

IONOSPHERIC DATA AT SYOWA STATION

(ANTARCTICA)

January – December 2012

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NATIONAL INSTITUTE OF INFORMATION
AND COMMUNICATIONS TECHNOLOGY
TOKYO, JAPAN

INTRODUCTION

This data book summarizes the results for vertical soundings of the ionosphere at Syowa Station, Antarctica in 2012. The observations were conducted by the National Institute of Information and Communications Technology. The location of the station, specifications of the ionosonde, and symbols used in this data book are as follows:

Geographic		Geomagnetic *	
Latitude	Longitude	Latitude (Deg.)	Longitude (Deg.)
69°00.4'S	39°35.4'E	- 70.4	85.4

* Geomagnetic latitude and longitude were calculated using IGRF-11(2010).

SPECIFICATIONS OF THE IONOSONDE USED AT SYOWA STATION

Items	Specifications
Frequency Range	1MHz - 15MHz
Transmitting Power	10kW (peak value)
Duration of Sweep	15 s
Transmitted Pulse Width	80 μ s
Pulse Repetition Frequency	100 Hz
Height Range	0 - 1000km
Recording Media	Hard drive
Power Supply	100V-AC, 2.0kVA
Transmitting Antenna and Receiving Antenna	30-m-high vertical delta antennas terminated by 600 Ω

OBSERVERS

Observer: H. Kitauchi

Scaler: K. Fukushima

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. 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 of the vertical ionospheric reflections.
$h'F$	Minimum virtual height of the ordinary wave F trace as a whole.

Symbols

(i) Descriptive Letters.

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

A	Measurement influenced by, or impossible because of, the presence of a lower thin layer, for example, Es .
B	Measurement influenced by, or impossible because of, absorption in the vicinity of $fmin$.
C	Measurement influenced by, or impossible because of, any non-ionospheric reason.
D	Measurement influenced by, or impossible because of, the upper limit of the normal frequency range.
E	Measurement influenced by, or impossible because of, the lower limit of the normal frequency range.
F	Measurement influenced by, or impossible because of, the presence of spread echoes.
G	Measurement influenced or impossible because the ionization density of the layer is too small to enable it to be made accurately.
H	Measurement influenced by, or impossible because of, the presence of stratification.
K	Presence of particle E layer.
L	Measurement influenced or impossible because the trace has no sufficiently definite cusp between layers.
M	Interpretation of measurement questionable because 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	Spur type spread present.
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.
T	Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
V	Forked trace that may influence the measurement.
W	Measurement influenced or impossible because the echo lies outside the recorded height range.
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 numerical values 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. (Used for x-characteristics only.)
T	Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
U	Uncertain or doubtful numerical value.
Z	Measurement deduced from the third magneto-electronic component.

(iii) Definitions of CNT, MED, UQ, and LQ

CNT (median count) is the number of values from which the median has been computed. In addition to numerical values, the count may include certain descriptive letters.

MED (median) is the middle value when the numerical values are arranged in the order of magnitude, or the average of the two middle values if there is an even number of values.

UQ (upper quartile) is the median value of the upper half of the values when they are ranked according to magnitude.

LQ (lower quartile) is the median value of the lower half.

Acknowledgment

Ionospheric observation at Syowa Station is based on the consignment study from the Ministry of Internal Affairs and Communications.

IONOSPHERIC DATA STATION SHOWA-ST.

JAN. 2012 f_{XI} (0.1MHz)

45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	X 54	X 58	Y	R	R	X 70	X 80	R	X 83	R	X 87	X 88	X 82	X 74	R	X 69	X 64	X 62	X 64	X 60	X 60	X 58	X 52	X 56			
2	X 53	X 53	R	X 56	X 70	X 76	X 83	X 100	X 100	X 96	X 93	X 93	X 94	X 72	X 71	R	X 69	X 68	X 66	X 64	X 64	X 64	X 62	X 58			
3	X 59	X 59	68	A	R	B	B	R	R	B	R	B	B	B	B	X 82	X 69	X	R	R	X	X 58	X 56	X 52	X 51		
4	X 38	X 48	X 49	X 52	X 54	X 62	X 72	X 80	X 83	X 92	X 86	X 89	X 86	X 74	X 68	X 67	X 62	X 58	X 59	X 64	X 67	X 70	X 64	X 62			
5	X 62	X 58	X 64	B	X 68	X 67	X 76	X 86	C	C	C	C	C	C	C	C	C	C	C	B	C	X 57	X 64	X 54	X 48		
6	B 46	X 58	X 63	X 67	X 75	X 76	X 77	X 78	X 81	X 81	Y	B	X 80	X 80	X 75	X 72	X	A	X	X	X 61	X 67	X 67	X 66	X 48	X 47	
7	A 48	X	A	B	R	R	B	B	X 69	X 72	X 72	X 75	X 71	X 69	X 68	X 66	X 65	X 65	X 65	X 62	X 56	X 52	X 48	X 53			
8	X 51	X 51	R	R	B	B	R	Y	A	R	B	X 67	X 65	X 64	X 62	X 61	X 58	X 59	X 60	X 56	X 58	X 56	X 50	X 44			
9	B	R	R	R	B	R	R	B	B	Y	Y	R	B	B	B	X 59	X R	B	B	X	X	X 62	X 57	X 49	X 48	X 46	X 48
10	X 52	X 48	X 54	X 58	X 64	X 66	R	R	X 70	X 74	X 82	X 86	X 71	X 67	X 67	X 66	X	B	X	B	X	X 57	X 47	R	X 48		
11	X 47	X 49	X 51	X	B	A	R	B	R	R	X 64	Y	Y	R	Y	X 64	X 58	X 60	X 59	X 56	X 52	X 50	X 56	X 46			
12	X 43	X 47	X 48	X 56	B	R	X 67	X 68	X 67	X 70	X 72	X 70	X 70	X 67	X 66	X 65	X 72	X 67	B	X 61	X 56	X 57	X 57	X 46			
13	A	X 46	X 64	X 55	B	X 64	Y	X	X	B	X 72	X 78	X 78	X 70	A	A	X 67	Y	B	X	X 62	X 57	X 56	X 56	X 56		
14	X 54	X 48	X 49	X 58	Y	R	A	A	X 69	X 70	X 72	X 72	X 73	X 71	X 69	X 65	Y	X	X	X 64	X 62	X 66	X 61	X 60	X 63	X 58	
15	X 57	X 58	X 59	X 67	X 71	X 78	X 76	X 71	X 77	X 76	X 78	X 80	X 72	R	X 74	X 67	X 67	X 64	X 64	X 61	X 64	X 63	X 52	X	B		
16	R 46	X	B	R	R	X 56	Y	Y	Y	R	X 62	B	R	A	X 68	X 67	X 74	X 82	R	X 60	X 58	X 54	X 48	X 42			
17	R	R	X 51	B	R	B	X 56	Y	Y	R	X 62	Y	R	X	R	X 64	X	R	X	X 58	X 59	X 57	X 56	X 50	X R		
18	X 46	X 48	B	B	B	A	X 65	X 68	X 71	X 74	X 75	X 70	B	X	X	R	X 68	X 66	X 65	X 64	X 58	X 57	X 48	X 40			
19	X 44	X 49	X 48	R	X 57	R	B	X	X	X	X	X 81	X 81	X 81	X 76	Y	X 68	R	Y	R	R	X 58	X 57	X 54	X 55		
20	X 57	X 50	X 52	B	A	X 47	B	R	R	X 68	X 70	X 71	R	R	R	X 66	X 64	X 64	X 65	R	X 63	X 48	X 45	X 43			
21	X 45	X 51	X 49	X 47	A	A	B	B	B	X 60	X 65	X 69	X 69	X 68	X 70	X 67	X	X	X 56	B	X 52	X 45	R	X 45	X 45		
22	A	R	A	R	X 48	X 52	R	X	X	R	X 64	X 65	R	X 68	X 72	X 73	B	R	X 68	B	R	X 52	B	R	A	A	
23	A	R	X 35	R	B	B	R	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
24	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
25	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
26	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
27	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
28	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
30	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
31	B	B	B	B	B	B	B	B	S	B	B	X 73	X 72	X 72	X 66	X 66	B	X 60	X 58	X 54	X 52	X 52	X 49	X 53			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	15	19	15	9	8	11	9	10	13	12	17	16	14	13	15	18	16	15	15	18	22	22	20	20			
MED	X 52	X 49	X 51	X 56	X 66	X 66	X 76	X 72	X 72	X 74	X 72	X 74	X 72	X 70	X 68	X 66	X 67	X 64	X 62	X 60	X 58	X 56	X 52	X 48			
U Q	X 57	X 53	X 59	X 60	X 69	X 75	X 78	X 80	X 82	X 81	X 82	X 84	X 78	X 73	X 69	X 69	X 70	X 66	X 65	X 64	X 61	X 60	X 56	X 56			
L Q	X 45	X 48	X 49	X 54	X 56	X 56	X 66	X 68	X 69	X 70	X 69	X 70	X 71	X 67	X 66	X 65	X 64	X 60	X 59	X 57	X 56	X 52	X 48	X 46			

JAN. 2012 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JAN. 2012 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	RJ	R	Y	R	R	J	R	J	R	R	J	R	D	R	U	R	R	J	R	J	R	J	R	J	R			
2	48	52				64	74		77	63	81	82	76	68		63	58	56	58	54	54	52	46	50				
3	J	R	J	U	R	A	R	B	B	R	R	B	B	B	B	U	R		R	R		J	R	R	J	R		
4	J	R			R			J	R		J	R	U	R					U	R						R		
5	32	42	43	46	48	56	66	74	77	86	80	83	80	68	62	61	56	52	53	58	61	64	58	56	56			
6	56	52	58		B	F	J	R		C	C	C	C	C	C	C	C	C	C	B	C		51	58	48	42		
7	B				F			R	J	R	J	R	Y		B	U	R		A	J	R		F		R			
8	A	40	52	57	57	69	70	71	72	75	75			U	R	R	R									47		
9		42			R	R	B	B		63	66	66	69	65	63	62	60	59	59	59	56	50	46	42	47			
10	45	45			R	R	R	B	Y	A	R	B		R	J	R	J	R	J	R	J	R	J	R	J	R		
11	B				B	R	R	B	B	Y	Y	Y		B		53					J	R				R		
12	46	42	F	52	58	60		R	R		64	68	76	80	65	61	61		B							42		
13	41	43	45		B	A	R	R	B		R	R	58	Y	Y	R	Y	R	J	R	J	R	U	R	R	R		
14	37	41	42	50				61	62	57	64	66	64	64	61	60	59	66	61		B	R				40		
15	A	R	F		B	R	Y	Y	J	R	B	R	66	J	R	R	A	A		Y					J	R		
16	48	42	J	R	J	R	Y	R	A	A		63	64	66	66	67	65	63	59		Y	J	R			50		
17	51	52	53	57	65	72	65	65	67	70	68	F	J	R	R		68	61	61	58	58	55	58	57	46	B		
18	R		B	R	R		Y	Y	Y	R		B	R	A	R		62	61	68	76		54	52	48	42	36		
19	A		R	B	R	B	U	R	Y	Y	R	J	R	Y	R	Y			J	R	R	U	R			R		
20	40	42			B	A	F			55	62	65	68	68	64		54	57									R	
21	R	38	43	42	R	51	R	B		66	75	J	R	J	R	J	R	U	R	Y	R	R	Y	R	R	R	R	
22	51	44	41		F	A	R	B	R		62	64	65				60	58	58	59							R	
23	R	39	45	43	41		A	A	B	B	B	U	R	R		59	63	63	62	64	61		B	J	R	B	U	R
24	A		R	A	R		U	R	R	J	R	R	J	R	R	J	R	R	R		B	R	R	R	R	R	R	R
25	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
26	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
27	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
28	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
30	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
31	B	B	B	B	B	B	B	B	B	S	B	B																
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	15	19	15	9	8	11	9	10	13	13	17	16	14	13	15	18	16	16	15	18	22	22	20	20				
MED	46	43	43	50	58	60	66	66	66	68	66	68	66	64	62	60	61	58	56	54	52	50	46	42				
U Q	51	47	53	54	61	65	J	R	J	R	J	R	R	R	R	R	R	R	R	R	55	54	50	50				
L Q	R	39	42	42	48	50	50	58	62	63	64	63	64	65	61	60	59	58	54	53	51	50	46	42	39			

JAN. 2012 foF2 (0.1MHz)

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IONOSPHERIC DATA STATION SHOWA-ST.

JAN. 2012 ftEs (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	33	26 ^G	49	36	30	18 ^G	42	38	22	27 ^G			35	25 ^G	32	32	32	28	28	26	33	24	29
2	36	32	36	35	33	32	41	40	35	39	46	40	45	37	25 ^G	23 ^G	28	40	38	44	38	41		20
3	20	25	25 ^G	65	24 ^G				42							55 ^B	31					27	30	23
4	34	28	34	40	36	29		24 ^G	28	28	27		27	37	34	34	23 ^G	27	34 ^E	34 ^B	30	38	41	34 ^G
5	26	29	38		37	32	31														24 ^E	28		
6		29	37	35	30		30	30	28	27	25			38	38	44	46	82	35	48	37	32	34	33
7	50	40	83		39	37			29	35		33		30			17	20	40	33	26	22	35	36
8	38	44	37	40			43	22 ^G	101	36		34				34		20	30	28	38	40	22	29
9		40	31 ^K	36		41	42								33	21			30	30	28	33		37
10	70	34	26	32	35	37	38	39	38	22	22	38		46	35 ^E	41 ^B		39			58	33	39	28
11	34	38	38		78	42	40		38	36	26			33	19	30	39	23	22	27	31	21	29	25
12	25	33	21 ^G	28		38	39	30	22	24	23	23		36	34	33				36	29	23	22	22
13	58	70	42	71		36	25	33	17		36			27	72	102	37	32		33	35	35	40	40
14	30	33	27	33	28	36	56	41	38	40	34	24	36	58	37	36	30	24		34	35	50	22	37
15	38	36	26	28	70	28	41	35	33	38	36	36	37	41	45	42	42	48	35	32	34		27	
16	28	57		38	38	32	23	24	35	22			42	64	48	48	44		36	43	34	40	56	71
17	36	42	36		39		31	25		26	22	29	27		36	32	31	40	43	25	36	31		37
18	29	35			44	32	18	31		28					37	34	29	28	18	27	23		20	28
19	34 ^K	32 ^K	40	42	34	36		33		22	39	34	34		28	37		35	35	25	28			
20	20 ^E	30	31		41	42		35	36					38	33		35	35	36	29	24	28		
21		30		42	51					31						44	47				26	29	32	32
22	43 ^K	27 ^G	42	39	25	18	25	27	32	32	35		28		22			40	45	36		69	41	102
23	59	34 ^K	20 ^E	36 ^K			32 ^K																	
24																								
25																								
26																								
27																								
28																								
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	21	23	21	17	17	19	18	18	19	19	19	20	18	19	21	23	19	20	19	20	22	23	23	22
MED	34	33	34	36	36	36	32	29	33					35	33	33	31	32	34	30	31	31	24	28
U Q	40	40	38	41	40	41	41	35	38	36	35	34	34	38	37	44	42	40	36	35	36	40	34	37
L Q	27	30		32	32	30	25	25		24	26						30		28	27	26	23		22

JAN. 2012 ftEs (0.1MHz)

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IONOSPHERIC DATA STATION SHOWA-ST.

JAN. 2012 fmin (0.1MHz) 45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	13	13	23	16	14	16	14	13	17	18	16	23	18	20	20	18	14	18	14	14	13	12	12	13	
2	12	19	26	18	13	12	13	13	12	13	17	14	13	16	16	14	13	14	14	14	13	13	14	12	
3	13	13	19	14	19	B	B	19	25	B	23	B	B	B	B	55	20	19	18	20	20	16	14	14	
4	13	12	14	20	16	12	15	12	13	13	18	18	16	15	20	16	17	17	34	30	12	16	13	13	
5	13	14	13	B	15	13	13	13	C	C	C	C	C	C	C	C	C	C	B	C	24	12	16	20	
6	B	13	13	13	12	12	12	18	14	14	15	26	B	26	14	16	18	16	20	12	12	12	13	15	
7	15	14	15	B	20	16	B	B	12	13	15	13	15	12	19	19	15	16	19	16	16	12	13	12	
8	12	15	21	22	B	B	19	20	22	24	B	22	21	23	16	14	17	14	16	14	13	19	14	13	
9	B	18	24	23	B	16	16	B	B	18	20	22	B	B	20	18	B	B	30	21	12	20	15	13	
10	14	12	13	13	12	13	24	14	13	15	19	25	19	17	35	41	B	19	B	B	18	13	14	11	
11	13	13	13	B	23	18	21	B	24	13	14	19	14	18	13	17	14	16	13	13	14	14	13	12	
12	12	15	13	14	B	20	39	13	14	12	17	14	24	20	20	19	18	25	B	B	36	18	18	13	13
13	16	14	14	14	B	18	21	14	12	B	36	20	21	20	30	24	19	29	B	24	25	20	12	12	
14	12	15	15	17	23	17	19	17	14	12	13	17	18	18	16	19	20	16	15	14	15	15	12	13	
15	13	12	12	13	14	13	12	15	16	15	14	13	14	15	16	13	13	14	14	15	16	13	13	B	
16	12	26	B	17	12	13	18	16	28	19	19	B	18	20	21	16	20	21	13	15	13	13	13	14	
17	23	25	20	B	28	B	14	18	22	19	18	17	20	23	22	24	19	20	15	13	16	12	13	17	
18	13	14	B	B	B	14	14	14	14	14	16	22	B	23	18	20	23	19	12	12	12	16	15	12	
19	12	23	15	18	18	21	B	33	14	18	39	23	18	14	24	18	20	19	23	20	20	17	18	14	
20	20	14	14	B	18	18	B	18	20	16	22	23	22	18	17	20	20	18	18	29	19	28	21	23	
21	18	19	23	20	26	20	B	B	B	29	24	29	24	19	22	17	47	B	23	B	23	20	20	17	
22	18	24	19	21	17	16	18	16	13	16	20	20	17	B	16	17	B	16	17	16	B	21	24	28	
23	23	23	20	30	B	B	26	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
24	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
25	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
26	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
27	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	55	56	B	B	B	B	B	B	B	
28	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
30	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
31	B	B	B	B	B	B	B	B	S	B	B	20	20	17	24	22	B	30	18	18	34	31	22	19	
	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	29	30	30	30	30	30	30	30	30	30	31	30	31	31	31	31	
MED	16	18	20	23	26	18	24	19	22	18	21	23	22	22	22	20	20	20	23	20	19	18	15	15	
U Q	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
L Q	13	14	14	17	16	14	15	14	14	14	17	19	18	18	17	17	18	16	15	14	13	13	13	13	

JAN. 2012 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JAN. 2012 h'F (KM)

45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	Q 262	A 236	Y	A	A 268	A 214	A 214		Y	Y	Y E Y	Y 218	192	196	202	196	192	214	198	206	214	218	234	194		
2	242	A	A	A	A 268	A 250	220	202	210		A	A	202	194	Y	194	196	194	A 250	A 278	A	234	220	220	242	
3	A E A	A 222	226	A	A	B	B	A	A	B	R	B	B	B	B	B	A	218	200	212	212	216	238	238	222	
4	E A 252	A 248	A 238	A	A	262	230	200	200	200	198	Y	196	196	204	204	194	200	E 234	B 214	A 214	A 250	A 226	A 230	Q	
5	Q 234	214	192	B	A	206	224	204	C	C	C	C	C	C	C	C	C	C	B	C		194	236	250	A	
6	B	A	234	224	242	232	206	212	192	196	224	E Y	Y	B	Y	206	A	A	A 238	A 228	218	218	240	A	A	
7	A E A	A 228	A	B	A	A	B	B	208	208	202	214	210	194	Y	198	198	206	E 248	A 222	A	210	244	258	232	
8	A E A	A 232	250	A	B	B	A	Y	A	R	B	198	Y	Y	198	204	202	206	206	216	210	256	236	A	A	
9	B	A	196	A	B	A	A	B	B	Y	Y E Y	Y 232	B	B	208	208	B	B	218	218	194	194	220	222	A	
10	A	A E A	A 264	A	A	A 226	A	A	222	196	Y	202	Y	A E B	B 206	B	B E A	A 244	B	B	A	A	A	A	222	
11	A E A	A 252	A	B	A	A	A	B	A	A	Y	Y	Y	204	210	210	204	200	210	210	210	226	232	268	Q	
12	200	A	A	A	B	R	B	210	194	200	200	Y	216	Y	216	Y	224	Y	B E B	B 248	220	220	246	234	Q	
13	A	204	232	232	B	A	Y	198	198	212	Y	200	212	A	A	Y	Y	B	A	A	A	244	232	212		
14	236	A	A	A	Y	A	A	A	A	A	Y	Y	Y	A	A	216	198	Y	228	210	226	226	264	226	232	B
15	238	E A 272	212	232	A	214	214	200	188	212	214	214	214	A	A	202	192	A	198	210	210	234	212			
16	A E A	A 264	B	A	A E A	A 268	Y	Y	A	208	200	B	A	A	A	A E A	A 248	214	A	A	202	218	294	202	A	
17	A	A	A	B	A	B E A	Y	Y	200	192	Y	Y	A	Y	218	Y	202	196	E 256	A 218	234	A	208	A		
18	A	226	B	B	B	A	240	228	200	210	210	E Y	Y	B	Y	A	A	200	200	200	200	210	232	238	262	
19	240	A	A	A	A	A	B E B	B 252	212	198	B	214	Y	Y	208	202	Y E A	A 248	A E Y	A 284	238	238	242	234	Q	
20	E B 258	A 250	A	B	A	A	B	A	250	220	E Y 216	198	220	A	198	208	218	222	A	228	220	280	236	A	A	
21	A	A	A	Y	A	A	B	B	B	Y	208	E A E Y	250	220	Y	A	B	B	A	B	A	242	238	A	A	
22	A	A	A	A	A E A	A 244	216	232	Y	222	222	Y	208	B	230	230	B	A	A	A	B	A	A	A	A	
23	A	A	B	A	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
24	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
25	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
26	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
27	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B E B	B 312	B	B	B	B	B	B	B	
28	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
30	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
31	B	B	B	B	B	B	B	B	S	B	B	Y	Y	198	204	200	B	A	206	228	250	238	238	246		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	10	12	8	3	2	9	9	10	11	13	12	9	10	7	15	13	14	13	15	17	20	20	20	15		
MED	237	E A 242	A 212	A 232	255	235	218	209	200	200	204	208	206	198	206	202	200	203	206	216	214	230	232	232		
U Q	E 252	E A 251	E A 236	A 232		A 265	235	228	212	215	214	E Y 216	216	212	216	208	218	225	E A 238	E A 228	A 230	A 244	A 241	A 242		
L Q	234	224	204	224		220	214	202	198	197	200	200	196	196	202	198	194	200	206	211	210	220	226	222		

JAN. 2012 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2012 f_{XI} (0.1MHz)

45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	X 57	X 58	X 51	B	B	B	R		74	73	87	84	88	90	86	80	78	B	B	B	B	O	X	X	X	O	X
2	X 63	X 64	X 48	X 52	O	X 53	B	R	R	R	B		77	81	81	75	72	72	69	65	68	65	58	60	60	60	X
3	X 55	X 48	R	B	B	B	R	X	X	X	B	X	O	X	B	O	X	X	X	X	O	X	X	O	X	X	X
4	43	X 46	X 45	R	B	B	R	B	Y	B	R	B	B	O	X	X	66	65	67	X	O	X	O	X	O	X	A
5	B	B	A	B	R	B	R	B	B	O	X	B	B	B	B	R	B	B	C	X	R	57	X	O	X	X	R
6	R	O	X	X	O	X	X	R	B	B	B	O	X	X	O	X	X	X	X	X	X	X	O	X	X	A	A
7	A	O	X	39	47	42	55	B	B	B	B	Y	Y	Y	B	B	B	O	X	B	O	X	O	X	R	X	A
8	B	R	R	O	X	X	R	R	Y	R	Y	B	B	B	B	B	B	O	X	B	B	X	X	X	X	X	A
9	43	R	R	B	B	O	X	X	X	O	X	O	X	O	X	O	X	O	X	R	O	X	O	X	B	R	R
10	R	O	X	46	40	A	R	O	X	X	X	X	B	O	X	O	X	O	X	X	X	X	X	X	X	X	X
11	59	R	B	O	X	B	R	R	X	X	X	X	B	O	X	X	X	X	X	X	X	X	X	X	X	X	X
12	O	X	O	X	B	A	O	X	X	R	X	X	O	X	O	X	X	X	X	X	X	X	X	X	X	X	X
13	R	X	X	O	X	O	X	O	X	O	X	O	X	B	O	X	X	X	X	B	X	R	R	O	X	R	R
14	R	O	X	44	40	R	B	O	X	R	O	X	Y	R	B	X	B	B	X	X	X	O	X	O	X	A	A
15	A	X	36	61	B	B	R	40	B	B	B	B	B	B	B	B	B	B	B	B	R	A	A	R	54	X	
16	A	X	42	B	R	R	R	57	X	54	R	O	X	R	B	B	B	R	X	X	X	X	X	X	C	X	X
17	X	45	47	50	50	55	62	68	69	79	79	X	O	X	O	X	B	O	X	O	X	X	X	O	X	O	X
18	X	53	57	O	X	X	X	O	X	O	X	O	X	B	B	B	X	X	X	X	X	X	X	O	X	X	X
19	57	53	B	B	R	R	Y	R	R	R	B	B	B	B	B	X	X	66	62	B	X	X	O	X	X	X	R
20	A	A	A	B	R	B	B	B	B	R	O	X	B	B	B	B	B	O	X	X	O	X	X	O	X	X	R
21	R	A	R	B	B	B	B	B	R	X	57	B	B	B	B	B	B	R	O	X	O	X	X	X	X	O	X
22	39	X	30	A	A	R	B	B	B	B	R	B	X	R	B	B	O	X	O	X	O	X	X	X	X	X	X
23	X	33	42	52	41	X	X	X	X	X	X	O	X	X	B	O	X	O	X	X	X	X	X	O	X	X	X
24	31	A	A	A	O	X	O	X	B	B	C	X	X	X	X	O	X	X	O	X	X	X	O	X	X	X	X
25	47	47	44	57	47	66	73	71	74	77	80	81	81	73	84	83	89	85	73	64	55	X	X	B	B	X	
26	39	X	37	B	A	B	B	B	B	B	B	O	X	O	X	X	X	O	X	O	X	B	B	B	B	X	B
27	R	R	O	X	B	B	B	B	O	X	X	X	O	X	X	X	X	X	X	R	B	X	X	O	X	X	B
28	X	34	R	R	A	R	R	O	X	O	X	X	X	R	B	B	B	R	R	X	X	O	X	O	X	X	X
29	A	A	A	A	R	R	R	B	R	Y	R	R	B	B	R	B	O	X	O	X	O	X	X	O	X	O	X
30																											
31																											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	16	19	15	11	10	9	11	13	13	16	13	14	13	16	19	19	22	26	21	23	26	21	23	17			
MED	44	44	45	48	48	49	60	70	73	74	75	74	78	76	73	72	68	66	57	55	52	49	48	44			
U Q	56	48	51	53	55	64	70	72	77	78	78	78	81	81	83	78	74	69	66	61	56	54	52	52			
L Q	X	X			X	X		X	X	X	X	X	O	X	X	X	X	X	X	O	X	X	X	X	X	X	
	36	37	41	42	46	46	57	67	68	68	72	71	71	74	66	67	64	58	54	50	48	45	38	36			

FEB. 2012 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2012 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	51	52	UR 45	B	B	B	R	F 61	67	81	UR 78	UR 82	UR 84	UR 80	JR 74	72	B	B	B	B	52	52	51	R 57	
2	57	58	42	46	UR 47	B	R	R	R	B	F 65	75	JR 75	69	66	66	63	59	62	59	52	54	54	55	
3	49	42	R	B	B	B	R		60	61	67	B	62	61	B	60	66	66	64	64	52	49	49	46	41
4	F 33	40	39	A	B	B	R	B	Y	B	R	B	B	B	60	59	61	60	52	UR 48	40	40	41	37	A
5	B	B	A	B	R	B	R	B	B	B	B	B	B	B	B	R	B	B	CJ 51	R	R	42	42	42	A
6	R	R 36	39	42	42	R	B	B	B	B	68	68	68	63	UR 62	58	52	JR 52	55	51	45	R 30	A	A	A
7	A	33	F 34	F 32	38	B	B	B	B	Y	R	R	Y	Y	B	B	B	B	60	B	44	48	R	42	A
8	B	R	R	33	38	R	R	Y	A	Y	B	B	B	B	B	B	B	B	41	B	B	42	38	24	A
9	F 35	R	R	B	B	R	54	62	62	67	68	69	64	R 64	R 62	66	61	56	UR 56	R	56	45	B	R	A
10	R	R 40	F 20	A	R	JR 38	51	64	69	64	B	UR 65	72	UR 74	66	UR 61	60	60	57	JR 52	52	46	28	F 65	
11	R	R	B	R 47	B	R	R	65	68	68	70	B	78	JR 74	JR 72	67	67	61	60	56	UR 49	52	45	42	
12	22	F 21	36	F 36	B	A	R	F 60	81	R	69	65	68	UR 70	JR 73	JR 71	64	60	60	JR 60	58	52	51	JR 50	F 32
13	R	25	35	UR 38	F 34	32	60	F 72	76	80	80	B	B	R 96	R 89	88	76	61	F 47	JR 47	R	A	R	A	
14	R	38	F 23	A	B	B	R	A	Y	A	B	B	B	B	JR 55	JR 54	JR 53	JR 53	48	36	R	A	A	A	A
15	A	30	A	B	B	R	F 31	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A	A	A
16	A	R 36	B	R	R	R	32	R	48	R	R	R	R	B	B	B	R	42	46	46	45	42	44	C	36
17	39	F 35	38	F 40	49	56	62	JR 63	73	73	B	B	UR 70	R 68	R 71	B	58	55	52	49	R 47	47	45	44	44
18	47	F 47	57	57	65	62	R 64	R 69	B	R	B	B	B	JR 76	JR 82	UR 75	65	63	57	JR 55	R	50	47	46	40
19	R	F 32	B	B	A	A	Y	R	R	A	B	B	B	B	60	56	B	JR 52	47	46	R	40	34	F 20	A
20	A	A	A	B	R	B	B	B	B	R	UR 51	B	B	B	B	B	R	68	52	UR 40	39	38	28	R	R
21	A	A	R	B	B	B	B	B	R	JR 51	B	B	B	B	B	B	R	49	48	46	42	37	32	F 30	
22	F 27	24	A	A	R	B	B	B	B	B	R	B	B	B	B	61	61	60	50	50	42	40	26	F 27	
23	27	F 32	39	F 30	40	44	57	64	65	67	69	68	B	69	67	65	59	60	54	50	45	40	37	F 29	
24	F 20	A	A	A	R	B	B	B	CJ 58	JR 59	F 67	JR 74	JR 81	JR 82	R 80	R 75	64	62	52	UR 46	35	35	38	B	
25	F 30	F 31	F 30	F 40	F 37	F 56	67	65	68	71	74	75	75	67	78	77	83	79	67	58	49	B	B	27	
26	F 28	31	B	A	B	B	B	B	B	B	B	B	66	66	69	77	72	72	67	B	B	43	UR 34	B	
27	R	R	31	B	B	B	B	B	R	66	68	71	72	UR 72	72	67	66	68	70	R	B	59	28	B	
28	28	R	R	A	R	R	R	R	43	51	59	61	R	B	B	B	R	JR 50	51	48	43	41	45	42	26
29	A	A	A	A	R	R	R	B	R	Y	R	R	B	B	R	B	UR 47	45	41	41	R	JR 40	40	33	20
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	14	19	14	11	10	9	11	13	13	16	13	14	13	16	19	19	22	26	21	23	25	21	22	16	
MED	32	35	37	40	41	43	54	63	67	68	69	68	72	R 70	R 67	R 66	62	60	51	49	45	43	40	37	
U Q	47	40	39	46	47	56	62	65	71	72	72	72	75	R 75	R 77	72	68	61	60	55	50	48	45	43	
L Q	27	31	F 31	F 33	F 38	38	43	60	62	62	62	65	65	68	60	61	58	52	48	44	42	39	32	28	

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2012 ftEs (0.1MHz) 45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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 B	E B	K	B	B	B	42	34	E B	E B	E B	E B	E B	E B	E B	34	B	B	B	B	58	E B	E B	E B
2	K	30	29	24	E B	B	28	40	45	B	34	36	36	36	34	35	E B	E B	E B	E B	27	E B	E B	E B
3	29	30	40	B	B	B	40	35	35	E B	E B	E B	50	38	35	35	34	E B	E B	E B	G	27	32	27
4	22	32	32	39	B	B	33	B	G	B	G	B	E B	E B	E B	E B	E B	E B	E B	E B	39	29	32	32
5	B	B	37	B	B	B	38	B	B	38	B	B	B	B	33	B	B	C	G	G	27	E B	24	24
6	35	K	K	K	32	G	B	B	B	G	G	27	24	G	32	G	30	30	26	22	26	42	K	K
7	42	41	39	40	40	B	B	B	B	G	G	G	G	G	B	B	B	E B	E B	B	E B	31	37	70
8	B	26	35	K	24	38	35	24	48	G	G	B	B	B	B	B	B	B	20	B	E B	23	22	25
9	K	K	K	B	B	32	G	G	G	G	G	30	29	G	E B	E B	E B	E B	E B	E B	25	23	B	39
10	G	33	36	40	40	36	38	28	18	25	B	E B	E B	32	36	33	27	37	71	33	44	24	16	K
11	38	34	70	41	B	32	34	28	29	20	20	B	33	G	41	38	40	65	34	24	21	15	28	32
12	30	32	47	26	B	60	39	29	34	E B	G	34	40	40	34	31	G	G	G	23	20	20	21	34
13	40	34	36	42	30	36	34	28	22	30	E B	B	E B	E B	58	32	25	24	G	B	28	38	43	48
14	33	38	30	35	B	31	42	41	22	42	E B	E B	B	B	32	29	30	E B	G	E B	32	102	42	52
15	92	45	70	B	B	28	54	B	B	B	B	B	B	B	B	B	B	B	B	B	40	70	82	43
16	76	41	B	34	40	27	31	38	G	G	G	31	B	B	E B	E B	32	27	20	26	32	32	22	C
17	20	32	26	30	K	20	23	G	22	56	B	E B	E B	37	33	23	G	B	30	37	24	39	E B	E B
18	36	25	16	E B	E B	E B	E B	E B	B	G	B	B	E B	E B	51	31	24	30	22	28	G	24	41	15
19	34	40	B	B	41	40	G	47	39	46	B	B	B	E B	E B	40	G	B	G	E B	23	16	32	30
20	43	65	58	B	B	B	B	B	B	E B	B	B	B	B	B	B	E B	E B	E B	E B	33	37	28	21
21	41	40	K	B	B	B	B	B	38	33	B	B	B	B	B	B	B	G	G	G	E B	E B	E B	E B
22	22	33	34	41	38	B	B	B	B	43	B	E B	E B	B	B	E B	E B	E B	E B	E B	24	20	32	30
23	33	33	33	32	32	22	21	28	25	28	28	34	B	E B	49	33	34	33	25	16	21	G	E B	E B
24	22	42	40	47	38	40	B	B	C	34	34	G	33	33	E B	56	47	59	62	23	21	23	17	E B
25	28	33	34	K	E B	E B	G	E B	E B	E B	B	37	33	41	57	34	E B	E B	E B	E B	E B	E B	E B	E B
26	E B	16	27	70	40	B	B	B	B	B	B	E B	E B	E B	E B	56	55	54	31	55	56	54	B	B
27	K	28	K	E B	B	B	B	B	E B	E B	B	G	G	G	E B	56	G	G	34	34	B	40	B	B
28	K	25	29	K	64	37	A	G	19	25	26	36	G	B	B	B	G	G	E B	E B	E B	E B	E B	E B
29	32	41	40	41	32	34	G	B	38	G	G	E B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	28	27	20	18	17	21	17	20	25	17	17	15	17	22	21	23	26	23	25	28	26	27	27
MED	32	33	35	38	32	32	32	28	E G	E G	G	E G	E G	E G	33	U	U	30	E G	E G	G	25	24	26
U Q	38	40	40	41	38	38	40	36	38	48	33	37	40	55	35	36	55	38	34	32	34	32	34	40
L Q	25	30	29	32	30	24	G	G	G	G	G	G	G	G	G	G	G	G	G	G	23	E B	E B	E B

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2012 fmin (0.1MHz) 45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	19	23	18	B	B	B	20	24	55	57	56	54	55	56	34	20	B	B	B	B	29	31	24	16	
2	14	12	20	21	19	B	24	24	20	B	19	21	19	18	14	20	54	32	50	42	21	22	19	15	
3	12	13	17	B	B	B	19	16	14	50	B	50	23	B	15	16	17	57	50	23	14	18	15	12	
4	12	12	13	23	B	B	23	B	13	B	22	B	B	56	36	33	55	28	16	12	13	12	13	13	
5	B	B	14	B	B	B	24	B	B	20	B	B	B	B	24	B	B	C	B	20	22	18	24	14	20
6	23	20	12	15	13	29	B	B	B	18	14	16	20	19	24	20	19	18	14	14	19	16	23	13	
7	13	13	13	14	22	B	B	B	B	17	21	17	19	20	B	B	B	B	47	B	13	35	23	15	13
8	B	15	14	15	13	20	20	19	19	19	B	B	B	B	B	B	B	B	16	B	B	23	13	13	12
9	14	16	20	B	B	22	22	14	13	14	14	27	20	19	20	51	55	30	30	14	12	B	17	14	
10	20	15	12	20	17	15	15	13	14	14	B	22	32	16	17	14	15	14	12	14	13	13	12	13	
11	14	28	64	16	B	18	19	13	16	13	16	B	28	32	16	16	14	16	14	15	19	13	12	12	
12	11	12	13	12	B	20	12	14	20	56	22	15	32	18	19	18	14	12	12	18	12	12	13	12	
13	12	12	12	21	18	16	15	11	15	14	32	B	B	58	19	14	16	20	B	24	18	18	16	13	
14	20	12	13	23	B	20	20	16	18	24	B	38	B	B	22	13	18	28	15	12	32	27	20	14	
15	16	14	16	B	B	18	16	B	B	B	B	B	B	B	B	B	B	B	B	B	21	20	37	20	13
16	19	14	B	23	24	13	13	18	15	15	13	18	B	B	B	32	18	17	14	16	15	13	C	11	
17	12	12	13	12	13	15	14	15	17	56	B	B	38	29	20	B	19	13	13	18	24	22	19	14	
18	14	11	13	19	30	36	56	28	B	29	B	B	B	51	14	21	30	17	18	13	13	12	13	12	
19	13	12	B	B	16	13	23	23	21	16	B	B	B	B	40	16	B	16	14	23	13	13	12	12	
20	13	13	17	B	23	B	B	B	B	25	30	B	B	B	B	B	55	18	30	12	13	13	12	14	
21	13	14	20	B	B	B	B	B	18	23	B	B	B	B	B	B	22	22	16	19	20	14	12	12	
22	11	12	20	20	20	B	B	B	B	18	B	20	35	B	B	34	31	37	30	24	13	12	12	12	
23	12	12	12	14	14	13	12	12	12	12	18	19	B	49	29	28	27	22	15	14	11	14	12	12	
24	11	15	13	13	16	15	B	B	C	14	14	21	14	24	56	24	22	19	19	12	18	17	17	15	
25	12	12	11	13	13	18	15	29	31	56	20	21	30	57	23	36	56	30	30	27	26	B	B	19	
26	16	15	40	20	B	B	B	B	B	B	B	56	55	54	19	55	56	54	B	B	30	20	B	B	
27	21	24	26	B	B	B	B	B	58	55	20	20	14	24	56	22	14	20	29	B	23	14	B	B	
28	18	13	18	13	21	16	17	14	14	14	18	B	B	B	19	19	20	15	25	20	15	13	13	12	
29	11	12	19	16	23	24	29	B	27	25	15	30	B	B	35	B	33	38	36	23	19	14	28	12	
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	29	29	29	29	29	29	29	29	28	29	29	29	29	29	29	29	29	28	29	29	29	29	28	29	
MED	14	13	16	20	23	22	22	24	20	23	30	50	55	56	24	28	30	21	25	19	18	16	14	13	
U Q	19	15	20	B	B	B	B	B	B	56	B	B	B	B	B	B	B	34	50	24	23	26	20	14	
L Q	12	12	13	14	16	16	16	14	15	14	18	20	26	24	19	18	18	16	14	14	13	13	12	12	

FEB. 2012 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2012 h'F (KM)

45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4' S LON. 039°35.4' E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	246	252	E Y 256	B	B	B	A E A 254	A	B E B 286	B	B	B	B	B	224	216	B	B	B	B	244	244	E B 244	236
2	268	286	298	266	A	B	A	A	A	B	200	200	202	198	202	Y	B	E	B E B 276	252	216	236	236	236
3	242	270	Q A	B	B	B	A	A	A	B	B	B	210	B	212	212	E A 256	B	B E A 228	A	240	242	A E A 236	250
4	256	224	234	A	B	B	A	B	Y	B	A	B	B	B	228	222	B	216	A	A E A 238	238	A	A	258
5	B	B	A	B	A	B	A	B	B	A	B	B	B	B	210	B	B	C		A	232	220	A	A
6	A	A	216	A	A	A	B	B	B	208	198	210	206	212	222	210	196	208	216	192	E A 262	A	A	A
7	A	A	202	210	A	B	B	B	B	Y E Y 266	200	B	B	Y	Y	B	B	B	B	258	E B 254	A	224	A
8	B	A	A	224	A	A	A	Y	A	Y	B	B	B	B	B	B	B E A 224	B	B	B	228	200	A	A
9	A	A	A	B	B	A E A 270	A	196	Y	198	Y	202	196	220	210	B	B	212	228	230	E A 218	B	A	A
10	A	196	196	A	A	A	250	238	210	196	B	Y	210	Y	204	180	H E A 220	A	A	212	242	226	226	242
11	206	A	B	A	B	A	A	208	212	196	202	B	216	Y	236	202	E A 220	192	224	224	230	220	224	224
12	196	A	A E A 334	B	A	A	196	226	A	B	212	210	E A 248	Y	A	194	198	194	216	222	222	222	252	A
13	A	A E A 224	A	196	A	A	250	222	222	198	206	B	B	B	Y	198	198	206	B	A	A	A	A	A
14	A	208	238	A	B	A	A	A	Y	A	B E B 272	B	B	B	216	210	208	212	230	Y	186	A	A	A
15	A	A	A	B	B	A	206	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A	A
16	A E A 258	B	A	A	210	E A 248	A E A 260	214	198	222	B	B	B	B	222	200	206	202	222	228	230	C	236	
17	260	268	292	304	306	262	222	222	206	B	B	B	226	226	206	B	206	210	210	E A E A 240	254	234	232	252
18	A	Q 250	Q 258	284	292	E B 306	B	230	B	Y	B	B	B	B	208	202	204	196	202	216	208	214	214	214
19	A	Q 248	B	B	A	A	Y	A	A	A	B	B	B	B	220	A	B	204	210	A E B 238	222	276	Q A	A
20	A	A	A	B	A	B	B	B	B	A	202	B	B	B	B	B	B	200	B	216	206	284	A	A
21	220	A	A	B	B	B	B	B	A	A	B	B	B	B	B	B	212	212	212	228	230	226	232	Q 248
22	E A 268	224	A	A	A	B	B	B	B	A	B	194	E B 236	B	B	E B 224	214	234	234	230	254	254	208	A
23	236	234	A	A	A E A 290	234	218	200	200	E Y 248	206	B	B	Y	218	210	E Y 218	E A 212	218	E A 218	206	212	212	242
24	E A 310	A	A	A	A	B	B	C	200	200	210	198	226	B	A E A 248	A	210	192	220	230	256	262	E B 296	
25	E A 270	A 234	240	A	A E B 266	230	230	218	B	Y	Y	B	B	222	234	272	250	224	214	230	B	B E B 296	B	
26	276	E A 310	B	A	B	B	B	B	B	B	B	B	B	326	Y E B 290	276	254	A	A	B	B	246	238	B
27	A	A E B 246	B	B	B	B	B	B	B	228	202	E Y 236	228	B	230	218	A	A	B	206	Q 200	200	B	
28	A	A	A	A	A	R	Y	232	202	A	202	B	B	B	200	200	206	206	238	B	244	234	228	A
29	A	A	A	A	A	A	A	B	A	Y	216	210	B	B	B	B	B	B	B E B 246	232	226	226	E B 306	A
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	14	14	12	6	3	5	8	12	9	10	13	12	11	7	15	18	19	21	19	21	26	20	18	12
MED	246	242	234	U 260	292	E 266	234	224	211	200	202	206	206	226	212	212	209	208	214	224	225	229	230	242
U Q	268	268	257	304	306	A E 298	250	235	224	214	222	210	236	228	224	222	224	221	230	238	240	243	244	257
L Q	236	224	220	224	196	236	226	213	204	198	200	201	202	212	206	202	204	203	210	217	218	221	224	236

FEB. 2012 h'F (KM)

IONOSPHERIC DATA STATION SHOWA-ST.

MAR. 2012 f_{XI} (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	O X 35	R	R	R	R	B	R	O X 46	B	B	B	B	O X 65	O X 65	B	B	B	B	B	B	O X 39	A	66	B	
2	R	B	B	B	R	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	O X 40	O X 38	A	O X 39	
3	R	R	R	R	B	R	B	B	B	B	B	R	B	B	B	B	B	B	B	O X 46	O X 36	B	B	B	
4	A	A	A	R	Y	A	B	B	B	R	R	B	B	B	B	B	B	B	R	O X 49	R	A	A	B	
5	B	R	O X 46	O X 39	B	B	B	B	B	B	B	B	B	B	B	B	B	B	O X 59	B	B	B	B	A	
6	B	B	R	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	O X 36	Y	B	
7	B	B	B	R	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
8	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
9	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
10	B	B	R	R	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R	R	
11	B	B	O X 50	O X 40	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	C	C	C	C	
12	C	C	C	C	C	C	C	C	C	B	B	B	B	B	B	B	B	B	B	B	B	B	R	R	A
13	A	R	R	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	O X 43	B	B	B	
14	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R	
15	B	B	B	R	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	31	A	31
16	B	B	A	B	B	B	R	B	B	B	B	B	B	B	B	B	B	O X 51	O X 46	R	A	R	A	B	
17	B	B	B	B	B	R	R	B	B	B	B	B	B	B	B	B	B	O X 46	B	B	B	R	53	B	
18	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	O X 50	B	B	R	B	R	
19	R	R	A	R	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	O X 48	42	25	R	A	
20	B	B	R	B	R	R	R	R	B	B	R	R	R	O X 80	X 78	X 73	X	X	B	O X 49	43	35	X	R	
21	R	R	B	A	R	O X 36	O X 40	O X 47	R	O X 58	O X 66	O X 68	O X 74	O X 79	O X 81	O X 80	O X 70	O X 63	O X 61	O X 48	52	40	R	70	
22	R	R	R	X	30	32	33	A	B	R	B	O X 59	O X 64	O X 73	O X 74	O X 71	O X 76	O X 71	O X 64	O X 62	O X 50	O X 42	O X 36	O X 32	
23	X 64	R	A	65	56	R	O X 49	O X 58	O X 66	O X 66	O X 70	O X 71	O X 83	O X 86	O X 83	O X 74	O X 63	O X 63	O X 48	O X 46	O X 34	O X 23	O X	B	
24	O X 27	A	A	A	A	A	53	O X 50	O X 51	B	B	B	O X 76	O X 72	O X 71	O X 71	O X 63	O X 60	O X 53	O X 24	O X 32	A	A	A	
25	A	A	A	B	B	R	44	O X 49	O X 57	R	O X 58	O X 68	O X 68	O X 71	O X 77	O X 72	O X 72	B	O X 54	O X 44	O X 38	O X 36	O X 33		
26	O X 29	X 28	O X 28	O X 27	X 32	X 34	R	O X 47	O X 64	O X 69	O X 74	O X 84	O X 89	O X 89	O X 91	O X 88	O X 87	O X 74	O X 72	O X 66	O X 47	O X 42	O X 36	O X 33	
27	X 30	X 26	A	A	A	A	B	B	A	R	B	O X 67	O X 74	O X 73	O X 88	O X 82	O X 105	O X 104	O X 58	O X 56	O X	R	A	A	
28	70	70	A	A	A	B	B	B	B	R	B	B	B	B	B	B	O X 55	O X 42	B	B	R	R	R	R	
29	R	Y	A	R	Y	O X 26	O X 36	O X 40	O X 46	O X 58	O X 65	O X 69	O X 73	O X 73	O X 70	O X 71	O X 68	O X 58	O X 49	O X 46	O X 38	O X 30	O X 28	O X 28	
30	O X 36	A	A	R	R	B	B	R	B	O X 56	O X 65	O X 70	O X 80	O X 90	O X 87	O X 83	O X 73	O X 68	O X 57	O X 51	O X 47	O X 38	O X 30	O X 24	
31	O X 24	O X 23	X 31	X 31	30	32	A	O X 35	O X 47	O X 64	O X 68	R	O X 80	O X 88	O X 89	O X 93	O X 82	O X 67	O X 58	O X 54	O X 40	O X 37	O X 28	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	8	4	3	6	5	5	4	8	6	6	8	8	10	11	11	11	12	12	12	13	16	14	9	7	
MED	O X 32	X 27	X 31	X 35	32	33	42	O X 47	O X 54	O X 61	O X 66	O X 68	O X 74	O X 76	O X 81	O X 80	O X 72	O X 63	O X 58	O X 49	O X 42	O X 36	O X 32	O X 33	
U Q	50	49	46	50	48	35	48	49	58	66	67	70	80	88	88	83	78	68	62	54	46	38	44	39	
L Q	O X 28	X 24	X 28	X 30	31	29	O X 38	O X 43	O X 47	O X 58	O X 62	O X 68	O X 71	O X 73	O X 72	O X 72	O X 70	O X 54	O X 54	O X 48	O X 40	O X 32	O X 28	O X 28	

IONOSPHERIC DATA STATION SHOWA-ST.

MAR. 2012 foF2 (0.1MHz) 45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4' S LON. 039°35.4' E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	R 29	R	R	R	R	B	R	R	B	B	B	B	R 59	R 59	B	B	B	B	B	B	B	R 33	A	A	B	
2	R	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R 34	R 32	A	R 33	
3	A	A	A	R	B	R	B	B	B	B	B	R	B	B	B	B	B	B	B	B	R 40	R 30	B	B	B	
4	A	A	A	R	Y	A	B	B	B	R	R	B	B	B	B	B	B	B	R U	R 44	R	A	A	B		
5	B	A	R 33	R 33	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R U	R 54	B	B	B	A	
6	B	B	R	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R Y	B		
7	B	B	B	R	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
8	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
9	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
10	B	B	R	R	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A		
11	B	B	R	R 44	F 31	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C	
12	C	C	C	C	C	C	C	C	C	B	B	B	B	B	B	B	B	B	B	B	B	B	R	R	A	
13	A	R	R	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R 37	B	B	B	
14	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R	
15	B	B	B	R	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	F 21	A	F 20	
16	B	B	A	B	B	B	R	B	B	B	B	B	B	B	B	B	B	R	R	R	R	A	R	A	B	
17	B	B	B	B	B	R	R	B	B	B	B	B	B	B	B	B	B	B	R 45	R 40	B	B	R	A	B	
18	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R 44	B	B	A	B	R	
19	A	R	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R	F 42	F 32	F 15	R	A
20	B	B	A	B	A	A	A	R	B	B	R	R	R	B	R J	R 74	R 72	67	B	B	R	F 43	F 34	29	B	R
21	A	A	B	A	A	R	30	34	41	R	R	R	R	J	R 73	J 75	R 74	R 64	57	55	42	F 40	F 27	A	A	
22	A	A	R	F 24	F 22	27	A	B	R	B	53	58	67	68	65	70	65	58	56	44	36	30	26	R	B	
23	58	A	A	F 56	F 40	R	R	R	R	R	61	64	65	77	80	77	68	J 57	R 57	R	42	40	28	17	R	B
24	R 21	A	A	A	A	A	F 42	R 44	R 45	B	B	B	B	R	70	66	65	65	57	54	47	18	26	A	A	
25	A	A	A	B	B	A	F 34	43	51	R J	R 52	R 62	R 62	R	65	71	66	66	B	B	R	48	38	32	30	27
26	R 23	22	22	21	26	24	F 41	58	63	68	78	83	J 83	R 86	J 82	R 81	R 68	66	56	F 41	F 29	F 26	F 24	F	F	
27	24	20	A	A	A	A	B	B	A	R	B	61	68	67	82	J 76	R 95	F 93	F 52	R	A	50	A	A	A	A
28	A	A	A	A	A	B	B	B	B	A	B	B	B	B	B	B	B	R 49	36	B	B	R	A	R	A	A
29	A	Y	A	A	Y	20	30	34	40	52	59	63	R 67	R 67	64	65	62	52	43	40	32	24	22	22	22	
30	R 30	A	A	A	R	B	B	A	B	50	59	64	J 74	R 84	R 81	77	67	62	51	45	41	32	24	18	A	
31	18	R 17	25	F 17	F 18	F 19	A	R	29	41	58	U 62	R 74	J 82	R 83	87	76	60	J 52	R 48	34	31	22	A	A	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	7	3	3	6	5	5	4	8	6	6	8	8	10	11	11	11	12	12	12	13	16	14	7	6		
MED	R 24	20	25	28	26	24	34	41	48	55	60	62	R 68	70	75	74	66	57	53	44	35	29	24	23		
U Q	30	22	33	44	36	28	F 38	R 43	52	60	62	64	J 74	R 82	R 82	77	72	61	56	48	40	31	26	27		
L Q	21	R 17	22	21	F 20	20	32	R 37	41	52	56	62	R 65	67	66	66	64	48	48	42	32	26	22	20		

IONOSPHERIC DATA STATION SHOWA-ST.

MAR. 2012 ftEs (0.1MHz) 45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4' S LON. 039°35.4' E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	26	31	31	15	B	B	28	25	B	B	B	B	B	B	B	B	B	B	B	B	G	41	41	B	
2	20	B	B	B	32	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	G	36	39	40	
3	36	35	35	K	B	K	B	B	B	B	B	B	B	B	B	B	B	B	B	B	G	18	B	B	B	
4	41	41	K	22	G	23	63	B	B	B	33	33	B	B	B	B	B	B	B	B	G	33	71	51	B	
5	B	K	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	K	
6	B	B	37	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	K	
7	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
8	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
9	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
10	B	B	26	29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	34	34	
11	B	B	32	29	26	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C	
12	C	C	C	C	C	C	C	C	C	B	B	B	B	B	B	B	B	B	B	B	B	B	B	K	K	
13	41	27	28	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
14	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	K	
15	B	B	B	K	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	26	
16	B	B	B	34	58	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	57	91	32	58	
17	B	B	52	B	B	28	G	B	B	B	B	B	B	B	B	B	B	B	B	B	B	40	30	90	B	
18	B	B	B	B	B	25	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	18	36	B	
19	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	K	
20	38	32	47	39	41	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	30	16	14	22	35
21	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	K
22	33	33	B	42	41	34	25	22	29	30	27	55	54	51	54	56	30	22	21	18	15	14	35	37	B	
23	62	42	56	35	26	32	38	40	G	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
24	25	30	37	30	38	43	24	24	36	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
25	42	40	70	B	B	33	30	30	25	G	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
26	E	B	B	17	43	30	34	31	28	G	G	29	G	G	G	G	G	G	G	G	G	G	G	G	G	B
27	E	B	15	30	46	55	37	41	B	B	51	36	B	B	B	B	B	B	B	B	B	B	B	B	B	B
28	69	70	56	46	44	B	B	B	B	B	46	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
29	39	25	46	38	18	15	B	17	16	25	G	B	G	B	G	B	G	B	B	B	B	B	B	B	B	B
30	K	36	43	44	36	G	B	B	42	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
31	E	B	B	16	15	E	B	B	B	E	B	29	30	32	E	B	27	23	26	26	E	B	B	B	B	K
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	17	17	21	19	17	13	11	10	9	10	10	11	11	11	11	11	12	12	13	15	20	22	21	18		
MED	36	33	37	34	30	33	30	28	E	G	G	E	B	B	B	B	B	B	B	B	B	B	B	B	B	B
U Q	41	40	46	39	40	38	38	31	36	39	31	46	33	51	40	39	31	28	28	27	28	33	38	40		
L Q	E	B	26	29	20	24	25	24	G	E	B	B	G	G	G	G	E	B	B	B	B	B	B	B	B	B

IONOSPHERIC DATA STATION SHOWA-ST.

MAR. 2012 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	13	13	12	24	12	B	28	13	B	B	B	B	33	18	B	B	B	B	B	B	12	13	28	B
2	16	B	B	B	28	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	14	13	26	12
3	14	15	23	26	B	24	B	B	B	B	B	25	B	B	B	B	B	B	B	16	14	B	B	B
4	18	16	15	14	20	21	B	B	B	25	20	B	B	B	B	B	B	B	28	16	22	20	13	B
5	B	16	29	29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	29	B	B	B	B	12
6	B	B	29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	18	22	B
7	B	B	B	29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
8	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
9	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
10	B	B	18	22	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	21	24
11	B	B	23	23	21	B	B	B	B	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	B	B	B	B	B	B	B	B	B	B	B	B	22	19	19
13	26	19	18	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	20	B	B	B
14	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	20
15	B	B	B	21	24	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	16	16	14	28
16	B	B	17	B	B	B	22	B	B	B	B	B	B	B	B	B	B	30	24	21	13	20	20	B
17	B	B	B	B	B	14	18	B	B	B	B	B	B	B	B	B	B	28	B	B	12	13	B	B
18	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	28	B	12	B	12	12
19	26	22	17	27	24	B	B	B	B	B	B	B	B	B	B	B	B	B	B	30	16	14	12	13
20	B	B	23	B	19	22	19	23	B	B	30	32	29	B	63	34	19	B	B	23	13	13	B	12
21	13	15	B	20	23	14	22	22	29	30	27	55	54	51	54	56	30	22	21	18	15	14	14	12
22	22	16	16	13	12	12	24	B	20	B	31	31	29	35	30	22	24	23	18	16	14	14	15	B
23	13	32	20	18	16	16	15	20	22	56	34	46	31	31	40	30	27	28	38	24	16	16	12	B
24	14	12	13	12	20	15	14	14	36	B	B	B	B	55	29	39	25	25	19	14	13	12	13	12
25	20	19	21	B	B	22	16	30	25	20	28	56	54	55	28	26	50	B	B	27	24	20	16	17
26	17	14	13	12	13	16	21	14	17	23	18	20	20	19	29	27	32	27	20	12	11	14	14	15
27	15	12	18	21	23	19	B	B	15	26	B	33	26	23	15	60	21	26	18	20	15	14	12	12
28	14	14	12	12	14	B	B	B	B	23	B	B	B	B	B	B	24	20	B	B	13	14	12	12
29	20	20	16	17	12	13	12	12	14	25	19	29	20	22	18	20	23	20	15	13	13	13	12	14
30	12	23	14	19	22	B	B	19	B	39	28	20	19	19	29	26	25	27	23	13	16	12	12	12
31	12	12	12	12	12	13	13	15	19	25	24	24	20	29	17	14	16	15	18	14	14	13	18	14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	31	31	31	31	31	31	31	31	31	31	30	30	30	30	30
MED	24	22	20	25	24	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	16	15	18	20
U Q	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
L Q	14	15	16	18	19	16	21	22	29	30	30	33	31	35	30	34	25	27	23	16	14	13	13	12

MAR. 2012 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAR. 2012 h'F (KM)

45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	220	A	R	B	B	226	B	B	B	B	226	198	B	B	B	B	B	B	196	A	A	B	
2	214	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	234	A	224	
3	A	A	A	A	B	A	B	B	B	B	B	A	B	B	B	B	B	B	B	Y	A	B	B	B	
4	A	A	A	A	Y	A	B	B	B	A	A	B	B	B	B	B	B	B	BE	184	A	A	A	B	
5	B	AE	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	BE	250	266	B	B	B	A
6	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	248	B	B	A	B	
7	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	234	B	B	B
8	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
9	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
10	B	B	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	
11	B	B	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C	
12	C	C	C	C	C	C	C	C	C	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A
13	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
14	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A
15	B	B	B	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	AE	A	A	252
16	B	B	A	B	B	B	A	B	B	B	B	B	B	B	B	B	B	BE	266	274	A	A	A	A	B
17	B	B	B	B	B	A	A	B	B	B	B	B	B	B	B	B	B	BE	264	B	B	200	A	B	B
18	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	BE	238	B	B	A	B	A
19	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	238	230	B	A	A
20	B	B	A	B	A	A	A	A	B	BE	BE	B	250	240	234	BE	B	286	236	216	B	B	B	A	A
21	A	A	B	A	A	A	A	262	BE	BE	B	206	B	B	288	274	262	234	218	216	200	210	254	A	A
22	A	A	A	A	A	A	A	A	B	A	B	238	222	214	226	224	216	226	226	210	202	218	218	232	B
23	212	A	A	A	A	A	A	A	A	BE	B	262	282	222	228	236	232	220	212	232	224	220	242	A	B
24	A	A	A	A	A	A	AE	A	B	B	B	B	B	B	288	212	240	218	202	216	232	242	236	A	A
25	A	A	A	B	B	A	AE	B	238	218	218	B	B	B	226	226	238	BE	B	B	222	224	254	254	254
26	EB	B	A	A	A	A	AE	A	Y	228	214	208	210	224	224	220	214	202	202	214	216	248	248	248	
27	264	A	A	A	A	A	B	B	A	A	B	252	226	226	226	270	228	246	Y	A	Y	A	A	A	
28	A	A	A	A	A	B	B	B	B	A	B	B	B	B	B	B	252	A	B	B	A	A	A	A	A
29	A	Y	A	A	Y	AE	BE	A	Y	242	220	222	214	206	228	214	222	210	198	212	220	232	248	254	
30	224	A	A	A	A	B	B	A	BE	B	304	252	238	230	238	214	220	214	212	206	222	226	206	230	262
31	EB	EB	B	A	A	B	A	A	244	224	222	220	218	220	214	214	204	196	204	204	202	222	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	6	2	3		1			6	4	5	10	8	9	10	11	11	12	11	12	13	13	14	5	6	
MED	U	228	306	292	244			E	259	244	230	223	226	222	224	225	225	220	213	210	217	220	234	248	244
UQ	E	B	A					E	264	251	276	250	246	228	238	236	240	231	246	243	230	228	242	251	254
LQ	214		220					232	241	221	220	221	214	210	214	216	217	210	205	202	212	218	231	248	

MAR. 2012 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2012 f_{XI} (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	O	X	X	R	O	X		O	X	X	X	X	X	X	X	X	O	X	X	X	X	R	R			
2	A	A	O	X		B	B	B	B	B	B	B	O	X	B	X	O	X	B	B	B	R	R	58	A		
3	A	A	R	O	X	R	R	B	B	B	B	B	B	B	B	B	O	X	B	X	X	O	X	A	O	X	
4	A	A	B	A	A	A	B	A	A	X	O	X	R	X	X	X	X	X	X	X	X	X	A	R	A		
5	A	A	B	A	R	A	B	B	B	B	B	B	B	B	B	B	X	B	O	X	R	R	R	R	R		
6	R	A	R	R	R	R	X	X	X	O	X	R	X	O	X	O	X	X	X	O	X	X	O	X	B	B	
7	B	56	A	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	O	X	O	X	B	R	R	
8	R	R	R	A	B	A	A	A	X	O	X	X	X	O	X	X	X	X	B	B	O	X	B	B	A		
9	Y	R	R	A	R	R	R	X	O	X	X	X	X	X	X	X	X	O	X	X	O	X	O	X	B	A	
10	A	A	R	A	A	A	B	54	60	58	74	B	O	X	X	X	X	X	O	X	O	X	X	B	R		
11	R	O	X	B	R	A	O	X	X	X	X	X	O	X	X	X	X	X	X	X	X	X	B	B	B		
12	B	A	A	A	38	39	43	37	X	B	R	X	X	X	X	O	X	81	70	63	57	R	A	A	A		
13	A	B	B	R	B	A	B	B	B	B	B	B	B	B	B	B	B	O	X	O	X	B	B	A	A		
14	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	O	X	X	B	X	B	R	R	B		
15	B	B	B	B	B	B	R	B	O	X	X	O	X	O	X	B	X	B	X	X	X	R	B	B	R	R	
16	B	R	B	B	R	B	B	B	O	X	X	X	X	O	X	X	O	X	X	X	B	B	B	O	X	B	B
17	B	X	R	B	R	R	X	X	X	X	X	B	X	X	X	X	O	X	X	X	X	O	X	A	A		
18	O	X	37	65	35	44	R	B	A	A	B	B	O	X	X	X	X	X	X	X	O	X	B	R	R	R	
19	R	R	B	B	R	R	Y	O	X	X	X	X	O	X	X	O	X	O	X	O	X	X	B	R	R	R	
20	82	A	R	B	A	A	B	A	B	B	B	B	B	O	X	O	X	B	O	X	B	O	X	O	X	R	A
21	A	O	X	A	A	A	41	43	X	X	O	X	X	X	X	O	X	X	X	X	X	X	O	X	B	A	A
22	A	A	A	A	B	B	R	B	R	B	B	B	B	B	B	B	B	B	B	O	X	O	X	R	A	A	A
23	A	A	A	A	A	A	R	O	X	B	B	B	X	X	X	X	X	X	X	X	X	R	A	A	X	R	
24	R	A	B	A	B	B	B	B	56	36	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A	A	
25	A	B	B	B	B	B	B	A	A	B	B	B	B	B	B	B	X	B	B	R	O	X	A	B	B	82	
26	B	B	B	56	B	B	B	A	B	B	B	B	B	B	B	B	O	X	X	X	O	X	B	B	R	R	
27	A	B	R	A	B	B	B	B	B	B	B	B	X	B	B	B	B	B	B	B	B	B	B	R	A	A	
28	A	B	B	B	A	S	S	S	O	X	X	S	S	S	S	S	S	S	S	X	S	S	C	C	C	C	
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
31																											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	2	6	3	4	3	3	6	10	13	14	12	11	17	18	19	21	21	19	21	17	13	10	4	2			
MED	60	X	O	X	O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	55	53		
U Q		56	38	57	70	39	43	43	48	57	65	76	84	86	88	82	78	70	60	47	36	33	77				
L Q		X	O	X	O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	42			

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2012 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	28	28	R	R		F	F	R		J	R		J	R	R		79	69	59	57	22	A	R	R					
2	A	A	R	Y	B	B	B	B	B	B	B	B		51	B	60	65	B	62	B	B	A	A	A	A					
3	A	A	A	R	A	A	B	B	B	B	B	B	B	B	B	B			B		51	43	30	20	A	R				
4	A	A	B	A	A	A	B	A	A		R	R		59	59	57	58	J	R		54	50	50	38	21	A	A			
5	A	A	B	A	A	A	B	B	B	B	B	B	B	B	B	B		71		42		R	R	R	A	R				
6	R	A	R	R	R	R		28	30	38	44		R	J	R		R	R			57	50	40	32	27	21	B	B		
7	B	A	A	B	B	A	B	B	B	B	B	B		49	F	B	R	B	B	B			33	27	R	B	R	R		
8	R	A	R	A	B	A	A	A		40	44	J	R		J	R	X	R		B	B	R	B	B	B	A				
9	Y	A	A	A	A	R	R		30	39	51	60	69	78	79	80	74	64	58	38	32	25	24	F	R	B	A			
10	A	A	A	A	A	A	B	F	F	50	52	68		91	92	85	82	73	60	40	32	32	26	B	A					
11	A	R	B	R	A		F	F	J	R	J	R		J	R	J	R	J	R	F	F		F	B	B					
12	B	A	A	A	F	F	F		B	R				75	76	76	75	73	47	38	26	23	F	B	B					
13	A	B	B	A	B	A	B	B	B	B	B	B	B	B	B	B		48	44	32		B	B	B	A	A				
14	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B		59	62		42	24	F	B	A	R	B			
15	B	B	B	B	B	B	A	B		35	49	58	61		B	J	R	B	R	J	R	R	B	B	A	A				
16	B	A	B	B	A	B	B	B	R	J	R	J	R		R	J	R	S	S		B	B	B	R	B	B				
17	B		R	B	R	R		41	48	60	70	78	86	82	72	71	57			F	R	A	F	A						
18	R	F		F	A	B	A	A	A	B	B	B		62	80	81	80	R	R		78	77	66	36	29	A	A	A		
19	A	A	B	B	A	R	Y	R		25	34	49	57	60	68	76	73	67	R		56	42	41	24	26	18	B	F		
20	F	A	A	F	B	A	A	B	A	B	B	B	B		R		B	R	B	R	B	R	R	A	A					
21	A	R	A	A	A	A	F	F		39	43	56	65	67	71	72	69	62	46	42	26	16	R	B	A	A				
22	A	A	A	A	B	B	R	B	A	B	B	B	B		69	68	70		B	R		56	49	21	R	A	A	A		
23	A	A	A	A	A	A	R	R	B	B	B	B	B		51	52	58	64	66	59	57	56			26	R				
24	R	A	B	A	B	B	B	B	Y	R		B	B		44	B	R	B	B	B	B	B	A	A	A	A	A			
25	A	B	B	B	B	B	B	A	A	B	B	B	B	B	B	B	J	R		B	B	R	R	A	A	B	A			
26	B	B	B		R	B	B	B	A	B	B	B	B	B		50	52	52	44	35	25	F	B	B	R	R				
27	A	B	A	A	B	B	B	B	B	B	B	B	B		68	B	B	B	B	B	B	B	B	B	A	A				
28	A	B	B	B	A	S	S	S	U	S	R	S	S	S	S		S	S	F	J	S	S	S	C	C	C	C			
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
31																														
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23						
CNT	2	5	3	3	1	3	6	10	12	14	12	11	17	18	20	21	21	19	21	17	12	8	2	1						
MED	36	31	29	30	27	28	28	32	40	46	56	64	67	74	74	70	64	57	49	33	26	22	25	18						
U Q		42	32	31		30	29	32	42	51	59	69	78	80	82	76	71	64	54	38	30	24								
L Q		26	28	30		26	27	30	37	44	52	52	58	62	66	62	58	46	40	26	24	20								

APR. 2012 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2012 ftEs (0.1MHz) 45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4' S LON. 039°35.4' E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	27	30	28	26	32	35	31	32	E B 33	31	26	28	27	25	26	E B 24	23	19	15	30	30	40	28	32
2	36	34	56	26	B	B	B	B	B	B	B	B	G	B E 30	30	B E 30	B E 26	B	B	B	K 32	33	34	58
3	39	43	34	29	32	39	B	B	B	B	B	B	B	B	B	B E 37	B E 23	B E 20	B E 16	B E 13	B E 30	B E 28	B E 30	28
4	58	42	B	40	34	32	B	44	50	32	E B 26	26	G	G	G	G E 26	B E 20	17	23	30	43	36	34	
5	40	42	B	38	35	41	B	B	B	B	B	B	B	B	B	B E 39	B	B	26	36	30	34	39	25
6	28	35	28	33	K 32	K 30	16	16	E B 23	E B 26	G	28	29	31	E B 29	E B 26	E B 22	E B 21	E B 25	E B 21	E B 14	E B 12	B	B
7	B	30	K 40	B	B	41	B	B	B	B	B	B	B E 35	B E 62	B	B	B	B	B E 27	B E 20	B	K 20	20	
8	26	31	28	39	B	50	50	34	E B 21	E B 22	E B 26	26	G	29	G E 20	E B 26	E B 30	B	B E 27	B	B	B	29	
9	17	30	31	58	40	K 26	23	E B 15	E B 28	E B 25	E B 27	30	26	G E 28	E B 29	E B 26	E B 19	E B 20	E B 20	19	E B 14	B	36	
10	36	38	K 30	92	38	36	B	33	E B 20	G	G	B	E B 60	E B 32	G	24	E B 19	E B 19	E B 21	E B 17	E B 15	E B 16	B	K 29
11	K 34	43	B	33	37	K 26	K 27	18	E B 18	E B 23	G E 27	E B 25	E B 27	E B 25	E B 23	E B 22	E B 18	E B 15	E B 14	E B 13	E B 14	B	B	
12	B	71	43	41	34	E B 14	E S 16	29	B	E B 38	E B 30	E B 25	E B 25	E B 26	E B 30	E B 54	E B 23	E B 20	E B 19	26	40	70	50	76
13	73	B	B	35	B	42	B	B	B	B	B	B	B	B	B	B	E B 28	E B 30	E B 25	B	B	B	37	35
14	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B E 52	E B 29	E B 18	E B 18	B	K 30	26	B	B
15	B	B	B	B	B	B	34	E B 14	E B 27	E B 28	E B 29	B E 32	B E 32	B E 28	B E 28	B E 29	B E 29	B E 20	B	B	B	37	36	
16	B	32	B	B	34	B	B	E B 28	E B 21	E B 25	E B 24	E B 28	E B 34	E B 24	E B 28	E B 33	E B 18	B	B	B	B	B	B	
17	B	K 28	30	B	37	30	K E 26	E B 18	E B 17	E B 20	E B 29	B E 60	E B 26	E B 26	E B 23	E B 29	E B 20	E B 16	E B 13	E B 17	44	37	60	
18	42	56	47	33	42	B	58	42	40	B	B	B E 39	E B 30	E B 26	E B 27	E B 23	E B 29	E B 28	B	31	35	35	27	
19	27	38	B	B	35	27	Y 20	Y E 16	E B 21	E B 28	E B 29	E B 22	E B 27	E B 28	E B 30	E B 21	E B 19	E B 15	E B 16	E B 13	E B 14	B	71	
20	58	42	37	35	B	41	39	B	58	B	B	B	B	E B 56	E B 55	B	E B 58	E B 52	B	B E 29	B E 17	K 24	39	
21	41	36	48	43	48	49	35	K 27	K 17	18	23	22	34	24	46	E B 20	E B 21	E B 15	E B 16	E B 15	E B 14	B	40	44
22	41	49	60	43	B	B	28	B	44	B	B	B	B	E B 27	E B 54	E B 40	B	E B 40	E B 23	E B 16	32	41	41	40
23	39	50	73	43	44	41	25	K 25	Y 25	B	B	E B 30	E B 28	E B 30	E B 26	E B 22	E B 22	E B 27	E B 27	E B 34	42	43	44	28
24	K 36	66	B	75	B	B	B	B	35	48	B	B	B	B	E B 33	E B 28	B	B	B	B	33	71	41	81
25	36	B	B	B	B	B	B	B	36	42	B	B	B	B	B	E B 27	B	B	21	34	41	80	B	A
26	B	B	B	K 26	B	B	B	B	50	B	B	B	B	B	E B 28	E B 28	E B 29	E B 28	E B 28	S	S	30	18	K
27	K 35	B	K 36	K 40	B	B	B	B	B	B	B	B	G 26	B	B	B	B	B	B	B	B	B	30	30
28	K 32	B	B	B	S	S	S E 19	S E 23	S	S	S	S	S	S E 39	S	S	S E 21	S E 17	S	S	C	C	C	C
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	21	21	16	19	17	17	14	13	19	15	13	12	17	18	20	21	21	19	22	20	20	20	19	22
MED	36	38	36	39	35	36	28	29	E B 28	E B 23	E B 26	E B 28	E B 27	E B 28	E B 28	E B 27	E B 26	E B 20	E B 21	19	30	34	36	34
U Q	41	46	48	43	40	41	35	35	42	31	28	29	34	32	34	30	30	28	26	27	32	43	40	44
L Q	30	32	30	33	33	28	23	17	E B 18	21	G E 26	E B 26	E B 26	E B 26	G	G E 22	E B 19	E B 17	E B 16	E B 16	E B 14	30	28	

APR. 2012 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2012 fmin (0.1MHz) 45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	12	13	12	12	12	12	12	14	33	18	18	19	16	16	16	24	23	19	15	21	12	18	16	26
2	20	20	15	13	B	B	B	B	B	B	B	B	21	B	30	30	B	25	B	B	13	12	12	19
3	12	29	29	14	24	29	B	B	B	B	B	B	B	B	B	B	37	B	23	21	16	13	12	13
4	16	27	B	19	22	18	B	20	19	19	28	26	17	19	20	15	25	20	14	12	12	12	12	12
5	12	23	B	26	28	20	B	B	B	B	B	B	B	B	B	B	39	B	19	20	11	14	12	14
6	13	12	20	19	14	15	12	12	23	26	14	22	17	16	29	18	22	21	25	21	14	12	B	B
7	B	12	23	B	B	30	B	B	B	B	B	B	35	B	62	B	B	B	B	27	20	B	12	12
8	12	14	18	20	B	20	15	20	21	22	26	17	20	22	18	26	29	B	B	27	B	B	B	13
9	12	12	12	16	16	17	13	15	28	25	27	30	26	20	28	29	26	19	20	20	12	14	B	12
10	13	12	20	19	22	17	B	14	20	16	18	B	60	32	13	24	19	19	21	17	15	12	B	12
11	13	15	B	20	20	15	12	12	18	23	20	27	19	27	25	23	22	18	14	14	13	14	B	B
12	B	13	16	14	13	14	16	12	B	28	30	E S	25	26	30	54	23	20	19	11	11	12	23	13
13	14	B	B	16	B	16	B	B	B	B	B	B	B	B	B	B	28	30	25	B	B	B	12	12
14	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	29	B	18	13	B	12	12	B
15	B	B	B	B	B	B	19	B	14	27	28	29	B	32	B	28	28	29	29	20	B	B	12	12
16	B	12	B	B	20	B	B	B	28	21	20	24	28	20	24	13	12	14	B	B	B	12	B	B
17	B	12	22	B	15	14	12	18	17	20	29	B	60	26	26	23	29	20	16	13	17	14	12	20
18	12	20	13	12	26	B	22	21	25	B	B	B	39	30	26	27	23	28	28	B	17	12	12	12
19	12	13	B	B	18	16	16	13	12	22	28	29	22	27	20	30	21	19	15	16	13	14	B	15
20	13	20	26	20	B	20	20	B	25	B	B	B	B	56	55	B	58	B	52	B	30	17	15	13
21	12	14	18	20	15	14	12	12	12	13	11	14	17	16	17	20	21	12	16	12	13	B	15	12
22	16	15	16	22	B	B	22	B	25	B	B	B	B	27	54	39	B	40	23	14	12	11	20	12
23	13	12	15	22	17	18	12	16	B	B	B	30	28	30	26	21	12	12	12	12	12	12	11	15
24	20	25	B	40	B	B	B	B	14	18	B	B	B	32	B	28	B	B	B	B	12	12	22	12
25	15	B	B	B	B	B	B	B	21	20	B	B	B	B	B	27	B	B	13	10	15	20	B	13
26	B	B	B	B	20	B	B	B	20	B	B	B	B	B	B	28	28	29	28	28	14	B	B	12
27	14	B	20	25	B	B	B	B	B	B	B	B	24	B	B	B	B	B	B	B	B	B	14	12
28	21	B	B	B	15	S	S	S	19	23	S	S	S	S	39	S	S	21	17	S	S	C	C	C
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	27	28	27	27	27	28	28	27	27	27	27	28	26	27	28	28	27	27	27	27	27
MED	14	18	24	20	23	20	22	21	25	28	B	B	35	30	30	28	28	26	22	20	15	14	15	13
U Q	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
L Q	12	12	17	16	16	16	13	14	19	22	26	27	21	22	24	23	22	19	16	13	12	12	12	12

APR. 2012 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2012 h'F (KM)

45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	206	198	A	E B	278	220	220	222	222	222	222	218	208	208	216	262	A	A	252	A		
2	A	A	A	Y	B	B	B	B	B	B	B	B	252	B	246	234	B	E B	B	B	B	A	A	A	A		
3	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	E B	B	B	222	230	234	E B	A	A		
4	A	A	B	A	A	A	B	A	A	A	244	234	220	210	216	E A	210	208	232	222	A	A	A	A	A		
5	A	A	B	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	E B	B	A	A	A	A	A		
6	A	A	A	A	A	A	A	E	A	E B	E A	E A	228	200	220	220	210	202	204	224	220	220	B	B	B		
7	B	A	A	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	E B	E B	B	A	A	A		
8	A	A	A	A	B	A	A	A	E B	B	246	214	222	214	204	E A	198	202	210	B	B	254	B	B	A		
9	Y	A	A	A	A	A	A	E	B	E B	B	B	222	208	208	206	206	206	194	194	208	226	238	B	A		
10	A	A	A	A	A	A	B	258	228	216	222	B	264	234	206	202	202	192	202	246	220	220	B	A	A		
11	A	A	B	A	A	A	A	E	A	A	286	230	220	214	214	214	214	208	202	208	186	218	214	222	B	B	
12	B	A	A	A	A	B	S	A	B	A	E B	284	226	226	228	226	232	214	208	214	220	A	A	A	A		
13	A	B	B	A	B	A	B	B	B	B	B	B	B	B	B	B	B	E B	B	B	E B	B	B	A	A		
14	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	236	B	214	248	B	A	A	B		
15	B	B	B	B	B	B	A	B	E B	B	248	216	212	216	B	234	212	188	198	228	206	B	B	A	A		
16	B	A	B	B	A	B	B	B	E B	E B	E B	A	B	210	210	210	198	198	192	B	B	B	230	B	B		
17	B	192	A	B	A	A	A	E	B	226	326	238	220	224	B	B	208	214	234	204	194	204	212	E B	A	A	
18	A	A	A	F	A	B	A	A	A	B	B	B	E B	258	244	238	224	214	216	232	B	A	A	A	A		
19	A	A	B	B	A	A	Y	Y	Y	232	232	232	B	218	232	210	212	192	212	212	E B	220	212	222	B	A	
20	208	A	A	A	B	A	A	B	A	B	B	B	B	B	B	B	E B	B	B	E B	B	B	E B	A	A	A	
21	A	A	A	A	A	A	A	A	262	232	202	214	E B	238	208	224	E B	210	200	194	200	200	E B	B	A	A	
22	A	A	A	A	B	B	A	B	A	B	B	B	B	B	252	284	254	E B	B	E B	E B	272	254	A	A	A	
23	A	A	A	A	A	A	A	Y	B	B	B	254	238	262	238	220	E A	220	242	232	A	A	A	214	A		
24	A	A	B	A	B	B	B	B	Y	A	B	B	B	B	B	B	E B	B	B	B	B	B	A	A	A	A	
25	A	B	B	B	B	B	B	A	A	B	B	B	B	B	B	B	258	B	B	A	A	A	A	B	A	A	
26	B	B	B		212	B	B	B	A	B	B	B	B	B	B	B	S	234	234	226	236	234	196	B	B	A	A
27	A	B	A	A	B	B	B	B	B	B	B	B	Y	B	B	B	B	B	B	B	B	B	B	B	A	A	A
28	A	B	B	B	A	S	S	S	S	260	230	S	S	S	S	S	S	S	E S	S	S	S	S	S	C	C	C
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31																											
CNT	1	2		1	2	2	3	5	11	12	13	12	14	16	18	20	20	19	21	17	11	8	4				
MED	208	245		F	242	263	226	E	286	E B	248	220	221	222	219	218	217	206	203	214	221	227	224	233			
U Q							S	E	312	339	272	231	231	230	238	234	234	E	223	E B	242	232	251	262	266	257	
L Q							198	266	236	216	214	215	214	209	210	209	202	194	203	210	220	221	202				

APR. 2012 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2012 f_{XI} (0.1MHz)

45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	X ₃₄	X ₃₂	B	B	B
2	R ₀	X ₃₆	R	B	B	B	X ₃₁	40	41	43	56	68	80	90	89	76	69	58	38	X ₃₂	B	B	X ₃₄	A	
3	A	R	A	A	A	A	B	B	B ₀	X ₄₇	B ₀	X ₅₈	X ₇₀	78	80	80	X ₇₄	B	B	B	B	B	B	R	
4	A	A	A	A	A	41	42	47	42	51	0	X ₅₀	C	X ₇₉	79	81	59	X ₅₀	X ₃₈	46	34	X ₃₀	30	B	B
5	B	B	R	X	52	31	38	37	28	29	39	59	78	84	86	92	75	52	35	38	B ₀	X ₂₅	X ₂₄	X ₂₄	B
6	B	B	B	B	B	44	42	50	B ₀	X ₄₀	B	B ₀	X ₇₆	X ₉₃	103	X ₉₄	X ₆₉	X ₄₈	X ₃₈	B	B	B	B	B	
7	B	B	B	B	B	B	B	B	B	X ₄₂	X ₆₅	X ₈₃	82	98	104	88	59	39	30	26	X ₂₃	B	Y	Y	
8	B	B ₀	X ₃₅	36	52	57	R	B	64	40	57	72	84	88	89	89	66	58	26	26	X ₂₄	X ₂₄	B	B	B
9	57	143	A	A	R	R	R	B	R	B	R	B	B	B	62	B	B	B	R	R	R	R	A	A	A
10	0	X ₃₇	A	B ₀	X ₄₀	A	B	B	B	B	B	B	B	B	B	X ₅₉	B	B	B	B	B	B	B ₀	X ₃₈	A
11	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	X ₇₇	B ₀	X ₃₉	35	33	B	R	A	A
12	0	X ₃₆	R	B	X	B	B	B	R	X	B	B	B	B	B	B	B	B	B	B	42	B	B	R	A
13	A	A	B	B	B	B	B	B	A	B	B	B	B	B	B	B	B	B	75	66	R	R	Y	A	B
14	B	B	A	B	B	B	R	R	B	B	B	B	B	X	X	X	B	B	B	B	B	B	B	B	R
15	B ₀	X ₃₆	A	R	A	31	A	B	B	B	B	B	X ₇₈	X ₈₅	80	65	0	X ₅₇	X ₄₂	44	34	R	B	B	B
16	Y	R	R	R	B	A	A	41	42	46	56	65	80	82	62	54	43	41	31	24	X ₂₄	A	A	A	A
17	A	A	A	42	B	R	A	R	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
18	B	B	B	B	B	B	B ₀	X ₃₄	42	47	60	66	72	72	86	80	63	43	B	B	B	B	B	B	B
19	B	A	A	A	A	A	A	A ₀	X ₃₃	B	X ₅₆	X ₆₅	79	86	70	56	41	28	B	B	B	B	B	B	B
20	B	Y ₀	X ₃₀	R	R	A	B	B	59	B	B	X	58	74	77	76	68	58	58	B	B	B	B	B	B
21	R ₀	X ₃₀	R	R	X	X	43	36	B	X ₃₂	50	74	81	62	B	B	B	B ₀	X ₂₈	B	B	B	B	B	B
22	Y	A	X	40	38	32	36	B	B	A	B ₀	X ₅₀	X ₇₀	B	B	B	B	0	X ₉₀	64	B	A	A	A	A
23	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	Y	R	A	A
24	R ₃₉	B	R	B	A	A	B	B	B	B	B	B	B	B	B	R	B	B	B	B	B	B	B	B	Y
25	Y	A	A	43	B	A	48	57	57	56	70	67	74	86	X	B	B	B	X	51	41	B	B	B	R
26	A ₀	X ₃₈	A	B	B	R	A	A	33	B	X	42	53	64	73	61	56	B	B	B	B	B	B	B	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	X ₅₄	0	X ₃₈	X ₃₇	27	B	B	B	B
28	B	B	B	B	B	B	B	24	B	X	27	46	65	65	66	74	48	36	31	27	Y ₀	X ₂₀	B	R	A
29	A	A	X	70	A	36	A	R	R	48	52	68	68	77	52	40	37	32	27	Y	B	B	B	B	
30	R	X	A	A ₀	X ₃₇	A	A	69	60	46	51	62	77	81	67	58	X	B	B ₀	X ₃₂	B	B	R	B	R
31	R	53	R	A	R	A ₀	X ₃₅	42	37	X ₃₈	X ₅₁	57	67	62	75	70	X	B	X ₄₁	X ₃₁	B	A	A	B	B
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	4	7	4	8	5	8	7	11	13	16	15	16	19	19	20	21	16	19	18	9	7	2	3		
MED	38	38	37	41	32	37	42	41	42	44	56	65	74	80	80	68	58	42	34	33	24	27	34		
UQ	48	53	40	48	44	42	43	50	58	47	59	68	79	86	88	78	68	58	41	34	30	30	38		
LQ	0	X ₃₆	X ₃₆	X ₃₂	37	X	34	X ₃₅	X ₃₄	X	X	X	X	X	X	X	X	X ₅₁	X ₃₈	X ₂₈	X ₂₈	X	23	24	

MAY 2012 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2012 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	28	R	B	B	B
2	A	R	A	B	B	B	25	24	32	37	J	R	R	J	R	70	63	52	32	26	B	B	R	A
3	A	R	A	A	A	A	B	B	B	R	B	52	64	68	F	F	70	68	B	B	B	B	B	R
4	A	A	A	A	A	F	31	36	37	F	F	C	J	R	J	R	J	R	F	28	24	20	B	B
5	B	B	R	R	25	28	25	22	18	33	53	72	78	80	J	R	86	69	46	29	32	B	R	R
6	B	B	B	B	B	F	34	33	34	F	B	R	70	87	J	R	88	63	42	32	B	B	B	B
7	B	B	B	B	B	B	B	B	B	36	59	81	76	92	J	R	98	82	53	33	24	20	17	B
8	B	B	R	F	F	F	R	B	F	53	34	51	67	78	82	J	R	83	56	46	20	20	18	B
9	A	A	A	A	A	A	A	B	R	B	R	B	B	B	56	B	B	B	R	A	A	A	A	A
10	31	A	B	R	A	B	B	B	B	B	B	B	B	B	B	J	R	B	B	B	B	B	B	A
11	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	71	B	R	F	F	B	A	A	A
12	R	A	B	27	B	B	B	A	26	B	B	B	B	B	B	B	B	B	B	36	Z	B	B	A
13	A	A	B	B	B	B	B	B	A	B	B	B	B	B	B	B	B	64	36	A	R	Y	A	B
14	B	B	A	B	B	B	A	R	B	B	B	B	B	B	55	57	J	R	B	B	B	B	B	A
15	B	30	A	A	A	F	21	A	B	B	B	B	72	79	R	J	R	74	57	F	R	R	B	B
16	Y	R	A	A	B	A	A	F	F	31	31	40	50	J	R	D	R	J	R	76	56	48	37	35
17	A	A	A	F	B	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
18	B	B	B	B	B	B	B	B	F	28	32	41	51	60	66	66	U	R	R	74	57	37	B	B
19	B	A	A	A	A	A	A	A	R	27	B	J	R	R	D	R	R	80	64	50	31	F	B	B
20	B	Y	24	A	A	A	B	B	F	50	B	B	52	64	71	70	62	52	52	J	R	B	B	B
21	A	R	R	R	21	21	F	24	30	B	R	26	44	68	75	56	B	B	B	22	B	B	B	B
22	Y	A	34	23	F	F	F	B	B	A	F	B	R	R	B	B	B	F	74	58	B	A	A	A
23	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	Y	R	A
24	R	B	A	B	A	A	B	B	B	B	B	B	B	B	B	B	R	B	B	B	B	B	B	Y
25	Y	A	A	F	B	A	F	F	F	F	F	F	F	F	80	B	B	B	J	R	B	B	B	R
26	A	R	A	B	B	A	A	A	A	F	B	36	47	58	67	J	R	R	55	50	B	B	B	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	48	F	R	28	31	21	B	B
28	B	B	B	B	B	B	B	F	B	14	21	40	59	59	60	68	42	R	30	25	21	Y	R	A
29	A	A	33	A	A	F	25	A	A	A	F	F	F	F	F	F	46	31	31	26	21	R	Y	B
30	A	45	A	A	R	A	A	F	F	56	44	31	37	56	J	R	75	61	52	B	B	R	B	R
31	A	A	A	A	A	A	F	F	F	29	31	31	32	45	51	57	51	66	64	B	35	25	B	B
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	3	5	4	6	5	8	7	11	13	16	15	16	20	20	20	21	16	19	18	9	7	2	3	
MED	R	R	31	30	F	F	F	F	F	F	F	F	F	F	F	F	62	52	36	26	26	18	19	R
U Q	R	33	38	34	32	30	32	36	37	42	39	51	61	74	80	J	R	82	70	60	46	32	28	24
L Q	R	30	27	26	27	22	23	25	24	26	32	41	52	62	67	59	51	45	31	22	22	14	R	18

MAY 2012 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2012 ftEs (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	E	B	E	B	B	B	
2		K			B	B	E	B	B			K	E	B	E	B	E	B	E	B	E	B				
3		30	43	40				17	16	23	23	35	24	19	23	22	22	20	20	18	16					
4		K	K																							
5		36	30	35	40	39	42																			
6		K																								
7		33	42	48	45	37	19	17	16	E	B	E	B	C	E	S	E	S	S	S	E	B	E	B	E	B
8		B	B			E	B	E	B	E	B	E	B	G	E	B	E	B	E	B	E	B	E	B	E	B
9		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
10		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
11		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
12		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
13		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
14		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
15		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
16		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
17		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
18		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
19		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
20		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
21		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
22		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
23		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
24		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
25		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
26		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
27		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
28		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
29		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
30		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
31		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	19	21	21	19	16	19	17	17	18	16	16	16	20	20	20	22	16	19	19	14	13	10	12	15		
MED	34	40	37	38	38	36	35	22	26	20	19	28	26	26	24	24	20	18	18	16	18	29	36	34		
U Q	39	46	44	44	42	42	42	34	35	28	30	36	35	30	32	29	24	28	22	20	32	40	46	46		
L Q	31	32	32	32	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2012 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	12	15	B	B	B
2	12	13	18	B	B	B	17	16	15	18	35	24	20	23	22	22	20	20	18	13	B	B	12	12
3	12	19	21	18	22	20	B	B	B	31	B	38	36	24	24	34	38	B	B	B	B	B	B	17
4	20	16	18	24	14	13	13	12	13	14	20	C	22	27	24	23	15	13	13	12	14	14	B	B
5	B	B	12	18	17	14	21	15	13	20	22	29	28	28	33	25	23	16	13	B	13	13	13	B
6	B	B	B	B	B	20	20	14	B	22	B	B	55	23	22	20	26	18	22	B	B	B	B	B
7	B	B	B	B	B	B	B	B	B	20	21	20	18	16	16	20	15	16	14	13	12	B	12	13
8	B	B	26	12	13	47	16	B	13	14	15	28	20	17	30	20	24	18	15	14	13	B	B	B
9	12	12	13	13	23	22	13	B	22	B	21	B	B	B	38	B	B	B	20	12	14	13	19	12
10	13	13	B	14	14	B	B	B	B	B	B	B	B	B	B	39	B	B	B	B	B	B	12	12
11	19	19	B	B	B	B	B	B	B	B	B	B	B	B	B	29	B	28	20	14	B	12	12	12
12	23	28	B	23	B	B	B	17	18	B	B	B	B	B	B	B	B	B	B	20	B	B	15	13
13	16	18	B	B	B	B	B	B	15	B	B	B	B	B	B	B	B	52	18	13	15	15	20	B
14	B	B	12	B	B	B	24	20	B	B	B	B	B	26	28	20	B	B	B	B	B	B	B	13
15	B	11	20	22	13	14	19	B	B	B	B	B	34	25	22	22	19	17	17	15	12	B	B	B
16	12	15	13	16	B	18	15	13	12	14	14	13	26	26	20	16	13	13	13	20	12	11	20	12
17	11	14	21	18	B	22	23	23	24	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
18	B	B	B	B	B	B	B	20	19	17	20	26	24	36	52	31	25	25	B	B	B	B	B	B
19	B	27	29	24	27	20	20	20	21	B	22	27	22	21	16	21	13	16	18	B	B	B	B	B
20	B	14	14	16	15	19	B	B	B	B	B	37	24	36	23	24	20	35	B	B	B	B	B	B
21	13	12	12	13	12	15	13	22	B	19	22	B	54	19	38	B	B	B	18	B	B	B	B	B
22	12	12	12	12	13	14	B	B	26	14	B	36	56	B	B	B	20	49	B	12	13	12	14	19
23	13	12	20	16	13	14	19	B	B	B	B	B	B	B	B	B	B	B	B	B	14	12	12	13
24	12	B	29	B	22	26	B	B	B	B	B	B	B	B	B	28	B	B	B	B	B	B	B	12
25	13	12	12	14	B	19	14	13	12	12	13	14	12	25	B	B	B	18	30	B	B	B	B	12
26	12	13	20	B	B	27	15	12	12	B	13	18	20	20	37	34	B	B	B	B	B	B	B	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	15	14	14	14	B	B	B	B	B
28	B	B	B	B	B	B	B	13	B	13	14	14	16	15	13	28	19	14	15	13	12	B	10	14
29	13	13	14	15	13	12	15	12	14	12	12	14	14	14	12	15	17	12	14	14	B	B	B	B
30	13	13	18	17	14	12	20	18	14	15	12	13	13	13	12	12	B	B	20	B	B	13	B	16
31	13	12	12	12	12	14	13	12	12	12	12	13	13	12	15	17	B	18	14	B	28	13	B	B
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	29	29	29	29	29	29	29	29	28	29	29	29	30	30	30	30	31	31	31	31	30
MED	13	15	20	18	23	20	20	20	22	22	22	36	28	26	30	26	32	26	20	B	B	B	B	B
U Q	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
L Q	12	12	13	14	14	14	15	14	14	14	14	19	20	20	21	20	19	16	15	13	14	13	14	13

MAY 2012 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2012 h'F (KM)

45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	210	B	B	B	B		
2	A	226	A	B	B	E	B	B	A	250	238	224	E	B	210	210	208	208	208	236	250	B	B	204	A	
3	A	A	A	A	A	A	B	B	B	B	B	B	276	E	B	250	E	B	232	B	B	B	B	A		
4	A	A	A	A	A	216	A	Q	282	236	236	212	C	S	S	208	204	202	Q	274	220	200	244	B	B	
5	B	B	A	A	B	B	B	B	A	B	254	224	210	214	210	200	188	204	218	208	B	E	B	E	A	B
6	B	B	B	B	B	B	B	B	B	E	B	B	B	252	226	208	208	220	230	240	B	B	B	B	B	
7	B	B	B	B	B	B	B	B	B	248	204	196	204	222	194	192	192	214	198	202	232	B	A	Y	B	
8	B	B	B	A	Y	B	A	B	A	252	206	198	200	206	214	204	216	188	E	B	E	B	B	B	B	
9	Q	A	A	A	A	A	A	B	A	B	A	B	B	B	B	B	B	B	A	A	A	A	A	A	A	
10	182	A	B	230	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	232	A	
11	218	A	B	B	B	B	B	B	B	B	B	B	B	B	B	242	B	B	B	B	B	B	B	232	A	
12	A	A	B	B	B	B	B	A	B	B	B	B	B	B	B	B	202	E	B	244	234	214	B	196	A	
13	228	A	B	210	B	B	B	B	A	B	B	B	B	B	B	B	B	B	B	E	B	B	B	B	A	
14	B	B	A	B	B	B	A	A	B	B	B	B	B	B	B	B	B	B	256	246	A	A	Y	A	B	
15	B	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
16	Y	A	A	A	B	A	A	A	Q	280	240	214	202	210	188	180	186	200	190	214	E	B	A	A	A	
17	A	A	A	A	B	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
18	B	B	B	B	B	B	B	B	B	A	260	222	214	216	226	240	206	212	250	E	B	B	B	B	B	
19	B	A	A	A	A	A	A	A	A	B	A	B	246	224	202	206	186	194	222	B	B	B	B	B		
20	B	Y	A	A	A	A	B	B	A	B	B	E	B	276	210	216	212	206	208	246	B	B	B	B	B	
21	A	234	A	A	A	B	E	B	B	E	B	B	B	230	210	228	B	B	E	B	B	B	B	B	B	
22	Y	A	212	A	A	A	B	B	A	A	B	B	B	B	B	B	B	E	B	306	B	A	A	A	A	
23	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
24	A	B	A	B	A	A	B	B	B	B	B	B	B	B	B	S	B	B	B	B	B	B	B	B	Y	
25	Y	A	A	A	B	E	A	Q	Q	Q	216	224	Q	Q	214	B	B	B	B	230	230	B	B	B	A	
26	A	218	A	B	B	A	A	A	A	B	222	222	222	196	228	220	B	B	B	B	B	B	B	B	C	
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	198	208	208	230	B	B	B	B	B	
28	B	B	B	B	B	B	B	B	B	E	B	276	234	204	194	202	204	204	A	E	B	E	B	A	A	
29	A	A	A	A	A	A	A	A	A	Q	Q	Q	Q	Q	Q	202	184	216	236	210	Y	B	B	B	B	
30	A	A	A	A	A	A	A	A	A	A	A	236	230	Q	Q	210	200	222	186	B	E	B	B	B	A	
31	A	A	A	A	A	A	A	Q	Q	Q	262	308	282	260	212	242	Q	Q	204	E	A	B	A	A	B	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	4	5	1	3		1	3	5	4	13	15	14	19	20	19	22	16	19	17	9	6	3	3			
MED	223	226	212	216		216	E	A	U	295	270	251	222	215	212	208	208	204	208	221	U	222	208	232	207	218
U Q	232	239		230			E	A	E	B	Q	E	B		Q				E	E	B	E	B	E	A	
L Q	200	218		210			A	Q		248	244	212	202	204	202	204	192	202	208	212	206	228	196	204		

MAY 2012 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2012 f_{XI} (0.1MHz)

45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	X 58	48	A	A	A	A	A	X 43	X 47	X 40	O X 66	O X 67	75	72	53	52	40	O X 24	B	A	A	A	B	
2	B	A	A	A	46	A	A	B	B	X 27	X 43	58	74	78	68	54	45	33	O X 36	O X 28	B	A	B	A	
3	42	A	A	R	84	55	A	A	41	B	B	B	X 74	X 75	X 69	X 68	89	68	A	R	A	A	A	A	
4	42	A	R	O X 42	O X 41	X 36	B	B	A	A	B	X 48	O X 48	B	O X 59	B	O X 72	59	A	R	A	A	A	A	
5	A	A	B	O X 34	B	B	B	B	B	B	B	B	B	B	B	X 64	X 66	X 58	B	R	A	A	A	A	
6	A	B	A	R	B	B	B	B	B	B	O X 39	O X 46	B	X 60	B	X 90	B	B	B	B	Y	A	A	B	
7	R	A	B	A	B	B	B	B	B	B	B	O X 48	65	B	B	B	B	B	B	O X 24	A	A	A	A	
8	R	A	A	R	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
9	B	B	B	O X 35	O X 34	O X 37	X 32	36	33	39	B	B	B	70	72	B	B	B	B	B	B	B	B	B	
10	Y	A	A	30	32	39	32	30	32	31	X 40	65	X 62	X 62	X 60	67	X 44	X 32	X 28	B	B	A	B	R	
11	O X 24	A	X 37	B	R	B	A	42	36	R	B	B	B	B	X 88	X 88	B	B	B	B	B	A	44	A	B
12	A	A	B	B	B	A	A	A	B	B	R	B	B	B	B	B	R	B	B	B	B	B	B	B	B
13	R	O X 31	X 32	R	28	O X 28	A	A	A	41	52	65	B	75	66	49	X 38	O X 38	B	B	B	B	Y	Y	
14	R	R	R	A	O X 40	X 34	42	45	42	49	50	66	X 60	X 68	R	B	R	B	B	B	B	B	B	R	
15	R	R	R	A	A	A	25	28	27	26	40	X 49	57	69	O X 51	X 37	X 34	X 26	X 26	O X 25	B	B	B	R	
16	A	A	A	O X 32	O X 29	X 39	38	35	A	30	42	42	X 54	X 69	X 59	X 51	X 47	X 45	X 39	O X 30	B	R	B	B	
17	B	O X 61	B	A	A	A	A	A	O X 48	R	B	B	B	B	B	B	X 68	R	R	A	A	A	A	A	
18	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R	R	R	R	
19	A	R	R	R	R	R	R	B	B	B	O X 41	B	B	B	B	O X 40	B	B	B	B	R	R	R	B	R
20	B	R	R	A	A	B	R	A	A	B	R	B	O X 50	B	X 59	O X 41	B	B	B	B	B	B	B	B	B
21	B	X 22	R	O X 23	B	Y	B	B	R	29	36	X 54	O X 48	O X 57	O X 47	B	B	B	B	Y	A	B	B	R	
22	B	B	B	A	R	R	X 43	B	36	36	30	X 38	X 38	B	X 58	X 57	B	B	B	B	B	Y	B	B	
23	R	A	R	Y	Y	B	Y	B	B	B	B	B	O X 48	O X 51	X 48	X 48	B	B	B	B	A	B	B	B	
24	Y	R	R	R	A	R	A	R	O X 26	O X 30	X 33	X 44	X 44	X 48	X 38	X 41	X 29	X 29	R	Y	B	B	B	B	
25	B	Y	A	O X 38	X 36	A	A	A	A	A	B	B	B	X 70	X 63	43	42	38	B	B	A	A	R	R	
26	A	A	63	A	A	A	R	56	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	
27	R	R	A	A	32	37	34	34	O X 36	R	O X 30	46	58	70	58	50	X 31	X 30	O X 27	B	A	A	R	R	
28	A	A	A	56	A	34	38	34	33	B	B	B	B	B	B	X 34	B	B	B	B	R	R	R	A	
29	A	A	A	A	Y	B	B	B	B	B	X 32	X 44	X 54	51	49	42	B	R	B	B	B	R	B	A	
30	R	A	33	A	A	A	B	A	A	A	B	B	B	B	B	B	B	O X 30	A	A	A	A	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	3	4	5	9	9	9	8	9	12	11	14	15	15	16	17	20	12	12	6	4		1			
MED	42	44	37	35	34	37	36	35	36	31	40	48	57	69	59	50	44	38	28	26		44			
U Q	42	60	56	49	40	39	40	44	42	41	42	65	65	72	68	66	59	52	36	29					
L Q	O X 24	X 26	X 32	O X 31	O X 30	X 34	X 32	X 32	X 32	29	X 33	X 44	X 48	X 58	X 54	X 42	X 36	X 31	X 26	O X 24					

JUN. 2012 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2012 foF2 (0.1MHz) 45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	52	A	A	A	A	A	A	37	41	34	60	61	F	F	F	F	F	18	B	A	A	A	B		
2	B	A	A	A	F	A	A	B	B	21	37	48	68	J	R	62	48	39	27	F	24	22	B	A	B	A
3	F	A	A	A	A	F	A	A	F	B	B	B	68	69	63	J	R	F	A	A	A	A	A	A	A	
4	F	A	A	F	R	R	B	B	A	A	B	42	42	B	R	B	66	48	F	A	R	A	A	A	A	
5	A	A	B	R	B	B	B	B	B	B	B	B	B	B	B	58	60	52	B	R	A	A	A	A	A	
6	A	B	A	R	B	B	B	B	B	B	R	R	B	J	R	B	B	B	B	B	Y	A	A	B	B	
7	A	A	B	A	B	B	B	B	B	B	B	R	52	F	B	B	B	B	B	18	A	A	A	A	A	
8	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
9	B	B	B	R	R	F	R	F	F	F	B	B	B	F	F	B	B	B	B	B	B	B	B	B	B	
10	Y	A	A	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	B	B	A	B	A		
11	18	A	31	B	A	B	A	F	F	A	B	B	B	B	82	82	J	R	B	B	B	A	F	A	B	
12	A	A	B	B	B	A	A	A	B	B	R	B	B	B	B	B	R	B	B	B	B	B	B	B	B	
13	R	25	26	R	R	F	R	A	A	A	F	F	F	B	F	F	F	R	B	B	B	B	Y	Y	Y	
14	A	A	A	A	R	R	F	F	F	F	F	F	F	54	62	R	B	R	B	B	B	B	B	B	R	
15	R	R	R	A	A	A	19	19	F	21	16	30	43	51	59	45	31	28	20	20	19	B	B	B	R	
16	A	A	A	R	R	F	F	F	A	F	F	F	F	F	J	R	45	41	39	28	24	B	R	B	B	
17	B	55	B	A	A	A	A	A	42	R	B	B	B	B	B	62	R	R	A	A	A	A	A	A	A	
18	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A	R	A	A	
19	A	A	A	R	A	R	A	B	B	B	35	B	B	B	B	34	B	B	B	R	A	R	B	R	R	
20	B	A	A	A	A	B	A	A	A	B	R	B	R	B	53	35	B	B	B	B	B	B	B	B	B	
21	B	16	R	17	B	Y	B	B	A	F	26	48	42	51	41	B	B	B	B	Y	A	B	B	A	A	
22	B	B	B	A	R	J	R	B	F	F	20	24	32	B	B	J	R	J	R	B	B	B	Y	B	B	
23	R	A	A	Y	Y	B	Y	B	B	B	B	B	R	R	42	45	42	B	B	B	B	A	B	B	B	
24	Y	A	A	A	A	A	A	R	R	20	24	27	38	38	42	32	35	23	R	Y	B	B	B	B	B	
25	B	Y	A	R	R	A	A	A	A	A	B	B	B	J	R	R	F	36	32	B	B	A	A	A	A	
26	A	A	A	A	A	A	A	A	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
27	R	A	A	A	F	F	F	F	R	A	R	F	F	F	F	F	F	25	24	21	B	A	A	R	R	
28	A	A	A	A	A	F	F	F	F	B	B	B	B	B	B	B	B	B	B	B	R	A	R	A	A	
29	A	A	A	A	Y	B	B	B	B	B	26	38	48	40	43	32	F	B	R	B	B	B	R	B	A	
30	A	A	F	A	A	A	B	A	A	A	B	B	B	B	B	B	B	24	A	A	A	A	A	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	3	4	3	8	9	9	8	8	12	11	14	15	15	16	17	20	12	12	6	4			1			
MED	F	38	26	28	28	26	25	24	26	22	32	42	48	58	53	42	38	30	22	20			34			
U Q	F	54	31	30	32	29	27	26	33	28	35	55	56	64	60	57	51	44	24	23						
L Q	18	20	22	23	22	23	22	21	21	20	26	38	42	52	48	34	28	24	20	18						

JUN. 2012 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2012 ftEs (0.1MHz) 45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4' S LON. 039°35.4' E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	32	36	42	46	49	50	60	40	30	20	32	E B	19	18	15	16	22	E B	14	19	B	39	47	30	B		
2	B	52	68	43	70	54	68	B	B	25	E B	12	18	42	34	E B	14	16	13	12	13	15	B	40	B	82		
3	70	39	40	34	38	40	46	50	35	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	44	34	72	64	58	41	
4	35	44	K	41	E B	23	26	B	B	51	44	B	E B	E B	E B	E B	E B	30	43	40	25	38	40	37	48			
5	71	35	B	62	B	B	B	B	B	B	B	B	B	B	B	E B	E B	E B	B	B	30	44	42	43	43			
6	79	B	31	30	B	B	B	B	B	B	E B	24	30	B	E B	E B	E B	B	B	B	B	16	39	34	K	B		
7	35	40	B	35	B	B	B	B	B	B	B	E B	E B	E B	B	B	B	B	B	E B	12	28	37	36	31	K		
8	27	39	37	31	42	40	44	40	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
9	B	B	B	32	35	33	34	30	29	21	B	B	B	E B	E B	E B	B	B	B	B	B	B	B	B	B	B	B	
10	16	33	37	25	34	40	26	32	E B	13	17	14	17	E B	16	24	41	29	30	E B	E B	E B	B	B	30	B	A	
11	22	39	67	B	33	B	40	22	K	41	32	B	B	B	B	E B	E B	E B	B	B	B	B	K	35	36	41	B	
12	35	39	B	B	B	36	44	35	B	B	30	B	B	B	B	B	E B	E B	E B	B	B	B	B	B	B	B	B	
13	26	32	31	26	18	32	31	44	37	15	16	15	B	32	30	22	16	19	B	B	B	B	B	B	15	16		
14	30	31	30	K	32	42	36	K	14	E B	E B	E B	E B	E B	E B	E B	E B	E B	B	B	B	B	B	B	B	B	20	
15	18	26	22	51	103	70	32	E B	13	26	13	13	23	E B	49	22	E B	K	14	17	19	15	17	18	B	B	21	
16	59	55	35	18	E B	E B	E B	E B	17	52	68	12	34	28	22	13	15	20	36	39	27	B	25	B	B	B		
17	B	50	B	91	52	39	58	43	42	40	B	B	B	B	B	E B	E B	E B	28	26	42	50	42	40	44	39	32	
18	34	68	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	K	K	K	K	34	36	33	33
19	34	27	35	K	33	K	24	28	B	B	E B	27	B	B	B	E B	E B	E B	22	B	B	B	25	34	31	B	24	
20	B	29	34	41	43	B	32	33	35	B	28	B	E B	E B	E B	E B	E B	E B	B	B	B	B	B	B	B	B	B	
21	B	14	17	22	B	19	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	B	B	B	B	16	42	B	B	26	
22	B	B	B	32	24	K	E B	E B	E B	E B	E B	20	12	19	24	B	E B	E B	E B	E B	E B	E B	B	B	B	B	B	
23	24	38	30	16	16	B	16	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	38	B	B	B	B	
24	16	31	32	31	34	41	37	25	K	E B	14	16	15	20	18	20	20	31	32	28	18	B	B	B	B	B		
25	B	19	26	28	46	44	49	50	45	52	B	B	B	B	E B	E B	E B	E B	E B	E B	E B	B	K	37	37	33	28	
26	36	38	41	57	44	44	34	42	B	B	42	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
27	22	34	50	35	28	30	26	28	33	31	34	27	34	20	42	33	E B	E B	E B	E B	E B	B	39	36	22	28		
28	46	36	37	34	43	38	28	16	E B	13	B	B	B	B	B	E B	E B	E B	22	B	B	B	24	32	25	32		
29	34	52	68	64	16	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	B	B	B	B	B	
30	27	32	E B	16	46	41	37	B	49	51	52	B	B	B	B	B	B	B	B	B	31	39	32	35	K	48	58	
31																												
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	23	27	23	27	24	22	22	19	19	17	17	15	15	16	18	20	15	15	11	12	16	19	14	17				
MED	34	36	35	34	34	38	34	33	35	25	E B	16	21	E B	21	E B	E B	E B	E B	20	18	19	26	38	36	35	31	
U Q	36	40	40	43	44	42	44	44	42	42	28	30	34	28	30	28	26	36	40	32	40	40	41	42				
L Q	24	31	30	29	26	30	28	22	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	34	31	30	25	

JUN. 2012 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2012 fmin (0.1MHz) 45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	13	12	12	12	14	12	14	12	13	13	14	18	19	14	15	14	13	14	12	B	13	13	14	B	
2	B	12	12	12	12	12	14	B	B	14	12	13	14	14	14	16	13	12	13	15	B	12	B	14	
3	12	19	18	14	20	13	22	14	12	B	B	B	38	30	36	55	20	56	12	13	14	12	28	13	
4	12	13	16	12	23	15	B	B	15	20	B	22	21	B	30	B	30	14	12	12	12	11	12	13	
5	20	21	B	17	B	B	B	B	B	B	B	B	B	B	B	16	26	17	B	17	13	12	12	13	
6	14	B	14	14	B	B	B	B	B	B	24	16	B	23	B	22	B	B	B	B	11	12	23	B	
7	21	12	B	14	B	B	B	B	B	B	B	B	35	19	B	B	B	B	B	12	12	11	12	20	
8	21	12	13	19	23	14	14	19	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
9	B	B	B	12	13	14	14	13	14	12	B	B	B	18	20	B	B	B	B	B	B	B	B	B	
10	12	13	18	13	12	12	13	13	13	12	14	12	16	14	12	14	12	15	14	B	B	13	B	12	
11	14	22	14	B	20	B	13	13	16	24	B	B	B	B	56	50	B	B	B	B	11	12	23	B	
12	26	13	B	B	B	21	15	27	B	B	20	B	B	B	B	B	26	B	B	B	B	B	B	B	
13	16	12	12	13	12	13	12	16	14	15	12	12	B	17	11	22	16	19	B	B	B	B	13	12	
14	12	14	12	12	13	14	13	12	12	13	13	13	98	21	29	B	18	B	B	B	B	B	B	12	
15	12	11	13	12	13	12	12	13	12	13	13	13	14	14	14	13	13	12	11	12	B	B	B	12	
16	13	12	13	12	14	15	14	12	12	13	12	14	13	12	13	15	19	14	13	14	B	17	B	B	
17	B	28	B	26	24	24	22	20	18	25	B	B	B	B	B	28	15	19	23	22	20	19	14	17	
18	14	17	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	12	15	13	13	12	
19	15	14	14	20	18	13	14	B	B	B	27	B	B	B	B	22	B	B	B	14	13	12	B	12	
20	B	12	14	13	14	B	14	15	17	B	20	B	24	B	23	23	B	B	B	B	B	B	B	B	
21	B	12	13	13	B	14	B	B	13	14	14	14	22	17	20	B	B	B	B	14	23	B	B	16	
22	B	B	B	12	12	12	22	B	20	12	13	16	B	B	30	28	B	B	B	B	B	12	B	B	
23	12	12	12	12	12	B	11	B	B	B	B	B	23	26	B	20	B	B	B	B	12	B	B	B	
24	12	13	12	12	13	17	14	14	14	12	11	13	13	12	13	12	14	15	13	B	B	B	B	B	
25	B	12	12	13	12	18	12	14	14	14	B	B	B	23	20	20	20	14	B	B	20	12	11	12	
26	12	13	16	22	17	24	23	35	B	B	22	B	B	B	B	B	B	B	B	B	B	B	B	B	
27	14	11	12	12	12	12	12	11	14	12	13	13	12	13	13	15	14	14	13	B	18	13	14	17	
28	12	12	12	13	15	13	12	12	13	B	B	B	B	B	B	22	B	B	B	B	16	16	13	13	
29	12	12	12	15	12	B	B	B	B	B	16	17	19	19	20	16	B	14	B	B	12	B	12	12	
30	12	12	16	13	16	22	B	18	13	24	B	B	B	B	B	B	B	14	12	13	14	12	11	14	
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	29	30	30	29	30	30	30	30	30	30	30	30	30	
MED	14	12	14	13	14	15	14	18	16	24	23	35	B	28	30	22	B	B	B	B	22	13	B	16	
U Q	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
L Q	12	12	12	12	12	13	13	13	13	13	13	14	19	17	14	16	16	14	13	14	13	12	13	12	

JUN. 2012 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2012 h'F (KM)

45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	326	A	A	A	A	A	A	A	A	E A	210	214	194	194	184	220	214	244	A	B	A	A	A	B	
2	B	A	A	A	A	A	A	B	B	E A	206	212	212	196	196	196	196	238	210	220		B	A	B	A	
3	A	A	A	226	200		A	A	A	B	B		256	236	244	E B	300	250	268	A	A	A	A	A		
4	A	A	A	E B	268	196	B	B	A	A	B	260	260	B	E B	318	236	232	A	A	A	A	A	A		
5	A	A	E A	262	B	B	B	B	B	B	B	B	B	B	B	E B	250	238	A	B	A	A	A	A		
6	A	B	A	A	B	B	B	B	B	B	280	248	B	228	B	214	B	B	B	B	A	A	A	B		
7	A	A	B	A	B	B	B	B	B	B	B	246	212	B	B	B	B	B	B	236	A	A	A	A		
8	A	A	A	A	A	A	A	A	B	B	B		B	B	B	B	B	B	B	B	B	B	B	B		
9	B	B	B	A	A		A	A	A	A	B	B	B	226	200	B	B	B	B	B	B	B	B	B		
10	Y	A	A	A	A	A	A	A	A	A	300	244	228	234	194	200	200	206	190	194	260	E B	238	B		
11	A	A	190	B	A	B	A	A	A	A	B	B	B	B	238	264	B	B	B	B	B	A	A	A	B	
12	A	A	B	B	B	A	A	A	B	B	A	B	B	B	B	B	254	B	B	B	B	B	B	B	B	
13	A	208	214	A	A	A	A	A	A	A	266	226	204	218	210	208	E B	242	216	B	B	B	B	Y	Y	
14	A	A	A	A	A	A	A	300	284	258	238	212	196	208	200	B	230	B	B	B	B	B	B	B	A	
15	A	A	A	A	A	A	A	B	A	E B	270	214	194	208	206	188	214	202	250	226	216	B	B	B	A	
16	A	A	A	A	E B	314	304	284	A	A	278	230	204	202	190	214	188	202	240	240	226	B	A	B	B	
17	B	196	B	A	A	A	A	A	A	A	B	B	B	B	B	B	A	A	A	A	A	A	A	A	A	
18	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	266	A	A	A	A
19	A	A	A	A	A	A	A	B	B	E B	282	B	B	B	B	220	B	B	B	A	A	A	B	A	A	
20	B	A	A	A	A	B	A	A	A	B	A	B	220	212	222	B	B	B	B	B	B	B	B	B	B	
21	B	A	A	A	B	Y	B	B	A	B	230	206	194	216	200	B	B	B	B	Y	A	B	B	A	A	
22	B	B	B	A	A	A	B	B	B	B	A	A	B	228	220	B	B	B	B	B	B	A	B	B	B	
23	A	A	A	Y	Y	B	Y	B	B	B	B	B	228	228	200	B	B	B	B	A	B	B	B	B	B	
24	Y	A	A	A	A	A	A	A	E B	330	A	238	206	194	194	204	196	196	A	Y	B	B	B	B	B	
25	B	Y	A	242	206	A	A	A	A	A	B	B	B	234	204	216	226	226	B	B	A	A	A	A	A	
26	A	A	A	A	A	A	A	A	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
27	A	A	A	A	A	A	A	A	A	A	A	210	218	202	206	192	220	220	226	B	A	A	A	A	A	
28	A	A	A	A	A	A	330	300	300	300	B	B	B	B	B	B	248	B	B	B	B	A	A	A	A	
29	A	A	A	A	Y	B	B	B	B	B	238	214	208	200	196	202	B	234	B	B	B	A	B	A	A	
30	A	A	E B	336	A	A	B	A	A	A	B	B	B	B	B	B	B	A	A	A	A	A	A	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		3	3	3	3	4	2	4	6	8	12	14	15	16	18	19	14	11	6	4	1					
MED		208	202	234	268	201	317	300	264	255	233	210	212	207	204	208	217	233	229	223	266					
U Q		326	336	262	274	261		300	310	272	249	214	220	227	214	222	238	250	240	231						
L Q		196	190	226	206	198		292	244	243	228	204	200	198	200	196	202	220	226	218						

JUN. 2012 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUL. 2012 f_{XI} (0.1MHz) 45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4' S LON. 039°35.4' E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	B	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R	56			
2		B	R	B	A	B	B	B	A	B	B	B	B	B	B	B	B	X	B	A	A	A	A	A	A			
3		A	A	A	A	B	A	A	B	B	B	B	X	B	X	B	B	B	B	B	B	B	Y	Y	Y			
4		R	A	A	R	R	B	B	B	B	B	B	O	X	B	B	B	B	B	B	B	B	B	B	B			
5		R	R	A	A	B	R	Y				X	X			X	B	B		O	X	B	B	B	A			
6	X	R	R			R	R	R	R	B	B	B	X	X	X	X			B	B	B	Y		R				
7	50		R	R	A	R		B	B	R	R	X	X	X	B	B	B	B	B	B	B	B	B	B	B			
8	B	A	A	A	A	B	X	A	B	O	X	X	O	X	X	X	B	B	B	B	B	B	B	B	B			
9	Y		B	A	B	B	B	B	B	B	B	B	B	B	O	X	B	B	R	B	A	A	A	A	52			
10	A	A	B	R	A	A	B	B	R	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A			
11	B	R	A	B	B	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A			
12	A	R	R	A	A	R	R	B	B	B	B	B	B	B	B	B	B	B		O	X	B	B	A	A			
13	54		A	R	R	B	B	B	B	B	B	B	O	X	B	B	X	O	X	B	B	B	B	B	B			
14	B	B	B	A	B	B	B	B	B	B	B	X	X	X	X	B	B	B	B	B	B	B	B	B	B			
15	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B		74	41	41	37	30		A	R	A			
16	A	R		R	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
17	C	C	C	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	R	B			
18	R	B	B	B	B	A	R	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B			
19	B	B	B	A	A	R	B	B	B	B	O	X	B	B	B	B	B	B	B	B	B	B	B	B	B			
20	B	R	R	R	A	A	A	B	R	R	O	X	O	X	B	X	O	X	B	O	X	O	X	B	A	A	A	A
21	B	A	O	X	A	O	X	R	A	A	A	B	B	B	B	X	O	X	X	O	X	O	X	B	B	B	B	B
22	R	R	R	O	X	O	X	B	B		B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B		
23	R	R	A	A	A	A	B	B	A	A	X	X	X	X	X	X	68	49	41		R	R	B	A	A			
24	A	A	A	B	A	A	A	B	B	B	O	X	B	B	B	O	X	B	B	X	R	A	B	B	B	B	A	
25	A	R	O	X	O	X	O	X	B	A																		
26	B	A	A	A	A	A	A	A	A																			
27	A	A	A	A	A	A	A	A	B																			
28	R	R	R	A	R	R	Y	A	A																			
29	A	A	A	A	A	B	R	A	R	R	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B		
30	Y	R				A	A	B	B	A	B	B	B	B	B	B	X	X	B	Y								
31	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	O	X								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	4	1	4	4	5	1	1	3	2	6	12	11	8	12	11	12	11	10	9	6	1	2	2	3				
MED	51	54	47	48	O	X	X	37	32	35	42	57	62	64	64	54	50	44	37	30	50	49	78	52				
U Q	53		70	54	57			41		38	46	60	66	71	68	66	57	48	49	41				56				
L Q	43		O	X	O	X	O	X				X	O	X	X	X	X	X	X	O	X				X			
			38	40	34			31		32	42	48	58	61	62	49	43	41	34	28				30				

IONOSPHERIC DATA STATION SHOWA-ST.

JUL. 2012 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	F 27	B	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	R 33
2	B	A	B	A	B	B	B	A	B	B	B	B	B	B	B	B	B	35	B	A	A	A	A	A	A
3	A	A	A	A	B	A	A	B	B	B	B	R 42	B	55	B	B	B	B	B	B	B	B	Y	Y	Y
4	R	A	A	A	A	B	B	B	B	B	B	B	56	B	B	B	B	B	B	B	B	B	B	B	
5	R	A	A	A	B	R	Y	F 19	F 20	F 24	F 32	F 52	61	47	56	47	B	B	F 26	R 20	B	B	B	A	
6	46	R	R	35	R	A	R	A	A	B	B	B	53	57	56	53	F 46	22	B	B	B	Y	A	A	
7	A	A	A	A	A	R	B	B	A	R	37	52	56	B	B	B	B	B	B	B	B	B	B	B	
8	B	A	A	A	A	B	24	A	B	R 26	36	47	50	49	J 59	R 66	B	B	R	B	A	A	A	A	
9	Y	F 42	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R	B	A	A	A	A	
10	A	A	B	A	A	A	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	
11	B	R	A	B	B	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
12	A	A	R	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	F 26	R 22	B	B	A	A	
13	A	A	A	R	B	B	B	B	B	B	B	R 41	B	B	62	42	R	B	B	B	B	B	B	B	
14	B	B	B	A	B	B	B	B	B	B	F 30	51	42	55	60	43	R	B	B	B	B	B	B	B	
15	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	65	30	28	24	19	A	F 16	A	
16	A	A	A	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
17	C	C	C	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	R	
18	A	B	B	B	B	A	R	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
19	B	B	B	A	A	R	B	B	B	B	R 36	B	B	B	B	B	B	B	B	B	B	B	B	B	
20	B	R	R	R	A	A	A	B	A	A	R 34	R 38	B	61	66	B	R 42	40	21	B	A	A	A	A	
21	B	A U 35	R 35	A 32	R	R	A	A	A	B	B	B	J 56	R 50	R 35	R 35	R 28	B	B	B	B	B	B	B	
22	R	R	A	36	R 25	B	B	F 31	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
23	R	R	A	A	A	A	B	B	A	A	37	44	J 58	R 55	R 55	50	F 58	F 40	F 31	A	A	B	A	A	
24	A	A	A	B	A	A	A	B	B	B	R 36	B	B	62	56	44	J 44	R 42	F 47	B	B	B	B	A	
25	A	A	R 29	R 32	R 38	B	R	F 27	F 23	F 24	36	B	B	R 68	B	B	J 50	R	A	B	B	B	B		
26	B	A	A	A	A	A	A	A	A	F 29	50	58	B	B	B	B	59	42	B	B	B	A	A	A	
27	A	A	A	A	A	A	A	A	B	F 23	42	54	R 72	J 72	R 43	R 37	R 42	32	A	R	B	B	R		
28	R	R	R	A	R	R	Y	A	A	F 26	45	58	60	F 70	R 56	R 58	J 51	F 49	51	35	R	R	A	A	
29	A	A	A	A	A	B	A	A	A	R	B	B	B	B	B	B	B	B	B	B	B	B	Y	24	
30	Y	A	A	A	29	A	A	B	B	A	B	B	B	B	B	71	51	B	Y	Y	A	C	C	C	
31	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	R 37	F 21	F 21	B	B	B	Y	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	2	1	2	3	4		1	3	2	6	12	11	8	12	11	12	11	10	9	5		1		2	
MED	36	F 42	R 32	35	R 30		24	F 27	F 22	F 25	36	51	56	56	56	48	44	38	F 26	21		F 16		28	
U Q				36	35			F 31		26	40	54	59	65	62	58	51	42	40	28					
L Q				R 32	27			F 19		F 24	35	42	52	55	R 56	R 43	37	28	F 22	20					

IONOSPHERIC DATA STATION SHOWA-ST.

JUL. 2012 ftEs (0.1MHz) 45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	59	B	40	40	33	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	28	38							
2	B	34	B	34	B	B	B	36	B	B	B	B	B	B	B	B	B	B	B	39	35	38	42	41							
3	42	57	52	58	B	35	43	B	B	B	B	B	B	B	B	B	B	B	B	B	B	17	17	18							
4	K	42	67	35	36	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B							
5	19	32	40	40	B	32	17	16	E	B	E	B	26	20	18	E	B	B	B	E	B	B	B	30							
6	E	B	16	30	E	B	E	B	40	30	42	42	B	B	B	E	B	E	B	E	B	E	B	E	B						
7	39	33	42	41	33	27	B	B	33	32	29	E	B	E	B	E	B	E	B	E	B	E	B	E	B						
8	B	37	37	35	40	B	B	36	40	B	32	30	28	39	26	E	B	B	B	B	B	B	B	B	B						
9	16	40	B	50	B	B	B	B	B	B	B	B	B	B	E	B	B	B	B	B	B	B	B	B	B						
10	52	76	B	36	64	81	B	B	42	B	B	B	B	B	B	B	B	B	B	B	B	B	A	32	40						
11	B	31	76	B	B	B	B	B	51	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	31						
12	40	35	34	41	46	35	32	B	B	B	B	B	B	B	B	B	B	B	B	17	20	B	B	31	31						
13	35	38	33	26	B	B	B	B	B	B	B	E	B	B	E	B	E	B	E	B	E	B	E	B	E	B					
14	B	B	B	71	B	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B					
15	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B						
16	94	35	40	32	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C						
17	C	C	C	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	36	33	25	B					
18	29	B	B	B	B	40	22	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B					
19	B	B	B	40	42	22	B	B	B	B	E	B	26	B	B	B	B	B	B	B	B	B	B	B	B	B					
20	B	32	27	25	40	43	43	B	32	35	25	29	E	B	E	B	E	B	E	B	E	B	E	B	E	B					
21	B	47	36	43	54	24	36	51	33	B	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B				
22	17	32	32	29	30	B	B	E	B	23	45	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B					
23	30	K	30	40	42	40	48	B	B	30	42	19	19	20	20	17	15	14	17	18	36	33	B	35	70						
24	64	50	43	B	50	51	69	B	B	E	B	24	B	B	E	B	E	B	E	B	E	B	E	B	E	B					
25	33	35	34	40	60	B	37	31	23	24	16	E	B	56	B	E	B	E	B	E	B	E	B	E	B	E	B				
26	B	33	42	35	59	40	37	36	42	26	16	E	B	25	B	B	E	B	E	B	E	B	E	B	E	B					
27	60	50	34	48	71	105	52	42	B	19	18	41	E	B	25	41	38	34	E	B	19	67	42	41	29	B	B	20			
28	24	24	34	47	32	30	25	70	71	27	18	G	25	28	22	32	E	B	E	B	E	B	E	B	E	B	E	B			
29	45	68	72	94	84	B	42	48	41	32	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B			
30	E	B	29	64	40	33	44	42	B	B	56	B	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B		
31	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23							
CNT	20	24	22	25	19	16	15	11	12	12	12	11	9	12	12	12	11	12	11	10	10	8	14	18							
MED	36	35	40	40	40	40	37	40	37	32	18	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B		
U Q	49	44	43	45	59	46	43	48	42	38	26	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B		
L Q	25	32	34	34	33	31	30	31	31	25	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B

IONOSPHERIC DATA STATION SHOWA-ST.

JUL. 2012 fmin (0.1MHz) 45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4' S LON. 039°35.4' E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	12	B	20	19	21	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	12	14
2	B	28	B	22	B	B	B	26	B	B	B	B	B	B	B	B	B	16	B	13	12	12	16	20
3	23	20	16	14	B	23	20	B	B	B	B	37	B	20	B	B	B	B	B	B	B	12	13	13
4	13	12	20	27	14	B	B	B	B	B	B	B	24	B	B	B	B	B	B	B	B	B	B	B
5	14	13	13	19	B	16	12	12	12	13	12	13	12	14	18	13	B	B	B	13	12	B	B	20
6	46	13	13	27	25	25	20	16	14	B	B	B	29	22	16	14	14	20	B	B	B	12	14	16
7	15	20	26	18	14	14	B	B	18	13	13	20	24	B	B	B	B	B	B	B	B	B	B	B
8	B	13	12	18	15	B	14	20	B	16	13	14	14	14	16	B	B	B	B	B	B	B	B	B
9	13	14	B	20	B	B	B	B	B	B	B	B	B	B	26	B	B	15	B	13	13	16	16	16
10	20	20	B	14	15	16	B	B	22	B	B	B	B	B	B	B	B	B	B	B	B	12	12	12
11	B	12	20	B	B	B	B	B	20	B	B	B	B	B	B	B	B	B	B	B	B	B	B	12
12	18	19	14	14	14	26	16	B	B	B	B	B	B	B	B	B	B	B	14	12	B	B	13	19
13	13	20	20	18	B	B	B	B	B	B	B	27	B	B	29	31	B	B	B	B	B	B	B	B
14	B	B	B	13	B	B	B	B	B	B	16	23	29	31	22	23	B	B	B	B	B	B	B	B
15	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	24	21	14	12	13	14	14	14	14
16	15	18	12	18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
17	C	C	C	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	13	13	14
18	23	B	B	B	B	19	13	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
19	B	B	B	22	16	14	B	B	B	B	26	B	B	B	B	B	B	B	B	B	B	B	B	B
20	B	19	18	18	19	21	29	B	20	13	25	29	B	24	58	B	28	22	14	B	23	18	19	15
21	B	22	16	24	15	14	15	20	13	B	B	B	B	32	31	14	21	20	B	B	B	B	B	B
22	12	14	14	12	13	B	B	23	B	21	B	B	B	B	B	B	B	B	B	B	B	B	B	B
23	12	14	13	15	24	17	B	B	20	17	12	19	20	20	17	15	14	17	18	14	14	B	12	18
24	16	15	13	B	18	16	41	B	B	24	B	B	B	34	30	17	27	14	14	B	B	B	B	12
25	12	12	12	13	13	B	27	13	14	14	16	B	B	56	B	B	23	24	22	B	B	B	B	B
26	B	13	13	12	12	15	13	11	12	12	13	25	B	B	B	24	19	B	B	B	13	14	12	14
27	13	12	12	12	13	11	12	11	B	13	18	24	25	24	18	16	19	15	12	14	12	B	B	12
28	12	13	12	12	12	12	15	12	12	13	13	14	14	16	14	12	16	13	12	11	12	13	14	14
29	13	13	12	14	21	B	26	18	23	22	B	B	B	B	B	B	B	B	B	B	B	B	13	13
30	14	13	13	12	12	17	15	B	14	B	B	B	B	B	B	21	18	B	21	19	15	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	18	14	14	B	B	B	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	29	29	29	30	29	29	29	28	28	29	29	29	29	29	29	29	29	30	30	30	30	29	29	29
MED	16	15	16	18	19	25	41	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	18
U Q	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
L Q	13	13	13	14	14	16	15	19	19	14	16	24	27	24	24	19	21	18	14	14	14	14	14	14

JUL. 2012 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUL. 2012 h'F (KM)

45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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 322	B	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A
2	B	A	B	A	B	B	B	A	B	B	B	B	B	B	B	B	B	270	B	A	A	A	A	A
3	A	A	A	A	B	A	A	B	B	B	B	E B 294	B	206	B	B	B	B	B	B	B	Y	Y	Y
4	A	A	A	A	A	B	B	B	B	B	B	B	232	B	B	B	B	B	B	B	B	B	B	B
5	A	A	A	A	B	A	Y	A	E B 298	B 216	226	216	Q 208	200	208	200	B	B	B	B	B	B	B	A
6	B	R	A	196	208	A	A	A	A	B	B	B	242	218	214	202	Q 212	Q 240	B	B	B	Y	A	A
7	A	A	A	A	A	E A 240	B	B	A	186	240	212	212	B	B	B	B	B	B	B	B	B	B	B
8	B	A	A	A	A	B	A	A	B	A	Q 274	Q 234	200	210	220	B	B	B	B	B	B	B	B	B
9	Y E 244	A	B	A	B	B	B	B	B	B	B	B	B	B	E B 282	B	B	A	B	A	A	A	A	A
10	A	A	B	A	A	A	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A
11	B	A	A	B	B	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A
12	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	Q E 230	A	B	B	A	A
13	A	A	A	A	B	B	B	B	B	B	B	208	B	B	200	208	B	B	B	B	B	B	B	B
14	B	B	B	A	B	B	B	B	B	B	226	200	206	206	194	200	B	B	B	B	B	B	B	B
15	B	B	B	B	B	B	B	B	B	B	B	B	B	B	E B 404	394	252	252	252	E B 252	A E B 264	A	A	A
16	A	A	A	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
17	C	C	C	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A
18	A	B	B	B	B	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
19	B	B	B	A	A	A	B	B	B	B	242	B	B	B	B	B	B	B	B	B	B	B	B	B
20	B	A	A	A	A	A	A	B	A	A	B E B 278	B 252	B	258	284	B	242	190	238	B	A	A	A	A
21	B	A	A	A	A	A	A	A	A	B	B	B	E B 226	218	A	198	198	B	B	B	B	B	B	B
22	A	230	A	A	A	B	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B
23	A	A	A	A	A	A	B	B	A	A	224	228	218	206	206	200	214	208	Q E B 242	A	A	B	A	A
24	A	A	A	B	A	A	A	B	B	B	242	B	B	212	200	212	220	212	212	Q	B	B	B	A
25	A	212	216	206	234	B	A	A E B 296	E A 210	A	210	B	E B 228	B	B	B	188	238	A	B	B	B	B	
26	B	A	A	A	A	220	A	A	A E A 242	216	186	B	B	B	206	194	B	B	B	B	A	A	A	A
27	A	A	A	A	A	A	A	A	B E A 252	210	214	198	198	198	198	214	214	198	A	A	B	B	A	
28	A	A	A	A	A	A	Y	A	A	A	214	210	Q 196	202	216	216	Q 200	240	204	212	A	208	A	A
29	A	A	A	A	A	B	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	Y	198
30	196	A	A	A	212	A	A	B	B	A	B	B	B	B	B	212	234	B	A	200	194	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	Y	234	198	B	B	B	Y
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	2	3	2	2	4	2			1	5	12	11	9	12	12	11	11	10	9	5	1	2		2
MED	259	221	219	201	217	230			E B E A 298	242	226	212	208	207	209	204	214	226	221	206	194	236		210
U Q	E A 244			228					E A 274	242	234	225	222	219	212	234	240	240	244					
L Q	212			210						201	215	208	199	204	200	200	198	208	202	199				

JUL. 2012 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2012 f_{XI} (0.1MHz) 45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4' S LON. 039°35.4' E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	O X 22	A O X 32	O X 39	A R		39	32		B	X O X 36 49	X O X 60 71	X O X 75 75	X 78	69		B O X 50	B	B	B	B	B	B	B	B	
2	A	A	A	A	R	32	31	34	33	41	51	76	72	67	72	74	74	65	58		B	B	A	A	40
3	A	B	B	B	S	B	A	A	B	B	B	B	B	B	B	B	X 54	47		B	B	B	B	B	R
4	R O X 34	X O X 32	O X 32	32	A	A	A	A	R	B	B		81	81	78	78	69	O X 48	31	38	O X 32	B	R	R	
5	A	A	R	R	A	X O X 28 31	X 32	X 32	32	42	54	70	77	82	79	82	62	48	44	37	22	X 22	A	A	A
6	A	A	A	A	B	A	A	B	A O X 47	X O X 48	X O X 67	X 72	B	X O X 79	X 88	X 87	74	46	33	O X 31	O X 34	A	A	A	
7	A	42	A	B	R O X 43	A		37	37	44	51	57	82	B	B O X 78	B	B	B	B	B	B	B	A	A	
8	A	A	A	A	R	B	68	47	52	49		B	B O X 72	X 80	X 83	B	B	B	B	B	B O X 24	A O X 28	52		
9	O X 35	A	A O X 38	A	B	A	A	R	A	R	X O X 59	X 72	B	B	X 75	B	B	B	X 38	X 27	B	B	B	R	
10	R	R	R	R	A O X 35	B	B	X O X 33	X 46	X 59	X 70	X 71	79	87	68	X O X 51	X O X 47	43		B	B	B	B	B	
11	B	B	B	O X 29	34	39	B	B	X O X 32	X 48	X O X 64	X O X 67	X O X 69	87	83	66	66		B	X 51	X 39	X 24	B	A O X 32	
12	A O X 37	X O X 38	A	A	B	A	A	A	A	X 61	X 52	B		O X O X 71	O X 64	X 50	X 57	X 48	35	26	O X 28	X 30	A	A	
13	A	A	A	A	A O X 37	X 32	X 40	X 41	42		B	B	63	B	64	66	55	50	47	31	26	A O X 28	A	A	
14	A	R	A	B	A	A	A	A	B	R O X 47	X O X 52	X O X 57	X O X 66	X O X 72	74	67	68	43	38	26	B	B	B	A	A
15	B	B	A	A	A	B	R	X 33	X 34	X O X 46	X O X 52	X 57	X O X 66	X O X 72	74	67	68	43	38	26	B	B	B	A	A
16	O X 37	71	O X 38	R	A	R	B	B	X O X 34	X O X 44	X O X 50	X 62	X O X 84	X O X 86	X 83	69	57	55	41		B	B	A	A	A
17	A	B	R	A	A	B	R	B	B	B	B	B	B	X 64	X O X 68	X 71	B	B	B	B	B	B	R O X 38		
18	A	A	A	B	B	R	A	B	B	B	B	X 56	X 60	X 59	X 67	X 72		B O X 49	X O X 39		B O X 28	A	A O X 56		
19	54	O X 49	A	52	B O X 41	X 41	43	42	45	X O X 50	X O X 60	X O X 63	X O X 67	X 74	X 70		B O X 69	X 68		R	R O X 37	X O X 32	A	A	
20	55	69	R	B	A	B	A	B	B	B	B	B	B	B	B	B	B O X 64	X 51		B	B	B	A	R	
21	R	A	A	R	R	B	R	X 31	X O X 36	X 49	B	X 67	X O X 73	X O X 72	X O X 72	X	B	B	X 47	X 38	A	B	B	R	
22	A	A	A	R	B	X 31	X 33	X 35	X 36	B	B	B	X 73	X 73	X O X 76	X O X 74	X 64	X 68		30	27	B	B	R	
23	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B O X 74	X O X 70	X 65	O X 47		B O X 34	A	A	A	
24	A O X 32		52	B	A	A	A	B O X 47	X 53	X 56	B	B	B	B	B	B	B	X 62	X O X 52	X O X 49	B	B	A	A	
25	A	49	B	A	R	R	A	X 41	X 40	X 48	B	B	B	B	B	B	B	B	X 58	X 39	R O X 31	A	71		
26	59	B	R	R	R	A O X 36	X 40	X 42	B	B	B	B	70	O X O X 66	X 68	X 68	B	B	X 54	X 42	27	A	A	A	
27	B	B	B	A	A	A	A	B	B O X 46	X O X 55	B	B	X 76	X 75	X 70	X 69	X 58	X 46	X 47	X 28	B	B	B	Y	
28	R	48	R	R	A	R O X 34	C	C	C	C	C O X 72	X 80	X 80	X 72	X 78	X 80	X 63	X 50	X 36		B	B	B	B	
29	B	B	R	A	R O X 24	X O X 24	X O X 32	X O X 44	B	B	X 76	X 88	X O X 87	X 77	X 76	X 74	X 58	X 57	X 47	O X 31	B	B	B	B	
30	B	B	B	B	B	B	B	B	B O X 68	X 76	X 93	B	X 76	X 87	X 77	X 72	B O X 72	X 41	X O X 28		B	B	B	R	
31	R	A	A	X O X 23	X O X 26	31	42	40	50	65	77	80	87	90	80	74	67	X 51	R O X 40		B	B	B	B	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	6	9	4	7	3	10	11	14	16	18	15	19	22	21	22	26	20	21	24	17	14	4	4	6	
MED	46	48	O X 35	X O X 38	X O X 32	X 34	X 34	X 36	X 36	X O X 46	X O X 52	X 62	X 72	X 76	X 75	X 73	X 66	X 57	X 48	X 38	X O X 28	X O X 32	X O X 29	46	
U Q	55	59	O X 38	O X 52	O X O X 34	O X 39	O X 41	O X 40	O X 42	O X 48	O X 59	O X 70	O X 81	O X 82	O X 79	O X 76	O X 70	O X 65	O X 52	O X 40	O X 31	O X 36	O X 31	56	
L Q	O X 35	X O X 36	X O X 32	O X 29	O X 26	X O X 31	X O X 31	X 32	X 34	X 44	X O X 50	X 57	X 70	X 69	X 72	X 69	X 60	X 48	X 44	X 32	X O X 26	X O X 30	X O X 28	X O X 38	

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2012 foF2 (0.1MHz) 45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	R 16	A	R 26	R 33	A	A	F 23	F 21	B	30	43	54	65	69	69	R 72	F 59	B	R 44	B	B	B	B	B		
2	A	A	A	A	R	F 22	F 21	F 21	F 22	35	J 45	J 45	R 70	66	F 57	66	F 64	68	F 56	46	B	B	A	A	R 34	
3	A	B	B	B	S	B	A	A	B	B	B	B	B	B	B	B	48	41	B	B	B	B	B	B	R	
4	A	R 28	R 26	R 26	R 22	F A	A	A	A	R	B	B	F 68	F 70	F 72	72	F 53	R 42	F 19	F 26	R 26	B	R	R		
5	A	A	A	A	A	R 22	R 25	26	22	36	48	64	71	76	J 73	R 76	F 52	F 40	F 34	F 27	F 16	A	A	A		
6	A	A	A	A	B	A	A	B	A	R	R	41	42	61	66	R B	J 73	R 82	81	63	40	23	25	28	R A	A
7	A	F 24	A	B	A	R 37	A	F 28	F 29	38	45	51	76	B	B	U 72	R	B	B	B	B	B	B	A	A	
8	A	A	A	A	R	B	R 33	R 41	F 41	43	A	A	A	66	74	77	B	B	B	B	B	18	R	A	R A	
9	R 29	A	A	R 32	A	B	A	A	A	A	A	53	66	B	B	69	B	B	B	32	21	B	B	B	R	
10	A	A	A	A	R	R 29	B	B	27	40	53	64	65	73	J 81	R 62	R 45	R 41	37	B	B	B	B	B	B	
11	B	B	B	F 21	28	28	B	B	R 26	42	58	61	63	J 81	R 77	R 60	R 60	B	45	33	18	B	A	R 26		
12	A	31	32	A	A	B	A	A	A	A	55	46	B	65	63	58	44	51	38	24	15	22	24	A		
13	A	A	A	A	A	R 31	26	34	31	33	B	B	57	B	58	J 60	R 49	44	41	18	F 17	F 22	24	A		
14	A	R	A	B	A	A	A	A	B	R	R	41	46	R	74	B	R 68	B	58	58	B	B	B	B	B	
15	B	B	A	A	A	B	A	27	28	40	46	51	60	66	68	61	58	37	32	20	B	B	B	A		
16	R 31	R 31	R 32	A	A	R	B	B	28	38	44	56	78	80	77	63	51	46	30	B	B	A	A	A		
17	A	B	A	A	A	B	B	A	B	B	B	B	B	58	62	65	B	B	B	B	B	B	R	R 32		
18	A	A	A	B	B	R	A	B	B	B	B	50	54	53	61	66	B	R 43	R 33	B	R 22	A	A	R 50		
19	A	R 43	A	R	B	R 35	35	31	F 32	39	44	54	57	61	R 68	64	B	R 63	J 62	R	A	R 31	R 26	A		
20	J 49	R 24	F	A	B	A	B	B	B	B	B	B	B	B	B	B	58	45	B	B	B	B	R 26	A		
21	A	A	A	A	A	B	R	25	30	43	B	R 61	67	66	66	66	B	B	41	32	A	B	B	A		
22	A	A	A	A	B	25	27	F 24	30	B	B	B	67	67	70	68	58	58	B	24	15	B	B	A		
23	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	R 68	64	F 56	41	B	R 28	A	A	A		
24	A	26	A	A	B	A	A	A	B	R	41	47	50	B	B	B	B	R 56	R 46	R 43	B	B	A	A		
25	A	A	B	A	A	A	A	F 30	34	42	B	B	B	B	B	B	B	B	52	33	A	R 25	A	A		
26	F 37	B	A	A	A	A	30	F 30	36	B	B	B	F 60	R 60	62	62	B	B	48	30	F 17	A	A	A		
27	B	B	B	A	A	A	A	B	B	R	R	40	49	B	J 70	R 69	64	63	52	40	F 38	F 18	B	B	Y	
28	R	A	A	R	A	A	R 28	C	C	C	C	C	U 66	R 74	66	68	F 74	R 57	F 40	30	B	B	B	B		
29	B	B	R	A	R	R 18	18	26	38	B	B	70	J 82	R 81	R 71	70	68	52	J 51	R 37	25	B	B	B		
30	B	B	B	B	B	B	B	B	U 62	R	B	R 69	87	R	B	J 66	R	B	66	35	R 22	B	B	A		
31	R	A	A	17	R 20	F 21	F 24	F 24	F 39	F 59	J 71	R 74	81	J 84	R 74	R 68	J 61	R	45	34	B	B	B	B		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	5	7	4	5	3	10	11	14	16	18	15	19	22	21	22	26	20	21	24	17	14	5	4	4		
MED	R 31	28	R 29	R 26	22	26	26	F 26	30	40	46	56	66	70	69	66	58	51	41	30	18	26	23	R 33		
U Q	43	31	32	32	28	31	30	30	35	42	53	64	71	75	J 73	R 69	64	58	46	34	25	30	25	42		
L Q	R 22	F 24	R 26	19	R 20	22	F 23	F 24	28	38	44	51	63	63	66	63	52	42	36	24	F 17	R 24	22	R 29		

AUG. 2012 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2012 ftEs (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	K 14	33	33	43	41	33	24	27		BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	B	B	B	B	B	
2	32	82	43	43	26	18	E 14	BE 13		30	28	18	G E	BE	BE	BE	BE	BE	BE	B	B	41	42	70	
3	46		B	B	S	B		42	38		B	B	B	B	B	B	BE	BE	BE	B	B	B	B	18	
4	31	31	32	32	30	42	43	43	38	36		B	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	
5	48	42	32	26	67	38	41	35	E 12	BE 13		22	22	25	25	17	18	15	17	31	11	31	34	32	
6	36	46	76	51	B	39	36	B	50	42	30	E B	28	30	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	
7	43	48	42		36	44	44	19	K 15	BE 18		22	28	35	B	BE	BE	B	B	B	B	B	36	43	
8	43	43	51	50	30		32	42	40	38		B	BE	BE	BE	BE	B	B	B	B	21	25	30	33	
9	36	40	44	42	66		48	61	40	50	44	E 37	BE 63		B	BE	BE	B	B	BE	BE	BE	BE	21	
10	29	33	31	31	22	K 26	B	BE	BE	BE	BE	BE	28	24	G	30	GE	BE	BE	BE	BE	B	B	B	
11	B	B	BE	BE	BE	BE	B	BE	BE	BE	B	GE	B	G	G	GE	BE	BE	BE	BE	BE	BE	B	35	
12	41	43	68	71	40		43	60	48	40	24	25		BE	BE	BE	BE	BE	BE	B	BE	BE	BE	75	
13	70	42	42	41	43	31	39	37	E 19	BE 14		B	G	BE	BE	B	G	K 18	26	13	28	16	42	33	
14	K 37	35	K 36	B	44	37	32	42	B	31		GE	BE	E 27	BE	BE	BE	BE	BE	BE	B	B	B	B	
15	B	B	71	55	41		34	E 21	BE 16	BE 18		GE	BE	22	GE	BE	BE	BE	BE	BE	B	B	B	28	
16	38	38	57	33	65	32		BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	B	B	74	105	
17	71		B	37	42	40		B	B	B	B	B	BE	BE	BE	BE	BE	BE	BE	B	B	B	22	40	
18	52	49	38		B	32	62		B	B	B	BE	BE	BE	BE	BE	BE	BE	BE	B	BE	BE	30	80	
19	53	58	71	33	B	38	32	31	E 16	S 16	GE	B	G	E	BE	BE	BE	BE	BE	BE	BE	BE	BE	39	
20	46	42	31		41		36		B	B	B	B	B	B	B	B	BE	BE	BE	B	B	30	36	28	
21	K 33	38	43	33	34	B	25	25	S 17	E 30		BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	B	28	
22	37	47	43	32		18	31	22	27		B	B	BE	SE	BE	BE	BE	BE	SE	S	BE	BE	B	29	
23	51	44	43	43	42	40	50		B	B	B	B	B	B	B	BE	BE	BE	BE	BE	B	34	37	42	
24	36	36	37	E 28	B	41	41	47	BE	BE	BE	BE	B	B	B	B	BE	BE	BE	BE	B	B	34	66	
25	42	41		54	32	33	45	31	E 30	B 20		B	B	B	B	B	B	BE	BE	BE	BE	BE	BE	58	
26	46		B	34	34	32	42	36	K 28	29		B	B	GE	BE	BE	BE	B	B	BE	BE	BE	BE	39	
27	B	B	B	36	44	38	41		B	B	E 26	33		BE	BE	BE	BE	BE	BE	BE	BE	BE	B	17	
28	25	37	34	K 24	41	33	24		C	C	C	C	C	25	G	G	GE	BE	BE	BE	BE	B	B	B	
29	B	B	26	42	26	18	E 13	BE 18	BE 18	B	B	BE	BE	30	27	21	G	GE	B	E	BE	BE	BE	B	
30	B	B	B	B	B	B	B	B	BE	BE	B	B	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	B	B	K 28
31	22	30	36	28	E 16	S 16	E 16	BE 16	BE 18	BE 22		G	31	GE	BE	BE	B	E	BE	BE	BE	BE	B	B	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	26	23	26	25	24	22	26	21	20	22	16	19	23	22	21	26	20	22	24	18	17	13	18	25	
MED	40	42	40	36	40	33	36	31	E 20	BE 24	BE 23	BE 28	BE 25	BE 28	BE 27	BE 26	BE 22	BE 20	BE 20	BE 16	BE 16	36	36	39	
U Q	46	46	44	43	42	39	43	42	34	36	28	32	35	41	52	32	24	25	24	20	30	42	42	53	
L Q	33	36	34	32	30	26	31	E 22	BE 16	BE 20		G	24	G	23	GE	BE	BE	BE	BE	BE	BE	B	28	

AUG. 2012 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2012 fmin (0.1MHz) 45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	11	13	12	16	14	12	11	15	B	20	23	27	36	55	54	28	24	B	25	B	B	B	B	B
2	14	19	20	14	14	13	14	13	12	12	12	16	20	18	20	12	18	13	12	B	B	14	12	13
3	12	B	B	B	S	B	22	14	B	B	B	B	B	B	B	B	24	25	B	B	B	B	B	12
4	12	11	12	11	12	12	13	14	20	15	B	B	50	23	18	14	14	25	12	12	14	B	12	12
5	13	14	13	12	12	12	11	10	12	13	13	18	22	18	15	17	13	15	17	12	11	12	12	10
6	12	14	13	16	B	25	19	B	20	16	20	28	24	B	56	30	14	20	20	14	12	11	12	12
7	14	12	12	B	22	16	13	14	15	12	14	29	35	B	B	54	B	B	B	B	B	B	12	13
8	14	20	12	28	16	B	14	15	14	12	B	B	57	27	26	B	B	B	B	B	12	12	12	12
9	12	17	12	14	12	B	13	16	26	13	14	37	63	B	B	32	B	B	B	24	18	B	B	15
10	12	12	12	12	14	20	B	B	14	22	28	18	17	20	18	20	21	20	20	B	B	B	B	B
11	B	B	B	14	20	20	B	B	18	22	16	34	18	18	17	18	53	B	22	14	12	B	12	13
12	12	12	13	17	23	B	19	17	12	20	12	13	B	50	27	22	20	14	11	14	12	12	12	13
13	14	16	16	12	13	12	13	13	19	14	B	B	18	B	29	12	15	15	13	11	12	11	11	12
14	14	12	12	B	15	18	13	26	B	26	22	27	28	41	B	20	B	14	13	B	B	B	B	B
15	B	B	14	13	16	B	16	21	16	18	15	22	19	26	26	20	16	12	14	13	B	B	B	12
16	13	11	15	26	20	28	B	B	25	22	29	27	39	56	24	34	22	12	12	B	B	18	20	14
17	12	B	27	17	16	B	B	25	B	B	B	B	B	28	50	23	B	B	B	B	B	B	12	12
18	13	13	16	B	B	26	13	B	B	B	B	30	22	23	25	46	B	28	17	B	13	12	12	14
19	12	12	22	19	B	13	12	11	E S	16	13	24	19	20	23	20	56	B	60	28	20	21	13	12
20	14	14	13	B	21	B	23	B	B	B	B	B	B	B	B	B	18	14	B	B	B	13	11	12
21	23	16	14	22	21	B	18	14	17	30	B	34	25	28	56	26	B	B	20	16	12	B	B	12
22	13	21	16	15	B	12	12	13	16	B	B	B	30	50	36	24	21	16	B	13	13	B	B	12
23	12	12	16	13	13	21	15	B	B	B	B	B	B	B	B	56	54	21	30	B	13	12	12	20
24	12	12	12	28	B	29	17	13	B	29	23	35	B	B	B	B	B	23	23	24	B	B	11	13
25	16	12	B	20	20	25	16	13	12	20	B	B	B	B	B	B	B	B	B	34	16	12	11	12
26	12	B	24	27	22	27	12	12	12	B	B	B	17	26	31	26	B	B	14	13	12	12	12	12
27	B	B	B	20	14	16	17	B	B	19	33	C	C	56	59	32	53	26	16	12	13	B	B	12
28	13	12	13	16	14	17	13	C	C	C	C	C	16	14	19	13	22	18	15	21	B	B	B	B
29	B	B	20	14	15	12	13	18	18	B	B	30	20	20	19	22	17	19	15	14	14	B	B	B
30	B	B	B	B	B	B	B	B	B	54	B	25	28	30	B	57	B	57	B	18	19	B	B	12
31	14	12	12	12	12	16	16	16	18	22	22	22	19	29	56	20	24	21	20	18	B	B	B	B
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	30	31	31	30	30	30	30	30	31	31	31	31	31	31	31	31	31	31	31	31
MED	13	14	14	17	16	21	15	16	18	22	31	32	28	30	36	26	24	23	20	18	19	B	12	13
U Q	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
L Q	14		22	28	22		19									56			34					15
L Q	12	12	12	14	14	13	13	13	15	15	20	25	20	23	20	20	18	15	14	14	12	12	12	12

AUG. 2012 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2012 h'F (KM)

45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	214	220	230	A	188	196	386	E	S	B	228	226	212	E	B	E	B	E	B	218	B	B	B	B
2	A	A	A	A	A	A	E	B	E	B	E	A	202	202	202	194	222	208	222	222	218	B	B	A	A
3	A	B	B	B	S	B	A	A	B	B	B	B	B	B	B	B	B	220	226	B	B	B	B	B	A
4	A	184	202	192	208	A	A	A	A	208	B	B	236	208	204	198	204	230	E	B	212	212	E	B	A
5	A	A	A	A	A	A	A	A	E	B	272	232	224	204	214	194	194	200	192	210	202	202	234	A	A
6	220	A	A	A	B	A	A	B	A	A	A	236	E	B	B	240	220	204	196	236	228	240	220	A	A
7	A	A	A	B	A	A	A	E	B	288	234	208	210	226	E	B	B	E	B	B	B	B	B	A	A
8	A	A	210	A	A	B	190	198	216	206	B	B	E	B	B	302	226	240	B	B	B	B	234	A	A
9	226	A	A	230	A	B	A	A	A	A	196	E	B	E	B	B	B	B	B	B	B	B	B	B	A
10	A	A	A	A	A	A	B	E	B	E	B	B	262	256	220	202	192	214	208	196	196	214	206	B	B
11	B	B	B	B	B	B	B	B	B	224	202	202	202	214	214	190	308	E	B	B	220	200	224	B	A
12	A	E	A	232	A	A	B	A	A	A	A	234	242	B	232	234	224	202	208	212	212	212	212	194	224
13	A	A	A	A	202	226	218	288	264	E	B	218	B	210	202	194	202	196	248	220	A	208	A	A	
14	A	206	A	B	A	A	A	A	B	A	A	240	E	B	E	B	B	E	B	B	230	200	B	B	B
15	B	B	A	A	A	B	A	B	E	B	268	234	220	220	216	208	188	202	192	208	218	B	B	B	A
16	218	224	224	A	A	A	B	B	B	250	256	244	228	252	214	212	194	216	E	A	B	B	A	A	
17	A	B	A	A	A	B	B	A	B	B	B	B	B	240	E	B	230	B	B	B	B	B	B	A	224
18	A	198	A	B	B	R	A	B	B	B	B	E	B	260	204	206	224	236	B	214	216	260	A	A	
19	220	210	A	A	B	A	234	230	266	232	234	228	198	206	226	278	B	E	B	E	A	A	212	202	
20	A	260	A	B	A	B	A	B	B	B	B	B	B	B	B	B	208	250	Q	B	B	B	190	A	A
21	A	A	A	A	A	B	A	A	S	276	244	B	226	228	208	E	B	208	B	B	208	214	A	B	A
22	A	A	A	A	B	A	A	A	A	B	B	B	B	214	228	210	222	196	210	B	200	200	B	B	A
23	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	256	256	228	254	E	B	216	A	A
24	A	216	A	190	B	A	212	A	E	B	E	B	E	B	B	B	216	202	208	B	B	B	B	A	A
25	A	208	B	A	A	A	A	A	A	230	B	B	B	B	B	B	B	B	B	B	304	242	A	218	A
26	224	B	A	A	A	A	A	A	270	B	B	B	208	222	224	224	B	B	214	198	246	B	A	A	A
27	B	B	B	A	A	A	A	B	E	A	E	B	B	E	B	E	B	E	B	B	Q	210	204	B	B
28	A	A	A	A	A	A	A	C	C	C	C	C	216	192	202	202	202	194	204	212	B	B	B	B	
29	B	B	A	A	A	A	B	E	B	292	234	B	220	220	210	200	202	200	200	194	194	208	B	B	
30	B	B	B	B	B	B	B	B	E	B	298	B	208	220	214	244	B	244	B	226	304	B	B	A	
31	A	A	A	208	196	S	S	256	E	B	216	210	198	210	210	226	238	198	214	190	204	210	B	B	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	5	10	5	5	2	3	6	7	12	18	14	19	23	22	22	26	20	22	24	17	14	5	6	4	
MED	220	210	220	200	202	202	212	227	269	231	218	215	213	212	216	210	202	213	210	212	216	212	209	236	
U Q	225	224	228	230		212	234	292	279	256	234	242	232	230	238	230	218	228	224	227	240	219	216	248	
L Q	219	206	206	191		188	196	218	248	228	202	208	208	208	208	202	196	202	205	201	208	192	202	217	

AUG. 2012 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2012 f_{XI} (0.1MHz)

45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4' S LON. 039°35.4' E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	Y	B	B	B	O X 34	A	A			X	X	X	X	O X	O X	R	R	B	B	B	B	B	B	B	
2	B	R	R	A	57	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	R	A	B
3	R	B	B	B	B	R	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
4	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	O X 42	B	B	A	B
5	A	R	A	A	80	B	B	B	B	B	B	C	C	C	C	C	C	C	C	C	C	C	C	A	X 33
6	A	A	B	R	B	B	B	A	O X	O X	O X	O X	O X	O X	B	X	B	X	X	X	X	B	O X	X	A
7	A	A		A	R	R	R	B	B	O X	X	B	B	B	B	B	O X	O X	O X	O X	O X	A	A	A	A
8	B	B	R	A	R	B	R	B	B	B	B	B	B	B	B	O X	X	O X	X	B	O X	X	A	O X	X
9	R	O X	O X	X	R	R	R	X	O X	R	X	O X	X	B	X	O X	X	X	X	X	X	X	B	B	B
10	A	A	R	B	R	A	R	O X	O X	X	B	B	76	R	X	X	O X	O X	O X	O X	X	X	B	B	B
11	B	B	B	B	O X 25	52	31	46	58	67	88	88	90	92	91	88	56	73	56	53	34	25		B	B
12	A	B	B	B	A	A	B	R	R	X	X	X	O X	X	X	X	X	X	X	X	O X	X	X	B	A
13	58	A	A		A	A	A	O X	X	B	B	B	B	O X	X	B	X	X	X	X	X	X	B	R	R
14	A	A		A	A	O X 70	36	B	B	B	R	X	O X	X	X	X	X	X	X	X	X	O X	X	B	Y
15	R	R	A	B	A	A	A	B	O X	O X	X	X	X	X	X	X	73	73	66	66	56	B	A	A	
16	55	R	R	B	B	B	B	B	B	O X	O X	O X	X	O X	R	X	X	O X	X	X	X		B	A	A
17	Y	R	B	B	B	R	A	X	O X	O X	X	X	X	X	X	O X	X	X	X	X	X	X	X	B	B
18	59	R	R	B	R	A	B	B	B	B	B	B	O X	X	X	X	O X	X	X	X	X	R	Y	R	R
19	Y	Y	R	X	X	X	B	B	O X	X	X	X	X	X	X	X	X	X	X	X	O X	X	A	A	
20	A	A	B	A	B	A	A	O X	X	O X	X	X	X	X	X	B	X	X	O X	X	X	A	A	A	
21	59	A	A	A	R	R	B	B	B	B	X	R	O X	X	X	X	X	X	X	X	X	B	B	34	
22	X	R	R	A	B	A	A	R	O X	O X	O X	X	X	B	B	B	B	B	O X	X	X	X	X	A	
23	B	R	R	B	X	33	38	O X	X	O X	R	X	X	X	X	X	X	X	X	X	O X	X	X	X	
24	33	32	34	38	X	42	42	B	B	O X	R	X	X	R	R	R	O X	O X	O X	O X	X	O X	X	O X	
25	X	S	S	A	A	S	S	X	X	X	O X	O X	X	X	X	X	O X	O X	O X	X	X	X	X	30	
26	B	28	O X	30	31	41	48	64	76	82	88	90	97	104	R	X	X	X	X	X	X	S	X	X	
27	R	O X	R	A	A	B	O X	B	X	B		X	X	X	X	X	X	X	X	X	X	O X	X	X	
28	31	B	B	A			B	B	B	O X	X	O X	X	X	O X	X	X	X	X	O X	X	O X	X	X	
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	R	X	X	X	X	R	
30	B	R	X		A	R	O X	X	X	O X	O X	O X	X	X	X	O X	O X	O X	O X	O X	O X	A	B	A	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	8	4	5	6	9	7	8	11	15	17	18	19	21	20	17	20	22	24	24	26	18	13	10	9	
MED	44	38	44	50	42	42	X	X	X	O X	X	X	X	X	X	X	X	X	X	X	X	X	41	36	
U Q	58	O X	44	51	68	50	52	O X	X	O X	X	X	X	X	X	X	X	X	X	X	X	X	41	36	
L Q	X	30	30	38	X	37	X	O X	O X	O X	O X	X	X	X	X	X	X	X	X	X	X	X	X	X	

SEP. 2012 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2012 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	Y	B	B	B	R 28	A	A	F 33	F 46	57	65	75	82	78	76	R	R	R	B	B	B	B	B	B			
2	B	R	R	A	F 30	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	R	A	B		
3	A	B	B	B	B	R	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B		
4	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	36	B	B	A	B	
5	A	A	A	A	Y	B	B	B	B	B	B	C	C	C	C	C	C	C	C	C	C	C	C	A	27		
6	A	A	B	R	B	B	B	A	R 43	R 51	R 51	R 56	62	58	B	J 53	R	B	52	42	33	B	B	U 21	R A		
7	A	A	F 32	A	A	A	A	B	B	B	43	B	B	B	B	B	R	88	69	57	30	A	A	A	A		
8	B	B	R	A	R	B	A	B	B	B	B	B	B	B	B	R	67	73	67	B	42	25	A	A	30		
9	A	U 37	R	A	A	A	A	A	R 41	R 42	R	61	62	B	J 72	R	R	F 70	F 67	F 57	F 54	B	B	B	A		
10	A	A	A	B	R	A	A	R 40	U 46	R 52	R	B	B	F	R	J 70	R	R	71	68	42	41	35	B	B	B	
11	B	B	B	B	S 19	R 23	R 25	R 40	R 52	61	82	J 82	R 84	R 86	R 85	R 82	R	U 50	R	J 67	R	R	28	19	B	B	
12	A	B	B	B	A	A	B	R	R	64	64	J 81	R 83	R 86	R 76	R 82	R	J 83	R	69	58	46	F 26	19	B	A	
13	A	A	A	A	A	A	A	R 36	40	B	B	B	B	58	58	R	B 60	J	59	50	45	43	23	F B	A	A	
14	A	A	A	A	A	A	R 30	B	B	B	R	64	69	78	J 74	R	70	J	69	R 64	58	53	36	20	R	B	Y
15	R	R	A	B	A	A	A	B	R 40	R 41	56	60	J 73	80	J 76	R	67	67	60	J	60	F 46	B	A	A	A	
16	A	R	R	B	B	B	B	B	B	R	43	49	53	60	65	J	65	58	58	60	42	28	F	B	A	A	
17	Y	A	B	B	B	A	A	R 42	R 43	R 57	R 64	R 74	83	82	J 78	R	78	70	68	53	43	F 30	F 24	B	B		
18	Y	R	A	B	A	A	B	B	B	B	B	B	U 72	R 85	R 82	87	81	72	F	F	Z	A	Y	R	R		
19	Y	Y	R		F 24	31	39	B	B	J 41	R 54	66	74	78	78	J 73	R	77	77	66	44	R	A	61	A	A	
20	A	A	B	A	B	A	A	42	45	48	54	58	59	62	65	B	66	60	51	41	27	F	A	A	A		
21	A	A	A	A	A	A	B	B	B	B	61	R	64	76	80	80	J	R	76	63	58	53	24	B	B	F 23	
22	22	R	A	A	B	A	A	A	R 46	56	60	62	R	B	B	B	B	B	67	62	53	40	27	22	F	A	
23	B	A	A	B	24	F 21	F 28	F 43	52	64	R	J 85	R 87	R 96	R 85	R	75	J	75	68	66	57	44	37	F	F	
24	F 24	F 20	F 24	F 32	F 36	F 26	F 32	B	B	R 69	R	J 86	R 86	R	R	R	70	R	66	61	61	54	34	31	28	F	
25	23	S	S	A	A	S	S	J 52	R 68	71	R 72	R 73	R 87	R 87	R	J	83	78	77	73	71	56	36	25	20	F	
26	B	F 18	20	20	F 21	F 28	42	58	70	76	J 82	84	J 91	98	R 84	R 86	84	J	76	R 72	R 72	S	57	46	37	A	
27	A	R 40	R	A	A	B	42	B	62	B	70	J 74	R 88	R 88	J	84	84	J	74	65	64	64	53	40	40	36	
28	F 20	B	B	A	F 26	F 28	B	B	B	R 64	R 76	R 80	R 98	R 95	R 102	R	100	J	85	75	62	56	44	38	36	30	
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	R	J	R	J	F 50	R 30	17	A	
30	B	A	A	R 29	A	A	R 63	J 82	R 84	R 81	80	81	J	R 83	R 100	R 88	85	R	R	78	77	44	A	B	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	4	4	4	4	8	6	8	11	15	17	18	19	21	20	18	20	22	25	24	26	18	13	9	8			
MED	22	28	28	30	25	27	36	42	46	57	62	74	82	81	79	76	74	67	60	46	36	34	31	28			
U Q	24	38	37	34	29	28	42	J 52	R 62	R 66	R 72	R 81	R 86	R 88	R 84	R	79	70	65	56	50	39	36	30			
L Q	21	F 19	22	24	22	23	R 29	40	43	50	54	62	65	74	76	68	69	64	55	42	27	22	22	25			

SEP. 2012 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2012 ftEs (0.1MHz) 45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	B	B	B	43	52	47	30	18	25	28	23	35	29	25	57	56	B	B	B	B	B	B	B		
2	B	31	34	46	70	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	72	36	55	B		
3	34	B	B	B	B	33	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B		
4	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	BE	B	B	30	B		
5	44	39	67	56	34	B	B	B	B	B	B	C	C	C	C	C	C	C	C	C	C	C	50	48		
6	41	36	B	36	B	B	B	40	34	E	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	B	B	30	30		
7	33	32	41	41	33	33	37	B	B	BE	B	B	B	B	B	B	BE	BE	BE	BE	K	43	70	67	55	
8	B	B	K	26	43	32	40	B	B	B	B	B	B	B	B	BE	BE	BE	BE	BE	BE	B	K	K	42	
9	35	35	34	42	40	40	38	29	E	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	B	B	B	33		
10	35	37	36	B	40	56	41	25	E	SE	S	B	BE	B	G	23	G	G	E	BE	B	B	B	B		
11	B	B	B	B	BE	BE	BE	BE	BE	SE	BE	BE	BE	BE	B	E	BE	BE	SE	BE	B	B	B	B		
12	30	B	B	B	50	42	B	32	34	E	BE	BE	BE	B	G	GE	BE	BE	BE	BE	BE	BE	BE	B		
13	K	39	71	48	67	45	42	43	37	G	B	B	B	B	36	29	BJ	AE	BE	BE	BE	BE	B	K		
14	34	31	38	42	31	31	33	B	B	BE	BE	BE	B	B	GE	B	G	G	GE	BE	B	E	B	B		
15	30	29	41	B	55	41	33	BE	BE	B	G	G	G	G	GE	30	23	22	16	12	B	29	32	58		
16	40	32	31	B	B	B	B	B	BE	B	G	G	E	BE	BE	BE	BE	BE	BE	BE	BE	B	B	36	32	
17	16	K	38	B	B	31	KE	B	E	BE	B	31	24	28	22	G	G	24	18	18	BE	BE	B	B		
18	32	32	43	B	40	45	B	B	B	B	B	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE		
19	18	24	30	31	32	33	37	B	BE	B	28	28	28	G	G	GE	BE	BE	BE	BE	BE	BE	BE	BE		
20	71	42	B	42	41	43	40	B	G	G	E	BE	BE	B	27	B	BE	BE	BE	BE	BE	BE	B	36	34	36
21	37	36	40	36	34	33	B	B	B	B	25	G	30	30	30	GE	B	GE	BE	B	20	B	B	28		
22	16	29	34	58	B	41	44	36	36	30	32	32	B	B	B	B	BE	BE	BE	BE	BE	BE	BE	BE		
23	B	37	33	BE	BE	SE	S	G	G	G	G	G	25	33	35	G	G	27	25	19	14	16	13	12		
24	E	BE	BE	BE	BE	BE	BE	B	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE		
25	E	B	S	S	34	43	S	S	28	27	GE	B	30	32	34	34	E	B	G	G	GE	BE	BE	BE		
26	B	18	E	B	E	BE	B	G	Q	G	G	31	42	38	44	44	60	46	44	30	18	E	BE	BE		
27	34	34	33	44	53	BE	B	BE	B	BE	BE	B	G	G	G	34	E	BE	BE	BE	BE	BE	BE	BE		
28	E	B	B	B	E	B	B	B	BE	B	G	31	27	31	27	G	30	GE	BE	BE	BE	BE	BE	BE		
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	CE	BE	BE	BE	BE	BE		
30	B	32	43	43	56	44	32	GE	BE	B	32	33	G	G	G	23	23	29	G	GE	BE	B	B	54	73	
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	22	21	19	18	22	21	18	13	16	18	21	20	21	22	20	22	23	25	24	26	23	19	21	23		
MED	34	32	34	42	37	33	37	29	E	GE	B	27	32	28	29	28	26	24	20	18	18	16	30	32		
U Q	37	37	41	44	45	42	41	36	34	33	32	38	36	32	33	39	31	32	24	20	21	31	40	42		
L Q	17	30	31	36	BE	BE	32	24	G	G	26	G	30	G	G	G	G	20	17	13	14	13	14	18		

SEP. 2012 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2012 fmin (0.1MHz) 45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	12	B	B	B	12	12	12	12	12	14	14	18	16	17	16	57	56	B	B	B	B	B	B	B	
2	B	23	18	13	13	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	31	24	27	B	
3	28	B	B	B	B	20	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
4	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	25	B	B	23	B	
5	28	20	32	19	23	B	B	B	B	B	B	C	C	C	C	C	C	C	C	C	C	C	14	14	
6	12	15	B	23	B	B	21	21	38	39	40	39	36	B	24	B	22	12	12	B	B	12	12		
7	12	12	14	13	12	12	16	B	B	B	34	B	B	B	B	B	35	30	26	14	13	28	12	14	
8	B	B	14	28	18	20	B	B	B	B	B	B	B	B	B	56	27	51	B	25	20	13	13	12	
9	12	12	18	34	20	15	19	14	19	33	28	29	B	32	55	36	19	20	18	19	B	B	B	12	
10	12	12	12	B	36	20	17	17	31	26	B	B	28	19	16	19	20	17	20	20	13	B	B	B	
11	B	B	B	B	12	16	16	22	31	42	32	36	37	29	17	26	29	20	19	13	13	13	B	B	
12	21	B	B	B	12	14	16	17	28	29	34	27	21	20	40	26	20	15	13	14	13	B	12		
13	12	14	21	12	16	14	13	13	18	B	B	20	20	B	25	23	19	16	12	13	B	12	12		
14	11	12	12	12	13	12	18	B	B	B	28	50	18	19	32	19	18	15	16	13	12	14	B	12	
15	11	12	20	B	19	24	20	B	36	35	15	14	17	18	20	30	23	22	16	12	B	13	12	11	
16	12	21	19	B	B	B	B	B	B	29	21	19	16	28	30	27	25	19	20	14	12	B	12	12	
17	14	20	B	B	20	22	26	13	23	26	22	17	26	20	17	16	16	18	18	17	13	B	B	B	
18	12	15	25	B	23	25	B	B	B	B	B	B	29	31	69	39	43	36	20	17	13	12	13	13	
19	12	13	13	21	12	14	13	B	B	28	19	23	18	17	22	62	26	22	55	26	15	16	18	14	
20	14	33	B	21	20	19	19	18	19	18	41	34	16	22	B	31	46	30	19	14	12	12	12		
21	12	17	29	25	22	25	B	B	B	B	20	20	20	19	19	22	29	19	21	15	12	B	B	12	
22	13	12	12	15	B	20	15	16	17	14	14	15	B	B	B	B	B	39	26	19	18	23	13	13	
23	B	26	14	B	17	16	17	14	18	18	16	19	15	33	35	21	18	18	16	19	12	12	13	12	
24	13	13	13	14	18	12	18	B	B	64	57	34	55	39	34	34	30	32	20	13	14	12	13	14	
25	13	S	S	15	13	S	S	16	16	17	30	20	20	19	29	17	16	20	14	18	14	13	13	14	
26	B	14	14	14	13	13	13	14	14	20	18	19	16	19	19	16	17	14	13	13	14	14	14	26	
27	19	28	28	18	13	B	37	B	38	B	37	55	28	19	19	19	36	25	21	19	15	13	14	13	
28	13	B	B	19	12	19	B	B	B	31	20	28	20	23	25	20	26	26	21	14	15	16	18	15	
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	26	23	21	20	15	15	15	
30	B	12	19	16	21	20	24	18	27	28	28	21	20	19	18	18	14	14	24	25	38	B	26	30	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	29	28	28	29	29	28	28	29	29	29	29	28	28	28	28	28	28	29	29	29	29	29	30	30	
MED	13	18	20	23	18	20	20	B	36	35	29	34	28	24	30	28	26	22	20	18	15	16	14	14	
U Q	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
L Q	12	12	14	15	13	14	16	16	18	24	20	20	18	19	20	20	20	19	16	13	13	13	13	12	

SEP. 2012 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2012 h'F (KM)

45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	Y	B	B	B	210	A	AE	AE	A	196	194	210	196	212	224	226	226	B	B	B	B	B	B	B	
2	B	A	A	198	192	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A	B	
3	A	B	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
4	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	236	B	B	A	B	
5	A	A	A	A	Y	B	B	B	B	B	B	C	C	C	C	C	C	C	C	C	C	C	A	A	
6	A	A	B	A	B	B	B	A	A	B	B	E	E	E	E	B	B	B	206	204	208	Q	B	B	A
7	A	A	202	A	A	A	A	B	B	B	282	B	B	B	B	B	B	240	234	242	222	A	A	A	A
8	B	B	A	A	A	B	A	B	B	B	B	B	B	B	B	E	E	E	258	B	232	E	B	A	A
9	A	226	A	A	A	A	A	A	A	232	256	236	224	B	E	E	E	204	208	218	198	B	B	B	A
10	A	A	A	B	A	A	A	AE	S	S	266	226	B	B	204	204	194	204	196	196	202	220	Q	B	B
11	B	B	B	B	E	E	E	E	B	S	B	E	S	E	B	B	B	206	212	198	202	202	236	B	B
12	A	B	B	B	A	A	B	A	A	226	220	242	212	222	196	226	210	198	198	198	202	222	B	222	
13	AE	A	A	A	A	A	A	A	A	B	B	B	B	A	B	B	232	222	210	208	202	224	Q	B	A
14	A	224	A	A	A	A	A	B	B	B	220	E	B	218	196	218	206	206	202	202	202	200	B	B	Y
15	A	A	A	B	A	A	A	B	B	B	216	230	206	220	204	208	212	204	200	198	Q	Q	B	A	A
16	A	A	A	B	B	B	B	B	B	B	282	202	210	210	210	226	212	208	216	216	194	196	B	A	A
17	Y	A	B	B	B	A	A	B	B	E	B	H	222	220	180	214	204	224	208	200	192	200	200	B	B
18	214	202	A	A	B	A	A	B	B	B	B	B	210	214	284	226	226	222	208	274	A	Y	A	A	
19	A	A	A	A	222	A	218	B	B	224	200	196	216	208	208	266	228	208	B	242	A	192	A	A	
20	A	A	B	A	B	A	A	A	226	204	218	B	E	B	240	214	226	B	E	B	230	244	220	228	A
21	A	A	A	A	A	A	B	B	B	B	214	218	208	208	208	208	208	202	202	204	264	B	B	A	
22	256	A	A	A	B	A	A	A	A	A	222	200	200	B	B	B	B	B	218	204	204	204	E	B	B
23	B	A	A	B	B	S	E	S	256	222	204	220	210	218	E	A	214	224	202	202	202	214	200	Q	Q
24	228	274	312	E	B	E	B	B	B	B	E	B	264	214	248	242	222	222	218	202	208	214	208	204	218
25	244	S	S	A	A	S	S	Q	226	214	214	220	220	218	208	212	210	210	210	206	206	200	210	220	250
26	B	BE	B	AE	B	O	238	236	222	220	208	222	228	220	228	220	216	200	206	208	204	204	220	A	
27	AE	A	A	A	A	B	B	B	E	B	B	262	BE	Y	242	218	218	208	208	208	210	208	Q	Q	Q
28	288	B	B	A	A	B	B	B	B	Y	216	216	220	216	206	212	212	214	204	194	Q	198	226	228	
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	212	208	206	206	252	206	A	
30	B	A	A	226	A	A	AE	A	254	202	212	218	216	206	206	216	216	216	216	216	E	B	A	A	
31																									
CNT	5	6	3	4	6	3	5	7	12	15	19	18	21	22	20	22	23	25	23	26	18	13	9	7	
MED	244	229	257	242	237	282	248	223	224	220	216	217	213	214	216	212	211	208	206	205	204	207	220	223	
U Q	272	274	350	335	338	334	270	254	245	226	226	230	230	222	225	226	226	216	214	222	214	232	228	250	
L Q	221	224	202	212	210	278	228	222	218	214	202	214	207	208	208	208	206	202	202	200	200	203	212	222	

SEP. 2012 h'F (KM)

IONOSPHERIC DATA STATION SHOWA-ST.

OCT. 2012 f_{XI} (0.1MHz)

45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4' S LON. 039°35.4' E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	X 40	B	X 57	R	B	B	B	B	O 58	X	B	B	B	R	B	B	B	R	B	B	O 52	X 48	X 47	X 34			
2	X 32	39	46	56	43	54	54	57	63	67	76	80	94	84	88	88	B	80	62	58	O 48	X 48	B 27	29			
3	30	B 29	X 34		B	R	B	B	B	O 62	X 80	X	B	R	R	Y	R	R	O 65	X 55	X 49	X 38	X 38	B			
4	A	R	A	46	52	O 54	X 60	X 62	X 74	X 80	X 87	B	R	R	R	R	R	O 72	X 66	X 59	X 50	X 48	X 46	39			
5	X 34	32	30	34	44	56	O 62	X 64	X 58	X 74	X 81	Y	X	X	X	X	X	X	X	O 78	X 67	X 62	X 56	28			
6	O 38	X	B	B	B	49	B	B	R	X 62	X 63	X 71	X 72	X 75	X 86	X 80	X	R	O 74	X 41	R	R	Y	R			
7	B	A	A	R	40	R	O 50	X	B	R	R	O 66	X	R	O 68	X 68	O 64	X 68	X 63	B	R	X 50	X 45	X 26	B		
8	A	A	68	A	A	B	B	R	R	B	B	B	R	B	B	B	B	B	O 59	X 57	O 47	X 43	X 38	X 32	39		
9	A	A	O 47	X 55	A	B	Y	B	B	O 40	X	R	R	B	B	B	B	B	B	B	O 47	X 42	X 32	A	A		
10	A	71	B	R	R	58	R	B	B	B	B	B	B	B	B	X 62	B	B	B	B	X	R	O 39	X 38	A		
11	A	B	B	B	X 37	B	B	R	R	R	B	R	R	R	R	R	C	C	C	C	C	C	O 48	X 45	X 42		
12	39	R	A	A	A	B	A	B	B	B	B	B	B	B	B	B	B	O 67	X	B	B	B	B	A	X 34		
13	X 48	R	R	B	B	B	B	B	B	B	B	R	B	B	B	B	B	B	B	B	B	B	O 39	X 32	36		
14	R	B	R	R	B	B	B	B	B	B	B	B	B	B	B	X 67	B	B	O 68	X	B	X 43	R	34	A		
15	B	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	X 43	X 28	X 28		
16	R	R	42	57	65	O 63	X 72	R	O 80	X	B	X 81	R	X	R	O 86	X	X	R	O 87	X 81	X 80	X 74	X 68	44	41	31
17	B	B	A	A	A	B	B	B	B	B	B	B	B	B	B	R	Y	O 66	X 66	X 59	O 52	X 57	X 53	X 51	52		
18	51	54	B	B	B	B	R	R	X 65	R	O 70	X	R	B	B	B	B	B	B	B	O 66	X 64	X 62	X 59	X 56	48	29
19	A	36	42	48	X	B	R	X 62	X 76	X 78	X 80	X 80	B	B	B	B	X 80	X 80	X 76	X 74	X 70	X 62	X 62	X 56	X 51		
20	56	50	52	63	69	71	X	B	X 79	O 86	X 93	R	B	R	B	X 96	R	O 89	X 84	X 82	X 71	X 71	X 63	X 59	X 58		
21	51	45	48	52	44	58	X 68	X 72	X 75	X 79	X 87	R	R	R	R	R	Y	B	B	B	Y	O 47	X 61	X 52			
22	O 43	X 43	X 42	X 44	R	R	R	R	O 72	X	R	R	B	R	B	B	B	B	Y	Y	O 63	X 64	X 57	R	X 50		
23	O 49	X 32	X 42	X 47	X 48	X 63	X 66	B	B	B	B	B	O 100	X 97	X 96	B	B	B	B	O 71	X 67	X 62	X 45	50	33		
24	A	O 34	X 43	X 56	X 57	R	R	B	B	B	R	R	O 86	X	B	B	B	B	X 74	X 69	X 67	X 58	X 52	X 50	31		
25	33	40	35	48	52	B	R	Y	X 80	B	B	B	B	B	B	B	B	B	B	B	X 65	X 63	X 63	X 58	X 51		
26	40	B	R	A	X 56	X 63	R	R	R	R	B	R	Y	B	B	Y	O 70	X	B	B	O 64	X 58	X 58	X 58	43		
27	A	A	X 57	X 58	X 67	B	B	B	A	X 75	X 74	X 79	R	R	R	R	X 79	X 74	X 72	X 71	X 61	X 62	X 65	O 54	X 52		
28	X 52	X 57	52	B	B	R	R	R	B	X 78	B	B	B	B	B	B	B	B	B	B	O 63	X	B	B	B	B	
29	33	42	51	56	58	X 63	X 63	B	B	B	B	B	B	B	B	B	B	B	R	O 63	X 62	X 57	X 56	X 43	B		
30	B	B	B	R	B	B	O 63	R	O 72	X 78	R	O 81	X 82	R	R	R	R	O 74	X 68	R	X	59	X 58	X 52	X 51	54	
31	O 63	X 58	X 60	X 58	X 65	X 68	X 75	X 76	X	R	X 80	B	R	O 82	X	B	R	O 76	X 68	R	X	X 65	X 57	X 50	X 54	X 58	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	17	14	18	16	16	11	11	7	13	13	11	4	8	5	9	7	13	15	15	23	24	25	25	21			
MED	X 40	42	46	54	52	63	63	72	72	78	80	80	86	84	86	80	74	72	67	62	57	48	47	42			
U Q	51	54	52	56	62	63	68	76	79	80	81	80	96	96	94	88	85	78	74	65	60	56	54	52			
L Q	34	36	42	46	44	X 56	X 60	X 62	X 62	X 65	X 70	X 75	X 82	X 72	X 68	X 79	X 68	X 66	X 63	X 57	X 48	X 41	X 37	X 32			

OCT. 2012 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT. 2012 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	34		B	J	R	R	B	B	B	B	B	B	B	R	B	B	B	D	R	B	B	R	J	R	41	28									
2	26	30	F	F	R	F		48	48	51	U	R	J	R		J	R	J	R	B	J	R	U	R	46	42	41	28							
3	21		F	B	R	F	B	A	B	B	B	B	R	J	R	B	R	R	Y	R	R	R	B	49	43	32	32		B						
4	A	R	A	A	F	F	R	R	R	R	J	R	B	R	R	R	U	R	R	R	R	R	59		49	43	32	32		F					
5	28	22	F	F	F	F	F	S	J	R	R	J	R	Y	J	R	J	R	J	R	J	R	J	R	61	56	50	22		R	A	A			
6	R	B	B	B	F	B	B	A	J	R	U	R	65	66	69	80	74	85		R	R	R	R	35		R	R	A	Y	R					
7	B	A	A	A	F	R		44	B	R	R	R	60	R	R	R	62	62	58	62	57		B	R		44	39	20		B					
8	A	A	A	A	A	B	B	R	R	B	B	B	B	R	B	B	B	B	B	R	F		41		37	32	26	33		R	R				
9	A	A	41	40	F	A	B	Y	B	B	B	B	R	B	B	B	B	B	B	B	B		41		32	26		A	A						
10	A	A	B	R	R		A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	J	R	52		30	32		R	A					
11	A	B	B	B	31	B	B	R	R	D	R	B	R	R	R	R	C	C	C	C	C	C	C			42	39	29		F					
12	F	A	A	A	A	B	A	B	B	B	B	B	B	B	B	R	B	R	B	B	B	B	B	B	B	B	B	A				28			
13	42	R	A	B	B	B	B	B	B	B	B	R	B	B	B	B	B	B	B	B	B	B	B	B	B	F	R	F				A			
14	A	B	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R	B	J	R		37		A	F					A			
15	B	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B							
16	R	A	F	F	F	R	R	U	R	B	J	R	R	J	R	R	R	R	81	75	74	68	62	J	R	B	F								
17	B	B	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	R	D	Y	U	R	R	J	R	J	R							
18	F	F	B	B	B	D	R	D	R	J	R	R	R	B	B	B	B	B	J	R	B	R	R	J	R	J	R								
19	A	26	F	29	42	B	R	56	70	72	74	74	R	B	B	B	B	J	R	J	R	R	74	74	70	68	64	56	56	46	40				
20	F	F	F	F	F	J	R	B	J	R	R	U	R	R	B	R	B	J	R	D	R	R	R	J	R	R	65	65	57	53	52				
21	F	F	F	F	F	J	R	B	J	R	R	U	R	R	B	R	B	R	R	R	Y	B	B	B	Y	Y	R	Y							
22	37	37	36	38	R	R	R	R	R	R	R	R	R	R	B	R	B	B	B	B	Y	Y	R		57	58	51	42	44						
23	R	R	R	R	R	R	B	B	B	B	B	B	B	R	J	R	R	B	B	B	R	R	R	R	R	R	R	R	A						
24	A	28	37	40	51	R	R	B	B	B	R	R	R	80	B	B	B	B	B	B	68	63	61	52	40	40	40	22							
25	F	F	F	F	F	B	R	U	Y	J	R	B	B	B	B	B	B	B	B	B	B	B	J	R		59	57	57	52						
26	F	B	R	A	J	R	50	57	R	R	R	R	B	R	Y	B	B	D	Y	R	B	B		58	52	52	52	33							
27	A	A	J	R	J	R	61	B	B	B	A	U	R	R	R	R	R	U	R	73	68	66	65	55	56	56	48	46							
28	46	51	F	42	B	D	R	56	R	R	B	J	R	B	B	B	B	B	B	B	B	B	57		B	B	B	B							
29	F	F	F	F	F	U	R	B	B	B	B	B	B	B	B	B	B	B	B	B	U	R	U	R	J	R	U	R	J	R					
30	B	B	B	A	B	B	R	U	R	U	R	R	U	R	R	R	R	R	U	R	R	R	R	R	R	R	R	R	R	R					
31	J	R	F	F	J	R	62	69	70	J	R	R	J	R	B	R	R	B	B	R	U	R	R	R	J	R	U	R	U	R					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23											
CNT	17	13	17	16	16	12	12	9	13	14	11	4	9	5	9	11	13	16	15	23	24	25	25	21											
MED	34	30	37	40	42	56	56	U	62	66	71	74	73	80	78	80	78	U	R	R	R	R	R	R	R	R	R	R	R						
U Q	42	40	42	43	53	57	61	J	R	R	R	J	R	R	J	R	R	R	R	R	R	R	R	R	R	R	R	R	R						
L Q	F	F	F	F	F	R	R	R	R	R	R	U	R	R	R	R	D	Y	R	R	R	R	R	R	R	R	R	R	R						

OCT. 2012 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT. 2012 ftEs (0.1MHz) 45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	B	38	42	B	B	B	B	62	B	B	B	B	G	B	B	B	B	B	B	B	B	B	B	B					
2	31	31	K	32	31	20	22	G	GE	BE	BE	BE	BE	E	B	E	B	BE	BE	BE	BE	BE	BE	B	B					
3	30	B	E	B	B	35	B	B	BE	B	G	BE	B	GE	B	GE	BE	B	BE	B	B	B	BE	B	B					
4	57	25	39	30	E	B	35	37	32	22	26	27	B	G	31	34	30	GE	BE	BE	BE	BE	BE	BE	B					
5	E	BE	BE	BE	BE	SE	BE	B	G	G	G	G	G	E	B	E	B	E	BE	BE	BE	BE	B	B	K					
6	42	B	B	B	27	B	B	41	43	G	G	G	G	G	G	30	26	GE	BE	B	B	33	28	37	24	22				
7	B	41	54	40	K	31	32	B	36	23	31	26	31	GE	BE	BE	BE	BE	B	BE	B	BE	BE	B	B					
8	35	K	35	69	68	40	B	B	43	43	B	B	B	G	B	B	B	B	G	25	43	32	38	44	23	30				
9	39	50	63	50	73	B	G	B	B	G	22	32	24	B	B	B	B	B	B	B	B	G	20	18	30	46	45			
10	42	70	B	38	32	25	34	B	B	B	B	B	B	B	B	B	B	B	B	B	BE	B	19	36	34	32	52			
11	42	B	B	BE	B	B	B	42	41	G	B	G	G	G	G	C	C	C	C	C	C	C	C	C	C	E	BE	B		
12	K	K	42	41	42	B	43	B	B	B	B	B	B	BE	B	BE	B	B	B	B	B	B	B	B	B	B	36	34		
13	38	28	32	B	B	B	B	B	B	B	G	G	26	B	B	B	B	B	B	B	B	B	B	B	B	39	33	35	42	
14	34	B	32	31	B	B	B	B	B	B	B	B	B	B	BE	B	B	BE	B	B	B	B	B	B	B	23	34	70	75	
15	B	38	B	56	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	BE	B	B	18	
16	K	26	36	40	28	23	E	BE	BE	B	GE	B	B	G	GE	B	GE	B	30	30	26	22	G	G	22	31	BE	B	24	
17	B	B	K	32	33	44	B	B	B	B	B	B	B	BE	BE	BE	BE	B	E	BE	BE	B	K	BE	BE	B	BE	B	22	
18	28	K	24	B	B	B	31	G	G	G	G	G	G	B	B	B	G	B	G	B	24	28	34	GE	BE	BE	B	16		
19	40	19	15	E	B	22	B	E	B	21	30	23	31	B	B	B	G	30	G	G	19	GE	BE	BE	BE	B	13	12	12	
20	E	BE	BE	BE	B	16	16	G	B	G	GE	BE	B	B	G	BE	B	G	G	E	BE	BE	BE	BE	BE	BE	BE	BE	B	
21	E	BE	BE	BE	BE	B	38	24	26	22	G	G	Y	G	G	30	32	26	39	B	B	B	B	E	BE	BE	BE	B	28	
22	E	BE	BE	BE	B	32	33	G	GE	B	G	G	Y	B	G	B	B	B	Y	G	Y	G	Y	E	BE	BE	BE	B	19	
23	E	BE	B	E	B	33	35	G	B	B	B	B	B	GE	B	G	B	B	BE	BE	BE	B	26	33	34	20	K	20		
24	32	K	26	34	32	33	38	31	B	B	B	33	31	E	B	B	B	B	B	G	25	25	27	G	28	14	30	30		
25	K	17	33	E	B	14	25	24	B	38	54	B	B	B	B	B	B	B	B	BE	BE	BE	B	27	15	14	24	24		
26	32	B	32	32	36	E	B	26	GE	B	B	B	G	G	B	B	G	G	B	B	G	G	17	GE	BE	BE	B	33		
27	38	41	38	30	26	G	B	B	B	57	32	27	23	E	B	31	26	29	20	G	G	G	22	15	22	13	B	13		
28	E	BE	BE	BE	B	BE	BE	B	31	32	29	BE	B	B	B	B	B	B	B	B	27	B	B	B	B	B	B	B	B	
29	E	BE	BE	B	31	30	17	G	B	B	B	B	B	B	B	B	B	B	B	32	26	24	20	28	25	B	B	B		
30	B	B	B	31	B	B	22	G	G	G	G	G	G	G	31	30	35	32	G	G	G	17	20	17	19	20	B	20		
31	E	BE	B	E	B	24	G	22	G	20	22	32	B	G	B	B	31	26	25	22	25	26	23	17	24	B	24	24		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23						
CNT	27	23	25	26	22	17	20	17	19	18	16	15	17	14	17	15	16	18	18	23	27	27	30	27						
MED	31	27	32	30	31	28	E	G	G	G	GE	G	26	G	G	30	28	26	GE	GE	BE	GE	BE	B	22	21	23	18	22	
U Q	39	36	38	38	36	34	32	36	43	29	32	GE	B	E	B	E	BE	B	27	27	28	32	28	32	32					
L Q	E	BE	BE	BE	BE	B	25	22	G	G	G	G	G	G	G	G	G	GE	B	GE	BE	BE	BE	BE	BE	BE	BE	BE	B	16

OCT. 2012 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT. 2012 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	23	B	25	27	B	B	B	B	24	B	B	B	B	26	B	B	B	36	B	B	37	24	13	17	
2	14	13	15	20	18	13	22	20	21	28	36	55	20	33	20	40	B	28	29	22	21	B	17	13	
3	12	B	15	25	B	24	B	B	B	29	22	B	30	23	59	23	31	46	B	19	18	13	13	B	
4	24	16	14	19	25	16	23	20	19	26	18	B	24	23	19	19	19	22	30	17	12	13	14	13	
5	13	13	12	12	E S 16	17	20	16	16	18	18	20	18	17	40	26	19	24	25	18	17	15	13	13	
6	13	B	B	B	15	B	B	25	15	24	20	19	18	14	14	19	17	28	25	15	20	13	15	13	
7	B	18	20	18	16	21	20	B	20	18	20	20	20	20	29	28	27	24	B	28	19	13	13	B	
8	22	19	13	25	22	B	B	25	29	B	B	B	17	B	B	B	B	18	16	19	14	14	16	18	
9	20	21	18	18	20	19	19	B	B	19	19	19	B	B	B	B	B	B	B	18	14	12	18	18	
10	13	17	B	19	20	13	20	B	B	B	B	B	B	B	20	B	B	B	B	19	13	12	19	19	
11	21	B	B	B	27	B	B	28	19	16	B	21	19	17	20	C	C	C	C	C	C	14	14	12	
12	13	19	14	20	16	16	B	B	B	B	B	B	B	B	31	B	28	B	B	B	B	B	12	12	
13	13	20	19	B	B	B	B	B	B	B	22	17	B	B	B	B	B	B	B	13	13	13	13	27	
14	18	B	22	24	B	B	B	B	B	B	B	B	B	B	36	B	B	37	B	18	14	12	12	16	
15	B	28	B	18	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	15	13	13	
16	18	16	14	20	16	19	24	18	56	B	19	24	38	24	30	17	13	14	14	15	17	B	16	17	
17	B	B	14	20	24	B	B	B	B	B	B	B	B	B	40	39	30	15	24	21	16	17	16	13	
18	13	12	B	B	B	B	23	23	19	19	20	18	B	B	B	B	18	B	16	13	12	32	19	13	
19	24	12	12	22	B	20	26	20	20	20	20	B	B	B	B	22	16	12	16	13	14	13	12	12	
20	13	12	12	12	12	14	B	14	17	52	36	B	26	B	38	19	23	23	25	22	19	15	14	13	
21	13	16	18	20	24	20	26	20	24	20	26	20	18	26	22	25	39	B	B	B	38	24	15	28	
22	23	23	29	23	20	18	19	18	32	16	19	20	B	25	B	B	B	19	20	15	19	16	28	19	
23	25	19	21	25	19	13	16	B	B	B	B	B	27	36	20	B	B	B	26	26	13	14	13	14	
24	13	19	13	12	19	30	26	B	B	B	29	24	37	B	B	B	B	21	17	27	13	13	14	13	
25	12	12	14	13	14	B	23	54	14	B	B	B	B	B	B	B	B	B	B	23	27	12	14	14	
26	12	B	30	21	17	26	15	28	15	19	B	24	25	B	B	24	20	B	B	14	13	27	17	12	
27	12	22	20	21	20	B	B	B	20	16	15	18	36	28	22	18	16	12	16	18	12	15	22	13	
28	28	29	18	B	B	31	31	24	B	B	B	B	B	B	B	B	B	B	23	B	B	B	B	B	
29	13	13	13	12	18	15	14	B	B	B	B	B	B	B	B	B	B	21	24	24	19	28	25	B	
30	B	B	B	27	B	B	19	18	14	15	20	20	16	18	29	15	18	15	14	16	13	12	12	12	
31	15	13	17	18	12	14	12	12	18	18	B	20	25	B	B	18	14	18	19	24	26	23	17	13	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	30	30	30	30	31	31	31	
MED	15	19	18	20	20	30	24	28	24	29	36	55	37	B	40	B	35	28	26	20	17	15	14	13	
U Q	24	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	27	21	24	17	19
L Q	13	13	14	18	16	17	19	20	19	19	20	20	20	24	22	22	19	19	19	17	13	13	13	13	

OCT. 2012 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT. 2012 h'F (KM)

45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	B	A	A	B	B	B	B	230		B	B	B	A	B	B	B	B	B	B	B	B	B	B	A						
2	A		A		A	A	E	B	274	232	230	212	228	B	E	B	238	220	220		B	B	216	212	212	218	B	B	244	284	A
3	E	A	B	A	B	B	A	B	B		B			E	A		A	214	232		B	204	208	218	234					B	
4	A	A	A	A	B	A	A	A			214	196	196	B	A	E	A	220	212	208	222	212	208	202	204	216	226	204	216	226	A
5	216	E	B	E	B	E	B	E	S	E	B					B	E	A	240	212	214	206	212	232	306					A	
6	A	B	B	B	212		B	B	A		212	256	238	240	218	196	206	214	214	234	234	220		A	A	Y	A			A	
7	B	A	A	A	A	A	A	B		A	E	A	220	228	208	212	222	238	208	228	224		210	210	228					A	B
8	A	A	A	A	A	B	B	A	A	B	B	B		228	B	B	B	B	B	A		250	250		A	A	200			A	
9	A	A	E	A	A	A	B	Y	B	B	A			B	B	B	B	B	B	B		214	254		A	A			A	A	
10	A	A	B	A	242	208		A	B	B	B	B	B	B	B	B	B	B	B	B		214		A	A	242				A	
11	A	B	B	B	E	B	B	B	A	A		B		E	B		C	C	C	C		C	C	A	242	226	238			O	
12	230	A	A	A	A	B	A	B	B	B	B	B	B		B	B	B	B	B	B		B	B	B	B	B	218	240		A	
13	204	A	A	B	B	B	B	B	B	B	B	A		214	B	B	B	B	B	B		B	B	202	224	198				A	
14	A	B	A	A	B	B	B	B	B	B	B	B	B		B	B	B	B	B	246		230	262		A	A			A		
15	B	A	B	A	B	B	B	B	B	B	B	B	B		B	B	B	B	B	B		B	B	B	B	230	336		A		
16	A	A	A	A	A	284	250	204		B	B	212	226	222	208	206	206	216	218	224	228	248		A	B	256	290		O	E	A
17	B	B	A	A	A	B	B	B	B	B	B	B	B		B	B	B	B	B	250	260	214	214	232	226	222	246	254		A	
18	266	A	B	B	B	B	E	A	260	228	216	212	214	214		B	B	B	B		208		212	230	224	246	238	282		O	
19	A	300	318	314	B	A	E	B	246	208	202	202		A	B	B	B	B		210	202	216	222	214	214	214	206	224		O	
20	Q	Q	272	286	276	242		B	202	210		210		218	B	E	B	218	212	220	220	202	216	216	224	214	206	224		O	
21	262	292	B	Q	A	E	A	A	304	254	230	208	218	238	210	224	214	228	224	240		E	B	B	248	224	234	250		O	
22	Q	E	B	E	B	A		A	E	A	R				B	B	B	B			218	224	224	228	212	244	238		E	B	
23	E	B	E	B	B	200	200	250		E	A	B	B	B	B	B		B	B	B			226	236	234		A			236	A
24	A	A	224	344	A	A	R	B	B	B		228	228	244		B	B	B	B		212	212	226	222	232	272				A	
25	E	A	272	Q	E	A	E	A	B	A	Y		B	B	B	B	B	B	B		234	226	224	224	260					O	
26	E	A	B	A	A	222	266	228	228	224	202		B	E	Y	Y	B	B	Y	E	Y	B	B	218	230	260	214	278		O	
27	A	A	A	A	A	B	B	B	A		218	204	202	222	218	206	206	204	224	224	224	220	220	220	230	242				B	
28	294	304	288	B	B	B	E	B	264	222		B	B	B	B	B	B	B	B		224		B	B	B	B	B			B	
29	E	A	Q	Q	A	A	E	A	E	A	B	B	B	B	B	B	B	B			218	234	234	218	234	250				B	
30	B	B	B	A	B	B	A		206	204	196	198	204	214	214	204	200	202	226	226	Y	Y	214	214	214	236	248			O	
31	Q	262	282	Q	Q	204	216	216	232	204		B	A	A	B	B	220	202	218	222	Y	220	220	224	236	260				O	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23							
CNT	15	11	10	10	9	9	12	11	14	17	15	14	15	12	16	12	16	17	18	24	23	22	22	19							
MED	253	270	U	U	U	U	E	235	252	216	214	215	214	210	220	217	216	211	212	218	224	220	221	224	234	244					
U Q	292	300	316	296	285	286	262	228	226	225	228	226	230	221	234	222	220	225	226	229	232	242	244	278							
L Q	244	262	272	274	217	206	237	206	210	202	210	204	214	213	207	207	206	215	212	214	214	218	218	236							

OCT. 2012 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV. 2012 f_{XI} (0.1MHz)

45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	O X 55	A	A	X 47	62	X	Y	R	R	Y	Y	B	B	B	B	B	B	B	R	Y	R		B	B		
2	Y	R	R	R	39	R	R		B	Y	B	R	R	R	R	R	R	X	B	B	X	68	X	X	X	
3	A	B	A	R	X 55	X 55	XO 70	X 74	XO 74	X 75	R	RO 70	X	R	B	B	R	X	X	X	XO 47	X 36	A	X		
4	O X 39	37	X 46	XO 50	XO 56	X 61	X 71	BO 63	X 63	B	B	B	BO 70	X	R	RO 70	XO 71	XO 66	XO 64	XO 60	X 57	X 48	X 58	X 57		
5	X 57	X 58	X 58	X 62	XO 69	X 76	XO 77	X 81	X 79	R	B	B	B	B	BO 74	X 73	X 68	X 72	X 66	Y	R	R		40		
6	X 35	A	A	R	R	R	R	R	XO 68	X 73	BO 70	X	B	B	B	B	R	B	B	B	R	X	X	X	38	
7	O X 36	43	O X 44	A	RO 64	X	R	R	RO 68	X 64	X	Y	R	B	R	BO 61	X 56	X	R	B	R	R	B	B		
8	B	B	BO 48	B	B	B	B	B	Y	Y	B	B	B	B	B	B	B	B	BO 54	X	R	R	XO 56	X 54		
9	O X 51	46	44	XO 57	XO 64	XO 68	XO 72	X 78	X 78	R	B	B	B	B	B	B	B	B	B	B	R	X	X	X	56	
10	O X 49	X 48	X 51	X 57	R	B	X 65	B	B	B	B	B	B	B	Y	B	B	B	B	B	B	B	R	X	X	49
11	X 48	R	B	R	R	B	B	XO 80	X 98	R	X	XO 91	XO 93	X 87	R	XO 73	X 71	X 68	X 68	X 67	X 65	X 63	XO 61	X 61		
12	67	X 72	74	80	O XO 78	X 78	O XO 70	XO 77	XO 78	X 79	X 80	B	B	BO 71	X	Y	B	BO 64	X 61	X 57	X 56	X 55	X 51	X		
13	R	R	A	R	R	B	R	B	B	B	B	B	B	B	B	B	B	B	BO 41	X 52	X	R	R	A		
14	X	AO 40	X 40	R	R	B	B	B	B	B	B	B	B	R	B	B	B	C	C	C	C	C	X	X	X	46
15	O X 46	RO 46	B	B	B	R	R	RO 69	X	B	B	B	B	B	B	B	R	R	B	X	R	XO 56	XO 50	XO 48		
16	B	X 41	B	B	B	B	R	B	B	B	B	B	B	B	B	Y	B	B	B	B	B	Y	B	B	B	
17	B	B	B	R	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	BO 49	X 45	B		
18	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R	R	RO 48	X	48	
19	O X 48	R	B	B	B	B	B	B	B	B	B	B	B	R	B	B	B	B	B	B	BO 55	X	RO 50	X 52		
20	O X 43	B	RO 50	X	R	B	R	B	B	B	B	B	B	B	B	B	B	B	B	B	R	B	A	B		
21	RO 44	XO 47	X	B	B	B	R	B	R	B	B	B	B	B	B	B	B	B	B	B	BO 51	X 51	R	B		
22	BO 45	XO 47	X	B	B	B	B	R	R	R	Y	B	Y	B	B	Y	Y	B	R	BO 63	X	RO 51	XO 56			
23	O XO 54	X 53	B	B	B	X 76	X 76	78	93	X	BO 94	X	B	B	BO 82	X	B	B	B	BO 73	X 65	BO 70	X 66	X 57	R	
24	R	B	B	R	B	R	B	B	R	B	B	B	B	B	B	B	BO 66	XO 66	XO 59	XO 57	XO 57	XO 60	XO 57	X		
25	X 55	71	XO 52	X 48	XO 50	X 49	Y	Y	Y	R	R	R	R	Y	R	R	R	R	R	R	XO 55	XO 52	XO 50	X 50		
26	XO 46	XO 47	X 48	R	R	R	B	B	BO 48	X	B	B	R	R	BO 62	X 62	Y	R	Y	RO 55	XO 59	X 46	X 44			
27	XO 46	XO 49	X 51	X 57	RO 62	X 75	X	R	X 78	RO 76	X	Y	X 79	Y	RO 66	XO 66	X	R	R	B	X	XO 59	XO 56	X 39		
28	X 50	X 55	BO 51	XO 52	XO 56	X 62	Y	Y	R	X 78	RO 79	X	Y	RO 73	XO 67	B	RO 55	X 59	X 60	X 62	X 62	X 56	X 56	X		
29	O X 52	X 43	X 58	XO 66	X 66	R	R	RO 69	X 69	RO 83	X	R	B	X 82	B	B	B	B	R	BO 58	X 56	X 56	B	X 42		
30	O X 43	49	58	64	X 59	XO 67	X 70	X 73	X 79	Y	B	R	BO 74	X	BO 77	X 78	X 61	X 59	X 59	X 56	X 57	X 58	X 58	X 56		
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	19	16	15	13	11	11	10	8	12	5	7	2	4	4	2	6	7	10	8	11	16	20	19	22		
MED	O X 48	X 48	X 48	X 57	XO 59	X 64	X 70	X 78	XO 78	X 73	X 80	XO 80	XO 79	XO 78	XO 76	XO 73	XO 71	X 66	X 64	X 59	X 56	X 56	X 55	X 50		
U Q	X 54	X 54	X 58	XO 63	XO 66	X 76	X 75	X 79	XO 79	XO 77	X 91	O X 86	X 84	O X 74	X 73	X 68	X 67	X 62	XO 58	X 59	X 58	X 58	X 56	X 56		
L Q	O X 43	X 44	X 46	X 49	X 52	X 56	X 70	XO 74	XO 69	X 58	X 76	XO 74	X 72	O X 66	XO 66	X 60	X 62	XO 55	X 54	X 48	X 46	X 46	X 42	X 42		

NOV. 2012 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV. 2012 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	49	A	A	41	F	Y	Y	R	R	Y	Y	B	B	B	B	B	B	B	R	Y	R	R	B	B				
2	Y	A	A	A	F	R	R	Y	B	Y	B	R	R	R	R	R	R	42	B	B	43	40	40	33				
3	A	B	A	R	49	49	64	68	J	R	U	R	R	R	B	B	R	J	R	50	41	30	A	29				
4	33	F	40	44	50	55	J	R	R	B	B	B	B	64	R	R	R	R	54	48	50	41	30	29				
5	F	46	52	56	63	70	J	R	R	J	R	R	B	B	B	B	68	67	62	66	60	Y	A	29				
6	29	A	A	R	R	R	R	R	62	U	R	B	B	B	B	R	B	B	B	B	R	R	36	33	32			
7	30	F	R	A	R	R	R	R	R	R	62	58	Y	R	B	R	B	R	J	R	R	B	R	B	B			
8	B	B	B	R	B	B	B	B	Y	Y	B	B	B	B	B	B	B	B	B	B	48	R	R	50	48			
9	R	F	R	R	R	62	R	J	R	J	R	R	B	B	B	B	B	B	B	B	B	R	J	R	R			
10	43	42	45	51	R	B	J	R	B	B	B	B	B	B	Y	B	B	J	R	B	B	B	U	R	R			
11	42	R	B	R	R	B	B	J	R	R	R	J	R	R	R	R	R	67	65	62	62	61	59	57	55	55		
12	F	66	F	F	R	F	U	R	R	R	J	R	B	B	B	R	Y	B	B	R	J	R	J	R	R			
13	R	A	A	R	R	B	R	B	B	B	B	B	B	B	B	B	B	B	B	B	35	46	R	A	A			
14	Y	A	R	A	R	B	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C	C	J	R	R			
15	40	R	R	B	B	R	R	R	R	B	B	B	B	B	B	B	R	R	B	J	R	R	50	44	42			
16	B	J	R	B	B	B	R	B	B	B	B	B	B	B	B	Y	B	B	B	B	B	B	Y	B	B			
17	B	B	B	R	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	43	39	B			
18	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R	R	R	42			
19	42	R	B	B	B	B	B	B	B	B	B	B	B	R	B	B	B	B	B	B	B	49	44	46	46			
20	37	B	R	U	R	R	B	R	B	B	B	B	B	B	B	B	B	B	B	B	B	R	B	A	B			
21	R	U	R	B	B	B	R	B	R	B	B	B	B	B	B	B	B	B	B	B	B	R	J	R	B			
22	B	R	R	B	B	B	B	R	R	R	Y	B	Y	B	B	Y	Y	B	R	B	B	45	45	R	R			
23	R	R	B	B	B	J	R	70	70	R	J	R	B	B	B	B	B	B	J	R	B	64	60	51	R			
24	A	B	B	R	B	R	B	B	R	B	B	B	B	B	B	B	B	B	60	60	53	51	51	54	51			
25	J	R	R	J	R	R	Y	Y	Y	R	R	R	R	Y	R	R	R	R	R	R	49	48	46	44	44			
26	40	R	R	R	R	R	B	B	B	R	B	B	R	R	B	R	Y	R	Y	R	U	R	J	R	38			
27	40	43	45	51	J	R	R	R	J	R	R	R	Y	J	R	Y	R	60	60	R	R	B	B	J	R	33		
28	44	49	B	U	R	R	U	R	Y	Y	R	J	R	R	U	R	Y	D	R	R	B	U	R	J	R	50		
29	R	46	37	52	60	60	R	R	R	R	R	R	B	J	R	B	B	B	B	R	B	R	J	R	B	J	R	36
30	J	R	F	F	J	R	53	61	64	67	73	Y	B	R	B	R	B	J	R	J	J	J	J	R	J	R	50	
31																												
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	19	15	15	13	11	11	10	6	12	6	7	2	4	4	3	6	7	10	9	11	16	19	20	22				
MED	42	40	42	51	50	58	64	72	72	68	74	74	73	72	70	67	65	60	58	53	50	50	47	44				
U Q	46	47	49	57	60	70	69	74	73	73	85		80	78	76	68	67	62	61	56	52	53	52	50				
L Q	37	F	40	43	44	50	60	68	63	62	70		U	R	R	D	R	60	60	54	51	49	47	42	40	36		

NOV. 2012 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV. 2012 ftEs (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	42	71	40	G	26	G	40	41	32	32	B	B	B	B	B	B	B	34	32	37	49	B	B			
2	G	41	41	41	30	35	G	37	B	G	B	B	G	32	33	34	40	26	B	B	25	G	14	25			
3	38	B	38	35	32	18	26	G	31	21	24	25	33	32	B	B	G	G	26	G	E	B	35	27			
4	K	32	K	30	31	27	30	B	B	B	B	B	B	B	G	26	32	32	24	GE	BE	BE	BE	B			
5	E	BE	BE	B	G	24	30	30	E	B	GE	B	B	B	B	B	44	50	34	21	16	30	39	38	K		
6	37	40	38	38	42	41	40	34	33	G	B	G	B	B	B	R	B	B	B	B	E	B	G	38			
7	41	33	42	68	37	16	40	39	32	24	21	27	26	G	23	B	G	33	E	B	B	G	B	B			
8	B	B	B	G	B	B	B	B	G	G	B	B	B	B	B	B	B	B	BE	BE	BE	BE	BE	BE	B		
9	E	B	K	BE	BE	BE	BE	BE	BE	BE	B	B	B	B	B	B	B	B	B	B	29	23	23	19	17		
10	E	BE	BE	BE	B	21	BE	B	B	B	B	B	B	B	G	B	B	G	B	B	23	18	24	23			
11	20	31	B	31	G	B	B	G	G	G	G	35	34	34	24	25	26	28	30	21	20	GE	BE	B			
12	E	BE	BE	B	25	37	47	40	E	BE	BE	BE	B	B	B	G	G	B	BE	B	G	GE	BE	21			
13	42	42	50	36	33	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	G	G	41	71			
14	32	44	48	45	32	B	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C	24	25	33			
15	33	25	E	B	B	31	33	32	22	G	B	B	B	B	B	B	GE	B	BE	BE	BE	B	B	E	B		
16	B	32	B	B	B	B	32	B	B	B	B	B	B	B	B	G	B	B	B	B	B	G	B	B			
17	B	B	B	32	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	BE	B	B			
18	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	BE	B	GE	BE	B		
19	25	26	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	BE	BE	B	G	23		
20	28	B	33	26	G	B	42	B	B	B	B	B	B	B	B	B	B	B	B	B	B	G	B	B			
21	33	27	29	B	B	B	31	B	34	B	B	B	B	B	B	B	B	B	B	B	BE	B	GE	B	B		
22	B	GE	B	B	B	B	B	GE	B	G	G	B	G	B	B	G	G	B	G	BE	BE	BE	B	G	G		
23	E	BE	B	B	B	G	G	GE	B	BE	B	B	B	BE	B	B	B	B	E	B	B	32	34	24	19		
24	42	B	B	40	B	G	B	B	32	B	B	B	B	B	B	B	B	B	GE	B	26	38	26	28	37	20	20
25	G	36	36	34	34	32	G	G	G	G	G	30	28	25	24	28	26	33	25	G	G	29	28	22			
26	24	25	33	37	42	39	B	B	B	G	B	B	G	36	B	32	G	G	31	31	26	G	G	31			
27	27	35	35	48	26	G	32	32	G	24	24	26	G	G	G	G	G	GE	B	B	B	BE	BE	B			
28	E	B	B	B	G	G	34	33	G	24	24	G	G	G	G	G	G	B	30	G	24	GE	BE	B			
29	G	G	G	21	24	G	40	30	31	30	26	29	BE	B	B	B	B	B	35	B	G	29	BE	B			
30	G	GE	B	24	36	33	28	31	22	G	G	B	B	35	B	45	32	36	40	36	27	24	26	20			
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	25	24	21	23	20	18	21	17	20	17	11	10	10	11	10	13	13	14	16	14	25	28	26	24			
MED	26	28	33	34	32	G	30	E	G	U	28	25	G	32	27	G	G	GE	G	E	G	E	G	21			
U Q	35	36	40	40	36	33	37	34	35	G		33	33	36	30	33	32	33	32	29		30	26	26			
L Q	E	B	E	B	24	25	G	G	G	G	G	G	G	G	G	G	G	G	G	26	GE	B	G	GE	B		

NOV. 2012 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV. 2012 fmin (0.1MHz) 45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	18	19	16	16	15	20	23	20	18	25	26	B	B	B	B	B	B	B	26	24	23	22	B	B	
2	22	19	13	13	12	28	19	21	B	23	B	21	21	18	13	19	19	13	B	B	13	13	12	13	
3	25	B	26	22	15	11	15	18	15	14	19	13	22	22	B	B	15	15	14	14	14	22	14	11	
4	13	13	13	13	12	19	19	B	26	B	B	B	B	25	24	15	14	20	25	22	13	18	15	14	
5	15	14	19	12	14	19	15	28	25	39	B	B	B	B	B	20	26	13	14	12	26	13	13	13	
6	13	18	13	20	26	26	20	18	20	23	B	20	B	B	B	14	B	B	B	B	13	22	17	12	
7	12	13	17	20	18	12	24	20	18	23	15	23	17	B	20	B	19	18	29	B	20	13	B	B	
8	B	B	B	15	B	B	B	B	19	18	B	B	B	B	B	B	B	B	B	29	23	23	19	17	
9	18	19	30	23	23	24	25	30	34	34	B	B	B	B	B	B	B	B	B	B	23	18	24	24	
10	24	28	23	21	19	B	28	B	B	B	B	B	B	B	18	B	B	23	B	B	B	B	24	14	
11	15	14	B	24	27	B	B	18	18	18	15	15	16	13	15	16	18	13	13	13	13	13	19	16	
12	13	18	12	13	20	28	22	32	62	63	21	B	B	B	19	18	B	B	30	19	17	15	24	18	
13	19	19	19	23	23	B	18	B	B	B	B	B	B	B	B	B	B	B	B	19	18	19	29	21	
14	30	18	18	14	14	B	B	B	B	B	B	B	24	B	B	B	C	C	C	C	C	13	19	16	
15	15	19	22	B	B	25	20	24	19	B	B	B	B	B	B	B	25	34	B	28	23	18	13	25	
16	B	24	B	B	B	B	23	B	B	B	B	B	B	B	B	23	B	B	B	B	B	23	B	B	
17	B	B	B	20	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	30	20	B	
18	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	31	13	29	22
19	16	23	B	B	B	B	B	B	B	B	B	B	B	28	B	B	B	B	B	B	25	26	14	13	
20	19	B	23	18	18	B	24	B	B	B	B	B	B	B	B	B	B	B	B	B	15	18	B	B	
21	23	19	19	B	B	B	16	B	30	B	B	B	B	B	B	B	B	B	B	B	26	22	24	B	
22	B	16	35	B	B	B	B	21	36	23	24	B	B	B	B	14	24	B	16	B	24	22	17	16	
23	26	28	B	B	B	26	14	19	56	B	50	B	B	B	60	B	B	24	29	B	23	26	14	16	
24	23	B	B	22	B	18	B	B	23	B	B	B	B	B	B	B	B	23	38	18	20	19	18	20	
25	14	13	14	18	18	18	18	14	18	19	16	20	23	23	19	13	14	19	13	19	21	19	14	13	
26	12	12	18	19	24	26	B	B	B	18	B	B	23	24	B	18	22	26	22	24	22	13	18	13	
27	14	18	18	20	20	14	13	18	24	18	18	18	19	19	18	19	16	20	30	B	18	24	24		
28	18	16	B	18	12	12	13	21	23	19	18	17	22	21	21	22	15	B	23	18	18	17	19	18	
29	16	13	16	18	13	19	16	19	24	19	15	19	B	39	B	B	B	B	26	B	12	13	B	16	
30	12	12	18	15	14	13	14	22	18	15	B	B	B	B	B	18	19	19	18	20	13	18	16	14	
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	29	29	29	29	29	30	30	30	
MED	18	19	20	20	22	26	22	29	28	36	B	B	B	B	B	B	B	B	30	B	22	18	19	16	
U Q	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	26	22	24	B	
L Q	14	14	17	16	15	19	16	20	19	19	21	21	23	25	21	18	19	20	22	19	14	13	15	14	

NOV. 2012 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV. 2012 h'F (KM)

45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	E A 344	A 256	Y	Y	A	A	Y	Y	B	B	B	B	B	B	B	196	Y	A	A	B	B	
2	Y	A	A	A	210	A	A	A	B	Y	B	226	R	218	218	204	228	210	B	B	O E A 232	A 248	A 248	284	
3	A	B	A	A	A	242	222	200	220	E Y 232	204	E Y 226	218	202	B	B	202	206	208	214	208	B	A	286	
4	A E A 248	A 302	A	A	230	264	238	B	A	B	B	B	B	A E Y 210	210	E A E Y 238	234	206	218	220	234	234	220	220	
5	Q 226	Q 248	E A 256	A 270	A 234	A 206	A 206	A 202	A 242	E Y 242	B	B	B	B	B	E A E A 238	A 266	A 202	A 212	A 228	Y	A	A	Q 260	
6	226	A	A	A	A	A	A	A	202	E Y 238	B	A	B	B	B	210	B	B	B	B	A	B	A	228	
7	A	A	A	A	A	A	A	A	R	Y	196	Y	196	B	196	B	196	204	222	B	A	A	B	B	
8	B	B	B	A	B	B	B	B	Y	Y	B	B	B	B	B	B	B	B	B	B	E B 242	E B 230	234	226	
9	242	E A 308	B	E B 292	240	244	236	224	E B 228	210	B	B	B	B	B	B	B	B	B	B	B	244	218	194	232
10	264	E B 292	E B 298	E B 260	Y	B	210	B	B	B	B	B	B	B	Y	B	B	B	B	B	B	B	B	224	
11	E Y 228	A	B	A	A	B	200	200	200	190	216	202	186	202	202	202	206	210	216	222	222	230	232	Q 232	
12	Q 240	Q 252	Q 262	E A E A 254	A 296	A	234	B	B	E A 244	B	B	B	B	216	Y	B	B	B	216	216	202	232	244	248
13	A	A	A	A	A	B	218	B	B	B	B	B	B	B	B	B	B	B	B	Y	A E A 228	A	A	A	
14	Y	A	A	A	A	B	B	B	B	B	B	B	A	B	B	B	C	C	C	C	C	250	A E A 288		
15	E A 308	A	B	B	B	A	A E A 234	198	B	B	B	B	B	B	B	B	E Y 242	228	222	224	204	B	B	268	
16	B	A	B	B	B	B	A	B	B	B	B	B	B	B	B	Y	B	B	B	B	B	Y	B	B	
17	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	E B 258	E A 282	B	
18	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	E B 248	208	232	240	
19	242	A	B	B	B	B	B	B	B	B	B	B	B	E Y 254	B	B	B	B	B	B	232	244	238	246	
20	E A 290	B	A	A	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	A	B	A	B	
21	A	A	A	B	B	B	A	B	A	B	B	B	B	B	B	B	B	B	B	B	E B 250	E A 266	E B 266	B	
22	B	A	B	B	B	B	B	224	232	E A 228	Y	B	Y	B	B	Y	Y	B	202	B	226	242	236	246	
23	246	E B 272	B	B	B	Y	Y	200	B	B	B	B	B	B	B	B	B	208	212	B	Y	Y	216	Y	
24	A	B	B	A	B	A	B	B	A	B	B	B	B	B	B	B	B	218	270	230	E A E A 248	E A E A 248	E A E A 248	252	
25	E A 276	A	264	A	A E A 276	204	Y	Y	Y	E Y 230	222	200	218	Y	218	A	198	220	220	220	226	240	238	236	
26	E A 268	284	A	A	A	B	B	B	202	B	E Y 222	B	Y	A	B	218	Y	194	Y	232	E Y 236	234	246	266	
27	266	E A 286	A	A	200	Y	A	A	Y	Y	Y	Y	Y	Y	212	200	Y	200	206	B	B	230	236	B	
28	Q 256	A	B	A	A	232	A	Y	Y	190	Y	Y	190	Y	Y	Y	Y	B	204	210	210	220	226	232	
29	A	A E A 260	A 244	230	230	230	A	A	212	Y	Y	Y	B E B 242	B	B	B	B	B	202	B	204	240	B E B 228		
30	E Y 246	A 256	244	246	E A 286	232	A	A	200	Y	B	228	B	A	B	Y	222	210	E A 230	238	222	222	236	238	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	15	9	7	7	9	8	8	8	8	9	5	5	7	5	7	7	9	14	15	12	18	21	19	21	
MED	243	E 272	261	257	U 217	234	220	207	206	206	197	226	200	U 202	212	207	U 210	206	208	220	222	228	235	239	
U Q	E A E A 268	289	298	292	E A 271	254	233	229	E 230	E Y E 230	237	227	218	E 248	218	218	E A 240	218	220	231	E 236	E 246	E 246	263	
L Q	240	Q 250	256	246	220	231	208	200	200	201	193	219	196	194	202	202	200	202	204	216	220	222	232	230	

NOV. 2012 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

DEC. 2012 f_{XI} (0.1MHz)

45° E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4' S LON. 039°35.4' E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	O X 51	48	X 58	X 56	O X 63	O X 71	B	R	R	B	X 79	R	B	B	R	R	O X 66	R	O X 56	R	X 59	R	R	B		
2	R	B	X 66	X 68	X R	R	R	B	B	R	O X 72	O X 74	O X 76	O X 76	O X 77	O X 78	71	70	B	R	X 54	R	X 50	X 48		
3	X 53	X 57	O X 64	X 65	X 65	Y	R	R	B	R	O X 76	Y	B	B	Y	B	B	R	B	C	C	R	X 52	X 48		
4	X 48	X 51	R	R	R	O X 53	O X 55	R	Y	B	O X 70	B	R	R	R	R	R	R	O X 64	B	R	R	O X 50	X 48		
5	O X 46	X 47	O X 58	X 61	X 68	X 70	X 67	X 78	R	R	O X 73	O X 74	X 77	B	B	R	R	R	O X 64	O X 64	O X 63	O X 62	O X 62	O X 60		
6	X 43	X 50	X 52	X 66	X 70	X 79	X 80	X 94	X 94	X 96	Y	R	A	A	O X 78	R	O X 65	A	X 66	R	R	59	X 57	X 56		
7	O X 48	X 66	O X 71	X 71	X 76	X 80	R	R	O X 91	R	R	R	B	O X 83	O X 69	R	A	X 64	X 64	X 59	X 57	X 57	X 56	X 56		
8	X 56	X 56	X 57	X 65	X 68	R	X 79	X 81	X 91	X 94	R	Y	R	R	O X 89	O X 84	Y	X 68	X 63	X 68	X 62	X 62	X 62	X 60		
9	X 63	X 66	X 70	X 70	X 71	X 79	A	X 95	X 98	B	R	R	Y	R	A	O X 72	O X 72	O X 70	O X 66	O X 62	B	O X 49	O X 47	R		
10	R	X 57	A	X 52	B	B	R	X 58	X 61	X 66	X 70	R	Y	R	O X 76	Y	O X 72	R	O X 58	O X 59	R	R	O X 50	X 48		
11	X 48	X 56	B	B	B	B	Y	Y	O X 64	R	O X 79	R	R	Y	R	R	R	O X 60	O X 67	O X 60	X 58	R	X 60	X 56		
12	X 57	X 57	X 68	X 68	X 77	X 88	X 93	X 96	O X B	Y	B	R	B	R	R	R	B	Y	Y	B	O X 49	X 58	X 56	X 49		
13	B	R	R	A	R	B	Y	Y	Y	B	B	Y	B	Y	Y	Y	R	B	B	B	R	R	X 58	R		
14	X 55	O X 60	R	X 61	X 66	O X 66	O X 80	O X 80	B	B	B	B	O X 84	X 80	X 79	Y	Y	O X 72	R	R	X 64	X 64	X 61	X 50		
15	B	B	B	B	B	B	B	B	B	B	73	B	O X 76	X 82	X 88	X 82	Y	Y	B	R	R	B	O X 50	A		
16	B	B	Y	B	B	B	O X 62	O X 66	B	X 78	X 85	B	B	B	B	B	O X 78	R	O X 67	O X 62	X 57	X 57	O X 49	X 42		
17	O X 49	R	B	R	Y	B	O X 70	R	B	B	B	B	B	B	B	B	B	B	B	B	O X 54	O X 53	O X 52	O X 47		
18	O X 48	O X 50	X 55	R	R	B	B	X 69	B	B	B	B	B	X 77	B	B	O X 75	B	B	B	O X 55	O X 47	O X 46	O X 42		
19	R	O X 42	O X 52	Y	R	B	R	B	B	B	B	B	B	O X 77	O X 70	R	R	B	B	B	B	B	B	O X 46		
20	O X 47	O X 50	R	R	B	O X 74	R	X 88	R	B	B	X 80	B	B	B	B	X 80	O X 78	O X 73	R	B	R	O X 52	R		
21	O X 48	R	R	Y	O X 53	R	R	X 65	R	R	Y	B	B	B	B	B	B	B	B	B	B	R	X 58	X 52	X 52	
22	O X 47	X 48	R	R	O X 64	R	R	B	B	B	B	B	B	B	B	R	O X 70	O X 70	O X 66	O X 66	R	X 60	X 57	X 57	X 55	
23	X 57	X 57	X 57	X 68	X 69	X 72	X 74	R	O X 84	O X 86	B	O X 77	X 88	X 87	R	X 79	X 78	X 76	X 72	X 61	O X 56	O X 55	O X 52	O X 49		
24	X 48	O X 63	O X 63	O X 66	O X 69	O X 72	R	R	B	B	R	B	B	B	B	Y	R	R	O X 60	X 58	B	B	O X 50	R		
25	R	R	R	R	R	R	R	Y	O X 87	O X 87	B	O X 86	R	R	O X 71	O X 71	O X 68	B	O X 65	X 65	X 53	X 53	X 50	X 48		
26	R	O X 53	X 53	X 59	X 69	X 73	X 78	X 78	B	B	B	B	B	B	R	R	Y	B	B	B	B	R	R	X 59	R	
27	X 57	O X 63	O X 69	R	R	R	R	O X 70	R	R	Y	O X 75	R	O X	R	O X	R	O X 75	O X 65	O X 64	X 62	X 62	X 62	Y	A	A
28	X 58	X 64	O X 64	X 65	O X 74	X 75	X 77	X 86	X 86	R	R	B	Y	B	Y	Y	O X 67	O X 70	R	O X 65	X 63	X 61	X 60	X 55		
29	X 47	O X 48	X 57	X 50	X 51	R	O X 74	X 75	X 75	X 82	O X 80	B	O X 82	X 77	X 74	O X 68	X 63	X 63	X 62	X 61	X 66	X 64	X 64	X 58		
30	X 58	X 57	X 61	R	X 58	X 68	O X 74	X 81	X 87	X 88	R	R	R	R	O X	X 80	X 78	O X 77	O X 68	X 66	X 66	X 66	X 57	X 47	X 48	
31	X 45	X 48	X 54	X 54	X 62	X 63	X 72	X 72	X 78	X 79	X 80	O X 79	O X 77	O X 72	O X 68	O X 60	X 64	X 63	X 59	X 58	X 58	X 58	X 58	X 65	X 60	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	23	24	19	17	18	15	14	17	12	9	11	7	8	8	12	14	14	16	18	17	19	18	27	24		
MED	X	X	X	X	X	X	X	X	X	O X	O X	O X	O X	X	O X	O X	O X	X	O X	X	X	X	X	X	X	
U Q	48	56	58	65	68	72	74	78	86	86	76	77	77	78	76	76	69	68	64	61	58	58	56	49		
L Q	X	X	X	X	X	X	X	X	X	O X	O X	O X	O X	O X	O X	O X	X	X	X	X	X	X	X	X	X	
	57	58	66	68	70	79	79	87	91	91	80	80	83	82	80	79	72	71	66	64	63	61	60	56		
	X	X	X	X	X	O X	X	X	X	X	O X	O X	O X	O X	O X	X	X	X	X	X	X	X	X	X	X	
	47	49	55	58	63	68	70	70	76	78	72	74	76	76	70	71	65	64	62	58	54	53	50	48		

DEC. 2012 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

DEC. 2012 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	R 45	F 39	J R 52	J R 50	57	65		B	R	R	B J R 73	R	B	B	R	R	R	R	51	R J R 53	R	R	R	B	
2	R	B	60	J R 62	R	R	R	B	B	R	66	68	70	70	71	72	J R 65	64	B	R J R 48	R	44	42	42	
3	J R 47	51	58	J R 59	59		Y	R	R	B	R	70	Y	B	B	Y	B	B	R	B	C	C	R J R 46	R 42	
4	42	45	A	R	R	R U R 47	49	R	Y	B U R 64	B	R	R	R	R	R	R	R U R 58	B	R	R	42	44	42	
5	40	41	52	55	62	J R 64	J R 61	J R 72	R	R U R 67	68	71	R J R 71	B	B	R	R	R	58	58	57	56	56	54	
6	37	F 39	46	60	64	73	J R 74	J R 88	J R 88	90	R	Y	R	A	A U R 72	R	R	A J R 59	60	R	R J R 53	51	50	50	
7	R 42	60	65	65	70	74	D R 66	R U R 85	R	R	R	R	B	R U R 77	63	R	A J R 58	J R 58	53	J R 51	J R 51	50	50	50	
8	J R 50	J R 50	J R 51	J R 59	62	R	J R 74	J R 75	J R 85	88	R	Y	U R 86	85	83	78	Y J R 62	J R 57	62	56	56	56	56	55	
9	57	J R 60	64	64	65	73	R	A J R 89	R	B	R	R	Y	R	A	R	66	66	64	60	56	B	43	41	A
10	R J R 51	J R 51	A J R 46	B	B	R	J R 52	J R 55	R	R	60	64	R	Y	R U R 70	Y	R	R U R 52	53	R	R	44	43	R	
11	42	J R 50	B	B	B	Y	Y	R	R U R 58	73	R	R	Y	R	R	R	R	54	61	J R 54	J R 52	R J R 54	R	50	
12	51	51	J R 62	62	71	82	J R 87	R 90	B	Y	B	R	B	R	R	R	B	Y	Y	B	R J R 43	52	50	43	
13	B	R	R	A	R	B	Y	Y	Y	B	B	Y	B	Y	Y	Y	R	B	B	B	R	R J R 52	R	R	
14	J R 49	R 54	R	J R 55	60	56	F R 74	R 74	B	B	B	B	R U R 78	74	73	Y	Y U R 66	R	R	58	58	55	44	44	
15	B	B	B	B	B	B	B	B	B	B	J R 67	B	B	B	B	70	J R 76	82	76	Y J R 74	B	R	44	A	
16	B	B	Y	B	B	B	R U R 56	R 60	B J R 71	R U R 79	B	B	B	B	B	72	R	61	56	J R 51	J R 51	Y	43	36	
17	R 43	R	B	R	Y	B	R	R	B	B	B	B	B	B	B	B	B	B	B	B	48	47	46	51	41
18	R 42	R J R 44	R 49	R	R	B	B	B	B	B	B	B	J R 71	B	B U R 69	R	B	B	B U R 49	R U R 41	R	41	40	J R 36	
19	A	R 36	R 46	Y	R	B	R	B	B	B	B	B	B	B U R 71	64	R	R	B	B	B	B	B	B	40	R
20	U R 41	U R 44	R D R 35	R	B U R 68	R J R 82	R	B	B	J R 74	B	B	B	B	B	J R 74	R	R	R	R	B	R U R 46	R	R 42	
21	R 42	R	R	Y	R	R	R	59	R	R	Y	B	B	B	B	B	B	B	B	B	R J R 52	J R 46	J R 46	46	46
22	R 41	42	R	R	58	R	R	B	B	B	B	B	B	B	R J R 64	R	R	64	60	60	54	51	51	49	R
23	51	J R 51	J R 51	J R 62	63	66	J R 68	R	R U R 77	80	B J R 71	J R 82	J R 81	R	J R 73	J R 72	J R 70	66	55	50	49	46	43	43	
24	42	57	57	60	63	66	R	R	B	B	R	B	B	B	Y	R	R	54	52	B	B	44	44	R	
25	R	R	R	R	R	R	R	Y	81	81	80	R	R	R U R 65	65	62	59	59	J R 47	J R 47	R	44	42	42	
26	R	47	J R 47	53	J R 63	J R 67	J R 71	72	B	B	B	B	B	R	R	Y	B	B	B	B	R	R J R 53	R	R	
27	51	57	63	R	R	R	R	R	R	R	Y	69	R U R 72	R	R	69	59	58	56	56	56	Y	A	A	
28	J R 52	58	58	J R 59	68	69	J R 71	80	80	U R 82	U R 82	B	Y	B	Y	Y	61	64	R	59	57	55	54	J R 49	
29	40	R 42	F 40	F 38	F 34	A	68	69	69	J R 76	R 74	B	R	R	R	R	57	57	56	55	60	58	58	52	
30	52	51	F 51	R	52	58	F 68	J R 75	81	82	R	R	R	R U R 74	72	J R 71	62	60	60	60	60	51	41	42	
31	39	42	F 43	F 48	56	57	F 62	J R 66	72	73	J R 74	U R 73	U R 71	66	62	J R 54	58	57	53	J R 52	52	52	56	F 52	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	23	24	20	17	18	15	15	17	12	10	12	7	9	10	12	14	14	16	18	17	19	19	27	24	
MED	42	50	52	59	62	66	68	72	80	80	72	71	71	73	70	70	63	62	58	55	52	51	50	43	
U Q	51	52	59	62	64	73	J R 74	J R 81	85	82	74	74	80	77	74	73	66	65	60	58	57	55	54	50	
L Q	41	42	46	52	57	58	R 62	R 64	70	73	66	68	70	71	64	65	59	58	56	J R 52	48	46	44	42	

DEC. 2012 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

DEC.2012 ftEs (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT.69°00.4'S LON.039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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 23	B 24	B 36	B 30	B 36	G	B	33	41	B	29	G 29	G	B	B	40	30	G	G	28	31	G	32	22	E 20	B
2	44	B	34	34	48	39	32	B	B	32	G 54	E 54	B 64	E 55	B 36	27	G	E 19	B 31	B	32	27	G	20	G	
3	27	26	33	32	32	22	43	39	B	G	G	G	B	B	35	B	B	B	32	B	C	C	32	32	E 19	B
4	G 14	32	50	42	33	G	G 20	G 21	32	B 54	B	G	37	33	33	29	E 34	B 29	B	G	B	G	25	25	G	
5	G	27	G	25	34	31	29	32	35	36	32	26	G	B	B	40	32	31	26	30	G	20	24	22	24	
6	24	G	G	G 14	G 14	40	43	37	36	36	G	56	99	80	44	59	58	63	43	42	35	24	33	38	B	
7	E 31	B 18	G	27	24	24	26	21	20	G	39	39	B	68	34	36	63	23	28	28	33	35	E 20	B 19	B	
8	E 20	B 19	B 23	26	26	26	G	G	30	20	27	G	G	G	G	G	37	33	G	G	G	16	22	20	24	
9	E 17	B 17	G	G	36	43	93	33	23	G	32	32	37	37	78	36	41	G	G	24	B	33	38	K 42		
10	41	45	43	G 24	B	B	33	36	24	E 40	G	G	G	32	29	26	G	E 36	B	G	G	34	36	40	21	
11	41	G	B	B	B	B	G 35	G	24	30	G	32	30	36	31	33	35	32	41	26	E 25	27	38	46	B	
12	G	28	23	G 16	34	22	33	G	B	G	B	34	B	33	68	42	B	G	G	B	E 29	24	41	29	B	
13	B	42	42	61	25	B	G	G	21	B	B	25	B	G	G	32	32	B	B	B	E 29	29	27	24	B	
14	33	G	32	32	33	E 28	30	31	B	B	B	39	41	32	26	G	G	E 31	B	33	20	G	E 32	B 42	B	
15	B	B	B	B	B	B	B	B	B	B	G	B 39	E 26	31	26	26	38	B	B	33	33	B	38	66	G	
16	B	B	G	B	B	B	35	G	B	G 21	E 55	B	B	B	B	B	E 48	28	25	32	29	29	G	23	22	
17	26	G	B	34	28	B	G 25	33	B	B	B	B	B	B	B	B	B	B	B	B	G	26	26	23	23	
18	26	26	36	30	27	B	B	G	B	B	B	B	G	B	B	29	B	B	B	B	G 31	E 23	B 36	B	B	
19	38	E 25	G 24	G	34	B	32	B	B	B	B	B	B	G 51	28	36	G 28	B	B	B	B	B	B	E 28	B	
20	E 30	B 28	B 29	B 30	B 30	B 30	B 31	22	27	G	B	B	B	B	B	B	E 37	B 64	B 33	B 33	B	34	35	36	20	G
21	35	35	30	G	37	34	G 22	G 24	B	B	B	B	B	B	B	B	B	B	B	B	B	E 28	31	G	23	B
22	33	24	E 31	21	24	G	G	B	B	B	B	B	B	B	34	24	31	24	27	30	21	22	14	14	G	
23	G 19	E 21	G	G	19	23	32	34	36	38	B	36	40	39	49	32	G 21	35	28	30	E 30	24	26	16	G	
24	28	28	27	27	46	36	E 29	32	B	B	27	B	B	B	B	G 25	32	30	21	24	B	B	E 28	27	B	
25	31	35	32	E 35	32	42	32	G	G	G	B 16	E 64	B 36	36	42	31	G 17	B	G	15	27	G	28	36	31	
26	37	39	30	27	E 27	32	32	32	B	B	B	B	B	G	G	G	B	B	B	B	B	32	36	30	42	B
27	41	34	64	42	38	34	22	30	32	21	G	45	41	40	33	41	57	34	36	27	E 28	31	50	119	B	
28	36	28	27	27	31	38	39	14	30	54	62	B	G 24	B	32	33	G 57	27	34	35	26	14	14	33	G	
29	40	38	35	32	38	47	34	29	24	32	32	B 52	E 36	36	33	32	32	15	28	G	33	40	30	30	B	
30	40	42	42	43	43	34	31	G	19	31	36	42	36	35	36	43	42	32	20	28	35	34	39	32	B	
31	33	32	32	29	27	27	G 25	G 17	15	35	G	38	60	46	73	36	34	28	31	29	33	38	36	41	B	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	28	28	28	28	26	23	28	27	19	18	20	18	18	20	24	28	25	24	22	23	27	28	30	30		
MED	31	28	30	28	32	31	32	G	G 30	G	G 33	G	G	36	E 34	G	32	G	30	28	E 28	G 26	28	26		
U Q	38	34	36	33	36	38	G	33	32	36	G	42	41	40	43	36	42	33	32	30	33	33	38	38		
L Q	24	19	G	G	27	G 23	G 29	G 29	G 23	21	32	G	G 30	G	33	28	G	G	28	24	G	21	24	22	G	

DEC.2012 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

DEC.2012 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT.69°00.4'S LON.039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC 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	23	24	15	14	29	14		19	18		19	19			34	25	22	18	16	18	14	16	20			
2	19		18	16	17	13	25			18	19	54	64	55	36	24	16	31		23	23	22	18	15		
3	13	13	14	13	14	18	18	23		23	20	19			24			20					27	24	19	
4	13	13	14	20	18	17	19	14	23		54		32	20	20	16	34	29	19			23	19	17	13	
5	12	14	13	13	14	12	13	13	17	18	18	24	24			28	23	19	16	18			18	16	14	18
6	13	17	14	13	13	17	12	16	20	20	18	16	35	19	20	18	18	21	18	21	15	16	17	12		
7	12	18	15	14	14	27	20	20	18	19	24	20		31	28	18	18	22	20	15	17	19	20	19		
8	20	19	23	14	19	12	16	19	24	18	23	23	20	19	20	16	19	16	19	16	13	19	12	14		
9	17	14	14	17	15	14	19	17	14		24	28	30	20	28	23	13	14	16	14		19	19	19		
10	18	18	19	19			18	23	14	40	27	22	28	16	14	16	23	36	19	18	19	16	19	18		
11	16	19					26	26	20	25	27	24	24	30	16	30	28	29	18	18	25	19	16	13		
12	14	13	15	13	13	14	17	19		22		23		25	20	21		27	28		29	17	20	29		
13		24	29	20	23		20	29	17			20		24	28	28	24				29	29	27	24		
14	19	18	24	18	14	28	21	13					18	19	19	23	21	18	31	26	16	22	31	42		
15											25		39	23	23	23	22	38		29	24		29	29		
16			30				26	19		18	55					48	24	23	24	22	23	24	18	19		
17	17	23		25	23		24	24												14	13	14	16	18		
18	13	14	18	23	23								23			24				19	31	22	23	13		
19	12	25	16	22	14		24						29	51	25	36								28		
20	30	28	29	30		30	31	15	24			19				36	64	33	33		24	21	19	17		
21	18	23	20	20	21	29	19	21	14	14	26										28	20	13	23		
22	14	12	31	18	24	20	13								31	21	19	23	24	24	12	12	13	13		
23	12	20	21	12	13	14	13	12	18	22		13	18	20	31	19	16	13	13	13	30	16	12	14		
24	13	12	12	12	13	13	28	29			13					24	14	19	18	15			28	27		
25	12	12	19	35	16	14	13	14	13	13		64	19	12	14	13	13			14	16	12	16	18	22	
26	18	11	12	14	27	22	17	21						25	24	23					27	25	23	22		
27	12	13	14	15	13	13	16	16	18	20	24	14	16	14	16	14	13	14	13	14	28	27	14	13		
28	12	12	13	12	12	12	22	13	14	25	41		15		14	28	22	14	26	13	18	13	12	12		
29	14	20	14	12	12	15	12	14	17	21	14		52	24	26	14	14	14	13	13	18	13	13	13		
30	12	12	13	12	12	14	12	12	13	13	13	14	14	13	16	13	16	13	19	12	12	13	13	13		
31	13	13	12	12	13	12	13	14	13	13	13	13	14	14	14	17	13	14	13	11	12	13	14	13		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	31	31	31		
MED	14	18	16	16	16	17	19	19	20	25	27	28	39	25	26	23	22	23	20	18	23	19	18	18		
U Q	19	23	24	22	24		25	26							51	28	36	38		29	28	24	23	23		
L Q	12	13	14	13	13	14	13	14	17	18	19	19	20	19	19	17	16	16	16	14	15	16	14	13		

DEC.2012 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

DEC. 2012 h'F (KM)

45°E MEAN TIME (G.M.T. + 3 H)

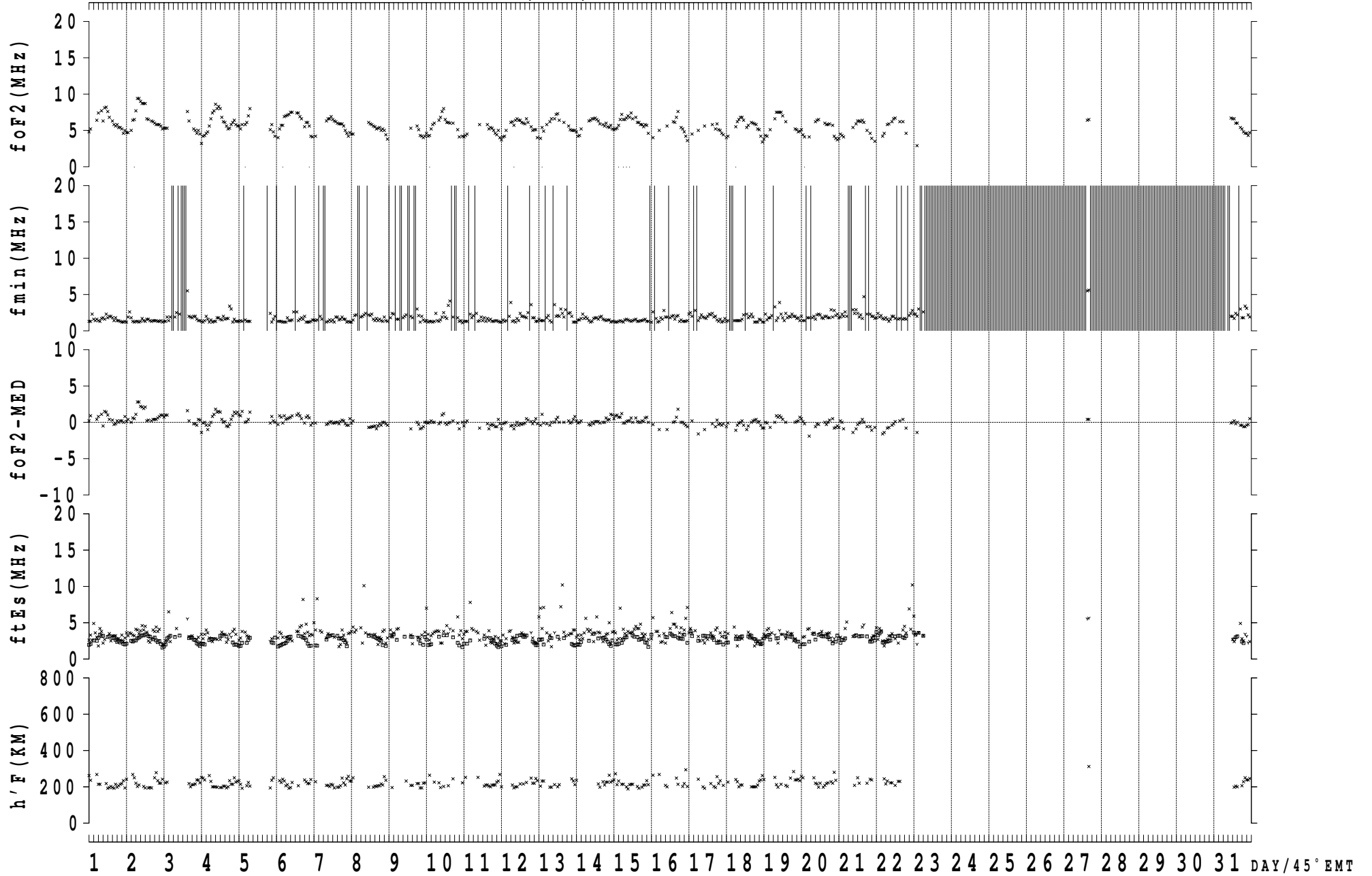
LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC IN MANUAL SCALING

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	230	E B 264	E A 264	E A 262	A	Y	B	A	A	B	Y E Y 212	B	B	A	A	212	196	206	200	216	220	228	236	B
2	A	B	A	O 204	A	A	A	B	B	A	206	B	B	B	202	234	206	216	B	216	226	238	222	254
3	E A 278	E A 278	A 240	E A 252	E A 238	A	A	A	B	196	Y	Y	B	B	Y	B	210	B	C	C	A E A 244	A 244	A 244	A 244
4	E A 256	E A 260	A	A	A	250	E Y 240	208	Y	B	B	B	A	A	R	198	204	204	204	B	230	230	230	230
5	O 230	A 230	228	224	234	216	196	196	200	194	A	212	Y	B	B	A	198	198	198	202	222	222	230	230
6	238	258	178	236	234	222	A	196	196	Y	Y	A	A	A	A	A	A	A	E A 222	A	216	234	228	242
7	A 234	256	230	226	208	216	212	E Y 236	186	206	196	A	B	A	Y	A	A	216	200	200	216	228	220	228
8	238	226	218	218	206	242	196	228	188	216	196	Y	192	Y	Y	192	Y	196	196	196	196	226	226	234
9	O 240	O 240	240	220	224	220	E A 208	E A 208	H 176	B	194	190	Y	A	A E A 230	212	200	208	210	B	238	234	A	A
10	192	202	A	202	B	B	A	A	E B 182	248	Y	198	Y	A E Y 216	Y	Y	212	E Y 220	206	A	218	230	230	
11	230	Y	B	B	B	Y	Y	Y	Y	A	Y	A	230	Y	A	228	208	200	200	186	210	A	222	238
12	E A 250	A 250	250	218	220	220	204	204	B	Y	B	A	B	A	A	A	B	Y	Y	B	212	222	220	246
13	B	A	A	A	A	B	Y	Y	Y	B	B	Y	B	Y	Y	Y	A	B	B	B	222	236	226	244
14	E A 264	302	A	208	204	226	204	202	B	B	B	B	A	190	190	Y	Y	212	202	A	202	224	224	B
15	B	B	B	B	B	B	B	B	B	Y	B	B	B	224	190	Y	200	Y E B 242	B	A	A	B	A	A
16	B	B	Y	B	B	B	A	Y	B	Y	B	B	B	B	B	B	206	206	E A 232	214	Y	Y	A	A
17	A	A	B	A	Y	B	222	A	B	B	B	B	B	B	B	B	B	B	B	B	A	222	E A 244	214
18	274	A	A	E A 248	B	B	Y	B	B	B	B	B	Y	B	B	Y	B	B	B	206	E B 246	230	228	236
19	A	252	Y	Y	A	B	A	B	B	B	B	B	B	Y	B	204	E B 216	B	B	B	B	B	B	B
20	E B 280	E B 260	B E B 274	B	220	212	200	194	B	B	194	B	B	B	B	216	B	E B 218	E B 236	B	248	240	A E A 228	A
21	E A 264	E A 260	A	Y	A	A	A	214	196	A	Y	B	B	B	B	B	B	B	B	B	204	214	202	228
22	H E A 190	228	B	Y	E Y 218	236	222	B	B	B	B	B	B	B	A	Y	194	E Y 212	212	212	200	204	218	218
23	228	238	238	H 218	182	216	196	196	198	202	B	208	Y	A	A	A	222	196	200	H 172	202	226	194	198
24	214	228	228	230	A	218	208	A	B	B	194	B	B	B	B	Y	A	A	196	200	B	B	240	226
25	226	A	214	B	A	214	A	Y	194	198	B	B	A	A	A	Y	Y	B	202	202	202	194	196	E A 260
26	A	E A 262	E A 242	E B 250	234	210	194	B	B	B	B	B	Y	Y	Y	Y	B	B	B	B	E A 258	A	242	A
27	E A 242	E A 276	E A 268	A	E A 230	240	218	208	208	A	Y	A	A	220	196	200	200	204	204	204	212	Y	A	A
28	E Y 246	246	218	232	204	230	208	Y	A	A	B	Y	B	Y	Y	Y	218	212	198	202	214	E A 230	240	234
29	E A 240	A	A	A	244	254	A	200	198	198	198	204	B	B	212	202	200	196	196	198	220	222	226	214
30	216	A	A	A	A	A	216	196	190	212	212	A	A	A	198	202	198	198	212	212	202	234	234	232
31	242	242	228	228	234	234	198	192	192	206	206	192	A	A	A	192	212	202	202	194	198	A E A 220	A 224	O
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	20	15	18	16	17	17	18	14	10	8	7	3	4	6	15	15	21	21	21	22	22	26	24
MED	234	240	229	223	220	221	209	201	194	202	200	196	224	201	198	203	202	204	201	204	214	226	226	230
U Q	E 253	E 260	250	E A 242	E A 236	235	220	208	198	212	206	212	230	216	202	222	212	212	E 212	213	226	234	234	243
L Q	229	234	218	218	207	217	199	196	188	198	195	192	192	190	196	200	196	200	198	200	202	222	220	228

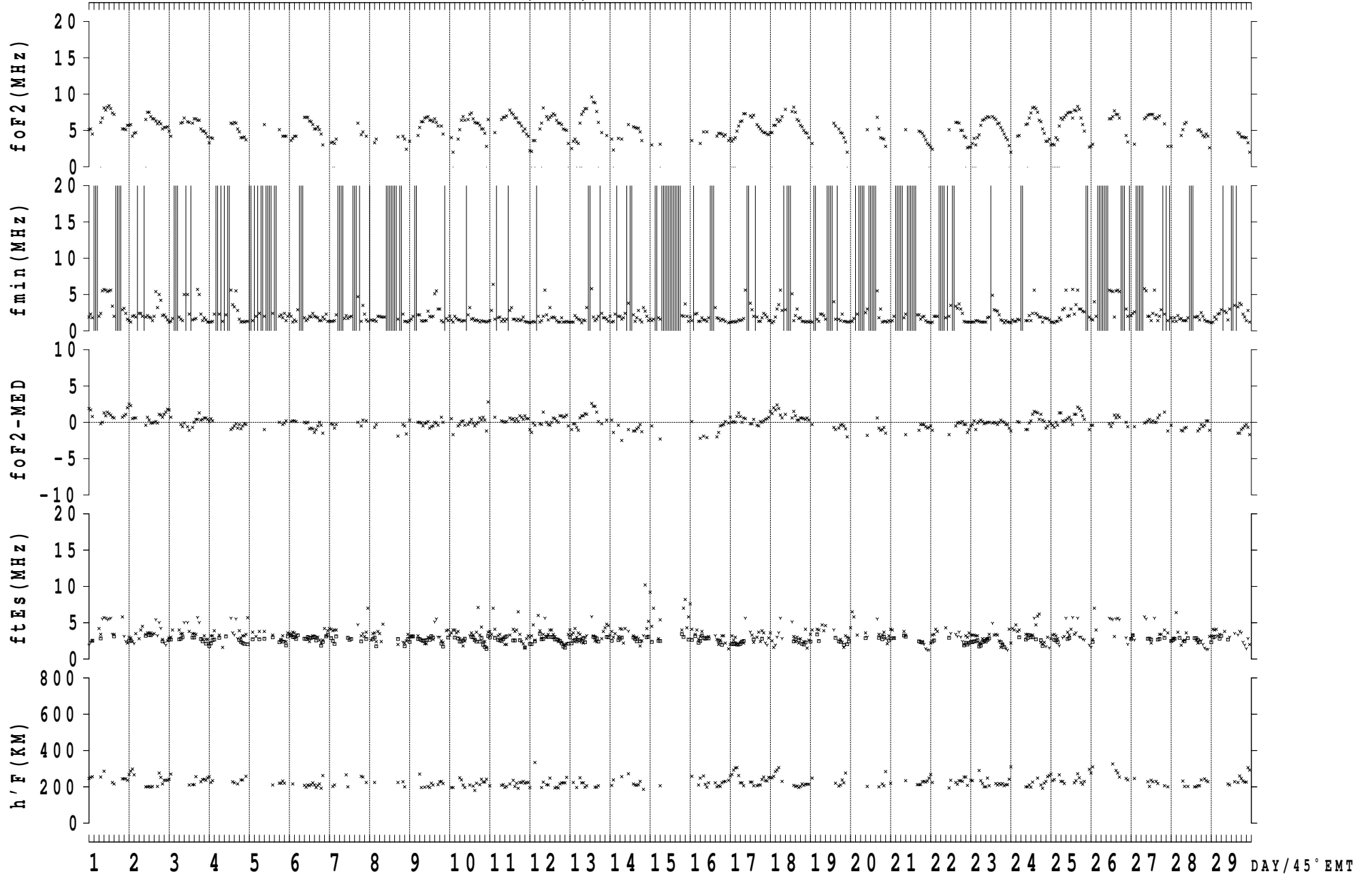
DEC. 2012 h'F (KM)

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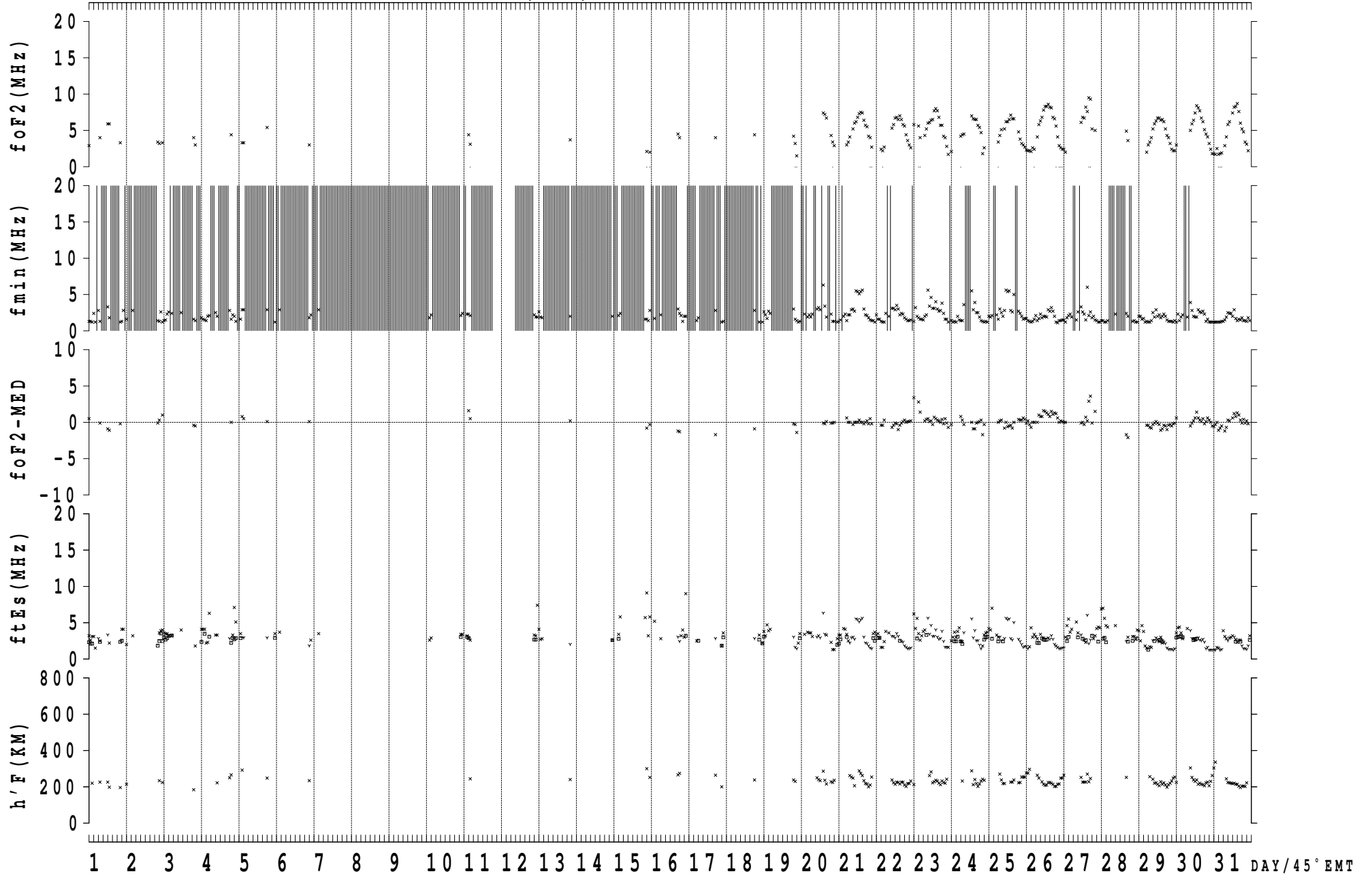
2012 0101 -> 2012 0131 (99) SYOWA-ST.



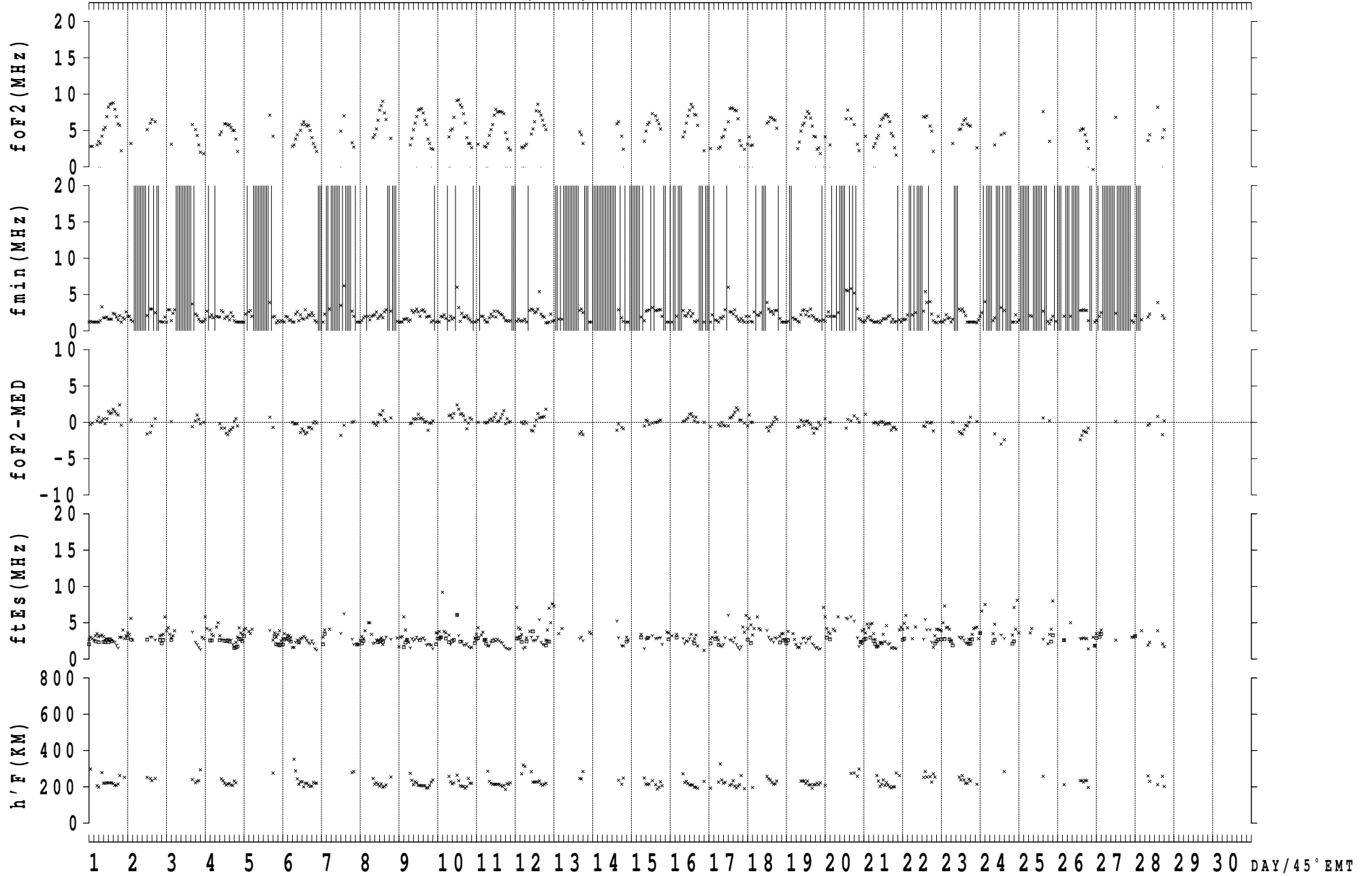
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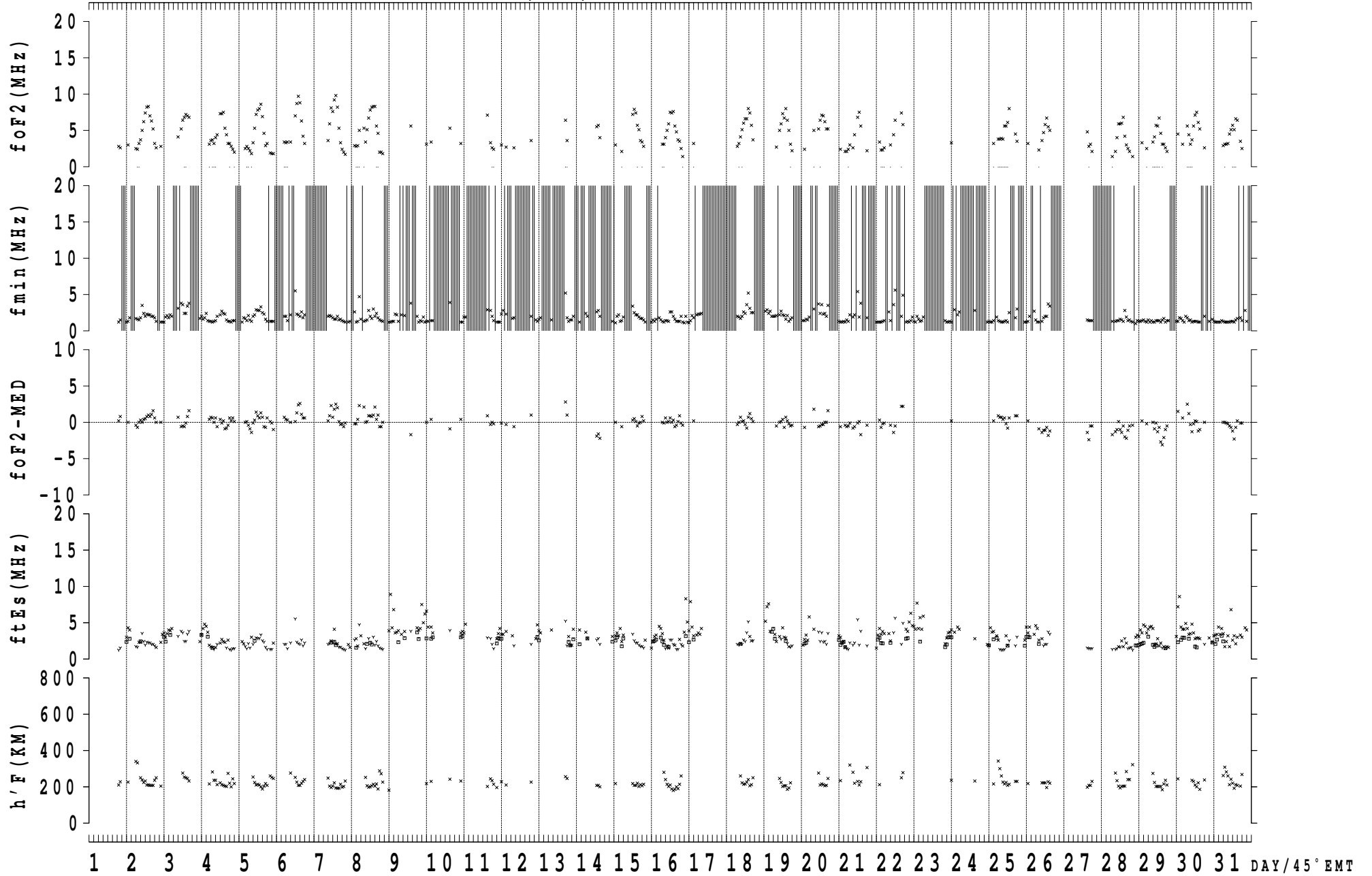
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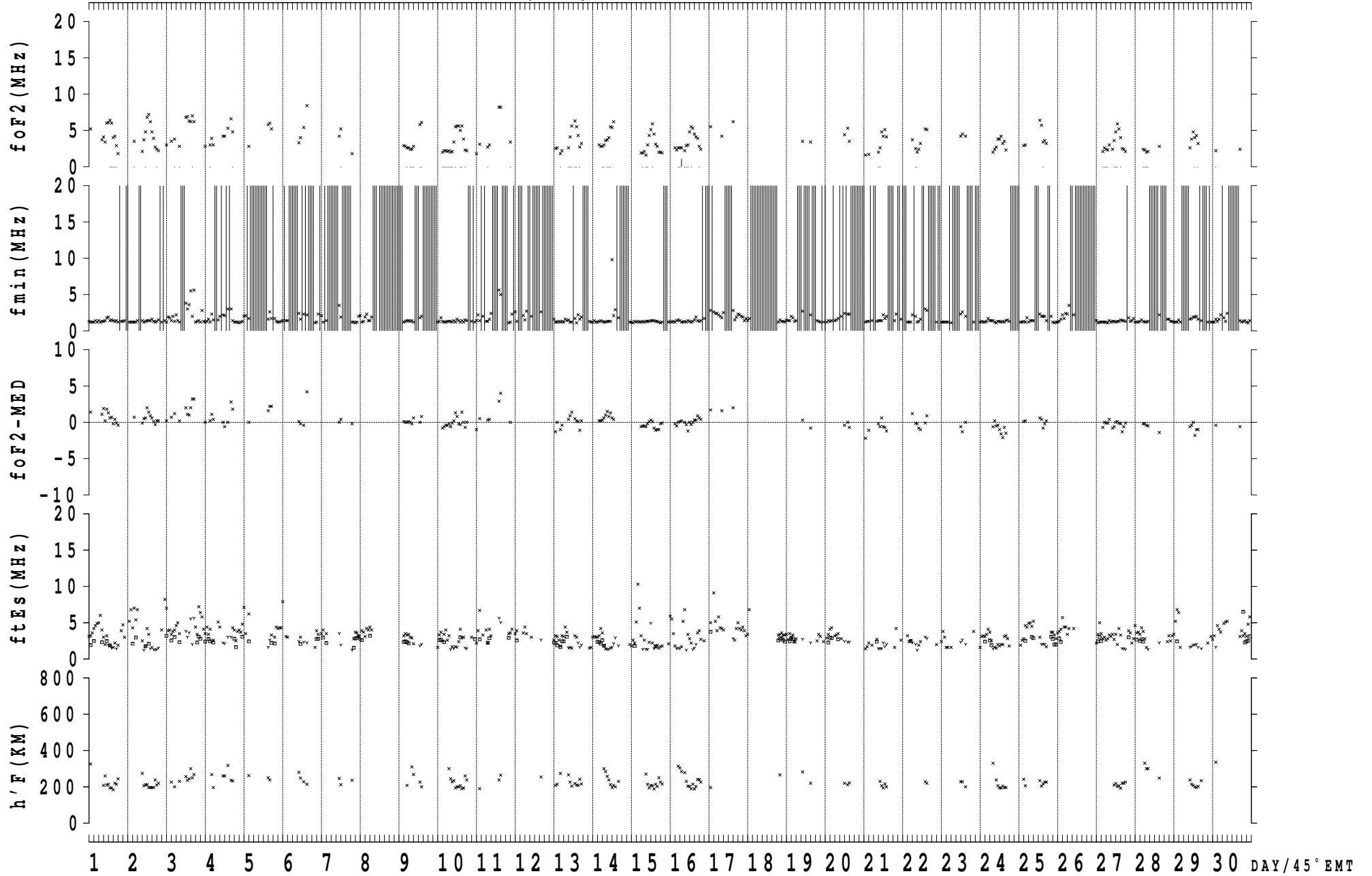
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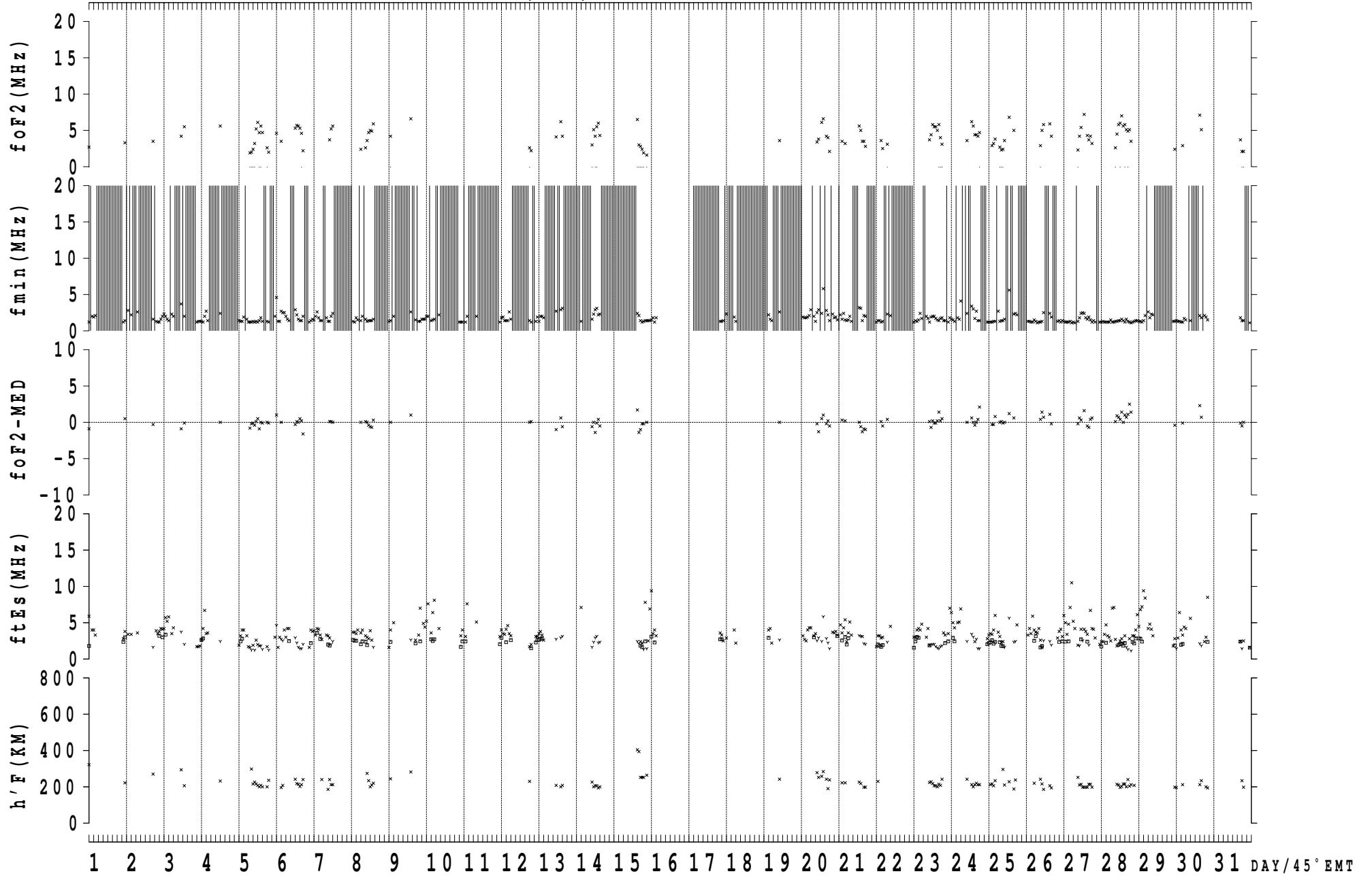
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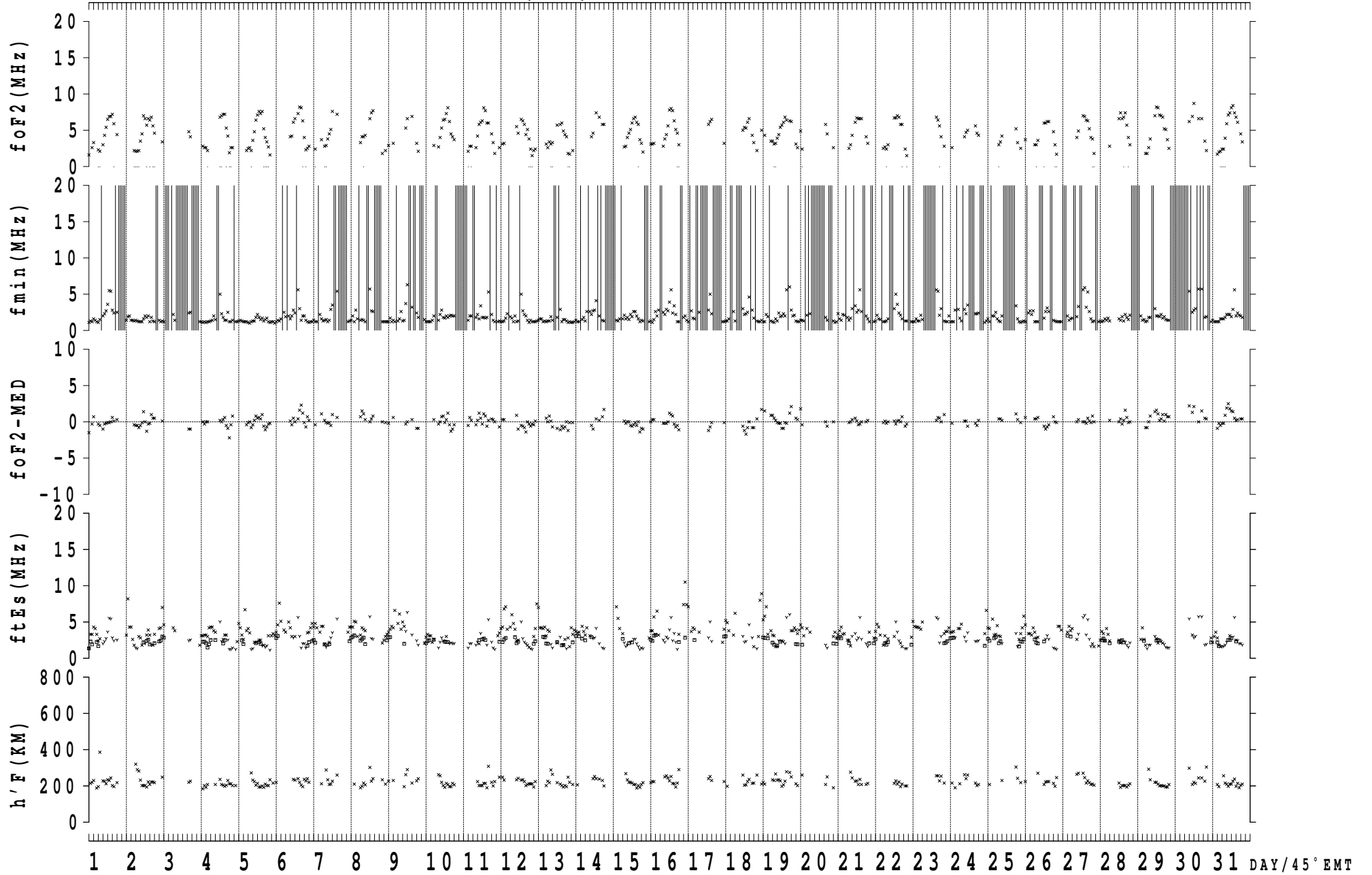
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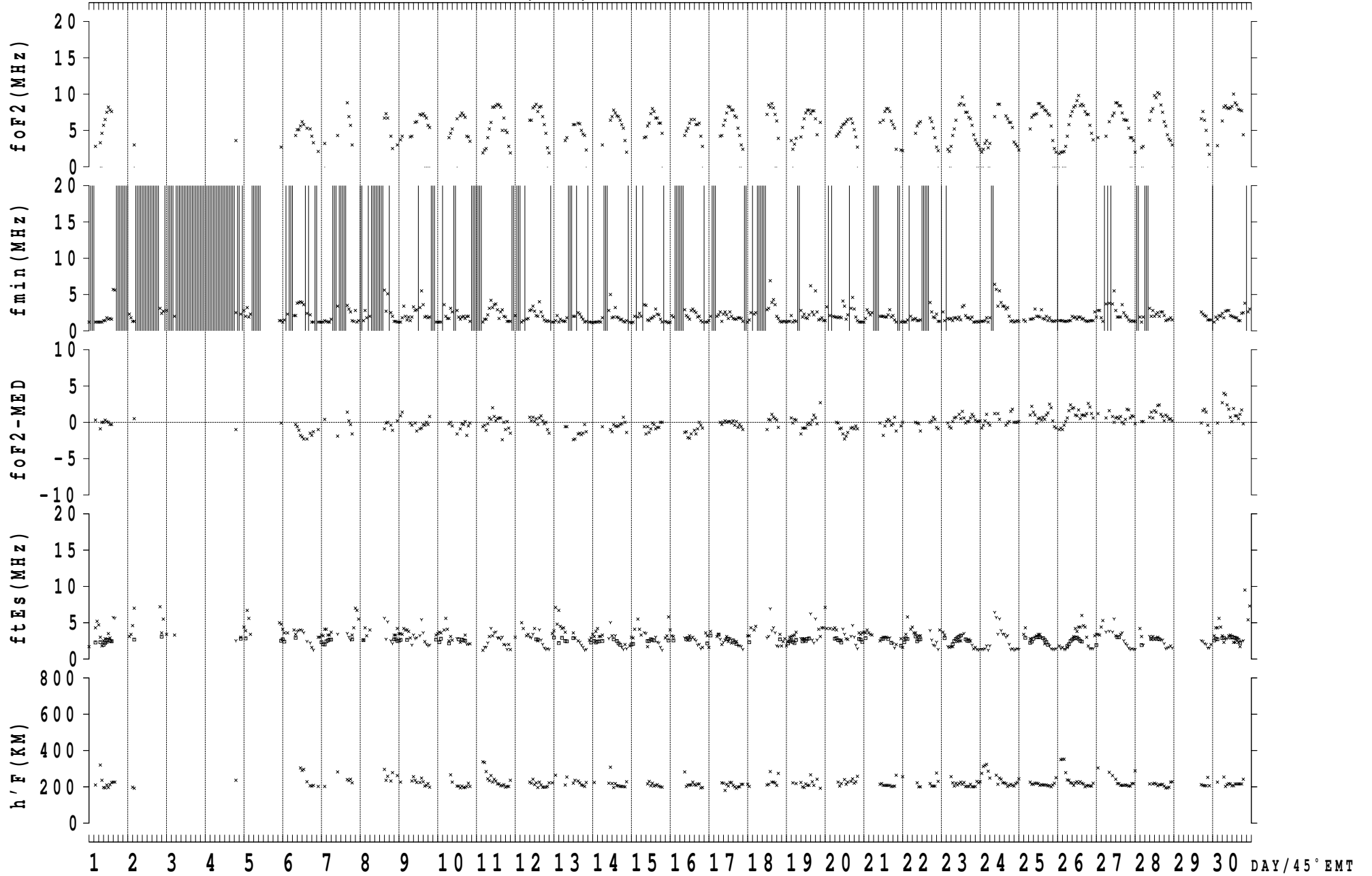
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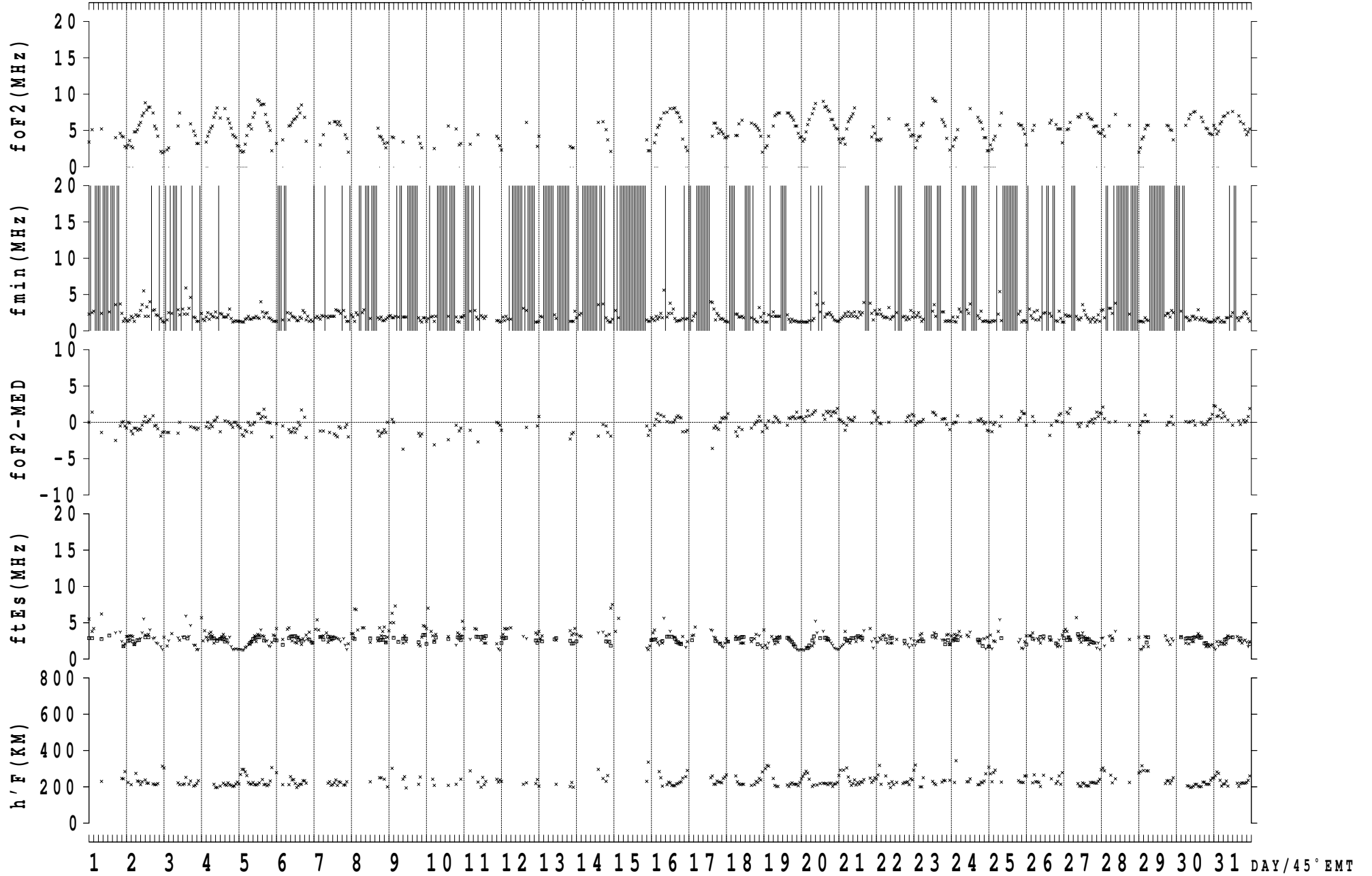
2012 0801 -> 2012 0831 (99) SYOWA-ST.



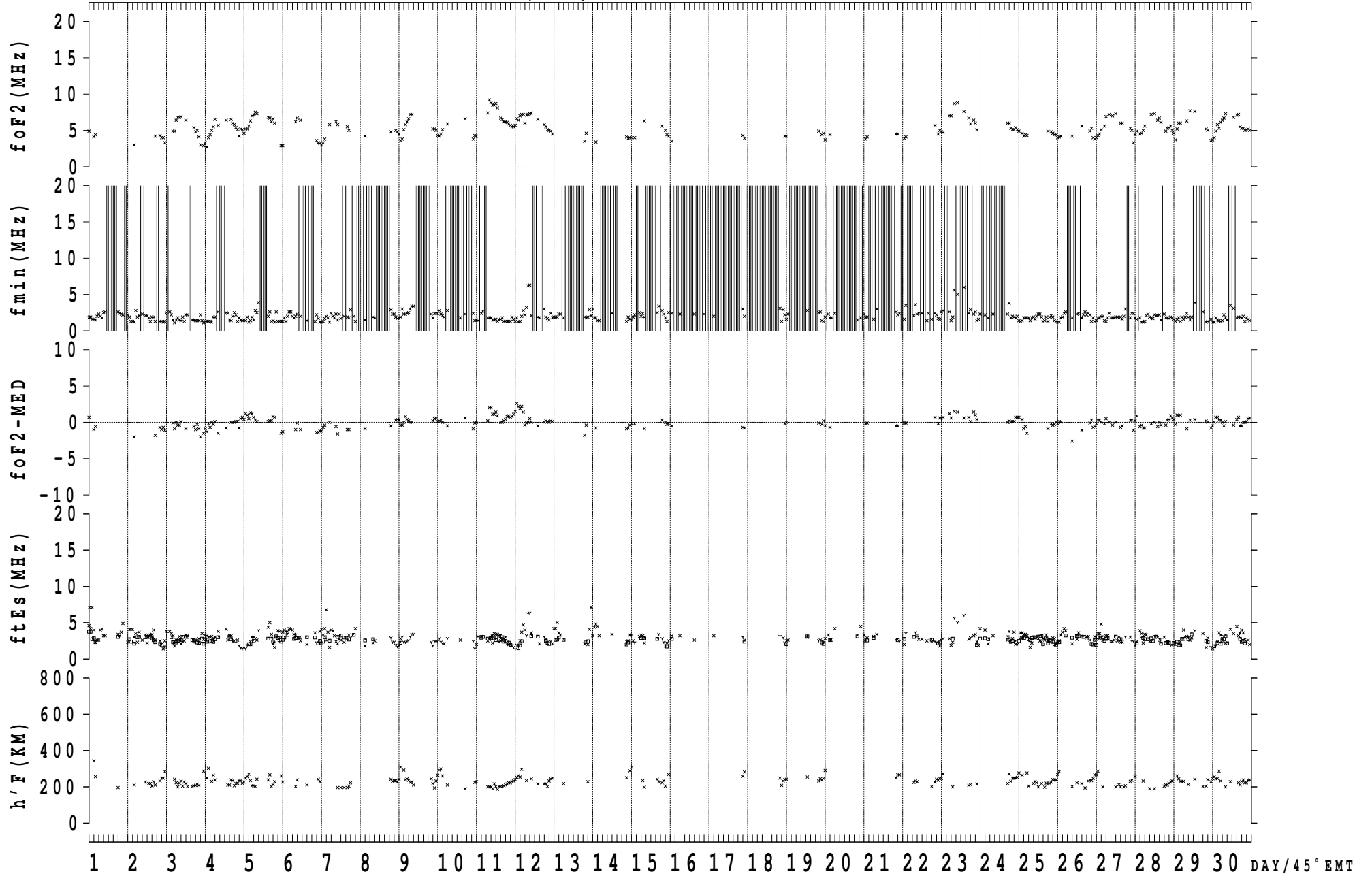
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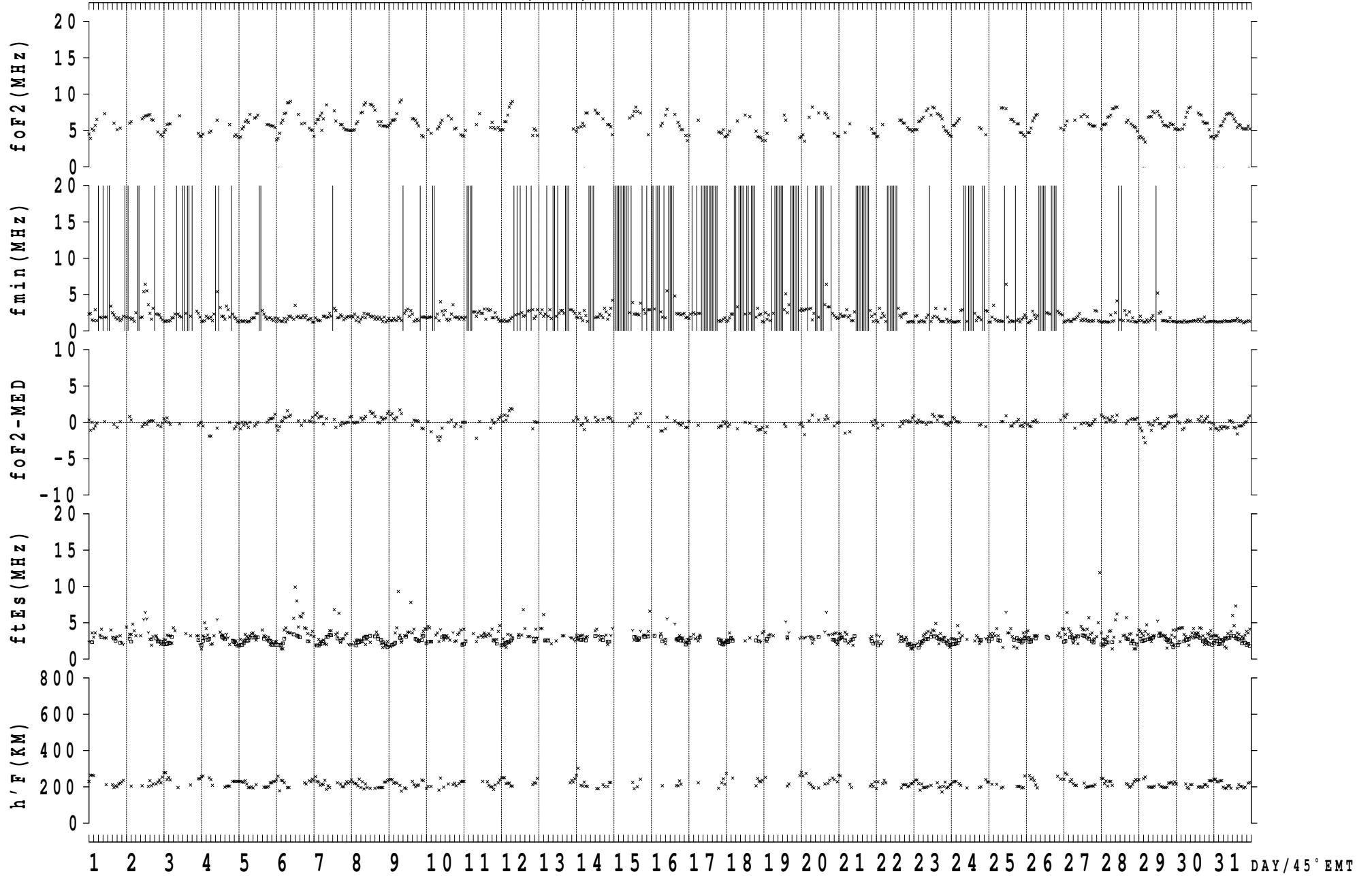
2012 1001 -> 2012 1031 (99) SYOWA-ST.



2012 1101 -> 2012 1130 (99) SYOWA-ST.



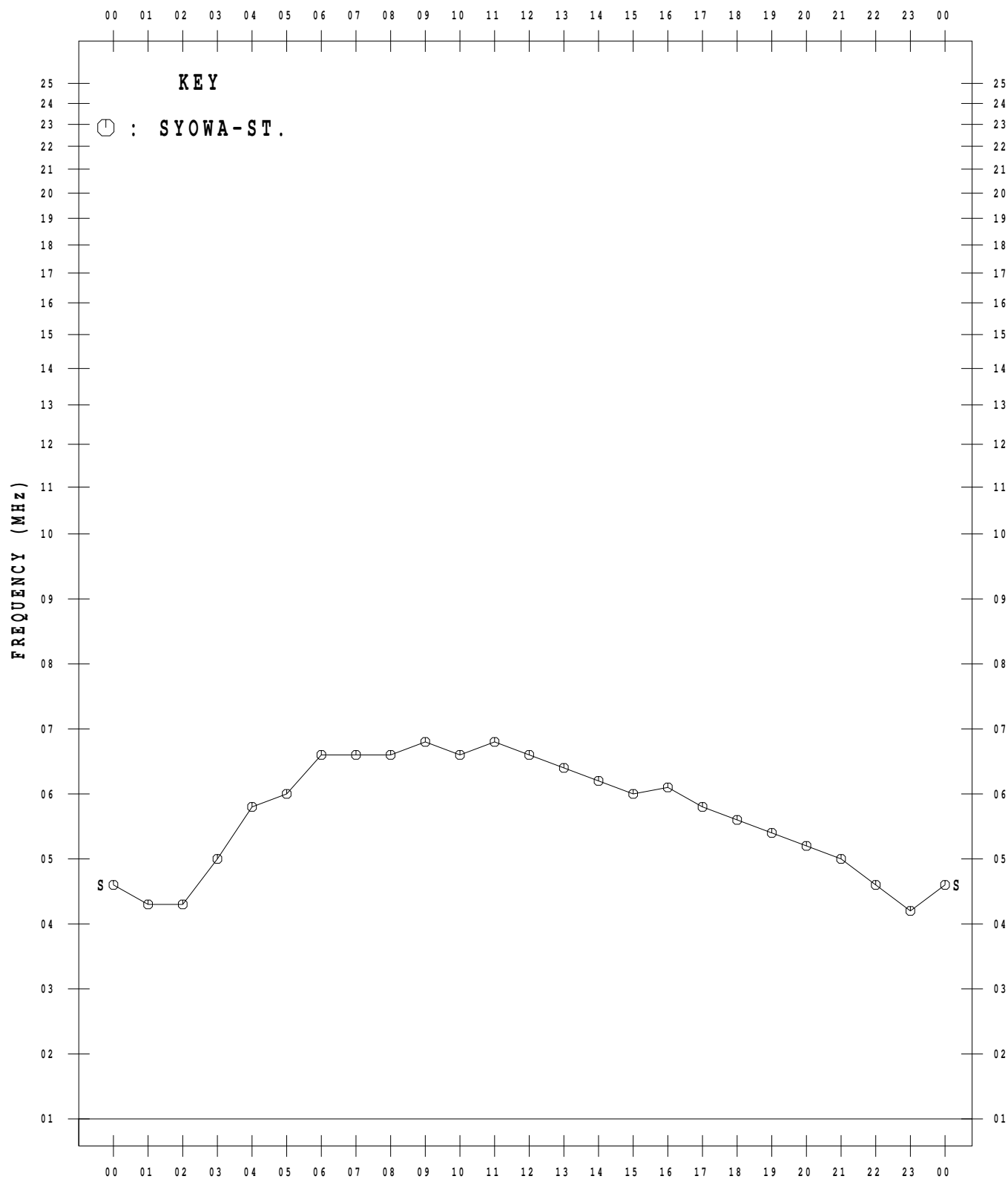
2012 1201 -> 2012 1231 (99) SYOWA-ST.



MONTHLY MEDIAN VALUES OF f_oF₂

45° E MEAN TIME

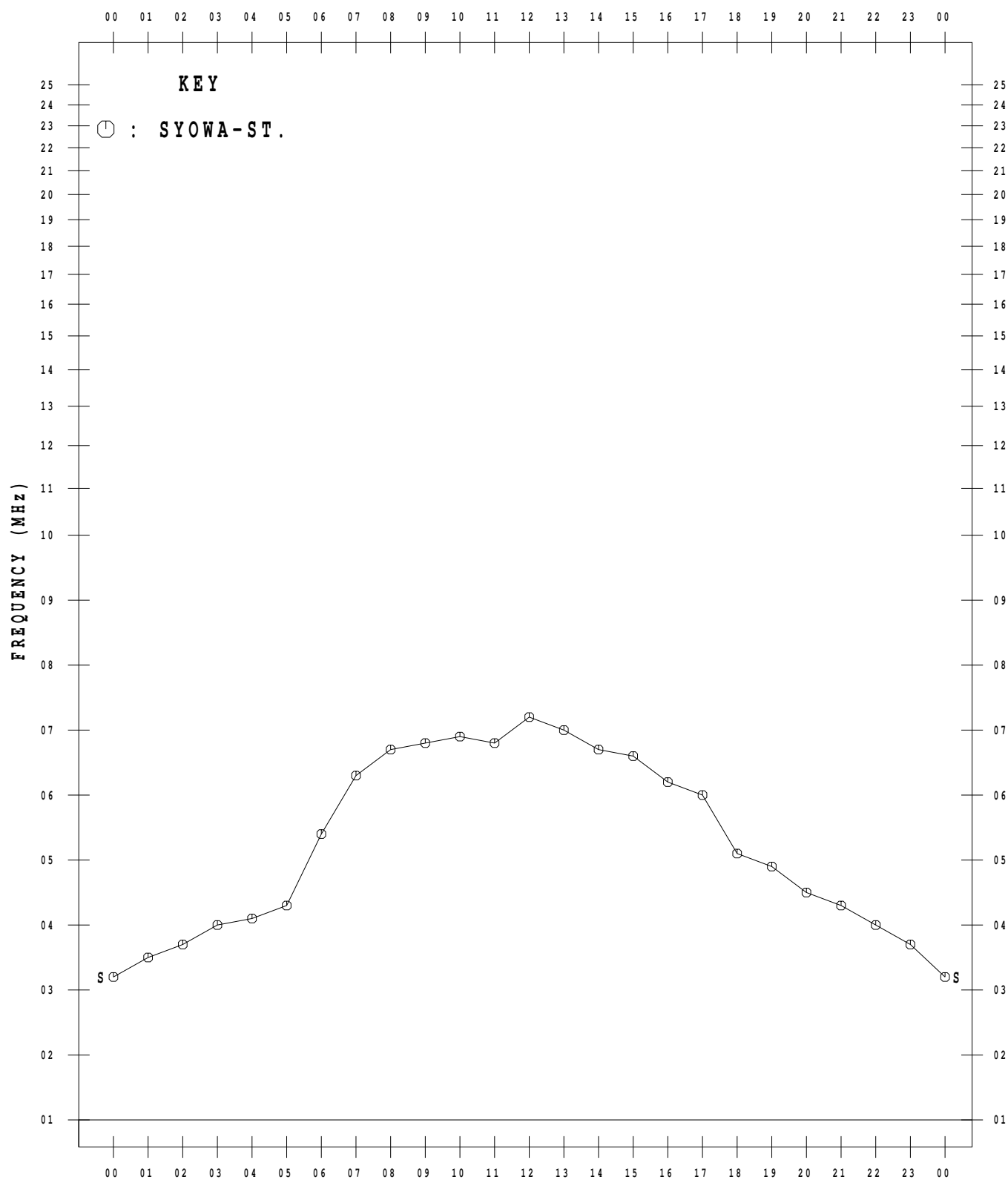
JAN. 2012



MONTHLY MEDIAN VALUES OF f_oF₂

45° E MEAN TIME

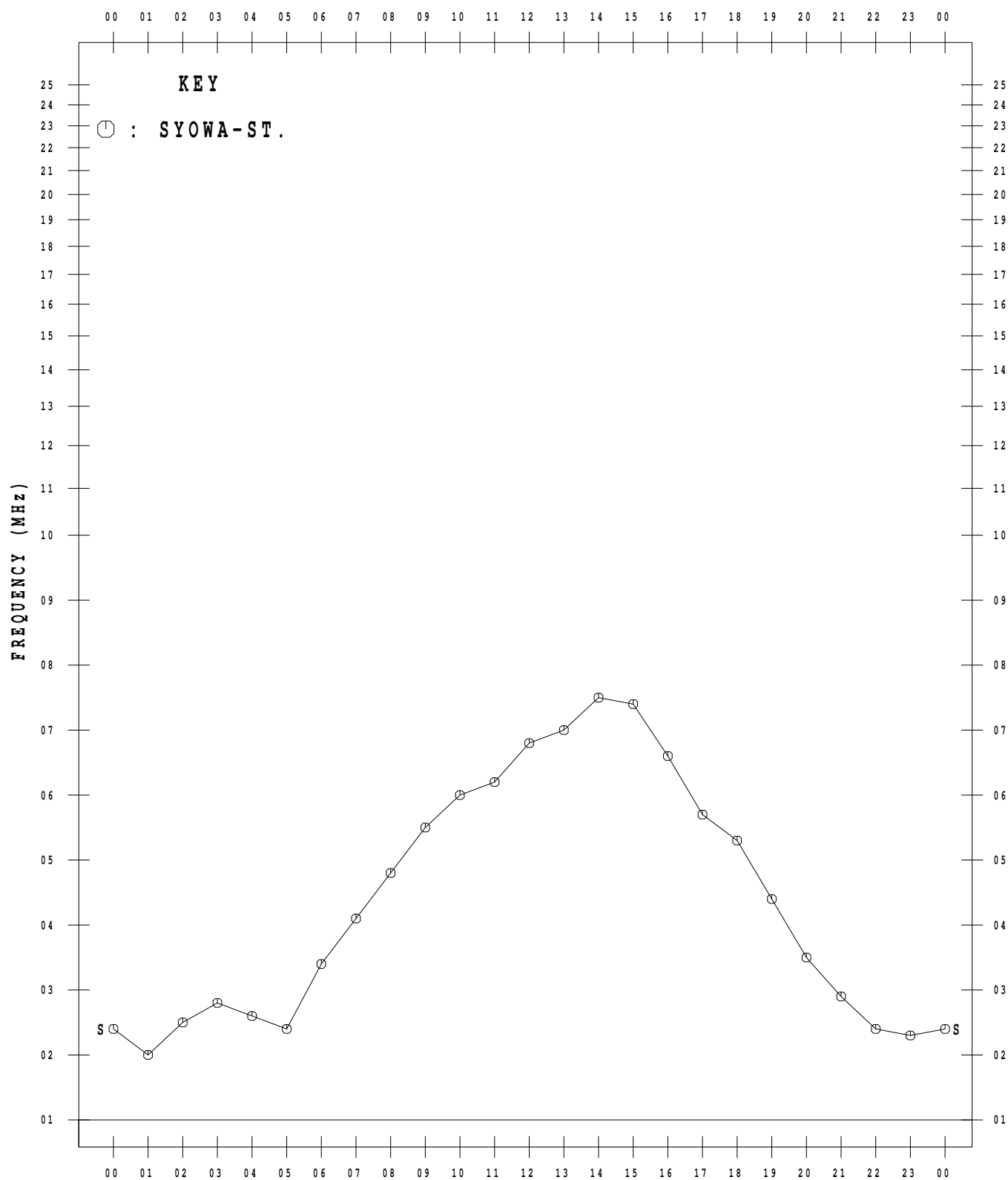
FEB. 2012



MONTHLY MEDIAN VALUES OF f_oF_2

45° E MEAN TIME

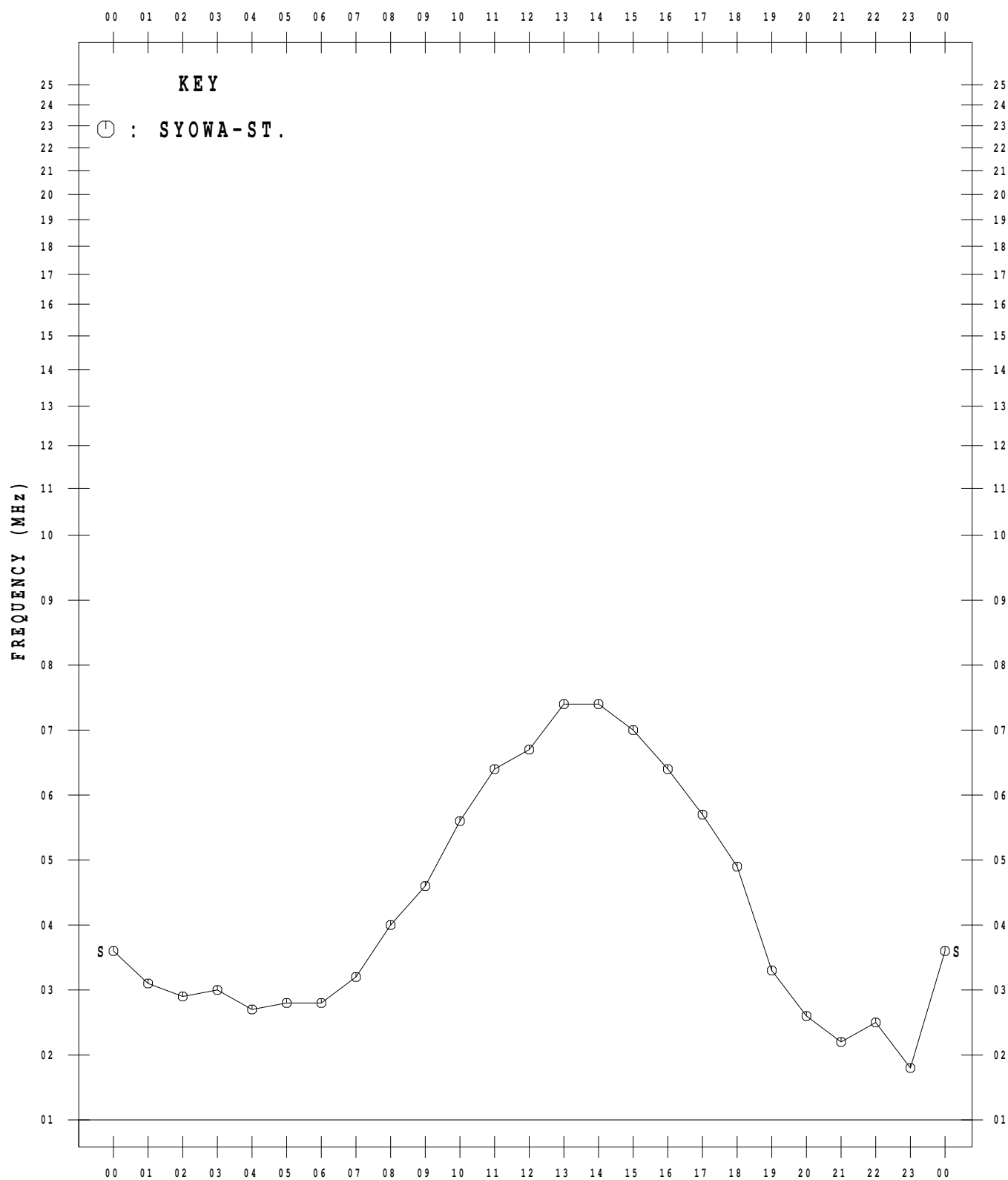
MAR. 2012



MONTHLY MEDIAN VALUES OF f_oF₂

45° E MEAN TIME

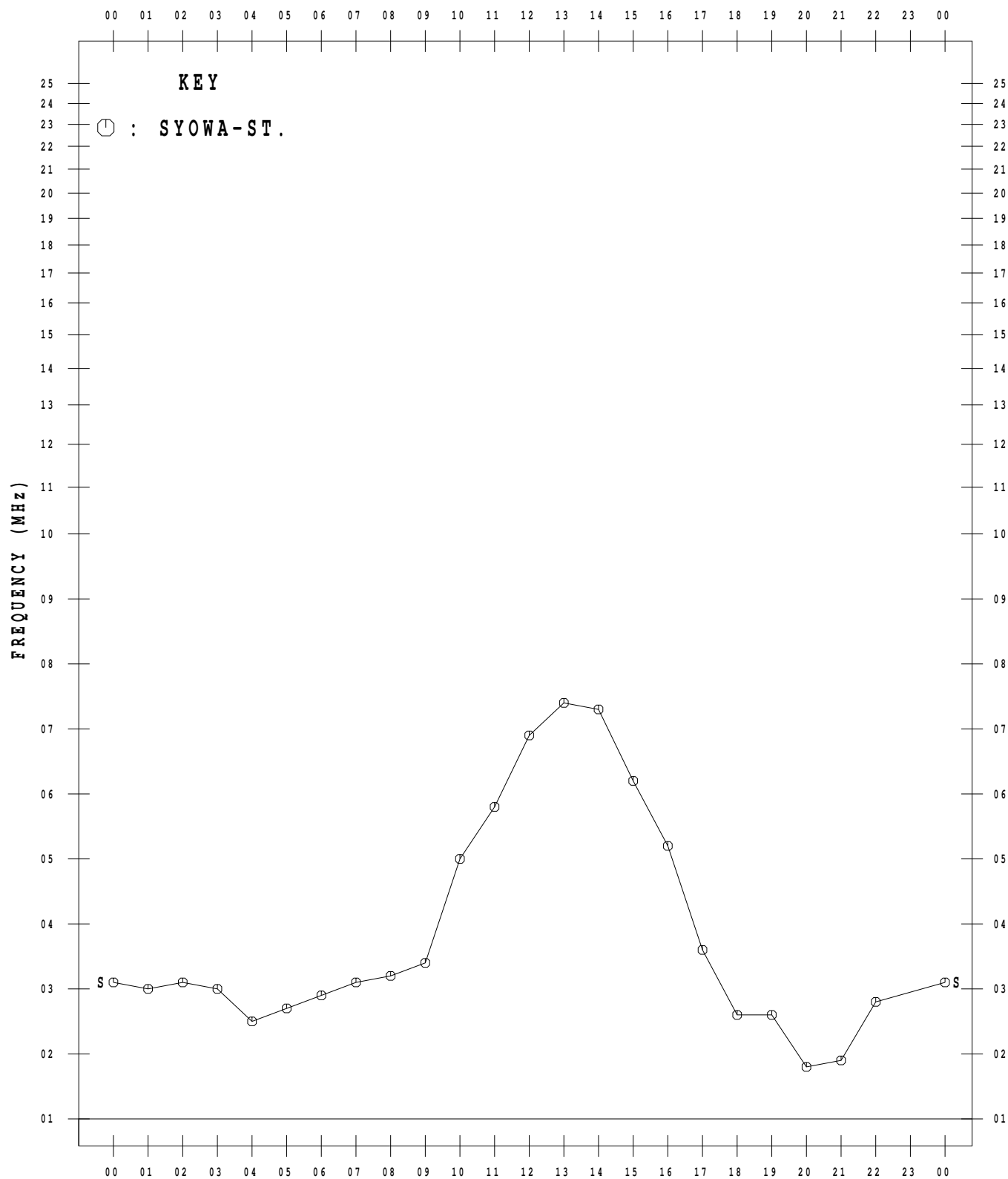
APR. 2012



MONTHLY MEDIAN VALUES OF f_oF₂

45° E MEAN TIME

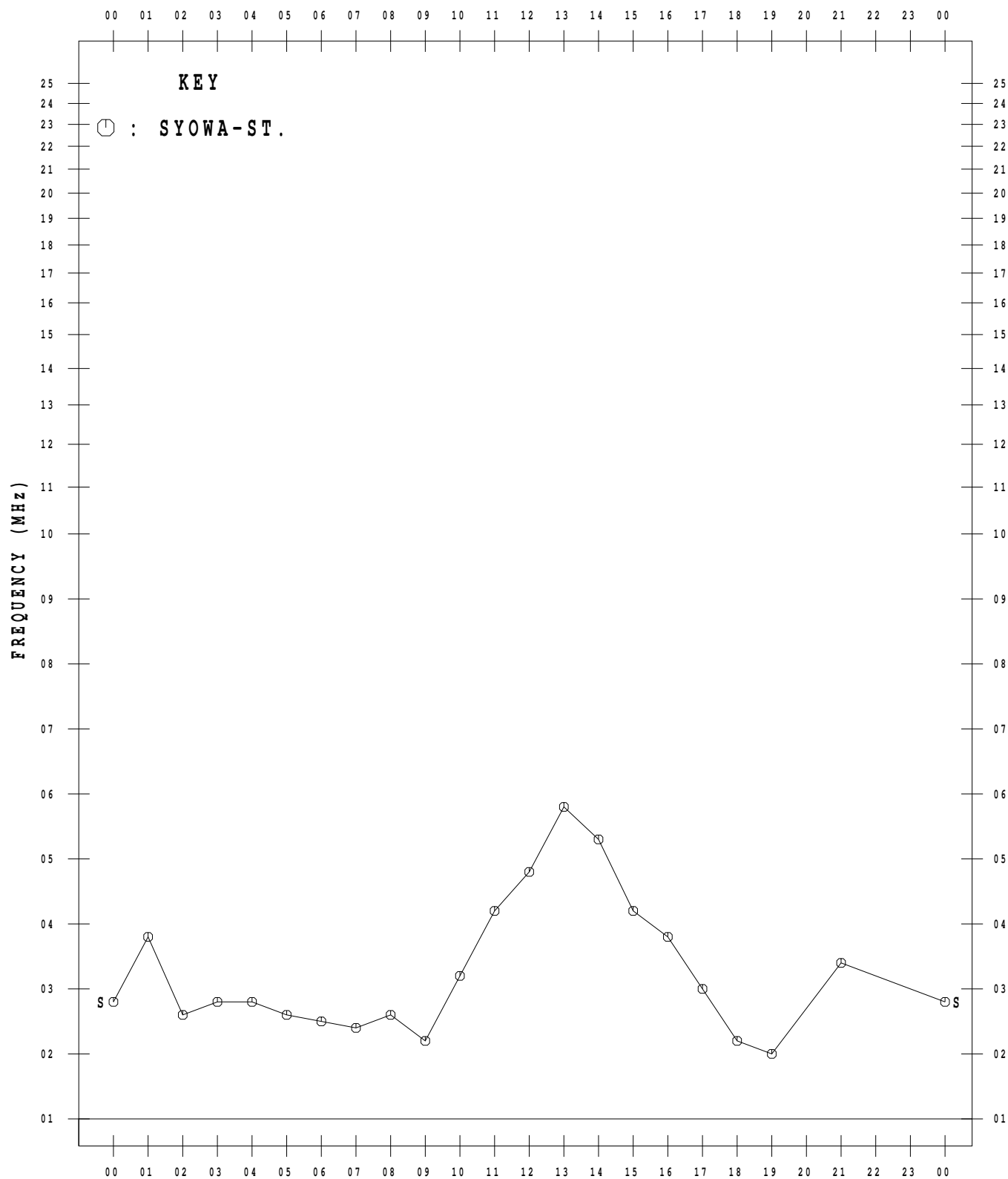
MAY 2012



MONTHLY MEDIAN VALUES OF f_oF₂

45° E MEAN TIME

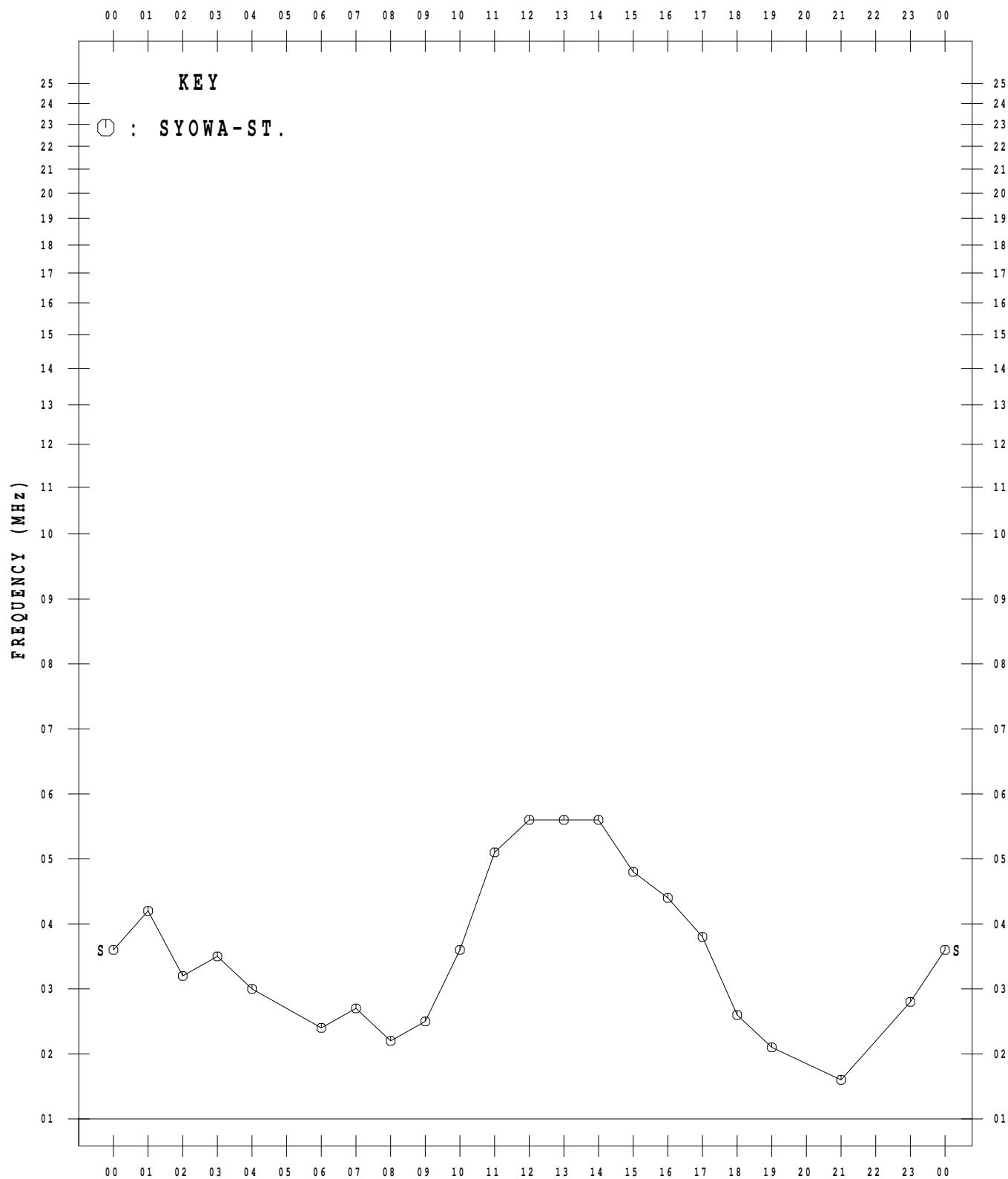
JUN. 2012



MONTHLY MEDIAN VALUES OF f_oF₂

45° E MEAN TIME

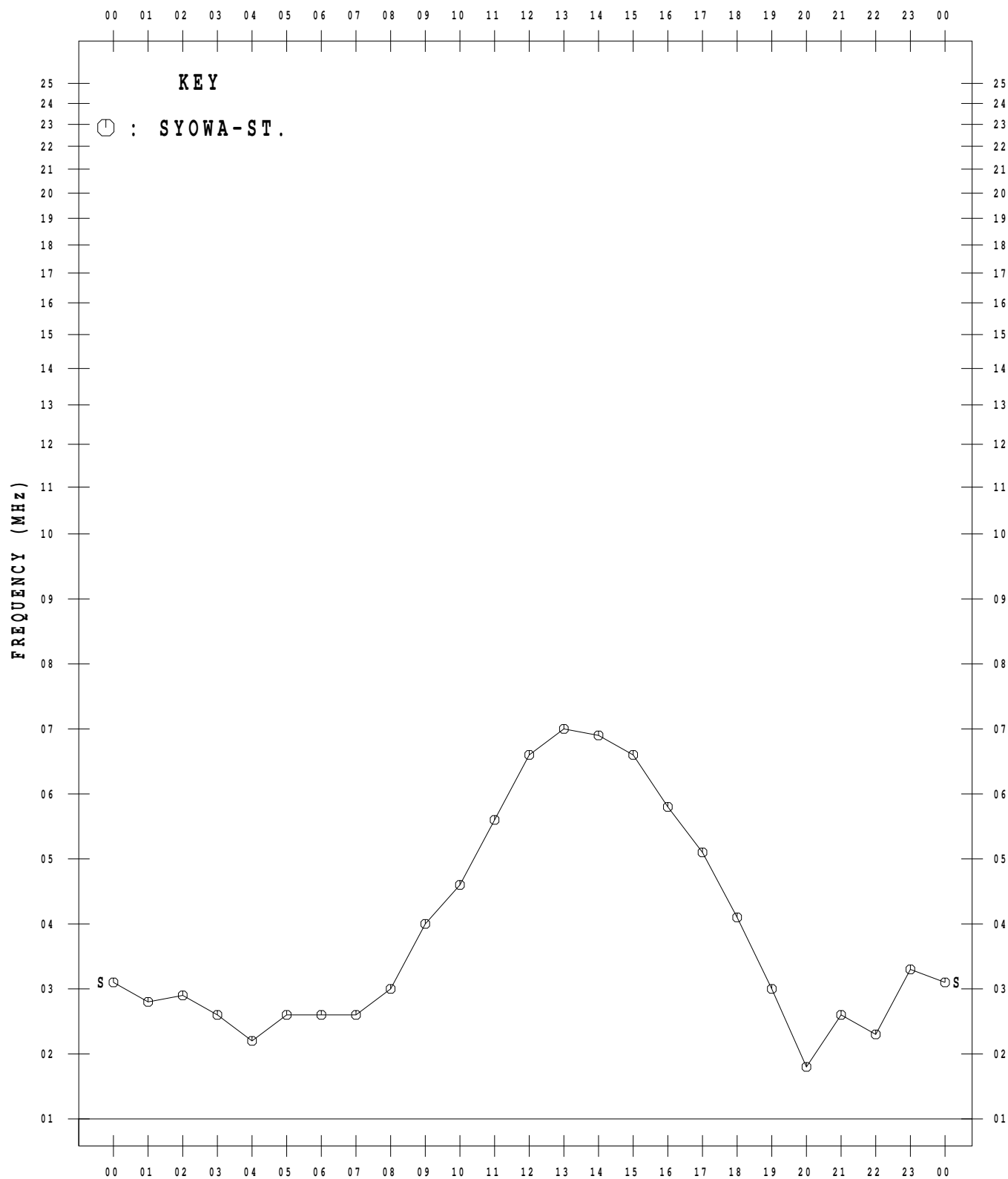
JUL. 2012



MONTHLY MEDIAN VALUES OF f_oF₂

45° E MEAN TIME

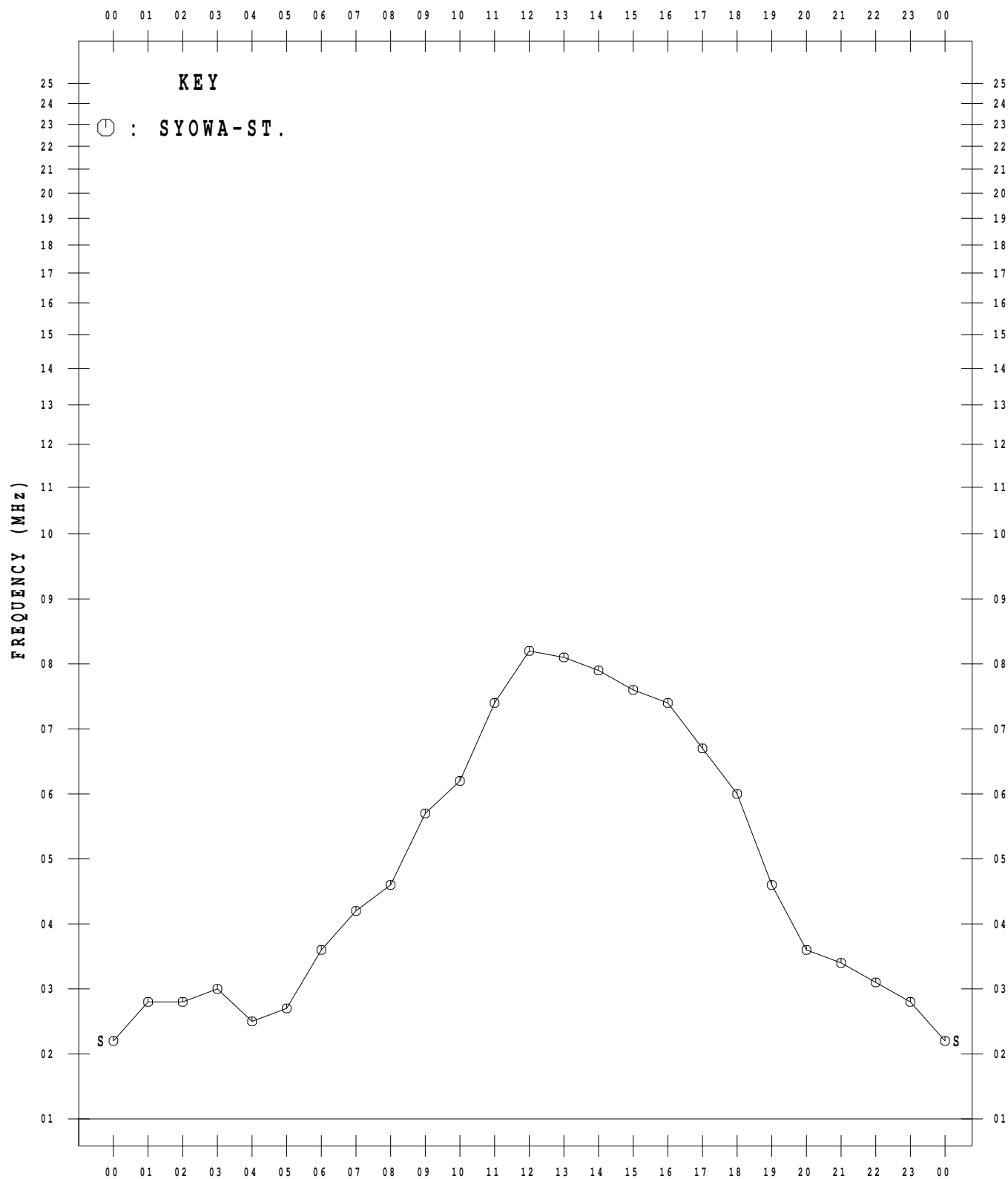
AUG. 2012



MONTHLY MEDIAN VALUES OF f_oF_2

45° E MEAN TIME

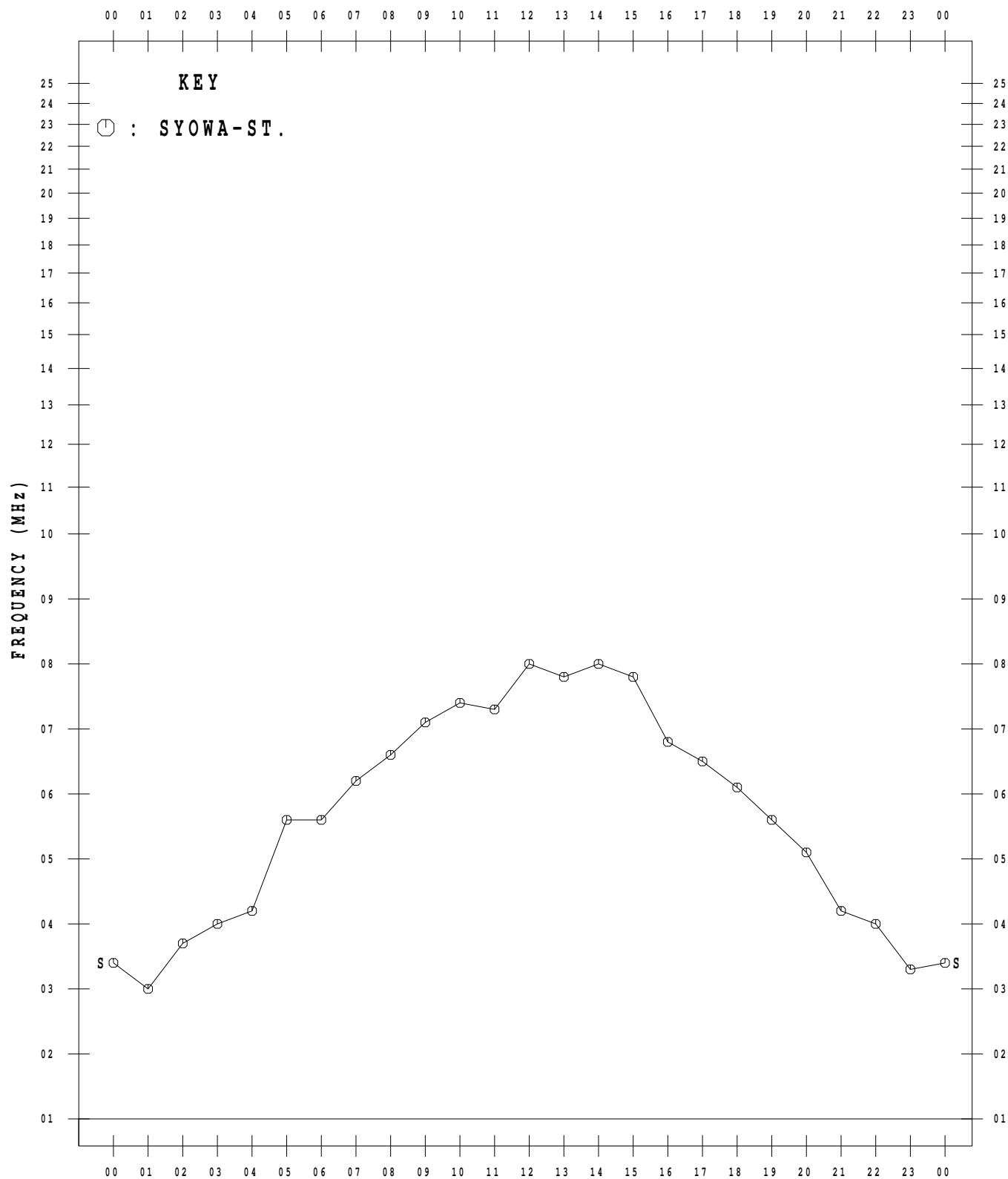
SEP. 2012



MONTHLY MEDIAN VALUES OF f_oF₂

45° E MEAN TIME

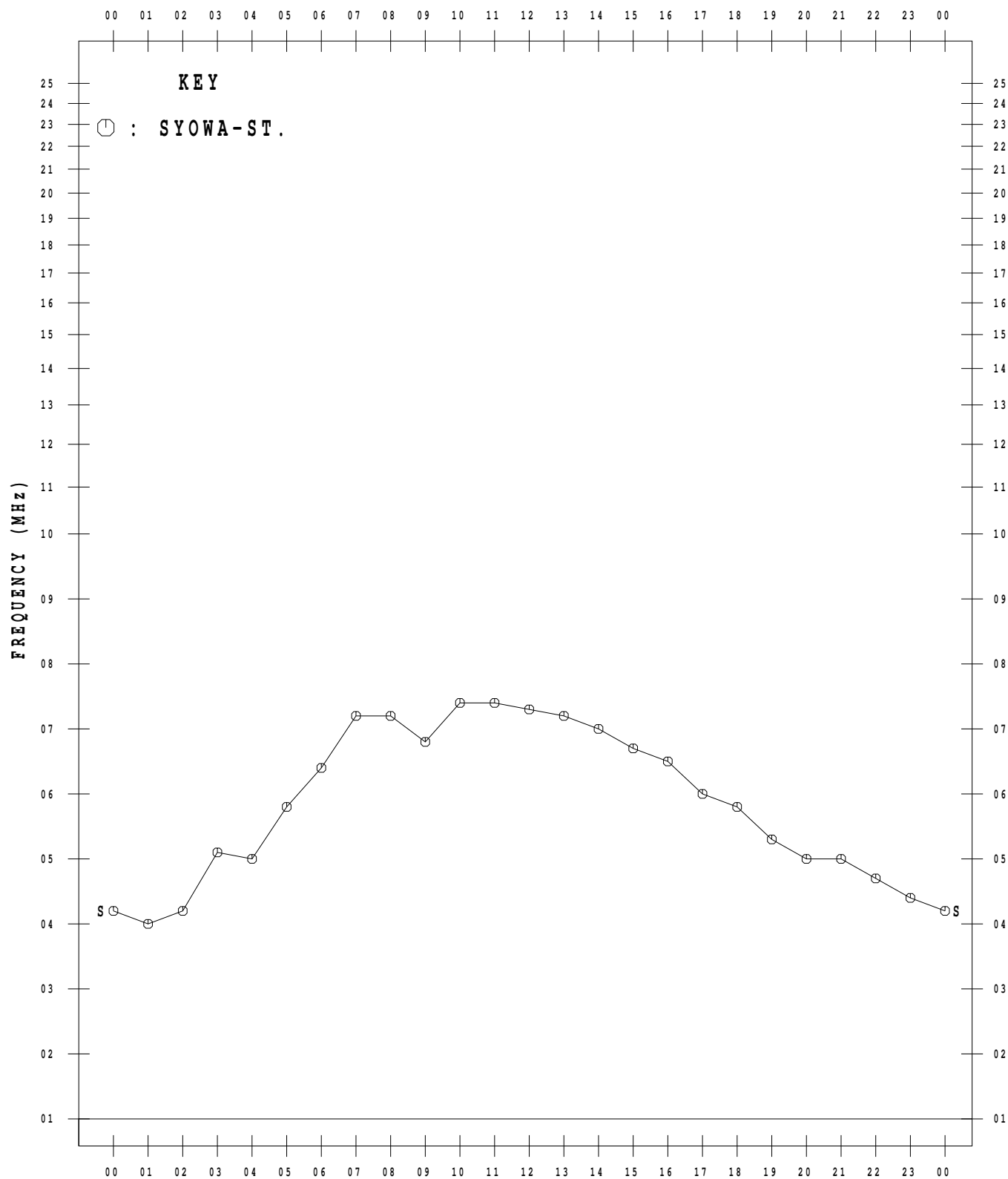
OCT. 2012



MONTHLY MEDIAN VALUES OF f_oF₂

45° E MEAN TIME

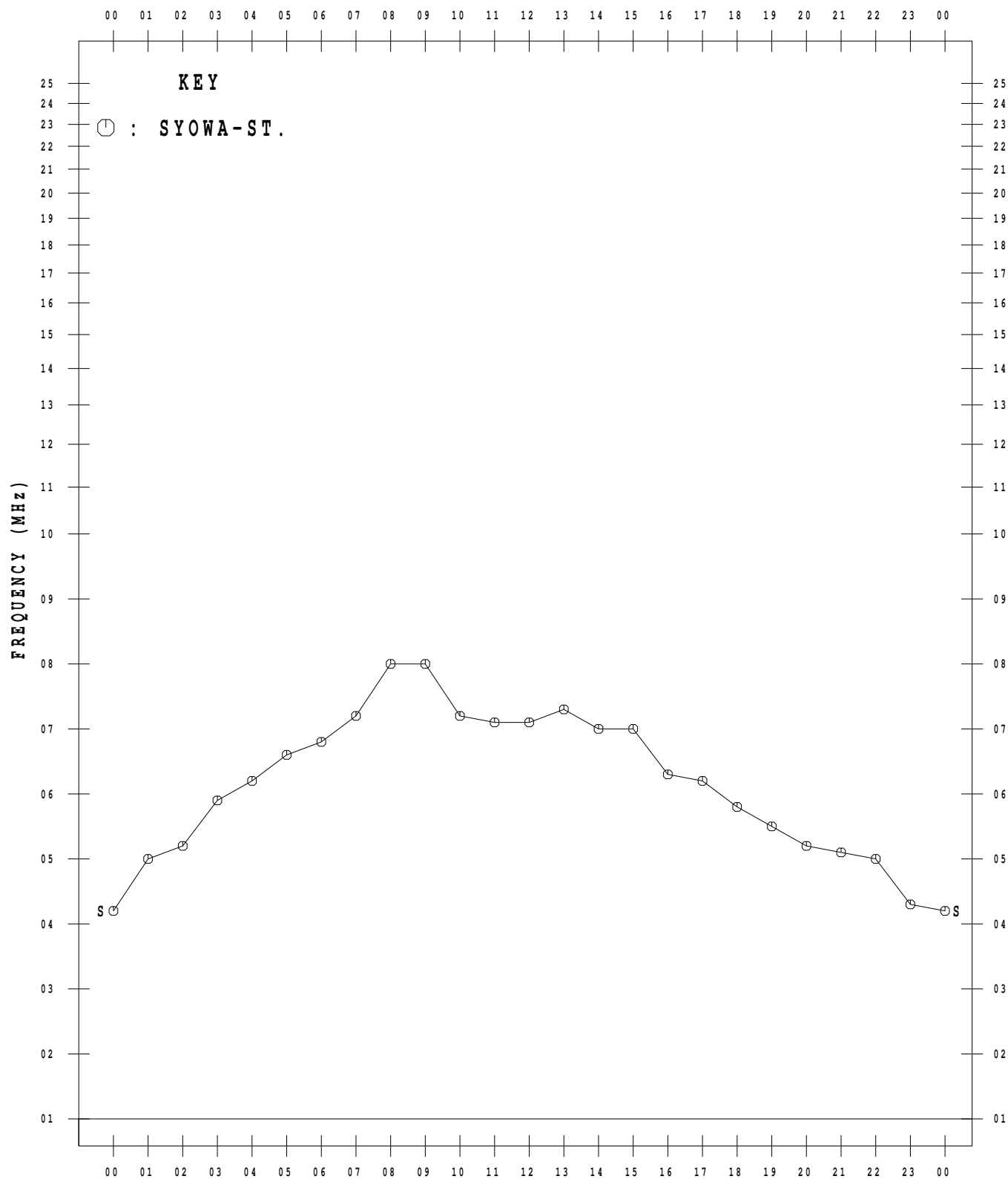
NOV. 2012



MONTHLY MEDIAN VALUES OF f_oF₂

45° E MEAN TIME

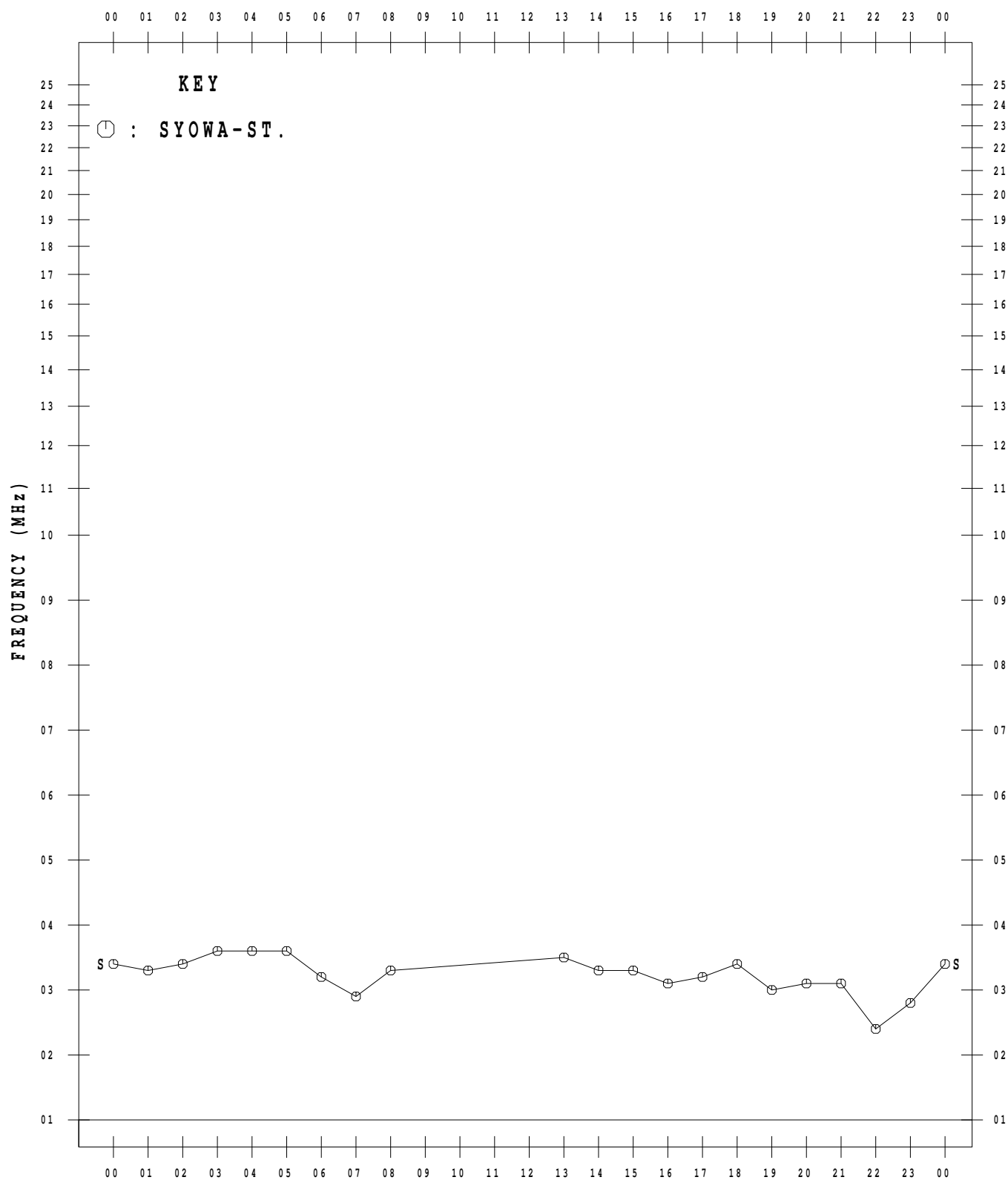
DEC. 2012



MONTHLY MEDIAN VALUES OF f_{tEs}

45° E MEAN TIME

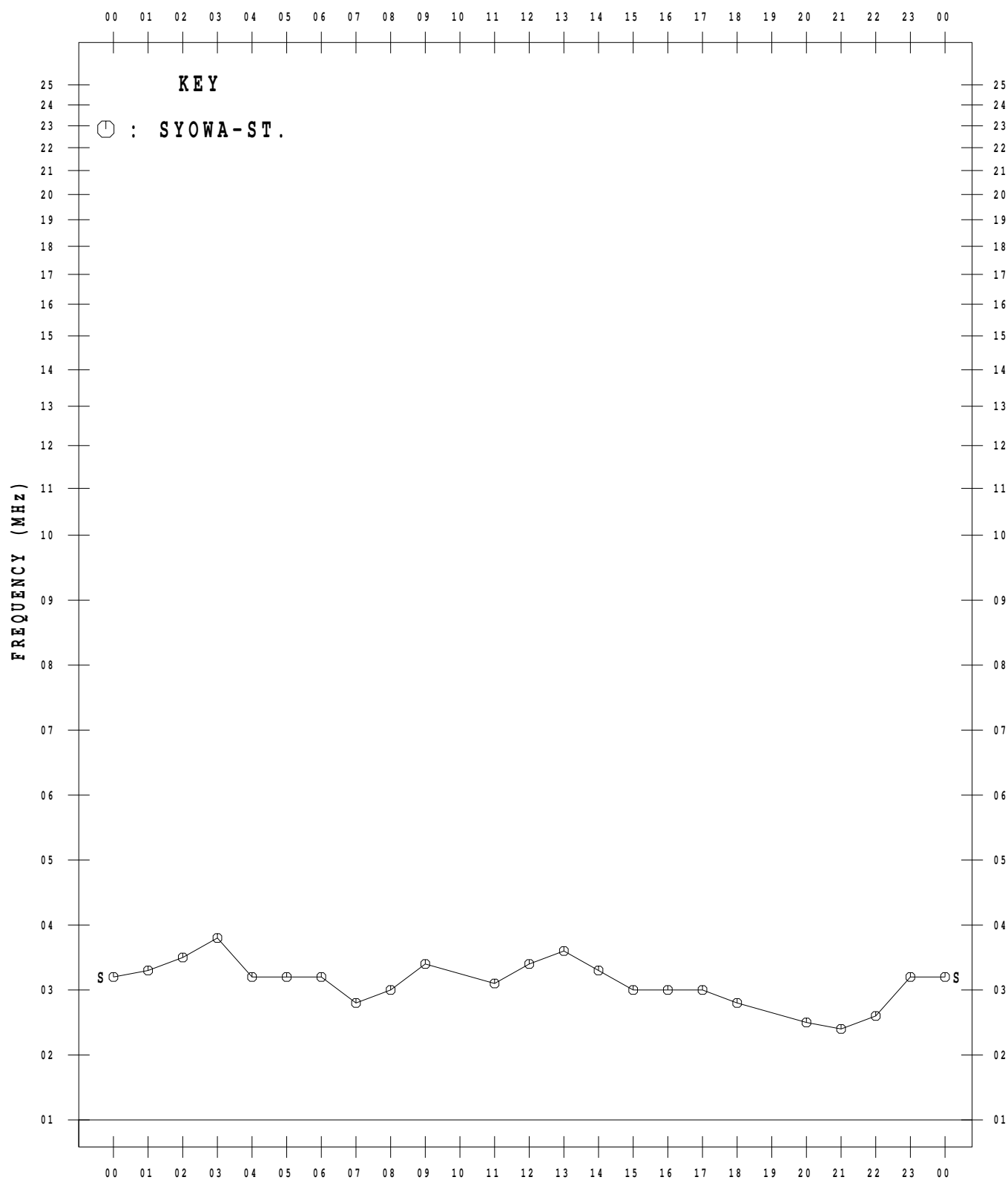
JAN. 2012



MONTHLY MEDIAN VALUES OF f_tE_s

45° E MEAN TIME

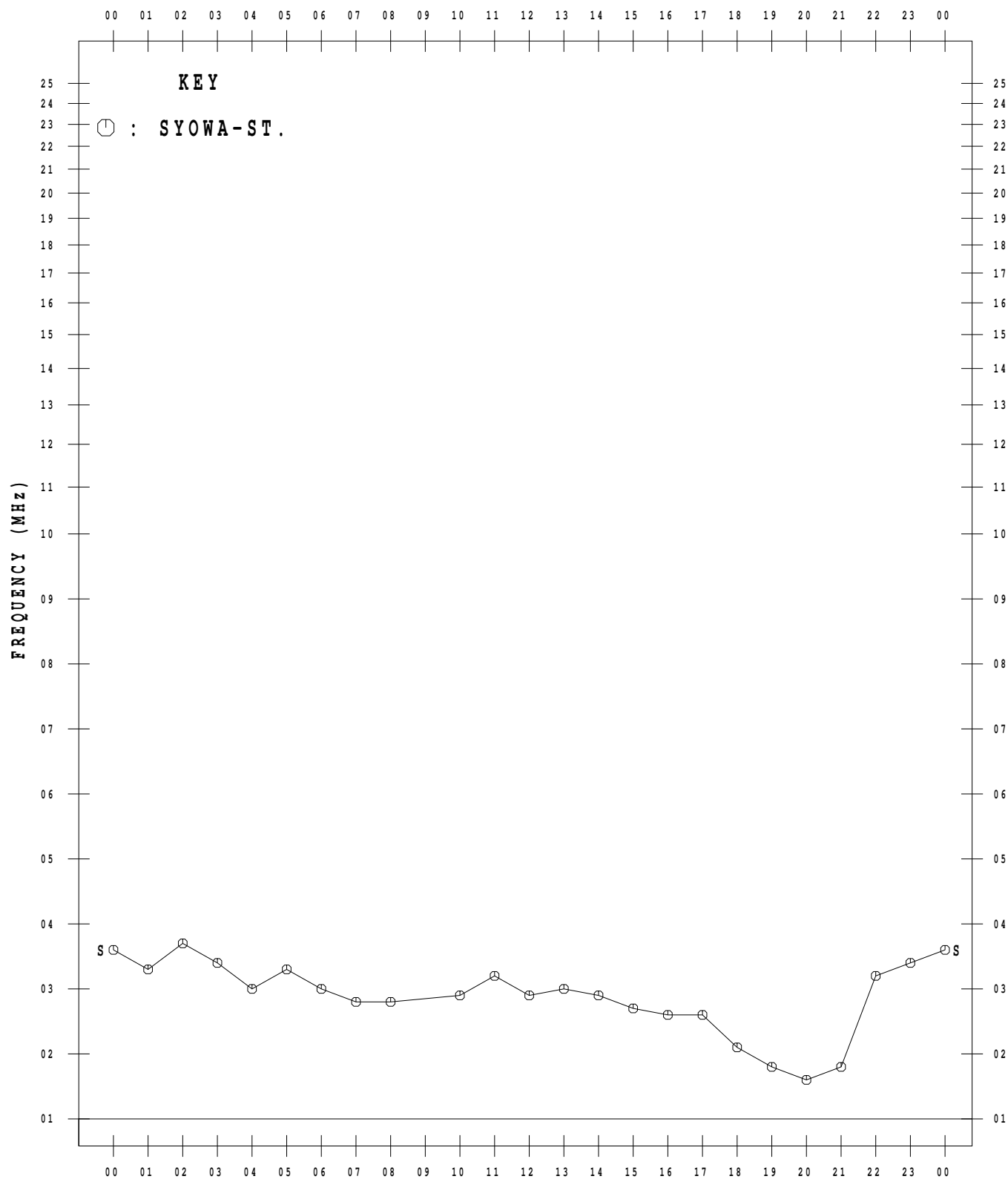
FEB. 2012



MONTHLY MEDIAN VALUES OF f_tE_s

45° E MEAN TIME

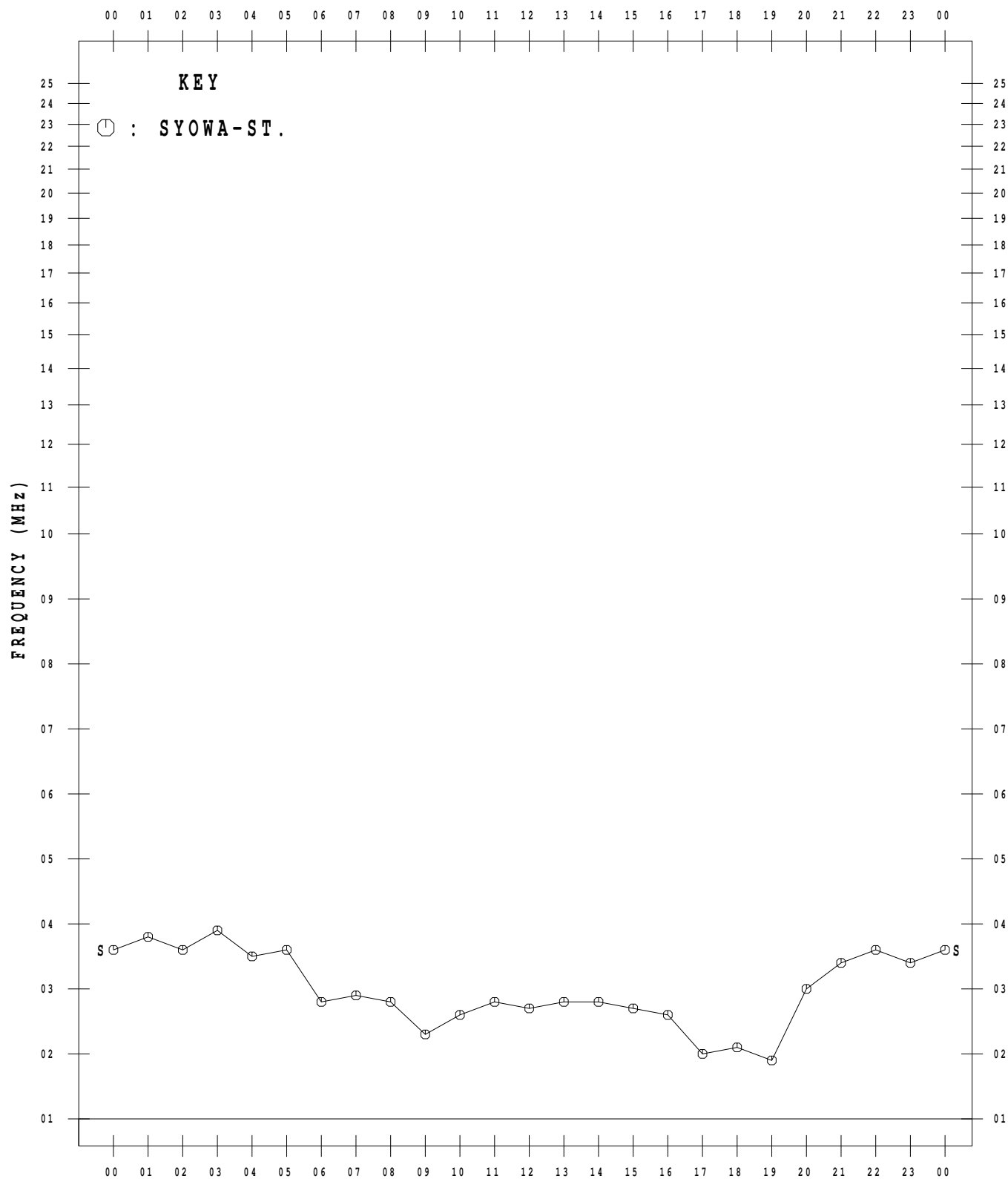
MAR. 2012



MONTHLY MEDIAN VALUES OF f_tE_s

45° E MEAN TIME

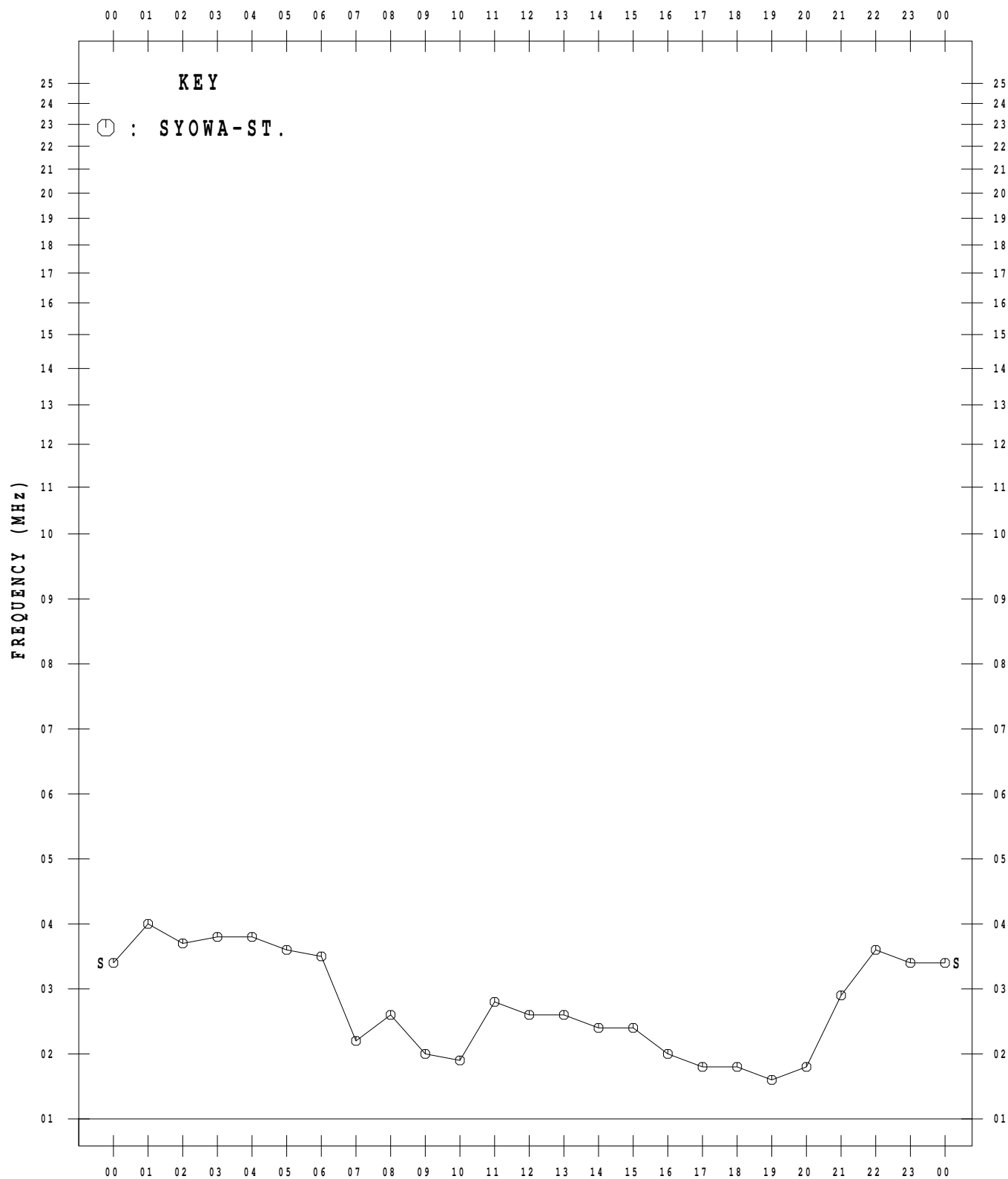
APR. 2012



MONTHLY MEDIAN VALUES OF f_tE_s

45° E MEAN TIME

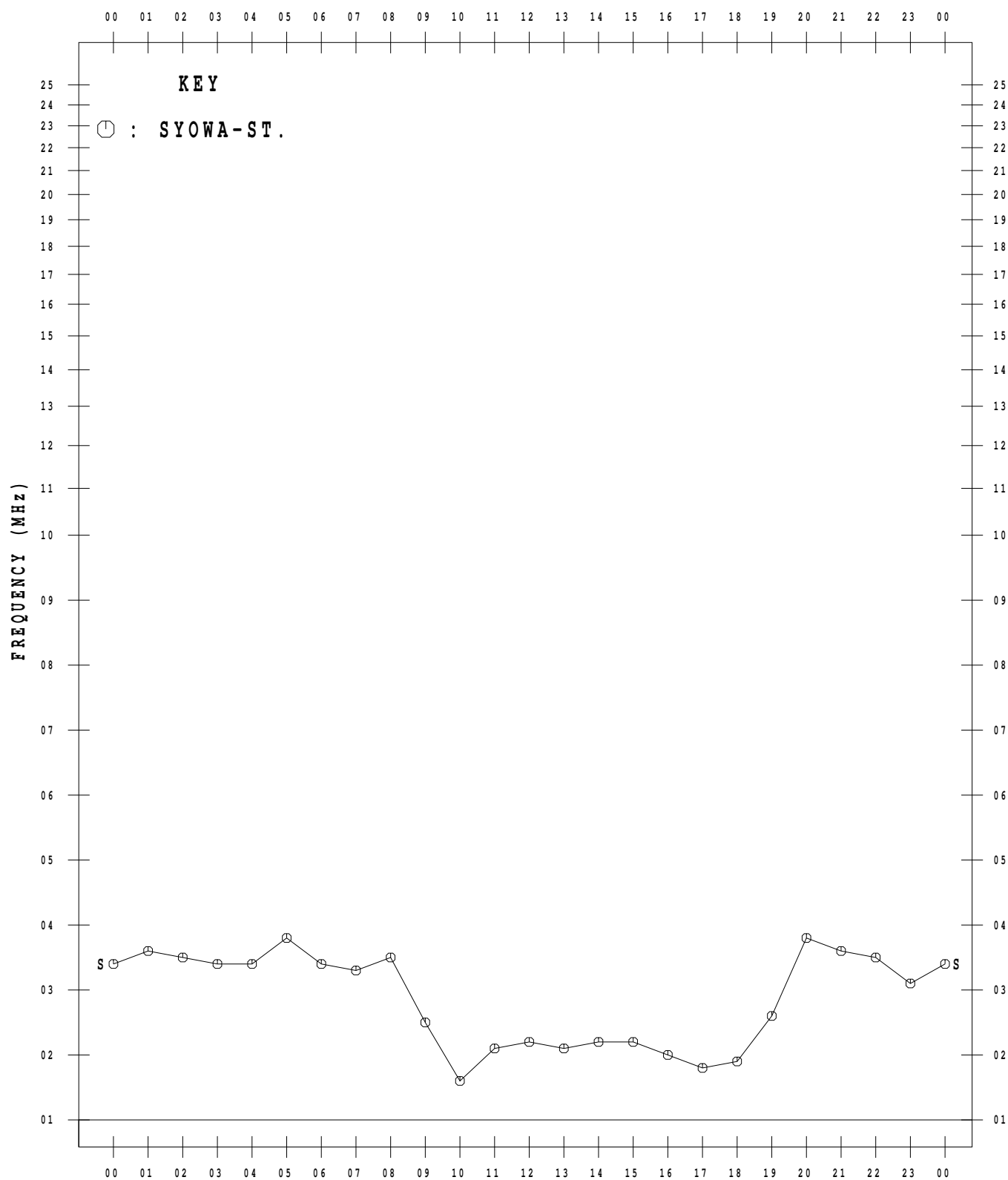
MAY 2012



MONTHLY MEDIAN VALUES OF f_tE_s

45° E MEAN TIME

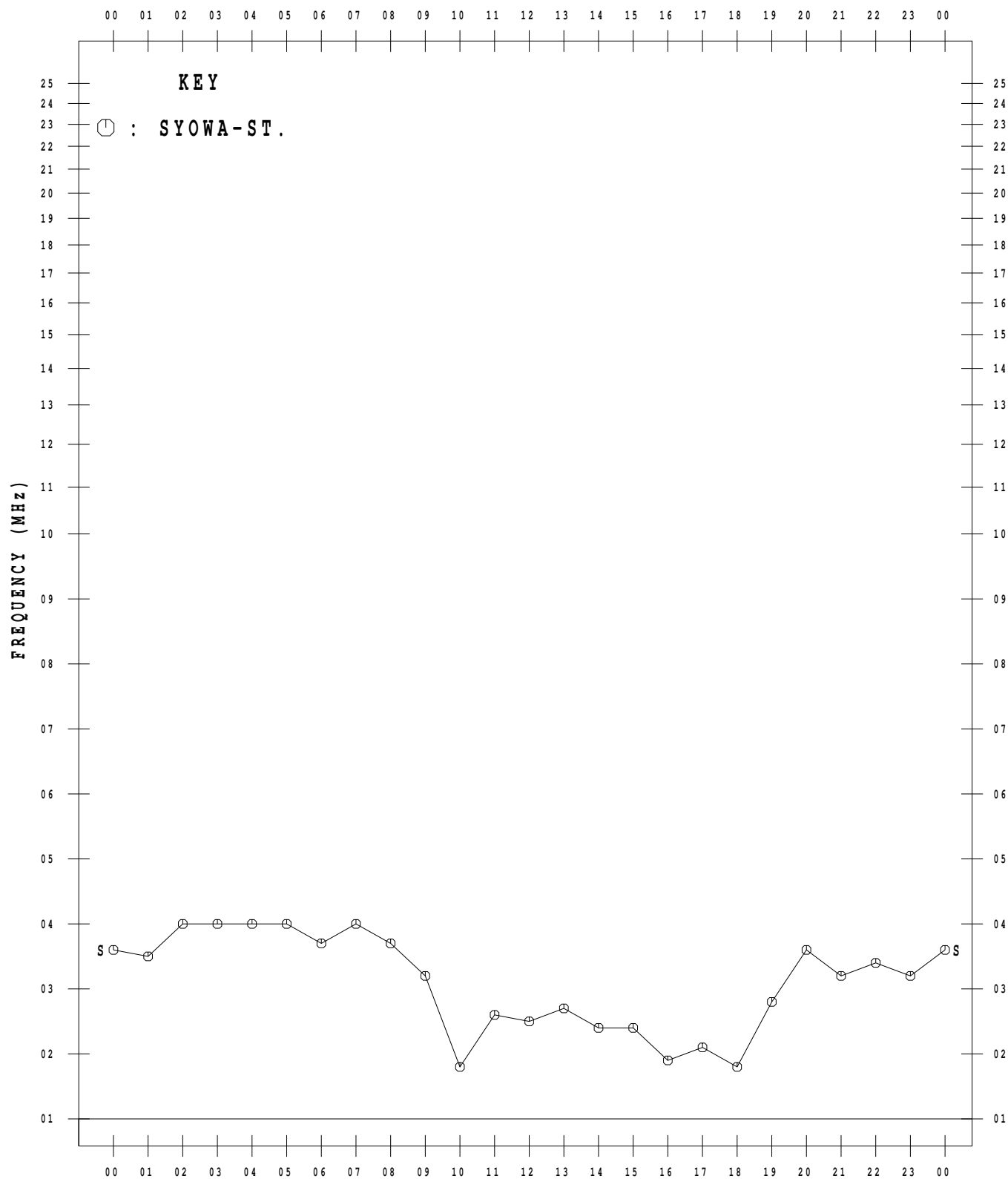
JUN. 2012



MONTHLY MEDIAN VALUES OF f_tE_s

45° E MEAN TIME

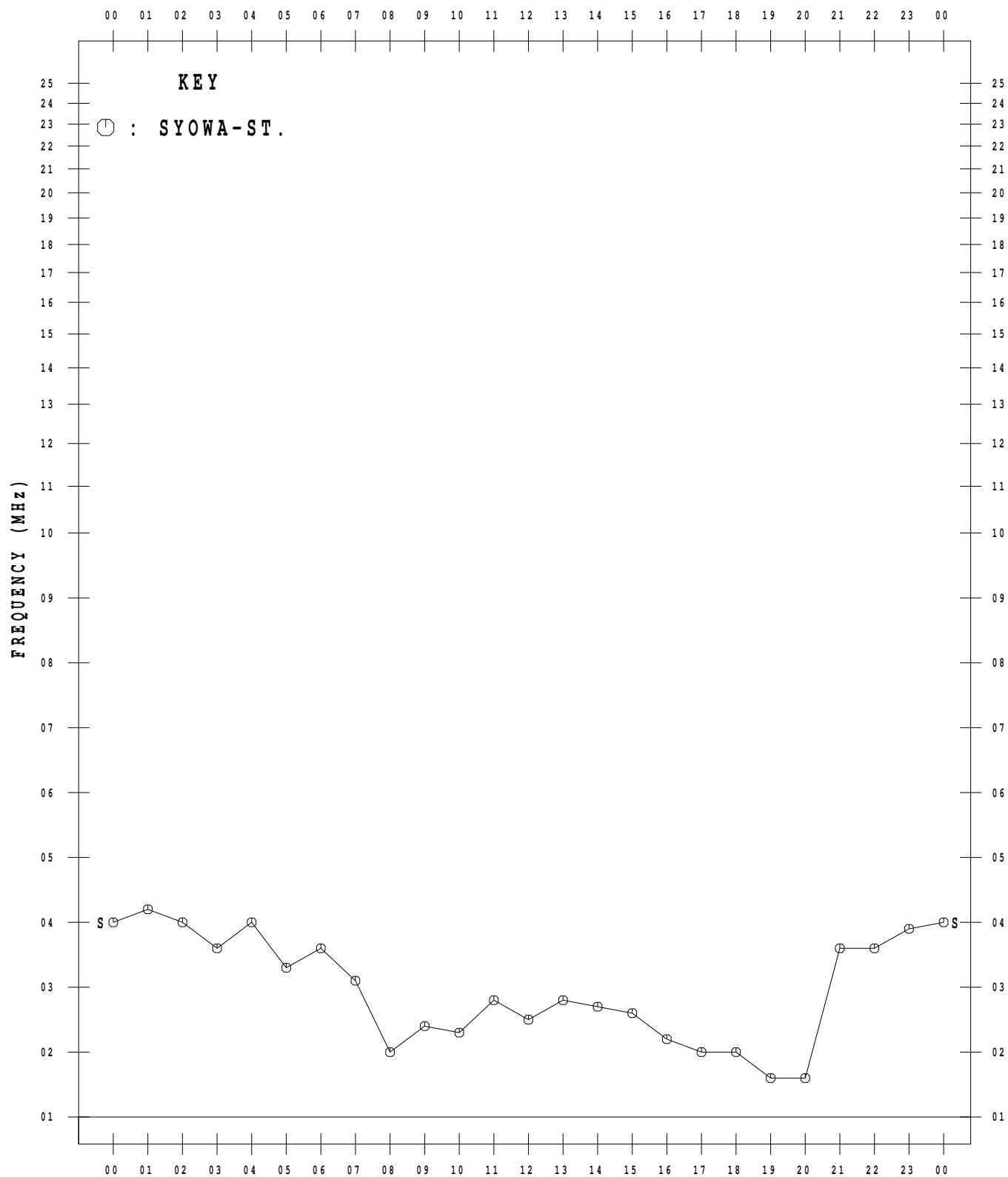
JUL. 2012



MONTHLY MEDIAN VALUES OF f_tE_s

45° E MEAN TIME

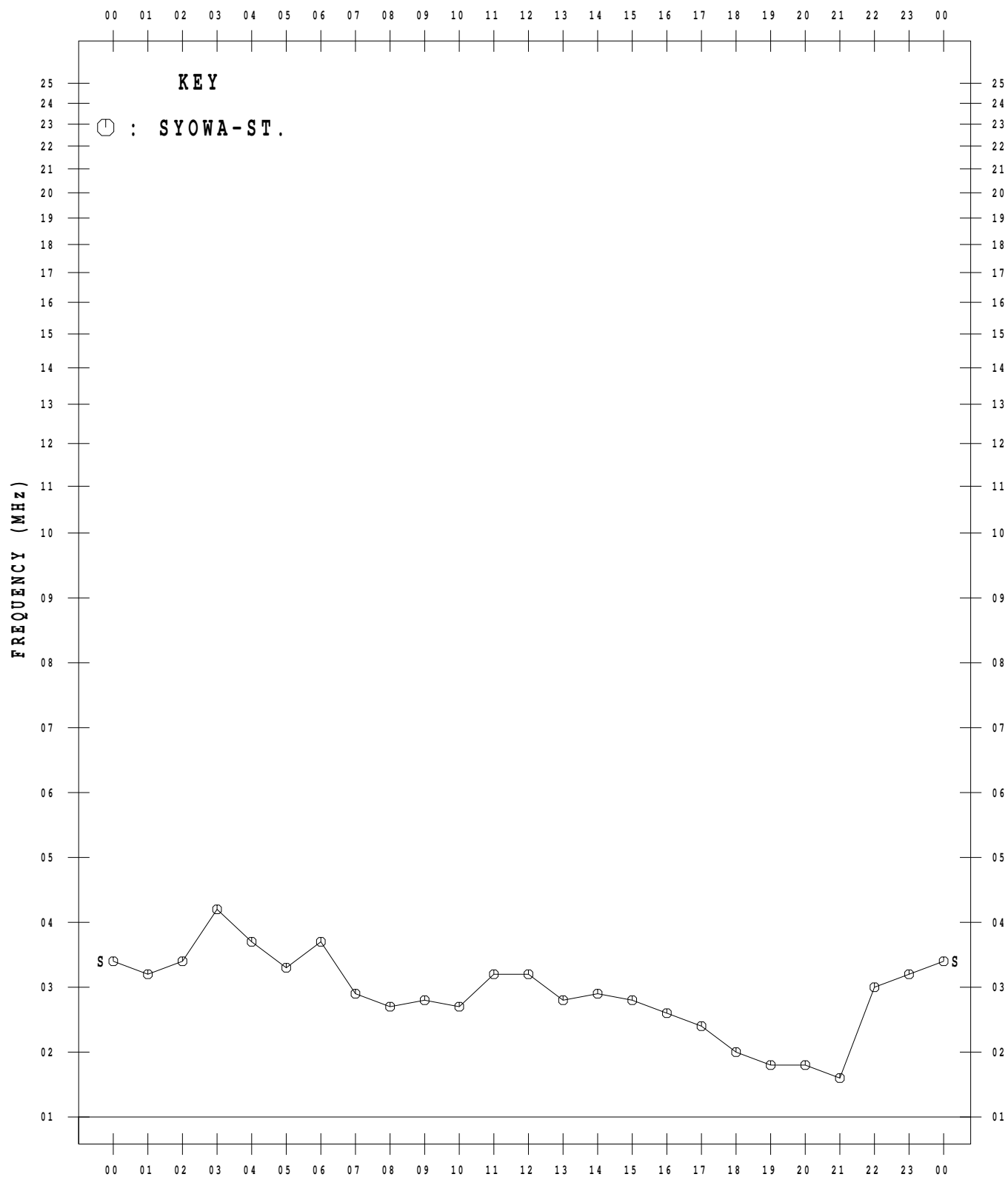
AUG. 2012



MONTHLY MEDIAN VALUES OF f_tE_s

45° E MEAN TIME

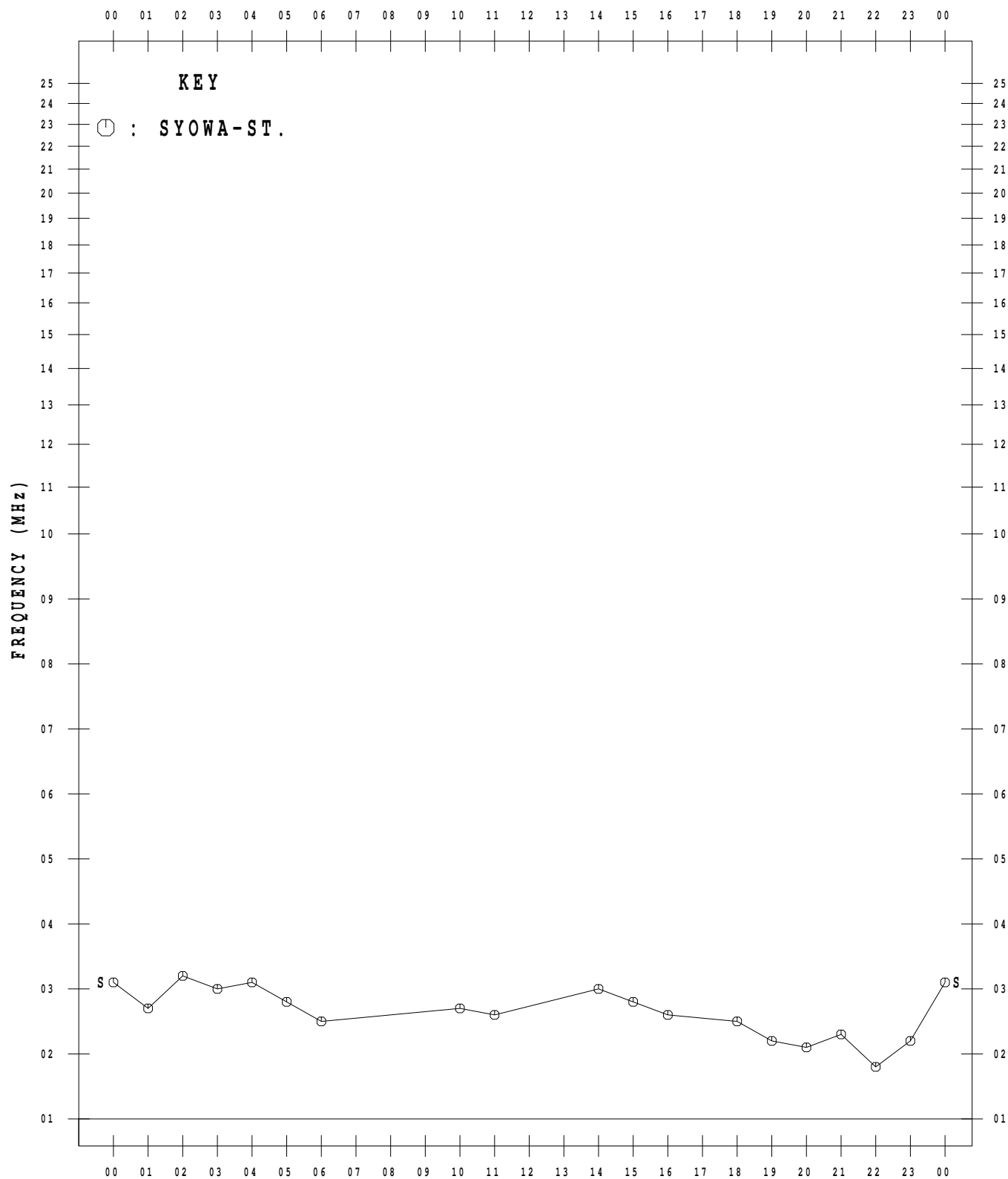
SEP. 2012



MONTHLY MEDIAN VALUES OF f_{tE}s

45° E MEAN TIME

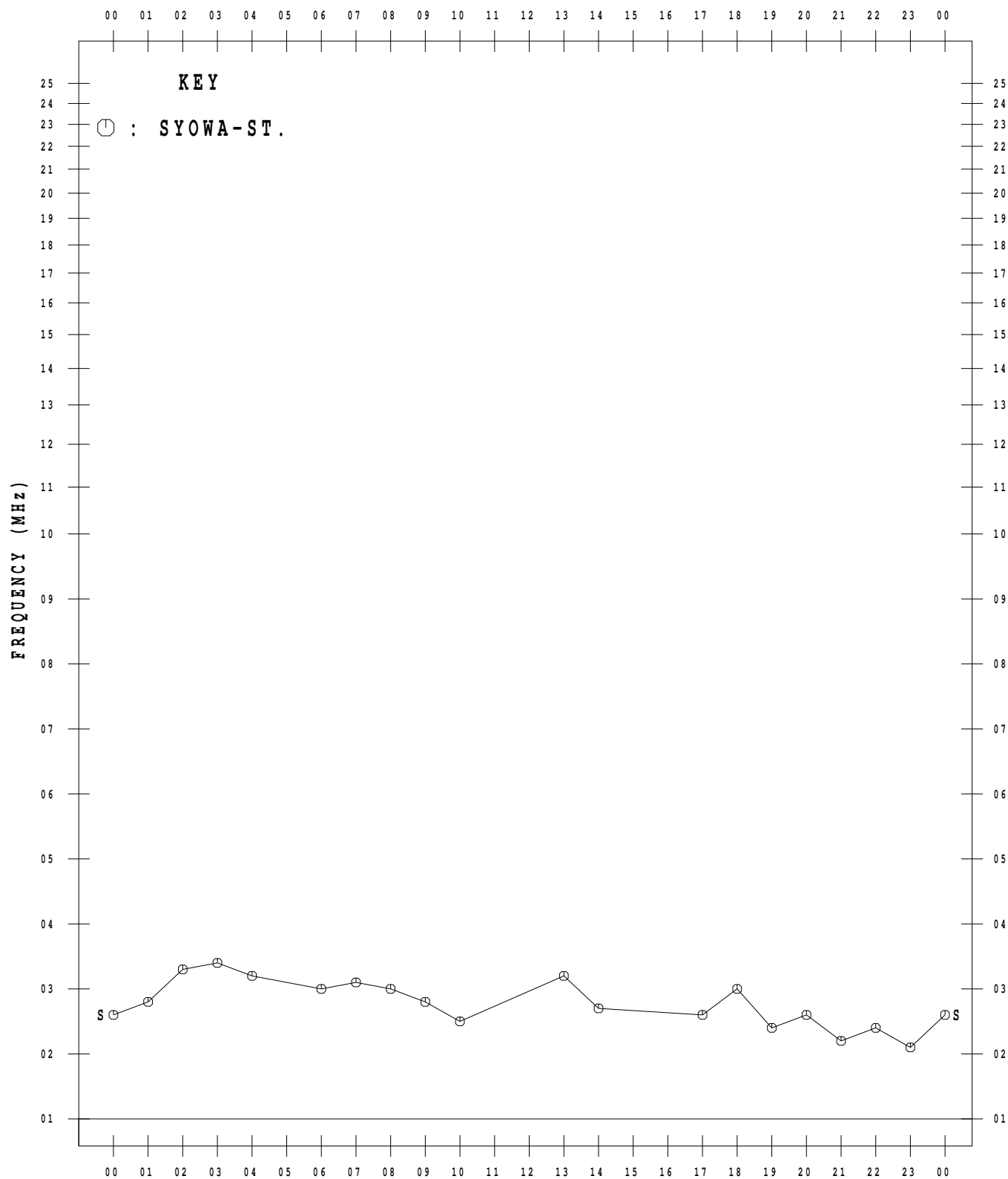
OCT. 2012



MONTHLY MEDIAN VALUES OF f_tE_s

45° E MEAN TIME

NOV. 2012



MONTHLY MEDIAN VALUES OF f_tE_s

45° E MEAN TIME

DEC. 2012

