

ION.ANT.-91

IONOSPHERIC DATA AT SYOWA STATION

(ANTARCTICA)

January – December 2024

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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 2024. 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	87.5

* 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, this type of FM/CW Ionosonde is used for routine ionospheric observations at Syowa Station.

OBSERVERS

Observer: T. Kondo

Scaler: C. Tao (Jan. Feb.), S. Ando (Mar. Apr. Sep.), N. Takahashi (May June),
H. Jin (July Aug.), M. Nishioka (Oct. Dec.20-31), S. Perwitasari (Nov. Dec.1-19)

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

$f_x I$	Top frequency of spread F traces or oblique traces.
$f_o F2$	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. 2024 f_{XI} (0.1MHz)

45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	X	50	60	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A	61	71	X
2	X	59	50	A	55	41	56	53	45	58	62	65	60	69	66	64	67	69	68	56	57	58	51	52
3	X	54	55	X	X	67	62	51	54	63	67	68	65	65	70	71	72	74	75	70	65	55	54	53
4	A	X	49	51	52	58	0	X	X	R	0	X	X	X	X	X	X	X	X	X	X	56	56	51
5	B	A	X	58	57	A	A	A	X	72	77	73	73	74	74	75	75	71	68	62	57	56	55	57
6	X	58	61	61	65	68	68	69	81	95	103	95	91	88	A	A	X	73	69	69	67	71	71	69
7	X	59	57	61	62	70	70	84	88	101	97	90	86	83	81	79	A	X	X	X	X	X	X	X
8	X	65	67	75	85	91	93	100	105	106	111	108	104	98	95	88	85	82	82	81	76	71	65	68
9	X	58	59	87	69	63	65	73	81	103	104	100	99	96	95	87	80	75	78	73	65	67	66	65
10	X	65	61	A	X	82	89	100	103	98	101	99	95	89	87	84	76	71	59	65	61	66	54	53
11	X	57	57	59	A	55	65	72	81	81	87	80	82	82	81	75	73	71	72	73	69	71	71	65
12	X	71	64	61	63	84	76	88	87	99	91	87	89	90	92	89	X	X	X	X	X	X	X	X
13	X	61	57	66	68	69	72	77	91	97	108	111	110	104	97	88	85	79	78	80	80	74	72	68
14	X	57	66	71	82	71	63	69	69	72	81	81	91	97	92	92	96	91	89	81	59	55	59	58
15	X	56	55	64	54	59	56	63	65	77	81	78	75	74	75	A	X	X	X	X	X	X	X	X
16	X	58	A	67	57	69	79	93	88	X	78	73	73	69	69	69	68	68	67	69	69	65	69	64
17	X	63	59	61	70	66	68	77	85	88	92	94	98	89	87	82	79	77	75	73	73	71	67	68
18	X	55	58	59	68	82	74	116	125	106	106	104	101	107	103	97	96	89	X	83	77	68	70	58
19	X	71	66	63	66	57	A	A	A	65	61	77	80	82	69	74	73	72	73	73	67	51	59	66
20	X	60	69	69	A	67	73	85	93	66	X	83	72	84	76	78	75	73	76	74	65	59	59	69
21	X	57	56	59	52	61	62	80	95	105	89	88	95	95	103	99	97	96	76	69	65	66	65	60
22	X	60	71	58	62	71	84	80	91	96	103	103	98	102	100	95	88	85	76	69	66	66	62	50
23	A	59	82	70	68	63	60	63	65	71	80	83	87	80	75	74	73	71	69	69	70	68	61	56
24	X	71	59	92	61	67	R	A	X	65	59	A	89	75	76	75	75	73	73	69	68	66	65	61
25	X	76	69	71	66	71	79	95	89	95	101	101	98	95	93	87	89	85	84	77	72	67	61	62
26	X	58	A	56	58	61	R	91	51	78	80	X	73	78	75	79	79	76	X	65	68	67	59	56
27	X	60	57	81	51	A	79	82	89	88	106	93	92	85	80	79	71	67	69	69	68	64	65	62
28	X	61	72	75	81	85	89	97	104	108	111	109	111	109	103	99	94	85	78	72	69	69	65	64
29	X	51	A	48	55	A	A	A	R	68	78	73	75	79	78	75	73	75	68	X	59	R	B	B
30	R	46	54	X	R	54	60	60	R	A	A	66	69	70	74	X	X	70	69	68	67	65	55	45
31	X	47	A	B	51	62	R	R	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	26	28	28	28	25	27	26	29	28	31	31	31	30	29	29	31	30	30	31	29	30	30	29
MED	X	59	59	61	62	67	70	77	86	82	88	83	84	84	80	79	75	74	72	70	67	65	65	62
U Q	X	63	66	71	68	71	79	89	91	100	103	100	98	95	93	88	85	82	76	73	70	69	67	66
L Q	X	57	57	58	56	61	62	69	65	66	78	73	73	74	74	74	72	70	69	68	65	59	59	56

JAN. 2024 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JAN. 2024 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		44	54	49	54	59	64	66	69	75	75	71	72	75	74	75	72	68	63	57	45		48	56	51
2		53	41		47	35	49	41	39	44	55	54	54	63	60	58	61	63	62	50	51	50	44	46	44
3		47	48	47	57	56	55	46	48	57	61	62	59	59	64	65	67	68	69	64	59	48	48	47	46
4		A	43	43	42	42	43	40		54	64	65	63	62	61	57	58	59	60	60	55	49	50	45	41
5		B	47	53	50		A	56		66	67	66	66	67	68	68	69	64	62	56	51	48	48	50	47
6		51	55	53	57	62	56	59	71	87	89	85	83	79		A	A	66	63	62	61	64	64	62	59
7		49	48	50	56	63	59	68	74	86	90	80	79	76	73	73		67	68	65	65	63	61	58	58
8		57	61	69	78	82	85	87	91	98	105	101	98	92	86	82	78	75	75	75	68	64	58	61	54
9		43	47	59	63	53	59	65	74	86	85	93	89	89	86	81	72	68	69	66	58	61	59	58	53
10		58	53		58	63	76	67	73	76	84	92	91	87	83	79	76	70		52	57	54	59	49	46
11		49	50	53		49	55	58	67	59	65	74	75	75	73	68	67	64	65	67	60	64	64	57	67
12		64	55	55	56	64	68	77	80	83	84	80	81	83	85	83		75	71	66	62	61	63	63	60
13		53	49	58	57	61	65	61	73	85	93	96	95	92	87	81	78	72	72	73	72	68	65	59	51
14		45	57	57	63	57	63	61	65	71	75	78	82	81	85	89	81	81	81	67	44	50	51	47	49
15		49	48	56	46	53	50	53	56	69	75	71	69	68	69		A	66	66	64	63	58	58	58	45
16		52		52	49		53	52		59	66	66	63	64	63	63	63	62	61	62	62	59	62	57	54
17		51	47	55	59	57	58	70	77	81	85	87	92	84	81	76	73	71	68	67	67	65	61	61	53
18		47	45	53	58	67	65	79	92	99	98	97	95	96	96	84	88	83		76	71	61	64	49	53
19		65	53	56	53	50				58		65	51	63	63	66	66	66	66	67	59	45	52	55	57
20		50	60	60		60	67	79	87	61		61	62	75	69	70	68	66	71	67	58	53	52	53	50
21		49	49	53	46	50	55	59	73	79	83	82	82	87	89	88	84	85	69	61	59	58	59	53	50
22		47	48	52	54	56	67	68	74	80	85	87	91	90	89	88	82	77	70	63	59	59	56	41	43
23			51	52	57	60	56	53	52	59	65	70	76	80	73	69	68	65	65	63	61	63	62	53	44
24		39	42	54	54	53	69		57	52		63	61	65	65	68	67	67	63	62	60	58	55	57	57
25		50	47	54	57	60	65	74	81	88	94	95	89	87	85	81	83	78	77	69	63	57	54	55	51
26		48		50	50	53		54	85	65	73	62	67	69	70	73	69	64	59	61	61	52	47	43	43
27		51	46	45	44	62	73	71	77	85	86	85	79	74	72	65	61	63	63	62	58	58	55	52	A
28		54	64	68	67	73	80	89	97	102	105	103	105	103	97	94	87	78	71	66	62	62	55	52	B
29		42		46	45					59	72	67	68	71	71	69	66	70	63	51	54	47		B	B
30		42	42	48	54	47	54		R	R	A		59	60	64	67	65	63	64	64	61	61	57	45	39
31		39		46	50	49		52	56	66	69	58	63	65	64	63	61	64	66	61	54	46	41	41	41
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT		28	27	28	28	27	27	26	25	29	27	31	31	31	30	29	29	31	29	31	31	30	30	30	29
MED		49	48	53	54	57	59	64	73	75	83	74	76	76	73	73	68	67	65	63	60	58	57	54	51
U Q		52	54	56	57	63	67	73	80	86	89	87	89	87	85	82	78	75	70	67	62	62	61	57	54
L Q		46	47	50	48	50	55	54	59	59	66	65	63	65	67	67	66	64	63	61	58	52	50	47	44

JAN. 2024 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JAN. 2024 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	46 G	44	42	34	43 G	40	40	41	35	38	36	39	40	67	53 G	35	E B 30 G	42 G	71 G	72		G	G	42
2	43		84	68	44 G		73	77	66	46 G	91 G	36	37	36	35		36				84		38	39	
3	40	58 G	38 G	27		42 E B G	39 G	70 G	38 E B G		35 E B G	35	35	45	35	E B 38	35	32	E B 30	E B 33	E B 26		G	G	41
4	46 B			26		33 E B G			33 E B G	35 G	36	31	39	43	37	36		32 G	35 G	E B 32 G	E B 29	E B 28	E B 27		G
5		69	44	33	53	55	32 E B G	57	49		41	46	50	37	41	36	40				E B 27			28	77
6	42 G	39	35 G	29 G	38	44	49	42	41 G	44	39	37	47	97	103	59	49	32	30	27	29	23	22	22	
7		27			44	33	39	29 G		39	40	54	49	53	125	81	53	76	42	42	37	28	68	30	
8	31 G	36	46	36	47	40	29		33	46	53	41	38	43	40	36 G	44 G	67 G	32	29 G	26	26	25	26	
9		41	40	58	49	51	48	46	37	39 G	38	39	46	47	40				30			26		19 G	
10	G	33	72	35	34	47	40	35	36		41	38	41	44		40 G	G	38	33	31	34	81	36		
11	37	42	46	71	46	37	46	44	45 G	40 G	45	44 G	40	55	54	E B 39 C	35	40 G	35 G	47	44	41	36	31	
12	37	31	31	35	28	31	40	34			37		38	40	39		35			29	29	35 G	35	29 G	
13	30 G	28	29	31 G	35	41	36	34	36 G		37	37 G	39	39	37 G	41	37 G	43 G	41 G	45			27		
14		41	43		50	46	49	50		41	40		43	41		38				38 G	41	47	38	49	
15	41	39	41	36 G	42	45	37	33	36	38	41	48	59	50	85	51	35	36	31		33	25	37	39	
16	59	61	46		46	33	43	44 G	50	46	40	42	42	46	37	42	39	35	36	33	30	38	27	28	
17	33	29	30	29	51	45	44		36	38	38	41	49	56	39	57	47	44	32	37	39	35	50	30	
18	26 K	32	31	41	29	49	44	34	35	37	41	39	39	48	55 G	58	51	37	38	85 G	93	28	30	36 G	
19	50 K	36 K	35	38	47	80	81	74 G	55	68 C	43	43	42	40		38	55	36	32		41 G	40 G	37		
20	37 K	31 K	28	87	39 G	31	30 G		51		36	37	37	38		53	40 G	38 G	33 G				44	39 G	
21	37 K	42 K	47	27		30		42 G	35	125	131 G	37	39	50	34	36		E B 34 G	E B 31 G	E B 34 G	30	30	27		
22	29	33	27		G	29			35 G	35		38 G	39	38	40	36	36	34	31	34	42	30	30	G	
23	126	128	K 32		G	G		35	45		49	44		40		38	108	45	32		30	54	59	29	31 K
24	50	29 K	47	37	31	43	61	46	40	57	47	44	35		37	35	33	33	33 G	29	27	28	26	21 K	
25	35 K	27	25	28	40	41	43	35	35	36	42 G	42	35	39	35	36	36	33		29	44	34	30	35 K	
26	42 K	49	52	47	44	46	33	43	37	38		39	44	41	45	39	41	37 G	114	29		33		29	
27	32	43	38	43 G	71 G	31	51	50	44	37		36 G	38	36	37	36	36		40	28	45	41	24	23	
28	18	26	28			27	30	33	34	36 G		45 G	47	46	53	67	55	45	56	45	37	23	48	57 B	
29	23	58	41	32	49	68	71	44	38				39	66	38	38	E B 36	E B 40	E B 41	E B 37 G	E B 41 G	B	B	B	
30	E B 37	K E 32	E B 37	E B 43	E B 38	E B 39	49	52	57	58 G	47 G	38			37	39	58	34	31					27	
31	32	149		42	31	35	27	46	49			34	34	33	35	35	30	31	29	E B 34				37	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	31	30	31	31	31	31	31	31	30	31	31	31	31	31	30	31	31	31	31	31	30	30	30	
MED	37	36	38	34	39	41	40	42	37	38	40	38	39	41	38	38	36	34	32	30	32	28	28	30	
U Q	42	46	46	42	47	46	49	46	45	46	43	42	44	48	45	53	45	38	38	37	42	35	37	39	
L Q	29	29	30	27	29	31	32	33	35			36	38	38	35	36	35	G	29		26		24	21	

JAN. 2024 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JAN. 2024 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	11	13	10	11	14	12	14	11	8	7	14	7	7	13	18	33	15	14	14	14	13	14
2	15	15	16	15	14	15	11	13	10	11	14	13	14	11	11	7	14	11	11	14	15	9	14	13
3	12	14	13	14	17	16	19	14	15	15	13	13	14	15	14	38	17	27	30	33	26	18	16	32
4	20	20	19	15	17	33	25	33	33	35	36	24	25	20	23	24	24	23	28	32	29	28	27	19
5	B	24	32	27	30	41	32	24	24	17	16	18	16	17	17	15	15	16	17	15	27	16	14	14
6	14	13	14	14	15	15	16	15	15	15	15	13	13	13	14	15	11	9	11	9	8	9	11	14
7	14	14	20	17	15	12	14	13	12	12	11	13	11	12	11	10	10	12	10	9	9	14	17	11
8	11	12	13	8	9	9	10	13	16	11	9	10	8	13	11	9	9	9	13	15	11	7	8	8
9	15	9	9	15	11	15	13	10	7	9	8	9	18	15	11	12	15	11	7	14	11	6	7	7
10	7	7	15	12	10	9	7	7	9	12	11	8	9	13	15	11	18	9	15	11	14	7	6	6
11	6	7	16	13	11	10	7	11	8	13	9	15	14	15	25	39	24	32	24	9	11	10	11	13
12	9	7	9	7	6	7	8	7	12	15	11	25	25	15	17	C	17	16	9	8	7	6	9	6
13	6	6	8	6	7	9	6	7	7	16	8	7	9	9	12	15	15	16	11	11	14	15	7	6
14	8	9	16	6	13	12	10	8	6	6	13	16	16	7	7	11	9	13	9	12	7	9	9	10
15	7	11	7	8	8	7	7	6	5	11	7	11	14	13	12	31	25	8	8	7	8	7	6	7
16	15	25	7	7	9	8	7	7	7	10	7	9	10	9	8	7	7	9	7	7	6	7	5	6
17	7	6	5	6	6	9	6	6	6	7	7	9	11	11	10	7	7	8	7	7	6	7	6	5
18	6	12	13	14	10	6	7	6	8	6	7	9	7	8	44	16	12	15	15	16	9	8	6	10
19	10	10	13	14	15	19	9	11	10	15	11	11	14	16	13	11	14	12	13	7	6	5	7	7
20	6	14	6	14	7	6	7	6	17	C	8	8	9	13	15	15	12	17	15	8	13	6	9	7
21	15	14	15	7	6	7	8	7	7	15	17	15	10	17	19	13	15	11	15	26	23	18	8	6
22	8	7	13	15	17	14	13	8	9	9	13	13	9	12	14	13	16	34	31	34	25	30	30	33
23	28	24	24	25	20	20	24	20	21	25	21	15	14	14	11	9	14	15	17	14	14	13	13	13
24	15	12	11	11	11	14	16	12	11	15	14	9	11	11	9	11	14	13	9	9	11	8	7	7
25	7	7	7	7	8	10	7	8	7	6	6	6	8	9	7	10	9	7	13	8	13	14	6	7
26	9	14	11	11	12	7	8	7	12	10	9	7	7	8	8	8	7	6	7	12	7	7	6	6
27	12	14	9	16	23	14	14	11	23	20	21	11	13	18	18	15	8	8	8	9	12	8	7	6
28	8	6	7	7	7	6	6	6	8	10	15	11	11	10	9	13	11	13	10	8	6	6	12	11
29	8	12	7	11	14	11	9	10	17	17	26	20	17	19	22	33	36	40	41	37	41	B	B	B
30	37	25	37	43	38	39	37	24	22	25	24	24	27	16	16	14	14	16	18	17	14	17	14	13
31	13	15	B	18	12	19	14	14	15	12	13	11	14	13	15	27	17	16	16	34	17	11	11	11
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	30	31	31	31	31	31	31	31	31
MED	10	12	13	13	11	11	10	10	11	12	11	11	13	13	13	13	14	13	13	12	12	9	9	10
U Q	15	14	16	15	15	15	14	13	16	15	15	15	14	15	17	15	17	16	17	16	15	15	14	13
L Q	7	7	8	7	8	8	7	7	7	10	8	9	9	10	10	10	10	9	9	8	8	7	7	6

JAN. 2024 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JAN. 2024 h'F (KM)

45°E MEAN TIME (G.M.T. + 3 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	A	A	A	E A	392	346	292	267	201	203	224	214	206	211	E A	A	E A	E A	E B	H	A	294	320	320	
2	310	E A	A	A	250	328	254	E A	H	H	A	246	224	198	218	195	194	209	215	254	276	240	240	290	317
3	356	E A	401	E A	304	366	411	258	234	207	188	E A	220	220	E A	E B	204	208	E B	E B	192	286	294	E A	
4	A	406	E A	412	266	252	238	306	E A	254	228	200	216	222	212	204	200	216	226	246	234	234	E B	246	A
5	B	A	E A	430	450	A	A	E B	A	A	256	208	216	228	204	208	206	208	H	H	216	210	258	246	256
6	E A	276	268	294	326	A	A	E A	278	262	232	206	200	192	232	A	A	E A	204	196	214	230	224	240	252
7	334	326	338	368	378	E A	282	282	220	210	198	230	A	E A	E A	A	A	E A	A	218	E A	E A	246	262	257
8	264	282	270	276	E A	250	232	218	218	204	204	216	194	204	230	214	206	E A	A	214	216	220	238	246	230
9	380	366	370	A	A	A	A	A	194	182	194	186	200	220	244	220	192	212	204	208	216	222	252	244	242
10	264	308	392	366	290	E A	258	274	260	214	208	220	216	222	200	194	214	244	220	216	234	244	270	283	341
11	E A	E A	A	A	A	A	E A	E A	E A	A	A	H	214	212	A	218	212	E A	E A	E A	A	248	240	256	270
12	302	338	316	278	264	246	252	240	216	206	202	206	206	216	214	A	H	C	212	218	222	214	238	258	252
13	276	280	322	308	296	290	282	230	218	214	214	218	218	202	206	218	208	210	246	258	242	246	248	252	A
14	304	A	A	288	252	A	A	A	H	H	E A	252	222	234	220	214	222	222	206	264	286	266	298		
15	370	358	290	E A	342	A	258	224	192	208	226	228	232	216	A	236	218	216	226	230	232	256	256	318	
16	A	A	A	262	A	254	294	A	A	228	204	210	216	218	208	210	212	224	204	222	244	248	260	266	
17	308	288	296	338	A	A	284	220	220	192	201	233	235	215	213	B	E A	E A	H	H	H	E A	E A	E A	
18	277	321	332	349	228	A	349	233	215	199	200	204	221	235		241	225	213	231	238	237	260	273	277	H
19	341	413	369	319	G	A	A	A	A	A	245	231	201	243	227	221	214	212	221	241	A	317	311	273	
20	E A	257	301	309	A	A	285	228	211	A	216	193	211	213	214	E A	233	219	221	236	248	282	311	273	313
21	315	E A	359	365	287	347	285	286	254	227	237	250	227	229	E A	255	219	221	212	223	233	257	263	261	251
22	307	328	328	297	277	H	A	A	H	227	207	213	207	215	205	201	207	219	209	E B	E B	E B	E A	E B	B
23	A	423	463	349	295	E B	335	A	A	H	E A	227	233	209	H	219	213	215	E A	236	253	267	252	249	317
24	403	374	323	364	251	E A	263	A	A	A	E A	A	H	213	215	217	209	227	223	229	231	241	255	252	259
25	289	289	297	307	H	E A	349	280	251	H	210	213	191	203	E A	209	196	217	213	217	227	221	249	269	263
26	329	A	A	A	387	A	252	284	251	213	199	201	221	204	239	235	207	223	H	233	220	241	283	271	273
27	321	E B	329	344	296	A	A	A	E A	287	229	209	201	213	211	222	211	205	227	223	241	245	257	239	245
28	285	279	283	287	283	243	241	215	215	202	199	219	217	207	227	E A	A	A	E A	A	H	239	249	287	A
29	251	A	A	287	A	A	A	A	255	210	229	209	241	A	217	E A	E B	B	B	B	B	B	B	B	B
30	B	345	E B	E B	B	B	A	A	A	A	218	235	215	209	E B	H	E A	A	A	231	225	247	247	289	287
31	293	A	B	E A	E A	A	A	A	A	A	205	217	210	225	215	223	215	213	225	226	252	236	290	264	E 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	25	24	23	26	18	18	22	20	24	26	31	30	31	29	25	27	29	28	30	31	28	30	29	26	
MED	304	322	326	307	278	267	264	226	214	208	210	213	218	213	214	212	212	219	225	237	241	256	259	270	
U Q	332	362	370	364	304	292	286	256	233	224	226	227	225	224	220	221	218	226	236	251	256	270	285	313	
L Q	276	295	297	287	252	254	252	219	206	204	200	203	211	208	208	209	208	213	216	230	235	246	252	252	

JAN. 2024 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2024 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 51	X 51	X 52	X 53	X 59	R 60	X 72	X 81	X 95	X 88	X 91	X 89	X 95	X 93	X 91	X 85	X 80	X 73	X 77	X 75	X 65	X 43	X 43	X 47
2	X 44	X 53	X 54	X 57	X 58		X 70	X 91	X 76	X 79	X 81	X 83	X 83	X 82	X A	X 84	X 79	X 78	X 75	X 73	X 71	X 71	X 68	X 65
3	X 61	X 65	X 73	X 63	X 68	X 74	X 78	X 91	X 109	X 107	X 107	X 105	X 101	X 101	X 92	X 88	X 86	X 85	X 80	X 74	X 71	X 72	X 73	X 66
4	X 61	X 59	X 58	X 61	X 62	X 91	X 80	X 71	X 77	X 86	X 83	X 85	X 81	X 80	X 73	X 70	X 71	X 67	X 65	X 65	X 60	X 71	X 53	
5	X 92	X A	X 52	X 53	X 61	X 68	X 71	X 81	X 89	X 96	X 97	X 102	X 101	X 97	X 94	X 86	X 89	X 81	X 75	X 67	X 69	X 58	X 58	X 54
6	X 57	X 83	X 59	X A	X 56	X 66	X 84	X 69	X 91	X 99	X 79	X 88	X 90	X 83	X 80	X 78	X 76	X 71	X 72	X 70	X 65	X 56	X 48	X 55
7	X 49	X 58	X 61	X 65	X 73	X 77	X 83	X 97	X 109	X 102	X 105	X 101	X 101	X 93	X 87	X 81	X 80	X 74	X 74	X 71	X 68	X 72	X 63	X 65
8	X 58	X 55	X 61	X 60	X 88	X 77	X 90	X 85	X 93	X 95	X 106	X 105	X 111	X 101	X 98	X 94	X 85	X 80	X 72	X 71	X 59	X 52	X 55	X 52
9	X 58	X 57	X 65	X 73	X 80	X 87	X 91	X 93	X 100	X 103	X 103	X 98	X 90	X 87	X 88	X 86	X 85	X 79	X 75	X 69	X 69	X 67	X 65	X 63
10	X 60	X 60	X 65	X 71	X R	X R	X 95	X 101	X 107	X 109	X 108	X 106	X 104	X 106	X 97	X 96	X 96	X 95	X 87	X 79	X 73	X 72	X 66	X R
11	X 61	X 67	X 69	X 71	X R0	X 78	X 76	X B	X 74	X 99	X 93	X 98	X 84	X B	X 98	X 96	X 83	X 74	X 76	X 76	X 64	X 53	X 52	X 49
12	X 33	X 55	X R	X 58	X A	X A	X 61	X R	X 61	X 67	X 75	X 74	X 74	X 74	X 75	X 71	X 69	X 71	X 69	X 68	X 63	X 59	X 56	X 56
13	X 56	X 58	X 58	X 59	X R	X 71	X 71	X 66	X B	X R0	X 72	X 68	X 72	X 81	X 87	X 92	X 98	X 89	X 73	X R	X B	X B	X R	X R
14	X 55	X R	X A	X A	X 0	X 65	X 66	X A0	X 61	X 65	X 70	X 73	X 75	X 76	X 75	X 72	X 71	X 71	X 68	X 67	X 62	X 65	X 61	X 63
15	X 61	X 61	X 69	X 70	X 76	X 87	X 84	X 93	X 99	X 103	X 101	X 103	X 98	X 97	X 97	X 89	X 87	X 83	X 83	X 79	X 76	X 72	X 65	X 45
16	X 53	X 60	X 55	X 58	X 58	X 69	X 71	X 80	X 93	X 98	X 99	X 97	X 95	X 95	X 90	X 86	X 81	X 79	X 77	X 71	X 71	X 66	X 66	X 53
17	X 61	X 66	X 63	X 59	X 58	X 68	X 70	X 74	X 89	X 100	X 101	X 98	X 96	X 90	X 88	X 86	X 82	X 83	X 79	X 79	X 76	X 66	X 58	X A
18	X 52	X A	X A	X 71	X 82	X 67	X A	X 61	X 71	X 72	X 79	X 81	X 82	X 83	X 81	X 82	X 79	X 76	X 72	X 66	X 65	X 63	X 50	X 47
19	X 45	X 54	X 51	X 61	X 69	X 69	X 86	X 90	X 92	X 96	X 101	X 98	X 93	X 91	X 88	X 85	X 80	X 76	X 79	X 73	X 68	X 61	X 59	X 58
20	X 56	X 57	X 72	X 86	X 63	X 70	X 83	X 97	X 104	X 108	X 107	X 101	X 106	X 109	X 104	X 101	X 97	X 95	X 84	X 75	X 67	X 60	X 58	X A
21	X A	X 57	X 56	X R	X 63	X 65	X 72	X 77	X 85	X 88	X 89	X 91	X 92	X 93	X 87	X 83	X 81	X 78	X 79	X 69	X 66	X 67	X 41	X 37
22	X 42	X 48	X 38	X 58	X 58	X 67	X 71	X 69	X 90	X 97	X 108	X 104	X 111	X 105	X 101	X 106	X 96	X 86	X 79	X 68	X 62	X 58	X 57	X 35
23	X 45	X 45	X 51	X 58	X 71	X 85	X 73	X 93	X 109	X 112	X 99	X 99	X 96	X 95	X 89	X 89	X 89	X 77	X 72	X 71	X 66	X 61	X 57	X 84
24	X 45	X 58	X 50	X A	X A	X 71	X 92	X 93	X 98	X 104	X 103	X 102	X 101	X 97	X 101	X 100	X 95	X 95	X 92	X 72	X 62	X 58	X A	X A
25	X A	X 53	X 45	X 55	X 65	X A	X A	X A	X A	X A	X A	X 57	X B	X 57	X 63	X 67	X 71	X 68	X 66	X 65	X 59	X 58	X 47	X 33
26	X A	X 47	X 50	X 49	X 53	X A	X A	X A	X 49	X 61	X 55	X 65	X 69	X 76	X 79	X 87	X 98	X 87	X 80	X 74	X 69	X 59	X 58	X 56
27	X A	X A	X A	X A	X A	X A	X 60	X A	X B	X 55	X R0	X 64	X 63	X 65	X 63	X 65	X 67	X 66	X 64	X 59	X 58	X 48	X 31	X A
28	X A	X A	X A	X A	X 54	X 52	X 57	X 64	X 74	X 82	X 85	X 88	X 87	X 87	X 89	X 89	X 86	X 68	X 64	X 65	X 63	X 57	X 44	X 32
29	X A	X A	X A	X 68	X 89	X 92	X 94	X 112	X 103	X 105	X 108	X 108	X 111	X 107	X 101	X 98	X 95	X 92	X 81	X 73	X 67	X 58	X 51	X 52
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	23	23	23	23	23	23	25	23	26	27	27	29	28	28	28	29	29	29	29	28	28	28	27	23
MED	56	57	58	60	63	70	73	85	92	97	99	98	94	92	88	86	83	78	75	71	66	60	58	53
U Q	61	60	65	70	73	78	85	93	100	103	105	102	101	97	97	93	92	86	80	74	69	66	65	63
L Q	45	53	51	58	58	67	70	74	74	79	81	82	84	82	80	82	79	72	72	68	63	58	50	47

FEB. 2024 fXI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2024 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	45	44	47	46	54	53	65	73	78	82	85	83	89	85	85	78	73	66	70	68	57	37	35	36
2	38	41	43	51			55	65	67	73	73	76	77	76		77	72	72	68	66	64	64	61	58
3	53	58	57	54	58	65	71	70	80	87	99	97	93	95	85	81	79	78	73	67	65	65	65	58
4	54	39	49	49	64				64	71	79	76	77	74	73	67	65	64	60	59	59	53	41	
5			47	45	55	61	62	73	80	90	91	96	94	91	87	79	83	75	69	62	62	51	47	46
6	42	43	42		49	57	66	56	59	74	71	80	79	76	73	71	71	66	66	64	57	44	40	47
7	43	48	51	59	67	71	76	87	91	85	97	94	95	87	79	73	73	65	67	65	61	65	56	54
8	43	31	39	50	61	58	74	74	85	88	95	97	101	94	88	87	78	74	65	64	52	46	45	47
9	47	49	58	62	72	76	81	87	93	96	96	90	83	81	82	78	79	72	68	63	63	61	59	57
10	54	48	57	65	64	76	91	95	102	103	103	99	97	99	91	89	89	89	81	72	68	67	60	55
11	53	57	62	63	70	72	72		64	70	68	81	70		89	89	71	67	69	69	57	47	45	28
12	26	43		46	39		47	48	55	61	69	68	67	67	69	65	64	64	63	61	57	53	50	50
13	51	51	52	52	56	65	63	60			65	62	67	75	81	85	89	83	68	48			45	
14	41				50	59	60		55	60	64	67	69	70	70	66	65	65	62	60	56	58	54	57
15	54	55	62	64	70	70	75	86	93	96	95	97	92	91	91	83	78	75	75	73	69	65	59	29
16	29	47	39	45	52	55	63	73	85	90	93	91	88	88	85	79	74	73	71	65	65	59	59	59
17	56	60	50	49	50	62	63	62	81	89	90	91	89	84	81	80	75	76	72	72	69	59	51	
18				47	75	60		55	62	66	72	73	75	75	74	76	73	69	66	59	59	56	37	39
19	39	39	41	41	52	62	69	79	84	87	90	90	86	84	82	78	73	70	72	66	61	54	52	45
20	45	51	66	68	58	63	73	89	98	103	102	96	97	103	98	94	91	89	77	62	57	54	41	
21		44			57	55	65	71	79	82	83	85	86	88	79	75	73	71	72	62	59	54	35	25
22	25	34	29	37	47	52	60	62	82	89	95	86	99	93	95	90	83	75	73	61	54	31	46	29
23	33	39	29	39	40	57	67	81	89	92	94	87	89	89	83	83	83	71	65	65	59	54	50	49
24	34	23	28		54	71	78	91	98	96	96	94	91	92	91	89	89	82	65	55	51			
25			51	49	53							52		51	58	60	65	62	58	57	52	47	34	28
26		42	42	43	47				43	54	60	57	61	70	73	81	91	79	70	67	62	53	43	38
27							47			49	56	58	57	59	56	59	61	60	56	54	50	38		
28					44	43	51	57	67	75	78	83	81	83	83	84	76	61	57	58	56	46	37	21
29				62	58	71	85	89	90	98	100	101	104	100	95	93	87	85	74	67	61	49	44	40
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	21	21	23	23	26	24	25	23	26	27	28	29	28	28	28	29	29	29	29	29	28	28	27	23
MED	43	44	47	49	54	62	66	73	80	87	90	86	87	84	82	79	75	72	69	64	59	54	46	46
U Q	53	51	57	62	61	68	74	86	90	92	96	96	94	91	88	86	83	77	72	67	62	59	56	55
L Q	36	39	41	45	49	56	61	62	64	71	72	74	76	75	74	74	72	66	65	60	56	47	41	29

FEB. 2024 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

FEB.2024 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	40	38	28 ^K	41	48	48	35		G		33	35	37	39	38	39	35	109		32	29	29	34	26	54
2	38	30	28 ^K	45	53	52	43	34	45	48	57	36	52	43	95	35	40	35	30	23	22		17	16	
3	14	12	35	27	24	24	30	32	37	43	36	35	37	39	41	35	53	36	32	27	23	23	20	15	
4	29	31	37	52	23	51	42	45	47	34	36	37	41	38	35	35	35	39	33	38	31	22	37	47	
5	82	51	41	33	35	40	38	48	37	38	38	37	37	36	36	35	35	33	39	27	27	20	30	23	
6	36 ^K	31 ^K	24 ^K	60	42	41		47	148	47	37	38	37	36	41	35	33	30		27	31	21	15	17	
7	15 ^{E B}	16 ^K	17 ^K	20 ^K			28		G		30		33	43	39	35	34	33	31	27		29	21	20	17
8	31	17	18	34		40	37	38	40	37	42	41	42	36	37	34	47	32	30	33	31	19	17	15	
9	16	18	20 ^K	32		G	25	29	30	34	38	43	36	48	38	32	31	32	34	23	28 ^{E B}	33 ^{E B}	28 ^{E B}	71	
10	44	32	28	40	48	49	49	48	45	50	42	39	65	58	41	57	68	42	41	40	39	38	37	44	
11	24	25	26	34	44	46	54		48	44	39	39	34		71	55	36	34	35	32	26	24	18	25	
12	17 ^K	30	31	33	58	57		G	G		G		36		G	35	35	106	28	38	25	28	27	16	
13	10 ^{E B}	15	17	25	38	43	45	48		52	42	39	41	43	42	57	43	38	35	40			37	37	
14	38	35	59	53	31	37	41	95		47	38	44	42	37	37	34	31	27	27	25	25	21	17	14	
15	13	14	18	21	19	31	23	28	32	30		37	77	84	127	50	32	29	24	26	23	25	39	25	
16	17	14	17	26	37	36	35		G	G	G	G	G		32	33	37	33	31	33	22	25	19	34	
17	12	12	31	31	23	21	43	41		41	41	34	46	35	129	84	47	41	36	42	25	22	15	34	
18	47	63	90	30	45	24	52	47	50	48		32	39	39	40	40	44	43	29	32		16	18	42	
19	31 ^K	31	31	18	19	51	46	28	29	31	134	35	44	34	55	63	37	30		25	16	20	43	39	
20	35 ^K	94	39	41	46	41	25		29	31	32	40	34	38	37	46	34		29	35	33	23	19	39	
21	39	34	51	52	42	31	23	23	33		42	35	34	35	34	38	32	28	40		20	20	27	20	
22	21	19	53	30	34		45	40		35	36	40	45	43	41	42	41	31		25	24	34	35	25	
23	20 ^K	35	31	21	23	20	19		G		29		51	35	41	39	31	29	29	21	20	22	19	17	26
24	24	11	22	58	49	36	23	46	29	40	47	37	37	42	51	47	31		26	26	41	36	50		
25	63	43	37	32	31	53	57	61	56	59	63	42		38	34	32		35	29	68	26	26	28		
26	45 ^K	36 ^K	35	39	18	66	55	56	137	45	44	41	35	39	32	31	42		30	30	29	42	15	18	
27	37	34	72	65	47	54	31	43		44	46	36		33		30				21	19	25	45		
28	51	58	58	40	48	42	36	27		36	42		32	31	31	32		33	19		16	17	13	72	
29	32 ^K	45	47	34	23	22			G		32	31	33	34	40	32	29	29		20	18	37	40	34	
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	29	29	29	29	29	29	29	28	27	29	29	29	28	28	29	29	29	29	29	29	28	28	29	29	
MED	31	31	31	34	33	38	33	33	30	36	37	36	37	38	38	35	34	30	30	26	24	22	22	28	
U Q	40	37	44	43	46	50	45	47	45	46	42	40	42	42	42	46	42	36	34	33	29	30	36	43	
L Q	17	16	23	28	23	24	24			30	32	34	34	35	34	32	31	28	20	23	22	20	17	18	

FEB.2024 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2024 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	14	14	12	18	15	16	11	11	9	10	8	7	8	10	13	9	16	14	13	16	11	11	7	11
2	25	12	14	9	11	9	15	10	10	15	16	14	13	11	13	13	15	18	17	17	15	14	13	12
3	10	8	9	10	9	7	7	8	17	15	10	14	17	17	18	16	15	12	13	11	13	14	11	12
4	8	11	9	11	12	8	9	11	13	9	11	10	10	11	10	14	9	11	11	11	7	6	6	11
5	9	14	13	18	16	13	7	13	11	7	11	15	9	9	12	12	9	10	9	11	9	6	5	7
6	10	7	9	13	13	11	11	7	8	9	15	14	11	11	10	10	27	10	12	12	9	6	15	7
7	15	12	14	12	12	15	15	15	10	12	16	19	12	13	12	9	11	12	15	14	9	11	10	6
8	7	6	9	7	7	8	7	7	6	13	10	9	7	9	10	12	24	13	12	12	11	12	11	11
9	8	9	10	9	6	6	10	11	8	7	11	9	12	11	13	11	19	16	13	16	28	33	28	25
10	17	17	19	40	48	49	49	48	45	50	42	39	29	40	41	38	38	42	41	40	39	38	37	30
11	17	25	26	34	44	46	54	B	33	37	17	19	25	B	71	45	36	34	27	32	26	24	18	12
12	10	10	13	15	19	19	16	18	21	17	17	16	18	19	21	25	27	23	25	38	25	28	18	16
13	15	15	17	25	38	43	45	48	B	52	42	39	41	43	42	37	43	38	35	40	B	B	23	16
14	19	13	14	18	25	37	41	29	24	47	38	44	42	37	37	34	19	17	27	25	25	21	17	14
15	9	9	11	13	19	17	16	16	17	16	16	17	19	18	16	15	17	15	15	14	13	14	9	9
16	6	7	10	13	15	15	15	14	15	15	17	12	13	13	11	11	12	11	7	7	8	9	8	7
17	6	6	8	9	12	9	13	14	12	13	9	11	9	12	10	15	13	12	13	11	8	8	9	9
18	9	8	9	12	11	9	15	15	16	15	21	13	9	13	11	9	13	12	11	10	5	11	7	8
19	7	7	7	7	7	8	7	9	11	13	13	16	15	15	11	11	13	9	12	10	9	13	9	6
20	8	9	9	14	15	12	9	9	7	9	7	14	17	15	15	16	17	12	14	17	9	14	15	9
21	9	8	11	13	10	11	10	12	11	11	9	11	7	9	9	9	10	8	7	6	8	7	7	7
22	7	7	7	7	9	17	8	8	7	14	14	17	13	15	16	14	7	7	16	12	9	8	9	10
23	15	12	11	9	11	20	11	17	15	13	16	18	16	15	15	19	15	15	14	13	12	10	12	8
24	6	7	9	12	12	10	10	8	7	8	10	9	12	9	16	15	13	17	18	17	14	14	10	10
25	8	8	9	7	8	7	10	9	8	15	19	25	B	17	20	16	13	18	11	13	17	9	9	7
26	9	9	8	6	7	13	17	11	15	15	31	36	22	24	14	15	42	18	24	15	13	13	10	9
27	8	8	8	10	10	11	11	14	B	36	46	36	17	33	17	7	12	12	9	7	9	6	7	10
28	7	7	9	14	11	14	12	8	9	36	42	19	14	13	14	32	17	17	12	17	16	14	8	7
29	7	9	14	11	12	12	7	7	10	10	11	11	14	16	14	16	15	11	15	14	11	7	7	8
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
MED	9	9	10	12	12	12	11	11	11	14	16	15	14	15	14	15	15	13	13	14	11	12	10	9
U Q	14	12	14	14	16	17	16	16	17	16	20	19	18	18	18	18	22	18	18	17	16	14	15	12
L Q	7	7	9	9	10	9	9	8	8	10	10	11	10	11	11	11	12	11	12	11	9	8	8	7

FEB. 2024 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2024 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	E A 353	386	339	E A 404	425	A	330	236	218	188	207	H 190	209	H 214	219	215	211	213	E A 224	237	235	294	310	345		
2	341	342	214	E A 342		A	305	239	E A 237		A	205	E A 254	235		202	211	E A 215	215	231	237	233	237	236		
3	249	255	301	319	283	258	E A 283	233	244	237	194	212	217	215	221	205		214	233	228	239	243	237	243		
4	255	333	317	285	279	E A 229	A	E A 309	257	221	211	195	219	202	H 198	215	205	221	234	238	234	253	E A 349	A		
5		A	A	E A 412	352	E A 409	A	E A 291	A	H 219	220	212	217	225	202	212	205	207	225	205	221	251	249	309	319	
6	357	330	186		E A 458	E A 387	E A 307	E A 371	258	205	241	225	204	227	221	213	E A 219	214	218	225	H 237	301	283	239		
7	E B 287	283	291	309	301	273	255	220	225	232	205	199	238	211	209	221	219	227	221	H 241	253	251	233	249		
8	281	343	317	305	281		252	221	206	212	204	211	215	202	207	215	238	228	231	262	279	271	255	249		
9	271	287	295	297	298	255	239	223	208	211	215	211	209	202	217	207	215	231	236	235	E B 240	E B 240	E B 242	E B 250		
10	249	295	316	E B 351	B	B	B	B	B	B	E B 253	E B 221	E B 217		A	E B 227	A	E B 231	E B 240	E B 238	E B 236	E B 230	E B 232	E B 260	E B 269	
11	263	281	307	337	385		B	B	E B 279	E B 257	E A 233	207	198		B	B		E B 258	E B 240	261	252	261	269	271	335	
12	363	335	570	223		A	A	E A 319	234	229	198	235	219	214	215	207	E A 253	E A 244	239	E B 262	245	249	265	251		
13	252	271	286	319	358	E B 358	B	B			E B 288	E B 230	E B 231	E B 245	E B 246	220	E B 260	E B 240	E B 262		B	B	E A 389	A		
14	E A 343	A	A	A	429	401		B	E B 349	E B 237	E B 271	E B 234	E B 239	E B 219		E B 214	218	232	248	253	257	265	249			
15	249	277	293	301	301	303	251	229	211	227	202	223			A	E A 291	E A 229	213	233	230	241	245	245	240	398	
16	327	233	309	369	400	356	288	228	219	185	228	217	211	213	219	204	211	229	227	247	251	237	233	244		
17	245	255	331	381	391	282		E A 349	223	213	196	229	218	189	230		E A 222	E A 220	237	243	239	229	237		A	
18		A	A	A	Q	Q	Q	A	A	A	A	H 267	H 230	215	200	212	223	E A 221	E A 238	243	237	249	239	256		
19		E A 350	E A 339	355	325		257	219	217	214	223	221	237	227		A	201	219	222	229	233	233	237	E A 277		
20	E A 371	E A 419	E A 335	289	E A 373	A	H 279	222	217	H 203	H 227	H 214	E A 215	E A 255	E A 223	218	221	223	237	283	282	250	296			
21		A	A	A	A	372		A	269	255	224	222	227	219	212	211	213	215	216	231	227	229	229	228	333	385
22	328	292	309	343	330		A	A	333	220	237	245	249	221	215	228	227	221	237	231	235	241	289	341	E A 319	
23	298	334	365	338	341	E B 295	260	238	241	211	H 205		225	215	243	214	223	231	235	241	229	227	235	247		
24	273	359	365		A	A	336	253	248	229	231	E A 239	229	219	227	E A 229	221	233	225	H 232	233	237	249		A	A
25		A	A	E A 383	355	321	Q	A	A	A	A	E A 309		B	269	261	233	237	249	269	265	262	271	317	368	
26		A	A	422	478	285		A	A	A	A	A	277	254	228	229	233	269	231	245	241	239	239	257	273	
27		A	A	A	A	A		A	B	A	B	E B 261	205	235	221	209	Q	H 211	235	231	241	229	287		A	
28		A	A	A	E A 389	A	E A 373	279	241	E B 249		229	211	223	219	247	E B 225	239	225	255	239	231	247	313		
29		A	A	A	361	371	345	249	249	227	221	213	211	217	236	239	219	217	223	229	225	223	230	227	250	
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	20	20	23	23	24	13	18	20	23	21	24	27	27	26	26	25	28	29	29	28	28	28	27	22		
MED	U	U			U					H																
U Q	342	342	365	355	390	350	E A 291	E A 294	241	232	238	230	225	234	230	222	E 232	E 238	238	248	251	263	309	319		
L Q	254	279	295	305	301	256	253	226	218	211	205	211	211	211	215	208	212	220	226	232	234	233	237	249		

FEB. 2024 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAR. 2024 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 46	57	56	56	0 50	A	A	A	A	X 64	76	82	X 79	86	93	97	103	92	X 82	71	56	A	A	A
2	A	A	A	A	A	57	A	A	A	A	68	71	X 72	X 76	X 74	X 74	X 74	X 74	X 68	X 66	X 59	X 56	X 55	X 57
3	37	A	A	44	A	60	67	X 80	X 84	X 87	X 95	X 95	X 95	X 97	X 95	X 90	X 83	X 63	A	A	57	70	52	A
4	A	A	A	A	A	49	56	X 48	X 61	X 66	X 66	X 69	X 70	X 71	X 71	X 69	X 68	X 60	X 59	X 57	X 55	X 46	X 38	X 36
5	A	A	A	A	67	55	68	X 64	X 69	X 83	X 77	X 80	X 94	X 103	X 90	X 80	X 77	X 75	X 72	X 70	X 66	X 58	A	A
6	48	45	47	48	58	83	56	X A	0 66	X 73	X 81	X 86	X 88	X 88	X 86	X 91	X 93	X 94	X 91	X 86	X 71	X 67	X 60	X 58
7	68	58	58	58	44	50	83	87	93	91	106	115	118	106	116	109	108	97	83	72	58	A	A	
8	A	A	71	A	A	55	59	63	A	A	X 60	X 63	X 68	X 66	X 66	X 68	X 66	X 67	X 66	X 60	X 55	X 46	X 42	X A
9	A	A	A	53	A	A	66	65	X 64	0 65	X 64	X 84	X 77	X 84	X 83	X 80	X 73	X 71	X 74	X 69	X 58	X 38	A	A
10	A	A	A	A	A	57	59	64	69	0 65	X 78	X 85	X 87	X 99	X 95	X 98	X 92	X 86	X 81	X 71	X 52	X A	X A	X A
11	A	A	A	A	0 48	X 47	X 57	X 61	X 68	0 73	X 78	X 85	X 96	X 97	X 94	X 94	X 85	X 79	X 70	X 62	X 49	X 48	X 44	
12	36	57	53	A	96	84	98	108	99	107	102	106	110	113	114	118	125	0 118	X 96	X 84	X 71	X 83	X 58	X 57
13	59	53	58	44	A	86	88	94	92	105	104	B	138	147	133	112	115	X 123	X 108	X 68	A	A	A	A
14	A	A	60	58	X 49	94	79	A	A	X 77	84	92	101	96	106	94	87	88	81	X 68	X 58	X 59	A	46
15	42	A	A	A	76	92	94	91	100	X 80	X 96	X 89	X 113	X 109	X 112	X 103	X 92	X 83	X 79	X 73	X 64	X 58	X 53	X 52
16	29	55	57	59	50	58	58	58	69	X 84	X 100	X 114	X 118	X 120	X 113	X 107	X 106	X 91	X 82	X 67	X 62	X 54	X 57	X 56
17	47	48	47	48	48	92	56	64	81	X 94	X 107	X 111	X 113	X 116	X 105	X 103	X 97	X 92	X 85	X 72	X 67	X 58	X 57	X 58
18	46	46	47	69	110	112	58	68	79	X 97	X 109	X 115	X 122	X 124	X 119	X 113	X 107	X 96	X 91	X 75	X 64	X 54	X 56	A
19	A	92	78	135	112	A	55	A	A	A	80	94	101	107	113	102	X 92	X 91	X 87	X 73	X 65	X 56	0 23	X A
20	64	94	84	95	A	69	68	77	X 85	X 98	X 94	X 108	X 113	X 111	X 103	X 106	X 102	X 98	X 96	X 74	X 65	X 47	X 42	X 59
21	A	A	65	A	A	65	74	81	82	X 92	X 91	X 77	X 84	X 113	X 111	X 90	X 85	X 76	X 55	X 59	A	A	A	48
22	86	60	0 42	58	52	R	A	A	X 54	X 58	X 61	X 62	X 68	X 66	X 62	X 63	X 60	X 64	X 63	X 57	X 49	X 47	X 39	X 31
23	52	57	50	0 44	43	49	59	A	58	A	B	X 63	X 74	X 97	X 107	X 105	0 102	X 94	X 85	B	B	B	A	A
24	B	A	72	56	0 X	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A
25	A	A	A	A	A	A	A	B	B	B	0 58	X 63	X 68	X 73	X 75	X 74	X 70	X 67	X 61	X 53	A	A	A	A
26	A	A	A	A	58	A	B	0 50	X 63	X 71	X 79	X 87	X 94	X 99	X 106	X 102	X 91	X 89	X 61	X 58	A	A	A	A
27	A	A	B	58	53	A	A	X 52	X 68	X 72	X 83	X 90	X 98	X 100	X 100	X 94	X 97	X 94	X 82	X 69	X 57	X 46	X 32	B
28	A	A	A	58	54	A	A	57	67	82	92	104	113	115	118	111	110	105	91	92	93	45	57	89
29	R	A	A	A	A	A	A	A	63	75	84	97	108	113	115	112	107	99	95	85	59	58	59	47
30	42	29	R	0 29	A	70	43	53	67	81	93	109	116	127	127	127	109	104	92	69	54	56	47	44
31	R	58	69	59	A	94	70	96	93	92	107	109	120	126	121	116	109	98	89	78	69	59	53	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	14	14	17	19	16	21	21	21	24	25	29	29	30	30	30	30	30	30	29	28	26	22	19	16
MED	46	57	58	58	54	65	66	64	69	81	84	89	96	102	104	100	96	91	82	70	59	56	53	50
U Q	59	58	70	59	72	89	76	84	84	92	98	107	113	113	114	109	107	97	91	74	65	58	57	58
L Q	42	48	48	48	50	55	57	57	64	67	72	78	79	88	90	90	83	75	73	66	57	47	42	45

MAR. 2024 fXI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA

STATION SHOWA-ST.

MAR. 2024 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	R 40	R 43	F 44	38	44	A	A	A	A	58	66	71	73	72	F 79	88	88	84	76	58	F 43	A	A	A
2	A	A	A	A	A	F 43	A	A	A	A	52	61	66	70	68	68	68	68	62	60	53	50	49	42
3	F 22	A	A	F 34	A	48	59	74	78	81	89	89	89	91	89	84	77	57	A	A	R	R	A	A
4	A	A	A	A	A	A	50	A	55	60	60	63	64	65	65	63	62	54	53	51	49	40	27	23
5	A	A	A	A	F 46	F 45	46	58	Z 63	63	71	74	81	F 90	79	74	71	69	66	64	54	F 49	A	A
6	F 37	R 39	34	F 36	29	Z 43	50	A	59	67	75	80	F 82	F 82	80	82	87	F 89	V 78	71	60	55	47	45
7	40	40	F 40	37	38	44	52	64	74	78	84	92	106	100	R 97	R 103	102	91	74	66	52	A	A	A
8	A	A	F 49	A	A	42	46	48	A	A	54	57	62	60	60	62	60	59	60	50	42	33	21	A
9	A	A	A	F 41	A	A	52	58	58	59	58	68	71	78	77	74	67	64	68	63	47	21	A	A
10	A	A	A	A	A	F 46	46	54	V 62	59	72	79	81	93	89	92	86	80	75	62	46	A	A	A
11	A	A	A	A	A	42	41	50	F 55	62	67	72	75	Z 87	91	88	88	79	71	61	56	43	37	31
12	F 26	F 27	29	A	F 46	F 65	F 78	F 87	F 78	86	96	95	100	107	108	R 112	118	112	90	72	60	46	41	34
13	F 37	A	27	F 34	A	F 43	F 53	F 65	F 79	94	98	R 98	B	B	97	101	103	109	117	96	58	A	A	A
14	A	A	40	A	43	F 58	50	A	A	Z 71	73	69	79	90	100	88	81	79	75	61	46	A	A	A
15	A	A	A	A	F 63	F 64	66	69	74	74	69	83	90	103	F 104	97	86	77	73	67	58	47	39	33
16	20	18	25	40	F 42	44	47	52	63	78	94	108	112	114	R 107	101	100	85	76	61	56	48	41	41
17	33	37	R 37	33	33	35	47	58	73	88	101	105	107	110	99	97	91	F 86	74	64	61	F 44	42	F 41
18	31	29	27	23	22	29	47	62	73	91	103	109	116	118	113	107	101	90	85	69	58	48	34	A
19	A	A	F 72	F 72	F 63	A	46	A	A	A	64	79	95	96	102	92	82	F 85	R 81	67	53	27	17	A
20	R 45	A	R 56	F 51	A	F 43	56	F 71	F 79	82	88	91	104	105	F 97	100	R 96	R 92	F 90	68	58	41	36	50
21	A	A	A	A	A	59	F 66	59	F 71	76	82	71	75	89	F 91	84	79	R 70	F 44	42	A	A	A	A
22	F 54	A	36	32	A	R 41	A	A	48	52	50	56	56	60	56	57	54	58	57	51	43	41	33	25
23	A	A	32	38	35	F 41	F 46	A	A	A	B	57	68	78	88	94	92	85	79	B	B	B	B	A
24	B	A	B	50	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A
25	A	A	A	A	A	A	A	B	B	B	52	57	62	67	69	68	64	61	55	47	A	A	A	A
26	A	A	A	A	A	A	B	A	44	57	65	73	81	88	93	100	96	85	74	F 34	R	A	A	A
27	A	A	B	F 42	R	A	A	46	60	66	76	81	91	92	94	88	91	85	76	63	51	36	19	B
28	A	A	A	A	A	A	A	49	61	73	84	98	104	R 109	112	105	104	89	85	74	F 67	F 34	F 30	A
29	R	A	A	A	A	A	A	A	54	69	77	87	F 98	F 107	F 109	106	101	93	89	79	53	47	36	30
30	F 25	F 19	R	23	A	F 27	37	40	58	73	87	103	110	R 121	F 119	121	103	98	86	58	48	40	29	F 25
31	R	A	F 56	Z 53	A	F 73	F 52	63	79	82	70	90	F 110	F 114	F 115	110	103	92	83	72	55	42	40	29
	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	12	10	15	17	12	20	21	20	23	25	29	29	29	30	30	30	30	30	29	28	24	20	18	13
MED	35	30	37	38	42	44	50	58	63	73	73	79	82	92	94	92	88	85	75	62	53	42	36	33
U Q	40	39	R 49	F 46	F 46	F 53	F 54	64	74	82	88	92	104	107	104	103	101	90	84	68	58	48	41	42
L Q	F 26	F 27	29	34	34	42	46	50	58	61	64	68	72	78	79	82	77	69	67	58	48	38	29	27

IONOSPHERIC DATA STATION SHOWA-ST.

MAR. 2024 ftEs (0.1MHz)

45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	32	35	17	25	69	66	108	89	90	57	22	E B	43	34	34	31	E B	34	27	28	24	20	24	46	110	45
2	48	60	45	42	50	41	48	44	68	46	30	34	31	33	31	28	28	E B	E B	E B	G	22	16	16	12	
3	K	13	47	45	30	E B	36	49	24	24	28	28	34	31	33	36	35	30	37	25	52	K	17	63	46	63
4	60	42	53	64	52	29	37	39	46	37	40	34	32	32	31	27	27	23	20	16	13	9	11	10		
5	48	95	55	58	38	35	23	18	15	27	31	32	33	32	33	30	27	25	21	20	E B	16	16	28	29	
6	30	20	23	29	28	25	41	57	47	E B	48	36	31	31	31	29	29	25	26	21	23	E B	E B	E B	17	14
7	19	12	15	18	16	30	28	E B	25	36	32	44	33	32	29	33	28	E B	E B	E B	E B	E B	21	41	91	70
8	60	66	38	55	44	33	36	23	57	51	46	32	E B	G	G	30	26	15	17	19	E B	E B	E B	22	13	43
9	68	36	28	35	28	47	39	44	48	E B	47	41	44	37	33	30	E B	E B	E B	E B	G	15	32	69	67	
10	48	43	65	55	42	42	21	21	25	E B	46	44	36	33	35	E B	E B	E B	E B	E B	G	19	21	41	31	46
11	23	37	82	58	44	35	39	26	30	33	51	36	37	32	33	35	E B	32	20	20	12	13	12	10	12	
12	9	12	12	86	46	49	29	21	24	27	30	40	46	38	38	53	53	28	19	24	E B	23	27	13	12	
13	30	15	31	32	45	33	16	18	25	28	30	E B	37	31	32	37	29	35	23	11	30	51	47	38		
14	39	40	36	34	34	31	31	49	42	49	38	43	30	30	30	29	G	27	23	21	16	E B	9	35	44	39
15	38	45	60	47	35	37	23	21	27	E B	37	30	30	34	31	31	34	33	22	25	19	E B	15	14	13	
16	E B	E B	E B	11	19	15	15	14	18	23	25	25	30	30	39	38	29	27	23	21	21	19	13	12	10	12
17	E B	E B	G	E B	E B	E B	E B	E B	G	22	24	26	27	30	30	31	E B	22	20	23	19	E B	E B	E B	E B	E B
18	E B	E B	E B	E B	E B	G	11	12	18	23	26	31	32	31	30	36	22	29	26	22	35	21	21	19	49	
19	55	66	52	52	45	48	28	40	51	58	42	31	E B	E B	28	G	27	25	20	20	E B	22	19	29	35	
20	31	66	34	53	65	34	44	28	29	27	29	33	29	30	29	27	25	22	15	17	13	E B	11	11	35	
21	69	61	52	55	57	46	51	31	28	29	32	30	E B	36	31	28	G	23	29	38	40	53	95	51	73	
22	45	17	80	26	43	31	48	39	31	25	24	E B	46	29	31	28	G	25	23	25	15	11	11	11	13	
23	30	25	18	28	28	31	39	56	37	59	37	41	52	39	33	33	33	31	42	B	B	B	79	55		
24	B	40	E B	46	E B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	E B	88	159
25	111	107	60	65	142	41	41	B	B	E B	E B	E B	E B	E B	E B	23	G	E B	E B	E B	E B	29	28	36	56	
26	59	36	27	49	47	59	63	E B	E B	E B	27	27	24	22	27	E B	28	19	19	18	17	E B	22	37	38	53
27	60	44	E B	21	E B	40	59	43	23	28	28	28	30	28	28	23	22	19	13	19	18	13	13	B		
28	33	30	25	52	52	51	56	56	27	28	E B	28	29	28	26	26	E B	25	34	25	34	13	17	16	11	36
29	35	61	73	51	58	58	55	61	52	30	E B	28	31	27	29	27	26	23	18	13	13	10	12	17	11	
30	G	33	11	47	33	19	15	15	19	23	27	31	29	28	27	26	22	16	11	E B	9	10	13	E B	12	
31	32	42	37	39	50	50	50	45	37	14	17	29	E B	33	28	27	G	22	18	21	21	18	E B	8	12	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	31	31	31	31	30	29	29	29	29	29	29	30	30	30	30	30	30	30	29	29	29	31	30		
MED	34	40	36	46	44	36	37	31	30	29	30	32	31	30	30	28	G	22	20	18	15	17	17	36		
U Q	55	60	55	55	52	48	48	47	46	46	39	E B	E B	E B	E B	E B	E B	E B	E B	G	22	36	46	53		
L Q	23	20	19	28	28	31	23	22	25	27	28	30	30	29	28	26	23	21	19	E B	13	12	12	12		

MAR. 2024 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAR. 2024 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	6	7	6	7	19	15	12	18	17	14	15	43	20	20	21	34	24	15	16	12	9	12	10	9
2	12	14	11	9	15	15	17	12	14	13	10	11	16	16	14	13	13	28	21	16	7	7	7	6
3	7	7	15	9	36	9	9	6	7	9	8	9	8	14	8	6	7	6	10	11	6	7	6	7
4	7	8	6	6	7	7	7	6	10	16	25	23	15	15	6	14	13	9	7	10	8	7	7	7
5	7	7	8	11	10	9	11	9	8	8	24	16	20	14	15	16	18	16	9	20	11	8	6	7
6	7	7	8	7	7	7	18	17	13	48	20	15	14	14	27	13	15	5	17	17	36	17	13	8
7	10	6	7	7	13	9	6	25	17	28	25	15	11	17	14	19	35	45	21	11	21	10	7	8
8	10	15	20	13	11	12	13	9	15	17	17	23	33	27	19	17	15	6	10	19	14	9	8	7
9	7	12	13	11	15	17	15	16	15	47	41	44	37	23	19	31	28	30	22	20	12	7	8	10
10	16	14	12	17	9	11	13	10	12	46	44	36	25	14	40	33	38	36	21	9	7	9	7	7
11	13	18	13	12	15	16	10	10	13	17	51	36	31	32	21	22	32	15	17	12	8	6	7	6
12	7	7	7	14	7	14	11	7	9	8	9	14	9	15	11	13	20	14	14	17	23	14	13	9
13	9	11	7	7	14	9	7	8	11	11	14	B	37	15	32	37	29	35	15	11	16	8	15	9
14	11	11	15	11	8	16	10	31	14	13	13	25	17	15	14	15	15	15	15	9	9	7	8	8
15	9	11	7	13	9	11	13	15	14	37	17	30	34	31	31	34	33	17	25	15	18	13	14	13
16	13	11	11	9	9	14	18	23	25	18	18	17	18	16	15	15	16	18	21	15	10	9	10	12
17	9	10	6	12	12	11	14	15	13	14	16	15	19	25	29	15	14	14	13	12	10	11	10	9
18	11	9	7	9	8	7	11	11	13	12	13	15	14	13	11	10	9	7	6	8	7	6	9	11
19	11	9	12	14	15	15	14	14	13	9	14	16	35	34	19	18	14	13	17	21	9	8	7	6
20	16	7	12	13	18	16	14	8	8	6	9	16	14	15	14	14	12	11	11	9	7	11	8	8
21	11	14	15	13	14	9	14	10	9	9	7	8	38	19	9	15	11	14	13	14	13	6	8	7
22	9	7	13	6	8	11	12	14	15	13	14	46	27	31	24	15	15	18	25	15	11	11	6	13
23	10	10	13	9	9	11	10	13	28	24	B	24	41	52	39	33	33	31	42	B	B	B	47	33
24	B	31	37	28	58	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	88	34
25	25	23	45	15	29	30	33	B	B	B	38	30	32	29	28	16	16	27	25	16	14	13	14	13
26	11	14	14	15	17	22	B	37	38	34	27	18	16	19	27	28	15	14	15	14	22	11	11	15
27	12	12	88	16	24	15	32	15	13	16	15	14	30	15	23	14	19	15	13	19	18	13	13	B
28	12	16	14	19	25	28	15	16	12	14	28	25	24	24	15	25	34	25	34	13	9	11	11	12
29	12	16	22	25	17	19	15	16	15	12	28	23	16	25	27	15	15	15	12	13	5	12	9	8
30	8	9	6	7	10	9	6	10	13	14	9	14	15	14	15	15	15	11	11	5	7	10	13	10
31	12	11	10	7	14	33	7	24	18	7	13	16	33	23	24	15	11	12	15	11	11	6	12	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	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	11	11	12	11	14	14	13	14	13	14	17	18	20	19	19	15	15	15	15	14	11	10	9	9
U Q	12	14	15	14	17	16	15	18	17	28	28	30	33	27	27	28	29	27	21	17	18	12	13	12
L Q	8	7	7	7	9	9	10	10	12	11	13	15	15	15	14	14	14	12	12	11	8	7	7	7

MAR. 2024 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAR. 2024 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	272	286	E A 304	E A 342	A	A	A	A	A	A	E B 272	B	E A 219	232	220	E B 234	220	220	238	232	276	A	A	A
2	A	A	A	A	A	A	A	A	A	A	245	236	230	224	216	213	220	242	226	228	220	225	225	234
3	E A 272	A	A	A	A	A	280	248	236	208	H 200	H 218	210	E A 230	E A 204	236	236	264	A	A	240	274	A	A
4	A	A	A	A	A	A	A	A	A	A	A	234	228	218	208	232	228	224	232	246	240	240	278	A
5	A	A	A	A	A	A	E A 292	258	206	H 214	H	A	232	236	238	220	220	234	232	258	236	216	E A 258	A
6	A	A	A	A	A	A	A	A	A	A	B	A	E A 204	204	220	B	218	230	222	238	222	0	B	240
7	270	278	0	A	A	E A 386	E A 296	B	E A 248	A	E A 242	A	A	240	230	212	B	B	220	242	232	A	A	A
8	A	A	E A 288	A	A	A	A	250	A	A	A	208	246	236	220	236	228	242	248	228	224	E A 278	A	A
9	A	A	A	A	A	A	A	A	A	B	B	B	B	232	228	214	B	234	240	226	214	A	A	A
10	A	A	A	A	A	A	306	254	254	B	B	B	E A 234	224	B	B	B	B	228	232	260	A	A	A
11	A	A	A	A	A	A	A	326	296	294	B	B	A	E B 238	232	222	B	222	218	214	206	212	222	E A 252
12	264	A	A	A	A	A	A	250	220	204	228	218	222	H 196	218	E A 228	A	218	216	218	224	222	230	262
13	A	E A 318	A	A	A	A	290	234	222	212	228	B	B	E A 208	E B 232	B	B	B	212	230	A	A	A	A
14	A	A	A	A	A	A	A	A	A	A	E A 230	A	E A 218	E A 220	238	230	230	222	214	208	210	A	A	A
15	A	A	A	A	E A 390	E A 362	310	260	E A 244	B	A	E B 222	B	242	230	E B 234	228	226	228	212	222	216	232	240
16	B	B	A	E A 328	E A 368	B	B	B	238	212	220	208	A	212	210	214	228	218	214	206	208	206	228	238
17	E A 264	256	254	B	E B 290	300	276	238	232	230	226	218	230	A	210	226	218	216	212	206	210	202	218	230
18	244	258	262	E B 306	E B 318	E A 304	264	232	224	214	224	218	220	216	214	220	222	212	212	E A 206	208	228	240	A
19	A	A	A	A	A	A	A	A	A	A	A	248	238	E B 244	222	230	240	236	228	232	242	E A 262	A	A
20	226	A	274	A	A	A	A	A	E A 256	242	212	232	218	234	220	220	218	222	222	210	200	222	234	262
21	A	A	A	A	A	A	A	0	H 388	284	222	230	228	B	260	242	230	240	314	A	A	A	A	A
22	A	A	A	250	A	A	A	A	A	254	A	B	250	B	216	234	236	252	236	222	220	222	222	270
23	A	A	E A 362	A	A	A	A	A	A	A	A	B	270	B	B	E B 244	E B 260	250	B	B	B	B	A	A
24	B	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A
25	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	248	246	242	242	252	254	A	A	A
26	A	A	A	A	A	A	B	A	B	B	B	240	236	218	228	238	238	220	208	A	B	A	A	A
27	A	A	B	B	B	A	A	A	A	264	236	246	230	226	230	232	216	214	208	212	236	240	258	B
28	A	A	A	A	A	A	A	A	E A 304	244	234	224	236	230	220	222	E B 222	216	E B 218	202	210	238	272	A
29	A	A	A	A	A	A	A	A	A	264	242	242	238	236	E B 234	228	218	214	216	214	206	224	228	242
30	286	A	A	A	A	A	A	270	248	238	224	230	222	218	222	218	202	206	208	196	214	206	E B 234	270
31	A	A	A	A	A	A	A	A	246	230	238	E A 244	E B 252	230	228	226	224	206	208	218	216	220	238	250
	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	5	5	5	4	4	8	12	16	16	17	21	21	26	27	28	24	27	27	26	24	20	16	12
MED	266	268	264	E A 328	E A 343	E A 333	284	252	240	230	229	227	226	228	221	226	228	222	220	220	218	223	232	245
U Q	272	302	E A 296	E A 352	E A 379	E A 374	301	265	255	249	240	241	237	236	230	234	236	242	236	232	234	240	239	262
L Q	254	257	258	E B 304	E B 302	278	243	228	213	224	218	220	218	216	220	220	216	212	210	210	218	226	239	

MAR. 2024 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2024 f_{XI} (0.1MHz)

45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E P 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	64	A	0 X	A	A	57	59	A	A	B	X	71	89	111	110	114	112	103	101	112	92	85	47	A	A	
2	A	A	A	A	58	A	69	73	77	77	80	88	102	108	134	131	158	117	104	91	82	58	A	A		
3	A	A	71	85	A	A	59	98	84	81	84	85	113	120	116	116	114	111	111	78	63	52	38	37		
4	30	0 X	24	22	0 X	70	57	59	40	58	71	78	89	110	120	117	124	127	124	101	81	A	A	A		
5	A	B	A	A	43	56	54	46	48	B	0 X	55	64	71	77	82	88	89	92	92	85	70	A	A	A	
6	A	A	A	A	A	A	A	A	A	A	B	B	52	66	72	74	78	71	85	69	68	44	A	A	46	
7	A	B	A	A	A	A	A	A	A	A	X	53	65	78	92	104	111	109	97	114	90	58	A	A	A	
8	A	A	A	A	A	A	A	A	A	A	B	B	0 X	71	85	85	86	94	91	91	70	48	45	A	A	
9	A	A	A	A	A	A	96	56	84	72	70	0 X	66	105	117	116	135	131	132	113	60	59	0 X	A	A	
10	A	A	A	A	59	A	59	57	67	73	83	111	115	124	122	131	131	115	93	59	45	0 X	A	A		
11	A	A	48	56	A	A	A	A	59	65	69	81	87	89	97	98	86	71	63	55	54	38	33	31		
12	23	A	A	A	53	61	68	69	69	90	97	97	115	118	117	121	112	94	90	92	59	47	39	0 X	24	
13	0 X	23	43	58	46	A	A	A	56	70	82	99	118	121	129	123	114	86	77	75	60	47	39	32	R	
14	24	54	A	A	61	66	73	91	91	93	106	107	114	131	131	128	116	99	78	70	63	56	38	A	A	
15	A	A	A	A	A	A	52	109	A	X	70	91	106	115	119	122	126	125	106	81	72	65	90	A	A	
16	A	A	83	53	90	A	A	60	51	45	A	A	0 X	53	67	111	115	115	136	107	A	A	A	A	A	
17	A	A	A	94	55	42	70	58	83	67	68	70	75	81	81	86	87	92	82	59	A	43	A	45		
18	A	A	54	39	38	33	57	64	76	85	92	108	119	131	138	136	115	110	91	72	58	48	30	0 X	19	
19	X	A	A	43	79	59	A	59	58	62	80	77	85	150	96	150	136	129	118	A	88	A	A	A	68	
20	A	A	A	0 X	58	26	32	59	46	46	63	68	65	94	116	134	116	113	115	115	80	70	A	A	A	
21	A	A	A	X	A	A	94	43	A	A	B	57	133	115	140	135	116	0 X	51	94	70	60	A	A	A	
22	94	68	45	A	A	A	A	A	A	A	56	71	108	118	133	140	124	117	114	91	47	A	A	A		
23	48	A	A	A	A	A	A	A	80	70	74	84	113	116	133	135	134	132	114	94	84	40	X	A	A	
24	A	A	A	85	61	A	A	A	58	74	97	107	119	129	130	130	120	101	87	59	44	24	25	23	X	
25	39	65	72	54	60	57	70	96	58	74	97	109	124	137	141	140	117	116	106	83	59	50	31	A	A	
26	0 X	51	A	84	A	A	A	A	117	A	94	69	105	135	143	150	153	133	62	A	A	93	56	A	A	
27	A	56	A	A	A	85	47	A	A	57	62	96	101	106	95	108	97	74	70	80	32	A	47	59	A	
28	A	A	63	56	62	A	0 X	51	57	65	74	99	115	117	104	110	92	70	73	66	58	A	23	X	A	
29	53	61	59	49	45	70	A	58	67	72	84	101	106	114	117	117	113	98	107	94	60	0 X	23	58	A	
30	A	A	A	51	A	A	57	60	83	71	87	87	95	105	111	106	97	77	67	83	A	A	A	A	A	
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	10	8	12	17	15	11	18	19	21	24	26	28	30	30	30	30	30	30	29	28	23	18	12	11		
MED	34	55	56	54	59	57	59	58	67	71	79	88	109	116	117	122	114	104	91	76	59	47	36	37		
U Q	53	63	67	82	61	66	70	73	83	76	91	100	115	120	133	135	125	117	107	86	65	52	39	58		
L Q	0 X	23	47	46	44	53	42	57	51	58	65	69	70	94	104	111	109	97	91	78	67	48	40	28	0 X	24

APR. 2024 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2024 foF2 (0.1MHz)

45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 23	A	42	A	A	A	44	A	A	B	65	64	F 77	97	103	94	97	95	92	76	60	36	A	A
2	A	A	A	A	F 41	A	F 47	67	71	68	72	82	88	102	118	120	117	104	F 86	F 78	F 62	40	A	A
3	A	A	A	A	A	A	47	46	54	63	72	70	87	109	108	101	102	82	R 76	R 56	45	40	F 27	18
4	17	18	16	22	34	42	23	34	52	65	72	70	101	114	111	118	R 121	R 118	95	75	A	A	A	A
5	A	B	A	A	F 46	A	40	42	B	32	49	58	61	71	76	75	79	F 74	F 76	F 70	54	A	A	A
6	A	A	A	A	A	A	A	A	A	B	B	42	55	64	63	66	65	67	54	43	F 24	A	A	A
7	A	B	A	A	A	A	A	A	A	A	47	53	65	79	92	102	103	91	73	57	30	A	A	A
8	A	A	A	A	A	A	A	A	A	A	B	B	65	70	67	73	71	71	F 70	51	36	F 31	A	A
9	A	A	A	A	A	A	A	Z 50	F 49	60	56	60	74	86	96	103	113	111	F 76	F 50	45	F 28	A	A
10	A	A	A	A	F 46	A	F 49	51	61	67	75	100	109	114	116	122	112	R 86	F 78	F 42	A	22	A	A
11	A	A	A	F 42	A	A	A	A	48	58	63	70	81	83	91	92	80	65	57	49	R 48	23	22	16
12	15	A	A	A	R 43	R 34	F 55	F 63	58	66	78	84	99	112	110	115	R 106	88	84	70	35	30	25	18
13	17	19	51	38	A	A	A	A	46	61	68	92	112	110	122	117	108	80	71	69	52	31	22	18
14	16	16	A	A	F 50	57	60	67	72	80	96	101	108	125	125	122	110	93	72	F 64	57	39	F 21	R
15	A	A	A	A	A	A	F 46	A	A	64	82	100	109	113	116	120	119	100	75	57	49	A	A	A
16	A	A	F 40	F 47	F 51	A	A	F 45	F 23	F 30	A	A	47	61	65	106	F 102	F 116	43	A	A	A	A	A
17	A	A	A	F 45	F 42	32	A	F 46	54	55	62	64	69	75	75	80	81	79	72	44	A	A	A	F 38
18	A	A	A	F 29	F 27	A	R 51	F 49	59	62	80	99	111	125	132	130	R 109	104	85	62	R 42	F 29	20	13
19	17	A	A	F 44	F 44	A	A	52	48	60	65	58	55	69	79	130	R 116	70	A	38	A	A	A	A
20	A	A	A	A	21	25	F 41	A	40	52	55	59	63	91	116	107	F 105	F 102	86	68	A	A	A	A
21	A	A	A	34	A	A	F 33	F 33	A	A	B	F 50	F 59	86	128	117	F 110	F 45	A	60	A	A	A	A
22	52	A	F 33	A	A	A	A	A	A	A	43	60	97	108	122	133	R 118	111	104	85	35	A	A	A
23	A	A	A	A	A	A	A	A	Z 52	58	68	78	98	110	120	125	F 126	R 115	108	71	44	34	A	A
24	A	A	A	A	A	A	A	A	F 52	64	80	96	113	123	124	124	114	95	79	49	33	18	19	17
25	15	A	A	R 44	29	34	F 37	F 26	46	68	91	103	118	131	135	134	111	108	90	77	53	34	23	A
26	A	45	A	A	A	A	A	A	A	A	64	63	73	123	137	144	R 147	R 127	A	A	A	A	F 47	A
27	A	A	A	A	A	A	F 38	A	A	46	56	73	95	97	89	102	R 86	66	59	45	21	A	27	39
28	A	A	F 50	F 44	40	A	A	A	Z 45	51	56	65	78	95	103	92	101	76	60	60	52	F 39	17	A
29	A	A	41	37	A	A	A	Z 52	F 50	52	70	90	97	108	105	103	F 100	R 79	R 67	F 72	F 35	A	17	A
30	A	A	A	A	A	A	46	F 49	38	60	76	81	85	99	105	100	R 91	71	59	45	A	A	A	A
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	8	4	7	10	13	6	14	17	20	24	26	28	30	30	30	30	30	30	27	28	20	14	12	8
MED	17	18	41	40	F 42	34	F 46	49	52	60	68	72	88	102	109	111	107	87	76	58	44	31	22	18
U Q	20	32	50	44	F 46	42	F 49	52	56	64	76	91	101	113	122	122	114	104	86	70	52	36	26	28
L Q	16	17	33	34	32	32	40	44	47	54	62	62	69	86	91	101	91	71	60	47	35	28	20	16

APR. 2024 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2024 ftEs (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	17	61	91	57	107	46	35	60	49	B	25	31	41	41	32	40	30	20	22	16	E B	14	36	36		
2	52	57	27	36	40	56	62	49	39	E B	35	28	28	28	E B	22	21	35	27	22	E B	16	15	36	36	
3	37	38	47	33	59	51	44	36	39	38	25	27	26	25	E B	33	28	15	12	14	E B	E B	9			
4	E B	12	13	17	18	E B	E B	E B	E B	E B	31	31	21	22	22	28	21	41	38	18	31	46	45	64		
5	59	B	78	23	37	36	30	27		E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	26	20	39	42	38	29	
6	63	71	47	60	60	55	59	48	59	B	53	29	30	33	27	22	22	18	32	22	E B	13	35	33	40	
7	48	E B	67	61	40	49	48	54	57	38	26	26	27	25	24	26	E B	23	15	20	41	37	37	47		
8	46	57	47	40	27	67	60	65	71	66	B		42	28	27	25	26	20	19	16	13	17	29	36		
9	45	35	30	22	69	35	61	41	36	35	27	42	35	26	24	35	34	27	25	24	E B	18	35	40		
10	41	42	72	51	45	51	45	29	18	21	E B	E B	E B		26	28	E B	24	18	16	7	34	37	36	37	
11	44	40	43	36	60	34	57	55	39	24	23	23	18	29	30	22	23	22	22	15	10	11	11	11		
12	E B	10	33	32	46	25	28	35	41	30	20	25	27	27	26	20	23	G	19	12	10	17	15	E B	E B	
13	22	22	36	24	29	52	51	56	33	32	23	26	26	26	25	27	16	13	9	12	8	14	E B	G		
14	K	K	34	51	41	35	34	23	13	16	25	26	26	25	23	43	35	25	E B	E B	E B	E B	E B	29		
15	58	93	70	57	53	44	41	57	53	29	23	28	26	19	26	22	G	17	11	7	9	13	40	44	57	
16	82	44	25	20	49	41	45	26	15	24	60	49	E B	32	25	48	31	25	32	42	47	68	151	46		
17	145	86	76	37	27	21	37	38	44	26	25	24	23	23	23	23	21	19	12	38	40	58	42	30		
18	47	46	27	20	29	50	39	20	17	18	20	29	39	20	25	36	22	14	10	10	9	9	13	9		
19	12	58	32	35	29	52	54	49	41	46	E B	37	30	25	28	25	E B	35	27	63	18	84	56	31	45	
20	89	53	45	34	16	15	23	31	23	27	18	E B	34	26	29	40	47	38	23	36	33	40	48	41		
21	53	64	64	26	38	59	45	28	48	73	B	45	41	E B	36	53	24	22	E B	32	41	47	45	59	57	90
22	36	57	31	74	66	52	42	47	53	63	25	27	23	27	24	19	23	18	13	21	17	31	34	37		
23	33	60	50	48	46	50	57	48	34	19	21	E B	32	44	38	44	52	39	22	E B	E B	59	37	31		
24	46	44	42	52	53	46	47	42	23	16	19	25	25	31	45	42	33	17	19	15	15	11	E B	G		
25	G	10	16	22	33	12	E B	E B	E B	E B	19	23	23	E B	20	19	24	E B	E B	E B	12	11	10	30		
26	31	53	50	69	58	64	60	63	50	62	56	27	E B	31	28	23	23	28	36	33	51	50	39	114		
27	75	45	62	78	72	55	31	40	39	35	29	24	24	24	23	31	19	E B	6	23	25	14	26	28	28	
28	71	55	43	31	31	41	41	55	46	21	19	25	20	24	19	17	15	10	21	E B	13	15	53	E B	40	
29	34	45	38	32	33	46	45	35	29	18	17	E B	40	23	21	15	16	22	18	17	14	54	30	41		
30	37	48	88	31	48	51	37	31	16	14	19	18	17	18	20	27	12	12	10	12	37	51	67	49		
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	30	30	30	30	29	28	28	29	30	30	30	30	30	30	30	30	30	30	30	30		
MED	44	46	44	36	40	48	44	41	39	25	24	26	26	24	25	24	U	22	17	18	17	16	36	36	36	
U Q	58	58	64	52	58	52	54	54	48	36	E B	E B	E B	E B	E B		E B	E B	E B	E B	25	25	39	51	42	45
L Q	31	39	32	31	29	35	35	29	23	20	22	25	24	24	23	22	21	14	12	13	13	14	E B	13	29	

APR. 2024 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2024 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	15	10	9	11	9	11	23	16	B	17	23	41	41	32	40	30	20	17	13	16	10	11	10
2	11	16	11	9	8	15	15	15	14	24	35	15	15	14	27	18	21	35	27	22	16	8	11	7
3	8	8	9	9	15	12	12	11	16	16	15	17	11	15	29	33	23	15	7	10	15	16	13	7
4	9	7	7	7	11	26	12	19	27	31	31	15	16	16	15	13	41	38	18	25	9	7	11	7
5	18	B	35	15	17	16	14	17	B	25	37	29	30	41	46	26	37	41	26	9	11	8	8	15
6	9	8	7	11	16	18	15	24	17	B	53	20	25	33	27	15	19	13	32	11	13	7	9	7
7	9	45	17	15	13	15	9	15	19	15	15	15	15	12	11	15	25	16	15	11	7	7	8	8
8	10	13	16	15	15	12	19	19	18	25	B	B	42	28	27	25	26	20	19	16	13	11	9	8
9	9	10	9	9	9	9	12	16	14	15	14	42	35	19	24	35	34	27	25	24	25	18	9	8
10	11	14	10	16	13	12	12	8	6	8	35	39	39	13	16	25	19	18	16	7	7	7	7	7
11	7	5	14	13	15	11	17	15	15	15	14	12	11	9	11	12	10	6	6	6	6	7	8	8
12	10	7	7	14	12	8	7	11	19	15	15	13	9	10	11	11	14	7	7	9	11	10	9	10
13	10	11	8	6	7	9	11	15	12	13	13	13	13	11	13	10	10	6	5	6	5	7	8	7
14	7	7	13	11	11	8	9	8	9	13	9	9	11	13	11	10	9	5	10	10	6	6	9	6
15	9	8	9	11	15	12	10	9	9	10	12	13	13	13	6	7	6	5	5	6	7	9	10	9
16	8	9	9	8	14	11	11	12	8	9	15	22	39	32	14	16	16	16	17	7	7	7	15	9
17	12	9	15	8	9	8	8	14	5	8	16	16	15	15	16	14	17	15	9	7	8	7	9	13
18	10	9	8	8	7	15	9	9	7	11	11	14	15	15	13	11	9	6	6	6	6	6	6	7
19	8	7	8	10	11	13	12	13	15	13	42	37	17	10	15	16	35	10	7	6	8	9	7	18
20	9	15	12	8	7	7	10	8	10	9	14	49	34	26	29	40	47	38	9	11	7	13	9	8
21	5	7	15	9	15	17	17	12	17	35	B	24	34	36	53	24	9	32	9	7	9	9	8	7
22	7	15	7	6	7	9	16	13	17	15	14	18	19	27	16	9	8	11	10	21	17	9	7	7
23	12	13	10	13	11	11	15	11	8	7	7	49	32	44	38	44	52	39	12	25	27	11	8	11
24	13	15	16	12	11	15	11	13	8	10	13	7	16	17	14	11	7	6	7	7	7	8	10	8
25	8	9	9	8	7	9	9	11	10	9	17	18	18	22	20	16	17	13	12	9	10	6	7	8
26	10	9	12	15	13	15	15	16	15	13	11	15	35	31	19	14	15	10	7	8	11	10	8	7
27	10	7	5	8	13	9	9	11	26	16	11	17	16	19	16	17	9	6	8	14	11	7	7	9
28	7	10	8	9	15	11	5	15	11	14	15	11	16	17	15	13	10	6	16	13	11	33	8	7
29	7	8	5	8	12	9	9	7	7	7	13	25	40	15	15	15	16	22	18	17	14	15	12	7
30	6	14	8	15	13	9	9	8	7	9	8	10	12	11	11	6	6	6	7	7	9	8	7	8
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	9	9	9	9	12	11	11	13	14	14	15	17	16	16	16	15	16	14	10	10	10	8	8	8
U Q	10	14	13	13	15	15	15	15	17	16	31	25	34	28	27	25	26	22	17	14	13	10	10	9
L Q	8	8	8	8	9	9	9	11	8	9	13	13	15	13	13	11	9	6	7	7	7	7	8	7

APR. 2024 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2024 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	B	A	B	B			240	238	236	216	224	224	216	262	A	A
2	A	A	A	A	A	A	A	A	272	272		B	240	238	238	246	228	200	E B	230	232	230	220	230	A	A
3	A	A	A	A	A	A	A	A	A		278	238	224	224	222	216	218	208	208	210	210	E B	E B	E B	B	
4	B	A	A	A	A	B	B	B	E B	258	240	236	224	210	214	218	236	228	208	212	E A		A	A	A	
5	A	B	A	A	A	A	A	A	A	B	B	B	E B	E B	B		B	E B	E B	B			A	A	A	
6	A	A	A	A	A	A	A	A	A	A	B	B	A	A	B	B		244	230	218	E B	E A	B	A	A	
7	A	B	A	A	A	A	A	A	A											0			A	A	A	
8	A	A	A	A	A	A	A	A	A	A	B	B	B	E B	E B	B		252	244	238	230	224	220	208	216	256
9	A	A	A	A	A	A	A	A	A	A		B	B			E B				E B	E B	B	B	A	A	
10	A	A	A	A	A	A	A	A		252	232	246	276	0 E B	230	220	224	204	196	218	238		A	A	A	
11	A	A	A	0	A	A	A	A	A		246	232	232	228	220	236	224	210	206	208	220	212	214	242	254	
12	B	A	A	A	A	A	E A	E A	0		246	220	222	232	210	216	210	200	194	204	210	222	242	234	256	
13	A	A	E A	A	A	A	A	A	E A	316	258	228	228	224	208	214	208	206	196	212	204	196	204	240	A	
14	A	A	A	A	A	A		366	292	242	222	228	222	220	232	228	222	206	194	182	212	212	204	B	A	
15	A	A	A	A	A	A	A	A	A		238	232	230	220	220	214	216	210	196	178	202	222		A	A	
16	A	A	A	A	A	A	A	A	A	A	A	A	B	B		264	240	232	262			A	A	A	A	
17	A	A	A	A	A	A	A	A	A		304	284	256	256	248	246	238	228	238	218		A	A	A	A	
18	A	A	A	A	A	A	A		368	288	260	240	228	216	214	216	214	194	208	192	180	200	224	A	A	
19	A	A	A	E A	A	A	A	A	E A	E B	300	266	272	256	246	230	256	252	264		A	A	A	A	A	
20	A	A	A	A	A	A	A	A		362	336	304		B	E B	E B		E B	E B		A	A	A	A	A	
21	A	A	A	A	A	A	A	A	A	A	A	B	A		294	262	E B	208	250		B	A	A	A	A	
22	A	A	A	A	A	A	A	A	A	A		290	258	238	228	216	216	208	214	216	218	246		A	A	
23	A	A	A	A	A	A	A	A		304	238	242	B	232	266	236	236	E B	E B		E B	246	A	A	A	
24	A	A	A	A	A	A	A	A		306	238	242	234	232	218	224	212	204	202	214	196	204	206	244	270	
25	A	A	A	A	E B	E B	E B	B	358	316	322	252	228	212	208	224	216	208	204	190	188	200	198	204	210	240
26	A	A	A	A	A	A	A	A	A	A	A	A	E B	290	266	250	230	236	272		A	A	A	A	A	
27	A	A	A	A	A	A	A	A	A	A		258	242	234	230	214	218	206	244	212	E A		A	A	A	
28	A	A	A	A	A	A	A	A	E A	324	238	248	230	218	216	202	216	190	212	236	224	E A	A	A	A	
29	A	A	A	A	A	A	A	A		318	244	234	236	228	214	220	212	194	E B	210	234	216	196	A	A	
30	A	A	A	A	A	A	A	E A	374	294	236	220	206	204	212	216	198	190	192	204	240		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	1	3	5	14	21	22	21	25	26	28	30	30	29	26	24	17	11	6	4		
MED			E A	0 E A	E B	E B	E B	U	280	245	238	231	228	224	222	222	208	210	212	216	213	217	240	258		
U Q							E A	374	371	316	275	248	249	242	246	242	238	232	227	224	E B	239	234	248	244	265
L Q							E B	316	307	258	238	232	224	222	216	216	212	204	199	206	209	204	206	240	255	

APR. 2024 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2024 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	91	A	A	A	A	A	117	A	67	78	91	98	94	93	85	93	82	71	52	47	36	42	35	27
2	61	45	A	A	A	71	A	72	74	79	72	73	99	105	93	101	126	116	A	56	A	A	A	A
3	A	A	A	A	A	A	A	40	A	A	54	50	63	65	76	92	71	58	29	18	20	20	A	0 X
4	68	A	A	67	A	A	A	A	38	62	78	98	116	112	110	105	68	70	58	47	A	A	A	A
5	R 40	A	A	A	A	A	A	A	A	58	70	102	105	116	112	109	92	70	57	45	32	A	63	83
6	80	A	82	A	A	51	A	A	A	74	91	101	85	110	X	92	106	95	72	65	46	38	35	41
7	0 X 50	46	56	59	A	A	A	A	A	58	77	91	97	102	106	115	94	88	79	71	A	A	A	A
8	A	A	A	A	A	A	45	A	67	65	88	91	112	125	127	113	92	84	82	88	44	15	15	17
9	26	A	23	40	0 X 42	50	57	50	56	70	86	100	113	118	124	114	83	91	92	59	20	A	A	A
10	A	A	A	A	A	X 56	X 65	68	59	78	100	87	117	134	123	115	111	115	110	B	B	B	111	71
11	82	47	A	47	A	A	A	A	A	B	B	B	B	B	B	B	B	A	B	A	A	100	A	A
12	A	A	A	A	A	A	A	A	56	B	B	R	B	B	0 X 53	X 54	X 51	X 44	X 32	A	A	A	A	A
13	A	A	A	A	A	A	A	A	A	0 X 50	X 52	B	R	X 70	79	79	66	66	67	47	22	0 X 38	0 X 58	A
14	58	69	64	69	42	68	82	94	95	48	70	90	107	109	116	106	111	69	64	55	24	B	B	A
15	A	A	A	B	0 X 43	A	56	46	57	B	B	107	111	121	118	131	116	83	71	47	24	A	A	A
16	A	A	A	59	62	A	52	58	52	B	B	B	B	B	71	76	90	49	29	47	42	35	43	44
17	48	35	30	A	43	50	64	70	60	79	82	104	104	118	117	116	89	84	73	20	91	26	86	64
18	55	A	A	A	A	A	A	A	A	A	A	44	56	46	61	77	80	74	64	57	51	A	0 X 34	A
19	58	A	A	A	0 X 45	A	55	A	A	68	82	90	103	107	103	94	93	82	50	84	0 X 63	A	A	A
20	A	A	A	A	A	A	36	31	28	49	51	76	107	108	114	90	82	90	58	47	0 X 20	A	A	A
21	0 X 52	0 X 58	0 X 62	0 X 48	A	A	A	57	58	67	71	96	110	113	110	107	92	109	98	65	45	A	A	A
22	A	36	48	60	44	71	70	71	60	53	70	106	108	108	116	113	69	65	63	20	22	A	A	15
23	A	23	A	A	57	71	69	34	32	37	70	77	110	135	111	108	108	114	94	0 X 58	0 X 92	A	A	A
24	A	A	A	A	0 X 58	0 X 74	0 X 59	A	A	A	A	63	67	67	85	90	95	87	63	45	A	A	A	A
25	0 X 46	0 X 59	A	A	A	A	A	A	50	54	51	0 X 71	95	84	91	91	60	68	43	23	A	A	A	A
26	A	A	0 X 69	A	A	A	A	A	A	39	63	64	93	91	97	96	67	67	62	A	A	A	A	59
27	A	A	A	A	23	24	30	31	33	37	49	68	78	90	91	98	70	65	55	36	18	A	A	A
28	0 X 58	0 X 70	A	A	A	A	A	50	55	57	62	76	90	79	95	90	56	54	24	A	A	A	A	33
29	45	25	24	26	X 26	23	30	22	21	27	56	77	86	88	86	74	58	41	38	29	22	18	A	A
30	A	A	A	A	A	32	48	X 36	X 32	37	51	82	93	90	92	71	63	67	59	53	36	A	A	A
31	A	A	A	A	A	A	A	A	A	A	40	52	58	72	71	76	69	70	39	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	16	11	9	9	8	14	14	18	20	23	25	28	27	28	30	30	30	30	29	25	19	10	8	13
MED	56	46	56	59	42	50	60	56	56	57	70	82	97	104	96	100	82	70	63	47	36	30	42	58
U Q	64	0 X 59	66	64	50	68	70	68	60	70	80	98	110	114	114	109	94	88	76	56	45	42	74	66
L Q	47	35	27	44	34	43	45	36	36	48	53	70	86	86	85	90	68	66	48	40	22	20	36	30

MAY 2024 fXI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2024 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	F 44	A	A	A	A	A	U 47	A	F	55	64	83	F	F	81	75	80	F 70	F 61	F	36	U 28	F 19	F	20
2	U 40	R J	R 38	A	A	A	F 61	A	F	57	56	58	66	74	69	83	92	F	104	V	A	F	A	A	20
3	A	A	A	A	A	A	A	A	F	A	A	V 48	J 44	55	59	68	78	F 61	F	J 12	R 13	F	A	R	
4	U 61	R	A	A	A	A	A	A	U 32	R 53	F	66	91	105	105	103	96	F 61	Z 53	F 51	R	A	A	A	A
5	R 34	A	A	A	A	A	A	A	A	F	F	F	F	Z	Z	Z	V	F	F	R	F	A	U 33	F 52	
6	U 45	R	A	R	A	A	U 45	A	A	A	F	64	85	90	106	102	103	F	F	V	F	J 29	R 35	U 47	
7	R	U 40	R 50	R	A	A	A	A	A	52	F	66	82	91	96	99	104	F 87	F 73	F	F	A	A	A	A
8	A	A	A	A	A	A	F 38	A	F	F	77	83	102	119	120	100	Z 76	F	F	F	56	33	R	R	R
9	18	A	R	U 34	U 37	R 38	J 51	R 38	F	F	F	U 81	R 103	110	114	106	F 73	F	F	F	39	A	A	A	A
10	A	A	A	A	A	50	58	62	J 53	R 61	F	81	101	115	109	105	109	R 91	F	B	B	B	F	56	
11	F 41	J 41	R	A	A	A	A	A	A	B	B	B	B	B	B	B	B	A	B	A	A	A	A	A	A
12	A	A	A	A	A	A	A	A	F 50	B	B	R 48	B	B	47	48	44	38	26	A	A	A	A	A	A
13	A	A	A	A	A	A	A	A	A	F	V 46	B	64	64	70	71	60	59	U 54	R 30	16	U 32	U 49		
14	F	V 58	U 58	R	F	60	F	F	J 30	R 43	63	81	94	100	106	97	104	61	52	F	F	B	B	A	
15	A	A	A	B	U 37	R 32	A 31	J 45	R B	B	B	B	B	B	F	F	U 96	F	F	60	38	18	A	A	A
16	A	A	A	J 53	U 56	A 48	J 52	R 46	B	B	B	B	B	B	F	68	77	43	J 23	U 39	R 35	29	36	38	
17	F 37	F	23	A 37	J 44	R 58	F	54	71	F	V 96	98	108	111	110	83	74	64	Z 14	J 20	U 65	U 57			
18	F	A	A	A	A	A	A	A	A	A	J 38	50	40	54	71	Z 74	68	58	51	45	U 45	R A	A	R	28
19	J 52	R	A	A	A	R	A	F	A	A	F 62	74	84	97	98	95	88	86	F 72	44	U 70	R 55	A	A	
20	A	A	A	A	A	A	31	25	J 22	R 43	J 45	R 70	F 92	F 91	F 98	F 84	F 62	F 72	F 52	F 31	A 14	A	A	A	
21	U 46	R 52	R 45	U 42	A	A	A	F	F	F	F	F	F	F	F	F	82	F	F	92	59	F	A	A	
22	A 30	J 42	R 54	J 38	U 54	R 54	R 50	F 52	F 46	F 60	F 93	F 100	F 103	F 110	F 106	F 61	F 58	F 50	F 14	F 16	J 71	R A	A 9	A	
23	A	18	A	A	51	F	F	Z	J 28	R 31	F	F	F	118	F	F	94	102	F	U 32	U 71	A	A	A	
24	A	A	A	A	A	R	R	49	A	A	A	57	55	61	77	83	91	81	55	40	A	A	A	A	
25	R 41	R 49	A	A	A	A	A	A	J 44	R 36	F	63	F	F	84	F	53	61	F	J 17	A	A	A	A	
26	A	A	J 63	A	A	A	A	A	A	F	F	F	Z	87	84	92	85	59	56	F	F	A	A	A	53
27	A	A	A	A	19	J 18	24	26	27	31	43	62	72	80	80	90	50	52	48	29	J 12	A	A	A	
28	U 52	R 64	A	A	A	A	A	J 44	F	F	F	F	F	F	F	F	F	F	20	A	A	A	U 22	A	
29	U 37	R 18	18	20	20	16	20	16	17	22	44	70	79	80	76	62	52	35	32	23	17	13	A	A	
30	A	A	A	A	A	F 26	F	R 27	26	30	45	77	86	83	84	57	55	F	51	46	27	A	A	A	
31	A	A	A	A	A	A	A	A	A	A	37	45	51	66	62	70	F	Z 59	32	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	12	10	7	6	7	10	11	12	16	19	19	26	25	24	27	26	26	23	23	20	13	7	5	11	
MED	42	40	45	42	37	41	48	38	38	46	60	76	90	94	92	91	74	61	51	36	J 27	U 20	U 35	R 47	
U Q	U 49	R 52	R 58	J 53	51	50	57	50	52	55	64	83	99	106	106	103	88	74	60	42	U 40	29	50	53	
L Q	37	30	23	34	20	26	31	26	26	34	45	62	73	74	76	71	60	56	32	J 26	16	14	32	22	

MAY 2024 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2024 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	37	67	82	48	64	63	29	44	34	37	29	28	25	22	22	20	13	13	12	14	14	7	11	13
2	35	34	54	59	58	56	67	43	38	30	28	22	22	19	18	45	42	18	35	22	39	48	29	59
3	47	45	37	20	69	65	40	28	46	41	23	41	36	27	24	22	28	16	15	58	57	56	26	37
4	40	51	57	41	34	47	42	47	132	27	22	23	21	22	18	21	10	16	8	10	57	52	46	58
5	63	58	47	47	60	38	57	133	55	45	34	22	26	26	41	38	14	15	17	14	13	15	26	31
6	21	141	38	87	50	34	36	46	40	32	36	30	24	25	23	39	18	17	18	12	14	28	34	29
7	63	30	28	40	49	47	59	58	41	19	17	24	23	22	20	26	32	19	18	17	37	37	23	37
8	42	43	43	37	32	23	22	43	39	34	29	20	25	32	39	25	17	14	16	17	12	53	52	92
9	46	52	34	32	26	33	49	43	31	25	16	19	25	21	15	13	9	13	16	23	16	64	46	40
10	36	51	44	30	68	32	38	49	45	23	27	41	42	26	28	17	45	34	39				43	42
11	59	39	53	37	81	57	37	67	69									45		54	23	47	75	58
12	62	59	56	57	60	69	58	76	21			38			29	22	25	19	16	55	26	37	38	88
13	60	67	46	41	58	53	58	56	36	41	32		46	31	25	29	10	21	19	11	10	25	29	37
14	33	27	22	18	19	20	18	15	16	33	39	43	38	41	41	39	35	28	26	25	17			24
15	52	49	28			26	57	22	58	20		32	34	35	30	27	39	18	27	31	16	52	29	46
16	57	65	71	39	29	35	30	47	42						33	25	21	27	17	28	20	25	24	26
17	16	15	15	21	22	21	28	32	32	28	17	22	27	18	18	17	14	21	14	13	25	14	50	45
18	64	52	66	45	28	78	55	62	53	40	54	62	23	63	40	24	25	27	29	29	40	37	33	31
19	47	42	47	38	39	18	66	32	60	56	41	31	29	26	26	16	14	17	11	13	23	38	25	58
20	47	52	43	50	49	28	16	16	13	40	52	22	20	25	24	14	16	13	15	14	66	11	39	32
21	32	34	58	30	47	47	45	32	21	14	18	18	16	53	21	13	36	22	15	10	20	40	23	32
22	33	41	37	47	31	45	42	27	17	13	16	16	70	18	15	12	12	12	12	17	15	19	18	11
23	29	50	70	58	43	39	40	17	11	19	40	20	22	17	17	18	27	22	15	15	50	94	66	43
24	70	97	58	57	50	38	78	36	48	27	53	33	28	38	25	14	24	13	16	17	33	29	31	33
25	34	35	37	35	30	23	67	52	41	13	18	20	23	26	26	17	23	24	15	19	30	35	36	58
26	35	40	46	50	58	55	45	75	57	54	32	22	20	14	16	15	16	12	19	58	47	42	41	65
27	79	33	39	29	17	16	13	13	14	8	12	13	19	16	32	14	14	18	16	13	91	47	38	30
28	38	34	43	56	57	58	48	20	19	18	10	12	21	18	13	10	16	14	14	58	30	22	25	14
29	13	14	14	15	9	11	12	12	10	12	13	18	21	16	15	14	9	9	12	10	8	9	24	30
30	46	46	40	46	30	16	16	11	25	8	97	25	51	18	16		9	12	19	11	34	31	47	34
31	45	49	65	61	43	38	34	42	64	50	30	18	21	21	16	17	18	17	16	34	26	30	37	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	31	31	31	30	30	31	31	31	31	28	27	28	28	28	30	30	30	31	30	30	30	29	30	31
MED	45	46	44	41	45	38	42	43	39	28	24	21	22	21	24	16	18	16	16	16	26	37	34	37
U Q	59	52	57	50	58	55	57	52	53	40	39	32	32	29	29	25	27	22	19	29	39	48	43	58
L Q	34	34	37	32	30	23	29	22	21	18	17	20	21	18	17	14	14	13	15	13	16	24	25	30

MAY 2024 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2024 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

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	14	11	15	42	15	10	7	14	17	12	25	19	17	16	15	11	13	12	14	14	6	8	7
2	8	8	8	8	7	9	10	8	8	12	13	7	14	15	11	45	42	18	7	6	6	7	7	9
3	14	11	7	7	16	16	11	11	11	15	21	41	36	27	24	22	28	16	15	13	11	12	6	8
4	9	9	7	12	15	12	8	10	8	7	12	15	15	15	11	7	7	9	8	6	16	10	9	11
5	7	16	14	16	16	14	11	12	9	10	25	20	15	26	41	38	14	15	17	14	13	10	7	10
6	7	15	15	16	15	6	8	11	12	20	36	30	24	25	15	11	15	11	16	12	7	6	6	9
7	7	8	10	14	6	12	10	11	7	7	6	8	11	12	16	26	32	15	18	17	6	11	12	11
8	11	11	11	11	11	11	10	16	12	16	14	9	25	32	39	25	13	14	8	17	8	11	10	9
9	7	6	6	6	7	8	11	11	10	13	8	15	17	16	11	9	7	13	16	16	16	11	16	10
10	9	10	10	11	15	18	16	18	12	23	27	41	42	26	28	17	45	34	39	B	B	B	34	32
11	30	30	33	22	39	16	20	25	29	B	B	B	B	B	B	B	B	41	B	42	17	27	23	19
12	17	14	17	15	17	12	15	16	16	B	B	38	B	B	29	22	25	15	14	14	15	14	14	15
13	16	18	17	15	16	14	16	17	11	25	32	B	46	31	25	16	8	21	19	11	10	12	12	13
14	11	12	12	16	15	16	14	15	16	33	39	43	38	41	41	39	35	28	26	25	17	B	B	20
15	15	16	16	B	B	15	17	15	17	20	B	32	34	35	30	27	39	18	27	31	16	17	16	17
16	16	17	16	25	25	30	16	16	18	B	B	B	B	B	33	25	17	16	17	14	14	14	15	13
17	11	11	10	10	13	13	12	13	12	15	11	18	16	16	18	13	14	14	8	10	12	14	14	11
18	11	14	16	16	16	17	17	16	15	16	26	36	23	19	40	24	25	27	11	12	15	12	12	11
19	12	13	14	14	11	11	14	17	17	17	24	25	29	26	26	16	14	11	11	9	8	9	10	8
20	11	11	10	10	10	9	8	8	10	14	32	14	15	16	24	14	16	10	15	14	39	11	10	10
21	10	10	11	17	14	12	10	10	11	9	11	11	12	12	13	8	36	17	15	10	8	7	16	11
22	8	8	11	14	9	16	13	9	7	9	9	14	16	15	10	9	9	12	12	12	9	10	10	8
23	8	8	7	8	8	8	7	6	11	19	40	20	18	12	12	9	17	18	15	15	10	14	10	9
24	10	10	11	14	11	10	16	12	17	16	24	33	16	38	25	14	24	11	16	17	13	14	10	10
25	8	8	10	12	18	9	15	15	11	11	15	20	16	12	13	10	13	17	11	13	7	8	6	14
26	9	9	7	15	15	15	11	15	11	17	14	11	15	12	16	15	16	12	16	18	17	11	7	17
27	6	9	14	9	8	8	8	8	6	7	10	11	19	16	32	11	14	10	8	11	10	8	14	9
28	9	17	10	14	16	16	10	6	7	7	7	10	13	12	6	7	6	11	14	14	10	10	8	7
29	7	7	6	6	6	7	5	8	10	12	10	12	11	9	7	9	7	7	6	5	8	6	6	6
30	8	8	8	10	8	6	6	6	6	6	11	9	10	7	9	7	6	5	7	7	7	9	12	8
31	12	8	14	11	13	11	12	15	16	15	30	16	16	18	16	17	15	13	16	8	7	7	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	9	11	11	14	15	12	11	12	11	15	21	20	17	17	18	15	15	14	15	14	11	11	10	10
U Q	12	14	14	16	16	16	15	16	16	20	32	36	34	31	30	25	28	18	17	17	16	14	14	13
L Q	8	8	8	10	9	9	10	8	9	10	11	11	15	12	12	9	11	11	11	10	8	8	8	8

MAY 2024 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2024 h'F (KM)

45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E P 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	204	A	A	A	A	A	222	A	Q	Q	262	258	236	228	212	210	196	204	194	220	204	220	Q	280
2	218	314	A	A	A	196	A	Q	370	376	288	266	262	240	230	256	282	260	238	A	348	A	A	A
3	A	A	A	A	A	A	A	Q	A	A	260	318	264	240	236	222	218	212	250	HE	AE	AE	A	AE
4	224	A	A	A	A	A	A	A	AE	B	404	262	218	222	218	206	214	196	184	180	200	222	A	A
5	238	A	A	A	A	A	A	A	A	A	Q	346	262	232	224	224	222	212	194	190	216	226	Q	176
6	210	A	328	A	A	228	A	A	A	Q	306	286	250	232	236	242	214	238	214	246	238	304	412	390
7	AE	A	202	200	266	A	A	A	A	A	240	244	218	222	220	208	222	204	252	Q	Q	Q	A	A
8	A	A	A	A	A	A	H	A	Q	Q	322	276	220	230	226	220	214	204	210	218	220	218	214	290
9	EB	AE	B	342	190	428	426	374	330	240	224	208	210	234	216	206	178	216	216	210	A	A	A	A
10	A	A	A	A	A	428	390	380	414	278	244	230	244	226	210	206	232	240	224	B	B	B	308	320
11	324	636	A	610	A	A	A	A	A	B	B	B	B	B	B	B	B	A	B	A	A	A	A	A
12	A	A	A	A	A	A	A	A	150	A	294	B	B	240	260	248	244	246	A	A	A	A	A	A
13	A	A	A	A	A	A	A	A	A	A	466	314	276	246	226	222	206	208	204	202	274	414	374	
14	360	248	322	300	A	436	364	290	300	334	244	240	220	214	236	214	218	230	224	252	Q	234	B	B
15	A	A	A	B	B	348	A	H	370	282	B	230	218	238	220	230	206	216	230	292	324	A	A	A
16	A	A	A	342	188	A	334	404	242	B	B	B	B	B	282	244	260	282	356	290	260	314	280	256
17	258	290	282	A	400	354	440	400	338	332	218	220	218	204	212	214	210	240	200	270	192	334	214	176
18	268	A	A	A	A	A	A	A	A	A	A	404	304	354	370	270	280	280	290	234	282	A	A	386
19	232	A	A	A	A	A	A	AE	B	A	A	280	250	240	236	222	206	194	218	222	270	436	314	A
20	A	A	A	A	A	A	H	H	Q	Q	400	392	366	378	420	248	220	212	220	198	200	216	214	212
21	460	326	244	168	A	A	A	Q	Q	Q	432	322	260	248	218	198	226	218	210	206	236	212	216	344
22	A	348	236	294	400	310	444	318	258	246	218	230	210	190	210	202	178	208	202	244	240	A	A	240
23	AE	B	A	A	Q	Q	Q	AE	A	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	A	A
24	A	A	A	A	A	298	208	182	A	A	A	292	282	298	252	246	232	214	230	236	A	A	A	A
25	462	230	A	A	A	A	A	A	510	316	270	272	222	214	220	210	204	226	220	222	A	A	A	A
26	A	A	174	A	A	A	A	A	AE	A	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	A	A	A	246
27	A	A	A	A	416	392	352	322	278	288	242	230	222	238	220	192	202	240	214	218	236	A	A	A
28	384	194	A	A	A	A	A	A	374	296	262	244	228	204	198	204	202	186	212	276	A	A	A	350
29	350	290	316	332	338	388	340	346	340	292	248	214	210	204	198	208	196	202	212	216	244	296	A	A
30	A	A	A	A	A	386	Q	304	310	298	274	234	216	202	206	182	236	224	216	260	318	A	A	A
31	A	A	A	A	A	A	A	A	A	A	AE	B	346	278	254	240	230	236	230	218	240	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	16	11	9	8	7	14	13	18	20	23	25	28	28	28	30	30	30	30	29	25	18	9	8	13
MED	267	290	263	316	400	360	390	368	324	290	254	233	222	226	220	210	208	218	222	228	252	298	277	251
U Q	355	344	325	342	404	398	433	392	368	332	277	267	240	237	236	222	232	240	235	266	304	324	349	335
L Q	228	230	218	280	190	298	337	318	298	262	243	227	217	213	212	202	196	212	213	217	234	262	242	215

MAY 2024 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2024 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

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	0 X	0 X	A	A	A	A		46	44	62	78	79	88	82	43	59	58	0 X	A	A	A	A	
2	A	A	A	A		30		46	0 X	26	28	57	75	83	85	81	70	50	41	33	30	A	A	A	A	
3		0 X	0 X	A	A	A		38	59	49	41	59	56	98	105	110	94	70	70	54	36	A	A	A	28	
4	0 X	0 X	0 X	A		39	44	42	A	A		56	67	74	84	102	94	65	52	40	23	A	31	31	A	
5	A	A	A	A		45	54	48		54	54	77	81	85	82	94	69	64	57	27	A	A	A	A		
6	A	A	A	A	A	A	A	A	A	0 X	50	B	77	78	93	70	67	70	37	36	0 X	A	A	A	A	
7	A	0 X			A	A	A	A	A	A	A		0 X	56	64	80	92	110	92	81	94	A	A	A	A	
8	A	41	40	A	A	A	A	A		55	56	48		C	C	B	84	87	82	71	48	29	B	B	B	A
9	A	A	A	A	A	A	A		40	28	38	44	66	75	88	96	88	66	70	46	A	A	0 X	A	A	
10	A	A	A	A		37	37	41	42	45	53	62	80	85	90	75	62	57	39	22	A	A	24	A	A	
11	A	44		41	A	A	A	A		57	63	0 X	57	74	74	87	81	72	69	51	35	A	A	A	A	
12	A	A	A	30	34	36	38	38	38	35	42	62	72	78	83	71	54	56	46	25	21	A	A	A	A	
13	A	A	A	A	30	31	32	34	32	34	49	66	70	85	91	64	40	49	30	22	18	A	A	A	A	
14	18	55	47	48	52	48	66	53	43	X	46	58	59	70	79	94	82	80	71	60	26	A	0 X	0 X	58	
15	0 X	52	A	A	A	A	A	A		47	44	53	66	80	98	77	87	90	38		A	A	0 X	29	26	
16	A	0 X	A	A	A	A	A		39	51	32	48	47	64	75	80	93	81	66		A	A	A	A	A	
17	A	0 X	A	A	46		42	52	54	46	50	69	84	78	94	91	66	57	34		A	A	A	A	A	
18	A	A	A		63	40	47	48		56	50	55	61	76	91	85	70	69	63	39	A	46	A	A	A	
19	0 X	0 X	0 X	A	A	A	A	A	A	B		47	59	76	80	94	64	64	60	54	0 X	A	A	A	A	
20	A	A	A	0 X	56		A	A	A		44	52	46	55	65	84	80	78	47	64	B	A	28	91	A	
21	A	A	A	45	R	A	A	A		33	35	50	68	70	88	79	46	44	36	31	28	13	13	16	A	
22	A	A	A	A	A	A		36	36	35	35	45	67	69	69	72	56	26	46	28	A	A	A	A	17	
23	A	33	27	A	A	60	58		27	28	42	54	59	68	90	74	60	34	28		A	A	A	A	80	
24	54		A	A	A	A	A		27	40	39	44	62	70	80	83	71	45	42	30	20	A	A	A	A	
25	A	118	A	A	33	52	56	46			45	54	62	75	100	90	88	60	35		A	A	A	A	A	
26	A	A	58	44	47		A		39	50	46	47	56	63	76	94	93	93	60		A	A	A	A	A	
27	0 X	0 X	0 X	0 X	A	A	A		45	44	42	50	75	88	91	96	73	61	71	51	33	14	0 X	A	A	
28	52	A	A	A	A	A	A	A	A	A	A	A			53	57	57	54		A	A	A	55	A	A	
29	A	A	A		87	88	57		A	A	A	40	46	59	76	74	74	89	70	69	X	28	A	96	57	A
30	A	56	A	A	A	A	A	A	A		45	47	67	X	81	82	86	81	71	65	55	A	A	A	46	A
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	8	13	8	10	13	10	11	16	17	24	28	27	28	29	30	30	30	29	26	17	6	7	10	5		
MED	53	54	52	46	43	46	42	43	42	44	48	62	73	80	90	81	66	64	46	28	20	42	38	28		
U Q	0 X	58	0 X	60	50	54	56	48	50	46	52	67	79	85	94	90	72	70	54	34	0 X	55	57	69		
L Q	50	44	34	41	34	36	37	38	32	35	45	56	66	76	82	71	54	54	34	23	14	28	29	22		

JUN. 2024 fXI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2024 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	R	R	A	A	A	A	F	F	38	55	70	71	82	F	J	R	F	F	U	R	A	A	A	A	
2	A	A	A	A	A	J	R	A	F	R	24	44	68	74	74	67	63	42	34	26	24		A	A	A	A		
3	U	R	R	R	A	A	A	F	F														A	A	A	J	R	
4	R	U	R	R	A			30	A	A	A	F	50	61	68		F	F	F	F	41	28		U	R	U	22	
5	A	A	A	A		39	48	A	F	A	F	46	71	71	77	73		F	F	F	52	50	21		A	A	A	
6	A	A	A	A		A	A	A	A	A	J	R	44	B			Z		F		31	30	J	R	A	A	A	
7	A	R		F		A	A	A	A	A	A	A	F		F	F	F	F	U	R		A	A	A	A	A		
8	A	U	R	R	A	A	A	A		R		43	C	C	B		F	F	J	R		B	B	B	A	A		
9	A	A	A	A	A	A	A		J	R	J	R	61	68	V	85	81	F	F	F	A	A	U	R	A	A		
10	A	A	A	A	A	U	R	F	F	F	35	38	61	68	78	85	81	54	64	40	J	R	A	A	17	A		
11	A	38		36		A	A	A	A	F	F	57	53	Z	69	69	79	73	63	63	45	27		A	A	A	A	
12	A	A	A		24	28	30	32	32	Z	F	35	54	F	64	72	74	64	Z	F	38	19	18		A	A	A	
13	A	A	A	A		24	24	27	28	26	28	43	62	63	80	84		34	44	Z	23	17	14		A	A	A	
14	U	R	45	41	41	42	F	54	41	19	34	F	53	62	73	92	74	F	F	F	J	R		A	U	R	51	
15	U	R	A	A	A	A	A	A	A	J	R	F	F	Z	F			Z		F	J	R	A	A	A	24	18	
16	A	52		A	A	A	A	F	F		26	40	40	59	64	75	88	F	F		A	A	A	U	R	A		
17	A	R	A	A	J	R	A		F		26	40	F	62	76	69	88	83	54	51	26		A	A	A	A	A	
18	A	A	U	R	J	R	A		A	F		43	48	55	70	82	75	62	62	Z	F	A	F	A	A	A		
19	45	37		A	A	A	A	A	A	B	F	F		67	72	88	58	59	55	40		R	A	R	A	A	A	
20	A	A	A	A		51		A	A	A	F	F			67	72	88	58	59	55	40		A	U	R	R	A	
21	A	A	A		A	A	A	A	F	F		40	47	59	75	70		40	60			J	R	J	R	A	A	
22	A	A	A	A	A	A		30	30	29	28	38	59	59	63	66	47	20		F	22		A	A	A	A	J	R
23	U	R	F	A	A		54	52	A		21	22	36	46	51	62	J	R	J	R	22		A	A	A	A	R	70
24	46		A	A	A	A	A	J	R	21	34	30	37	54	64	74	77		39	35	24	J	R	A	A	A	A	
25	A	R	A	A		J	R	46	50	F	A	A	39	48	56		94	84	F	F	J	R	A	A	A	A	A	
26	A	A	52	39	J	R	A	A	F	F	F	J	R	41	47	57	70	88	87	85	54		A	A	A	A	A	
27	R	R	U	R	A	A	A		36	34	35	43	69	80	85	89	66	55	64	42	29		U	R	A	A	A	
28	J	R	A	A	A	A	A	A	A	A					46	47	F	J	R		A	A	A	U	R	A	A	
29	A	A	U	U	U	R		A	A							F				F	J	R		U	R	A	A	
30	A	50		A	A	A	A	A	A	F	F	F	F		65	68	83	Z	65	58	46	22	A	A	A	50	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	7	10	7	7	11	10	10	13	16	18	25	26	26	25	27	24	24	23	24	16	5	7	9	5				
MED	46	46	41	39	37	37	36	35	33	34	41	54	64	72	82	72	54	55	39	21	17	30	37	22				
U Q	48	48	52	41	41	48	50	40	39	38	44	61	70	76	88	82	63	62	44	26	20	49	46	60				
L Q	44	37	20	36	28	30	30	30	24	28	38	48	59	69	74	64	41	44	26	J	R	10	14	18	14			

JUN. 2024 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2024 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	43	67	41	33	21	56	58	58	46	K	13	14	18	17	35	35	13	15	K	K	58	56	28	22	34				
2	29	23	23	31	26	22	56	27	44	E	B	B	K	23	18	13	12	10	20	16	13	30	48	22	26				
3	34	59	52	48	45	44	45	16	13	16	41	20	19	18	13	13	13	14	16	14	33	32	38	35					
4	46	40	41	35	32	28	22	41	49	52	35	23	23	18	16	30	17	16	19	18	22	12	10	29					
5	33	11	11	64	10	7	28	41	52	21	52	38	18	17	20	12	20	15	20	15	12	11	38	40	48				
6	51	69	44	60	57	46	42	57	63	58	35		24	20	24	19	24	20	10	12	16	57	47	31					
7	21	25	26	33	39	62	62	63	59	56	45	27	43	30	23	26	21	22	55	54	46	58	32	47					
8	55	23	22	62	47	63	60	70	65	46	E	B	C	C	B	E	B	E	B	E	B	B	B	60					
9	41	58	56	39	42	56	43	34	56	52	30	41	37	32	24	22	15	17	31	56	61	56	28	30					
10	35	30	32	60	44	34	18	16	14	12	12	18	15	13	16	17	19	20	13	56	23	52	E	B	48				
11	53	55	53	31	77	54	51	59	36	44	30	42	39	47	29	25	25	16	20	15	27	51	59	46					
12	34	40	34	22	14	14	11	15	11	11	10	13	17	18	15	39	17	13	12	20	E	B	14	32	42	45			
13	57	54	50	47	19	18	E	B	E	B	E	B	K	15	16	12	10	9	20	10	K	K	K	27					
14	22	20	22	34	29	29	21	16	12	11	15	E	B	E	B	E	B	E	B	K	K	K	K	35					
15	29	51	43	65	38	43	46	47	56	64	42	E	B	E	B	E	B	E	B	E	B	41	43	44	42				
16	40	43	47	60	44	44	43	17	15	12	14	30	41	36	14	37	45	32	44	32	34	78	24	50					
17	36	38	61	50	35	40	35	38	19	20	E	B	E	B	E	B	K	E	B	E	B	9	32	26	30	43	69		
18	93	71	44	36	23	44	33	30	54	34	34	22	36	37	19	26	23	25	14	32	46	20	29	40					
19	37	34	50	43	53	42	56	64	55	B	36	46	23	24	16	19	E	26	46	17	32	11	35	30	34				
20	45	35	41	44	35	50	35	51	34	25	31	19	22	E	B	E	B	E	B	B	E	B	57	46	9	38	48		
21	93	54	48	32	55	52	48	36	20	16	E	B	E	B	E	B	K	K	K	K	22	26	13	33					
22	40	38	56	40	53	43	28	16	13	12	21	14	29	16	13	16	13	17	42	58	79	58	57	37					
23	37	26	18	42	50	43	41	45	16	25	24	14	32	E	B	E	B	E	B	K	22	11	10	58	59	37	43	48	35
24	37	57	50	58	72	58	47	32	15	17	57	21	17	18	20	12	17	14	17	29	22	41	31	28					
25	34	36	38	30	18	17	14	12	54	54	28	24	E	B	E	B	E	B	E	B	E	B	34	37	38	34	33		
26	47	34	34	34	37	55	39	21	12	12	14	15	16	K	E	B	E	B	K	K	K	57	54	37	38	47	46		
27	38	41	23	71	42	61	56	38	17	21	17	13	17	17	15	17	23	K	K	11	14	55	23	33	59	52			
28	49	84	99	125	78	55	58	33	74	56	60	65	49	26	37	30	46	47	42	51	54	39	79	54					
29	53	47	68	29	65	45	43	41	39	19	17	17	30	E	B	E	B	E	B	E	B	35	34	39	40	33			
30	33	36	70	43	41	39	77	35	38	14	17	23	25	17	E	B	E	B	E	B	13	13	59	42	39	34	41		
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	29	30	28	29	29	30	30	30	30	29	30	29	29	29	30					
MED	39	40	44	42	42	44	43	34	37	20	20	18	20	20	20	18	18	17	16	32	34	39	34	38					
U Q	49	57	53	60	53	55	56	47	54	49	35	26	36	34	29	29	23	25	30	55	44	50	46	48					
L Q	34	34	34	33	29	39	33	17	15	12	16	16	17	18	16	16	16	15	13	16	22	31	26	33					

JUN. 2024 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA

STATION SHOWA-ST.

JUN. 2024 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	10	7	9	15	10	16	10	14	10	10	10	9	14	35	35	11	10	10	10	17	11	13	9	9
2	11	10	13	10	10	14	10	16	14	15	16	11	16	15	9	10	10	10	8	8	10	7	8	6
3	7	15	7	13	10	9	9	8	8	9	18	17	14	18	10	11	10	11	16	12	14	10	6	8
4	9	7	8	8	9	8	8	12	15	14	13	16	18	18	16	30	17	16	16	18	11	8	8	6
5	11	8	10	8	11	10	16	9	13	7	10	10	11	9	14	9	10	6	6	7	5	7	8	12
6	10	6	12	14	14	11	10	9	16	12	16	B	24	20	24	19	24	20	10	12	16	17	16	18
7	10	7	8	7	9	12	16	12	11	14	16	16	17	15	16	17	16	17	17	14	8	8	8	7
8	10	10	6	18	16	17	16	18	12	16	26	C	C	B	62	43	30	29	25	24	B	B	B	18
9	25	20	17	26	24	29	24	20	15	8	30	41	37	32	24	16	15	17	31	39	21	15	17	16
10	18	18	16	16	17	16	14	16	14	10	10	11	10	10	10	12	10	10	8	9	12	16	12	13
11	12	9	9	9	15	17	16	17	13	11	17	42	39	47	29	25	14	16	9	15	15	11	15	10
12	8	10	8	8	7	6	5	8	8	8	10	11	17	18	15	14	9	10	9	11	14	10	9	10
13	23	15	12	14	11	10	12	9	10	9	11	10	10	10	12	10	8	7	7	8	8	15	11	10
14	9	9	11	10	10	9	10	7	6	8	10	19	38	48	25	16	15	16	11	13	16	11	8	10
15	8	11	12	16	16	20	16	13	18	14	16	25	15	30	44	35	17	26	17	10	10	8	10	9
16	15	9	9	15	15	11	11	11	8	7	8	30	41	20	10	37	45	17	19	12	10	10	7	9
17	8	6	7	8	8	9	9	6	7	10	16	16	36	19	14	11	16	17	9	8	7	7	10	7
18	8	7	7	7	8	16	17	12	10	7	16	22	36	37	17	26	23	25	14	9	7	6	7	7
19	10	14	11	14	15	16	14	17	17	B	16	46	23	24	16	14	26	46	17	16	8	7	6	9
20	8	7	9	15	16	16	18	16	14	10	10	11	15	24	19	14	10	22	B	17	15	9	9	12
21	14	16	14	8	25	18	12	9	10	10	17	33	23	10	10	9	10	10	11	9	9	11	7	7
22	7	7	7	10	12	8	8	10	8	6	6	6	8	10	9	6	6	8	8	5	6	6	7	8
23	8	7	6	7	7	7	7	7	6	6	8	8	7	35	36	46	18	24	7	12	8	7	6	7
24	7	15	10	15	15	10	7	7	5	8	7	8	9	10	7	7	8	8	8	6	8	7	6	9
25	7	8	8	7	7	6	7	7	5	10	10	16	18	7	22	17	17	18	17	9	9	10	10	10
26	9	10	14	10	8	9	9	7	7	7	7	7	11	20	42	20	17	16	14	16	9	9	7	8
27	12	16	17	13	10	17	15	10	9	10	7	7	7	6	7	6	6	6	9	13	7	7	11	11
28	8	9	7	17	14	15	11	17	15	9	17	18	15	11	12	11	14	13	19	8	9	9	7	14
29	16	8	7	14	9	10	10	10	15	7	8	7	7	38	37	28	17	17	18	10	10	8	8	7
30	7	7	10	16	11	11	11	16	11	9	10	10	14	9	18	29	17	13	7	10	7	8	8	8
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	29	29	30	30	30	30	30	30	30	30	30	30	30
MED	10	9	9	13	11	11	11	10	10	10	10	16	15	18	16	15	15	16	11	12	10	9	8	9
U Q	12	14	12	15	15	16	16	16	14	11	16	24	24	32	25	26	17	18	17	15	14	11	10	11
L Q	8	7	7	8	9	9	9	8	8	8	10	10	10	10	10	11	10	10	8	9	8	7	7	7

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2024 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	230	302		A	A	A	A	0	246	228	226	220	242	204	198	222	242	270		A	A	A	A					
2		A	A	A		434		488	386	324	248	230	208	202	202	190	188	254	244	234		A	A	A	A						
3	274	266	202		A	A	A	0	396	310	366	326	332	284	240	234	210	222	228	228	246	226		A	A	A	230				
4	A	198	246		A	E	A	E	A	E	A		330	254	256	240	228	222	236	216	268	248		A	148	134	A				
5		A	A	A	A	E	A		A	0	A	0	282	232	206	210	220	210	202	216	218	218		A	A	A	A				
6		A	A	A	A	A	A	A	A	A	E	A	350		236	230	232	210	242	210	230	236	190		A	A	A	A			
7		A	460	362	228	446		A	A	A	A	A	0	282	332	280	276	240	260	258	198		A		A	A	A	A			
8		A	274	248		A	A	A	A	E	A	A	358	418	260				0	242	228	254		B	B	B	B	A			
9		A	A	A	A	A	A	A	E	A	E	B	332	316	294	278	246	244	208	222	210	214	226	244		A	A	A	A		
10		A	A	A	A	E	A	0	492	378	318	294	260	224	224	222	206	202	188	240	220	208	224		A	A	148	A			
11		A	E	A	A	E	A		A	A	0	A	0	248	E	B	316	256	276	224	232	228	222	240	244		A	A	A	A	
12		A	A	A		390	366	330	286	260	226	202	212	208	218	206	224	212	206	222	240	E	B	254		A	A	A	A		
13		A	A	A	A	E	B	E	A	352	310	274	238	226	220	210	180	210	196	184	228	222	244	262		A	A	A	A		
14	E	A	404	290	298	340	366	372	330	290	292	266	274	220	268	216	204	236	218	216	E	B	234		A	A	A	372			
15	260									494	326	260	260	256	240	264	274	252	312							A	A	222	216	A	
16		A	278		A	A	A	A	0	370	270	272	272	360	302	250	248	264	270	240		A	A	A	A	204					
17		A	488		A	A		A	E	A	524	494	334	314	296	246	228	204	240	204	202	202	214		A	A	A	A	A		
18		A	A	A		188	202		A	336	462		396	394	274	296	254	228	232	220	216	264	264		A	256		A	A	A	
19	E	B	E	B		A	A	A	A	A	A	0	A	0	386	306	224	236	216	190	260	314	280		A	232		A	A	A	
20		A	A	A	A		A	A	A	E	A	0	398	266	284	220	220	212	236	204	208	256				A	140	214		A	
21		A	A		176		A	A	A	A	0	338	356	274	268	234	224	220	174	246	204	258	212	236	196	336		A	A	A	
22		A	A	A	A	A	A	E	A	348	314	300	258	214	226	196	208	212	166	196	218	194		A	A	A	A	E	B	248	
23		A	432	264		A	A	H	A	356	386		A	E	B	310	330	238	248	290	294	274	244	226	290	260		A	A	A	232
24	204		A	A	A	A	A	A	E	A	400	306	274	288	234	198	228	218	172	214	238	208	252		A	A	A	A	A	A	
25		A	216		A		434	346	334	332		A	A	312	282	258	244	252	224	218	236	266		A	A	A	A	A	A	A	
26		A	A		E	A	E	A		A	0	414	304	258	234	252	240	262	230	224	232	224		A	A	A	A	A	A	A	
27	316	258	244	354		A	A		A	362	296	280	256	226	214	238	198	196	208	212	208	218		E	A		A	A	A	A	
28	258		A	A		A	A		A	A		A				396	428	404	480							A	364		A	A	A
29		A	A	A		274	300	320		A	A		A	292	212	234	230	226	232	214	230	254	230	242		A	192	358		A	
30		A	236		A	A	A	A	A	A		A	266	246	218	200	226	192	212	212	232	244		A	A	A	408		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	8	13	8	9	13	10	11	16	17	24	28	27	28	29	30	30	30	29	26	17	6	7	9	5							
MED	266	272	256	251	365	356	354	334	303	283	258	240	229	230	226	210	221	225	232	233	222	196	222	231							
U Q	310	418	280	358	415	420	396	407	348	328	304	274	256	255	240	224	240	247	258	250	254	256	347	310							
L Q	259	247	245	208	321	346	336	316	292	266	242	226	212	211	212	196	208	216	216	225	190	148	176	223							

JUN. 2024 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUL.2024 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

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	X 79	A	A	A	A	A	A	A	A	A	59	68	X 71	107	115	107	X 80	72	49	X 42	A	A	A	A
2	A	A	64	A	A	A	A	A	A	52	78	67	X 86	83	97	76	59	59	R	A	A	A	A	A
3	A	A	A	A	A	A	A	47	42	56	B	65	X 74	X 88	X 83	68	48	53	42	X 24	A	A	A	A
4	27	A	78	108	A	A	A	A	60	74	94	79	95	104	94	82	X 72	X 81	X 72	X 64	A	A	A	A
5	A	63	95	A	A	53	66	95	88	89	83	71	86	X 93	X 83	X 78	X 65	X 68	X 47	X 28	A	24	A	A
6	A	X 44	47	54	49	45	53	54	56	48	49	73	83	X 88	93	71	X 56	X 58	X 28	A	A	A	23	31
7	55	72	65	A	A	A	A	58	58	X 60	84	85	89	X 91	X 105	88	53	61	58	29	13	16	A	A
8	A	A	A	0 49	A	A	A	A	X 49	50	70	67	83	X 91	X 91	X 93	100	108	67	A	A	A	0	X 83
9	A	A	A	A	A	A	A	A	A	51	53	66	X 72	X 87	X 86	X 85	79	67	55	A	A	0	X 42	A
10	0 49	X A	0 55	X A	A	A	45	55	59	59	67	83	89	95	91	72	87	71	60	44	A	0 15	X A	A
11	48	A	A	86	56	58	56	56	44	A	63	75	X 91	X 106	X 94	88	84	70	56	X 33	A	A	A	A
12	0 72	X A	0 65	X A	A	A	A	X 51	52	56	47	62	X 82	X 86	X 91	88	92	87	58	0 17	X A	A	A	R
13	94	80	0 78	X 57	A	43	95	43	43	47	59	104	X 79	X 92	X 97	X 93	58	64	59	32	A	A	A	A
14	A	R	57	A	A	A	57	61	61	62	59	65	X 79	X 97	X 90	X 82	85	93	58	A	A	R	R	A
15	88	94	61	47	43	44	41	56	70	83	107	95	102	108	105	80	X 61	X 70	X 68	X 39	23	A	0 60	X A
16	0 58	X 56	R	A	A	A	139	A	84	57	69	69	X 79	X 102	X 115	X 101	X 83	X 81	X 68	X 45	X 45	A	A	78 A
17	59	67	59	48	56	60	61	77	61	36	63	116	X 114	X 127	X 130	X 94	X 75	X 102	X 107	0 58	X A	A	A	A
18	A	A	A	A	A	A	56	86	78	79	67	86	X 102	X 114	X 118	X 101	X 85	X 91	X 118	0 42	X 17	A	A	A
19	A	A	R 39	67	86	63	97	A	71	85	98	85	124	129	138	114	114	91	59	0 46	X 15	X 15	A	87 A
20	85	A	0 88	A	A	55	65	59	55	87	93	98	113	X 114	X 116	X 126	115	89	82	47	23	24	0 58	X A
21	48	33	0 54	X 57	A	A	A	59	44	50	71	93	X 113	X 116	X 125	X 108	81	72	55	39	33	42	A	A
22	A	A	A	X 37	A	R	A	A	A	A	81	104	101	114	124	131	139	114	92	61	A	R	R	A
23	A	A	A	A	A	A	A	43	38	43	X 58	X 75	X 84	X 105	X 103	84	77	53	52	35	17	A	19	18 A
24	28	A	46	90	73	58	60	93	X 35	0 67	0 83	0 101	0 101	0 112	0 99	0 96	0 106	0 91	0 65	0 34	27	23	A	A
25	43	59	86	57	A	123	43	45	83	83	70	83	108	X 113	X 115	X 75	X 84	X 69	X 57	X 39	A	31	A	A
26	A	A	0 71	A	R	A	67	A	A	A	R	A	69	89	82	90	89	88	R	R	A	A	A	A
27	A	A	A	A	A	A	A	52	48	B	B	71	77	68	87	147	150	113	47	A	A	A	A	A
28	A	A	A	A	A	A	A	46	50	58	61	0 78	0 84	0 83	0 88	0 106	0 69	0 70	0 59	0 33	A	A	A	A
29	A	A	A	A	0 57	X 83	A	0 60	0 65	0 71	0 76	0 88	0 85	0 92	0 95	0 94	0 85	0 57	0 47	0 27	A	A	A	A
30	R	A	A	A	A	0 69	A	A	A	B	B	0 43	0 64	0 113	0 101	0 98	0 76	0 64	0 26	X A	A	R	A	A
31	A	A	A	A	R	A	A	49	55	47	58	70	75	85	82	85	83	73	63	31	A	A	A	63
	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	9	16	13	7	11	16	20	25	25	27	29	31	31	31	31	31	31	29	24	10	7	4	8
MED	56	63	62	57	56	58	60	56	56	58	69	76	86	95	97	90	83	73	59	39	23	24	21	62
U Q	79	76	74	87	73	63	68	60	66	76	83	90	101	112	115	101	94	91	68	46	27	31	32	80
L Q	48	50	54	48	49	45	54	48	46	50	59	68	79	87	90	82	69	68	55	32	17	16	17	44

JUL.2024 fXI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA

STATION SHOWA-ST.

JUL.2024 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	79	A	A	A	A	A	A	A	A	A	51	61	65	107	115	107	74	49	49	36	A	A	A	A	
2	A	A	F	A	A	A	A	A	A	F	F	60	80	73	90	68	53	51	38	A	A	A	A	A	
3	A	A	A	A	A	A	A	40	36	31	B	52	68	81	77	58	40	53	36	24	A	A	A	A	
4	F	A	F	F	A	A	A	A	F	F	F	F	F	81	98	88	76	66	75	66	F	A	A	A	
5	A	55	89	A	A	47	47	53	60	89	48	63	80	87	77	72	59	68	40	22	A	24	A	A	
6	A	38	47	54	49	45	44	54	56	48	43	71	83	82	87	63	48	43	28	A	A	A	F	F	
7	55	F	F	A	A	A	A	52	52	54	69	70	74	85	94	85	47	52	58	29	13	16	A	A	
8	A	A	A	U	A	A	A	A	43	50	43	53	64	85	85	85	77	91	51	A	A	A	U	R	
9	A	A	A	A	A	A	A	A	A	F	39	50	66	81	78	79	69	48	42	A	A	U	R	A	
10	U	R	A	U	A	A	F	F	F	F	F	F	F	F	F	F	F	F	F	F	A	A	F	A	
11	42	A	A	A	F	A	F	F	F	A	F	69	79	91	88	70	59	44	37	27	A	A	A	A	
12	U	R	A	U	A	A	A	45	49	32	41	56	75	78	82	82	63	72	32	17	A	A	A	R	
13	U	R	F	U	A	F	F	F	F	F	F	72	73	86	91	82	48	52	39	32	A	A	A	A	
14	A	R	F	A	A	A	39	61	61	45	59	59	73	91	82	76	78	65	34	A	A	R	R	A	
15	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	74	55	63	62	30	23	A	U	R	
16	U	R	F	R	A	A	139	A	F	70	49	45	63	73	94	102	95	77	72	58	34	19	F	78	
17	49	41	46	47	56	60	61	49	61	32	63	84	91	93	124	88	66	91	72	51	A	A	A	A	
18	A	A	A	A	A	A	56	42	48	39	61	80	96	108	112	95	79	75	54	42	17	A	A	A	
19	A	A	R	F	U	R	F	U	R	A	F	F	F	F	F	F	F	F	F	F	35	15	11	A	F
20	54	A	A	U	R	A	55	65	53	49	56	56	81	80	108	116	118	115	89	60	40	23	18	U	R
21	J	R	F	F	A	A	A	F	F	F	F	F	107	110	119	102	72	60	44	24	17	42	A	A	
22	A	A	A	31	A	R	A	A	A	A	A	F	F	F	F	F	F	F	F	F	A	R	R	A	
23	A	A	A	A	A	A	A	F	F	F	81	84	79	99	114	131	139	113	63	48	F	A	19	F	
24	F	A	20	20	20	21	24	23	29	39	55	84	83	112	93	83	80	91	65	34	27	18	A	A	
25	F	F	F	F	A	A	43	45	51	34	57	83	90	107	109	69	70	63	46	28	12	A	A	A	
26	A	A	U	R	A	R	A	F	A	A	A	R	A	58	70	73	73	67	54	F	R	A	A	A	
27	A	A	A	A	A	A	A	A	F	F	B	B	F	F	F	F	F	R	F	A	A	A	A	A	
28	A	A	A	A	A	A	A	24	41	41	71	56	68	78	85	88	88	37	A	A	A	A	A	A	
29	A	A	A	A	A	A	A	F	F	F	F	72	78	77	82	91	63	64	56	27	F	A	A	A	
30	R	A	A	A	A	R	A	A	F	65	71	70	82	79	86	87	88	69	41	41	22	A	A	R	A
31	A	A	A	A	R	A	A	33	38	41	52	64	69	79	76	79	J	R	67	57	F	A	A	A	F
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	14	9	16	12	7	8	16	20	25	25	27	29	31	31	31	31	31	30	29	24	10	7	4	8	
MED	52	56	62	49	49	46	46	42	49	46	56	70	78	87	88	82	70	63	49	30	18	18	21	62	
U Q	58	72	68	50	56	58	62	50	60	54	69	78	82	99	109	88	79	72	60	38	23	24	32	76	
L Q	27	40	46	45	28	36	40	33	37	38	48	60	69	79	78	73	59	52	38	24	17	12	17	39	

IONOSPHERIC DATA STATION SHOWA-ST.

JUL.2024 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	37	48	45	83	53	45	68	41	48	62	E	BE	BE	BE	BE	BE	BE	BE	BE	80	36	57	55	65				
2	59	58	36	38	39	57	65	52	48	38	29	35	23	E	BE	BE	BE	BE	BE	64	58	63	63	48				
3	88	135	37	48	61	58	48	27	16	14	K	B	35	29	18	19	E	BE	BE	67	74	58	85	62				
4	87	152	38	20	55	69	48	57	37	27	23	K	K	19	16	16	E	BE	BE	K	K	59	58	105				
5	52	45	88	68	58	41	39	32	49	42	31	K	K	17	20	22	E	B	16	16	22	78	27	13	25	92		
6	76	31	36	55	47	22	97	24	104	131	113	32	41	33	15	16	16	13	16	52	24	21	17	E	B			
7	23	25	32	58	62	52	52	32	27	10	12	17	27	27	15	16	12	18	16	70	56	59	47	39				
8	38	103	52	38	52	53	73	61	61	47	20	18	18	24	18	26	27	30	74	58	59	59	37	32				
9	K	K	K	K	K	52	52	55	56	25	20	18	17	17	17	24	13	27	27	60	58	44	51	46				
10	43	58	59	56	56	K	26	K	19	16	25	45	27	19	17	21	17	17	14	35	K	K	21	46	56	28		
11	38	47	116	82	28	56	31	25	23	66	33	13	23	23	18	18	12	E	B	14	13	43	30	46	37	42		
12	K	65	44	58	62	65	55	12	19	17	117	37	30	20	17	22	21	E	B	15	23	40	K	93	56	59		
13	97	36	39	37	127	57	56	34	19	13	42	11	15	17	17	12	12	12	15	57	46	55	46	58	K			
14	14	15	19	19	39	21	17	23	15	19	18	17	31	31	24	21	19	19	57	82	56	52	25	63	K			
15	K	K	K	K	K	K	K	K	10	25	24	E	BE	BE	16	17	13	14	13	9	7	7	47	34	45	41		
16	K	K	K	K	66	58	59	48	55	33	12	12	19	19	18	21	17	15	13	9	50	10	55	54	34	K		
17	36	29	41	35	29	11	12	22	11	28	39	23	24	24	24	18	22	39	25	24	59	52	72	43	K			
18	K	58	30	30	32	41	11	31	13	10	15	16	19	22	18	13	15	27	21	16	55	66	58	52	K			
19	58	57	32	26	25	38	13	59	20	15	15	24	30	26	23	14	18	12	15	67	58	45	48	38	K			
20	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	E	B	9	60	42	31	37	K		
21	27	21	32	41	57	46	57	17	13	13	15	14	14	16	11	16	15	15	22	13	E	B	7	49	39	71		
22	62	57	43	59	67	56	51	67	66	57	46	36	30	30	24	72	E	B	38	32	32	35	45	47	82			
23	K	K	K	K	58	52	52	20	55	67	13	25	46	46	39	23	14	15	14	E	B	11	55	35	49	45		
24	57	59	26	19	27	16	E	B	16	13	39	13	12	29	24	21	23	18	17	21	15	12	53	54	57	56		
25	63	37	38	64	159	160	134	127	16	23	34	25	30	36	40	37	32	12	12	E	B	7	33	5	46	55		
26	51	58	72	48	52	55	45	66	60	86	64	66	E	B	35	32	E	BE	BE	BE	21	33	43	41	42	105	51	
27	118	45	111	47	56	49	112	81	19	K	B	B	K	K	E	BE	BE	BE	BE	K	33	62	61	58	66	K		
28	87	70	42	65	69	65	56	36	24	13	39	16	45	37	16	16	16	14	33	55	43	33	41	53	K			
29	K	64	60	44	34	60	57	12	48	23	26	K	45	38	30	E	BE	BE	BE	K	E	BE	BE	61	63	62	53	45
30	K	75	83	56	69	61	21	66	70	117	B	BE	BE	BE	BE	E	BE	BE	BE	E	B	21	49	34	51	41	52	
31	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	K	48	106	32	41	22	K	K		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	31	31	31	31	31	31	31	31	31	30	28	30	31	31	31	31	31	31	31	31	31	31	31	31	31			
MED	51	48	42	48	55	52	48	34	24	24	25	24	24	22	20	17	16	16	18	48	53	51	48	51				
U Q	63	59	60	59	62	58	57	57	49	47	39	32	30	32	E	BE	BE	BE	B			58	59	57	62			
L Q	38	37	K	36	37	39	41	26	22	16	14	16	18	19	18	17	16	14	14	15	18	33	42	41	39			

JUL.2024 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUL. 2024 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	6	7	8	8	16	11	13	8	9	9	24	35	53	49	31	37	24	28	25	14	7	9	8	8
2	7	7	8	9	9	11	9	9	9	13	11	13	13	29	38	24	23	17	16	12	9	8	10	9
3	9	8	9	9	11	14	10	7	8	7		21	15	13	10	35	15	9	13	24	12	11	13	8
4	7	7	9	16	11	8	15	17	10	9	9	13	9	7	9	9	7	8	15	9	7	7	8	7
5	7	9	6	11	13	7	8	8	10	8	9	9	8	8	14	27	11	14	15	9	14	9	9	11
6	9	7	9	7	10	9	9	9	9	13	9	11	13	14	15	16	16	13	16	14	13	13	11	12
7	8	7	13	11	12	13	12	11	8	6	6	7	10	9	7	7	8	7	7	7	7	9	9	8
8	7	7	14	7	8	8	11	9	14	9	9	9	7	14	9	26	27	30	10	17	17	14	8	7
9	7	9	9	9	9	12	14	13	9	8	9	7	7	8	17	24	11	27	17	12	10	8	6	9
10	7	15	13	14	11	10	9	5	5	7	11	9	9	9	7	8	8	7	7	7	7	10	9	7
11	8	11	14	13	11	11	9	9	15	11	9	10	15	15	7	9	9	14	7	9	9	9	9	8
12	11	13	15	16	12	14	9	8	9	9	8	37	30	15	13	15	14	15	16	11	13	15	10	8
13	7	7	8	8	7	7	8	6	7	7	6	7	9	9	9	9	7	7	6	11	11	15	11	7
14	7	7	8	9	9	9	7	7	7	5	6	7	8	8	17	10	8	7	7	7	7	9	9	8
15	7	12	10	9	9	10	8	7	9	7	14	19	16	8	8	8	13	7	7	5	5	7	9	9
16	9	9	8	9	15	16	13	10	10	8	8	7	7	5	8	8	8	8	5	7	7	8	5	7
17	8	8	9	9	7	7	7	7	5	6	15	7	17	12	15	14	17	15	15	10	11	9	8	8
18	8	8	9	8	8	8	7	11	6	6	6	6	10	12	10	9	7	7	8	8	7	9	8	9
19	9	11	8	8	7	7	8	13	11	7	9	7	13	14	9	8	7	6	7	5	8	8	9	8
20	7	8	9	9	9	10	8	7	8	6	16	13	19	15	14	12	9	10	9	9	8	6	6	7
21	7	7	7	7	12	8	8	8	7	6	7	7	5	9	7	7	7	7	6	7	7	7	6	8
22	8	8	5	7	13	11	13	15	16	9	14	6	14	16	13	20	38	10	15	9	8	10	8	7
23	12	9	11	9	14	11	9	8	8	7	9	15	15	12	14	12	9	7	7	11	8	7	17	9
24	9	10	11	9	8	9	16	9	7	7	7	12	12	13	12	12	7	8	8	7	5	6	7	8
25	9	8	11	8	9	10	8	8	7	13	12	15	13	13	12	8	7	7	6	7	6	5	7	8
26	7	9	9	9	8	10	9	14	13	15	15	15	35	17	39	25	18	7	12	9	10	7	7	7
27	8	7	8	18	16	13	9	8	6			16	15	38	35	16	25	17	9	10	9	7	7	8
28	7	7	8	7	12	16	9	8	7	7	6	5	16	16	11	10	16	14	33	15	16	7	9	11
29	12	10	8	11	8	12	8	7	9	11	15	13	15	9	33	17	17	17	15	14	11	10	7	7
30	7	11	11	13	15	16	9	24	7	15			29	37	17	18	18	15	21	9	6	7	10	13
31	7	8	8	15	13	9	9	9	7	7	7	11	10	8	8	11	9	10	9	8	7	7	8	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	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	7	8	9	9	11	10	9	8	8	8	9	11	13	13	12	12	11	10	9	9	8	8	8	8
U Q	9	10	11	11	13	12	11	11	10	11	15	15	16	15	17	20	17	15	15	12	11	10	9	9
L Q	7	7	8	8	8	8	8	7	7	7	7	7	9	9	9	9	8	7	7	7	7	7	7	7

JUL. 2024 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUL.2024 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	318	A	A	A	A	A	A	A	A	A	272	252	268	256	212	234	222	252	280	230	A	A	A	A
2	A	A	214	A	A	A	A	A	A	332	252	242	230	218	244	208	258	242	214	A	A	A	A	A
3	A	A	A	A	A	A	A	E	E	A	B	256	202	210	218	216	198	238	244	236	A	A	A	A
4	333	A	E	A	294	248	A	A	A	E	A	420	320	238	224	212	212	196	190	246	240	222	248	A
5	A	E	A	0	A	A	365	374	250	E	E	E	A	A	234	224	208	214	212	202	228	244	208	A
6	A	334	332	304	358	460	338	330	298	262	240	210	196	214	202	186	202	210	E	B	A	A	E	B
7	285	258	210	A	A	A	A	370	308	272	242	238	238	238	204	200	166	214	204	220	262	336	A	0
8	A	A	A	216	A	A	A	A	E	E	A	430	402	274	244	230	228	234	216	232	242	218	A	292
9	A	A	A	A	A	A	A	A	A	A	328	250	222	212	216	198	224	214	256	216	A	A	E	A
10	E	A	E	A	A	A	390	328	314	334	334	218	242	214	206	180	202	210	228	236	A	A	190	A
11	E	A	A	A	0	A	E	A	A	E	A	234	218	210	206	190	212	208	208	214	A	A	A	A
12	E	A	A	190	A	A	A	A	432	280	316	300	E	B	294	232	218	220	206	192	196	224	238	265
13	338	270	314	320	A	E	A	442	390	388	328	215	212	205	194	216	210	198	170	212	208	220	A	A
14	A	E	E	A	A	A	E	A	482	360	272	230	224	210	230	214	198	206	206	212	210	A	236	210
15	274	220	350	390	346	344	342	296	282	300	252	220	198	232	208	186	196	228	204	184	282	A	A	206
16	E	A	0	A	A	A	170	A	324	264	310	272	232	220	206	194	186	214	196	220	272	220	A	372
17	274	224	270	442	436	390	358	292	308	343	322	240	216	214	230	198	198	261	216	230	A	A	A	A
18	A	A	A	A	A	A	370	334	296	252	202	218	218	232	204	204	210	232	206	208	E	A	A	A
19	A	A	E	B	417	420	E	A	E	A	A	E	A	E	A	236	228	218	218	194	196	212	188	200
20	E	A	A	E	A	A	E	A	E	A	A	236	228	218	218	194	196	212	188	200	216	286	290	A
21	E	A	E	A	A	A	A	A	E	A	E	A	236	228	218	218	194	196	212	188	200	216	286	290
22	262	272	340	294	A	A	A	A	354	286	254	228	212	232	206	212	198	192	210	202	204	212	190	0
23	A	A	A	A	A	A	A	A	A	A	A	266	292	266	264	250	292	234	222	244	350	A	E	A
24	E	A	E	A	A	A	E	A	E	A	A	394	342	220	238	224	220	224	206	194	192	198	194	208
25	426	344	242	330	A	A	330	296	322	288	222	218	212	214	202	184	173	206	200	214	A	332	A	A
26	A	A	E	A	A	A	E	A	A	A	A	230	A	E	B	E	B	250	254	260	236	300	208	A
27	A	A	A	A	A	A	A	A	E	A	B	B	256	248	298	264	228	220	242	288	A	A	A	A
28	A	A	A	A	A	A	A	A	E	A	B	B	256	248	298	264	228	220	242	288	E	B	A	A
29	A	A	A	A	A	A	A	A	387	308	208	220	206	228	216	228	212	190	220	244	228	E	B	A
30	294	A	A	A	A	A	0	A	A	A	B	B	E	B	E	B	E	B	E	B	E	B	A	A
31	A	A	A	A	A	A	214	A	A	A	B	B	E	B	E	B	E	B	E	B	E	B	A	A
					227			470	330	264	234	232	222	228	202	218	204	198	208	214	A	A	A	200
CNT	14	10	17	12	9	10	16	20	25	25	28	29	31	31	31	31	31	31	31	25	10	10	7	9
MED	300	246	264	278	295	400	352	343	309	263	244	228	222	218	207	201	203	214	215	217	248	234	233	266
U Q	360	337	337	425	397	442	390	388	355	330	269	249	234	232	230	218	220	240	244	230	286	290	290	332
L Q	285	224	228	292	258	344	340	326	300	253	232	218	212	214	202	194	192	208	204	208	246	196	210	231

JUL.2024 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2024 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	R	R	A	A	A	A	A	41	B	B	X	X	X	X	X	X	X	X	X	A	A	A					
2	X	X	0	X	A	0	X	A	A	67	77	82	87	77	102	100	85	83	65	51	A	A	A	R					
3	A	0	X	X	A	0	X	A	0	X	X	X	X	X	X	X	X	X	0	X	A	A	A	A					
4	A	A	A	R	0	X	A	A	A	A	B	A	50	69	0	X	0	X	A	0	X	A	A	X					
5	0	X	R	A	0	X	A	0	X	X	X	66	87	111	103	95	X	X	X	X	X	A	A	0	X				
6	X	52	A	A	A	A	A	A	X	45	58	50	B	X	X	X	X	0	X	X	X	A	A	A					
7	A	A	R	A	A	A		37	51	47	57	90	92	123	123	124	118	131	117	110	55	23	A	A	A				
8	0	X	0	X	0	X	0	X	53	55	65	67	67	64	102	107	110	123	123	102	106	86	45	25	0	X	A		
9	A	0	X	X	R	R	A	A	A	61	67	80	95	109	117	127	119	106	107	84	58	46	21	25	A	A	A		
10	A	57	64	A	A	65	61	61	44	53	80	113	119	119	126	127	117	105	93	66	41		A	A	A	A			
11	A	A	A	X	X	58	54	51	39	A	56	64	43	64	73	92	104	112	112	115	85	54	49	43	51	R			
12	A	R	X	R	A	R	0	X	A	A	A	B	A	A	A	A	X	A	A	A	A	A	A	A	A	A			
13	R	R	0	X	A	A	R	R	A	R		X	X	X	X	X	X	X	X	X		0	X	A	0	X			
14	R	R	A	A	A	A	A	A	X	58	68	67	80	103	111	115	117	119	99	94	59	32		A	A	A			
15	A	0	X	X	0	X	A	A		56	66	72	80	101	112	120	128	127	138	121	123	92	67	58	39	0	X	0	X
16	0	X	0	X	X	A	A	A		64	61	72	73	94	102	122	137	148	113	64	68		R	A	A	A	A		
17	A	A	R		R	0	X														A	A	A	A	A	A			
18	59		61	86	51	45	92	69	89	62	95	101	103	98	105	110	114	95	75	55	37		R	0	X	R			
19	R	0	X	A	0	X	A	A	53	47	50	72	82	101	105	107	115	114	105	95	101	83	60	A	A	A	A		
20	A	53	62	A	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X	X		A	A	A	A	A			
21	X	47	A	A	A	A			70	65	58	84	84	80	106	107	115	116	117	127	111	112		A	A	A	A		
22	R	69	A	R	R	0	X	0	X	A	A	A	67	71	87	92	100	113	113	105	90	58	42		A	A	0	X	
23	0	X	R	A	A	A	54	58	61	56	67	78	82	97	108	108	91	95	96	97	81	56		A	A	A	A		
24	A		R	R	X	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X		R	A	A	A	A	A		
25	53	A	0	X	A	0	X		A	A	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	A		
26	A	R	A	0	X	R	0	X	A	67	75	79	84	99	113	117	125	127	123	130	112	114	70	0	X	A	A		
27	A	33	A		A	A	X	X	54	51	64	70		111	122	116	122	123	121	126	127	79		A	A	A	A		
28	78	A	A		75	56	69	62	R	A	62		A	A	48	63	65	74	85	87	79	61		A	A	A	A		
29	0	X	A	R		A	A	A	R	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
30	0	X	0	X	0	X	0	X	0	X	0	X	0	X	0	X	0	X	0	X	0	X	0	X	0	X	0	X	
31	A	A		0	X	A	A	A		57	49		A	B	A	X	X	X	X	X		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	13	11	14	17	9	14	16	14	24	28	24	26	29	30	30	31	30	30	30	25	20	9	8	6					
MED	58	59	62	60	54	54	56	61	59	67	79	94	103	108	115	116	114	105	90	61	43	33	27	44					
U Q	66	69	69	68	70	65	61	66	68	71	86	101	114	117	124	127	117	117	97	80	54	41	48	58					
L Q	X	X	X	X	X	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
	50	48	53	50	48	47	54	51	54	56	67	75	87	92	102	95	89	87	77	54	32	24	21	39					

AUG. 2024 fXI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2024 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	R	R	A	A	A	A	A		B	B	J	R							J	R	A	A	A	
2	J	R	R	F	A	F	F	A		26	F	F	F	56	53	53	53	44	35	28	J	R	A	A	R	
3		J	R	U	R	A	F	A	F	F	F	F	F	93	105	105	102	106	86	61	F	A	A	A	A	
4	A	A	A	R		F	A	A	A	A	B	A	J	R	F	F	F	A	F	U	R	A	A	J	R	
5	R	R	A	U	R	A	F	A	F	F		F	F	F	F	F	70	69	71	40	15	A	A	U	R	
6	J	R	A	A	A	A	A	A			B		89	108	111	123	120	102	77	81	31	17	A	A	A	
7	A	A	R	A	A	A	J	R	F	F	F	F	J	R	J	R	F	F	F	F	F	F	A	A	A	
8	U	R	U	U	U	R	F	F	F	F	50	58	87	96	104	117	117	96	101	63	44	39	25	15	A	
9		A	R	J	R	R	F	A	A	F	61	61	74	89	103	111	121	113	100	101	72	52	40	15	19	
10	A	J	51	58	A	A	45	46	47	38	47	68	98	113	113	120	121	J	R	J	R	F	A	A	A	
11	A	A	A		52	48	40	39		41	54	34	50	61	86	90	98	100	109	J	R	U	R		R	
12	A	R	J	R	R	A	U	R	A	A	A	B	A	A	A		A			A	A	A	A	A	A	
13	R	U	R	R	A	A	R		A	R							J	R	J	R	F	F	U	R	A	
14	R	R		A	A	A	A	A			37	42	48	53	54	64	63	68	63	50	37	33	23		U	R
15	A	F		U	R	A	A	F	F	F					J	R				J	R	Z	F	U	R	
16	F	U	R	F	A	A	A	A	F		Z				Z					Z	F	R	A	A	A	
17	A	A		R		U	R	U	R	F	F	F	F		F	J	R	J	R	F	F	A	A	A	A	
18	F	A	F	U	R	F	F	J	R	J	R	F	Z	Z	92	99	104	108	89	69	49	28	87	R		
19	U	R	48	A	U	R	A	A	F	Z	44	66	76	95	99	101	109	108	99	89	95	J	R	A	A	
20	A	F	F	A	A	A	A	A	A	A	51	63	69	83	93	99	102	109	128	116	69	52	A	A	A	
21	41	A	A	A	A	A	70	65	58	72	78	74	106	101	101	106	111	121	111	112	F	A	A	A	A	
22	R	A	R	U	U	R	A	A	A	A	F	67	65	76	86	94	99	103	99	76	41	42	F	U	R	
23	U	R	R	A	A	F	F	F		Z	55	68	76	82	99	89	85	89	90	91	52	38	A	A	A	
24	A	R	R		A	A	A	A	J	R	63	66	86	99	107	97	126	119	110	109	97	R	A	A	A	
25	42	A	U	R	A	F	F	A	A	55	64	72	88	114	117	121	121	108	96	85	75	35	23	J	R	
26	A	R	A	Z	U	R	A	F	F	75	73	78	93	101	111	119	121	117	119	95	114	70	34	A	A	
27	A	25	A	R	A	A	48	45	50	70	F	C	96	122	110	116	117	115	120	127	79	F	A	A	A	
28	F	78	A	A	F	F	V	R	A	62	F	A	A	42	53	59	74	79	77	64	61	F	A	A	A	
29	U	R	A	R	F	A	A	R	42	49	54	59	57	60	58	57	57	61	57	35	26	27	23	19	A	
30	U	R	U	F	U	R	F	F	47	62	77	90	105	105	115	118	108	105	94	F	U	R	A	A	A	
31	A	A	F	F	A	A	A	A	43	36	A	B	A	J	R	52	62	72	77	67	81	F	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	11	14	17	9	14	16	14	24	28	24	26	29	30	30	31	30	30	30	25	20	9	8	6		
MED	46	48	57	52	48	50	54	46	50	56	68	88	97	98	107	108	102	99	81	55	38	25	21	44		
U Q	63	59	69	64	60	57	58	56	60	66	78	95	108	111	119	119	111	109	93	68	47	38	42	52		
L Q	41	25	47	44	46	45	44	41	43	50	60	69	74	85	89	88	79	77	64	42	27	23	16	39		

AUG. 2024 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2024 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	72 K	83 K	43 K	25	69 K	58 K	60 K	61	47	26 E	B	B	BE	B	K		K	K	E	B			K	K	K
2	32 K	26 K	27 K	55	43 K	24 K	25 K	41	42	24 E	B		G	G				E	B			61	48	49	35
3	56 K	29 K	30 K	25	19	47 K	49	66	63	41	21 B	22	20	29 K	23	23	E	B	E	B		K	K		58
4	68 K	56 K	64 K	49	64	70 K	42	71 K	61	63		B	56 K	43 K	37	21	19	23	24	37	40	59	61	52	40
5	43 K	47	53	47	25	50 K	37	28 K	25	20	37	24 K	28 K	22	19	21	17	15	13	20 K	29	11	14	37	
6	41 K	55	47	54	61	58	47	44	24	15		BE	BE	B	K		K	BE	BE	BE	B	50	45	31	51
7	58	58	60	47	62	32	18	13	10	12	17	21	25	24	20	E	B		E	BE	BE	BE	B		57
8	52	42	58 K	43	47 K	26	34	28	18	19	37 KE	31 BE	27	24	26	33	KE	BE	BE	B	12	60	57	59	46
9	27	23 K	32	34	22 K	49	60	56 K	25	22	24	27	28	24	22	19	16	14	13	12		9	58	47	34
10	41 K	35 K	58	51	48 K	28	21 K	15	38	70	35	27	31	25	28	21	16	10	12	10 K	11	45	37	38	
11	43 K	36	33	45	38 K	27	35 K	56	46	34	21 B	27	33	27	23	20	17	13	11	16	17	29	41	42	
12	48 K	51 K	39 K	73	68 K	65	34	60	61	56		55	59	58	60	19	15	7	71	79	71	63	64	67	
13	52 K	52 K	56 K	49	30	51 K	43	48	43	35	28	27	33	36	26	24	18	17	15	12	10	9	40	36	
14	47 K	67 K	60 K	26	33	49	42	63	32	25	22	31	30 E	BE	BE	BE	BE	B		K	K	K		40	
15	46 K	53 K	16	37	33 K	43 K	28	16	14	18	24		G	G	G			K	KE	B		9	8	55	31
16	39 K	37	23	92	61 K	59	54 K	50	49	55	51	39		37	28	35	33	23	21	19	21	30	36	63	
17	29	31	35	23	34	47	52	37	23	21	20		23	33	23	29	28	21	22	47	49	64	65	50	
18	35	63	22	54	21	23	31	23	23		G	GE	B		GE	B		E	B	KE	B	K	K	K	
19	44 K	38 K	36	29	43	58	31	12	14		G	G	25	G	G		22	9	15	18	19	37	49	51	
20	61	45	51	67	64	55	63	54	55	52	32	49	42	35	29		GE	B	K	K	K	K		37	
21	36 K	65	56	65	49	49	40	26	47	34	33	29	E	BE	B	G	GE	BE	BE	BE	B	30	48	49	49
22	37 K	41	45	40	61	49	46	57	59	57	48	41	38	36		27		20	15	10	22	32	39	49	
23	37	39	67	60	57	40	33	36	27	25	E	BE	B	32	G	G	G	18	20	19	E	B	K	K	51
24	75	45	44	33	65	52	57	53	48	57	E	BE	B	G		GE	BE	BE	BE	B	K		K		
25	56	84	42	61	25	29	64	60	45	39	34	38	38	25	35	36	23	29	16	14	18	62	55	57	
26	59	39	90	49	114	79	55	42	47	19	22	22	23	25	23		G	GE	BE	B	K		K		
27	47	30	38	46	56	56	46	38	25	16			14	37	30		14	E	B	K	K	K	K	K	
28	37 K	103	52	43	25	19	43	59	75	43	65	70		42		27	G	19	16	29	39	45	50	51	
29	41	50	39	45	59	37	45	43	35		G	G	29	33	29	27	27	19	12	11	15	9	11	56	
30	11 K	29	25	23	22	24	10	10	14		G			27	21	24		G	KE	B					
31	79	18	20	23	64	49	53	47			65		B	E	BE	BE	BE	B	K	K	K	K	K	K	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	31	31	31	31	31	26	29	31	31	31	31	31	31	31	31	31	31	31	31	
MED	44	45	43	46	48	49	43	44	38	24	24	24	26	24	22	20	16	17	16	18	31	43	49	49	
U Q	56	56	56	54	62	56	53	57	48	43	37	E	B	35	37	28	27	E	B		50	57	55	57	
L Q	37	35	32	33	30	29	33	28	23	16	20	22	14	22	21		14	14	13	12	17	32	37	37	

AUG. 2024 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2024 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	15	11	14	6	5	15	12	11	14	B	B	35	16	16	15	11	12	13	9	9	9	10	7
2	9	8	9	9	15	9	11	9	8	24	14	18	17	17	15	12	13	9	11	10	11	15	10	7
3	8	11	9	7	9	15	15	15	13	11	16	14	14	29	20	19	30	18	6	8	8	8	7	8
4	10	12	11	9	8	16	9	14	11	14	B	16	20	17	16	15	13	13	7	7	5	9	8	9
5	13	12	13	15	13	11	12	11	8	8	18	15	21	15	15	15	7	9	9	15	11	8	7	7
6	9	18	11	15	11	15	12	14	11	10	B	28	34	15	12	15	12	16	15	11	6	9	8	7
7	7	8	12	9	15	8	9	7	5	10	13	16	15	17	10	16	16	29	16	16	13	15	10	10
8	10	9	12	15	11	7	11	9	9	9	37	31	24	17	15	33	25	15	16	8	13	9	8	6
9	8	7	8	8	7	9	15	15	8	7	8	7	16	9	15	9	7	7	8	7	5	6	8	7
10	6	8	17	10	11	8	7	7	15	15	16	6	15	13	15	11	7	5	12	6	5	5	7	6
11	7	7	8	8	13	15	9	11	10	8	15	18	18	16	16	16	11	7	8	7	7	7	6	7
12	7	7	7	16	13	11	8	13	15	15	B	28	34	17	15	11	7	7	7	6	6	18	7	9
13	8	9	13	8	7	11	7	9	9	6	11	13	13	15	16	7	9	7	7	7	7	7	6	7
14	7	12	15	7	13	15	25	16	15	6	5	24	30	40	25	23	10	12	12	9	7	7	11	9
15	7	7	7	11	9	12	8	7	5	11	15	17	16	17	16	16	9	8	13	11	5	5	25	7
16	8	8	11	9	15	13	15	14	15	15	25	39	20	37	21	35	18	18	10	7	7	11	8	9
17	7	7	9	13	14	17	13	10	9	14	12	18	17	33	17	21	21	12	12	9	8	8	6	5
18	8	13	7	11	7	7	11	10	9	6	15	24	14	19	27	15	19	6	6	7	7	5	8	8
19	11	11	7	7	8	11	8	7	7	9	15	15	18	17	6	12	5	5	7	8	11	7	9	11
20	7	9	11	14	8	11	15	16	15	15	32	49	42	35	17	19	17	11	13	11	7	8	7	7
21	13	8	5	8	11	11	9	9	22	23	17	18	35	37	21	14	21	21	16	17	7	9	8	8
22	6	7	7	8	7	15	7	14	17	42	23	41	18	19	23	18	15	11	15	6	7	7	10	8
23	7	7	9	9	12	10	7	7	6	14	39	39	17	22	19	14	12	11	20	15	13	7	7	12
24	7	8	7	7	15	15	13	11	15	9	45	45	24	26	43	38	25	17	14	9	7	7	7	11
25	6	7	7	7	9	7	15	15	11	39	19	38	38	25	35	36	23	29	16	14	8	7	6	10
26	7	7	15	7	7	8	6	11	9	14	6	6	8	5	5	15	16	16	15	7	5	7	9	7
27	7	5	8	16	19	11	10	15	13	9	C	17	8	37	23	16	11	13	13	7	8	7	5	9
28	5	5	14	9	5	8	9	13	16	16	15	19	13	42	17	27	17	13	7	8	7	8	7	6
29	8	8	9	6	12	7	7	6	9	13	19	15	15	9	16	15	15	13	7	5	11	5	7	7
30	5	7	7	7	6	7	7	7	10	14	14	14	15	15	9	10	13	13	7	8	7	7	7	11
31	11	8	5	8	10	10	11	15	12	13	15	B	75	37	33	41	28	16	11	7	9	11	8	11
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	7	8	9	9	11	11	10	11	11	13	16	18	18	17	16	15	13	12	12	8	7	7	8	8
U Q	9	11	12	13	13	15	13	14	15	15	32	38	30	33	21	21	19	16	15	11	9	9	9	9
L Q	7	7	7	7	7	8	8	9	9	9	14	15	15	15	15	14	10	8	7	7	7	7	7	7

AUG. 2024 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2024 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	310	278	A	A	A	A	A	190	B	B	E B	346	250	238	254	250	234	224	258	180	A	A	A	
2	E A	A E	A E	A	A	A E	A E	A	A E	A	522	330	242	218	232	208	232	228	218	234	200	208	A	A	E A	
3	A	186	210	E A	A	E A	E A	A	A E	A	347	284	222	228	224	232	228	208	232	210	198	E A	A	A		
4	A	A	A	A	215	222	A	A	A	A	B	A	344	308	306	280	322	A	E A	E A	E B	A	A	E A		
5	E A	361	270	A E	B	A E	A	A E	A	482	380	190	318	260	242	228	228	220	192	244	212	238	E A	A	442	
6	304	A	A	A	A	A	A	A E	A	422	310	250	B	236	238	214	202	210	188	196	190	234	244	A	A	
7	A	A	482	A	A	A E	A	432	356	320	256	222	204	228	216	212	210	208	218	198	210	220	A	A	A	
8	600	206	211	E A	190	314	358	454	340	254	274	258	212	220	236	218	214	198	208	238	180	212	E A	262	324	
9	A E	434	310	E A	E A	290	416	A	A	350	242	206	208	228	202	202	208	200	218	194	196	204	E B	250	160	
10	A	232	278	A	A	466	410	332	354	366	258	240	220	222	210	218	194	174	206	198	218	A	A	A		
11	A	A	A	E A	E A	E A	E A	A E	A	618	334	288	270	252	228	216	210	234	224	234	252	254	E A	E A	E A	
12	A	364	276	E A	A	E A	E A	A	A	A	B	A	A	A	A	358	A	200	A	A	A	A	A	A	A	
13	E A	A E	A E	A	A	A E	A	A	E A	270	240	382	294	282	260	252	220	220	210	204	214	228	190	A	212	
14	200	194	A	A	A	A	A	A E	A	468	258	234	244	252	220	210	202	204	194	215	216	224	A	A	A	
15	A	191	282	422	A	A E	A	428	334	270	216	214	232	216	220	214	208	192	180	190	196	212	222	183	E A	
16	E A	328	184	204	A	A	A	A E	A	536	520	384	334	262	244	250	252	208	218	204	218	E A	A	A	A	
17	A	A	362	192	206	374	520	384	282	280	230	234	216	224	198	202	202	192	230	A	A	A	A	A		
18	E A	328	A	E A	E A	196	330	312	180	218	292	252	263	238	248	250	236	228	210	206	190	302	E A	E A		
19	E A	568	204	E A	366	A	478	230	292	228	224	218	222	208	210	206	210	224	230	218	218	A	A	A		
20	A	E A	344	298	A	A	A	A	A E	A	410	262	304	260	246	242	218	236	239	196	220	332	A	A	A	
21	290	A	A	A	A	A E	E A	E A	E A	386	310	412	254	256	258	256	238	230	220	238	220	208	A	A	A	
22	336	A	348	370	E A	E A	A	A	A	A E	E A	E B	272	256	260	254	244	232	218	218	212	220	270	A	408	
23	418	283	A	A	E A	E A	512	404	302	256	272	312	264	238	228	212	208	218	204	216	214	236	A	A	A	
24	A	194	E B	240	A	A	A	A	A	191	310	258	260	246	E B	E B	E B	224	202	242	238	308	A	A	A	
25	266	A E	A	A	O E	A	A	A	E A	E A	E B	302	264	254	216	254	204	E B	218	202	228	218	206	210	262	E B
26	A E	B	A	195	240	E A	A	E A	364	278	230	222	215	240	232	228	222	215	200	208	208	280	180	A	A	
27	A E	A	A	245	A	E A	E A	A	500	414	290	240	C	212	232	212	234	205	236	190	223	210	A	E A	A	
28	180	A	A	E A	368	238	E A	E A	254	510	626	260	A	A	E A	E B	E B	E B	252	258	278	404	A	A	A	
29	200	A	180	E A	A	A	A	A	452	511	303	264	283	E A	224	246	238	238	222	228	232	198	228	208	228	254
30	406	396	350	208	432	E A	475	386	253	262	250	228	236	224	232	232	249	281	294	384	E B	A	196	198	A	
31	A	A	256	236	A	A	A	A	230	252	A	B	A	E B	E B	E B	E B	274	266	284	248	238	292	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	16	18	20	20	11	16	17	16	25	28	24	26	29	30	30	31	30	30	30	26	22	10	8	9		
MED	286	222	285	282	243	366	432	295	286	256	244	236	238	229	229	219	218	218	214	212	222	210	206	368		
U Q	384	352	356	347	416	441	489	418	396	298	268	263	258	250	242	238	234	234	232	234	270	262	324	415		
L Q	253	194	234	226	222	270	386	306	266	241	226	218	224	220	212	208	202	200	204	206	212	198	194	277		

AUG. 2024 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2024 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	64	A	A	A	94	57	56	A	A	A	X	X	X	91	93	103	103	X	76	93	A	A	A	A			
2	A	A	A	87	59	A	A	55	57	62	72	82	95	101	101	105	113	115	112	55	55	A	A	A			
3	A	A	X	53	59	X	X	84	67	53	63	60	84	99	104	112	121	132	116	X	X	X	X	37			
4	R	72	69	57	54	58	71	85	70	87	113	122	130	135	129	126	130	128	127	103	75	58	53	70			
5	78	71	62	65	A	55	53	46	65	69	82	113	116	115	125	120	118	122	115	91	65	53	34	46			
6	61	A	A	54	95	83	83	62	71	80	94	98	111	118	115	116	117	136	123	90	83	69	45	79			
7	71	A	X	50	71	A	X	59	78	78	100	109	114	113	116	123	114	118	111	110	80	56	41	40			
8	86	63	58	57	A	A	71	55	64	57	95	102	113	116	120	118	119	114	111	91	73	66	45	A			
9	A	45	A	A	X	90	A	A	X	X	X	X	X	X	X	X	X	X	X	X	84	A	A	A			
10	A	A	A	A	A	53	44	B	0	X	X	X	X	X	X	X	X	X	X	X	X	X	0	X			
11	84	A	55	64	58	57	56	61	63	80	86	112	117	131	127	124	120	105	115	105	82	A	125	91			
12	52	A	94	96	68	72	72	82	82	75	62	66	A	75	133	78	54	A	A	57	48	A	A	A			
13	108	88	60	A	A	A	A	A	A	A	49	A	57	54	115	86	87	86	92	A	A	A	A	94			
14	A	A	A	X	86	56	50	A	45	58	61	63	65	75	116	109	0	X	X	X	58	42	A	A			
15	95	A	87	94	90	62	53	B	41	A	0	X	B	X	108	116	111	95	81	80	61	86	A	A			
16	A	A	43	A	A	58	A	67	65	A	X	B	72	86	81	115	136	128	103	70	61	42	35	A	A		
17	79	42	47	A	A	A	0	X	A	B	B	A	A	A	B	B	B	B	B	B	A	A	A	A			
18	A	A	A	A	A	A	B	A	B	X	0	X	X	X	X	X	92	83	70	51	A	A	A	A			
19	A	A	A	0	X	63	72	49	82	54	54	60	64	68	73	87	92	95	109	54	A	B	A	A	A		
20	A	46	A	A	0	X	38	78	58	60	64	74	79	89	97	104	116	107	103	94	83	84	59	A	A		
21	A	A	A	92	91	64	89	A	82	89	97	103	109	117	115	113	110	116	107	92	66	57	70	A			
22	57	58	A	A	A	48	57	62	67	83	99	112	113	117	127	134	122	116	106	112	78	65	57	45			
23	44	A	52	A	A	70	65	70	72	78	89	102	114	125	131	128	120	91	71	61	A	A	52	52			
24	A	49	68	A	A	57	85	65	84	84	93	112	99	113	128	134	132	124	114	70	63	60	78	A			
25	59	58	A	A	A	63	61	A	A	A	B	0	66	86	106	94	79	66	83	68	A	A	A	A			
26	A	79	58	70	65	A	0	X	0	X	A	0	X	X	X	86	95	88	71	72	66	61	42	A	A		
27	A	X	49	66	86	A	X	X	X	75	73	82	85	100	110	123	127	129	93	93	93	92	74	69	59		
28	61	57	50	57	53	90	84	77	89	108	117	122	126	126	135	135	127	120	112	83	59	A	A	A			
29	A	A	62	A	73	65	46	60	84	83	86	96	107	108	118	115	127	92	88	84	89	58	47	44			
30	56	64	0	X	42	60	A	A	0	X	X	44	46	56	66	70	81	90	93	93	95	89	84	72	62	55	29
31																											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	15	14	18	17	18	22	23	21	23	24	27	26	28	29	29	29	29	28	27	27	23	16	15	12			
MED	64	58	58	64	66	62	61	61	67	74	82	92	100	108	116	115	114	103	94	82	72	57	47	49			
U Q	84	71	66	86	86	72	72	72	78	82	95	103	113	117	126	125	123	116	111	92	83	62	69	74			
L Q	57	49	51	57	57	56	53	54	57	62	63	71	76	86	108	99	95	88	76	61	59	48	34	42			

SEP. 2024 fXI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2024 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	47	R	A	A	A	57	65	73	82	85	97	97	86	F	A	A	A	A	A	
2	A	A	A	F	F	A	A	A	51	56	66	76	89	95	95	99	107	106	85	44	A	A	A	A	
3	A	A		F		39	37	33	44	47	53	54	77	89	98	106	115	126	110	96	76	42	25	20	17
4	R	F			F			F	F											R					
5	F	F	F	F	A	A	F	41	40	F	63	76	96	103	109	119	114	112	116	F	97	74	59	31	28
6	F	A	A	A		37	27	46	44	60	74	88	92	105	112	105	110	111	126	117	81	56	44	28	
7	R	A		A		A		45	53	59	72	87	103	108	107	110	117	108	112	105	100	64	37	26	22
8	A	A	A	A	A	A			49	58	51	74	90	97	110	111	112	113	108	100	F	76	67	60	36
9	A	A	A	A		A	A	A		55	68	74	81	85	97	103	99	96	95	92	74	59		A	A
10	A	A	A	A	A		A	B		56	66	81	96	104	109	109	109	107	107	92	75	66	48	28	19
11	A	A	F	A	A	F	F	F		50	72	80	106	111	125	121	118	114	R	R	99	109	99	72	
12	A	A	F	A	A		58	60	70	70	49	52	48		F	91	72	F	F	A		41	38	A	A
13	50	51	50	A	A		A	A	A		A	37		42	46	70	80	72	62	49			A	A	A
14	A	A		F		A	F	A	A		52	42	57	59	69	76	90	81	F	55	55	43	28	A	A
15	A	A		F		F	F	B			A		B		65	78	88	96	89	F	55	34		A	A
16	A	A	34	A	A		A		A		B	66	72	75	109	127	R	92	F	64	36	58	29		A
17	27	A	27	A	A	A	A		A	B	B	A	A	B	B	B	B	B	B	B	B	A	A	A	A
18	A	A	A	A	A	A	B	A	B		49	53	55	55	59	59	66	84	F	64	39		A	A	A
19	A	A	A			F		F			49	53	55	55	59	59	66	84	74	A	B	A	A	A	A
20	A	A	A	A		32	34	45	49	58	68	73	83	91	98	110	101	R	98	97	88	71	55	42	A
21	A	A	A	F	A	A	A	A	Z	72	75	87	95	103	111	109	107	R	104	103	96	81	57	33	A
22	A	A	A	A	A		38	48	54	61	77	87	103	105	111	121	128	116	110	F	F	68	47	32	24
23	A	A	A	A	A		50	50	64	66	72	83	96	108	119	125	122	114	85	47	A	A	A	A	A
24	A	A	A	A	A	A		F	61	62	68	81	93	102	122	128	126	118	64	59	48	39		A	A
25	A	46	A	A	A	F	R	A	A	A	B	B		60	76	79	77	73	55	49	F	A	A	A	A
26	A	A	F	A		46		39	33		A	B	Z		60	76	79	77	73	55	49	41		A	A
27	A		50		A		39	33			59	61	58	67	70	82	82	63	63	50	35	35	F	A	A
28		43	44	43		60	65	67	69	F	61	71	83	98	F	F		R	F	F	76	75	F	74	57
29	F	F			F	47	58	65	83	102	111	116	120	120	129	129	121	114	97	46					F
30	A	A	F	A	F	F	A	A		Z	66	74	80	86	91	95	112	109	106	82	70	70	F	F	F
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	15	11	14	17	18	19	22	24	27	26	28	29	29	29	29	28	27	25	20	16	11	7	
MED	44	46	45	47	45	45	45	49	58	67	74	84	90	98	109	109	106	90	85	71	56	36	28	24	
U Q	50	51	50	60	52	50	50	61	66	73	83	96	104	111	116	117	114	109	97	78	65	46	36	40	
L Q	36	35	36	43	37	38	40	40	51	54	57	66	70	77	86	90	89	72	60	45	48	30	26	19	

SEP. 2024 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2024 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	59	59	44	87	62	42	44	71	56	58	43	23	22	E ^B 31	G ^B 26	G ^B 26	20	17	32	45	52	48	55	45
2	53	36	49	37	21	44	70	46	47	25	28	28	G ^B 28	29	27	23	19	E ^B 16	E ^B 10	35	38	40	46	42
3	65	65	36	31	37	34	25	15	G ^B 19	33	45	36	29	29	30	31	24	35	E ^B 10	12	E ^B 11	E ^B 10	13	16
4	21	33	32	19	22	21	17	22	E ^B 25	26	30	27	29	28	28	25	26	12	15	E ^B 9	E ^B 8	E ^B 15	28	36
5	25	25	26	34	33	36	27	29	31	26	28	34	31	35	26	24	20	14	19	G ^B 12	10	E ^B 11	E ^B 12	56
6	37	44	57	47	26	15	E ^B 13	E ^B 14	21	22	24	29	28	30	28	25	22	E ^B 17	E ^B 17	E ^B 14	12	E ^B 9	15	37
7	41	77	31	27	40	61	45	42	24	24	26	35	32	36	29	30	17	29	33	12	G ^B 9	E ^B 7	56	16
8	39	37	31	31	42	56	51	45	52	45	39	37	39	34	29	27	23	19	17	10	10	12	27	35
9	35	38	77	73	48	53	52	53	52	34	37	30	34	34	30	27	23	E ^B 24	E ^B 20	E ^B 21	E ^B 16	57	30	96
10	42	36	64	61	59	43	38	E ^B 41	E ^B 28	E ^B 29	E ^B 29	31	34	31	29	22	18	22	E ^B 16	E ^B 15	12	12	11	16
11	41	40	26	25	47	25	15	16	22	30	30	32	38	32	29	35	25	18	14	15	19	36	49	29
12	44	47	34	58	49	41	37	21	E ^B 22	31	46	42	31	44	39	26	28	37	41	28	37	56	49	64
13	25	37	41	57	62	53	53	32	50	56	30	51	36	E ^B 41	E ^B 35	29	30	26	25	34	31	83	81	79
14	85	59	47	25	53	40	21	49	41	46	39	34	32	E ^B 47	E ^B 37	28	E ^B 64	27	E ^B 33	31	27	21	29	57
15	61	84	47	41	30	30	26	B	28	31	37	B	E ^B 38	E ^B 40	29	25	26	23	E ^B 38	21	38	33	65	71
16	38	45	56	71	87	44	57	46	61	49	B	E ^B 44	31	28	E ^B 85	E ^B 28	29	30	26	24	31	31	55	60
17	65	93	73	65	119	70	70	67	54	B	70	61	55	B	B	B	B	B	B	E ^B 109	48	71	35	31
18	59	49	31	96	45	54	B	37	B	E ^B 37	E ^B 31	E ^B 39	E ^B 32	E ^B 36	E ^B 33	27	25	37	22	20	29	57	61	56
19	51	22	55	57	E ^B 39	32	33	39	E ^B 36	51	43	33	27	E ^B 35	E ^B 36	26	29	E ^B 28	68	E ^B 54	26	40	103	41
20	34	32	64	31	28	25	26	E ^B 22	22	28	29	29	29	30	34	20	24	17	17	E ^B 14	13	16	38	49
21	65	81	70	48	41	56	47	65	35	27	32	30	37	31	29	28	25	18	14	E ^B 13	19	15	43	66
22	32	36	65	39	51	34	18	19	25	27	35	31	33	31	39	27	25	26	14	11	E ^B 23	19	21	15
23	30	59	34	59	54	40	33	21	28	34	37	35	31	E ^B 33	E ^B 52	31	25	29	34	44	52	43	35	31
24	34	36	43	87	34	31	31	34	25	29	28	33	33	E ^B 38	E ^B 30	52	39	31	31	41	41	38	58	75
25	45	37	35	69	55	36	19	65	41	37	B	B	E ^B 46	E ^B 33	E ^B 35	28	26	25	G ^B 31	24	56	48	80	96
26	62	55	46	52	39	47	88	30	45	B	34	31	31	31	31	30	25	28	27	23	27	31	35	63
27	46	37	44	73	58	45	29	27	42	45	40	35	37	G ^B 29	G ^B 33	G ^B 32	G ^B 34	E ^B 34	E ^B 31	23	21	23	19	21
28	33	27	24	22	33	23	23	25	26	29	31	34	37	34	32	29	27	27	27	32	37	57	46	49
29	42	107	127	59	18	30	42	51	47	42	33	39	34	E ^B 64	E ^B 34	29	29	27	30	E ^B 29	25	17	25	30
30	31	19	55	33	62	65	46	31	45	31	33	34	30	35	33	31	29	24	21	E ^B 14	G ^B 9	29	30	39
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	29	29	29	28	28	28	30	29	29	29	29	29	29	30	30	30	30	30
MED	42	39	45	50	44	40	33	33	33	31	32	34	32	32	30	28	25	25	U ^B 22	21	26	31	36	44
U Q	59	59	57	65	55	53	49	48	47	44	39	36	37	E ^B 36	E ^B 35	30	29	29	32	32	37	48	55	63
L Q	34	36	34	31	33	31	24	22	25	28	30	30	30	30	29	26	23	18	16	14	E ^B 12	15	27	31

SEP. 2024 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2024 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

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	14	11	7	7	7	10	12	9	17	15	9	16	16	31	21	19	16	15	8	6	7	8	9	8
2	11	7	15	13	9	9	13	14	11	15	24	17	25	23	12	14	15	16	10	8	8	8	9	11
3	13	16	9	11	16	9	8	7	11	24	19	25	17	16	18	15	15	13	10	9	8	10	7	7
4	6	8	6	8	7	7	11	17	25	19	21	17	16	15	15	17	11	8	9	9	8	15	17	16
5	16	14	16	16	17	14	15	18	15	15	14	10	15	12	13	11	9	7	8	8	8	11	12	14
6	12	14	12	13	10	11	13	14	9	11	10	13	14	17	12	9	12	17	17	14	9	9	8	9
7	10	13	10	14	14	9	12	12	9	9	11	9	12	10	9	7	7	6	6	7	7	7	9	8
8	9	9	8	8	10	9	10	11	14	11	11	14	14	11	16	12	8	7	7	7	7	7	8	8
9	8	10	5	9	7	7	13	14	14	16	14	15	17	16	15	16	15	24	20	21	16	32	19	23
10	22	17	23	19	18	18	23	41	28	29	29	19	15	15	14	17	14	14	16	15	12	12	11	10
11	11	11	11	9	13	9	9	12	15	24	13	14	11	11	11	11	9	8	7	7	9	9	11	5
12	9	11	9	12	11	11	11	11	9	31	15	14	23	15	18	15	14	9	8	9	7	7	8	12
13	7	10	8	16	15	10	42	14	21	16	17	33	21	28	16	19	16	8	6	7	7	9	7	13
14	9	15	25	11	24	10	9	16	15	24	16	23	23	47	37	15	64	14	33	10	15	9	7	9
15	9	8	11	9	7	13	15	B	19	16	25	B	38	40	25	17	18	15	38	7	14	8	9	8
16	7	7	7	15	9	14	16	16	24	35	B	44	17	21	85	28	17	15	18	9	9	7	9	5
17	9	8	8	9	11	7	18	31	47	B	70	51	40	B	B	B	B	B	B	109	27	19	15	16
18	17	15	21	23	21	16	B	25	B	37	31	39	32	36	27	27	25	37	22	20	15	14	9	14
19	13	13	17	17	39	16	17	23	36	24	23	28	19	35	36	21	29	28	22	54	15	16	15	15
20	14	13	15	15	15	12	15	22	19	17	18	18	18	15	16	16	16	15	17	14	13	9	11	11
21	11	15	21	16	15	19	28	23	15	16	17	15	34	17	17	18	14	10	10	13	11	8	8	10
22	16	8	16	16	12	9	7	11	13	13	13	14	14	14	14	13	12	14	8	7	23	12	11	7
23	7	7	7	15	14	8	9	5	11	11	13	11	9	19	52	28	15	15	11	16	12	9	8	7
24	7	8	10	9	7	11	22	15	13	13	14	13	21	38	22	52	39	11	12	11	8	7	7	7
25	7	17	7	19	17	11	11	37	25	16	B	B	46	23	35	16	18	15	18	10	15	12	15	9
26	11	19	13	5	9	26	17	18	23	B	21	24	17	15	15	18	15	16	16	15	11	9	9	14
27	11	14	13	15	16	13	12	13	22	29	15	17	15	19	25	18	34	34	31	9	13	9	8	8
28	8	7	8	11	7	8	11	15	18	15	16	15	15	14	12	15	15	13	10	7	8	9	8	7
29	6	17	13	15	7	11	18	15	13	11	16	23	19	64	34	23	18	10	16	11	8	7	7	7
30	10	9	9	10	19	16	13	13	13	14	23	25	16	18	15	13	13	15	13	14	7	7	8	5
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	10	11	10	13	12	11	13	15	15	16	16	17	17	18	16	16	15	14	12	10	9	9	9	9
U Q	13	15	15	16	16	14	17	22	23	24	23	25	23	31	27	19	18	16	18	14	14	12	11	13
L Q	8	8	8	9	9	9	11	12	13	14	14	14	15	15	14	14	13	10	8	7	8	8	8	7

SEP. 2024 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2024 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	A	A	A	A	A	A	A	A	A	A	A	A	264	238	230	218	232	222	226	236	A	A	A	A	A
2	A	A	A	A	A	A	A	A	A	A	244	254	242	240	240	234	210	214	220	212	A	A	A	A	A
3	A	A	214	A	A	A	E A 408	288	266	264	286	234	238	230	224	206	228	216	210	206	206	230	A	A	A
4	A	298	A	E A 394	A	A	E A 372	304	E B 256	240	222	218	208	218	218	222	224	222	204	190	208	250	294	A	A
5	242	242	A	204	A	A	A	A	288	242	248	230	232	220	218	214	222	220	188	192	194	242	B	A	A
6	266	A	A	A	A	A	B	300	250	236	236	218	230	220	214	232	222	204	206	204	204	210	230	A	A
7	A	A	E A 296	A	A	A	A	A	262	220	238	240	232	228	216	222	220	206	196	210	200	202	268	A	A
8	A	A	A	A	A	A	A	A	A	A	242	236	234	232	212	214	228	208	184	192	204	208	A	A	A
9	A	A	A	A	A	A	A	A	A	A	262	234	244	230	222	224	228	216	222	216	E B 220	212	A	A	A
10	A	A	A	A	A	A	A	B	E B 260	252	252	236	220	232	214	222	224	210	206	210	210	196	240	A	A
11	A	A	A	A	A	A	366	264	244	234	220	222	222	216	216	224	206	236	210	194	218	A	A	A	A
12	A	A	E A 318	A	A	A	A	264	236	E B 252	A	A	A	A	238	250	A	A	A	A	A	A	A	A	A
13	280	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	266	242	294	A	A	A	A	A	A
14	A	A	A	A	A	A	A	A	A	A	A	A	E A 282	B	B	286	B	236	B	252	E A 266	A	A	A	A
15	A	A	A	A	364	A	A	B	A	A	A	B	E B 294	E B 268	242	240	256	260	B	E A 334	A	A	A	A	A
16	A	A	A	A	A	A	A	A	A	A	B	B	250	242	B	E B 262	228	200	236	A	282	A	A	A	A
17	A	A	A	A	A	A	A	A	A	B	B	A	A	A	B	B	B	B	B	B	B	A	A	A	A
18	A	A	A	A	A	A	B	A	B	B	B	B	E B 242	B	A	B	244	E B 250	228	B	A	A	A	A	A
19	A	A	A	A	B	A	A	B	B	A	A	A	230	H	B	256	240	300	292	A	B	A	A	A	A
20	A	A	A	A	A	A	E A 350	B	238	224	218	228	208	208	226	218	222	216	204	200	E A 208	228	A	A	A
21	A	A	A	A	A	A	A	A	A	218	222	208	218	206	224	218	210	212	202	208	E A 216	212	A	A	A
22	A	A	A	A	A	A	340	264	246	234	236	230	214	220	A	E A 218	222	206	216	218	220	224	A	A	A
23	A	A	A	A	A	A	348	254	252	232	238	234	222	220	E B 260	228	230	252	240	A	A	A	A	A	A
24	A	A	A	A	A	A	A	A	240	238	222	224	E A 230	E B 252	240	268	254	250	248	290	A	A	A	A	A
25	A	A	A	A	A	A	246	A	A	A	B	B	B	B	B	238	238	248	274	A	0	A	A	A	A
26	A	A	A	A	A	A	A	A	A	B	A	A	E A 260	232	228	236	246	240	254	236	A	A	A	A	A
27	A	A	A	A	A	A	312	A	A	A	260	236	A	A	236	236	276	216	E B 234	224	228	252	E A 266	A	A
28	A	A	A	A	A	A	E A 286	E A 250	242	244	236	214	E A 214	228	220	230	216	214	224	268	A	A	A	A	A
29	A	A	A	A	A	A	A	A	A	H 278	A	A	A	248	B	E B 232	234	228	240	262	212	246	270	A	A
30	A	A	A	A	A	A	A	A	A	A	A	A	230	236	220	232	236	218	210	210	232	A	A	A	A
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	3	2	3	2	1		9	8	13	17	17	18	25	22	24	27	27	28	24	21	17	12	5		
MED	266	270	E A 296	299	364		U 317	264	247	239	236	232	230	227	223	229	228	220	212	210	210	222	266		
U Q	280	E A 318					E A 369	294	261	252	250	236	241	236	237	238	246	241	236	244	230	246	281		
L Q	242	214					299	259	241	233	222	222	221	220	218	218	222	213	205	202	205	209	235		

SEP. 2024 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT. 2024 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	A	A	57	92	65	47	57	142	142	A	71	77	88	92	92	96	96	95	88	83	61	38	A	A			
2	A	46	A	0	X	52	69	59	65	79	85	91	117	115	115	117	119	128	128	111	91	0	0	72	57	90	
3	0	X	0	X	61	63	65	65	79	81	86	95	103	107	115	106	111	111	104	108	95	95	61	48	59		
4	71	A	0	X	44	55	80	56	60	68	77	93	105	103	99	96	102	95	91	83	84	80	68	59	A		
5	A	A	0	X	A	A	0	X	0	X	79	82	79	85	83	85	77	85	79	81	81	85	75	70	62	45	R
6	A	A	0	X	59	58	69	78	84	78	84	88	91	95	97	89	91	102	97	91	96	86	83	61	59	57	
7	71	A	A	0	X	46	A	59	87	A	A	A	A	56	61	63	72	71	67	71	A	A	A	A	0	X	
8	A	A	88	58	A	A	R	B	A	A	B	A	0	X	B	R	51	R	R	48	A	63	75	A	A	A	
9	A	A	66	A	57	55	57	58	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
10	A	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
11	B	A	A	B	U	R	R	108	A	A	B	R	B	R	R	R	R	B	54	45	47	45	49	A	0	X	
12	43	58	A	A	51	53	55	67	69	72	71	76	81	89	81	89	121	125	107	71	76	77	51	48	A		
13	A	A	61	54	61	64	63	78	88	94	100	104	109	113	113	111	R	R	103	R	63	66	35	R	A		
14	57	85	115	83	59	88	117	111	113	118	121	120	115	113	113	103	95	99	93	86	72	72	35	A	A		
15	89	89	A	63	61	62	60	58	70	73	85	97	98	120	R	114	93	89	85	79	54	A	A	A	A		
16	60	65	45	62	64	65	68	62	57	81	78	87	78	89	106	105	88	71	R	60	A	A	A	37	A		
17	A	61	U	R	72	71	56	55	56	A	71	71	72	68	68	68	70	72	73	69	0	X	56	47	A		
18	46	59	56	88	90	A	62	63	66	67	71	76	82	82	86	87	86	77	62	46	A	A	A	53	A		
19	0	X	A	A	A	56	A	A	A	A	A	A	0	X	X	0	X	X	X	X	55	54	53	A	A		
20	A	A	67	75	48	A	53	51	65	71	75	81	80	78	76	75	71	73	68	67	63	55	57	59	A		
21	49	A	A	A	58	64	77	84	91	90	87	85	89	89	89	89	81	81	79	75	74	65	57	A	A		
22	A	60	58	57	62	68	66	73	A	70	85	93	96	96	113	114	104	97	70	A	A	53	A	A	A		
23	56	64	84	73	62	62	69	53	64	73	83	84	84	85	88	88	94	89	88	75	75	71	57	67	A		
24	59	68	A	71	70	70	A	A	A	B	R	72	70	80	82	82	79	74	74	72	65	59	58	A	A		
25	A	61	A	59	67	74	86	95	96	101	102	95	95	89	88	85	86	85	85	77	73	73	66	62	A		
26	59	A	61	64	70	81	85	92	88	97	101	97	98	101	95	94	93	88	84	72	58	60	A	A	A		
27	A	A	B	B	B	B	B	B	B	R	R	R	R	B	B	R	B	B	B	B	B	B	B	B	A	A	
28	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R	R	R	R	R	B	R	B	B	B	A	A	
30	R	59	51	B	B	B	B	B	B	B	B	B	R	B	B	69	67	64	R	R	B	B	R	45	X		
31	49	52	57	R	B	B	67	66	81	87	85	83	82	82	77	79	75	75	76	73	72	58	R	48	A		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	14	14	18	18	20	21	23	22	19	20	22	22	26	23	21	25	23	24	24	21	21	20	15	11			
MED	56	61	58	62	62	65	65	70	81	83	85	86	84	89	89	89	88	83	81	75	70	61	57	57			
U Q	60	65	66	75	68	72	84	84	88	92	95	97	98	101	106	108	96	93	88	84	76	70	58	62			
L Q	47	59	56	58	58	58	57	60	66	72	75	77	72	80	80	77	75	72	70	68	62	56	47	45			

OCT. 2024 fXI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT. 2024 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	U R	U R	F	F	U R	A	A		62	71	75	80	82	90	87	88	F	F	53	21	A	A
2		A	U R	A	36	41	57	52	58	U R	J R	84	105	109	107	109	113	122	119	100	85	71	64	43	34
3		41	56	38	49	48	55	60	71	73	80	89	96	101	107	U R	98	103	106	V	F J	R J	F	F	A
4		U R	57	A	U R	53	38	49	74	45	52	62	68	81	98	97	92	89	95	89	84	77	78	F	A
5		A	A	U R	A	A	U R	42	53	69	73	73	73	77	77	71	77	72	74	74	79	69	64	54	29
6		A	A	53	52	53	64	70	75	77	80	85	89	J R	88	83	85	95	91	85	90	78	J R	F	U R
7		U R	A	A	U R	A	A	U R	A	A	A		41	A	50	55	57	66	65	57	58	A	A	A	A
8		A	A	U R	63	28	A	A	R	B	A	B	B	A	37	B	39	45	U R	51	42	A	U R	U R	A
9		A	A	U R	A	F	F	51	40	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
10		A	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
11		B	A	A	B	F	U R	A	A	B	R	B		40	40	R	F	B	F					A	U R
12		36	35	A	A	39	40	49	63	61	66	64	69	75	83		115	115	Z	F	64	69	70	44	39
13		A	A	U R	53	47	54	55	56	69	77	85	89	97	102	105	105	103	108	109	99	84	56	58	45
14		F	34	U R	U R	U R	72	94	102	101	110	115	104	106	105	107	Z	Z	Z	87	94	83	77	62	58
15		U R	75	62	A	A	51	53	51	46	61	66	75	82	93	113	116	106	81	78	76	58	A	A	A
16		U R	53	57	30	51	59	51	51	56	52	67	61	68	69	83	95	96	79	64	58	51		A	30
17		A	U R	55	40	71	64	60	50	49	56	A	63	64	65	62	62	61	62	65	65	59	63	47	33
18		A	39	50	47	67	67	A	54	53	59	62	62	68	76	73	79	80	79	70	56	38	A	A	47
19		F	37	A	A	A	45	A	A	A	A	A	B	J R	57	67	68	62	58	48	45	46	A	U R	A
20		A	A	U R	55	68	48	A	44	59	59	66	68	74	73	71	71	64	64	65	61	59	54	46	45
21		U R	35	A	A	A	52	56	65	75	83	84	82	79	83	83	83	82	75	73	73	69	67	58	44
22		A	U R	47	49	49	56	61	60	66	A	65	68	77	72	80	99	108	98	89	61		A	A	47
23		U R	49	57	54	54	55	54	62	47	53	66	71	77	76	79	81	82	J R	J R	J R	68	67	62	49
24		U R	53	49	A	58	60	56	A	A	A	B	57	65	64	71	75	74	71	67	66	67	57	47	45
25		A	51	F	A	F J	R Z	Z	J R	88	94	95	88	87	83	81	77	79	78	78	70	66	65	58	54
26		J R	53	A	F	U R	J R	73	75	76	81	91	93	91	91	95	87	88	87	81	77	65	45	U R	A
27		A	A	B	B	B	B	B	B	B	B	R	R	R	R	B	B	B	B	B	B	B	B	B	B
28		A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
29		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
30		R	51	45	B	B	B	B	B	B	B	B	B	B	B	B	B	F	F	59	71	54	B	U R	45
31		43	45	49	47	B	B	61	63	76	81	78	76	76	75	73	73	69	67	70	67	F	F	Z	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		13	14	17	19	20	21	21	21	18	19	23	22	27	24	24	28	25	27	26	24	18	19	16	10
MED		49	50	52	51	54	56	54	63	70	73	73	77	76	82	82	81	79	74	72	68	64	53	44	42
U Q		U R	53	56	54	67	60	62	64	73	77	84	85	91	91	94	96	96	90	85	79	77	67	58	46
L Q		38	45	46	47	48	50	51	50	59	66	62	69	64	71	74	65	70	65	61	58	56	47	40	34

OCT. 2024 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT.2024 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	49	85	39	31	29	30	G	33	53	46	G	G	G	G	G	G	G	G	G	7	K	K	25	27	
2	27	29	30	31	36	23	G	43	39	G	41	G	G	38	35	G	BE	BE	BE	BE	BE	20	18	23	15
3	31	17	32	35	45	41	35	24	27	26	25	35	32	33	34	G	G	23	G	18	14	19	28	40	
4	38	91	47	13	19	47	G	48	46	G	G	39	40	39	35	33	33	27	G	K	K	35	35	48	
5	36	58	42	63	67	39	35	G	35	28	28	35	36	35	37	G	G	G	G	GE	BE	B	K	K	
6	32	54	45	37	28	23	G	G	G	G	G	G	34	33	13	12	12	13	10	11	K	K	44	43	
7	40	62	70	19	60	38	36	70	69	61	46	62	G	35	32	35	G	31	29	49	64	65	57	59	
8	51	45	34	20	35	36	G	B	71	BE	B	74	142	G	B	G	GE	BE	B	G	49	29	33	82	114
9	55	69	27	78	31	G	31	G	61	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
10	65	B	B	74	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
11	B	51	53	BE	B	83	32	G	K	62	B	K	B	32	36	36	G	B	G	35	35	27	32	43	23
12	K	25	56	44	31	31	28	BE	BE	B	29	33	34	32	G	BE	B	BE	B	G	39	27	20	21	K
13	63	61	37	27	45	G	30	G	31	G	34	33	35	34	G	33	42	24	G	GE	BE	BE	BE	B	K
14	K	K	27	38	62	39	G	27	30	BE	B	34	G	G	32	31	G	G	G	G	K	K	K	K	K
15	62	15	58	42	35	28	28	G	G	48	43	G	45	39	40	43	G	G	26	25	41	57	48	47	
16	35	45	19	21	28	31	33	BE	B	G	51	49	39	35	G	33	G	30	47	30	52	48	37	24	
17	57	35	22	29	30	41	37	G	62	63	47	35	37	34	31	32	29	26	G	23	16	12	13	71	
18	42	45	43	47	37	62	36	G	55	45	G	G	G	G	33	G	G	G	25	32	43	61	59	48	
19	31	70	53	38	48	39	58	59	67	61	47	BE	BE	BE	B	G	GE	B	G	28	G	40	36	71	57
20	68	69	38	46	37	46	37	37	37	47	36	G	G	G	G	G	30	G	G	G	19	18	20	35	
21	24	45	61	54	48	G	25	29	31	33	G	36	35	35	33	G	G	G	G	G	18	11	14	58	
22	30	30	39	38	46	51	G	G	59	G	46	44	36	37	39	34	32	G	G	39	56	114	42	55	
23	41	43	40	38	15	23	27	41	47	57	44	37	48	36	G	G	35	G	G	G	21	25	30	29	
24	69	17	37	31	46	47	70	56	47	BE	B	50	G	36	36	G	G	G	26	23	17	31	52	BE	
25	67	22	44	38	42	G	G	G	G	G	G	44	37	39	34	38	37	34	26	18	13	11	11	9	
26	13	59	30	50	25	G	39	G	G	38	49	43	43	41	G	32	G	G	G	G	G	33	70	55	
27	30	61	B	B	B	B	B	B	BE	BE	BE	BE	BE	B	BE	B	B	B	B	B	B	B	B	B	52
28	72	71	61	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	BE	BE	BE	BE	BE	BE	B	B	B	B	55
30	34	BE	BE	B	B	B	B	B	B	B	B	BE	B	B	BE	BE	BE	BE	BE	BE	B	BE	BE	BE	B
31	BE	BE	BE	BE	B	B	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	B
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	29	29	28	26	25	25	26	25	26	23	26	24	27	24	25	28	26	27	26	27	25	25	26	28	
MED	38	45	39	38	36	32	28	29	39	34	37	34	34	34	23	22	28	13	GE	GE	20	22	30	42	
U Q	60	62	50	46	47	41	36	44	59	48	47	41	41	38	36	36	35	31	27	35	39	36	44	55	
L Q	30	28	33	31	30	23	G	G	G	G	G	G	G	G	G	G	G	G	G	G	15	16	21	28	

OCT.2024 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA

STATION SHOWA-ST.

OCT.2024 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	12	22	9	11	10	15	15	16	15	12	24	17	16	15	12	14	15	14	11	5	6	7	8	6
2	7	7	6	7	6	11	15	5	11	14	13	15	15	14	12	14	39	34	27	25	20	13	15	15
3	12	7	9	12	9	10	7	9	9	9	13	15	15	14	15	16	13	10	8	11	8	9	8	7
4	13	5	11	7	8	13	16	14	14	21	16	15	16	14	13	10	11	9	7	6	7	7	6	7
5	9	14	15	12	16	11	11	11	13	12	13	28	23	16	13	12	14	10	10	7	12	8	7	5
6	8	17	10	11	11	10	11	11	9	11	12	12	12	12	8	7	7	7	6	7	7	7	8	8
7	7	13	12	8	12	13	7	14	17	16	16	38	24	21	14	19	15	15	14	12	7	11	5	11
8	9	9	15	8	15	14	41	10	7	24	74	24	19	25	28	33	33	21	18	15	14	15	15	15
9	14	9	9	13	17	17	16	25	24	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
10	48	B	B	49	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
11	B	41	18	B	83	23	65	28	41	B	77	B	28	36	31	23	B	20	19	23	15	15	14	10
12	9	11	23	14	16	16	22	33	30	17	21	19	23	18	B	75	16	28	17	19	16	15	12	13
13	16	14	12	16	19	16	15	15	15	17	15	16	16	14	15	13	13	15	15	15	15	19	11	8
14	9	8	10	19	16	15	15	15	15	38	18	19	24	18	16	15	10	13	15	14	12	9	7	9
15	8	7	11	12	15	12	11	13	15	15	23	23	45	39	40	43	15	13	14	25	10	13	18	13
16	15	16	7	9	9	15	15	37	16	16	18	17	19	26	25	33	14	11	47	15	10	18	7	8
17	15	8	8	10	25	25	37	15	29	15	23	16	18	29	23	15	11	16	14	15	11	7	7	7
18	9	14	6	9	10	15	16	20	15	23	23	16	16	14	13	15	14	15	12	22	14	7	7	8
19	7	12	16	9	15	9	15	15	15	18	25	B	54	33	15	23	28	12	6	17	8	7	13	18
20	10	11	7	17	17	15	13	15	15	47	36	21	24	19	14	12	9	14	11	10	7	8	7	8
21	8	12	16	14	11	13	11	11	11	13	13	14	15	15	15	14	14	10	9	14	11	9	7	9
22	11	11	21	16	23	16	9	17	16	15	18	16	19	37	39	34	32	8	12	12	9	8	6	7
23	7	7	7	6	6	7	6	9	15	17	17	16	17	15	12	15	10	16	16	17	10	6	7	7
24	7	7	14	6	21	12	13	39	21	B	50	23	17	19	18	16	15	13	11	8	13	10	7	8
25	7	9	18	12	24	15	13	11	11	9	13	13	13	13	15	10	9	8	7	6	7	7	11	9
26	7	10	9	16	10	12	13	13	15	15	49	43	22	22	15	19	14	11	9	15	16	17	15	16
27	15	18	B	B	B	B	B	B	B	48	52	49	45	B	B	51	B	B	B	B	B	B	B	39
28	49	37	42	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
30	29	35	34	B	B	B	B	B	B	B	B	B	48	B	B	51	49	47	47	43	B	B	B	35
31	24	26	34	38	B	B	47	45	39	39	38	39	41	40	36	33	37	35	37	34	38	32	25	23
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	10	12	12	12	16	15	15	15	15	17	23	21	22	21	16	19	15	15	14	15	12	11	11	9
U Q	15	18	21	19	25	23	41	39	30	B	52	49	45	40	40	43	39	34	37	25	20	19	18	18
L Q	8	8	9	9	10	12	11	13	15	15	16	16	16	15	14	14	13	11	10	11	8	7	7	8

IONOSPHERIC DATA STATION SHOWA-ST.

OCT. 2024 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	E A	E A	A	A	A	A	E A	A	256	236	228	224	H	220	240	228	224	208	212	206	E A	A	A
2	A	A	A	A	E A	A	378	270	600	288	256	236	230	230	222	222	H	216	230	230	208	204	216	220	212	250	288
3	E A	248	224	A	A	A	412	386	268	228	240	234	232	222	216	224	224	228	170	224	212	228	E A	E A	A	A	
4	A	A	E A	364	304	252	E A	Q	A	340	252	244	244	230	232	240	230	222	228	228	216	198	398	E A	A	A	
5	A	A	E A	A	A	E A	A	592	544	298	260	248	236	250	E A	246	240	236	234	234	244	230	228	222	214	272	A
6	A	A	546	464	410	396	302	254	228	234	234	236	E A	234	238	222	230	230	240	232	222	268	348	350	374	A	
7	A	A	A	288	A	420	324	A	A	A	E A	A	A	292	A	252	254	252	336	274	234	294	A	A	A	A	A
8	A	A	E A	414	318	A	A	E B	B	A	B	B	A	290	B	250	288	330	360	356	A	U	R	A	A	A	
9	A	A	Q	A	A	Q	310	350	348	278	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
10	A	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
11	B	A	A	B	Q	R	Q	A	A	B	B	B	E B	208	298	R	260	B	Q	590	E A	E A	E A	A	A	A	
12	386	356	A	A	E A	400	470	282	E B	E B	248	238	220	218	210	212	B	E B	334	236	232	206	E A	E A	E A	A	
13	A	A	Q	E A	E A	390	366	268	230	220	212	230	214	232	218	218	224	230	224	216	210	236	272	A	A	A	
14	E A	A	A	A	A	372	384	290	242	224	224	208	224	218	214	224	228	216	216	216	214	210	228	422	A	A	
15	A	248	A	A	A	E A	E A	E A	Q	Q	E A	E A	E A	E B	388	262	246	240	230	168	234	244	A	A	A	A	
16	Q	E A	E A	E A	242	336	370	360	290	342	312	284	244	246	236	230	238	238	E A	E B	E A	A	A	E A	A	178	
17	A	Q	A	Q	Q	358	394	286	610	636	E A	E A	E A	254	236	248	240	232	232	244	228	228	220	228	262	A	
18	E A	436	492	394	436	346	A	498	368	A	382	240	198	220	228	220	236	234	174	260	434	A	A	A	E A	A	
19	E A	264	A	A	A	E A	A	A	A	A	A	A	B	522	240	238	240	266	254	280	264	A	E A	A	A	A	
20	A	A	E A	A	A	A	A	E A	E A	E A	A	260	238	236	220	224	238	242	244	236	234	236	240	268	A	A	
21	E A	290	A	A	A	476	392	260	246	230	220	232	222	210	220	224	228	218	238	240	232	230	218	222	A	A	
22	A	A	A	A	A	A	A	Q	A	A	E A	E A	E A	218	244	232	228	234	244	330	Q	Q	A	A	A	A	
23	A	A	A	A	A	A	E A	A	A	E A	E A	E A	E A	244	220	228	224	238	244	228	220	222	222	292	272	A	
24	E A	330	268	A	342	A	386	A	A	A	B	E B	578	252	276	244	242	236	236	234	250	244	242	242	308	A	
25	A	348	A	E A	E A	420	298	244	206	236	228	226	230	212	204	220	228	234	E A	222	228	222	234	228	244	A	
26	282	A	296	462	322	290	290	282	218	236	360	280	248	236	238	234	232	242	246	250	Q	Q	Q	A	A	A	
27	A	A	B	B	B	B	B	B	B	E B	E B	E B	E B	B	B	B	B	B	B	B	B	B	B	B	B	A	
28	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
30	R	E B	E B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
31	E B	E B	E B	E B	B	B	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 B	E B	E B	E B	E B	E B	E 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	11	11	14	16	16	20	23	18	16	19	23	22	27	24	24	28	26	27	26	24	18	19	16	9			
MED	318	329	353	306	347	381	307	273	232	238	232	233	228	230	228	232	232	237	232	224	221	227	266	280			
U Q	364	378	394	449	402	404	386	324	294	312	286	252	252	242	241	250	240	250	280	257	242	340	316	371	A		
L Q	264	268	296	288	329	335	284	254	226	236	230	224	220	220	223	229	228	228	224	218	220	224	256	258			

OCT. 2024 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV. 2024 f_{XI} (0.1MHz)

45°E MEAN TIME (G.M.T. + 3 H)

LAT. 69°00.4'S LON. 039°35.4'E P 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 52	71	59	67	49	54	64	71	X 64	X 67	X 74	X 78	X 79	X 79	X 79	X 79	X 83	X 79	X 75	X 71	X 72	X 67	X 59	X 53
2	X 55	X 56	X 65	X 69	X 75	X 85	X 93	X 103	X 103	X 101	X 101	X 102	X 102	X 102	X 101	X 109	X 89	X 67	X 61	X 63	X 59	X 63	X 42	X 44
3	R	R	X 55	A	59	56	63	64	X 64	69	62	X 68	X 66	A	X 69	X 69	X 72	X 74	X 71	X 72	X 69	X 66	X 61	X 52
4	49	57	61	73	59	67	A	59	A	71	75	74	77	X 78	X 78	X 75	X 71	X 68	X 66	X 63	X 65	X 66	X 61	X 59
5	X 55	67	A	A	61	70	X 85	97	94	112	94	104	X 98	X 101	X 102	X 95	X 94	X 88	X 80	X 67	X 58	X 56	A	A
6	64	70	68	59	70	A	X 65	59	A	68	72	66	X 76	X 78	X 81	X 80	X 74	X 68	X 61	X 58	X 59	X 54	X 56	X 57
7	61	66	A	X 67	72	83	X 88	X 94	X 105	X 103	X 101	X 101	X 101	X 98	X 99	X 97	X 95	X 88	X 84	X 74	X 66	X 63	X 66	A
8	62	93	65	74	65	64	74	83	84	82	87	83	79	79	75	73	75	71	71	71	66	64	57	A
9	A	A	X 59	A	A	A	A	A	A	A	A	A	A	A	X 45	X 71	A	A	X 46	A	X 38	57	53	X 48
10	A	52	A	A	71	A	A	A	A	51	A	53	46	63	64	72	69	46	A	A	A	72	B	A
11	54	49	X 46	A	X 55	X 59	61	A	X 49	X 62	X 61	X 64	X 63	X 71	X 73	X 73	X 71	X 68	X 66	X 55	X 54	X 57	X 60	X 58
12	X 58	X 51	X 52	X 60	X 60	X 69	X 64	X 73	X 77	X 85	X 88	X 87	X 100	X 89	X 87	X 85	X 79	X 76	X 74	X 69	X 61	X 56	X 55	X 57
13	X 49	X 51	X 55	X 64	X 73	X 66	A	57	X 59	X 93	X 93	X 89	X 85	X 81	X 77	X 74	X 74	X 71	X 65	X 58	X 59	X 51	X 51	X 45
14	57	X 57	X 64	X 67	X 73	X 75	X 95	X 78	X 64	X 90	X 89	X 87	X 85	X 84	X 77	X 76	X 76	X 69	X 56	A	A	A	A	X 46
15	A	55	X 72	X 61	X 65	A	A	A	A	A	X 63	X 61	X 69	X 71	X 75	X 79	X 71	X 57	X 59	A	A	A	A	X 55
16	53	48	X 71	X 51	A	A	A	A	A	A	A	X 61	X 73	X 76	X 73	X 69	X 72	X 67	X 64	X 61	X 59	X 58	X 61	X 59
17	X 61	62	X 69	X 76	83	87	X 97	X 97	X 104	X 112	X 99	X 109	X 104	X 103	X 97	X 94	X 92	X 74	X 72	X 80	X 66	X 64	X 67	X 56
18	64	56	62	62	69	67	X 73	X 63	X 72	X 85	X 84	X 85	X 88	X 92	X 95	X 93	X 93	X 85	X 85	X 75	X 71	X 71	X 57	X 52
19	57	X 47	X 57	A	71	69	X 79	X 84	X 89	X 87	X 86	X 85	X 88	X 89	X 97	X 101	X 83	X 60	X 54	X 58	X 57	A	57	X 55
20	66	63	60	60	39	67	X 69	A	X 65	X 75	X 89	X 84	X 81	X 85	X 96	X 92	X 73	X 69	X 61	X 57	X 57	X 55	X 54	X 56
21	X 59	59	X 59	X 85	X 73	X 81	X 92	X 91	X 96	X 96	X 103	X 101	X 93	X 94	X 87	X 79	X 78	X 75	X 67	X 74	X 67	X 55	X 55	X 51
22	A	A	A	54	55	48	B	B	65	X 81	X 85	X 71	X 71	X 69	X 70	X 69	X 67	X 61	X 54	B	B	B	42	A
23	A	54	A	A	46	56	44	55	X 55	X 74	X 75	X 75	X 74	X 71	X 65	X 66	X 63	X 53	X 56	X 56	X 63	X 63	X 59	X 48
24	57	A	55	52	64	72	46	42	X 63	X 51	X 67	X 66	X 67	X 69	X 68	X 71	X 67	X 69	X 68	X 66	X 66	X 68	X 62	X 56
25	61	71	A	A	53	58	46	A	X 55	X 61	X 57	X 62	X 63	X 65	X 69	X 71	X 65	X 54	X 55	X 59	X 61	X 55	X 50	X
26	X 59	X 56	X 56	X 61	X 51	X 59	A	X 61	X 71	X 69	X 69	X 71	X 69	X 71	X 69	X 67	X 67	X 66	X 66	X 66	X 66	X 68	X 61	X 59
27	57	A	A	A	X 63	X 71	X 75	X 78	X 83	X 83	X 83	X 90	X 83	X 77	X 75	X 77	X 75	X 73	X 73	X 68	X 69	X 67	X 65	X 55
28	61	63	A	65	60	68	68	63	X 74	X 74	X 77	X 72	X 77	X 75	X 73	X 75	X 69	X 71	X 64	X 64	X 61	X 63	X 61	X 61
29	X 59	60	X 63	66	62	64	X 73	X 72	X 85	X 89	X 78	X 81	X 83	X 81	X 83	X 76	X 74	X 73	X 69	X 70	X 69	X 67	X 61	X 59
30	X	X 67	67	49	B	A	X 47	X 66	X 68	A	72	66	59	72	73	69	67	65	68	65	67	65	64	62
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	25	23	22	27	23	22	24	22	25	27	29	29	29	30	30	29	29	29	26	26	26	26	25
MED	58	57	X 60	63	63	67	X 71	68	X 74	X 81	X 83	X 78	X 79	X 78	X 76	X 76	X 74	X 69	X 66	X 66	X 64	X 63	X 58	X 55
U Q	61	66	X 65	67	71	72	X 85	84	X 89	X 91	X 90	X 89	X 88	X 89	X 87	X 85	X 81	X 74	X 72	X 71	X 67	X 67	X 61	X 58
L Q	55	53	X 55	X 59	56	59	63	60	X 64	X 68	X 72	X 66	X 69	X 71	X 71	X 69	X 70	X 66	X 61	X 58	X 59	X 57	X 55	X 50

NOV. 2024 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA

STATION SHOWA-ST.

NOV.2024 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	47	42	59	58	49	45	57	71	59	63	68	72	73	72	73	73	77	71	66	65	65	61	53	46	
2	44	49	56	63	66	79	87	97	97	95	94	95	95	95	95	94	78	63	54	55	53	51	36	37	
3																									
4	39	47	61	66	52	61		53		62	67	67	71	73	72	69	65	62	58	56	59	58	54	49	
5	49	61			54	64	72	78	74	79	84	88	93	94	93	87	85	81	72	61	51	51			
6	53	59	56	53	57		58	53		61	63	60	72	73	75	75	68	61	55	51	53	43	43	51	
7	52	51		63	66	77	82	85	97	95	94	95	95	91	93	89	87	81	76	69	58	54	60		
8	53	74	52	49	50	55	68	68	79	77	81	77	73	72	69	66	67	64	61	64	59	57	53		
9			52																						
10		38			71				46			45	40	56	61	62	63	40							
11	44	44	39		49	44	50		43	55	55	58	57	65	67	67	64	63	58	49	39	47	55	51	
12	51	45	43	49	54	64	58	65	70	76	80	82	82	83	81	77	73	69	66	61	54	46	47	53	
13																									
14	41	51	57	61	65	62	75	69		58	79	80	71	73	77	73	69	70	61	49				40	
15		49	66	48	48						57	57	65	64	69	73	61	48	53					52	
16	40	43	53	44									53	66	71	65	63	65	59	57	54	53	52	54	53
17	54	53	63	70	77	74	83	79	86	91	83	87	92	91	85	85	84	67	65	73	59	57	61	50	
18	58	50	56	53	61	58	66	54	66	72	74	78	81	86	87	85	85	77	77	66	63	57	49	41	
19	49	41	53		71	58	71	78	72	76	79	78	83	85	79	84	75	54	46	47	52		52	45	
20	43	52	54	55	34	61	61		59	63	74	72	76	75	74	75	61	63	55	49	49	47	47	50	
21	44	45	53	72	65	69	85	81	87	83	88	93	84	87	81	72	72	69	60	64	61	47	46	47	
22																									
23																									
24	51																								
25	51	52																							
26	54	49	49	49	45	54		55	65	63	63	64	63	64	62	62	61	60	59	58	58	62	53	48	
27	43				56	64	69	71	75	76	81	83	77	72	69	71	69	67	66	61	61	59	57	46	
28	46	47		53	51	59	53	56	61	66	66	65	72	69	67	69	65	63	59	54	55	56	54	53	
29	53	55	56	52	56	57	61	66	77	83	72	74	77	74	77	70	67	65	62	64	63	61	50	53	
30		61	59	43			42	61	44		60	60	53	65	67	63	60	57	61	58	60	58	58	54	
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	25	23	22	27	23	22	24	22	25	27	29	29	29	30	30	29	29	29	26	26	26	26	25	
MED	49	49	53	53	54	59	61	63	66	72	72	68	72	72	70	70	67	63	59	58	57	55	52	47	
U Q	53	52	57	61	65	64	72	74	77	81	81	81	82	84	79	75	74	68	64	64	60	59	54	52	
L Q	43	45	48	49	49	54	53	53	58	62	63	60	64	64	65	63	62	58	54	53	52	47	47	42	

IONOSPHERIC DATA

STATION SHOWA-ST.

NOV.2024

ftEs (0.1MHz)

45°E MEAN TIME (G.M.T. + 3 H)

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

D\H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	41	21	43	29	36	28	39	35	36	37	95		G	G	G		G	G	G	G	31	28	32	5	16
2	17	16	17	24	25	25	26	31					G	G	39	59		G	31		G		23	29	42
3	42	64	43	43	18		G	G		32	32	37		G	G	85	49	62	32	31		G	G		G
4	19	43	47	29	33	35	66	45	64	55	37		G	38	37	38		G	G	G	G	17	11	21	23
5	31	35	91	43		G	G	G		G	G	G	G	41	38		G	G	G	G	G		43	51	51
6	47	48	39		34	86		81	51	54	41	43	53	37	37		G	G	G	G	G		27	31	31
7	31	46	84			G		53	41		G	G	G	G	43	35		G	G	G	28	G	52	47	77
8	45	60	19	47	41				48	35	41	43	40	133					34				23	46	69
9	46	39	46	49	69	59	37		54	72	63	55		G	G	111	43	36		44		69	61	46	
10	54	29	86	65	31	69	45	51	53	59	54	41		G	G	G	G	37		47		17		69	
11	40	92	78	76	38		G	50		G	G	G	G	49		G	G	G	G	G	25		38	34	28
12	36	29	80	52	47			47	44		G	G		G	G	G	G	G	G	G		37	29	34	
13	35	35	44		83		G	58	44		G	G		G	G	G	G	G	G	G	G	G	G		36
14	36	30	33		G	G	G	G		61	50	39	40	39		G	G	G	G	G	G		91	55	77
15	47	35	52	42	55	69	44	59	83	69			G	38	38	31		G	G	G	69	68	58	47	41
16	38	32	59		G	88	39	52	110	55	54		G	38	38		G	G	G	30		G	17	17	
17	21	5			G	G	G	G		47	37	45	41		46		42	47	31		G		43	73	31
18	32	38		67	53	49		G	G	38		G	G	G	G	109		33		G	G	G	G	G	28
19	44	66	38	48	37	38	47			G	38	38		G		36	36	34		36		87	89	G	28
20	35	24	28		G		27	40	39	41	55	41	37	37	37	40		31	33	G	G	G	G	G	37
21	38	37		G	G		35	33	35	38	38	35	35		41		G	G	G	G	G	G	G	G	45
22	61	62		38	44	45		52		48	53	49	45	41	38	37	41	45	40		G	G	G	29	68
23	40			55		G		45		G	G	G		42	39	36	35	35		G	G		G	G	37
24	41	87		G	G	G	G		34	51	74	39	43	44	42	43	39		G	G		G	G	G	G
25	26			67	57	45	37	43	48	51	39	43		45	41	38	36	41	35	38	31		G	G	G
26	49	43	53		G	70	62	47		41	41	41	44	43	46	37	35	37	35		G	G	G	G	G
27	G																								
28	G	57	55	55	43	44	36	40	39	42	43	65	61	62	52	46	41	47		31		G	G	G	
29	G	G		57	47	43	37	43	37	45	42	41	43	41	45	55	56	39	38	43	31	33		35	G
30			31		G	G			34	38	38	39	63	49	45	45	57	41	39		G	G	G	G	G
31					G	B			59	42	47	107	53	43	40	37		42	37	36	37				
CNT	30	30	30	30	29	29	29	30	29	30	30	30	30	30	30	30	30	30	30	29	29	29	29	30	
MED	38	36	44	29	33	28	35	39	44	38	38	38	38	38	38	37						11		31	
U Q	45	48	57	48	44	54	44	47	52	54	43	43	44	42	43	40	36	35		G	G		40	40	45
L Q	31	24	31																						

IONOSPHERIC DATA STATION SHOWA-ST.

NOV. 2024 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	19	21	24	23	36	27	39	35	36	37	28	24	22	24	22	17	27	25	24	31	28	32	5	16
2	17	16	17	24	25	18	16	15	17	15	16	19	17	39	59	18	15	31	15	16	18	15	18	16
3	17	64	14	15	18	15	15	15	16	15	16	15	15	17	15	15	13	13	15	14	16	14	15	9
4	8	20	16	13	9	15	15	15	26	15	15	19	38	29	15	17	15	15	16	15	17	11	8	7
5	7	7	16	18	12	9	16	14	15	14	17	15	41	38	15	16	19	19	15	10	9	11	9	16
6	7	7	11	7	8	6	15	9	14	15	17	43	53	37	37	15	14	15	18	13	7	11	7	9
7	13	7	9	25	12	14	15	14	15	14	23	31	17	27	43	35	16	14	13	28	11	14	12	9
8	9	8	8	11	7	8	13	11	13	13	7	12	14	16	14	14	11	7	6	6	9	7	9	9
9	9	9	14	5	10	14	8	8	9	11	12	15	37	22	12	12	11	9	11	10	10	9	7	8
10	7	8	33	9	7	15	8	13	12	11	15	15	26	21	23	18	15	11	9	9	7	7	B	12
11	7	11	7	8	6	7	12	11	16	16	15	16	49	24	21	14	14	9	7	25	9	6	6	7
12	7	14	15	16	15	7	11	13	13	14	11	14	15	16	14	13	12	15	11	8	10	9	9	12
13	11	14	8	24	9	13	16	15	11	17	15	13	12	11	13	14	10	7	11	9	7	14	7	5
14	7	13	12	9	14	19	5	12	13	13	15	14	15	16	16	13	14	15	7	7	9	10	7	7
15	13	9	9	7	6	7	11	12	14	13	16	25	21	20	23	15	13	9	8	14	9	8	8	6
16	6	7	15	9	38	15	15	15	15	16	17	16	38	38	31	16	9	15	14	25	13	13	17	14
17	14	5	15	7	7	9	9	13	16	15	27	23	19	23	15	18	9	19	28	27	18	19	15	7
18	11	15	7	13	11	11	9	13	16	15	12	13	9	9	15	15	15	9	9	6	7	14	8	9
19	8	8	14	17	16	17	14	9	8	9	12	38	15	22	16	12	9	16	10	9	7	8	7	6
20	7	7	7	7	7	7	9	13	15	13	14	16	11	15	15	15	15	7	12	7	6	5	7	7
21	8	7	7	13	12	6	7	7	9	9	12	16	21	17	14	16	19	15	9	7	6	6	6	19
22	17	29	38	44	45	B	B	52	B	48	53	49	45	41	38	37	41	45	40	B	B	B	29	25
23	23	24	23	20	15	16	6	16	17	15	16	15	15	15	5	17	15	14	18	15	13	10	11	9
24	15	13	11	9	7	7	12	13	12	15	14	14	14	13	11	12	10	12	9	9	6	7	6	7
25	7	7	15	19	13	9	11	11	13	11	14	25	15	11	13	16	15	12	11	9	7	8	6	7
26	14	13	15	15	7	12	11	13	11	12	12	12	12	10	14	15	14	11	7	5	6	6	6	6
27	7	14	15	13	9	8	7	9	7	9	9	11	11	12	10	13	12	9	7	6	7	5	6	7
28	7	6	12	9	9	7	11	9	12	12	11	11	12	9	9	10	9	9	9	7	6	6	6	6
29	6	6	6	7	6	11	10	11	9	9	9	9	13	11	11	13	14	15	14	12	10	10	6	7
30	7	6	7	6	B	17	10	11	9	13	15	15	14	16	15	15	9	9	11	11	13	14	12	12
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	9	14	13	10	12	11	13	14	14	15	15	15	17	15	15	14	14	11	10	9	10	8	8
U Q	14	14	15	18	15	15	15	15	16	15	16	23	26	24	22	17	15	15	15	15	13	14	12	12
L Q	7	7	8	8	7	7	9	11	11	12	12	14	14	13	13	13	11	9	9	7	7	7	6	7

NOV. 2024 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV. 2024 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	E B	E A	E A	E B	E B	E B	E B	E B	E B	E B	E B	E B	E A	E A	E A	E A	E A	E A	E A	E B	E B	E B	E B	
2	354	308	446	310	414	352	432	280	250	258	240	236	222	222	256	230	240	244	250	264	262	264	270	320	
3	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	
4	294	318	318	332	304	282	252	246	228	228	216	214	224	250	436	264	270	252	278	246	272	300	420	508	
5	544	234	242	452	272	294	268	236	258	230	228	240	232	262	232	242	240	248	242	242	248	242	242	278	260
6	248	491	486	306	300	222	348	558	216	252	254	240	224	236	238	242	282	246	278	262	270	296	270	296	
7	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	
8	352	278	406	394	270	272	240	238	220	220	224	244	212	252	222	234	242	286	308	356	308	356	308	356	
9	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	
10	400	380	370	312	362	272	684	613	224	274	514	236	234	228	242	256	260	272	268	306	328	304	328	304	
11	334	312	410	406	332	438	286	240	250	232	242	222	242	258	222	222	244	246	256	296	398	394	394	394	
12	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	
13	370	282	302	386	330	260	248	220	242	236	218	218	230	234	238	210	242	240	234	248	278	266	266	266	
14	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	
15	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
16	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
17	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	
18	508	374	372	338	264	348	206	268	238	214	560	236	228	236	224	232	248	262	380	412	288	218	218	218	
19	278	312	348	438	418	250	514	254	292	244	210	246	212	224	220	212	218	240	218	256	250	290	222	272	
20	312	360	254	354	302	290	220	350	232	230	214	220	216	218	228	216	238	266	284	254	254	248	328	328	
21	264	344	298	322	320	336	256	222	244	230	216	210	188	202	228	224	232	250	288	A	A	A	A	A	
22	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	
23	372	394	410	294	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
24	380	394	328	246	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
25	266	278	312	316	288	258	228	216	244	212	238	218	208	214	212	210	258	220	236	236	230	252	248	304	
26	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	
27	284	396	318	310	414	480	186	298	240	214	206	210	218	204	210	220	210	220	224	188	240	240	242	262	
28	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	
29	302	352	336	356	320	326	214	208	206	202	236	232	220	232	222	220	240	312	314	340	356	296	356	296	
30	306	270	246	288	272	250	262	262	238	202	220	218	238	216	224	250	230	248	246	318	272	306	214	214	
31	190	246	224	378	274	256	220	218	200	220	220	210	212	224	228	214	218	222	236	238	220	298	302	356	
32	A	A	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	
33	A	314	E B	516	312	288	262	640	272	224	208	246	228	210	220	220	212	238	238	254	248	252	282	398	
34	342	A	278	288	262	256	240	248	278	220	208	208	224	222	206	210	218	222	232	238	246	264	250	230	
35	204	236	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	
36	414	386	418	392	312	550	278	246	218	198	222	200	202	228	212	220	214	214	202	246	252	236	284	284	
37	280	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	
38	354	298	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	
39	290	288	318	260	206	284	238	228	204	224	532	228	218	212	222	216	218	220	234	240	232	248	250	316	
40	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	
41	402	342	294	312	368	252	236	232	226	216	208	210	218	220	232	232	252	258	268	260	260	260	260	260	
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	24	26	23	22	27	23	22	24	22	25	27	29	29	29	30	30	29	29	29	26	26	26	26	25	
MED	U	U	E A	U	E	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	
U Q	294	297	328	309	330	269	250	237	238	226	220	225	220	221	224	222	222	236	240	244	249	256	264	279	
L Q	279	282	298	306	294	258	246	222	228	216	208	217	218	215	216	216	218	221	232	236	242	248	250	260	

NOV. 2024 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

DEC.2024 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	X	61	58	62	68	73	76	77	79	83	87	95	89	84	77	73	69	68	63	69	61	65	62
2	61	A	60	69	61	54	A	65	79	86	85	79	81	81	75	72	73	67	74	69	71	69	71	67
3	X	68	68	55	57	A	75	77	77	84	83	86	95	98	94	95	97	87	79	67	57	A	58	62
4	59	A	58	58	A	A	42	69	68	75	69	74	77	73	75	76	71	67	66	64	54	48	56	55
5	X	A	A	47	55	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	X	63	61	64	68	68	67	66	75	67	77	73	71	69	82	75	75	75	77	78	72	69	61	60
7	X	63	61	61	62	62	61	59	A	71	77	76	73	75	76	76	76	73	69	65	63	61	58	53
8	X	58	61	69	72	67	81	84	95	93	94	95	94	89	82	82	76	74	69	66	57	58	71	55
9	58	69	67	72	76	A	A	A	A	69	71	75	82	85	87	81	68	52	A	A	A	59	57	57
10	58	55	47	A	59	A	A	A	55	71	67	79	85	71	75	66	65	60	59	61	55	55	53	55
11	X	59	57	55	58	61	41	A	A	A	58	67	69	75	75	75	74	61	56	61	64	60	61	56
12	62	65	59	63	63	74	65	62	67	75	91	75	77	76	73	72	68	68	68	69	66	61	53	53
13	59	57	57	69	68	78	80	85	90	93	93	89	87	82	74	69	71	68	69	58	53	57	61	55
14	X	53	62	56	61	60	63	71	74	83	85	82	79	79	81	77	78	79	74	63	45	A	A	60
15	57	56	58	59	63	60	A	A	55	59	71	67	68	68	66	65	63	57	53	54	59	55	A	A
16	A	55	74	74	66	61	70	72	77	94	77	56	48	49	71	72	71	59	55	57	64	59	50	57
17	53	69	59	57	66	69	A	A	A	B	A	56	62	47	61	57	51	59	59	55	54	55	53	51
18	A	A	A	A	43	A	57	61	61	65	68	63	68	67	68	65	67	59	58	53	53	53	54	57
19	A	53	56	59	67	A	A	61	67	75	73	72	67	61	65	65	63	66	63	66	59	61	58	58
20	53	A	61	A	63	70	65	49	A	63	67	63	63	69	69	71	65	57	63	64	48	57	R	58
21	R	A	A	A	A	61	A	59	68	77	76	72	74	69	65	68	69	67	64	63	61	51	55	51
22	A	58	A	46	55	58	65	69	76	78	77	73	68	71	68	65	63	60	53	63	50	57	53	43
23	A	A	A	59	54	41	69	57	58	66	65	64	63	61	61	64	63	60	62	58	45	54	59	A
24	B	R	55	57	56	63	76	63	A	A	65	67	71	71	67	66	63	59	R	49	57	54	60	56
25	A	A	55	58	60	66	R	A	A	61	60	60	65	63	61	61	62	65	63	59	64	65	62	56
26	61	60	61	65	71	76	83	89	91	92	90	84	77	73	72	69	65	67	66	68	68	67	65	67
27	X	64	65	69	71	73	85	93	101	103	99	89	82	79	73	71	71	69	67	67	65	66	61	59
28	65	72	70	69	73	65	83	89	97	97	95	89	83	78	75	75	71	70	72	69	69	67	58	55
29	59	65	67	70	70	72	76	89	93	94	96	91	88	85	75	70	70	69	69	70	66	67	67	63
30	79	69	72	71	81	85	98	105	105	102	109	91	71	75	75	73	73	74	70	67	66	61	59	57
31	74	53	63	69	74	74	79	91	87	83	89	96	93	79	85	76	71	69	70	64	51	53	69	66
	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	26	27	28	25	21	23	25	28	30	31	31	31	31	31	31	31	29	30	29	29	28	29
MED	59	61	60	62	63	66	73	74	77	78	76	74	75	75	74	71	70	67	65	63	61	59	58	57
U Q	63	65	67	69	69	74	82	89	90	92	90	87	83	81	75	76	73	69	69	67	66	64	61	62
L Q	58	57	56	58	60	60	65	62	67	70	68	67	68	68	68	66	65	60	60	58	54	55	54	55

DEC.2024 fXI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

DEC. 2024 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	Z 53	F 52	F 50	F 51	F 63	F 63	F 68		70	Z 73	Z 76	82	87	84	77	71	66	63	62	57	61	51	V 55	F 47		
2		59		55	59	51	48		59	64	74	72	72	75	75	69	66	67	63	67	62	64	62	64	61	
3		61	Z 59	R 49	R 51	A 51	J 67	R 71		71	78	79	79	F 89	88	87	88	89	81	71	58		A 52	55		
4	F 48	A	F 48	F 44		A	J 36	R 54	F 60		V 67	65	67	71	67	69	72	J 65	R 61	59	58	46	41	49	47	
5		52	A	A 41	R 51		A	A			53	56	59	62	62	64	65	J 61	R 59	58	58	57	55	55	54	
6		55	Z 55	Z 55	F 57	F 53	F 56	F 50	F 65	F 53	F 63	66	65	63	75	71	68	69	Z 71	71	64	62	54	59	52	
7		63	54	F 49	F 50	55	56	F 41	A	66	72	71	68	69	71	69	71	66	Z 63	57	57	54	51	51	51	
8		53	54	V 61	F 65	F 61	F 68	V 67	Z 85	Z 82	Z 81	Z 89	86	84	75	75	69	67	63	60	51	Z 51	F 49	42	51	
9	F 50	F 49	F 57	F 61	F 66	R A	A	A	A		F 54	66	69	75	79	78	F 68	V 61	U 45	R A	A		A 52	50	53	
10	U 57	R 39	F 41	R A	F 45	A	A	A		49	61	54	61	F 69	F 64	67	59	58	53	52	55	49	48	44	49	
11		52	51	51	F 48	J 49	R 35		A	A		53	63	64	68	69	68	F 64	55	49	54	57	50	53	49	
12	F 53		57	53	57	57	64	54	56	V 62	V 67	V 72	67	70	71	66	65	62	62	62	63	57	54	46	47	
13		52	F 48	R 51	V 60	Z 62	F 58	68	79	F 84	F 85	F 84	83	81	76	66	62	64	62	62	52	46	52	55	49	
14	46	55	51	55	38	56	62	67	69	F 69	F 63	F 61	63	65	71	73	F 71	F 68	J 54	R 39			A A	A 49	F A	
15	F 52	F 48	F 51	F 51	F 57	R 54				J 49	R 53	F 54	F 55	F 54	F 57	55	59	56	50	46	47	50	47		A	
16	A		48	Z 67	F 54	F 52	55	56	64	Z 71	F 76	F 71	J 49	R 42	R 43	R 3	F 56	F 58	J 65	R 53	R 49	J 52	R 57	R 48	R 44	
17	J 47	R 49	F 44	F 51	R 60	R 64		A	A		A	B			52	51	41	J 4	R 55	R 52		J 53	R 49	F 45	F 45	
18		A	A	A	A 37	R 51	J 55	R 55		59	62	57	63	61	62	59	61	53	53	45	45	45	47	F 44		
19		A		45	52	52	61		A	44	61	68	66	65	61	55	58	59	56	59	57	59	53	55	51	52
20		47		50	F 51	U 63	R 72	F 42		F 57	F 57	F 58	Z 57	F 60	F 63	F 66	F 60	F 51	F 57	F 59	F 42	F 54	V 42	R 54	F 69	
21		47	A	A	A	U 56	R 51	U 61	R 70	V 71	V 66		67	64	60	63	F 65	F 61	F 57	F 57	F 54	F 41	U 47	R 45		
22	A	U	R	A	U	R	V		V	V				F		R						R	F	R		
23		A	A	A	U	R	Z		F			61	58	58	55	55	57	57	55	55	51	39	48	52	A	
24	B	R	J	R	F	U	R	F	A		A	V	A	V		F		U	R	R		43	49	46	54	49
25		A	A		49	51	55	U	R	R	A		F	54	53	59	51	55	57	F	51	F	57	F	55	50
26	F 53	F 53	55	59	65	71	Z 75	V 77		85	85	84	78	72	67	65	62	61	59	59	H 63	61	60	59	59	
27		56	57	F 63	F 65	V 67	V 81	Z 89	Z 93	J 92	R 92		83	76	73	67	66	A 65	A 63	A 62	61	58	58	53	F 51	
28		55	Z 64	F 61	F 63	F 65	Z 60	Z 74	Z 83	Z 87	Z 87		89	84	76	71	69	69	65	63	66	63	61	59	51	Z 50
29		49	57	Z 60	A 58	J 69	R 70	U 82	U 84	U 83	Z 90	Z 84	Z 79	F 78	F 69	F 63		64	63	63	62	A 59	A 59	A 61	56	
30	F 57	F 61	F 68	F 64	F 72	F 77	F 92	F 93	F 96	F 95	F 83	F 75	F 66	F 67	F 68	F 67		65	67	65	F 61	F 61	F 54	J 52	R 50	
31	V 55	F 47	F 56	F 63	F 67	F 67	F 71	F 85	F 81	F 75	F 82	F 85	F 87	F 72	F 75	F 71	F 63	F 63	F 63	F 57		U 45	U 45	U 55	U 46	
	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	26	26	28	25	21	23	25	28	30	31	31	31	31	31	31	31	29	30	29	29	28	29		
MED	53	53	52	53	55	56	66	65	67	71	71	67	67	67	67	65	64	61	58	57	54	51	52	50		
U Q	56	57	57	60	62	66	72	82	83	80	82	79	76	75	69	69	65	63	62	61	58	55	55	52		
L Q	50	48	49	50	50	54	55	55	58	61	61	61	61	61	61	59	58	53	54	51	48	48	48	47		

DEC. 2024 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

DEC. 2024 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

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	G	G	G	G	G	34	35	G	38	41	42	55	49	69	50	55	42	39	35	G	G	G	G	41
2	52	57	44	G	36	32	62	47	G	G	44	45	42	45	42	41	52	39	36	35	G	G	G	G
3	G	G	G	G	67	50	49	55	41	41	E B 39	G E B 41	G E B 41	G E B 41	G E B 39	G E B 32	G	G	G	G	42	70	46	38
4	G	72	44	35	53	45	41	37	40	42	43	41	42	G	G	G	41	37	34	32	G	G	G E B 30	G
5	47	51	59	G	33	42	67	57	48	43	36	42	49	42	G	93	47	45	36	29	G	G	G	G
6	G	G	G	G	G	36	39	47	51	53	45	39	42	43	44	46	41	44	37	33	30	G	G	G
7	G	37	G	G	41	45	35	53	41	41	43	42	43	41	41	36	39	51	42	33	G	G	G	G
8	G	41	35	G	G	G	G	38	38	36	37	41	41	45	60	55	38	35	32	G	G	G	73	46
9	G	G	G	G	28	66	54	65	60	42	42	121	119	E B 40	37	37	37	43	40	47	59	G	35	75
10	42	G	63	118	37	39	46	56	39	39	55	49	44	E B 39	37	35	G	G	G	G	G	G	G	G
11	G	39	35	42	G	41	64	73	62	51	41	41	36	E B 39	G	37	35	31	29	G	G	G	G	G
12	35	G	31	G	G	G	47	55	62	38	43	43	42	38	39	41	40	35	G	G	G	G	G	G
13	G	G E B 36	G	G	G	G	33	35	39	41	43	38	38	43	41	45	96	35	35	G	G	G	G	G
14	G	G	39	49	31	35	38	46	53	41	39	41	41	38	37	35	36	G	31	G	57	53	60	47
15	45	38	33	38	32	33	44	48	38	39	37	39	39	41	38	38	35	69	57	43	43	G	47	66
16	61	46	41	37	52	45	44	108	109	42	52	45	41	115	37	40	35	32	35	G	52	56	74	G
17	95	G	G	27	46	33	127	77	77	B	63	65	127	96	34	38	52	G	33	28	45	46	43	G
18	67	59	72	55	G	96	39	37	39	39	41	37	114	114	118	38	33	32	G	58	G	44	G	G
19	45	G	36	30	G	71	70	81	41	41	40	43	41	41	41	39	47	37	G	G	G	G	G	G
20	K 35	92	G	142	42	G	G	G	68	G	G	38	G	K G	G	37	39	G	35	G E B 29	31	29	42	37
21	43	67	72	72	46	35	58	48	48	40	42	G	37	E B 50	E B 46	35	G	G	G	E B 34	G	G	43	41
22	49	48	55	34	G E B 41	G	G	32	G	G	G	G	G	38	G	41	G	G	G	25	G	G	G	G
23	133	64	71	G	G	G	40	G	39	G	G	40	41	64	40	G	G	31	G	G	G	G	39	67
24	B	42	G	38	29	G	G	G	52	134	G	117	G	41	G	39	G	G	G	G	G	G	29	31
25	72	59	G	G	G	G	G	49	62	47	G	40	42	35	G	G	G	35	37	45	39	25	18	G
26	32	33	23	G	29	28	G	34	37	40	G	G	41	44	42	41	43	39	27	33	G	21	21	19
27	25	G	G	G	26	25	73	54	70	48	39	40	39	43	55	50	53	67	52	47	G	G	G	G
28	29	G	32	G	37	G	37	35	41	G	G	G	G	45	45	48	42	46	49	47	111	41	42	61
29	31	G	G	46	46	35	51	G	G	G	G	G	G	44	43	39	46	G	36	36	104	159	31	G
30	30	33	57	37	G	G	33	36	38	41	G	G	G	61	G	G	G	G	35	49	47	31	G	G
31	37	35	31	23	23	31	45	31	G	G	G	G	43	E B 41	41	41	G	G	G	G	30	G	48	34
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	31	31	31	31	31	31	30	31	31	30	31	31	31	31	31	31	31	31	31	31	31
MED	34	35	32	27	28	34	41	47	41	41	39	43	41	42	38	39	37	35	33	G	G	G	G	G
U Q	47	51	44	42	41	42	54	55	60	42	43	G	43	48	42	41	46	39	36	36	42	36	43	38
L Q	G	G	G	G	G	G	G	G	33	34	38	38	40	39	39	36	G	G	G	G	G	G	G	G

DEC. 2024 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA

STATION SHOWA-ST.

DEC.2024 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

LAT.69°00.4'S LON.039°35.4'E P 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	11	8	11	11	12	9	9	12	14	14	11	13	14	15	13	14	12	12	9	7	6	11	11	11
2	9	6	8	9	7	7	14	13	12	8	10	11	7	11	12	12	10	9	7	9	6	6	6	5
3	7	7	7	6	15	12	11	9	11	13	39	33	41	41	29	39	16	31	16	16	11	9	11	10
4	13	9	12	8	11	8	13	12	9	11	12	8	9	20	14	17	11	15	11	7	6	6	7	38
5	8	10	7	7	7	7	16	9	12	9	15	11	9	11	22	14	15	14	9	9	6	7	7	6
6	6	11	9	9	17	7	7	9	11	15	14	17	12	14	9	9	9	8	7	6	7	6	6	7
7	7	11	14	9	12	12	9	9	11	9	9	11	14	13	10	14	11	15	9	17	9	7	7	9
8	8	13	10	8	14	12	9	10	9	8	14	21	16	22	15	15	15	12	9	15	9	15	11	8
9	12	11	11	12	9	9	14	11	12	9	11	15	13	13	17	10	10	9	9	9	9	8	7	7
10	7	7	7	12	11	17	22	15	9	9	21	24	23	39	15	19	30	28	13	13	9	6	8	16
11	24	11	17	13	15	15	27	25	11	13	16	41	36	39	19	15	16	13	29	15	13	15	6	6
12	11	6	16	15	11	11	15	14	15	11	10	10	11	11	11	11	7	7	9	12	6	6	8	7
13	12	13	36	14	12	9	7	6	5	9	11	14	16	13	12	9	8	8	8	8	11	12	5	7
14	6	7	11	18	6	7	7	8	13	9	8	8	11	8	15	13	12	15	15	9	7	8	7	7
15	6	7	7	7	7	9	8	7	8	9	12	15	12	14	12	8	8	9	7	7	7	6	6	15
16	15	20	7	12	11	9	8	8	7	14	12	11	12	15	11	15	12	7	8	16	7	6	15	9
17	13	7	11	6	8	13	17	15	15	B	37	11	11	14	15	9	9	10	6	7	6	6	7	6
18	10	11	12	11	6	11	8	9	8	9	13	15	14	23	23	9	24	21	13	13	8	7	15	15
19	31	7	7	6	7	13	15	9	9	7	10	9	11	11	13	10	9	12	9	15	19	11	6	6
20	25	12	11	23	9	15	25	9	15	5	9	11	13	11	10	9	9	10	8	29	13	8	9	13
21	25	16	9	15	11	7	17	11	8	11	11	13	13	50	46	24	18	12	15	34	15	12	11	16
22	29	13	15	13	16	41	12	14	15	15	19	15	15	26	37	17	15	15	15	17	15	14	15	29
23	29	33	14	12	14	15	14	15	14	13	15	14	15	14	13	14	15	17	17	12	13	5	9	12
24	B	32	13	15	14	15	13	15	13	41	21	17	15	14	14	12	9	13	11	12	11	12	9	9
25	15	15	14	14	7	15	14	15	15	14	13	13	11	11	13	15	12	13	13	12	13	11	8	7
26	7	8	12	11	11	9	13	12	12	12	9	9	8	11	10	5	12	11	11	9	11	8	6	7
27	6	9	17	14	17	9	9	9	9	13	9	14	11	11	9	11	11	14	11	9	7	7	7	7
28	7	15	12	7	12	13	9	9	12	8	9	9	12	12	11	13	11	11	10	8	9	6	7	8
29	8	14	8	7	8	13	13	12	11	14	18	25	15	15	13	15	15	11	11	9	9	7	6	7
30	7	11	13	13	11	9	13	12	17	15	13	13	16	23	23	9	11	14	15	24	15	8	12	10
31	11	10	11	12	11	10	9	14	13	11	20	14	22	41	21	21	17	11	13	11	19	13	13	9
	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	11	11	11	12	11	11	13	11	12	11	12	13	13	14	13	13	12	12	11	12	9	8	7	8
U Q	15	13	14	14	14	13	15	14	14	14	16	15	15	23	19	15	15	15	13	15	13	11	11	12
L Q	7	7	8	8	8	9	9	9	9	9	10	11	11	11	11	9	9	10	9	9	7	6	6	7

IONOSPHERIC DATA STATION SHOWA-ST.

DEC. 2024 h'F (KM)

45°E MEAN TIME (G.M.T. + 3 H)

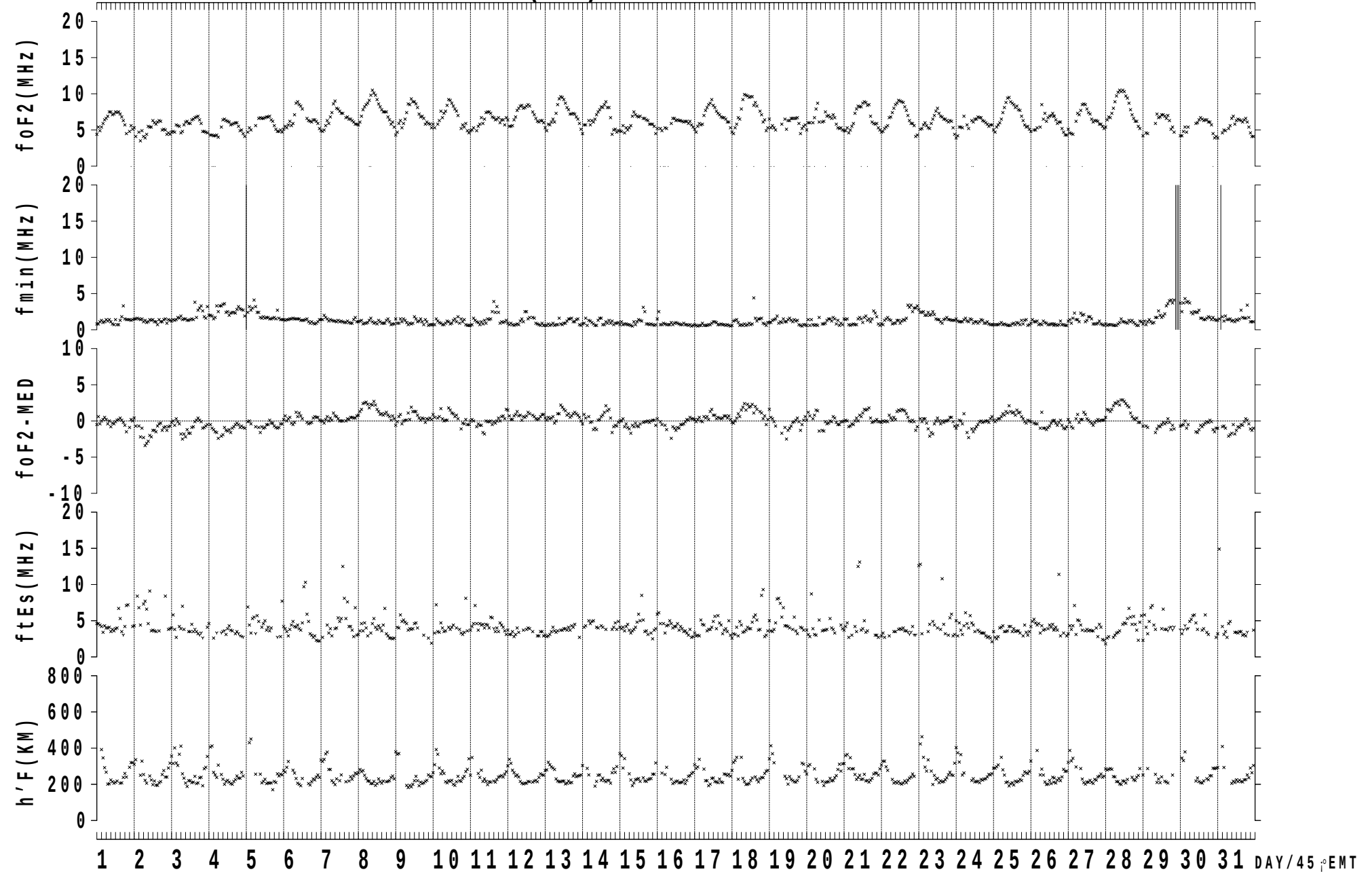
LAT. 69°00.4'S LON. 039°35.4'E @SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC IN MANUAL SCALING

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	318	312	340	202	204	264	242	240	220	238	216	252	232	252	220	260	222	204	232	202	244	264	296	354
2	370	AE A	548	484	356	234	AE A	266	224	222	206	198	238	236	210	200	208	224	212	234	242	242	264	252
3	288	264	362	308	AE A	592	468	484	254	202	252	236	264	242	220	238	216	228	232	244	392	AE A	390	330
4	336	AE A	320	294	AE A	354	198	188	214	230	212	228	236	216	220	224	232	228	238	254	306	324	342	EB
5	388	AE A	AE A	348	308	AE A	AE A	AE A	250	210	188	224	216	204	232	216	232	238	218	224	240	242	246	272
6	216	338	362	300	278	272	278	242	308	534	214	204	228	220	202	202	220	232	230	236	236	200	230	268
7	272	AE A	222	394	410	530	252	AE A	218	216	218	210	228	208	238	232	216	270	204	246	246	294	312	294
8	274	AE A	AE A	274	228	198	228	190	208	198	220	214	212	212	214	220	230	202	240	370	340	298	394	332
9	292	306	262	298	250	AE A	AE A	AE A	210	194	198	224	214	238	198	218	244	AE A	AE A	AE A	246	288	352	AE A
10	210	370	358	328	AE A	AE A	AE A	AE A	228	194	514	468	292	232	230	218	284	266	244	232	238	270	280	316
11	274	310	334	462	290	306	AE A	AE A	AE A	AE A	230	250	224	222	212	214	212	220	210	248	244	254	262	264
12	282	286	314	332	262	288	348	558	530	194	208	200	194	200	196	210	222	218	220	224	236	250	252	236
13	282	336	316	288	296	278	234	214	206	198	202	198	224	202	212	208	206	216	230	250	266	278	252	256
14	242	272	286	418	286	262	230	210	238	224	208	202	202	204	198	224	218	234	218	214	AE A	AE A	AE A	380
15	450	432	514	430	202	282	AE A	AE A	190	222	210	198	204	194	216	210	230	212	240	324	288	264	AE A	AE A
16	AE A	AE A	AE A	AE A	AE A	352	216	248	220	212	218	294	194	240	204	212	206	190	238	306	318	210	332	322
17	262	262	302	280	446	306	AE A	AE A	AE A	AE A	AE A	194	212	178	230	212	204	274	232	260	368	380	364	316
18	AE A	AE A	AE A	AE A	200	AE A	242	228	200	192	204	186	224	206	238	194	216	214	240	252	306	310	338	274
19	AE A	314	300	274	258	AE A	AE A	268	246	220	202	196	202	206	230	228	220	232	220	222	242	266	258	272
20	222	AE A	314	604	480	264	212	AE A	232	206	180	196	212	214	206	222	198	240	224	308	288	172	334	AE A
21	380	AE A	AE A	AE A	AE A	266	AE A	AE A	290	252	212	202	196	218	258	210	224	204	224	244	244	188	216	422
22	AE A	AE A	AE A	AE A	344	AE A	318	242	208	214	206	230	222	232	240	208	198	220	248	254	372	322	298	350
23	AE A	AE A	AE A	AE A	292	322	322	356	266	236	190	216	212	212	300	208	214	212	216	210	228	288	306	272
24	B	AE A	AE A	AE A	374	350	268	274	268	290	AE A	198	550	212	204	192	222	202	228	248	194	290	238	256
25	AE A	AE A	AE A	AE A	496	374	274	308	AE A	AE A	248	202	188	206	208	212	218	214	230	228	242	238	252	278
26	238	304	202	318	284	252	230	212	220	198	190	196	212	220	212	204	220	220	218	242	230	240	246	264
27	288	322	338	324	308	268	304	240	416	196	206	208	196	202	240	234	222	414	318	238	248	254	278	288
28	294	320	296	272	324	272	250	210	216	208	210	206	218	246	196	236	228	244	224	238	246	268	262	264
29	302	290	336	384	260	458	240	198	210	216	234	222	222	230	210	212	240	236	234	272	254	258	262	AE A
30	298	296	284	294	254	246	246	236	218	232	228	238	236	276	234	228	218	218	238	242	242	240	292	344
31	330	430	384	350	304	288	238	236	230	228	226	230	220	248	230	228	218	222	234	240	316	448	462	308
	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	26	25	28	24	21	23	25	28	30	31	31	30	31	31	31	31	30	30	29	29	29	29
MED	281	305	318	301	279	272	245	238	219	211	208	207	218	212	215	212	218	222	230	238	245	259	270	281
U Q	324	343	362	362	336	307	333	266	248	223	218	234	228	236	232	228	222	238	240	248	307	296	318	338
L Q	267	293	300	286	260	263	236	212	208	198	202	198	206	204	210	208	212	216	220	228	242	242	254	266

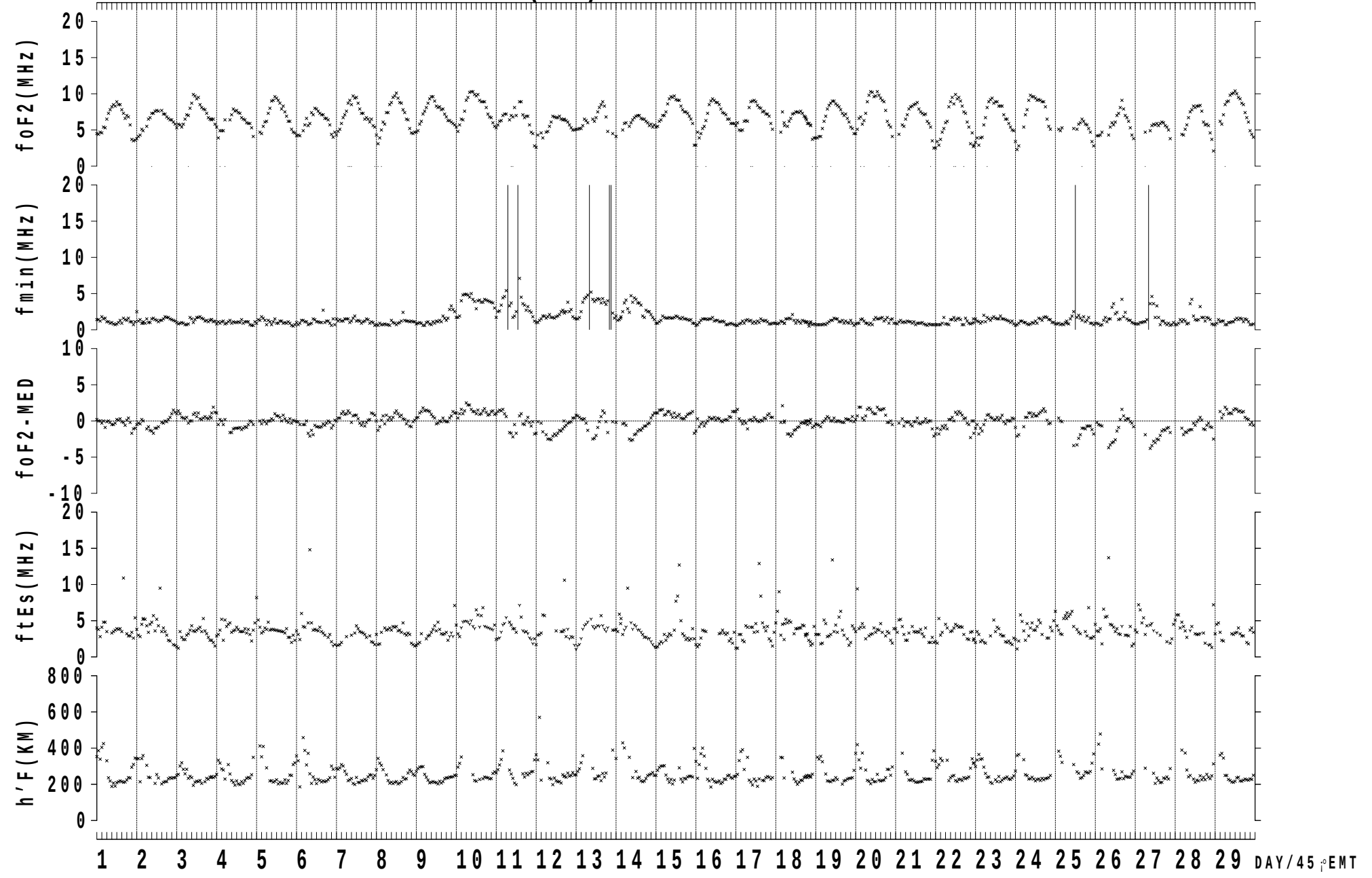
DEC. 2024 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

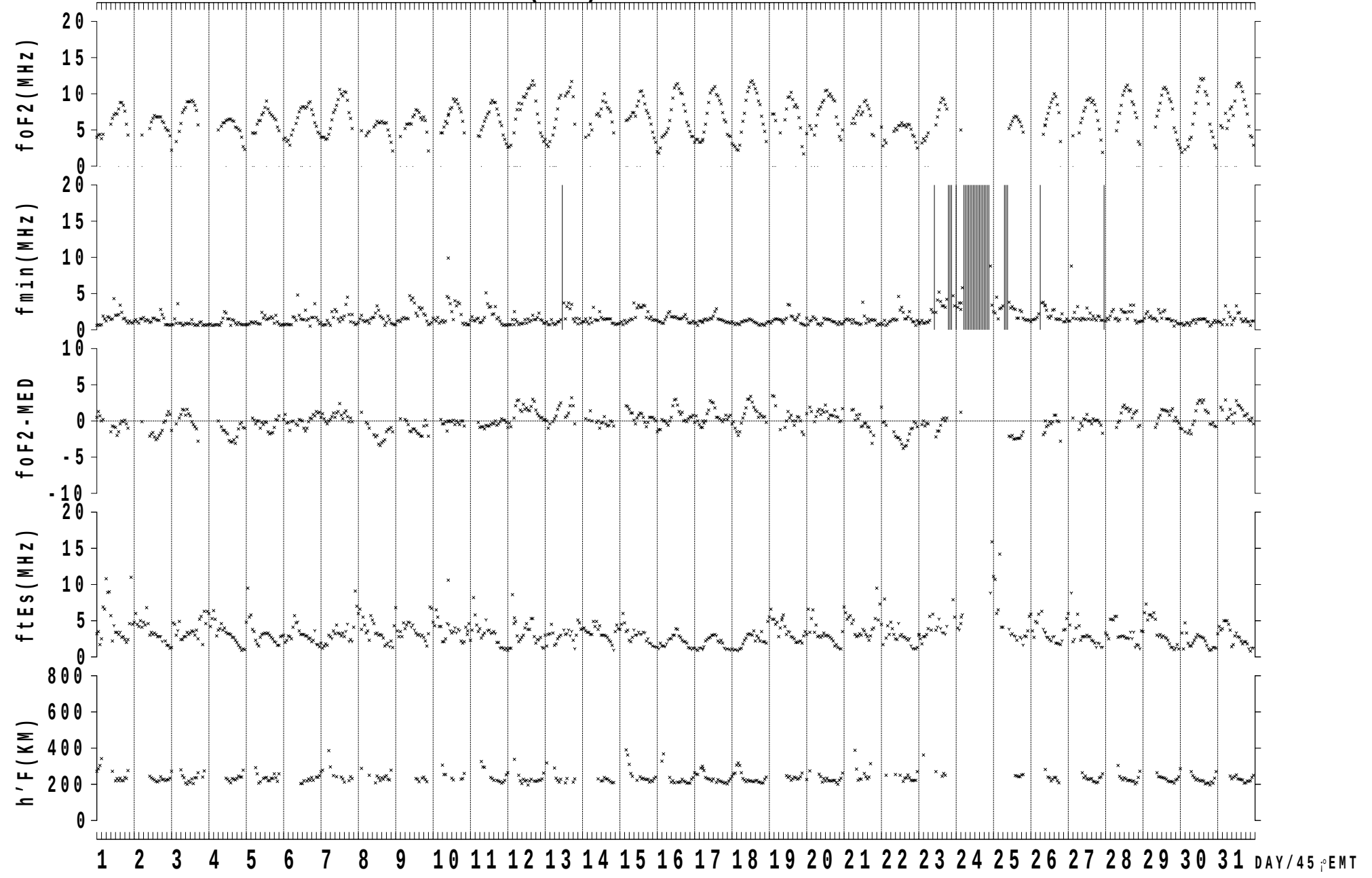
2024 0101 -> 2024 0131(99) SYOWA-ST.



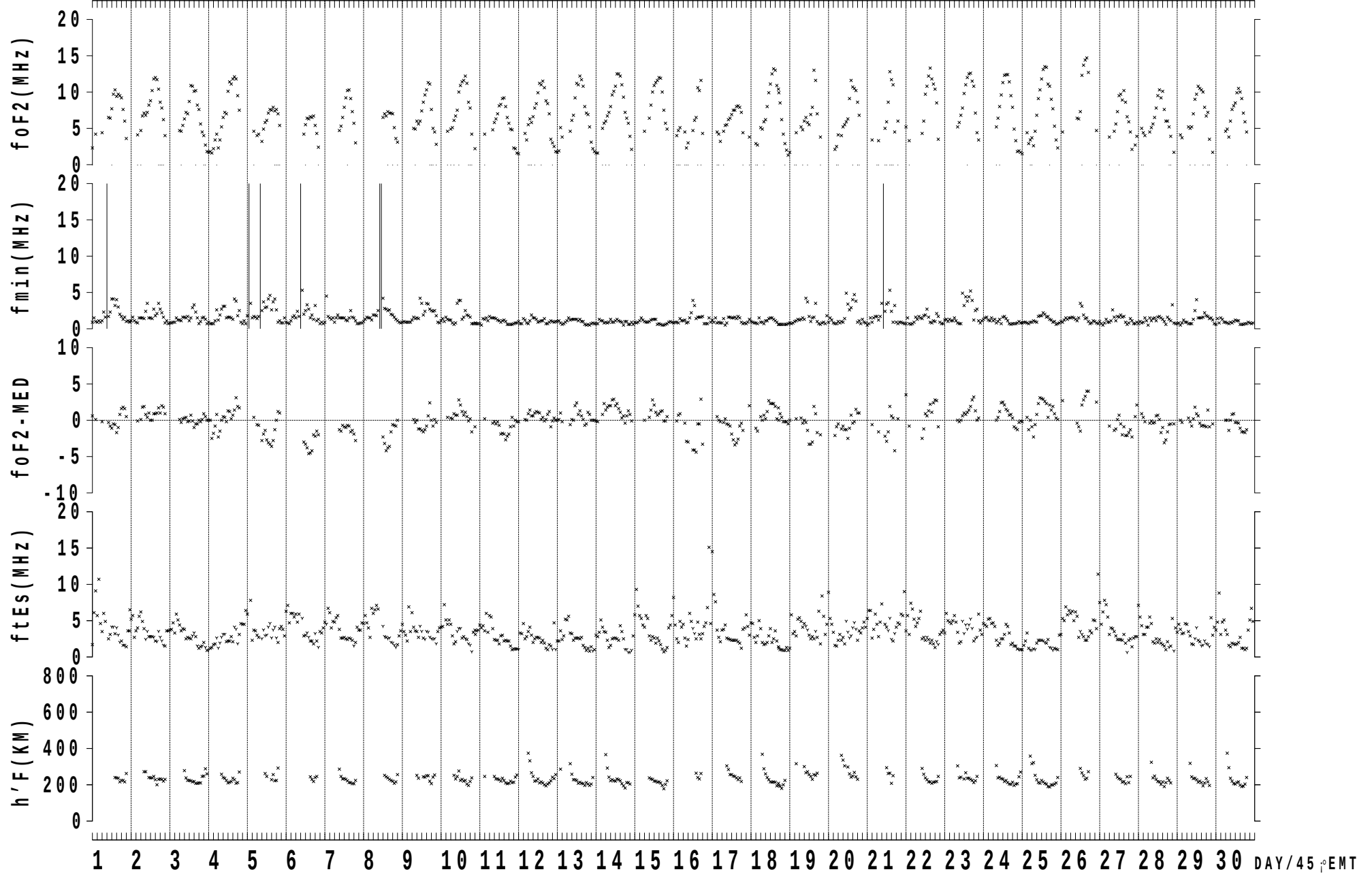
2024 0201 -> 2024 0229(99) SYOWA-ST.



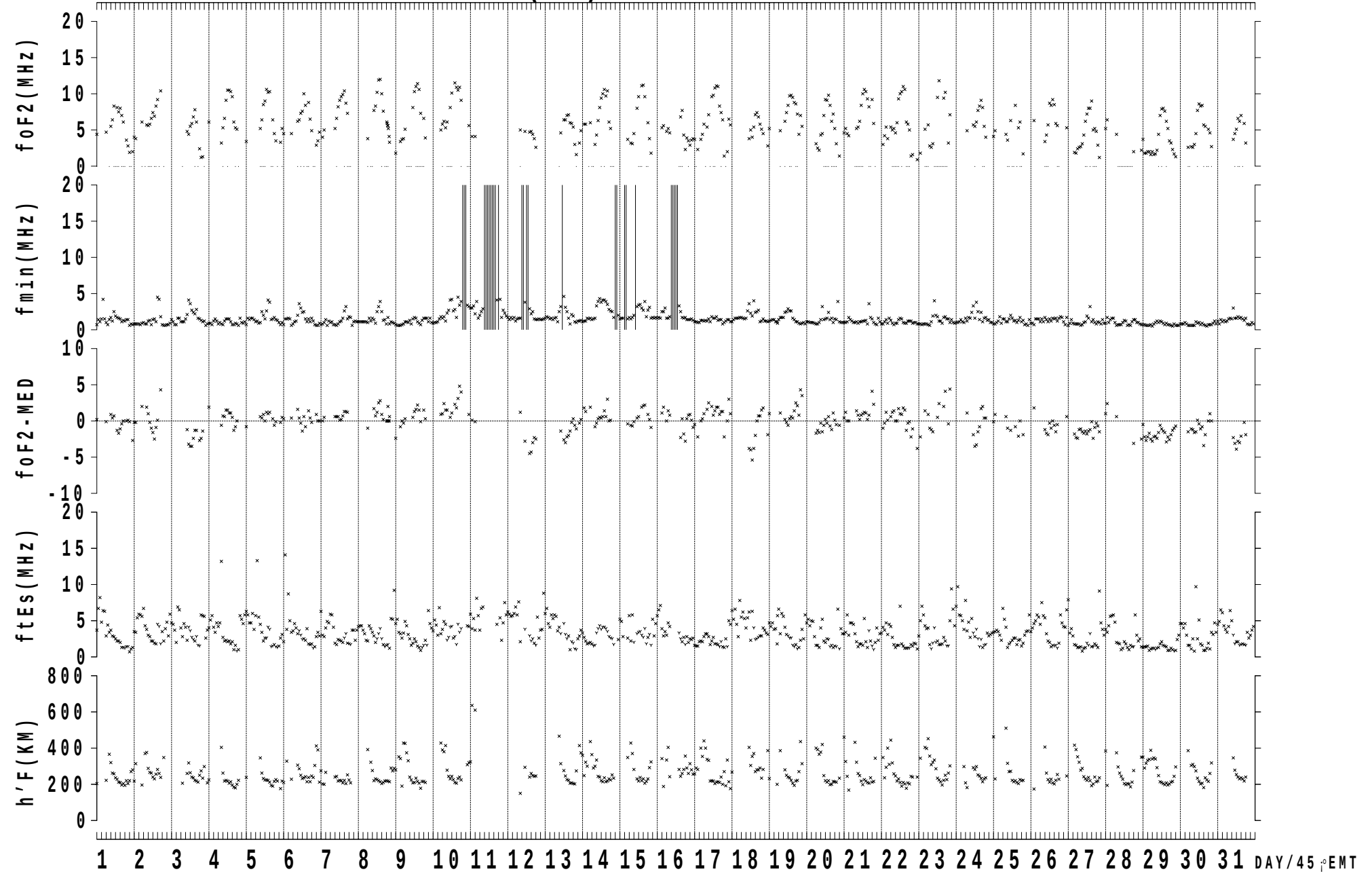
2024 0301 -> 2024 0331(99) SYOWA-ST.



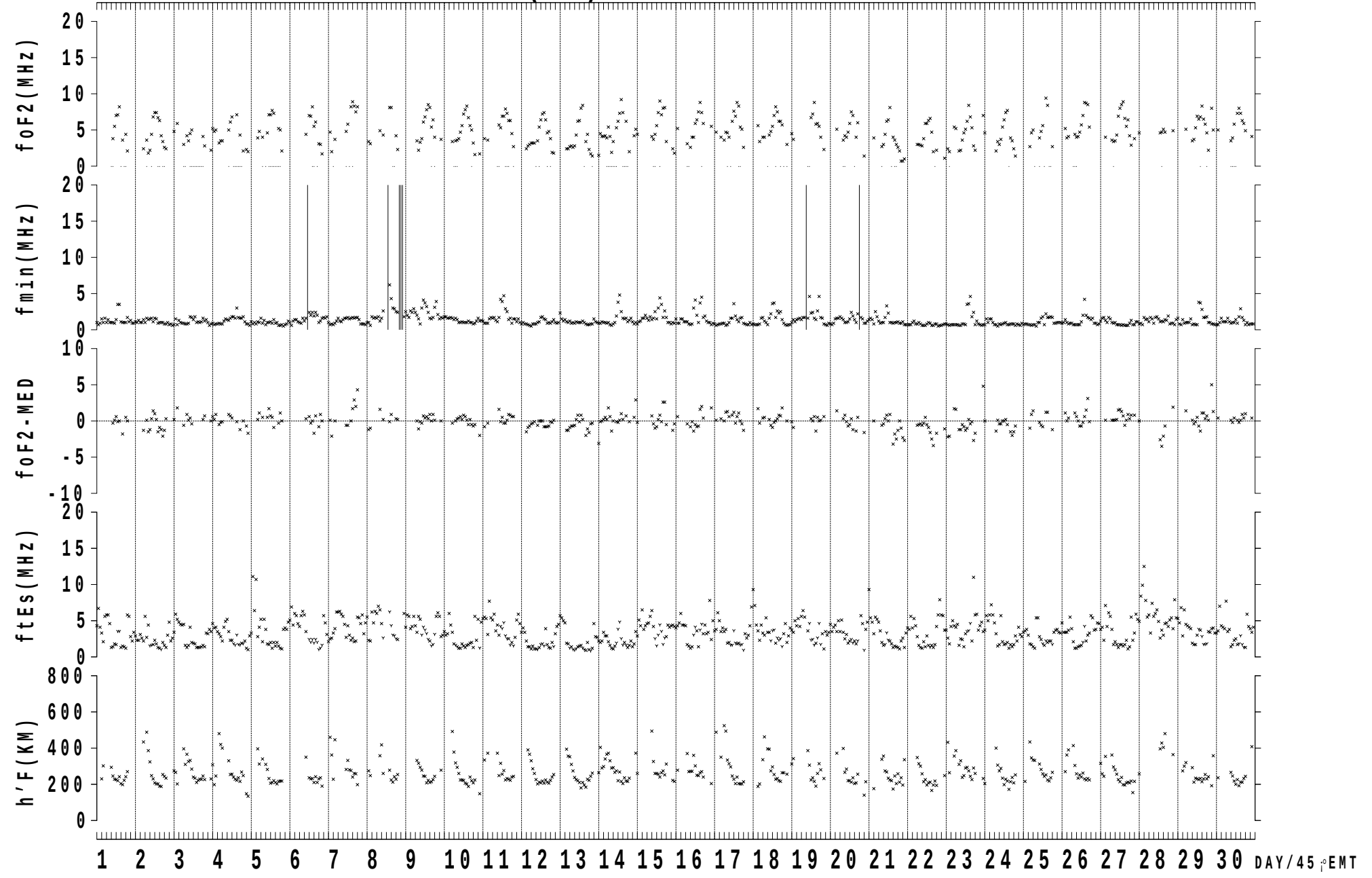
2024 0401 -> 2024 0430(99) SYOWA-ST.



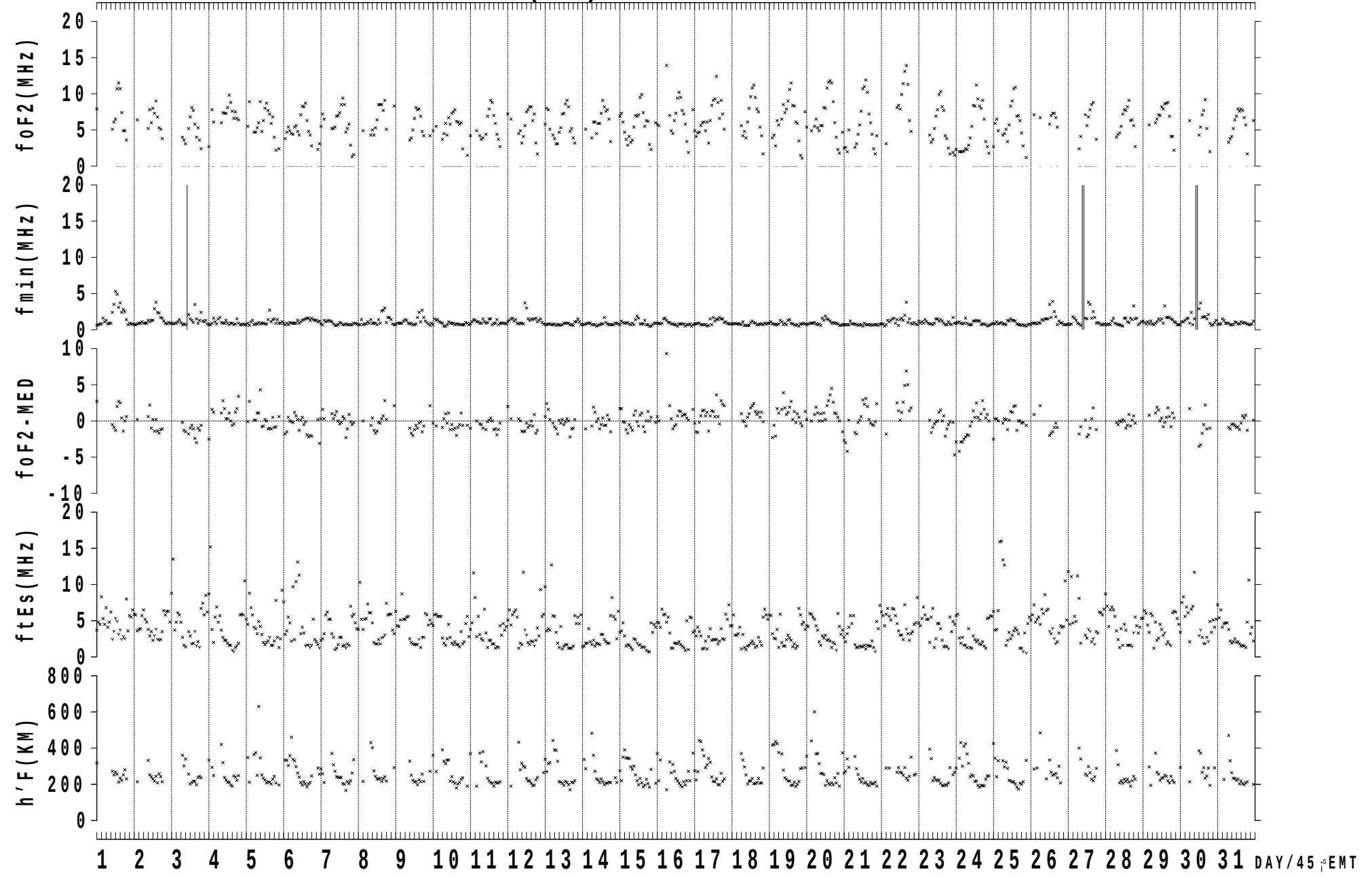
2024 0501 -> 2024 0531(99) SYOWA-ST.



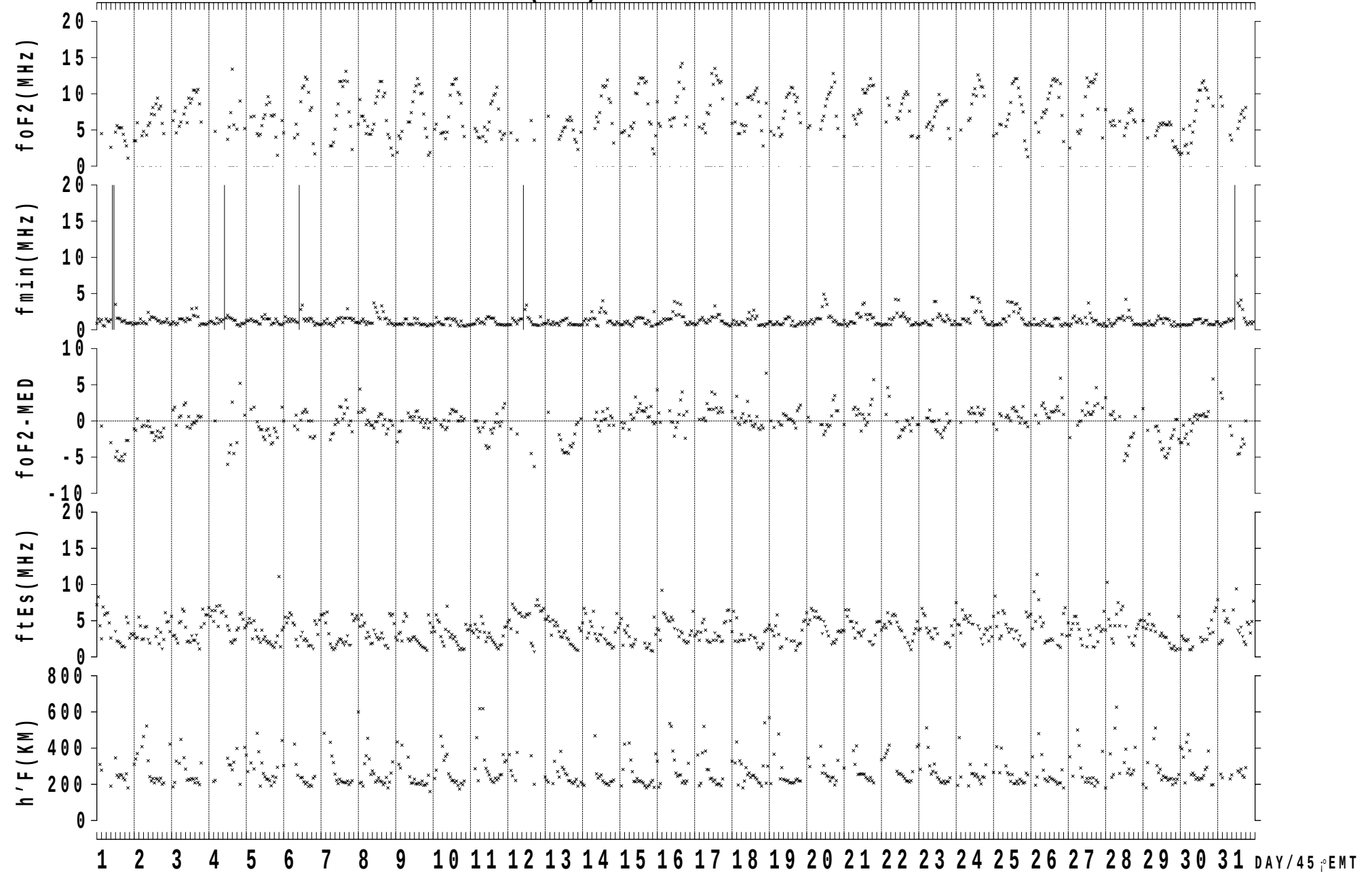
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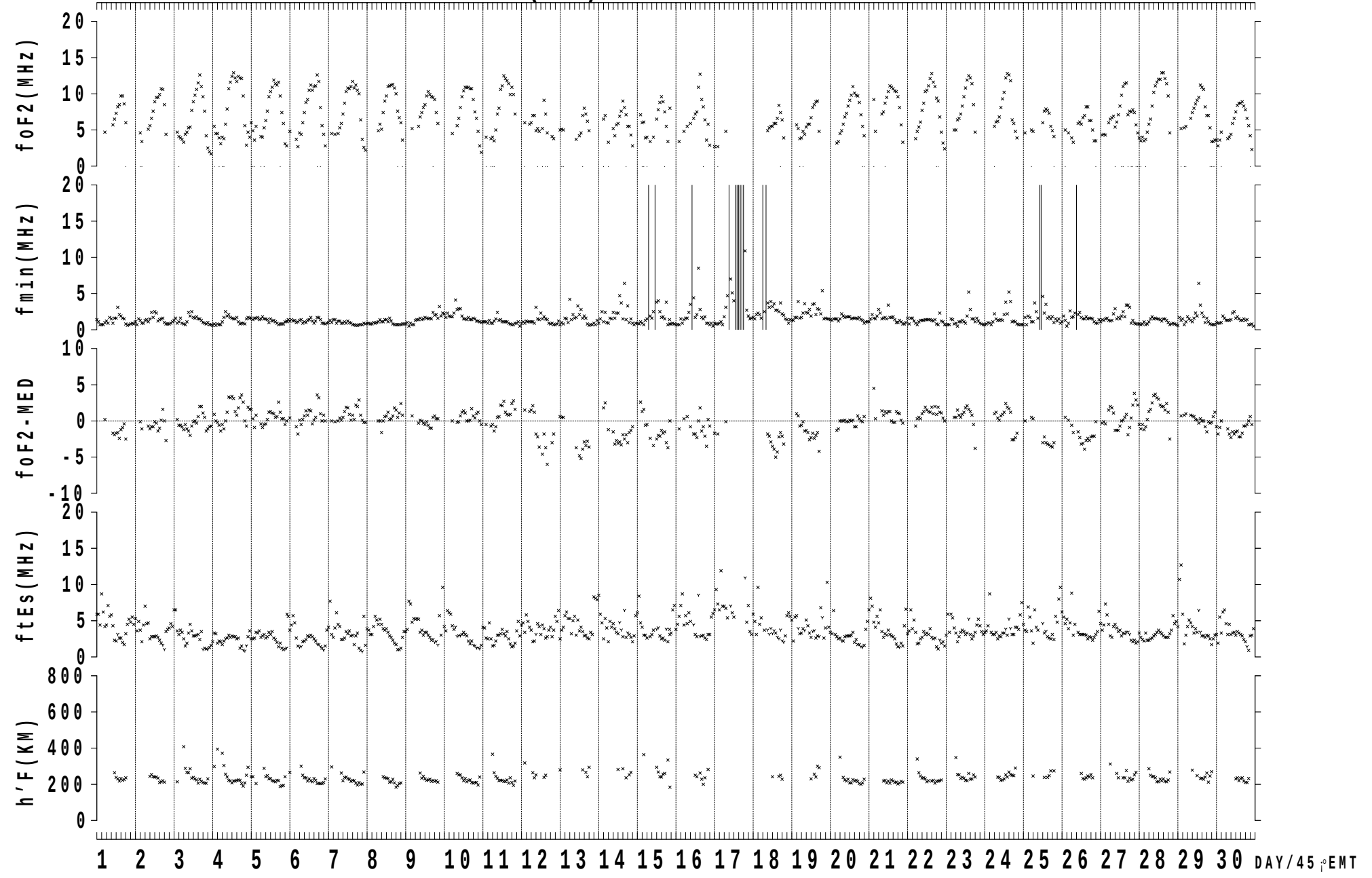
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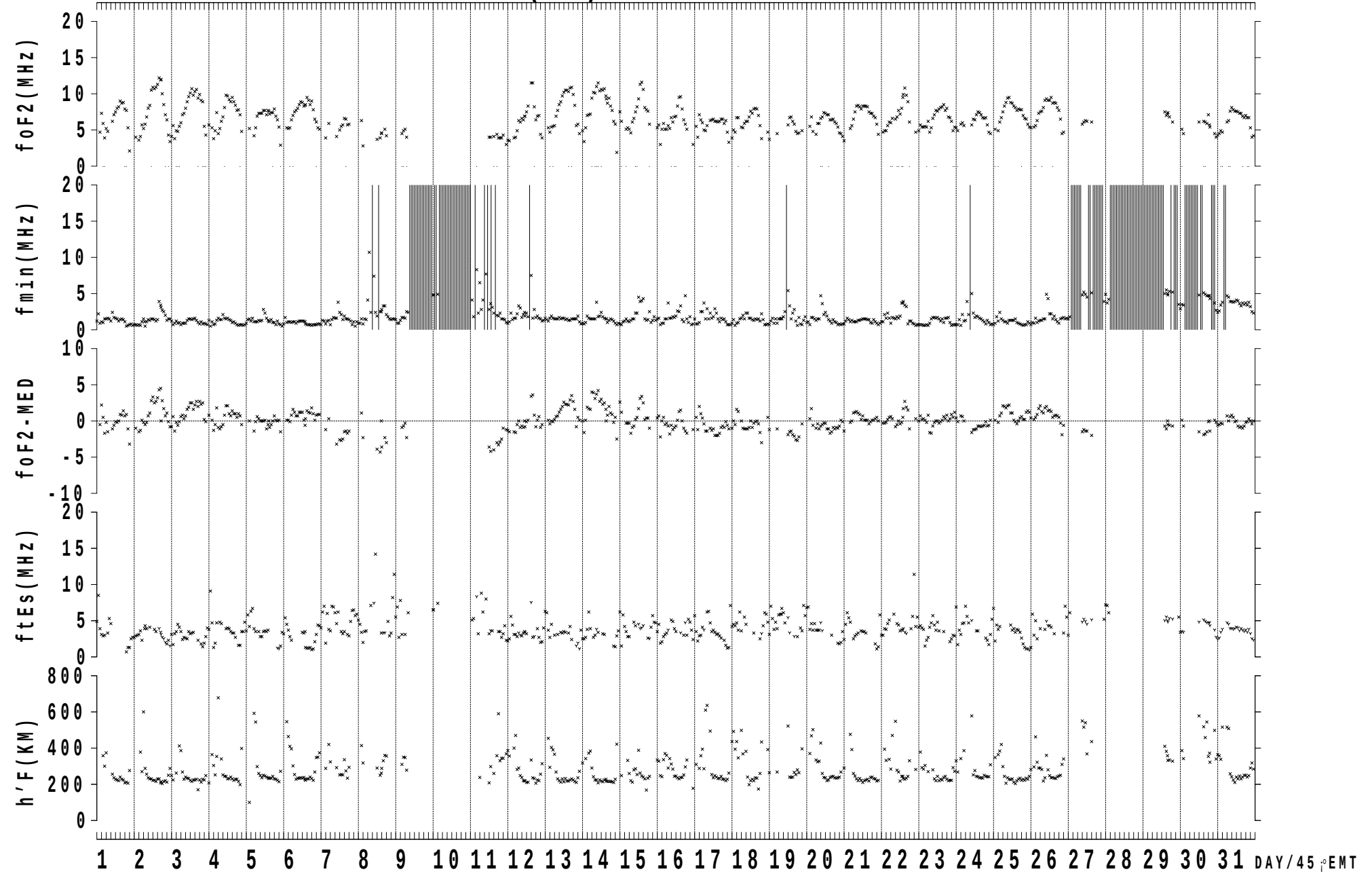
2024 0801 -> 2024 0831(99) SYOWA-ST.



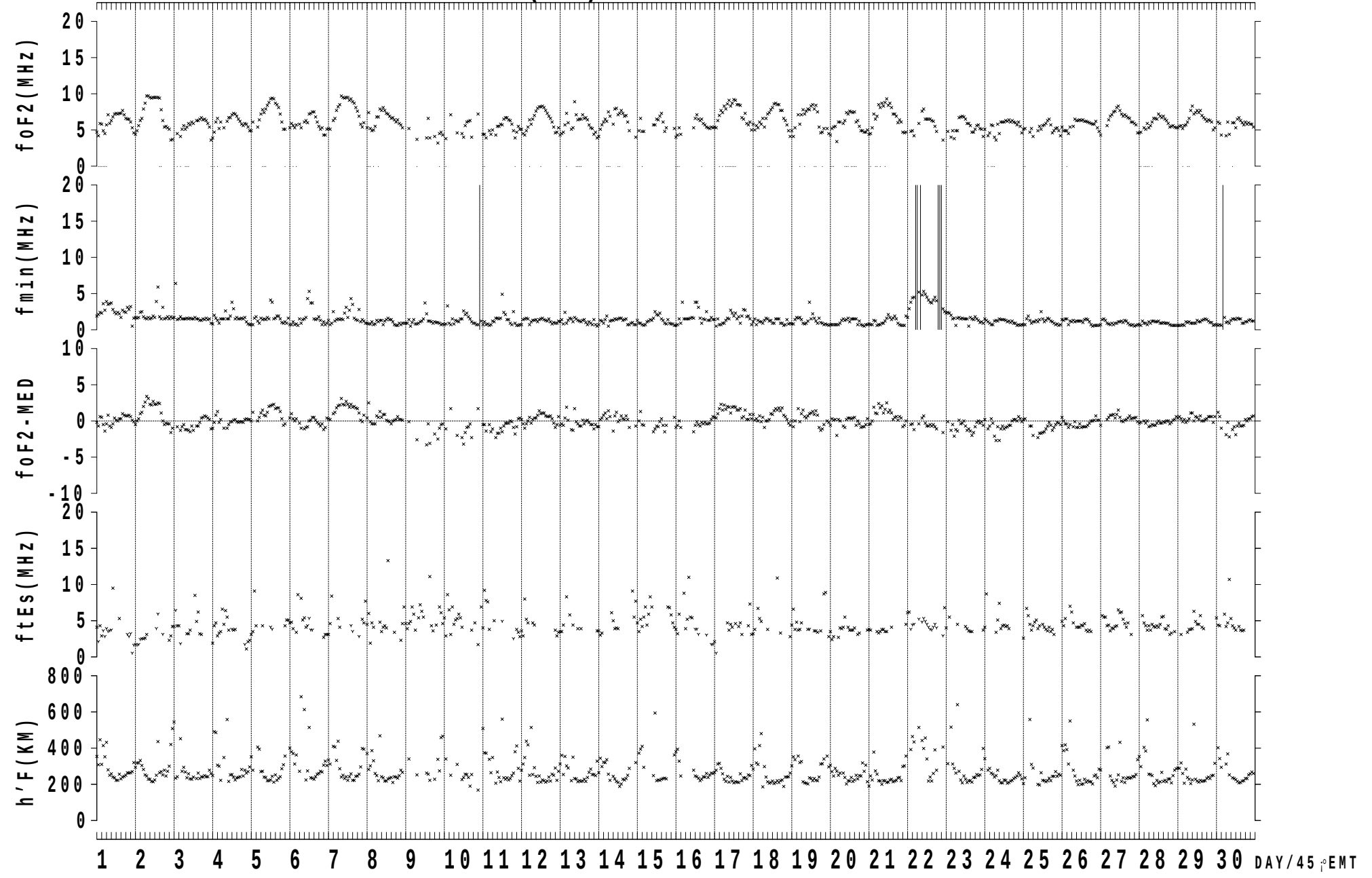
2024 0901 -> 2024 0930(99) SYOWA-ST.



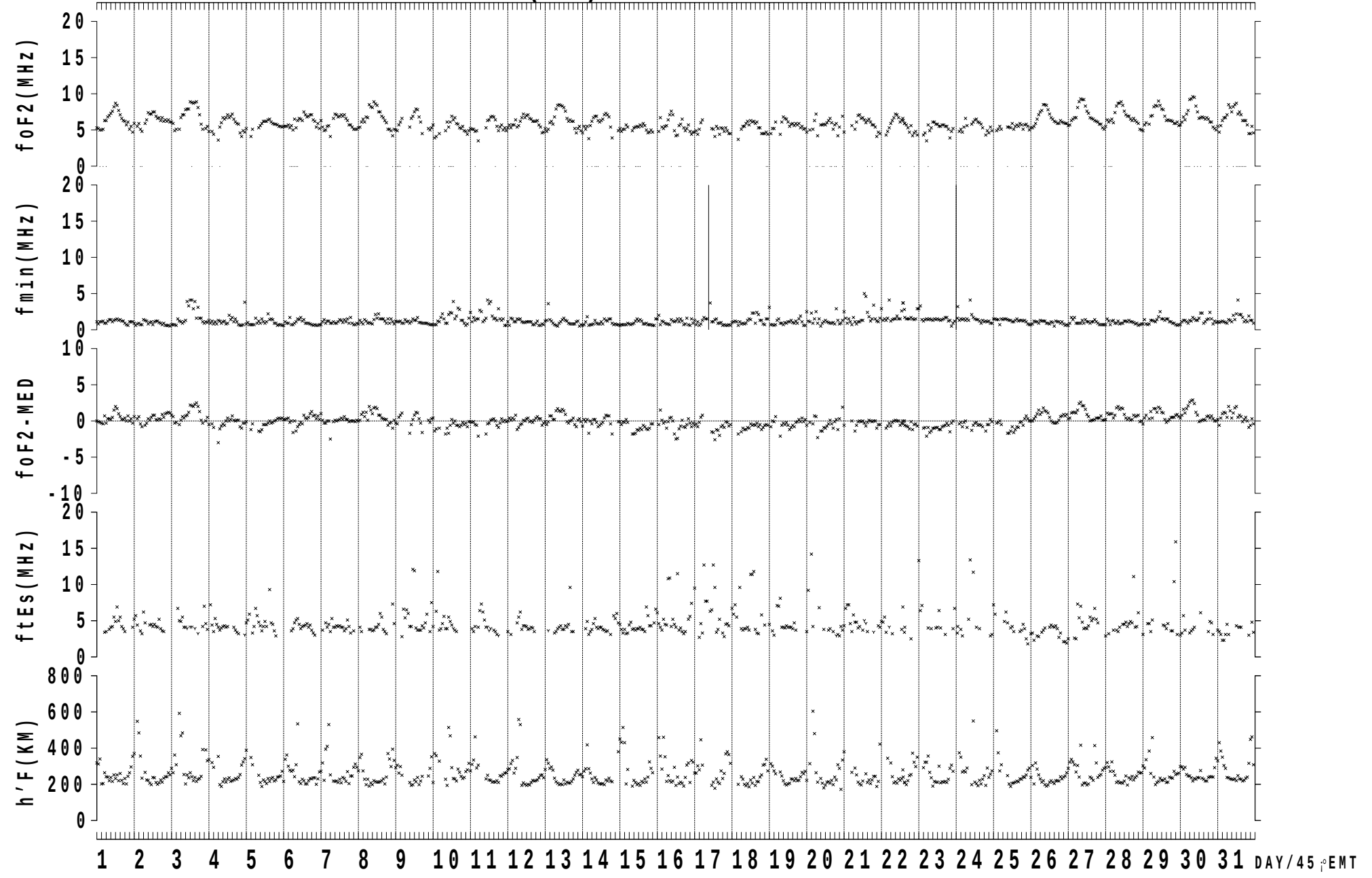
2024 1001 -> 2024 1031(99) SYOWA-ST.



2024 1101 -> 2024 1130(99) SYOWA-ST.



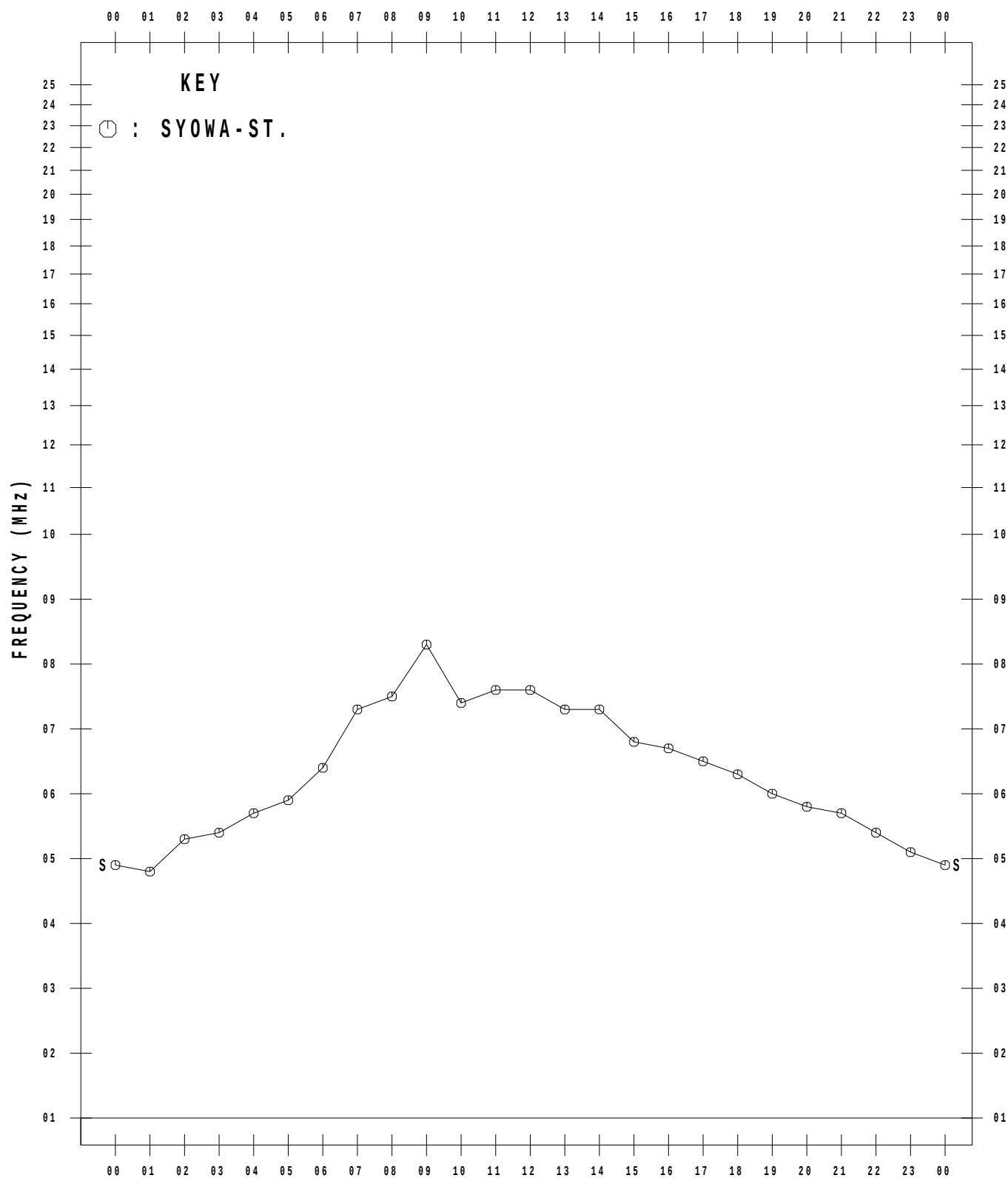
2024 1201 -> 2024 1231(99) SYOWA-ST.



MONTHLY MEDIAN VALUES OF f_oF_2

45°E MEAN TIME

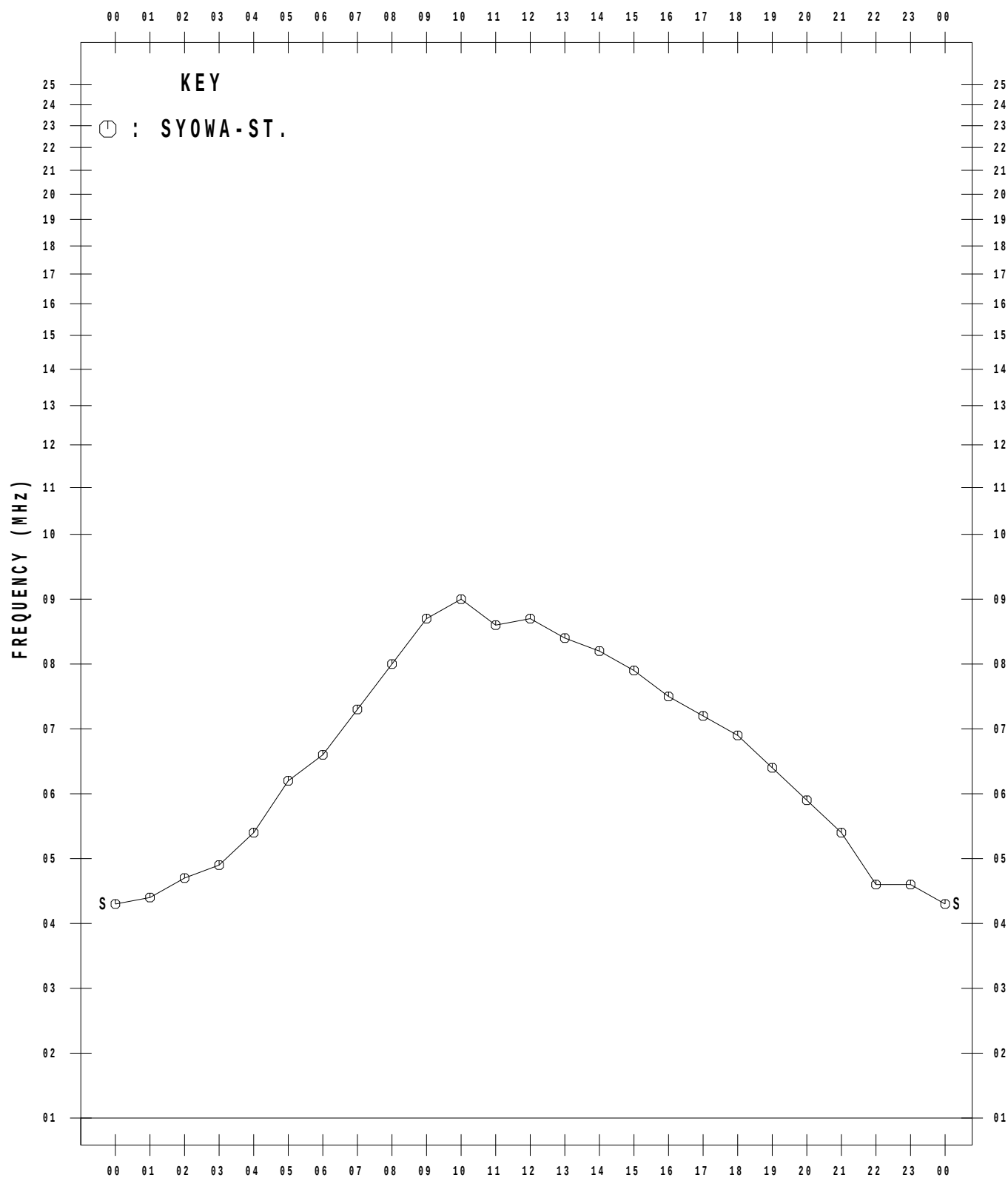
JAN. 2024



MONTHLY MEDIAN VALUES OF f_oF_2

45°E MEAN TIME

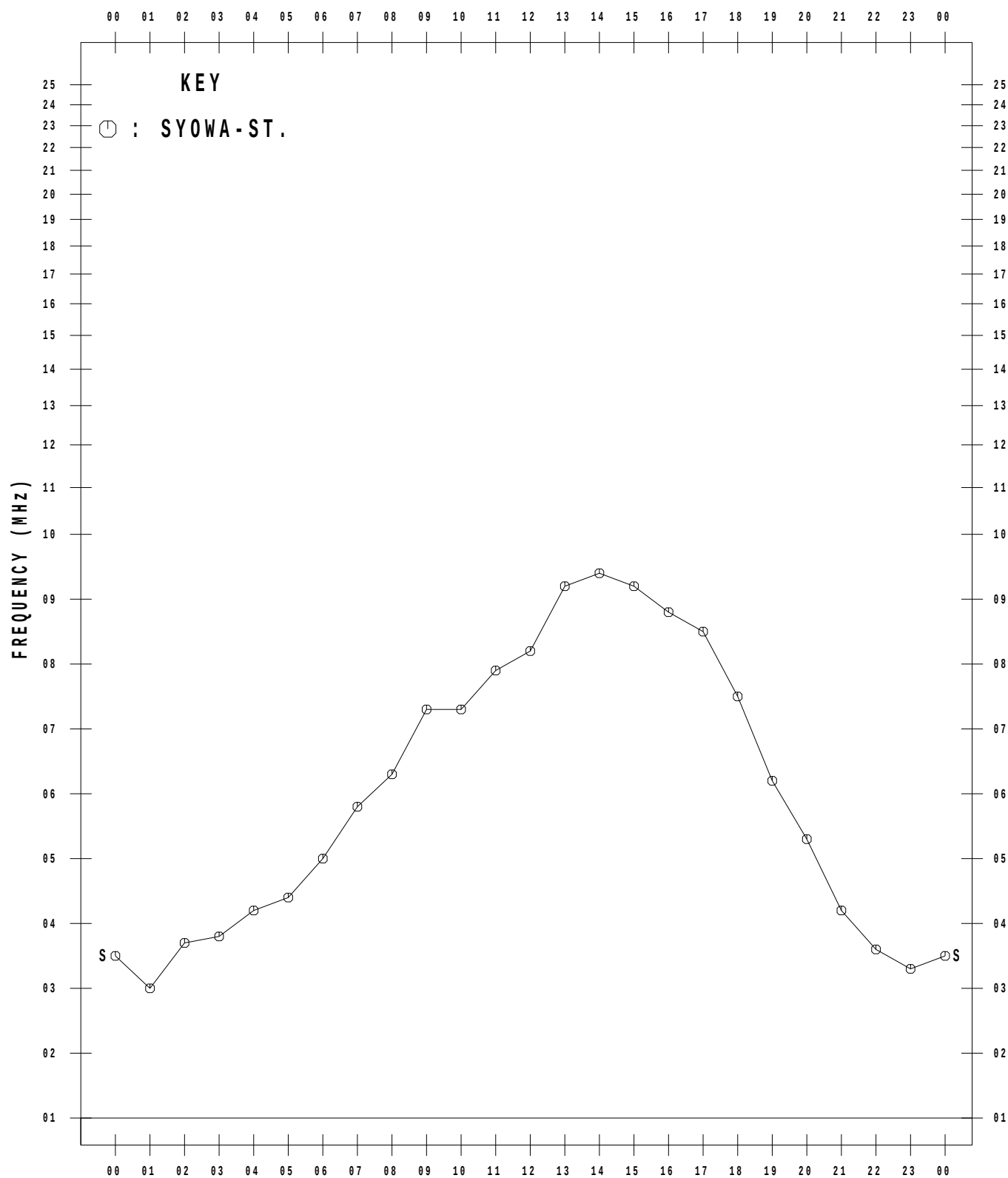
FEB. 2024



MONTHLY MEDIAN VALUES OF f_oF_2

45°E MEAN TIME

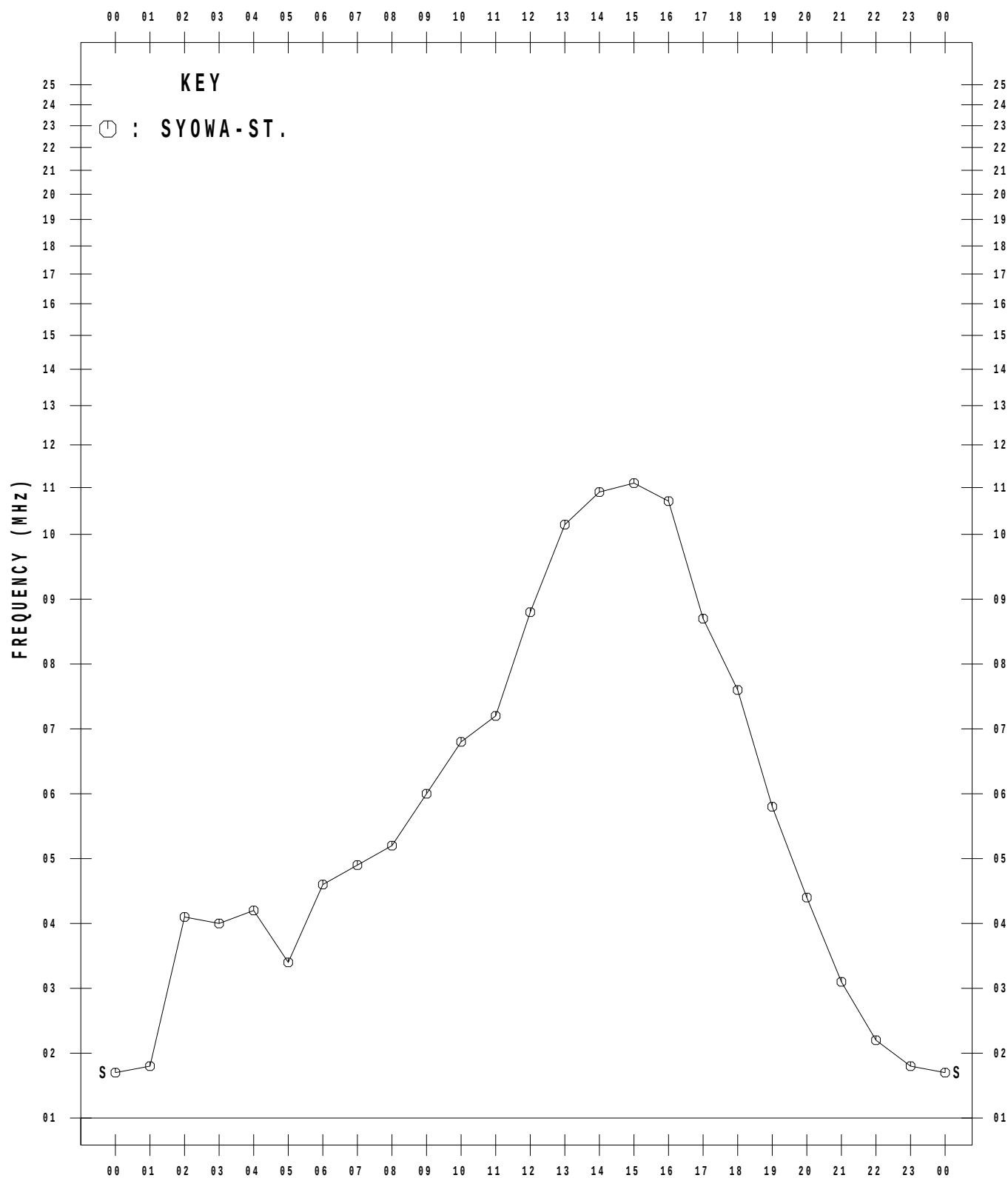
MAR. 2024



MONTHLY MEDIAN VALUES OF f_oF_2

45°E MEAN TIME

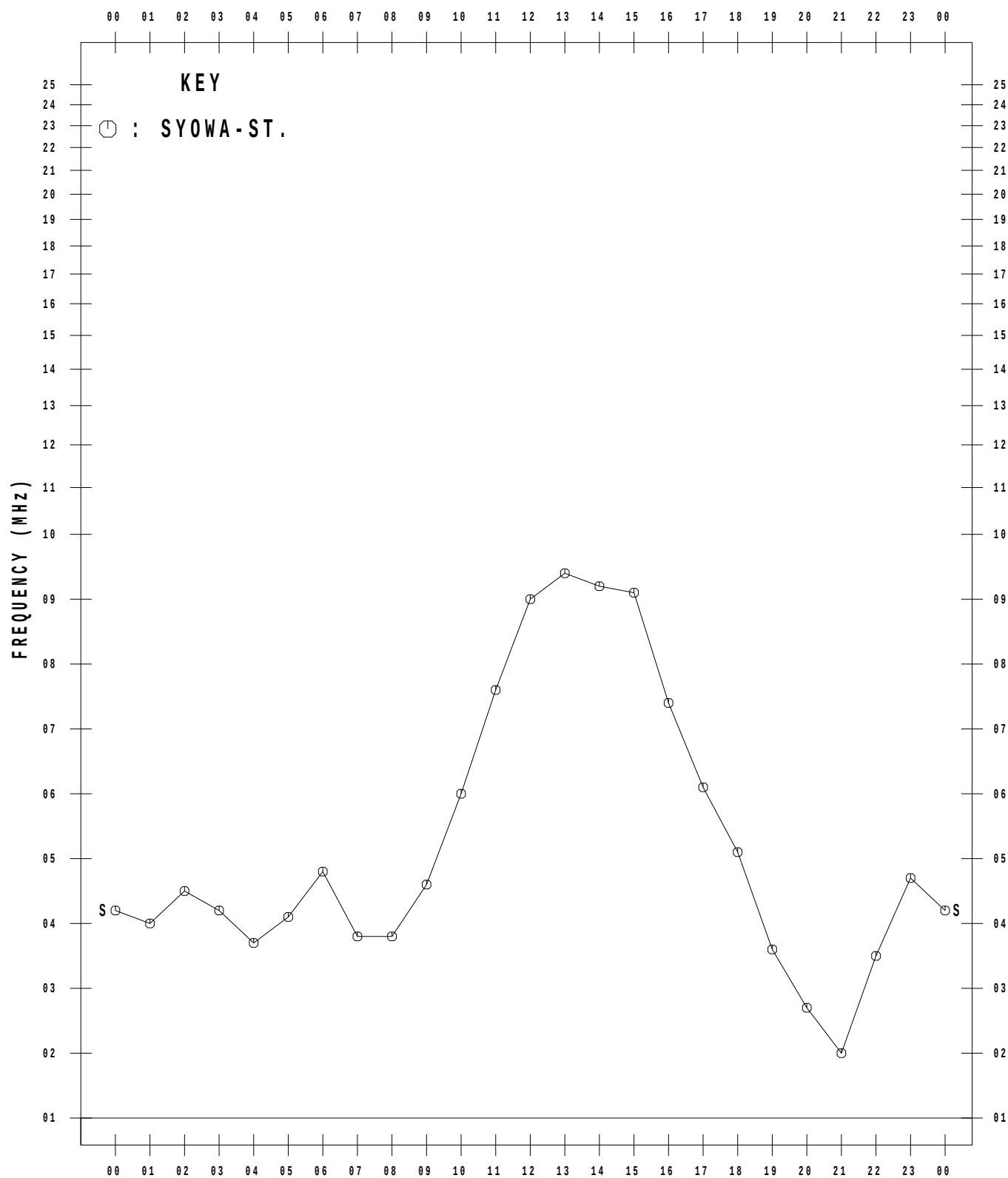
APR. 2024



MONTHLY MEDIAN VALUES OF f_oF_2

45°E MEAN TIME

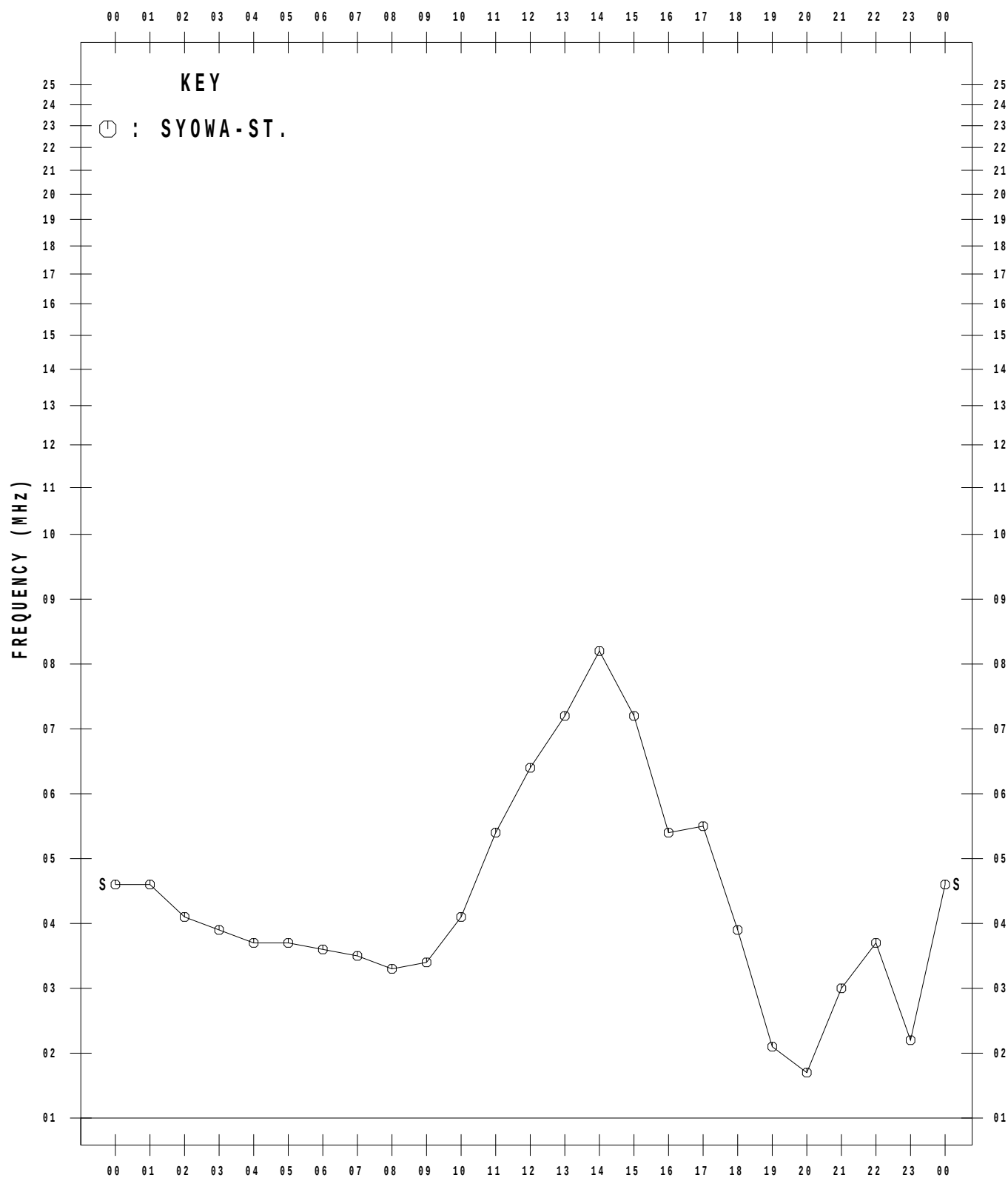
MAY 2024



MONTHLY MEDIAN VALUES OF f_oF_2

45°E MEAN TIME

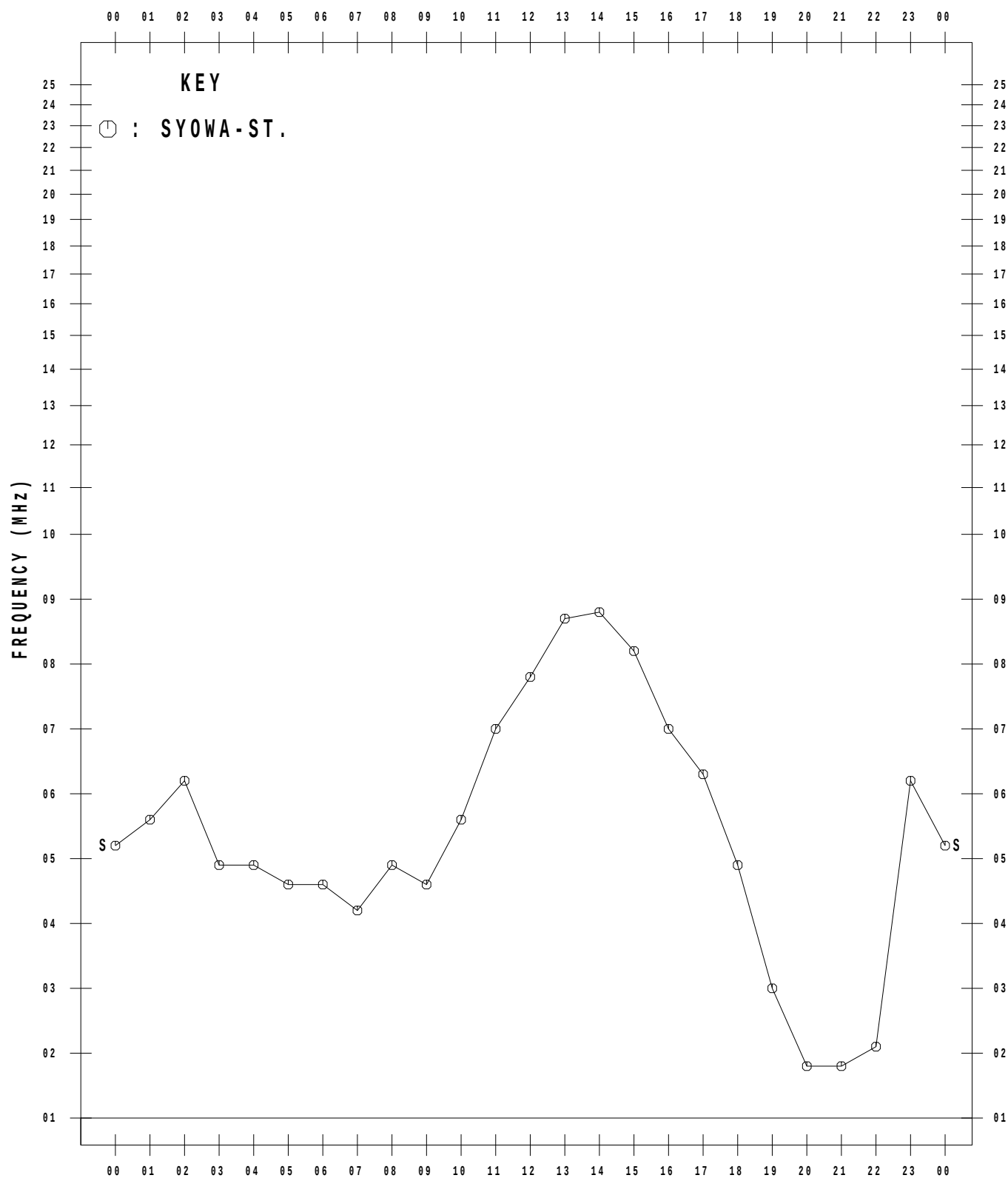
JUN. 2024



MONTHLY MEDIAN VALUES OF f_oF_2

45°E MEAN TIME

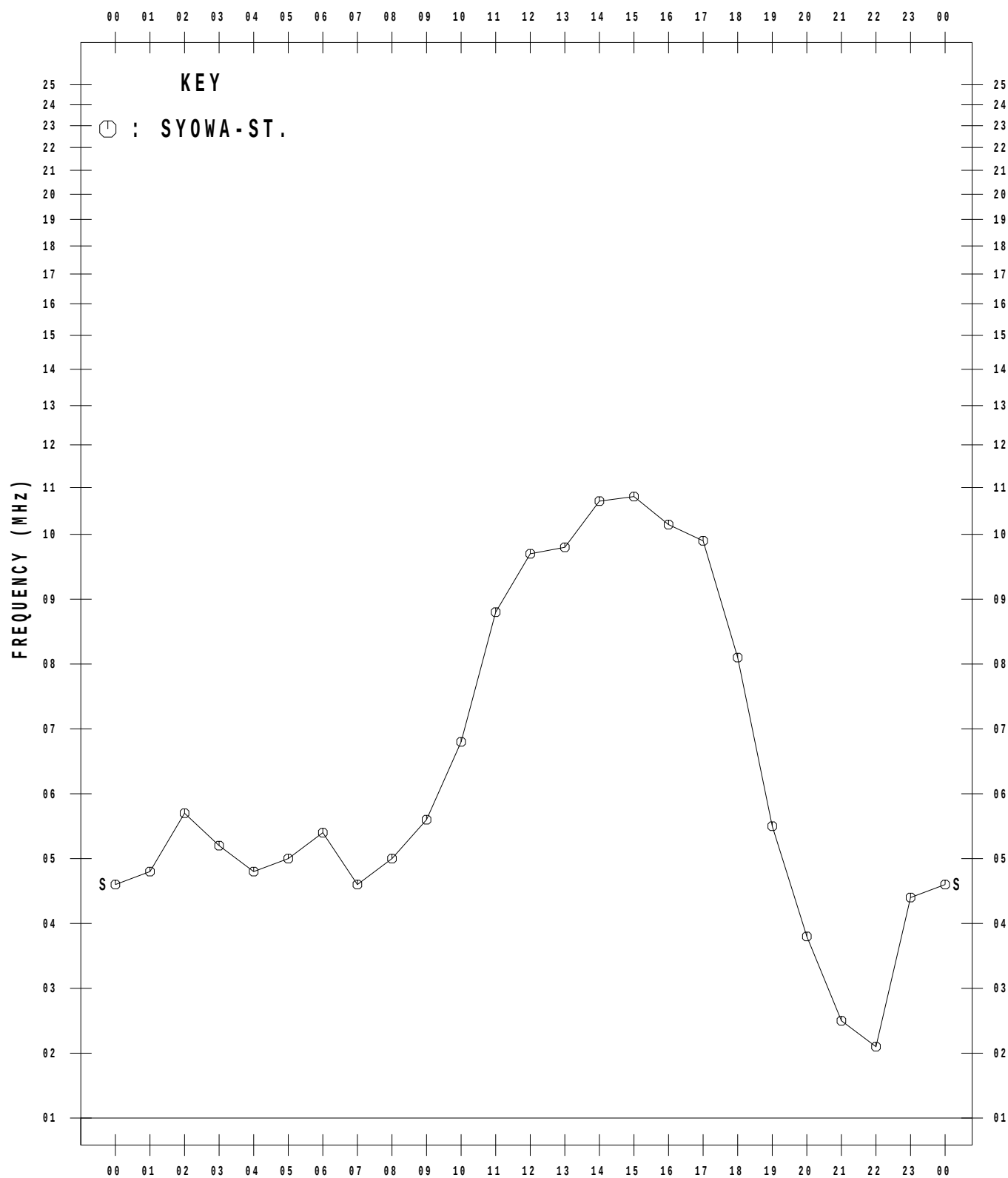
JUL. 2024



MONTHLY MEDIAN VALUES OF f_oF_2

45°E MEAN TIME

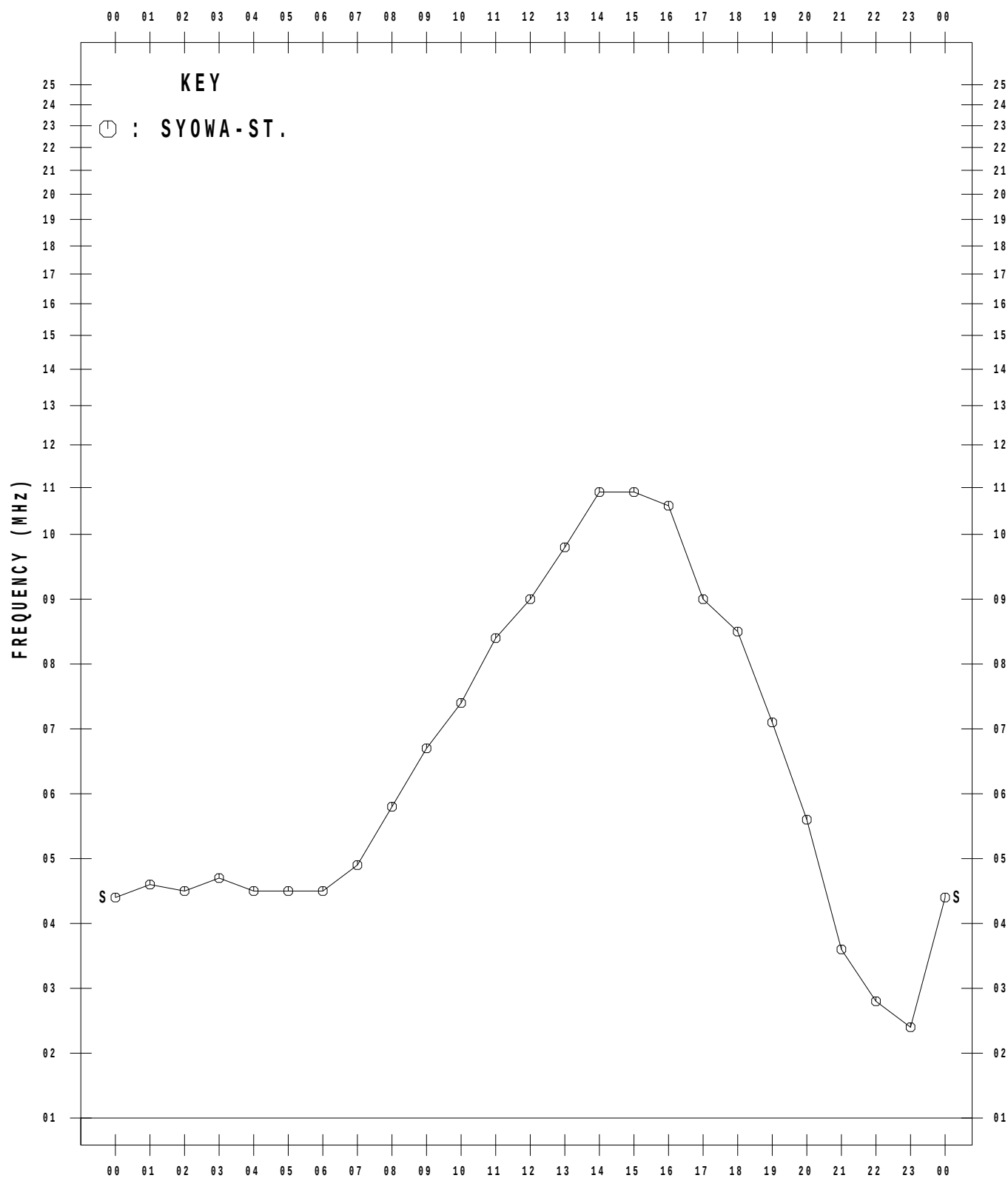
AUG. 2024



MONTHLY MEDIAN VALUES OF f_oF_2

45°E MEAN TIME

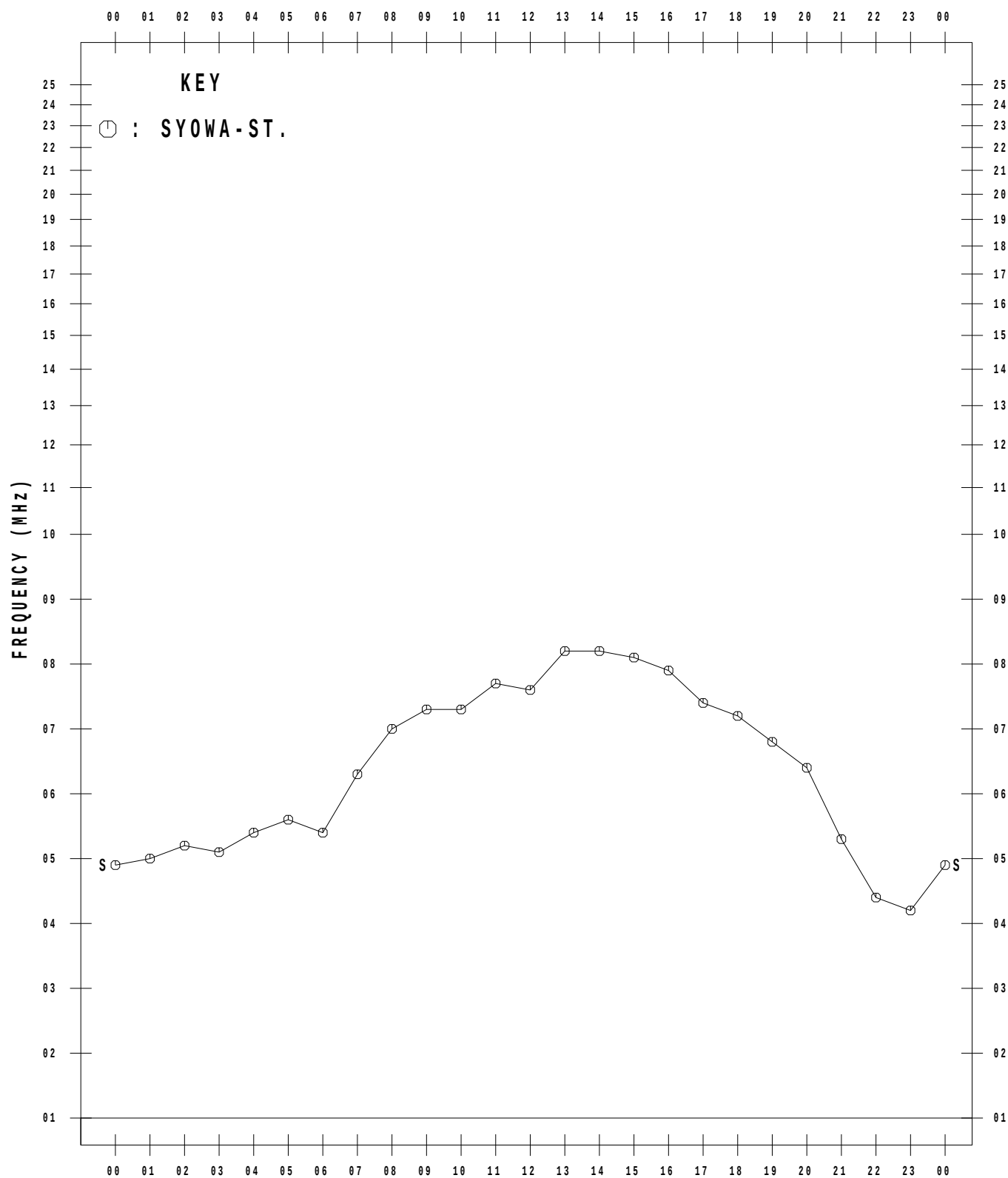
SEP. 2024



MONTHLY MEDIAN VALUES OF f_oF_2

45°E MEAN TIME

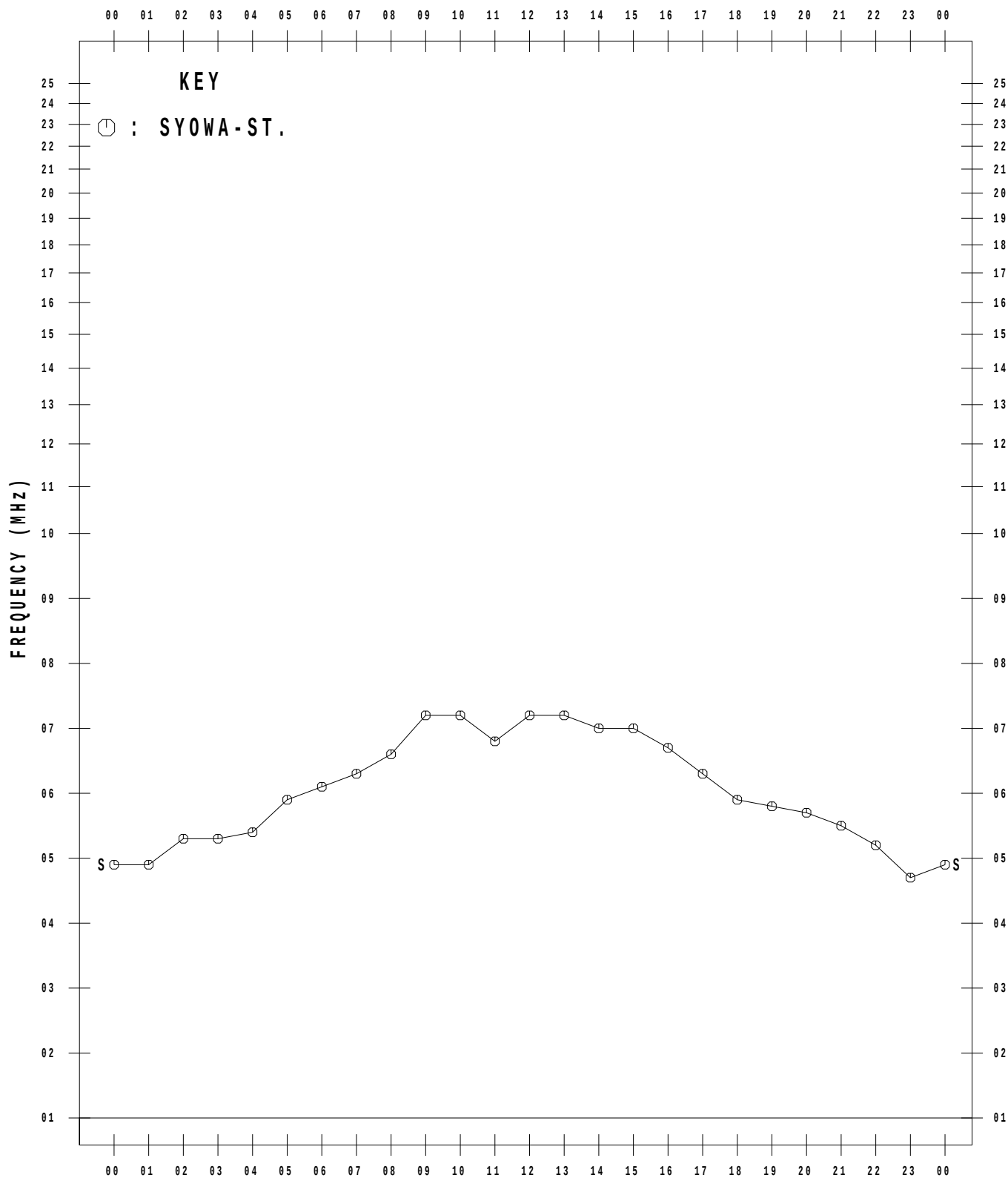
OCT. 2024



MONTHLY MEDIAN VALUES OF f_oF_2

45°E MEAN TIME

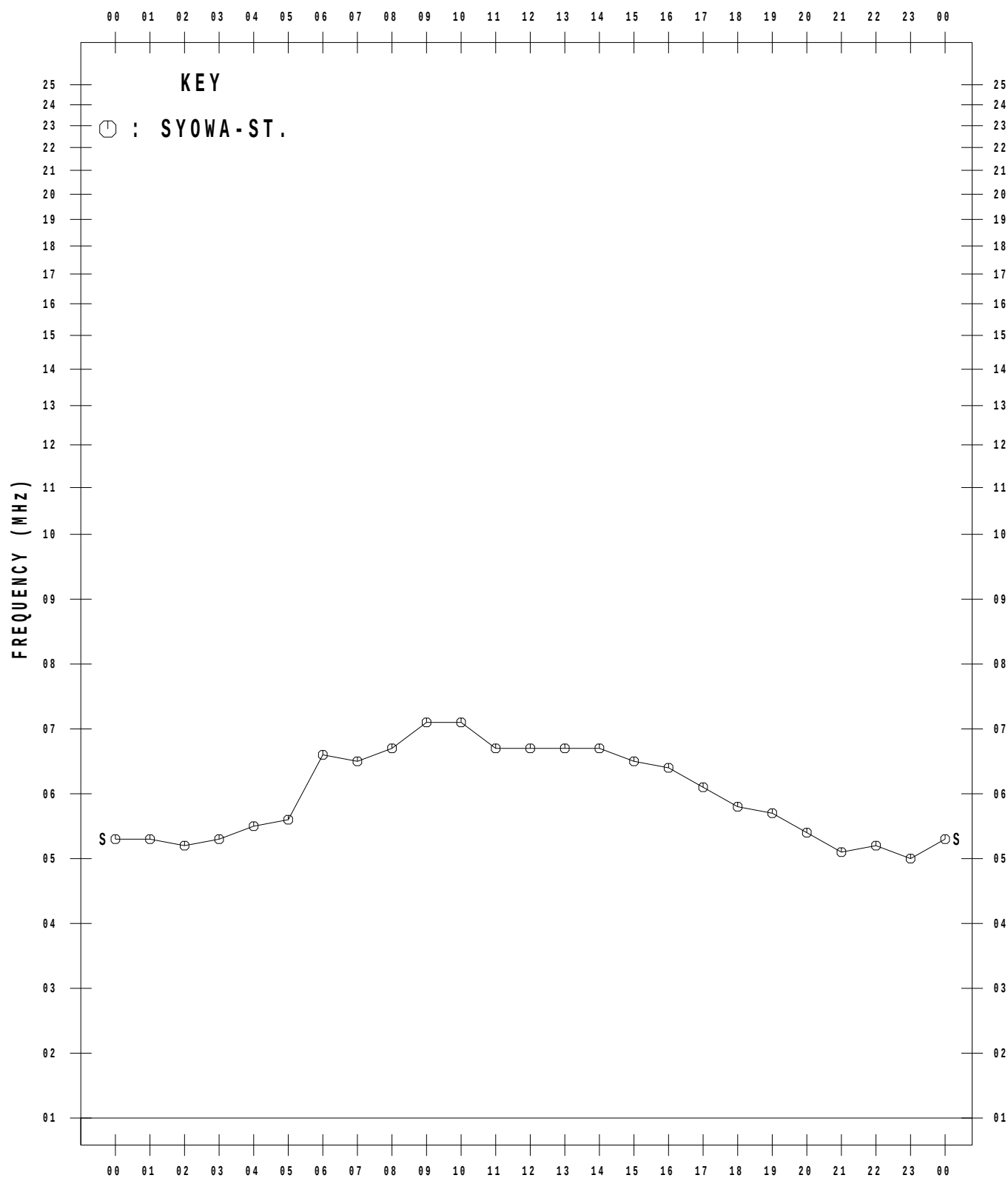
NOV. 2024



MONTHLY MEDIAN VALUES OF f_oF_2

45°E MEAN TIME

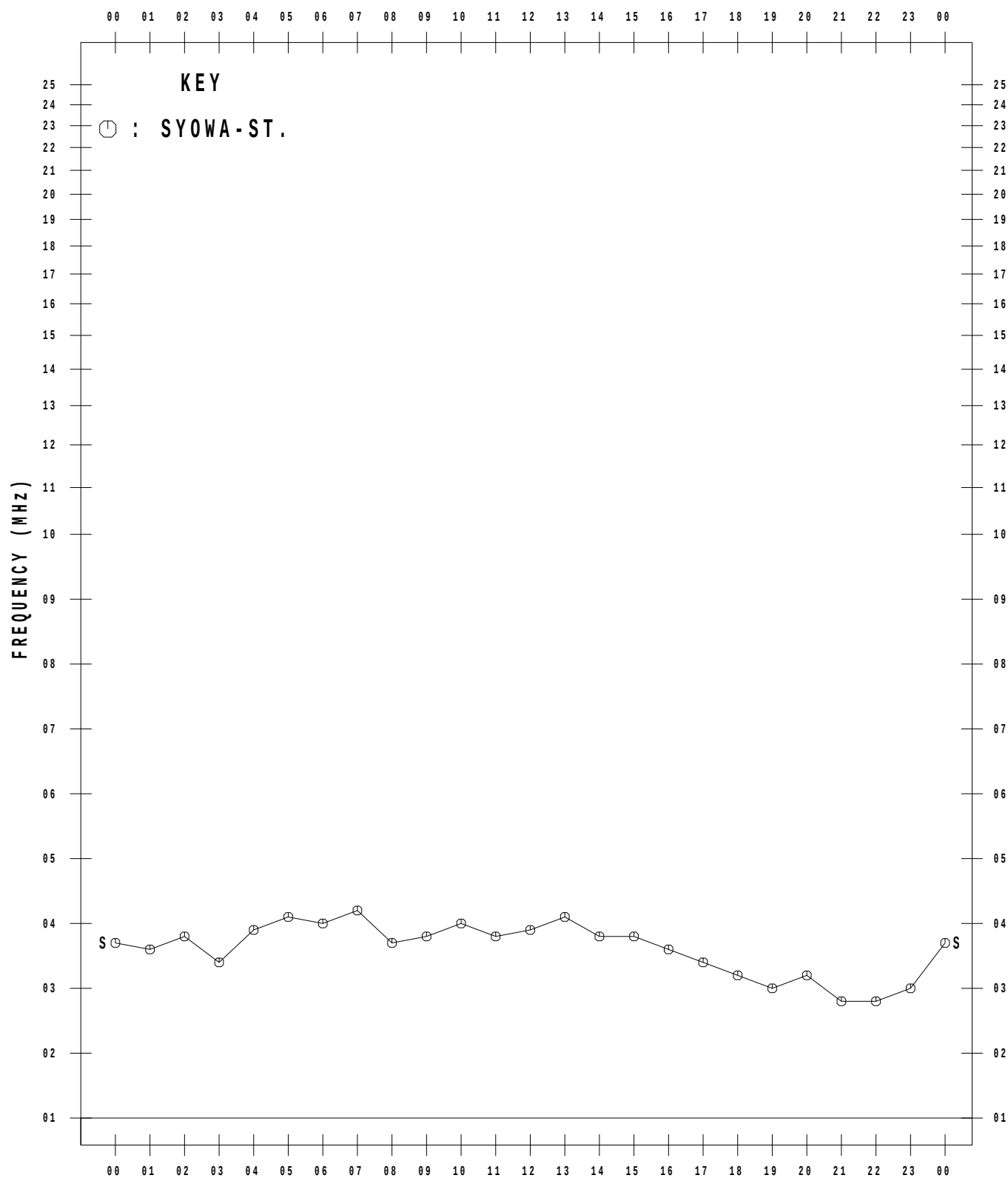
DEC. 2024



MONTHLY MEDIAN VALUES OF f_{TE}s

45°E MEAN TIME

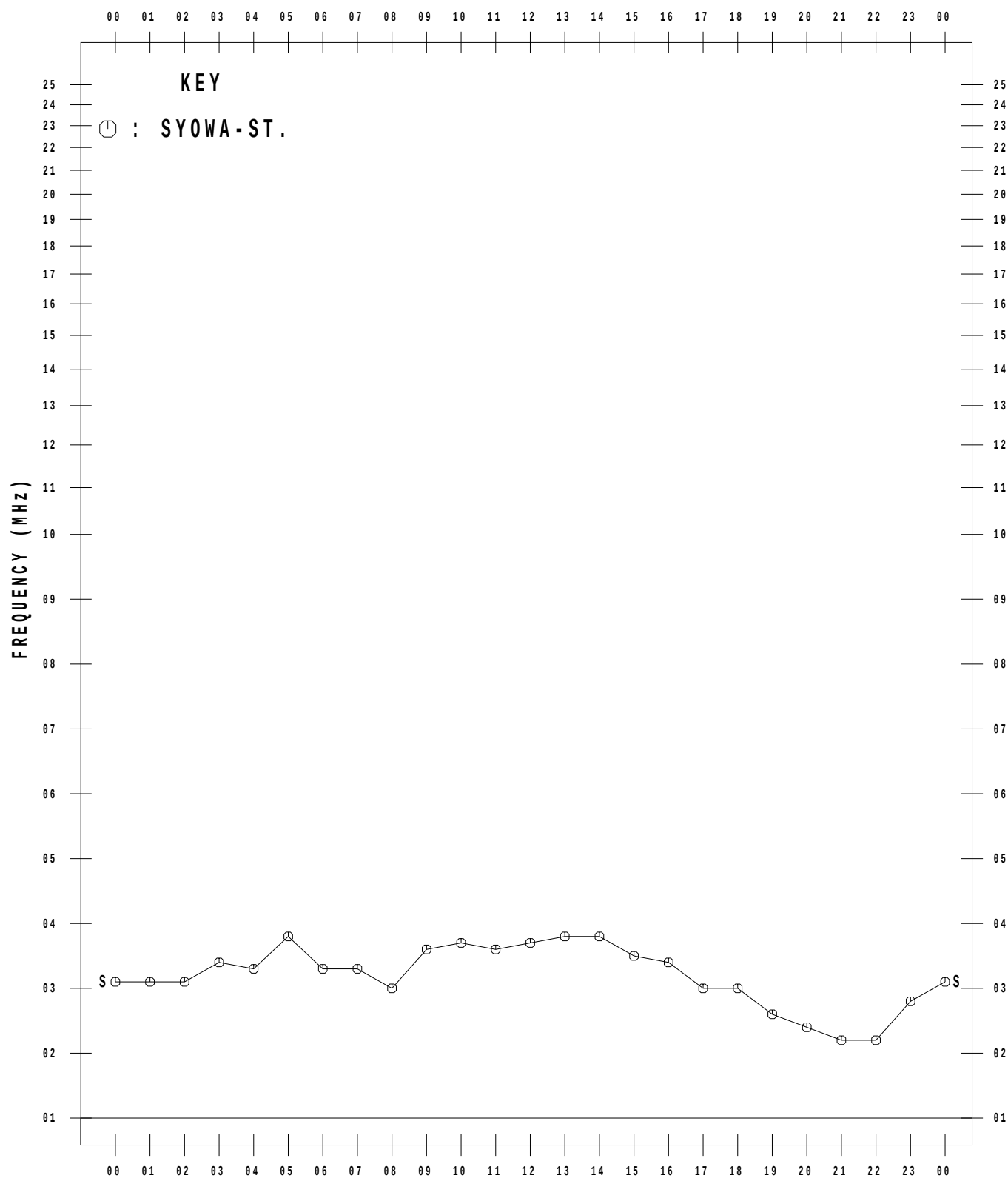
JAN. 2024



MONTHLY MEDIAN VALUES OF f_{TE}s

45°E MEAN TIME

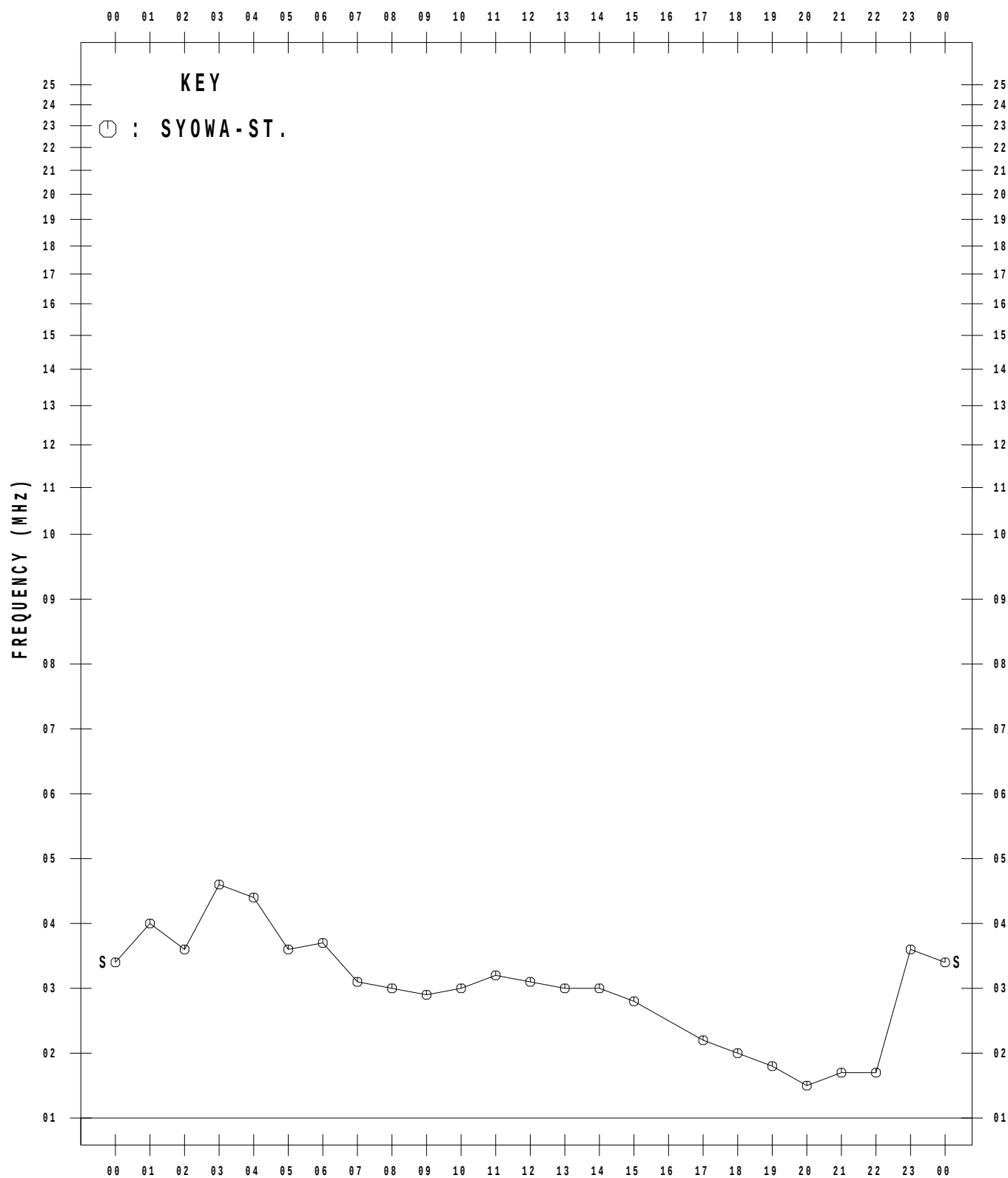
FEB. 2024



MONTHLY MEDIAN VALUES OF f_{TE}s

45°E MEAN TIME

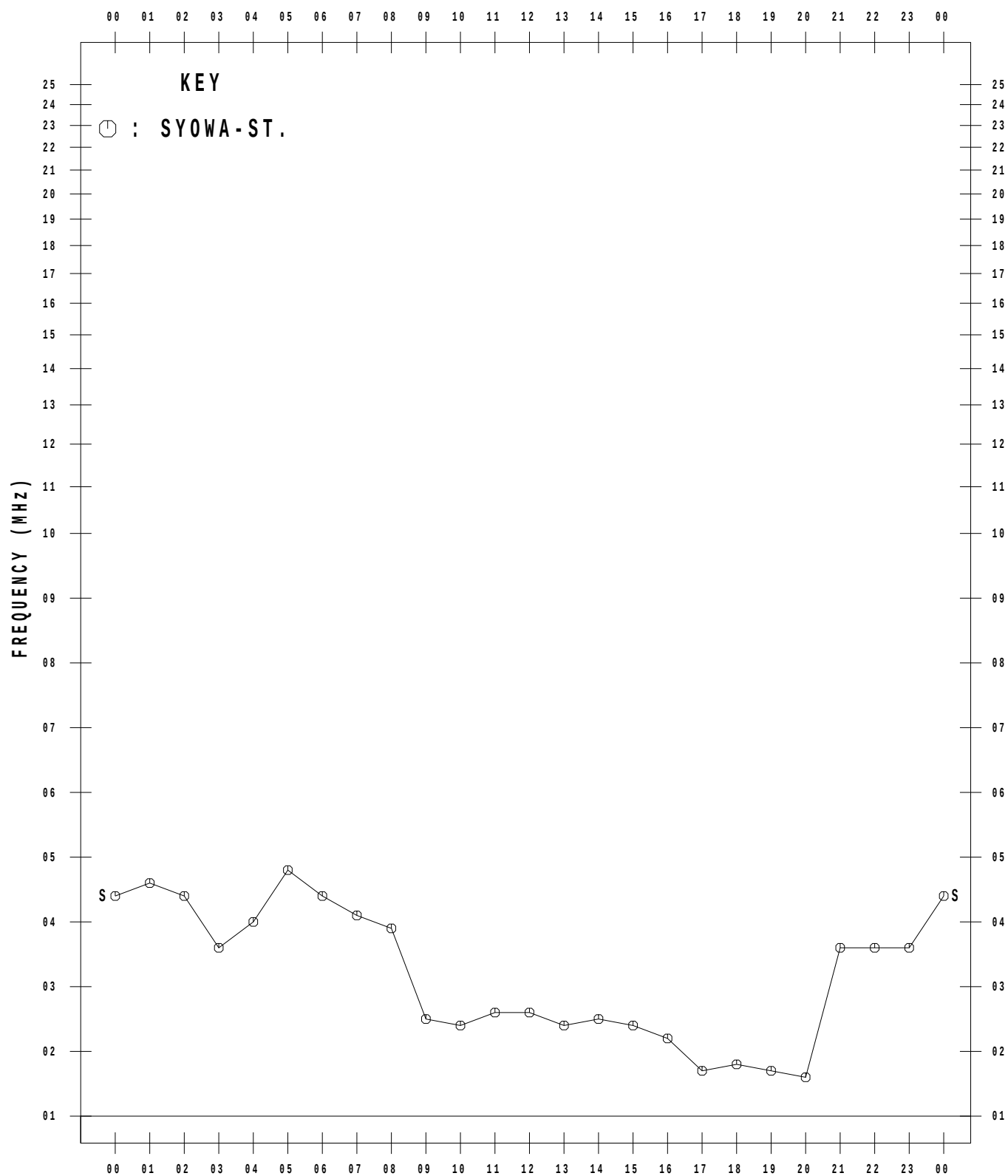
MAR. 2024



MONTHLY MEDIAN VALUES OF f_{TE}s

45°E MEAN TIME

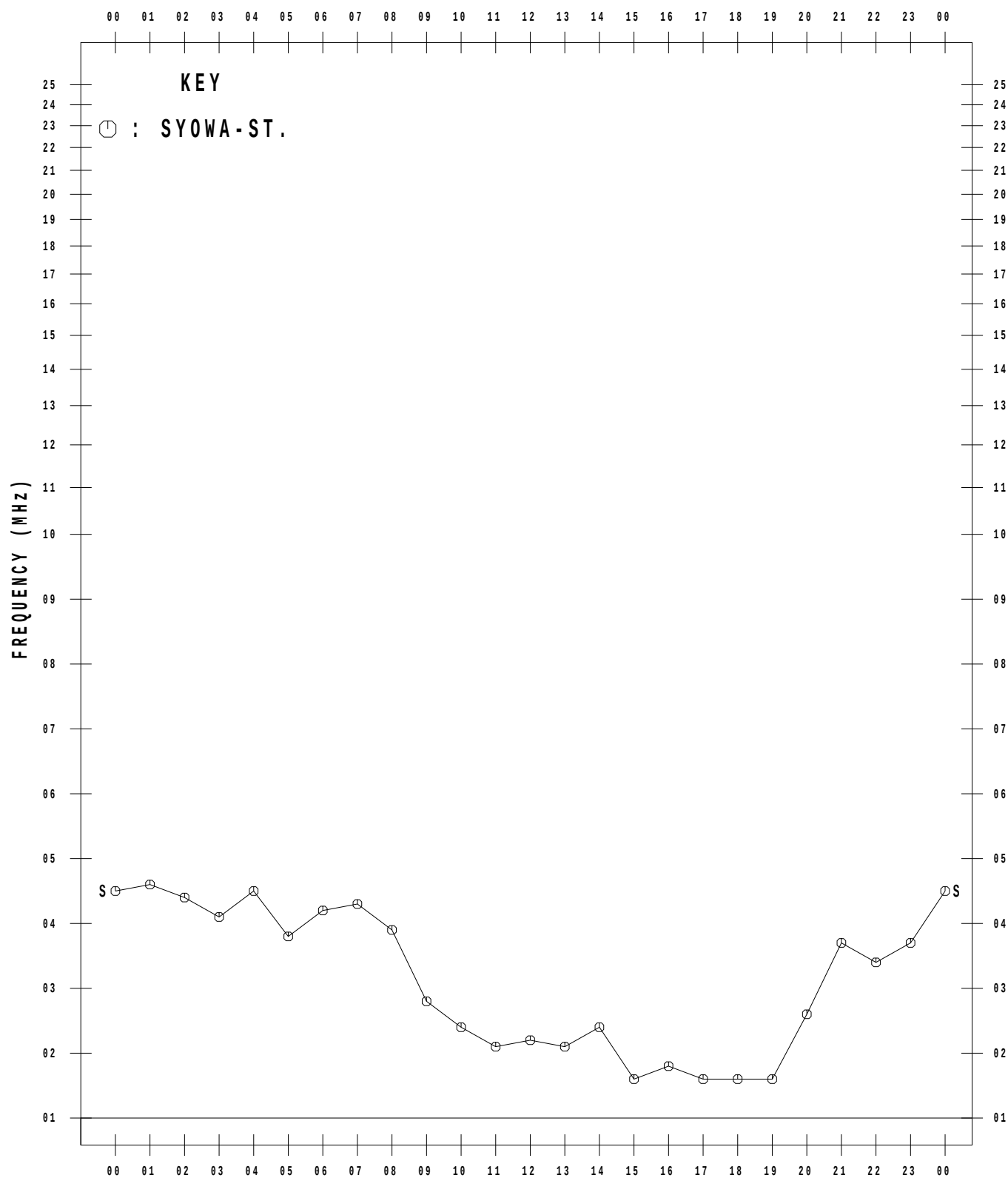
APR. 2024



MONTHLY MEDIAN VALUES OF f_{TE} s

45°E MEAN TIME

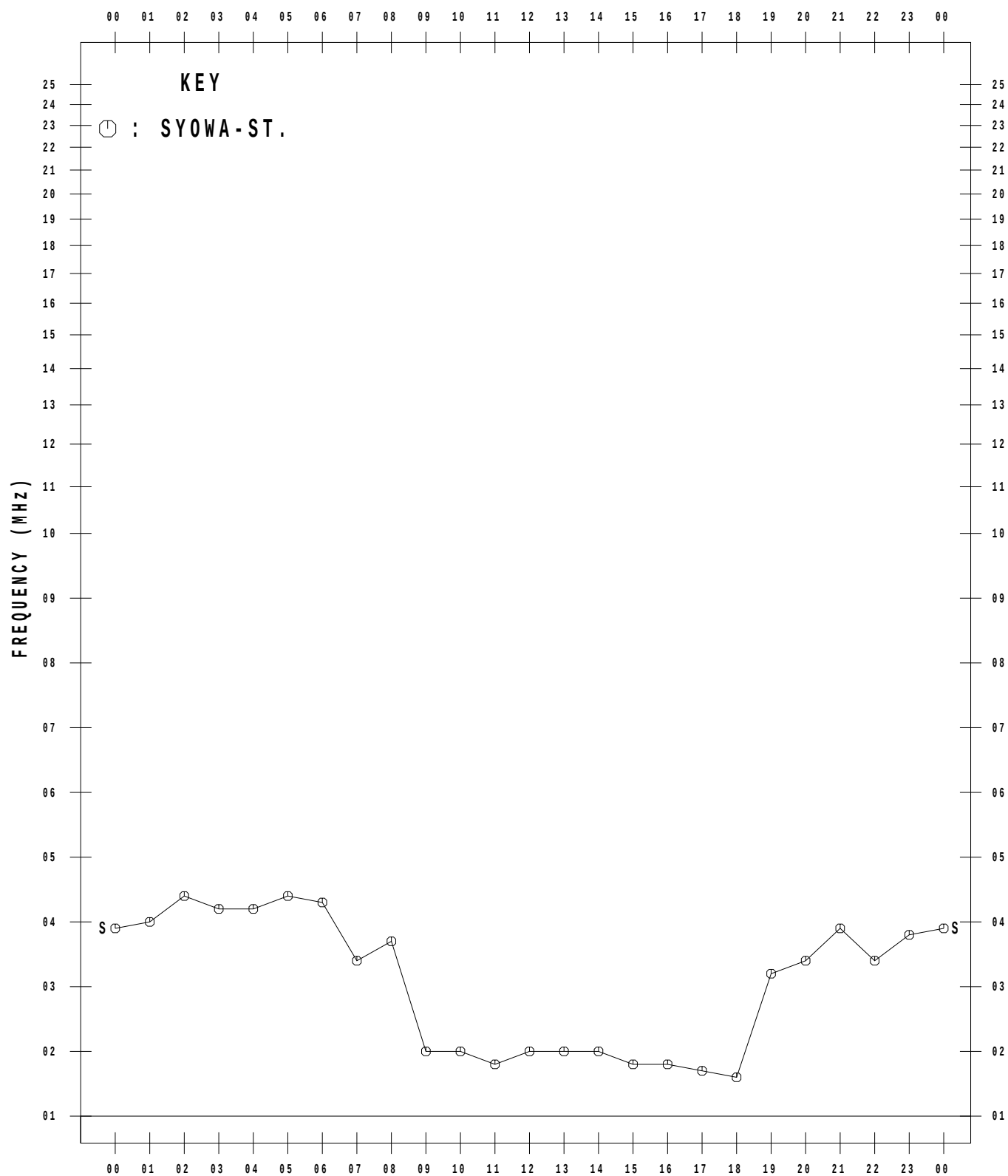
MAY 2024



MONTHLY MEDIAN VALUES OF f_{TE}s

45°E MEAN TIME

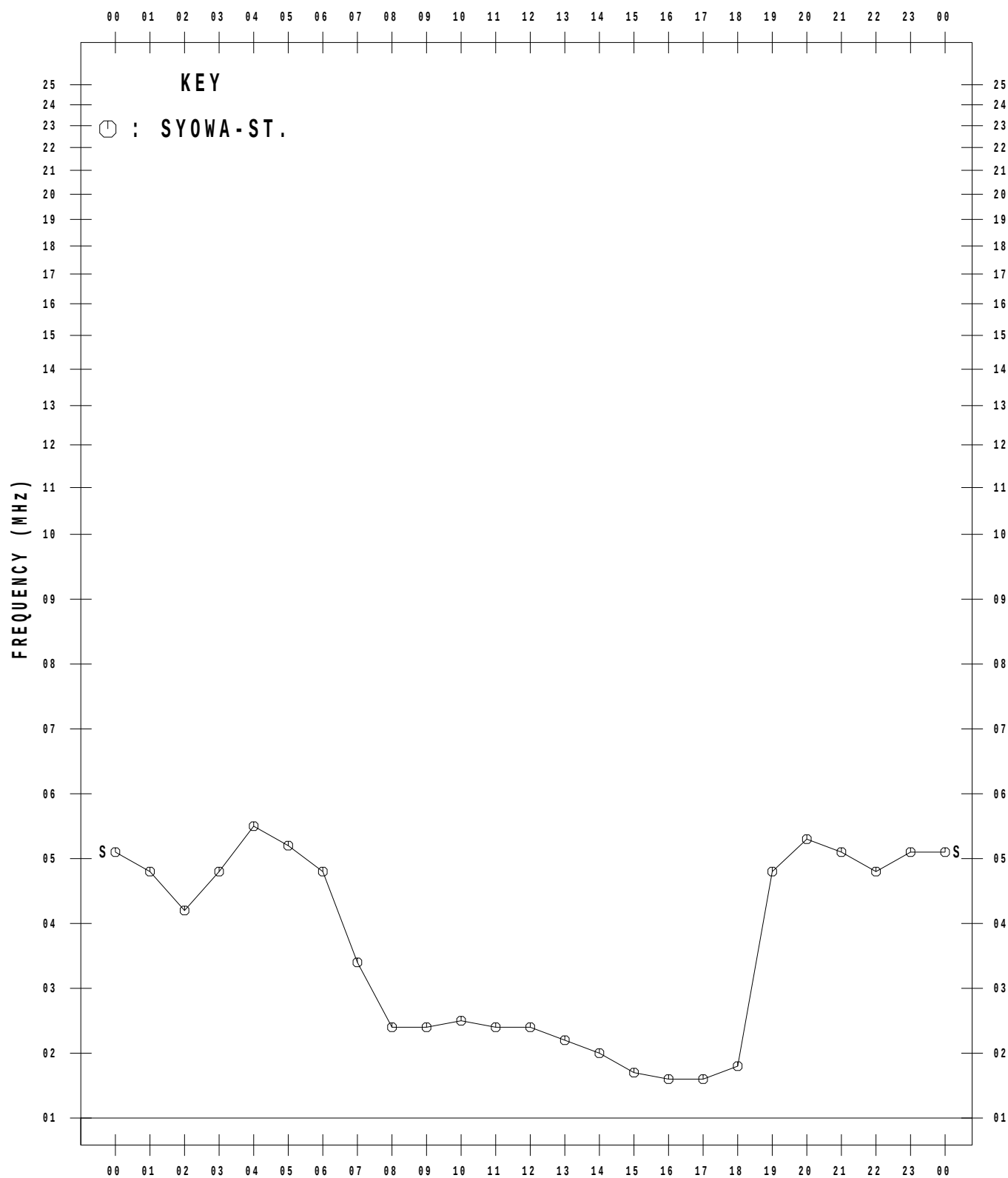
JUN. 2024



MONTHLY MEDIAN VALUES OF f_{TE}s

45°E MEAN TIME

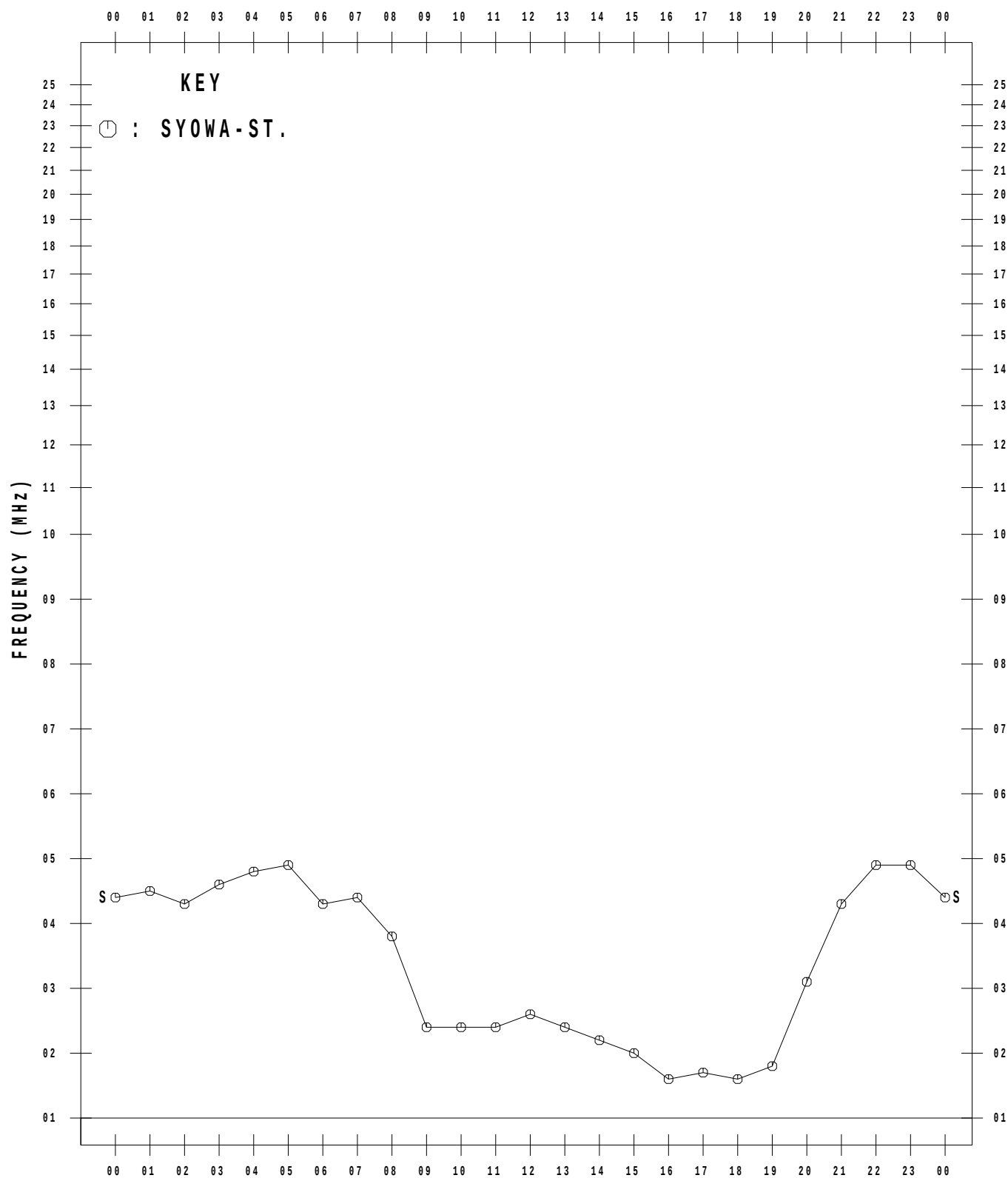
JUL. 2024



MONTHLY MEDIAN VALUES OF $f_t E_s$

45°E MEAN TIME

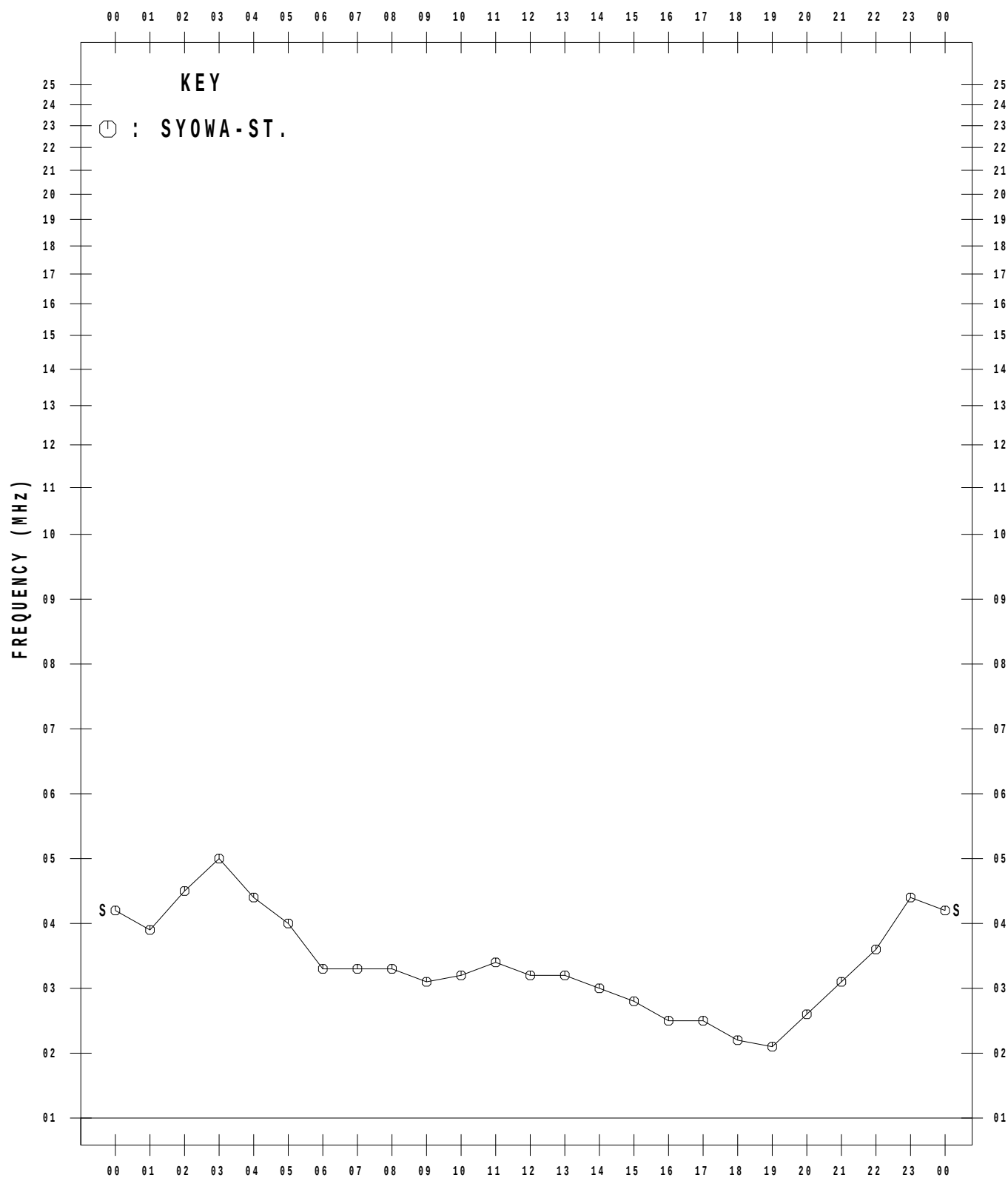
AUG. 2024



MONTHLY MEDIAN VALUES OF f_tE_s

45°E MEAN TIME

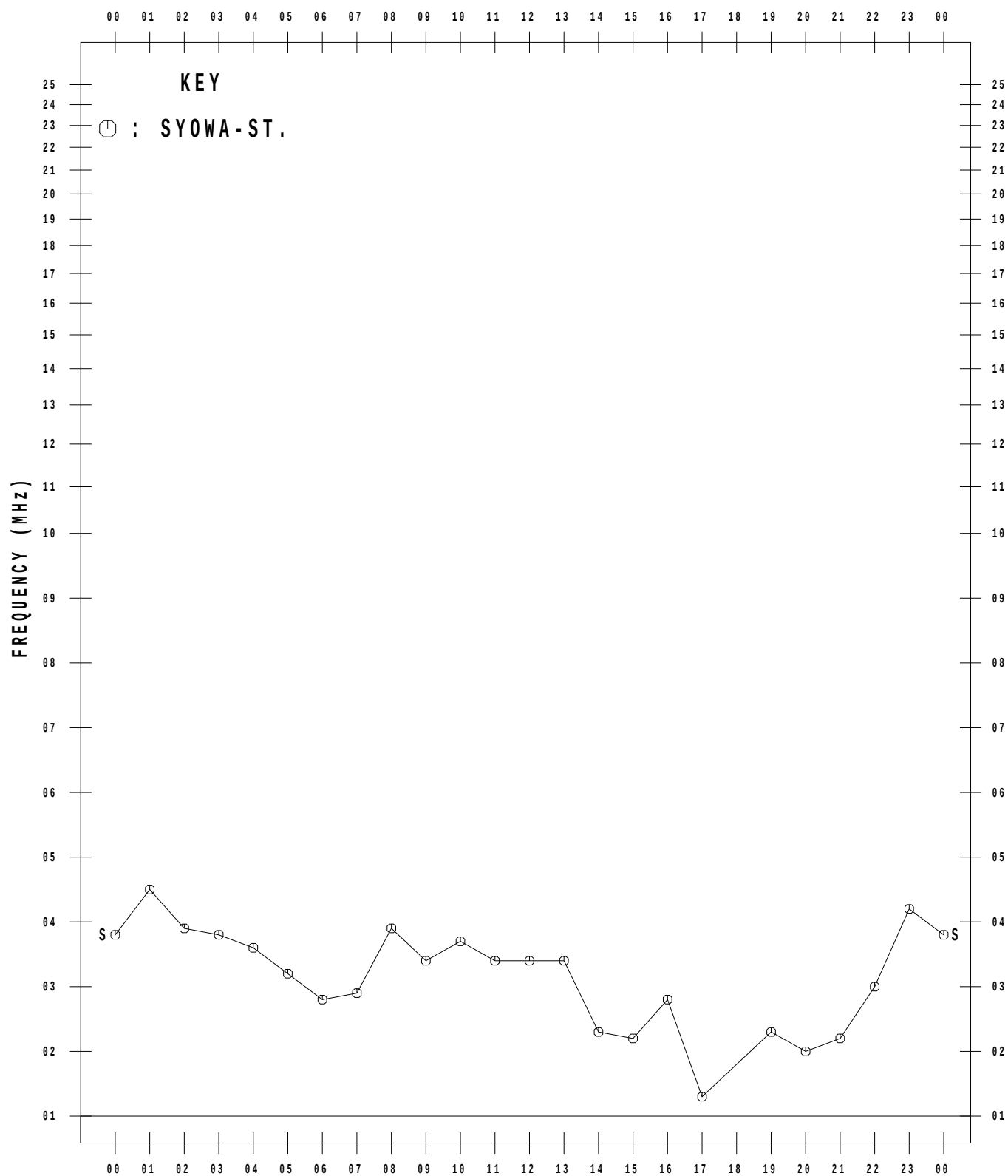
SEP. 2024



MONTHLY MEDIAN VALUES OF $f_t E_s$

45°E MEAN TIME

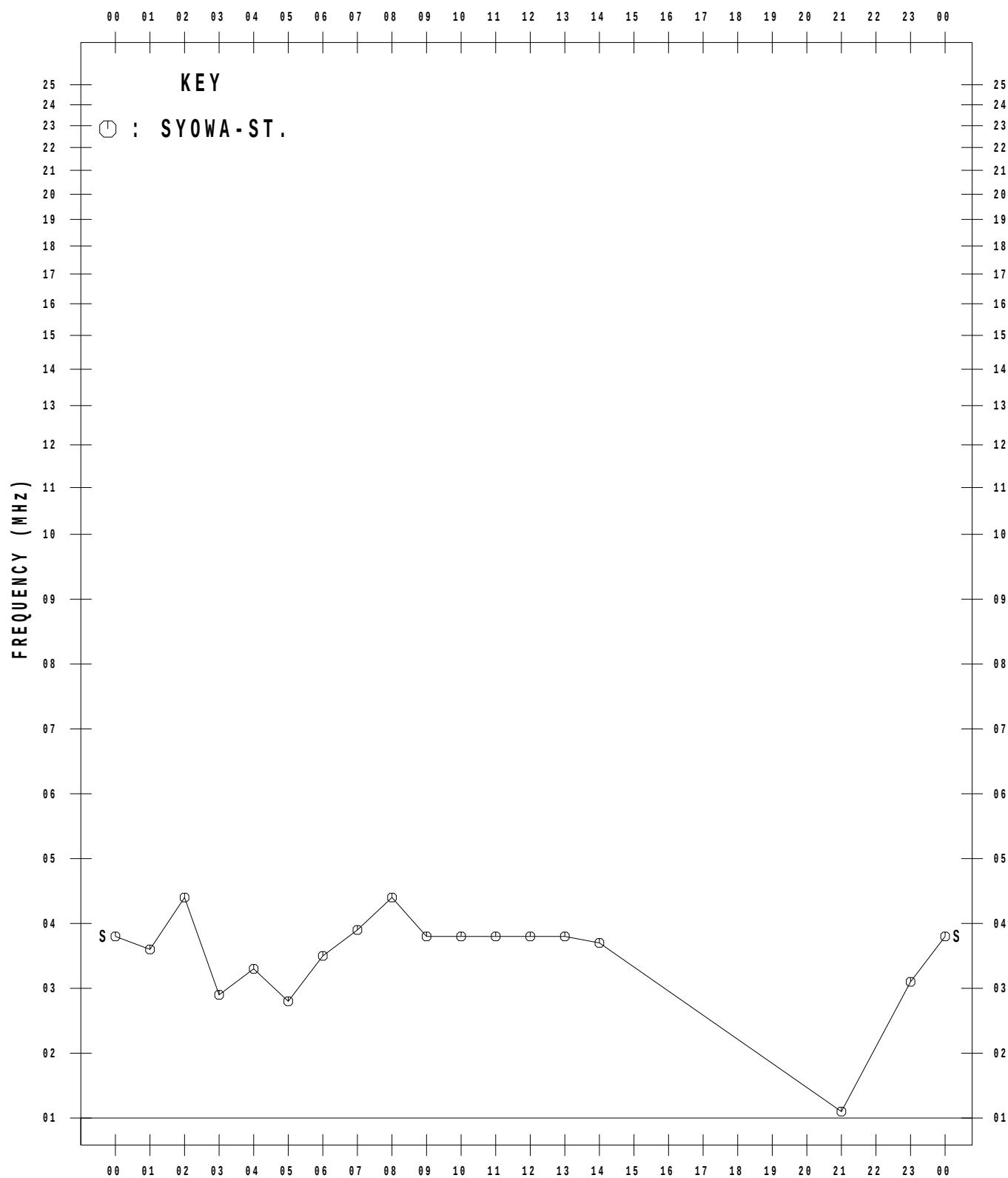
OCT. 2024



MONTHLY MEDIAN VALUES OF f_{TE}s

45°E MEAN TIME

NOV. 2024



MONTHLY MEDIAN VALUES OF f_{TE}s

45°E MEAN TIME

DEC. 2024

