	
27	A	B	A	A	A	A	A	A	A	A	B	B	B	B	B	B	0	X	0	X	B	B	A	B	B	A	A
28	A	A	A	A	A	A	A	A		26	38	50	66	75	86	76	81	54	56	56	34		A	A	A	A	
29	A	A	A	B	B	B	A			31	38	40	52	65	76	90	85	81	56	74	32	30	B	B	A	A	
30	A	A	A	A	A	B	A	A			35		B	B	B	X	X	X	X	X		B	0	X	A	A	
31	A	A	A	A	A				B		B	B	B	X	B	X	0	X	X	0	X		B	A	B	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	1	2	3	2	5	6	8	8	13	13	17	18	19	17	21	25	25	24	16	9	1		1	1			
MED	28	25	27	30	X	30	34	38	40	33	38	44	55	65	71	72	60	50	50	34	33	21		0	X	21	19
U 0			38		0	X	36	40	39	43	42	42	47	63	73	80	77	73	56	60	46	36					
L 0			X				26	29	34	32	28	34	41	51	57	64	66	53	42	38	27	29					

IONOSPHERIC DATA STATION SHOWA ST.  
 JUL. 1988 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	A	A	A	B	A	A	A	A	A	A	B	B	B	F	F	B	B		B	B	B	A	A	A
2	A	A	B	B	B	B	B	B	B	B	B	B	F	B	B	U	R	U	R	38	B	B	B	A
3	F	A	A	A	A	A	A	B	B	F	F										B	B	A	A
4	A	B	A	B	A	A	B	A	F	F	F	F	24	26	36	46	51	55	62	47	28	24	19	A
5	A	17	17	18	17	19	19	19	20	25	42	47	60	55	65	44	33	17	19			B	B	B
6	A	A	F	F	A	F	U	R	A	A	F	F									B	B	B	A
7	A	A	A	A	A	A	A	A	A	A	A	B	B	B							B	B	B	A
8	A	A	A	A	A	A	A	A	A	A	B	B									B	B	B	A
9	A	A	A	A	A	A	A		26	25	26	38	51	57		A	46	57	29	35	20		A	A
10	A	A	A	A	33	34	33	35	38												U	R	A	A
11	A	F	A	A	26	A	A	A	A	A	F	F	B	B	F	F	F	F	A	A		A	A	A
12	A	A	A	A	A	A	A	A	A	A	A	B	B	B	B	U	S				B	B	B	A
13	A	A	A	A	B	A	A	A	B	A	F	B									B	A	A	B
14	A	A	A	A	A	A	B	A	F	F	B	B									A	A	A	A
15	A	A	A	A	B	B	A	A	A	F	F	F									F	A	A	A
16	A	A	A	A	A	A	A	A	F	F	B	F	F	B	F						B	A	B	A
17	A	A	A	A	A	A	A	A	A	A	F	F									F	A	A	A
18	A	A	A	A	F	F	F	A	A	A	F	F	B	B	B	B	B	B	B	B	B	B	A	A
19	A	A	A	A	A	A	A	A	F												B	B	B	A
20	A	A	A	A	24	30	33	40	39	39	34	54	63	55	64	57	37	U	R	F		A	A	B
21	A	A	F	A	A	A	F	A	A	A											A	A	A	A
22	A	A	A	A	A	A	A	B	A	B	B	B	B	B	B	B	50	48			A	A	A	B
23	B	B	B	A	A	B	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A
24	A	A	A	A	A	A	A	A	B	U	R												B	B
25	A	A	A	A	A	A	A		F	C	C										F	F	B	B
26	B	A	A	A	A	A	F	A	B	B	B	B	B	B	B	B	B	F	B	B		A	A	A
27	A	B	A	A	A	A	A	A	A	A	B	B	B	B	B						B	A	B	A
28	A	A	A	A	A	A	A	A	F	F	20	32	44	60	69	80	70	75	48	50	F	F	A	A
29	A	A	A	B	B	B	A	F	F	F	F	25	32	34	46	59	70	84	79	75	50	68	B	A
30	A	A	A	A	A	B	A	A	F	B	B	B									F	F	F	A
31	A	A	A	A	A	F	F	F	B	F	B	B									F	U	S	B
					23	33	37		37				75		89	60	52	60	40	33				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	1	2	3	2	5	6	8	8	13	13	17	18	19	17	21	25	25	24	16	9	1		1	1
MED	F		F	F			F	F	F	F	F	F							F	F	F		F	F
U O			32		30	34	33	37	36	36	41	55	67	74	71	67	50	54	40	30				
L O			17		20	23	28	26	22	28	35	45	51	58	60	47	36	32	21	23				

IONOSPHERIC DATA STATION SHOWA ST.

JUL. 1988 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	35	40	44	B	43	44	37	36	41	36	B	B	B	29	23	B	B	E B	B	B	B	B	42	37	68			
2	42	70	B	B	B	B	B	B	B	B	B	B	E B	B	B	35	24	23	B	B	B	B	B	37	42			
3	31	31	26	38	29	41	41	B	B	E B	B	B	E B	E B	E B	E B	E B	B	B	B	27	30	43	39				
4	45	B	45	B	57	72	B	41	31	32	29	16	16	19	18	13	13	12	12	E B	B	B	27	12				
5	24	31	14	22	24	26	31	17	E B	E B	E B	E B	E B	B	B	E B	E B	B	B	B	B	B	B	B				
6	14	32	38	32	39	45	85	46	60	45	42	E B	E B	B	B	E B	E B	E B	B	B	B	B	26	39	36			
7	45	47	45	43	45	57	59	57	40	45	21	B	B	B	E B	B	B	B	B	B	B	30	40	37	46			
8	45	45	37	37	66	45	37	59	44	37	B	B	34	B	24	55	20	B	B	B	B	B	32	39	40			
9	47	46	39	42	45	46	37	28	14	14	18	36	20	18	E B	E B	12	16	16	35	30	40	16	25				
10	40	46	41	33	21	26	28	11	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	20	21	B	34			
11	32	31	37	35	29	45	60	45	45	58	35	27	B	B	E B	E B	E B	E B	E B	E B	53	49	38	45				
12	46	77	71	43	90	92	60	60	45	43	32	B	B	B	B	30	14	12	21	B	B	B	31	40				
13	42	45	45	45	B	60	59	42	B	42	35	27	E B	21	18	20	32	E B	E B	E B	15	35	B	12				
14	29	31	36	47	41	56	B	41	42	35	B	B	E B	24	25	23	24	15	13	13	21	16	12	35	41			
15	46	43	45	37	B	B	41	60	46	41	25	32	24	20	E B	38	36	26	19	31	35	48	45	45				
16	55	56	90	60	75	45	45	60	33	43	B	41	32	B	E B	E B	E B	E B	35	29	B	30	44	40	45			
17	99	45	45	58	68	46	54	58	37	45	36	32	29	21	18	22	20	30	E B	24	32	30	32	41	28			
18	31	70	45	54	41	35	36	45	36	42	E B	E B	E B	B	B	B	B	B	B	B	B	16	30	29				
19	35	38	83	42	42	35	32	27	15	12	B	E B	24	B	B	B	B	B	B	B	B	B	18	30				
20	20	30	40	40	30	35	37	27	37	42	37	E B	19	37	16	32	33	27	E B	17	25	30	45	32	69			
21	20	30	22	27	47	41	27	45	30	47	32	B	B	E B	E B	E B	E B	E B	29	36	39	42	36	39	42			
22	45	45	60	44	70	36	36	36	36	B	B	B	B	B	B	E B	E B	E B	23	20	35	37	45	44	70	59		
23	B	B	B	36	36	B	33	38	71	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	31		
24	35	32	47	45	45	50	42	47	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	37			
25	44	55	46	44	30	31	46	43	C	C	20	36	17	18	21	E B	E B	E B	E B	E B	E B	E B	E B	E B	B			
26	B	16	28	45	48	45	70	42	B	B	B	B	B	B	B	B	B	E B	E B	E B	E B	36	60	59	110			
27	33	B	45	35	87	45	59	45	35	38	B	B	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	32	36		
28	32	40	47	47	45	41	45	31	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	41			
29	45	47	41	B	B	B	44	31	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	31			
30	57	80	44	105	36	B	37	60	B	B	B	E B	25	30	33	35	18	E B	19	42	27	16	19	17				
31	29	32	35	46	50	32	16	30	B	B	B	E B	30	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	32	32		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	29	28	29	27	27	26	28	28	25	23	17	18	19	18	21	25	25	25	20	16	17	20	22	29				
MED	40	44	44	43	45	45	41	42	37	38	29	24	24	20	E B	E B	E B	E B	U	20	20	18	29	30	36	37	39	
UO	45	47	46	46	57	46	56	52	44	43	35	32	30	27	E B	31	32	24	30	27	34	40	43	39	45			
LO	31	32	37	36	36	35	36	31	22	32	E B	E B	E B	20	18	18	19	E B	E B	E B	E B	E B	E B	E B	24	31	30	30

IONOSPHERIC DATA STATION SHOWA ST.  
 JUL. 1988 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	25	13	23	B	19	23	14	10	22	15	B	B	B	19	23	B	B	29	B	B	B	10	8	15
2	24	23	B	B	B	B	B	B	B	B	B	B	19	B	B	35	24	23	B	B	B	B	8	24
3	13	13	13	14	15	15	13	B	B	14	16	14	11	20	19	23	23	14	B	B	9	9	9	9
4	10	B	21	B	19	21	B	14	14	13	9	14	14	19	14	13	13	10	12	B	14	B	8	8
5	8	8	8	7	7	7	8	8	9	11	13	14	18	14	10	14	13	13	12	B	B	B	B	B
6	8	8	7	9	10	8	8	14	14	14	10	22	B	21	B	26	21	24	B	B	B	13	8	19
7	8	14	22	23	14	20	15	14	14	11	14	B	B	B	35	B	24	B	B	B	13	8	8	10
8	15	14	19	23	23	24	10	13	8	15	B	B	25	B	24	55	20	B	B	B	B	8	8	20
9	14	20	14	24	13	12	10	8	9	8	9	11	10	13	23	13	9	8	9	9	8	8	8	9
10	8	8	8	8	8	8	7	8	8	B	B	31	19	13	18	14	14	15	13	14	10	13	B	8
11	8	8	8	8	8	13	14	13	14	13	9	10	B	B	30	24	20	15	14	7	7	7	7	8
12	14	22	17	20	9	23	15	8	14	15	15	B	B	B	B	30	14	8	11	B	B	B	9	10
13	25	19	20	15	B	23	14	15	B	23	10	11	10	18	14	11	13	13	14	B	8	8	B	8
14	8	8	8	13	10	10	B	20	13	10	B	B	24	15	23	24	15	13	13	13	10	8	7	8
15	17	17	24	25	B	B	13	14	10	10	18	23	18	16	25	16	11	9	10	9	11	8	8	10
16	8	8	10	8	8	10	21	15	13	10	B	24	15	B	34	34	B	35	23	B	10	8	8	13
17	8	14	13	11	15	15	11	14	14	15	19	15	15	12	14	11	9	14	24	15	14	12	23	10
18	9	11	10	11	9	9	10	25	24	24	24	23	B	B	B	B	B	B	B	B	B	9	8	8
19	13	8	23	11	13	11	13	10	9	9	B	24	B	B	B	B	B	B	B	B	B	B	8	10
20	9	8	8	10	8	14	8	8	8	8	8	19	16	9	13	9	14	17	14	10	9	16	B	23
21	8	8	16	14	13	13	9	17	10	8	23	B	B	25	B	24	24	14	10	10	11	11	10	10
22	12	11	12	14	28	8	10	B	10	B	B	B	B	B	B	23	20	14	8	9	9	10	B	18
23	B	B	B	10	24	B	22	21	29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	8
24	9	9	10	13	15	14	14	14	B	B	29	30	23	15	24	17	24	15	10	8	B	B	B	10
25	19	8	14	15	14	10	13	14	10	C	C	15	19	14	14	10	14	13	19	9	B	B	B	B
26	B	8	8	19	14	13	10	27	B	B	B	B	B	B	B	B	B	24	B	B	9	10	20	14
27	10	B	21	13	23	15	10	14	9	24	B	B	B	B	B	25	20	B	B	24	B	B	15	14
28	13	24	14	14	15	21	9	13	14	14	13	19	22	21	22	13	14	10	13	8	8	10	11	10
29	14	14	24	B	B	B	14	10	13	10	16	19	20	24	19	9	14	14	9	14	B	B	8	8
30	13	18	14	24	14	B	26	15	15	B	B	B	25	24	20	13	13	19	14	13	8	B	9	8
31	8	8	23	15	13	10	9	8	B	10	B	B	30	B	60	31	23	23	16	14	B	23	B	8
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	12	13	14	14	14	14	13	14	14	14	24	24	24	24	24	24	20	15	14	24	14	12	9	10
U O	15	19	22	23	23	B	15	17	24	24	B	B	B	B	B	35	24	29	B	B	B	B	15	
L O	8	8	10	11	10	10	10	10	10	10	13	15	18	15	19	13	14	13	12	10	9	8	8	8



IONOSPHERIC DATA STATION SHOWA ST.

JUL. 1988 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	A	A	B	A	A	A	A	A	A	B	B	B	240	240	B	B	E B	B	B	B	A	A	A				
2	A	A	B	B	B	B	B	B	B	B	B	B	210	B	B	E B	260	230	280	B	B	B	B	A	A			
3	E A	A	A	A	A	A	A	B	B	260	275	225	225	240	240	245	E B	260	220	B	B	A	A	A	A			
4	A	B	A	B	A	A	B	A	E A	400	A	E A	260	215	215	200	220	200	195	230	245	B	A	B	A	A		
5	A	E A	E A	E A	E A	E A	E A	E A	A	275	280	225	220	210	230	200	195	200	260	230	B	B	B	B	B			
6	A	A	E A	E A	E A	E A	E A	A	A	E A	E A	E A	350	315	230	B	240	295	245	B	B	B	A	A	A			
7	A	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	250	250	B	B	B	A	A	A	A		
8	A	A	A	A	A	A	A	A	A	A	B	B	E A	B	B	E B	310	240	300	230	B	B	B	A	A	A		
9	A	A	A	A	A	A	A	E A	E A	E A	E A	360	310	305	245	230	200	200	220	230	200	A	A	A	A	A		
10	A	A	A	A	E A	E A	E A	E A	E A	E A	B	B	205	225	205	200	200	240	230	240	230	A	A	B	A			
11	A	E A	A	A	A	A	A	A	A	A	E A	E A	E A	B	B	E B	B	E B	E A	A	A	A	A	A	A			
12	A	A	A	A	A	A	A	A	A	A	E A	E A	B	B	B	B	E B	250	245	280	295	B	B	B	A	A		
13	A	A	A	A	B	A	A	A	B	A	250	230	215	200	220	200	200	275	250	E A	E B	B	A	A	B	225		
14	A	A	A	A	A	A	B	A	E A	E A	E A	500	350	B	B	250	215	225	225	240	230	245	E B	A	A	A	A	
15	A	A	A	A	B	B	A	A	A	E A	E A	E A	400	280	240	225	220	230	215	200	210	210	E A	A	A	A	A	
16	A	A	A	A	A	A	A	A	E A	A	O	B	330	350	275	270	B	260	270	B	A	B	A	A	A	A		
17	A	A	A	A	A	A	A	A	A	A	E A	E A	290	210	210	225	200	200	295	250	260	A	A	A	A	A		
18	A	A	A	A	E A	E A	E A	A	A	A	E A	E B	E B	B	B	B	B	B	B	B	B	B	B	A	A	A		
19	A	A	A	A	A	A	A	A	A	270	B	260	B	B	B	B	B	B	B	B	B	B	B	B	A	A		
20	A	A	A	A	E A	E A	E A	E A	A	380	360	310	255	200	250	225	200	190	200	200	200	230	215	250	A	A	B	A
21	A	A	A	A	A	E A	E A	E A	E A	A	E A	A	B	B	E B	B	245	250	280	A	A	A	A	A	A	A		
22	A	A	A	A	A	A	A	B	A	B	B	B	B	B	B	B	E B	325	310	A	A	A	A	A	B	A		
23	B	B	B	A	A	B	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A		
24	A	A	A	A	A	A	A	A	B	B	E B	E B	300	240	225	240	220	225	E B	240	225	225	215	B	B	B	A	
25	A	A	A	A	A	A	A	E A	E A	C	C	400	330	245	245	215	200	200	200	210	225	210	B	B	B	B		
26	B	A	A	A	A	E A	E A	A	B	B	B	B	B	B	B	B	B	B	230	B	B	A	A	A	A	A		
27	A	B	A	A	A	A	A	A	A	A	B	B	B	B	B	B	E B	290	240	B	B	A	B	B	A	A		
28	A	A	A	A	A	A	A	A	O	310	270	230	200	220	210	205	205	195	240	225	230	A	A	A	A	A		
29	A	A	A	B	B	B	A	E A	E B	E A	350	300	270	250	225	220	210	215	200	E A	240	210	190	E B	B	B	A	A
30	A	A	A	A	A	B	A	A	E A	B	B	B	210	220	215	220	220	225	230	205	E A	230	B	E A	300	A		
31	A	A	A	A	A	A	E A	E A	B	E A	B	B	255	B	E B	245	230	220	240	220	225	B	A	B	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	1	2	2	2	4	4	8	8	12	12	17	18	19	17	21	25	25	24	16	9	1		1	1				
MED	E A	E A	E A	E A	E A	E A	E A	E A	E A	U	E	320	261	275	228	220	218	218	U	212	230	232	225	220	E A	E A	225	
U O					E A	E A	E A	E A	E A	E A	E A	390	395	372	355	355	350	308	245	E B	E B	E	E	E A				
L O					E A	E A	E A	E A	312	325	330	318	300	270	250	220	210	208	200	200	200	228	218	212				

IONOSPHERIC DATA STATION SHOWA ST.  
 AUG. 1988 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	0 X 38	X 38	A	A	A	A	B	A	38	0 X 53	0 X 49	X 67	0 X 77	77	76	71	58	46	45	30	0 X 22	34	A	28
2	S	A	A	A	A	A	34	38	41	B	65	75	72	76	76	62	65	65	51	39	19	19	A	A
3	A	A	A	A	A	A	A	A	A	B	B	B	0 X 65	X 56	X 69	X 79	X 84	X 58	0 X 46	0 X 34	B	B	A	B
4	A	A	A	46	45	39	31	A	B	B	X 55	X 76	X 81	X 67	X 71	X 71	66	70	48	25	B	B	A	A
5	A	A	A	32	28	35	41	37	X 57	49	62	X 71	X 95	X 91	X 85	X 79	81	86	80	A	A	A	A	A
6	A	A	A	A	A	X 40	40	46	0 X 49	46	62	X 73	X 78	X 97	X 86	X 75	77	56	51	35	A	A	0 X 22	21
7	X 23	A	A	A	A	A	46	50	46	X 56	60	X 78	X 78	X 73	X 98	X 63	65	51	36	B	B	B	A	A
8	A	A	A	39	39	40	A	A	0 X 34	47	66	X 73	X 88	X 86	X 96	0 X 91	54	50	54	37	0 X 23	A	A	A
9	A	A	A	A	A	A	A	A	53	55	56	62	70	81	83	92	80	67	70	66	51	A	A	A
10	A	A	A	45	B	A	A	A	X 36	0 X 45	X 49	X 59	0 X 61	X 66	X 65	X 63	60	51	36	28	22	25	A	A
11	A	A	A	A	A	A	A	A	0 X 44	B	B	0 X 55	X 66	X 71	X 78	X 90	0 X 96	0 X 95	B	S	26	A	A	A
12	X 38	A	A	A	A	A	A	A	X 62	X 66	X 76	X 81	X 85	X 86	X 100	X 104	X 96	X 73	B	A	A	A	A	A
13	A	A	A	A	A	A	B	A	A	B	A	B	0 X 66	X 70	X 81	0 X 81	B	X 73	71	A	A	A	A	A
14	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	X 100	B	X 55	43	A	A	A	A
15	A	A	A	A	A	A	A	A	A	50	55	X 55	B	B	B	B	X 88	B	B	A	A	A	A	A
16	A	B	A	A	A	A	A	A	0 X 36	X 46	B	B	B	B	0 X 84	X 89	0 X 71	X 76	X 76	40	B	B	B	32
17	A	A	A	A	A	A	A	A	X 45	X 52	X 65	X 68	B	B	X 90	X 85	0 X 66	X 68	X 65	43	33	30	A	A
18	20	A	A	A	A	A	A	A	B	B	60	70	X 78	X 91	X 90	X 90	X 91	X 91	X 86	46	A	A	A	A
19	A	A	A	A	A	A	A	A	0 X 52	X 60	X 74	X 68	0 X 88	X 94	X 85	X 73	X 75	X 63	X 41	23	B	A	A	A
20	A	A	A	A	A	A	A	A	B	B	A	B	X 73	X 71	X 72	X 78	X 75	X 70	57	39	A	A	A	A
21	A	A	A	A	A	A	A	A	X 57	60	56	66	X 81	X 78	X 75	X 78	0 X 84	0 X 68	0 X 60	48	40	B	A	A
22	A	A	A	A	45	41	A	A	A	A	B	B	0 X 53	X 50	X 51	X 56	X 54	X 55	X 47	35	25	A	A	A
23	A	A	B	A	A	A	B	A	A	X 49	X 49	0 X 56	X 65	X 69	X 71	X 67	X 66	X 71	X 66	51	A	A	A	A
24	A	A	A	A	A	A	A	A	0 X 41	X 42	X 55	X 63	X 63	X 72	X 80	X 90	X 92	X 90	X 80	46	33	B	A	A
25	A	A	A	A	A	A	A	A	X 41	B	B	0 X 51	0 X 60	X 75	X 78	X 91	X 90	X 94	X 93	36	A	A	A	A
26	A	A	A	B	A	A	A	A	A	0 X 51	X 56	X 65	X 66	X 76	X 83	0 X 78	0 X 67	0 X 66	0 X 50	36	24	20	B	
27	0 X 42	A	A	A	A	B	A	A	B	B	B	B	B	0 X 76	X 77	X 83	X 70	X 70	60	0 X 46	A	A	A	A
28	A	A	A	A	A	B	A	A	0 X 34	0 X 40	X 51	X 59	X 58	X 61	X 70	B	X 73	X 71	X 65	60	0 X 28	A	A	A
29	A	B	A	A	A	A	A	A	A	X 52	B	B	B	B	F	0 X 106	B	80	64	50	A	A	A	A
30	A	A	A	A	36	A	B	43	41	B	B	B	B	0 X 66	X 65	X 70	X 72	X 55	45	39	B	B	A	
31	A	A	A	A	A	B	42	46	0 X 46	0 X 52	X 60	X 67	0 X 76	X 81	X 81	X 95	X 80	X 70	X 66	40	A	A	A	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	5	1		4	5	9	5	9	18	18	20	21	24	24	27	30	28	30	28	24	13	5	2	3
MED	X 38	X 38		42	39	40	40	42	42	52	60	68	72	74	78	80	74	70	62	40	26	25	21	28
U O	0 X 40			46	45	40	44	48	49	53	62	74	80	84	90	90	84	75	68	0 X 47	34	32		32
L O	22			36	32	37	32	36	40	47	55	58	65	70	72	71	66	58	50	36	22	22		21

IONOSPHERIC DATA STATION SHOWA ST.

AUG. 1988 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	32	32	A	A	A	A	B	A	F	47	43	61	71	71	70	65	52	40	39	24	16	F	A	F				
2	S	A	A	A	A	A	F	F	F	B	59	69	66	70	70	56	59	59	45	23	F	F	A	A				
3	A	A	A	A	A	A	A	A	A	B	B	B	59	50	63	73	78	52	U	S	U	S	B	B	A	B		
4	A	A	A	F	F	F	F	A	B	B	49	70	75	61	65	65	60	64	42	19		B	B	A	A			
5	A	A	A	F	F	F	F	F	F	F	51	43	56	65	89	85	79	73	F	A	A	A	A	A	A			
6	A	A	A	A	A	34	34	40	43	40	56	67	72	91	80	69	71	50	45	29	F	A	A	F				
7	17	A	A	A	A	A	F	F	F	F	40	44	40	50	54	72	72	67	92	57	59	45	30	B	B	B	A	A
8	A	A	A	F	F	F	A	A	F	F	28	41	60	67	82	80	90	85	R	F	R	F	16	A	A	A	A	
9	A	A	A	A	A	A	A	F	F	F	47	49	50	56	64	75	77	86	74	61	64	60	45	A	A	A	A	A
10	A	A	A	F	B	A	A	A	30	39	43	53	55	60	59	57	54	45	30	22	F	U	R	A	A	A	A	
11	A	A	A	A	A	A	A	A	38	B	B	R	49	60	65	72	84	90	89	R	B	S	F	A	A	A	A	
12	32	A	A	A	A	A	A	A	56	F	F	F	F	60	70	75	79	80	94	98	90	67	B	A	A	A	A	A
13	A	A	A	A	A	A	B	A	A	B	A	B	F	60	64	75	75	B	67	65	F	A	A	A	A	A	A	A
14	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	94	B	49	37	F	A	A	A	A	A	A	A	A
15	A	A	A	A	A	A	A	A	A	F	J	S	B	B	B	B	B	82	B	B	A	A	A	A	A	A	A	A
16	A	B	A	A	A	A	A	A	F	30	40	B	B	B	U	R	78	83	65	70	70	34	B	B	B	F	26	
17	A	A	A	A	A	F	A	A	F	39	46	59	62	B	B	84	79	60	58	59	30	F	F	A	A	A	A	A
18	F	A	A	A	A	F	A	A	B	B	F	F	F	54	60	72	85	84	84	85	85	80	40	F	A	A	A	A
19	A	A	A	A	A	A	A	A	A	U	S	46	54	68	62	82	88	79	67	69	57	35	F	F	B	A	A	A
20	A	A	A	A	A	A	A	A	B	B	A	B	67	65	66	72	69	64	51	33	F	A	A	A	A	A	A	A
21	A	A	A	A	A	A	A	A	51	54	50	60	75	72	69	72	78	62	54	42	F	F	B	A	A	A	A	A
22	A	A	A	A	F	F	A	A	A	A	B	B	47	44	45	50	48	49	41	29	F	F	A	A	A	A	A	A
23	A	A	B	A	A	A	B	A	A	43	43	50	59	63	65	61	60	65	60	45	U	S	A	A	A	A	A	A
24	A	A	A	A	A	A	A	A	35	38	49	57	57	66	74	84	86	84	74	40	F	F	B	A	A	A	A	A
25	A	A	A	A	A	F	A	F	35	B	U	S	U	R	54	69	72	85	84	88	87	30	F	A	A	A	A	A
26	A	A	A	B	A	A	A	A	A	B	45	50	59	60	70	77	72	61	60	44	F	F	F	B	A	A	A	B
27	R	A	A	A	A	B	A	A	B	B	B	B	B	B	70	71	77	64	64	54	U	S	A	A	A	A	A	A
28	A	A	A	A	A	B	A	F	F	U	S	28	34	45	53	52	55	64	B	67	65	59	54	40	F	A	A	A
29	A	B	A	A	A	A	A	A	A	46	B	B	B	B	F	100	B	F	F	58	44	A	A	A	A	A	A	A
30	A	A	A	A	F	A	B	F	F	B	B	B	B	B	60	59	64	66	49	39	F	F	B	B	A	A	A	A
31	A	A	A	A	A	F	B	F	F	40	46	54	61	70	75	75	89	74	64	60	34	F	A	A	A	A	A	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	5	1		4	5	9	5	9	18	18	20	21	24	24	27	30	28	30	28	24	13	5	2	3				
MED	32	32		36	F	F	F	F	36	46	54	61	66	68	72	74	68	64	56	34	F	F	F	F				
U O	34			40	F	F	F	F	43	47	56	68	74	78	84	84	78	69	62	41	F	F		F				
L O	16			30	F	F	F	F	34	41	49	52	59	64	66	65	60	52	44	29	F	F		F				

IONOSPHERIC DATA STATION SHOWA ST.

AUG. 1988 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	26	34	45	53	36	42	B	41	37	37	E B	19	25	23	24	21	20	E B	E B	E B	28	23	12	25	29			
2	42	30	40	38	45	44	36	30	17	B	21	23	27	42	32	30	32	16	16	16	37	19	21	35				
3	40	51	39	37	70	60	59	16	43	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	B	B		B				
4	18	17	32	35	28	21	25	36	B	B	26	59	51	45	71	58	36	35	E B	E B	B	B		36	34			
5	42	35	31	40	69	42	31	18	27	21	18	E B	E B	30	21	37	30	39	E B	E B	33	36	45	45	56			
6	46	45	45	47	36	31	34	30	22	18	21	20	36	16	31	36	16	37	37	32	E B	9	12					
7	32	40	21	39	50	35	56	43	30	37	21	22	22	27	30	17	29	36	16	B	B	B		42	21			
8	21	26	32	27	70	41	57	45	33	33	34	51	73	51	31	33	E B	E B	19	16	38	18	15	13				
9	21	26	31	36	40	47	45	31	29	30	36	32	30	23	35	34	22	31	E B	E B	8	35	45	66	59			
10	43	42	32	41	B	45	39	38	26	16	17	19	E B	E B	24	24	21	16	E B	E B	13	13	12	37	70			
11	46	35	82	40	46	44	35	46	43	B	B	E B	E B	E B	E B	E B	E B	E B	E B	B	27	45	45	81	33			
12	33	41	45	41	37	35	45	42	52	37	31	36	28	43	E B	E B	E B	24	30	B	37	22	38	37	31			
13	54	47	45	41	70	43	B	80	42	B	37	B	27	31	29	55	B	E B	E B	30	24	32	42	38	45	40		
14	42	42	71	80	47	59	59	59	46	B	B	B	B	B	E B	E B	30	E B	E B	22	29	40	18	35	32	27		
15	35	92	80	34	35	42	45	45	41	37	38	B	B	B	B	B	E B	E B	B	B	26	44	32	30	37			
16	42	B	37	37	35	56	41	36	37	E B	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	B	B	B	28			
17	31	47	41	42	42	34	52	43	42	20	35	23	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	28			
18	27	26	44	48	52	46	53	42	B	B	35	30	55	29	35	34	24	29	E B	E B	14	40	20	39	37			
19	37	41	47	38	41	40	52	60	46	E B	E B	E B	E B	E B	E B	E B	25	56	27	35	25	30	12	22	16	28	38	
20	41	45	47	70	92	55	42	40	B	B	35	B	E B	E B	E B	E B	34	29	26	24	14	13	41	40	33	44	53	90
21	43	38	45	35	48	40	43	45	51	50	32	32	35	39	E B	26	32	32	32	19	17	E B	B	23	36			
22	41	46	47	57	44	45	44	42	47	34	B	B	26	27	25	21	19	15	13	E B	E B	9	10	26	31	37		
23	31	37	B	41	40	44	B	40	43	43	26	29	E B	E B	E B	E B	24	28	28	23	18	16	14	33	20	A	34	48
24	55	43	45	37	35	47	45	45	41	42	34	27	26	27	26	28	E B	E B	E B	E B	E B	17	B	31	41			
25	70	41	42	50	46	52	40	37	21	B	B	25	28	31	25	22	E B	E B	E B	E B	30	16	25	22	41	35	41	58
26	43	39	41	B	45	32	45	41	38	B	E B	E B	26	25	17	27	21	12	10	E B	E B	9	9	13	12	B		
27	38	79	45	39	60	B	40	40	B	B	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	32	30	41	44		
28	36	35	37	45	44	B	38	27	E B	E B	E B	E B	E B	E B	E B	B	26	22	18	19	15	14	26	36	52			
29	70	B	42	45	62	46	43	41	42	37	B	B	B	E B	E B	E B	57	56	E B	E B	35	23	19	34	41	36	39	
30	40	81	43	37	29	59	B	25	34	B	B	B	B	E B	E B	E B	30	25	23	24	14	13	18	B	B	38		
31	80	71	83	41	60	35	B	36	35	E B	25	27	30	E B	E B	E B	29	28	28	25	31	16	12	32	47	44	52	47
	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	29	30	30	30	29	26	31	27	19	22	21	24	24	28	30	28	30	28	30	27	22	29	29				
MED	41	41	44	40	45	44	44	41	38	33	27	27	26	26	E B	E B	22	20	18	18	32	31	36	37				
U O	43	46	45	45	60	47	52	45	43	37	35	31	32	38	E B	E B	32	32	24	32	38	41	42	48				
L O	32	35	37	37	37	38	39	36	29	23	21	24	E B	24	24	26	23	20	16	E B	E B	17	18	25	32			

IONOSPHERIC DATA STATION SHOWA ST.

AUG. 1988 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	8	8	11	14	24	24	B	21	13	10	19	18	23	24	21	15	20	13	13	11	8	8	8	8
2	8	8	8	9	18	15	10	10	9	B	13	17	17	16	14	10	9	8	10	9	9	8	8	8
3	9	10	10	8	13	12	14	8	25	B	B	B	25	15	25	23	19	20	20	19	B	B	13	B
4	10	8	7	8	9	14	15	15	B	B	17	20	14	15	14	14	13	15	14	13	B	B	9	8
5	8	8	8	8	8	8	8	8	8	8	11	30	21	17	13	8	19	10	15	10	8	8	8	8
6	10	23	11	13	13	9	9	8	8	8	10	14	14	14	13	8	8	9	9	8	7	8	9	8
7	8	8	7	7	10	23	9	9	9	21	15	19	15	14	13	9	11	8	9	B	B	B	23	8
8	8	8	8	8	8	8	8	8	8	13	14	15	16	15	15	13	9	13	10	10	10	8	8	8
9	8	8	8	8	8	10	8	8	8	8	13	12	14	14	13	10	9	8	8	8	8	9	11	10
10	14	8	12	9	B	14	8	8	8	8	13	14	24	24	16	13	13	9	14	13	13	8	8	9
11	8	8	17	23	24	29	24	23	12	B	B	30	24	23	20	35	54	40	B	8	10	19	13	10
12	9	10	14	14	8	10	12	14	10	14	13	15	16	15	56	20	24	20	B	20	14	8	7	8
13	11	13	15	13	14	11	B	24	25	B	29	B	14	31	29	55	B	30	24	10	11	9	14	8
14	8	8	8	13	8	15	14	13	23	B	B	B	B	B	B	30	B	22	17	9	13	8	8	8
15	8	9	10	25	13	14	13	23	15	13	14	B	B	B	B	B	40	B	B	9	8	9	8	9
16	13	B	15	18	15	25	23	19	18	23	B	B	B	B	60	55	35	50	35	26	B	B	B	8
17	8	8	10	13	10	10	23	9	14	15	25	23	B	B	60	25	28	25	13	15	17	14	10	10
18	9	8	10	8	10	11	13	30	B	B	25	30	55	29	35	34	24	18	25	14	10	9	8	8
19	8	8	12	13	22	24	15	13	9	25	27	30	19	56	27	35	25	19	12	9	13	10	9	9
20	9	17	13	19	13	11	30	10	B	B	24	B	34	29	26	24	11	9	9	14	19	9	15	9
21	8	10	10	10	14	14	11	10	8	15	15	16	17	14	26	16	13	9	10	10	26	B	8	8
22	9	10	13	21	11	8	12	10	13	15	B	B	19	18	18	15	13	9	9	9	10	7	7	7
23	8	9	B	12	13	23	B	30	24	12	15	29	24	28	28	23	13	13	9	10	10	A	9	9
24	24	21	15	26	14	17	14	10	8	15	16	15	17	15	13	28	24	38	13	14	14	B	8	8
25	10	25	22	20	17	11	14	10	13	B	B	23	28	31	25	18	30	11	25	22	10	12	14	19
26	23	23	23	B	25	24	22	22	24	B	B	24	17	15	15	15	13	9	10	9	9	13	12	B
27	15	19	21	23	30	B	23	24	B	B	B	B	B	B	55	35	34	22	19	25	23	17	18	22
28	23	24	15	16	23	B	22	14	28	23	24	28	27	29	B	22	18	18	19	15	14	10	13	14
29	17	B	22	19	19	23	22	24	22	22	B	B	B	B	57	56	B	35	23	19	10	10	11	10
30	10	13	22	24	19	15	B	15	19	B	B	B	B	B	30	25	23	15	14	13	10	B	B	10
31	13	13	14	29	17	13	B	17	14	25	22	23	29	28	28	25	18	13	9	10	8	10	14	11
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31
MED	9	10	12	13	14	14	14	13	14	23	24	28	24	24	26	23	19	15	14	11	10	10	10	9
U O	13	19	15	21	19	23	23	22	24	B	B	B	55	56	55	34	30	22	23	15	17	14	10	
L O	8	8	10	9	10	11	11	9	9	13	14	17	17	15	15	14	13	9	10	9	9	8	8	8

IONOSPHERIC DATA STATION SHOWA ST.

AUG. 1988 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	E A 300	A	A	A	A	A	B	A	E A 400	275	250	210	230	205	205	205	200	180	205	200	E A 260	E A 280	A	E A 260
2	E A 345	A	A	A	A	A	A	E A 300	E A 280	B	245	215	225	220	210	190	225	220	205	200	E A 250	A	A	A
3	A	A	A	A	A	A	A	A	A	B	B	B	255	245	225	245	225	215	225	250	B	B	A	B
4	A	A	E A 340	E A 330	E A 375	E A 360	A	B	B	B	230	240	220	200	205	230	200	210	200	220	B	B	A	A
5	A	A	E A 340	E A 380	E A 375	E A 370	E A 330	E A 290	E A 240	E A 230	240	225	210	205	205	215	240	230	A	A	A	A	A	
6	A	A	A	A	E A 400	E A 400	E A 310	E A 300	260	215	210	220	220	215	200	200	180	225	250	E A 250	A	A	250	260
7	E A 270	A	A	A	A	A	E A 360	E A 330	E A 300	250	230	225	210	200	210	180	220	200	215	B	B	B	A	A
8	A	A	E A 325	E A 360	E A 350	A	A	E A 300	240	210	230	210	210	210	200	190	210	225	230	240	A	A	A	A
9	A	A	A	A	A	A	E A 400	E A 315	265	245	220	225	250	230	210	210	225	220	200	A	A	A	A	A
10	A	A	A	220	B	A	A	E A 380	280	250	270	225	230	225	230	240	210	230	255	E B 270	225	A	A	A
11	A	A	A	A	A	A	A	A	A	B	B	270	250	245	245	260	250	250	B	240	E A 350	A	A	A
12	E A 400	A	A	A	A	A	A	A	E A 350	270	240	230	220	225	270	230	220	310	E B 310	B	A	A	A	A
13	A	A	A	A	A	A	B	A	A	B	A	B	255	270	275	270	B	240	260	A	A	A	A	A
14	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	225	B	240	270	A	A	A	A	A
15	A	A	A	A	A	A	A	A	E A 270	225	B	B	B	B	B	B	E B 280	B	B	A	A	A	A	A
16	A	B	A	A	A	A	A	A	E A 350	260	B	B	B	B	E B 250	E B 245	225	280	220	E B 250	B	B	B	E A 260
17	A	A	A	A	A	A	A	A	E A 280	225	230	225	B	B	250	225	230	260	210	250	E B 255	E B 240	A	A
18	E A 360	A	A	A	A	A	A	A	B	B	245	240	E B 280	250	240	230	200	220	230	250	A	A	A	A
19	A	A	A	A	A	A	A	A	270	240	230	225	275	215	240	200	230	225	240	E A 270	B	A	A	A
20	A	A	A	A	A	A	A	A	B	B	A	B	250	240	225	220	225	275	300	320	A	A	A	A
21	A	A	A	A	A	A	A	A	E A 310	250	220	225	250	220	225	215	210	200	205	245	245	B	A	A
22	A	A	A	E B 440	E A 400	A	A	A	A	A	B	B	245	240	245	240	230	250	210	210	250	A	A	A
23	A	A	B	A	A	A	B	A	E A 310	255	260	225	225	230	230	210	240	220	260	A	A	A	A	A
24	A	A	A	A	A	A	A	A	E A 320	250	240	240	230	230	225	230	240	210	225	230	B	A	A	A
25	A	A	A	A	A	A	E A 400	E A 305	B	B	225	225	210	250	230	240	215	215	300	E B 300	A	A	A	A
26	A	A	A	B	A	A	A	A	A	B	275	240	245	225	H 200	215	205	200	210	190	230	E B 250	E B 310	B
27	225	A	A	A	A	B	A	A	B	B	B	B	B	B	E B 320	245	230	240	240	225	A	A	A	A
28	A	A	A	A	A	B	E A 400	E B 345	260	250	250	250	240	B	240	240	220	210	200	240	A	A	A	A
29	A	B	A	A	A	A	A	A	E A 325	B	B	B	B	B	E B 270	E B 240	B	225	250	275	A	A	A	A
30	A	A	A	E A 300	A	B	E B 375	E A 440	B	B	B	B	B	B	260	250	250	220	220	240	240	B	B	A
31	A	A	A	A	E A 320	B	0 E A 410	345	260	240	260	230	250	230	240	230	210	225	270	E A 270	A	A	A	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	6			4	5	6	4	9	16	18	20	21	24	24	28	30	28	30	28	25	13	5	2	3
MED	E A 322			E A 332	E A 360	E A 375	E A 365	E A 375	E A 312	258	240	230	226	226	228	228	224	221	220	230	240	E A 240	280	E A 260
U O	E A 360			E A 340	E A 410	E A 400	E A 385	E A 400	E A 350	275	250	245	250	245	250	240	230	240	230	252	E A 265	E A 265		260
L O	270			E A 272	E A 315	E A 350	E A 360	E A 320	E A 300	250	230	225	225	215	212	215	208	210	210	215	240	228		E A 260

IONOSPHERIC DATA STATION SHOWA ST.  
 SEP. 1988 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	B	B	B	B	0 X	51	57	61		61	66	65	51	31		A	A	A	A	
2	A	A	A	B	A	B	A	A	B	B	0 X	49	61	56	69	77	81	91	100	95	40		B	A	A	A	
3	0 X	A	A	B	A	A	B		B	B	0 X	X	X	X	X	X	X	X	X	73	60	47	24		A	35	
4	A	A	A	B	B	B	B				0 X	B	X	X	X	X	X	X	X	96	66	40	31	0 X	A		
5	A	A		A	A	A	A				X	X	X	0 X	X	X	X	X	X	96	66	40	31	0 X	B		
6	B	A	A	A					0 X		X	X	X	X	X	X	0 X	0 X	0 X	0 X					A		
7					37	46	55	46	54	68	79	87	100	104	105	106	104	91	82	66	56	36	26		A		
8	27	30	36	26	43		0 X				X	0 X	X	X	X					0 X		0 X			25		
9	22	22	21	24	28	31	33	46	60	68	61	94	100	110	116	106	106	110	86	71	60	25		A	A		
10	A	A	A		0 X		X				X	X	X	X	X	X	X	X	X		0 X		0 X		A		
11	A			A	A				X	X	X	X	X	X	X	X	X	X	X						A		
12		54	60	53	47			70	F		A	B	B	B	S	S		0 X	0 X	X	A	A	A	A	A		
13	39	A	A	A	A						B	B	B	B	B	B	0 X	X	X	X	56	31		A	A	A	
14	A	A	A			45		A	B	B	B	B	B	S	B	0 X	0 X	0 X	0 X	X	X		A	A	A		
15	A	A	A		37	40		A	B	A	A		66	66		B	B	X	X	0 X	0 X		A	A	A		
16	A	A	A		52	54		A	B	A	A		58	65		B	B	0 X	X	X	82		A	A	A		
17	A	B	A	A	A	A	B	A	A	A	A	0 X	62	66	71	75	71	73	69	65	60	48	28	24	A		
18	24	0 X	0 X	A			A	B	B	A	A	A	B	0 X	50	64	71	75	74	71		42		A	A	A	
19	A	43		55	60		A	A	A	A	A	0 X	54	59	58	66	75	76	76	74	56	51	45		A	53	
20	A	0 X	A	A			A	A	A	0 X	B	B	B	B	B	B	B	B	X	X	B		A	A	A		
21	A	B	B	B	B	B	A	A	0 X	X	X	X	X	X	X	X	X	X	X	X	0 X		0 X		A		
22	X	A	A	A	A	A	B	B	B	B	B	B	0 X	56	59										A	A	A
23	A	A	A	A	A	B	A	B	B	B	B	B	B	X		X	X	X	X	X	0 X	X	X	X	X	X	
24	A	A	A	A	A				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
25	A	A	A	A	A	B			0 X	X			B	B	X	X	X	X	X	X	X	X	A	A	A	A	
26	A	A	B	B	X	X	0 X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	
27	A	0 X	A	A																							
28	31	29	28																								
29	45	40	36	58	46	46	54	64	73	88	96	110	112	115	112	112	106	105	96	86	75	66	56	55	A	A	
30	54	48	50	50	54	53	61	73	77	93	101	106	107	111	125	113	121	116	106	102	76	57					
31																											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	9	11	8	9	13	12	13	17	17	18	17	19	24	24	25	28	27	29	29	27	24	21	13	10			
MED	39	40	36	52	46	47	54	51	61	67	71	76	78	85	88	90	87	82	75	66	54	46	36	40			
U O	50	48	48	56	52	52	58	62	70	74	79	94	96	100	104	102	97	93	90	77	66	56	50	50			
L O	26	26	30	32	42	44	46	44	54	64	66	62	60	70	74	76	74	71	71	60	46	35	26	35			

IONOSPHERIC DATA STATION SHOWA ST.  
 SEP. 1988 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	B	B	B	B				B			60	59	45	F	A	A	A	A
2		A	A	A	B	A	B	A	A	B	B		45	51	55		55	60	59	45	25	F	B	A	A	A
3			A	A	B	A	A	B	F	B	B			U S						F	F	F	F	A	F	
4		A	A	A	B	B	B	B	F	F		U S								F	F	F	F	F	A	F
5		A	A	F	A	A	A	A	F	F										F	F	F	F	F	F	B
6		B	A	A	A	F	F	F	F	U R	F									F	F	F	F	F	A	
7		F	F	F	F	F	A	F	F	F	F									F	F	F	F	F	F	F
8		F	F	F	F	F	F	F	F	F	F									F	F	F	F	F	F	A
9		A	A	A	F	F	F	F	F	F	F									F	F	F	F	F	F	A
10		A	F	A	A	A	F	F	F	F	A	B	B	B	S	S	F					A	A	A	A	A
11		F	A	A	A	A	B	A	F	B	B	B	B	U S	B					F	F	F	F	A	A	A
12		A	A	A	A	A	F	A	B	B	B	B	B	S	B							F	A	A	A	A
13		A	A	A	F	F	B	A	A	F	F	B	B	B	B	B						U S	F	F	A	A
14		A	A	A	F	F	A	B	F	A	F	B	B									F	A	A	A	A
15		A	B	A	A	A	A	B	A	A	A	A	A									F	F	F	F	F
16		F		D S	A	F	F	A	B	B	A	A	B									B	F	A	A	A
17		A	F	B	F	F	A	A	A	A	A	A	A									F	F	F	A	A
18		A	37		49	54							48	53	52	60	69	70	70	68	50	45	39		47	
19		A	43			37							33							68	65	29	24		A	A
20		A	B	A	A	A	A	A	A	A	B	B			S						F	F	F	A	A	A
21		A	B	B	B	B	B	A	A													F	F	F	A	A
22				A	A	A	A	B	B	B	B	B	B									F	A	A	A	A
23		A	A	A	A	A	B	A	B	B	B	B	B									55	47	39	35	F
24		A	A	A	A	A	F	F														63	49	49	40	F
25		A	A	A	A	A	B	F															A	A	A	A
26		A	A	B	B			U S																		F
27		A		A	A	A	F	F	F	F												F	F	F	F	F
28		F	F	F	A	A	F	F	F	F												74	54	50	44	F
29		F	F	F	F	F	F	J S																		F
30		F	F	F	F	F																				F
31																										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		9	11	8	9	13	12	13	17	17	18	17	19	24	24	25	27	27	29	29	27	24	21	13	10	
MED		F	F	F	F	F	F	F	F													F	F	F	F	
U O		44	42	42	48	46	46	48	56	64	68	74	88	90	94	98	97	91	87	84	71	60	50	44	44	
L O		F	F	F	F	F	F	F	F												F	F	F	F	F	
		18	20	22	26	36	38	40	38	48	58	60	56	54	64	68	69	68	65	65	54	39	29	20	29	



IONOSPHERIC DATA STATION SHOWA ST.

SEP. 1988 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	46	69	50	52	36	45	37	B	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	36	32	28	28	
2	38	62	46	B	72	B	45	44	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	B	40	35	44	
3	58	90	46	B	57	42	B	34	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	15	31	37	27	
4	16	55	31	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
5	35	42	21	37	36	43	36	24	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
6	B	21	24	30	29	26	27	15	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
7	25	24	36	26	15	47	36	20	21	24	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
8	28	21	27	28	25	25	13	21	21	27	29	19	15	31	35	31	23	21	14	12	E B	E B	E B	E B	E B	
9	47	45	41	42	40	35	15	15	19	22	25	27	32	32	32	32	22	33	32	30	32	12	11	38		
10	28	30	45	45	41	19	E B	16	15	18	21	24	31	26	30	28	26	22	33	26	32	E B	E B	E B	E B	
11	55	71	44	34	30	35	33	42	49	45	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
12	32	34	45	62	41	B	26	36	B	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
13	45	40	38	45	32	32	45	B	B	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
14	43	47	34	29	65	B	41	41	36	31	B	B	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
15	42	27	40	92	59	52	B	35	39	38	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
16	37	B	44	42	32	51	B	35	60	45	35	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
17	25	32	32	38	32	33	40	B	B	61	42	B	35	32	27	24	E B	E B	E B	E B	E B	E B	E B	E B	E B	
18	60	46	B	57	35	41	41	45	38	52	41	31	36	40	27	22	32	31	20	19	19	30	31	36		
19	51	42	76	70	31	51	36	45	39	29	E B	B	B	B	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	
20	70	B	55	33	38	45	35	53	38	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
21	43	B	B	B	B	B	B	42	42	35	25	27	28	29	29	28	29	25	24	18	14	E B	E B	E B	E B	
22	45	42	39	36	41	70	B	B	B	B	B	B	29	29	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	
23	36	90	59	70	47	B	45	B	B	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
24	40	37	45	42	45	41	34	22	25	27	33	30	36	34	33	34	24	21	18	23	E B	E B	E B	E B		
25	39	39	42	40	55	B	32	25	26	28	30	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
26	33	45	B	B	38	36	26	37	25	31	34	29	34	34	29	41	34	24	15	13	E B	E B	E B	E B		
27	32	45	66	70	43	45	44	32	30	32	31	31	31	32	33	35	27	25	22	16	27	31	35	24		
28	31	28	30	32	45	30	35	26	30	32	34	35	36	37	35	35	32	23	20	E B	E B	E B	E B	E B		
29	E B	E B	E B	E B	14	30	12	18	22	32	34	35	36	41	40	36	35	32	24	21	31	26	22	20	12	
30	12	E B	10	11	14	20	32	36	30	31	34	32	36	37	42	40	35	32	23	22	24	31	30	47	35	
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	29	27	27	25	28	23	25	25	22	22	20	19	25	26	26	28	27	29	29	29	29	29	30	30	29	
MED	38	42	41	40	38	41	36	32	30	30	30	30	30	30	30	28	25	24	20	18	24	28	30	35		
U O	46	47	46	54	45	45	41	42	38	34	34	31	36	34	33	35	32	32	25	30	30	32	37	42		
L O	30	28	31	31	32	32	26	22	21	24	28	27	E B	29	29	28	26	E B	E B	E B	E B	E B	E B	E B	E B	

IONOSPHERIC DATA STATION SHOWA ST.  
 SEP. 1988 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	11	10	13	12	16	15	B	B	B	B	25	28	23	B	30	23	24	25	15	8	8	11	12	
2	10	24	19	B	23	B	24	23	B	B	33	21	28	29	20	24	22	48	18	15	B	9	8	12	
3	10	24	25	B	23	30	B	23	B	B	27	30	29	28	30	30	25	24	13	9	11	11	9	13	
4	10	14	15	B	B	B	B	20	21	23	29	B	34	21	25	26	26	35	55	30	23	16	13	13	
5	11	15	11	23	18	13	15	24	22	23	25	19	12	18	16	26	25	30	18	21	10	12	13	B	
6	B	12	8	9	7	8	8	9	20	14	13	14	13	13	18	18	19	13	10	10	8	10	8	8	
7	8	8	8	8	8	9	10	8	13	15	30	24	19	18	20	22	17	35	14	9	9	9	9	8	
8	9	8	8	9	8	8	8	10	15	14	17	17	10	19	15	15	14	13	9	9	10	8	8	14	
9	12	13	13	14	18	13	8	9	13	14	15	14	14	14	14	13	13	10	8	8	7	9	8	9	
10	8	9	9	17	10	13	16	11	13	10	14	14	14	14	13	11	13	14	10	10	11	9	8	19	
11	8	18	15	13	13	10	9	9	15	19	B	B	B	20	29	15	21	15	10	9	10	14	15	20	
12	8	10	15	15	15	B	15	17	B	B	B	B	30	B	30	25	24	14	13	10	20	8	9	8	
13	15	15	23	15	20	16	15	B	B	B	B	B	35	B	30	55	55	24	19	13	8	8	9	13	
14	15	13	23	19	17	B	13	13	18	15	B	B	B	B	B	55	30	20	54	26	27	18	13	8	
15	9	11	15	9	10	14	B	23	24	24	B	B	55	50	17	14	B	B	20	20	13	10	10	8	
16	10	B	15	13	11	18	B	20	24	24	30	32	29	29	28	26	24	20	20	18	8	23	12	13	
17	13	8	11	10	8	14	23	B	B	22	30	B	25	21	19	17	24	14	B	10	7	9	10	10	
18	8	8	B	10	7	30	17	19	25	20	25	24	15	20	21	20	13	14	14	11	10	9	8	8	
19	9	13	23	14	11	13	14	14	21	29	B	B	B	B	B	B	B	24	13	B	10	9	8	9	
20	12	B	22	10	25	14	19	17	19	B	B	30	20	30	30	20	19	19	21	10	15	20	9	8	
21	13	B	B	B	B	B	23	15	15	15	13	15	14	15	14	15	20	24	18	9	23	19	9	9	
22	17	15	27	17	15	16	B	B	B	B	B	B	19	19	B	B	B	30	14	9	17	13	10	8	
23	9	19	9	19	23	21	B	B	B	B	B	B	B	31	31	27	18	23	20	24	17	15	13	9	
24	8	11	11	21	14	11	13	13	14	27	15	8	14	13	14	15	13	18	18	23	13	8	23	11	
25	12	11	10	20	35	B	18	19	18	19	19	B	B	32	15	15	15	13	14	16	10	9	7	9	
26	13	24	B	B	15	11	13	13	14	12	10	13	13	13	15	13	10	10	10	13	10	10	9	9	
27	9	13	10	13	13	12	13	13	10	14	14	15	15	19	13	11	13	13	9	11	8	8	20	8	
28	8	8	9	8	13	9	11	13	10	13	13	13	13	14	15	15	16	13	15	15	13	9	10	20	
29	10	9	9	8	7	8	11	13	12	14	13	13	13	13	13	10	10	14	12	10	8	7	8	8	
30	8	10	9	9	9	7	9	9	13	13	14	17	15	15	13	15	18	16	13	7	8	9	13	11	
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	13	14	14	14	14	15	16	20	21	28	24	20	20	20	19	20	18	14	11	10	9	9	9	
U O	12	18	23	20	20	30	23	23	B	B	B	B	34	30	30	26	25	24	20	18	15	13	13	13	
L O	8	10	9	10	10	11	11	13	14	14	14	15	14	15	15	15	14	14	12	9	8	9	8	8	

IONOSPHERIC DATA STATION SHOWA ST.

SEP. 1988 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	A	A	A	A	A	A	B	B	B	B		E B		B E B		240	255	255	E B	A	A	A	A
2	A	A	A	B	A	B	A	A	B	B	E B		225	280	255		275	240	255	255	E B		A	A
3	E A	A	A	B	A	A	B	E A	B	B	B		225	280	255		275	240	255	255	E B		A	A
4	A	A	A	B	B	B	B	E B	E B	E B	E B		250	240	240	240	250	240	225	290	E B		A	A
5	A	A	E A	A	A	A	A	E B	E B	E B	E B		250	240	240	230	240	215	220	200	210	220	350	E A
6	B	A	A	A	E A	E A	E A	E A		H	H		225	220	220	210	210	205	200	200	210	200	290	A
7	0 E A	A	A	A	E A	A	A	E A		H	H		225	220	220	210	210	205	200	200	210	200	290	A
8	400	360			360			340	250	225	240	200	210	200	240	220	225	210	210	200	210	200	230	260
9	E A	E A	E A	E A	E A	E A	E A	E A		H	H		225	225	230	230	210	210	200	200	210	210	300	A
10	A	A	A	A	E A	E A	E A	E A		H	H		225	225	230	230	210	210	200	200	210	210	300	A
11	A	E A	A	A	A	E B	E A	H		H	H		225	225	230	230	210	210	200	200	210	210	300	A
12	E A	A	A	A	A	B	A	A	B	B	B		270		B E B		250	270	275		A E A	E A	A	A
13	A	A	A	A	A	A	A	B	B	B	B		260		B E B		245	305	255	240	240	240	230	280
14	A	A	A	E A	E A	B	A	A		B	B		260		B E B		260	240	300	250	E B	E B	A	A
15	A	A	A	E A	E A	A	B	E A	A		B		320	275	230	240		B	B		235	225	A	A
16	A	B	A	A	A	A	B	A	A	A	E B		265	240	230	240	230	240	225	240	225	210	225	245
17	E A	E A	A	A	A	A	B	B	A	A	A		280	260	255	240	260	260		B E A	A	A	A	A
18	A	E A	B	A		A	A	A	A	A	A		275	255	240	230	240	245	240	230	240	240	270	195
19	A	A	A	A		A	A	A	E B	B	B				B	B			260	290	B	E A	E A	A
20	A	B	A	A	A	A	A	A	A	B	B		260	240	240	250	240	240	230	230	220	240	230	A
21	A	B	B	B	B	B	A	A	E A				225	230	225	245	245	230	220	210	245	240	240	A
22		A	A	A	A	A	B	B	B	B	B		220	250		B	B	B		245	250	A	A	A
23	A	A	A	A	A	B	A	B	B	B	B			245	240	245	240	245	240	230	225	230	240	250
24	A	A	A	A	A	A		200	260	215	250	220	250	220	225	230	240	225	220	225	215	220	225	250
25	A	A	A	A	A	B	E A	E A			B			240	240	240	225	230	225	240	190	A	A	A
26	A	A	B	B	E A	A	E A	E A		H	H		220	215	225	250	E A	245	225	220	210	220	220	260
27	A	E A	A	A	A	A	A	E A					230	245	220	225	225	215	210	215	200	200	220	255
28	E A	E A	E A	A	A	A	E A			H	H		220	225	230	225	225	230	225	225	210	210	225	230
29	260	300	340	350	360	325	280	240	250	230	230	225	220	225	215	215	225	220	220	215	210	210	225	240
30	250	260	280	300	310	315	275	240	225	225	230	215	230	225	240	210	225	225	225	220	225	255	E A	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	9	9	6	6	12	6	9	17	16	18	17	19	25	26	26	28	26	29	29	27	24	21	13	10
MED	260	E A	E A	E A	E A	E A	E A	E A	245	226	228	225	228	229	230	235	236	230	225	222	215	220	232	244
UO	E A	E A	E A	E A	E A	E A	E A	E A	260	230	245	250	E B	252	245	240	245	240	242	240	240	E	E	E A
LO	255	285	290	300	295	315	295	250	238	225	225	215	220	225	225	225	225	220	215	210	210	210	225	240

IONOSPHERIC DATA STATION SHOWA ST.  
 OCT. 1988 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	44	A	63	56	66	69	80	84	X	X	X	X	X	X	X	X	61	56	35	A				
2	A	A	A	A	A	66	70	76	X	77	78	87	86	80	88	86	81	84	80	77	75	70	56	50	46			
3	X				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0	X	80	75	65	51			
4	0	X			0	X	0	X	X	X	X	X	X	X	X	X	X	0	X	X	0	X	X	70	58			
5	A	A	A	A	70	A	B	B	71	80	78	82	89	90	91	96	91	86	80	69	66	A	A	A				
6	50	0	X	A	B	B	A	A	0	X	0	X	0	X	59	70	74	X	X	S	S	A	A	A				
7	A	48	45	A	52	A	A	0	X	55	60	72	76	75	78	78	80	81	80	82	76	69	58	43	28			
8	A	A	A	A	A	74	84	92	96	106	110	110	111	110	108	106	103	97	84	61	60	A	A	A				
9	A	A		A	86	74	70	66	A	72	76	80	86	99	94	96	100		72	71	A	A	A	A				
10	A	A	46	A	60	63	51	B	B	A	A	B	B	0	X	47	48	A	A	A	A	A	40	31	A			
11	A	A	A	A	A	A	B	A	A	0	X	X	X	X	0	X	X	X	X	0	X	B	X	52	50			
12	32	40	50	61	90	86	90	86	X	X	X	0	X	B	B	X	X	0	X	X	X	X	76	70	63	51		
13	A	50	65	71	A	A	A	B	70	76	81	84	86	105	106	112	124	110				65	65	53	54			
14	45	55	68	A	A	B	B	0	X	81	90	103	111	118	122	130	126	119	112	105	104	90	74	74	70	65		
15	60	63	48	56	61	71	72	94	94	96	103	101	101	99	98	96	96	95	86	85	66	43	44	47				
16	45	40	37	X	71	65		A	A		83	81	83	89	86	83	81	80	76	71	75	71	56	A	0	X	51	
17	A	A	45	A	45	53	52	50	55	68	74	74	85	87	96	92	96	96	91	90	76	65	60	58				
18	A	A	45	51	0	X	A	S	A	B	B	69	68	B	X	X	85	66	A	A	40	A	A	A				
19	A	A	A	A	42	42	42	41	45		58	58	66	66	71	78	79	70	76	63	55	35	39					
20	38	43	44	B	A	A	A	X	B	B	0	X	B	S	0	X	X	X	X	X	42	38	B	A				
21	A	46	46	B	B	B	57	A	72	66	76	76	B	B	B	X	X	0	X	0	X	X	X	X	X	X	X	
22	X		0	X	60	66	71	90	91	92	96	98	98	96	93	90	96	86	81	81	76	75	75	61				
23	X				A	X	A				X	X	B	0	X	X	X	0	X	0	X	X	X	X	X	X	X	
24	X				0	X	A	A	X	X	X	X	X	X	X	X	X	X	0	X	0	X	0	X	0	X	0	X
25	56	45	46	A	58	A	A	A	68	68	70	73	73	72	75	71	70	81	70	66	67	65	66	66	66	66	66	
26	66	60		A	64	75	90	90	86	92	80	80	80	81	80	80	79	78	74	71	66	72	A	A	A	A	A	
27	A	A	A	52	61	75	79	81	82	87	85	81	86	86	82	80	80	80	76	71	58							43
28	A	60	A	X	A	A	0	X	A		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
29	0	X			56			A	78	76	90	91	84	79	79	80	80	79	81	74	71	70	66	64	66	66	66	66
30	X	X	X	0	X	0	X	0	X	B	95	100	104	105	111	105	104	100	96	91	86	84	79	81	75	70	67	67
31	X				0	X	B	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	56	45	60	A	60	60		76	83	90	85	87	93	90	80	76	76	72	73	73	65	66	55	56	56	56	56	56
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	16	20	21	14	19	19	16	20	25	27	26	30	25	27	30	30	30	29	27	28	28	25	22	22				
MED	48	47	46	56	58	63	70	77	77	83	86	84	86	89	88	90	88	84	81	74	66	65	58	52				
U O	X	58	58	60	67	70	71	74	88	90	95	96	98	100	104	98	96	96	96	86	80	76	72	65	61			
L O	44	44	45	52	51	53	54	62	68	72	78	75	78	79	78	80	79	75	74	70	64	56	50	46				

IONOSPHERIC DATA STATION SHOWA ST.

OCT. 1988 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	A	A	A	A	F	A	F	F	F	F	F								F		F	F	F	A
2	A	A	A	A	A	F	F	F	F	F	F								F		F	F	F	A
3		F	F	F	F														F		F	F	F	F
4	42	38	40	45	49	F	U	S											F		F	F	F	F
5	A	A	A	A	F	A	B	B	F	F	F	F							F		F	A	A	A
6	44	39		64	B	B	A	A	45	41	42	53	F	F	F			F		S	S	F	A	A
7	A	F	F	A	F	A	A	R	F	F	F	F							F		F	F	F	F
8	A	A	A	A	A	F	F	F	90	95	104	104	105	J	S	102	100	97	91	78	55	54	F	A
9	A	A	F	A	F	F	F	A	F	F	F	F						B	F	F	F	A	A	A
10	A	A	F	A	F	57	F	B	B	A	A	B	B		D	S	A	A	A	A	F	A	F	F
11	A	A	A	A	A	A	B	A	A													B	F	F
12	F	F	F	F	F	U	S	F	F	F	F	U	S	B	B							F	F	F
13	A	F	F	F	A	A	A	B	F	F	F	F	F							B	S	F	F	F
14	F	F	F	F	A	B	B	U	S										R	D	R	F	F	F
15	F	F	F	F	F	F	F	F	F	F	F	F	F						F	F	F	F	F	F
16	F	F	F	F	F	F	A	A	A	F	F	F	F									F	A	A
17	A	A	F	A	F	F																F	A	A
18	A	A	F	F	F	A	S	A	B	B	F	F	B						R	A	A	F	A	A
19	A	A	A	A	F	F	F	F		A	S		S	R	R						U	R	F	F
20	F	F	F	B	A	A	A	J	S	F	B	B	R	B	S						F	F	B	A
21	A	F	F	B	B	B	F	A	F	F	B		B	B	B							F	F	F
22	27	F	D	S	F	F	F	F	85	86	90	92	92	90	87	84	90	80	75	75	F	70	69	69
23	55	60	64	61	A	53	A	F	F	F			B									F	F	F
24	41	F	F	F	F	A	A	A	77	80	80	80	78	83	77	79	79	78	75	70	70	61	60	59
25	F	F	F	A	52	A	A	A	A	F	F	F	67	67	66	69	65	64	75	64	60	61	59	60
26	F	F	A	A	A	F	F															A	A	A
27	A	A	A	F	B	F	F	F	84	80	86	74	74	75	74	74	73	72	68	65	60	66	A	A
28	A	F	A	49	A	A	A	A	65	76	74	74	67	68	64	62	60	65	60	59	F	58	49	45
29	F	38	42	51	F	A	A	F	70	70	84	85	78	73	73	74	74	73	75	68	65	64	60	58
30	60	59	65	D	R	U	R	B	F	F	F	U	R									F	F	F
31	50	39	54	F	F	A	F	R	B												F	F	F	F
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	16	20	21	14	18	19	16	20	25	27	26	30	25	27	30	30	30	29	27	28	28	25	22	22
MED	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
UO	42	41	40	50	50	57	62	70	71	77	80	78	80	83	82	84	82	78	75	68	60	59	52	46
LO	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
UO	52	52	52	61	55	65	69	81	84	89	90	92	94	98	92	90	90	90	80	74	70	66	59	55
LO	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
LO	37	37	39	46	45	47	48	54	60	66	70	69	72	73	72	74	73	69	68	64	58	50	44	40

IONOSPHERIC DATA STATION SHOWA ST.

OCT. 1988 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	38	39	45	41	45	41	44	43	42	26	35	37	48	36	35	36	33	23	29	E B	E B	E B	E B		
2	45	45	37	45	45	39	25	24	33	40	35	40	36	36	35	33	15	25	20	14	E B	E B	E B	E B	
3	12	20	21	12	12	E B	14	25	20	32	34	37	36	34	37	31	35	28	31	29	18	E B	E B	E B	
4	E B	E B	E B	E B	E B	11	10	13	11	20	28	32	34	36	38	36	32	38	35	36	31	22	18	E B	E B
5	45	35	44	47	28	38		B	B	41	40	32	32	37	37	32	E B	E B	E B	E B	E B			E B	
6	28	45	72	42		B	B	48	52	37	38	35	34	36	33	32	34	26	28	36	19	12	47	37	
7	40	37	36	39	25	42	45	34	32	33	35	26	36	26	37	34	33	25	22	16	14	E B	11	16	
8	34	37	71	71	45	50	42	41	39	35	31	36	37	35	33	36	34	29	31	26	29	36	41	42	
9	45	37	40	42	23	33	43	37	45	45	E B	E B	E B	E B	E B	E B	E B			E B	E B				
10	69	57	140	93	42	43	36		B	B	62	31		B	B		E B								
11	93	84	70	40	26	35		B	43	38	33	E B	E B	E B	E B	E B	E B			E B	E B	E B	E B		
12	30	41	71	45	76	33	37	60	45	37	E B	E B	E B	E B	E B	E B	E B			E B	E B	E B	E B		
13	31	26	26	29	45	45	42		B	35	36	30	35	E B		E B	E B	E B	E B						
14	31	36	35	45	45			48	30	28	30	35	33	36	41	36	28	25	23	24	30	E B	19	35	
15	32	38	45	38	22	20	22	30	32	31	36	31	34	40	37	36	33	31	31	21	42	39	29	32	
16	34	37	25	27	41	26	45	43	45	37	36	37	37	37	35	37	37	22	17	20	16	23	45	45	
17	41	45	36	71	50	49	46	41	37	35	31	33	37	40	36	37	38	36	31	29	17	27	28	38	
18	65	69	47	46	41	41	41	41	41		B	E B	35	31		B					E B	18	38	42	
19	91	48	39	34	29	35	36	40	41	45	35	31	35	E B	E B	E B					E B	24	31	37	
20	31	30	42		38	41	42	36	35		B	B	31	B	32	30	29	26	25	32	32	31	35	45	
21	36	39	70	B	B	B			E B	B	E B	B	B	B	E B										
22	35	37	39	41	38	27	35	34	35	36	37	38	31	33	37	34	31	32	30	27	19	25	40	31	
23	12	12	12	25	34	35	44	42	36	36	37	32		35	38	35	37	34	27	E B	E B			E B	
24	E B	E B	E B		13	14	32	68	42	55	58	53	35	32	37	36	34	37	39	35	35	32	32	32	
25	39	70	55	52	37	44	52	52	45	37	38	37	37	35	37	36	35	33	31	25	17	12	26	11	
26	24	32	39	36	34	34	35	32	35	36	31	32	42	37	38	37	34	32	32	28	26	27	40	47	
27	47	39	42	43		B	37	34	31	33	35	37	37	36	36	31	36	34	32	24	22	28	41	43	
28	42	43	58	46	45	43	42	55	34	36	37	35	32	32	32	30	E B	E B	E B	E B	28	16	15	26	
29	37	35	32	71	42	42	40	44	23	30	36	37	32	35	37	37	33	34	15	22	31	31	32	31	
30	30	31	14	21	36	30		B	43	33	37	30	37	42	64	41	37	29	32	25	22	22	35	26	
31	28	31	36	47	41	44		B	32	33	40	41	31	E B	31	E B	39	41	32	29	36	38	32	40	
	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	29	28	28	26	28	30	29	28	30	26	28	30	31	31	30	30	31	30	31	30	31	
MED	35	37	39	42	40	38	42	41	35	36	36	36	36	36	34	35	32	30	28	24	24	25	30	32	
U O	45	45	55	47	45	43	44	44	41	38	37	37	37	37	38	36	36	32	31	30	31	36	40	41	
L O	30	31	32	35	28	33	35	33	33	33	32	32	34	33	32	34	28	25	24	20	E B	17	17	20	

IONOSPHERIC DATA STATION SHOWA ST.

OCT. 1988 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	9	16	17	15	11	22	17	14	13	20	14	14	18	19	18	15	15	20	14	<sup>E</sup> 18	<sup>B</sup> 14	12	8	9
2	18	15	11	14	18	14	10	11	11	21	14	14	13	14	14	13	11	13	13	11	10	10	12	9
3	9	9	8	8	8	14	10	13	11	13	15	14	14	14	14	13	13	11	13	13	9	9	9	7
4	9	9	9	8	13	9	11	10	13	13	13	15	18	12	14	13	14	11	10	11	9	12	8	12
5	17	13	18	19	15	27				21	14	17	15	14	12	16	30	27	25	9	22	14	20	15
6	18	17	20	20	<sup>B</sup>	<sup>B</sup>	24	21	22	29	30	15	15	14	17	14	20	15	23	11	9	10	10	8
7	10	13	14	8	9	16	18	14	14	13	17	14	15	15	15	15	13	13	12	13	10	11	8	8
8	8	13	21	22	20	16	20	13	14	13	13	14	14	14	15	13	11	11	11	12	8	10	9	10
9	18	18	19	15	10	13	13	21	18	20	38	56	51	56	32	19	29		<sup>B</sup> 30	13	14	9	9	9
10	8	8	11	16	12	17	12																	
11	13	24	13	11	9	17		<sup>B</sup> 17	24	25	51	29	34	55	32	34	15	18	28	30		<sup>B</sup> 17	11	9
12	7	9	8	13	15	29	14	17	21	17	57	58			32	35	61	20	25	20	19	20	17	10
13	11	11	10	10	20	22	30																	
14	7	11	11	14	20		<sup>B</sup>	<sup>B</sup> 30	19	13	14	15	19	15	14	14	15	11	13	13	13	19	7	10
15	9	8	22	14	13	14	13	12	11	11	13	17	22	13	13	12	11	11	10	13	14	9	8	9
16	9	10	18	14	13	13	13	15	24	13	14	15	14	13	13	13	13	10	10	12	9	7	9	7
17	10	9	10	20	10	13	13	13	15	15	17	18	13	14	18	12	13	12	10	12	8	8	9	10
18	9	15	13	17	10	15	19	13	23															
19	10	14	17	18	10	13	12	27	18	23	25	24	21	35	33	13	18	18	17	18	24	14	10	9
20	12	15	19		<sup>B</sup> 30	22	17	20	19															
21	16	8	14		<sup>B</sup>	<sup>B</sup>	<sup>B</sup>	20	29	22	33													
22	8	14	15	13	17	20	18	13	14	14	13	13	15	15	15	14	14	14	10	10	8	8	8	8
23	8	9	8	9	20	14	15	14	13	15	13	14												
24	13	14	8	13	13	13	14	13	10	13	12	12	13	14	12	13	10	11	11	10	10	10	9	7
25	8	10	11	11	13	21	14	15	10	14	13	13	10	13	10	13	11	11	13	9	7	9	7	7
26	9	9	15	19	18	10	10	9	10	11	22	19	15	15	13	12	9	10	10	13	8	7	13	7
27	8	20	19	15		<sup>B</sup> 13	9	10	9	9	13	11	14	14	16	13	14	13	10	10	11	9	14	10
28	10	13	16	15	23	18	15	13	15	12	12	15	22	23	23	24	32	30	29	29	13	13	10	9
29	9	10	10	12	13	17	30	10	16	15	14	14	14	15	19	15	15	10	13	10	13	12	8	9
30	7	8	8	8	7	7		<sup>B</sup> 13	21	15	16	13	15	19	15	18	15	14	14	13	13	10	8	7
31	12	15	13	15	14	19		<sup>B</sup> 13	12	11	10	22	35	23	39	17	28	13	11	7	8	8	9	8
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	9	13	13	14	13	16	15	14	15	15	15	15	18	15	17	15	15	13	13	13	13	10	9	9
U O	12	15	18	18	20	22	24	21	21	21	25	24	35	24	23	23	20	18	17	18	14	13	13	10
L O	8	9	10	11	10	13	13	13	12	13	13	14	14	14	14	13	13	11	10	11	9	9	8	8

IONOSPHERIC DATA STATION SHOWA ST.  
 OCT. 1988 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	A	A	A	E A 325	A	A	E A 350	E A 275	E A 255	H E A 210	E A 275	230	220	250	225	240	240	220	225	225	220	2300	E A A	
2	A	A	A	A	A	A	E A 325	E A 270	240	E A 360	230	220	210	230	240	230	240	230	230	230	220	220	240	E A 260	
3	E A 280	E A 290	E A 340	E A 350	E A 340	E B 310	E A 270	250	230	225	225	225	225	220	205	225	220	215	220	215	210	210	210	230	
4	270	E B 305	E A 320	E A 340	E B 325	E A 310	280	255	240	240	230	230	220	215	230	230	225	220	230	220	205	220	210	230	
5	A	A	A	A	240	A	B	B	250	225	230	240	245	230	230	245	250	250	240	220	250	A	A	A	
6	E A 280	E A 380	A	E A 375	B	B	A	A	E A 280	E A 310	E A 270	225	230	240	230	240	250	245	E A 360	E A 350	E A 280	A	A	A	
7	A	A	E A 400	A	A	A	A	E A 315	250	230	240	230	210	225	230	225	245	225	230	225	210	225	250	E A 340	
8	A	A	A	A	A	E A 360	E A 400	E A 340	E A 270	220	220	H 210	215	220	230	225	225	245	245	245	275	A	A	A	
9	A	A	E A 290	A	A	A	O E A 310	O E A 380	A	E A 340	E B 275	E B 430	E B 405	E B 305	230	230	250	B	255	E A 300	A	A	A	A	
10	A	A	O 420	A	O 400	A	E A 400	B	B	A	A	B	B	230	A	A	A	A	A	E A 325	A	E A 420	E A 410	A	
11	A	A	A	A	A	A	B	A	A	E A 280	E A 450	240	220	E B 360	B	B	240	225	230	230	B	250	280	300	
12	A	E A 400	E A 400	E A 350	E A 350	O E A 315	E A 325	E A 390	E A 360	240	E B 345	E B 390	B	B	230	B 230	E B 305	240	230	225	230	245	250	E A 400	
13	A	E A 375	E A 350	E A 340	A	A	A	B	E A 275	210	240	230	E B 380	240	E B 320	E B 310	270	240	B	E B 290	250	260	270	E A 305	
14	A	A	A	A	A	B	E A 520	260	210	215	E A 230	220	220	220	220	225	230	230	225	225	225	240	240		
15	250	E A 310	E A 375	A	E A 375	E A 300	240	240	230	220	225	220	210	215	215	240	225	240	225	245	E A 315	A	E A 320	E A 305	
16	E A 350	E A 380	A	E A 400	255	275	A	A	A	250	245	240	210	220	225	225	230	245	250	250	245	320	A	E A 350	
17	A	A	A	A	A	A	A	A	E A 300	230	230	250	240	225	225	230	230	230	240	240	230	255	E A 290	E A 270	
18	A	A	245	A	E A 410	E A 350	A	A	A	B	E B 250	E B 240	B	E A 280	E A 290	260	325	A	A	190	A	A	A		
19	A	A	A	A	E A 325	A	A	A	A	E A 270	H 220	E A 250	E B 250	B	235	225	250	245	240	240	245	240	O E A 380	E A 345	
20	E A 450	O E A 375	O E A 425	B	A	A	E A 330	E A 280	B	B	B	230	B	240	230	240	230	250	240	E A 265	E A 375	A	B	A	
21	A	E A 420	A	B	B	B	A	A	E A 450	255	E B 450	B	B	B	225	220	230	240	250	245	230	240	250		
22	E A 370	E A 400	E A 425	A	E A 350	E A 340	220	215	230	230	210	H 210	H 220	215	230	220	235	230	225	225	230	225	230	225	230
23	245	240	280	E A 325	A	A	A	E A 350	245	215	230	220	B	210	230	225	220	210	230	230	240	230	250	E B 270	
24	E B 280	E B 290	E B 310	E A 290	A	A	A	A	H 230	225	225	220	210	210	220	210	215	225	230	230	230	240	225	E A 280	
25	E A 350	A	A	A	E A 340	A	A	A	A	240	220	220	210	210	220	230	225	225	235	235	240	240	235	240	
26	E A 290	E A 375	A	A	E A 300	A	230	225	225	220	225	225	H 220	H 205	220	220	215	225	230	230	240	240	A	A	
27	A	A	A	A	B	A	E A 270	240	230	225	230	210	H 230	220	210	215	220	225	245	245	255	A	A	A	
28	A	A	E A 275	A	A	A	A	A	E A 290	225	210	225	230	E A 250	225	225	240	250	250	255	250	245	250	270	
29	E A 330	E A 360	E A 360	A	E A 450	A	A	A	240	215	210	200	H 220	H 220	220	225	220	230	230	230	240	230	245	245	
30	250	265	280	290	275	260	B	240	250	215	215	200	H 200	A E A 310	210	200	230	225	240	230	240	230	230	245	
31	E A 280	E A 350	250	E A 350	A	B	230	220	220	240	235	250	250	260	230	240	240	245	255	250	270	250	E 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	14	16	16	10	12	11	11	18	24	27	27	30	26	28	29	30	30	29	28	30	28	23	22	20	
MED	E A 280	E A 368	E A 345	E A 340	E A 340	E A 310	E A 310	E A 292	239	222	228	224	220	221	228	226	228	230	231	231	238	235	245	U 252	
U O	E A 350	E A 380	E A 400	E A 350	E A 362	E A 350	E A 340	E A 350	E A 278	250	240	240	240	240	230	230	245	245	242	E 250	250	250	E A 280	E A 305	
L O	E 270	E 298	E 285	E A 290	300	300	270	240	230	220	220	220	210	220	220	225	220	225	230	225	225	225	235	242	



IONOSPHERIC DATA STATION SHOWA ST.

NOV. 1988 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	0 X 61	60	A	A	A	A	0 X 64	A	84	66	69	70	B	X	X	X	X	X	X	X	0 X 51	45	A	0 X 46		
2	42	47	54	59	B	B	A	71	A	71	82	B	B	B	B	X 93	96	74	70	A	A	A	A	A		
3	49	41	45	0 X 46	X	X	B	A	B	A	B	B	0 X 70	X	B	70	53	S	X	X	0 X 52	X	45	A		
4	A	B	B	0 X 52	58	62	71	80	86	85	85	80	78	A	B	X 72	70	71	68	60	54	51	54	0 X 49		
5	48	54	0 X 60	B	A	A	B	A	71	75	B	78	74	X	X	76	81	X	71	B	0 X 64	X	56	X 48		
6	A	X 54	0 X 55	65	0 X 76	67	75	80	B	A	B	B	B	S	S	66	69	70	74	53	56	54	50	0 X A		
7	A	0 X 48	61	70	55	56	X	B	B	A	A	S	A	B	X	X	X	X	B	X	B	0 X 44	45	A	A	
8	A	46	A	A	A	0 X 51	A	0 X 56	A	A	A	A	63	68	B	B	X 86	75	61	B	A	A	A	B	A	
9	46	46	43	0 X 51	0 X 49	S	S	A	A	S	X	X	0 X 70	X	X	X	X	0 X 74	61	S	0 X 48	A	0 X 51	0 X 53	X 50	
10	A	0 X 46	0 X 46	B	X	A	B	A	A	A	B	65	75	80	X	B	90	74	S	B	0 X 60	X	59	63	64	
11	X 60	60	60	70	0 X 71	77	95	104	105	93	88	83	81	78	76	76	73	74	70	60	52	0 X A	A	A		
12	A	54	A	S	0 X 47	41	40	41	S	0 X 50	B	B	0 X 66	65	62	S	62	61	53	A	49	52	47	53		
13	X 53	50	A	40	A	X	X	60	72	75	73	70	70	70	76	75	75	64	65	59	51	46	51	0 X		
14	X 55	X 56	0 X 52	0 X 53	0 X 51	0 X 58	S	A	A	0 X 66	X 70	B	0 X 71	0 X 71	0 X 70	X	69	73	65	64	62	56	48	0 X 46		
15	0 X 52	52	56	55	0 X 53	A	A	A	S	0 X 50	0 X 51	X 59	X 58	S	0 X 54	0 X 64	X 65	X 66	65	61	60	56	55	49	X	
16	50	55	0 X 56	56	B	0 X 65	73	77	A	A	B	B	B	B	B	80	X	B	B	X	58	A	A	A		
17	45	A	A	52	A	A	A	A	60	58	X	B	B	B	B	S	0 X 61	0 X 61	X 65	X 60	X 59	62	56	56	X	X
18	X 51	X 51	0 X 55	0 X 63	X 68	X 73	76	86	95	96	96	88	90	86	78	77	75	70	B	B	X	X	58	48	56	47
19	A	0 X 48	54	70	0 X 60	60	65	71	83	86	80	79	75	70	73	73	72	71	72	75	75	71	70	73	X	
20	X 75	X 76	X 78	X 71	X 78	X 86	X 96	X 106	X 105	X 104	X 100	X 98	X 100	X 100	X 92	X 85	X 80	X 73	X 71	X 72	X 73	69	71	70	X	
21	X 66	X 66	70	70	A	A	75	81	81	81	80	75	75	75	76	76	75	73	71	70	67	67	66	67	X	
22	60	63	62	60	65	71	74	82	86	88	90	87	89	87	76	75	74	71	72	70	70	70	67	65	X	
23	70	71	72	71	70	71	82	85	74	74	82	81	81	81	78	72	71	70	70	68	66	67	67	66	X	
24	70	72	71	65	A	A	69	70	80	85	81	85	85	81	79	75	72	70	69	66	66	70	65	70	X	
25	A	0 X 76	0 X 76	0 X 75	X 72	A	S	X	65	66	70	76	71	75	75	75	76	75	77	73	70	62	49	49	0 X	
26	A	0 X 48	X 46	A	A	60	63	A	A	A	A	A	0 X 58	S	X	X	B	B	X	X	51	54	56	60	53	X
27	46	52	53	A	60	A	B	A	78	73	81	80	82	76	76	80	82	72	S	B	0 X 60	61	56	50	X	
28	B	51	53	61	61	70	70	76	86	B	B	X	94	A	X	X	X	X	X	B	X	60	56	55	47	
29	0 X 72	61	66	64	A	60	X	67	72	A	X	X	X	X	X	80	78	75	66	65	61	60	59	54	0 X	
30	59	B	A	A	70	70	X	66	68	70	X	X	0 X 73	0 X 79	0 X 76	0 X 90	0 X 95	A	0 X 54	X 56	A	0 X 50	0 X 50	46	X	
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	20	27	23	21	19	20	17	19	18	20	19	21	23	22	22	28	28	25	23	23	26	27	24	22		
MED	54	54	56	61	61	64	73	76	80	74	80	79	75	76	76	76	74	71	69	64	60	56	55	51		
U 0	X	X					X		X		X	X	X	X	X	X	X	X	X	X	X	X	X	X		
L 0	48	48	53	52	53	58	64	66	72	68	73	70	70	72	72	72	70	66	64	59	56	51	50	49		

IONOSPHERIC DATA STATION SHOWA ST.  
 NOV. 1988 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	55	F 54	A	A	A	A	58	A	78	F 60	F 63	F 64	B	F 66	66	65	64	60	61	55	R 45	F 39	A	40	
2	F 36	F 41	48	F 53	B	B	A	F 65	A	F 65	76	B	B	B	B	87	F 90	68	F	A	A	A	A	A	
3	F 43	F 35	F 39	40	45	50	B	A	B	A	B	B	F 64	67	B	F 64	47	S	50	48	R 46	41	F 39	A	
4	A	B	B	U S 46	F 52	F 56	65	74	80	79	79	74	72	A	B	66	64	65	F 62	54	48	45	F 48	43	
5	F 42	F 48	54	B	A	A	B	A	F 65	69	B	F 72	68	70	70	75	74	65	F	B	58	53	F 50	42	
6	A	48	R 49	F 59	70	60	69	74	B	A	B	B	B	S	S	R 60	63	64	68	R 47	50	F 48	44	A	
7	A	42	F 55	F 60	49	50	B	B	A	A	S	A	B	64	69	69	70	B	64	B	38	39	F	A	A
8	A	F 40	A	A	A	45	A	U S 50	A	A	A	F 57	58	B	B	80	F 69	F 55	B	A	A	A	B	A	
9	F 40	F 40	F 37	45	43	S	S	A	A	S	62	64	65	70	72	75	68	55	S	42	A	U R 45	47	44	
10	A	40	40	B	58	67	A	B	A	A	B	F 59	69	74	B	F 84	F 68	S	B	54	59	53	57	F 58	
11	54	F 54	54	B	F 64	65	71	89	F 98	F 99	87	82	77	75	72	70	F 70	67	68	64	54	46	R	A	A
12	A	F 48	A	S	41	F 35	34	35	F 44	S	R	B	60	59	56	S	R 56	55	47	A	F 43	46	41	47	
13	47	F 44	A	F 34	A	52	51	54	66	69	67	64	64	64	64	70	69	69	58	59	53	45	F 40	45	
14	49	50	46	47	45	52	A	A	A	60	64	B	65	65	65	64	63	67	59	58	56	50	42	40	
15	46	F 46	F 50	F 49	47	A	A	A	S E 44	G E 45	G 53	52	S E 48	G 58	59	60	59	55	R 54	50	49	43	A		
16	F 44	F 49	U R 50	F 50	B	59	67	71	A	A	B	B	B	B	B	74	B	B	F 58	52	F 52	A	A	A	
17	F 39	A	A	F 46	A	A	A	A	F 54	52	B	B	B	B	S	55	55	59	54	53	56	50	50	50	
18	45	F 45	U S 49	57	62	F 67	F 70	80	F 85	F 90	F 90	82	U R 84	80	72	71	69	64	B	B	52	42	F 50	41	
19	A	42	48	64	54	54	59	65	77	80	74	73	69	64	67	67	66	65	66	69	69	65	64	67	
20	69	70	72	F 65	F 72	F 80	90	100	99	98	94	92	94	94	86	79	74	67	65	66	67	63	65	64	
21	60	60	F 60	F 60	A	A	F 69	75	75	75	74	69	69	69	70	70	69	67	65	64	61	61	60	61	
22	F 54	57	56	F 54	F 59	65	68	76	80	82	84	81	J S 83	81	70	69	68	65	66	64	64	64	61	59	
23	F 64	F 65	F 66	F 65	64	65	76	70	68	68	70	75	75	75	72	66	65	64	64	62	60	61	61	60	
24	F 64	66	F 65	F 59	A	A	63	64	74	79	75	79	79	75	J S 73	69	66	64	63	60	60	64	59	64	
25	A	70	70	69	66	A	S	59	60	64	70	65	69	69	69	70	70	69	71	67	64	56	43	43	
26	A	42	F 40	A	A	F 54	F 57	A	A	A	A	A	52	S	64	68	B	B	45	48	J S 50	54	47	45	
27	F 40	46	F 47	A	F 54	A	B	A	F 72	F 67	F 75	74	76	70	70	74	76	66	S	B	54	55	50	44	
28	B	F 45	F 47	F 55	F 55	64	64	70	80	80	B	B	88	A	84	83	80	75	67	65	B	54	50	49	41
29	F 66	F 55	F 60	F 58	A	F 54	A	60	66	A	72	75	75	78	80	74	72	69	60	59	F 55	F 54	53	48	
30	F 49	B	A	A	F 60	F 60	70	60	62	60	67	73	70	84	89	A	H 48	50	A	F 48	A	44	44	40	
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	20	27	23	21	19	20	17	19	18	20	19	21	23	22	22	28	28	25	22	23	26	27	24	22	
MED	F 48	F 48	50	F 55	55	58	67	70	74	68	74	73	69	70	70	70	68	65	62	58	54	50	49	45	
U O	58	55	60	60	64	65	70	75	80	80	79	80	76	78	72	74	70	67	65	64	60	56	58	59	
L O	F 42	F 42	F 47	46	47	52	58	60	66	60	67	64	64	66	66	66	64	60	58	52	50	45	44	43	

IONOSPHERIC DATA STATION SHOWA ST.

NOV. 1988 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	31	35	95	46	45	45	47	45	34	35	35	32	B <sup>E</sup>	B <sup>E</sup>	33	34	27	26	25	25	41	36	32	42						
2	40	48	31	67	B	B	37	37	43	34	31	B	B	B	B <sup>E</sup>	B <sup>E</sup>	32	32	25	120	45	70	65	42						
3	43	70	42	45	35	32	B	41	B	36	B	B	E	B	B	28	32	28	E	B	28	28	36	40	58	45				
4	41	B	B	34	32	31	30	41	33	33	30	32	36	39	B	30	28	26	32	24	35	40	39	34						
5	31	37	36	B	41	44	B	51	E	B	B	35	E	B	E	B	31	28	38	B	34	40	37	40	38					
6	24	41	37	39	33	37	36	40	B	42	B	B	B	32	31	31	29	30	32	32	35	35	35	51						
7	45	43	41	45	32	42	B	B	40	41	32	38	B	50	31	30	27	B	40	B	38	41	57	53						
8	41	37	45	36	35	34	42	34	80	40	36	32	E	B	B	E	B	E	B	26	53	70	41	B	43					
9	44	39	71	E	B	42	32	E	B	26	36	37	33	29	32	33	28	34	30	30	25	28	34	41	40	32	35			
10	32	90	42	B	34	28	39	B	41	65	B	32	35	E	B	B	E	B	34	31	26	B	E	B	30	31	24	24	26	
11	30	32	26	B	37	35	34	39	37	41	37	41	29	34	32	34	29	29	28	27	22	27	36	60						
12	43	37	41	41	41	35	35	37	37	40	B	B	31	34	34	33	30	33	27	41	28	32	31	31						
13	32	40	41	33	42	32	36	33	37	E	B	37	37	36	33	37	41	32	31	30	25	32	23	26	34	52				
14	47	46	38	41	25	30	20	36	38	34	37	B	42	37	41	33	30	E	B	32	33	34	32	33	42					
15	40	44	29	55	73	41	41	51	41	44	36	34	33	37	34	35	30	31	30	E	B	25	27	36	39					
16	38	41	43	41	B	35	33	40	45	39	B	B	B	B	B	34	B	B	30	26	31	45	52	45						
17	58	71	41	35	40	43	40	40	35	31	B	B	B	B	E	B	35	30	E	B	E	B	33	33	33	27	29	27	30	31
18	41	46	31	32	91	43	49	45	33	37	40	40	E	B	36	39	37	37	36	39	B	B	26	30	37	41				
19	35	38	35	34	40	36	30	35	35	35	37	37	43	42	35	41	37	36	35	35	31	31	27	45						
20	31	27	32	34	30	29	31	36	36	51	51	43	39	35	42	45	30	28	26	26	25	21	17	36						
21	28	29	28	38	45	45	55	36	41	37	E	B	39	36	35	34	33	32	30	27	28	26	24	30	17	20				
22	32	32	60	42	36	36	37	36	36	37	32	35	E	B	E	B	36	31	30	28	30	27	26	37	64	39				
23	30	30	32	32	31	30	36	34	45	41	37	37	34	35	32	32	30	33	35	28	32	33	26	24						
24	24	32	27	45	41	47	43	42	39	32	35	40	37	37	53	35	31	33	37	40	32	30	36	57						
25	71	46	92	45	71	38	36	41	37	31	36	37	33	34	36	32	35	32	40	36	30	40	30	59						
26	59	37	43	70	45	38	41	69	46	43	57	34	E	B	35	30	30	B	B	31	37	41	42	45	39					
27	39	37	32	45	71	65	B	52	42	36	32	31	E	B	E	B	32	31	33	B	35	32	41	37						
28	B	36	36	45	41	34	39	42	40	B	B	E	B	60	111	71	60	64	32	29	27	B	25	22	37	32				
29	59	42	32	35	90	36	40	47	40	36	35	32	34	29	31	30	30	29	30	27	26	29	32	34						
30	32	B	47	55	38	36	37	34	45	35	36	32	30	33	34	37	37	36	33	37	46	46	45	45						
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	29	27	28	29	26	28	28	29	22	23	24	26	24	30	28	27	26	26	30	30	29	30						
MED	39	38	38	41	40	36	37	40	40	37	36	34	34	36	34	32	30	30	30	31	32	32	36	40						
UO	44	45	43	45	45	42	41	44	42	41	37	38	36	E	B	42	36	35	32	33	33	36	38	40	43	45				
LO	31	36	32	34	34	32	34	36	36	34	32	32	33	34	32	30	30	28	28	27	26	29	30	34						

IONOSPHERIC DATA STATION SHOWA ST.  
 NOV. 1988 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	10	14	10	10	10	8	11	12	11	10	8	B	35	22	23	19	15	13	10	9	8	10	10	
2	17	16	12	11	B	B	11	25	25	19	18	B	B	B	B	55	19	12	10	10	15	8	10	23	
3	10	13	12	11	7	9	B	19	B	24	B	B	22	56	B	15	14	17	28	15	14	10	13	16	
4	22	B	B	19	12	11	15	14	13	13	14	15	14	23	B	21	18	20	12	19	13	9	8	18	
5	14	11	13	B	18	23	B	24	15	60	B	23	35	35	35	17	17	13	B	25	12	10	10	11	
6	23	22	18	8	20	15	10	12	B	27	B	B	B	17	19	18	16	13	10	13	12	15	9	8	
7	10	10	9	14	8	8	B	B	21	14	15	18	B	50	15	17	17	B	16	B	15	15	8	9	
8	14	8	22	24	20	23	20	16	18	29	15	19	34	B	B	56	33	18	B	22	14	22	B	19	
9	13	13	18	24	15	15	26	23	22	19	23	19	24	18	34	23	21	25	19	19	17	15	15	10	
10	12	13	17	B	15	15	19	B	29	22	B	24	18	55	B	34	25	23	B	30	23	15	14	12	
11	11	12	15	B	15	15	15	18	15	20	10	13	25	20	18	34	25	29	13	13	12	13	19	13	
12	12	13	19	17	19	13	13	14	15	23	B	B	18	19	15	15	14	13	13	10	13	14	12	9	
13	9	14	18	17	10	10	10	15	14	37	15	14	14	13	14	13	11	14	15	13	10	12	11	13	
14	14	15	14	8	15	24	19	17	21	25	17	B	17	21	22	15	25	34	16	24	15	14	16	14	
15	13	13	13	10	13	20	15	10	15	15	17	16	15	13	20	35	19	14	14	27	15	15	9	10	
16	13	12	14	16	B	15	13	13	19	23	B	B	B	B	B	14	B	B	15	17	10	10	10	13	
17	15	15	13	10	14	14	15	14	14	15	B	B	B	B	35	19	33	33	18	20	21	20	14	10	
18	10	14	16	19	13	13	11	8	15	11	11	40	30	20	15	11	13	11	B	B	12	9	8	12	
19	20	19	14	23	18	15	15	9	10	10	11	20	24	15	11	13	10	13	13	12	12	11	10	9	
20	8	8	8	11	10	9	8	9	9	10	13	15	21	21	20	16	14	12	13	9	10	9	10	7	
21	7	8	12	15	15	15	14	12	24	20	39	25	14	14	18	15	13	12	13	14	14	13	12	10	
22	9	10	16	9	13	21	24	13	11	13	15	25	55	55	30	21	17	20	19	20	20	14	13	11	
23	9	10	9	10	10	10	8	9	10	15	15	13	14	11	14	14	14	13	9	10	10	8	8	11	
24	10	9	13	13	21	15	14	13	10	14	10	14	14	11	14	14	15	11	11	10	9	10	15	13	
25	11	10	9	10	11	14	11	15	14	15	15	10	13	9	14	13	13	10	13	15	14	11	13	13	
26	15	13	10	17	17	13	8	15	13	19	13	23	22	35	21	17	B	B	15	13	10	11	15	10	
27	11	13	13	14	20	18	B	14	17	14	18	21	20	60	35	18	13	12	14	B	10	9	12	20	
28	B	22	15	17	14	15	24	15	14	B	B	60	24	34	33	18	13	12	14	B	22	12	14	19	
29	10	10	11	9	22	11	23	19	23	22	34	22	23	23	19	15	15	12	12	14	17	13	9	9	
30	9	B	17	12	20	15	20	29	13	12	12	21	23	9	13	11	10	13	10	11	9	12	9	9	
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	12	13	14	14	15	15	15	14	15	19	16	22	23	22	20	17	16	14	14	15	13	12	12	11	
U O	14	15	17	19	20	15	23	19	21	23	B	60	35	55	35	21	21	23	18	24	15	14	14	13	
L O	10	10	12	10	12	11	11	12	13	14	13	15	17	15	15	14	13	12	13	12	10	10	9	10	

IONOSPHERIC DATA STATION SHOWA ST.

NOV. 1988 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	A	A	A	A	A	A		H	H	B		245	230	230	220	230	240	250	A	A	A	A								
2	A	E A		A	B	B	A	E A	A	H	B	B	B	B	B	E B		E A		A	A	A	A	A								
3	A	A	A	A	E A	E A	B	A	B	A	B	B	E B	B	B	B	B	E A	B		E A	A	A	A								
4	A	B	B	E A	E A	E A	A	A						A	B		230	230	230	250	250	E A	A	E A								
5	E A	A	E A	B	A	A	B	A	E A	E B	B	B						E A	B	E A	A	E A	E A	A								
6	A	E A	E A		A	A	A	B	A	B	B	B		200	230	230	230	240	270	280	E A	E A	A	A								
7	A	A	A	A	E A	E A	B	B	A	A	H	A	B	E B				B		B	E A	A	A	A								
8	A	A	A	A	A	A	A	E A	A	A	A		225	225	B	B	E B		B	A	A	A	B	A								
9	A	E A		E B	E A	E A	E A	A	A				260	245	230	265	230	240	230	240	240	290	325	E A								
10	A	E A	E A	B	E A		A	B	A	A	B		215	245	455		230	230	270		250	270	250	270								
11	290	310	320	B	E A	E A		A		A			200	230	210	220	230	230	230	240	250	325		A								
12	A	0	A		A	A	A	205	230	245		B		225	225	220	225	215	225	255	E A	A	E A	E A								
13	E A	E A		A	0	A	A	E A	H	E B				220	210	200	200	220	230	240	240	275	275	330								
14	E A	A	E A	A	A		A	A	A			B	E A	E A				B	E A		E A	E A	E A	A								
15	E A	E A		E A	A	A	A	A	E A	E A				H								E A	E A	A								
16	A	E A	E A	E A	B	E A	E A	A	A	B	B	B	B	B	E A		B	B		275	290	280		A								
17	A	A	A	E A	A	A	A	A		B	B	B	B											A								
18	290	360	340	E A	E A	E A					E B		230	225	230	220	225	230		B	B		A	E A								
19	A	E A		E A	A	E A	E A															245	240	250	270							
20	270	275	305	E A	355	290	250	240	210	240	E A	E A	E A	E A	E A						245	235	245	245								
21	250	275	295	E A	A	A	A			E A	A											245	245	250	260							
22	E A	E A	E A	E A	A	E A	E A	E A	215	205	235	215	240	E B	E B	E B					240	245	250	275								
23	280	270	300	E A	E A	A				H	E A	H										250	250	250	260							
24	275	270	310	E A	E A	A	E A				H											250	255	250	275							
25	A	E A	E A	A	A	E A	E A	A			H	H	H	H						A	A		E A	A								
26	A	A	E A	A	A	E A	E A	A	A	A	A	A	H	205	240	225	235		B	B		230	275	E A	E A							
27	E A	A	A	A	E A	A	B	A		A				E A	E B						B		A	E A								
28	B	E A	E A	E A	E A	E A	A	B	E A					E A	E A	E A					B	H	A	E A								
29	A	A	E A	E A	A		A	E A	E A	E A												220	245	A	E A							
30	E A	B	A	A	E A		A	A	E A				H	E A	A	E A	E A	A	E A		A	A	A	E 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	13	19	19	17	14	19	15	17	19	21	20	21	23	25	24	29	28	27	25	23	24	21	16	18								
MED	E A	E A	E A	E A	E A	E A	E A	A	290	310	320	345	310	280	260	232	222	220	218	220	228	222	225	225	229	228	232	245	258	252	263	310
U O	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A
L O	350	360	375	372	325	325	280	285	300	260	235	240	240	310	240	230	230	245	245	275	278	280	312	350								
	275	275	295	292	270	250	250	212	215	210	210	208	210	212	218	220	220	225	230	240	248	245	250	270								

IONOSPHERIC DATA STATION SHOWA ST.  
 DEC. 1988 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	0 X 47	X 52		58	64	72	76	76	X 81	X 85	X 94	X 89	X 90	X 90	X 85	A	S	B	0 X 69	B	B	X 66	X 65	X 67
2	70	70	71	71	76	81	91	102	X 105	X 106	0 X 101	B	101	90	86	85	76	A	A	X 52	X 55	X 56	X 55	60
3	A	A	A	58	56	60	A	A	A	0 X 61	67	70	71	75	B	75	S	0 X 66	X 66	X 55	0 X 48	A	X 52	X 59
4	60	B	B	A	A	A	A	0 X 53	A	68	71	68	0 X 74	B	B	X 80	B	B	A	X 61	X 51	X 64	X 65	X 59
5	X 59	X 59	59	56	0 X 72	74	85	90	X 94	X 96	X 95	X 94	X 89	X 82	X 81	X 79	75	71	68	X 63	X 65	X 62	X 56	X 58
6	A	0 X 63	X 58	X 65	0 X 70	0 X 76	0 X 76	X 90	X 90	X 96	X 99	X 96	X 95	X 96	X 91	X 89	X 85	X 82	X 78	X 79	X 79	X 78	X 79	X 64
7	0 X 61	S		68	70	80	85	92	100	101	B	X 96	X 96	X 94	X 90	X 86	X 84	X 81	X 80	X 75	X 75	X 73	X 72	X 68
8	X 65	X 66	B	71	B	73	73	79	81	83	86	89	89	90	88	85	80	76	76	74	61	65	68	61
9	0 X 71	B	X 56	X 60	X 66	A	X 76	X 90	X 94	X 91	X 90	X 91	X 97	X 91	X 89	X 81	X 75	X 70	X 70	X 70	X 66	X 64	X 53	X 61
10	61	61	69	69	60	70	69	80	91	94	90	90	96	98	100	96	76	70	S	0 X 51	A	0 X 56	X 60	
11	0 X 65	X 66	X 71	X 76	75	75	75	88	75	81	80	74	90	80	84	80	80	68	60	A	X 68	X 64	A	58
12	58	60	A	52	A	A	45	46	48	0 X A	0 X A	A	S	X 66	X 68	X 66	67	70	64	60	64	60	58	60
13	0 X 56	0 X 54	56	56	A	58	S	63	65	A	S		66	65	64	S	S	S	S	A	B	X 60	X 58	A
14	B	0 X 49	0 X S	A	65	S	A	A	70	72	76	71	68	A	S	66	A	66	66	59	51	52	50	A
15	A	0 X 49	0 X 46	A	A	41	A	A	A	B	B	B	A	A	S	B	S	0 X 56	0 X 60	0 X 58	0 X 59	0 X 62	0 X 59	0 X 60
16	X 60	X 66	0 X 72	0 X 80	62	B	B	A	A	A	B	B	B	B	B	B	0 X 75	0 X 76	0 X 66	S	A	A	A	B
17	A	A	41	A	0 X 45	0 X 50	B	0 X 62	B	B	B	B	B	B	B	B	B	B	B	0 X 50	0 X 51	0 X 60	0 X 56	0 X 52
18	A	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	0 X 51	0 X 48	0 X 50	0 X 52	A
19	A	A	B	A	A	A	A	B	S	A	A	B	A	B	A	S	S	S	S	S	A	0 X 54	0 X A	0 X A
20	0 X 50	S	0 X 63	A	A	A	A	A	A	A	A	B	B	A	0 X 68	0 X 70	B	0 X 69	0 X 67	0 X 69	0 X 67	0 X 63	0 X 58	0 X 54
21	S	0 X 56	B	0 X 66	70	B	B	B	B	A	B	0 X 70	B	B	B	B	0 X 81	0 X 72	B	A	0 X 63	0 X 66	0 X 70	0 X 60
22	X 61	X 66	69	70	60	A	A	A	A	70	65	65	67	0 X A	B	A	A	0 X 65	S	X 65	X 65	X 55	X 55	0 X 54
23	0 X 51	0 X 55	B	0 X 56	0 X 66	A	A	S	67	A	0 X 69	A	68	A	S	0 X 69	0 X 66	0 X 66	0 X 75	0 X 64	0 X 65	0 X 63	0 X 68	X 68
24	X 66	X 66	0 X 66	0 X 70	0 X 75	S	73	80	78	80	X 81	X 84	X 85	X 82	X 81	X 79	X 74	X 76	X 76	X 80	X 70	X 71	X 65	X 65
25	X 60	X 54	B	A	67	A	A	0 X 63	A	70	76	70	68	86	98	93	69	S	60	S	0 X 74	S	A	A
26	51	70	60	A	58	A	A	A	0 X 52	A	A	A	B	0 X 52	0 X 69	B	0 X 52	0 X 51	A	X 60	66	66	54	49
27	X 51	A	A	A	A	X	A	A	A	A	B	B	A	S	S	X	71	B	B	0 X 62	0 X 67	0 X 65	0 X 62	0 X 55
28	0 X 49	0 X 56	B	A	A	71	66	76	82	79	75	74	79	81	X 81	X 79	X 74	X 76	X 76	0 X 76	0 X 65	0 X 60	0 X 50	0 X 63
29	X 70	X 56	60	A	A	B	A	X 60	B	B	A	A	B	B	81	B	56	62	65	64	66	64	54	X 54
30	X 58	0 X 55	A	A	A	A	B	A	S	76	80	72	70	71	74	80	B	B	S	60	B	X 56	X 56	X 62
31	52	B	55	61	58	A	A	S	B	0 X 68	74	68	S	67	71	73	78	69	59	S	S	X 64	X B	X 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	23	21	18	18	19	15	11	17	14	18	18	20	17	19	19	21	18	17	20	24	25	28	26	24
MED	X 60	X 59	60	66	66	71	76	79	81	78	82	73	89	82	81	80	75	69	66	63	64	62	58	60
UQ	X 65	X 66	69	70	72	75	85	90	94	91	94	90	94	90	88	84	78	74	72	70	66	66	65	62
LQ	0 X 51	0 X 54	56	58	60	58	73	62	70	70	76	70	69	68	74	74	69	66	62	58	57	56	55	56

IONOSPHERIC DATA STATION SHOWA ST.

DEC. 1988 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	41	46	F	F	F	F	F	F	75	79	88	83	84	84	79	A	S	B		B	B	60	59	61															
2	F	F	F	F	F	F	F	F	99	100	95	B	F	F	F	F		A	A		46	49	50	49	F														
3	A	A	A	F	F	F	A	A	A	R	F	F	F	F	B		S					A	46	53															
4	F	B	B	A	A	A	A		A	F	F	62	B	B			F	B	B	A		45	58	59	53														
5	53	53	F	F		F			88	90	89	88	83	76	75	73	F	F			55	45	58	59	52														
6	A	57	52	59	F	F	70	70	84	82	90	93	90	89	90	85	83	79	76	72	73	73	72	73	58														
7	U	S	S	F	F	F	F		F	B		F				J	S							F	59														
8	59	60		B	F	B	F	67	67	73	75	77	80	83	83	84	82	79	74	70	70	68	55	59	F	F	55												
9	R	B			A					J	S													F	F	55													
10	F	F	R	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	S		A	A		51	54													
11	59	60	65	70	69	69	69	69	60	75	74	68	84	74	78	74	74	62	54		A		F	A	F	52													
12	F	F	A	F	A	A	F			A	A	A	S				61	64	58	54			F		54	54													
13	F		F	F	A	F	S	F	F	A	S	F	F	F	S	S	S	S	S	A	B				A	A													
14	B	43	S	A	F	S	A	A	F	F	F	65	62	A	S		A	60	60	53	45	46	44		A														
15	A	43	40	A	A	F	A	A	A	B	B	B	B	B	B	B		S	U	R	R		R		A	B													
16	R	54	60	66	F	F	B	B	A	A	A	B	B	B	B	B	69	70	60		R	S	A	A	F	A	B												
17	A	A	A	F	A		B	R	B	B	B	B	B	B	B	B	B	B	B	B		R		R	F	A	46												
18	A	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R		R	U	R	A													
19	A	A	B	A	A	A	A	B	S	A	A	B	A	B	A	S	S	S	S	S	S		A		A	A													
20	44	S		A	A	A	A	A	A	A	A	B	B	A	B	62	64	B	R		B	63	61	63	61	57	52	J	S	48									
21	S	R	B		F	B	B	B	B	A	B	R	B	B	B	U	R		B	A	R			R		R													
22	55	60	F	F	F	A	A	A	A	F	59	59	61	B	A	A		S				F	F	F	F	R													
23	R	R	B		R	F	A	A	S	F	A		A	F	A	S		59	59	59	59	59	49	49	48														
24	60	60	60	60	69	67	73	70	70	75	78	79	76	75	73	R		68	70	70	74	64	65	65	59														
25	54	48	F	B	A		A		A	F	F	F	64	70	60	62	80	92	87	63		54	68	50															
26	F	F	F	A	F	A	A	A	R	A	A	A	B	E	G		B	E	G	E	G	A		F	F	F	F												
27	45	A	A	A	A		A	A	A	A	B	B	A	S		S		65	B	B			56	61	59	56	54	49											
28	U	S	B	A	A	F	A		A	70	76	73	69	68	73	75		B	B			70	59	54	44	55	57												
29	64	50	F	A	A	B	A	54	B	B	A	A	B	B	F	B	U	S	B			56	59	58	60	58	48												
30	52	49	A	A	A	A	B	A	S	F	F	66	64	65	68	74						54																	
31	F	B	F	F	F	A	A	S	B		F	F	S									S	S	J	S	B	A												
	46	49	49	55	52				62	68	62		61	65	67	72	63	53																					
CNT	23	21	18	18	19	15	11	17	14	18	18	20	17	19	19	21	18	17	20	24	25	28	26	24															
MED	54	53	54	60	60	65	70	70	75	70	76	67	83	76	75	74	69	63	60	57	58	56	52	54															
UO	59	60	60	64	66	69	79	84	88	85	88	84	88	84	82	78	72	68	66	64	60	60	59	56															
LO	45	48	50	50	54	52	67	56	60	62	68	62	63	62	68	68	63	60	56	52	51	50	49	50															

IONOSPHERIC DATA STATION SHOWA ST.  
 DEC. 1988 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	36	41	55	33	36	33	37	37	42	36	E B 55	40	32	31	25	23	33	B E B 50	B	B E B 25	B E B 24	23		
2	28	28	34	34	35	34	34	35	33	38	32	B E B 60	36	32	32	35	32	28	41	41	89	41	41	
3	67	39	45	42	45	36	37	51	38	36	36	35	E B 56	B E B 60	E B 35	28	32	32	41	43	37	37		
4	45	B	B	43	59	41	39	34	36	26	E B 52	B	B E B 55	34			B	B	85	57	39	24	26	20
5	30	35	32	28	32	28	35	36	33	35	32	40	55	45	57	51	39	41	47	32	32	32	28	28
6	42	39	40	41	43	41	65	45	36	32	42	36	35	38	E B 55	33	30	31	27	29	23	25	24	30
7	21	28	41	29	33	34	36	32	37	B	34	34	37	37	34	36	33	34	45	40	24	21	35	43
8	40	35	B	35	B	41	53	42	42	34	41	37	37	36	36	36	35	33	32	31	27	33	E B 24	21
9	32	B	39	45	42	38	36	37	37	36	37	52	44	39	37	39	40	36	27	28	34	28	31	36
10	36	32	37	45	45	60	43	34	31	34	37	31	36	71	45	35	31	34	29	37	43	42	42	27
11	34	36	36	36	37	35	42	36	41	36	35	35	38	41	78	41	39	36	45	35	47	48	59	46
12	34	31	45	35	45	53	33	35	32	52	42	34	35	35	38	34	32	32	33	38	90	56	67	30
13	39	33	36	37	60	32	32	34	41	60	34	34	37	32	35	35	37	32	45	B	33	34	46	42
14	B	35	35	33	28	72	90	36	37	37	35	40	36	43	34	37	42	32	30	28	37	33	42	50
15	41	39	58	38	33	41	41	30	36	B	B	B	30	40	38	B E B 37	E B 32	29	34	33	27	26	33	B
16	E B 23	26	30	36	38	B	B	42	38	37	B	B	B	B	B	B	E B 55	31	28	26	42	33	36	
17	85	42	27	59	E B 27	24	28	B	B	B	B	B	B	B	B	B	B	B	B	45	45	37	41	67
18	41	27	B	33	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B E B 32	E B 30	E B 32	E B 29	39	
19	39	115	B	40	41	43	43	B	40	31	36	B	35	B	33	34	27	E B 35	30	28	36	42	42	45
20	32	39	67	45	39	38	39	42	42	44	39	B	B	32	36	33	B	32	30	28	28	26	23	36
21	30	35	B	70	35	B	B	B	B	46	37	B	B	B	E B 55	45	B	108	70	41	37	37	39	
22	38	35	32	27	37	43	37	41	47	42	39	37	37	B	35	33	33	32	40	67	70	37	90	40
23	35	33	B	29	37	34	42	37	40	35	40	35	35	35	33	36	34	33	36	33	35	27	26	25
24	28	36	37	39	35	35	42	35	35	36	35	36	36	35	35	34	33	32	E B 31	E B 34	32	33	24	26
25	32	27	B	80	45	73	44	45	41	36	36	36	36	34	36	41	38	36	37	41	33	22	36	70
26	36	26	25	41	26	51	45	30	41	24	36	35	B	25	22	B	32	29	29	41	36	44	38	41
27	35	92	42	81	40	22	37	57	60	36	B	B	35	37	40	32	B	B	35	27	28	32	37	37
28	39	65	B	38	70	32	42	43	38	36	33	35	36	41	75	32	B	B	38	32	35	52	28	60
29	42	26	36	42	39	B	35	35	B	B	36	32	B	B	33	B	32	B E B 40	67	32	34	40	32	
30	90	35	42	43	40	37	42	35	34	31	E B 54	32	31	E B 56	33	B	B E B 32	27	B	B	32	34	31	
31	30	B	50	71	58	45	35	41	B	36	41	37	32	25	34	35	32	31	33	30	30	41	B	40
	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	28	23	31	29	27	26	28	26	26	25	23	23	23	26	26	24	22	29	29	29	31	30	30
MED	36	35	37	39	39	38	39	36	38	36	36	36	36	36	36	34	34	32	32	32	35	33	36	37
U O	41	39	45	45	45	43	43	42	41	37	40	40	37	41	45	37	38	34	42	41	41	42	41	42
L O	32	30	34	34	35	34	36	34	36	34	34	35	35	32	34	33	32	32	30	28	31	27	26	30



IONOSPHERIC DATA STATION SHOWA ST.

DEC.1988 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

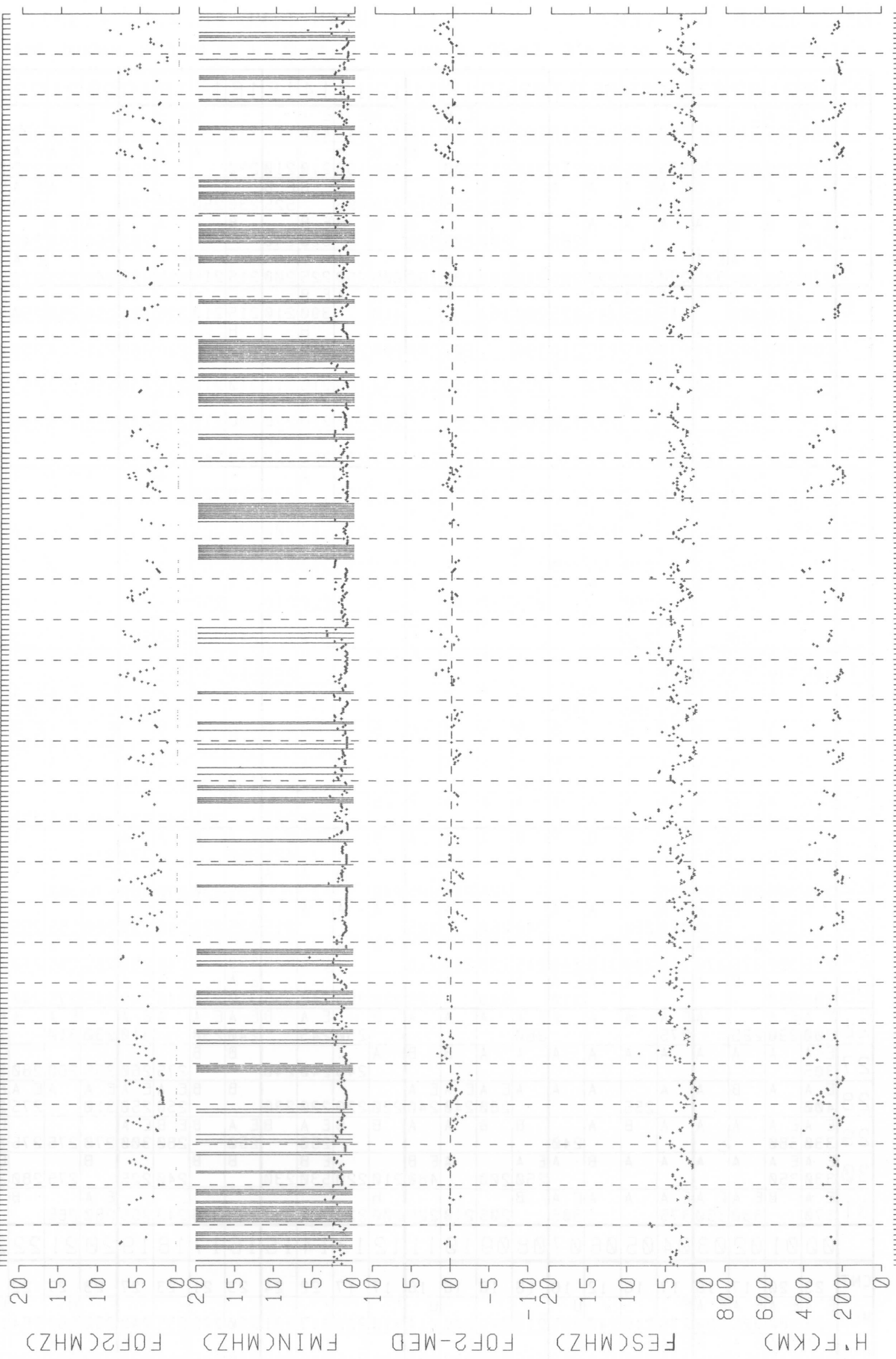
H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	17	9	12	10	8	9	9	9	11	11	55	19	20	20	20	16	22		B	50	B	B	25	24	14
2	9	9	9	13	13	10	11	9	14	15	14	B	60	18	22	13	9	15	13	11	10	10	10	12	
3	9	19	15	10	14	13	12	19	14	20	16	20	24	56		60	35	20	12	14	9	14	14	13	
4	14	B	B	18	13	21	13	13	19	15	16	52	B	B		55	14	B	B	34	13	14	13	9	10
5	9	11	12	14	13	13	12	13	25	16	13	15	20	15	14	14	14	14	10	11	13	13	13	9	
6	8	13	15	13	13	15	15	12	12	13	14	28	30	21	55	13	13	14	16	15	15	15	14	12	
7	15	21	13	20	9	10	13	10	13	B	16	14	14	11	15	14	19	19	13	9	9	19	18	14	
8	12	10	B	14	B	13	14	18	9	9	9	10	8	10	10	14	14	13	10	9	15	10	24	17	
9	13	B	18	13	14	17	12	9	9	10	9	9	10	9	9	9	11	9	10	10	8	8	15	14	
10	13	9	12	15	10	10	12	10	15	13	13	9	9	13	12	12	12	25	19	13	18	14	9	9	
11	13	9	9	10	12	15	11	14	10	18	20	18	14	13	15	13	9	12	13	14	10	10	16	10	
12	13	14	9	9	10	10	10	13	11	12	15	18	13	14	12	14	10	10	13	10	20	10	9	8	
13	14	19	10	10	15	10	14	10	14	20	15	18	12	13	16	18	24	14	17	B	15	14	16	24	
14	B	8	13	25	14	9	14	14	14	14	14	13	14	15	13	14	17	15	14	13	15	14	14	18	
15	13	12	12	24	17	15	19	13	23	B	B	B	19	19	20	B	37	17	15	17	17	20	15	15	
16	23	17	19	14	20	B	B	19	19	22	B	B	B	B	B	B	22	55	18	17	18	19	19	18	
17	14	19	18	21	27	19	B	17	B	B	B	B	B	B	B	B	B	B	B	B	24	24	21	24	18
18	23	21	B	22	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	32	30	23	29	20
19	22	30	B	24	24	24	23	B	23	23	20	B	18	B	20	21	19	35	16	18	18	18	24	24	
20	18	20	30	24	21	20	24	31	20	18	24	B	B	19	18	18	B	16	15	15	15	14	15	15	
21	24	16	B	14	19	B	B	B	B	18	B	27	B	B	B	54	35	B	17	21	18	13	15	15	
22	13	21	15	15	13	19	14	10	14	15	15	15	11	B	22	20	13	19	24	16	15	10	15	14	
23	22	18	B	18	9	12	11	15	18	16	14	15	24	19	17	14	18	16	18	15	18	18	17	12	
24	9	10	15	14	12	20	14	14	13	13	17	15	15	15	15	15	15	18	21	34	24	24	16	15	
25	13	14	B	14	13	20	17	15	14	13	24	17	15	13	13	23	14	14	14	13	15	14	13	13	
26	14	15	14	15	15	14	14	24	22	15	24	22	B	19	22	B	19	16	15	13	16	18	14	10	
27	13	18	20	15	23	13	18	15	14	25	B	B	20	13	20	15	B	B	15	15	15	14	15	14	
28	17	23	B	11	24	13	21	15	23	23	23	18	19	15	19	15	B	B	19	13	14	15	11	14	
29	17	15	9	29	23	B	20	19	B	B	20	20	B	B	17	B	17	B	40	16	14	17	13	15	
30	15	15	20	19	24	22	B	22	15	15	24	54	21	21	56	20	B	B	32	16	B	13	14	14	
31	14	B	12	10	13	13	29	14	B	22	18	20	14	20	11	12	15	15	12	13	9	12	B	15	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	
MED	14	16	15	14	14	15	14	14	15	16	18	20	20	19	19	15	19	18	16	15	15	14	15	14	
U O	17	21	B	20	23	20	23	19	23	23	24	B	B	B	B	55	23	55	B	21	18	18	18	15	
L O	13	11	12	13	13	12	12	12	13	13	14	15	14	13	14	14	14	14	13	13	14	13	13	12	

IONOSPHERIC DATA STATION SHOWA ST.  
 DEC.1988 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	E A E A E A	480 325 340	245	260	250	245	240	220	200	E B E A	400 410	E A E A E A	440 440 460	A	225	B E B	310	B	B	275	280	280	E A E A E A		
2	275	280	295	270	275	255	240	215	210	215	200	B	E B H	460	190	210	220	A	A	250	A E A E A E A	300	275	300	
3	A	A	A	0	E A E A	A	A	A	E A	250	225	210	220	E B	B E B	525	230	250	225	220	A	A	E A E A	260 360	
4	E A	B	B	A	A	A	A	260	A	H	200	E B	B	B E B	500	240	B	B	A	E A E A	205	260	280	240 240	
5	270	290	E A E A	300 325	270	250	230	205	210	200	190	H	E A	225	200	215	215	H E A	E A	230	240	235	E A	250	
6	A E A E A	310 320	A E A E A	415 425	245	225	200	180	A	A	E A	A E B	390	210	215	210	225	225	225	250	250	250	E A	290	
7	E A E A E A	280 300	E A E A	330	E A	270	245	235	210	H	B	205	200	200	200	230	H	H	E A	H	215	220	250	260	
8	E A E A	275 300	B E A	320	B E A	280	240	A	255	210	190	200	190	195	215	210	210	225	230	250	250	255	240	A	
9	270	B E A	A	A	A	250	210	200	250	200	A	A	200	215	220	220	200	215	230	240	240	250	280	A	
10	250	250	A E A	E A E A	400 300	240	200	H	210	215	210	200	205	200	H	220	H	E A E A	A	A	A	A	E A	305	
11	E A	305	270	E A	300	280	270	250	250	210	210	250	200	225	225	A	220	220	A	A	A E A	310	A E A	A E A	
12	E A E A	255 255	A E A	250	A	A	230	255	230	A	A	A	215	215	210	200	200	225	230	230	255	250	260	E A	
13	E A E A E A	325 340	E A E A	355 340	A	240	255	250	A	A	220	225	215	225	210	200	H	H E A	A	B	265	270	A	A	
14	B	A E A	330	A	280	290	A	A	275	270	240	A	A	A	220	210	A	250	250	250	275	340	250	A	
15	A	A	230	A	A E A	290	A	A	A	B	B	B	A	A	210	B	240	230	250	250	250	275	270	275	
16	E B E A	305 310	E A E A	300 330	360	B	B	A	A	A	B	B	B	B	B	B	A E B	E A	A	A	A E A	280	A	B	
17	A	A	Q	A	E B E A	B E A	B	B	B	B	B	B	B	B	B	B	250	510	275	225	260	275	300	305	255
18	A	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	255	255	400	330	A	
19	A	A	B	A	A	A	A	B	A	A	A	B	A	B	A	230	230	230	290	270	A	A	A	A	
20	E A E A E A	440 360	425	A	A	A	A	A	A	A	A	B	B	A	220	225	B	225	240	230	245	255	275	295	
21	325	350	B E A	425	250	B	B	B	B	A	B	A	B	B	B E B	425	260	A	A	270	275	255	A E A	295	
22	E A E A	355 300	Q	295	275	A	A	A	A	225	210	225	240	B	A	A	225	230	270	280	270	300	A	A	
23	A E A	390	B E A	E A	300	280	A	A	240	260	225	A	A	A	215	225	220	240	250	260	255	255	270	A	
24	275	300	E A E A	E A	310	200	E A	310	240	215	180	210	210	A	A	225	225	220	225	240	255	255	270	280	
25	290	250	B	A	A	A	A E A	310	240	225	220	250	240	255	E A	310	210	E A E A	E A	245	275	240	A	A	
26	E A E A	300 290	225	A E A	A	A	A	A	E A	A	A	B	E A	230	245	B	E A E A	A E A	A E A	310	230	310	E A	A E A	
27	E A	305	A	A	A	A	A	A	A	A	B	B	A	240	240	240	B	B	275	260	255	260	280	300	
28	E A	400	A	B	A	A	255	A	A	A E A	E A	E A	220	220	220	230	B	B	E A E A	E A	250	250	275	280	
29	E A E A	330 380	A	A	A	B	A	240	B	B	A	A	B	B E A	250	250	B E A	B E B E A	280	300	270	275	275	E A	
30	E A E A	330 350	A	A	A	A	B	A	E A	250	200	A E B	480	210	220	530	230	B	B	240	225	B	E A	E A	
31	E A	370	B E A	E A E A	E A	A	A E A	305	205	210	225	200	225	230	220	225	225	240	255	E A	280	265	B	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	23	20	17	16	17	16	12	16	16	18	16	16	17	17	22	24	23	21	23	27	23	27	22	22	
MED	E A E A E A E A	305 300 325 328	275	248	240	225	215	209	206	214	210	222	217	221	220	222	235	240	252	262	264	266			
U O	E A E A E A E A	330 345 352 345	305	290	250	258	245	250	232	232	232	245	245	235	240	245	260	270	270	300	280	300			
L O	275	285	298	288	270	248	232	210	210	200	200	202	200	215	215	210	215	215	230	230	245	255	255	270	

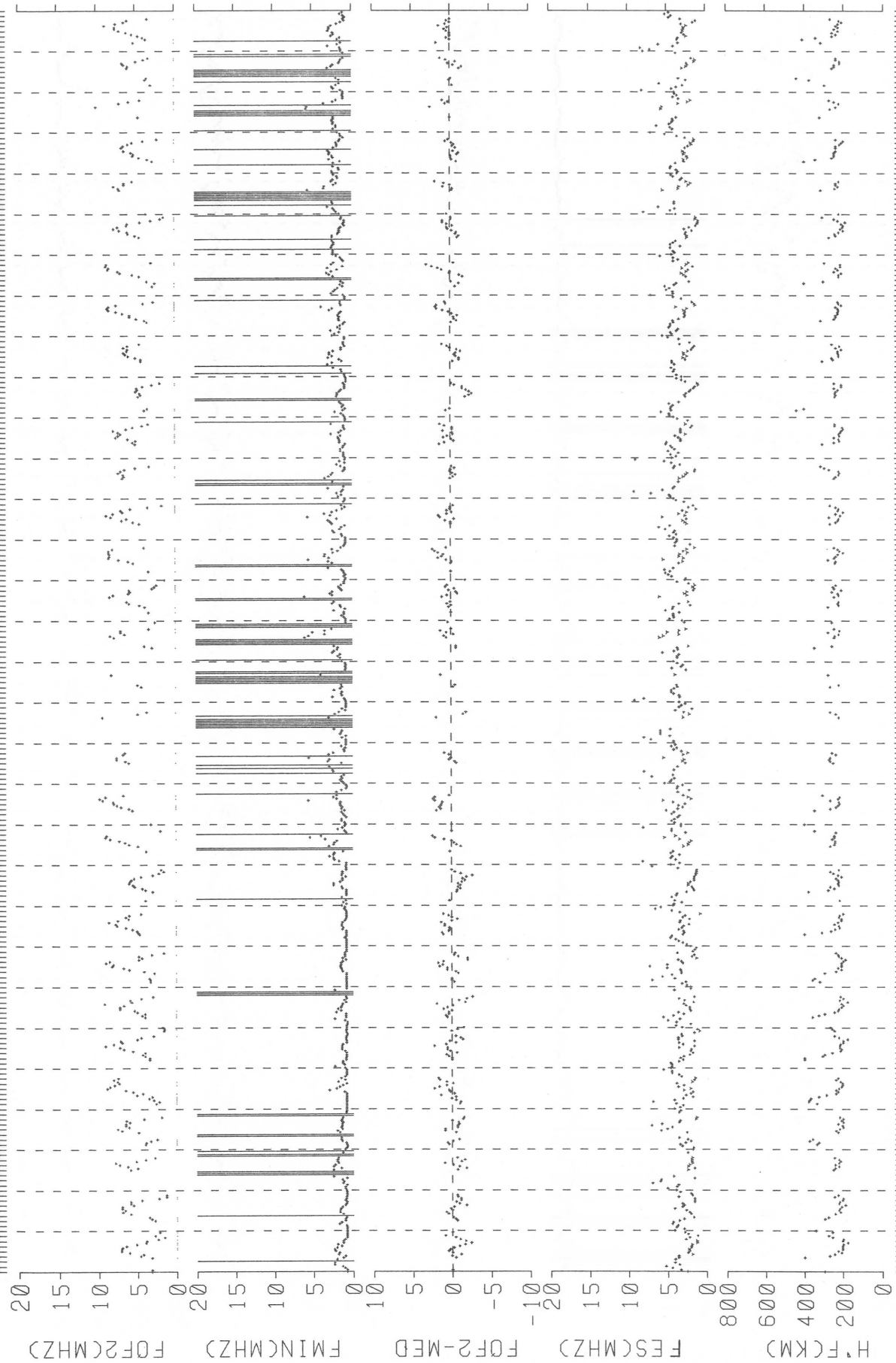
SHOWA ST.

19880701 -> 19880731



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

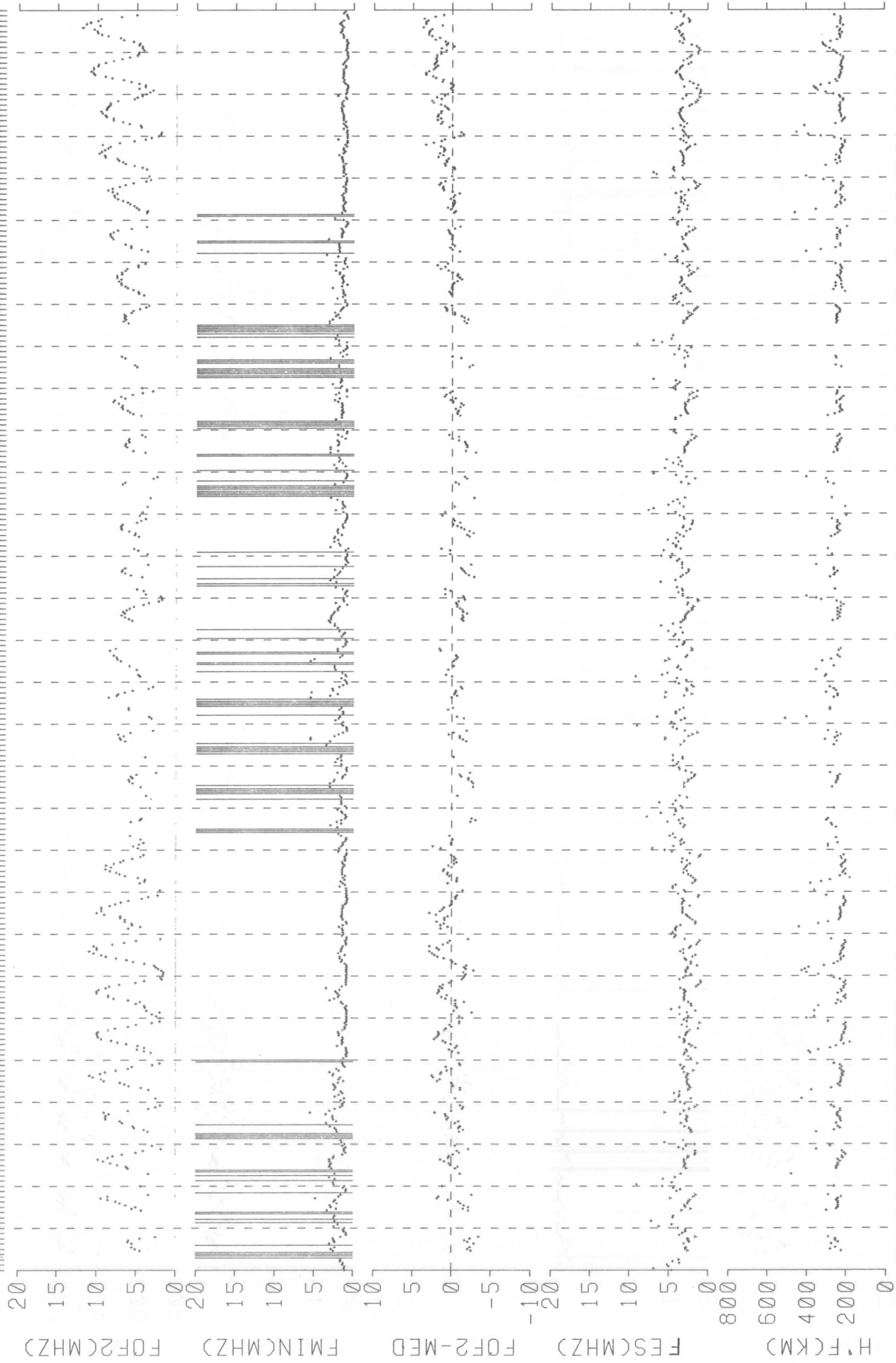
19880801 -> 19880831 SHOWA ST.



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

SHOWA ST.

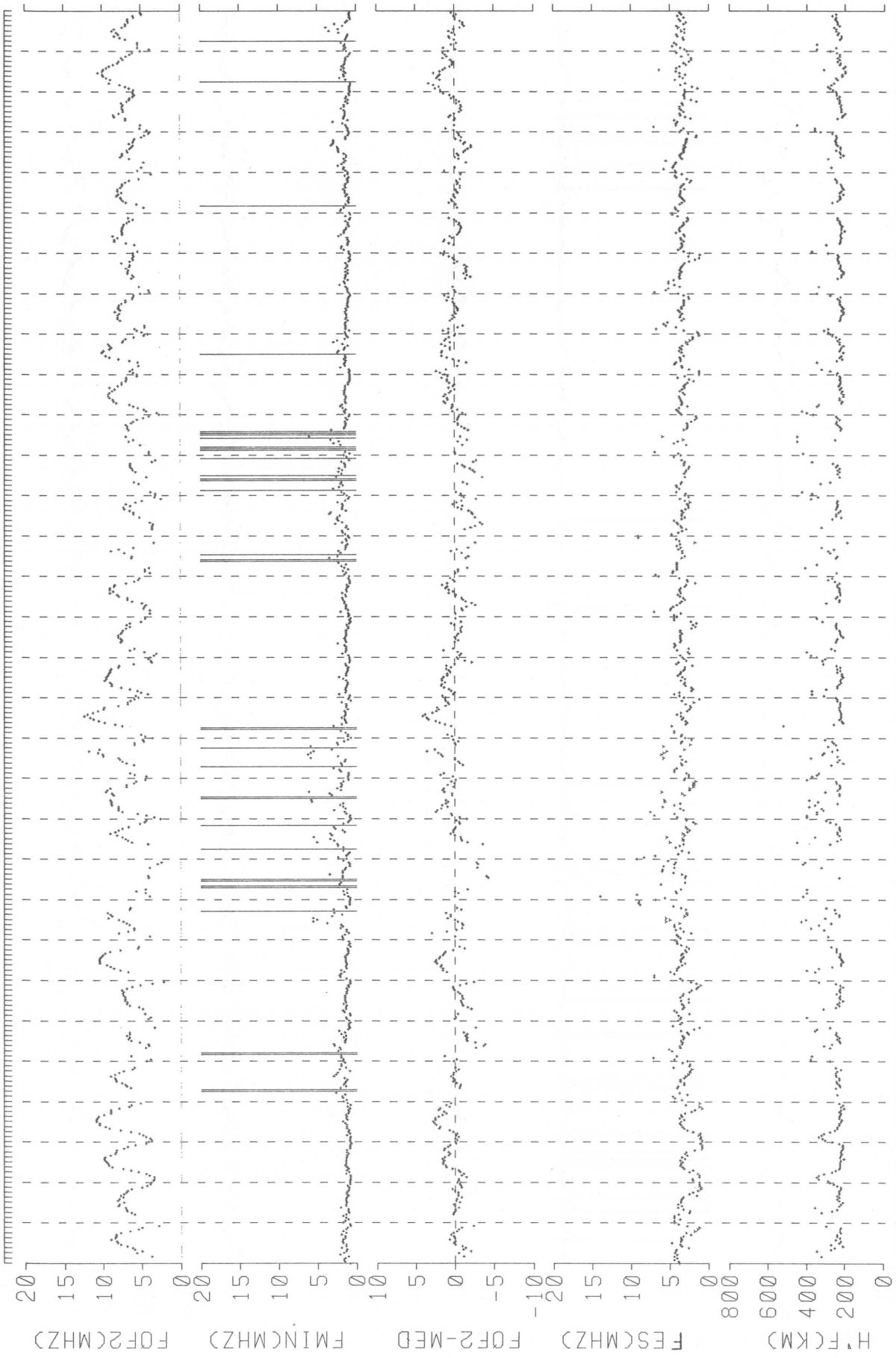
19880901 -> 19880930



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

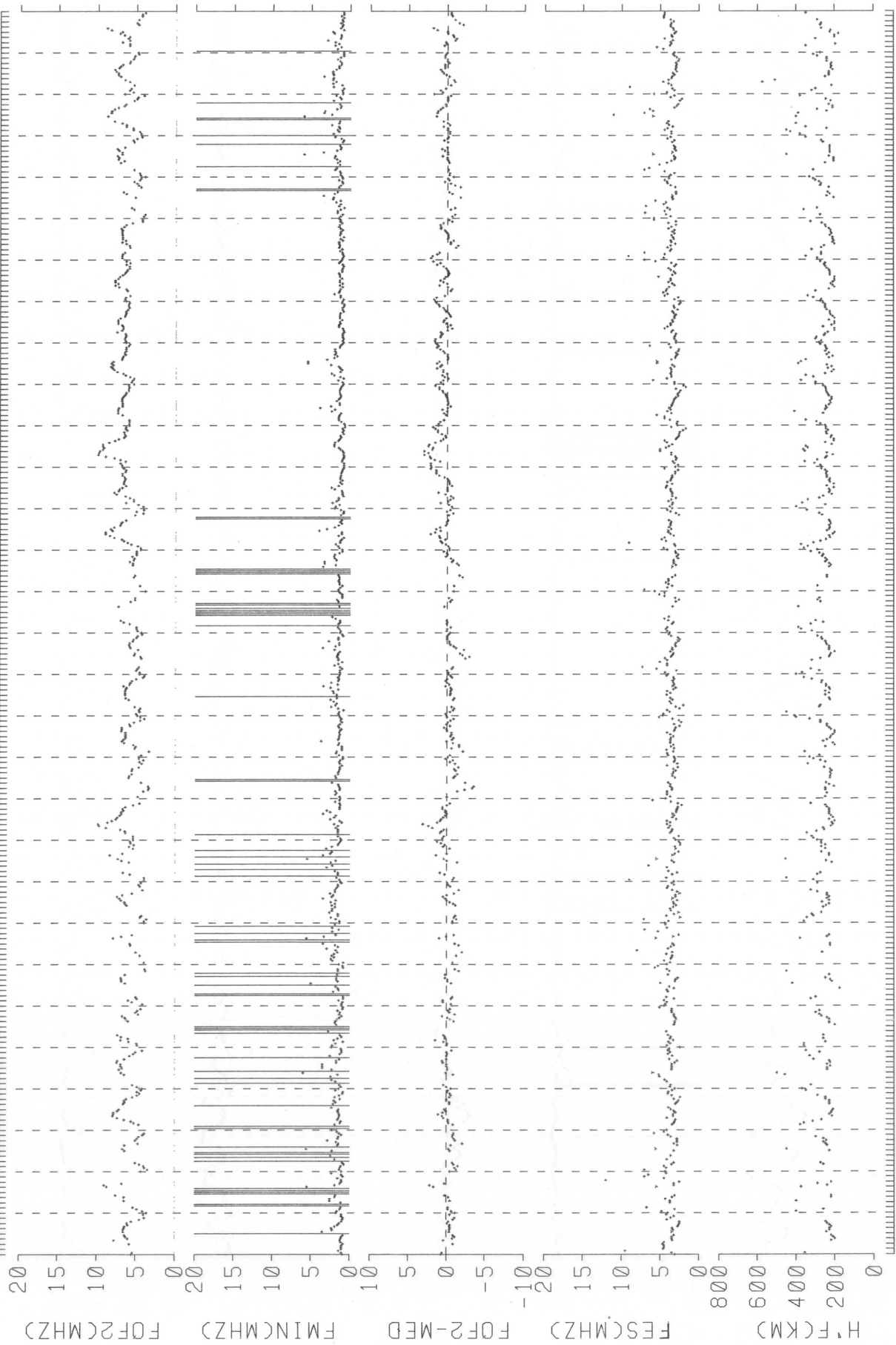
19881001 -> 19881031 SHOWA ST.

19881001 -> 19881031



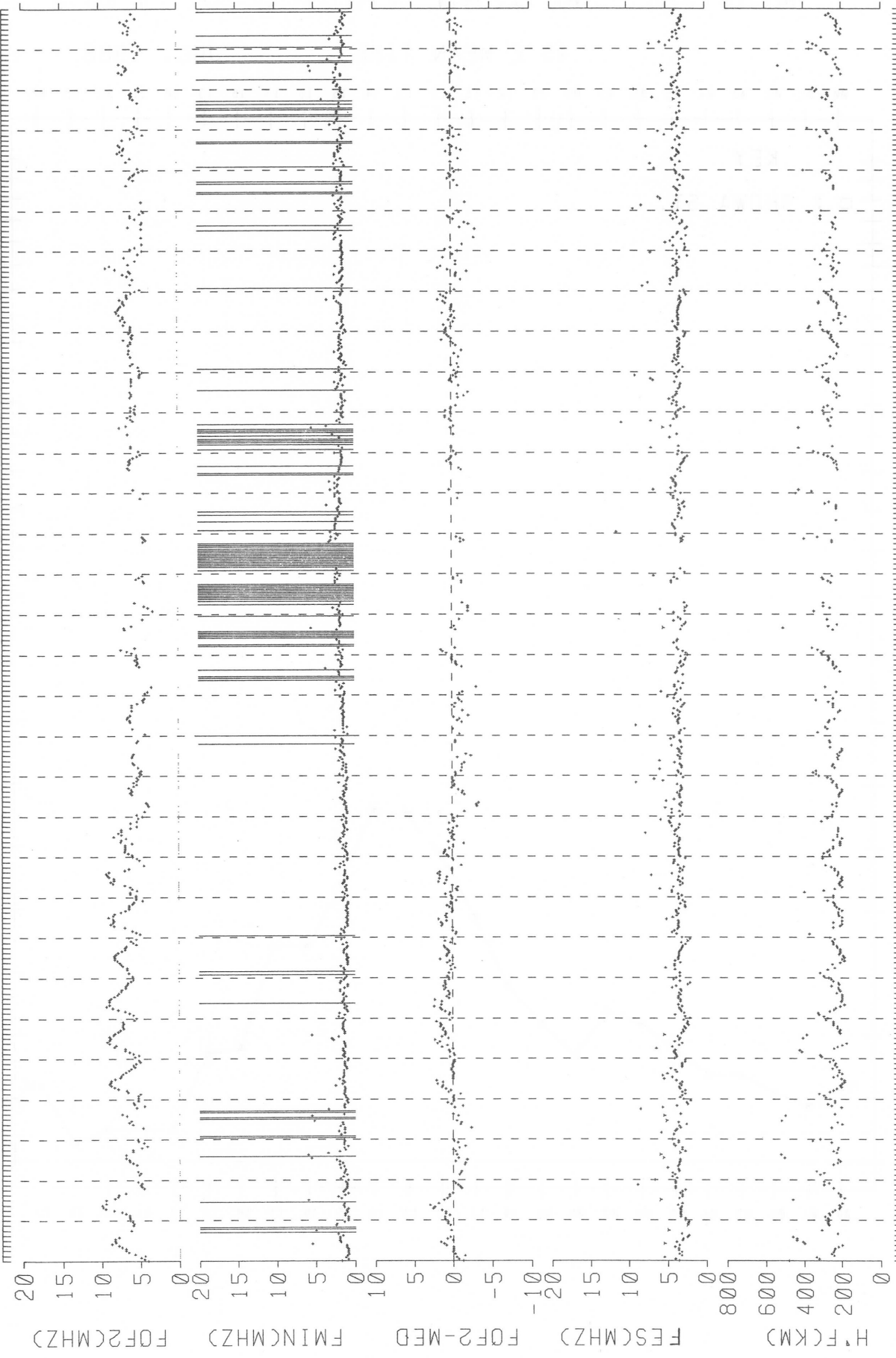
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 DAY

19881101 -> 19881130 SHOWA ST.



19881201 -> 19881231 SHOWA ST.

19881201 -> 19881231



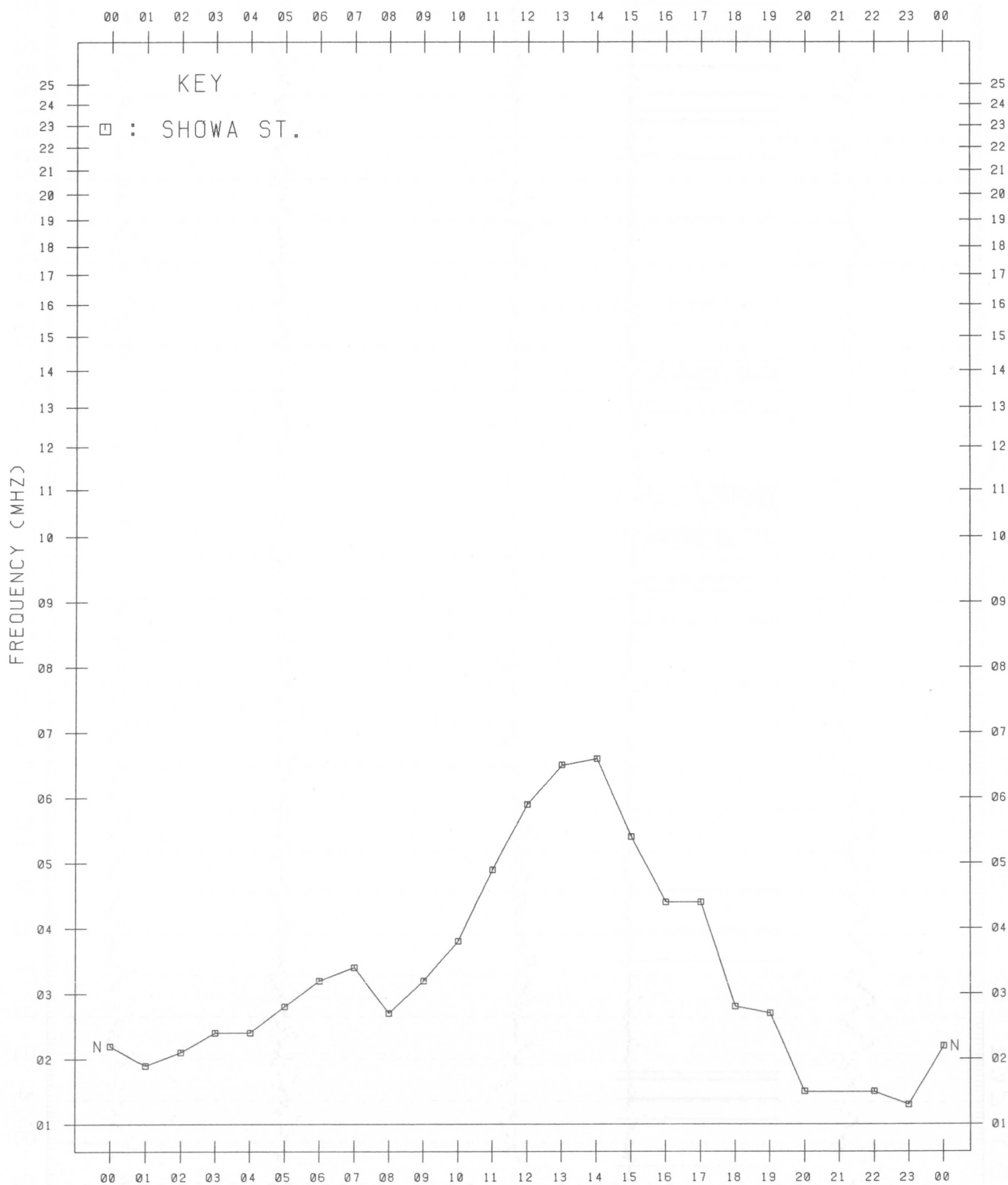
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 DAY



# MONTHLY MEDIAN VALUES OF FOF2

45 °E MEAN TIME

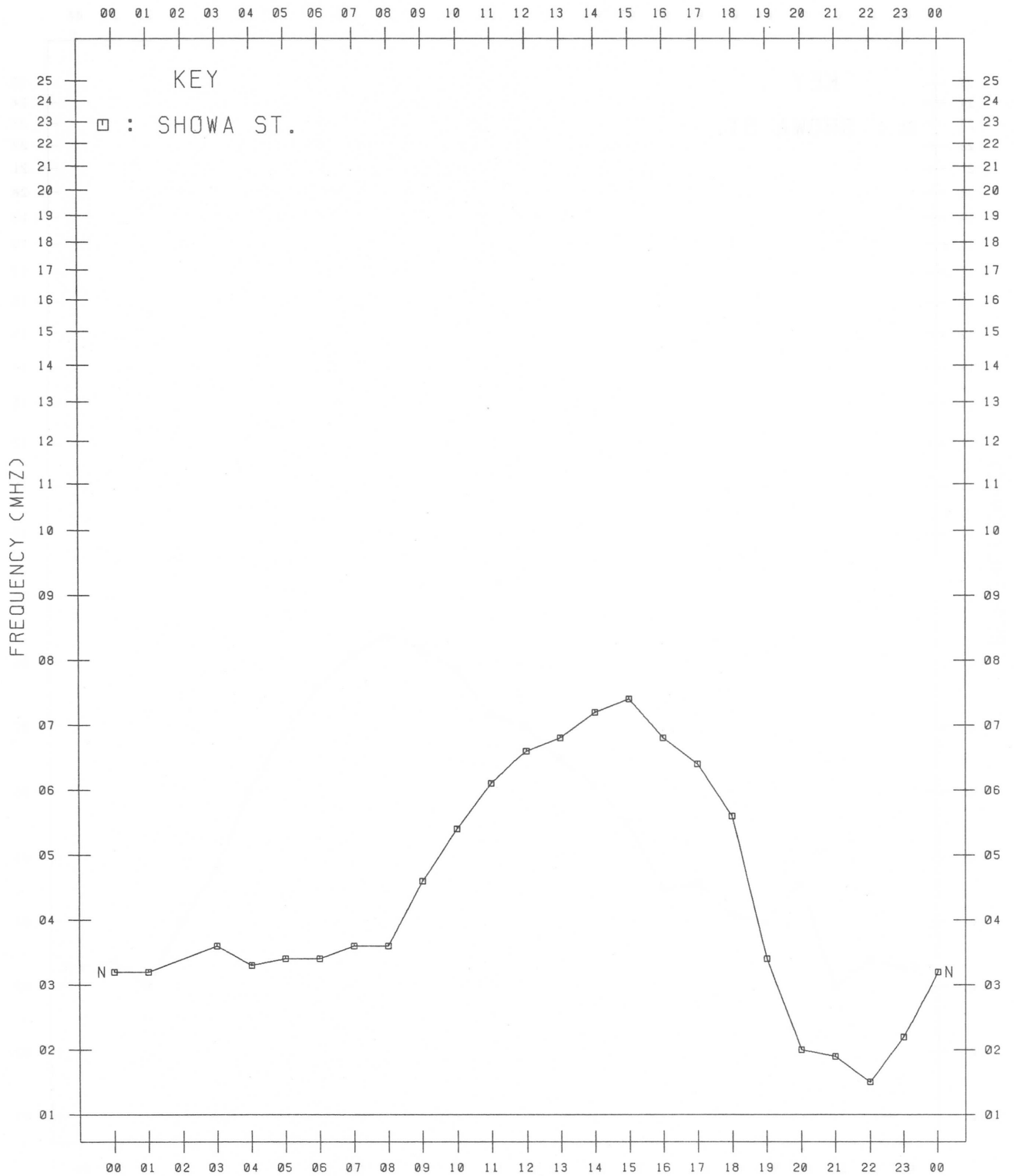
JUL. 1988



# MONTHLY MEDIAN VALUES OF FOF2

45°E MEAN TIME

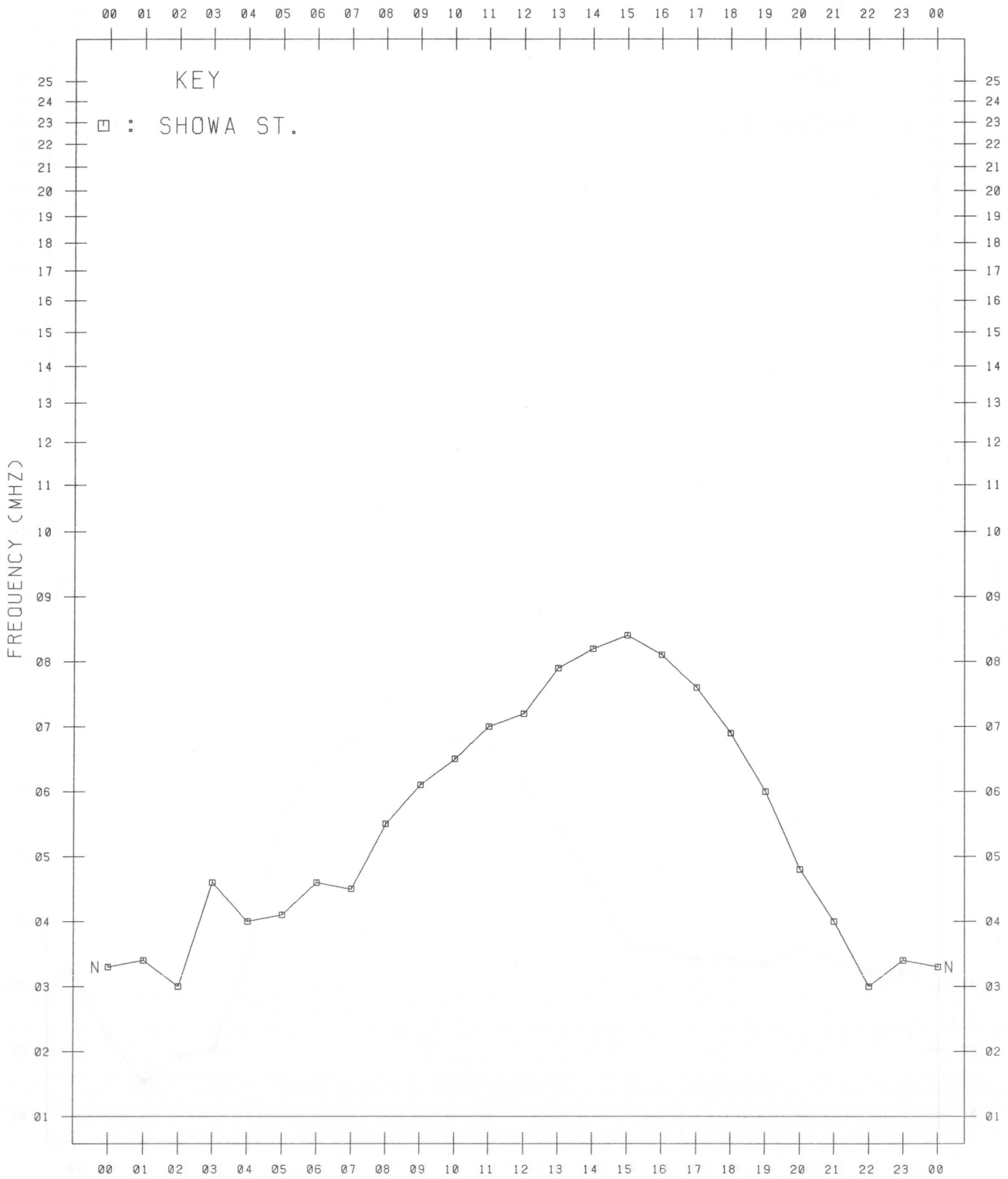
AUG. 1988



# MONTHLY MEDIAN VALUES OF FOF2

45°E MEAN TIME

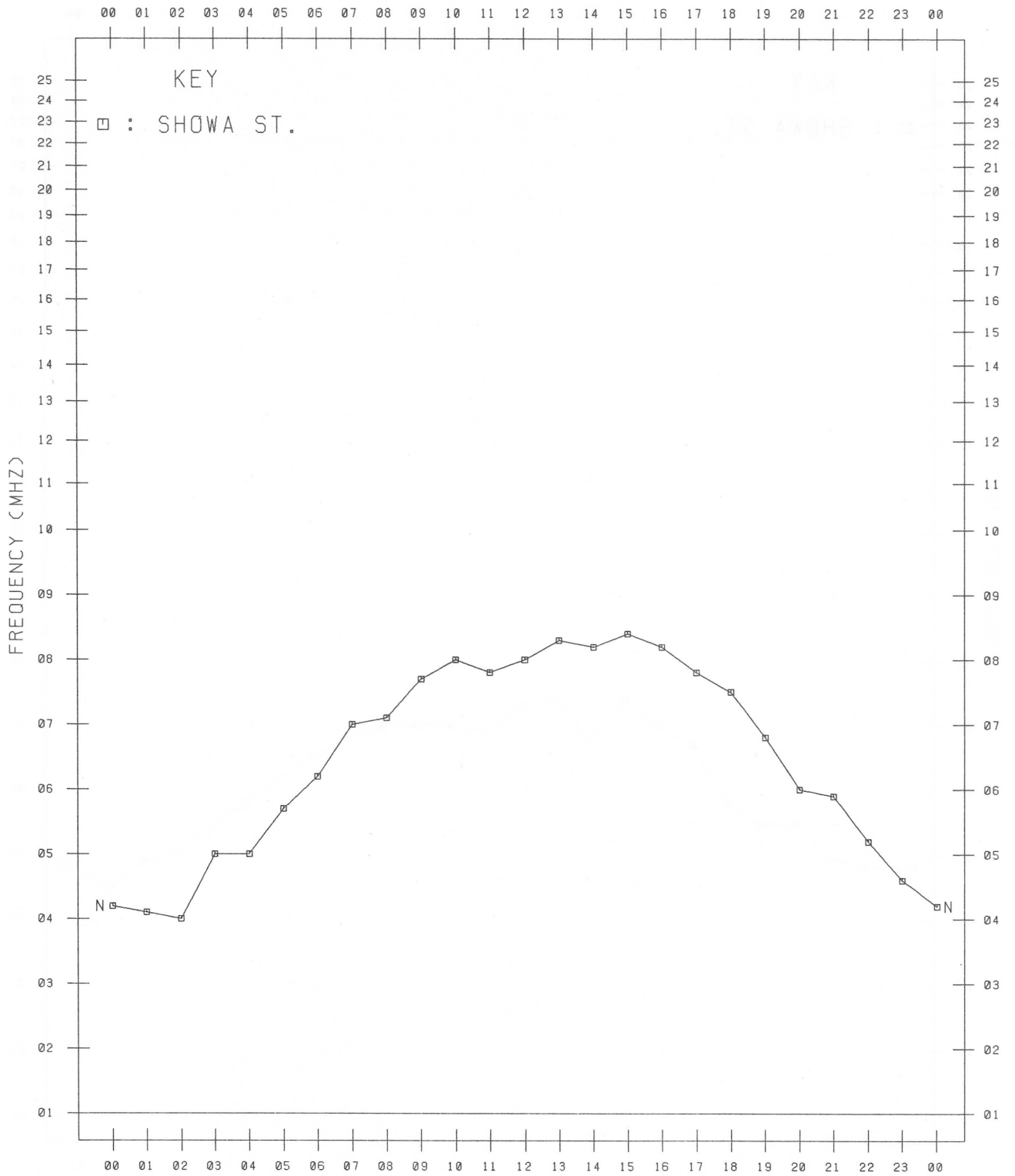
SEP. 1988



# MONTHLY MEDIAN VALUES OF F<sub>0</sub>F<sub>2</sub>

45°E MEAN TIME

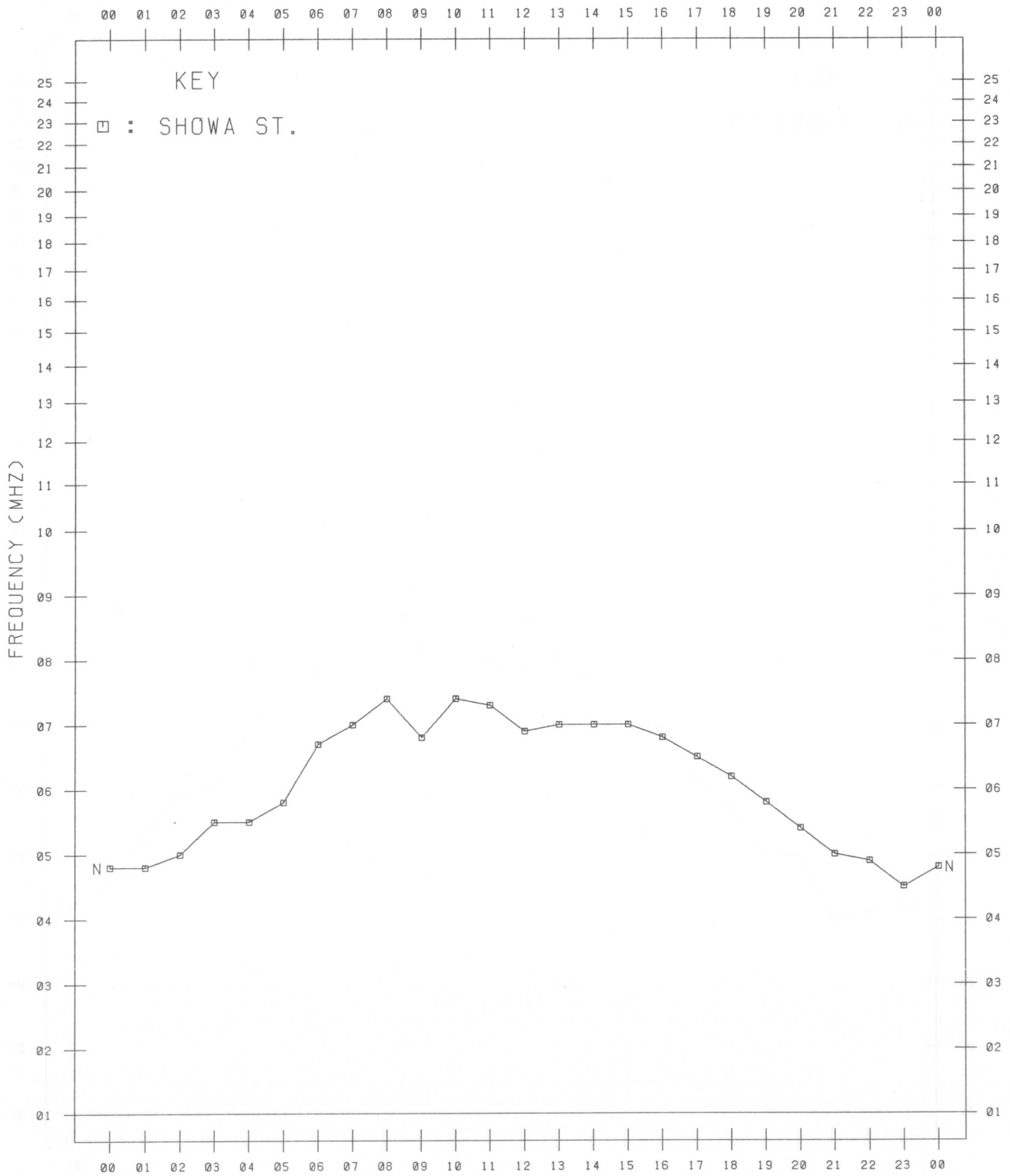
OCT. 1988



# MONTHLY MEDIAN VALUES OF F<sub>0</sub>F<sub>2</sub>

45°E MEAN TIME

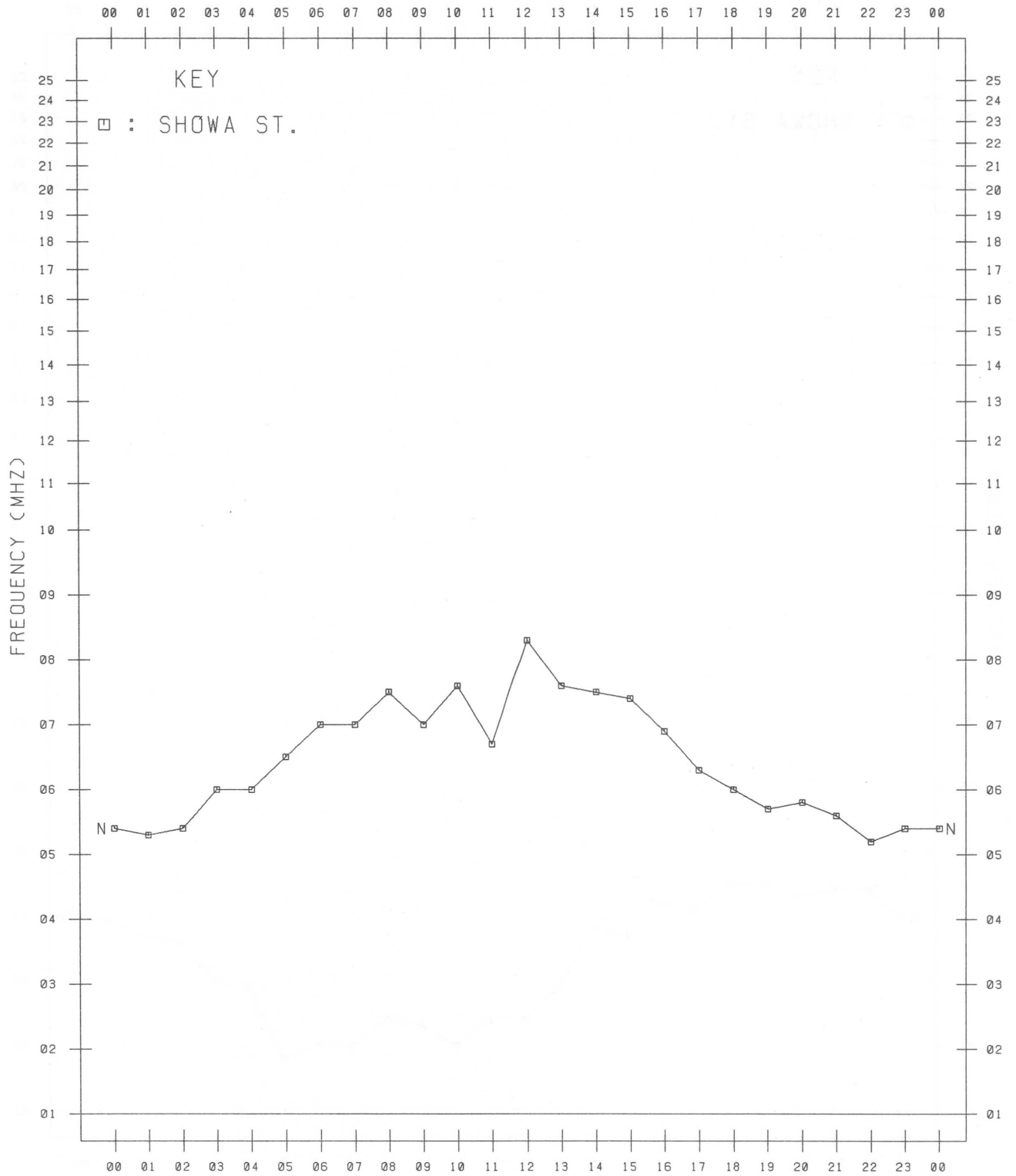
NOV. 1988



# MONTHLY MEDIAN VALUES OF FOF2

45°E MEAN TIME

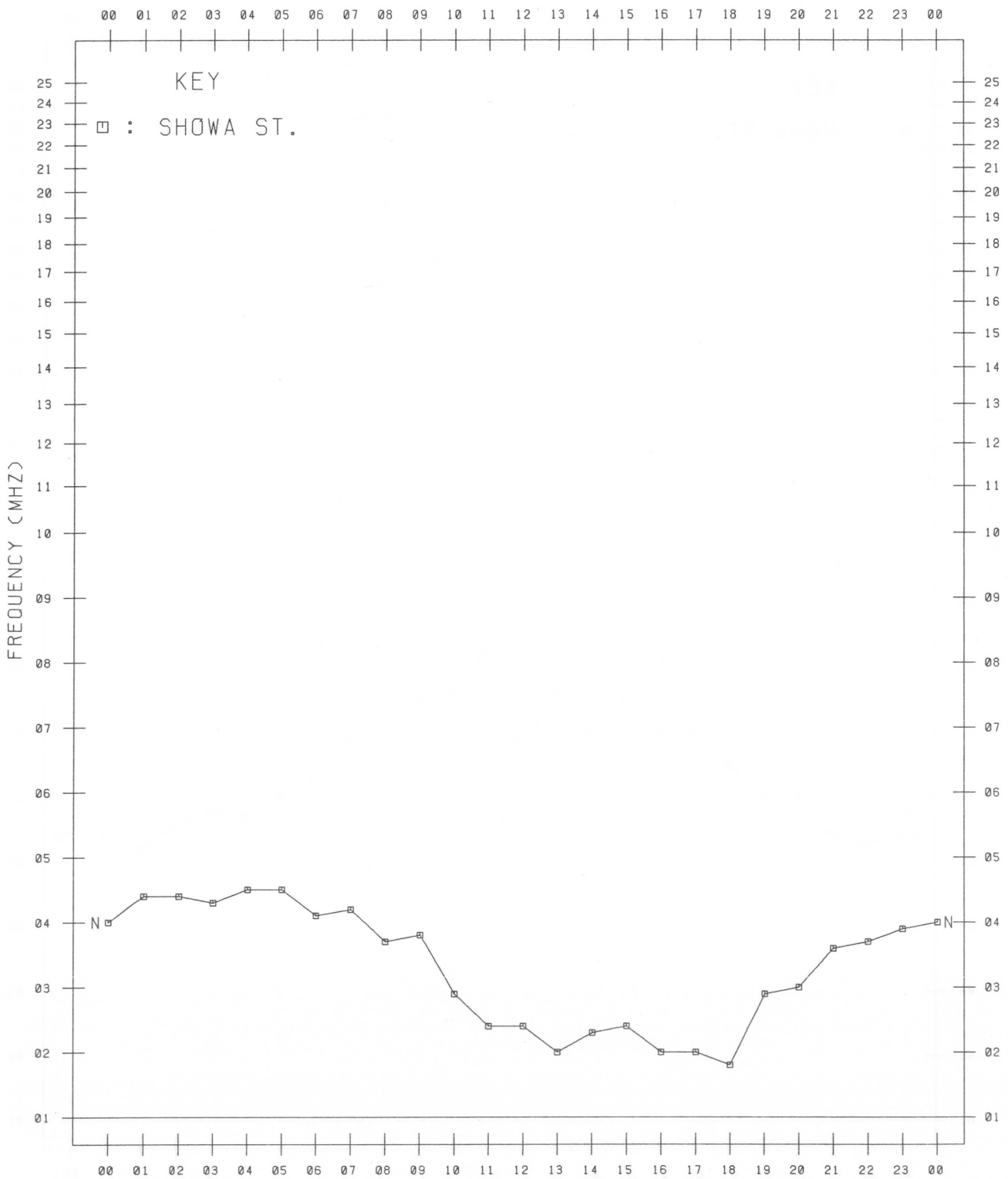
DEC. 1988



# MONTHLY MEDIAN VALUES OF FES

45°E MEAN TIME

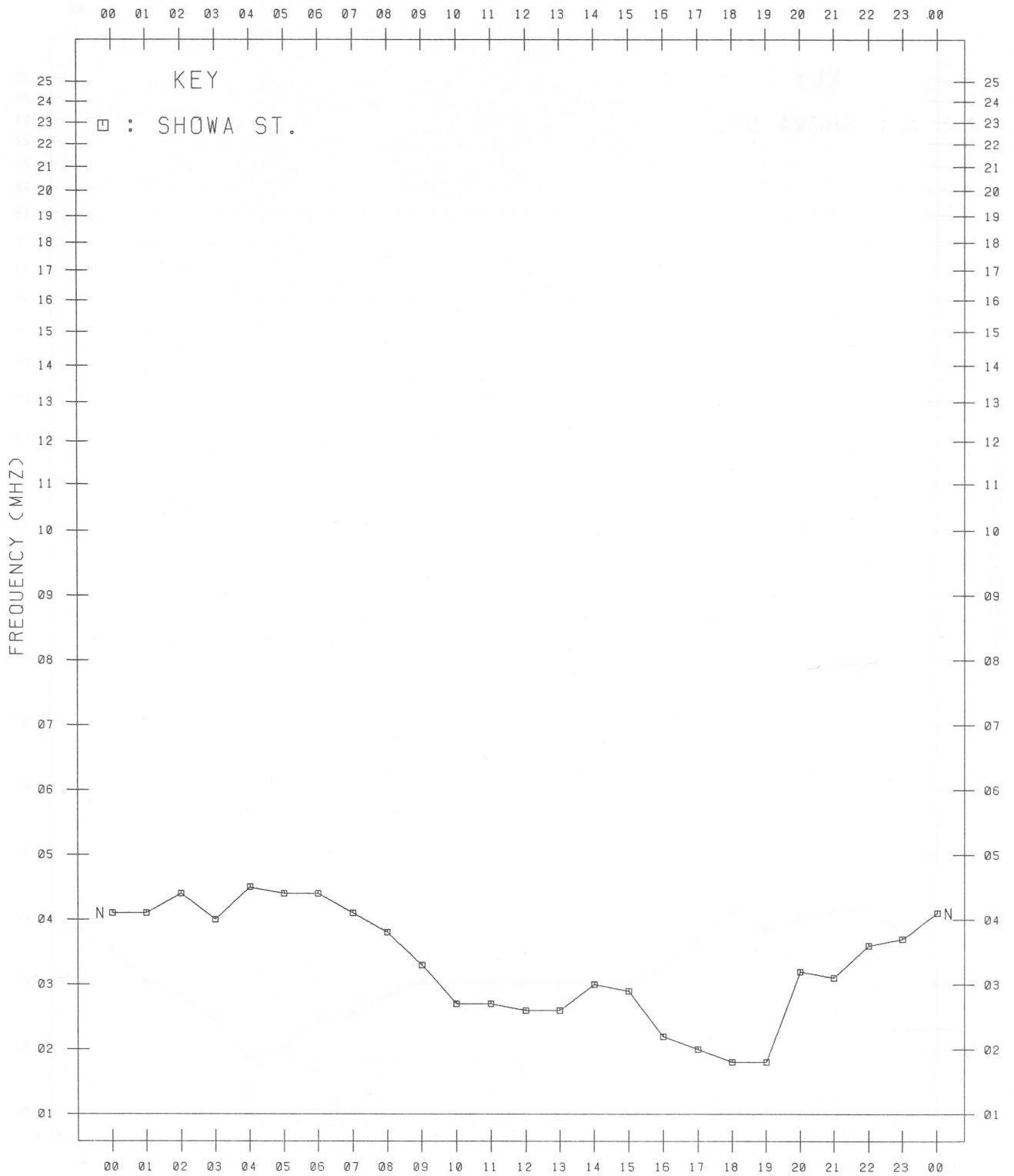
JUL. 1988



# MONTHLY MEDIAN VALUES OF FES

45°E MEAN TIME

AUG. 1988

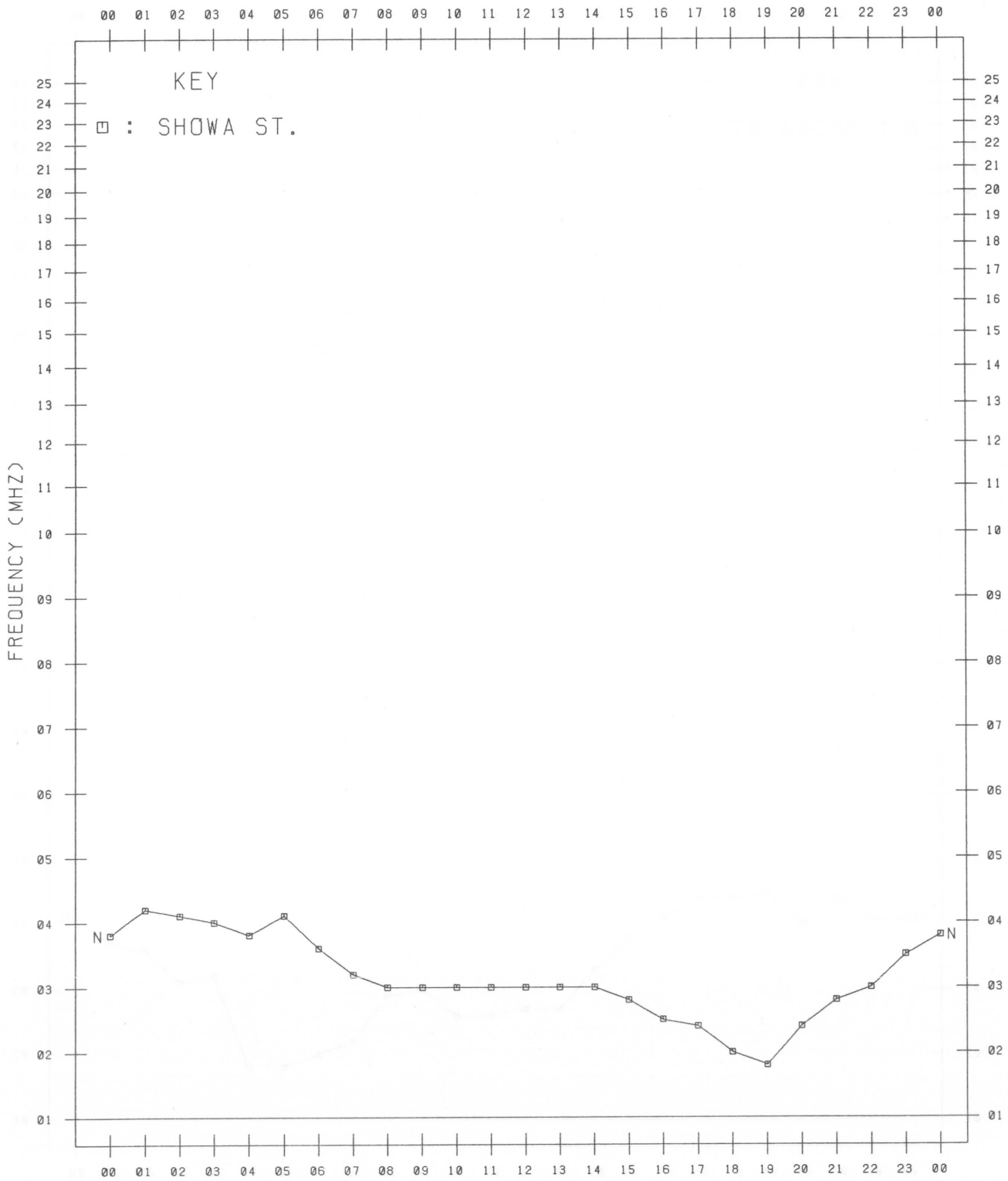




# MONTHLY MEDIAN VALUES OF FES

45°E MEAN TIME

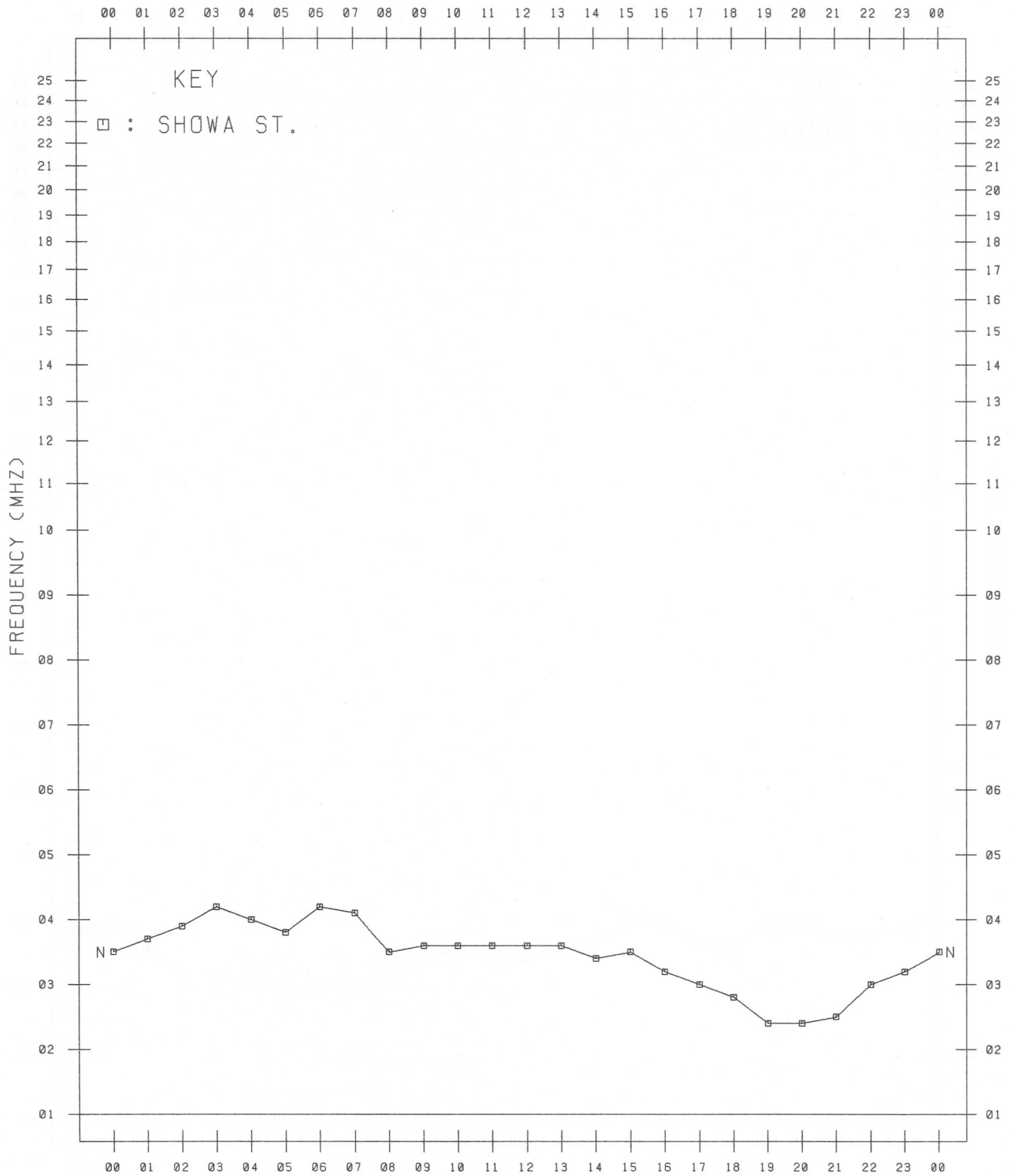
SEP. 1988



# MONTHLY MEDIAN VALUES OF FES

45°E MEAN TIME

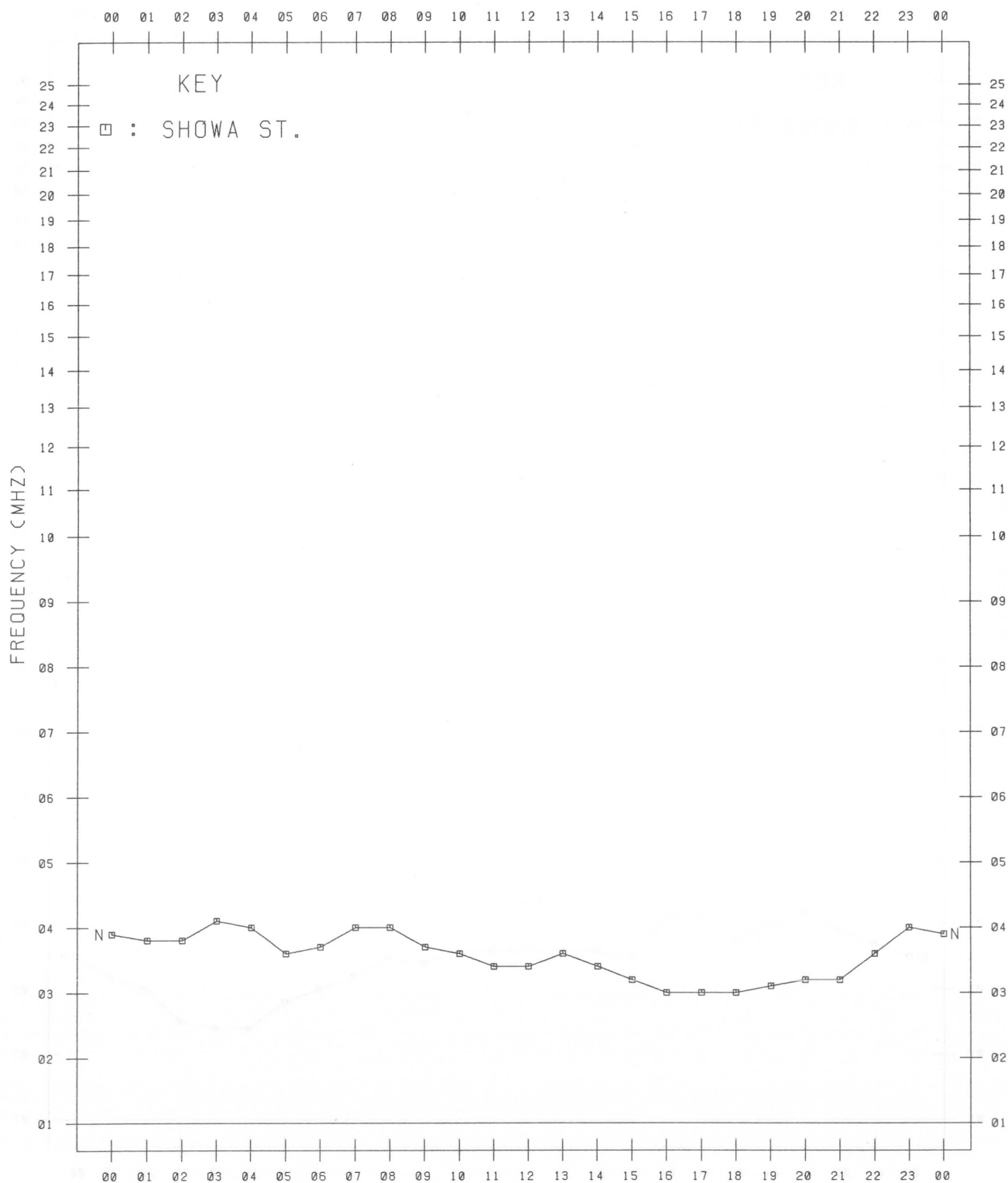
OCT. 1988



# MONTHLY MEDIAN VALUES OF FES

45 °E MEAN TIME

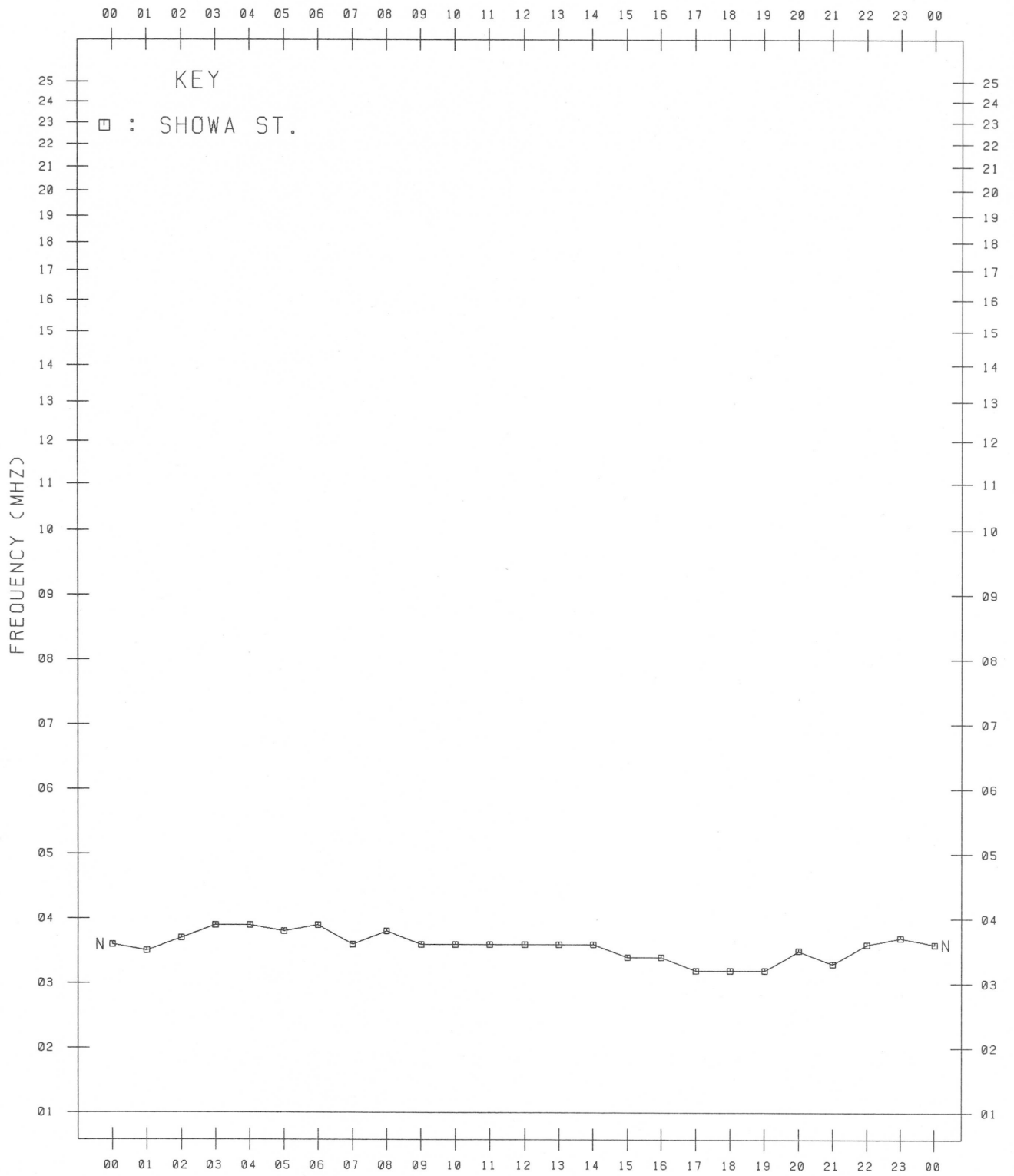
NOV. 1988



# MONTHLY MEDIAN VALUES OF FES

45°E MEAN TIME

DEC. 1988



---

IONOSPHERIC DATA AT SYOWA STATION (ANTARCTICA)  
ION.ANT.— 51 July 1988 —December 1988 (Not for Sale)

---

昭和基地電離層資料(南極)

(1988年7月—1988年12月)

1992年3月19日 印刷 (非売品)

1992年3月25日 発行

編集兼発行所

郵政省通信総合研究所

〒184 東京都小金井市貫井北町4丁目2-1

☎ 0423 (21) 1211 (代)

---

Queries about "Ionospheric Data at Syowa Station" should be forwarded to: The Communications Research Laboratory,  
Ministry of Posts and Telecommunications, 2-1 Nukui-Kitamachi 4-chome, Koganei-shi, Tokyo 184 JAPAN.