

IONOSPHERIC DATA AT SYOWA STATION (ANTARCTICA)

January – December 2022

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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 2022. 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	- 70.5	87.2

* Geomagnetic latitude and longitude were calculated using IGRF-12 (2015)

SPECIFICATIONS OF THE IONOSONDE USED AT SYOWA STATION

Items	FM/CW Ionosonde Specifications
Frequency Range	0.5 MHz - 16 MHz
Transmitting Power	100 W
Duration of Sweep	max 155 s
Transmitted Pulse Width	1-10 ms
Pulse Repetition Frequency	1 kHz
Height Range	60 - 1000 km
Recording Media	Solid State Drive
Power Supply	100 V - AC, 1.5 kVA
Transmitting Antenna and Receiving Antenna	40-m-high vertical delta antennas terminated by 400 Ω

Note: From 2016, new type of FM/CW Ionosonde will be used for routine ionospheric observations at Syowa Station.

OBSERVERS

Observer: T.Naoi

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 atmospherics.
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. 2022 f_{XI} (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E OSWEEP 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 54	X 62	X 60	111	X 50	62	A	A	X 52	X 56	X 63	X 64	X 61	X 58	X 55	X 54	X 55	X 58	X 58	X 50	79	X 45	X 46	
2	50	X 46	X 49	52	50	X 46	X 53	56	56	58	58	65	65	64	64	69	66	67	65	54	44	43	52	0 45	
3	70	A	A	A	B	51	44	A	A	A	A	A	X 49	X 58	X 63	72	63	61	57	54	45	46	49	70	
4	81	A	A	A	A	A	A	X 55	X 45	X 49	58	56	56	60	60	58	58	58	59	54	55	50	50	46	
5	X 47	X 41	X 33	A	A	X 56	61	60	56	58	58	59	56	56	54	55	52	56	53	52	50	47	46	45	
6	X 46	X 47	X 48	X 53	54	68	71	81	74	72	69	66	60	57	57	56	58	58	58	55	53	53	51	49	
7	X 55	X 52	X 49	X 51	X 56	X 60	X 65	X 70	X 78	X 70	X 67	X 58	X 63	X 63	X 58	X 58	X 58	A	X 58	X 57	X 55	X 57	X 58	X 49	
8	X 56	X 57	X 62	X 65	X 68	X 76	X 84	X 92	X 96	X 94	X 90	X 80	X 76	X 72	X 75	X 68	X 59	X 64	X 62	X 62	X 60	X 48	A	A	
9	53	86	45	A	X 51	52	58	0 51	X 58	X 61	X 56	X 58	X 59	X 56	X 55	X 55	X 57	X 56	X 57	X 54	X 50	X 49	X 48	X 46	
10	A	A	X 44	X 50	X 47	X 50	X 58	X 68	X 72	X 70	X 64	X 63	X 60	X 58	X 56	X 55	X 59	X 57	X 55	X 52	X 44	X 46	X 46	X 56	
11	R	B	A 47	X 50	X 56	X 57	X 43	A	X	X 57	X 64	X 63	X 59	X 57	X 58	X 55	X 59	X 54	X 54	X 53	X 48	X 46	X 47	X 51	
12	X 48	X 51	X 49	X 56	X 61	X 61	X 65	X 68	X 80	X 83	X 76	X 67	X 62	X 62	X 59	X 59	X 62	X 52	X 56	X 59	X 58	X 58	X 58	X 56	
13	X 43	X 44	X 49	X A	X A	52	58	69	66	66	70	70	64	62	62	61	A	X 55	X 62	X 51	X 56	X 56	X 56	X 40	
14	X 42	X 47	X 52	X 53	X 59	X 64	X 67	X 66	X 66	X 69	X 71	X 66	X 68	X 61	A	X 56	X 55	X 56	X 56	X 56	X 49	A	A	A	
15	A	A	A	69	X 44	A	A	A	A	A	R 0	X 50	X 47	X 52	X 60	X 62	X 62	X 46	X 46	X 58	X 51	X 48	A	A	
16	A	A	A	A	A	X 41	X 46	X 48	A	X 52	X 48	X 48	X 44	X 49	X 57	X 60	X 56	X 55	X 54	X 49	R	X 44	X 45	A	
17	A	A	62	A	A	A	X 54	X 48	X 52	X 48	X 53	X 52	X 60	X 56	X 60	X 55	X 55	X 50	X 45	X 48	X 42	X 38	A	A	
18	A	A	A	51	A	A	A	A	X 52	X 45	X 57	X 56	X 64	X 47	X 59	X 61	X 60	X 54	X 52	A	X 49	X 54	X 52	X 50	A
19	A	A	0 43	A	A	A	A	A	A	A	0 53	0 47	0 48	0 48	0 48	0 48	0 49	0 52	0 50	0 48	0 49	0 46	0 42	A	
20	A	A	A	A	A	X 50	X 52	X 59	X 64	X 63	X 63	X 64	X 62	X 62	X 61	X 56	X 54	X 53	X 54	X 54	X 52	X 52	X 52	X 48	
21	X 47	X 46	X 48	X 49	X 56	X 60	X 70	X 74	X 82	X 82	X 80	X 77	X 78	X 73	X 67	X 67	X 62	X 58	X 59	X 55	X 46	X 48	X 48	X 44	
22	X 43	A	A	A	X 52	X 56	A	A	A	A	X 55	X 62	X 54	X 60	X 59	X 60	X 61	X 56	X 49	X 50	X 46	X 42	X 47	X 40	
23	A	A	B	A	A	B	X 55	X A	63	A	0 55	0 48	0 54	0 48	0 54	0 59	0 62	0 60	0 61	0 59	0 54	0 53	0 50	0 45	
24	X 46	X 46	X 46	X 49	X 49	X 54	X 61	X 68	X 70	X 74	X 77	X 65	X 65	X 62	X 60	X 57	X 55	X 57	X 57	X 54	X 54	X 54	X 45	X 56	
25	X 44	115	A	88	A	A	A	X 61	A	A	X 56	X 62	X 57	X 64	X 69	X 73	X 66	X 57	X 51	X 80	130	115	48	A	
26	X 48	A	A	A	A	X 48	A	X 45	X 64	X 69	X 68	X 64	X 57	X 64	X 70	X 73	X 66	X 60	X 60	X 55	X 52	X 58	X 42	X 56	
27	X 42	A	0 48	0 48	X 48	X 60	X 58	X 68	X 73	X 75	X 75	X 74	X 75	X 66	X 64	X 59	X 58	X 63	X 59	X 56	A	X 54	X 50	A	
28	A	X 45	X 52	A	A	48	A	A	A	A	X 61	X 64	X 73	X 73	X 67	X 67	X 66	X 62	X 56	X 60	X 65	X 65	X 58	X 48	X 39
29	A	A	A	52	65	38	A	A	A	A	X 58	X 48	X 64	X 67	X 72	X 75	X 65	X 52	X 54	X 58	X 53	X 54	X 54	X 58	
30	X 50	X 52	X 44	X 50	X A	X 52	A	55	R	X 54	B	X 62	X 66	X 66	X 61	X 60	X 66	X B	X 54	X 54	X 56	X 50	X 38	X 42	
31	X 39	A	0 39	0 42	A	A	R	A	A	A	A	A	B	0 64	0 70	0 75	0 74	0 53	0 48	0 44	0 70	0 43	0 46	0 48	
	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	15	19	18	15	22	20	22	20	23	26	29	30	31	30	31	30	29	30	31	29	30	27	22	
MED	X 48	X 47	X 48	X 52	X 54	X 53	X 58	X 60	X 65	X 64	X 60	X 63	X 61	X 61	X 60	X 59	X 58	X 56	X 57	X 54	X 52	X 50	X 48	X 47	
U Q	54	54	52	56	61	60	64	68	72	72	70	66	65	64	64	67	62	60	59	57	56	54	51	56	
L Q	X 44	X 46	X 44	X 49	X 50	X 50	X 53	X 52	X 57	X 56	X 56	X 57	X 56	X 57	X 58	X 56	X 55	X 54	X 53	X 52	X 49	X 46	X 46	X 45	

JAN. 2022 f_{XI} (0.1MHz)

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IONOSPHERIC DATA STATION SHOWA-ST.

JAN. 2022 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

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		51	48	J R	54	A	44	F	A	A	46	50	F	58	55	52	49	48	49	52	52	44	40	39	40					
2		Z	40	43	F	44	A	40	F	50	F	52	59	59	58	58	63	60	61	59	48	38	37	F	R					
3		A	A	A	A	B	A	38	A	A	A	A	A	43	R	52	F	F	55	F	48	48	39	40	R	A				
4		A	A	A	A	A	A	A	F	46	39	43	52	50	50	54	54	52	52	52	53	48	49	44	44	40				
5		41	35	27	A	A	50	F	F	F	F	52	53	50	50	48	49	46	50	47	46	44	41	40	39					
6		40	41	42	47	48	Z	61	V	65	70	68	66	63	60	54	51	51	50	52	52	52	49	47	47	45	43			
7		49	46	43	45	50	54	59	64	72	64	61	52	57	57	52	52	52	A	52	51	49	51	52	43	A				
8		50	51	56	59	62	70	78	86	90	88	84	74	70	66	69	62	53	58	56	56	54	42			A				
9		F	A	39	A	45	F	F	F	52	55	50	52	53	50	49	49	51	50	51	48	44	43	42	40					
10		A	A	38	44	41		44	52	F	66	64	58	57	54	52	50	49	53	51	49	46	38	40	50					
11		R	B	A	R	41	44	50	51	37	A	51	50	57	53	51	52	49	53	R	48	48	47	42	40	40	45	F		
12		42	45	43	50	55	55	55	59	62	74	77	70	61	56	56	53	53	R	56	46	50	53	52	52	35				
13		37	38	43	A	A	46	52	59	60	60	64	64	58	56	56	55	A	49	R	56	45	50	50	50	34	A			
14		36	41	46	47	53	58	61	60	60	63	65	60	62	55	A	50	49	50	50	50	43			A	A	A			
15		A	A	A	F	45	36	38	A	A	A	A	R	R	44	41	46	54	56	56	40	40	F	F		A	A			
16		A	A	A	A	A	35	40	42	A	46	42	42	38	43	51	54	50	49	48	43	R		38	39	A	A			
17		A	A	F	A	A	A	48	R	42	46	42	47	46	54	50	54	49	49	44	39	42	R	36	32	A	A			
18		A	A	A	F	35	A	A	A	A	39	52	50	58	R	41	53	55	54	48	46	A	43	F	44	46	44	A		
19		A	A	37	A	A	A	A	A	A	A	R	R	R	R	42	42	42	43	46	44	42	43	40	36		A			
20		A	A	A	A	A	F	40	46	53	58	57	57	58	56	56	55	50	48	47	48	48	R	46	46	46	42			
21		41	40	42	43	50	54	64	68	76	76	74	71	72	67	61	61	56	52	53	49	40	42	42	38					
22		37	A	A	A	46	F	41	A	A	A	49	F	47	48	54	53	54	55	50	43	44	40	36	41	34				
23		A	A	B	A	A	B	49	A	R	A	R	R	48	42	48	53	56	54	55	53	48	47	44	39		A			
24		40	40	40	43	43	48	55	62	64	68	67	F	59	V	59	56	54	51	49	51	51	48	V	48	48	39	A		
25		38	A	A	35	A	A	A	55	A	A	50	R	56	51	58	63	67	60	51	45	A				42	A			
26		42	A	A	A	A	42	A	J R	39	58	F	51	62	58	51	58	64	F	61	60	54	F	49	46	A	F	38		
27		36	A	R	42	42	42	54	F	52	57	67	69	69	68	69	60	58	53	52	57	53	50		48	44	A	A		
28		A	39	46	A	A	F	33	A	A	F	51	58	A	F	F	55	61	60	56	R	50	54	59	59	52	42	33		
29		A	A	A	F	F	36	32	A	A	A	A	52	42	R	58	61	66	69	59	R	46	R	48	52	47	48	48	F	45
30		44	46	F	44	A	A	46	A	49	A	48	B	F	56	F	60	55	54	60	B	48	48	50	44	32	36			
31		33	A	R	R	A	A	R	A	A	A	A	A	A	B	F	54	R	64	R	69	R	68	47	42	38		A	F	42
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23					
CNT		18	13	19	18	15	21	20	21	20	23	26	29	30	31	30	31	30	29	30	30	27	28	27	20					
MED		40	41	42	44	45	46	51	53	58	57	52	57	55	55	54	53	52	50	50	48	46	42	42	40					
U Q		43	46	45	47	50	54	57	61	66	66	64	60	58	58	58	61	56	54	53	50	49	48	44	42					
L Q		37	40	38	41	42	39	47	44	50	48	50	48	50	51	52	50	49	48	47	46	42	40	39	37					

JAN. 2022 foF2 (0.1MHz)

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JAN. 2022 ftEs (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E PSWEEP 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	20	22	24	33	90	61	66	58	57	37	37	34	E 44	B 36	B 34	31	G 29	G	G	G 26	31	38	30	G 36	
2	28	G 30	35	G 37	37	61	G 32	38	30	85	89	33	32	G	42	32	32	31	31	26	36	22	36	49	
3	46	55	66	40	B 36	B 58	56	58	63	61	128	62	112	E 44	B 36	B 32	B 34	B 40	B 38	25	25	40	47		
4	59	96	53	54	49	52	54	31	33	33	G 33	G 33	G	G 34	B 32	B 31	B 27	B 33	29	56	28	28			
5	22	22	78	98	66	66	76	38	55	37	G	35	35	30	33	33	33	33	30	26	26	20	24	22	
6	29	63	46	41	28	25	27	33	40	33	35	33	64	48	69	31	38	G 28	33	G	33	33	24	24	
7	G	15	18	25	22	30	26	G 26	G	32	32	34	36	42	42	63	38	74	32	30	26	35	20	16	
8	18	20	19	20	26	32	32	32	31	23	G	G	G	36	40	35	34	34	32	33	28	24	G	56	62
9	24	47	32	111	55	34	28	32	38	39	32	G 32	36	44	59	G 33	42	30	25	27	24	21	24	22	
10	41	52	E 41	B 37	34	52	41	37	35	39	36	38	34	34	34	36	33	28	E 28	B 32	24	33	38	37	
11	46	B	56	41	34	38	42	30	63	43	37	E 36	B 36	G 35	34	G	G	G	29	36	26	23	22	E 24	B 30
12	30	25	40	26	30	34	34	28	48	33	33	47	87	39	42	62	38	55	33	30	46	22	18	18	
13	20	20	39	72	53	30	32	32	32	35	43	50	47	37	37	41	78	35	66	54	45	34	18	23	
14	19	24	32	23	27	25	30	32	32	52	35	36	50	45	71	34	69	35	30	G	30	61	79	59	
15	53	64	58	30	28	24	64	52	50	50	49	37	74	98	G	G	G	G	34	42	39	40	91	53	
16	52	55	61	58	64	56	36	55	57	36	60	58	62	G	G	G	G	G	28	28	33	33	38	54	
17	51	51	36	48	56	56	40	G	30	33	33	33	33	35	48	41	G	32	28	G	G	42	40		
18	72	53	53	32	60	65	74	52	38	73	44	34	81	E 32	B 35	B 31	38	E 30	B 53	56	40	37	104	55	
19	45	83	54	58	58	62	51	52	55	56	37	40	32	G 33	60	G	35	61	E 30	B 27	26	29	20	46	
20	54	54	52	57	64	40	G 28	G 28	G 32	33	31	38	38	44	E 35	B 31	G	G	30	26	25	22	G	23	
21	E 16	B 20	E 22	B 22	23	30	28	G 28	G 28	32	32	34	40	36	36	G	32	38	33	27	G	40	44	34	
22	40	63	51	45	45	42	48	55	63	65	34	41	40	G 12	1 33	G	30	82	27	27	21	26	46		
23	55	66	B	69	76	B	44	58	55	55	40	39	35	33	31	117	G	35	33	36	29	36	20	36	
24	E 19	B 27	32	55	68	26	G 19	30	32	36	56	36	36	35	34	67	G 37	39	32	31	26	24	29	47	
25	46	61	56	38	114	58	46	52	66	62	34	46	36	66	34	G	34	34	30	43	68	57	68	88	
26	51	A	78	56	59	65	106	42	44	37	32	32	35	32	32	G 32	E 32	G	28	26	23	40	24	37	
27	29	48	39	39	B 38	B 41	30	30	33	33	33	33	36	41	41	32	30	G 30	32	38	65	30	16	77	
28	52	35	E 32	B 48	58	51	52	42	90	88	79	36	43	41	G	35	27	E 41	B 35	B 56	E 35	B 22	23	36	
29	45	56	50	57	26	59	60	58	62	62	36	40	E 43	B 35	B 35	G	34	38	E 37	B 70	77	58	24	G	
30	23	32	32	36	68	48	57	44	49	40	B	G	G 34	B 31	G	G	G	B	35	35	24	26	22	14	
31	26	66	83	66	38	59	50	61	49	62	56	54	B 39	E 48	B 46	B 52	B 34	B 36	B 38	38	39	39	39	33	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	29	30	31	29	30	31	31	31	31	30	31	30	31	31	31	31	30	31	31	31	31	31	31	
MED	40	51	44	41	53	45	42	38	44	39	36	36	36	36	34	G	32	31	32	29	28	33	26	36	
U Q	51	62	56	57	64	59	57	52	57	62	44	40	47	42	44	36	38	35	35	38	38	39	40	49	
L Q	22	24	32	33	29	32	32	30	32	33	33	34	35	G	G 32	33	G	G	30	26	24	22	22	24	

JAN. 2022 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JAN. 2022 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	8	8	9	7	15	11	18	22	15	18	10	12	44	36	14	14	13	14	17	11	9	10	13	12
2	10	16	11	17	15	34	15	10	9	15	15	15	10	19	19	15	10	18	16	12	12	10	8	23
3	35	24	15	23	B	36	16	15	25	27	14	39	38	43	44	36	32	34	23	19	14	8	9	15
4	7	9	18	16	19	32	20	14	14	10	11	10	10	13	23	34	33	31	27	24	10	13	9	7
5	8	11	11	11	11	11	9	8	7	7	8	8	8	10	10	10	10	10	12	9	9	6	6	9
6	8	7	7	6	7	6	6	7	8	11	8	14	10	9	10	10	8	8	8	8	8	8	6	7
7	7	5	6	6	8	8	8	9	10	9	7	9	11	11	11	10	9	11	10	7	7	7	8	7
8	6	8	6	7	6	7	7	6	7	13	14	22	20	15	15	15	12	10	8	8	11	24	13	7
9	8	7	7	8	10	9	6	6	8	10	15	17	8	6	11	11	9	10	14	8	10	8	9	6
10	17	20	11	37	18	18	14	10	10	10	7	10	10	11	10	10	11	8	15	32	10	7	8	10
11	23	B	16	19	18	18	17	11	15	15	23	36	20	18	15	16	14	10	10	6	6	15	24	14
12	8	9	6	6	8	7	9	16	21	15	13	13	8	14	20	21	16	10	8	8	8	8	7	8
13	6	6	8	16	15	10	8	8	8	8	8	8	8	13	13	10	10	7	8	9	6	6	8	7
14	6	8	8	8	6	8	6	8	8	8	8	7	7	8	9	10	10	7	8	8	8	9	8	8
15	12	7	14	10	12	11	13	12	10	13	10	15	17	16	14	20	16	14	11	12	9	10	10	14
16	6	9	10	6	11	7	10	8	12	9	9	12	39	16	19	14	18	19	17	13	17	9	8	11
17	14	22	20	13	16	14	12	10	10	8	10	10	11	10	13	14	17	9	8	13	18	11	25	8
18	18	12	8	10	28	11	22	17	12	23	26	14	38	32	35	32	19	30	10	11	11	10	34	17
19	16	10	7	8	20	24	25	22	14	18	17	16	17	12	14	14	20	25	30	14	10	10	8	14
20	20	18	18	36	24	14	12	9	9	23	11	15	20	29	36	23	19	16	20	15	14	11	12	15
21	16	20	12	14	14	14	14	12	9	10	10	10	10	11	11	10	14	10	10	10	25	13	13	13
22	17	19	19	15	16	11	20	17	14	29	15	16	23	22	24	33	20	21	22	19	8	10	8	10
23	16	14	B	20	20	B	21	24	15	20	16	16	14	11	8	34	21	18	22	16	15	13	11	10
24	19	8	7	7	9	7	8	8	10	7	7	12	14	14	10	6	9	12	9	13	9	8	8	12
25	20	14	6	6	6	12	10	9	10	10	9	9	9	9	9	16	20	14	13	11	8	16	9	11
26	6	9	16	9	7	7	18	19	9	9	9	17	10	10	14	21	32	20	19	10	7	8	10	7
27	12	12	32	26	37	38	17	10	10	11	12	12	14	30	9	9	10	18	18	20	9	7	7	16
28	13	13	32	20	10	9	16	16	16	24	22	24	22	25	25	17	19	41	35	34	35	14	9	6
29	8	14	8	8	6	10	13	10	19	19	11	23	43	35	21	15	18	22	37	13	13	8	7	6
30	7	6	15	18	15	10	18	15	24	24	B	24	24	34	23	19	22	B	11	10	12	14	8	8
31	8	15	14	8	15	28	26	18	22	14	26	24	B	39	46	46	52	34	22	10	8	10	6	6
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	10	11	11	10	15	11	14	10	10	13	11	14	14	14	14	15	16	14	14	11	10	10	8	10
U Q	17	16	16	18	18	18	18	16	15	19	15	17	23	29	23	21	20	22	22	15	13	13	11	14
L Q	7	8	7	7	8	8	9	8	9	9	9	10	10	11	10	10	10	10	10	9	8	8	8	7

JAN. 2022 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JAN. 2022 h'F (KM)

45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E pSWEEP 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 A 248	A E A 288	E A 288	A	A	A	A	A	A	A	204	196	202	B	B	194	184	204	212	202	218	218	A E A 274	A	
2	A	A	A	A	A	A	A	214	194	198	194	202	196	200	226	198	202	202	E A 212	244	200	E A E A 232	A E A 256	A	
3	A	A	A	A	B	B	206	A	A	A	210	A	A	B	B	E B 230	216	E B 252	238	216	216	210	A	A	
4	A	A	A	A	A	A	A E A 240	224	196	198	192	176	196	208	E B 220	206	224	224	200	E A 232	210	E A E A 234	238	A	
5	E A 290	E A 262	E A 268	A	A	A	E A 232	200	230	A	224	192	184	184	176	216	192	182	202	230	208	208	218	218	E A 224
6	E A 242	222	224	A E A 222	206	194	192	184	174	204	190	A	226	196	196	180	192	196	210	210	208	A	222	A	
7	214	228	210	198	250	220	196	196	206	190	200	200	196	218	208	A	192	A	210	220	204	234	196	200	
8	202	E A 240	A	226	204	196	194	198	190	198	202	198	E A 190	212	194	192	196	216	232	208	212	190	A	A	
9	A	A	222	A	240	210	210	220	202	224	224	206	214	198	198	206	208	200	218	226	204	246	244	A E A 244	
10	A	A	A E B 328	234	A	A	A	A	234	190	186	216	194	198	200	192	196	200	208	234	210	A	E A 234	252	
11	A 204	B	A	A	A	A	A	200	A	A	228	202	246	208	206	196	212	200	212	210	230	230	E B E A 274	246	
12	E A 246	E A 246	E A 244	E A 250	246	242	234	200	212	188	206	198	E A 368	208	230	226	208	A	208	208	A	228	236	E A 230	
13	E A 246	E A 258	E A 312	A	284	212	200	196	184	274	208	208	196	196	220	A	202	306	250	A	256	228	256	E A 256	
14	E A 274	244	A	E A 264	226	232	214	206	204	212	208	196	240	210	A	H 200	202	222	212	222	E A 268	A	A	A	
15	A	A	A	A	E A 220	A	A	A	A	A	212	236	212	E A 232	220	222	200	200	212	200	E A 298	A	A	A	
16	A	A	A	A	A	E A 242	A	A	194	206	212	A	198	204	204	222	198	208	218	A	230	A	A	A	
17	A	A	198	A	A	E A 304	204	204	194	204	204	198	186	H 186	A	200	204	198	194	240	A	202	A	A	
18	A	A	A	A	A	A	A	A	A	E A 194	240	178	202	204	230	216	218	204	A	234	A	320	A	A	
19	A	A	A	A	A	A	A	A	A	A	200	198	E A 220	206	200	194	E A 254	232	218	E A 234	228	200	E A 266	A	
20	A	A	A	A	A	A	232	218	198	E A 234	190	200	200	244	196	206	192	198	222	214	220	232	236	E A 244	
21	242	E B E A 290	290	260	240	230	204	202	198	194	204	198	190	194	H 194	H 196	206	206	E A 224	212	A	A	A	A	
22	A	A	A	A	A	A	A	A	A	A	198	196	E A 226	210	E A E B 230	214	198	208	208	214	E A 258	208	A	A	
23	A	A	B	A	A	B	A	A	A	A	218	198	194	204	204	E B 212	200	200	222	214	216	248	E A E A 234	248	
24	B E A 264	A	A	A	E A 264	222	194	H 202	202	204	194	196	186	198	H 230	196	228	204	236	228	204	200	A	A	
25	A	202	A	A	A	A	A	220	A	A	188	234	206	A	220	212	216	204	224	A	204	A	A	A	
26	A	A	A	A	A	A	A	A	216	212	198	198	206	206	200	200	206	194	202	220	228	A	A	A	
27	A	A	A	A	B	B	A E A 220	194	212	190	192	198	206	E A 240	194	198	210	E A E A 232	258	A	202	202	A	A	
28	A	A	A	A	A	254	A	A	A	A	A	A	E B 276	236	212	212	204	B E B E B 246	254	250	206	E A 270	202	A	
29	A	A	A	A	202	216	A	A	A	A	200	196	B E B 250	220	208	208	240	E A E B E A 284	264	242	246	E A E A 246	E A E A 238	A	
30	A	212	A	A	A	A	A	A	210	A	A	B	200	208	228	220	202	202	B	220	218	220	A	A	
31	E A 252	A	228	A	A	A	A	A	A	A	A	A	B E B 288	B	422	B	258	206	A	A	A	A	A	214	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	11	11	11	7	8	13	14	18	16	21	28	28	25	29	27	30	29	27	30	29	22	22	18	14	
MED	E A 246	E A 244	U 213	U 243	230	231	208	202	203	196	201	198	199	205	203	201	203	203	210	216	218	208	U 223	E A 238	
U Q	E A 252	E A 262	E A 288	E A 288	243	248	232	E A 218	214	212	207	206	210	222	E A 220	216	208	222	224	235	232	232	E A 266	E A 246	
L Q	214	222	222	226	213	218	200	200	195	192	197	196	195	198	198	196	197	200	208	211	212	204	228	222	

JAN. 2022 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2022 fxI (0.1MHz)

45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E PSWEEP 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	O X 44	A	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2	60	64	B	B	A	X	A	A	A	X	X	X	X	X	X	X	X	X	X	X	O X 46	X	X	X
3	X	X	X	X	X	X	A	A	B	A	B	A	A	52	66	B	44	43	X	X	X	X	A	A
4	A	A	45	59	43	48	A	66	56	A	A	A	O X 48	B	56	69	O X 53	O X 55	83	70	91	A	A	A
5	X	A	X	A	X	A	A	A	A	A	X	X	O X 49	O X 48	O X 49	O X 51	O X 55	O X 56	O X 57	O X 54	O X 54	O X 49	O X 52	O X 78
6	A	82	O X 44	O X 40	O X 49	O X 48	O X 37	O X 56	A	X	X	X	O X 58	O X 58	O X 58	O X 59	O X 52	O X 55	B	56	X	X	X	X
7	A	A	A	A	53	X	49	62	67	74	67	64	65	70	70	70	67	62	56	50	44	48	42	36
8	X	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O X	X	X	X	X	X
9	A	A	X	A	O X 44	52	62	73	73	77	76	75	74	69	67	61	56	57	57	57	55	53	52	46
10	X	42	40	70	44	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	A	X	A	A
11	A	A	A	A	A	49	A	A	49	44	48	B	B	47	51	52	56	51	53	52	X	X	X	A
12	X	45	A	X	A	A	R	X	X	O X	X	X	X	X	X	X	X	X	X	X	X	X	A	A
13	A	A	55	A	74	86	A	A	A	44	45	O X 53	O X 54	57	54	56	58	52	46	50	46	34	A	A
14	A	A	A	A	A	A	A	55	59	61	65	62	63	62	63	62	59	61	57	50	44	36	66	O X 32
15	O X 31	40	A	O X 40	A	A	A	A	54	57	67	64	62	62	64	62	62	57	57	58	50	46	40	35
16	X	42	X	50	42	45	A	A	X	57	52	67	68	64	67	72	69	76	69	64	52	44	A	69
17	A	A	A	55	40	45	51	61	61	64	O X 59	65	62	63	60	55	55	54	52	50	49	44	28	A
18	57	X	A	47	48	56	56	65	70	74	76	72	71	76	73	66	66	66	64	61	59	51	67	A
19	69	A	82	79	56	A	51	A	A	70	A	X	X	X	X	X	X	X	X	X	X	A	A	62
20	A	A	A	A	73	A	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	A	57
21	57	A	X	A	X	X	X	X	X	X	X	X	X	X	X	B	X	X	X	57	58	48	51	70
22	A	113	A	A	O X 54	57	54	A	A	A	63	68	B	X	60	72	80	76	68	65	62	59	57	49
23	X	41	A	A	X	X	X	X	X	X	X	X	X	X	X	X	75	59	62	56	49	A	A	67
24	A	66	A	A	A	A	A	A	A	R	O X 44	R	X	X	X	X	X	X	X	X	X	X	X	X
25	X	42	X	A	A	X	X	A	A	A	O X 54	61	70	78	72	68	68	67	62	54	54	54	51	44
26	X	36	X	41	41	56	58	66	68	72	77	83	82	90	91	75	66	70	67	64	54	52	47	37
27	40	35	48	44	A	51	66	73	76	82	75	72	70	76	100	90	85	66	63	55	46	37	36	
28	O X 29	A	A	32	A	52	51	55	62	72	72	72	67	72	73	73	62	62	62	60	X	53	51	58
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	16	11	14	12	17	17	15	17	17	22	25	24	25	27	26	27	28	28	27	28	26	22	16	18
MED	X	41	X	44	X	X	52	61	62	63	63	66	64	65	66	62	60	58	56	53	52	50	46	45
U Q	51	66	50	54	55	56	58	66	69	72	72	71	71	76	72	70	66	64	63	58	55	54	52	60
L Q	X	40	X	40	X	X	50	55	56	55	55	59	58	57	56	56	55	54	52	50	46	46	38	37

FEB. 2022 fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2022 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E pSWEEP 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	R 38	A	A	A	A	46	50	56	57	61	65	61	54	52	48	53	58	55	49	48	54	F 43				
2	F 46	F 50	B	B	A	48	A	A J	R 50	50	48	52	56	59	61	56	55	56	52	44	40	41	42	33				
3	37	35	38	48	38	45	F	A	A	B	A	A	A	F	A	B	38	37	40	39	39	A	A	A				
4	A	A J	R 39	A	37	42	A	A	A	A	A	A	R 42	B	F	F	R	R	F	F	33	A	A	A				
5	38	A	38	A	37	A	A	A	A	A	43	42	43	45	49	50	51	48	48	43	V	A	A	A				
6	A	52	R 38	V 34	R 43	R 42	31	50	R	A	51	51	52	52	52	53	46	48	B	F	46	49	42	30	31			
7	A	A	A	A	F 41	A	43	50	F	52	64	61	58	59	64	64	64	61	56	50	44	38	42	36	30			
8	33	A	A	A	39	44	52	57	V	62	66	65	63	65	66	63	57	56	54	50	50	45	36	31	A			
9	A	A	36	A	R 38	F 40	56	67	A	67	71	70	69	68	63	61	55	50	51	51	51	49	47	46	40			
10	36	R	A	38	A	A	A	A	44	52	58	62	67	72	70	70	62	59	50	52	A	40	A	A				
11	A	A	A	A	A	F 34	A	A	F	38	38	42	B	B	J	R	41	45	46	50	45	47	46	46	44	38	A	
12	J	R 39	A	A	A	A	F	A	F	34	44	39	46	50	R	R	49	49	50	49	46	41	37	J	R	R	A	A
13	A	A	A	A	A	F 37	A	A	A	A	38	39	47	48	51	48	50	52	46	40	44	37	28	A	A			
14	A	A	A	A	A	A	A	A	F 44	B	53	55	59	56	57	56	53	55	51	44	38	30	A	A	R 26			
15	R 25	F 24	A	R 34	A	A	A	A	A	48	51	61	58	56	56	58	56	56	51	51	52	44	33	27	F 23			
16	V 36	A	F 42	39	36	39	A	51	A	46	51	55	58	61	66	63	70	63	58	46	38	A	A	A				
17	A	A	A	A	34	39	31	34	V	55	55	53	54	56	57	54	49	49	48	46	44	43	38	22	A			
18	A	A	A	F 32	42	50	50	59	64	68	70	66	65	70	67	60	60	60	58	55	53	F 33	A	A				
19	A	A	A	A	F 34	A	F 39	A	A	A	A	48	48	52	51	53	49	44	44	36	58	A	A	A				
20	A	A	A	A	R 39	A	A	A	A	46	54	51	50	50	49	50	46	46	44	46	44	26	A	A				
21	A	A	34	A	38	40	F 42	55	59	66	68	72	76	82	B	66	60	53	50	F 48	42	F 42	A	A				
22	A	A	A	A	R 48	F 39	F 45	A	A	A	46	62	B	54	F 59	F 69	F 61	F 62	59	56	53	V 51	43	A				
23	35	A	A	A	37	39	V 46	51	56	61	63	64	66	76	79	F 60	53	56	50	V 43	A	A	A	A				
24	A	A	A	A	A	A	A	38	A	A	38	A	48	48	48	48	49	49	46	46	45	42	36	32				
25	36	34	A	A	41	44	A	A	A	48	55	54	60	F 60	F 62	62	62	61	56	48	48	48	45	38				
26	30	F 19	F 26	F 22	F 26	45	F 44	F 52	66	71	77	76	84	85	69	60	64	61	58	48	46	46	41	31				
27	F 20	F 19	F 21	F 31	A	45	F 56	67	70	76	69	66	64	F 52	F 64	F 67	F 65	60	57	49	40	A	31	30				
28	R 23	A	A	A	A	F 42	45	49	56	F 58	F 58	56	56	66	67	67	56	56	56	54	47	F 39	A	A				
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	13	8	11	9	16	17	15	17	16	21	25	24	25	27	25	27	28	28	27	28	25	20	14	11				
MED	36	34	38	34	38	42	44	50	56	55	55	58	56	57	59	56	54	52	50	46	45	42	37	31				
U Q	38	46	R 38	37	R 40	45	50	56	63	66	64	64	65	66	65	63	60	58	56	50	49	46	43	38				
L Q	28	F 22	F 34	F 28	37	F 39	39	44	49	48	48	52	51	51	49	50	49	48	45	44	40	37	31	30				

FEB. 2022 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2022 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	57	37	48	66	50	40	37			33	34	33	43	42	30	22		31	49	41	28	22	13		
2	19	19	B	B	56	42	97	54	29	32		35	35	35	34	30	33	49	27	27	44		18	22		
3	58	44	32	48	42	78	52	58		60		50	50	31	62		64	42	35	30	44	47	46	51		
4	47	58	46	62	22	30	63	58	50	67	64	75	62				42	39	34							
5	90	54	31	90	54	66	36	58	56	64																
6	56	44	42	20	54	30	34	61	51	36	33															
7	105	52	42	49	54	58	43	38	32	29	30	34	37	33	34	26	34	38								
8	30	65	50	53	31	30	36	29	29	32	37	33	36	31	34	42	42	33								
9	43	40	62	50	36	36	28	27	32	32	32	32	32	34	35	66	31	27	27	24	21	16		13		
10	15	31	58	43	66	50	52	49	43	41	34	41	34	105	36	34	31	30	26	31	113	31	63	75		
11	49	49	55	50	42	26	68	55	31	33	35															
12	44	52	38	70	74	34	55	31	46	52	42															
13	54	79	43	48	52	28	124	69	59	40	65															
14	63	67	59	54	48	56	50	50		121	38	27	45	36	33	35										
15	35	29	43	43	52	52	60	61	32	49	39	32	29													
16	E B	10	18	33	33	43	52	58	54	58	44	33	33	33												
17	51	48	54	41	37	37	29	26	44																	
18	36	52	57	25	27	24	24	23	27																	
19	42	73	66	51	25	66	31	64	52	42	57	42	31	30	30	31	28									
20	87	56	71	53	28	44	58	57	45	46																
21	52	47	65	36	28	23	25	27	24	39	28	28														
22	46	90	56	65	67	32	32	83	61	54	37	48														
23	67	64	54	54	32	22	19	22	24	28	28	30	30	30	28	34	27	25	22							
24	45	56	58	56	78	44	60	40	60	43	48	42														
25	13	32	52	56	54	54	52	64	47	48	42															
26	18	24	55	16	32																					
27	12	28	32	30	48	34	21		25	26	48	42	25	29	28	27	30	28	24							
28	33	35	40	46	55	35	35	35	29	36	27	27	27	31	31		26		23							
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	28	28	27	27	28	28	28	28	26	28	27	27	26	27	26	27	28	28	27	28	28	28	28	28		
MED	46	50	52	49	48	36	42	50	38	40	E G	32	32	30	32	31	G	G	G	E G	E G	25	28	36	44	
U Q	55	58	58	54	54	52	58	58	51	48	42	42	36	34	35	E B	32	32	28		G	40	40	46	50	
L Q	32	34	40	41	32	30	30	28	29	34	32	G	G	G	G	G	G	G	28	28	24	24	21	18	20	28

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2022 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	8	23	27	17	23	14	10	10	10	16	19	9	9	10	19	18	14	16	11	12	12	8	7	8	
2	6	8	B	B	20	7	19	14	9	9	9	8	10	10	10	10	9	8	8	7	10	15	9	8	
3	10	8	18	18	16	13	10	20	B	21	B	20	14	8	23	B	22	10	8	9	8	7	14	17	
4	14	8	6	9	11	12	33	10	10	10	14	29	27	B	34	32	15	12	13	10	16	7	10	9	
5	8	7	5	23	7	14	8	15	16	16	14	15	32	32	39	32	31	10	10	16	9	10	8	8	
6	10	11	24	8	24	8	7	11	14	11	16	20	36	34	B	47	12	29	B	29	27	15	10	8	
7	16	11	12	20	15	16	14	13	10	9	11	14	17	15	16	19	30	24	26	11	11	12	10	10	
8	16	23	20	19	13	14	12	10	10	9	10	12	18	14	19	16	9	10	42	17	10	8	10	10	
9	15	25	22	20	18	12	10	10	8	8	10	10	15	11	11	15	16	15	12	9	9	7	8	6	
10	6	24	9	7	16	14	14	22	23	20	19	12	10	10	13	13	12	12	8	12	10	7	9	18	
11	15	8	10	11	11	10	14	16	11	8	9	B	B	34	32	13	10	20	16	12	11	8	7	8	
12	10	8	7	8	10	10	10	11	11	16	42	32	22	15	10	8	8	16	13	10	7	11	10	11	
13	8	13	8	28	7	8	26	16	18	12	14	42	38	17	19	10	20	10	17	10	9	10	8	19	
14	7	16	18	29	23	14	24	15	B	34	19	23	45	36	32	35	19	32	8	10	9	12	8	7	
15	7	8	14	12	12	13	22	19	16	23	26	15	13	13	14	16	15	12	10	12	12	9	9	16	
16	10	8	8	9	14	20	9	24	15	17	12	10	13	13	22	9	12	14	14	14	9	9	9	14	
17	14	9	10	10	11	7	11	12	14	15	38	17	17	15	15	15	15	17	12	11	10	8	7	7	
18	8	8	10	7	8	10	9	9	10	8	8	10	13	13	11	8	8	8	12	14	8	8	8	8	
19	6	9	9	10	16	23	11	18	15	17	11	11	14	13	10	11	10	15	15	11	20	14	9	8	
20	10	9	8	10	12	12	20	13	11	15	27	23	24	16	15	16	14	14	9	10	8	10	9	9	
21	13	8	10	10	10	9	10	9	9	10	9	10	16	20	B	42	24	9	24	23	12	12	8	10	
22	9	8	8	14	38	18	19	22	28	20	36	32	B	34	35	42	30	33	30	18	21	20	8	11	
23	8	8	8	10	10	8	9	8	9	9	13	8	14	8	13	25	18	14	12	15	10	8	22	8	
24	10	16	8	11	19	12	25	13	20	30	17	23	19	11	14	14	14	12	16	9	10	8	9	8	
25	6	8	10	11	18	7	13	29	13	13	24	45	28	21	15	45	47	39	32	27	14	10	12	8	
26	6	7	7	7	8	23	25	25	27	34	15	23	18	12	12	14	11	10	11	8	8	9	9	9	
27	7	7	9	12	13	10	10	9	9	9	20	9	10	15	15	14	21	16	12	8	10	10	6	7	
28	8	8	9	10	18	11	10	12	10	16	12	11	16	16	16	16	10	10	10	9	8	6	6	8	
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	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
MED	8	8	10	11	14	12	12	13	12	15	14	15	17	15	16	16	14	14	12	11	10	9	9	8	
U Q	12	12	16	18	18	14	20	18	17	18	22	23	28	20	28	32	20	16	16	14	12	12	10	10	
L Q	7	8	8	10	10	10	10	10	10	9	11	10	14	12	13	13	10	10	10	10	9	8	8	8	

FEB. 2022 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2022 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	A	A	A	A	E A 280	A	A	A	196	200	190	198	208	198	206	208	228	E A 230	E A 230	E A 228	240	226				
2	A	E A 232	B	B	A	A	A	A	A	A	222	200	U H 182	224	204	202	214	U H 186	198	206	200	198	A	A	E A 262				
3	E A 290	A	A	A	A	A	A	A	A	B	A	B	A	A	A	A	B	E A 242	E A 240	E A 306	E A 264	210	A	A	A				
4	A	A	A	A	A	A	A	E A 316	A	A	A	A	E A 244	B	B	E B 254	258	238	E A 266	A	200	A	A	200	A				
5	A	A	A	A	A	A	A	A	A	A	A	210	200	210	222	E B 282	242	218	204	E A 244	E A 232	E A 256	A	A	A				
6	A	200	A	A	A	A	E A 250	204	A	238	216	210	244	E B 214	B	B	190	222	B	256	E B 250	E B 272	A	E B 304					
7	A	A	A	A	A	A	A	E A 280	240	200	182	202	198	200	202	200	232	214	226	212	202	200	228	242	A				
8	E A 320	A	A	A	A	E A 328	E A 252	222	200	198	198	208	200	202	200	204	208	208	B	230	234	306	A	A	A				
9	A	A	A	A	A	A	A	A	A	A	A	250	226	208	188	194	198	198	198	206	A	200	192	212	226	234	216	A	234
10	258	A	A	238	A	A	A	A	A	E A 230	200	216	200	224	206	212	212	208	206	206	A	198	A	A	A				
11	A	A	A	A	A	E A 276	A	A	194	A	198	B	B	E B 228	222	206	228	236	226	236	E A 258	E A 250	E A 260	190	A				
12	A	A	A	A	A	A	E A 264	E A 276	A	A	B	222	244	226	212	196	212	226	206	262	E A	A	A	A	A				
13	A	A	A	A	A	E A 278	A	A	A	A	E A 228	B	B	H 192	208	204	192	252	222	242	E A 272	A	A	A	A				
14	A	A	A	A	A	A	A	E A 246	B	A	242	200	B	E B 244	B	E B 206	232	206	246	206	250	198	A	A	A				
15	A	218	A	A	A	A	A	A	E A 244	A	202	190	172	H 204	198	200	H 200	210	216	228	228	288	288	312	A				
16	256	244	E A 270	228	A	A	A	A	A	A	204	202	198	186	220	220	206	218	230	202	E A	E A	A	A	A				
17	A	A	A	A	A	A	E A 360	210	A	H 198	B	208	196	184	194	198	212	222	222	236	E A 236	E A 230	A	A	A				
18	A	A	A	A	A	A	246	208	208	196	196	206	192	224	202	198	218	208	208	216	E A 234	E A 274	A	A	A				
19	A	A	A	A	A	A	E A 264	A	A	A	A	188	206	212	H 234	230	206	216	236	200	196	A	A	A	A				
20	A	A	A	A	A	A	A	A	A	A	E A 250	244	228	200	200	208	E A 228	206	E A 228	E A 240	E A 254	A	A	A	A				
21	A	A	A	A	A	A	280	226	218	214	202	206	198	196	H 212	B	A	A	204	242	266	E A 260	234	A	A				
22	A	A	A	A	192	A	A	A	A	A	196	198	B	E B 242	B	B	216	B	254	240	248	260	E A 250	E A 200	A				
23	200	A	A	A	A	216	266	220	H 210	208	196	198	208	184	H 212	224	210	216	198	238	A	A	A	A	A				
24	A	A	A	A	A	A	A	A	A	A	A	A	236	224	200	190	200	216	E A 260	E A 244	E A 238	E A 234	E A 230	248	A				
25	E A 266	A	A	A	A	A	E A 254	A	A	A	E A 288	B	E A 254	216	218	316	282	B	260	238	E A 238	E A 238	230	248	A				
26	A	E A 276	E A 296	E A 336	A	214	E B 258	E B 230	E B 216	E B 244	204	230	242	198	218	198	E A 228	E A 218	222	202	218	218	220	E A 260					
27	E A 278	E A 314	A	204	A	216	200	218	200	200	A	240	202	218	190	210	202	228	248	206	A	A	A	A	A				
28	A	A	A	184	A	A	A	A	208	208	234	192	186	196	208	236	210	210	200	220	208	220	228	A	A				
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	7	6	2	5	2	6	12	15	13	13	21	22	23	26	25	23	28	26	25	28	21	16	8	10					
MED	E A 266	U 224	E A 283	U 216	199	246	E 256	217	209	199	198	204	201	204	209	206	208	212	219	U 219	E 234	E A 236	U 222	U 222					
U Q	E A 290	E A 276		287		E A 278	E A 265	E A 276	224	232	213	216	236	224	B 227	224	222	E 226	243	241	E A 252	E A 266	E A 255	E B 262					
L Q	256	218		194		216	250	210	204	198	196	198	198	198	H 201	198	204	208	207	206	224	228	225	226					

FEB. 2022 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAR. 2022 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	A	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	R	A		
2	X				A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
3	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A		
4	84	A	A		56	58	52	B	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A	A	A		
5	A	A	58		A	A	A	A	A	O	X	X	X	X	X	X	X	O	X	X	X	A	A	A	A		
6	A	A	A		O	X	B	B	O	X	X	A	B	B	B		58	X	O	X	X	X	A	A	A		
7	A	A	A		45	38	A	A	A	B	O	X	X	X	X	X	X	X	X	X	X	A	79	89	81		
8	A	A	A		A	A	B	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A		
9	A	A	A	B	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	X	X	X		
10	41	62		A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X		A	A	86	91		
11	66	O	X	X	A	A	X	A	A	X	X	O	X	B	O	X	X	X	X	X	X	O	X	A	A		
12	A	A	A	A	A	X	A	A	A	O	X	X	B	O	X	X	X	X	X	X	X	X	X	O	X	A	
13	A	A	A	A	R	A	A	A	X	X	H	X	X	X	X	X	X	X	X	X	A	A	44	78	A		
14	A	86		A	A	42		A	R	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A		
15	A	48	50	40	46	39	41	44	48	52	56	63	63	64	61	60	61	61	61	52	54	52		A	A		
16	A	49		A	X	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		A	A		
17	57		A	A	A	A	51	50	57	59	62	66	75	79	80	74	68	62	61	54	45	45	42	O	X	25	
18	58	O	X	A	A	A	A	X	X	X	H	X	X	X	X	X	X	X	X	X	X	X	X	X	A		
19	X	26	45	A	A	42	42	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A	52			
20	A	A	X	39	47	84	59	A	B	A	A	A	X	X	X	X	X	X	X	X	X	X	X	O	X		
21	O	X	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X		
22	A	58	92	55		A	A	A	O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A		
23	56		62	46	42		X	56	58	60	60	58	67	69	77	68	67	67	63	54	46	46	34	O	X		
24	A	54	43	32	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
25	O	X	A	A	A	A	R	B	X	X	O	X	X	X	X	X	X	X	X	X	X	X	A	82	A		
26	A	A	A		A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A	A	A		
27	A	59		A	X	42	84		A	A	X	X	X	X	X	X	X	X	X	X	X	A	A	A	A		
28	58	68		A	A	A	X	A	B	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
29	59	43	O	X	X	X		A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
30	A	A	A	A	A	B	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A		
31	A	A	B	A	R	O	X	O	X	X	X	A	B	O	X	X	X	X	X	X	X	R	O	X	O	X	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	13	14	10	12	11	15	14	20	28	28	28	29	29	30	30	31	31	31	30	31	24	24	21	12			
MED	56	50	46	46	44	46	48	54	54	57	62	64	70	74	76	72	70	65	58	52	46	44	35	34			
U Q	58	59	58	51	51	52	52	57	60	65	68	72	79	80	87	77	77	70	61	55	50	46	58	66			
L Q	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	27	45	39	39	42	40	45	47	50	54	57	59	64	64	68	65	65	60	56	48	40	36	28	27			

MAR. 2022 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAR. 2022 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

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23												
1		A	A	A	A	A	40	48	52	57	F 60	62	64	F 61	F 64	69	66	64	60	53	55	42	38		R	A											
2		22		A	A	A	38	40	46	52	58	64	68	66	67	62	62	64	53	55	48	46	48	46	40	A											
3		36	20	25	F 23	F 38	F 41	50	61	F 65	F 62	65	70	73	74	71	71	71	66	60	51	47	40	43	A												
4		A	A	A	F 38	F 44	F 40	B	47	53	54	60	69	66	65	67	67	63	55	52	47	F 30	A	A	A												
5		A	A	A	A	A	A	A	A	A	49	54	58	65	65	66	66	65	R 50	R 41	39		A	A	A	A											
6		A	A	A	F 26	R 32	B	B	R 40	44	A	B		B	B	B		52	49	R 42	R 44	R 44	34	23	F	A	A										
7		A	A	A	A	A	A	A	B													F 30	A	A	A	A											
8		A	A	A	A	38	A	B	A		41	41	48	52	55	54	62	70	68	59	45	30		Z	Z		A										
9		A	A	A	B	A	A			39	51	53	59	56	Z	60	60	62	63	58	58	54	50	45	R 42	36	29	24									
10		A	A	A	A	A	A			44	49	55	59	F 55	F 60	74	74	70	72	71	F 60	55	44	F 42	36	29	F 24	42									
11		A	R 39	34	A	A	28	A	A		A	46	48	50	R	B	B	R 52	54	50	49	50	52	40	A	A	A	A									
12		A	A	A	A	A	37	A	A		A	R 38	R 40		B		47	49	52	49	47	48	44	41	35	25	13	A									
13		A	A	A	A	R	A	A	A		47	44	48	52	56	55	54	55	64	36		A	46		F 29	A	A	A									
14		A	A	A	A	A	F 33	A	A		36	44	43	45	47	48	48	48	46	44	42	40	37	29	23	F	A	A									
15		A	A	A	34	F 26	F 28	35	38	42	46	50	57	57	58	55	54	55	55	46	48	32	F 32	A	A	A	A	A									
16		A	F 36	A	41	A	29	42	42	47	52	54	58	61	63	65	66	66	66	58	51	44	37	23	F	F	A	A									
17		A	A	A	A	A	A	F 41	44	F 46	R 53	56	60	69	73	74	68	62	56	55	48	F 36	34	26	19	R	A	19									
18		A	R 17	A	A	A	A	A		43	52	56	54	58	64	71	74	70	65	55	52	44	37	30	24	F	A	A	A								
19		20	A	A	A	F 31	Z 34	34	38	45	49	54	58	73	80	81	70	64	65	54	49	40	28		F	A	A	A									
20		A	A	33	R 38	A	A	A	B	A	A	A		47	52	54	63	62	58	54	49	46	32	26	20	18	R	18									
21		R 15	A	A	A	B	A			F 42	F 47	49	49	52	60	64	68	70	66	61	59	52	43	43	32	21	17	R	17								
22		A	A	A	F 43	A	A	A	A	R 41	F 46	F 55	54	61	69	71	62	62	60	51	42	26	32	36	F	F	A	A	A								
23		A	A	A	37	F 26	A			Z 41	50	50	54	54	52	61	63	71	62	61	61	57	48	40	26	28	28	R	28								
24		A	A	A	26	A	A			50	49	63	64	63	64	62	60	69	67	67	59	54	40	39	32	22	28	F	A	A	A						
25		R 20	A	A		A	A	R	B		47	50	56	58	66	76	79	82	86	70	60	56	52		A	A	A	A	A	A							
26		A	A	A	A	A	A	A		36	41	49	60	71	88	92	95	88	77	61	52	50	31		A	A	A	A	A	A	A						
27		A	F 44	A	35	F 31	A	A	A		54	61	73	80	90	94	90	106	101	83	69	44			A	A	A	A	A	A	A						
28		A	A	A	A	A	34	A	B		44	50	56	61	62	73	84	81	74	64	61	43	32	28	21	16											
29		A	F 31	R 25	30	32	A	A		48	58	57	75	88	F 89	96	91	92	81	72	66	52	Z 32	F 32		A	A	R	A	A	R	A					
30		A	A	A	A	A	B			34	38	38	57	60	67	75	83	87	87	78	72	62	46	30	26		A	A	A	A	A	A					
31		A	A	B	A	R	R 40	R 41	44	60	A	B		R 46	F 60	F 73	F 92	F 71	R 80	F 64	51	37		A	R 30	R 23											
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23												
CNT		5	6	4	11	10	12	14	19	28	28	28	29	29	30	30	31	31	31	30	31	24	21	16	9												
MED		20	34	29	35	F 32	36	42	47	47	51	55	58	62	66	70	66	64	59	52	45	37	30	25	24												
U Q		29	39	34	38	F 38	40	46	50	54	58	60	66	71	74	79	71	71	64	55	48	42	35	32	34												
L Q		18	20	25	F 26	F 31	31	39	40	44	48	51	52	58	58	62	59	59	54	50	42	32	26	22	18												

MAR. 2022 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAR. 2022 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	41	49	47	47	50	35	29	36	J A 43	37	29	31	31		G	G E B 31 32	G E B 26 26	24		G	20	19	29	30			
2	37	37	41	48	35	25	18	22	29	29	28	29	31	36	38	31	28	28	35	41	21	18	14	11			
3	54	14	30	18	19	15	17	22		G	26	28	30	30	30	30	28	25	15	G 14	G 11	G 12	28	37			
4	64	57	48	36	20	B	B	31	29	26		G	B	34	46	E B E B 30 32 38		G	G	19	24	38	59	65			
5	55	63	36	57	60	59	53	55	55	43	40		B		G	G E B 27 27 25	32	32	28	104	104	71	80				
6	92	44	38	38	53	B	B	35	40	52		B E B 30	B	B	B	E B E B E B 29 43 30	24	E B 37	20	26	26	41					
7	44	55	53	61	51	52	54		B	36	40	32	32	29	29	32		B	E B 24	E B 21	24	48	46	48	46		
8	37	52	53	50	57	46		32	32	24	E B 27	31	36	32	29	27	27		G	23	21	35	25	27	35		
9	40	32	40		B	58	48	35	22	22	24	29	29	30	32	28	32	34	41	E B E B 34 33	26	21	16	17			
10	35	33	52	51	48	48	36	41	49	42	32		G	28	30	30	32	26		G	20	36	43	84	80	72	
11	56	27	30	80	48	59	52	57	48	46	24		B	B	G E B E B E B 33 36 28 29		G	G	36	42	34	62	42				
12	75	48	56	64	44	54	52	54	54	55	55		B E B 39	G	31	30	27	25		G E B E B 22 24	49	68	62	56			
13	46	64	53	49	40	86	54	56		G	G		G	29	29	29		G		58	49	40	54	57	43	54	
14	58	63	81	55	52	37	55		G	30		G E B E B 38 38	32	31	31	26		G	20	17	13	18	48	48			
15	35	33	38	32	32	57	20		G	24	22	26	29	32	32	29	28	26	23	19	19	14	35	43	38		
16	28	24	47	44	81	57	20	20	21	25	26	28	28	32	30	27	25	20		G	G	12	13	26	48		
17	40	55	80	56	58	44	26	38	30	E B E B 38 32	32	32	E B E B E B E B 32 31 26 23	32	31	26	23	23	E B E B 25 21	19	19	19	41				
18	36	32	38	46	56	56	52	31		G	G	23	29	29	26	26	26		G	37	19	13	14	18	23		
19	28	51	55	54	42	16	34		G	G	G		G	30	E B E B E B 27 29	G E B E B E B 28 26 24	B	24	28	28	24	24	29	36			
20	44	90	37	32	54	48	50		B	61	67	53		E B E B E B 29 38 29	25	G	G		G	18	19	22	23	30	56		
21	59	40	68	59	68	70	42	24	22		G	27	29	29	29	29	20	G	G	17	22	18	15	28	14	66	42
22	45	41	44	36	60	59	59	56	56	40	35	35	31	31	31			25	21	13	13	24	E B 14	30	56		
23	47	77	40	34	36	48	33		G	21	23	26		G	28	28	28	28	23	20	16	10	18	19	32	32	
24	50	33	33	49	57	60	40	40	38	26	28	28	26	28	28	26	E B 25	22	18	14	14	E B 12	53	44			
25	27	58	51	56	56	72	23		B	30		G E B E B E B E B 44 34 34 34	43	37	33	33	26	24	28	21	42	40	56				
26	45	56	34	70	54	42	38	22		G	34	26	26	29	29	23	G	G E B 20	G	20	E B 10	48	80	41			
27	52	36	72	54	22	42	59	50		B	44	30	26	33	37	30	27	27	23	G E B 24	15	48	67	70	41		
28	51	53	58	48	45	28	60		B	53	38	E B E B E B E B 36 31 39	26	G	25	28	24	25	24	14	80	E B 10	57				
29	32	34	58	24	40	31	40	39		G E B E B 24 28	28	24	G	G	31	19	23	36	24	21	17	31	38	31			
30	86	50	48	42	42		26	22	31		G		G	30	22	27		G		E B 23	12	35	78				
31	75	50		B	35	29	32	38	38	52	56		B	36	G E B E B E B E B 29 36 34 24 32	18	18	32	28	22	30						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	31	31	30	30	31	28	28	27	30	31	29	27	29	30	30	31	30	31	31	31	31	31	31	31	31		
MED	45	49	48	48	50	48	39	32	30	26		G E G 29	30	30	30	E G 28		G	22	20	19	22	25	35	42		
U Q	56	56	55	56	57	58	52	41	48	40	34	32	E B 34	32		G	31	28	28	25	28	35	46	59	56		
L Q	37	33	38	36	40	36	28	22	G 21		G	26	29	28	29	28	27	25		G	15	14	18	26	35		

MAR. 2022 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAR. 2022 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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	9	9	10	10	15	12	10	10	26	17	13	14	11	21	18	32	16	26	14	11	9	7	8	9	
2	10	9	12	16	11	10	10	8	10	11	13	14	10	10	10	16	13	10	9	10	6	7	7	7	
3	6	6	9	10	9	9	9	11	8	9	10	12	12	12	11	11	10	9	7	6	6	7	7	9	
4	14	16	12	10	8	31	B	11	11	11	17	41	26	16	26	32	38	17	14	12	11	10	7	8	
5	8	12	15	9	10	22	12	14	14	24	19	40	20	14	14	20	25	11	15	11	10	8	42	8	
6	10	15	12	8	12	B	B	18	15	25	B	30	B	B	B	29	43	30	16	37	12	7	7	8	
7	10	14	12	31	14	21	24	B	37	24	14	19	18	18	12	15	39	12	21	15	9	10	7	10	
8	16	12	12	12	15	10	B	13	12	14	28	18	21	16	14	13	15	16	19	13	11	10	8	10	
9	12	18	15	B	9	15	13	12	13	10	14	17	17	16	18	16	24	28	34	33	20	16	11	10	
10	7	14	16	12	12	15	15	15	24	24	17	17	16	22	16	20	14	14	11	16	13	10	7	7	
11	7	12	7	13	13	10	21	16	14	19	16	B	B	21	36	28	29	12	17	16	10	8	8	9	
12	11	11	10	10	12	15	24	36	14	20	41	B	39	22	14	17	16	19	E B	22	24	10	10	8	8
13	10	16	12	15	12	15	14	14	14	14	12	14	14	14	24	14	16	21	16	15	11	7	7	9	
14	12	9	9	19	10	10	15	21	15	15	11	38	38	19	14	14	14	13	9	10	7	7	6	6	
15	7	6	8	8	8	10	8	10	14	14	14	14	14	15	15	12	14	12	11	10	6	8	8	8	
16	7	12	17	14	16	11	10	13	12	12	12	12	14	16	13	12	17	11	11	10	10	7	7	7	
17	10	10	13	11	17	19	11	14	14	38	32	15	18	32	31	25	23	14	25	21	15	10	10	8	
18	6	8	12	15	12	11	22	14	10	12	13	13	14	14	14	14	14	14	14	10	9	9	8	9	
19	7	8	9	12	12	9	9	10	12	14	10	10	26	29	15	28	24	24	19	16	11	11	9	8	
20	10	9	11	12	8	14	12	B	20	16	17	29	38	29	25	22	16	14	11	9	9	8	6	6	
21	14	7	11	14	32	15	16	11	12	12	12	12	13	15	15	15	13	11	9	8	8	6	10	10	
22	12	11	8	10	12	14	14	33	24	23	10	12	12	16	16	16	16	12	8	7	8	14	10	12	
23	10	10	10	9	9	14	10	9	9	10	10	11	17	16	14	14	13	11	10	9	7	8	11	9	
24	10	7	11	10	17	10	12	12	9	16	14	14	14	12	12	11	25	16	11	7	9	12	13	12	
25	8	11	12	12	14	14	12	B	16	16	44	34	34	34	43	37	33	26	24	28	10	10	8	8	
26	7	8	10	15	12	10	10	10	10	10	13	15	12	14	18	14	16	20	13	10	10	14	10	7	
27	8	6	8	8	8	9	12	10	10	12	12	11	11	15	11	16	11	17	24	9	12	8	6	8	
28	7	24	13	26	14	10	19	B	24	24	37	31	39	26	19	25	28	24	25	24	14	9	10	8	
29	9	8	8	10	10	13	16	16	13	24	28	21	16	19	15	15	12	11	10	14	12	9	10	22	
30	10	18	13	16	16	12	14	14	14	16	16	18	16	17	13	16	16	9	9	7	6	12	13	9	
31	11	10	B	20	24	21	26	17	20	30	B	24	21	29	36	34	24	32	18	10	8	5	10	8	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	
MED	10	10	12	12	12	14	13	14	14	16	14	17	17	16	15	16	16	14	14	11	10	9	8	8	
U Q	11	14	13	15	15	15	21	18	16	24	28	30	26	22	24	25	25	21	19	16	11	10	10	9	
L Q	7	8	9	10	10	10	10	11	11	12	12	13	14	15	14	14	14	11	10	9	8	7	7	8	

MAR. 2022 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAR. 2022 h'F (KM)

45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E 0SWEEP 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	A	A	A	206	218	124	E A 264	214	196	174	214	210	214	214	228	198	204	236	248	A	A	
2	A	A	A	A	A	A	202	212	222	198	198	198	200	E A 214	204	204	204	200	A	216	220	234	218	230	
3	E A 242	E A 270	E A 324	A	318	E A 290	232	234	206	196	192	196	198	198	216	202	202	222	220	212	E A 212	232	258	A	
4	A	A	A	A	A	B	B	E A 308	238	200	H 206	B	216	216	226	226	E B 252	214	214	E A 232	E A 256	A	A	A	
5	A	A	A	A	A	A	A	A	A	A	234	B	E A 228	204	202	222	234	332	322	262	A	A	A	A	
6	A	A	A	A	A	B	B	A	A	A	B	212	B	B	B	232	E B 334	E B 256	210	E B 270	E A 270	E A 318	A	A	
7	A	A	A	A	A	A	A	B	B	E A 244	230	218	218	218	214	228	B	236	246	200	200	A	A	A	
8	A	A	A	A	192	A	B	A	238	220	208	230	E A 248	238	200	200	220	E A 220	A	U B 234	220	E A 226	E A 238	A	
9	A	A	A	B	A	A	A	A	228	H 198	H 202	212	224	216	230	202	218	E A 246	A	E B 232	E B 248	234	248	230	242
10	194	A	A	A	A	A	A	A	A	E A 334	236	218	220	236	E A 216	216	226	224	246	A	A	A	190	198	
11	A	198	A	A	A	A	A	A	A	A	A	B	B	B	E B 264	320	238	238	242	254	A	A	A	A	
12	A	A	A	A	A	A	A	A	A	220	B	B	B	A	214	232	218	E A 262	250	E B 250	E A 236	240	202	A	
13	A	A	A	A	A	A	A	A	228	204	192	232	218	226	334	258	206	A	A	A	A	250	A	A	
14	A	A	A	A	A	A	A	A	200	238	232	B	B	E A 246	234	238	238	E A 238	E A 238	E A 238	246	232	288	A	A
15	A	A	A	A	A	A	A	A	260	232	194	224	E A 224	228	204	216	210	226	226	202	E A 218	220	A	A	A
16	A	248	A	A	A	E A 320	254	236	226	220	220	220	220	E A 220	204	210	228	226	206	216	214	182	A	A	
17	A	A	A	A	A	A	A	A	A	A	B	E B 262	226	208	E B 242	230	218	234	230	230	E B 228	222	228	228	238
18	A	222	A	A	A	A	A	A	234	202	186	222	224	212	200	196	200	186	216	212	208	212	230	A	A
19	192	A	A	A	A	246	238	232	222	206	212	212	224	216	224	216	E B 226	E B 210	E A 222	232	232	A	A	A	A
20	A	A	A	A	A	A	B	A	A	A	A	268	B	232	222	230	230	230	230	230	220	E A 244	E A 270	E A 308	A
21	E B 344	A	A	A	B	A	A	200	232	202	202	228	214	202	202	220	204	218	216	216	212	210	240	E B 264	A
22	A	A	A	A	A	A	A	A	A	A	A	E A 260	244	224	244	230	220	208	220	212	218	258	268	272	A
23	A	A	A	E A 202	280	A	A	A	236	236	202	208	222	198	210	224	216	226	A	198	202	216	224	A	A
24	A	A	A	A	A	A	A	A	E A 280	230	210	218	210	222	222	222	222	E A 224	214	E A 224	244	250	E A 296	E A 336	A
25	A	A	A	A	A	A	A	B	254	244	H 304	E B 276	E B 276	E B 278	248	232	E B 218	E B 222	222	236	A	A	A	A	A
26	A	A	A	A	A	A	E A 280	242	220	222	H 222	210	220	220	220	214	204	208	208	208	A	A	A	A	A
27	E A 334	A	A	A	A	A	A	A	182	264	228	240	216	222	218	258	234	202	216	208	A	A	A	A	A
28	A	A	A	A	194	A	B	A	A	A	B	236	B	204	236	230	224	210	224	E B 226	230	230	250	E A 302	A
29	A	218	A	A	A	A	A	A	204	244	244	230	222	222	E A 228	228	E A 216	A	216	216	208	230	A	A	A
30	A	A	A	A	A	B	A	A	E A 208	290	240	234	226	214	210	224	224	208	200	204	204	204	220	A	A
31	A	A	B	A	A	A	A	A	A	A	B	E A 290	E A 250	E B 240	B	B	234	E B 234	E B 268	284	A	A	A	A	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	5	6	1	2	3	3	4	12	20	23	24	26	25	30	29	30	30	29	29	28	25	20	14	8	
MED	U 218	U 222	E A 324	203	280	U 220	212	229	231	212	215	223	214	220	217	222	220	221	213	212	223	234	230	253	
U Q	339	E A 270			318	E A 290	276	257	238	244	233	232	E A 224	236	229	230	234	233	236	231	236	249	E A 270	E A 305	
L Q	193	218			192	194	204	215	205	202	206	218	210	212	207	216	214	215	210	210	213	229	224	234	

MAR. 2022 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2022 f_{XI} (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E PSWEEP 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	54	56	O X 35	41		54	58	59	72	99	116	130	113	100	72	44	36	71		A	A	A
2	A	A	A	A	A	B	A	A	B	B	B	B	B	X O 50	X O 51	X 54	52	51	51	34	55	59		R	R
3	A	R	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	A O	X	A	B	
4	A	A	A	B	A	A	B	B	B	B	B	B	B	B	B	X 56	B O	X O	X	45	R	A	A O	X 30	
5	A	A	A	A	B	B	B	B	A	B	B	X 61	X O 63	X 60	B O	X 73	B	B	X	X	X	B	A	A	A
6	A	A	B	B	B	B	A	A	A	B	B O	X 60	X 67	X O 82	X O 68	X 92	X 85	B	B O	X 40	B	A	A	B	
7	B	R	A	A	B	B	B	B	B	B	B O	X 56	X 59	X 84	X 83	X 92	X 112	X 110	X	X	A	A	A	A	
8	A	62	A	A	A	A	A	A	A	X	X	X	X	X	X	X	X	S O	X	X	X	X	B	C	
9	C	C	C	C	C	C	C	C	C	C	C	C	C	X 56	X 65	X 72	X 64	X 62	X 52	X 82	91	89	66	O X 35	
10	B	A	A	A	A O	X 24	B	B	B	B	B	B	B	B	X 67	X O 56	X 52	X 47	X 46	X 40	A	O X 59	X 37	A	
11	O X 36	A	A	A	A	A	A	A	A	B	B	X 51	X 56	B	B	B	B	B	63	B	B	B	B	A	X 38
12	A	A	A	A	R	A	A	A	X	X	B	X	B	X	R	B	X	B O	X	B	A	A	B	R	
13	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
14	B	B	B	A	B	R	B	A	A O	X 58	A	B O	X O 55	X 56	B	B	57	B	X 32	B	C	C	C	C	
15	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
16	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
17	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
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	X 24	A	B	A	
19	B	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	B O 34	X	R	A	A	A	A	A	X	X	B	X	X O 67	X 70	X O 91	X 92	X 83	R	X	X	C	C	C	C	C
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	C	B O 104	X 113	X 128	X 114	X 100	X 84	X 71	X 47	X 34	X 25	X	X	R	B
26	C	C O 24	X O 21	X 30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
27	C	C	C	C	C	C	C	C	C	B	81	B	R	X O 107	X O 114	X 101	R O	X O 66	X 66	R	A	B	87	R	
28	63	B	B	R	B	B	R	B	B	A	B	B	A	X 80	X B	X 112	R	102	62	B	A	A	A	68	
29	A	48	54	A	A	A	A	B	B	B	B	B O	X 65	B	B O	X 96	B	X 89	R	B	R	B	A	A	
30	B	A	R	B	C	C	C	A	C	C	B	B O	X 56	B O	X O 63	X 67	X 61	C	40	B	R	A O	X 32	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	2	3	2	2	3	2	1	1	4	6	4	9	12	14	12	16	12	13	16	11	7	6	5	4	
MED	50	48	39	38	O X 30	X 41	X 38	X 49	X 58	X 59	X 60	X 64	X 78	X 78	X 85	X 66	X 66	X 52	X 45	X 39	X 42	X 43	X 36	X	
U Q		62			56			52	58	70	66	68	91	103	98	92	86	61	47	71	59	76	53		
L Q	O X 34				26			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X O	X O	X	

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2022 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	A	A	F 33	R 46	R 29	B 21	B	F 42	52	53	66	R 93	110	124	F 98	F 82	F 56	38	28	A	A	A	A
2	A	A	A	A	B	B	B	A	B	B	B	B	B	44	45	48	46	45	45	28	A	F 44	A	A
3	A	A	A	A	A	A	A	32	41	45	53	59	60	63	68	69	63	60	47	40	A	R 16	A	B
4	A	A	A	B	A	A	B	B	B	B	B	B	B	B	B	50	B	R 54	R 46	39	R	A	A	R 24
5	A	A	A	A	B	B	B	B	A	B	B	J 55	R 57	U 54	R 67	B	B	B	54	40	J 33	R	B	A A
6	A	A	B	B	B	B	A	A	A	B	B	J 54	R 61	U 76	R 62	86	79	B	B	U 34	R	B	A	A B
7	B	R	A	A	22	B	B	B	B	B	B	R 50	53	F 74	77	86	F 99	R 104	F 73	50	A	A	A	A
8	A	A	A	A	A	A	A	A	A	48	50	52	56	63	75	81	71	S	R 44	33	26	20	B	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	50	59	66	58	56	38	62	R	R	R	R 29
10	B	A	A	A	A	18	B	B	B	B	B	B	B	B	F 56	50	46	J 41	R 40	F 26	A	A	31	A
11	R 30	A	A	A	A	A	A	A	A	B	B	45	50	B	B	B	B	F 50	B	B	B	B	B	A 32
12	A	A	A	A	R	A	A	A	40	53	J 48	R	B	69	R	B	49	B	R 24	B	A	A	B	R
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
14	B	B	B	A	B	R	B	A	A	R	A	B	R 49	R 50	B	B	J 51	R 26	J 26	B	C	C	C	C
15	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
16	C	C	C	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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	18	A	B A
19	B	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	B 28	R	R	A	A	A	A	A	45	52	B 61	J 64	R 85	R 86	77	U 55	R 61	48	C	C	C	C	C	C
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	C	B 98	U 107	R 116	F 108	96	78	R 65	F 35	28	19	A	B	
26	C	C	R 18	R 15	F 19	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
27	C	C	C	C	C	C	C	C	C	B 69	F	B	R	101	108	95	R	S	60	R	R	A	B	A R
28	A	B	B	A	B	B	A	B	B	A	B	B	A	74	B	F 93	U 76	R 91	F 44	B	A	A	A	F 32
29	A	A	F 38	A	A	A	A	B	B	B	B	B	U 59	R	B	B	R 90	B	83	R	B	R	B	A A
30	B	A	A	B	C	C	C	A	C	C	B	B	50	B	R 57	61	55	C	F 29	B	R	A	R 26	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	1	1	2	2	3	2	1	1	4	6	4	9	12	14	12	16	14	13	16	11	4	4	2	4
MED	R 30	R 28	28	24	22	24	21	32	42	52	53	54	58	R 72	72	79	60	60	44	35	27	20	28	30
U Q				R 46					44	52	61	60	62	85	97	92	79	80	51	40	30	32		32
L Q				F 19					40	48	52	R 49	52	54	58	64	51	52	38	28	22	18		R 26

APR. 2022 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2022 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	28	35	35	34	32	22	15	49	28	24	E B E B	25	27	E B E B	33	28	41	29	E B E B	29	35	39	42	50				
2	53	56	60	50	58	B	53	52	B	B	B	B	E B E B	32	36	38	E B E B	32	32	20	E B	16	30	33	43	36		
3	39	48	62	56	56	66	39	27	E B E B	E B E B	E B E B	E B	32	28	23	J A G	G	E B E B	E B E B	E B	K	K	B					
4	36	41	60	B	54	54	65	B	B	B	B	B	B	B	E B E B	44	B	E B E B	E B	20	22	44	K	K	32			
5	32	34	28	28	B	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	39	B	E B E B	E B E B	E B	27	B	36	39				
6	42	37	B	B	B	B	44	35	44	B	E B E B	E B E B	E B E B	E B E B	E B E B	23	E B	B	E B E B	E B	B	34	38	B				
7	B	22	37	33	22	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	22	E B E B	E B E B	E B E B	40	30	45	44	65				
8	51	45	54	54	42	46	52	56	54	32	G	22	23	24	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	B	B	C			
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	
10	B	33	46	K	K	J	K	B	B	B	B	B	B	B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B 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	
11	54	66	57	50	52	39	57	54	48	B	E B E B	E B E B	E B E B	B	B	B	B	B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	
12	K	37	38	85	39	23	39	52	34	20	E B E B	E B E B	E B E B	42	30	B	G	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	
13	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
14	B	B	B	B	B	B	B	B	E B	E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	
15	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	
16	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	
17	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	
18	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	
19	B	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	
20	B	43	24	31	50	59	56	56	47	B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
22	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
25	C	C	C	C	C	C	C	C	C	C	C	C	C	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	
26	C	C	16	14	13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
27	C	C	C	C	C	C	C	C	C	B	G	27	27	25	24	21	13	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	
28	40	E B E B	61	32	71	B	28	B	B	B	B	B	65	40	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	
29	62	51	35	66	58	58	66	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 E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	
30	B	78	31	B	C	C	C	49	C	C	B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	
31																												
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	11	15	15	14	13	10	11	10	9	6	5	9	13	14	13	16	15	14	17	12	16	14	15	14				
MED	40	41	42	36	50	42	52	49	47	28	25	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B 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	
U Q	53	51	60	50	57	58	57	54	55	37	40	43	42	39	36	46	41	27	28	29	34	44	44	44	50			
L Q	36	34	31	31	24	22	39	35	G	24	24	E B	26	30	29	24	30	26	19	17	16	22	25	36	32			

APR. 2022 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2022 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	9	9	11	10	10	8	9	36	14	12	25	27	56	34	28	41	16	23	20	8	8	8	20	10
2	14	14	25	11	38	B	38	21	B	B	B	B	B	32	36	38	32	32	20	16	10	14	26	17
3	15	20	14	10	16	22	20	22	24	28	24	34	27	19	16	16	17	17	38	15	13	12	16	B
4	17	18	17	B	16	20	42	B	B	B	B	B	B	B	B	44	B	44	36	14	13	10	10	10
5	10	14	14	14	B	B	B	B	29	B	B	34	48	36	B	39	B	B	23	21	27	B	13	15
6	14	18	B	B	B	B	14	18	30	B	B	46	42	33	47	16	49	B	B	27	B	8	10	B
7	B	15	10	14	17	B	B	B	B	B	B	40	37	36	13	46	41	25	25	12	6	10	15	10
8	18	12	10	9	15	17	17	24	29	15	14	14	16	19	26	45	16	17	25	10	11	10	B	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	37	39	49	16	16	6	10	7	8	8	9
10	B	10	11	11	8	11	B	B	B	B	B	B	B	B	25	36	33	16	18	11	8	6	7	13
11	10	15	25	14	26	15	10	18	23	B	B	38	34	B	B	B	B	17	B	B	B	B	15	14
12	11	14	10	8	15	12	7	9	10	10	B	24	17	16	B	18	B	16	B	B	14	7	B	9
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
14	B	B	B	B	B	B	B	18	20	38	22	B	39	46	B	B	43	B	7	B	C	C	C	C
15	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
16	C	C	C	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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	10
19	B	11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	B	10	9	10	20	19	14	14	10	36	B	56	42	29	26	22	34	17	13	C	C	C	C	C
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	C	B	15	39	28	36	29	19	36	16	12	11	7	B
26	C	C	9	8	9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
27	C	C	C	C	C	C	C	C	C	B	15	B	12	14	14	11	8	22	21	7	9	B	16	11
28	14	B	61	13	35	B	12	B	B	B	B	B	42	40	B	38	60	22	10	B	8	10	15	8
29	14	7	8	11	10	9	32	B	B	B	B	B	36	B	B	71	B	36	10	B	12	B	19	14
30	B	36	13	B	C	C	C	13	C	C	B	B	42	B	37	55	39	C	15	B	14	10	11	11
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	17	17	17	17	16	15	15	16	15	16	17	18	18	19	19	19	19	18	19	18	18	18	18	17
MED	15	14	13	11	16	19	20	23	29	B	B	B	42	36	36	41	34	22	20	16	12	10	15	11
U Q	B	19	25	14	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
L Q	12	10	10	10	12	11	12	18	20	32	24	34	34	29	25	36	17	17	13	11	8	8	10	10

APR. 2022 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2022 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	A	A	A	A	B	E	A	E	A	E	B	B	E	B	E	B	B	A	A	A	A	A	
2	A	A	A	A	B	B	B	A	B	B	B	B	B	B	E	B	E	B	E	B	E	B	A	A	A	
3	A	A	A	A	A	A	A	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	A	A	B	
4	A	A	A	B	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	E	A	A	A	A	
5	A	A	A	A	B	B	B	B	A	B	B	E	B	B	B	B	B	B	B	B	E	B	B	A	A	
6	A	A	B	B	B	B	A	A	A	B	B	B	B	E	B	B	B	B	B	B	B	B	A	A	B	
7	B	A	A	A	B	B	B	B	B	B	B	B	E	B	B	B	B	E	B	E	B	A	A	A	A	
8	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
9	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	
10	B	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	E	A	A	A	A	
11	198	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	
12	A	A	A	A	A	A	A	A	E	A	E	A	B	E	A	A	B	A	B	B	B	A	A	B	A	
13	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	
14	B	B	B	A	B	R	B	A	A	E	B	A	B	B	B	B	B	B	B	A	B	C	C	C	C	
15	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	
16	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	
17	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	
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	E	A	A	B	
19	B	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
20	B	A	A	A	A	A	A	A	A	E	B	B	E	B	E	B	E	B	B	B	B	C	C	C	C	
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
22	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
25	C	C	C	C	C	C	C	C	C	C	C	B	E	B	218	240	214	214	206	240	214	224	212	242	B	A
26	C	C	136	A	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
27	C	C	C	C	C	C	C	C	C	B	A	B	A	E	A	E	A	A	A	E	B	A	A	B	A	
28	A	B	B	A	B	B	A	B	B	B	B	B	B	A	E	B	B	E	B	E	B	B	A	A	A	
29	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	A	B	A	B	A	
30	B	A	A	B	C	C	C	A	C	C	B	B	B	B	B	B	E	B	E	A	C	B	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	1		1		1				3	5	3	6	5	12	11	11	10	12	15	9	4	4		1		
MED	198		136		192				E	A	E	B	272	244	244	258	235	246	236	234	229	226	221	242	221	
U Q									E	B	E	B	292	279	250	290	292	268	278	250	250	271	266	282	278	
L Q									E	A	E	A	272	232	244	234	225	236	226	216	212	228	214	212	213	

APR. 2022 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2022 f_{XI} (0.1MHz)

45°E MEAN TIME (G.M.T. + 3 H)

LAT.69°00.4'S LON.039°35.4'E pSWEEP 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	A	A	A	A	A	A	B	B	X	X	X	X	X	X	X	B	X	A	A	O	X	X			
2	A	A	A	X	A	A	A	42	38	51	64	80	92	112	100	85	63	42	46	48	30	O	X	A	A			
3	A	A	A	O	X	A	A	A	B	A	X	B	82	96	107	107	115	C	O	X	B	B	B	A	A			
4	A	B	B	A	B	A	A	A	C	B	60	75	O	X	X	X	X	X	X	X	A	O	X	A	A			
5	A	42	A	A	A	32	34	34	X	O	X	51	61	69	84	86	93	91	62	57	47	44	27	O	X	X	A	
6	48	A	A	37	A	X	29	46	54	O	X	X	B	B	B	C	C	C	C	C	C	X	C	A	A			
7	A	A	A	B	R	A	A	A	A	B	X	58	74	78	78	86	88	62	47									
8	C	C	C	B	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
9	A	A	A	C	61	A	A	58	A	A	B	A	O	X	C	X	O	X	X	X	O	X	A	A	A	A		
10	A	A	A	57	44	R	A	B	B	X	46	72	70	88	91	89	74	44	38	34	B	O	X	O	X	X	C	
11	40	60	A	A	A	A	A	A	X	X	X	O	X	C	X	X	R	67		C	X	X	O	X	A	A		
12	A	64	A	B	A	A	A	B	A	A	A	55	73	67	60	38	59	51	39		B	A		R	A			
13	X	64	O	X	B	B	A	B	X	X	X	C	76	82	96	C	70	C	C	C	C	C	C	A	A			
14	B	A	A	A	O	X	C	B	A	A	C	O	X	O	X	76	90			R	O	X	C	C	C	C		
15	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		
16	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		
17	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		
18	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		
19	C	C	C	C	A	A	B	A	O	X	54	54	64	63	C	X	X	B		O	X	X	C	X	O	X	A	X
20	A	R	A	A	A	C	A	A	B	B	B	X	69	C	B	B	B	B	B	O	X	B	B	A	A	C		
21	C	C	A	A	83	B	80	A	B	B	B	B	B	C	X	X	X			R	B	B	B	O	X	A		
22	A	B	A	A	A	A	A	B	A	B	B	B	B		97	88	87	91		X	O	X	C	C	C	C		
23	R	R	44	A	C	R	A	X	X	O	X	C	C	C	C	100	C	C	C	C	C	C	C	B	C			
24	C	C	C	R	O	X	O	X	B	C	B	X	57	82	82	84	90	84		B	O	X	C	C	C	B	B	
25	A	R	B	R	R	A	A	A	B	A	C	89	85	110	80	61			B	58	B	C	B	C	A	C		
26	C	47	C	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	O	X	A	
27	B	R	B	R	56	58	58	45	B	X	X	O	X	R	C	C	C	C	C	C	C	C	C	A	A	A		
28	O	X	X	A	A	R	O	X	X	B	B	C	C	B	C	C	O	X	53	B	C	C	B	A	B	A	R	
29	42	40	B	C	A	A	R	B	B	C	B	B	O	X	X	60	84	95	82	X	B	R	O	X	B	B		
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	C	R	R	A	C	C	A	A	B	B	B	B	B	B	B	C	C	C	C	C	C	C	A	R	R	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	2	4	6	5	6	7	7	10	10	15	14	17	19	15	15	14	11	8	7	9	4	3				
MED	48	51	43	42	52	X	46	44	45	X	X	X	80	86	88	85	64	54	43	41	27	26	26	28				
U Q	X	60		52	61	52	58	54	54	X	X	80	87	102	96	91	79	58	47	46	32	46	28	34				
L Q	41	42	34	48	29	X	34	42	O	X	X	X	X	X	X	X	O	X	X	X	X	X	O	X	O	X	X	

MAY 2022 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2022 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT.69°00.4'S LON.039°35.4'E PSWEEP 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	A	A	A	A	A	A	B	B	47	64	74	F 77	81	68	48	B	21	A	A	R 21	R 18
2	A	A	A	41	A	A	A	F 30	32	45	58	74	86	106	94	Z 76	57	36	40	30	24	16	R A	A
3	A	A	A	R 25	A	A	A	B	A	41	B	F 71	F 82	J 101	R 101	109	C	R 52	B	B	B	B	A	A
4	A	B	B	A	B	A	A	A	C	B	F 51	F 64	R 81	108	109	F 96	73	F 61	47	J 24	R A	R 16	A	A
5	A	A	A	A	A	F 23	F 22	28	22	40	48	58	72	80	87	85	56	34	41	30	21	14	R 20	A
6	A	A	A	F 26	A	23	F 28	F 21	22	41	B	B	B	C	C	C	C	C	C	C	C	19	C	A
7	A	A	A	B	A	A	A	A	A	B	52	F 60	F 64	72	80	82	56	41	B	B	C	C	C	C
8	C	C	C	B	B	C	C	C	C	C	C	C	C	C	C	C	F 76	F 46	F 38	F 35	A	A	A	A
9	A	A	A	C	A	A	A	A	A	A	B	A	R 46	C	58	48	53	38	35	22	A	A	A	A
10	A	A	A	A	30	R	A	B	B	40	58	F 64	F 78	85	83	68	38	26	28	B	R 18	R 19	R 13	C
11	A	A	A	A	A	A	A	A	52	49	53	58	R C	80	80	48	56	C	32	32	19	19	R A	A
12	A	A	A	B	A	A	A	B	A	A	A	51	F 60	61	54	32	53	45	33	B	A	A	R	A
13	58	42	36	R B	B	A	B	38	42	40	50	C 63	F 76	90	52	62	C	C	C	C	C	R 28	A	A
14	B	A	A	A	R 43	C	B	A	A	C	C	R 66	U 66	R 62	F 74	F C	D 48	C 30	R 27	C	C	C	C	C
15	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
16	C	C	C	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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
19	C	C	C	C	A	B	A	R 48	F 40	F 52	57	C	80	J 64	R B	B	F 48	U 35	R 37	D 31	C 26	20	A	28
20	A	A	A	A	A	C	A	A	B	B	B	D 62	C 57	B	B	B	B	B	R 37	B	B	A	A	C
21	C	C	A	A	A	B	A	A	B	B	B	B	C	79	81	65	Z 58	Z 50	R	B	B	B	R 24	A
22	A	B	A	A	A	A	A	B	A	B	B	B	B	F 73	82	81	85	B	C	C	C	C	C	C
23	A	R	A	A	C	A	A	38	39	37	C	C	C	C	D 94	C 82	C	C	C	C	C	C	B	C
24	C	C	C	R	F 32	R 23	R 25	B	C	B	51	76	76	78	84	78	B	R 34	C	C	C	C	B	B
25	A	R	B	R	R	A	A	A	B	A	C	F 67	F 74	F 77	F 70	F 50	B	F 47	B	D 24	C	B	C	C
26	C	F 37	C	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	R 22
27	B	A	B	R	F 40	F 30	F 46	F 20	B	24	53	53	R	C	C	C	C	C	C	C	C	C	A	A
28	R 45	46	A	A	R 39	R 39	B	B	C	C	C	B	36	C	C	47	B	C	C	B	A	B	A	A
29	A	A	B	C	A	A	R	B	B	C	B	B	R	54	78	82	76	B	R	38	R	A	B	B
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	C	R	R	A	C	C	A	A	B	B	B	B	B	B	C	C	C	C	C	C	A	R	R	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	2	3	1	3	4	5	5	6	7	10	10	15	15	17	19	18	16	15	11	10	6	7	4	3
MED	52	42	R 36	26	36	23	F 28	29	39	40	52	U 62	69	78	81	78	57	41	37	30	20	R 19	R 20	R 22
U Q		46		41	42	34	42	38	48	41	53	67	78	82	90	82	70	48	40	32	24	20	22	28
L Q		F 37		R 25	31	23	24	F 21	R 22	40	51	57	60	72	74	R 50	53	34	32	24	19	R 16	R 16	R 18

MAY 2022 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2022 ftEs (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT.69°00.4'S LON.039°35.4'E PSWEEP 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	30	68	54	55	64	45	57	59	34	B	B	B	B	B	B	B	B	B	B	B	35	34	17	E B				
2	34	36	43	68	51	45	38	18	G	E	B	B	B	B	G	B	B	G	K	E	B	B	9	16	34	36		
3	34	29	32	22	53	58	50		B	G	B	B	B	B	B	B	C	E	B	B	B	B	B	31	36			
4	36	B	B	37	B	29	32	61	C	B	B	B	B	B	B	B	B	B	B	B	B	51	56	37	29			
5	34	57	88	57	35	16	48	14	60	30	31	26	E	B	23	23	16	E	B	B	B	B	B	11	40	22	62	
6	38	30	34	25	36	14	E	B	B	B	B	B	B	C	C	C	C	C	C	C	68	C	29	26				
7	36	36	23	B	G	16	52	58	44	46	B	23	27	22	22	29	23	14	E	B	B	C	C	C	C			
8	C	C	C	B	B	C	C	C	C	C	C	C	C	C	C	C	C	22	21	E	B	13	33	46	49	42		
9	41	35	G	C	53	46	53	58	67	51	B	53	45	C	E	B	B	B	B	B	30	34	29	32	37			
10	38	40	35	K	K	22	29	47	B	B	E	B	B	G	23	23	E	B	B	B	B	B	22	30	29	C		
11	28	51	51	58	52	52	60	53	46	42	36	49	C	E	B	B	B	B	B	C	14	15	46	15	38	48		
12	48	47	48	B	53	48	54	B	E	B	56	37	G	22	20	16	14	22	17	K	E	B	31	32	26	39		
13	41	29	49	B	B	46	B	31	E	C	G	E	C	C	E	C	E	C	C	E	C	C	C	44	63	55		
14	B	60	42	58	D	C	D	C	B	48	40	C	E	C	E	B	E	B	E	C	C	C	C	C	C	C		
15	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		
16	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		
17	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		
18	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		
19	C	C	C	C	53	48	B	52	49	30	G	E	B	C	E	B	B	B	E	B	E	B	E	B	27	44	46	
20	42	30	52	72	50	C	50	51	B	B	B	B	E	B	B	B	B	B	B	E	B	B	B	30	31	C		
21	C	C	61	42	56	B	59	63	B	B	B	B	C	E	B	B	B	B	E	B	B	B	B	B	B	28	34	
22	33	B	27	40	56	56	56	B	53	B	B	B	B	E	B	B	B	E	C	B	C	C	C	C	C	C		
23	26	18	K	27	37	C	28	40	52	16	20	C	C	C	E	B	E	C	C	C	C	C	C	C	B	C		
24	C	C	D	23	25	K	21	21	48	B	C	B	E	B	E	B	E	B	E	B	E	B	C	C	C	B	B	
25	38	26	B	26	26	47	52	49	B	54	C	E	B	E	B	E	B	E	B	B	B	B	29	35	C			
26	C	31	C	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	25		
27	B	25	B	E	B	24	24	24	11	E	B	B	E	B	E	B	B	C	C	C	C	C	C	C	C	35	48	
28	47	87	84	48	27	38	18	B	B	C	C	B	B	C	C	E	B	B	C	C	B	40	B	43	30			
29	33	33	B	C	55	42	28	B	B	C	B	B	B	E	B	E	B	E	B	B	B	30	33	16	41	B	B	
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	C	36	42	58	C	C	69	58	B	B	B	B	B	B	C	C	C	C	C	C	C	41	29	25	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	18	20	19	18	20	21	21	17	14	13	11	16	16	17	19	18	16	15	13	10	14	15	19	16				
MED	36	36	42	41	51	45	50	51	43	25	E	B	E	B	E	B	E	B	E	B	E	B	E	B	34	30	32	36
U Q	41	49	52	58	53	48	56	58	53	46	36	36	34	38	29	34	23	24	19	17	16	41	41	38	47			
L Q	33	30	27	26	26	28	35	24	22	G	E	B	E	B	E	B	E	B	E	B	E	B	E	B	29	28	30	

MAY 2022 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2022 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	10	19	20	15	10	10	13	13	B	B	38	35	35	36	24	20	16	B	16	24	7	6	16	
2	8	8	8	12	15	20	13	10	10	38	39	20	20	14	19	13	8	8	9	9	9	9	7	8	
3	11	10	10	11	24	8	10	B	22	17	B	36	28	23	23	15	C	46	B	B	B	B	12	12	
4	12	B	B	20	B	15	14	9	C	B	32	31	74	46	45	38	36	32	20	16	17	11	8	6	
5	6	12	15	15	12	11	10	11	14	18	16	15	25	8	12	11	10	14	12	10	11	8	8	8	
6	9	14	10	9	8	8	11	10	18	16	B	B	B	C	C	C	C	C	C	C	11	C	9	18	
7	16	14	10	B	12	11	10	10	15	B	16	17	14	16	14	10	8	10	B	B	C	C	C	C	
8	C	C	C	B	B	C	C	C	C	C	C	C	C	C	C	C	12	12	11	9	8	12	10	15	
9	9	19	16	C	20	13	21	17	21	24	B	35	41	C	39	24	24	18	15	14	17	8	7	8	
10	7	9	13	11	13	9	10	B	B	20	18	18	15	16	16	16	15	15	12	B	10	8	7	C	
11	8	8	10	14	32	32	16	12	12	16	36	49	C	19	18	30	18	C	8	8	12	15	10	10	
12	14	12	16	B	24	18	19	B	15	32	19	16	19	16	10	16	14	18	17	B	13	10	9	15	
13	12	16	10	B	B	16	B	11	22	8	20	C	34	37	12	24	16	C	C	C	C	8	9	10	
14	B	19	11	19	24	14	B	14	14	C	C	36	36	26	E	C	C	19	22	11	C	C	C	C	
15	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
16	C	C	C	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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
19	C	C	C	C	138	16	B	33	17	15	15	24	C	38	26	B	13	30	12	12	13	8	8	9	
20	12	12	12	14	10	C	13	14	B	B	B	12	26	B	B	B	B	B	25	B	B	9	10	C	
21	C	C	19	29	26	B	24	23	B	B	B	B	C	52	19	21	20	10	12	B	B	B	9	10	
22	8	B	10	11	33	16	14	B	30	B	B	B	B	34	29	39	E	C	B	C	C	C	C	C	
23	11	11	9	10	C	12	8	8	9	8	C	C	C	C	29	39	C	C	C	C	C	C	B	C	
24	C	C	11	12	8	10	11	B	C	B	19	24	19	16	14	16	B	19	C	C	C	C	B	B	
25	12	12	B	13	11	21	12	10	B	9	C	28	23	22	18	27	B	24	B	10	B	11	11	C	
26	C	10	C	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	8	
27	B	10	B	10	26	6	9	11	B	B	13	18	22	10	C	C	C	C	C	C	C	C	15	11	
28	11	7	11	10	16	18	14	B	B	C	C	B	20	C	C	34	B	C	C	B	13	B	8	8	
29	8	8	B	C	12	24	16	B	B	C	B	B	B	41	29	40	25	B	11	8	8	10	B	B	
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	C	19	24	36	C	C	30	19	B	B	B	B	B	B	C	C	C	C	C	C	8	10	16	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	20	22	23	23	23	22	24	24	22	21	20	22	20	19	20	20	20	18	17	17	18	18	22	19	
MED	11	12	12	14	20	14	14	14	22	24	38	33	27	26	20	24	19	18	12	16	13	10	9	10	
U Q	12	16	19	36	32	18	20	B	B	B	B	B	58	41	32	38	58	32	B	B	B	24	12	12	16
L Q	8	10	10	11	12	10	10	10	14	16	18	20	20	16	15	16	14	14	11	10	10	8	8	8	

MAY 2022 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2022 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	A	A	A	A	A	A	B	BE B	BE B	E B	E B	220	224	218	222		BE B	A	A	A	208	
2	A	A	A	A	A	A	A	A	E	AE	BE B	BE B	226	226	A	204	196	192	194	220	206	218	E A	A	
3	A	A	A	A	A	A	A	B	A		B	222	222	218	220	202		C	E B	B	B	B	A	A	
4	A	B	B	A	B	A	A	A	C	B	E B	E B	E B	E B	E B	212	212	208	214	E B	A		A	A	
5	A	A	A	A	A	E	AE	AE	AE	A	AE	AE	AE	A			194	210	232	210	E B			A	
6	A	A	A	A	A	A	E	B	B	BE	B	B	B	B	C	C	C	C	C	C	C	238	C	A	
7	A	208		B	A	A	A	A	A	BE	AE	AE	AE	A	A					B	B	C	C	C	
8	C	C	C	B	B	C	C	C	C	C	C	C	C	C	C	C	202	216	250	238		A	A	A	
9	A	A	A	C	A	A	A	A	A	A	B	A	B	C		E B	232	234	214	234	E A	A	A	A	
10	A	A	A	A	A	A	A	B	BE	B	252	232	206	210	204	204	208	198	E B	BE	AE	AE	A	C	
11	A	A	A	A	A	A	A	A	AE	AE	BE	BE	B	C	220	212	216	224	C		A	198	A	A	
12	A	A	A	B	A	A	A	B	A	A	AE	AE	AE	A	274	246	212	226	228	238	242	238	B	A	
13	200		A	B	B	A	B	AE	CE	AE	CE	C	CE	CE	CE	A	218	202	C	C	C	C	A	A	
14	B	A	A	A	A	A	B	A	A	C	CE	C	244	216	218	232		202	198	E A	C	C	C	C	
15	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
16	C	C	C	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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
19	C	C	C	C	A	A	B	A	AE	AE	A		CE	E B		B	188	E B	E B	E B	244	E A	A	A	
20	A	A	A	A	A	C	A	A	B	B	B	236	E B	B	B	B	B	B	218	B	B	A	A	C	
21	C	C	A	A	A	B	A	A	B	B	B	B	C	226	214	210	210	220	A	B	B	B	210	A	
22	A	B	A	A	A	A	A	B	A	B	B	B	BE	B		E	BE	C	B	C	C	C	C	C	
23	A	A	A	A	C	A	A	AE	AE	A	C	C	C	CE	E B		C	C	C	C	C	C	B	C	
24	C	C	A	A	A	A	B	C	BE	B	252	220	202	220	212	214		BE	B	C	C	C	B	B	
25	A	A	B	A	A	A	A	A	B	A	CE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	A	A	C	
26	C	248	C	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	218	
27	B	A	B	A		AE	A		BE	BE	BE	BE	B	A	C	C	C	C	C	C	C	C	A	A	
28	208	202	A	A	A	A	B	B	C	C	BE	A	C	C	CE	B		B	C	C	B	A	B	A	
29	A	A	B	C	A	A	A	B	B	C	B	B	BE	BE	B		A	B	AE	A	R	A	B	B	
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	C	A	A	A	C	C	A	A	B	B	B	B	B	B	C	C	C	C	C	C	C	A	A	A	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	2	3	1		2	1	4	2	3	10	10	15	14	16	19	18	15	15	11	10	5	7	3	2	
MED	204	208	266		260	E	AE		E	AE	E	E	236	219	U	202	216	212	202	214	219	E	234	234	
U Q		248				E			E	AE	AE	E	BE	E	B		E	B		E	B	E	A	E	A
L Q		202					261		E	CE	BE	E	220	216	215	212	210	196	210	214	218	224	202	186	

MAY 2022 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2022 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	R	C	A	A	C	C	C	C	C	C	B	B	B	B	B	B	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	X 38	X 35	B 0	X 51	B	B	X 64	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
15	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
16	C	C	C	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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
19	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
26	C	C	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	A
28	A	A	B	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	44	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									1	1		1			1								1	
MED									X 38	X 35		0 X 51				X 64							44	
U Q																								
L Q																								

JUN. 2022 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2022 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	R	C	A	A	C	C	C	C	C	C	B	B	B	B	B	B	C	C	C	C	C	C	C	
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
3	C	C	C	C	C	C	C	C	32	29		BU R 45	B	B	58		C	C	C	C	C	C	C	C	
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
12	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
15	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
16	C	C	C	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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
19	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
20	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
22	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
26	C	C	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	A	A
28	A	A	B	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	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									1	1		1			1										
MED									32	29		U R 45			58										
U Q																									
L Q																									

JUN. 2022 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2022 ftEs (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E pSWEEP 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	54	36	C	52	41	C	C	C	C	C	C	B	B	B	B	B	B	C	C	C	C	C	C	C	
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
3	C	C	C	C	C	C	C	C	44	38	C	BE	B	B	BE	B	C	C	C	C	C	C	C	C	
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
12	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
15	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
16	C	C	C	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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
19	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
20	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
22	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
26	C	C	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	33	32
28	40	44	B	36	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	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	2	2		2	1				1	1		1			1								1	1	
MED	47	40		44	41				44	38		E	B		E	B						33	32		
U Q																									
L Q																									

JUN. 2022 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2022 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	22	C	17	15	C	C	C	C	C	C	B	B	B	B	B	B	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	12	10	B	B	B	B	34	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
15	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
16	C	C	C	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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
19	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
26	C	C	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	8
28	10	13	B	20	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	10
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	2	2	2	2	1				1	1	1	2	2	2	2	1	1					1	1	1
MED	11	18	B	18	15				12	10	B	B	B	B	B	B	B				B	8	10	
U Q																								
L Q																								

JUN. 2022 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2022 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	C	A	A	C	C	C	C	C	C	B	B	B	B	B	B	C	C	C	C	C	C	C	
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
3	C	C	C	C	C	C	C	C	E	A	A	B	A	B	B		C	C	C	C	C	C	C	C	
4	C	C	C	C	C	C	C	C	3	1	2	2	7	8		2	1	4							
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
12	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
15	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
16	C	C	C	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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
19	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
20	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
22	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
23	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
26	C	C	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	A	A
28	A	A	B	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	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									1	1					1										
MED									E	A	A				2	1	4								
U Q									3	1	2	7	8												
L Q																									

JUN. 2022 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUL.2022 fXI (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT.69°00.4'S LON.039°35.4'E OSWEEP 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	40	X	47	56	56	49	38	X	A	A	A	A	A	A	A		
2	51	90	A	92	A	58	77	A	A	A	A	A	A	A	A	49	48	54	A	A	A	43	A	A	A		
3	A	X	48	55	A	A	A	A	X	X	X	X	X	O	X	56	58	58	A	O	X	A	O	X	X		
4	X	51	X	38	52	54	A	A	A	A	68	A	O	X	49	52	52	46	44	39	48	A	O	X	A		
5	A	A	A	A	A	A	A	A	A	A	X	X	X	O	X	54	62	45	O	X	B	A	A	O	X	A	
6	O	X	41	A	A	A	A	A	X	X	37	42	37	48	49	X	X	O	X	30	31	X	O	X	A	B	
7	R	R	A	A	A	33	41	A	41	O	X	X	X	64	68	47	55	43	R	40	24	A	A	A	82	69	
8	A	92	A	A	A	A	84	A	A	O	X	A	B	X	X	X	X	34	A	A	A	A	A	A	53	47	
9	A	A	A	A	A	X	27	34	34	33	F	O	X	O	X	X	X	X	B	X	B	B	A	A	A	A	
10	A	A	A	A	A	X	29	X	X	X	X	X	X	O	X	86	73	57	X	B	49	47	A	A	A	A	
11	A	A	A	46	46	A	39	49	27	24	45	59	61	65	70	55	40	35	46	37	26	78	A	A	A		
12	A	A	A	A	A	80	A	A	A	A	A	52	48	55	62	58	56	58	O	X	A	A	A	66	60		
13	A	A	A	A	A	A	A	A	A	X	X	X	X	X	X	X	X	X	O	X	A	B	A	A	A		
14	A	A	A	B	A	A	B	X	O	X	X	X	X	X	X	X	X	X	O	X	A	A	A	A	O	X	
15	A	A	A	A	A	A	A	A	A	X	X	X	X	X	X	X	X	X	O	X	A	A	A	A	O	X	
16	A	A	A	A	A	A	A	A	A	A	X	B	X	O	X	O	X	58	41	B	B	R	A	A	R		
17	A	A	O	X	40	63	A	A	A	O	X	37	42	56	68	72	75	74	56	50	48	32	A	B	B	B	A
18	A	A	A	A	32	27	30	30	44	44	57	58	78	74	72	65	60	A	O	X	A	A	A	A	A	A	
19	A	A	A	A	56	A	A	60	56	X	A	B	B	R	B	108	114	79	46	A	A	A	A	A	74	A	
20	60	46	A	A	A	62	A	68	A	O	X	A	X	X	X	X	O	X	B	O	X	A	A	A	A	A	
21	A	A	56	A	O	X	30	A	41	38	38	48	58	62	66	79	90	67	O	X	B	80	A	A	40	A	
22	A	A	64	A	A	A	A	A	A	A	A	A	40	B	X	X	X	X	O	X	X	O	X	A	O	X	A
23	A	52	A	A	A	A	A	A	A	49	55	42	O	X	B	O	X	X	X	X	X	B	A	A	A	O	X
24	A	A	A	A	A	A	A	A	A	A	X	B	X	O	X	X	X	X	X	X	A	B	X	A	A	R	
25	A	A	A	A	A	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X	O	X	A	A	A	A	
26	A	O	X	50	A	A	A	A	A	A	47	46	56	58	63	84	62	42	X	O	X	A	R	A	A	A	
27	A	A	A	A	A	A	A	A	A	A	A	B	X	X	X	X	X	X	X	O	X	B	B	A	A	A	
28	A	O	X	52	A	A	A	X	A	A	A	A	A	A	X	X	X	X	X	B	B	B	A	A	A	58	
29	A	A	A	A	A	A	A	X	A	A	A	A	A	X	X	X	X	X	X	A	A	A	A	A	A	A	
30	42	A	A	A	A	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X	O	X	O	X	A	A	
31	A	46	A	A	A	A	A	42	34	B	51	58	57	58	51	50	44	34	30	36	A	A	A	A	A	A	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	5	9	5	5	4	7	8	11	16	20	21	25	27	29	31	31	30	22	22	8	7	7	7	6			
MED	51	50	55	63	39	33	38	38	38	36	46	54	59	64	63	56	46	42	34	32	26	42	60	53			
U Q	56	71	60	80	51	62	59	49	43	39	50	58	64	70	74	62	54	48	46	36	43	66	74	58			
L Q	42	46	46	50	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	O	X	O	X	44	47

JUL.2022 fXI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUL.2022 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	F	F	F	Z	F		A	A	A	A	A	A	A	A
2	A	A	A	A	A	A	A	A	A	A	A	A	A	A	43	42	35	F	A	A	A	A	A	A
3	A	42	A	A	A	A	A	A	A	J	R	F	R	F	F	F	A	R	A	R	R	U	R	47
4	45	32	A	A	A	A	A	A	A	A	A	R	F	F	40	38	33	36	F	A	R	U	R	A
5	A	A	A	A	A	A	A	A	A		21	32	J	R	U	R	F	F	R	B	A	A	R	A
6	R	35	A	A	A	A	A		F	F	F	F	Z	F	Z	R	Z	Z	34	18	A	A	A	B
7	A	A	A	A	A		F	A	A	R	18	30	46	47	62	41	49	37	R	A	A	A	A	A
8	A	A	A	A	A	A	A	A	A	R	22			31	30	32	35	28	A	A	A	A	A	A
9	A	A	A	A	A		F	F	F	F	F		U	R	F			B	J	R	B	B	A	A
10	A	A	A	A	A		21	21	23	23	22	31	47	54	50	52	40	42		B	F	F	A	A
11	A	A	A	A	A		23	25	32	23	22	29	40	U	R	F	F		30	32			A	A
12	A	A	A	A	A		F	F					Z						F	F	F	R	A	A
13	A	A	A	A	A		A	A	A	A	A		F	F	49	56	48	50	44	32		A	B	A
14	A	A	A	B	A		A	B		R	24	36	50	62	63	57	60	44	41	43		A	A	A
15	A	A	A	A	A		A	A		17	19	26	42	58	63	73	58	49	31	29	23		A	A
16	A	A	A	A	A		A	A		30	27	39	53	66	65	66	55	46	46	33	14		A	A
17	A	A	R	A	A		A	A		A	A	32	58	54	54	44	42	27	F	B	B	A	A	A
18	A	A	34	A	A		A	A		31	27	F	F	F	F	Z	F	F	R	A	B	B	B	A
19	A	A	A	A	A		21	24	24	F	38	38	52	72	56	61	59	54	A	U	R	A	A	A
20	A	A	A	A	F		A	A		F	44	50	A	B	R	B	R	F	A	A	A	A	A	A
21	A	A	A	A	A		A	A		A	A	R	A					B	F	R	A	A	A	A
22	A	A	F	A	A		A	A		F	31	28	32	42	52	56	60	73	84	F	R	B	A	A
23	A	A	38	A	A		A	A		A	A	A		B	B			Z	F	R	R	A	R	A
24	A	A	A	A	A		A	A		A	A	F	39	36			52	66	50	48	37	31		47
25	A	A	A	A	A		A	A		A	A	B							F	F	A	B	J	R
26	A	R	A	A	A		A	A		A	A	F	26	48	48	52	56	68	46	32	29	22		A
27	A	44	A	A	A		A	A		A	A	F	37	40	50	52	57	67	56	36	26	24		R
28	A	A	A	A	A		A	A		A	A	B							R	B	B	A	A	A
29	A	R	A	A	A		A	A		A	A	A		41	54	64	56	53	39	24	24			A
30	A	46	A	A	A		30			A	A	A		44	52	47	49	41	39	B	B	B	A	A
31	A	A	A	A	A		A			F	F	F	J	R	F	J	R		F	F	A	A	A	A
	A	A	A	A	A		A			A	A	A		25	22	28	37	56	62	62	57	49	36	30
	A	A	A	A	A		A			A	A	B	F	F	F			Z	F	F	A	R	R	A
	A	A	A	A	A		A			F	F	B	F	F	F			A	22	20		A	20	14
	A	A	A	A	A		A			29	23		36	42	51	45	45	44	38	28	24	30		A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	2	4	3		1	4	6	10	13	21	20	25	27	28	30	31	30	21	21	7	6	5	2	3
MED	40	43	F		R	22	26	27	23	27	36	48	52	56	55	49	37	30	26	22	R	R	R	47
U Q		R	F			25	30	31	31	32	39	52	58	62	66	54	42	38	32	30	30	40		47
L Q		37	R			21	24	24	22	22	32	42	F	50	47	42	33	28	22	14	R	R	R	20

JUL.2022 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUL.2022 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	50	68	E B 14	G	68	22	22	41	70	70	48	36	41	66	
2	42	46	53	49	71	49	49	83	55	58	69	60	52	61	64	60	25	57	48	44	40	38	42	94	
3	59	60	46	50	44	54	51	52	42	21	21	36	100	79	28	25	E B 12	34	58	46	40	24	28	31	
4	36	31	42	55	65	55	53	75	58	71	55	E B 38	31	19	23	22	14	18	65	51	52	73	74	50	
5	49	52	55	59	49	42	50	48	33	17	58	57	G	20	20	23	48	B	46	50	51	47	52	50	
6	33	56	42	60	52	57	44	45	18	13	20	20	17	19	23	E B 12	17	14	56	38	42	56	58	B	
7	K 25	32	39	56	32	50	24	39	29	15	18	B	23	31	17	13	K E B 11	32	45	11	3	105	79	50	K 56
8	56	110	48	71	71	60	76	52	56	32	32	B	26	16	G 16	G	K E B 10	14	52	72	80	48	52	K 38	K 40
9	50	42	K 36	36	47	39	K 14	12	14	E B 13	16	B	19	29	B	28	32	B E B 12	B	B	B	30	32	43	
10	49	49	44	40	E B 38	E B 17	E B 16	E B 14	E B 12	E B 13	E B 14	G	41	32	E B 19	E B 21	B E B 24	16	52	E B 34	33	36	36	36	
11	46	35	34	K 32	32	54	95	15	49	61	15	16	31	35	41	20	14	58	E B 14	E B 14	53	84	85	48	
12	50	89	69	99	58	51	51	49	57	42	52	61	31	E B 36	E B 27	E B 25	E B 14	34	54	32	32	40	50	53	
13	54	76	84	54	47	50	46	35	30	K 19	20	K E B 19	E B 21	34	19	19	23	58	E B 25	70	B	49	52	25	
14	38	44	34	B	32	48	B	12	33	E B 15	E B 18	23	18	23	26	22	16	16	36	41	32	48	30	42	
15	37	42	44	41	40	56	59	54	45	K 19	20	G	20	23	20	21	E B 16	29	16	15	31	42	35	38	63
16	54	83	65	45	57	52	61	54	57	57	38	B E B 27	E B 43	E B 36	E B 34	E B 24	E B 20	B	B	B	24	47	47	26	
17	107	32	34	27	36	31	39	34	55	36	44	32	G E B 22	E B 17	E B 14	E B 58	E B 22	53	50	B	B	B	B	41	
18	40	41	48	44	29	16	18	14	20	36	35	E B 18	E B 17	G	E B 39	E B 55	E B 36	74	56	44	53	56	26	50	
19	62	55	44	63	K 34	56	55	44	K 23	59	B	B	38	B E B 32	E B 24	E B 25	42	80	74	78	76	38	48		
20	44	43	46	48	81	43	61	44	44	55	40	36	26	21	G	E B 24	E B 30	B	E B 20	12	49	25	28	30	
21	32	46	E B 39	76	59	50	56	34	19	18	G	18	22	19	E B 39	E B 34	E B 35	E B 40	B	51	52	42	38	47	
22	61	39	44	60	53	46	48	51	49	48	46	41	B	E B 36	E B 25	E B 17	E B 24	E B 19	E B 15	E B 18	36	48	30	47	
23	35	38	64	58	48	42	57	52	58	42	53	B	E B 39	E B 22	E B 28	E B 22	E B 24	E B 22	B	B	52	58	54	39	
24	35	49	48	61	38	59	55	45	55	42	B	38	E B 38	E B 49	E B 44	E B 39	E B 22	E B 25	E B 12	45	B	38	52	30	
25	34	40	K 35	45	58	48	53	53	42	K 20	G	25	20	16	E B 17	G	13	15	55	53	54	48	50	64	
26	27	37	48	45	54	63	60	56	48	86	18	G	18	19	E B 25	E B 20	23	E B 24	E B 19	E B 14	54	24	50	40	57
27	45	48	85	47	55	51	62	67	59	59	B	39	23	31	28	18	G	24	20	41	B	53	44	39	
28	46	61	43	48	61	50	52	54	54	54	52	58	G	20	G	G	16	14	B	B	B	60	30	54	
29	51	58	50	52	56	45	35	19	19	13	21	21	21	21	21	18	18	16	18	42	57	26	28	34	
30	39	84	54	49	54	60	50	57	44	23	G	G	17	G	G	G	23	14	19	42	50	24	45	34	42
31	45	43	44	72	44	55	47	30	K 26	B	53	32	E B 14	G	G	G	K 15	44	12	34	42	40	40	35	
	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	29	30	30	29	30	30	29	28	25	29	30	30	31	30	28	28	26	25	30	30	30	
MED	45	46	45	50	50	50	51	46	44	36	26	U	E G 28	22	20	21	21	U	18	22	42	48	48	40	45
U Q	51	58	53	60	58	55	58	54	55	56	51	40	31	E B 35	E B 32	E B 25	25	42	56	53	52	56	50	53	
L Q	36	40	42	45	38	45	45	34	26	18	G	G	20	19	19	18	14	18	E B 16	38	35	38	32	36	

JUL.2022 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUL.2022 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

$\begin{matrix} H \\ D \end{matrix}$	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	9	12	14	10	8	12	9	10	12	8	8	8	8	10
2	10	9	13	14	12	10	11	9	9	14	13	12	33	12	12	13	13	18	14	8	8	8	8	9
3	12	11	9	13	11	12	10	9	8	8	8	8	11	25	11	11	12	12	11	11	8	6	9	16
4	9	7	8	8	18	10	11	14	18	22	13	38	24	7	8	9	10	13	22	7	9	8	8	10
5	21	11	23	7	16	13	8	11	8	9	8	8	10	10	8	14	15	B	17	11	12	10	12	11
6	8	10	8	7	13	16	9	8	9	8	8	8	8	10	11	12	10	9	10	9	9	8	9	B
7	14	14	12	10	11	12	14	13	13	11	18	14	10	10	12	8	11	22	13	8	9	11	14	8
8	12	8	9	12	32	12	12	7	10	10	10	B	11	10	8	9	13	11	22	13	12	10	10	10
9	11	10	8	7	8	17	8	8	7	13	10	24	13	11	28	12	12	B	12	B	B	10	12	16
10	11	12	13	12	14	17	16	14	12	13	14	8	36	18	19	21	B	24	11	14	34	6	10	8
11	8	8	10	8	8	10	10	7	9	9	8	8	8	9	8	7	10	12	14	13	22	11	11	12
12	10	9	9	11	8	8	14	9	10	11	14	21	12	35	27	25	14	13	13	11	8	10	12	14
13	6	8	9	16	17	12	11	9	11	11	11	19	21	34	19	19	23	24	25	26	B	12	7	8
14	8	8	8	B	12	14	B	8	13	15	18	8	9	10	10	9	11	10	10	16	19	14	14	7
15	7	8	8	8	7	11	13	17	10	10	10	10	8	10	11	11	29	10	10	6	8	7	10	16
16	8	11	32	14	11	12	10	13	17	15	16	B	27	43	36	34	24	20	B	B	17	18	15	14
17	14	8	7	8	8	10	10	8	8	12	15	13	22	22	17	14	13	22	12	14	B	B	B	7
18	9	7	7	8	8	7	9	7	9	11	15	18	17	7	39	55	36	37	22	12	12	10	6	10
19	10	11	7	10	16	23	13	11	9	13	B	B	17	B	32	23	11	10	11	8	10	8	6	11
20	13	12	10	10	8	11	13	16	9	7	14	11	12	11	13	15	30	B	10	12	11	8	6	8
21	7	7	39	11	8	10	11	9	9	7	9	11	14	10	39	34	35	40	B	9	8	8	8	8
22	11	7	13	21	12	15	12	12	17	20	16	14	B	36	25	17	24	19	15	18	9	9	8	9
23	6	9	24	12	12	11	20	14	16	14	18	B	B	39	24	28	22	24	22	B	17	10	8	9
24	6	17	14	38	10	15	17	13	12	10	B	20	38	49	44	39	22	25	12	8	B	7	10	13
25	8	8	8	12	16	12	10	19	11	9	12	12	11	12	17	10	8	10	9	9	8	8	7	7
26	6	9	12	16	37	12	17	21	10	10	10	15	11	25	20	12	24	18	14	12	12	12	10	8
27	6	10	16	11	18	11	16	14	11	12	B	22	14	17	12	10	14	9	14	B	B	6	9	8
28	7	11	10	12	10	14	12	10	18	22	15	24	16	14	12	12	10	9	B	B	B	11	12	9
29	10	9	10	16	13	12	8	8	8	7	9	12	14	10	10	10	7	9	8	8	8	8	7	8
30	8	18	12	10	12	14	11	9	7	9	11	7	8	10	8	10	9	12	9	11	10	9	8	7
31	10	9	8	8	8	9	11	7	9	B	12	15	14	13	8	9	9	9	8	8	10	12	10	12
	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	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	9	9	10	11	12	12	11	10	10	11	13	14	14	12	12	12	13	13	13	11	11	9	9	9
U Q	11	11	13	14	16	14	14	14	12	14	16	22	22	25	25	21	24	24	22	16	B	B	11	12
L Q	7	8	8	8	8	10	10	8	9	9	10	10	11	10	10	10	10	10	10	8	8	8	8	8

JUL.2022 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUL.2022 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	234	E A	224	E A	E A	E A	E A	A	A	A	A	A	A	A	A
2	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	296	E A	A	A	A	A	A	A	A	A
3	A	A	A	A	A	A	A	A	A	A	254	E A	E A	E A	E A	238	190	A	246	E A	268	200	A	230	
4	A	A	A	A	A	A	A	A	A	A	A	B	E A	E A	E A	E A	212	246	A	E A	190	202	200	A	
5	A	A	A	A	A	A	A	A	A	A	E A	E A	E A	E A	E A	208	218	B	A	A	A	A	A	A	
6	202	A	A	A	A	A	A	A	E A	E A	E A	E A	202	210	212	206	206	E A	254	208	242	A	A	A	
7	A	A	A	A	A	A	A	A	A	A	A	E A	E A	E A	E A	E A	E A	A	A	A	A	A	A	A	
8	A	A	A	A	A	A	A	A	A	A	A	B	E A	E A	E A	E A	E A	A	A	A	A	A	A	A	
9	A	A	A	A	A	A	308	290	282	E B	E A	220	210	224	218	208	198	B	218	B	B	A	A	A	
10	A	A	A	236	E B	358	336	296	280	272	240	238	E A	E A	E A	E A	E A	B	E B	306	216	A	B	A	
11	A	A	A	A	A	A	A	A	310	290	268	242	A	208	196	216	200	210	268	242	218	198	A	A	
12	A	A	A	A	A	A	A	A	A	A	A	E A	E A	E A	B	274	246	246	E A	354	202	A	204	A	
13	A	A	A	A	A	A	A	A	A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	A	B	A	
14	A	A	A	B	A	A	B	A	A	300	226	210	206	202	198	200	206	238	200	A	A	A	A	210	
15	A	A	A	A	A	A	A	A	A	A	E A	E A	248	212	204	222	198	236	240	200	230	A	A	A	
16	A	A	A	A	A	A	A	A	A	A	A	B	E A	E A	E A	E A	E A	E A	E A	E A	E A	B	B	A	
17	A	A	A	A	A	A	A	A	A	E A	E A	E A	254	212	200	210	210	208	E B	E A	280	A	B	B	
18	A	A	A	A	E A	E A	A	308	332	A	E A	E A	270	212	228	250	270	238	A	A	A	A	A	A	
19	A	A	A	A	A	A	A	A	A	A	B	B	A	B	E A	E A	E A	E A	A	A	A	A	A	202	
20	A	A	A	A	A	A	A	A	A	202	E A	E A	230	224	204	220	232	250	B	258	238	A	A	A	
21	A	E B	E B	A	A	A	A	A	A	A	E A	E A	E A	E A	E A	E A	E A	E A	B	A	A	A	A	A	
22	A	A	A	A	A	A	A	A	A	A	A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E B	A	A	
23	A	A	A	A	A	A	A	A	A	A	A	A	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	A	A	
24	A	A	A	A	A	A	A	A	A	E A	E A	E A	294	266	268	228	228	224	232	248	240	A	B	A	
25	A	A	A	A	A	A	A	A	A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	A	A	
26	A	A	A	A	B	A	A	A	A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	A	A	
27	A	A	A	A	A	A	A	A	A	A	A	B	E A	E A	E A	E A	E A	E A	E A	E A	E A	B	B	A	
28	A	212	A	A	A	A	A	A	A	A	A	A	E B	E B	E B	E B	E B	E B	E B	E B	E B	B	B	A	
29	A	A	A	A	A	A	A	E A	E A	E A	E A	E A	360	294	252	210	222	202	200	200	196	202	202	A	
30	A	A	A	A	A	A	A	A	A	A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	A	A	
31	A	A	A	A	A	A	A	A	A	A	B	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	A	A	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	1	1	1	1	2	2	2	7	8	17	18	23	26	28	30	31	30	20	21	6	5	4	2	2	
MED	202	212	E B	236	264	E	370	322	302	283	273	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	200	199	203	
U Q								326	292	325	252	260	244	231	232	246	250	271	261	242	251	200			
L Q								290	269	253	236	222	206	203	200	206	208	232	217	218	199	197			

JUL.2022 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2022 f_{XI} (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E PSWEEP 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 34	A	A	A	A	56	A	A	A	X 43	56	58	56	59	79	49	48	O 51	X	B	A	A	R	R		
2	A	49	49	A	A	A	A	A	A	X 38	O 39	X 50	67	60	64	51	63	43	O 25	X 22		A	A	A	90		
3	A	A	A	A	A	A	A	A	A	B	B	X 57	62	70	69	64	50	X 36	O 27	X 20	O 20	X 20	A	A	A		
4	A	A	A	A	A	A	A	A	X 36	X 38	X 49	X 61	X 59	X 72	X 62	X 58	X 58	X 44	X 57	O 20	X 20	A	A	X 47	A		
5	A	48	A	A	A	A	A	A	A	X 38	X 50	X 65	X 65	X 64	X 62	X 53	X 56	O 48	X 26	X 24	O 17	X 20	X 20	A	A		
6	28	66	46	A	A	A	36	32	32	X 38	X 58	X 59	X 70	78	71	62	X 49	X 51	38	29	X 21	X 20	O 20	X 20	A		
7	X 22	A	64	57	50	54	59	55	51	O 34	X 62	62	73	76	98	84	86	82	53		A	A	A	A	A		
8	A	69	A	58	A	A	A	A	A	A	B	A	O 46	X 49	X 58	62	62	56	B	O 18	X 70	A	A	A	A		
9	A	A	A	A	A	A	A	A	B	A	O 49	X 56	X 56	B	B	X 79	X 76	B	O 53	X 69	A	A	87	A	A		
10	A	A	68	A	54	A	A	A	A	A	X 46	B	68	68	69	X 68	X 69	B	B	B	B	X 23	A	A	A		
11	A	A	A	A	A	B	A	A	B	A	B	O 57	X 64	68		B	X 88		X 89	58	82	O 38	A	A	A	68	
12	A	A	104	A	A	A	A	O 36	X 36	X 42	X 44	X 49	X 50	X 51	X 55		B	B	B	B	B	B	B	A	A	A	
13	A	A	A	A	A	A	A	A	26	28	X 45	X 54	X 57	O 57	X 64	64	60	54	50	56		A	A	A	A	A	
14	A	A	A	A	O 48	X	A	A	A	A	X 49	X 54	X 58	66	63	65	58	48	31	33	O 19	X 23	O 16	X 22	X 22		
15	O 26	X 42	57	40	O 50	X 40	52	42	47	62	62	X 70	84	79	X 71	69	58	50	56	44		R	R	B	A		
16	A	A	A	A	A	O 26	X 36	X 30	B	O 60	X 84	77	79	76	58	X 57	54	57	35		A	R	O 19	X 19	A		
17	R	57	O 51	A	A	X 37	40	46	39	X 41	X 57	X 73	88	87	96	100	82	72	62	31	X 25	A	82	A	A		
18	A	A	61	A	X 31	A	A	A	A	52	48	64	63	65	65	60	67	66	A	A	A	A	A	A	X 37		
19	B	B	A	A	A	A	R	A	O 54	X 49	X 52	X 65	O 64	X 60	X 65	X 62	O 57	X 45	X 33		B	A	A	A	A		
20	A	A	A	B	A	A	A	A	B	A	B	B	B	O 56	X 49	X 50	X 62	X 51	X 48		B	O 24	X 20	X 20	A	41	
21	A	55	A	A	A	A	A	A	A	A	B	O 54	X 54	X	B	O 57	X 56	X 46	X 42		A	A	A	A	X 39		
22	A	A	A	A	A	A	A	A	B	B	X 45	X 49	X 52	X 62	X	56	59	57	57	58	O 29	X 30	A	A	A		
23	A	A	A	A	A	A	R	O 28	X 36	X 49	X 59	X 67	X 76	X 74	X 64	X 59	X 58	X 38	X 34		A	A	A	O 25	X 25		
24	A	X 41	36	A	X 25	X 26	X 28	X 45	X 38	X 51	X 54	X 69	X 78	X 85	X 76	X 61	X 58	X 46	X 33	X 32	X 32	X 32	A	O 21	X 21	A	
25	R	A	41	38	A	A	A	A	32	38	50	51	58	67	63	61	66	60	41	31	35	24	20	A	A	A	
26	A	A	56	A	A	X 31	34	27	47	54	56	70	77	74	65	62	57	47	44	28	X 29	X 19	X 36	O 29	X 29		
27	A	A	O 30	A	A	A	A	A	A	A	52	61	60	67	73	84	76	72	42		R	A	A	60	A		
28	74	64	A	A	A	A	A	O 54	X 41	X 44	X 51	X 51	X 56	X 59	X 69	X 73	O 53	X 45	X 39	X 34	X 23	O 20	X 20	X 20	A	A	
29	A	A	A	A	X 48	A	A	A	A	A	B	B	A	B	O 53	X 62	X 67	X 60	X 62	X 58	X 82	X 53	X 42	X 24	A	A	A
30	A	50	86	41	A	44	60	A	A	A	B	O 47	X 56	X 54	X 65	X 57	X 53	X 58	X 50	X 45	A	A	A	A	A	A	
31	55	81	A	X 53	A	A	A	A	A	X 41	X 48	X 55	X 57	X 63	X 61	X 61	X 63	X 56	X 46	X 43	X 32	X 30		R	A	A	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	5	12	13	6	6	7	9	13	15	15	24	27	29	29	28	29	28	29	27	22	15	9	9	8			
MED	28	52	56	47	X 49	X 40	40	36	38	42	50	57	63	66	64	62	58	53	46	34	X 24	O 20	X 21	X 38			
U Q	64	65	66	57	50	48	58	50	47	50	58	65	72	74	71	71	62	58	56	42	29	30	54	54			
L Q	X 24	45	44	40	X 31	X 31	X 31	X 30	X 36	X 38	X 47	X 53	X 57	X 60	X 61	X 58	X 56	X 46	X 38	X 28	O 21	O 20	O 20	O 27			

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2022 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

AUG. 2022 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2022 ftEs (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E PSWEEP 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	18 ^K	78	100	55	56	47	46	56	42	34	27	24	G	G	20	21	E	B		B	54	64	22	35			
2	42	40	36	42	46	40	45	59	44	24	56	E	B	E	B	24	23	17	53	54	29	24	55	33	42			
3	42	79	50	48	46	32	44	44	44		B	E	B	B	E	B	E	B	E	B	E	B	28	44	42	50		
4	48	87	65	60	58	58	60	54	30	G	18	26	G	G	19	19	G	E	B	K	13	38	32	40	43			
5	45	45	41	56	64	59	54	58	38	E	B	26	31	25	24	19	19	E	B		15	34	29	54	62	52		
6	33	35	40	50	48	40	31	13	50	G	14	18	G	G	22	23	23	18	23	14	13	47	55	39	31	45		
7	57	56	34	31	31	14	26	68	16	E	B	E	B	E	B		B	B	E	B		56	40	46	94	79		
8	55	46	90	45	58	63	57	48	58	60		56	E	B	E	B	E	B	E	B	E	B	40	46	83	54		
9	47	26	52	55	38	47	55	E	B	48	74	57	54	E	B	43		E	B	E	B	39	48	71	57			
10	49	91	40	56	33	56	59	60	63	44	56		E	B	E	B	E	B	E	B		16	46	38	33			
11	50	58	55	41	47	69	54	60	38	44		E	B	E	B	E	B	E	B	E	B	80	84	108	81			
12	66	76	68	58	56	64	116	42	16	20	18	G	G	E	B	E	B	E	B	E	B			50	44			
13	48	44	41	42	56	52	35	52	42		E	B	24	24	E	B	E	B	E	B	E	B	32	29	31	38		
14	44	48	79	107	47	60	65	59	61	61	35		E	B	21	24	24		G	G	14	53	43	46	13	14	47	
15	58	38	34	33	37	57	44	51	34	34	20		E	B	28	28	E	B	24	28	25	25	10	15	22	17	63	
16	49	55	34	44	28	37	24	18	53		E	B	32	26	G	26	32	E	B	E	B	44	22	54	41			
17	23	38	65	82	48	30	19	30	15	G	21	28	28	18	27	G		G		31	16	18	18	21	54	53	71	
18	58	54	36	73	47	47	49	42	33	30	60		50	22	G	G	G		G	E	B	46	56	46	43	46	31	
19	B	51	67	48	62	51	32	49	58	51	28	28	E	B	E	B	E	B	E	B	E	B	87	108	92			
20	68	78	52		52	60	47	44	49	62		B	B	E	B	E	B	E	B	E	B	54	45	30	42			
21	58	35	62	63	56	66	58	56	47	42		E	B	37	G	B	E	B	E	B	E	B	44	68	50	30		
22	93	70	56	60	60	58	57	55		K	B	B		B		B	E	B	E	B	E	B	14	11	29	46		
23	38	40	56	44	36	24	14	16		G	18		26	26	26	G		G		16	19	14	31	19	18	22		
24	31	38	30	41	36	27	32	12	15	E	B	E	B	E	B	G	28	26	26	E	B	G	E	B	E	B	79	
25	K	44	49	22	58	60	42	38	26	20	24	24	24	28	24	24	22	20	G		32	16	18	77	36	39	42	
26	42	50	34	54	42	38	42	49	47	19	26	24		G	25	G	24	20	15	E	B	E	B	E	B	40	26	40
27	27	42	71	57	50	67	49	47	58	50	27	25	28	28	E	B	E	B	E	B	E	B	45	39	47	76		
28	45	48	51	54	37	52	45	26	E	B	E	B	E	B	G	26	19	G	E	B	E	B	E	B	30	14	20	32
29	36	37	74	38	41	63	59	68	59	61		E	B	E	B	E	B	E	B	E	B	49	49	36	43			
30	41	35	39	42	45	29	27		B	B	42	45	E	B	E	B	E	B	E	B	E	B	30	32	32	43		
31	42	46	64	46	48	48	61	65	48	24	24	37	31	30	26	24	24	24	16	15	14	29	29	23	28			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	30	31	31	30	31	31	31	30	29	27	25	26	29	28	28	28	27	29	28	27	29	30	30	31				
MED	46	46	52	49	47	52	47	48	44	30	26	E	G	G	E	G	E	B	E	B	E	B	38	42	38	43		
U Q	55	56	65	58	56	60	57	58	57	50	41	E	B	E	B	E	B	E	B	E	B	48	49	53	57			
L Q	41	38	39	42	38	38	32	42	28	23	22	G	E	B	G	G		G		E	B	E	B	26	29	30	38	

AUG. 2022 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2022 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	10	8	8	8	10	11	12	11	15	23	12	18	16	18	12	14	20	17	38	B	10	12	12	12
2	10	10	10	12	14	8	19	16	15	13	24	27	24	26	16	14	12	16	15	8	10	9	12	10
3	9	7	19	14	8	8	11	16	8	B	B	34	20	19	20	22	16	18	15	12	10	8	9	18
4	12	17	10	18	16	17	13	10	9	8	10	12	13	16	12	9	8	10	7	10	6	8	8	8
5	8	9	9	14	27	13	25	14	14	26	10	12	15	13	12	22	11	11	9	6	8	8	12	11
6	7	7	9	12	14	8	7	7	8	8	8	13	12	12	12	10	6	8	7	8	7	6	8	8
7	7	10	8	8	7	7	7	7	8	23	37	32	16	14	22	34	34	32	9	11	8	7	11	8
8	8	8	15	8	11	16	28	18	21	23	B	33	32	29	22	28	34	29	B	10	7	8	9	17
9	14	15	29	6	8	20	12	48	34	27	14	43	B	B	45	45	B	37	11	7	8	7	10	9
10	13	8	11	6	14	20	16	9	17	21	26	B	32	27	40	B	B	B	B	B	7	8	9	12
11	17	17	15	16	17	53	18	22	30	20	B	43	38	30	B	45	26	36	11	11	15	11	8	8
12	10	8	8	16	7	13	14	10	10	9	12	14	39	27	20	B	B	B	B	B	B	B	11	9
13	11	7	9	9	15	15	11	8	10	B	24	15	26	35	48	36	30	21	11	16	12	7	6	7
14	11	9	9	24	30	30	16	11	17	21	22	19	21	15	16	16	11	10	10	11	9	10	10	8
15	8	8	10	7	6	11	10	10	11	11	17	29	28	23	24	12	25	26	10	15	16	9	B	16
16	9	11	10	8	13	12	10	7	14	B	32	26	19	13	19	26	29	13	10	12	12	10	9	13
17	14	12	15	21	13	9	9	8	6	11	13	14	15	15	14	12	13	7	10	7	6	8	9	8
18	17	12	9	10	9	10	11	11	8	9	39	B	22	19	18	11	10	29	10	9	11	8	10	9
19	B	33	15	17	8	24	20	22	20	20	14	16	24	41	34	32	36	20	30	15	B	16	10	9
20	8	17	10	B	14	14	14	12	34	21	B	B	B	37	34	24	25	16	20	B	12	8	8	7
21	11	9	12	21	19	25	18	18	14	21	B	37	16	B	B	44	21	30	8	7	16	12	8	12
22	8	10	22	12	16	17	16	25	B	B	24	17	18	39	B	28	29	24	10	9	11	9	6	6
23	6	7	17	14	14	12	10	9	12	11	16	12	15	15	15	14	13	7	10	8	8	7	7	9
24	7	8	7	8	8	8	6	7	10	19	22	32	18	17	15	21	11	17	16	10	9	11	10	14
25	8	8	7	8	26	9	7	7	9	10	14	16	14	15	19	14	12	10	8	8	7	8	10	12
26	10	8	8	13	10	8	8	7	7	11	15	17	14	13	15	16	10	10	10	8	8	9	8	6
27	8	8	11	12	8	10	10	14	12	12	15	16	14	13	37	23	26	23	24	22	21	20	21	17
28	16	10	13	18	15	16	16	16	24	24	22	15	14	15	15	47	38	24	12	10	10	10	10	12
29	11	11	11	14	18	14	13	20	22	24	B	38	25	26	24	24	15	10	15	14	11	16	12	9
30	10	12	9	11	9	10	10	B	B	22	36	31	26	23	26	22	23	20	8	16	8	11	7	10
31	8	8	8	6	11	13	11	19	18	16	16	37	31	30	26	16	24	16	15	8	8	10	10	8
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	10	9	10	12	13	13	12	11	14	21	22	26	20	19	20	22	23	18	11	10	10	9	10	9
U Q	12	12	15	16	16	17	16	18	21	24	37	37	28	30	34	34	30	29	16	15	12	11	11	12
L Q	8	8	9	8	8	9	10	8	9	11	14	15	15	15	15	14	12	10	10	8	8	8	8	8

AUG. 2022 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2022 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	280	A	A	A	A	A	A	A	A	A	A	E A	222	218	200	E A	212	208	E A	E B	B	A	E A	A	A	
2	A	A	A	A	A	A	A	A	A	E A	E B	E B	226	214	212	210	236	210	254	250	A	A	A	A	A		
3	A	A	A	A	A	A	A	A	A	B	E B	E B	202	218	210	200	214	242	254	220	190	A	A	A	A		
4	A	A	A	A	A	A	A	A	A	184	208	208	208	204	202	204	216	198	230	254	A	200	A	A	A		
5	A	A	A	A	A	A	A	A	A	B	E A	E A	212	202	196	212	196	196	A	204	E A	204	A	A	A		
6	198	A	A	A	A	A	A	A	E A	268	202	226	210	196	214	212	196	198	208	230	208	202	A	194	A		
7	A	A	A	A	A	A	A	A	E A	E B	E B	E B	230	224	254	248	E B	248	244	A	A	A	A	A	A		
8	A	A	A	A	A	A	A	A	A	A	B	E B	E B	E B	E B	E B	266	258	B	A	A	A	A	A	A		
9	A	A	A	A	A	A	A	B	B	E A	E A	B	B	B	E B	E B	E B	348	220	Q	A	A	A	A	A		
10	A	A	A	A	A	A	A	A	A	E A	E A	B	226	234	240	B	B	B	B	B	206	A	A	A	A		
11	A	A	A	A	A	B	A	A	B	A	B	B	222	222	B	262	220	258	Q	A	A	A	A	A	A		
12	A	A	A	A	A	A	A	A	E A	238	240	218	E B	324	240	252	B	B	B	B	B	B	B	A	A		
13	A	A	A	A	A	A	A	A	A	B	E A	E A	252	226	226	238	280	228	228	238	286	A	A	A	A		
14	A	A	A	A	B	206	A	A	A	A	A	230	228	234	218	202	206	188	200	228	E A	E A	A	176			
15	202	A	A	A	E A	348	A	A	E A	E A	E A	E B	230	222	226	222	204	234	232	E B	A	A	B	A			
16	A	A	A	A	A	A	A	338	308	B	E B	E B	214	218	214	210	218	220	200	218	A	E A	A	A			
17	A	A	222	H	A	E A	E A	348	380	314	200	200	220	226	210	E A	204	204	224	224	208	A	A	A			
18	A	A	A	A	200	A	A	A	A	206	322	A	B	E A	E B	E B	242	256	242	330	A	A	A	212			
19	B	B	A	A	A	A	A	A	A	200	A	E A	250	228	232	240	224	224	246	232	B	A	A	A			
20	A	A	A	B	A	A	A	A	B	A	B	B	242	270	210	224	210	228	B	220	E A	A	A	A			
21	202	A	A	A	A	A	A	A	A	A	A	E B	314	246	B	B	B	232	262	210	A	A	A	A	A		
22	A	A	A	A	A	A	A	A	B	E A	E A	252	208	224	254	B	216	222	192	230	204	190	190	A	A		
23	A	A	A	A	A	A	A	A	E A	328	230	200	214	220	210	202	206	200	192	252	252	A	A	204	A		
24	A	E A	284	A	A	A	A	A	208	242	226	222	256	204	212	200	192	212	200	266	222	200	190	A	A		
25	A	A	A	A	A	A	A	A	310	240	210	196	208	200	210	206	208	200	174	190	202	186	252	A	A		
26	A	A	A	A	E A	E A	E A	A	370	360	A	E A	332	202	226	222	230	216	202	212	212	212	202	232	206	196	200
27	A	A	A	A	A	A	A	A	A	A	A	E A	262	216	216	236	266	234	E B	242	250	266	A	A	A	A	
28	A	A	A	A	A	A	A	A	E B	286	230	252	230	216	226	E A	224	226	250	212	224	224	242	240	206	A	
29	A	A	A	A	A	A	A	A	A	A	A	B	B	258	234	214	238	214	218	E A	210	214	A	A	A	A	
30	A	A	A	A	A	A	A	B	B	A	B	B	E B	240	240	E B	232	240	230	228	214	A	196	A	A	A	
31	A	A	A	204	A	A	A	A	A	E A	E A	256	254	B	232	230	234	216	216	206	214	214	E A	276	A	A	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	3	1	2	1	1	3	3	5	13	14	21	21	29	29	28	28	28	29	24	20	12	9	5	4			
MED	202	280	253	204	200	E A	E A	348	348	319	E A	U	230	224	224	223	218	213	215	216	226	218	204	203	195	202	
U Q	202					E A	E A	370	360	359	311	256	254	253	236	237	252	236	234	245	249	233	241	253	242	208	
L Q	198					206	214	259	234	202	216	217	215	214	208	207	207	203	213	208	195	198	192	188			

AUG. 2022 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2022 fxI (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	60	O X 43	A	A	A	O X 38	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	O X 43	O X 21	O X 23	A
2	46	A	A	A	A	A	A	O X 33	X	X	X	X	X	X	X	77	70	83	71	65	48	37	O X 33	X 24	B 58
3	69	X 56	A	A	A	95	A	A	B	B	B	B	B	B	O X 64	118	112	B	A	R	A	A	A	A	A
4	A	A	A	A	80	B	A	A	B	B	B	B	B	B	B	80	B	X 49	X 45	X 32	X 54	A	94	A	A
5	A	B	A	A	B	A	A	B	A	B	B	B	B	B	B	60	63	X 53	X 48	X 45	A	104	62	A	A
6	49	A	54	A	O X 67	A	A	B	A	B	B	O X 52	O X 53	X 56	X 58	X 59	65	61	55	O X 28	A	A	A	A	A
7	A	A	A	A	78	O X 40	A	X	X	B	B	O X 64	X 69	O X 61	X 69	X 62	X 56	X 50	O X 83	A	A	56	59	59	
8	A	54	44	A	A	A	A	B	B	B	B	B	X 54	58	B	B	B	X 52	58	44	A	114	A	51	
9	A	A	A	O X 46	A	A	R	X	X	X	X	X	B	O X 61	O X 74	B	116	X 56	X 44	X 40	X 46	42	B	B	
10	48	A	A	O X 40	55	A	A	X 52	X 46	X 54	B	B	O X 66	81	80	X 76	X 81	X 67	X 46	B	A	57	A	A	
11	A	A	49	38	46	A	A	X 47	X 51	X 53	X 60	X 64	X 74	X 74	X 80	X 78	O X 72	X 67	X 60	X 50	70	A	A	A	
12	A	A	A	A	A	B	A	A	O X 51	O X 55	O X 58	B	71	71	70	71	67	66	57	55	52	40	A	O X 25	
13	A	O X 27	A	A	O X 38	33	32	47	58	64	76	79	91	92	94	91	81	72	70	56	46	34	34	O X 21	
14	O X 19	47	A	A	A	A	X 50	X 54	X 59	X 68	X 72	X 83	X 90	X 90	X 92	X 88	X 94	X 79	X 72	X 67	X 48	X 40	A	A	
15	86	80	80	A	62	64	58	57	60	64	75	76	78	82	88	78	77	66	68	59	50	47	27	O X 20	
16	39	38	56	38	54	52	56	46	52	62	74	87	88	92	94	87	74	71	66	56	38	34	34	X 29	
17	X 29	A	X 50	O X 56	47	50	47	46	57	61	73	85	92	94	96	87	89	85	64	58	40	34	30	O X 24	
18	68	A	57	A	X 45	45	40	A	A	X 49	X 55	X 60	X 73	X 78	X 71	X 68	X 66	X 68	X 69	X 60	A	A	53	58	
19	A	102	62	28	X 50	A	A	O X 42	X 47	X 48	X 53	X 57	X 64	X 61	X 65	X 76	X 91	X 81	X 64	A	A	36	A	A	
20	A	A	A	A	A	A	A	A	A	B	B	X	X	X	X	X	X	X	X	X	X	X	A	A	A
21	A	X 47	X 64	A	A	O X 35	X 38	X 40	X 50	X 55	X 62	X 64	X 70	X 76	X 79	X 81	X 72	X 67	X 62	X 55	X 46	F 37	F 32	X 27	
22	X 24	X 25	O X 26	A	X 28	O X 31	46	49	56	66	70	86	89	81	81	82	83	78	60	59	44	28	A	A	
23	A	A	A	A	A	62	X 58	X 67	X 67	X 72	X 81	X 86	X 92	B	X	111	112	114	90	59	X 36	X 26	A	A	A
24	A	A	A	59	X 57	X 62	X 46	B	B	B	B	O X 54	X 58	X 63	X 65	X 74	X 76	X 72	X 50	X 55	A	64	A	A	A
25	60	A	A	A	A	A	B	B	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
26	X 25	O X 41	O X 38	A	A	A	A	66	67	74	89	99	100	97	100	99	92	78	63	57	52	39	36	X 28	
27	71	66	38	61	X 53	B	A	X 58	X 65	X 74	X 72	X 66	X 70	X 73	X 77	X 92	X 72	X 58	X 50	X 51	O X 44	X 29	R	57	
28	78	72	A	A	A	X 36	X 44	X 50	X 56	X 58	X 60	X 60	X 60	X 61	X 61	X 62	X 57	X 60	X 54	X 56	X 56	X 47	X 47	O X 24	
29	R	R	A	A	A	A	A	X 54	X 58	X 64	X 66	X 64	X 80	X 84	X 82	X 76	X 74	X 68	X 69	X 56	44	A	O X 28	O X 30	
30	43	40	A	A	56	A	52	O X 56	O X 60	X 60	X 63	X 65	X 72	B	X	86	90	80	86	69	49	45	31	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	16	14	12	8	15	13	13	18	22	23	23	24	27	26	29	27	29	29	29	29	26	22	22	13	15
MED	48	47	52	43	53	50	46	51	54	58	63	64	71	75	79	78	74	67	60	55	46	40	34	29	
U Q	68	66	60	58	57	63	54	57	59	64	73	81	88	84	88	90	90	78	67	57	50	47	50	57	
L Q	X 34	X 40	X 41	X 38	X 45	X 36	X 40	X 46	X 50	X 53	X 58	X 60	X 64	X 64	X 63	X 65	X 71	X 66	X 59	X 50	X 48	X 43	X 34	X 29	X 24

SEP. 2022 fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2022 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E 0SWEEP 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	R 37	A	A	A	R 32	A	A	A	35	38	43	46	48	53	51	42	44	36	34	37	R 15	17	A	
2	A	A	A	A	A	A	A	R 27	37	50	57	62	62	71	64	77	Z 59	F 55	F 42	31	R 27	18	B	A	
3	A	50	A	A	A	44	A	A	A	B	R 47	F 52	50	54	58	F 99	F 100	B	A	R	A	A	A	A	
4	A	A	A	A	A	B	A	A	B	B	B	B	B	B	F 70	B	F 43	39	26	48	A	A	A	A	
5	A	B	A	A	B	A	A	B	A	B	B	B	B	B	F 50	R 57	R 47	42	39	A	A	A	A	A	
6	A	A	A	A	R 61	A	A	B	A	B	B	R 46	R 47	50	52	53	55	55	Z 49	R 22	A	A	A	A	
7	A	A	A	A	A	R 34	A	A	B	B	B	B	R 58	63	55	63	56	50	44	77	A	A	A	A	
8	A	A	38	A	A	A	A	B	B	B	B	B	F 48	50	B	B	B	46	48	38	A	A	A	A	
9	A	A		R 40	A	A	R	A		42	44	49	50	B	R 55	R 68	B	F 106	50	38	34	40	F 30	B	
10	A	A	A	R 34	A	A	A	46	40	48		B	R 60	F 66	F 69	70	F 72	61	40	B	A	A	A	A	
11	A	A	F 39	F 27	F 34	A	A	41	45	47	54	58	68	68	74	72	R 66	F 56	V 54	F 34	19	A	A	A	
12	A	A	A	A	A	B	A	A	R 45	R 49	R 52	B	F 61	65	64	65	61	60	51	40	F 25	F 28	A	R 19	
13	A	R 21	A	A	R 32	F 18	26	40	52	58	70	73	85	86	88	85	75	66	64	50	40	28	F 20	R 15	
14	R 13	A	A	A	A	A	Z 44	48	53	62	66	77	84	84	86	82	88	72	66	61	F 36	34	A	A	
15	40	42	48	A	F 45	F 46	52	51	54	58	69	70	71	76	82	72	71	60	62	53	44	F 31	21	R 14	
16	A	A	F 39	A	F 44	F 21	F 26	F 35	46	56	68	81	82	86	88	81	68	65	60	50	32	28	28	23	
17	23	A	44	50	R 33	41	41	39	51	55	67	79	86	88	90	81	83	79	58	52	34	28	24	18	
18	A	A	R 41	J 39	R 39	A	34	A		43	49	54	62	72	65	62	60	62	F 57	F 54	F 28	A	A	A	
19	A	A	F 48	F 22	F A	A	A	R 36	41	42	47	51	58	55	59	70	85	75	Z 58	A	A	A	A	A	
20	A	A	A	A	A	A	A	A	B	B	V 55	60	64	62	67	70	67	64	56	42	32	A	A	A	
21	A	41	A	A	A	R 29	32	34	44	49	56	58	64	70	73	75	66	61	56	49	40	31	26	21	
22	18	19	20	R A	22	R 25	Z 40	43	50	60	64	80	83	75	75	76	77	71	54	53	38	R 22	A	A	
23	A	A	A	A	A	F 46	52	F 54	61	66	75	80	86	B	105	F 96	F 96	F 77	F 47	30	20	A	A	A	
24	A	A	A	A	F 48	A	40	B	B	B	B	R 48	52	57	R 59	R 68	R 70	66	44	49	A	A	A	A	
25	A	A	A	A	A	A	B	B	46	50	52	58	69	79	81	88	87	90	62	F 43	39	39	35	27	
26	19	A	R 32	A	A	A	A	F 51	61	68	83	93	94	91	94	93	86	72	57	51	46	33	30	22	
27	A	A	F 23	A	47	B	A	52	59	68	61	60	64	68	71	86	66	52	44	45	F 28	R 23	R	A	
28	A	A	A	A	A	30	38	44	50	52	54	54	54	55	55	56	51	54	48	50	50	41	41	R 18	
29	R	R 21	A	A	F 27	A	A	Z 48	52	58	60	58	74	78	76	70	68	62	63	50	F 31	A	R 22	R 24	
30	F 20	A	A	A	F 42	A	F 40	50	R 54	R 54	57	55	66	B	80	Z 83	74	F 76	F 54	F 39	F 32	25	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	6	7	10	5	12	10	13	17	21	23	23	24	27	26	29	27	29	29	29	26	21	16	10	10	
MED	20	37	39	R 34	F 40	31	40	44	50	52	57	58	64	68	70	72	68	61	54	48	34	28	25	20	
U Q	23	42	44	F 45	46	F 44	42	50	54	58	67	75	82	78	82	83	84	72	58	51	40	32	30	23	
L Q	18	21	R 32	F 24	32	F 25	33	38	43	47	52	53	58	55	59	65	60	53	44	38	R 28	24	21	R 18	

SEP. 2022 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2022 ftEs (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E 0SWEEP 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	41	93	57	51	44	20	41	62	52	48	23	G	35	27	24	28	21	19	12	18	14	E B	31	30			
2	30	36	42	45	45	50	48	42	G	23	23	26	26	G	26	26	21	17	20	13	15	53	B	41			
3	52	44	64	67	42	63	40	45	K	F	B E	B E	B	G	31	37	34	24	B	K	40	32	44	82	47		
4	117	113	101	58	56	B	82	47	B	B	B	B	B	B E	B	B	54	30	E B	43	48	44	67	66			
5	56	B	52	96	B	58	46	B	43	B	B	B	B	B E	B E	B E	B	G	G	42	44	39	59	43			
6	33	66	48	62	64	52	54	B	57	B	B E	B E	B E	B E	B E	B	23	23	E	B E	B E	33	32	32	40		
7	88	43	44	73	42	50	42	48	B	B	B	B	B E	B E	B E	B E	B E	B E	B E	B	Y	102	96	44	42		
8	56	33	26	50	50	52	50	B	B	B	B	B	G E	B	B	B	B	B E	B E	B E	B	41	47	102	44		
9	104	54	49	57	50	88	34	48	B	E B	G	B	B E	B	B	B E	B E	B E	B E	B	E B	23	20	B	B		
10	32	100	105	54	41	43	52	42	E B	B	B	B E	B E	B E	B E	B E	B E	B E	B E	B	B	52	40	30	44		
11	52	70	38	18	33	52	59	33	G	24	28	28	27	25	38	39	38	26	B	G	39	13	42	42	45		
12	42	61	43	47	54	B	62	80	E 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	13	22	36	25		
13	27	22	47	28	24	15	16	19	E	B E	B E	B E	44	32	G	G	G	G	G E	B E	B E	15	15	18	12	10	10
14	10	30	41	52	58	56	30	G	G	G	G	29	29	G	G	26	G	G	E B	12	12	33	41	48			
15	36	34	63	118	41	35	22	22	25	29	29	29	29	29	29	29	26	22	20	E B	12	12	E B	8	14	10	
16	19	19	22	22	27	13	25	14	E B	19	26	29	31	31	30	28	G	20	G E	B E	B	9	15	12	12		
17	25	K	25	30	29	35	35	E B	26	23	24	28	28	G	G	G	G	23	23	E B E	B E	B E	15	11	10	14	
18	32	54	39	46	38	36	24	51	44	25	30	35	29	29	30	31	25	G	B E	B	24	40	56	41			
19	41	49	42	17	23	63	57	43	G	24	29	26	26	34	28	35	G	G	G	37	42	40	32	43	35		
20	42	47	58	54	61	58	54	52	B	B E	B E	B	G	G	26	G	G	21	G E	B E	B	16	35	39	45		
21	50	31	56	56	48	23	18	G	G	G	G	30	22	20	22	22	22	E B E	B E	B	10	15	10	42			
22	51	19	42	35	30	E B	16	16	G E	B	23	26	27	27	29	28	23	25	24	22	16	14	14	32	26	39	
23	35	66	91	46	50	34	37	15	G	G	28	28	31	E B	B E	B E	B E	B E	B E	B	36	31	45	44	53	46	
24	61	52	71	36	32	46	23	B	B	B	B	G E	B	G E	B E	B E	B E	B E	B E	B	G E	B	32	46	80	39	
25	55	48	43	44	36	50	B	B	G	G	41	G E	B E	B E	B	G E	B E	B E	B E	B E	B E	B E	16	17	19	16	
26	57	33	39	52	47	53	50	33	G	G	30	30	30	32	32	33	32	23	21	E B	13	11	16	16	E B	10	
27	33	33	18	51	43	B	64	37	49	34	27	30	G	27	G	G E	B E	B E	B E	B	E B	15	20	20	39		
28	37	56	43	47	49	K	24	24	24	G	G	G	30	G	30	27	G	G	18	13	E B E	B E	B E	B E	B	13	
29	K	30	51	40	27	51	51	28	G	G	G	E B	G	G	G	22	28	G	G	20	13	K	24	17	K	15	
30	23	41	34	56	47	52	47	38	E B E	B E	B E	B E	B E	B E	B	B E	B	G	G E	B	G	25	20	19	25	37	
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	29	30	30	29	27	29	25	25	23	23	24	27	25	29	27	29	29	30	28	30	30	28	29			
MED	41	44	44	50	43	50	42	37	G	24	G	G	G	G	27	G	G E	G E	G E	B	16	32	32	39			
U Q	55	58	57	56	50	53	53	48	E B E	B E	B E	B	G E	B E	B E	B E	B E	B E	B	25	33	42	48	44			
L Q	32	32	39	40	32	34	24	20	G	G	27	29	29	29	G	G	24	G	G E	B E	B E	13	13	16	16	16	

SEP. 2022 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2022 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	33	15	16	21	10	10	10	26	19	15	14	16	16	26	24	28	22	19	6	11	10	9	8	8	
2	7	9	18	14	16	13	12	10	14	12	15	14	14	14	20	14	13	17	20	13	15	12	B	15	
3	8	8	8	15	12	14	14	11	23	B	36	29	15	31	37	34	24	B	24	12	7	7	9	17	
4	11	10	20	12	8	B	27	17	B	B	B	B	B	B	38	B	22	12	12	9	10	10	8	18	
5	7	B	12	11	B	22	17	B	36	B	B	B	B	B	37	46	35	16	10	9	8	6	18	14	
6	8	25	14	37	30	12	35	B	17	B	B	B	38	41	35	32	22	14	44	21	13	6	6	8	7
7	11	11	16	11	12	20	15	24	11	19	B	B	42	38	40	40	34	22	19	16	10	12	11	14	
8	10	14	7	17	16	16	14	B	B	B	B	B	24	35	B	B	B	20	24	16	10	12	11	9	
9	18	17	13	10	13	12	21	18	19	21	24	18	B	40	43	B	31	38	16	13	12	20	B	B	
10	8	7	21	12	8	13	16	17	18	34	B	B	45	35	30	24	39	33	27	B	13	8	8	15	
11	8	8	8	8	11	14	13	13	14	14	16	15	16	16	38	39	38	26	10	8	11	9	11	9	
12	9	8	11	19	11	B	19	30	22	22	39	B	28	35	42	34	34	34	31	21	13	8	7	7	
13	8	7	8	9	8	6	7	11	21	24	28	44	18	18	18	19	18	16	17	14	18	12	10	10	
14	7	9	9	12	14	11	10	12	14	16	16	18	17	16	16	14	13	12	9	11	6	8	10	10	
15	8	8	11	22	15	11	12	11	13	14	14	13	17	17	13	17	14	12	10	12	8	8	8	8	
16	6	8	7	9	9	6	10	14	21	15	14	14	16	18	15	13	13	13	10	10	9	7	7	7	
17	8	9	9	8	8	10	9	26	15	14	14	16	13	14	14	11	13	14	17	24	15	11	10	9	
18	10	10	16	16	10	10	10	16	11	12	16	24	18	28	30	20	14	10	18	20	8	7	9	9	
19	9	17	17	9	8	23	14	12	10	13	14	13	11	11	11	9	13	22	22	12	8	8	9	9	
20	15	11	36	15	20	22	33	32	B	B	37	32	20	15	15	13	14	12	11	14	16	8	9	9	
21	16	12	38	18	13	13	10	12	12	11	15	12	12	22	15	10	11	11	17	12	9	8	10	9	
22	8	8	6	8	8	16	9	11	23	15	9	10	14	18	13	10	10	9	7	9	8	8	8	8	
23	8	21	8	10	10	8	10	11	11	14	13	15	33	B	40	50	39	30	13	11	6	8	11	9	
24	7	17	12	15	10	30	10	B	B	B	B	23	40	16	38	38	43	24	22	25	11	13	14	8	
25	10	14	16	17	14	14	B	B	20	10	14	16	33	30	16	30	36	44	36	22	16	17	19	16	
26	11	11	16	14	13	15	14	13	11	14	14	11	15	13	13	9	12	12	12	13	11	10	8	10	
27	9	12	8	13	9	B	24	16	16	14	12	14	12	12	12	21	36	24	23	18	15	10	12	10	
28	10	18	17	18	17	14	12	14	14	14	14	11	13	13	13	12	12	11	10	10	10	10	10	13	
29	10	10	17	11	13	15	19	11	12	12	11	17	38	17	16	16	20	14	7	7	6	8	6	8	
30	8	10	11	15	19	23	11	11	48	46	37	37	43	B	33	19	18	34	24	14	12	8	9	10	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	
MED	8	10	12	14	12	14	14	15	18	15	16	18	18	20	22	20	19	18	17	13	10	8	10	9	
U Q	10	15	17	17	15	22	19	26	23	46	39	38	40	35	38	38	35	30	22	16	13	11	11	14	
L Q	8	8	8	10	9	11	10	11	13	14	14	14	15	16	15	13	13	12	10	11	8	8	8	8	

SEP. 2022 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2022 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	206	A	A	A	A	A	A	A	E A	E A	E A	230	200	226	228	250	212	212	204	202	230	E B	202	A					
2	A	A	A	A	A	A	A	E A	E A	E A	220	208	218	230	E A	200	214	206	250	232	260	E A	B	A						
3	A	206	A	A	A	196	A	A	A	B	E B	E B	E B	E B	Q	Q	B	A	A	A	A	A	A	A						
4	A	A	A	A	A	B	A	A	B	B	B	B	B	B	B	B	E A	E A	216	246	A	A	A	A						
5	A	B	A	A	B	A	A	B	B	B	B	B	B	B	B	B	E B	E B	212	288	A	A	A	A						
6	A	A	A	A	244	A	A	B	A	B	B	B	B	E B	E B	E B	E B	E B	244	E B	A	A	A	A						
7	A	A	A	A	A	A	A	A	A	Q	B	E B	E B	E B	E B	E B	E B	E B	E B	Y	A	A	A	A						
8	A	A	206	A	A	A	A	B	B	B	B	E A	E A	B	B	B	B	240	232	234	A	A	A	A						
9	A	A	A	236	A	A	A	A	A	A	214	214					234	256	228	248	E A	A	B	B						
10	A	A	A	A	A	A	A	A	A	B	B	E B	E B	288	240	240	232	234	286	250	A	A	A	A						
11	A	A	A	A	A	A	A	A	E A	A	E A	214	230	216	B	234	258	214	206	A	200	A	A	A						
12	A	A	A	A	A	B	A	A	A	A	B	B	E B	E B	E B	E B	236	234	244	238	E A	A	A	212						
13	A	A	A	A	A	E A	E A	E A																						
14	A	A	A	A	A	A	A	E A	E A	E A	E A	218	212	212	228	222	234	220	210	252	228	A	A	A						
15	E A	266	A	A	242	A	A	A	208	190	202	242	226	210	210	216	210	212	212	212	202	216	214	230	A					
16	A	A	224	A	A	E A	E A	E A	314	190	200	226	222	230	220	220	206	218	202	202	202	226	214	226	226	254				
17	E A	320	A	204	240	E A	E A	E B	376	318	202	214	224	224	210	210	212	218	218	218	208	220	236	236	246	E A				
18	A	A	212	A	216	A	176	A	A	A	202	228	240	230	228	E B	218	220	230	228	228	252	E A	A	A	A				
19	A	A	204	E A	284	A	A	A	252	240	E A	218	218	198	224	E A	200	236	E A	E A	E A	A	A	A	A					
20	A	A	A	A	A	A	A	A	B	B	E B	282	226	192	224	222	210	220	206	198	212	Q	A	A	A					
21	A	A	B	A	A	E A	E A	250	230	222	206	206	206	228	214	208	216	214	220	210	208	218	222	E A	276					
22	E A	312	Q	A	A	E B	E B	E B	348	208	222	222	198	210	196	210	208	204	198	230	202	198	208	198	278	A				
23	A	A	A	A	A	A	A	A	208	222	212	212	256	E B	B	E B	E B	234	236	E A	A	E A	A	A	A					
24	A	A	A	A	A	A	B	B	B	B	B	260	A	B	E B	B	B	E B	E B	E A	A	A	A	A	A					
25	A	A	A	A	A	A	B	B	E A	270	200	228	222	E B	254	224	216	228	230	230	212	226	236	244	E B	E B	B			
26	E A	340	E A	310	A	A	A	A	226	212	212	212	198	198	208	220	A	216	208	206	206	202	202	236	242					
27	A	A	232	A	A	B	A	A	A	A	250	204	222	222	232	248	248	228	228	228	254	E B	E A	A	A					
28	A	A	A	A	A	E A	E A	324	268	252	230	220	220	216	214	214	224	218	200	212	196	216	210	218	286					
29	A	220	A	A	A	A	A	294	216	216	228	218	256	220	206	220	220	210	206	218	238	A	A	A	A					
30	A	A	A	A	A	A	E A	E A	E B	262	406	298	272	B	E B	E B	272	228	236	276	250	230	280	E 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	4	4	7	3	4	2	8	11	17	19	22	23	24	23	25	25	28	29	29	23	21	15	9	9						
MED	E A	316	213	209	240	264	272	E A	U	305	229	226	222	217	220	216	222	217	220	227	219	215	226	223	U	224	226	U	258	
U Q	E A	330	284	232	242	301		E A	E A	320	294	256	240	228	230	239	232	E B	E B	260	241	235	244	247	248	E	E	E	E	B
L Q	E A	289	206	204	236	230				198	208	212	212	212	214	210	214	213	210	217	211	207	208	215	214	220	248			

SEP. 2022 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT.2022 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	41	39	46	45	50	52	54	64	64	68	74	77	76	80	83	84	76	69	70	64	51	51	30	59		
2	A	A	46	52	A	A	A	60	66	65	71	79	87	B	X	109	117	116	79	58	54	A	33	38	28	
3	45	28	B	57	A	X	70	52	B	X	62	B	X	X	X	X	X	X	X	X	X	X	0	X		
4	A	82	53	95	A	A	A	A	A	O	X	B	O	X	B	X	X	X	X	X	X	X	71	A		
5	A	A	X	O	X	A	X	A	R	O	X	X	X	X	X	X	V	X	X	X	X	X	A	75		
6	A	A	58	92	89	51	O	X	O	X	X	X	O	X	X	X	X	X	X	X	X	A	X	52		
7	O	X	A	A	B	A	O	X	B	X	X	X	B	X	X	X	X	X	X	O	X	X	X	X		
8	O	X	O	X	46	37	52	57	56	X	X	A	70	74	67	67	78	84	91	100	X	B	X	A		
9	A	A	A	57	A	A	56	A	X	O	X	O	X	B	71	80	104	90	69	57	60	57	36	85		
10	50	A	B	X	63	57	53	61	52	71	74	76	70	70	74	80	78	70	68	68	57	47	A	A		
11	A	A	A	A	O	X	49	74	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
12	A	A	A	58	A	X	55	66	73	75	75	81	87	88	92	91	87	86	79	72	64	60	60	57	66	
13	A	A	62	A	O	X	63	43	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
14	65	39	X	A	X	B	X	A	A	X	A	O	X	A	X	X	X	X	X	X	X	X	X	37		
15	56	102	O	X	51	61	79	B	A	A	A	O	X	52	60	68	79	86	100	102	92	81	70	72		
16	A	A	48	62	A	A	A	A	X	X	X	X	X	O	X	X	X	O	X	X	X	X	X	X		
17	A	B	A	48	A	X	49	52	58	62	70	71	79	86	82	84	88	83	81	76	47	47	51	49	50	
18	X	47	57	52	54	54	65	70	77	80	86	85	87	88	84	82	81	80	76	70	68	54	57	50	59	
19	A	A	A	A	X	X	59	58	61	54	61	B	64	65	63	68	66	66	66	67	62	63	54	50	42	42
20	O	X	A	A	48	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
21	A	A	A	A	X	58	59	65	67	72	80	85	90	95	88	74	73	71	66	60	57	57	49	52		
22	A	A	78	58	51	53	58	72	76	76	78	84	85	106	105	95	62	A	A	O	X	X	A	A	A	
23	O	X	A	A	A	A	A	57	49	48	B	X	X	X	X	X	X	X	X	X	X	X	X	X	64	
24	X	37	55	48	A	A	53	41	70	55	57	58	62	64	68	70	69	63	60	55	52	52	51	56		
25	50	52	X	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
26	X	52	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	68	
27	A	40	X	X	A	A	X	57	70	72	84	74	76	77	75	80	80	80	68	56	58	51	40	40	A	
28	A	50	O	X	51	A	A	A	58	62	67	71	73	73	78	81	83	81	79	59	45	A	A	O	X	A
29	56	43	X	58	58	41	X	B	A	A	B	O	X	B	B	O	X	X	B	X	X	X	X	X	A	
30	O	X	A	A	X	56	62	O	X	R	X	B	B	X	X	O	X	X	X	X	X	X	X	X	X	
31	A	A	O	X	A	57	56	B	R	A	X	X	O	X	X	X	X	X	X	X	X	X	X	X	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	15	15	17	21	17	20	19	20	24	28	27	27	29	29	31	30	31	29	30	31	29	25	23	22		
MED	47	50	51	57	54	56	57	62	66	68	71	73	77	80	82	80	73	69	66	58	51	50	44	53		
U Q	56	57	58	62	61	59	62	72	72	74	76	80	84	85	91	88	80	77	70	64	57	56	57	64		
L Q	O	X	X	X	X	X	X	X	X	O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	39	39	46	50	48	50	53	56	60	56	61	65	67	73	76	74	69	61	59	54	48	45	40	42		

OCT.2022 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT.2022 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

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	A	A	F	F	F	F																			A	
2	A	A	40	27	A	A									B							A				
3	A	22	B	39	A																F				R	
4	A	F	F	F	A	A																			A	
5	A	A	53	51	R	A	A																		A	
6	A	A	F	F	F	F	R	R																	A	
7	R	A	A	A	B	A																			A	
8	20	R	F	30	F	51	50																		A	
9	A	A	A	F	A	A																			A	
10	F	A	B	J	R	F	F	F																	A	
11	A	A	A	A	R	F	A	A																	A	
12	A	A	A	F	A																				A	
13	A	A	A	A	R	R																			A	
14	A	33	A	35	B	A	A	J	R	A	R	A													A	
15	F	A	R	F	A	B	A	A																	A	
16	A	A	F	A	A	A	A	A																	A	
17	A	B	A	F	A																				A	
18	41	F	46	46	48	48	59	64	71	74	80	79	81	82	78	76	75	74	70	64	59	48	38	18	A	
19	A	A	A	A	53	52	55	48	49	F	B	F	F	F	F	F	60	60	60	61	56	57	48	44	36	36
20	Z	R	A	A	F	A	A																		A	
21	33	44			38		59	64	68	68	73	76	76	73	67	64	58	56	65	65	50	46	36	30	F	
22	A	A	F	51	52	42	47	52	58	65	59	64	72	79	100	99	82	56							A	
23	A	R	A	A	A	A	A	F	45	43	42														A	
24	31	F	F	A	A	A	F	A																	A	
25	F	33	46		32	40	50	56	66	68	72	74	77	79	79	75	72	64	65	63	52	41	37	42	48	
26	46	52	52	56	61	70	78	84	83	83	83	80	74	79	75	73	73	68	62	62	52	43			A	
27	A	34	39	A	A	A																			A	
28	A	F	R	F	A	A	A																		A	
29	F	44	37	41	44	35	B	A	A	B	R	B	B	R	B	B									A	
30	R	A	A	A	F	F	R	A																	A	
31	A	A	R	A	F	B	A	A																	A	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	11	13	16	20	16	18	19	20	23	28	27	27	29	29	31	30	31	29	30	30	26	23	20	12		
MED	33	41	40	44	43	48	50	54	58	59	64	67	68	72	76	74	66	63	58	51	45	43	36	31		
U Q	F	44	46	46	51	50	51	56	59	65	67	70	73	78	79	82	82	74	71	64	57	48	45	42	42	
L Q	32	32	F	35	41	F	45	48	50	50	54	58	60	66	70	68	63	55	52	44	41	38	F	31	24	

OCT.2022 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT.2022 ftEs (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT.69°00.4'S LON.039°35.4'E OSWEEP 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	30	30	18	18	K 30	G	30	23	G	32	34	G	29	29	30	33	G	G	20	G	21	E B 11	K 11	K 30	
2	42	36	38	33	45	50	50	32	G 25	27	34	31	G	B 48	B 48	B 32	B 34	31	18	38	20	20	20	28	
3	40	16	60	36	79	26	46	30	B 36	B 35	G	B 32	B 36	B 37	B 33	G	38	G 26	B 23	B 22	56	66			
4	53	34	34	43	48	54	34	57	51	26	B 36	B 36	G	B 37	B 30	G 22	B 22	22	26	16	28	61	51		
5	36	87	36	39	50	46	G	60	E 40	B 35	G	G	G	G	30	G 28	B 25	B 24	B	24	39	36	48		
6	52	52	28	48	19	20	G	E 40	B 33	38	39	E 40	B 44	B 37	B 47	B 47	27	28	32	29	29	85	39	52	
7	41	63	44	49	B	46	46	64	B	E 32	B 31	B 32	B 50	B 33	B 35	B 32	26	37	43	E 38	B 25	B 48	B 40		
8	24	25	K 30	32	28	19	40	53	44	G 51	B 35	B 35	G	35	33	32	G	B 30	19	36	44	49	53		
9	51	47	40	28	K 59	56	44	60	42	38	44	B 46	B 46	G 33	B 29	35	28	30	40	30	44	48	56		
10	30	59	B	38	82	22	36	42	44	42	G	G	G 32	E 45	B 50	B 45	39	G	G	K 18	20	37	29	32	
11	50	60	40	55	59	G	48	44	G	E 33	B 33	B 36	B 40	B 35	B 37	G	G	E 23	B 19	B 34	B 10	29	34		
12	57	42	54	38	G	44	G	24	27	27	G	G	G 32	G 32	31	28	G	G	E 22	B 17	E 11	B 10	32	49	
13	54	55	54	46	53	23	52	36	34	29	G	27	G	34	G	G	G	26	22	G 11	B 12	32	44		
14	44	76	68	71	60	33	32	56	49	60	64	48	E 36	B 39	E 50	B 35	35	35	33	46	29	28	17	26	
15	34	47	40	38	50	B	41	59	47	45	G 34	B 29	G 29	B 36	G	G	G	26	G 21	30	37	41	52		
16	58	40	56	39	54	55	52	52	37	G	G	G 34	B 30	B 46	B 46	G 41	B 30	22	E 14	B 16	K 17				
17	89	B	43	47	39	39	34	33	33	G	G	33	35	40	34	36	28	G	G	26	20	16	30	15	
18	15	15	21	26	18	18	G	G	29	G	G	32	32	32	29	31	33	40	18	29	18	E 14	B 11	B 36	
19	40	45	57	46	35	41	46	44	43	B	40	G	G	G	G	28	30	28	25	E 23	B 20	B 20	14	10	E 10
20	15	38	50	48	36	55	52	33	33	31	G 35	B 34	G	G	G	24	26	G	G	26	26	23	E 20	B 19	K 26
21	36	78	70	46	48	38	37	G	G	33	G	G 38	B 31	B 38	B	G	32	G	G	17	G	G	13	30	
22	51	66	45	41	42	47	42	40	40	G	B 34	B 32	G	45	32	45	35	G	51	46	33	35	59	57	54
23	44	40	52	49	48	43	47	42	38	G	B 34	B 32	G	30	G	26	22	30	G	22	44	46	54	36	
24	22	28	21	52	54	45	33	30	48	E 39	B 36	B 36	B 47	B 36	B 32	30	29	34	32	23	19	12	14	29	
25	29	35	51	28	29	35	43	32	28	G 33	35	35	G	G	G	G	G	G	24	22	G	G	15	15	
26	12	15	18	24	23	G	G	G 36	B 31	G	36	38	37	33	33	33	30	33	26	G	16	25	42	46	
27	57	38	80	76	52	44	48	47	39	36	38	38	G	G 34	G	G	G	32	38	40	21	37	35	43	
28	37	40	29	21	65	55	56	47	48	40	37	E 34	B 36	B 34	B	G	31	G	27	G	70	106	58	49	
29	40	35	36	30	28	B	52	63	B	50	B	B	B 43	B 43	B	G	B 33	B 37	B 37	26	30	25	33	45	
30	93	51	47	32	32	G	27	48	48	B	B 49	B 38	B 50	B 50	B	G 29	B 33	B 37	B 37	26	30	29	20	38	38
31	92	56	40	44	33	41	B	51	49	G	G	G 49	B 36	B 32	B	G 33	B 27	B 28	47	G	39	50	41		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	30	30	31	30	29	30	31	28	29	27	28	29	29	31	30	31	30	31	30	31	31	31	31	
MED	41	41	42	39	46	41	42	42	38	E 31	G 34	G 34	G 36	E 36	B 33	B	G	G	G	G	22	25	33	40	
U Q	53	56	54	48	54	46	48	53	46	38	37	36	E 37	B 40	B 37	B 35	B 32	G	31	29	30	39	48	49	
L Q	30	35	34	32	30	21	32	33	G	G	G	G	G	G	G	31	G	G	27	24	21	16	14	16	29

OCT.2022 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT.2022 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT.69°00.4'S LON.039°35.4'E 0SWEEP 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	7	10	11	9	9	15	9	6	9	11	12	12	13	11	15	12	15	9	11	9	9	11	7	8
2	9	12	10	10	11	15	12	10	10	12	12	12	11	B	48	48	32	34	17	8	10	10	10	10
3	10	10	39	19	12	14	20	16	B	36	20	B	32	36	37	21	16	16	16	26	23	8	15	10
4	22	20	7	21	22	22	18	35	16	16	B	36	20	B	37	30	15	22	12	10	8	8	9	25
5	14	32	18	15	23	38	16	27	28	35	24	24	22	20	22	20	28	14	24	18	9	8	6	10
6	13	20	10	13	8	11	14	18	33	19	24	40	44	37	47	47	17	14	14	10	7	10	7	14
7	6	25	14	15	B	35	20	47	B	19	14	32	B	50	33	35	32	21	11	43	38	25	8	8
8	8	8	8	8	13	10	17	17	14	16	51	35	18	18	19	16	13	B	30	10	9	11	11	24
9	16	18	14	20	39	20	35	24	24	28	44	B	46	21	33	29	13	17	18	10	7	14	14	10
10	18	24	B	22	20	11	26	33	44	14	16	16	16	45	50	45	39	15	16	10	7	7	10	12
11	10	20	24	18	36	26	29	26	20	24	32	32	36	40	35	37	16	15	23	19	15	10	8	8
12	23	11	15	14	31	23	17	12	11	11	12	14	14	13	12	12	20	12	11	10	11	7	10	14
13	16	28	32	20	38	14	12	10	10	10	19	16	20	24	24	22	23	14	21	14	11	12	10	9
14	9	11	13	12	43	20	11	17	24	23	15	25	36	24	50	38	24	16	9	7	9	6	6	7
15	9	10	10	11	8	B	18	20	14	24	23	34	13	13	36	21	17	14	12	11	10	6	6	16
16	22	12	11	7	16	22	17	18	12	10	13	34	16	46	46	13	41	13	13	30	10	14	6	8
17	12	B	16	14	24	15	11	10	13	11	9	16	16	12	13	11	11	11	14	8	11	12	8	7
18	9	9	8	10	9	6	11	11	11	15	20	14	18	15	12	9	10	11	12	7	7	14	11	9
19	12	14	14	15	17	21	15	14	12	B	18	18	20	17	16	14	10	10	23	20	20	9	8	10
20	7	8	16	12	14	17	12	10	9	9	11	35	17	17	21	16	12	10	11	16	11	20	10	6
21	8	22	21	20	14	14	11	11	11	12	15	38	31	38	16	12	15	13	17	13	12	10	7	7
22	10	10	8	10	16	15	11	11	16	11	18	14	45	16	45	35	12	12	11	6	8	7	8	13
23	12	11	6	16	20	9	12	12	19	27	B	34	22	18	14	15	12	11	10	10	7	9	14	8
24	10	8	10	16	16	12	10	9	11	39	36	22	47	36	31	15	29	34	32	18	13	8	10	10
25	8	8	15	13	16	12	12	9	11	14	33	19	25	15	26	22	21	16	12	9	11	9	9	9
26	8	8	7	7	7	14	18	18	36	22	22	17	21	18	14	18	11	10	12	12	9	6	8	10
27	13	9	11	18	35	18	11	14	10	10	10	14	27	24	17	17	17	8	8	12	10	7	8	8
28	13	10	7	9	16	15	13	13	22	16	11	34	21	36	34	22	15	9	19	16	9	17	8	9
29	8	8	7	8	8	B	17	38	B	22	B	B	B	43	14	B	33	20	9	9	10	7	8	14
30	10	22	15	23	14	10	16	34	20	B	B	49	38	50	50	18	29	10	13	11	16	8	6	16
31	16	23	20	28	15	22	B	31	22	17	24	24	49	36	32	22	33	27	11	11	10	17	8	8
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	10	11	13	14	16	15	15	16	16	16	20	25	22	24	31	21	17	14	13	11	10	9	8	10
U Q	14	22	16	19	24	22	18	26	24	24	33	35	38	40	37	35	29	17	18	16	11	12	10	13
L Q	8	9	8	10	12	12	11	11	11	11	13	16	17	17	16	15	13	11	11	9	9	7	7	8

OCT.2022 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT.2022 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	A	216	A	A	246	240	212	200	H	226	210	202	212	218	214	208	E A	220	212	206	236	246	A				
2	A	A	A	A	A	A	A	280	202	H	H	218	210	B	B	E B	272	230	226	248	234	A	A	A	A	A				
3	A	A	B	A	A	A	A	252	274	A	B	E B	240	E B	252	282	232	308	314	266	E B	E A	252	294	A	E A	274			
4	A	A	A	A	A	A	A	A	A	238	B	254	266	B	E B	256	228	240	E B	238	222	220	224	A	A	A				
5	A	A	A	A	A	A	E A	A	A	A	A	280	210	232	246	228	204	210	228	238	252	240	308	A	A	A				
6	A	A	A	A	226	E A	A	352	A	E B	274	266	278	B	E B	E B	296	334	294	244	234	A	E A	246	292	A	A	A		
7	296	A	A	A	B	A	A	A	B	H	200	222	212	234	B	B	E B	E B	E A	A	E B	E B	302	260	284	358	Q	E A		
8	A	A	A	A	A	206	A	A	E A	E A	A	B	E B	H	232	232	226	244	B	218	198	A	A	A	A	A	A	A		
9	A	A	A	A	A	A	A	A	A	A	286	B	B	B	E B	230	246	240	E A	268	232	264	282	A	A	A	A	A		
10	202	A	B	A	E A	A	E A	A	A	B	H	236	206	208	216	B	B	B	268	242	230	232	254	A	A	A	A			
11	A	A	A	A	E B	A	A	A	A	A	260	240	218	218	256	E B	288	242	242	228	242	222	230	96	214	A	A	A		
12	A	A	A	A	A	A	A	E A	H	276	216	200	230	212	214	222	202	220	220	218	230	232	222	230	240	A	A	202		
13	A	A	A	A	E A	E A	A	A	A	A	204	200	218	226	210	202	214	214	228	224	234	218	218	222	260	A	A	A		
14	196	E A	A	A	B	A	A	A	A	202	A	A	A	E B	304	268	412	284	272	A	A	A	256	256	300	370	E A	E A		
15	212	A	A	A	204	B	A	A	A	A	300	252	232	206	218	240	214	198	220	E A	228	218	214	A	A	A	A			
16	A	A	238	A	A	A	A	A	A	A	H	214	196	216	242	224	B	B	222	222	286	258	246	252	252	340	E A	A		
17	A	B	A	A	E A	A	A	E A	A	E A	490	268	204	222	232	214	206	210	198	208	208	224	214	238	228	228	240	246	A	
18	246	294	308	344	316	262	254	236	214	214	200	H	212	194	200	198	212	218	E A	226	198	198	202	256	290	290	290	A		
19	A	A	A	A	A	A	A	A	A	A	262	B	A	240	222	206	228	224	220	214	232	234	234	232	232	256	256	256		
20	274	A	A	A	A	A	A	E A	A	A	A	H	262	206	196	196	244	210	222	214	202	H	204	238	218	230	228	234	260	260
21	A	A	A	A	A	A	A	A	228	214	200	232	284	218	246	228	204	200	200	230	218	218	224	232	316	E A	E A	316	A	
22	A	A	H	H	A	E A	A	356	232	196	214	208	192	B	218	B	E B	E A	A	A	A	234	A	A	A	A	A	A	A	
23	A	244	A	A	A	A	A	E A	E A	E A	A	B	E B	266	232	218	216	224	224	252	250	E A	286	A	A	A	A	186	A	
24	270	A	E A	A	A	A	A	A	A	A	A	B	E B	298	238	B	E B	264	236	210	224	252	238	222	E A	226	238	242	248	
25	A	A	A	A	E A	A	A	A	218	220	220	220	208	198	198	212	208	214	214	238	232	206	228	246	240	A	A	A	A	
26	254	266	284	296	E A	A	250	224	220	E B	246	208	216	216	216	210	210	198	206	224	224	224	198	246	A	A	A	A	A	
27	A	E A	A	A	A	A	A	A	A	A	A	H	256	204	190	218	212	208	220	234	204	230	A	E A	272	230	A	A	A	
28	A	A	A	A	A	A	A	A	A	E A	E A	A	276	224	210	220	220	E B	228	228	210	210	232	238	206	A	A	286	A	
29	A	A	A	208	A	B	A	A	A	B	B	B	B	B	B	B	B	B	B	E A	A	E A	E A	E A	E A	E A	E A	E A	A	
30	A	A	A	A	E A	A	A	A	A	A	B	B	B	E B	222	268	B	B	226	242	236	236	A	E A	E A	E A	A	A	A	
31	A	A	A	A	A	A	B	A	A	E A	A	A	254	226	B	204	230	230	242	246	246	E A	A	198	336	A	A	A	A	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23						
CNT	8	4	5	3	9	6	8	14	20	27	22	26	24	24	26	29	30	28	26	28	25	21	14	12						
MED	250	268	296	296	302	265	314	226	210	218	214	222	216	212	223	219	224	229	232	226	223	234	251	226						
U Q	272	299	308	344	389	312	364	262	261	266	232	238	236	239	240	241	244	242	246	252	255	256	286	328						
L Q	207	255	261	208	221	250	253	218	204	208	208	216	210	205	214	210	214	224	224	220	210	228	242	243						

OCT.2022 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV.2022 fxI (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		A	A	X	X	X		X	X	X	B	X			X	X	X	X	X	X	X	X	X
2	X	X	X	X	X	A	A	A	R	B	O	X		O	X		X	X	X	X	X	X	X	X
3	A			A			B	A	X	X	X	O	X	O	X		X	X	X	O	X	X	X	A
4	A	A	A	O	X	O	B	B	B	A	B	B	O	X	X	X	X	O	X	X	X	O	X	A
5	X		X	B	B		X	B	B			X	X		X	X	B		X	X	X	X	X	X
6	X	X	X		X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9	A	X		A	X			X	X	A		A	R	X	X	X	X	X	X	X	X	X	X	X
10	X				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
11	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12	A	A	O	X	A	X	X	O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
13	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
15	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
16	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
17	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18	X	X	O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
19	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
22	O	X	O	X	A	O	X	X	X	X	X	V	X	X	X	X	X	X	X	X	X	X	X	X
23	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
24	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
25	X	A	X	A		X	O	X	A	A	O	X			X	X	X	X	X	X	X	X	X	X
26	X		A	O	X	X		O	X	X		O	X	O	X	X	X	X	X	X	X	X	X	X
27	X	A	X	A	X	X	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
28	X	X	X	A	O	X	A	O	X	A	B	O	X	B	O	X	X	X	X	X	X	X	X	A
29	B	B			B	A	A	A	O	X	X	B	X	O	X	X	X	B	X	X	X	X	X	X
30	X	B	A	A	B	A	A	A	X	B	O	X			X	X	X	X	X	X	X	X	X	X
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	23	23	20	26	22	23	22	26	24	26	27	29	30	30	30	29	29	30	30	30	28	26	25
MED	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
U Q	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L Q	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

NOV.2022 fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV.2022 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT.69°00.4'S LON.039°35.4'E 0SWEEP 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 37	F 39	A	A	29	45	57	56	60	60	64	B	R 66	F 71	F 71	70	70	65	60	54	52	49	40	F 29
2	41	F 34	47	F 46	52	A	A	A	A	B	56	58	F 53	61	F 65	64	62	58	42	F 45	J 42	R 33	32	33
3	A	F 35	F 46	A	A	B	A	46	47	48	52	R 52	R 56	F 58	80	R 40	R 38	38	34	50	35	A	A	A
4	A	A	A	R 40	R 47	B	B	B	A	B	B	B	R 61	59	62	53	44	R 50	42	40	38	R 39	34	A
5	29	F 40	F 44	B	B	F 55	54	B	B	F 44	F 53	60	62	F 72	78	70	B	F 54	56	46	48	48	44	Z 45
6	42	44	46	F 50	52	F 63	70	F 79	87	88	91	81	77	74	72	72	72	F 72	F 66	60	65	F 59	F 63	F 57
7	F 50	44	40	F 49	F 60	F 62	F 78	F 81	R 80	R 82	F 83	80	81	83	89	79	60	F 55	F 60	R 45	F 44	49	A	A
8	F 44	F 46	F 31	F 48	F 46	U 41	R	R	A	R	R	F 55	F 52	F 68	64	50	R 38	46	42	44	F 41	A	A	32
9	A	37	39	A	46	A	Z 42	40	48	A	A	R	49	50	49	48	50	52	54	58	F 54	54	50	54
10	60	F 62	F 47	F 52	F 57	F 64	86	89	88	80	77	75	72	72	70	70	66	69	59	56	55	52	51	53
11	57	60	66	67	66	71	77	91	89	86	69	F 69	F 69	R 83	R 98	102	94	70	61	52	A	50	48	39
12	A	A	R 56	A	44	34	R 36	53	42	50	53	59	62	60	67	65	59	58	54	54	54	50	46	44
13	46	49	48	60	61	54	49	A	48	62	63	55	62	69	73	74	72	67	60	58	50	40	42	40
14	40	47	49	51	Z 62	63	72	81	F 78	76	72	73	74	75	67	61	61	60	62	59	55	52	F 42	36
15	41	46	54	54	Z 56	H 54	61	F 58	64	79	79	76	72	65	62	60	60	56	54	51	51	52	48	50
16	53	49	49	54	F 52	F 49	F 60	83	87	83	78	72	72	69	64	60	58	57	57	54	54	43	32	F 32
17	F 35	F 42	F 46	F 52	63	F 55	F 57	F 59	66	74	74	66	66	68	68	65	60	59	56	55	52	F 50	57	54
18	53	F 41	F 44	57	F 51	F 53	F 56	F 64	F 70	75	77	Z 67	F 69	65	65	65	65	66	57	54	50	48	A	53
19	F 45	51	A	A	57	R 46	50	62	64	64	68	64	62	60	63	62	59	58	58	56	54	51	46	45
20	F 33	A	46	A	A	A	J 45	R 55	F 60	62	57	56	55	59	53	56	53	52	52	52	50	46	A	39
21	A	45	A	A	50	46	F 40	R 41	48	55	53	55	56	56	55	63	55	54	49	44	48	44	41	39
22	R 44	R 45	A 48	U 48	46	49	58	63	63	73	80	66	56	54	56	56	56	56	56	53	52	48	48	42
23	42	44	47	F 45	51	F 55	F 59	F 69	F 86	86	87	86	77	77	78	72	64	62	58	58	49	51	F 48	F 32
24	F 32	46	46	F 53	F 52	F 62	F 68	F 74	F 79	A 83	A 86	R 77	F 77	F 72	F 71	Z 64	R 64	R 60	F 57	F 53	53	F 47	F 47	F 45
25	49	A	52	A	F 61	F 58	70	R 46	A	A	44	R 56	F 60	F 73	F 88	80	Z 64	50	F 42	F 46	45	42	39	
26	F 37	A	A	R 38	42	F 45	F 55	F 53	R 55	R 55	F 49	R 54	R 60	F 64	F 66	61	R 48	R 40	F 47	F 48	47	41	37	51
27	44	A	39	A	44	44	A	46	52	54	54	56	59	59	60	62	67	R 63	51	49	F 42	40	A	A
28	A	F 39	42	A	R 40	A	R 37	A	A	A	B	R 56	B	R 45	R 50	54	53	50	51	48	48	45	F 41	A
29	B	B	F 37	F 42	B	A	A	A	R 40	50	B	R 52	F 54	F 54	R 55	R 65	R 52	B	F 46	F 43	Z 50	48	42	36
30	40	B	A	A	B	A	A	A	49	B	R 59	F 60	60	55	60	62	R 56	R 47	44	45	42	41	F 39	F 32
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	22	23	18	25	22	23	22	25	24	26	27	29	30	30	30	29	29	30	30	29	27	24	25
MED	42	44	46	50	52	54	57	60	63	68	66	60	62	65	66	64	60	57	55	52	50	48	43	40
U Q	49	47	49	54	58	62	70	79	80	81	78	73	72	72	72	70	64	62	58	55	54	51	48	50
L Q	F 37	F 40	F 42	F 46	46	46	49	53	48	54	53	56	56	59	60	60	53	51	47	46	44	43	40	F 34

NOV.2022 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV.2022 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	41	30	52	94	21	96	43	31	G	36	G	B	E	B	E	B	E	B	E	B	E	B	E	B	K					
2	30	K	31	32	G	43	60	60	59	G	B	E	B	G	E	B	G	G	G	36	29	30	23	18	23	27				
3	50	25	39	91	58	B	43	40	40	G	37	E	B	E	B	E	B	E	B	A	E	B	34	34	32	44	18	42	52	36
4	56	88	84	58	62	B	B	B	53	B	B	B	E	B	E	B	E	B	E	B	K	35	35	34	39	34	39	G	43	
5	40	32	40	64	B	G	32	B	B	G	44	38	G	G	E	B	E	B	B	B	29	33	24	25	20	23	33			
6	33	37	41	39	36	G	G	36	36	35	35	35	41	58	56	38	G	E	B	E	B	E	B	E	B	E	B	E	B	19
7	R	26	29	G	22	27	29	29	E	B	31	31	E	B	E	B	E	B	G	G	G	38	48	48	34	32	40	66	79	
8	K	36	32	37	22	42	38	44	70	49	54	36	40	37	G	G	36	36	34	32	30	35	47	47	36	G	17			
9	49	30	32	68	35	55	G	30	39	57	57	39	33	G	35	G	G	G	30	26	26	21	17	G	17					
10	24	29	30	30	G	23	G	28	32	G	36	G	36	62	37	35	44	38	G	G	G	G	26	15						
11	E	B	16	23	23	G	24	26	29	32	33	42	G	E	B	E	B	E	B	G	E	B	33	28	39	43	43	43	37	
12	44	46	35	52	38	31	G	39	39	38	36	36	G	42	48	48	37	G	G	30	26	26	20	14	16					
13	24	30	30	G	39	45	45	54	43	44	35	35	35	26	31	30	32	32	E	B	E	B	E	B	G	30	30	36	36	20
14	32	30	30	32	33	30	32	32	36	36	36	G	42	26	36	35	G	30	35	25	22	22	22	G	22	G	22	22	22	
15	16	18	24	27	28	30	45	40	G	39	41	35	33	33	34	35	30	32	44	G	E	B	E	B	E	B	14	G		
16	G	33	24	31	40	36	28	34	34	34	34	36	34	36	37	G	32	29	29	24	G	G	24	16	16	G				
17	G	22	19	G	29	45	48	34	G	36	38	38	G	G	38	G	G	G	39	G	25	24	31	19	G					
18	17	20	39	39	39	31	34	30	36	36	36	35	35	35	35	35	35	35	43	26	26	35	27	77	39					
19	44	34	56	53	43	32	36	40	32	32	36	G	G	G	G	38	G	G	G	34	22	G	18	31						
20	G	41	42	48	44	49	43	30	34	36	48	41	37	38	51	34	34	32	G	G	26	46	42	42						
21	46	29	104	46	36	30	36	42	46	37	34	38	38	42	33	G	G	G	27	26	28	28	18	34						
22	45	111	56	44	36	34	44	42	36	36	36	36	37	40	35	45	40	31	31	31	22	19	18	18						
23	18	20	34	30	33	28	28	31	37	37	35	37	37	42	38	32	36	45	33	25	24	20	20	35						
24	G	35	35	46	44	35	32	40	36	36	35	38	38	38	38	34	G	31	31	29	37	30	18	21						
25	42	112	93	56	28	32	32	36	61	61	37	35	39	G	34	G	33	36	36	42	42	44	45	44						
26	105	104	110	44	34	47	40	45	47	58	46	E	B	E	B	E	B	E	B	G	E	B	34	32	38	38	46	40	26	45
27	41	88	57	55	29	E	B	54	G	38	34	34	G	E	B	G	G	E	B	E	B	30	40	38	30	40	42	94	45	
28	41	30	30	35	98	53	38	53	90	50	B	G	B	35	36	G	G	G	G	G	23	23	20	72						
29	B	B	33	33	B	55	64	61	46	G	B	E	B	E	B	E	B	E	B	B	30	42	35	32	40	38				
30	34	60	64	50	B	68	52	45	45	B	E	B	G	G	42	G	E	B	E	B	34	46	38	32	32	35	43	96	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	29	29	30	30	27	28	29	28	29	27	27	28	29	30	30	29	29	29	30	30	30	30	30	30	30					
MED	34	31	36	42	36	34	36	38	36	36	36	G	E	G	E	G	E	G	G	32	30	30	26	29	23	34				
U Q	44	44	56	53	43	48	44	44	46	44	41	38	40	42	37	36	G	37	34	34	35	40	45	43						
L Q	19	29	30	30	29	30	28	30	G	G	35	36	G	G	G	G	34	G	G	26	25	22	22	18	21					

NOV.2022 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV.2022 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	8	13	20	14	8	16	10	10	10	10	15	B	45	36	36	22	16	36	29	30	23	15	6	8	
2	16	16	15	22	21	17	17	15	15	B	46	17	15	47	24	22	21	10	12	16	10	14	12	10	
3	26	13	16	12	20	B	14	10	12	12	24	47	48	35	35	15	34	9	8	11	6	13	9	6	
4	12	6	8	17	36	B	B	B	22	B	B	B	35	34	35	35	18	20	11	11	11	12	16	7	
5	19	10	21	56	B	16	18	B	B	36	25	22	22	17	47	52	B	16	11	14	12	10	7	8	
6	9	11	19	14	13	13	12	14	11	15	14	15	14	12	25	15	15	34	32	27	29	25	19	12	
7	9	17	12	8	10	12	9	10	31	16	36	36	36	15	10	12	12	10	8	8	6	7	6	37	
8	7	6	7	8	8	6	13	18	16	36	19	16	17	14	23	13	13	11	8	9	8	12	7	8	
9	14	11	10	15	10	24	16	19	16	16	16	14	15	16	12	22	16	16	15	13	11	10	10	10	
10	8	8	6	9	7	7	8	12	29	22	15	16	16	16	12	11	9	10	10	14	14	14	15	6	
11	8	16	9	12	14	13	9	13	10	33	17	12	54	60	34	15	26	32	14	10	10	8	7	6	
12	9	10	6	22	9	11	9	9	11	14	16	16	16	13	13	11	14	12	9	9	10	9	6	8	
13	5	8	8	12	12	12	13	18	19	12	13	11	12	12	18	30	33	32	16	16	9	8	8	8	
14	8	8	8	9	8	8	6	9	9	8	16	16	18	13	16	20	15	9	17	9	13	10	10	7	
15	8	9	7	8	6	10	12	7	9	17	34	15	12	12	15	9	8	8	8	12	9	19	14	8	
16	8	10	7	8	11	10	9	8	9	8	9	8	12	12	9	10	10	8	10	11	8	9	8	10	
17	10	8	6	7	9	11	10	10	10	12	12	12	11	12	12	11	11	12	10	8	8	7	6	6	
18	8	7	11	10	8	8	8	8	8	8	11	12	12	13	15	9	12	11	14	11	9	10	9	12	
19	8	6	10	17	11	10	15	9	11	9	13	14	14	14	13	16	18	15	10	9	11	9	7	7	
20	11	11	8	11	8	12	9	8	8	12	8	8	11	9	10	10	10	10	10	8	8	10	10	12	
21	12	7	22	11	9	9	9	18	14	9	14	11	12	16	11	11	16	20	10	8	10	7	7	7	
22	13	14	14	14	8	10	14	9	10	10	9	11	13	11	13	10	10	12	8	10	8	7	8	7	
23	8	7	11	10	10	9	9	9	9	6	9	9	9	8	8	8	8	8	8	6	8	6	6	11	
24	7	8	8	14	8	8	10	10	7	8	16	13	6	11	11	10	10	10	10	9	7	7	7	7	
25	11	9	8	11	8	15	9	17	14	14	10	12	17	18	22	11	13	11	10	12	9	7	10	10	
26	8	16	12	12	12	16	19	18	16	25	17	44	46	45	33	12	34	9	12	14	14	8	6	16	
27	6	8	30	13	12	40	34	20	16	14	11	11	11	36	21	20	16	40	38	12	12	18	9	12	
28	6	7	6	6	8	24	10	15	55	18	B	23	B	35	36	24	13	13	16	16	8	9	7	9	
29	B	B	9	7	B	15	15	15	15	30	B	37	35	35	36	50	14	B	14	8	14	12	9	14	
30	10	37	22	30	B	21	34	15	12	B	49	16	11	9	23	16	46	38	15	23	8	10	16	7	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	
MED	8	10	10	12	10	12	11	12	12	14	16	15	15	14	17	14	14	12	10	11	10	10	8	8	
U Q	12	13	15	14	13	16	15	18	16	25	25	22	35	35	33	22	18	20	15	14	12	12	10	11	
L Q	8	8	8	9	8	10	9	9	10	10	12	12	12	12	12	11	11	10	10	9	8	8	7	7	

NOV.2022 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV. 2022 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 282	A	A	A	206	A	A	226	224	200	206	B	Y	B E B 210	250	220	216	E B E B E B 240 246 236	236	244	264	324	A	A
2	A E A 226	A	A	A	A	A	A	A	A	B	B	220	208	B	228	224	224	240	A	A	206	A	A	318
3	A E A 402	A	A	A	A	B	A	A	A	A	A	B	B	E B 266	272	A E B E A E A 302 252 268	216	202	202	298	A	A	A	
4	A	A	A	A	A	B	B	B	A	B	B	B	242	234	240	B E A E A E A 250 242 274	222	E A 298	A	A	A	A	A	
5	A	A	A	B	B	A	A	B	B	B	E A 208	224	222	218	B	B	B	232	252	248	136	A E A 262	A	A
6	A E A 320	A	A E A E A 346 258	258	H 210	H 216	214	208	208	208	208	208	208	208	208	208	E B 244	244	234	250	226	240	E A 242	
7	E A 270	A	A E A E A 308	328	272	232	228	210	194	234	218	202	236	218	232	E A 282	200	218	260	E A 242	220	A	A	
8	A	A	208	198	198	210	A	A	A E B 256	206	206	E A 238	230	E A 270	226	202	238	236	278	E A 270	A	A	A	
9	A	A	A	A	A	E A 246	A	A E A 238	A	A	A	228	202	202	H 196	220	220	220	234	234	234	200	E A 236	252
10	E A E A E A 276 286 268	A	A	A	274	206	224	218	218	228	210	210	206	224	198	210	216	214	214	234	224	242	E A E A 236 240	A
11	E A E B E A E A 254 276 290	314	278	244	232	200	216	220	256	210	B	B	228	216	216	222	224	A	A	A	A	254	A	
12	A	A	276	A	A	A	E A 218	272	222	202	256	216	208	224	204	210	220	202	228	230	E A E A 236 236	220	258	
13	238	E A 292	A E A 274	A	A	A	A	A E A 274	204	196	202	216	202	H 202	230	204	226	226	222	242	E A E A 266	288	258	
14	E A E A E A 262 290 284	224	278	246	242	228	204	202	200	200	200	216	204	224	214	204	212	212	218	E A 236	232	232	A	
15	232	E A E A E A 258 284 262	276	248	254	256	194	210	220	196	202	202	202	H 192	200	212	216	216	E A 230	242	214	240		
16	256	A	312	238	226	218	216	220	206	196	220	204	200	200	214	198	224	232	226	236	246	200	200	
17	A	A	200	A	242	260	208	202	198	202	202	202	206	200	208	218	212	228	212	200	212	242	234	
18	E A 246	286	A	A	258	242	216	196	194	202	200	198	210	202	200	200	242	220	232	232	232	A	204	
19	A E A 274	A	A	A	E A 252	266	240	216	200	204	232	220	208	204	218	218	208	206	228	E A 228	238	250	272	
20	278	A	A	A	A	A	200	202	202	A	H 192	216	192	202	200	226	206	206	222	234	A	A	A	
21	A	294	A	A E A E A 276 260	212	E A E A 356	232	204	192	198	210	204	220	228	212	212	232	222	238	244	A E A 290	A	A	
22	A	A	A	A	E A 306	256	256	228	202	202	210	198	198	208	208	210	214	214	224	222	232	238	254	
23	248	276	A E A E A 286 266	244	218	208	208	208	194	202	192	200	200	202	200	208	210	216	216	234	248	290	A	
24	276	A	A	A	E A 262	214	214	206	198	208	208	204	230	214	202	210	218	206	216	224	224	242	236	
25	A	A E A 286	A	A E A E A 234 244	218	200	186	194	214	214	214	208	208	214	A E A E A 306 306	A	A	A	A	A	A	A	A	
26	204	A	A	A	A	A	A	A	A	A	270	E B 458	426	392	222	210	E B 260	184	E A E A E A 278 258	288	288	264	184	
27	E A 304	A	B	A	E B 292	446	256	216	202	194	202	194	234	202	218	212	290	282	234	A	A	A	A	
28	A	196	A	A	A	E A 286	A	A	A	A	B	220	B 268	234	198	228	222	228	228	228	250	218	A	
29	B	B	A	A	B	A	A	A	204	A	B E B E B E B 226 268 264	240	B	H 214	B E A 232	A	E A E A E A 310 260 282	A	A	A	A	A	A	
30	E A 318	B	A	B	B	A	A	A	A	B	B	216	198	202	222	266	B E B 280	208	240	A	A	A	324	
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	10	8	14	16	17	20	22	21	23	27	26	28	29	27	28	29	28	27	27	19	19	18
MED	U 247	E A U 284	A U 242	E A U 268	U 265	234	228	222	212	202	205	208	206	209	211	210	214	216	222	227	228	234	239	247
U Q	276	E A E A E A 292 286	297	292	259	254	256	222	212	220	220	216	232	229	220	225	240	240	240	250	244	262	290	
L Q	246	E A 274	A 208	A 231	242	244	218	212	206	201	196	202	202	202	202	204	208	212	214	222	224	226	232	236

NOV. 2022 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

DEC.2022 fxI (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	A	A	A	X 51	X 50	A	A	B	A	O 48	X 48	X 57	69	71	59	63	62	X 52	X 53	X 52	50	48	46	
2	B	B	54	56	64	O 48	A	A	A	X 57	O 61	X 69	O 75	X 74	B	X 62	X 58	X 56	X 50	X 50	X 46	X 56	X 58	X 44	
3	A	A	A	54	B	54	A	A	A	O 57	X 64	X 64	X 64	X 68	B	X 68	O 60	X 54	X 57	X 53	X 49	X 52	X 50	X 48	
4	X 45	X 47	A	X 54	X 55	X 59	X 69	X 76	X 78	X 81	X 68	X 69	X 70	X 70	X 71	X 71	X 61	X 46	111	A	A	76	53	54	
5	O 42	X 45	X 57	X 51	X 56	X 58	X 68	X 73	X 71	X 74	X 75	X 77	X 78	X 77	X 79	X 86	X 48	X 54	X 53	X 56	X 59	X 61	X 58	X 52	
6	X 58	X 59	60	X 57	X 58	X 62	X 78	X 82	X 94	X 97	X 93	X 86	X 82	X 78	A	X 69	X 68	X 65	X 64	X 57	X 57	X 52	X 46	X 47	
7	X 50	X 51	V 54	X 58	X 60	X 56	X 59	X 71	X 86	X 90	X 89	X 86	X 85	X 82	X 79	X 76	X 61	R	X 46	R	A	X 64	X 58	X 55	
8	A	A	46	45	X 46	O 45	54	X 46	58	64	56	54	57	60	62	63	61	62	58	59	56	53	50	57	
9	A	A	A	A	X 48	O 43	X 60	X 46	65	66	70	72	70	78	80	73	66	62	60	60	60	54	59	57	50
10	X 52	O 58	A	A	X 52	O 42	A	A	56	63	59	57	57	59	61	67	61	59	59	55	52	46	A	50	
11	O 51	A	X 58	O 51	X 62	X 48	A	X 61	X 48	A	A	O 59	X 60	X 56	X 60	X 64	X 61	X 57	X 44	X 50	X 55	X 54	X 54	X 54	
12	A	A	A	B	A	X 54	X 55	X 63	X 59	X 63	X 66	X 71	X 66	X 67	X 70	X 69	X 68	X 64	X 66	X 60	X 61	X 61	X 53	X 42	
13	X 50	X 51	A	A	X 55	X 58	X 68	X 70	X 74	X 77	X 76	X 64	X 66	X 63	X 64	X 62	X 64	X 63	X 65	X 64	X 58	X 56	X 55	X 54	
14	X 57	X 54	X 58	X 62	X 67	X 82	X 89	X 94	X 97	X 92	X 90	X 85	X 80	O 74	X 72	O 70	X 67	X 66	X 64	X 65	X 56	X 45	X 52	X 56	
15	X 52	O 54	X 56	X 56	X 69	X 60	X 46	A	A	59	60	62	64	63	65	67	64	64	64	64	56	49	52	54	
16	X 52	X 52	X 55	X 62	A	A	X 58	X 66	X 71	X 74	X 74	X 64	X 63	X 61	X 61	X 62	X 63	X 64	X 64	X 61	X 63	X 56	X 49	X 46	
17	O 54	X 48	X 56	X 58	X 56	X 60	X 63	X 77	X 82	X 86	X 84	X 78	X 72	X 74	X 70	X 69	X 65	X 64	X 68	X 65	X 62	X 62	X 62	X 61	
18	X 61	X 68	X 72	X 80	X 77	X 80	X 85	X 95	X 101	X 104	X 88	X 79	X 77	X 77	X 79	X 81	X 77	X 72	X 70	X 66	X 62	X 56	X 52	X 50	
19	A	A	A	56	59	58	X 52	A	A	A	A	O 50	X 58	X 57	X 54	X 60	X 57	X 55	X 53	X 50	X 51	X 49	X 58	X 47	
20	O 51	X 47	A	X 59	O 46	X 52	R	O 56	X 62	X 60	X 60	X 63	X 64	X 66	X 64	X 64	X 62	X 64	X 61	X 61	X 57	X 59	X 56	X 45	
21	A	A	X 46	X 47	X 55	X 47	X 56	X 55	X 54	X 61	X 62	X 74	X 70	O 56	X 55	X 63	X 64	X 59	X 59	X 56	X 85	X 50	X 49	X 49	
22	51	77	48	56	54	58	65	72	76	77	76	77	74	72	72	64	64	57	53	62	68	54	47	58	
23	49	48	58	A	B	A	A	X 58	X 60	X 66	A	A	B	O 55	X 62	X 72	X 59	X 56	X 58	X 58	X 52	X 49	A	48	
24	X 46	X 50	A	A	A	65	A	A	A	A	A	O 50	X 64	X 73	X 66	X 67	X 50	X 56	X 50	A	O 48	X 58	X 55		
25	X 57	X 56	60	A	X 50	X 53	X 60	X 64	X 62	X 66	X 67	X 68	X 63	X 66	X 64	X 64	X 61	X 57	X 54	X 54	X 47	X 46	X 46	X 44	
26	O 46	X 54	A	X 49	O 57	X 64	A	O 55	X 68	X 66	X 66	X 70	X 79	X 81	X 88	X 90	X 54	R	X 60	X 76	X 50	X 50	X 49	X 54	
27	X 52	X 53	X 52	X 47	X 50	X 54	A	A	X 58	X 60	X 61	X 64	X 61	X 62	X 60	X 59	X 60	X 57	X 58	X 60	X 63	X 62	X 62	X 59	
28	X 46	X 46	X 49	X 50	X 50	X 54	X 76	X 86	X 82	X 86	X 84	X 84	X 80	X 73	X 72	X 71	X 68	X 65	X 60	X 54	X 52	X 54	X 48	X 52	
29	X 58	X 55	X 55	X 60	X 72	X 76	X 76	X 86	X 82	X 86	X 84	X 84	X 80	X 73	X 72	X 71	X 68	X 65	X 60	X 54	X 52	X 54	X 48	X 52	
30	X 54	A	X 56	A	B	X 57	O 55	A	A	A	A	A	O 56	X 67	X 79	X 70	X 49	X 49	X 68	X 59	X 54	X 83	A	A	
31	X 47	X 60	A	A	A	X 58	O 50	X 62	X 84	X 53	X 52	X 58	X 58	X 60	X 62	X 60	X 58	X 56	X 54	X 50	X 50	X 52	X 46	X 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	24	21	19	21	23	28	20	22	23	26	25	28	28	31	28	31	31	29	31	29	28	31	28	30	
MED	X 52	X 53	X 56	X 56	X 56	X 58	X 60	X 65	X 71	X 66	X 67	X 68	X 66	X 67	X 68	X 67	X 61	X 59	X 59	X 59	X 56	X 54	X 52	X 51	
U Q	X 54	X 57	X 58	X 58	X 62	X 60	X 68	X 76	X 82	X 86	X 80	X 77	X 76	X 74	X 72	X 71	X 65	X 64	X 64	X 63	X 62	X 59	X 58	X 54	
L Q	X 48	X 48	X 52	X 50	X 51	X 51	X 55	X 56	X 59	X 61	X 60	X 60	X 60	X 60	X 62	X 62	X 60	X 56	X 53	X 54	X 52	X 49	X 48	X 47	

DEC.2022 fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

DEC.2022 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

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	F	A	A	A	45	44	A	A	B	A	R	R	51	57	65	53	43	42	46	47	46	44	42	40	
2	B	B	Z	Z	40	42	A	A	A	51	55	63	69	68	B	56	52	50	39	43	40	50	46	38	
3	A	A	A	A	B	F	A	A	A	R	F	51	52	58	58	62	B	62	54	48	51	47	43	46	42
4	39	41	A	48	49	53	63	70	58	F	F	64	61	63	64	64	65	65	55	40	A	A	A	37	41
5	R	36	39	F	44	45	50	52	Z	62	67	65	68	69	71	72	70	73	80	42	48	46	51	53	56
6	52	53	F	51	52	56	Z	72	76	88	91	87	80	76	72	A	63	62	59	58	51	51	46	40	41
7	44	45	V	52	54	50	53	65	80	84	83	80	79	76	73	70	55	R	40	R	A	58	A	F	
8	A	A	40	39	40	39	R	48	40	F	F	49	44	50	48	51	54	56	57	55	56	52	53	50	47
9	A	A	A	A	42	37	R	54	40	Z	59	60	64	66	64	72	R	74	67	60	56	54	54	48	53
10	46	52	A	A	46	R	A	A	50	57	53	51	51	53	55	61	55	53	53	49	46	40	A	44	
11	R	45	A	R	45	A	F	42	42	42	A	A	R	53	54	50	54	58	55	52	38	44	49	48	48
12	A	A	A	B	A	48	49	57	53	R	R	57	60	65	60	61	64	63	62	58	60	54	55	55	47
13	44	45	A	A	49	52	62	64	68	71	70	58	60	57	58	56	58	57	59	58	52	50	49	48	
14	51	48	52	56	61	76	Z	83	88	F	F	F	F	F	R	R	66	64	61	60	58	59	50	39	46
15	46	R	48	50	50	63	54	40	A	A	53	51	56	58	57	59	61	58	58	58	58	50	43	46	F
16	46	46	49	56	A	A	52	60	65	68	68	58	57	55	55	56	57	58	58	55	57	50	43	40	
17	F	R	Z	F	50	54	F	57	65	76	80	78	72	66	68	64	63	59	58	62	59	56	56	56	55
18	55	62	66	74	F	F	F	62	81	97	98	82	73	71	71	73	75	71	66	64	60	56	50	46	44
19	A	A	A	F	F	F	A	A	A	A	A	R	44	52	51	48	54	51	49	J	R	47	44	45	43
20	R	F	A	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
21	A	A	40	44	49	41	50	49	48	55	56	56	57	58	60	58	58	56	58	55	55	51	53	50	39
22	F	A	42	50	46	52	59	66	70	71	70	71	68	66	66	58	58	51	47	41	R	62	48	41	R
23	F	42	52	A	B	A	A	A	52	54	60	A	A	B	R	49	56	58	53	50	F	42	52	46	43
24	40	40	F	A	A	A	A	A	A	A	A	A	R	A	R	58	67	60	61	44	R	50	44	A	R
25	51	50	47	A	44	47	54	58	56	60	61	62	57	60	58	58	55	51	48	48	41	40	40	40	38
26	R	40	48	A	43	51	F	45	R	F	60	60	64	73	75	72	84	41	F	R	F	40	40	44	44
27	46	47	46	41	A	A	A	A	A	A	B	B	A	R	A	R	42	56	42	47	50	45	48	A	R
28	40	40	43	44	R	R	A	A	A	52	54	55	58	55	56	54	53	54	51	52	54	57	56	56	53
29	52	49	49	54	F	70	F	62	74	76	80	78	78	74	67	66	66	62	59	54	48	46	48	38	F
30	48	A	50	A	B	51	R	49	A	A	A	A	A	R	50	61	73	64	R	43	43	47	53	48	A
31	41	Z	A	A	A	52	R	F	R	R	R	R	R	R	R	54	56	54	52	50	48	44	44	46	40
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT		24	20	19	20	22	27	20	22	23	25	25	28	28	31	28	31	31	29	30	29	26	30	27	29
MED		45	46	49	49	49	49	54	59	58	60	61	62	60	60	62	60	55	52	52	51	50	46	46	43
U Q		47	50	52	52	52	53	62	67	76	74	72	71	70	68	66	64	59	58	58	54	53	50	49	48
L Q		40	42	44	44	44	R	49	49	52	54	54	54	54	R	54	56	56	52	50	46	46	46	43	41

DEC.2022 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

DEC.2022 ftEs (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT.69°00.4'S LON.039°35.4'E 0SWEEP 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	59	82	59	55	G	B	50	B	50	48	34	B	B	34	G	E	B	G	G	25	31	30	38	56			
2	B	B	G	30	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	29	42	31	34		
3	48	52	36	44	B	28	54	62	52	39	G	G	E	B	E	B	B	G	E	B	G	G	34	31	38			
4	G	58	68	56	44	38	36	48	36	36	36	30	E	B	E	B	G	G	G	G	62	90	70	28	36	39		
5	50	34	41	56	32	G	38	35	35	G	E	B	E	B	E	B	E	B	G	G	38	32	35	41	38	30		
6	30	36	36	35	30	30	G	36	40	42	40	40	38	47	80	48	45	E	B	G	G	26	24	22	34	34		
7	34	31	32	32	40	44	44	41	46	39	39	37	39	36	36	35	41	48	34	34	24	24	19	37	35			
8	89	39	34	26	28	29	32	G	44	38	59	48	38	38	47	35	39	34	34	24	24	19	37	35				
9	71	69	75	62	38	32	33	32	43	38	38	38	G	G	E	B	E	B	E	B	E	B	28	27	38	32		
10	33	44	69	55	36	27	48	51	43	35	35	38	40	37	37	42	E	B	G	G	30	26	26	38	47	38		
11	80	63	21	62	28	32	55	42	37	44	59	G	36	38	G	39	G	32	35	35	33	37	36	33				
12	51	56	56	B	70	35	31	33	44	45	39	39	44	48	51	62	34	35	33	30	27	27	27	19				
13	36	41	64	53	42	36	G	36	36	38	G	38	38	38	36	33	37	36	36	30	26	E	B	34	30			
14	21	28	21	30	28	31	32	40	47	36	38	36	49	133	88	157	39	42	31	31	25	25	38	51				
15	42	37	42	42	40	41	38	58	55	49	42	J	A	40	41	41	37	33	G	G	G	G	26	26	34			
16	36	36	26	37	69	62	47	41	42	35	37	40	39	39	46	50	37	40	32	32	41	24	41	38	G			
17	41	27	25	32	36	40	40	47	52	46	42	37	35	36	36	39	33	34	34	28	32	22	G	G	G			
18	G	G	22	22	23	34	29	42	34	48	40	44	36	38	50	56	50	43	36	31	65	25	22	21	28			
19	54	57	60	37	33	36	37	50	55	58	64	66	44	42	61	41	35	35	35	32	43	47	47	70				
20	49	20	84	43	38	43	G	40	37	37	38	38	38	38	38	32	35	48	53	55	36	24	22	37				
21	56	48	34	34	32	33	44	40	33	37	37	39	39	68	42	38	40	39	42	51	34	40	36	36				
22	36	54	32	34	32	32	35	33	34	34	39	36	38	37	36	36	31	G	57	G	87	44	71	52				
23	42	39	34	46	B	59	52	42	36	40	64	53	B	E	B	62	36	35	35	36	39	41	38	38	62	36		
24	39	24	54	44	42	34	59	58	57	52	70	70	122	124	35	133	E	B	E	B	G	34	52	75	G	34		
25	38	30	28	59	35	32	32	35	67	37	41	74	46	72	43	34	G	G	G	33	25	26	30	G	G			
26	G	30	60	33	78	40	56	56	40	36	37	41	E	B	E	B	G	E	B	45	39	34	30	35	40	41	38	36
27	38	32	32	25	78	47	54	58	66	56	B	B	57	67	34	41	41	34	32	39	39	39	48	37				
28	34	30	57	37	67	127	64	63	40	38	38	38	38	38	38	36	36	30	E	B	31	27	27	24	22	28		
29	18	28	28	40	34	30	34	34	35	35	37	E	B	48	64	138	117	39	33	34	80	36	27	36	46	78		
30	27	62	40	58	B	43	32	82	56	54	72	70	55	45	127	G	G	G	41	36	41	38	49	49	50	48		
31	34	43	61	62	46	29	35	35	44	51	E	B	G	G	E	B	G	G	G	37	34	G	31	94	42			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	30	30	31	30	28	31	30	31	30	31	30	29	29	30	29	31	31	31	31	31	31	31	31	31	31			
MED	37	38	36	41	37	34	38	41	44	38	40	38	38	39	38	38	35	G	33	32	31	32	37	36				
U Q	49	54	60	56	45	41	52	52	52	46	46	48	46	56	50	42	39	36	37	37	41	40	46	39				
L Q	33	30	28	33	32	30	32	35	37	36	38	38	38	37	G	35	G	34	30	27	26	25	27	32				

DEC.2022 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

DEC.2022 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

$\frac{H}{D}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	9	22	14	26	7	9	37	15	B	22	19	26	34	33	15	23	33	11	10	12	8	6	16	10
2	B	B	24	8	29	35	36	18	22	35	45	48	52	56	B	35	18	32	14	37	14	14	8	14
3	15	10	24	24	B	9	22	14	25	14	14	24	35	34	B	23	39	14	10	12	8	8	9	7
4	23	15	24	20	14	12	10	14	15	9	8	20	38	16	11	14	10	16	20	11	24	9	7	7
5	15	8	18	7	9	11	9	8	10	10	46	40	39	34	17	15	16	12	13	9	8	9	7	7
6	5	9	10	12	10	9	10	8	15	24	24	17	12	11	12	9	23	35	16	9	8	6	9	14
7	21	14	10	13	16	17	10	10	14	12	11	9	8	10	10	11	17	20	11	10	11	7	7	8
8	10	7	6	7	9	8	8	9	10	11	20	18	19	11	11	14	10	8	10	8	8	7	8	6
9	8	7	14	12	16	6	8	10	14	11	12	14	23	8	50	36	35	14	14	18	13	12	9	9
10	10	8	10	14	7	8	14	14	12	9	12	12	11	11	14	34	35	18	10	7	6	8	12	12
11	27	20	9	11	10	11	12	12	10	14	15	26	23	24	24	21	23	10	9	12	11	11	12	12
12	32	22	15	B	15	8	8	7	7	20	21	14	12	14	13	11	11	11	10	10	8	10	9	10
13	8	13	14	14	14	10	10	10	10	10	10	10	10	13	13	13	13	12	9	10	10	36	11	10
14	8	8	8	8	8	7	9	12	14	14	14	14	10	16	11	17	16	10	15	10	8	10	12	15
15	11	11	11	7	10	9	10	11	14	19	19	18	14	27	20	14	16	21	16	10	10	10	8	8
16	10	8	11	14	14	16	10	12	12	12	13	13	13	14	14	10	8	10	10	10	10	7	9	9
17	9	14	9	10	8	10	12	10	14	14	14	10	10	10	10	10	10	9	7	8	10	8	8	8
18	8	10	8	10	9	9	7	10	8	10	13	12	14	10	10	12	16	16	16	10	7	8	7	8
19	8	10	8	6	8	8	10	10	14	11	17	10	15	15	16	18	9	20	9	9	8	8	10	8
20	8	8	7	12	8	11	8	10	7	11	11	11	14	9	9	11	10	11	10	7	7	8	6	7
21	13	10	6	9	7	9	8	8	11	8	12	10	12	16	18	18	15	10	13	12	8	10	8	8
22	16	8	6	6	8	17	13	8	8	8	8	10	10	14	10	10	15	19	17	16	9	7	6	16
23	11	9	8	15	B	24	11	13	11	10	26	24	B	24	36	18	9	9	9	9	9	5	6	12
24	15	7	14	24	9	10	16	20	20	31	23	22	36	36	35	35	36	34	24	8	10	12	16	11
25	22	9	8	43	14	14	10	13	18	11	29	23	20	20	15	11	15	15	15	8	8	8	20	20
26	18	7	12	16	19	13	24	21	14	15	9	13	46	54	27	45	10	8	8	8	8	8	8	8
27	8	9	8	10	18	15	22	12	20	21	B	B	16	22	14	11	10	8	8	11	11	11	12	8
28	13	8	18	23	25	14	16	12	10	11	11	10	11	11	11	14	13	11	31	12	10	7	7	7
29	8	9	8	8	7	13	10	9	7	7	23	48	38	17	14	10	12	10	20	9	8	6	10	8
30	8	15	10	42	B	35	16	12	18	13	18	42	26	16	19	18	11	9	9	10	16	8	12	9
31	7	8	20	13	16	8	9	9	22	14	37	15	23	19	36	24	11	14	8	8	18	8	13	10
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	10	9	10	12	10	10	10	11	14	12	15	15	16	16	14	14	15	12	10	10	9	8	9	9
U Q	16	14	14	20	16	14	16	13	18	15	23	24	35	24	24	23	18	18	16	12	11	10	12	12
L Q	8	8	8	8	8	9	9	9	10	10	12	11	12	11	11	11	10	10	9	8	8	7	7	8

DEC.2022 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

DEC.2022 h'F (KM)

45°E MEAN TIME (G.M.T. + 3 H)

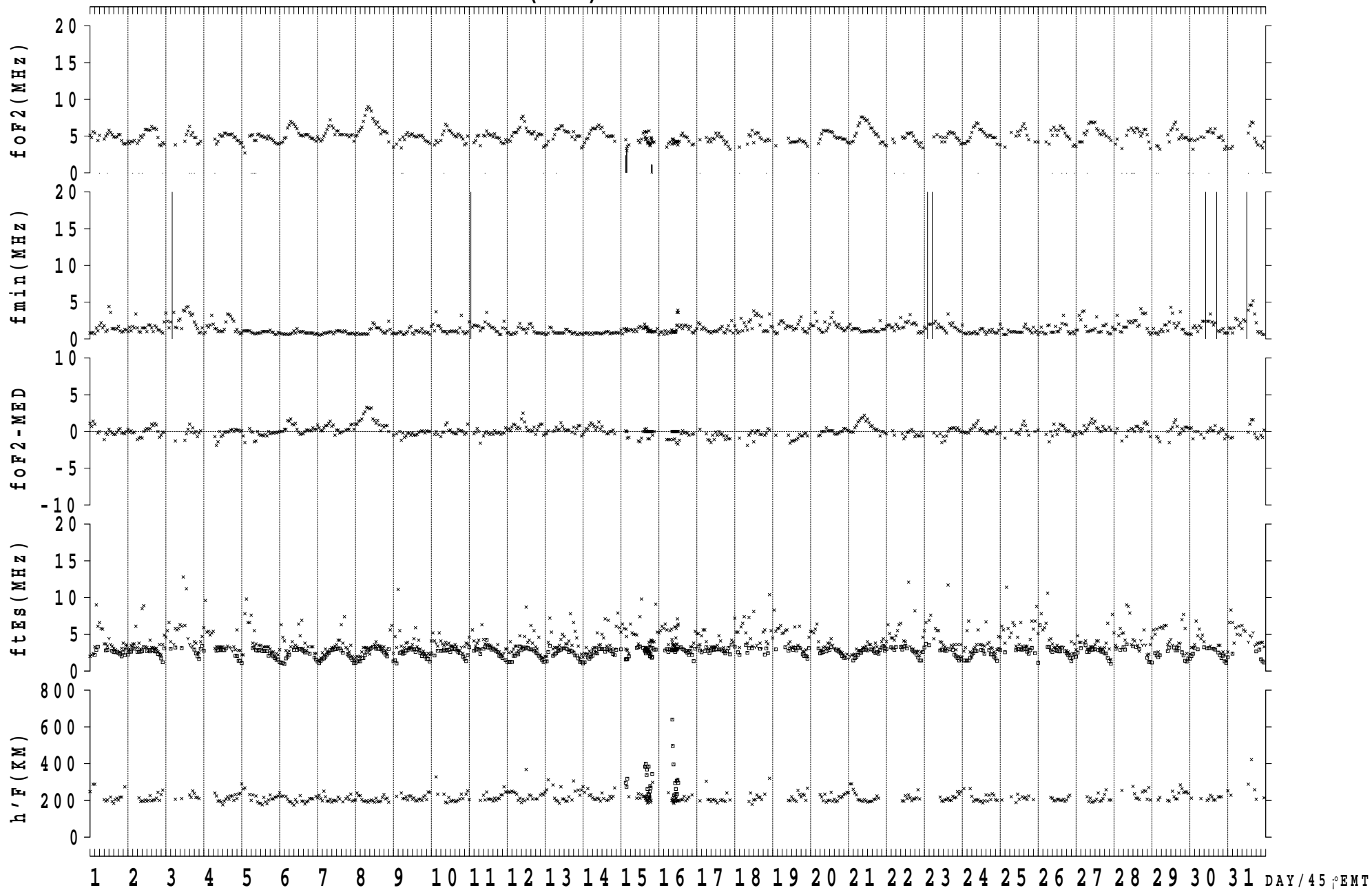
LAT.69°00.4'S LON.039°35.4'E OSWEEP 1.0MHz TO 15.0MHz IN 15.0SEC IN MANUAL SCALING

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	242	A	A	A	A	232	B	A	B	A	214	214	236	236	242	212	E B	218	230	230	A	270	E A	E A	E A			
2	B	B	A	294	224	B	A	A	A	248	B	B	B	B	B	212	220	E B	224	196	B	E A	E A	E A	E A			
3	A	A	A	A	B E A	A	A	A	A	E A	200	196	190	206	H	B	E B	218	200	E A	250	E A	E A	E A	E A			
4	E A	A	A	A	A	A	E A	A	A	258	218	198	204	196	208	196	212	204	206	E A	A	A	A	A	A			
5	A	A	A	A	272	270	268	216	200	222	446	242	232	214	228	204	202	E B	240	206	254	E A	E A	E A	E A			
6	A	240	256	E A	H A	234	220	210	234	E A	212	198	184	228	H	A	E A	200	E B	206	210	E A	E A	E A	E A			
7	A	E A	A	E A	A	A	A	E A	E A	242	300	214	194	200	198	194	198	218	A	194	A	A	A	A	A			
8	A	A	A	E A	286	264	E A	240	228	210	206	A	224	218	204	216	216	216	206	228	222	228	E A	E A	E A			
9	A	A	A	A	A	E A	218	228	194	232	198	188	206	206	222	H	B	230	224	214	230	242	230	240	264	290		
10	E A	A	A	A	A	240	A	A	A	258	200	200	200	212	216	208	224	224	210	230	230	H	E A	E A	E A			
11	A	A	A	A	A	A	A	A	E A	222	A	A	E A	E A	292	250	210	204	218	202	208	254	A	E A	E A	E A		
12	A	A	A	B	A	A	218	216	230	E A	H	216	216	216	274	216	200	208	226	220	230	248	220	202	202			
13	E A	A	A	A	A	260	238	206	196	204	206	206	214	214	206	206	200	206	218	218	224	E B	E A	E A	E A			
14	E A	E A	A	A	250	226	216	218	218	204	194	196	206	H	A	A	A	236	198	228	208	190	E A	E A	E A			
15	E A	A	A	H	E A	A	E A	A	A	A	234	188	226	226	218	202	220	220	212	228	240	240	268	A	A			
16	236	A	242	252	A	A	302	212	222	198	190	210	210	202	220	248	218	230	244	218	E A	260	242	E A	E A			
17	A	194	194	E A	E A	242	202	226	198	A	242	202	200	198	224	212	212	198	196	220	222	230	230	248	188			
18	250	248	E A	258	246	236	234	218	216	228	200	196	188	198	264	E A	A	E A	E A	270	234	212	210	354	246	238	238	250
19	A	A	A	A	E A	A	256	286	224	A	A	A	A	E A	E A	E A	216	250	232	274	A	A	A	E A	E A	258		
20	A	E A	A	A	A	A	232	232	212	198	222	212	226	212	214	206	206	220	288	274	E A	228	240	246	206			
21	198	A	A	A	202	244	A	276	220	224	218	218	234	E A	210	210	210	208	220	252	A	A	A	254	242			
22	A	A	E A	A	E A	E A	220	210	236	200	194	194	198	202	200	206	200	244	296	A	228	A	A	A	A			
23	A	A	A	A	B	A	A	A	220	242	A	A	A	B	A	240	240	226	234	250	186	A	A	A	A	A		
24	A	216	A	A	A	A	A	A	A	A	A	A	202	A	E A	E B	A	B	E A	246	208	A	A	A	A	A		
25	A	A	E A	A	A	E A	E A	E A	E A	202	228	226	252	220	A	204	198	222	212	190	238	246	280	A	A			
26	A	A	A	A	E A	A	A	A	A	A	B	B	A	B	B	226	B	E A	248	216	204	212	A	A	A	A	216	
27	A	244	A	234	A	A	A	A	A	A	B	B	A	A	H	A	A	222	222	216	A	A	A	A	A	A		
28	222	A	E A	A	A	A	A	A	250	202	190	204	196	194	212	202	210	206	226	E B	234	226	232	238	194			
29	A	E A	272	256	E B	E A	E A	218	200	200	194	196	B	E B	228	236	220	206	206	216	200	264	250	A	A	218		
30	E A	242	A	A	B	B	A	232	A	A	A	A	B	A	232	240	238	E A	224	A	E A	260	A	A	A	A		
31	A	A	A	A	A	E A	234	242	210	A	E A	E B	202	210	198	230	210	196	198	244	254	240	E A	E A	E A	E A		
CNT	11	11	7	11	13	18	19	17	21	24	23	26	25	28	24	27	29	30	28	24	21	19	18	22	22			
MED	E A	U	229	249	E A	257	239	226	213	221	203	202	204	209	216	214	209	211	212	218	224	233	243	E A	U	221		
U Q	E A	E A	E A	E A	A	A	E A	A	A	E A	A	A	E	A	A	E A	A	E	A	E A	E A	E A	E A	E A	E A	E A		
L Q	304	272	258	294	286	264	242	230	235	236	222	216	230	234	229	226	224	224	231	254	250	266	282	296	296			
L Q	236	216	242	246	239	234	220	208	211	200	194	198	198	205	209	206	201	208	208	218	228	240	246	218	218			

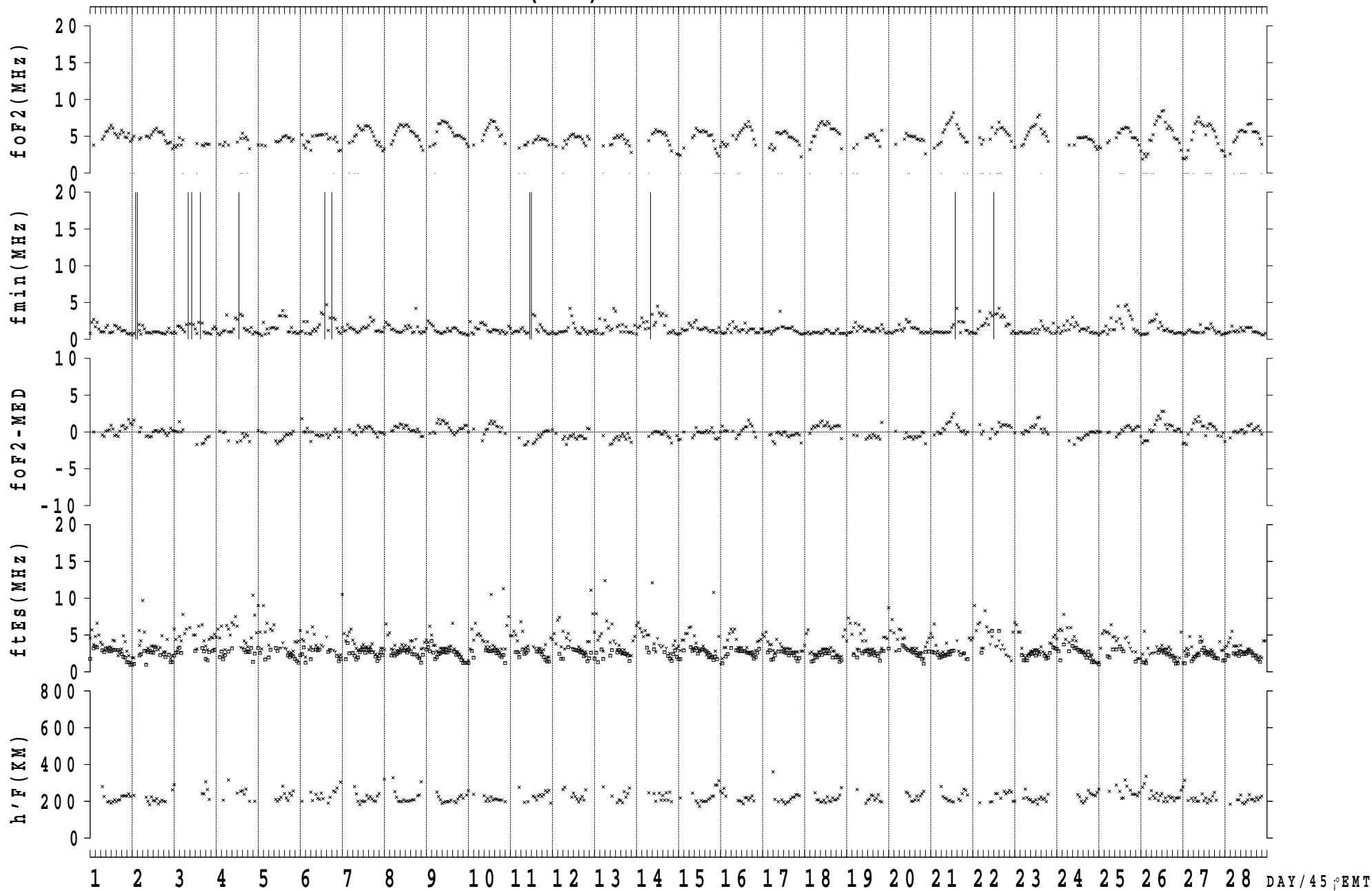
DEC.2022 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

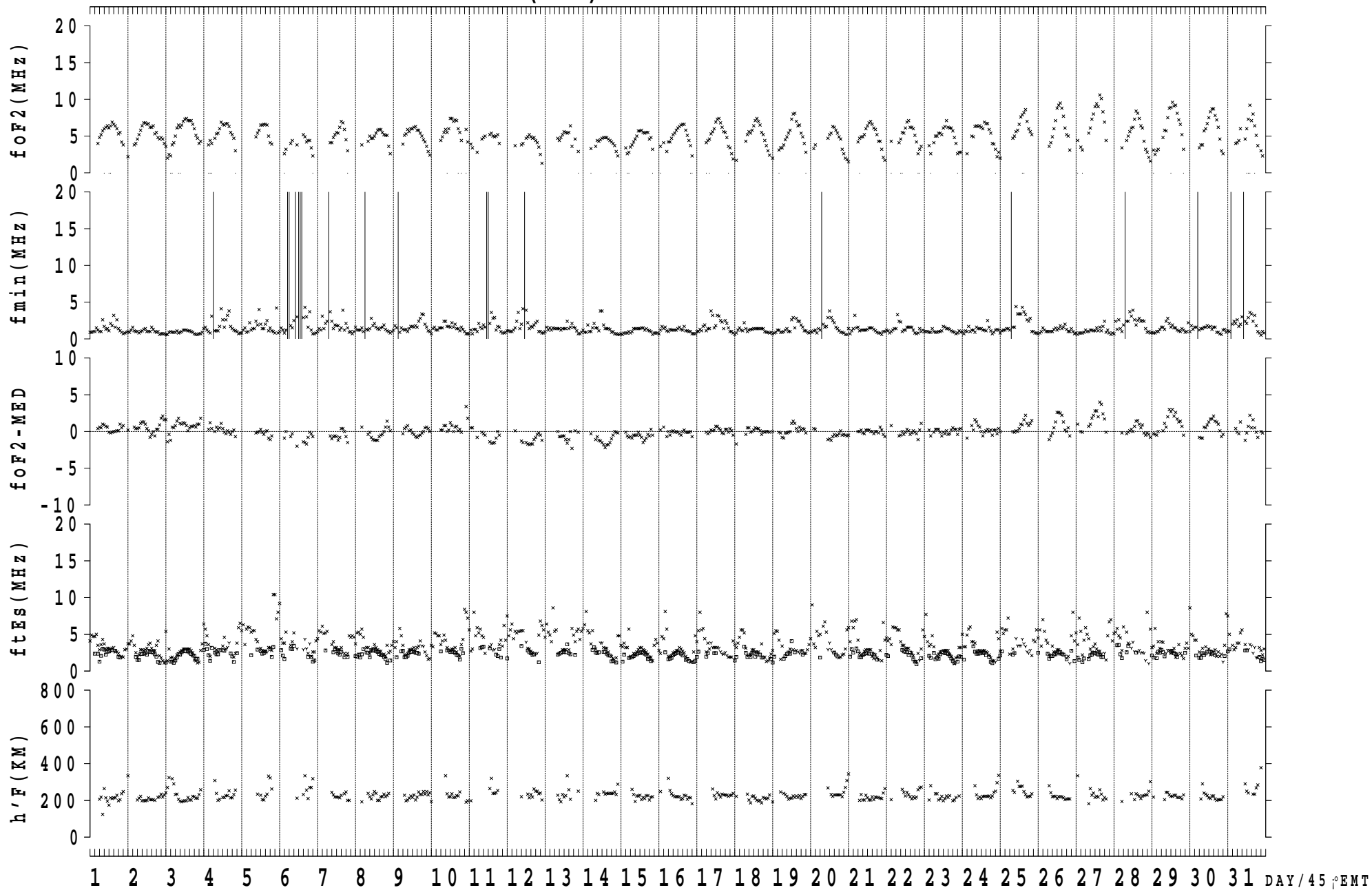
2022 0101 -> 2022 0131(99) SYOWA-ST.



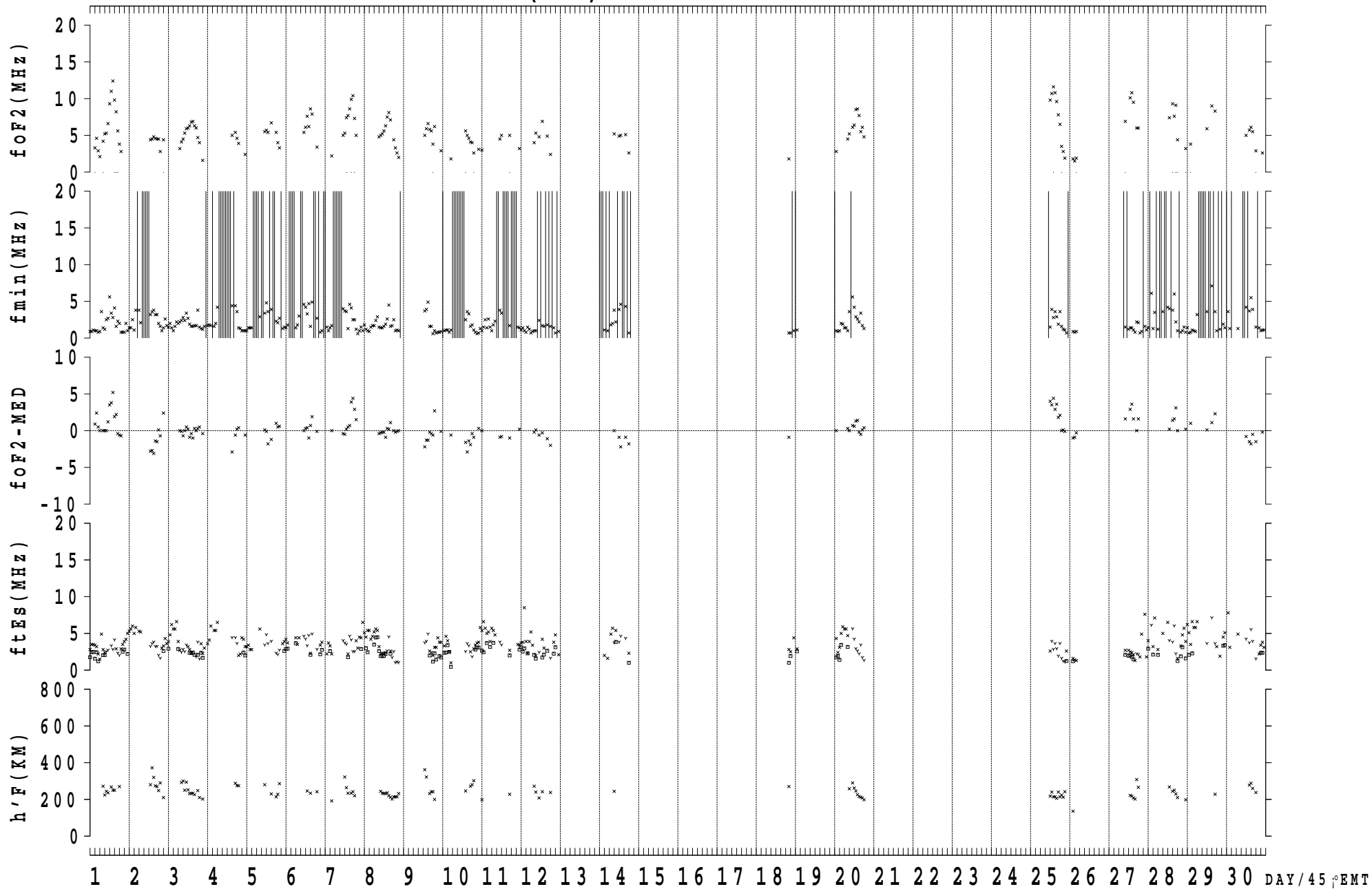
2022 0201 -> 2022 0228(99) SYOWA-ST.



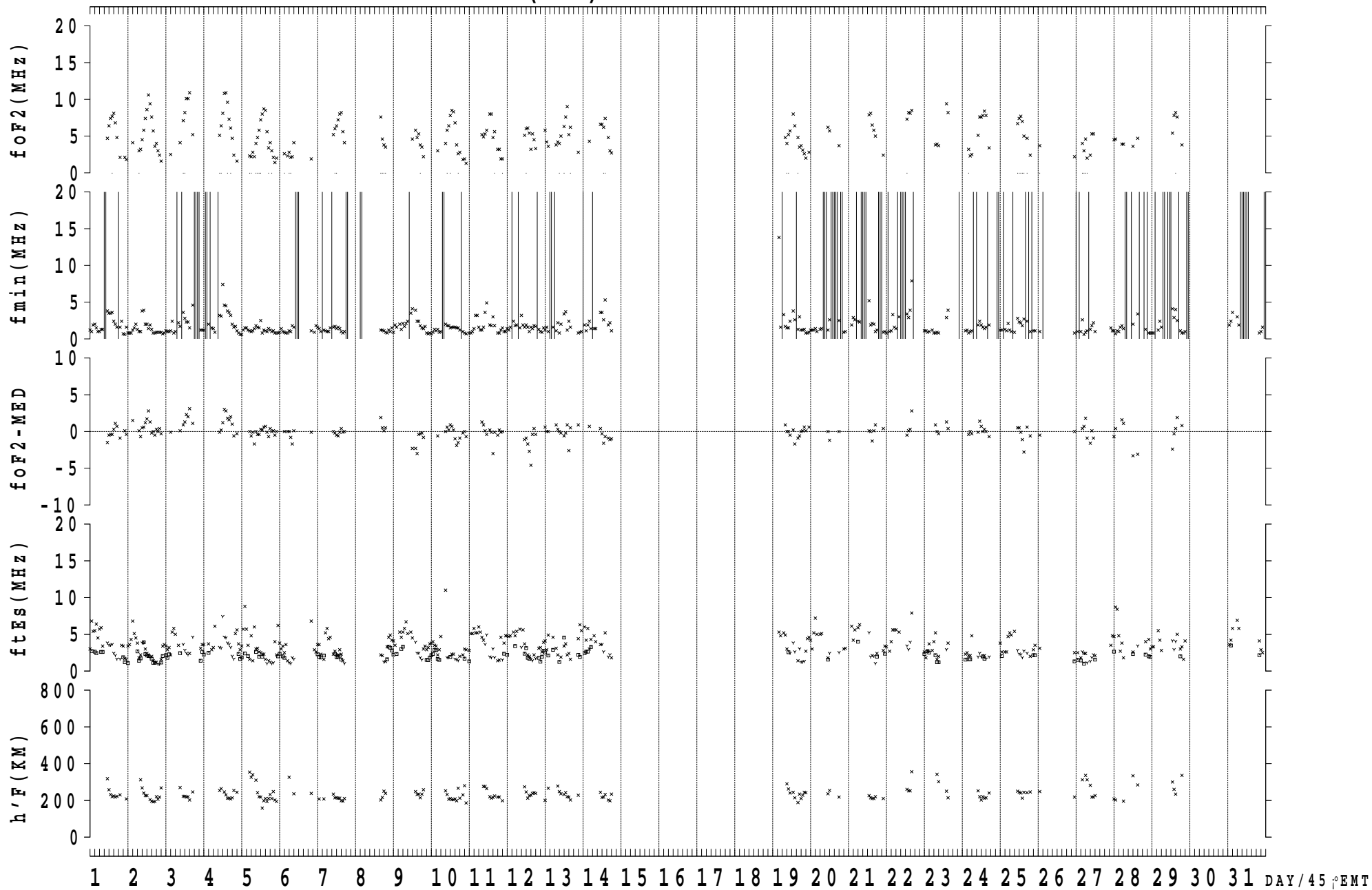
2022 0301 -> 2022 0331(99) SYOWA-ST.



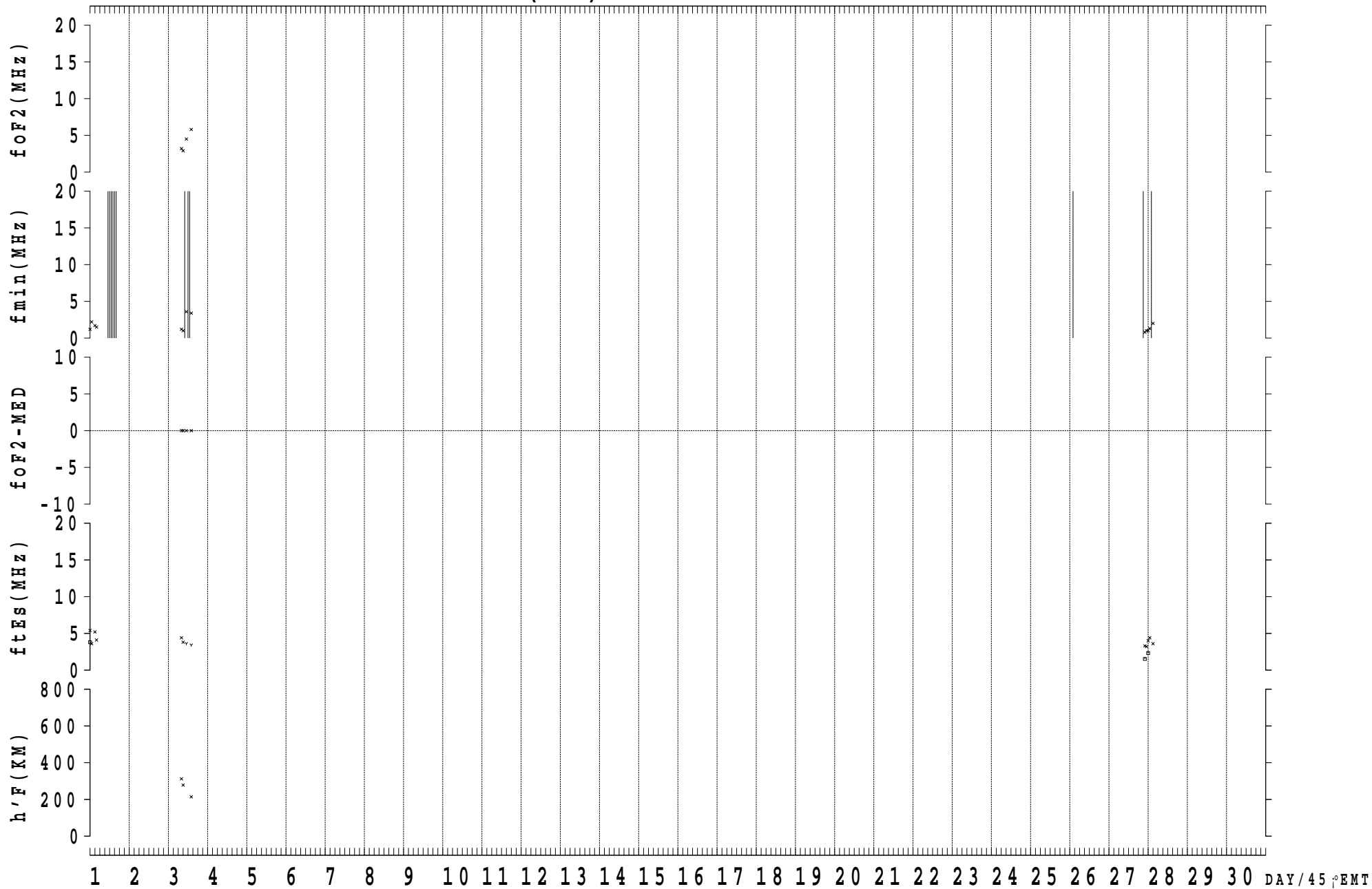
2022 0401 -> 2022 0430(99) SYOWA-ST.



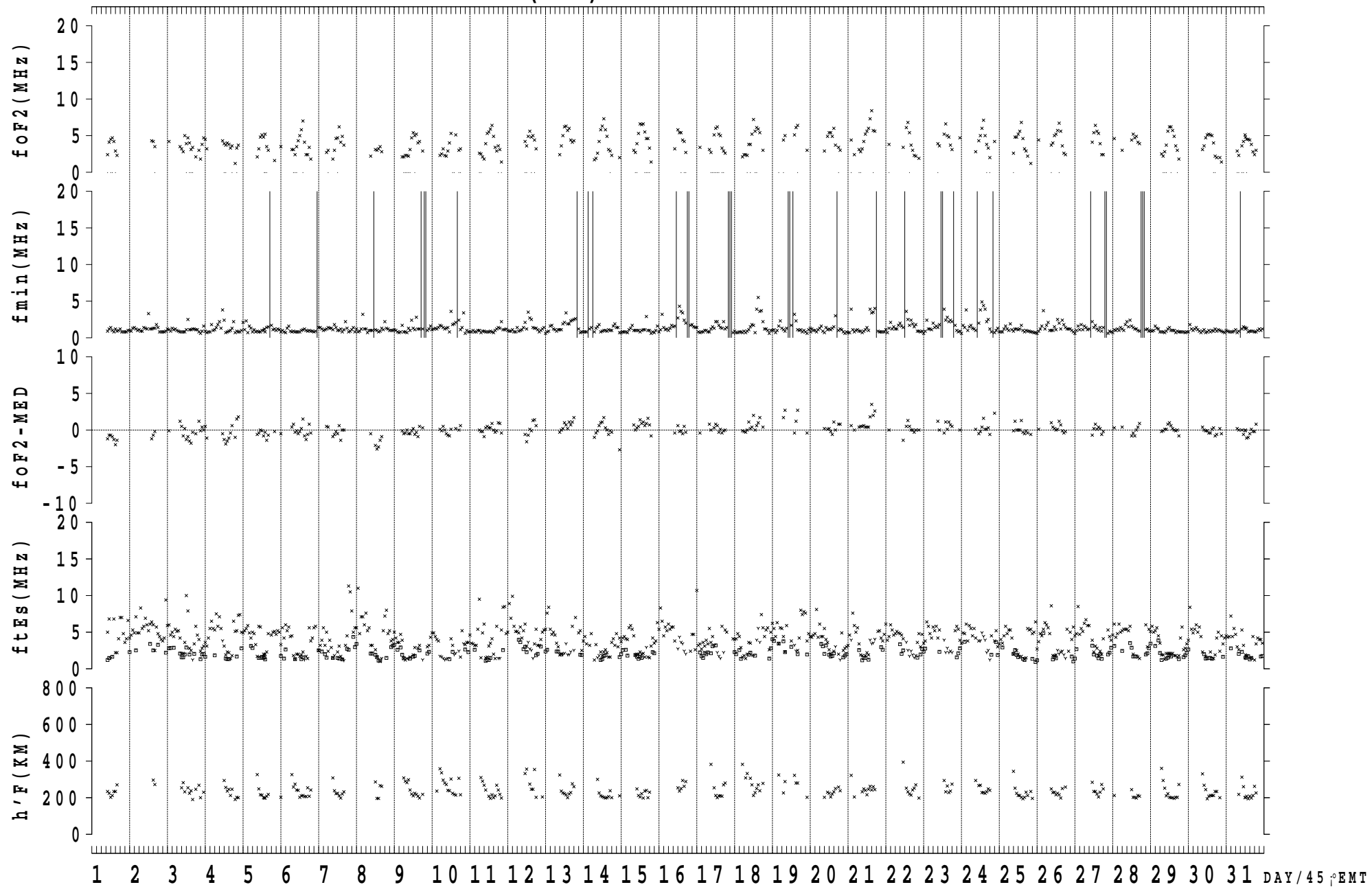
2022 0501 -> 2022 0531(99) SYOWA-ST.



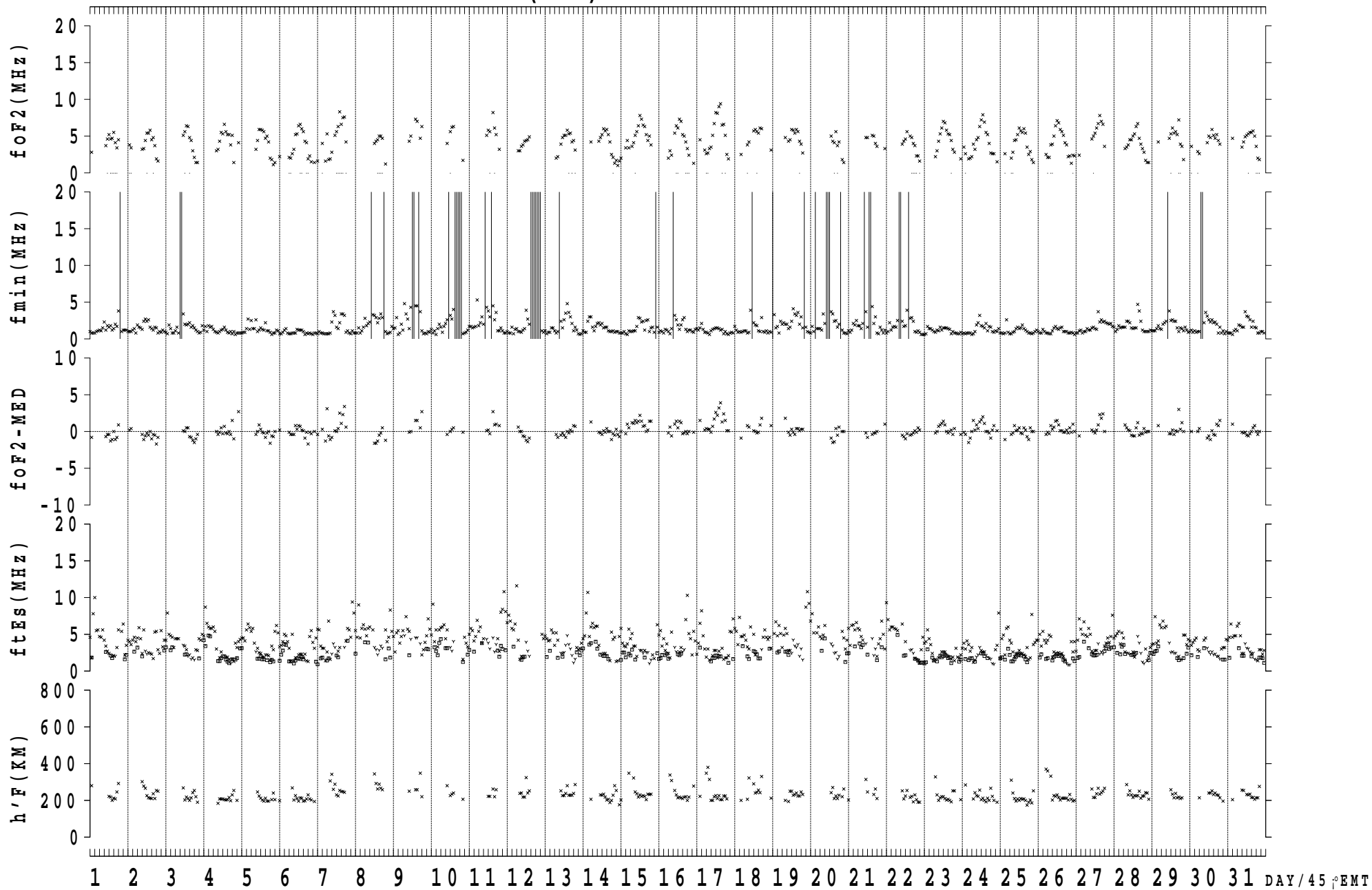
2022 0601 -> 2022 0630(99) SYOWA-ST.



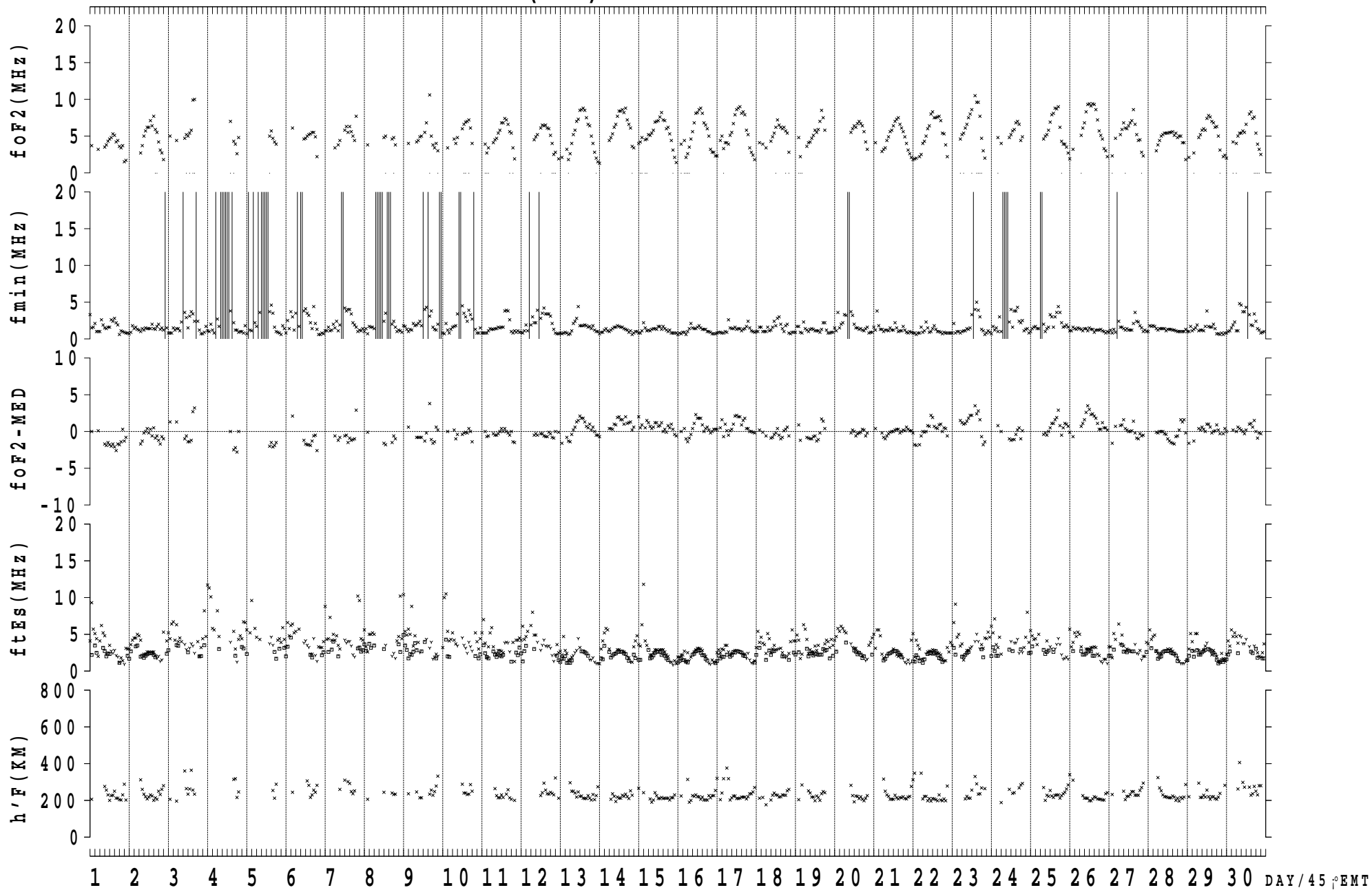
2022 0701 -> 2022 0731(99) SYOWA-ST.



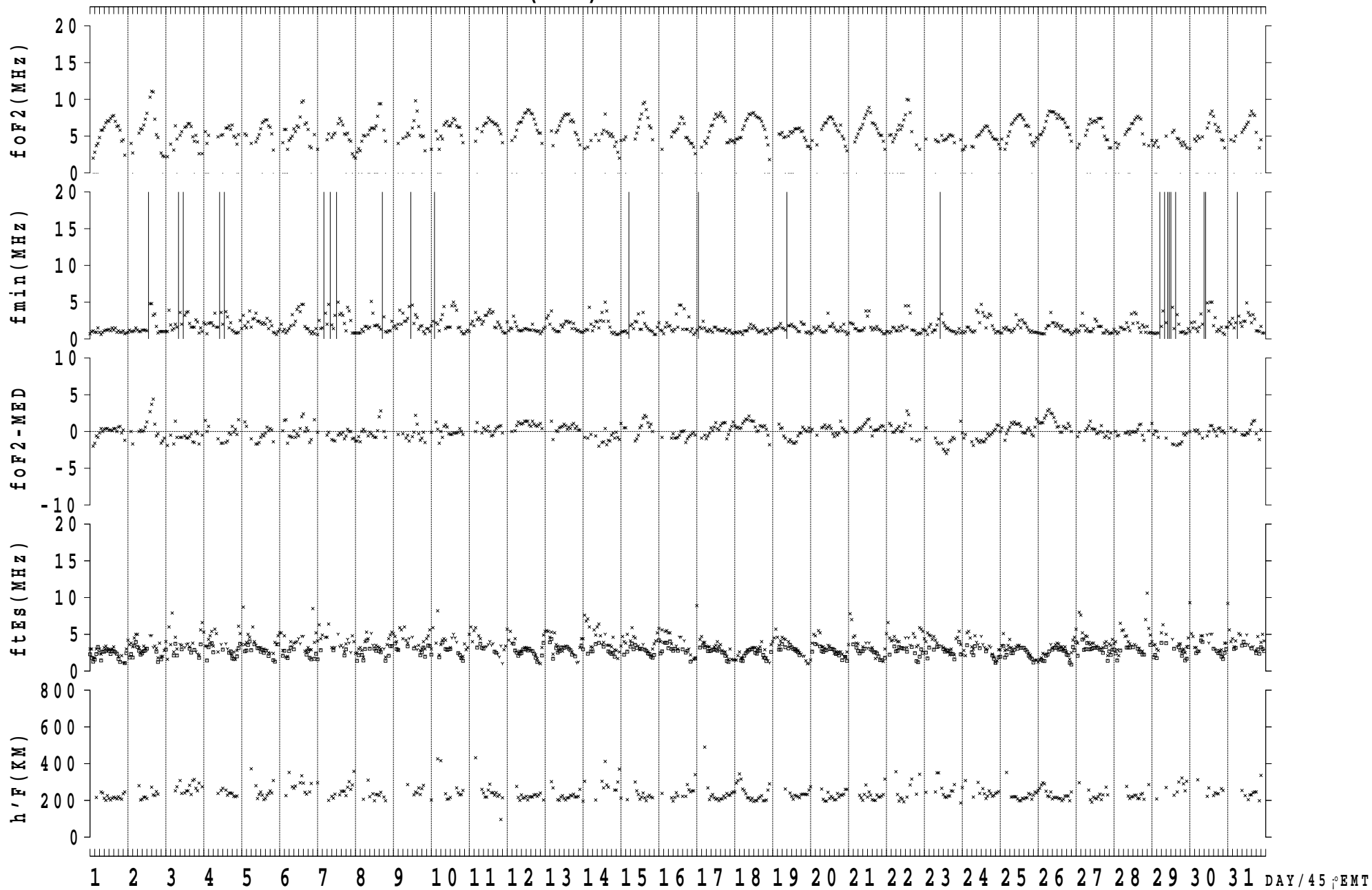
2022 0801 -> 2022 0831(99) SYOWA-ST.



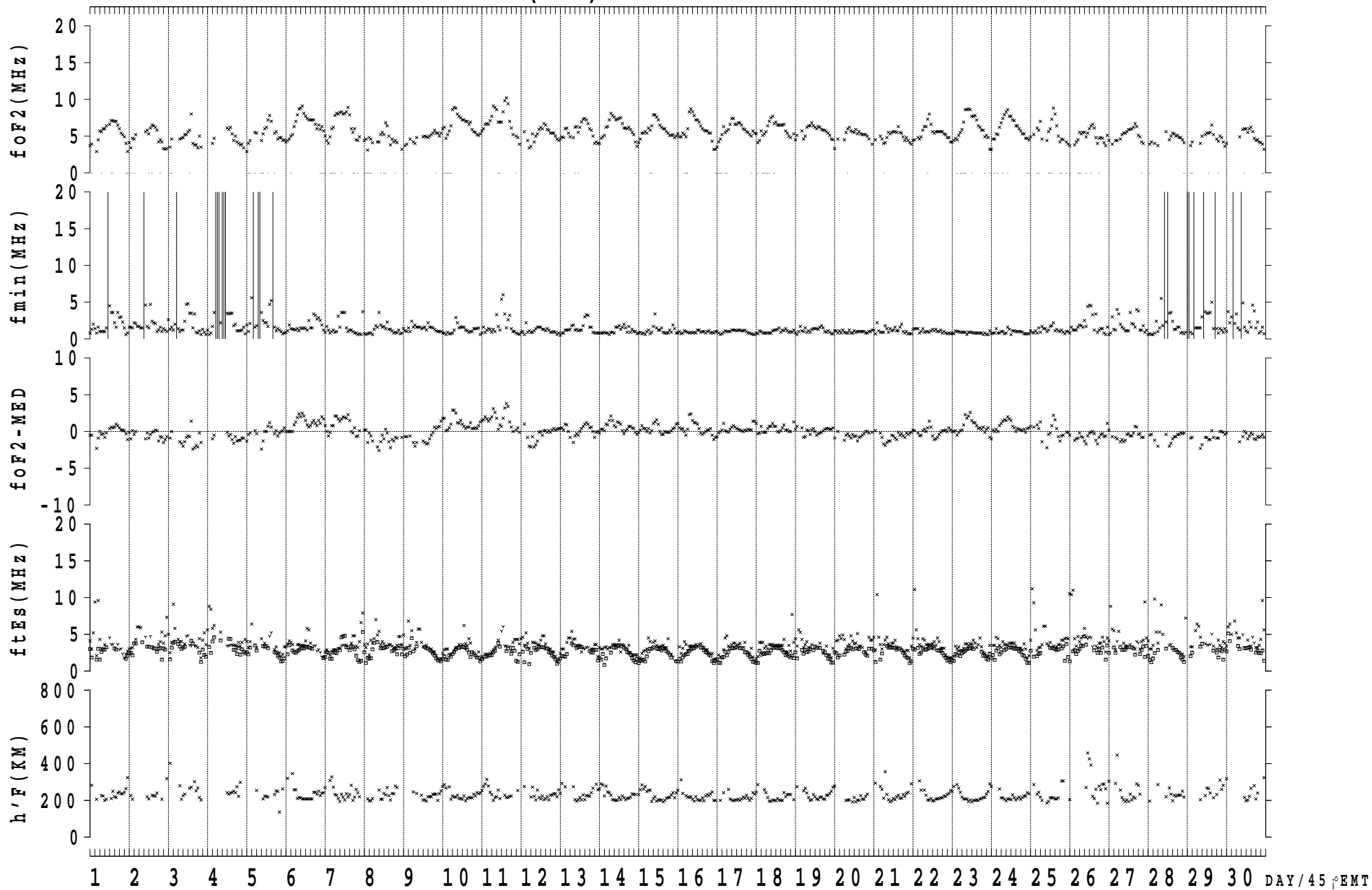
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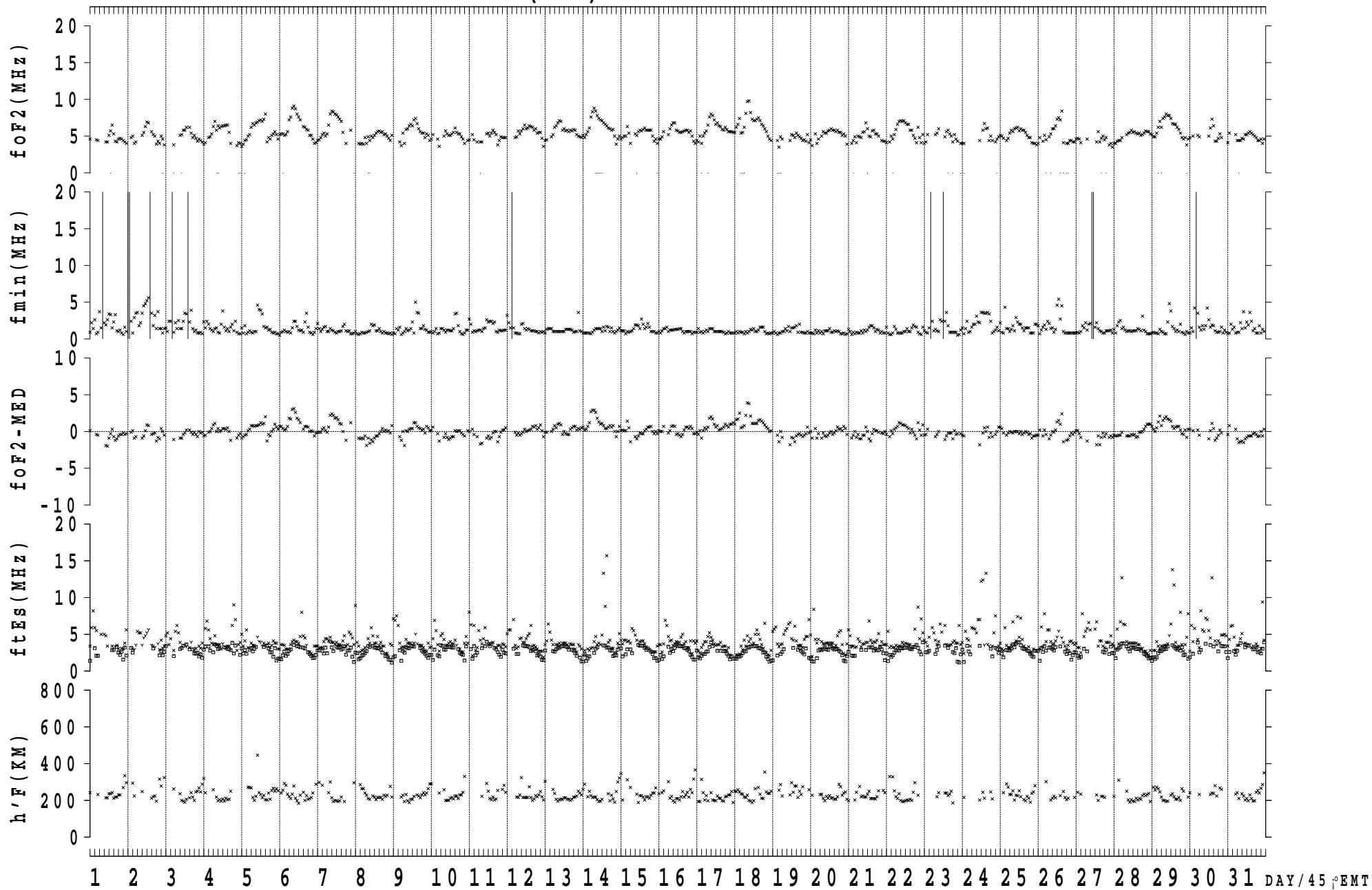
2022 1001 -> 2022 1031(99) SYOWA-ST.



2022 1101 -> 2022 1130(99) SYOWA-ST.



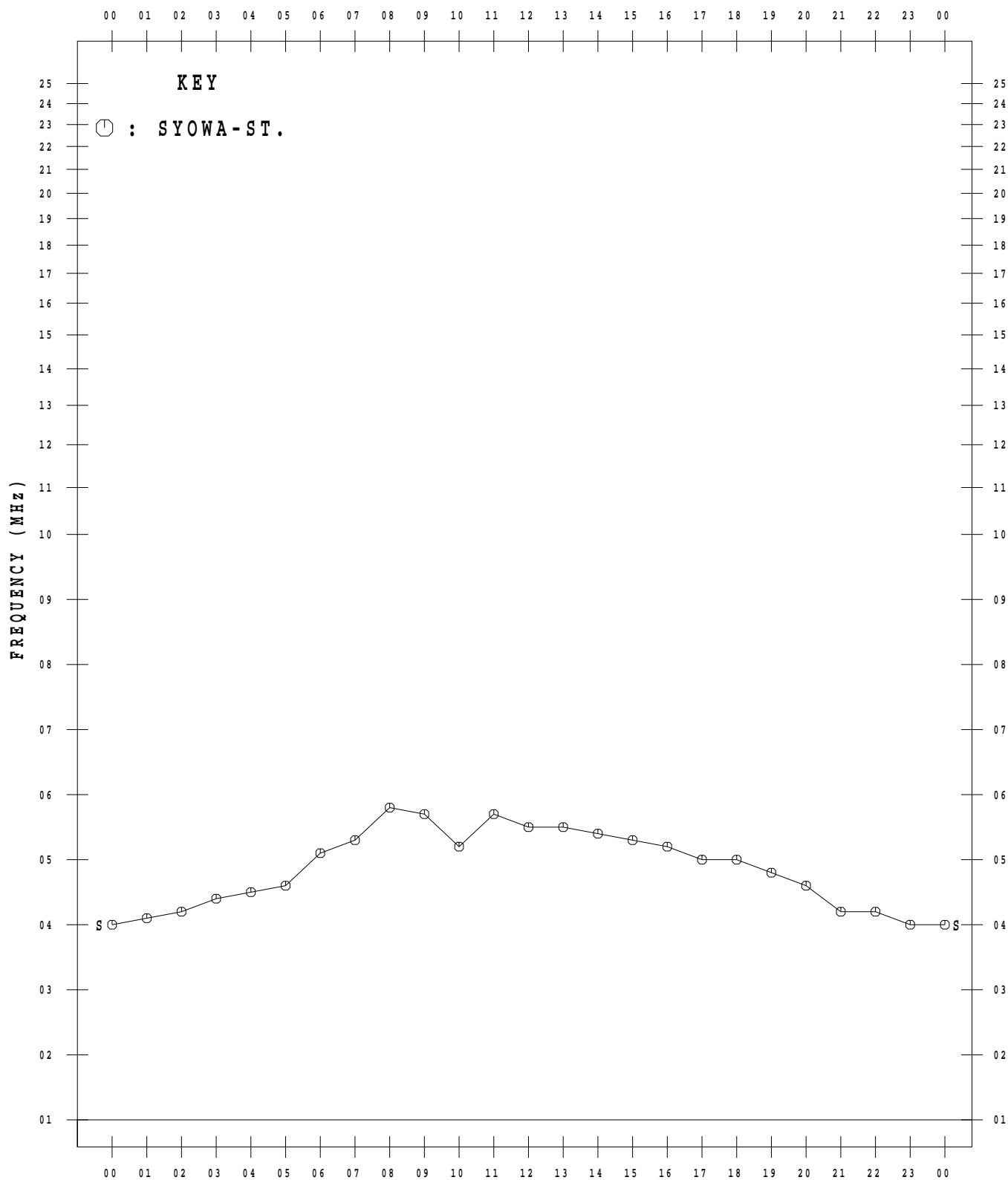
2022 1201 -> 2022 1231(99) SYOWA-ST.



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

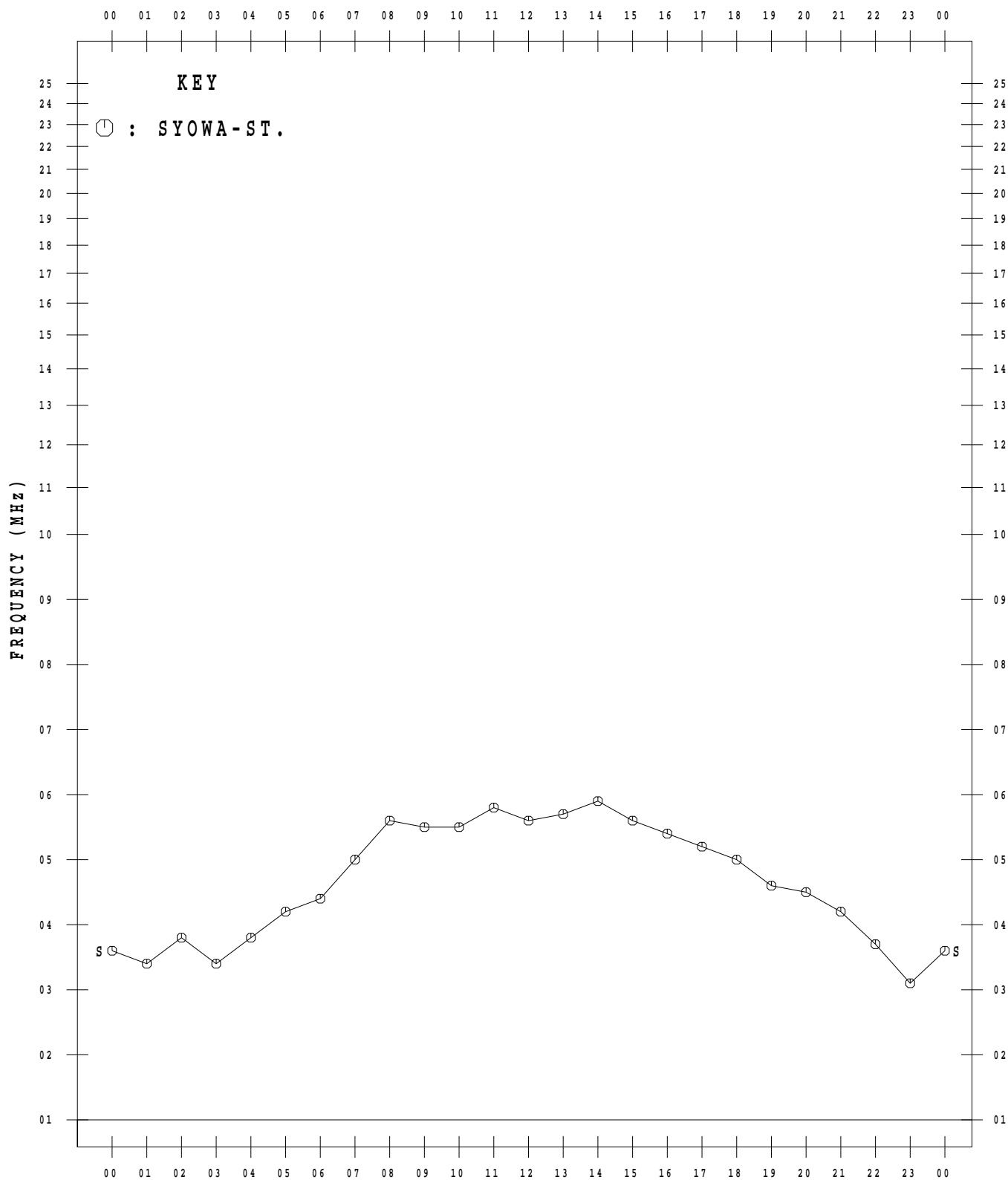
JAN. 2022



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

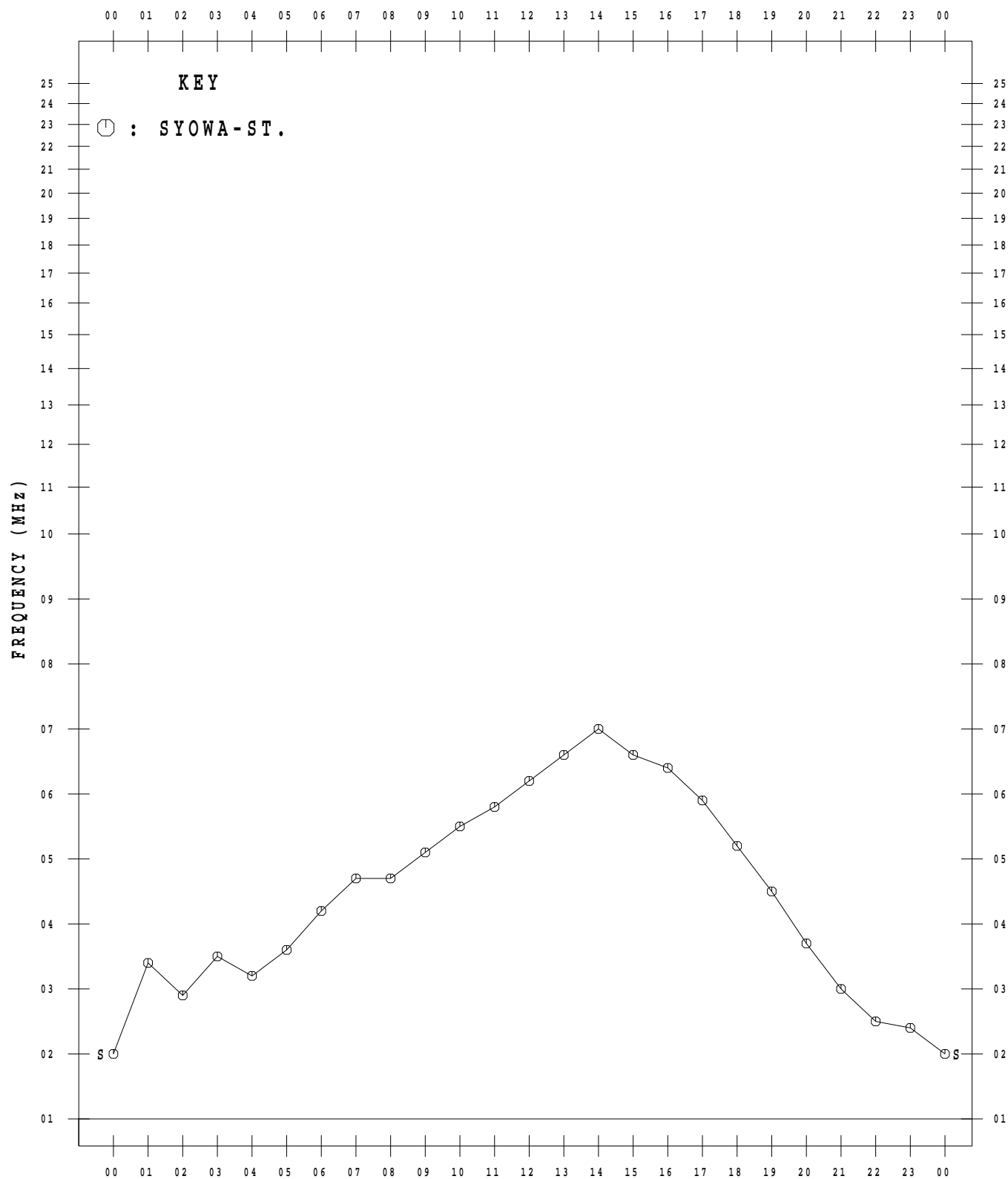
FEB. 2022



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

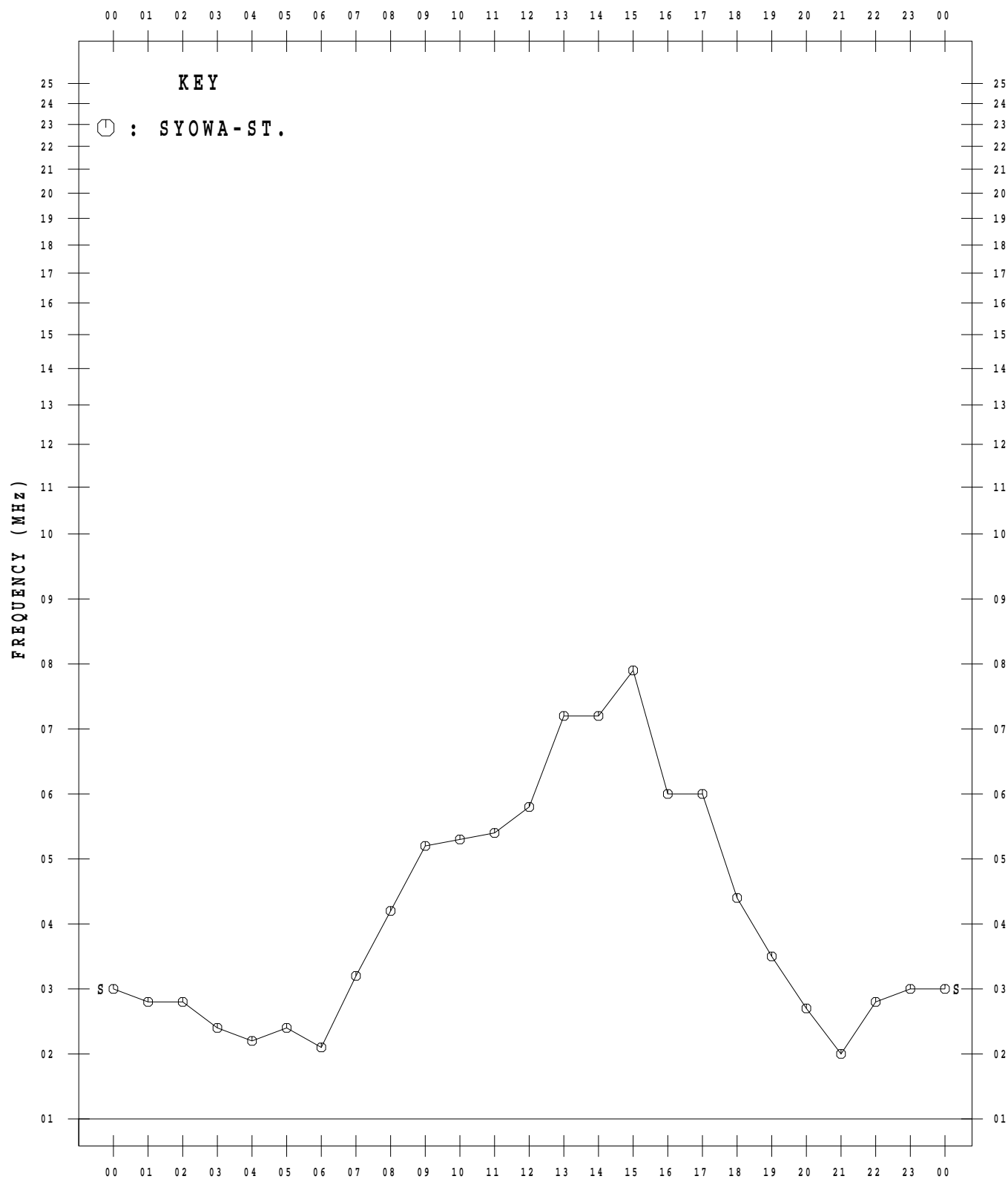
MAR. 2022



MONTHLY MEDIAN VALUES OF foF2

45°E MEAN TIME

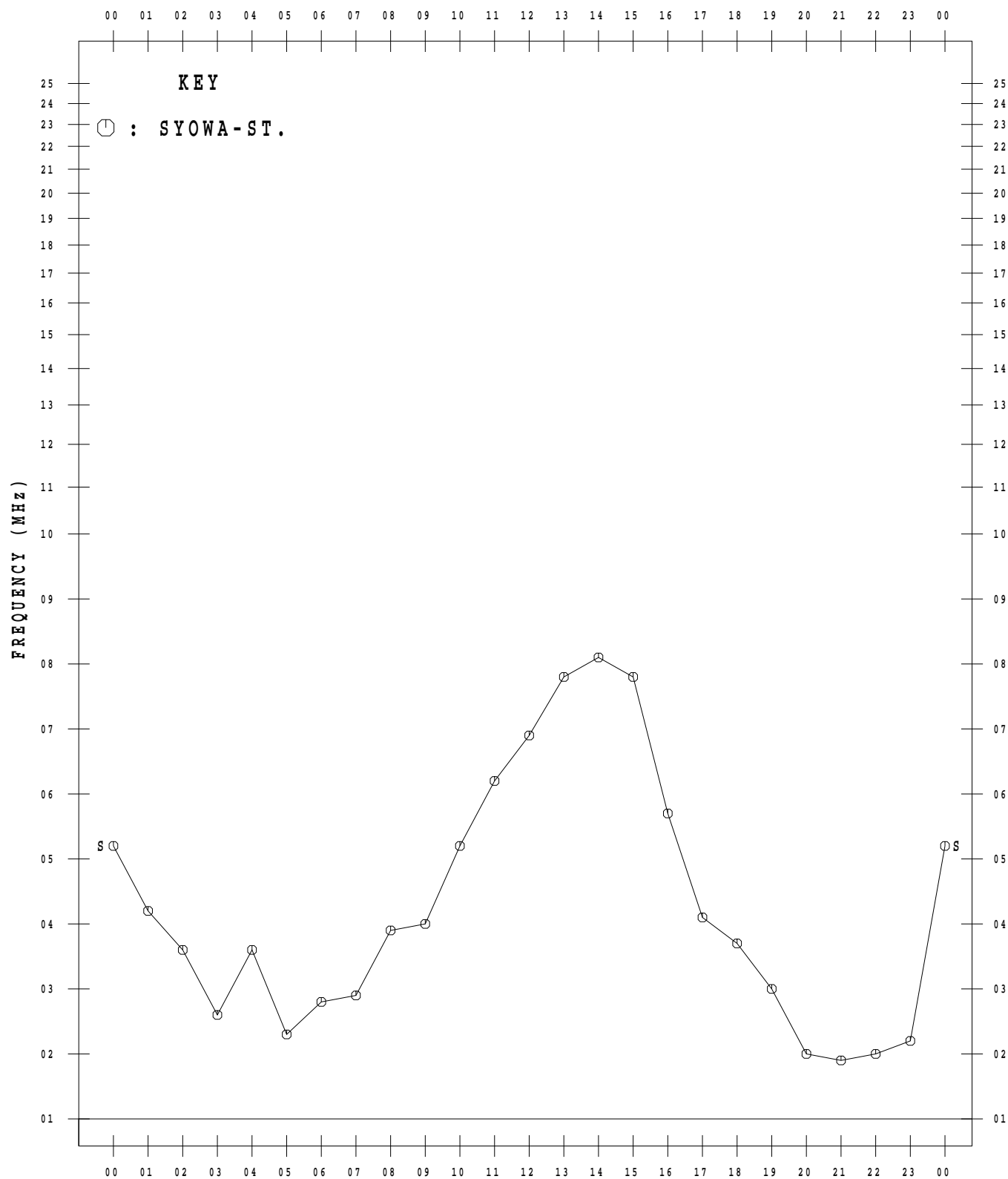
APR. 2022



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

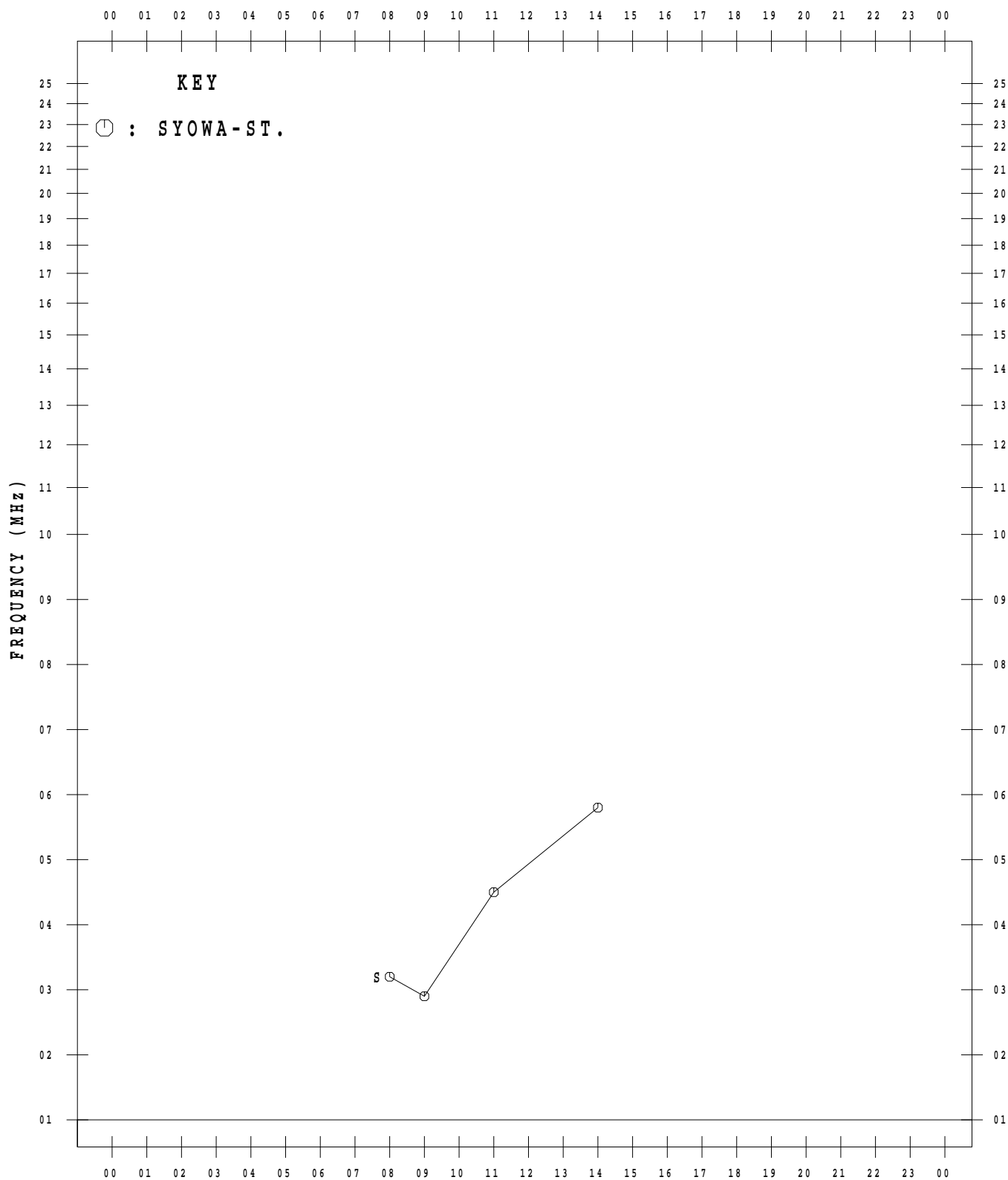
MAY 2022



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

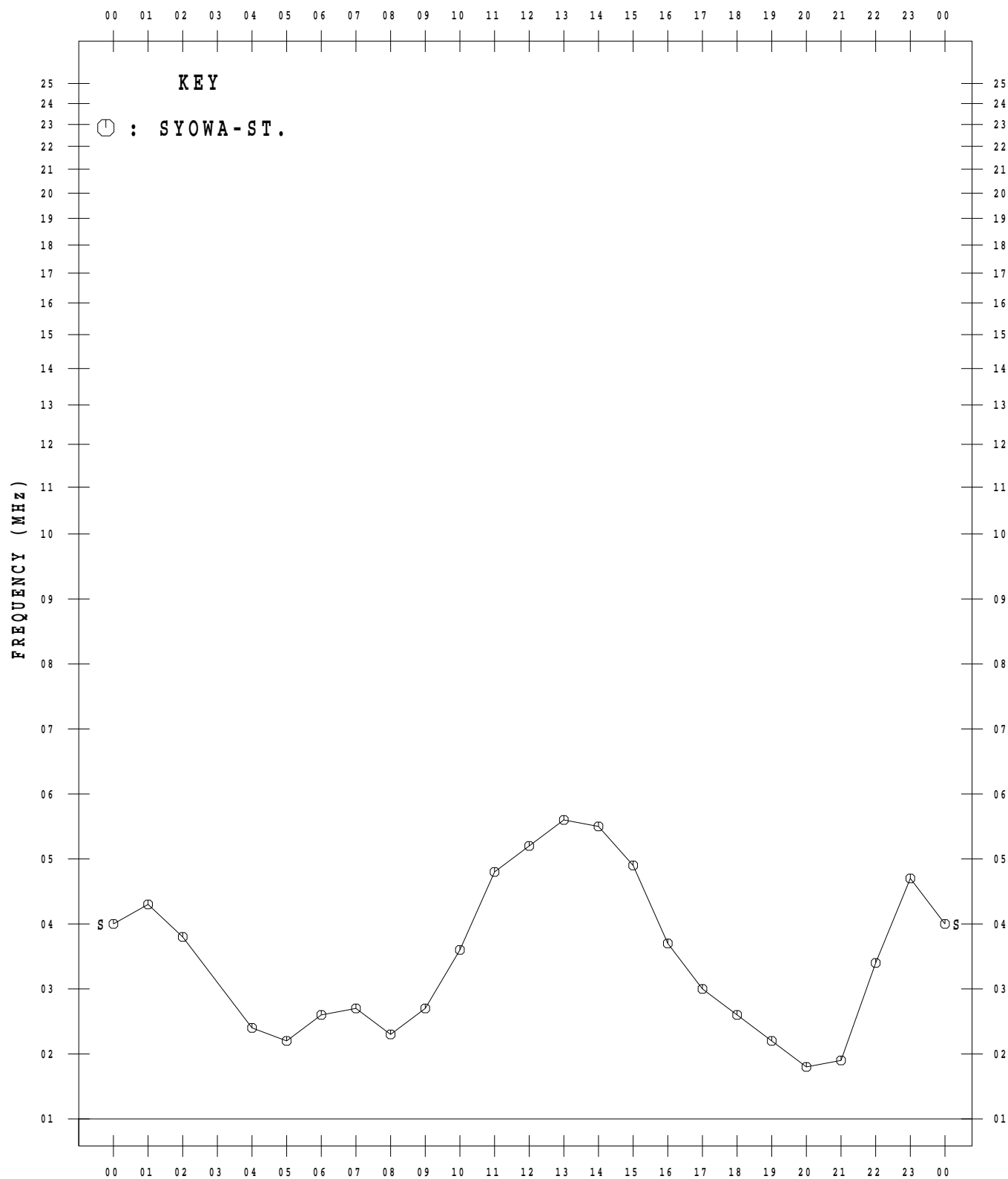
JUN. 2022



MONTHLY MEDIAN VALUES OF f_oF_2

45°E MEAN TIME

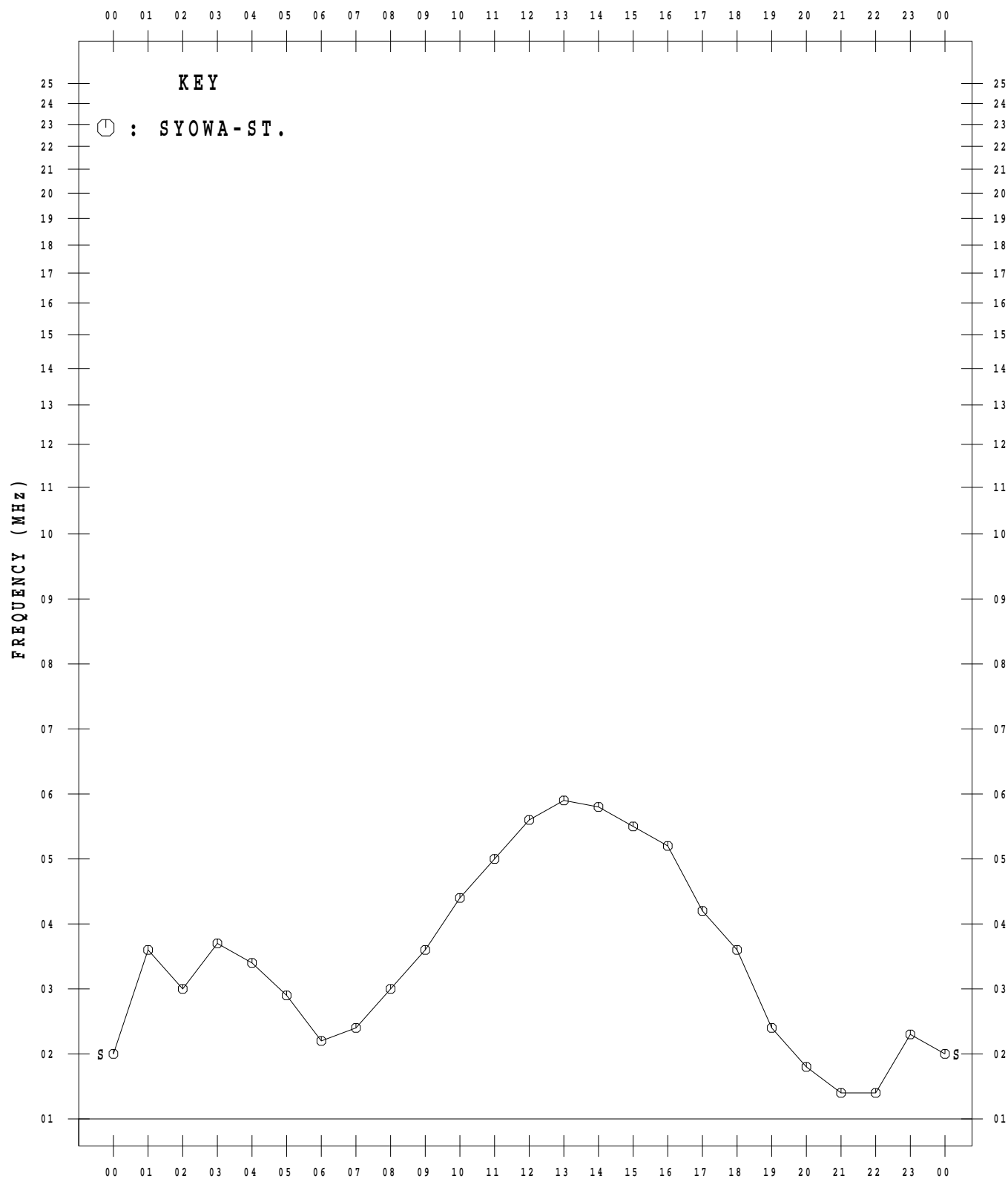
JUL. 2022



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

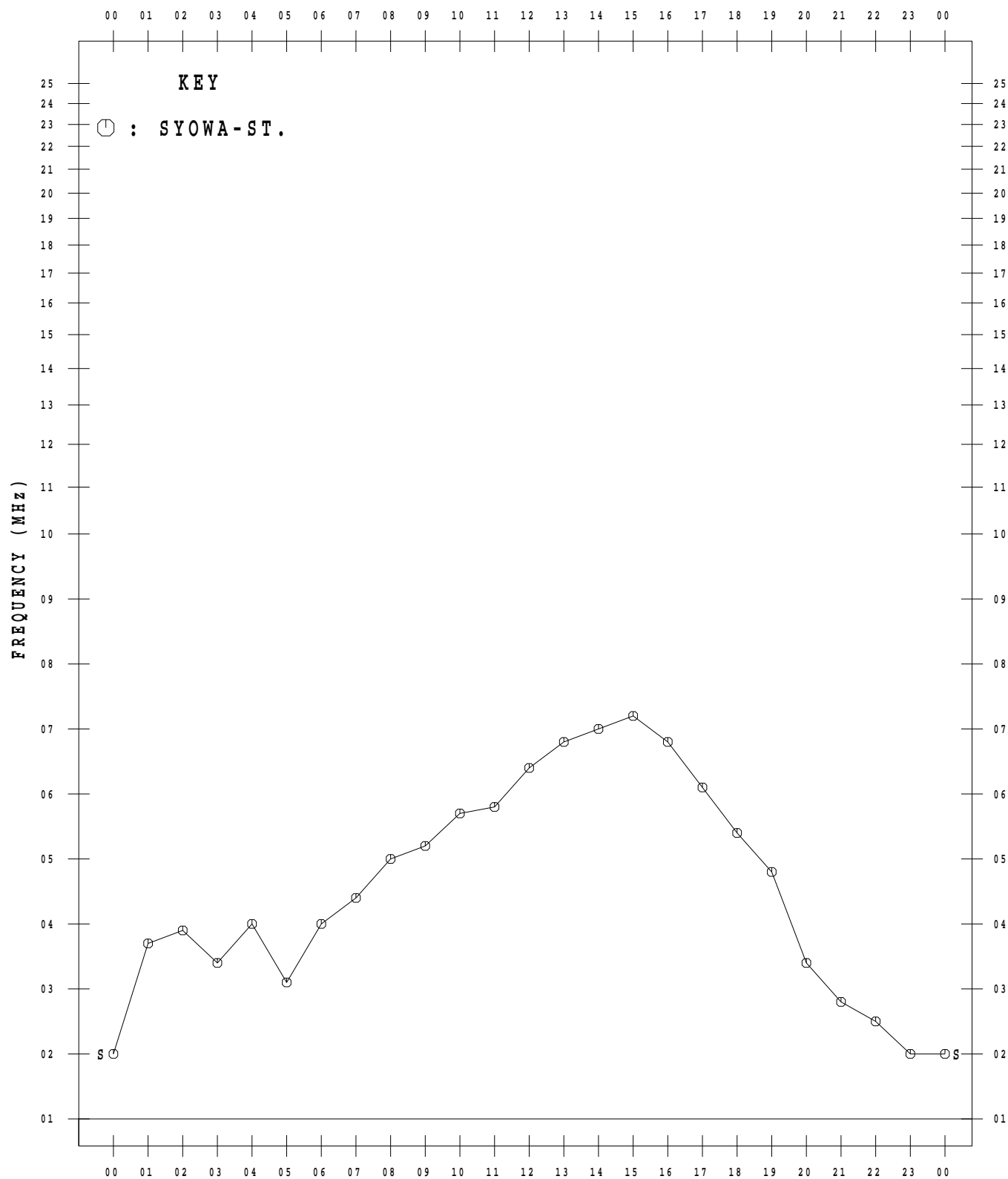
AUG. 2022



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

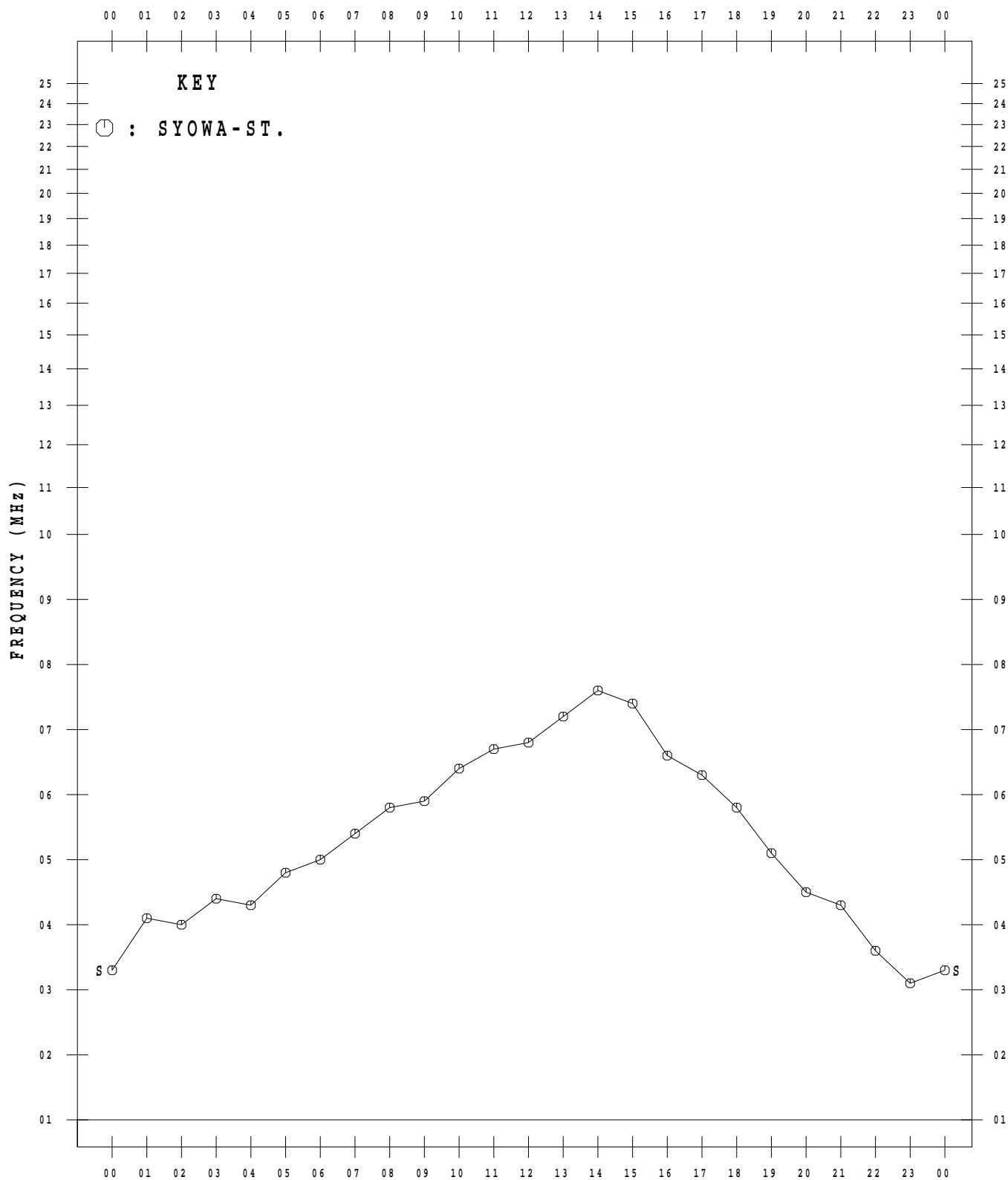
SEP. 2022



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

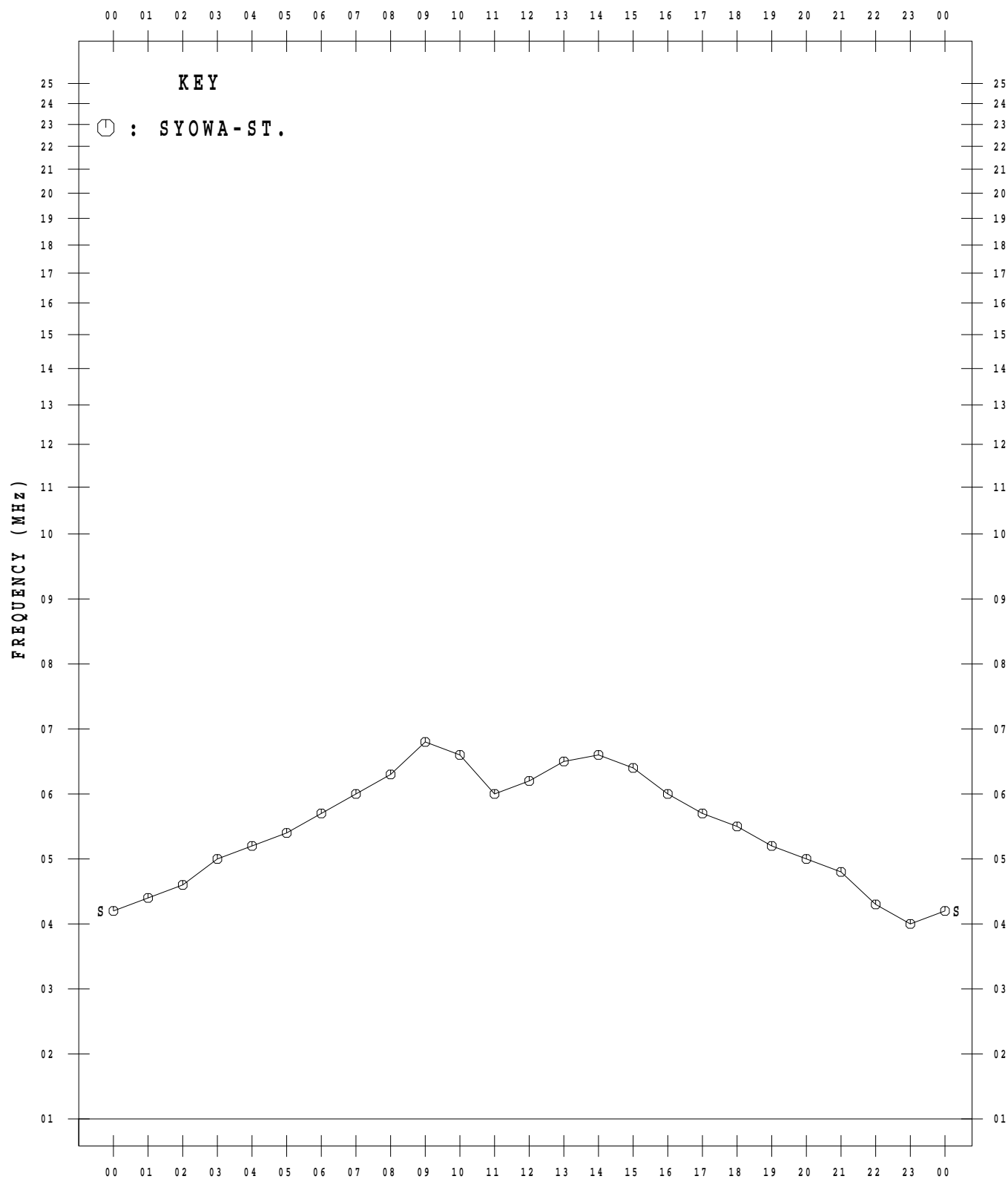
OCT. 2022



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

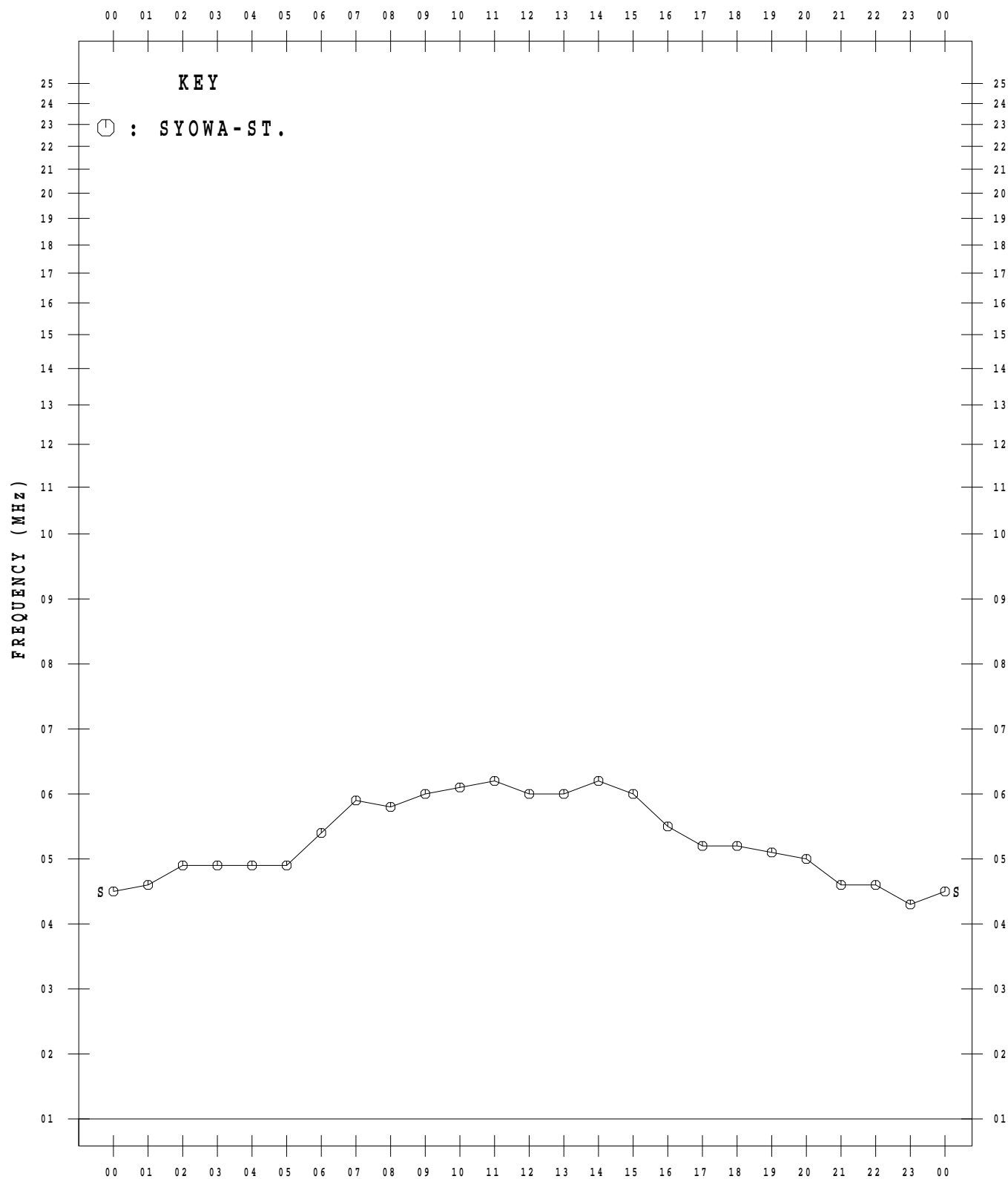
NOV. 2022



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

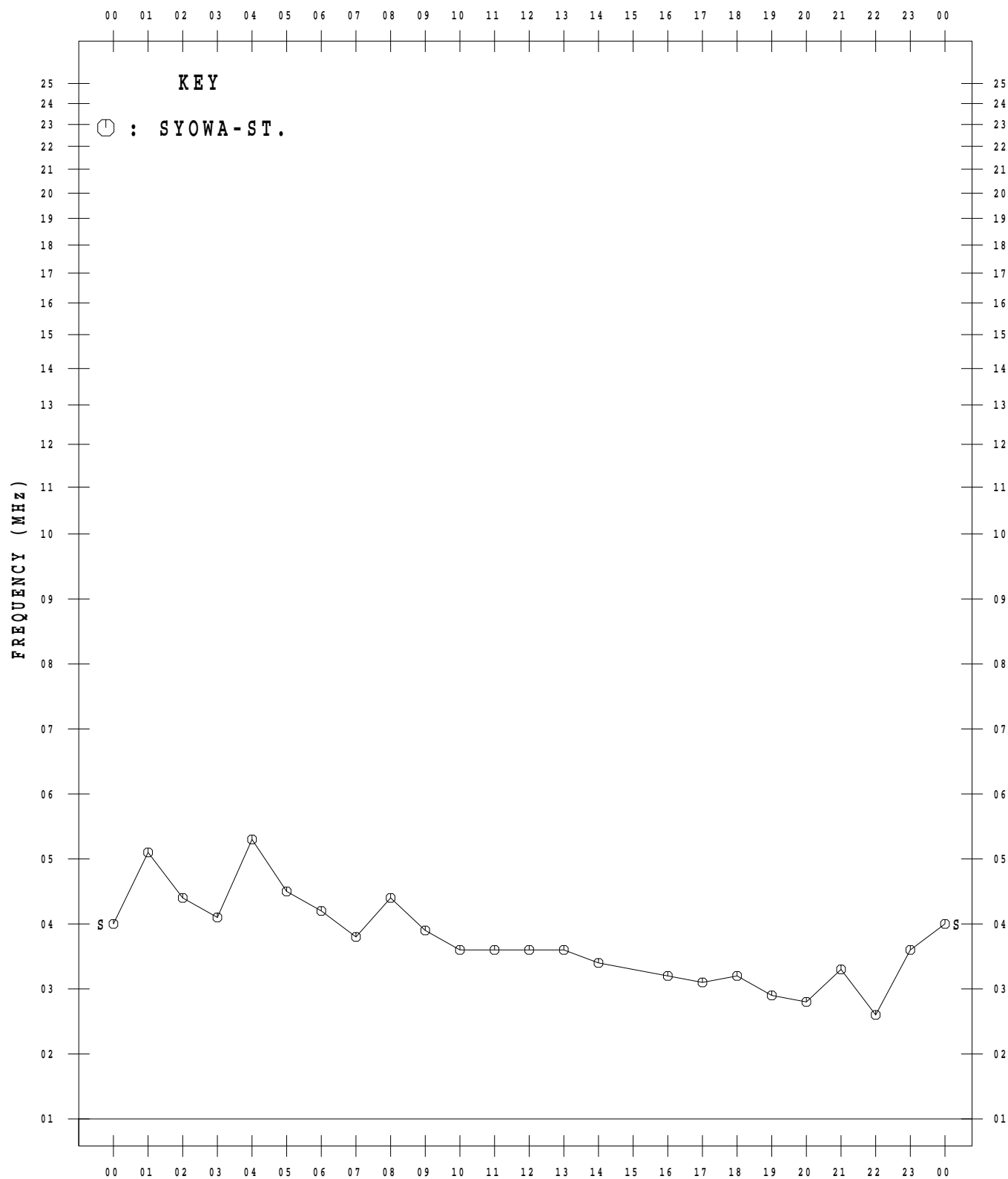
DEC. 2022



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

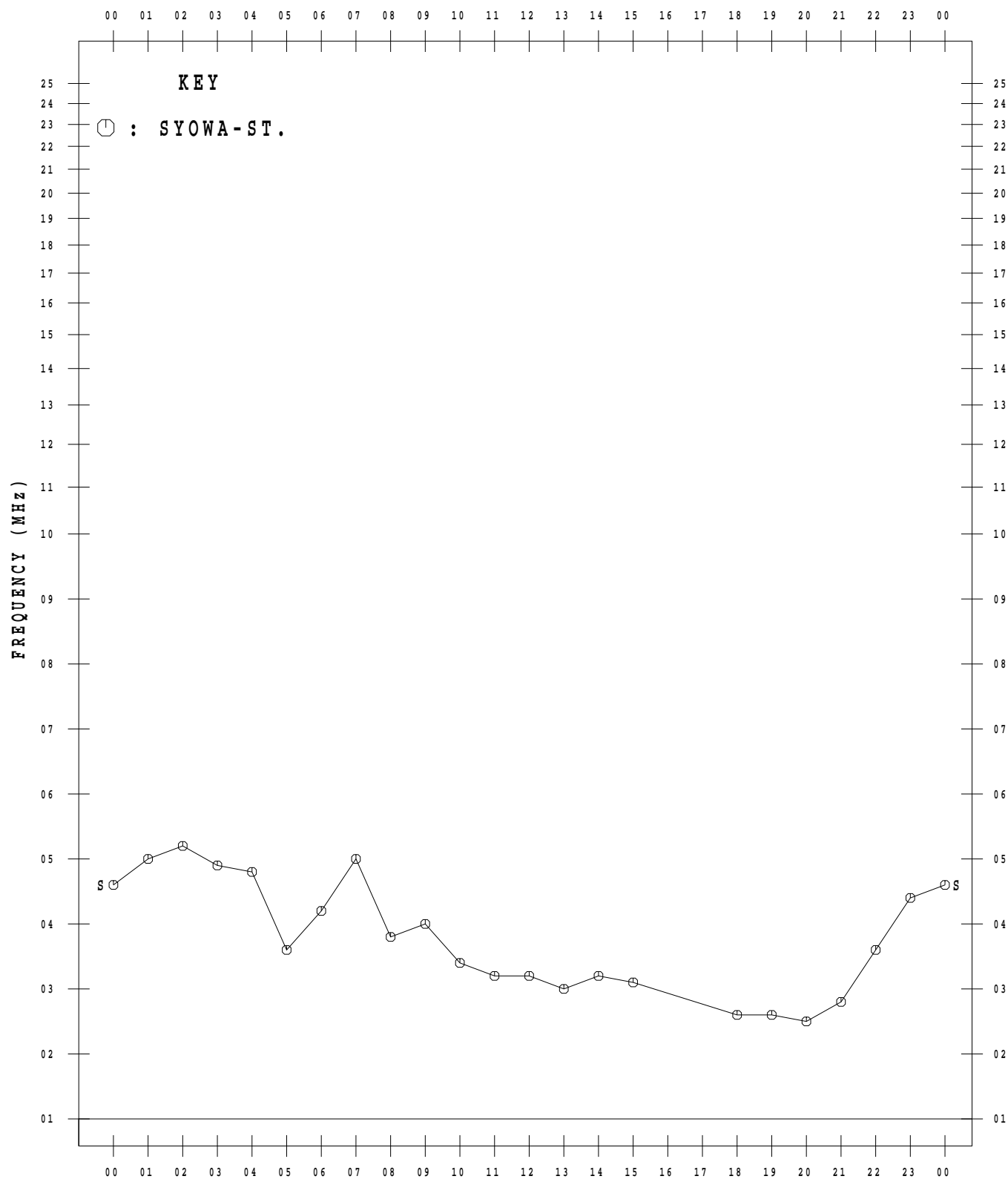
JAN. 2022



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

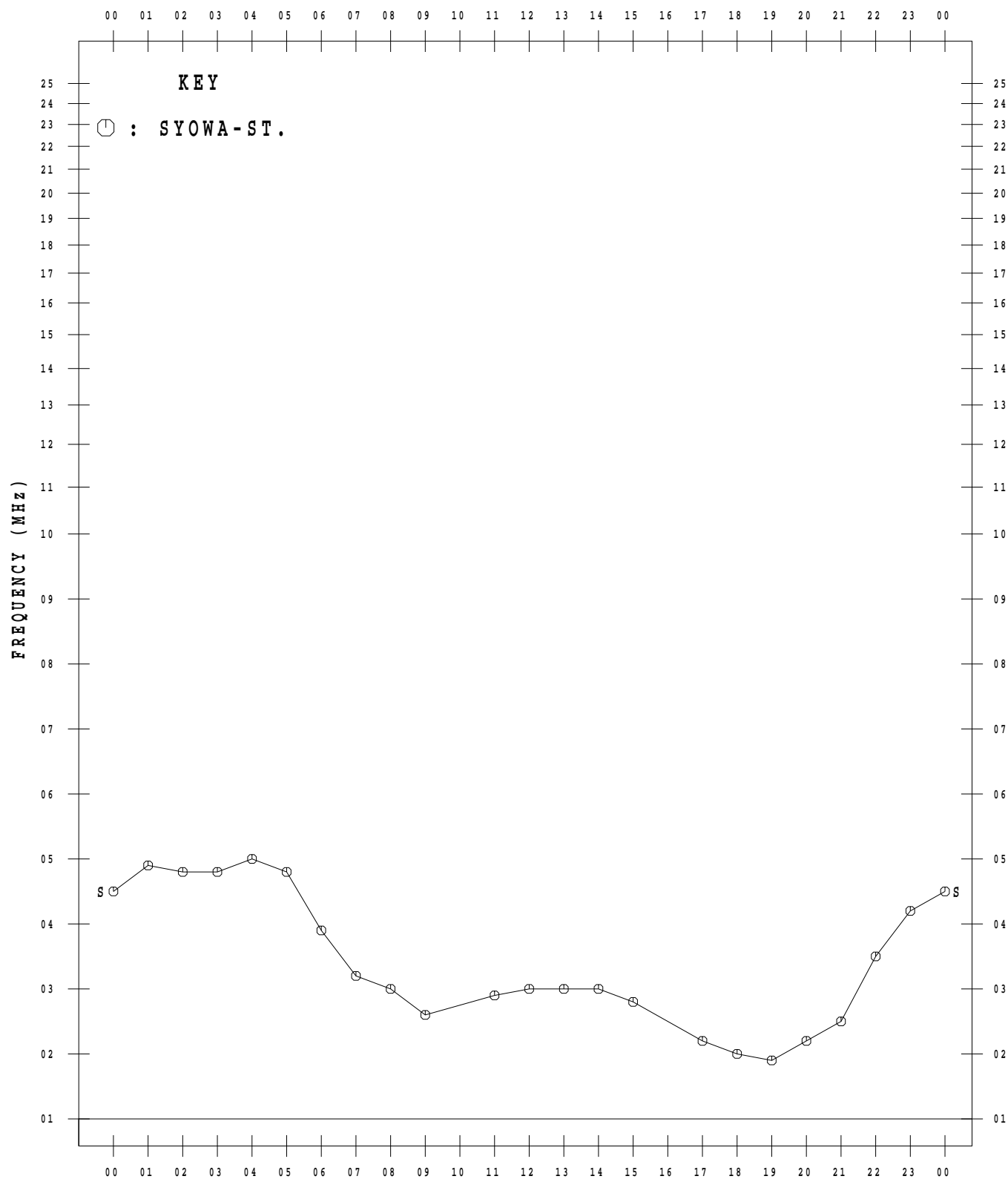
FEB. 2022



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

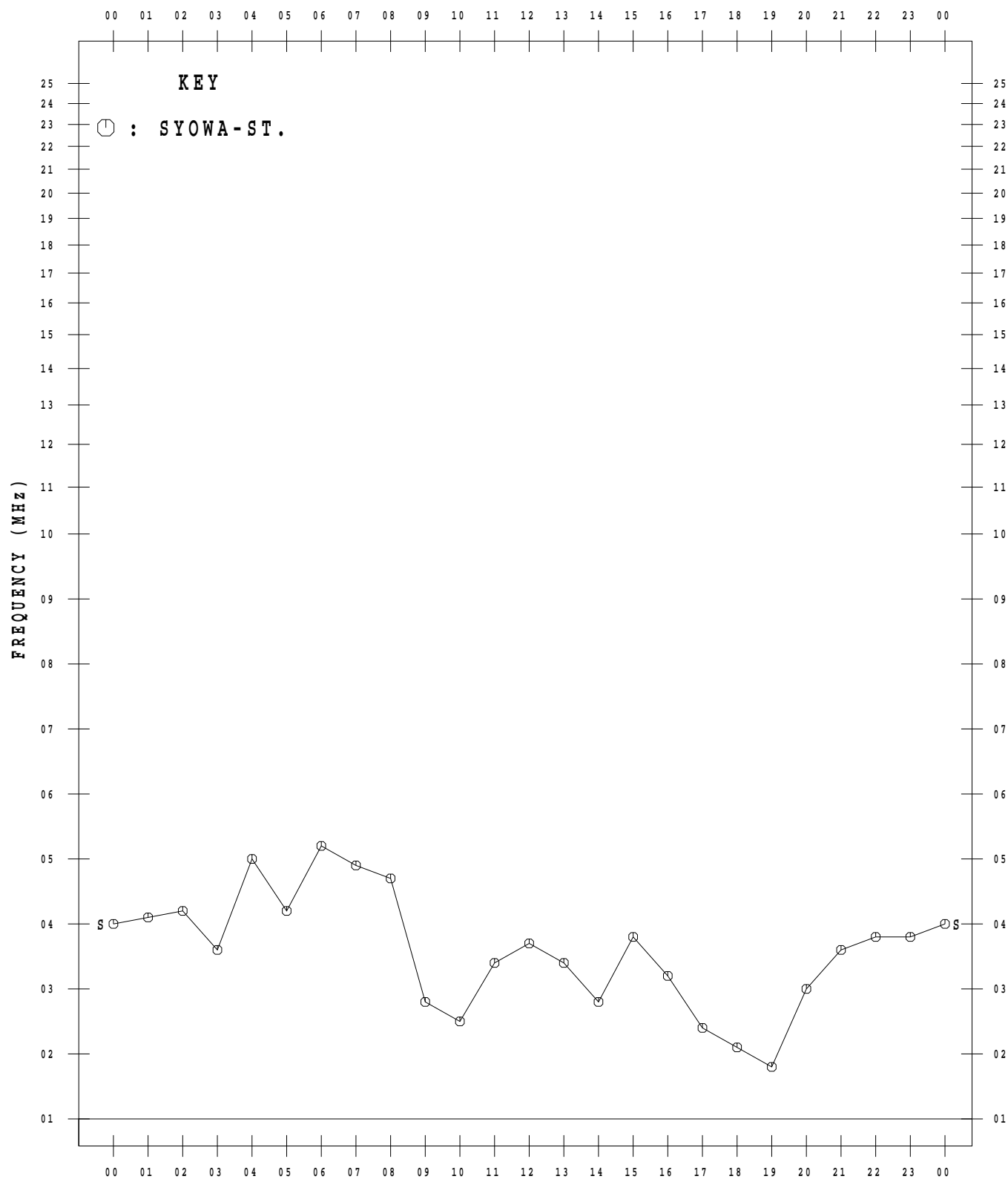
MAR. 2022



MONTHLY MEDIAN VALUES OF f_{TE}s

45°E MEAN TIME

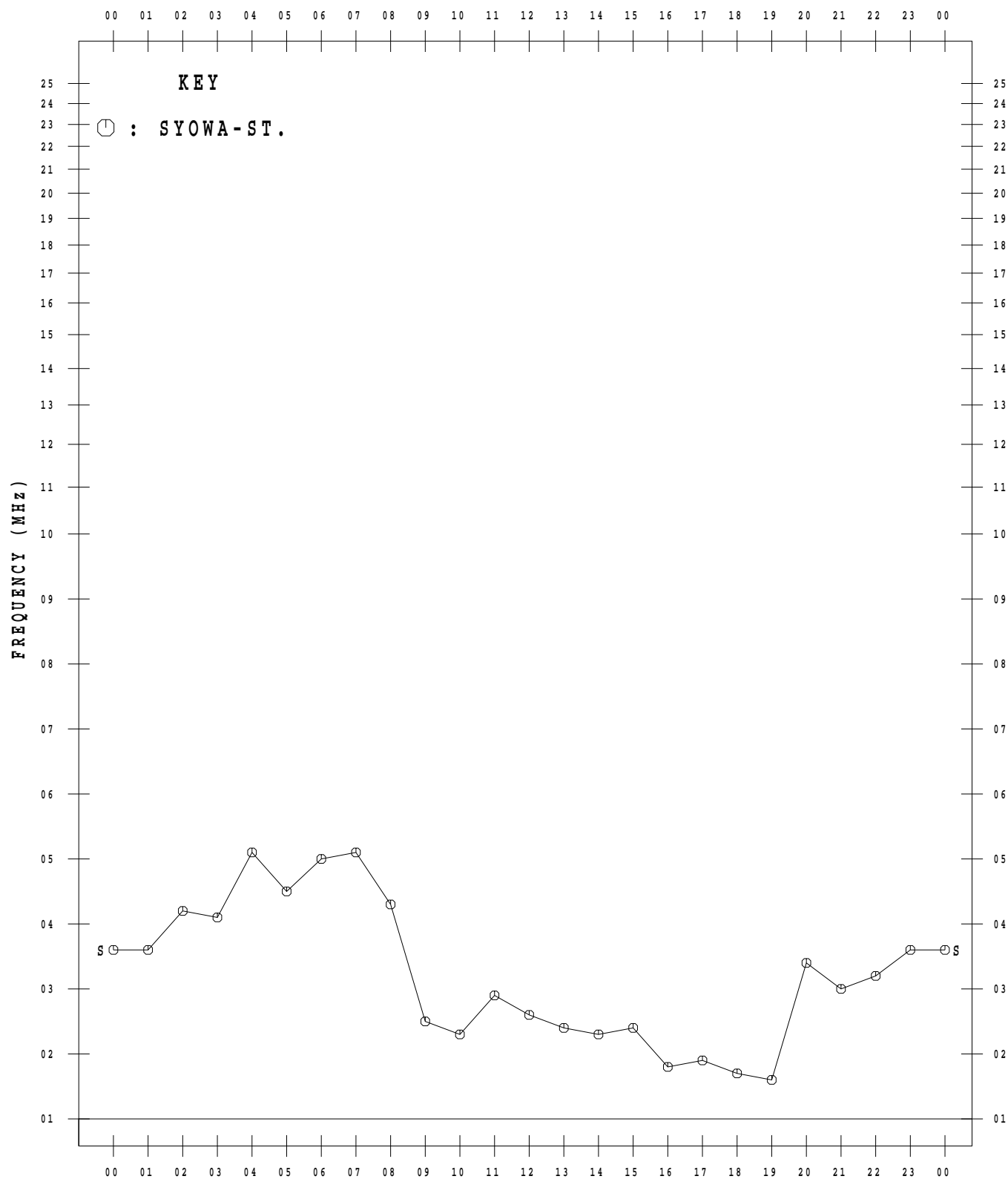
APR. 2022



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

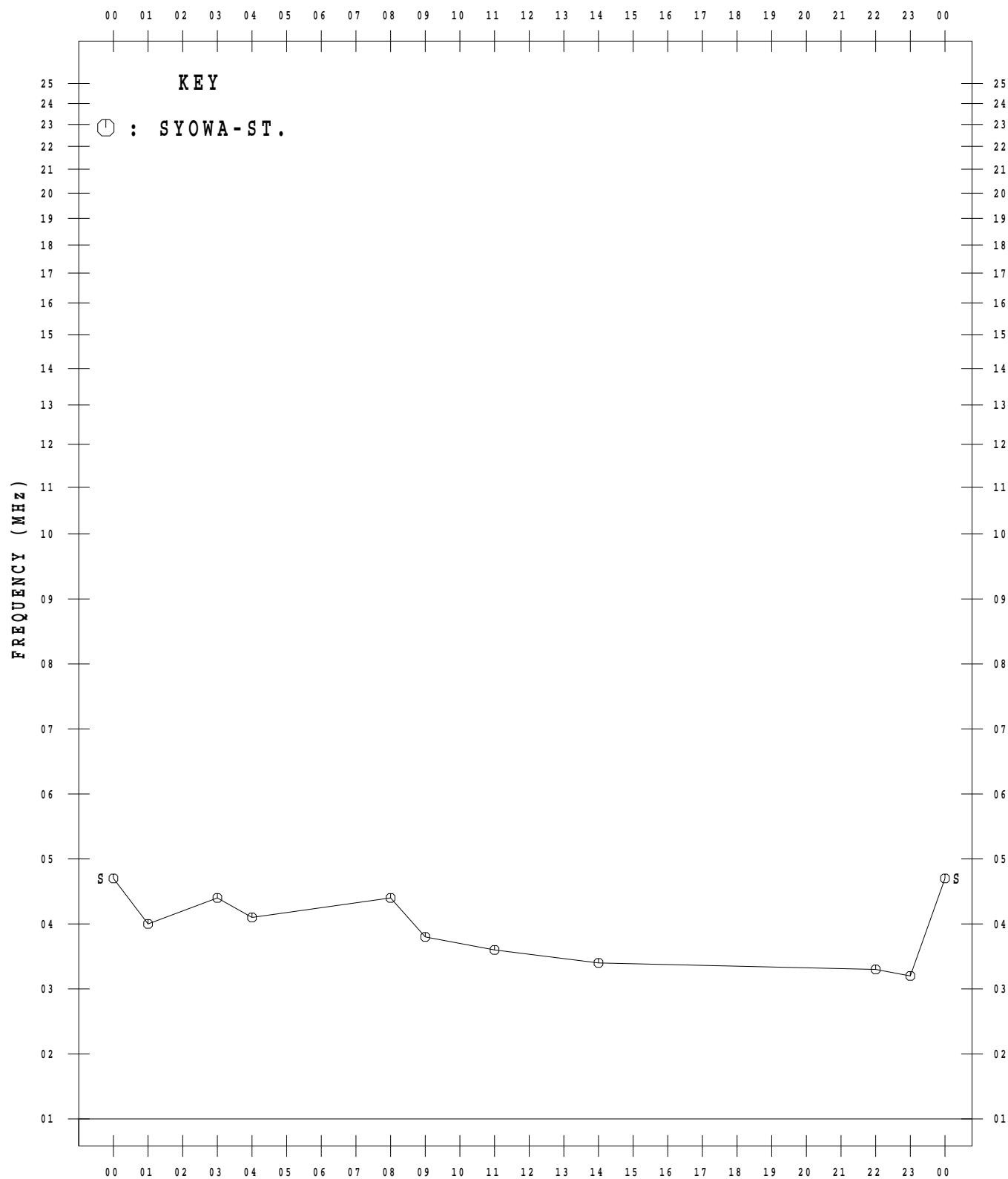
MAY 2022



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

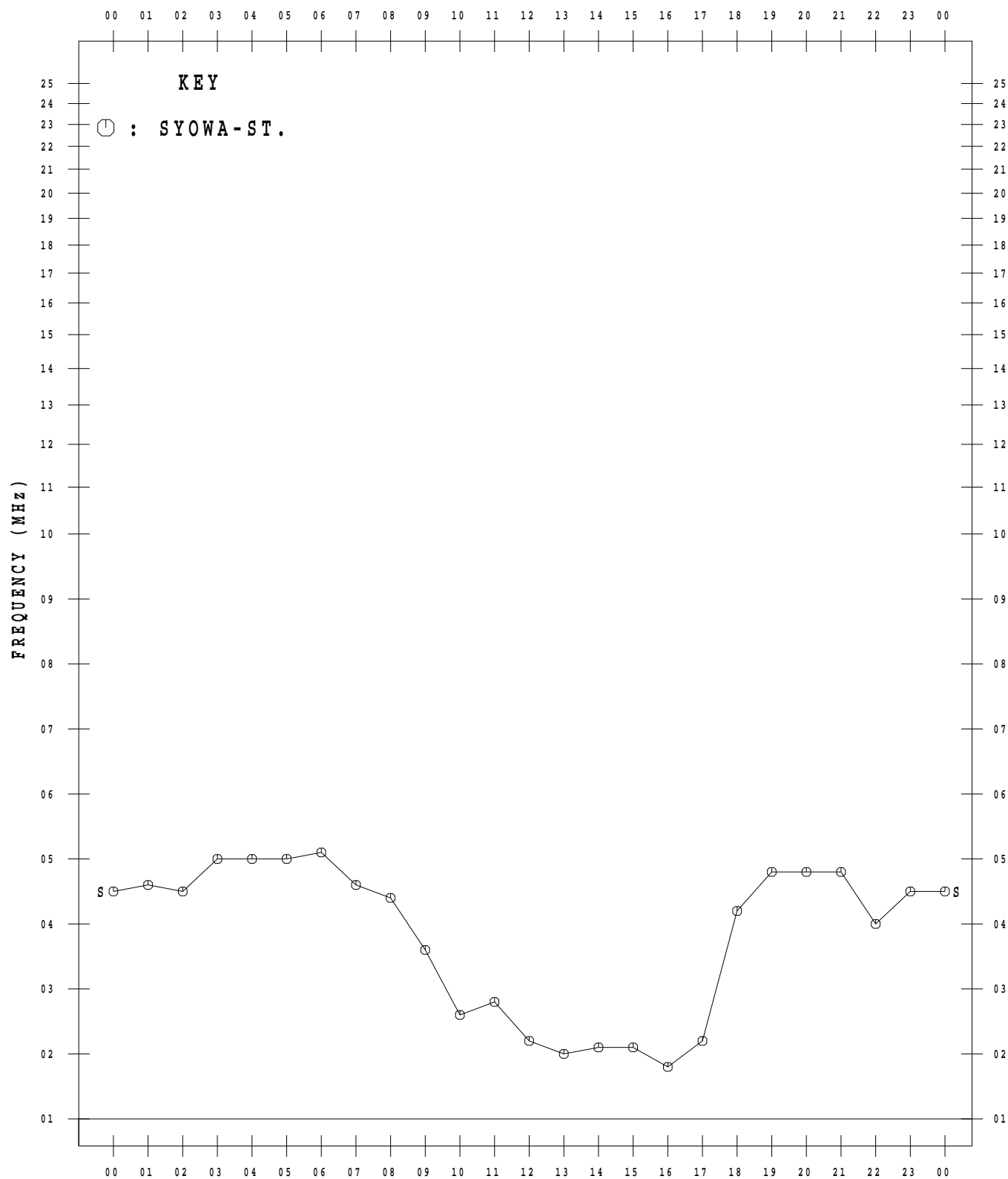
JUN. 2022



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

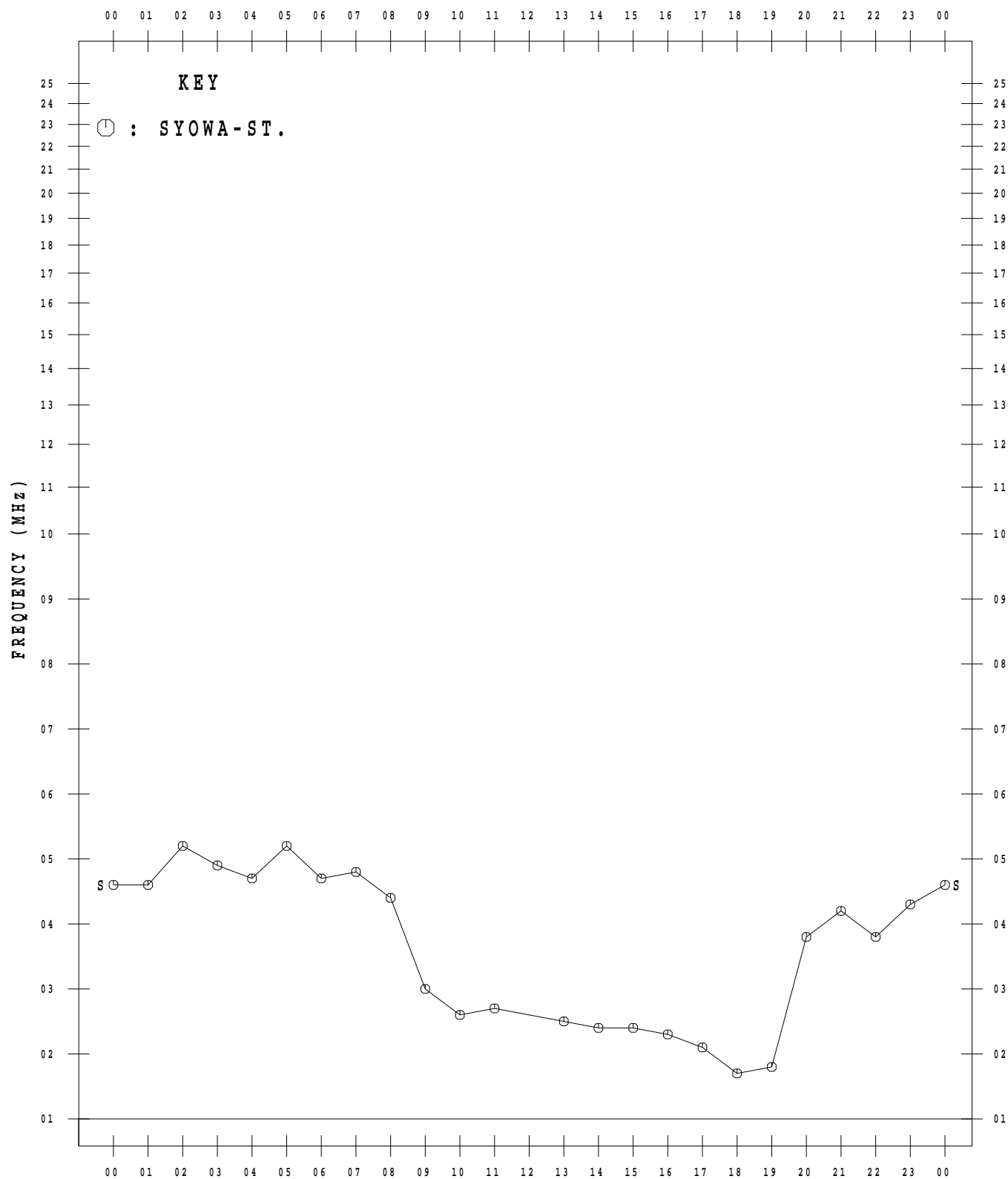
JUL. 2022



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

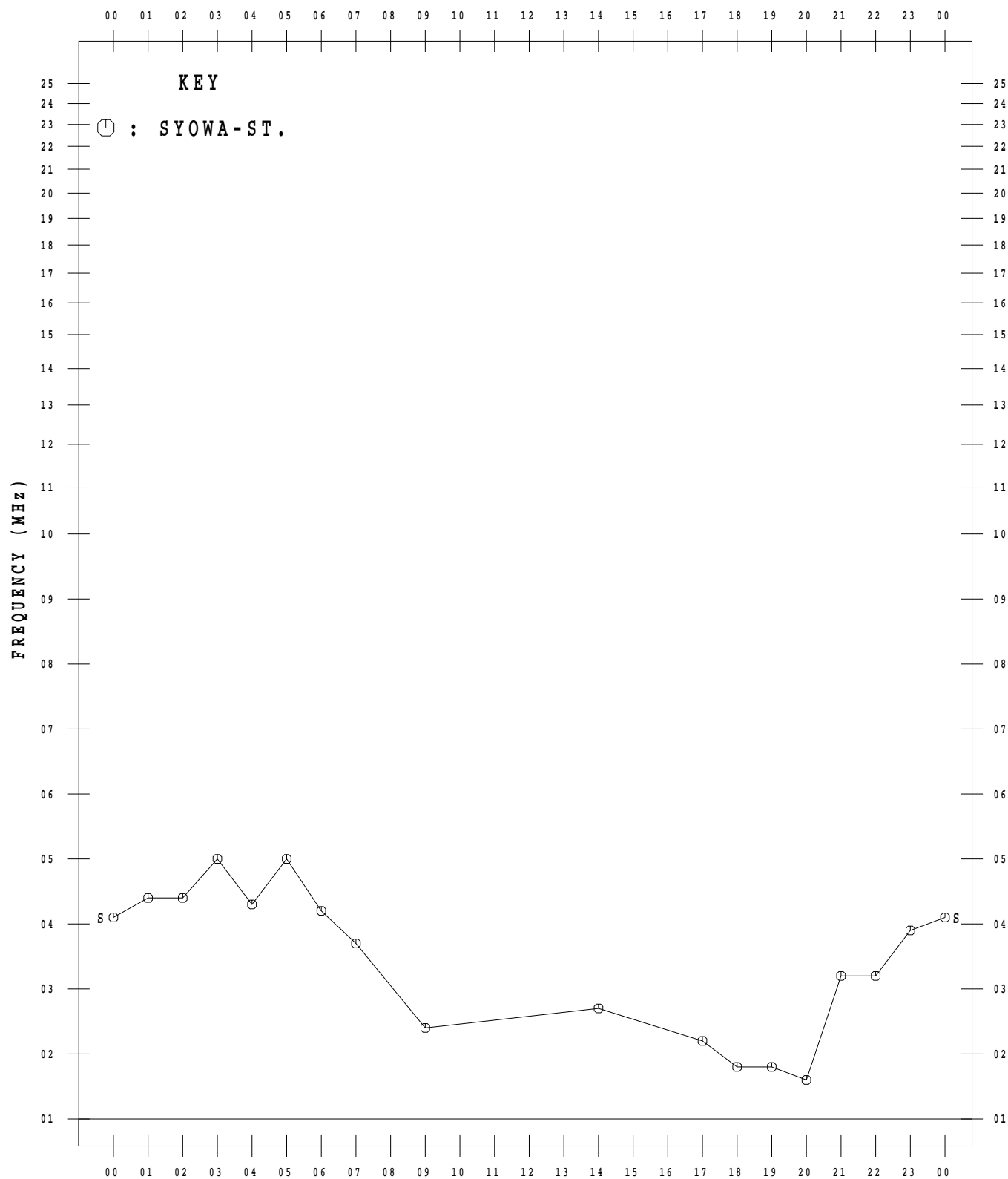
AUG. 2022



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

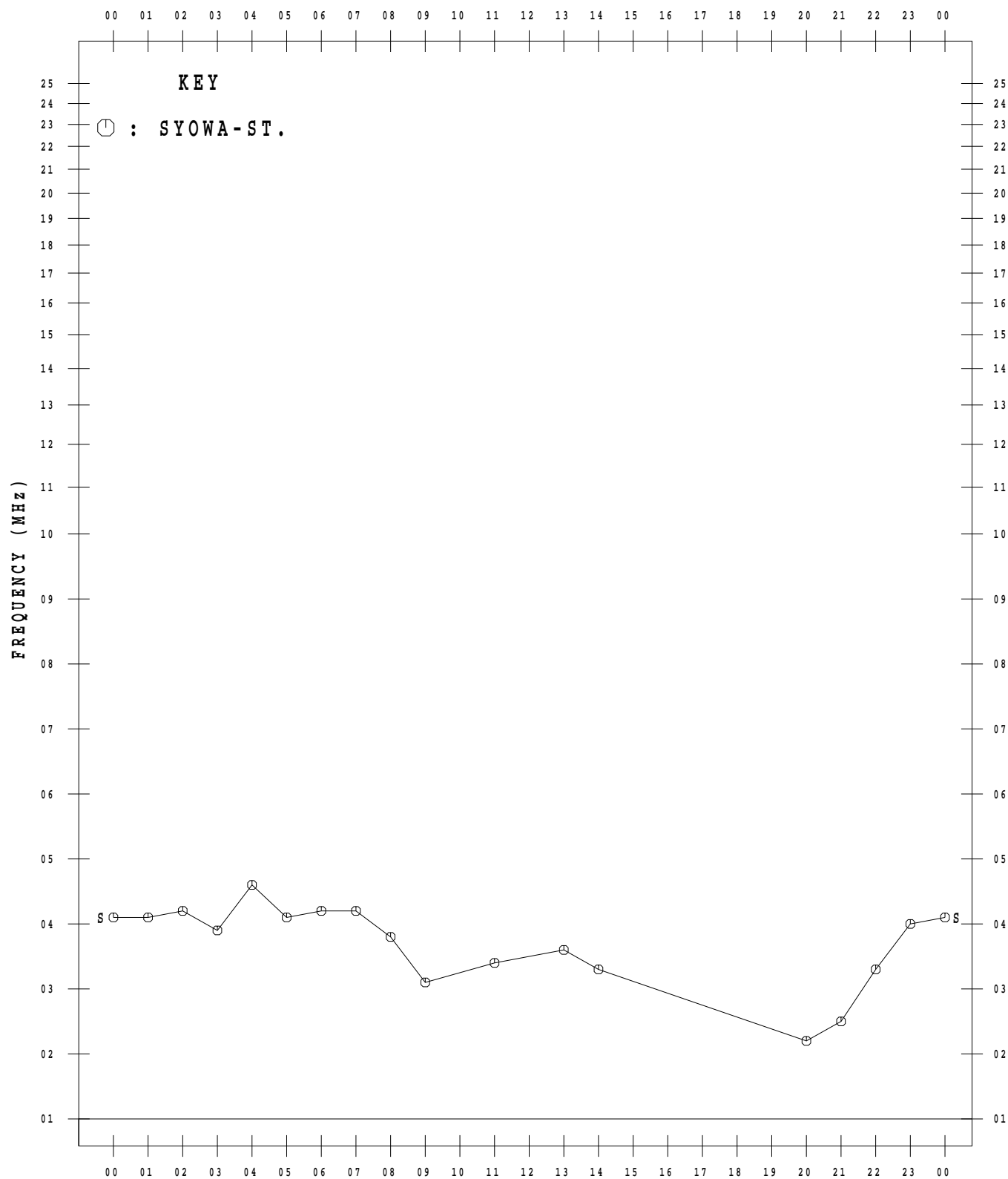
SEP. 2022



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

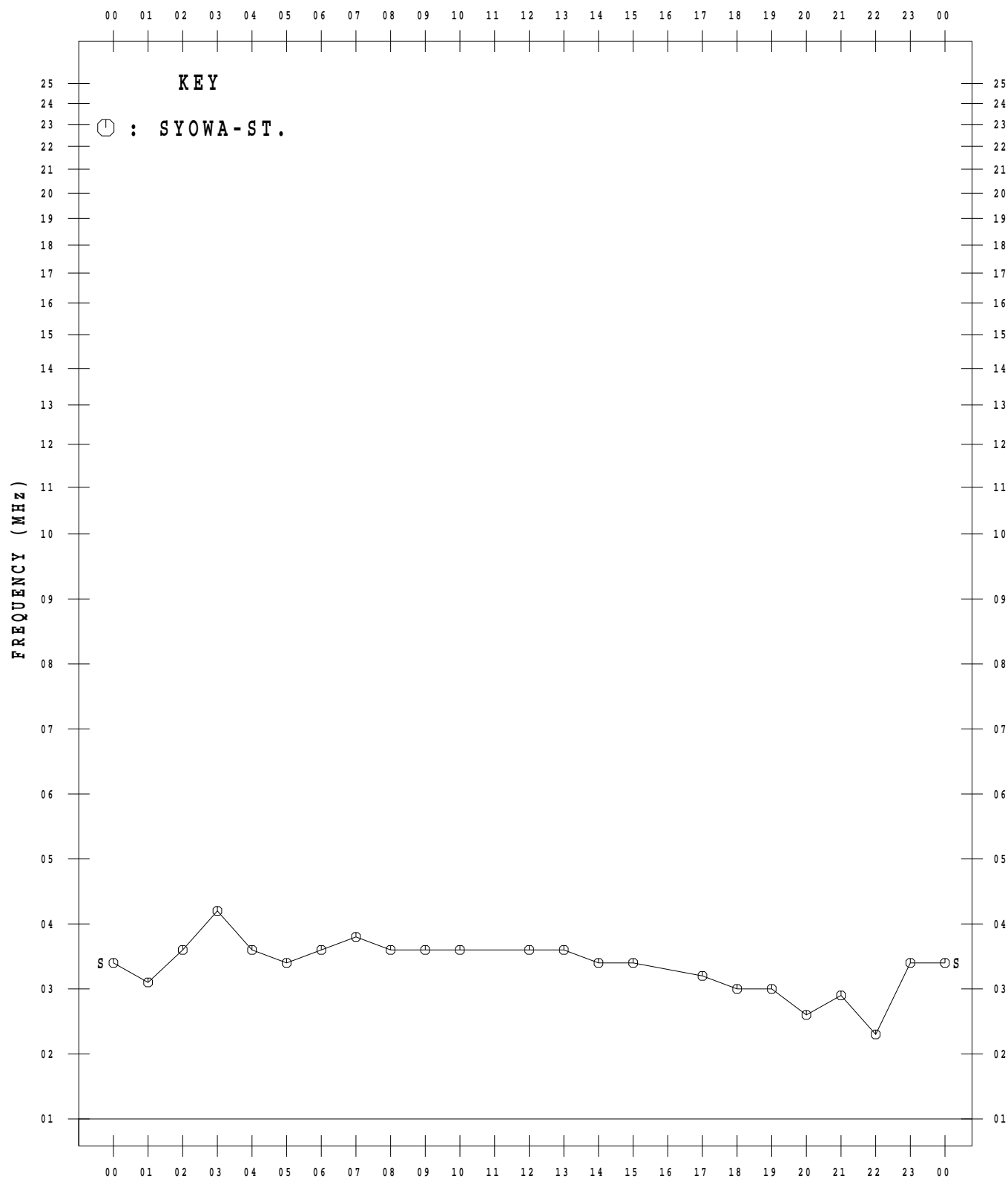
OCT. 2022



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

NOV. 2022



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

DEC. 2022

