

IONOSPHERIC DATA AT SYOWA STATION

(ANTARCTICA)

January – December 2018

CONTENTS

	Page
Introduction.....	1
Tables.....	4
Monthly plots of f_xI , $foF2$, $ftEs$, $fmin$ and $h'F$	64
Monthly median plots of $foF2$	76
Monthly median plots of $ftEs$	88



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 2018. 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	86.9

* 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	Hard drive
Power Supply	100 V - AC, 1.5 kVA
Transmitting Antenna and Receiving Antenna	40-m-high vertical delta antennas terminated by 400 Ω

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

OBSERVERS

Observer: T. Naoi

Scaler: K. Fukushima

DESCRIPTION

- a. All symbols and terminology in the tables or figures of ionospheric data are used in accordance with the *URSI Handbook of Ionogram Interpretation and Reduction* (second edition 1972)
- b. Characteristics of Ionosphere

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

Symbols

(i) Descriptive Letters.

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

- A Measurement influenced by, or impossible because of, the presence of a lower thin layer, for example, Es .
- B Measurement influenced by, or impossible because of, absorption in the vicinity of $fmin$.
- C Measurement influenced by, or impossible because of, any non-ionospheric reason.
- D Measurement influenced by, or impossible because of, the upper limit of the normal frequency range.
- E Measurement influenced by, or impossible because of, the lower limit of the normal frequency range.
- F Measurement influenced by, or impossible because of, the presence of spread echoes.
- G Measurement influenced or impossible because the ionization density of the layer is too small to enable it to be made accurately.
- H Measurement influenced by, or impossible because of, the presence of stratification.
- K Presence of particle E layer.
- L Measurement influenced or impossible because the trace has no sufficiently definite cusp between layers.
- M Interpretation of measurement questionable because ordinary and extraordinary components are not distinguishable.
- N Conditions are such that the measurement cannot be interpreted.
- O Measurement refers to the ordinary component.
- P Spur type spread present.
- Q Range spread present.
- R Measurement influenced by, or impossible because of, attenuation in the vicinity of a critical frequency.
- S Measurement influenced by, or impossible because of, interference or atmospherics.
- T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
- V Forked trace that may influence the measurement.

- W Measurement influenced or impossible because the echo lies outside the recorded height range.
- X Measurement refers to the extraordinary component.
- Y Lacuna phenomena, severe layer tilt .
- Z Third magneto- electronic component present.

(ii) Qualifying Letters

The following letters are entered in the first column before numerical values on the monthly tabulation sheets.

- D Greater than.
- E Less than.
- J Ordinary component characteristic deduced from the extraordinary component .
- M Mode interpretation uncertain.
- O Extraordinary component characteristic deduced from the ordinary component.
(Used for x-characteristics only.)
- T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
- U Uncertain or doubtful numerical value.
- Z Measurement deduced from the third magneto-electronic component.

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

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

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

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

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

Acknowledgment

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

IONOSPHERIC DATA STATION SHOWA-ST.

JAN.2018 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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	X	51	50	47	X	X	X	X	X
7	58	42	X	X	X	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A	X	X	
8	58	79	57	47	47	66	60	63	56	54	56	55	64	64	58	46	A	54	46	48	44	44	38	A	
9	45	A	X	X	O	X	A	A	61	84	R	54	C	X	X	A	O	X	X	X	X	X	X	X	
10	X	A	X	A	O	X	55	78	A	59	59	56	55	54	52	51	57	50	54	52	50	48	49	46	
11	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12	48	46	42	47	47	54	57	62	71	70	68	68	70	64	59	58	53	52	53	50	52	44	45	44	
13	46	45	46	47	49	58	57	57	53	54	58	62	59	58	61	57	49	51	52	48	45	47	68	62	
14	68	A	A	X	X	O	X	A	A	A	A	X	X	X	X	55	55	52	51	50	57	47	48	37	
15	X	X	X	A	A	A	53	50	52	48	51	53	B	O	X	X	X	X	X	X	X	X	A	R	
16	A	R	45	A	A	A	47	51	57	55	52	52	56	58	56	53	50	51	52	49	49	44	46	44	
17	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
18	46	42	42	42	47	52	68	65	70	68	64	C	56	64	59	53	52	47	47	50	52	48	57	47	
19	65	O	X	X	X	A	A	A	94	52	X	54	58	60	X	X	X	X	X	X	X	X	X	A	
20	A	A	76	A	A	A	A	A	A	A	46	52	50	51	51	49	49	44	47	47	48	40	44	36	
21	X	A	43	A	A	57	62	A	70	56	48	A	48	54	58	51	49	50	48	45	46	42	A	A	
22	B	A	A	B	A	A	A	A	A	44	B	B	O	X	X	X	X	X	X	X	X	R	A	A	
23	A	R	B	A	A	A	B	R	X	O	X	X	X	A	A	X	A	X	X	X	X	X	X	X	
24	X	X	50	47	50	46	C	C	46	50	50	50	50	C	C	C	C	C	C	C	C	C	C	C	
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
26	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
28	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
31	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	14	10	15	11	11	10	11	10	14	14	15	13	16	16	15	17	15	18	18	17	17	16	15	13	
MED	46	42	46	47	49	54	57	59	60	56	56	55	56	54	54	53	50	50	48	48	47	46	45	44	
U Q	58	46	50	47	50	57	62	63	70	61	64	62	58	61	59	56	52	52	52	50	50	48	48	52	
L Q	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	41	41	42	45	47	52	53	51	54	52	51	52	50	52	51	50	49	47	47	48	44	44	44	40	

JAN.2018 fxI (0.1MHz)

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IONOSPHERIC DATA STATION SHOWA-ST.

JAN. 2018 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

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

JAN. 2018 foF2 (0.1MHz)
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IONOSPHERIC DATA STATION SHOWA-ST.

JAN.2018 ftEs (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	71	58	58	30	36	23	17	93
7	26	26	30	30	51	47	33	29	30	32	38	38	117	61	62	66	70	60	26	57	89	40	13 ^G	24
8	32	24	21	28	30	25 ^G	25 ^G	28 ^G	29	32	31 ^{E B}	47	52	52	34	35	113	60	30	39	24	57	31	42
9	43	56	28	27	27	53	51	62	52	63	74 ^G			98	112		90	82	59	54	81	57	43	27
10	30	69	36	50	34	35	47	57	77	78	24 ^G	33	33	33	34	69	22	57	70	57	85	46	14 ^G	17
11	17	17	33	24	26	26	19 ^G	42	32	32	32	36	34	34	34	35	59	47	71	35	58	58	58	58
12	15	56	60	48	31	68	32		32 ^G	31	31	34	36	36	71	42	36	80	41	57	34	19	35	30
13	37	37	62	89	26	23	23		28 ^G		28 ^G	29	30	40	41	29	23	26	29	28	23	34	54	40
14	44	58	66	32	32	80	80	58	57	60	106	74	125	38	30	62		67			29 ^{B E B}	29	58	18
15	53	22 ^G	30	49	50	50	28	30	76	74	129	76		41 ^{B E B}		30 ^{G E B}	30	73	83	26	67	25	40	
16	40	37	48	48	58	58	58	26	27	33	78	63	32	31	35	68	29	28	27	41	22	22	17	22
17	24		18	57	57	22	24	32	37	55	39	38	34	28	28	28	24	92	57	78	68	20		12 ^{G E B}
18		16	16	16	19	23	23	28	28	28	34		30	43	46	36	45	34	16	26	15	19	19	19
19	36	95	42	39	47	59	59	72	64	42	39	34	120	30	79	81	58	62	24	47	58	33	42	42
20	88	58	36	76	65	74	76	61	58	57	57	57		33	30	52	58	91	64	29	25	35	37	22
21	57	47	42	57	58		51	57	61	77	86	53	57	97	32	58	56	57	34	41	57	28	67	44
22		57	117		58	60	58	59	51	30			66		31	31	82	79	68	81	21	41	76	56
23	51	30 ^{E B}		92	58	58		42	28	71	64	64	32	66	67	46	60	29	31	86	72	28	24	143
24	16 ^{E B}	19	29	14 ^G	20	24		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
26	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
28	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	17	18	17	17	18	18	16	17	17	17	16	14	16	17	17	17	18	18	18	17	18	18	18	18
MED	36	37	36	48	40	48	40	42	37	42	39	42	34	37	34	42	57	60	38	41	46	31	36	28
U Q	48	57	54	57	58	59	58	58	60	67	76	63	62	56	64	64	70	79	64	57	68	41	54	44
L Q	20		28	28	27	25	24		28	32	32	34	31	32	30	30	30	47	27	30	24	23	17	19

JAN.2018 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JAN.2018 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	8	7	7	10	8	8	7	6
7	6	7	8	11	12	7	8	7	7	8	6	7	8	6	8	8	7	5	8	6	5	7	8	11
8	8	8	7	7	6	6	8	6	7	7	31	8	8	8	6	7	8	7	10	8	9	9	6	6
9	8	10	9	8	8	9	9	10	12	11	8	C	14	10	13	16	14	15	12	8	16	11	11	7
10	7	10	10	15	13	11	14	12	12	10	7	11	8	9	10	12	10	10	13	8	10	8	6	8
11	8	6	8	6	8	8	8	10	8	8	8	8	8	8	8	8	8	10	11	14	14	15	12	15
12	8	8	8	9	9	9	8	8	8	8	7	7	7	7	14	14	10	13	8	8	10	10	9	11
13	10	10	10	9	6	6	6	6	8	8	14	17	14	7	7	17	17	8	12	7	10	9	12	9
14	10	10	10	9	6	10	14	10	9	23	16	14	19	13	9	8	8	8	10	B	30	13	11	7
15	8	8	8	16	25	14	12	12	10	16	42	15	B	41	22	30	20	15	9	21	12	8	8	24
16	10	15	9	15	11	14	10	10	8	8	6	6	9	12	12	12	12	12	10	13	12	8	6	7
17	16	9	9	8	8	6	8	8	7	7	7	6	8	9	10	10	10	8	8	9	10	9	8	10
18	8	9	8	7	6	8	6	8	9	9	8	C	9	9	9	9	9	8	10	8	9	9	9	8
19	8	8	12	9	8	9	12	10	11	14	10	10	9	15	16	15	18	17	11	8	17	9	11	10
20	10	9	8	12	14	14	8	18	14	12	12	14	14	16	15	15	11	11	12	10	8	9	8	8
21	8	10	18	18	8	14	8	11	9	8	7	6	9	8	8	14	7	8	8	20	10	10	9	13
22	B	21	20	B	15	20	12	14	9	13	B	B	30	24	16	11	17	15	15	11	7	14	12	24
23	12	30	B	19	11	22	C	C	C	C	C	C	C	C	C	C	C	C	C	C	20	13	11	16
24	16	12	8	8	7	7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
26	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
28	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	18	18	18	18	18	18	17	17	17	17	17	15	17	17	17	17	18	18	18	18	18	18	18	18
MED	8	10	9	9	8	9	8	10	9	8	8	10	9	9	10	12	10	10	10	10	10	9	9	10
U Q	10	10	10	15	12	14	12	12	10	12	15	14	14	14	16	16	17	15	12	14	14	11	11	13
L Q	8	8	8	8	7	7	8	8	8	8	7	7	8	8	8	8	8	8	8	8	9	8	8	7

JAN.2018 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JAN. 2018 h'F (KM)

45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23					
1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C					
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C					
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C					
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C					
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C					
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	196	192	196	218	202	A	216	216	204				
7	A	E	A	E	A	A	A	224	204	198	182	202	202	200	200	192	192	192	192	A	A	204	204	E	A				
8	A	E	A	E	A	A	210	210	188	192	200	200	208	190	210	208	198	A	E	A	A	236	A	230	A				
9	A	A	250	200	208	A	A	A	204	200	208	C	H	176	198	198	206	200	206	204	226	218	206	200	A				
10	A	A	A	A	A	A	A	A	A	198	188	180	200	184	192	200	200	218	202	A	A	A	184	212	212				
11	224	232	E	A	228	212	206	198	A	190	196	198	196	188	198	196	196	A	A	204	216	E	A	A	E	A			
12	222	A	E	A	A	232	A	216	198	198	182	188	194	170	192	198	198	198	214	206	E	A	198	198	E	A	E	A	
13	A	A	A	A	214	232	206	188	188	194	190	206	200	186	210	198	204	198	208	206	208	210	242	A	A	A	A		
14	A	A	A	248	234	196	A	A	A	A	A	A	202	202	220	198	180	H	214	196	204	B	E	B	238	238	230		
15	242	242	E	A	A	A	A	276	226	A	216	250	194	B	B	212	212	202	194	200	H	200	216	214	A	A	A		
16	A	A	202	A	A	A	A	284	200	196	178	204	186	202	192	206	200	194	210	196	E	A	220	220	206	228	E	A	246
17	262	E	A	200	220	230	222	200	202	202	320	204	198	198	192	192	194	198	234	198	198	198	198	198	222	222	216		
18	196	A	256	238	228	216	218	206	194	194	178	192	C	176	200	206	206	E	A	226	196	204	204	204	204	194	216	210	
19	E	A	A	E	A	E	A	A	A	A	A	A	198	200	198	232	210	202	216	202	202	234	A	E	A	A	A	A	
20	A	A	244	A	A	A	A	A	A	A	A	A	210	196	194	214	176	212	192	206	210	234	244	260	E	A	A	A	
21	E	A	A	A	A	E	A	A	A	A	A	210	202	A	194	A	216	192	196	232	234	E	A	A	E	A	A	A	
22	B	A	A	B	A	A	A	A	A	A	A	B	B	E	B	E	A	228	228	202	202	202	202	248	234	218	A	A	A
23	A	212	B	A	A	A	B	A	200	232	206	188	200	A	A	208	A	A	A	208	222	222	E	A	E	A	A	A	
24	E	B	E	A	238	222	210	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
26	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
28	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
31	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23					
CNT	10	8	11	9	10	8	9	8	10	14	15	13	16	14	16	17	15	17	18	14	14	15	12	10					
MED	225	238	E	A	228	227	209	210	199	197	199	202	196	195	199	199	200	198	206	204	219	212	206	220	218				
U Q	E	A	E	A	E	A	A	A	A	A	A	A	201	201	214	207	206	202	213	210	234	236	E	A	E	A			
L Q	222	235	222	217	216	206	199	191	194	182	198	191	187	192	197	195	196	196	200	208	204	198	214	212					

JAN. 2018 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2018 f_{XI} (0.1MHz)

45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	A	A	O	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3	X	28	52	46	36	46	50	59	52	48	50	50	52	52	51	52	A	X	X	X	X	X	X	X
4	A	A	57	38	X	A	O	X	X	X	X	X	X	X	A	X	X	X	A	X	O	X	X	X
5	X	30	31	A	X	X	41	126	A	X	X	X	O	X	O	X	X	X	X	X	X	X	X	X
6	O	X	33	33	37	44	37	44	48	X	A	X	X	O	X	X	X	O	X	X	X	X	A	X
7	67	38	A	40	49	55	55	57	61	60	59	61	62	59	56	57	57	51	50	46	46	44	53	58
8	58	53	X	42	50	44	53	60	61	59	53	54	58	58	59	55	52	53	48	48	46	46	42	42
9	A	A	A	A	A	A	46	A	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X
10	43	73	A	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
11	R	R	40	42	39	48	44	56	52	56	55	57	A	A	A	O	X	A	A	X	X	X	O	X
12	57	58	58	58	47	53	52	55	55	57	58	57	60	60	57	54	55	51	53	48	48	46	79	58
13	O	X	O	X	X	X	58	58	70	56	53	54	55	A	A	A	A	A	47	46	49	58	58	46
14	A	57	A	O	X	A	52	56	57	59	57	54	54	55	60	57	51	49	48	46	46	44	48	45
15	X	37	A	A	A	42	48	57	61	64	66	65	57	58	65	65	59	54	51	50	50	A	A	A
16	A	R	63	A	64	A	A	55	58	71	68	55	57	58	60	61	58	54	51	45	48	42	41	54
17	54	A	81	A	A	A	A	58	92	A	B	O	X	X	X	X	70	54	54	49	46	46	52	39
18	A	A	A	A	A	A	A	A	A	A	B	O	X	X	X	X	X	X	X	O	X	O	X	A
19	A	A	A	A	A	B	B	A	47	A	B	O	X	X	X	X	O	X	B	O	X	X	A	A
20	A	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
21	X	29	36	33	38	41	42	47	49	53	63	55	54	52	A	X	X	70	66	64	49	46	45	46
22	59	A	A	53	A	A	A	A	50	51	49	48	45	43	51	51	54	59	46		36		60	
23	A	80	A	63	57	50	46	64	A	A	A	B	X	B	B	B	B	B	X	X	A	X	26	80
24	A	A	X	A	A	A	A	A	A	X	X	X	X	B	B	B	X	X	O	X	X	X	X	A
25	A	A	61	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A	A
26	A	A	A	A	A	A	A	A	A	A	A	B	X	X	X	X	X	X	X	X	X	O	X	X
27	61	72	A	A	A	A	A	A	B	B	A	X	X	B	X	X	X	X	X	A		A	O	X
28	62	35	X	O	X	A	A	A	B	O	X	X	X	X	X	X	X	O	X	X	X	X	X	X
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	14	13	12	14	12	15	15	18	18	21	21	24	25	20	23	24	24	23	27	25	24	21	22	18
MED	48	52	50	41	45	50	51	56	54	56	54	53	56	52	52	50	49	46	46	44	43	42	41	
U Q	59	65	60	53	50	53	57	58	59	58	59	57	57	60	57	58	54	51	49	48	47	46	46	54
L Q	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	30	34	38	38	41	46	46	52	50	50	50	49	48	51	51	49	48	47	44	44	38	37	34	35

FEB. 2018 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2018 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

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

FEB. 2018 foF2 (0.1MHz)
NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2018 ftEs (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	54	51	48	32	29	29	76	72	J 63	A 60	57	28	J 58	A 25	20	28	16
3	19	34	40	25	28	G 14	G 14	G	33	27	30	32	69	41	68	74	74	27	27	27	24	16	16	40
4	38	44	G	30	41	36	23	30	31	30	40	47	E B 94	82	76	34	46	62	33	29	22	17	35	14
5	17	31	46	26	90	57	60	67	72	72	45	31	E B 40	114	33	29	G	66	71	25	23	30	17	56
6	53	26	46	50	58	58	31	70	59	40	59	30	G 112	88	29	33	E B 38	30	35	25	68	60	52	52
7	33	40	62	70	30	G 12	G	24	24	G	27	29	30	30	28	29	29	29	31	27	27	56	57	31
8	14	19	19	34	21	25	23	25	25	28	30	39	39	34	73	56	39	45	55	27	19	26	30	18
9	95	66	46	48	48	55	55	87	100	39	G	G 29	G 29	30	42	62	62	34	27	34	92	47	47	20
10	E B 10	50	53	52	49	41	38	36	30	30	31	31	32	29	42	38	90	56	52	24	56	72	33	28
11	33	34	27	24	G 11	33	21	26	26	34	64	44	74	107	87	69	78	106	26	69	20	20	75	85
12	12	E B 9	14	67	G	18	29	38	30	31	32	34	45	45	40	28	66	110	39	37	36	106	19	38
13	18	57	80	65	24	24	24	14	G	29	29	37	68	97	132	96	133	59	49	34	31	20	24	71
14	36	45	50	71	58	112	25	24	25	25	29	32	39	30	30	41	G 18	G	56	54	56	54	32	55
15	26	60	56	56	112	24	37	30	G	30	30	33	44	46	38	33	G	24	24	26	110	47	49	49
16	58	36	G	56	G 42	46	48	G	53	32	37	36	39	30	28	58	G	G	24	22	17	17	15	14
17	36	72	58	60	71	80	44	G	53	58	B	34	G 31	E B 15	41	G	B	E B 28	32	24	52	56	56	31
18	48	76	86	108	57	55	49	56	56	51	B	B	E B 38	32	29	G	37	E B 25	G	E B 20	25	19	39	52
19	55	68	57	101	117	B	B	62	51	52	B	93	28	28	G	E B 36	E B 40	B	E B 21	E B 21	34	43	86	46
20	49	74	57	72	68	44	61	58	G	63	62	G	27	27	24	72	63	G	G	E B 22	20	17	16	14
21	50	51	51	55	59	83	31	20	22	111	G	29	29	68	E B 40	31	31	19	21	46	59	58	44	46
22	46	46	46	32	56	58	57	60	80	28	28	29	30	37	34	27	27	22	22	43	G	70	75	45
23	58	58	43	28	58	31	42	45	56	57	61	B	28	B	B	B	B	B	24	28	42	39	70	
24	57	53	42	71	82	84	52	58	59	59	53	58	B	B	B	32	38	E B 32	G	20	28	40	23	42
25	56	42	46	49	44	56	72	54	48	72	26	66	27	26	29	29	29	21	21	21	G	56	47	50
26	47	46	65	59	64	56	48	46	52	47	50	B	28	29	G	E B 27	27	52	22	E B 23	63	53	58	17
27	52	46	77	77	58	58	63	63	B	B	57	60	60	B	G	48	G	G	67	41	20	33	46	62
28	48	48	52	52	57	50	50	51	B	59	41	35	G 22	29	87	60	E B 37	E B 73	G	G	16	47	49	
29																								
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	26	26	26	26	25	25	27	25	26	24	24	26	24	25	26	25	25	27	27	27	27	27	27
MED	46	46	48	56	57	50	42	45	48	40	32	34	U 32	U 33	36	34	38	30	27	27	27	40	39	45
U Q	53	58	57	70	64	58	54	58	56	58	52	42	45	72	70	60	62	58	39	37	56	56	52	52
L Q	26	36	42	34	42	28	24	G 24	25	30	29	G	29	29	G	29	G	G	21	22	20	19	24	20

FEB. 2018 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

FEB.2018 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

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

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2018 h'F (KM)

45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
2	C	C	C	C	C	C	C	A	A	204	216	200	178	178	222	196	192	202	220	E A	230	220	E A	E A	E A			
3	E A	A	A	A	274	244	206	196	192	178	194	184	A	196	212	A	200	220	E A	220	204	216	200	220	A			
4	A	A	A	202	A	A	220	194	206	200	A	E A	230	192	A	E A	248	202	A	A	206	206	202	234	A	A		
5	E A	A	A	194	A	A	A	A	194	188	198	184	B	A	A	H	204	188	204	206	214	216	E A	A	E A	E A		
6	E A	E A	E A	E A	E A	246	206	220	A	A	210	196	178	B	B	206	206	B	200	200	200	A	A	A	E A	E A		
7	A	A	A	A	244	200	196	196	196	198	190	190	200	190	216	190	194	194	218	202	214	250	222	224	A	A		
8	220	242	234	A	E A	192	206	200	198	192	188	198	192	192	A	204	204	196	E A	212	224	196	226	242	A	A		
9	A	A	A	A	A	A	A	A	A	232	206	200	192	192	184	A	250	212	200	E A	230	222	230	226	252	A	A	
10	E B	240	296	A	A	A	A	A	200	204	200	200	192	192	198	198	206	194	206	200	216	242	254	254	A	A		
11	A	A	A	306	242	268	206	206	196	196	220	206	A	A	A	196	A	A	198	198	E A	E A	224	224	236	238	A	
12	232	232	232	226	226	240	222	204	204	198	198	200	A	212	210	202	210	198	210	202	212	226	214	A	A	A		
13	A	A	E A	296	A	E A	266	234	222	198	198	192	206	200	A	A	A	A	E A	220	212	226	220	218	222	250	A	
14	A	A	A	192	A	E A	326	216	194	194	194	200	204	204	196	196	208	194	194	198	212	228	A	E A	A	A		
15	A	A	A	A	A	226	236	202	192	214	198	198	A	A	196	196	190	194	226	242	A	A	A	A	A	A		
16	A	A	226	A	A	A	A	200	A	E A	220	210	210	192	180	212	188	202	202	218	218	E A	224	224	240	242	A	
17	A	A	A	A	A	A	A	208	192	A	B	236	204	204	B	204	226	216	E B	238	238	E A	254	250	250	E A	256	
18	A	A	A	A	A	A	A	A	A	A	B	B	B	218	212	204	216	222	198	240	E A	334	248	A	A	A	A	
19	A	A	A	A	A	B	B	A	198	A	B	202	216	198	214	B	B	B	218	204	A	A	A	A	A	A	A	
20	A	A	A	A	A	A	E A	276	218	218	196	202	178	202	202	190	182	208	202	216	230	218	224	240	226	A	A	
21	E A	E A	E A	E A	E A	244	240	212	204	204	204	204	190	A	B	222	198	198	198	230	218	230	282	A	A	A	A	
22	A	A	A	210	A	A	A	A	214	204	188	196	202	202	200	206	198	224	212	A	216	A	224	A	A	A	A	
23	A	A	A	A	218	A	206	206	A	A	A	B	194	B	B	B	B	B	B	238	262	A	208	A	A	A	A	
24	A	A	A	A	A	A	A	A	A	208	224	200	B	B	B	200	208	270	202	202	A	A	262	A	A	A	A	
25	222	A	A	A	A	210	220	198	198	188	188	188	188	188	242	198	210	210	196	228	216	A	A	A	A	A	A	
26	A	A	A	A	A	A	A	A	A	A	A	B	192	200	222	220	204	220	232	E B	232	244	234	282	E A	E A	E A	
27	222	222	A	A	A	B	A	A	B	B	A	200	200	B	H	188	200	258	248	A	A	248	A	214	A	A	A	
28	204	206	222	A	A	A	A	A	B	E A	266	232	194	194	218	206	230	262	238	198	206	230	220	264	A	A	A	
29																												
30																												
31																												
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	10	7	7	8	9	11	13	15	17	21	20	24	18	17	20	22	21	23	26	25	22	18	21	14				
MED	222	232	228	208	A U	236	222	218	202	198	199	200	200	193	196	207	201	204	204	210	211	218	226	232	246			
U Q	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	
L Q	250	276	276	271	265	244	229	208	204	209	208	203	202	203	215	206	213	220	220	230	228	234	258	256				
	222	222	226	198	234	206	206	196	194	195	195	192	192	191	197	196	198	198	200	203	216	220	223	242				

FEB. 2018 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAR.2018 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	67	A	A	A	A	A	X	A	A	A	48	52	48	51	50	50	50	46	46	42	35	R	A	A
2	A	A	A	A	A	37	42	44	48	49	48	50	53	54	52	54	52	48	46	44	42	32	24	27
3	A	A	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A	A
4	A	A	55	A	57	84	X	X	X	X	R	X	X	X	X	X	X	X	X	X	X	37	30	84
5	A	A	71	A	50	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	30
6	X	50	60	105	91	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A
7	59	57	21	49	38	40	46	47	50	50	49	50	50	53	56	52	51	48	45	42	36	45	25	78
8	A	X	X	36	31	40	36	44	47	47	48	54	56	54	56	52	54	48	45	42	46	41	41	30
9	28	A	A	74	A	A	A	A	57	52	52	50	55	56	57	51	50	48	49	46	45	32	23	A
10	A	79	51	48	A	A	A	A	95	A	A	A	B	B	X	X	X	X	X	X	R	A	A	41
11	A	A	57	46	34	46	R	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A	X
12	58	54	60	38	30	43	47	42	42	44	46	50	52	56	58	55	53	48	43	39	33	26	A	A
13	A	X	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A	A
14	A	A	44	A	40	36	37	41	46	49	49	51	56	58	56	50	51	46	49	83	A	A	71	
15	A	A	62	70	B	A	A	A	A	A	A	X	X	X	X	X	X	X	X	X	A	A	A	A
16	A	A	R	A	A	A	B	A	A	B	A	A	B	B	B	B	B	X	A	A	A	A	A	A
17	A	A	A	A	B	A	B	41	A	A	X	B	B	X	X	X	X	X	X	X	X	X	44	A
18	A	82	A	A	A	A	R	R	B	X	X	X	X	X	X	X	X	X	A	A	A	A	A	A
19	A	A	53	R	A	A	B	A	A	B	B	B	B	B	X	X	X	X	X	X	B	A	A	A
20	A	A	A	A	A	A	B	A	A	X	X	X	X	X	X	X	X	X	X	X	X	A	A	57
21	A	R	A	59	65	A	A	A	38	38	42	45	49	53	53	46	45	44	40	35	28	21	66	A
22	A	A	82	A	A	A	A	A	B	X	X	X	X	X	X	X	X	X	X	X	X	0	A	A
23	A	85	A	70	41	A	A	A	59	44	45	45	45	45	48	41	38	34	25	A	A	A	A	A
24	A	A	B	A	A	A	A	A	X	X	B	B	B	B	B	B	X	X	X	X	A	A	A	A
25	A	A	X	A	A	A	B	B	A	B	B	B	B	B	B	B	X	X	X	X	B	A	R	A
26	A	A	A	A	A	A	A	A	A	A	B	B	X	B	X	B	X	X	X	X	X	A	X	A
27	A	A	A	A	A	A	B	A	A	X	X	B	B	B	B	X	X	X	X	X	X	A	A	X
28	A	A	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A	A	A
29	A	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
30	A	50	83	65	35	46	A	X	X	X	X	X	X	X	X	69	54	46	38	40	24	20	B	34
31	58	A	70	52	65	63	A	X	X	X	X	X	X	X	X	X	X	X	X	X	A	R	A	A
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
CNT	6	9	15	13	13	10	10	16	20	21	22	23	24	25	27	27	30	28	29	27	25	17	11	12
MED	58	54	57	52	38	42	38	42	44	45	46	47	50	53	52	51	50	46	42	40	35	30	27	32
U Q	59	80	70	70	61	46	42	45	50	47	48	50	52	56	57	55	52	48	46	43	44	39	41	64
L Q	28	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

MAR.2018 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAR.2018 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 35	A	A	A	A	A	33	A	A	A	F 36	F 42	42	44	44	44	44	40	39	36	29	A	A	A
2	A	A	A	A	A	F 27	36	38	42	43	42	44	47	48	45	48	46	42	40	38	36	26	18	21
3	A	A	A	A	A	A	A	35	38	40	40	39	41	44	45	49	51	44	40	35	31	24	A	A
4	A	A	A	A	A	A	32	40	43	40	A	R 34	40	41	45	43	41	40	36	34	26	F 12	A	A
5	A	A	A	A	F 36	A	A	42	39	40	40	41	46	46	46	46	43	41	40	38	34	31	24	Z 24
6	17	A	54	A	A	A	36	42	44	41	42	41	42	45	46	46	45	41	39	34	32	24	F 14	A
7	A	14	15	R 32	R 34	F 26	41	44	44	43	44	44	47	50	46	45	42	39	35	30	25	19	72	U R
8	A	R 27	F 26	F 24	F 21	F 29	30	F 34	41	41	42	48	50	48	50	46	48	Z 42	39	36	F 32	F 23	F 20	F 17
9	F 14	A	A	A	A	A	A	A	F 42	46	46	44	49	50	51	45	44	42	43	40	30	F 26	R 17	A
10	A	A	A	F 36	A	A	A	A	A	A	A	A	B	B	38	38	R 42	38	36	32	R	A	A	A
11	A	A	A	A	28	40	A	33	37	37	34	32	B	40	40	40	37	36	35	31	28	20	A	13
12	A	A	A	A	24	37	41	36	36	38	40	44	46	50	52	49	47	42	37	33	27	20	A	A
13	A	18	A	19	26	R 19	28	34	41	42	43	44	49	54	57	53	49	44	38	38	F 29	F 20	A	A
14	A	A	26	A	A	F 29	F 25	31	35	40	43	43	45	50	52	50	44	45	40	41	F A	A	A	A
15	A	A	A	A	B	A	A	A	A	A	A	R 39	40	42	43	40	40	37	33	27	A	A	A	A
16	A	A	R	A	A	A	B	A	A	B	A	A	B	B	B	B	B	35	A	A	A	A	A	A
17	A	A	A	A	B	A	B	A	A	A	32	B	B	40	41	R 44	45	42	38	30	24	A	A	A
18	A	A	A	A	A	A	A	A	B	31	32	38	43	44	48	46	46	40	A	A	A	A	A	A
19	A	A	47	A	A	A	B	A	A	B	B	B	B	B	R 36	35	33	34	30	B	A	A	A	A
20	A	A	A	A	A	A	B	A	A	31	32	35	38	41	39	40	40	38	34	F 27	20	A	A	F 46
21	A	A	A	A	A	A	A	A	32	32	36	39	43	47	47	40	39	38	34	29	22	15	A	A
22	A	A	A	A	A	A	A	A	A	B	39	42	44	48	43	42	44	40	35	F 29	F 19	F 17	A	A
23	A	A	A	A	35	A	A	A	A	B	B	38	39	39	B	42	35	B	32	28	19	A	A	A
24	A	A	B	A	A	A	A	A	30	30	B	B	B	B	B	B	B	37	32	26	A	A	A	A
25	A	A	R 39	A	A	A	B	B	A	B	B	B	B	B	B	B	32	34	31	B	A	R	A	A
26	A	A	A	A	A	A	A	A	A	A	B	B	32	B	42	B	37	35	32	24	16	A	21	A
27	A	A	A	A	A	A	B	A	A	28	31	B	B	B	B	41	41	B	34	R 24	A	A	A	F 18
28	A	A	A	A	A	A	A	25	28	32	32	40	42	50	48	44	43	38	33	27	18	14	A	A
29	A	A	A	A	A	A	17	30	34	39	39	46	50	53	53	53	45	38	29	28	21	17	16	14
30	A	A	A	A	A	A	A	32	R 32	37	38	42	F 43	51	58	F 56	48	40	32	F 25	F 18	F 14	B	R
31	A	A	A	R 34	F 37	A	A	U 37	R 37	39	40	41	46	49	50	49	52	40	34	F 27	F 18	A	R	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	3	3	6	4	8	7	10	15	18	21	22	23	24	25	27	27	30	28	29	27	22	16	8	8
MED	17	18	32	29	30	29	31	35	38	39	40	41	43	47	46	45	44	40	35	31	26	20	18	20
U Q	R 35	R 27	47	35	F 36	37	F 36	40	42	41	42	44	46	50	50	49	46	42	39	36	30	24	20	35
L Q	F 14	14	26	22	25	27	F 26	32	34	32	34	39	40	42	42	41	40	38	32	27	19	16	16	16

MAR.2018 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAR.2018 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	56	84	51	55 ^{J A}	40	40	26	46	58	48	54	30	28	G	G	35	G	28	37	E B	20	48	32	55	53	
2	48	85	56	56	49	46	80	52	59	26	26	26	G	G	27	44	16	G	G	16	E B	12	48	32	50	
3	49	67	47	55	50	52	47	50	G	G	23	25	25	28	60	25	29	20	23	24	G	13	55	31	46	
4	69	102	35	87	53	53	48	37	57	57	42	31	30	23	28	106	38	G	22	72	18	23	58	31	43	
5	57	57	50	48	25	41	44	19	G	18	52	76	28	27	27	90	37	G	22	18	16	16	18	14	34	
6	17	33	37	55	57	56	42	28	72	23	27	27	27	29	31	31	32	25	19	G	12	51	E B	8	53	
7	23	36	66	46	24	13	48	66	23	57	25	28	72	29	27	G	G	G	15	18	18	15	13	10	36	
8	39	39	32	18 ^K	13	G	25	12	G	G	28	22	28	30	29	24	G	24	22	13	G	E B	67	11	47	67
9	E B	10	28	38	38	109	57	48	55	45	64	30	30	28	29	48	44	23	22	20	G	11	70	56	58	
10	106	101	40	31	44	58	56	62	55	67	57	49	B	B	32	B	B	B	G	20	29	44	50	49		
11	47	52	70	34	35	34	31	G	12	26	54	18	B	35	34	28	56	20	57	57	57	45	50	49		
12	38	42	48	56	48	38	46	53	57	56	57	28	36	34	33	27	G	G	16	43	48	50	55			
13	47	46	58	45	45	21	48	31	22	72	61	G	E B	E B	26	26	28	26	20	55	20	18	54	49		
14	57	52	54	58	52	15	15	21	14	55	58	30	32	E B	28	32	G	G	18	17	18	12	52	40	65	61
15	84	88	50	49	B	55	50	49	46	45	51	E B	26	G	E B	E B	E B	E B	24	52	G	35	87	49	50	
16	60	57	26	72	53	47	B	50	50	B	56	71	B	B	B	B	B	E B	E B	36	40	40	57	48	72	
17	72	136	78	62	B	62	B	36	55	44	26	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	20	31	38	48	
18	55	80	50	68	64	55	41	49	B	44	44	36	26	G	E B	E B	E B	E B	24	46	46	49	48	54	94	
19	80	53	67	45	49	104	B	143	68	B	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	54	52	49	71	
20	54	54	77	38	48	47	B	52	43	45	23	77	26	23	59	23	G	E B	E B	E B	14	14	47	46	37	
21	35	43	38	45	58	56	58	44	46	50	18	G	26	19	22	27	G	21	16	70	18	45	36	46		
22	36	53	38	50	62	54	57	51	57	B	B	G	28	28	26	26	18	26	20	22	20	57	14	49	80	
23	56	77	60	40	20	60	52	63	48	B	B	G	24	24	B	E B	E B	E B	E B	E B	E B	17	52	48	50	
24	53	63	B	58	52	73	58	42	52	64	B	B	E B	E B	E B	22	B	E B	E B	E B	E B	46	56	50	52	
25	52	62	49	57	44	34	B	64	55	B	B	B	B	B	B	B	E B	E B	E B	E B	E B	39	30	41	44	
26	119	60	84	59	37	62	58	58	48	40	B	B	51	B	B	B	E B	E B	E B	E B	E B	57	32	24	70	
27	48	33	47	49	51	30	B	59	52	27	51	B	B	B	B	E B	E B	E B	E B	E B	E B	42	42	A	40	
28	28	58	38	54	55	42	31	E B	16	44	44	23	26	26	23	G	26	61	E B	E B	E B	46	E B	65	50	
29	46	65	86	29	39	55	41	48	54	23	64	34	35	35	35	E B	E B	E B	E B	E B	E B	44	44	49	56	56
30	64	70	38	31	47	40	48	48	45	48	G	27	27	23	23	33	27	30	47	22	30	49	B	18		
31	33	84	60	49	32	49	56	55	29	31	64	30	30	26	26	27	21	17	16	15	33	51	28	33		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	31	31	30	31	29	31	25	31	30	26	26	25	24	25	27	25	30	27	31	29	31	31	29	31		
MED	52	58	50	49	48	49	48	49	48	45	43	28	27	G	28	28	G	22	20	17	35	48	48	50		
U Q	60	80	60	57	53	56	56	55	55	56	57	30	30	29	34	35	29	24	36	32	48	52	52	58		
L Q	38	46	38	40	38	38	41	36	G	29	27	25	G	26	24	26	G	21	20	16	16	17	32	32	44	

MAR.2018 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAR.2018 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	12	12	17	13	13	15	10	9	16	15	13	13	10	10	12	9	12	19	19	20	11	7	12	16	
2	16	14	9	10	11	11	10	9	11	12	9	10	10	10	10	10	11	10	9	11	12	12	9	8	
3	10	8	11	14	10	10	8	8	8	8	8	8	8	10	6	9	10	9	9	9	9	8	8	9	
4	10	10	10	11	10	10	12	8	9	15	17	11	12	12	12	12	7	9	13	12	12	6	6	12	
5	9	15	20	18	15	12	11	8	8	8	10	8	10	10	10	9	8	6	6	8	7	10	8	8	
6	8	7	12	14	12	11	11	8	8	9	9	9	8	8	7	7	10	10	8	6	7	10	J 9	9	
7	8	8	8	6	7	7	8	8	10	14	14	13	13	13	12	12	10	9	8	8	8	9	8	10	
8	9	11	11	9	7	6	8	6	8	14	16	18	13	8	15	12	11	14	11	9	14	11	9	12	
9	10	8	8	9	10	13	13	24	12	11	10	10	8	6	10	8	8	6	8	8	7	10	11	9	
10	10	9	10	8	9	20	42	14	28	15	29	15	B	B	14	23	33	28	15	11	14	6	8	6	
11	11	16	12	8	8	12	10	13	6	13	10	14	B	22	16	11	14	12	12	10	13	12	10	10	
12	8	7	6	7	8	8	7	7	10	10	10	11	12	10	10	9	11	7	7	7	6	8	7	6	
13	6	6	11	9	8	8	7	7	8	9	9	16	27	26	17	16	14	14	15	14	10	9	6	7	
14	8	9	8	8	7	7	7	8	11	10	13	13	26	36	24	19	16	13	9	7	11	8	8	7	
15	9	10	12	B	12	16	16	34	20	24	26	16	15	37	26	24	18	7	6	7	7	11	9		
16	10	17	15	17	9	12	B	18	24	B	21	30	B	B	B	B	42	23	10	14	8	13	11	8	
17	10	12	8	16	B	14	B	8	12	12	26	B	B	27	27	28	36	23	30	18	11	6	7	9	
18	8	14	16	9	23	28	14	17	B	24	18	15	13	11	15	35	23	14	12	10	13	8	10	10	
19	9	12	7	10	7	18	B	22	17	B	B	B	B	B	27	24	23	23	19	B	14	8	8	14	
20	9	14	20	24	15	10	B	15	16	15	15	15	15	15	15	16	15	15	18	12	14	10	12	8	9
21	8	14	16	11	11	10	14	16	12	12	13	13	13	13	13	13	13	13	8	7	7	8	8	12	
22	10	10	16	14	9	10	12	6	16	B	14	14	14	14	14	14	9	10	8	6	10	7	10	10	
23	10	10	17	10	9	9	17	14	12	B	B	16	13	9	B	26	21	B	25	21	9	7	8	14	
24	14	10	B	10	14	16	11	13	10	12	B	B	B	25	24	15	B	29	B	18	10	9	9	8	11
25	13	15	14	14	15	7	B	53	33	B	B	B	B	B	B	B	B	24	16	14	B	7	7	7	15
26	12	15	22	14	10	16	13	14	25	19	B	B	14	B	38	B	31	24	19	15	13	6	6	12	
27	24	23	19	14	16	12	B	18	20	20	15	B	B	B	B	B	31	30	B	18	14	9	8	K 15	8
28	7	8	16	14	15	13	13	16	9	16	15	15	16	16	16	15	18	16	15	15	10	9	9	15	
29	15	14	8	7	7	7	6	7	8	11	12	14	15	15	29	26	20	16	16	9	10	9	12	B 6	
30	9	7	10	10	8	10	10	7	17	13	19	16	14	14	14	11	14	11	16	16	9	6	B	9	
31	10	9	9	9	9	10	11	8	7	8	21	16	14	12	12	8	10	10	8	8	8	12	10	12	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	10	10	12	10	10	11	12	9	12	14	15	15	14	14	15	15	14	14	12	10	10	8	8	9	
U Q	11	14	16	14	15	13	B 17	16	17	B 20	B 24	B 26	B 27	B 27	B 27	26	24	23	16	15	12	10	10	12	
L Q	8	8	9	9	8	9	10	8	8	11	10	13	12	10	12	10	10	10	8	8	8	7	8	8	

MAR.2018 fmin (0.1MHz)
 NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAR. 2018 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	224	A	A	A	A	A	192	A	A	AE A	220	220	190	196	204	98	206	E AE A	E A	226	E A	A	A	A				
2	A	A	A	A	A	196	A	216	202	214	206	212	196	236	198	210	210	202	214	198	216	216	240	208				
3	A	A	A	A	A	A	A	208	212	198	196	200	190	218	206	200	214	206	220	222	234	E A	A	A				
4	A	A	A	A	A	A	A	200	206	218	AE A	234	200	110	224	214	196	222	200	AE B	E A	A	A	A				
5	A	A	A	A	A	A	A	198	200	200	220	206	198	198	216	222	208	208	210	220	A	A	214	240	246			
6	A	A	190	A	A	A	214	220	200	204	236	202	194	212	202	108	210	202	208	198	A	E B	A	A				
7	AE A	AE A	AE A	AE A	AE A	AE A	108	222	202	214	202	218	200	198	210	200	198	198	210	218	220	238	238	210				
8	A	210	230	AE A	AE A	AE A	232	192	202	202	202	200	206	202	202	188	188	208	218	200	216	222	242	272				
9	E B	262	216	A	A	A	A	AE A	AE A	AE A	200	200	198	216	226	230	198	96	230	210	210	214	314	A				
10	A	A	A	248	A	A	A	A	A	A	A	A	A	B	B	228	216	B	B	234	A	212	A	A	A			
11	A	A	A	A	A	A	228	218	206	232	200	200	B	232	230	220	208	224	228	210	222	238	AE B	278	A			
12	A	A	A	A	E A	AE A	236	210	194	204	194	212	204	200	200	208	210	204	196	202	202	218	A	A	A			
13	A	A	A	A	AE A	AE A	222	230	212	198	196	196	218	218	202	226	222	214	232	212	224	256	A	A	A			
14	A	A	A	A	AE A	AE A	310	238	204	220	218	228	212	212	330	226	220	208	208	222	E A	A	A	A	A			
15	A	A	A	A	B	A	A	A	B	A	A	234	234	226	330	218	230	230	240	240	A	A	A	A	A			
16	A	A	A	A	A	A	B	A	A	B	A	A	B	B	B	B	B	E B	B	A	A	A	A	A	A			
17	A	A	A	A	B	A	B	A	A	A	198	B	B	218	236	230	262	238	E B	E A	264	A	A	A	A			
18	A	A	A	A	A	A	A	A	B	AE A	256	228	208	200	214	B	228	248	A	A	A	A	A	A	A			
19	A	A	206	A	A	A	B	A	A	B	B	B	B	B	E B	E B	E B	E B	266	244	B	A	A	A	A			
20	A	A	A	A	A	A	B	A	A	208	186	206	210	202	214	218	216	222	224	222	244	A	A	A	A			
21	A	A	A	A	A	A	A	A	AE A	AE A	H	224	186	228	208	194	216	198	206	226	226	226	E A	AE A	A	A		
22	A	A	A	A	A	A	A	A	A	BE A	246	214	214	198	198	216	210	202	222	208	222	286	A	A	A			
23	A	A	A	A	200	A	A	A	A	B	B	238	236	228	B	238	230	BE B	BE B	260	264	E B	A	A	A			
24	A	A	B	A	A	A	AE A	AE A	A	B	B	BE B	BE B	220	236	218	B	246	BE A	248	266	A	A	A	A			
25	A	A	282	A	A	A	B	B	B	B	B	B	B	B	B	B	BE B	BE B	244	240	300	B	A	A	A	A		
26	A	A	A	A	A	A	A	A	A	A	B	BE A	230	BE B	314	BE B	BE B	270	242	234	258	310	A	A	A			
27	A	A	A	A	A	A	B	A	AE A	AE A	268	238	B	B	B	BE B	BE B	BE B	B	232	292	A	A	A	A			
28	A	A	A	A	A	A	AE A	246	212	212	218	206	226	218	206	222	208	218	218	222	98	98	94	94				
29	A	A	A	A	A	AE A	AE A	346	250	190	196	206	218	234	206	222	222	208	198	210	226	E A	AE A	AE A	AE A			
30	A	192	A	A	196	A	A	AE A	260	220	218	182	202	202	208	216	212	212	230	268	E A	AE A	B	200				
31	A	A	A	198	A	A	208	266	268	246	264	220	222	222	218	218	218	204	204	222	274	196	A	A	A			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	2	4	5	1	6	5	9	14	17	20	22	23	24	25	27	26	29	27	29	26	22	16	10	9				
MED	243	207	218	248	198	E AU	278	210	211	204	209	204	212	205	207	215	214	210	209	218	216	U	U	230	207			
U Q		258	302		E AE AE A	314	295	237	222	E AE A	253	225	228	228	219	226	226	222	E B	E B	230	230	236	240	248	266	278	275
L Q		201	198		196	228	203	204	201	203	198	200	199	199	204	206	208	204	212	210	216	217	200	204				

MAR. 2018 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2018 f_{XI} (0.1MHz)

45°E MEAN TIME (G.M.T. + 3 H)

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

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

APR. 2018 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2018 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

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

APR. 2018 foF2 (0.1MHz)
NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2018 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	46	50	56	45	57	52	29	13	G	G	24	23	35	100	80	34	20	20	16	43	31	50	46	82						
2	37	36	47	64	64	52	41	54	28	G	G	22	26	26	14	G	23	14	17	12	16	46	69	61	34						
3	31	51	56	47	79	71	60	44	44	G	B	G	27	25	22	65	G	17	G	E	B	E	B	10	28	58	33				
4	29	46	64	62	50	52	47	9	G	G	19	23	G	30	25	23	G	E	B	G	14	16	15	44	48	47	40				
5	40	47	50	57	57	63	49	49	56	G	G	22	G	27	32	71	22	18	16	16	21	44	24	31	53						
6	42	42	46	38	60	44	22	66	E	B	G	G	22	22	22	G	24	22	52	47	30	29	71	64	45						
7	43	46	51	36	38	31	16	K	E	B	E	B	9	15	21	21	22	24	24	34	72	22	33	26	58	47	44	42	80		
8	46	47	44	66	K	30	40	E	B	12	50	40	G	G	21	14	26	22	21	18	17	46	13	32	32	51	35				
9	42	86	59	64	58	54	46	67	55	G	28	B	E	B	E	B	E	B	E	B	E	B	E	B	39	48	53	44	48	55	70
10	79	48	47	40	49	49	52	29	55	61	B	B	B	E	B	E	B	E	B	E	B	E	B	39	48	53	44	48	55	70	
11	58	54	46	48	47	60	55	55	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B	63	23	32	53	41			
12	47	40	57	54	54	48	50	35	G	47	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	49
13	78	46	67	61	43	69	53	66	57	43	98	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	47	
14	76	50	56	62	40	56	59	45	54	58	19	22	22	65	23	G	58	58	54	47	46	38	39	53							
15	85	46	56	70	56	56	56	55	48	50	32	24	24	35	32	32	22	24	E	B	18	60	57	55	49	53					
16	68	58	56	80	75	66	61	61	47	48	G	G	24	23	23	90	63	G	22	35	46	46	56	49	K						
17	57	37	36	56	48	39	46	56	17	29	G	G	20	G	24	28	G	55	55	56	35	52	50	55	22						
18	42	56	K	37	57	54	56	59	48	50	94	56	G	23	23	G	G	E	B	15	G	53	46	43	40	40	40				
19	44	48	35	32	27	38	51	48	49	G	23	23	G	G	G	20	19	E	B	E	B	E	B	11	60	27	52	55	50		
20	40	86	47	47	35	48	53	63	29	70	44	44	E	B	E	B	E	B	E	B	E	B	E	B	63	48	35	57	64	104	87
21	54	57	82	52	52	48	51	52	52	B	B	B	B	B	B	B	B	B	B	B	B	B	B	56	44	43	36	48	48		
22	56	45	60	54	54	48	48	B	B	B	61	81	23	G	G	23	23	G	E	B	18	56	B	48	48	45					
23	60	48	43	52	52	50	62	50	B	E	B	20	30	35	35	G	60	52	22	15	E	B	8	11	46	46	39	48			
24	59	52	40	52	54	46	54	49	64	G	57	21	B	E	B	E	B	E	B	E	B	E	B	8	59	59	82	42			
25	62	67	44	71	57	62	58	58	82	49	B	E	B	E	B	E	B	E	B	E	B	E	B	53	54	57	51	56	27		
26	57	58	42	57	57	53	56	43	49	G	71	G	19	20	20	G	16	51	56	58	50	64	54	37							
27	54	32	40	55	47	48	35	19	57	74	60	G	G	14	22	20	25	45	46	55	54	31	36	34							
28	40	77	59	54	52	54	46	54	10	K	G	G	18	22	20	G	E	B	E	B	E	B	9	44	25	34	61				
29	46	47	52	28	81	20	102	22	93	54	57	21	26	92	G	13	G	E	B	E	B	E	B	59	46	48	31	53			
30	47	37	44	47	61	39	58	18	E	B	9	54	18	22	20	22	16	16	55	48	67	80	51	52	56						
31																															
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23							
CNT	30	30	30	30	30	30	30	29	27	27	24	25	26	28	26	26	27	28	26	28	27	29	30	30							
MED	47	48	48	54	53	51	52	49	48	21	24	24	24	24	G	G	20	18	40	45	46	48	48	48							
U Q	59	56	56	62	57	56	58	56	55	54	56	G	27	32	33	24	26	48	53	58	53	53	55	53							
L Q	42	46	44	47	47	46	46	32	15	G	G	22	22	22	22	21	18	G	16	19	39	37	42	40							

APR. 2018 ftEs (0.1MHz)
 NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2018 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

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

APR. 2018 fmin (0.1MHz)

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IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2018 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	214	A	A	A	A	A	234	214	194	198	198	202	228	226	E A	196	196	E A	230	A	A	A	
2	A	A	E A 266	A	A	A	A	A	A	202	202	234	212	206	208	210	210	202	198	228	228	A	A	A	
3	224	A	A	A	A	A	A	A	A	210	B	A	210	208	200	218	194	196	226	E A	E B	E B	A	A	
4	A	A	A	208	A	A	A	208	216	202	208	216	212	202	200	214	210	202	198	236	A	A	A	A	
5	A	A	A	A	A	A	A	E A 296	A	210	202	242	210	224	208	212	202	202	202	252	A	A	A	A	
6	A	A	A	A	A	A	A	E A 258	236	206	196	198	198	198	216	204	200	202	210	E A	E A	190	A	A	
7	A	A	A	A	A	A	A	E B 326	242	208	222	222	222	196	222	216	212	196	226	E A	A	A	A	A	
8	A	A	A	A	A	A	A	188	A	282	224	200	220	192	210	208	214	204	198	E A	E A	A	A	A	
9	A	A	A	A	A	A	A	A	A	A	E A 278	B	B	242	E B 238	222	B	B	E B	E A	A	A	A	A	
10	A	B	B	A	A	A	A	A	A	A	A	B	B	B	E B 278	E B 270	E B 294	B	A	A	A	A	A	A	
11	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	A	A	A	A	A	
12	A	A	A	A	A	A	A	A	A	E A 254	B	B	230	214	B	B	E B	B	B	B	B	B	A	A	
13	A	A	A	A	A	A	A	A	A	A	A	B	B	B	E B 238	E B 256	254	B	B	B	B	B	A	A	
14	A	A	A	A	A	A	A	E A 274	E A 236	E A 232	206	206	196	210	216	218	214	232	202	E A	A	A	A	A	
15	A	A	A	A	A	A	A	A	A	A	E A 236	236	234	E B 258	210	A	E A	E A	E B	A	A	A	A	A	
16	A	A	A	A	A	A	A	A	A	E A 274	E A 258	212	242	224	E B 226	204	212	200	222	E A	E A	A	A	A	
17	A	A	A	A	A	A	A	202	298	E A 274	E A 262	E A 262	222	216	216	204	206	206	248	E A	A	A	A	196	
18	A	A	A	A	A	A	A	A	A	E A 254	E A 238	E A 238	224	234	222	204	202	198	246	E A	A	A	A	A	
19	A	A	A	A	A	A	A	A	A	E A 256	232	220	206	204	214	188	212	194	184	224	B	A	A	A	
20	A	A	A	A	A	A	A	A	A	A	A	A	224	A	A	B	B	B	A	A	A	A	A	B	
21	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	E A 280	A	A	A	A	A	
22	A	A	A	A	A	198	A	B	B	B	E A 270	E A 246	E A 246	222	220	228	196	222	B	B	B	A	A	A	
23	A	A	A	A	A	A	A	A	A	B	E A 268	E A 250	E A 250	222	236	218	210	210	210	232	234	196	A	A	
24	A	A	A	A	A	A	A	A	A	E A 318	E A 232	E A 184	212	212	236	218	202	210	198	192	E B 244	222	A	A	
25	A	A	A	A	A	A	A	A	A	E A 306	B	B	B	226	E B 218	208	224	224	A	A	A	A	A	A	
26	A	234	A	A	A	A	A	A	A	E A 260	204	228	222	206	208	210	210	204	204	E A 232	196	E B 218	A	E A 252	
27	A	232	196	A	A	A	A	A	A	E A 312	268	210	200	182	206	194	218	198	198	186	230	230	A	A	
28	A	A	A	A	A	A	A	A	A	202	268	212	194	210	218	208	200	200	192	186	258	E B 232	E A 232	E A 272	
29	A	A	A	A	A	E A 298	302	A	A	230	212	210	224	198	198	206	200	186	186	E B 242	230	256	A	A	
30	A	A	A	A	A	A	A	A	A	E B 252	196	208	210	202	216	212	200	204	202	202	226	226	216	204	
31																									
CNT	1	2	3	1		2	4	9	14	22	22	23	24	25	25	25	25	25	25	24	20	11	4	3	2
MED	224	233	205	208		248	252	E A 274	234	208	206	217	208	212	210	211	203	201	214	227	E A 230	234	212	224	
U Q			E A 266				314	E A 305	E A 268	E A 254	E A 238	236	227	224	222	218	212	213	245	244	E A 244	E A 262	220		
L Q			196				195	225	232	206	202	210	200	207	205	204	198	196	203	224	E B 226	203	204		

APR. 2018 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2018 f_{XI} (0.1MHz)

45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	A	A	A	A	25	32	41	40	25	37	42	47	53	54	53	54	39	26	20	21	17	17	18	31	
2	X						A	A		71	40	57	57	58	94	90	71	50	24	21	19	22	20	21	16
3	X									53	43	51	60	75	54	58	61	50	26	18		22	23	28	
4	62	67	A	A	X	X	X	X	X	X	X	X	X	X	67	56	58	34	22	A	A	A	R	A	45
5	A	54	A	57	A	A	X	A	A	X	X	X	X	X	X	X	X	X	X	A	A	63	66	A	A
6	A	A	A	A	A	A	A	A	A	B	A	B	B	B	B	B	41	B	A	A	45	A	A	A	A
7	A	69	A	A	A	B	A	A	A	B	B	B	B	B	B	B	B	B	B	A	A	A	55	A	A
8	A	A	A	A	A	A	A	A	A	A	A	35	40	B	B	B	B	B	19	A	A	A	A	A	A
9	A	60	A	A	X	B	A	A	A	B	B	B	B	B	B	B	B	X	A	A	B	A	87	A	A
10	A	A	A	A	A	B		A	A	A	X	B	B	B	B	B	51	B	A	A	A	R	A	A	A
11	A	A	A	B	A	A	A	A	B	B	B	B	B	B	X	X	B	B	B	B	R	A	A	A	A
12	A	A	A	A	A	A	A	A	A	B	B	B	X	X	B	B	B	B	B	A	R	A	R	A	A
13	A	A	A	A	A	A	X	X	A	B	B	X	B	B	X	B	B	B	X	B	A	A	A	A	A
14	X										X	B	X	X	X	X	X	X	X	B	B	A	A	A	A
15	55	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A	A	A	A	A
16	A	A	A	A	A	32	40	41	24	29	39	50	53	45	53	41	A	A	A	A	A	A	A	A	A
17	A	A	A	A	A	A	74	82	A	53	50	53	52	53	44	50	48	B	B	A	A	A	A	A	A
18	A	A	A	A	A	A	A	A	A	X	X	X	X	X	X	X	X	B	B	A	A	A	A	A	A
19	45	A	A	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X	X	A	A	A	A	A	A
20	52	A	A	A	A	A	40	A	A	A	A	X	X	X	X	X	X	X	A	A	A	A	A	A	A
21	A	A	A	A	A	36	A	A	A	A	X	X	X	X	X	X	X	X	A	A	A	A	A	A	A
22	A	44	64	A	A	X	A	A	A	X	X	B	B	57	47	26	A	A	A	A	A	A	A	A	A
23	A	A	51	A	A	A	A	A	A	A	B	B	55	64	66	40	A	A	A	A	A	A	A	A	A
24	A	A	A	A	45	A	A	A	A	A	X	X	X	X	X	X	A	A	A	A	A	A	A	A	A
25	X	X	A	A	A	A	A	A	A	X	X	X	X	X	X	X	X	A	A	A	A	A	A	A	A
26	A	A	A	X	A	A	A	A	A	X	X	40	55	59	56	48	36	A	A	B	B	B	A	A	R
27	A	A	A	A	A	A	A	X	A	X	X	X	X	X	X	X	A	A	A	A	A	A	R	A	A
28	X	A	A	A	A	A	48	A	A	R	X	X	X	X	X	X	A	A	A	A	A	A	A	A	A
29	A	A	A	A	A	A	43	A	X	X	X	X	X	X	X	X	X	X	A	A	A	A	A	A	A
30	A	A	A	A	A	A	33	36	36	22	40	82	68	59	40	27	A	A	A	A	A	X	17	27	A
31	A	51	A	A	59	49	A	A	A	A	X	X	X	X	X	X	X	X	A	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	9	10	4	3	8	9	14	9	9	16	22	23	24	24	25	24	17	9	9	2	6	7	6	3	
MED	X	57	58	57	47	36	40	37	25	29	40	52	55	55	52	40	34	25	22	20	22	23	28	X	
U Q	58	67	65	57	52	46	47	43	52	38	46	57	58	61	56	52	46	28	27		45	66	55	45	
L Q	X	44	36	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
	26	44	36	26	28	29	33	28	22	27	34	47	52	52	47	34	24	22	20		19	17	21	16	

MAY 2018 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2018 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	A	A	A	A	F 14	F 23	R 35	F 30	19	31	36	41	47	48	47	48	33	20	14	15	11	11	11	25
2	22	A	A	A	F 22	F 33	A	A	F 30	34	44	46	52	64	F 73	F 51	44	18	15	13	16	14	15	10
3	R 11	A	16	A	A	F 38	F 35	F 35	F 47	R 37	45	50	69	48	52	55	R 44	R 20	R 12	A	16	17	22	A
4	A	A	A	A	22	20	30	31	U 32	R 32	40	46	52	F 56	F 44	F 47	28	16	A	A	A	A	A	R 24
5	A	A	A	A	A	A	20	A	A	24	32	50	50	46	48	57	37	28	26	A	57	A	A	A
6	A	A	A	A	A	A	A	A	A	B	A	B	B	B	B	B	A	B	A	A	F 40	A	A	A
7	A	A	A	B	A	B	A	A	A	B	B	B	B	B	B	B	B	B	B	A	A	A	A	A
8	A	A	A	A	A	A	A	A	A	A	A	29	34	B	B	B	B	B	13	A	A	A	A	A
9	A	A	A	A	44	B	A	A	B	B	B	B	B	B	B	B	B	25	A	A	B	A	A	A
10	A	B	A	A	A	B	A	A	A	A	27	B	B	B	B	B	F 39	B	A	A	A	A	A	A
11	A	A	A	B	A	A	A	A	A	B	B	B	B	B	34	30	B	B	B	A	A	A	A	A
12	A	A	A	A	A	A	A	A	A	B	B	B	30	33	B	B	B	B	B	A	A	A	R	A
13	A	A	A	A	A	A	R 20	20	A	B	B	32	B	B	46	B	B	B	R 20	B	A	A	A	A
14	55	A	A	A	A	A	A	A	A	22	B	38	45	40	46	34	23	19	B	B	A	A	A	A
15	A	A	A	A	R 22	18	15	14	R 15	20	35	47	50	46	45	36	22	14	16	A	13	A	A	A
16	A	A	A	A	A	F 20	27	21	F 18	23	33	44	47	39	47	35	A	A	A	A	A	A	A	A
17	A	A	A	A	A	A	A	A	A	F 38	F 32	F 40	46	47	38	44	42	B	22	A	A	A	A	A
18	A	A	A	A	A	A	A	A	A	A	34	50	52	52	44	34	32	B	B	A	A	A	A	A
19	A	A	A	A	A	A	A	A	12	23	31	42	49	48	42	31	16	16	16	A	A	A	A	A
20	A	A	A	A	A	A	A	A	R 17	21	28	38	46	F 46	F 39	F 32	20	A	A	A	A	A	A	A
21	A	A	A	A	A	F 27	A	A	A	A	27	42	47	50	F 37	R 27	18	A	A	A	A	A	A	A
22	A	A	A	A	A	R 33	A	A	A	A	28	B	B	F 46	F 41	20	A	A	A	A	A	A	A	A
23	A	A	A	A	A	A	A	A	A	A	B	B	41	F 49	F 45	34	A	A	A	A	A	A	A	A
24	A	A	A	A	A	A	A	A	A	A	28	37	38	F 32	F 32	F 34	A	A	A	A	A	A	A	A
25	30	22	A	A	A	A	A	A	A	21	32	F 48	F 39	F 37	50	31	19	A	A	A	A	A	A	A
26	A	A	A	20	A	A	A	A	A	16	34	F 35	F 39	F 44	42	30	A	A	B	B	B	A	A	A
27	A	A	A	A	A	A	A	A	A	24	23	F 25	F 50	F 40	43	48	23	A	A	A	A	A	A	A
28	18	A	A	A	A	A	A	A	A	A	26	44	44	42	36	20	F 20	A	A	A	A	A	A	A
29	A	A	A	A	A	A	A	A	A	R 23	F 23	F 42	F 49	F 51	R 46	F 23	16	A	A	A	A	A	A	A
30	A	A	A	A	A	A	A	F 25	A	16	F 21	F 39	F 56	53	34	21	A	A	A	A	A	11	F 16	A
31	A	A	A	A	A	A	A	A	A	A	25	42	46	R 54	F 42	26	16	A	A	A	A	A	A	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	5	1	1	1	5	8	7	8	8	16	22	23	24	24	25	24	16	9	9	2	6	4	4	3
MED	22	22	16	20	22	F 25	27	24	18	23	32	42	46	46	44	33	26	19	16	14	16	12	16	24
U Q	42				33	F 33	35	F 30	F 31	32	34	47	50	F 50	47	40	38	22	21		40	16	19	25
L Q	14				18	20	20	20	R 16	21	27	38	F 40	42	38	26	18	16	14		13	11	13	10

MAY 2018 foF2 (0.1MHz)
NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2018 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	33	58	56	47	29	26	50	59	51	11	58		18	20		19	11	58	51	52	32	62	42	36	
2	45	34	26	19	22	^E 11	83	54	68	16	32	32		18	34	28	17	45	37	29	28	66	50	58	
3	43	29	46	32	32	64	12	20	^E 8	^B 51					22	14		46	46	46	48	^E 9	^B 43	47	
4	31	44	55	46	49	65	^E 9	^B 9	^B 73		20	63			17	18		52	35	53	49	28	68	21	
5	46	46	51	39	84	47	75	37	59	46	27	77	17	17					12	11	47	21	51	46	51
6	84	74	58	65	63	56	39	58	62		40							44		50	56	32	40	56	84
7	55	44	52	57	38		60	58	85												49	52	46	39	38
8	68	56	52	58	55	53	58	58	50	78	53	41	^E 24							56	45	57	57	50	84
9	48	45	47	53	66		99	61	59									^E 20	^B 50	56		54	65	44	
10	47	70	67	62	59		57	58	48	55	32						^E 24	^B 43	42	46	31	40	46		
11	43	41	54		56	48	51	55	52						^E 27	^B 23				30	40	51	70	88	
12	65	55	56	55	73	54	75	81	40		75			47	62					67	23	91	23	43	
13	49	54	54	56	50	42	24	56	52			27									50	45	58	53	
14	42	42	58	44	46	40	54	49	58	64			26	28	22	24	48	60	54			58	57	57	57
15	48	72	49	40	58	50	42	46	56	45	53	^E 16	^B 22	20	22	52	51	31	51	86	40	30	44	49	
16	51	52	59	62	48	116	51	58	43	56	56	64	152	22	28	48	34	67	47	46	46	58	32	43	
17	47	52	66	102	70	84	53	70	70	57							^E 11	^B 15	^B 42	34	90	92	80		
18	51	58	82	56	58	60	64	61	59	65		16	23	28	18	20	15			38	86	56	65	56	
19	58	49	58	53	57	57	58	32	31	66		16	15	18	18		56	12	47	34	33	36	44	^K 24	
20	66	51	62	58	46	76	36	46	64	51	54	13	23	25		58	18	47	63	56	48	49	28	58	
21	53	58	56	101	44	56	56	58	72	56	31	28	23		17	24	23	59	56	53	66	47	53	33	
22	105	42	46	46	43	30	56	58	48	47	44			22	60	54	58	54	47	32	43	45	56	46	
23	49	67	34	79	55	58	56	69	52	55			60	24			64	69	54	55	39	59	34	68	
24	34	50	50	58	47	59	52	52	48	65	44	49	18	16	16	19	47	47	47	22	60	38	59	30	
25	28	47	48	71	48	51	68	46	45	153			16	16	13	54	58	49	35	59	48	57	40	56	
26	48	62	62	46	46	58	47	47	55	50	51	^E 12				55	71	48			52	59	32		
27	40	65	53	65	48	44	37	14	57	34	91	13	12	19	25	18	44	30	30	48	51	22	29	44	
28	36	36	58	72	63	64	39	81	61	34	15			19	28	22	43	38	54	32	46	58	51	34	29
29	35	34	58	55	92	54	27	56	64	52	37	20		16	14	48	45	50	49	56	54	49	57	57	
30	51	48	49	41	41	56	43	48	40	16	13	13	18	19	30	48	40	44	30	52	51	28	40	29	
31	30	30	36	49	34	32	66	55	59	44	46	19	23		50	49	30	66	68	32	26	28	83	60	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	30	31	28	31	31	31	25	25	23	24	24	24	24	25	22	25	28	29	31	31	31	
MED	48	50	54	56	49	55	53	56	56	51	37	16	18			26	38	48	47	48	48	49	50	47	
U Q	53	58	58	62	59	60	60	58	62	60	53	32	23		26	48	54	54	51	56	53	57	59	58	
L Q	40	42	49	46	44	46	39	46	48	39	14	16		19	18	18	16	44	34	40	34	36	40	36	

MAY 2018 ftEs (0.1MHz)
 NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2018 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	7	7	7	8	8	8	8	9	8	9	11	16	14	14	14	12	7	9	8	8	8	8	8	12
2	10	8	8	8	9	11	14	12	11	9	16	13	12	13	15	11	7	9	8	8	8	8	8	14
3	7	6	8	6	7	8	7	7	9	8	9	10	9	11	11	8	6	10	8	16	7	9	8	6
4	8	10	12	10	10	7	9	8	7	7	7	10	9	10	9	7	8	8	8	8	9	9	10	9
5	9	10	9	10	10	10	10	10	9	8	8	12	10	10	12	8	7	8	7	9	7	7	7	8
6	10	10	12	15	13	14	12	13	13	B	16	B	B	B	B	B	16	B	11	10	7	8	10	9
7	16	8	19	38	9	B	15	18	24	B	B	B	B	B	B	B	B	B	B	14	14	7	8	7
8	16	24	20	28	14	12	16	8	13	14	18	13	24	B	B	B	B	B	8	8	14	12	8	9
9	11	11	22	18	13	B	13	14	35	B	B	B	B	B	B	B	B	20	19	16	B	6	9	20
10	16	37	11	16	21	B	18	15	13	12	14	B	B	B	B	B	24	B	9	9	6	7	7	7
11	17	12	19	B	13	12	14	14	15	B	B	B	B	B	27	24	B	B	B	9	3	8	7	11
12	7	11	17	18	12	15	22	24	14	B	64	B	15	17	B	B	B	B	B	13	10	11	11	6
13	8	15	12	16	14	12	10	8	14	B	B	20	B	B	40	B	B	B	14	B	15	14	13	7
14	11	10	15	9	11	12	8	8	8	9	B	18	16	16	15	12	8	11	B	B	15	14	14	16
15	8	17	13	10	9	12	8	6	8	8	12	16	14	8	10	12	10	10	9	9	8	8	10	10
16	12	12	14	15	10	9	10	10	7	8	8	11	11	11	8	9	10	10	9	9	10	10	10	8
17	9	12	17	21	21	15	16	17	13	10	11	13	12	12	8	7	10	B	15	9	8	11	9	8
18	10	10	23	13	16	17	16	14	14	10	10	11	12	11	11	8	15	B	B	16	15	16	17	17
19	10	10	10	11	10	10	9	12	7	9	7	11	10	11	12	9	8	7	8	7	7	7	8	9
20	8	8	10	12	12	12	8	12	7	7	7	8	20	25	16	17	12	15	15	15	19	17	17	14
21	15	11	11	11	9	8	8	12	11	14	19	14	10	11	16	22	16	12	11	14	12	10	13	14
22	10	10	11	8	8	8	8	7	9	9	15	B	B	23	11	14	13	12	10	9	9	10	8	9
23	9	9	9	14	10	10	9	12	11	8	B	B	14	24	10	8	16	10	12	16	14	10	9	7
24	7	7	10	14	10	10	14	13	12	12	13	11	8	8	12	13	12	6	8	8	8	8	8	7
25	8	7	6	8	8	11	11	9	9	8	8	8	9	8	6	6	6	9	8	9	8	10	12	10
26	10	9	8	6	8	10	9	9	13	11	12	12	11	11	8	14	13	18	B	B	B	11	8	7
27	7	6	6	10	10	10	7	7	6	6	8	6	6	10	7	8	18	10	11	11	11	12	8	9
28	7	7	9	8	8	7	7	9	10	9	7	8	13	13	10	7	10	8	8	8	11	7	8	8
29	7	6	9	9	9	8	6	12	11	9	8	6	8	7	6	8	8	8	9	11	10	11	12	10
30	8	8	8	6	7	8	6	8	7	8	7	8	8	8	7	7	7	8	7	8	8	8	8	7
31	7	8	9	11	9	11	8	8	6	7	8	8	9	10	9	10	6	8	10	9	5	8	8	14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	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	10	11	11	10	11	9	10	11	9	12	13	12	12	12	12	12	10	10	9	9	9	8	9
U Q	11	11	15	16	13	12	14	13	13	14	19	B	B	B	B	B	B	B	B	15	16	14	11	12
L Q	7	8	9	8	9	8	8	8	8	8	8	10	9	10	9	8	8	8	8	8	8	8	8	7

MAY 2018 fmin (0.1MHz)
 NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2018 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	208	198		A	A	234	126	202	210	224	216	198	200	190	104	E A	214	92	224	104	198		
2	A	A	A	A	A E B	318		A	A	A E A	242	216	E A	244	208	214	202	198	192	E A	250	258	230	202	238	238	
3	208	202	210		A	A	A	A		232	208	190	204	210	200	196	196	184	202	202		228	E B	A	A		
4	A	A	A	A	A	A		200	202	252	194	202	212	214	202	192	202	206	218	A	A	A	A	A	196		
5	A	A	A	A	A	A		200		250	226	226	206	194	200	214	180	244	256		226		A	A	A		
6	A	A	A	A	A	A		A	A	A	B	A	B	B	B	B	B	A	B	A	A	202	A	A	A		
7	A	A	A	B	A	B		A	A	A	B	B	B	B	B	B	B	B	B	B	A	A	A	A	A		
8	A	A	A	A	A	A		A	A	A	A	A E A	E B	B	B	B	B	B	B	E A	306	A	A	A	A		
9	A	A	A	A	A	B		A	A	B	B	B	B	B	B	B	B	E B	B	274	200	A	B	A	A		
10	A	B	A	A	A	B		A	A	A	A E A	274	B	B	B	B	B	E B	B	B	A	A	A	A	A		
11	A	A	A	B	A	A		A	A	A	B	B	B	B	E B	E B	B	B	B	B	B	A	A	A	A		
12	A	A	A	A	A	A		A	A	A	B	B	E A	E A	B	B	B	B	B	B	A	A	A	A	A		
13	A	A	A	A	A	A		200	184		A	B	B	A	B	E B	B	B	B	E B	286	B	A	A	A		
14	E A	A	A	A	A	A		A	A	A E A	238	232	216	202	212	192	200	272	A	B	B	A	A	A	A		
15	A	A	A	A	204	204	204		A	A	232	218	E B	224	204	196	196	190	192	292	288	A E A	254	A	A		
16	A	A	A	A	A	A E A		340	292	258	236	218	210	196	196	186	200		A	A	A	A	A	A	A		
17	A	A	A	A	A	A		A	A	A	A E A	E A	268	234	228	214	204	214	222	B E B	264	A	A	A	A		
18	A	A	A	A	A	A		A	A	A	A E A	248	224	206	204	226	218	208	B	B	A	A	A	A	A		
19	A	A	A	A	A	A		A	A	A	A	254	216	204	206	214	190	200	194	194	236	248	A	A	A		
20	A	A	A	A	A	A		A	A E A	A	296	282	196	206		B	B	212	212	214	222	A	A	A	A		
21	A	A	A	A	A	A		A	A	A	A	292	220	206	200	200	E B	242	270	A	A	A	A	A	A		
22	A	A	A	A	A			A	A	A	A E A	278		B	B		212	188	210	A	A	A	A	A	A		
23	A	A	A	A	A	A		A	A	A	A	B	B	E A	268	208	216	184	A	A	A	A	A	A	A		
24	A	A	A	A	A	A		A	A	A	A E A	E A	E A	E A	238	220	194	196	188	216		A	A	A	A		
25	192	A	A	A	A	A		A	A	A E A	E A	312	216	206	194	188	198	196	210	A	A	A	A	A	A		
26	A	A	A	A	A	A		A	A	A	A	196	204	192	192	186	194	A	A	B	B	B	A	A	A		
27	A	A	A	A	A	A		A	A	A	A	210	E A	226	208	194	210	200	186	A	A	A	A	A	A		
28	196	A	A	A	A	A		A	A	A	A	A	244	214	220	202	202	192	A	A	A	A	A	A	A		
29	A	A	A	A	A	A		A	A	A	A	252	E A	224	218	192	192	192	196	A	A	A	A	A	A		
30	A	A	A	A	A	A		A	A	A E A	244	226	206	206	192	204	194	A	A	A	A	A	194	208	A		
31	A	A	A	A	A	A		A	A	A	A E A	244	210	204	204	198	198	198	A	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	4	1	1		3	4	5	3	6	13	22	22	22	24	25	24	16	9	10	2	6	4	4	3			
MED	198	202	210		208	200	200	202	A U	248	222	214	210	206	202	199	197	198	U	E	219	253	236	220	206	205	198
U Q	222				274	261	272	292	A	258	247	248	224	218	211	208	214	216	E	273	286	230	226	223	238		
L Q	194				204	198	200	184	234	209	204	206	204	195	194	193	192	196	238		202	198	153	196			

MAY 2018 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2018 f_{XI} (0.1MHz)

45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	A	A	A	A	52	A	A	A	A	A	B	B	B	A	X	B	A	A	A	A	A	A	A	A
2	A	A	A	A	42	A	A	A	A	A	B	B	O	X	B	B	B	A	A	A	R	A	48	91
3	A	A	A	A	A	A	A	A	A	A	B	B	O	X	X	B	X	B	R	A	R	A	A	A
4	A	A	A	A	A	A	A	A	A	A	B	B	B	O	X	O	X	R	R	A	B	A	A	37
5	A	A	A	A	A	A	A	A	A	A	X	X	X	X	X	X	A	B	A	A	A	A	A	B
6	B	A	A	X	A	A	A	A	A	A	A	O	X	X	X	O	X	X	A	B	A	A	A	A
7	A	B	A	B	A	A	A	A	A	A	A	A	A	36	36	33	28	A	A	A	A	O	X	A
8	56	A	A	A	A	A	A	A	A	A	X	X	X	X	X	X	B	B	A	B	B	B	A	A
9	A	51	56	48	A	A	A	A	O	X	X	X	X	44	29	25	21	A	A	A	A	A	X	A
10	A	48	A	A	A	A	A	A	A	A	X	X	X	37	42	52	37	32	32	22	A	A	O	X
11	A	A	A	A	A	A	A	O	X	X	21	18	40	40	52	49	O	X	X	A	A	A	A	B
12	A	A	A	A	A	94	A	A	A	A	X	X	X	27	36	42	49	39	32	28	A	A	A	A
13	A	64	39	A	A	48	30	B	A	A	X	X	X	27	44	42	47	42	27	A	A	A	A	89
14	A	A	73	A	A	A	A	A	A	A	X	X	X	25	30	40	48	32	32	R	A	A	A	A
15	A	A	A	A	A	40	A	A	A	A	O	X	X	24	36	36	36	42	29	O	X	A	A	A
16	A	A	A	A	A	A	A	A	A	A	33	35	35	41	31	34	X	A	A	A	A	A	A	A
17	52	A	A	A	A	A	O	X	A	O	X	22	34	47	46	X	X	X	O	X	A	A	A	A
18	A	A	A	A	A	A	A	O	X	X	A	O	X	A	B	B	O	X	O	X	B	A	A	A
19	A	A	O	X	A	A	A	A	A	A	B	B	X	36	45	B	B	B	B	B	B	A	A	A
20	A	A	40	46	A	A	31	A	A	A	A	X	X	35	40	B	B	B	A	A	A	A	A	R
21	A	A	A	A	A	A	A	A	A	A	O	X	X	32	33	43	40	32	36	A	A	A	A	A
22	A	A	A	A	A	A	A	A	A	A	A	43	48	60	45	34	21	X	O	X	A	A	A	A
23	A	A	A	A	A	A	A	A	A	A	X	X	X	30	34	37	37	B	B	O	X	A	A	A
24	A	A	44	A	60	54	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	A	A	A
25	A	A	A	A	A	A	A	A	A	A	X	X	X	24	38	39	46	38	41	22	22	A	A	A
26	A	A	A	A	A	A	78	A	A	A	A	A	A	A	B	B	B	A	B	A	A	36	81	A
27	A	74	A	A	A	A	A	38	A	A	A	A	B	B	B	B	B	B	B	B	B	B	A	63
28	A	A	40	A	A	A	A	A	A	A	X	X	X	27	36	38	47	37	29	A	A	A	A	A
29	A	A	A	A	A	A	X	A	A	A	A	X	X	36	42	38	35	38	O	X	A	A	A	A
30	A	A	A	A	A	A	A	A	A	A	X	O	X	25	42	52	A	R	O	X	B	A	R	A
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	2	4	7	3	3	4	3	4	2	4	16	21	24	22	20	22	11	2			1	2	6	4
MED	54	58	40	46	52	51	30	54	O	X	X	X	X	X	X	X	O	X	X			O	X	
U Q		69	56	48	60	74	31	74		38	32	41	47	47	42	34	28						63	90
L Q		50	39	X	X	X				X	X	X	X	X	X	X	O	X					O	X
				44	42	44	26	33		20	26	35	38	38	32	28	21						31	48

JUN. 2018 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN.2018 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	A	A	A	A	A	A	A	A	A	A	B	B	B	A	48	B	A	A	A	A	A	A	A	A	A	
2	A	A	A	A	36	A	A	A	A	A	B	B	41	B	B	B	B	A	A	A	R	A	A	A	A	
3	A	A	A	A	A	A	A	A	A	A	B	B	38	38	B	50	B	R	A	R	A	A	A	A	A	
4	A	A	A	A	A	A	A	A	A	A	B	B	B	41	32	22	A	A	A	B	A	A	A	R	19	
5	A	A	A	A	A	A	A	A	A	A	22	34	43	44	38	27	A	B	A	A	A	A	A	A	B	
6	B	A	A	38	A	A	A	A	A	A	A	34	F	34	36	36	20	14	A	B	A	A	A	A	A	
7	A	B	A	B	A	A	A	A	A	A	A	A	30	30	27	22	A	A	A	A	A	R	A	A	27	
8	A	A	A	A	A	A	A	A	A	A	25	31	31	37	J	R	22	B	B	A	B	B	A	A	A	
9	A	A	A	A	A	A	A	A	A	R	22	21	32	35	F	32	23	19	15	A	A	A	A	A	A	
10	A	A	A	A	A	A	A	A	A	A	31	36	F	37	31	26	26	16	A	A	A	A	A	R	A	25
11	A	A	A	A	A	A	A	A	15	12	21	F	F	28	34	F	32	33	20	A	A	A	A	A	A	B
12	A	A	A	A	A	A	A	A	A	A	21	30	36	38	F	32	25	F	17	A	A	A	A	A	A	A
13	A	A	A	A	A	A	A	B	A	A	21	F	29	36	F	F	33	21	A	A	A	A	A	A	A	A
14	A	A	A	A	A	A	A	A	A	A	19	24	F	J	R	42	26	26	A	A	A	A	A	A	A	A
15	A	A	A	A	A	A	A	A	A	A	18	30	30	30	36	F	17	21	A	A	A	A	A	A	A	A
16	A	A	A	A	A	A	A	A	A	A	F	21	29	29	35	25	28	A	A	A	A	A	A	A	A	A
17	A	A	A	A	A	A	A	R	A	R	22	F	F	18	31	40	31	32	22	14	R	A	A	A	A	A
18	A	A	A	A	A	A	A	A	J	R	33	41	A	R	A	B	B	28	30	B	A	A	A	A	A	A
19	A	A	R	A	A	A	A	A	A	A	B	B	30	R	B	B	B	B	B	B	A	A	A	A	A	A
20	A	A	A	R	A	A	A	A	A	A	A	A	29	34	B	B	B	A	A	A	A	A	A	R	R	
21	A	A	A	A	A	A	A	A	A	A	26	27	37	34	26	F	21	A	A	A	A	A	A	A	A	A
22	A	A	A	A	A	A	A	A	A	A	A	F	F	F	F	F	28	15	A	A	A	A	A	R	A	14
23	A	A	A	A	A	A	A	A	A	A	24	28	31	31	B	B	F	R	A	A	A	A	A	A	A	A
24	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A	A
25	A	A	A	A	A	A	A	A	A	A	18	32	33	40	32	F	24	16	16	A	A	A	A	A	A	A
26	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	B	A	B	A	A	A	A	A	A	A	A
27	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	A	A	A	A
28	A	A	A	A	A	A	A	A	A	A	21	30	32	41	32	23	A	A	A	A	A	A	22	A	A	A
29	A	A	A	A	A	A	20	A	A	A	A	30	36	32	29	Z	31	17	A	A	A	A	A	A	A	A
30	A	A	A	A	A	A	A	A	A	A	19	F	R	A	R	22	B	A	A	A	A	A	A	A	A	A
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT			1	2	1		1	1	2	4	16	21	24	22	20	22	11	2				2	2	1		
MED			R	31	35	36		R	24	R	19	21	30	34	36	32	22	16	22			24	20	R	R	
U Q										R	32	23	32	37	40	34	27	21								
L Q											14	19	28	31	32	26	21	15								

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2018 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	62	51	49	54	47	56	54	49	80	70	B	B	B	E B	B		45	46	57	40	52	28	37	62	
2	70	51	41	53	42	55	52	69	58	56	B	B	E B	B	B	B	B	57	61	56	29	83	45	42	
3	53	65	50	81	44	48	46	50	56	56	B	B	E B	E B	B	B	B	18	47	24	33	33	36	52	
4	51	53	46	55	58	51	41	51	60	57	B	B	E B	E B	G E	B		20	25	62	B	52	52	56	46
5	50	50	55	54	46	44	49	51	55	100	24	55	21	22	28	54	54	B	58	58	48	46	44	B	
6	B	51	55	32	54	55	50	49	57	76	59	E B	E B	G	G	15	14	42	32	B	54	51	51	83	60
7	49	58	55	51	49	69	56	56	56	46	48	59	54	51	19	42	43	60	26	41	60	36	42	28	
8	54	54	51	K 35	49	46	52	49	53	85	20	15	17	17	G	14	B	B	60	B	B	B	77	44	
9	40	34	90	57	51	56	50	53	32	56	44	15	18	112	E B	E B	69	54	54	45	59	55	51	51	
10	94	58	58	90	61	48	41	48	64	48	52	34	34	60	69	50	24	37	84	84	73	56	28	44	
11	46	56	38	51	70	56	56	56	56	36	60	43	18	29	52	52	52	52	58	49	89	58	42	B	
12	60	118	77	52	54	54	57	50	51	56	60	16	G 16	G 12	24	71	66	45	44	55	35	46	46	52	
13	33	30	30	30	105	59	39	61	56	34	64	E B 18	55	55	26	41	28	38	44	57	30	56	40	40	
14	52	54	54	51	57	59	69	63	58	29	55	50	52	57	50	50	30	58	44	44	47	69	44	38	
15	45	38	68	46	36	23	34	57	46	47	47	46	50	55	58	14	56	35	48	34	30	56	22	25	
16	29	50	52	52	69	54	46	28	81	48	46	55	48	18	54	13	54	49	49	52	52	28	54	49	
17	32	32	52	60	54	48	50	32	30	40	13	22	22	67	16	56	55	49	37	49	50	51	32	43	
18	56	53	47	50	72	58	65	44	45	54	38	G 20	58	B 68	E B 16	E B 24	B	B	44	45	42	30	42	38	
19	38	44	50	50	63	83	55	57	52	52	B	E B 15	E B 22	B	B	B	B	B	B	56	51	57	52	31	
20	31	36	32	53	47	41	25	42	47	62	61	50	E B 17	B	B	57	46	46	54	55	52	56	23	23	
21	31	36	45	57	49	40	56	56	48	54	67	24	56	56	G	46	55	80	43	55	46	52	52	52	
22	47	55	45	93	57	27	42	54	53	58	62	35	E B 24	G 24	44	52	36	38	46	54	45	53	46	37	
23	45	41	55	49	60	51	64	86	62	58	44	38	G	G	B	B	E B 10	55	48	40	40	40	35	35	
24	61	51	80	56	31	55	55	74	58	58	B	B	B	B	B	B	B	B	B	B	43	63	47	39	
25	49	58	45	70	43	28	44	48	49	49	E B 14	25	106	18	44	50	57	64	46	35	42	90	102	74	
26	68	73	67	79	60	50	54	55	52	53	50	58	58	B	B	B	54	B	58	56	36	47	52	74	
27	73	44	48	70	56	50	34	49	48	63	63	55	B	B	B	B	B	B	B	B	42	38	52		
28	45	73	40	60	60	58	52	47	47	32	50	21	55	G 22	54	48	46	56	48	30	46	32	41	41	
29	39	51	44	46	44	38	24	60	45	39	59	47	52	56	E B 56	B 12	57	46	43	56	38	20	56	27	
30	75	75	49	58	65	56	57	48	37	40	45	G	56	66	E B 22	B 20	B	31	22	32	34	58	51	42	
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	30	30	30	30	30	30	30	30	30	24	24	26	24	21	23	23	23	26	26	28	29	30	28	
MED	49	51	50	54	54	52	51	51	53	54	50	34	U 33	30	28	42	46	46	48	50	46	52	44	42	
U Q	60	58	55	60	60	56	56	57	58	58	60	50	55	56	54	52	55	56	58	56	52	56	52	52	
L Q	40	44	45	50	47	46	42	48	47	46	44	G	18	22	G	14	30	37	44	40	37	38	38	38	

JUN. 2018 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN.2018 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	12	15	15	12	13	14	14	10	19	17	B	B	B	26	39	B	16	14	8	8	8	7	7	12	
2	25	14	14	11	17	14	18	36	14	13	B	B	37	B	B	B	18	18	18	12	8	8	8	8	
3	14	13	12	11	22	11	10	11	12	15	B	B	26	20	B	19	B	11	14	8	9	7	7	7	
4	7	10	15	15	14	10	10	6	12	16	B	B	B	30	13	17	15	15	16	B	12	13	16	7	
5	8	8	8	17	14	12	9	12	15	14	12	10	9	9	8	7	9	B	21	17	11	11	8	B	
6	B	16	9	8	16	13	9	9	10	15	17	16	15	10	10	9	10	10	B	9	12	7	13	13	
7	16	35	15	26	13	17	16	16	17	12	20	20	15	12	8	9	8	8	10	8	8	7	7	6	
8	6	14	10	12	10	10	15	10	10	16	9	10	8	9	9	8	B	B	B	B	B	B	14	12	
9	8	8	10	8	16	14	14	10	7	8	8	7	7	12	12	10	12	10	10	10	8	8	8	7	
10	7	10	8	9	10	7	8	7	8	8	8	7	7	8	8	8	8	8	8	8	8	8	8	7	
11	6	6	6	12	12	12	12	10	8	9	9	9	6	6	7	8	7	7	9	8	9	15	15	B	
12	15	10	10	11	11	10	14	12	13	10	8	8	9	8	8	8	8	8	6	6	8	8	8	8	
13	8	8	8	6	8	8	6	25	14	13	11	18	14	13	13	11	8	8	8	11	8	11	7	8	
14	8	15	16	17	13	12	12	11	13	8	8	8	8	10	10	10	10	8	8	8	8	8	8	8	
15	10	8	10	8	8	9	10	10	12	12	10	8	6	9	9	9	7	7	10	9	9	8	7	7	
16	7	7	7	9	9	9	8	9	9	9	9	8	8	8	8	8	8	8	8	13	14	7	8	8	
17	8	8	8	9	9	9	8	10	6	8	8	7	8	8	8	8	9	6	7	7	7	8	8	9	
18	9	10	10	9	15	14	9	10	10	14	10	10	18	B	40	16	24	B	13	16	9	8	10	7	
19	7	9	9	8	13	14	13	10	10	10	B	B	15	22	B	B	B	B	B	19	16	18	10	10	
20	7	8	8	8	10	10	6	10	9	9	10	11	17	B	B	24	25	14	16	11	11	11	12	8	
21	8	10	8	10	12	10	10	10	9	8	9	12	10	8	7	8	8	10	10	11	8	8	8	16	
22	9	7	8	9	8	8	8	8	8	7	12	14	24	13	8	7	9	8	8	10	10	10	8	8	
23	10	9	10	10	10	10	10	12	12	12	12	12	9	11	B	B	10	12	12	8	8	10	7	8	
24	10	10	10	14	8	16	12	7	12	12	B	B	B	B	B	B	B	B	B	B	21	16	12	7	
25	7	15	15	11	12	9	11	9	10	10	14	12	12	10	15	8	6	7	14	11	9	10	12	8	
26	8	12	15	11	11	15	12	20	13	8	9	14	15	B	B	B	14	B	14	12	10	10	14	14	
27	8	8	13	8	12	12	9	7	10	8	15	20	B	B	B	B	B	B	B	B	B	12	13	10	
28	8	11	12	15	15	10	9	9	9	8	11	8	8	9	8	8	8	12	9	11	15	8	7	11	
29	11	11	11	11	13	10	8	10	12	10	12	10	7	7	9	12	10	10	10	14	10	10	11	14	
30	17	12	10	9	10	8	9	8	9	9	8	10	10	18	22	12	B	10	8	13	16	14	14	14	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	
MED	8	10	10	10	12	10	10	10	10	10	11	12	11	12	11	10	10	10	10	11	10	9	8	8	
U Q	11	13	13	12	14	14	12	11	13	13	17	20	18	26	B	B	24	25	18	16	16	12	11	12	12
L Q	7	8	8	9	10	9	9	9	9	8	9	8	8	9	8	8	8	8	8	8	8	8	8	7	

JUN.2018 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2018 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	A	A	A	A	A	A	A	B	B	B	A	E B 264	B	A	A	A	A	A	A	A	A	A	
2	A	A	A	A	206	A	A	A	A	A	B	B	E B 256	B	B	B	B	A	A	A	A	A	A	A	A	
3	A	A	A	A	A	A	A	A	A	A	B	B	236	220	B	238	B	A	A	A	A	A	A	A	A	
4	A	A	A	A	A	A	A	A	A	A	B	B	E B 250	E B 192	258	E B 194	194	A	A	A	B	A	A	A	200	
5	A	A	A	A	A	A	A	A	A	A	E A 278	A	208	206	216	194	194	A	B	A	A	A	A	A	B	
6	B	A	A	A	A	A	A	A	A	A	A	A	194	194	E B 216	202	202	202	A	B	A	A	A	A	A	
7	A	B	A	B	A	A	A	A	A	A	A	A	A	E A 272	E A 256	E A 228	208	A	A	A	A	A	A	A	A	
8	A	A	A	A	A	A	A	A	A	A	A	280	200	E A 220	212	188	196	B	B	A	B	B	B	A	A	
9	A	A	A	A	A	A	A	A	A	A	A	242	E A 222	192	222	196	206	216	A	A	A	A	A	A	A	
10	A	A	A	A	A	A	A	A	A	A	A	216	E A 196	222	200	200	200	178	A	A	A	A	A	198	A	
11	A	A	A	A	A	A	A	A	E A 276	E A 276	E A 276	A	208	208	204	204	268	A	A	A	A	A	A	A	B	
12	A	A	A	A	A	A	A	A	A	A	A	228	E A 218	218	200	210	206	222	A	A	A	A	A	A	A	
13	A	A	A	A	A	A	A	B	A	A	A	240	222	202	216	198	206	A	A	A	A	A	A	A	A	
14	A	A	A	A	A	A	A	A	A	A	E A 278	E A 240	E A 220	204	222	196	A	A	A	A	A	A	A	A	A	
15	198	A	A	A	A	A	A	A	A	A	A	222	202	202	198	218	186	A	A	A	A	A	A	A	A	
16	A	A	A	A	A	A	A	A	A	A	A	222	200	200	204	200	186	A	A	A	A	A	A	A	A	
17	A	A	A	A	A	A	A	A	A	A	A	208	216	208	198	198	208	208	A	A	A	A	A	A	A	
18	A	A	A	A	A	A	A	A	A	A	A	206	E A 340	A	B	B	240	E B 284	B	A	A	A	A	A	A	
19	A	A	212	A	A	A	A	A	A	A	B	B	230	210	B	B	B	B	B	B	A	A	A	A	A	
20	A	A	A	216	A	A	A	A	A	A	A	E A 260	E A 234	B	B	B	A	A	A	A	A	A	A	A	A	
21	A	A	A	A	A	A	A	A	A	A	A	E A 244	E A 212	194	E A 238	A	A	A	A	A	A	A	A	A	A	
22	A	A	A	A	A	A	A	A	A	A	A	E A 254	E A 226	206	204	200	206	A	A	A	A	A	A	186	A	
23	A	A	A	A	A	A	A	A	A	A	A	E A 282	E A 216	250	B	B	240	E B 256	A	A	A	A	A	A	A	
24	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A	
25	A	A	A	A	A	A	A	A	A	A	A	E A 248	E A 240	E A 230	E A 202	E A 236	198	E A 262	E A 286	A	A	A	A	A	A	
26	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	B	A	B	A	A	A	A	A	A	A	
27	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	A	A	A	
28	A	A	A	A	A	A	A	A	A	A	A	272	E A 224	210	204	E A 208	196	206	194	A	A	A	A	188	A	A
29	A	A	A	A	A	A	A	A	A	A	A	E A 236	E A 214	190	196	200	A	A	A	A	A	A	A	A	A	
30	A	A	A	A	A	A	A	A	A	A	A	220	200	200	214	222	216	B	A	A	A	A	A	A	A	
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	1		1	1	1		1		2	1	13	21	24	23	21	22	12	3					1	2	1	
MED	198		212	216	206		204		241	208	232	209	208	205	201	204	211	E 256					188	192	200	
U Q											E A 277	E A 242	E A 228	216	E 222	218	231	E A 286								
L Q											221	204	202	202	197	198	204	194								

JUN. 2018 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUL.2018 f_{XI} (0.1MHz)

45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	A	55	80	A	A	A	A	A	A	O	X	X	X	X	O	X	X	R	A	R	A	A	A	A	A
2	A	A	A	A	A	X	X	A	R	A	A	X	X	X	X	X	A	A	A	A	A	A	A	A	A
3	A	A	A	A	A	A	A	A	A	A	O	X	X	X	X	X	X	O	X	A	A	A	A	A	A
4	A	A	A	A	56	A	56	A	A	A	O	X	X	X	X	X	A	R	B	R	A	A	A	A	A
5	R	A	A	A	63	A	A	X	32	30	25	29	40	39	46	36	27	32	A	A	A	A	A	A	A
6	A	A	A	A	A	A	A	A	A	X	O	X	X	X	X	A	O	X	A	A	A	A	X	A	A
7	A	A	A	A	A	A	A	A	A	A	B	B	O	X	O	X	X	A	A	A	A	A	A	A	B
8	32	A	A	A	A	A	A	A	A	A	A	X	X	X	X	X	26	A	A	A	A	A	A	A	A
9	A	A	A	A	A	A	A	A	A	A	A	X	X	X	X	X	O	X	A	A	A	A	A	A	A
10	A	A	A	A	A	42	A	A	A	A	A	X	X	44	44	44	X	O	X	R	A	A	A	A	A
11	A	A	A	A	A	A	A	A	A	A	B	A	58	58	58	43	B	A	A	A	A	A	A	A	39
12	A	48	66	A	A	A	A	A	A	O	X	A	O	X	O	X	X	O	X	A	A	A	A	A	A
13	A	A	X	A	A	A	A	A	A	A	A	X	X	X	X	X	29	32	A	A	A	A	A	A	A
14	A	A	A	A	A	A	A	A	A	R	O	X	X	X	X	X	X	X	A	A	A	A	O	X	A
15	A	A	A	A	A	A	A	A	A	A	O	X	X	34	54	58	48	O	X	A	A	A	A	A	A
16	A	A	A	A	A	A	68	A	A	A	A	A	A	A	O	X	O	X	B	A	R	A	A	A	A
17	A	A	A	A	A	O	X	O	X	A	B	A	A	X	46	58	41	32	A	O	X	O	X	A	A
18	A	84	A	A	A	A	A	A	X	X	X	X	X	X	X	X	X	A	A	A	O	X	O	X	A
19	A	O	X	A	A	A	A	A	A	X	X	X	X	X	X	X	O	X	A	A	A	A	X	O	X
20	A	A	A	A	A	A	A	A	A	A	A	41	44	52	B	B	B	B	A	A	B	A	A	A	A
21	A	A	A	A	A	A	O	X	A	A	A	B	X	56	B	56	B	B	B	B	A	A	A	A	A
22	A	A	A	41	A	A	A	A	A	A	A	X	X	X	O	X	B	B	B	A	A	A	A	A	A
23	A	A	A	A	A	A	A	A	A	A	B	B	X	X	B	X	O	X	A	O	X	A	A	A	A
24	A	A	A	A	A	A	A	A	A	A	A	X	X	X	X	X	B	B	A	B	A	A	A	A	A
25	A	A	A	A	A	B	A	A	A	A	B	B	O	X	X	X	X	O	X	B	R	R	A	A	A
26	A	A	A	A	A	A	A	A	A	A	O	X	X	X	X	X	X	X	A	A	A	R	B	A	R
27	A	A	A	O	X	A	R	A	X	X	X	X	X	X	X	X	X	X	A	A	A	A	A	A	R
28	A	54	22	A	X	O	X	A	A	A	A	X	X	X	X	X	46	B	A	A	A	O	X	A	A
29	A	A	A	A	A	A	A	A	A	A	A	X	X	49	49	45	X	X	O	X	A	A	A	A	A
30	A	A	A	A	A	A	A	A	A	A	X	X	X	X	X	O	X	A	A	A	A	A	A	A	A
31	A	A	A	A	71	A	A	75	45	26	34	42	46	38	40	39	33	A	O	X	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	1	5	4	3	4	4	4	4	3	7	19	23	30	30	28	27	19	6	4	1	3	5	1	4	
MED	32	54	50	41	60	24	50	32	30	25	31	38	43	44	41	35	26	22	22	19	19	29	26	50	
U Q		70	73	58	67	34	62	54	45	26	33	40	46	49	46	42	31	23	23		21	32		62	
L Q		37	28	32	40	24	36	32	22	24	28	35	40	40	38	31	24	20	20		18	22		40	

JUL.2018 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUL.2018 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

Table with columns H/D (00-23) and rows 1-31. Data includes numerical values and letters (A, R, F, Z, U, B, J) representing ionospheric parameters. Below the main table is a summary section with rows labeled CNT, MED, U Q, and L Q, and columns 00-23.

JUL.2018 foF2 (0.1MHz) NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUL. 2018 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	44	43	68	A 48	28	31	32	51	36	45	34	G	G	G	14	52	27	53	27	46	47	116	84	64		
2	51	47	55	76	43	42	63	48	35	58	31	G	G	G	G	18	53	62	54	51	70	46	63	68		
3	49	34	55	76	70	50	56	47	84	42	15	30	47	70	48	49	31	28	39	28	44	51	28	55		
4	49	25	68	58	29	58	52	31	47	44	46	15	24	54	G 15	26	44	20	B		25	31	39	36	58	
5	27	52	88	87	40	55	45	52	43	30	21	64	59	55	58	34	44	55	27	32	40	70	54	95		
6	78	51	K 44	56	81	60	55	48	50	44	54	54	18	G	52	28	50	53	45	46	47	46	79	55		
7	86	39	50	51	46	71	58	50	43	52	B	30	E B	25	55	22	63	53	48	39	62	51	37	27		
8	32	35	47	48	56	46	47	88	48	52	34	53	57	17	18	16	16	49	51	53	51	48	51	53		
9	37	40	56	48	48	46	33	60	60	41	24	E B	18	E B	14	19	43	54	49	27	27	52	26	30	46	65
10	38	42	22	29	28	34	56	51	51	55	38	53	23	G	67	55	57	48	22	45	53	42	56	50		
11	81	52	46	51	45	31	52	52	48	52	B	52	31	25	G	58	B	58	58	52	56	52	33	32		
12	42	34	82	57	45	49	110	52	42	41	68	57	B	54	22	52	28	38	59	30	52	50	52	32		
13	42	48	47	42	57	83	59	56	56	48	47	49	G	58	70	48	35	61	58	58	58	58	49	45		
14	44	35	66	58	58	53	46	49	49	24	50	18	18	G	G	51	21	57	53	50	57	25	54	59		
15	26	46	46	83	59	58	58	58	58	56	54	56	22	24	26	25	54	83	47	42	57	27	51	46		
16	37	37	51	46	56	57	54	52	51	48	54	34	47	48	E B	40	25	B	48	G	49	47	44	32	46	
17	82	60	60	64	47	48	34	24	43	B	59	59	G	28	26	E B	32	46	46	53	40	43	34	48		
18	56	40	66	52	56	50	55	55	55	64	48	57	G	23	19	G	34	92	56	43	52	36	40	34		
19	36	43	52	64	46	45	54	45	47	47	49	24	G	G	G	59	15	23	32	34	35	46	57	34		
20	49	103	86	90	56	58	38	28	46	57	57	18	G	B	B	B	B	59	58	B	56	59	43	43		
21	64	60	52	85	58	50	55	55	65	58	58	B	E B	30	25	B	B	B	B	B	39	53	45	40		
22	73	43	46	54	77	68	47	42	48	57	53	29	G	49	E B	38	B	56	32	64	59	59	59	54		
23	45	46	87	55	46	51	72	54	52	73	B	B	28	92	B	49	68	56	53	28	42	28	56	40		
24	40	65	43	68	63	64	67	72	72	56	39	52	E B	19	E B	23	31	B	B	77	38	K	42	50	44	61
25	95	59	44	51	55	74	54	62	57	53	B	B	G	53	G	E B	19	E B	B	B	22	22	28	42	44	38
26	44	48	58	57	59	48	57	43	49	58	G	49	G	19	18	18	57	44	27	44	29	19	B	58	17	
27	37	58	58	47	40	69	39	26	54	54	G	G	61	55	29	19	25	27	34	30	29	42	22	26		
28	30	40	53	32	55	47	59	52	46	27	46	17	G	16	G	G	19	B	59	54	52	26	57	32	59	
29	48	66	47	48	54	62	53	45	44	49	38	G	G	G	G	21	16	16	56	50	54	49	32	43		
30	45	47	52	52	59	52	44	44	36	56	49	50	58	50	57	G	30	30	31	32	40	57	32	43		
31	98	50	57	68	59	59	57	38	54	52	G	14	18	G	G	22	21	39	46	43	44	57	51	51		
	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	27	28	30	30	28	28	24	29	28	29	31	30	31	30		
MED	45	46	53	55	55	52	54	51	49	52	48	32	G	25	E G	22	31	33	49	46	45	47	47	46	47	
U Q	64	52	66	68	59	60	58	55	55	56	54	53	30	54	42	52	50	58	54	52	54	57	56	58		
L Q	37	40	47	48	45	47	46	44	44	44	34	G	G	G	G	20	23	29	32	31	39	42	33	40		

JUL. 2018 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUL.2018 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

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

JUL.2018 fmin (0.1MHz)
 NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUL.2018 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	A	A	A	A	A	A	E A	A	E A					A	A	A	A	A	A	A	A
2	A	A	A	A	A	E A	A	A	A	A	A	200	196	192	194	186		A	A	A	A	A	A	A
3	A	A	A	A	A	A	A	A	A	A	A	256	188	196	198	190	204	210	194		A	A	A	A
4	A	A	A	A	A	A	A	A	A	A	A	E A	210	202	202	194	194		A	A	B	A	A	A
5	A	A	A	A	A	A	A	E A	E A	A									A	A	A	A	A	A
6	A	A	A	A	A	A	A	A	A	218	A	E A	232	206	208		A	A	A	A	A	E A	A	A
7	A	A	A	A	A	A	A	A	A	A	B	B		E A	A			A	A	A	A	A	A	B
8	A	A	A	A	A	A	A	A	A	A	A	E A	244	206	206	200	200	208		A	A	A	A	204
9	A	A	A	A	A	A	A	A	A	A	A	A	222	208	194	202	204	256		A	A	A	A	A
10	A	A	A	A	A	A	A	A	A	A	A	E A	E A	E A	E A		A	E A			A	A	A	A
11	A	A	A	A	A	A	A	A	A	A	B	A		A				B	A	A	A	A	A	A
12	A	A	A	A	A	A	A	A	A	A	A	A	B		E A	E A		A	A	A	A	A	A	A
13	A	A	A	A	A	A	A	A	A	A	E A	E A		E A	E A				A	A	A	A	A	A
14	A	216	A	A	A	A	A	A	A	A	A	A	A	214	214	200	200	216		A	A	A	A	A
15	A	A	A	A	A	A	A	A	A	A	A	E A	208	234	206	230	198	198	242		A	A	A	A
16	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	E B	B		A	A	A	A	A
17	A	A	A	A	A	A	A	A	A	B	A	A	E A	292	214	234	196	232	232	E A	A	A	A	A
18	A	A	A	A	A	A	A	A	E A	A	A	218	218	196	196	196	206		A	A	206	194	A	A
19	A	A	A	A	A	A	A	A	A	A	E A	288	242	218	202	214	182	204	194	E A	A	A	A	A
20	A	A	A	A	A	A	A	A	A	A	A	210	206	216		B	B	B	B	B	A	B	A	A
21	A	A	A	A	A	A	A	A	A	A	A	B	B	E B	B		236		B	B	B	B	A	A
22	A	A	A	A	A	A	A	A	A	A	A	E A	E A		E B	B		B	B	B	A	A	A	A
23	A	A	A	A	A	A	A	A	A	A	B	B	214	228		B	E A		A		A	A	A	A
24	A	A	A	A	A	A	A	A	A	A	A	E A	E B		E B		B	B	A	B	A	A	A	A
25	A	A	A	A	A	B	A	A	A	A	B	B	E A	E A	E A		238	224	232	220	224		A	A
26	A	A	A	A	A	A	A	A	A	A	E A	276	192	212	198	198	196	198	200		A	A	A	A
27	A	A	A	A	A	A	A	A	A	A	E A	E A		E A	E A				A	A	A	A	A	A
28	A	A	A	A	A	A	A	A	A	A	A	A	250	210	210	192	192	194	218	200		B	A	A
29	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E A		E A		B	A	A	A	A	A
30	A	A	A	A	A	A	A	A	A	A	A	E A	230	214	192	196	210	196	210		A	A	A	A
31	A	A	A	A	A	A	A	A	A	E A	A	E A	216	198	192	210	196	208		A	E 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		1		1	1	2	1	3	3	6	15	20	28	28	28	26	17	6	5	2	3	5		1
MED		216		240	192	274	210		E A	U	253	220	205	206	201	201	202	210	212	206	202	194	204	204
U Q								E A	E A	A	A	E A	E A	E A	E A			A	E A	E A		196	257	
L Q								214	196	224	208	203	200	198	195	196	199	200	200		194	194		

JUL.2018 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2018 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	32	A	103	A	98	A	O X	X	X	X	X	X	X	X	X	X	X	O X	O X	A	A	X	A	O X
2	A	A	A	A	A	A	O X	X	X	X	X	X	V	X	X	X	X	X	O X	X	A	A	A	A
3	A	A	A	A	A	A	O X	X	A	A	X	X	X	X	B	B	O X	A	A	A	A	A	A	A
4	A	A	A	A	A	A	A	A	A	O X	X	X	X	O X	X	X	X	O X	X	A	A	A	R	O X
5	A	A	A	A	A	A	X	A	X	X	X	X	X	X	V	X	O X	O X	X	A	A	A	A	A
6	A	A	A	A	A	A	A	A	A	A	X	X	O X	X	X	X	X	A	O X	A	A	A	A	A
7	A	A	A	A	A	A	A	A	A	A	X	X	X	O X	X	X	X	X	O X	X	A	A	O X	A
8	59	A	A	A	A	A	X	A	O X	X	X	X	X	X	X	X	X	O X	X	A	A	A	A	X
9	A	A	A	A	A	A	A	A	A	A	X	X	X	X	X	X	X	X	X	A	A	R	A	A
10	A	A	A	A	A	A	A	A	A	A	X	X	X	X	X	X	X	X	X	A	A	A	A	A
11	67	A	A	A	A	A	A	A	A	A	X	X	X	X	X	X	X	X	X	A	A	R	A	A
12	A	A	A	A	A	A	A	R	A	A	X	X	X	X	X	X	X	O X	O X	A	A	A	64	70
13	56	A	A	A	A	A	A	A	A	A	O X	X	X	X	X	X	O X	X	A	O X	B	A	A	A
14	A	A	A	A	A	A	A	A	A	X	X	X	X	X	X	X	X	X	O X	A	O X	A	X	X
15	A	A	56	A	56	A	A	X	A	A	O X	X	X	X	X	X	X	X	A	A	A	A	A	A
16	A	A	A	A	A	A	A	A	A	A	B	B	X	X	O X	O X	O X	X	A	A	X	A	A	A
17	A	A	59	A	A	A	A	A	A	A	A	B	B	B	O X	X	O X	O X	A	A	R	R	39	A
18	88	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	R	A	A	R	A
19	A	A	A	A	A	A	A	A	A	A	A	A	O X	X	B	O X	X	X	A	O X	X	A	A	A
20	O X	61	80	A	A	A	A	A	A	A	X	X	X	X	X	X	X	X	O X	O X	A	A	A	A
21	B	A	A	B	A	A	A	A	A	X	X	B	O X	X	B	B	B	B	B	A	A	A	A	A
22	A	A	64	A	A	A	A	A	A	A	X	X	X	B	X	X	X	X	X	A	B	A	A	A
23	A	40	40	A	A	A	A	A	A	X	X	O X	X	X	X	X	X	O X	O X	A	A	A	A	A
24	A	A	A	A	X	A	A	A	A	X	X	X	X	X	X	X	X	X	X	R	A	A	A	O X
25	A	O X	A	A	A	A	A	X	O X	X	X	X	X	X	X	X	X	X	X	A	A	A	A	A
26	A	A	A	A	A	A	A	A	B	B	O X	R	A	A	O X	A	A	A	A	A	X	A	A	59
27	A	A	65	35	40	A	48	A	A	A	A	B	B	B	B	B	O X	X	A	O X	35	70	70	A
28	A	A	A	A	B	A	A	A	B	B	B	B	B	B	B	B	O X	X	B	A	A	A	R	A
29	45	A	A	O X	A	A	A	A	B	O X	B	B	O X	X	X	X	X	O X	O X	O X	A	A	A	A
30	40	A	A	A	A	A	A	O X	X	X	X	X	V	X	X	X	X	X	X	A	A	R	A	57
31	A	X	A	A	A	A	A	A	O X	X	X	X	X	X	X	X	X	X	O X	X	A	A	A	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	8	4	7	3	6	3	6	7	13	23	22	25	25	24	26	25	27	26	16	13	6	4	4	7
MED	50	X	38	64	43	56	25	32	28	32	34	37	44	48	46	44	41	32	28	28	26	29	52	38
U Q	63	50	80	44	62	30	40	32	37	38	38	48	50	52	50	50	46	37	38	38	33	50	67	59
L Q	38	X	34	56	35	O X	28	23	X	X	X	X	X	X	X	X	X	O X	O X	X	O X	X	30	26

AUG. 2018 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2018 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	A	A	A	A	46	A	22	J R 17	18	24	36	41	36	41	F 32	28	22	R 14	18	A	A	22	A	R 32	
2	A	A	A	A	A	A	R 34	36	34	20	29	F 35	V 38	39	F 31	32	F 26	22	14	A	A	A	A	A	
3	A	A	A	A	A	R 12	12	A	A	22	31	36	F 38	46	B	B	R 24	A	A	A	A	A	A	A	
4	A	A	A	A	A	A	A	A	A	25	31	34	41	40	44	F 29	25	R 21	A	A	A	A	R 16	A	
5	A	A	A	A	A	19	A	A	18	24	F 31	38	40	44	V 38	37	31	18	A	A	A	A	A	A	
6	A	A	A	A	A	A	A	A	A	23	28	41	39	45	37	37	A	16	A	A	A	A	A	A	
7	A	A	A	A	A	A	A	A	A	24	28	36	44	44	F 35	F 35	J R 30	19	R 20	A	A	R 24	A	A	
8	A	A	A	A	A	R 24	A	R 26	16	23	30	35	40	36	38	34	28	R 19	A	A	A	A	A	20	
9	A	A	A	A	A	A	A	A	A	25	32	42	Z 42	Z 47	F 36	F 32	Z 36	21	A	A	R	A	A	A	
10	A	A	A	A	A	A	A	A	A	25	31	39	43	42	Z 45	F 42	F 30	F 19	F 14	A	A	A	A	A	
11	A	A	A	A	A	A	A	A	A	26	31	39	42	40	44	44	41	F 34	A	A	R	A	A	A	
12	A	A	A	A	A	A	A	A	F 20	28	32	37	40	40	38	38	Z 40	21	R 16	A	A	A	A	A	
13	A	A	A	A	A	A	A	A	A	28	31	36	42	42	F 38	F 40	33	27	A	17	B	A	A	A	
14	A	A	A	A	A	A	A	A	20	28	33	36	41	39	F 34	38	F 37	F 20	F 14	R 14	A	U R 11	A	12	
15	A	A	A	A	A	A	A	21	A	A	R 31	R 35	38	F 42	45	46	44	32	A	A	A	A	A	A	
16	A	A	A	A	A	A	A	A	A	A	B	B	32	33	31	32	R 26	21	A	A	23	A	A	A	
17	A	A	A	A	A	A	A	A	A	A	A	B	B	B	B	33	32	R 32	28	A	A	R	R	A	A
18	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A	A
19	A	A	A	A	A	A	A	A	A	A	A	34	41	B	40	37	34	A	17	17	R 9	A	A	A	
20	A	R 55	A	A	A	A	A	A	A	28	30	30	32	34	35	32	31	F 30	R 25	R 18	R 18	A	A	A	
21	B	A	A	B	A	A	A	A	21	29	B	36	43	B	B	B	B	B	B	A	A	A	A	A	
22	A	A	A	A	A	A	A	A	A	32	31	37	B	40	40	42	38	23	22	20	A	B	A	A	
23	A	A	A	A	A	A	A	A	22	31	36	36	44	41	44	41	R 37	30	20	22	A	A	A	A	
24	A	A	A	A	14	A	A	F 15	26	33	B	39	45	47	48	40	35	27	31	22	A	A	A	R 26	
25	A	R 25	A	A	A	A	A	17	28	34	37	43	52	42	44	44	39	34	22	18	A	A	A	A	
26	A	A	A	A	A	A	A	A	B	B	27	R	A	A	R 26	A	A	A	A	A	29	A	A	A	
27	A	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	32	30	A	A	27	A	A	A	
28	A	A	A	A	B	A	A	A	B	B	B	36	B	B	B	B	40	F 30	32	B	A	A	R	A	
29	A	A	A	R 37	A	A	A	A	B	B	B	51	43	44	48	42	R 31	R 23	F 26	U R 13	R	A	A	A	
30	A	A	A	A	A	A	A	22	31	37	38	51	V 50	48	40	44	48	F 34	F 25	F 23	A	A	A	A	
31	A	J R 30	A	A	A	A	A	A	31	36	39	46	46	45	51	F 38	F 35	F 41	R 32	R 26	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		3		1	2	3	3	7	12	23	22	25	25	24	26	25	27	26	16	11	6	3	1	4	
MED		R 30		R 37	30	R 19	22	21	22	28	31	36	41	42	38	38	34	25	21	20	20	R 22	R 16	23	
U Q		R 55				R 24	R 34	26	30	32	33	40	44	44	44	42	39	30	25	23	F 27	R 24		R 29	
L Q		R 25				R 12	12	17	19	24	30	36	38	40	35	32	30	20	16	17	R 13	U R 11		16	

AUG. 2018 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2018 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	40	86	99	50	48	32	47	28	11	17	22	22	25	22	G	16	31	28	32	38	24	34	56				
2	46	49	57	51	48	58	42	56	24	53	48	31	37	27	52	12	G	20	69	58	54	100	54	54	54			
3	56	58	56	28	60	46	46	53	53		G ^E B	14	18	18	22	B	B ^E B	16	52	56	60	46	54	40	115			
4	72	105	37	88	71	63	70	70	58	45	43	G	G	G	17	17	G		54	44	32	32	24	56	56			
5	27	59	54	60	26	56	44	46	46	17	18	19	19	19	G	G ^E B ^E B	18	17	25	34	24	44	53	31	42			
6	45	36	54	59	48	116	116	66	56	52	21	27	G	G		27	60	85	52	54	87	56	65	79	59			
7	50	58	48	46	58	62	57	40	59	19	16	19	19	21	30	33	54	20	46	43	56	24	37	49				
8	38	62	53	54	47	28	45	34	43		G	G		20	20	G	58	57	14	38	28	27	30	31	47			
9	48	31	31	35	52	49	50	36	30	20	56	20	16	26	20	56	56	59	59	54	20	43	50	37				
10	37	40	47	38	55	54	56	36	57		G	20	54	24	22	22	59	16	47	28	26	46	81	55	39			
11	44	77	43	53	56	55	59	33	42	26	30	22	26	25	18		G	G		9	39	38	22	48	48	39		
12	96	65	62	58	43	50	42	23	55	28	26	23	20	22	E B	17	19	49	56	56	28	31	46	46	42			
13	44	80	54	51	47	42	51	51	52	58	58	55	21	24	24	22	E B ^E B	17	14	56	57		69	48	53			
14	51	58	43	54	54	44	30	36	39	44	51	54	19		G	19	17	17	29	29	29	51	30	56				
15	56	56	42	79	46	58	47	56	48	50	51	55	63	G	G	14	G ^E B	18	28	40	50	28	58	53	48			
16	52	93	68	48	114	60	58	60	60	60		B	B	55	55	E B ^J A	22	76	70	58	58	26	53	58	57			
17	71	76	51	53	62	69	72	58	55	55	64		B	B	B ^E B	21	57		64	54	51	20	34	32	84			
18	84	84	54	55	56	52	35	38	58		B	B	B	B	B	B	B	B	B		30	47	47	29	32			
19	37	63	68	54	56	57	57	57	46	46	44		G ^E B	34	B ^E B ^E B ^E B	34	24	18	34	45	85	28	23	33	40			
20	78	44	69	91	68	48	48	49	57	51	58	22	54	54	58	53	53	56	66	58	24	56	42	42				
21	B	65	58	B	59	52	48	58	20	48		G ^E B	28	23	B	B	B	B	B		57	57	52	28	36			
22	38	46	64	54	57	62	78	50	49	51	30	52	B ^E B	25	G	G	G		77	47	59	52		49	86			
23	37	28	35	53	48	37	49	35	18	47		G ^E B	25	28	24	22	29	G ^E B ^E B	17	15	17	29	55	53	28			
24	47	32	45	49	34	67	23	23	E B ^E B	10	18	B	30	30	27	44	G	45	17	63	18	54	31	26	35			
25	36	46	46	47	58	54	33	12	K	E B	85	18	20	G	G	27	26	31	37	20		14	14	14	24	30	86	92
26	73	53	68	60	55	52	68	60		B	89		26	38	58	58	62	42	50	26	32	17	48	46	46			
27	83	49	38	54	36	54	43	53	52	43	65		B	B	B	B	B	31	20	35	43	44	57	45	42			
28	81	41	49	49	B	49	58	52		B	B	B ^E B	25	B	B	B	B ^E B	28	18	21		56	48	22	34			
29	29	58	51	55	54	49	59	48		B	G	B	B ^E B ^E B ^E B ^E B	42	24	24	21	23	19	68	13	27	26	44	30			
30	46	55	48	53	48	48	44	29	53	30	24	G	23	26	25	G	G	21	21		G	K	17	41	71	22	34	
31	34	35	59	57	51	54	33	58	46		G	23	25	24	G	G	24	25	20	18	14	E B	16	45	39	32	47	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	30	31	31	30	30	31	31	31	28	29	25	26	26	25	26	26	29	29	29	30	30	30	31	31				
MED	46	56	53	54	54	54	48	49	50	43	26	24	24	E G	G	G	19	28	44	35	35	48	44	46				
U Q	71	65	59	58	58	58	58	57	56	51	51	30	34	26	34	53	47	55	56	57	47	55	53	56				
L Q	38	41	45	49	48	48	42	36	40	18		G	G	22	20	22	22	21	G	17	28	26	27	31	31	37		

AUG. 2018 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2018 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	7	20	11	8	12	10	7	7	6	6	6	7	8	8	8	7	8	7	7	7	7	7	7	
2	9	10	10	8	8	8	6	8	8	8	11	10	10	10	12	8	9	8	8	10	10	11	11	11	
3	11	8	8	8	8	7	7	7	9	9	14	10	11	13	B	B	16	12	12	9	8	12	12	11	
4	11	10	10	10	12	14	17	11	15	12	12	12	8	8	11	7	8	8	8	10	12	10	8	12	
5	10	12	12	7	7	7	8	6	6	8	10	11	9	11	11	18	17	12	12	12	8	12	8	8	
6	10	8	8	11	11	12	12	13	12	10	12	12	15	14	8	11	6	7	9	8	6	7	14	7	
7	7	9	7	7	7	7	9	10	10	8	8	8	8	10	7	8	8	8	14	15	14	8	7	9	
8	8	8	11	12	11	8	9	8	8	6	7	9	11	11	11	13	10	9	9	9	14	8	9	8	
9	10	9	8	10	12	11	11	8	8	11	10	10	10	10	11	8	7	8	15	12	12	13	9	7	
10	7	7	9	9	10	15	14	9	9	8	8	8	9	8	6	8	6	7	6	7	8	18	7	8	
11	10	10	10	14	14	14	10	8	9	6	7	10	11	9	6	8	5	6	6	13	11	10	7	7	
12	8	16	16	8	14	12	9	8	8	7	7	11	11	11	17	13	8	12	8	10	B	10	9	10	
13	10	17	15	10	10	8	8	10	10	10	11	11	10	14	12	11	17	14	10	9		9	9	11	
14	11	10	11	12	12	13	10	9	8	5	8	10	8	8	8	6	6	6	6	8	12	8	9	8	
15	8	8	6	10	10	10	10	7	9	11	18	14	11	6	6	11	18	8	6	7	7	10	9	12	
16	7	10	10	8	9	9	15	12	12	10	B	B	13	13	12	22	24	16	20	17	7	7	9	10	
17	7	7	14	10	11	11	10	10	22	24	19	B	B	B	21	13	13	16	16	16	10	9	9	8	
18	12	8	21	12	12	22	11	12	12	B	B	B	B	B	B	B	B	B	B		11	11	11	7	7
19	7	10	10	12	14	15	12	12	12	12	17	16	34	B	34	24	18	11	8	8	9	9	8	8	
20	8	16	11	9	11	11	18	14	12	14	6	10	8	12	8	8	12	15	8	14	8	8	9	14	
21	B	14	23	B	13	14	10	11	9	15	B	28	16	B	B	B	B	B	B		12	15	14	10	12
22	10	10	9	9	12	12	12	24	8	12	20	14	B	25	18	13	9	7	10	8	10	B	14	10	
23	9	9	8	14	11	11	11	9	10	7	14	25	20	16	11	12	7	17	15	13	11	18	14	7	
24	8	9	8	10	8	8	8	6	10	18	B	23	17	15	28	17	13	10	18	12	12	8	8	8	
25	8	7	7	8	7	8	6	6	16	18	17	12	18	14	15	8	12	6	8	7	6	5	8	15	
26	16	12	11	13	9	7	10	14	B	34	14	15	12	28	11	14	15	18	10	8	8	8	10	7	
27	10	8	7	7	7	16	9	10	21	16	18	B	B	B	B	B		12	7	10	8	15	6	9	12
28	11	13	16	16	B	12	9	15	B	B	B	B	B	B	B	B	28	8	9	B	14	13	10	10	
29	13	7	14	8	17	18	16	9	B	B	B	B	25	B	B	B									
30	7	17	15	20	18	14	14	12	10	18	18	15	17	15	16	16	14	8	8	10	10	8	10	8	
31	7	8	17	14	14	11	8	8	11	13	15	14	15	14	17	14	8	7	8	16	10	7	7	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	9	10	10	11	11	10	9	10	11	14	12	12	14	12	13	12	8	9	10	10	9	9	8	
U Q	11	12	15	12	13	14	12	12	12	18	19	25	20	25	24	21	17	15	14	13	12	12	10	11	
L Q	8	8	8	8	8	8	9	8	8	8	8	10	10	10	8	8	8	7	8	8	8	8	8	8	

AUG. 2018 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2018 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	196	A	A	A	A	A	222	204	198	208	216	196	188	190	188	A	A	A	198	194
2	A	A	A	A	A	A	A	A	A	198	E A	E A	E A	E A	222	182	200	200	200	E A	A	A	A	A
3	A	A	A	A	A	196	196	A	A	A	204	222	222	200	220		220		A	A	A	A	A	A
4	A	A	A	A	A	A	A	A	A	A	A	E A	244	202	202	202	202	194	A	A	A	A	194	A
5	A	A	A	A	A	198	A	A	E A	E A	E A	E A	E A	204	206	196	208	198	246	A	A	A	A	A
6	A	A	A	A	A	A	A	A	A	A	A	E A	E A	216	206	206	206	A	200	A	A	A	A	A
7	A	A	A	A	A	A	A	A	A	A	A	A	A	218	194	200	210	188	E A	E A	A	A	A	A
8	A	A	A	A	A	200	A	A	E A	E A	258	198	200	200	208	188	204	204	194	A	A	A	A	A
9	A	A	A	A	A	A	A	A	A	A	A	E A	E A	260	208	236	194	192	190	198	196	196	A	A
10	A	A	A	A	A	A	A	A	A	A	A	196	212	196	208	208	208	194	194	200	200	A	A	A
11	A	A	A	A	A	A	A	A	A	A	A	E A	200	262	220	220	196	210	222	200	204	A	A	A
12	A	A	A	A	A	A	A	A	A	A	E A	E A	218	214	202	202	208	214	204	208	214	E A	A	A
13	A	A	A	A	A	226	A	A	A	A	E A	E A	260	198	196	210	202	202	208	B E	B	294	252	A
14	A	A	A	A	A	A	A	A	E A	E A	268	196	176	204	204	188	200	214	212	178	E A	E A	A	A
15	A	A	A	A	A	A	A	A	A	A	A	A	A	E A	E A	E A	E A	E A	E A	E A	E A	A	A	A
16	A	A	A	A	A	A	A	A	A	A	A	A	B	E A	E A	E A	E A	B	A	A	A	A	A	A
17	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	A	A	A
18	A	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	A	A	A
19	A	A	A	A	A	A	A	A	A	A	A	A	A	E A	E A	E A	E A	E A	E A	E A	E A	204	222	A
20	A	A	A	A	A	A	A	A	A	A	A	A	A	236	216	200	200	200	212	216	E A	E A	E A	A
21	B	A	A	B	A	A	A	A	E A	E A	260	224	B	212	212	B	B	B	B	B	B	A	A	A
22	A	A	A	A	A	A	A	A	A	A	E A	E A	E A	274	274	242	198	200	200	192	198	222	A	A
23	A	A	A	A	A	A	A	A	A	A	198	198	232	246	218	210	206	196	204	244	228	A	A	A
24	A	A	A	A	A	A	A	A	A	A	228	212	B	236	230	210	222	212	202	202	254	232	A	A
25	A	204	A	A	A	A	A	A	E A	E A	228	218	204	220	220	224	224	206	202	202	202	202	A	A
26	A	A	A	A	A	A	A	A	B	E A	276	A	A	A	274	A	A	A	A	A	A	A	A	A
27	A	A	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	E A	E A	E A	A	A	A	A
28	A	A	A	A	B	A	A	A	B	B	B	B	B	B	B	B	E A	E A	E A	E A	A	A	A	A
29	A	A	A	A	A	A	A	A	A	B	E A	B	B	B	E A	E A	E A	E A	E A	E A	E A	A	A	A
30	A	A	A	A	A	A	A	A	E A	E A	308	240	240	222	236	200	200	198	202	202	204	242	206	A
31	A	202	A	A	A	A	A	A	E A	E A	258	198	220	208	204	196	198	198	198	214	210	E B	A	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT		2	1		2	3	1	1	9	22	21	24	23	24	25	25	25	25	15	11	4	4	1	3
MED		203	192		211	198	196	308	E A	E A	258	209	207	208	206	202	204	206	201	202	222	219	202	213
U Q					200				E A	E A	264	246	230	230	220	220	216	213	E	E A	E A	204	219	200
L Q					196				228	200	201	202	202	198	198	200	198	198	210	210	200	204		184

AUG. 2018 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2018 f_{XI} (0.1MHz)

45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	A	A	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A		A
2	A	A	57	A	A	41	A	42	36	37	44	46	50	48	47	46	45	41	38	27	X	22	44	A
3	A	78	A	A	A	46	43	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	R	A
4	A	A	A	A	A	A	A	A	65	B	B	B	X	X	X	X	X	X	X	X	X	A	A	A
5	A	A	A	A	A	A	A	A	A	A	X	38	42	42	42	44	B	X	X	X	A	A	A	A
6	A	A	A	A	A	A	A	A	X	X	X	B	X	X	X	X	X	X	X	X	X	X	A	A
7	A	A	92	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	B	R	A
8	R	A	A	58	35	30	28	35	43	45	46	56	58	58	49	52	56	44	40	28	22		A	43
9	A	A	49	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	59	A	A	A	X	X	37	38	X	X	X	X	X	X	X	X	X	X	X	A		A	A	65
11	86	A	69	61	A	A	52	A	61	A	B	B	B	B	B	B	B	X	A		A	A	A	A
12	A	A	72	X	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	A	A	A
13	A	57	A	A	A	A	A	B	A	B	B	B	X	X	X	B	B	X	B	A	A	A	A	A
14	A	A	A	A	A	A	B	B	A	B	B	X	X	B	B	B	B	X	X	X	X	A	A	A
15	A	B	A	A	A	A	A	A	B	B	B	B	X	B	B	X	X	X	X	X	X	A	A	A
16	X	70	A	A	A	A	A	A	B	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
17	X	A	109	A	A	B	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18	A	A	A	A	A	X	30	98	35	X	B	B	B	X	X	X	X	X	X	X	X	X	X	30
19	A	58	63	A	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	B	B	A
20	A	57	66	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A
21	A	A	48	43	39	36	41	40	47	50	50	55	56	61	53	52	54	48	41	33	28	24	A	A
22	A	70	90	A	60	A	A	A	A	A	A	B	A	X	B	X	B	X	R	A	A	A	A	A
23	A	80	A	A	A	A	B	A	A	A	B	B	B	B	B	X	X	X	X	X	A		A	A
24	A	A	A	A	A	A	A	A	X	X	X	C	C	C	C	C	C	C	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
26	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
28	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	4	7	10	5	6	6	7	7	15	15	16	15	19	19	17	19	19	21	21	19	13	12	2	5
MED	44	70	68	43	37	38	37	40	37	42	44	46	48	48	50	50	46	43	40	33	24	25	43	30
U Q	72	78	90	60	60	42	43	42	44	45	46	51	53	52	53	52	49	45	41	35	28	51		54
L Q	X	57	57	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

SEP. 2018 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2018 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	A	A	A	A	A	A	A	A	24	31	34	37	42	42	42	F 41	44	35	F 30	F 28	F 18	16	A	A	A	
2	A	A	A	A	A	A	A	A	A	30	31	38	40	44	V 42	41	40	39	F 35	F 28	F 22	R 16	A	A	A	
3	A	A	A	A	A	A	A	A	A	28	34	38	37	40	42	42	38	42	29	F 28	F 29	24	R	A	A	
4	A	A	A	A	A	A	A	A	A	A	B	B	B	45	40	40	42	40	32	29	25	18	A	A	A	
5	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	36	29	F 23	A	A	A	A	A	A	
6	A	A	A	A	A	A	A	A	A	28	32	32	B	32	41	39	40	37	34	28	25	12	14	R	A	A
7	A	A	A	A	A	A	A	A	A	31	36	39	44	48	49	47	46	40	43	F 28	33	B	R	A	A	
8	A	A	A	A	F 26	24	22	29	37	39	40	50	52	52	43	46	50	38	34	34	22	F 13	A	A	A	
9	A	A	A	A	A	A	A	A	A	33	36	37	40	42	42	44	46	39	38	33	22	17	10	A	10	
10	A	A	A	A	19	24	A	F 24	30	37	40	45	47	46	49	45	46	42	A	A	A	A	A	A	A	
11	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	29	A	A	A	A	A	A	A	
12	A	A	A	R 33	A	A	A	A	A	30	34	37	40	43	42	47	43	38	37	18	R	A	A	A	A	
13	A	A	A	A	A	A	B	B	A	B	B	B	40	38	37	B	43	B	34	A	A	A	A	A		
14	A	A	A	A	A	A	B	B	A	B	B	B	R 36	40	B	B	B	33	R 32	R 26	R 18	A	A	A	A	
15	A	B	A	A	A	A	A	A	B	B	B	B	R 40	B	B	R 39	36	33	33	25	A	U 19	R	A	A	
16	R 21	A	A	A	A	A	A	A	B	36	40	43	42	44	46	44	38	38	36	28	19	19	14	18	R	
17	21	A	A	A	A	A	B	A	37	42	R 33	39	42	43	46	39	39	36	34	29	18	A	A	A	A	
18	A	A	A	A	A	A	R 24	30	29	B	B	B	B	39	B	R 45	B	37	34	31	23	19	A	A	A	
19	A	A	A	A	A	A	A	A	A	32	R 36	39	44	45	48	44	43	40	33	29	B	B	A	A	A	
20	A	A	A	R 20	23	A	R 20	F 29	38	44	46	46	51	46	47	44	48	46	42	28	R 22	R 18	B	A	A	
21	A	A	A	A	F 29	30	F 23	34	41	44	44	49	50	55	47	46	48	42	35	27	22	18	A	A	A	
22	A	A	A	A	A	A	A	A	A	A	A	B	A	32	B	R 38	B	B	30	R	A	A	A	A	A	
23	A	A	A	A	A	A	B	A	A	A	B	B	B	B	B	38	38	31	29	17	A	A	A	A	A	
24	A	A	A	A	A	A	A	A	30	30	32	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
26	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
28	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	2			2	4	3	5	6	13	15	16	15	19	19	17	19	19	21	21	18	13	7	1	2		
MED	21			R 26	24	24	23	29	31	36	38	40	42	42	43	44	40	36	33	26	18	18	14	14		
U Q				F 28	30	30	30	30	37	39	40	45	47	46	47	46	43	39	34	29	22	19				
L Q					21	24	21	24	30	32	34	37	40	40	40	39	38	32	F 28	22	16	14				

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2018 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	50	56	34	50	50	50	36	18	G	56	20	24	26	24	24	24	24	18	57	47	32	28	39	39				
2	35	52	47	51	49	37	37	34	58	56	35	26	25	59	23	23	23	16	13	9	28	31	31	50				
3	56	54	57	52	38	33	23	42	57	57	22	61	54	G	26	21	G	G	15	13	12	69	23	42	42			
4	49	70	106	58	58	39	60	57	52	B	B	B	G	29	29	22	G	E	B	B	G	32	43	70				
5	64	84	76	66	64	61	52	45	59	41	25	27	24	E	B	B	B	B	53	13	15	12	32	43	70			
6	41	40	36	41	52	59	54	59	47	G	21	B	E	B	G	G	G	21	16	G	E	B	8	55	35	27		
7	42	68	44	61	56	52	52	48	22	G	56	24	24	G	26	26	26	23	16	13	56	B	26	69	62			
8	30	51	31	53	39	17	43	53	G	24	20	28	G	G	G	G	G	20	16	19	G	48	39	50	30			
9	36	40	41	53	50	50	36	53	G	47	25	25	26	G	G	G	G	21	18	13	10	29	29	33	33			
10	26	64	47	G	46	56	28	48	E	B	19	31	27	30	27	23	G	25	22	22	20	51	40	60	46	50	56	
11	58	56	53	37	44	49	41	42	55	53	B	B	B	B	B	B	B	53	45	39	39	42	45	82				
12	57	59	42	31	44	48	48	55	48	G	24	24	24	G	E	B	E	B	B	G	E	B	50	33	48	40	48	
13	44	49	70	74	52	63	70	B	61	B	B	B	E	B	B	B	B	B	E	B	E	B	34	29	45	40		
14	58	74	56	72	53	72	B	B	56	B	B	B	E	B	B	B	B	B	E	B	E	B	E	B	37	34	41	76
15	36	B	84	54	49	56	58	58	B	B	B	B	E	B	B	B	E	B	E	B	E	B	43	42	48	51		
16	34	50	48	48	48	60	61	58	B	27	G	27	27	E	B	29	28	G	G	20	14	18	E	B	11	38	49	51
17	20	40	45	58	67	54	62	52	46	45	G	G	E	B	E	B	G	G	E	B	18	G	K	69	48	54		
18	52	52	34	56	50	52	43	33	59	B	B	B	B	E	B	B	B	E	B	E	B	E	B	9	32	28		
19	45	33	34	43	41	54	54	40	43	48	24	39	30	27	G	27	G	G	21	E	B	E	B	53	56			
20	51	48	29	49	22	26	E	B	G	G	E	B	23	27	29	26	26	21	G	G	24	17	20	16	17	11	36	
21	34	50	50	34	46	21	18	54	37	24	28	29	G	G	G	24	G	G	E	B	E	B	14	14	33	33		
22	K	52	44	56	50	66	70	60	68	57	57	B	B	E	B	B	E	B	B	B	B	19	24	40	44	67	60	
23	60	35	50	37	32	81	51	59	62	64	E	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
24	76	57	50	53	69	60	51	48	48	26	E	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
26	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
28	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
31																												
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	24	23	24	24	24	24	23	22	22	19	17	15	20	19	17	19	19	21	23	23	21	22	22	23				
MED	44	52	47	52	50	53	51	50	48	41	24	G	28	E	G	G	G	G	18	16	24	33	33	44	50			
U Q	56	59	54	57	52	60	58	57	58	56	27	29	G	27	26	G	G	23	20	25	49	42	42	49	56			
L Q	35	48	38	42	44	44	36	42	37	G	G	G	24	26	G	G	E	B	16	14	12	14	28	38	36			

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2018 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	10	10	11	9	11	11	8	10	10	12	13	13	13	12	12	11	6	8	6	7	6	9	6
2	9	9	15	14	11	12	8	8	9	12	14	13	13	13	14	11	11	6	7	6	6	7	7	10
3	12	11	11	12	10	12	8	8	11	13	13	13	13	13	13	12	12	10	8	7	11	14	7	7
4	7	13	13	15	10	10	16	12	20	B	B	B	17	17	14	13	13	9	13	8	6	8	10	8
5	8	8	12	13	15	14	14	16	18	17	13	13	10	14	26	B	20	16	8	12	8	7	7	7
6	7	7	9	10	15	12	13	12	14	14	14	B	27	18	13	14	10	11	7	11	B	6	6	6
7	8	8	18	15	17	14	14	14	11	11	8	8	9	10	6	8	11	8	7	7	B	9	8	10
8	7	7	7	9	8	7	7	7	8	11	10	12	15	9	9	8	8	6	8	8	7	7	8	8
9	8	8	13	14	9	9	9	9	10	7	8	10	11	12	10	11	10	10	6	7	6	6	8	8
10	8	14	13	12	12	8	12	8	18	15	11	11	12	16	13	12	8	9	9	9	12	9	9	6
11	8	8	12	8	13	7	12	30	18	21	B	B	B	B	B	B	B	11	7	7	7	8	9	8
12	22	15	18	19	15	16	18	16	14	13	12	12	10	10	12	21	20	10	16	12	6	13	6	10
13	12	12	9	17	12	14	36	B	21	B	B	B	25	16	14	B	20	B	16	7	7	6	7	8
14	12	10	20	19	17	14	B	B	14	B	B	18	28	B	B	B	B	16	27	22	13	11	7	10
15	6	B	8	16	13	16	19	19	B	B	B	B	36	B	B	25	32	17	25	17	10	13	12	10
16	7	17	14	14	11	14	16	15	B	17	16	15	11	29	20	14	14	8	14	10	11	9	8	9
17	7	10	10	15	21	16	40	17	14	17	19	16	28	24	16	17	18	13	9	7	6	10	9	9
18	16	23	9	8	13	11	12	7	13	B	B	B	B	32	B	41	B	31	25	15	12	9	12	9
19	10	8	11	14	14	10	10	28	14	14	12	12	12	14	13	13	13	13	24	11	B	B	18	16
20	12	8	8	8	8	10	12	12	15	23	20	16	12	26	13	16	16	13	20	16	15	11	B	10
21	9	9	5	7	8	6	10	10	18	12	14	13	12	12	13	11	12	16	16	10	7	7	10	8
22	10	10	10	10	12	16	19	19	17	16	16	B	18	27	B	34	B	B	10	10	7	7	10	8
23	17	8	14	15	9	34	39	30	12	18	B	B	B	B	B	23	24	18	14	12	8	7	7	8
24	14	14	14	17	16	14	14	12	12	12	24	C	C	C	C	C	C	C	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
26	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
28	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	24	24	24	24	24	24	24	24	24	24	23	23	23	23	23	23	23	23	23	23	23	23	23
MED	8	10	12	14	12	12	14	13	14	16	15	15	13	16	14	14	14	11	10	10	8	8	8	8
U Q	12	14	14	15	15	14	18	19	18	22	B	B	28	29	B	B	34	24	16	16	12	12	11	10
L Q	8	8	9	10	10	10	10	8	12	12	12	12	12	13	13	12	11	9	8	7	7	7	7	8

SEP. 2018 fmin (0.1MHz)
NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2018 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	A	A	A	A	208	196	202	202	202	196	A	198	198	198	196	208	246	A	A	A	A	
2	A	A	A	A	A	A	A	A	200	194	208	200	212	202	202	200	212	198	198	222	222		A	A	A
3	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	194	236	214	214		A	A	A
4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	196	224	214	238		A	A	A
5	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	210	216	238		A	A	A	204
6	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	212	212	196	204	E A	A	A	A
7	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	210	192	220		B	A	A	A
8	A	A	A	A	268	268	234	194	220	226	196	218	200	198	198	198	224	206	200	208	202		A	A	A
9	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A
10	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A
11	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A
12	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A
13	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A
14	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A
15	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A
16	212	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A
17	204	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A
18	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A
19	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A
20	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A
21	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A
22	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A
23	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A
24	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		C	C	C
26	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		C	C	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		C	C	C
28	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		C	C	C
29	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		C	C	C
30	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		C	C	C
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	2			2	2	2	5	6	11	14	15	15	17	18	17	18	19	21	21	18	13	7	1	3	
MED	208			234	275	313	U	217	199	209	206	204	203	210	206	204	206	211	205	206	215	228	229	E A	204
U Q							E	259	208	234	226	210	218	221	214	214	214	E B	214	215	236	236	252	238	238
L Q								202	196	200	202	202	200	197	198	198	200	206	198	200	208	213	212		198

SEP. 2018 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT.2018 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

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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
12	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
15	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
16	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	X	X	X	X	X	X	O	X	X	X
17	O	X	A	A		X	O	X	X	O	X	O	X	B	O	X	X	X	X	X	X	X	X	X	X
18	35	35	32	36	35	42	44	49	51	51	52	53	53	52	50	56	51	48	49	44	47	40	47	46	
19	43	37	32	37	42	48	48	48	50	50	51	54	57	61	53	50	57	53	48	46	42	95	44	30	
20	X	43	X	X	36	43	52	47	50	49	51	51	54	55	55	55	55	53	50	46	41	37	29	28	
21	27	A	68	40	46	45	50	46	41	41	52	49	50	52	56	65	58	56	52	47	40	35	74	56	
22	80	42	46	A	A	A	A	X	45	52	41	46	48	50	49	50	49	50	51	48	50	47	39	37	
23	A	47	51	A	A	A	A	X	42	45	44	46	50	55	57	52	50	51	50	49	49	43	40	40	
24	X	33	48	O	X	55	57	44	46	46	47	48	52	50	53	58	56	56	50	47	51	45	40	42	
25	O	X	A	A	X	X	X	X	O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
26	O	X	A	A	A	A	A	X	43	45	46	47	47	47	48	50	51	56	52	50	48	47	43	48	
27	61	A	A	A	A	X	X	X	41	40	44	49	46	42	44	48	50	48	47	50	48	44	42	45	
28	44	35	33	34	A	A	A	A	44	46	49	48	50	52	55	49	50	50	50	46	46	44	45	49	
29	52	44	35	41	44	47	48	46	47	47	49	50	48	48	46	46	47	49	46	44	45	39	35		
30	43	44	32	41	A	A	A	A	56	51	54	50	48	51	51	50	50	50	49	48	44	43	56	37	
31	A	A	A	A	A	O	X	X	X	X	O	X	O	X	X	O	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	13	9	10	11	8	10	12	15	15	15	15	14	15	15	16	16	16	16	16	16	16	16	15	13	
MED	43	43	32	37	39	43	46	46	47	48	50	50	51	52	50	50	51	49	48	46	42	41	39	36	
U Q	49	46	46	41	45	45	48	48	50	49	51	51	54	57	54	56	55	50	50	47	44	45	44	48	
L Q	X	36	32	35	36	41	44	44	45	46	47	48	49	50	49	49	50	48	46	44	40	37	34	30	

OCT.2018 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT.2018 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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
12	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
15	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
16	C	C	C	C	C	C	C	C	C	C	C	C	C	C	41	42	44	42	39	36	31	29	28	26	
17	R 16	A	A	F 20	F 24	35	41	38	R 39	42	44	B	R 48	51	47	43	44	42	44	39	35	F 30	F 26	F 22	
18	F 18	F 21	F 20	F 24	F 26	36	38	43	45	45	46	47	47	46	44	49	45	42	43	38	41	F 27	F 29	F 31	
19	F 24	F 23	26	F 21	F 27	F 36	F 40	42	44	44	45	48	51	55	47	44	51	47	42	40	Z 36	Z 38	Z 35	24	
20	14	A	22	29	27	37	41	41	44	43	45	45	48	49	49	49	49	47	44	40	35	31	23	22	
21	F 18	A	A	F 31	40	39	F 38	40	35	35	46	43	44	46	50	59	52	50	46	F 36	34	29	A	A	
22	A	36	A	A	A	A	A	F 39	F 38	36	40	42	44	43	44	43	44	45	42	44	40	33	F 26	F 26	A
23	A	A	A	A	A	A	A	A	R 39	R 38	40	44	49	51	46	44	45	44	43	43	37	34	F 29	F 27	A
24	27	A	17	28	F 40	38	40	40	41	42	46	44	47	52	50	50	44	41	45	39	34	F 30	24	A	
25	R 28	A	A	26	30	37	40	42	40	43	44	45	45	51	51	51	49	44	41	F 38	F 36	25	A	A	
26	40	A	A	A	A	A	37	39	40	41	41	41	42	44	45	50	46	44	42	41	37	42	F 27	F 30	
27	F 48	A	A	A	A	R 35	34	38	F 38	40	36	38	42	44	42	41	44	42	38	36	36	F 32	F 28	F 31	
28	F 28	29	27	28	A	A	A	38	40	43	42	44	46	49	43	44	44	44	40	40	38	F 34	F 34	F 41	
29	F 40	F 24	29	F 30	38	41	42	40	41	41	43	44	42	42	40	40	41	43	40	38	39	33	29	24	
30	F 31	F 33	26	35	A	A	A	F 44	45	43	F 44	42	45	45	44	44	44	43	42	38	37	F 41	30	F 21	
31	A	A	A	A	A	R 34	41	42	42	42	41	42	43	R 42	44	43	50	41	40	41	34	F 29	22	A	
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	
CNT	12	6	7	10	8	10	12	14	15	15	15	14	15	15	16	16	16	16	16	16	16	16	14	11	
MED	F 28	F 26	26	28	F 28	36	40	40	40	42	44	44	45	46	44	44	45	43	42	39	36	30	28	F 26	
U Q	F 36	F 33	27	F 30	F 39	R 38	41	42	44	43	45	45	48	51	48	50	49	44	44	40	37	34	29	F 31	
L Q	18	F 23	20	F 24	F 26	R 35	38	38	39	40	41	42	43	44	43	43	44	42	40	38	34	29	26	22	

OCT.2018 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT.2018 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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
12	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
15	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
16	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	G	G	E	B	G	G	16	E	B	E	B	
17	28	34	24	E	B	G	G	20	G	46	E	B	E	B	B	B	E	B	E	B	G	19	12	44	12		
18	54	54	14	12	G	G	21	23	24	18	G	G	31	G	96	30	G	G	24	22	58	E	B	E	B		
19	11	11	15	17	16	23	23	23	20	27	30	31	G	31	30	28	G	26	26	20	20	17	12	E	B	E	B
20	30	31	22	44	17	G	58	26	20	38	G	30	36	31	31	G	20	16	14	G	14	12	46	32			
21	31	31	32	42	24	26	28	30	E	B	30	27	27	36	33	33	31	34	28	25	22	18	18	24	42	40	
22	36	33	28	68	62	50	39	29	E	B	31	34	23	31	30	22	G	27	24	G	22	16	16	14	17	33	
23	34	57	46	52	54	71	50	36	42	26	68	68	G	30	27	28	28	25	G	17	G	20	12	E	B	E	B
24	E	B	12	36	45	31	19	18	G	23	G	28	G	29	32	32	G	28	E	B	G	12	12	24	33		
25	36	47	32	47	22	35	36	28	G	57	G	31	29	29	29	29	G	26	G	G	15	19	34	48			
26	38	43	49	50	50	54	24	54	54	52	28	44	30	28	28	G	24	20	20	18	18	G	53	25			
27	22	72	54	48	42	32	49	31	G	28	50	45	30	30	31	27	G	24	G	G	19	13	72	16			
28	E	B	E	B	E	B	G	42	53	40	G	31	G	34	31	31	G	29	21	24	22	G	19	11	E	B	
29	E	B	10	16	28	20	17	19	22	25	31	30	32	28	G	28	30	G	G	25	21	16	G	11	16	14	
30	10	16	31	47	47	40	45	36	36	31	29	32	32	22	31	24	26	26	22	16	G	18	14	22			
31	86	48	37	53	53	38	27	25	32	33	33	33	32	30	30	30	29	G	24	21	16	23	35	33			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	15	15	15	15	15	15	15	15	15	15	15	14	15	15	16	16	16	16	16	16	16	16	16	16			
MED	30	34	31	44	24	32	28	G	31	28	28	32	30	30	G	G	E	G	G	G	G	14	29	24			
U Q	36	48	45	50	50	50	45	31	42	33	32	36	32	31	30	G	27	25	22	18	18	19	45	33			
L Q	11	16	22	17	G	G	22	25	G	G	G	30	G	28	28	28	G	G	G	G	E	B	E	B	E	B	

OCT.2018 ftEs (0.1MHz)
 NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT.2018 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

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

OCT.2018 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT.2018 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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
5	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
12	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
15	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
16	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B				E B					
17		A	A	E A								B	B							A						
18	208			300	262	240	216	204	210	210	200			202	194	194	204	218	218	214	214	214	262	270		
19	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		
20	250	254	254	254	224	232	218	214	196	196	198	214	200	200	190	196	202	202	202	206	228	228	222	222		
21	232	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		
22	E A	A	A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A		
23	278				246	206	216	216	202		202	202		218	212	202	208	216	216	188	196	216	234	260		
24	E A	A	A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A		
25	276				272	212	212	212	212	198	200	188	204	204	198	212	212	214	222	204	224	244				
26	A			A	A	A	A	A		E A														A		
27		224							238	238	292	190	226	218	200	210	202	206	204	214	214	220	220	276		
28	A	A	A	A	A	A	A	A																A		
29									208	208	208	198	220	202	202	212	212	212	204	228	218	218	240	240		
30	252	A	A	A	236	232	200	214	200	200	194	206	204	204	196	212	202	202	188	214	194	228	268	A		
31	238			202	212			236	224	200	212	200	206	206	196	186	198	200	200	204	228	288	A	A		
32	202	A	A	A	A	A		212	202	202	198	220	200	194	186	194	208	208	208	202	202	232	224	228		
33	204								218	200	194	194	200	210	198	206	204	210	210	210	204	218	240	240	230	
34	246	234	254	E A	A	A																				
35	Q	Q	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	222	254		268	234	222	208	208	208	200	200	198	186	200	200	200	200	200	210	202	216	188	220	242		
37	Q	Q	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	236	232	214						222	232	188	178	178	220	220	198	198	198	198	200	206	218	218	218	262	
39	A	A	A	A	A	A																				
40							234	204	198	198	194	194	190	200	196	202	200	208	212	206	220	240	282	A		
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		
42	CNT	12	6	4	7	8	7	10	14	15	14	15	14	13	15	16	16	15	16	16	16	16	14	11		
43	U	226	234	254	261	E A	E A	232	215	213	202	200	200	200	202	199	202	202	208	210	205	218	220	234	232	
44	E A	251	254	279	272	E A	E A	236	218	222	212	206	202	206	212	206	203	209	208	212	213	212	226	235	262	262
45	L Q	215	232	252	214	229	212	212	204	196	198	194	194	191	200	196	197	198	202	202	202	212	215	220	224	

OCT.2018 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV.2018 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	68	A	54	82	47	45	X ^O X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
2	X ³⁷	59	75	A	A	A	X	X	X	X	X	X	X	X	X	X	X	V	X	X	46	45	46	36	41
3	51	45	X ³⁷	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	45	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A	A	A	X	77
5	B	A	93	X ³⁴	B	A	A		R	B	B	B	B	B	X ^O	X	X	B	X	X		A	A	A	A
6	44	B	B	A	A ^O	X		B	A	X	X	X	X ^O	X	B	B	X	X	X	X	X	X	X	X	X
7	X ⁴²	X ⁴⁰	A	A	A	A	B	A	A	A	A	B	B	X ^O	X	X	X	X	X	X	X ^O	X ^O	X ^O	X ^O	X ^O
8	X ^O	X	A	40	44	X	A	A	A	X	X	X	X	X	X	B	B	X ^O	X	X	X	X	X	X	X
9	X ^O	X	42	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A	A	X ^O	X	A
10	A	56	65	62	39	X	A	A	A	X	X	X	X	X	X	B	X	X	X	X	X	X	A	A	
11	B	A	A	A	A	A	A	X	A	A ^O	X	X	X	X	X	X	X	X	X	X	X	X	X	A	A
12	A	B	B	B	X	50	A	X	A	A	B	B	B	B	X ^O	X	B	X	X	X	X	X	54	67	
13	A	A	A	A	A	65	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14	X ^O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A	X	X
15	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
16	X	X	47	52	53	50	52	54	54	50	52	49	52	49	A	X	X	X	X	X	X	X	X	X	X
17	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18	58	57	X ^O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
19	44	X	X	54	A	A	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X ^O	X	43	56	68
20	A	A	A	A	A	X	A		A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
21	X	43	42	X	X	X	A	A	A	X	X	X ^O	X ^O	X	X	X	X	X	X	X	X	A	A	X	X
22	47	42	42	A	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
23	50	39	41	50	40	X	A	A	A ^O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
24	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
25	X	48	38	48	44	52	49	54	55	53	48	49	52	54	A	X	X	X	X	X	X	X	X	X	X
26	X ^O	X	42	A	A	X	A		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
27	X	X	X	X	A	A		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
28	A	A	A	50	46	A	A	54	55	53	43	A	A	A	X	X	X	X	X	X	X	X	X	X	X
29	78	80	66	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
31	43	44	56	49	47	52	65	61	62	60	56	54	54	52	52	51	48	47	48	48	48	51	51	43	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	22	19	22	18	16	19	16	21	21	26	27	25	24	25	25	27	29	30	30	27	26	26	27	24	
MED	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
U Q	44	44	44	48	46	49	50	53	50	50	50	49	50	50	51	50	48	47	46	45	44	42	42	42	
L Q	50	49	54	50	49	52	54	58	54	52	51	52	52	54	52	53	50	50	48	47	45	44	46	44	
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	42	40	40	42	42	45	48	49	48	48	46	46	46	48	48	49	47	46	44	44	43	40	39	40	

NOV.2018 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV.2018 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	A	A	A	A	R 33	39	48	45	48	46	44	46	47	50	45	44	38	41	38	38	38	34	35	34		
2	31	A	A	A	A	A	33	39	42	43	44	48	50	49	49	51	47	V 45	44	40	39	F 34	31	35		
3	F 36	F 27	31	A	A	A	A	A	40	46	44	42	42	47	50	50	46	42	42	39	41	34	32	32		
4	A	A	A	A	38	40	43	42	42	43	43	43	41	44	42	43	42	42	40	A	A	A	26	A		
5	B	A	A	28	B	A	A	A	A	B	B	B	B	B	R 46	R 34	B	38	30	A	A	A	A	A		
6	A	B	B	A	A	35	F 36	B	A	35	36	37	38	B	B	47	41	39	40	38	34	31	33	34		
7	36	34	A	A	A	A	B	A	A	A	A	B	B	41	43	41	41	39	39	36	R 38	R 36	32	R 32		
8	R 39	A	R 31	F 32	31	A	A	A	36	38	36	39	38	40	B	B	42	38	37	39	32	30	25	26		
9	27	R 27	32	A	32	41	42	43	42	39	40	44	45	48	51	48	44	46	46	A	A	A	R 40	A		
10	A	A	R 27	38	33	A	A	A	33	34	34	34	36	36	35	B	38	35	38	35	33	29	A	A		
11	B	A	A	A	A	A	A	32	A	A	R 36	36	36	36	37	36	36	40	36	36	32	33	A	A		
12	A	B	B	B	R 34	F 35	A	R 55	A	A	B	B	B	B	R 39	B	38	39	40	36	38	34	F A	A		
13	A	A	A	A	A	A	A	A	35	37	37	37	37	42	40	37	41	39	38	34	35	33	30	29		
14	R 31	28	30	34	42	42	40	42	43	42	42	47	45	45	44	43	41	41	38	38	40	A	F 28	26		
15	A	A	34	33	44	43	44	44	44	43	44	48	45	A	44	42	43	41	40	41	39	36	38	36		
16	34	31	F 34	F 36	F 38	44	46	48	48	44	38	43	46	43	A	44	46	44	44	40	38	38	33	34		
17	F 38	40	36	41	46	46	51	F 49	F 47	46	45	A	A	48	50	46	46	43	41	38	38	38	40	F 50		
18	F 48	F 46	42	39	48	50	40	43	46	46	45	45	45	44	46	46	44	46	44	42	38	38	38	38		
19	F 34	34	34	F 40	A	A	A	A	A	44	45	45	46	48	49	43	41	40	38	R 46	F 33	A	A	A		
20	A	A	A	A	A	32	A	A	A	42	46	37	38	42	43	47	44	40	40	39	A	A	36	35	36	F 32
21	37	Z 36	42	37	40	F 29	A	A	A	42	46	41	R 44	48	47	44	41	41	40	A	A	36	34	37		
22	F 37	36	36	A	A	A	41	44	42	44	44	44	44	44	42	43	41	40	40	38	37	36	35	F 35		
23	F 34	33	35	44	34	A	A	A	A	44	45	44	46	46	46	A	44	43	42	38	38	39	35	36	37	
24	39	38	F 41	36	41	42	45	52	48	46	45	43	42	46	A	46	44	44	41	41	40	38	40	41		
25	33	36	F 32	42	38	40	43	48	49	47	42	43	46	48	A	50	50	47	42	43	39	38	37	36		
26	36	34	F 33	A	A	44	A	F 42	F 37	42	44	43	A	43	44	43	44	46	42	38	37	36	42	38		
27	45	43	42	42	A	A	F 43	F 51	F 46	50	47	46	46	A	R 46	49	47	48	50	41	37	35	R 44	A		
28	A	A	A	A	40	A	A	48	49	47	37	A	A	41	45	40	40	40	41	39	39	39	36	38		
29	37	A	A	R 34	A	37	41	48	47	46	45	44	43	R 43	43	43	44	41	41	39	42	41	41	37		
30	37	38	50	43	41	46	F 48	55	56	54	50	48	48	46	46	45	42	41	42	42	45	45	37	34		
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	19	16	18	16	16	18	16	19	21	26	27	25	24	25	25	27	29	30	30	26	26	25	25	22		
MED	36	35	34	38	39	40	43	45	44	44	44	43	44	44	45	44	42	41	40	39	38	36	36	35		
U Q	38	38	41	42	42	44	46	49	48	46	45	46	46	48	46	47	44	44	42	41	39	38	39	37		
L Q	34	32	32	34	34	35	40	42	41	42	38	40	40	42	42	43	41	40	38	38	36	34	32	32		

NOV.2018 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV.2018 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	46	37	48	36	32 ^G	46	59	26 ^G		30		30	30	29 ^G	27	28	27	24	20				13		
2	23	32	36	50	48	60	37	31	31	31	34	33	32	28	23 ^G	28		28	25	18 ^G	19	19		57		
3	10 ^{E B}	20	27	34	52	60	67	52	33	28	32	32	28	30	28	30									22 ^K	
4	40	114	52	55	46	30	23	28	28																65	
5		106 ^B	54			57	53	29	29																42	
6	46			50	50	57	66		44	28																
7	22	34	58	62	58	43		60	60	60	42														41	
8	71	40	24	32 ^G	72	46	50	44	58	30															15	
9	17	37	26	42	36	33	25	25	28	50	47	35	32												135	
10	53	62	23	40	60	50	49	42	57	54	50	46	39	32	52										53	
11		58 ^B	62	47	58	54	52	43	49	51	35	32	31												42	
12	47				30	27	51	49	54	60															48	
13	58	44	44	36	56	56	52	47	58	49	54	66	64													
14	14	18	18	20	20	22	21	22	22	29	31	34	34	40	31	32	49	42	25	51	21	94	15	17		
15	37	51	20	20	57		26	35	27	31	31	40	32	60	60	18	32	30	28	28	18			23		
16	17	22	41	18	20		25	30	28	40	64	64	32	56	86	55	39	26	28	28	24			54		
17	23	14 ^G	23	23	21		26	26	30		31	74	113	105	67	62										
18		14	18	68	32	27	38	32	32	32	32	32	32	32	34	37	37	37	30	27	22	23	23	70		
19	15	23	32	39	57	58	57	58	54	30	63	31	31	32	28	54	60	55	24	23	37	48	48	48		
20	56	62	57	59	67	37	48	30	60	30		31	31	31	31	31	28	25	27	48	49	23	18	23		
21	36	30	30	25	42	28	58	54	48	33	30	35	69	78	31	60	44	72	48	59	108	108		76		
22		25	36	44	54	53	58	24	30	30	28	59	32	32	32		28	55	27	36	57	18	22	16		
23		56	18	22	58	57	57	47	44	59	32	32	32	32	60	57	84	61	61	24	24	36	52	52		
24	14 ^G	29	26	18	20			25	36	33	33	36	64	49	123	72	31	27	18	30	20	20	20	28		
25	22	37	52	31	26	58	71	36	32		33	35	42	50	78	43	38		26	27	68	27	37			
26		26	28	80	42	49	54	26	79	37																
27		27	13	18	58	55	35	71	30	38	32	32	37	74	67	85	63	86	26	26	24	35	32	41		
28	42	64	54	54	34	49	56	33	30	30	58	67	103	31	54	42	68	32	27	22	22	28	36	20		
29	30	42	47	56	69	56	67		104	34	33	33	30	34	32	34	32	56	56	58	22	18	20	15		
30			20	28	35	48	33		32	32	32	32	34	58	34	33	41	34	26	24	24	28				
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	28	28	28	29	29	30	29	29	30	29	28	27	27	26	27	27	29	30	30	30	30	30	30	30		
MED	22	36	31	39	48	48	50	33	32	32	32	34	32	32	32	32	31	28	26	26	22	24	20	34		
U Q	41	54	50	52	58	56	57	48	54	44	38	40	42	50	60	55	42	42	28	36	40	36	38	53		
L Q		24	23	24	33		30		30	30	30	32	31	30		28		25	24	22	20	18		15		

NOV.2018 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV.2018 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	8	10	17	15	11	13	9	8	8	10	13	19	9	13	26	13	13	12	10	8	8	8	9	6
2	7	9	12	14	11	13	11	6	8	8	8	7	8	7	11	13	8	9	12	8	8	9	9	10
3	10	8	9	20	8	13	14	7	7	7	9	8	8	8	8	8	9	7	7	7	7	7	6	7
4	9	11	11	9	11	8	6	8	8	8	8	8	8	8	9	9	10	8	7	11	10	8	8	9
5	B	21	12	8	B	15	18	12	14	B	B	B	B	B	38	29	B	20	11	9	9	10	11	18
6	7	B	B	18	21	18	14	B	14	12	12	13	27	B	B	15	25	15	12	12	12	12	9	9
7	8	8	17	25	23	16	B	24	16	10	18	B	B	30	25	15	15	10	14	24	24	24	14	10
8	17	9	6	14	11	23	36	14	14	14	10	10	11	13	B	B	27	14	14	8	8	8	8	8
9	8	12	16	14	14	12	12	10	10	14	11	11	15	40	16	16	13	12	10	11	9	10	12	12
10	11	9	8	11	10	22	12	13	10	9	9	12	15	15	10	B	12	11	11	9	6	7	10	14
11	B	10	28	23	19	19	23	10	24	20	17	24	31	16	19	28	28	36	24	21	14	10	7	29
12	12	B	B	B	12	12	16	10	15	16	B	B	B	B	31	B	27	19	15	19	15	14	12	17
13	21	16	14	21	18	18	20	16	11	11	11	10	12	31	18	14	13	13	13	16	12	10	7	8
14	6	6	7	7	7	10	9	13	13	14	15	13	13	13	11	12	12	13	10	12	12	8	6	6
15	8	10	10	9	10	8	8	14	9	9	9	9	12	10	11	10	10	7	7	7	7	7	7	8
16	8	8	10	9	9	8	8	8	8	11	9	7	7	7	8	8	6	6	6	14	13	9	7	8
17	10	10	7	12	7	7	12	12	9	9	8	8	8	8	7	10	10	10	9	9	9	7	7	8
18	7	7	8	7	7	7	7	7	7	7	7	8	8	8	8	8	8	8	11	8	8	7	8	8
19	7	9	11	18	12	11	11	10	8	9	8	9	6	6	11	11	8	8	8	8	10	10	16	10
20	10	10	10	12	33	8	11	7	13	13	18	12	12	10	10	10	15	15	15	15	9	7	7	7
21	7	7	10	12	9	13	10	9	13	13	9	15	15	15	15	14	14	12	12	12	12	12	9	11
22	8	6	6	10	11	10	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	7	7	7
23	7	14	9	9	9	7	7	8	7	7	7	8	8	8	8	9	9	9	9	9	8	6	6	7
24	8	8	7	7	6	7	7	8	8	8	8	11	7	6	6	6	6	6	6	6	10	7	7	5
25	6	9	10	7	7	7	7	11	11	9	9	9	8	8	8	8	7	12	9	9	10	6	6	6
26	6	6	10	9	8	12	9	8	8	7	7	7	7	7	7	7	7	7	6	6	6	7	7	7
27	7	8	7	6	8	9	7	7	8	8	6	6	6	8	8	8	8	8	8	8	7	7	8	9
28	8	14	9	9	6	11	8	8	8	8	8	8	8	8	8	8	8	8	6	6	6	6	7	8
29	8	11	11	8	14	10	10	7	7	7	7	7	7	7	7	7	7	7	7	7	8	8	8	7
30	7	7	8	6	10	10	7	8	8	9	9	8	7	7	8	9	8	8	8	8	8	8	6	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	8	9	10	10	10	11	10	8	8	9	9	9	8	8	10	10	10	10	10	9	9	8	8	8
U Q	10	11	12	15	14	13	14	12	13	13	12	13	15	15	18	15	14	13	12	12	12	10	9	10
L Q	7	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	8	7	7	7

NOV.2018 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV. 2018 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	218	198	206	194	198	202	202	202	202	214	216	220	204	212	230	228		
2	262		A	A	A	A	A	A	A	204	214	198	192	194	202	200	200	202	212	212	202	198	198	208	234	224	236
3	246	248	E A 296	A	A	A	A	A	A	250	196	196	188	194	186	H 216	216	202	196	212	196	210	220	220	260		
4	A	A	A	A	222	222	216	194	202	202	182	198	198	190	202	202	196	216	A	A	A	A	A	248	A		
5	B	A	A	A	B	A	A	A	A	B	B	B	B	B	B	B	B	B	A	A	196	A	A	A	A		
6	A	B	B	A	A	A	A	B	A	200	194	136	190	B	B	198	212	212	210	226	E A 230	E A 244	E A 252	E A 252			
7	252	A	A	A	A	A	B	A	A	A	A	B	E B 228	B	192	212	212	202	202	222	E B 242	E A 242	E A 250	226			
8	244	A	A	204	246	A	B	A	E A 220	198	190	166	H 200	190	B	B	212	200	198	216	214	240	256	220			
9	A	A	A	A	A	A	A	A	A	270	218	208	208	198	222	210	196	214	216	216	216	A	A	204	A		
10	A	A	204	A	A	A	A	A	A	204	204	196	196	E A 242	E A 226	208	B	198	194	238	E A 280	E A 256	A	A			
11	B	A	A	A	A	A	A	A	A	222	A	A	A	A	A	A	E B 232	192	198	214	216	E B 230	E A 220	A	A		
12	A	B	B	B	198	216	A	A	A	A	B	B	B	B	B	B	218	198	208	222	222	E B 250	228	A	A		
13	A	A	A	A	A	A	A	A	206	192	196	200	212	208	196	184	214	210	208	222	E A 200	E A 240	E A 220	E A 254			
14	260	E A 284	E A 242	250	236	226	210	200	196	212	206	216	216	232	198	198	198	A	220	206	228	A	244	194			
15	A	E A 280	E A 274	220	210	206	A	206	186	198	198	204	H 204	A	188	198	214	206	200	200	200	216	E A 230	E A 230			
16	E A 230	E A 288	A	E A 274	222	214	210	210	196	196	202	200	192	A	A	210	222	196	196	196	214	214	210	E A 242			
17	236	E A 246	A	A	222	200	220	208	194	184	110	A	A	200	194	200	200	212	200	200	212	212	216	246			
18	240	236	256	240	228	228	214	E A 270	198	190	198	184	190	200	186	214	214	202	204	202	218	E A 230	E A 226	226			
19	E A 226	276	A	A	A	A	A	A	A	204	210	198	220	200	204	196	196	198	200	212	A	A	A	A			
20	A	A	A	A	A	A	A	A	A	212	248	198	98	126	202	202	204	210	210	218	E A 230	E A 220	E A 280				
21	A	A	A	A	A	214	A	A	E A 252	198	198	198	198	220	E A 224	204	200	226	A	A	A	E A 226	A	A			
22	E A 240	E A 256	A	A	A	A	252	202	194	204	196	196	188	194	200	190	H 208	200	210	202	212	202	240	230			
23	230	254	E A 282	230	E A 278	A	A	A	198	192	186	198	182	194	194	A	212	196	210	208	190	202	200				
24	E A 252	E A 278	E A 264	230	220	212	200	204	200	200	192	200	200	200	A	190	196	196	212	200	204	E A 228	210	232			
25	244	E A 312	E A 300	254	244	226	210	206	196	198	220	228	356	A	A	200	200	212	222	E A 234	E A 222	E A 246	E B 234				
26	E A 234	A	A	A	A	A	A	244	196	110	196	208	A	202	198	A	214	A	212	196	218	218	242	E A 236			
27	E A 242	244	228	212	A	A	276	210	202	196	196	196	196	A	A	A	H 194	A	192	192	192	206	212	212	228	254	
28	A	A	A	A	E A 286	A	A	198	198	198	A	A	A	H 194	A	194	200	202	202	202	202	202	202	226	226		
29	A	A	A	A	A	A	226	204	196	192	182	238	192	198	188	172	H 188	208	200	208	182	H 212	224	200			
30	E A 236	E A 236	A	E A 302	A	A	252	194	188	188	180	200	200	188	202	192	208	192	206	198	202	212	212	228			
31																											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	16	12	9	9	12	11	13	17	21	26	25	25	24	23	23	25	27	26	30	26	24	24	24	21			
MED	240	248	E A 264	226	224	215	218	209	198	198	196	198	198	199	200	199	204	202	209	206	208	216	223	228			
U Q	249	E A 281	E A 289	E A 264	245	228	239	217	206	204	200	205	208	202	204	213	214	210	216	222	E 229	E A 232	E A 245	E A 244			
L Q	E A 235	A 245	A 235	A 221	221	212	208	203	196	192	193	192	193	192	194	193	200	196	200	200	204	212	218	226			

NOV. 2018 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

DEC.2018 f_{XI} (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	X 40	X 38	X 44	X 44	X 49	X 52	X 59	X 51	A	X 55	X 55	X 54	X 53	A	X 55	X 53	X 53	X 51	X 52	X 46	60	X 42	A	97	
2	A	A	57	38	A	50	A	A	49	49	50	53	60	55	55	54	54	50	46	A	38	A	A	A	
3	A	A	X 42	A	X 43	X 43	X 46	X 48	X 53	X 54	X 55	X 54	X 51	X 51	X 51	X 50	X 50	X 48	X 43	X 38	66	52	A	A	
4	A	A	A	65	X 47	A	A	A	A	O 46	X 44	X 44	X 45	X 44	X 47	X 50	X 47	X 46	X 45	X 45	X 45	X 43	X 40	X 36	X 37
5	X 40	A 40	O 47	X 48	X 48	R 58	65	64	51	50	50	51	52	50	50	50	52	49	51	51	O 48	X 46	X 42	X 44	
6	X 42	A	A	X 45	X 48		55	58	48		49	50	52	52	52	52	54	54	53	51	47	44	O 41	X 37	X 39
7	X 35	X 45	A	A	A	56	55		59	54	54	55	64	56	49	53	58	53	54	54	42	X 41	O 40	X 40	A
8	A	A	B	X 38	A	A	A	A	50	51	52	O 50	O 56	X 54	X 52	O 49	O 50	X 50	X 45	X 43	O 40	X 49		X 44	X 44
9	O 43	X 43	A	A	X 46	A	A	O 44	X 55	X 52	X 51	X 53	X 51	X 52	X 50	X 52	X 52	X 53	X 49	X 44	O 43	X 42	X 50	X 48	X 48
10	57	A	A	A	A	52	A	A	A	X 44	X 43	R 49	O 52	O 52	O 52	O 52	O 52	O 50	O 47	O 46	X 43	X 38	X 38	X 46	X 46
11	A	A	A	X 44	X 48	X 50	X 53	X 51	X 53	56	56	53	54	60	68	B 51	O 51	X 53	X 56	X 50	44	A	X 47	X 49	X 49
12	42	X 43	X 43	A	A	A	A	X 46	X 51	X 46	X 46	X 46	X 44	O 50	O 46	O 44	X 47	X 47	X 49	X 46	44	42	42	X 42	X 34
13	X 34	X 37	X 39	X 43	X 48	X 52	X 51	X 52	57	52	52	52	52	52		A	X 48	X 48	X 48	X 48	46	42	44	X 42	X 42
14	X 42	X 42	X 44	X 48	X 50	X 51	51	59	60	60	55	53	51	54	52	50	46		A	X 48	X 49	X 46	52	50	X 42
15	X 38	X 38	X 43	X 48	X 50	X 61	65	80	59	58	57	54	53	52	51	49	49	48	48	48	51	50	47	45	X 44
16	X 43	X 38	X 38	X 42	X 51	X 56	57	63	65	68	57	55	55	56	53	50	51	52	51	49	44	45	41	X 44	X 44
17	X 42	X 37	X 44	X 47	X 50	X 52	54	51	55	53	51	51	51	58	54	55	52	X 51	A	X 54	X 49	X 46	X 78	X A	X A
18	A	A	A	A	A	71		A	A	X 44	X 47	X 50	X 44	X 46	X 49	X 50	X 52	X 55	X 48	X 45	X 44	42	A	O 42	X 42
19	A	A	A	A	X 49	X 42	56	50	54	55	51	51	51	52	52	53	54	50	52	49	46	42	X 42	X 71	X 42
20	A	A	A	O 53	X 51	A	A	X 42	X 44	X 48	X 48	X 52	X 49	X 49	X 50	X 50	X 49	X 49	X 47	X 42	X 43	X 40	X 62	X 62	X 62
21	A	A	X 41	X 41	A	A	X 41	X 46	X 46	X 46	X 47	X 50	X 51	X 49	X 48	X 50	X 50	X 46	X 46	O 44	X 43	X 42	X 36	X 39	X 39
22	X 41	A	X 43	A	X 44	X 44	X 48	X 56	X 56	X 57	X 52	X 53	X 53	X 53	X 51	X 51	X 50	X 48	X 49	X 48	49	43	45	X 41	X 41
23	X 38	X 46	X 49	A	X 45	X 52	58	55	55	55	51	51	52	52	53	52	X 50	X 50	X 49	X 50	51	52	45	X 40	X 40
24	X 36	X 42	X 44	X 45	X 53	X 51	58	59	60	56	52	52		A	X 48	X 48	X 45	X 53	X 50	X 52	51	48	54	X 47	X 41
25	X 41	X 39	A	A	X 47	A	A	A	X 53	X 53	X 49	X 46	X 46	X 49	X 46	X 46	X 47	X 48	X 51	X 52	56	46	40	X 40	X 40
26	X 39	X 50	A	X 38	X 49	X 56	X 51	X 59	X 60	X 55	X 52	X 51	X 52	X 50	X 49	X 47	X 50	X 50	X 54	X 47	X 47	X 44	X 41	X 42	X 42
27	X 43	X 44	X 46	X 49	X 54	X 51	X 48	X 48	X 52	X 63	X 54	X 53	X 50	X 52	X 47	X 46	X 49	X 49	X 50	X 50	45	50	47	X 50	X 50
28	X 43	X 62	O 44	X 46	X 44	A	A	A	X 47	X 62	X 59	X 55	X 57	X 60	X 56	X 46	X 48	X 41	A	A	X 48	X 63	X 42	O 42	X 42
29	A	A	A	O 47	X A	B	X 50	A	A	X 50	X 49	A	O 53	X 59	X 54	X 52	X 50	X 48	X 46	X 42	X 42	X 43	X 38	X 40	X 40
30	X 38	O 40	X A	A	A	A	A	A	X 50	A	O 44	A	O 50	X 61	X 58	X 59	X 58	X 53	X 55	X 55	X 52	A	X 41	X 38	X 37
31	A	A	A	A	A	A	A	A	A	O 42	X 50	X 54	X 59	X 61	X 57	X 58	X 58	X 50	X 50	X 48	X 50	X 40	X 40	X 45	X 45
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	20	15	16	19	20	20	19	21	25	30	30	29	29	30	30	30	31	29	30	29	30	28	25	25	
MED	X 41	X 42	X 44	X 45	X 48	X 52	X 54	X 51	X 54	X 53	X 51	X 52	X 52	X 52	X 52	X 50	X 50	X 49	X 48	X 48	X 46	X 44	X 42	X 42	X 42
U Q	X 42	X 45	X 44	X 48	X 50	X 54	X 58	X 59	X 59	X 56	X 54	X 54	X 54	X 56	X 54	X 53	X 53	X 50	X 51	X 50	X 49	X 50	X 46	X 47	X 47
L Q	X 38	X 38	X 42	X 42	X 46	X 50	X 50	X 48	X 50	X 48	X 49	X 50	X 50	X 50	X 49	X 49	X 49	X 48	X 47	X 44	X 43	X 42	X 39	X 40	X 40

DEC.2018 f_{XI} (0.1MHz)
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IONOSPHERIC DATA STATION SHOWA-ST.

DEC. 2018 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	34	32	38	37	42	46	53	45	A	49	49	48	47	A	49	47	47	45	46	40	A	36	A	A	
2	A	A	39	32	A	F 36	A	A	43	43	44	47	54	48	49	47	48	44	40	A	32	A	A	A	
3	A	A	A	36	37	37	39	42	47	48	49	48	45	45	45	44	44	42	37	32	A	46	A	A	
4	A	A	A	R 46	41	A	A	A	A	40	38	38	39	38	41	44	41	40	39	39	37	34	30	31	
5	34	A	34	F 36	F 33	42	43	F 53	F 48	45	44	44	45	46	44	44	46	43	45	45	42	40	36	38	
6	36	A	A	39	42	A	F 42	F 40	42	43	44	44	46	46	46	48	48	47	45	41	38	35	31	33	
7	29	39	A	A	A	F 47	49	A	A	53	46	48	49	54	50	43	47	52	47	48	48	36	35	34	
8	A	A	B	32	A	A	A	A	44	45	46	44	50	48	46	43	44	44	39	37	34	F 39	F 39	A	
9	37	A	A	A	40	A	A	38	49	46	45	47	45	46	44	45	45	47	43	38	R 37	36	40	F 40	
10	A	A	A	A	A	A	A	A	A	38	37	R	43	46	46	46	46	44	41	40	37	32	32	40	
11	A	A	A	38	42	44	47	45	47	46	46	47	48	54	F 56	R	B	R	45	47	50	44	38	41	43
12	36	37	37	A	A	A	A	40	45	40	40	U R 40	38	44	40	38	41	41	43	40	38	36	36	28	
13	28	31	33	37	42	46	45	46	51	46	46	46	46	45	A	42	42	42	42	42	40	36	38	36	
14	36	36	38	42	44	45	F 40	F 48	54	49	49	47	45	48	46	44	40	A	42	43	40	46	44	36	
15	32	32	F 33	F 38	44	55	F 50	F 59	53	52	51	48	47	46	45	43	43	42	42	45	44	41	39	38	
16	37	32	32	36	F 38	50	51	F 50	59	53	51	49	49	A	50	47	44	45	46	45	43	38	39	35	F 32
17	36	31	38	41	44	46	48	45	49	47	45	45	A	52	48	49	46	A	45	48	43	40	72	A	
18	A	A	A	A	A	F 31	A	A	38	41	44	38	40	43	44	46	49	42	39	38	36	A	A	R 36	
19	A	A	A	A	43	36	F 46	44	48	48	45	45	45	46	46	47	48	44	46	43	40	36	36	A	
20	A	A	A	47	A	45	A	36	38	42	42	R 46	43	43	44	44	43	43	41	36	37	34	A	R 39	
21	A	A	35	35	A	A	35	40	40	40	41	43	45	43	42	44	44	40	40	38	37	36	30	33	
22	35	A	37	A J	R 38	38	42	50	50	51	46	47	47	47	45	45	44	42	43	42	43	37	39	35	
23	32	40	F 34	A	39	46	F 42	49	49	49	45	45	46	46	47	46	44	44	43	44	45	46	39	34	
24	30	36	38	39	47	45	52	53	54	51	46	46	A	42	42	39	47	44	46	45	42	48	41	35	
25	35	33	A	A	41	A	A	A	47	47	43	40	40	43	40	40	41	42	45	46	50	40	34	A	
26	33	44	A	32	43	F 40	45	53	54	49	46	45	46	44	43	41	44	44	48	41	41	38	34	36	
27	37	38	40	39	48	45	R 42	R 42	46	47	F 46	F 47	44	46	41	40	43	43	44	44	39	44	41	44	
28	37	A	38 J	R 40	38	A	A	A	41	56	53	49	R 51	54	50	R 40	42	35	A	A	42	F 48	36	A	
29	A	A	A	41	A	B	44	A	A	44	43	A	47	53	R 48	46	44	42	40	36	36	37	32	34	
30	32	R 34	A	A	A	A	A	A	44	38	A	44	F 48	52	F 53	52	47	49	49	46	A	35	32	31	
31	A	A	A	A	A	A	A	A	A	36	F 39	F 43	F 46	55	F 47	52	52	44	44	42	44	44	34	F 31	
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	
CNT	19	14	16	19	20	19	19	21	25	30	30	29	29	30	30	30	31	29	30	29	28	28	25	22	
MED	35	35	37	38	42	45	45	45	48	46	45	46	46	46	46	44	44	44	43	42	38	38	36	36	
U Q	36	38	38	41	44	46	49	50	52	49	46	47	48	50	47	47	47	44	45	44	42	42	40	38	
L Q	32	32	34	36	38	38	42	41	44	42	43	44	44	44	43	43	43	42	41	38	37	36	33	33	

DEC. 2018 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

DEC.2018 ftEs (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
1	28	48	59	94	21 ^G	39	33	68	74	98	33	34	35	76	32	39	50	70	27	24	45	42	58	69			
2	64	52	36	35	62	25	58	53	58	31	^G	^G	31	32	31	20 ^G	^G	27	26	48	23	49	48	52			
3	41	70	68	82	57	58	114	16 ^G	30	28	29	32	48	32	30	^G	^G	^G	28	51	40	42	40	83			
4	48	49	78	25	31	120	79	79	58	48	78	50	31	34	55	65	61	61	58	^G	18	28	18	20			
5	22	78	64	34	32	60	35	43	32	^G	33	33	33	50	82	60	33	^G	59	30	^G	58	58	33	58		
6	50	78	52	39	58	44	37	29	58	80	32	64	63	32	37	64	31	31	58	^G	^G	^E	^B	19	21		
7	20	26	52	58	58	45	40	56	32	29	29	^G	30	31	^G	30	29	29	22	30	26	40	84	123			
8	70	74	^B	48	50	59	63	56	38	30	63	75	^E	^B	^E	^B	^E	^B	^G	^G	^G	^G	36	46	47		
9	36	43	46	46	37	55	54	57	28	31	31	34	50	33	31	36	62	31	^G	23	34	25	34	45			
10	48	82	41	94	40	76	58	63	70	60	62	58	123	114	81	^E	^B	^E	^B	^E	^B	66	93	24	21	26	30
11	48	55	45	30	29	22	37	35	42	34	41	127	92	120	46	^B	^E	^B	^E	^B	^E	^B	42	82	41	42	24 ^G
12	28	34	54	51	57	62	46	^G	63	65	69	50	52	52	58	66	58	^G	31	27	27	24	18	48			
13	18	18	26	25	57	56	25	25	28	29	30	32	32	36	63	61	46	70	34	27	21	^G	18	^G			
14	100 ^G	19	22	24	21	22	25	27	32	45	33	35	34	41	46	46	46	55	29	60	32	24	58	16			
15	^G	17	21	19	56	^G	24	30	30	30	32	42	32	33	42	37	57	66	56	39	22	22	22	21			
16	22	22	22	24	28	38	26	31	^G	31	33	54	64	74	43	68	30	^G	32	26	30	22	19	19			
17	28	34	26	20	69	68	26	26	^G	^G	36	79	76	36	34	41	41	68	50	70	40	24	43	43			
18	43	114	72	66	66	36	56	50	22	33	32	33	34	30	34	32	32	27	64	80	22	44	40	38 ^G			
19	48	116	84	59	56	28	43	37	27	30	63	33	40	122	121	130	64	^G	25	25	25	^G	19	^G			
20	75	57	113	77	55	56	76	65	65	66	72	^E	^B	96	66	^G	^G	34	^G	^E	^B	27	23	42	95		
21	56	53	39	44	57	62	59	8	36	64	59	56	61	36	^G	30	90	28	26	26	23	18	20	20			
22	33	55	32	77	56	72	38	27	64	31	31	62	^G	30	80	61	58	58	60	25	23	23	51	51			
23	20	17	20	50	30	^G	26	31	31	34	34	34	34	65	37	38	32	28	34	26	25	25	18	18			
24	18	28	28	55	70	23	^G	24	48	47	81	60	86	86	71	71	57	59	45	58	58	58	20	20			
25	29	72	62	50	56	56	62	53	34	34	60	58	58	58	34	34	31	51	25	^G	25	22	55	44			
26	40	40	42	38	41	33	40	30	32	32	33	33	33	50	55	133	54	31	28	32	91	70	28	104			
27	84	49	24	24	21	22	54	40	32	64	32	34	60	62	33	^G	^G	31	26	26	18	28	22	26			
28	16	35	91	52	22	84	65	77	32	32	32	^E	^B	^E	^B	32	79	76	77	50	44	44	99	69			
29	56	52	87	85	50	^B	27	63	77	64	59	97	58	^E	^B	^E	^B	115	115	28	^G	60	29	58	22	30	
30	38	40	53	56	56	57	57	61	56	49	65	145	115	^E	^B	^E	^B	34	29	39	^G	20	22	24			
31	80	41	88	56	64	85	50	60	51	75	32	24	25	31	^G	27	30	27	28	28	66	60	59	58			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	31	31	30	31	31	30	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31			
MED	40	49	49	50	56	56	43	40	34	34	33	42	46	36	36	40	40	30	29	^G	26	25	33	^G			
U Q	56	70	68	59	57	62	58	60	58	64	62	60	63	65	55	65	58	59	56	51	40	44	48	58			
L Q	22	34	28	30	31	28	^G	27	^G	30	32	33	33	32	^G	30	31	27	27	26	22	22	20	21			

DEC.2018 ftEs (0.1MHz)

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IONOSPHERIC DATA STATION SHOWA-ST.

DEC.2018 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	7	7	7	8	8	8	6	6	11	9	6	8	7	8	7	7	7	6	7	5	17	7	8	8	
2	8	8	7	8	8	11	13	11	6	10	17	11	8	8	12	7	12	10	7	8	6	7	9	14	
3	10	34	21	11	11	9	9	8	8	8	9	9	10	10	14	10	18	10	7	9	7	8	8	11	
4	12	13	13	9	12	14	17	16	17	12	12	12	9	7	10	10	10	14	14	7	7	10	9	8	7
5	7	12	20	9	19	10	13	10	10	7	5	9	8	8	7	8	12	8	10	24	24	13	8	8	
6	6	15	10	8	11	12	10	9	8	13	9	7	7	8	8	9	12	25	15	13	16	18	10	7	
7	8	8	13	13	9	7	8	15	9	9	7	10	14	14	10	8	8	8	8	9	7	8	8	30	
8	12	10	^B	11	16	18	18	13	10	8	9	38	40	32	33	22	22	13	8	14	14	7	10	7	
9	8	10	14	11	10	15	13	11	8	8	8	8	8	8	8	5	8	8	8	6	20	10	9	7	
10	13	13	14	13	22	13	14	14	23	10	10	10	36	38	31	^B	38	40	16	18	13	11	7	10	
11	12	12	10	13	10	10	18	12	12	10	10	23	20	30	13		40	28	26	17	9	9	8	8	
12	8	8	8	26	11	13	10	9	7	7	8	8	10	12	12	9	9	11	9	8	6	7	7	7	
13	7	7	8	8	8	8	9	7	7	7	7	9	10	11	10	8	8	10	8	8	7	6	8	8	
14	8	9	8	6	6	6	6	7	7	7	7	7	7	7	7	9	9	9	7	10	8	6	6	6	
15	8	8	8	6	8	8	8	8	8	8	8	8	8	8	8	8	8	7	8	7	8	10	10	8	
16	8	8	8	8	7	8	8	8	10	10	10	8	8	11	11	10	11	10	8	8	8	7	7	7	
17	7	7	7	7	7	8	20	7	7	7	7	8	8	7	8	8	8	7	7	6	7	6	11	7	
18	10	18	10	8	8	8	10	14	8	7	9	7	8	10	7	10	10	10	8	8	14	10	8	8	
19	7	6	7	7	12	10	6	7	6	8	8	8	16	30	17	17	14	11	11	10	7	7	7	13	
20	9	10	8	14	12	9	24	11	11	11	40	31	16	14	12	10	8	14	26	11	14	8	8	8	
21	15	15	12	14	20	20	12	8	7	8	8	10	12	8	9	12	12	12	12	14	10	8	7	8	
22	9	16	12	10	9	11	11	7	10	8	8	8	8	11	8	8	8	7	6	5	8	10	6	6	
23	6	6	13	11	8	8	8	8	8	8	8	8	7	7	7	9	9	10	8	8	7	7	7	7	
24	8	6	8	8	6	9	9	9	9	7	6	9	9	7	7	8	8	8	8	8	8	6	6	6	
25	6	6	10	11	10	10	13	9	8	8	8	8	8	8	8	8	8	8	7	7	7	7	14	12	
26	9	9	10	9	8	8	8	7	9	7	7	7	7	7	8	8	8	8	8	10	10	9	9	6	
27	7	7	8	8	6	8	13	9	7	8	7	7	8	8	10	12	9	9	9	9	9	14	8	8	
28	8	8	8	6	8	^B	18	8	7	7	9	42	46	19	17	18	16	7	12	8	8	8	17	15	
29	14	28	25	8	14		12	18	11	11	11	46	33	31	40	38	38	24	15	19	14	8	9	6	
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31	13	11	9	12	27	11	6	22	27	14	12	12	12	9	11	11	18	27	28	15	13	16	14	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	8	9	10	9	10	10	11	9	8	8	8	9	9	9	10	9	10	10	8	9	8	8	8	8	
U Q	10	13	13	12	12	12	14	12	11	10	10	12	16	14	13	12	16	14	14	13	14	10	9	8	
L Q	7	7	8	8	8	8	8	8	7	7	7	8	8	8	8	8	8	8	8	8	7	7	7	7	

DEC.2018 fmin (0.1MHz)

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IONOSPHERIC DATA STATION SHOWA-ST.

DEC.2018 h'F (KM)

45°E MEAN TIME (G.M.T. + 3 H)

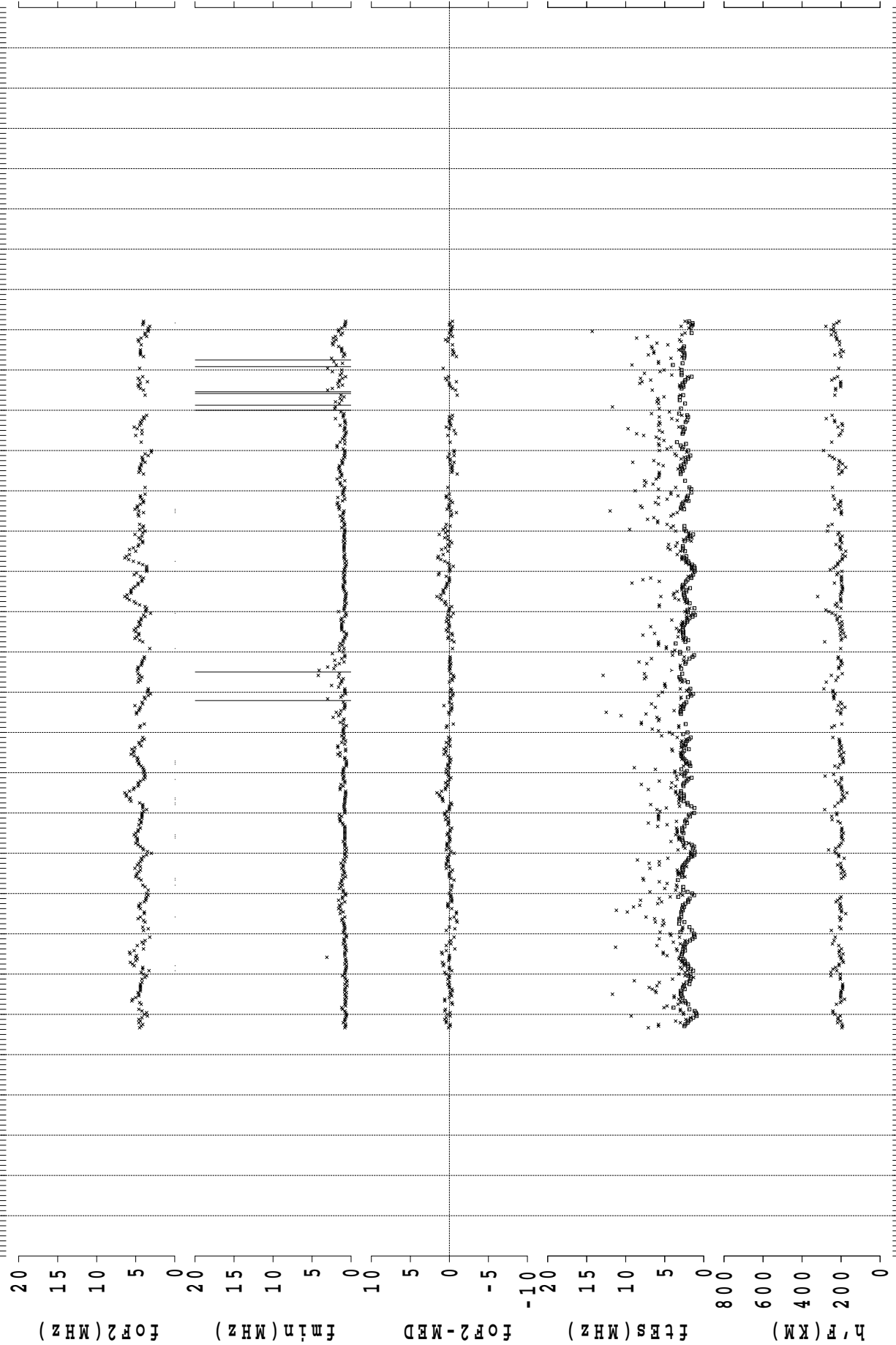
LAT.69°00.4'S LON.039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC IN MANUAL SCALING

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	238	238	216	220	232	228	206	210	A	224	198	190	192	A	212	212	A E A	232	194	198	224	A	A	A	A						
2	A	A	A	A	224	A	198	A	A	A	198	196	190	178	H	214	218	198	204	204	222	A	A	A	A	A						
3	A	A	A	A	A	A	214	200	198	204	192	200	216	A	194	210	210	200	182	H	228	304	A	A	A	A						
4	A	A	A	A	196	E A	A	A	A	A	204	204	190	208	202	192	200	198	202	216	198	216	A	A	A	A						
5	E A	242	A	204	E A	E A	E A	A	A	196	182	172	H	H	H	184	184	196	200	204	204	228	E A	A	A	A						
6	A	226	A	A	A	A	A	E A	A	260	200	200	A	184	198	198	198	218	202	208	186	204	H	210	210	E A	E A					
7	A	E A	238	A	A	A	A	E A	A	240	A	198	198	198	178	H	202	202	194	206	212	208	202	262	E A	E A	E A					
8	A	A	A	B E A	260	A	A	A	A	A	200	200	A	A	B E B	222	220	208	198	190	158	272	E A	E A	A	A	E A	298				
9	A	A	A	A	E A	A	A	A	A	156	194	200	200	A	H	196	200	200	200	214	198	220	A	E A	A	A	A					
10	A	A	A	A	A	A	A	A	A	A	194	178	208	A	E A	E A	A	B	B	E B	338	206	206	E A	232	242	230	A				
11	A	A	A	A	A	A	E A	A	A	220	240	A	198	212	212	198	A	216	B	B	216	210	220	E A	244	A	A	E B	244			
12	E A	E A	A	A	A	A	A	A	A	228	182	172	H	194	194	186	186	190	182	208	202	192	216	212	206	210	204	A	A			
13	E A	E A	244	266	264	232	226	226	208	198	192	186	186	192	186	186	A	196	E A	E A	234	238	202	202	202	226	210	204	A			
14	E A	230	246	210	216	230	200	210	202	194	194	194	198	198	198	A	208	208	A	142	206	214	214	214	194	A	A	A				
15	A	248	218	240	226	222	210	196	198	198	194	188	188	204	198	192	204	196	206	206	206	206	206	206	204	224	A	A	A			
16	224	224	224	214	196	198	198	198	198	198	202	186	198	A	A	192	204	184	186	202	214	214	214	200	222	E A	A	A	A			
17	A	A	E A	E A	242	232	208	212	200	200	196	200	200	182	A	194	194	194	208	A	216	A	A	234	200	232	A	A	A			
18	A	A	A	A	A	A	224	A	A	A	200	186	198	198	214	194	194	200	206	206	206	214	200	A	A	218	A	A	A			
19	A	A	A	A	A	194	A	206	206	200	180	194	190	204	E A	252	A	A	A	216	200	202	208	200	200	230	A	A	A			
20	A	A	A	A	208	262	A	228	206	190	A	E B	240	186	206	206	196	204	196	202	202	206	A	A	214	A	A	A	A			
21	A	A	A	A	A	A	A	A	H	214	198	188	180	198	204	194	176	184	H	H	194	182	202	202	206	214	228	220	220	A		
22	A	A	A	A	A	A	A	200	208	202	180	178	184	182	192	200	206	198	188	180	H	194	206	208	208	220	E A	A	A	A		
23	196	238	238	A	272	268	214	202	190	192	192	214	214	194	194	200	182	192	214	196	A	204	214	206	230	E A	A	A	A	A		
24	202	226	A	248	202	224	204	198	196	200	A	220	A	196	190	190	198	198	216	A	216	222	202	224	E B	A	A	A	A	A		
25	E A	E A	A	A	A	A	A	A	A	A	212	174	184	196	224	200	190	198	198	198	198	198	208	208	A	A	A	A	A	A		
26	A	A	A	A	A	218	A	184	186	198	190	184	202	188	198	202	196	196	200	200	214	222	240	240	A	A	A	A	A	A		
27	232	A	202	208	198	198	A	206	206	200	176	198	198	198	186	192	198	210	200	192	192	232	216	216	A	A	A	A	A	A		
28	234	A	A	A	228	A	A	A	A	A	196	182	182	H	B	B	188	202	200	192	210	A	A	210	A	A	A	A	A	A		
29	A	A	A	A	A	B E A	A	A	E A	E A	E A	A	E B	230	212	B	B	B	204	206	200	A	228	236	236	E A	A	A	A	A		
30	A	A	A	A	A	A	A	A	A	A	236	230	A	A	B	B E B	224	198	B E A	216	210	184	H	A	238	208	272	E A	A	A	A	
31	A	A	A	A	A	A	A	A	A	A	E A	256	200	218	194	200	192	212	206	206	232	198	228	216	240	256	E 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	9	12	13	16	15	18	22	30	28	27	22	27	28	27	27	29	30	27	24	23	21	20							
MED		223	232	217	220	218	219	205	200	197	197	194	197	195	197	195	200	201	201	202	205	210	214	213	216							
U Q		E A	E A	A	A	E A	E A	A	A	A	204	200	200	208	202	204	211	206	208	209	210	220	E A	230	228	233	238	E A	A	A	A	A
L Q		225	226	207	211	205	199	204	198	192	190	184	190	186	188	192	196	198	196	198	198	205	208	207	217							

DEC.2018 h'F (KM)

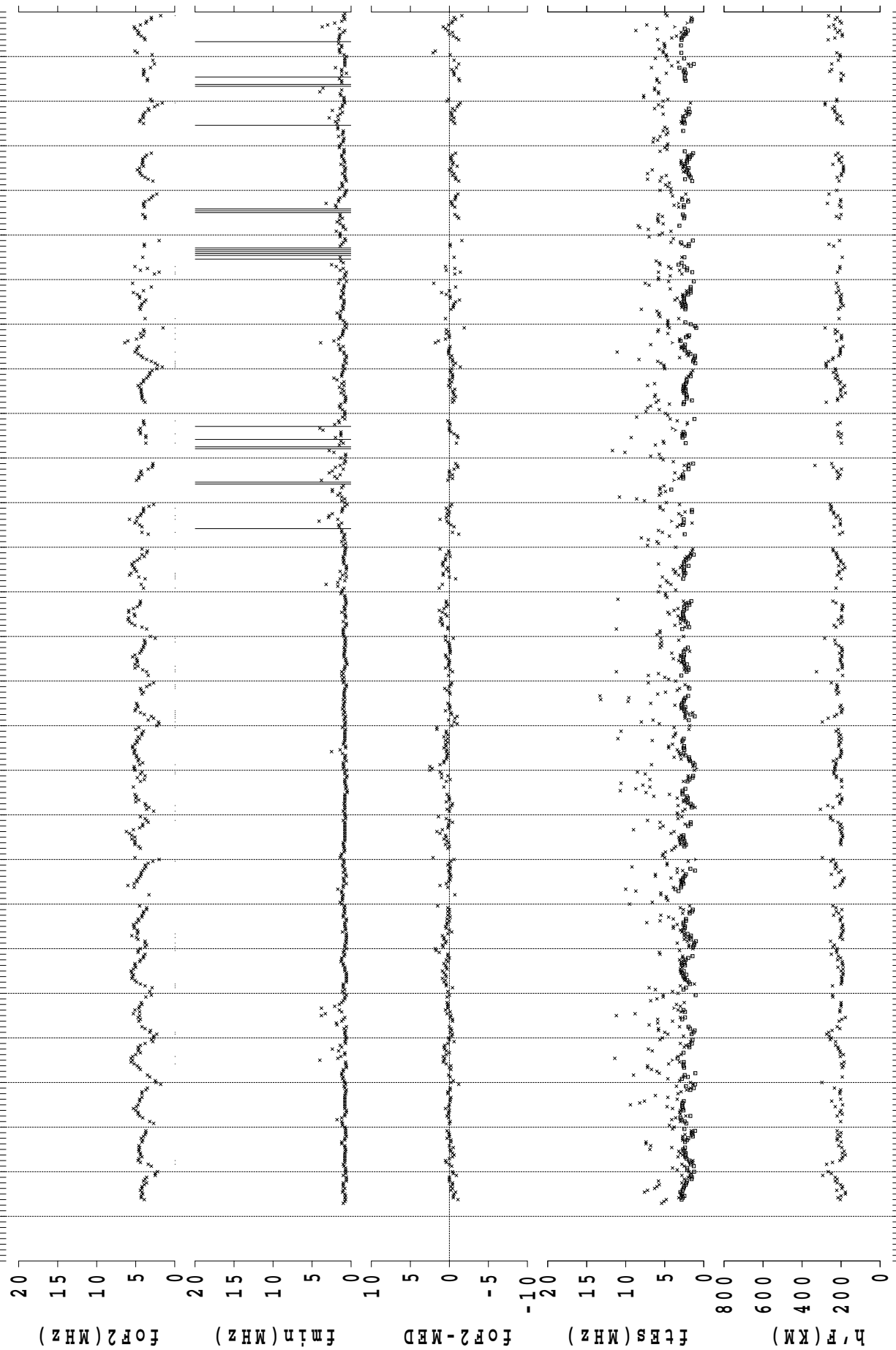
NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

2018 0101 -> 2018 0131(99) SYOWA-ST.



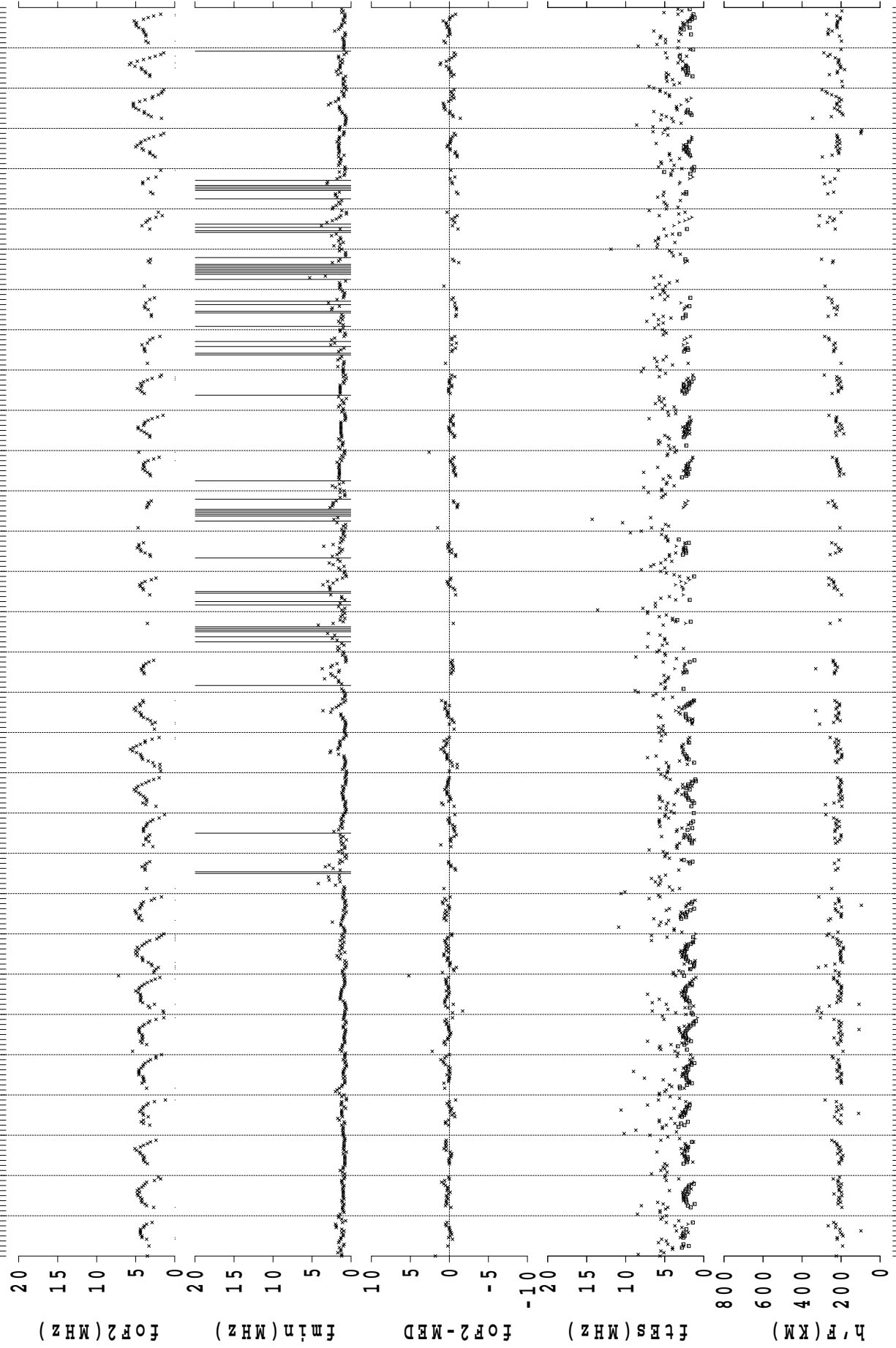
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2018 0201 -> 2018 0228(99) SYOWA-ST.



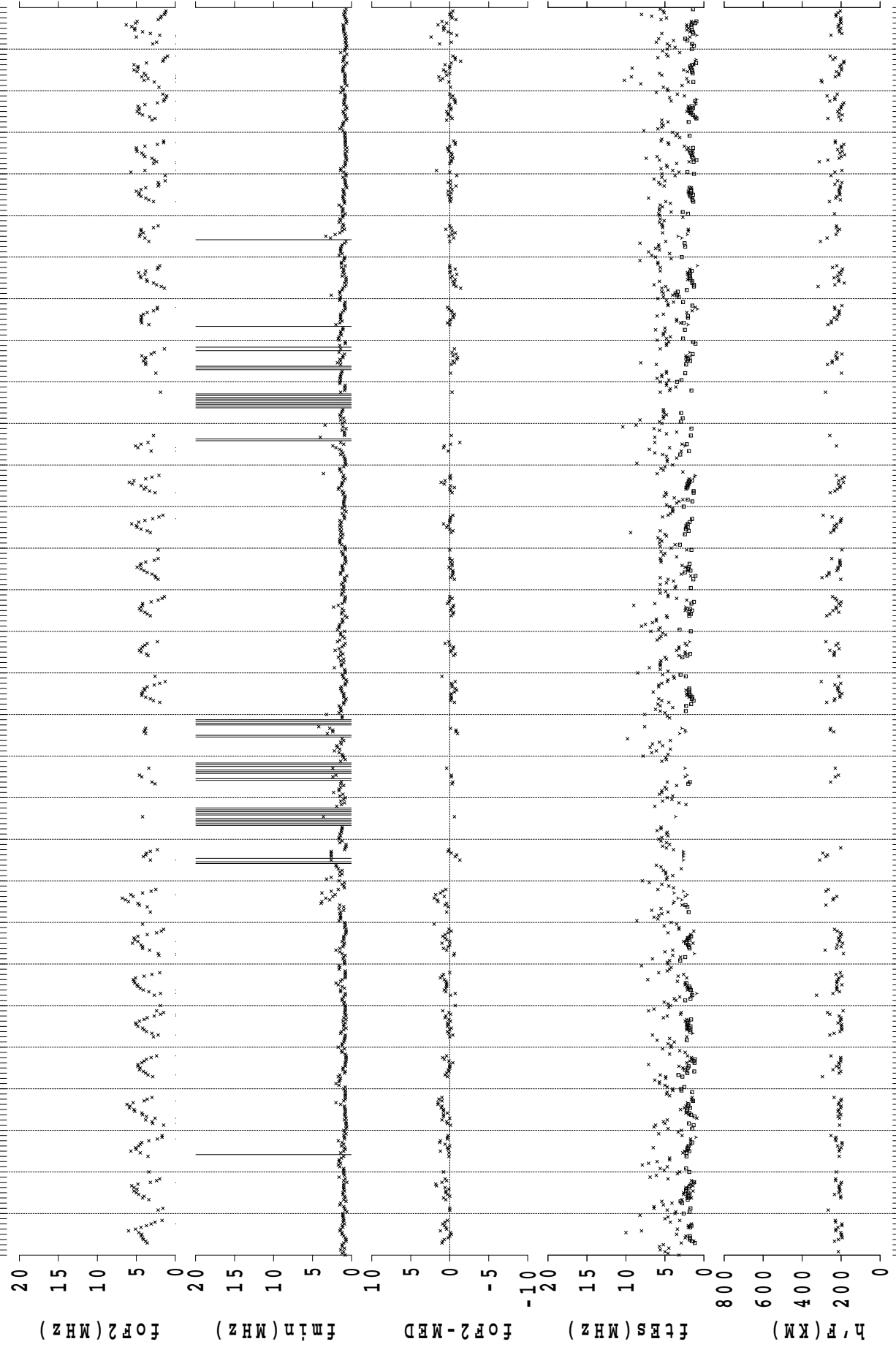
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2018 0301 -> 2018 0331(99) SYOWA-ST.



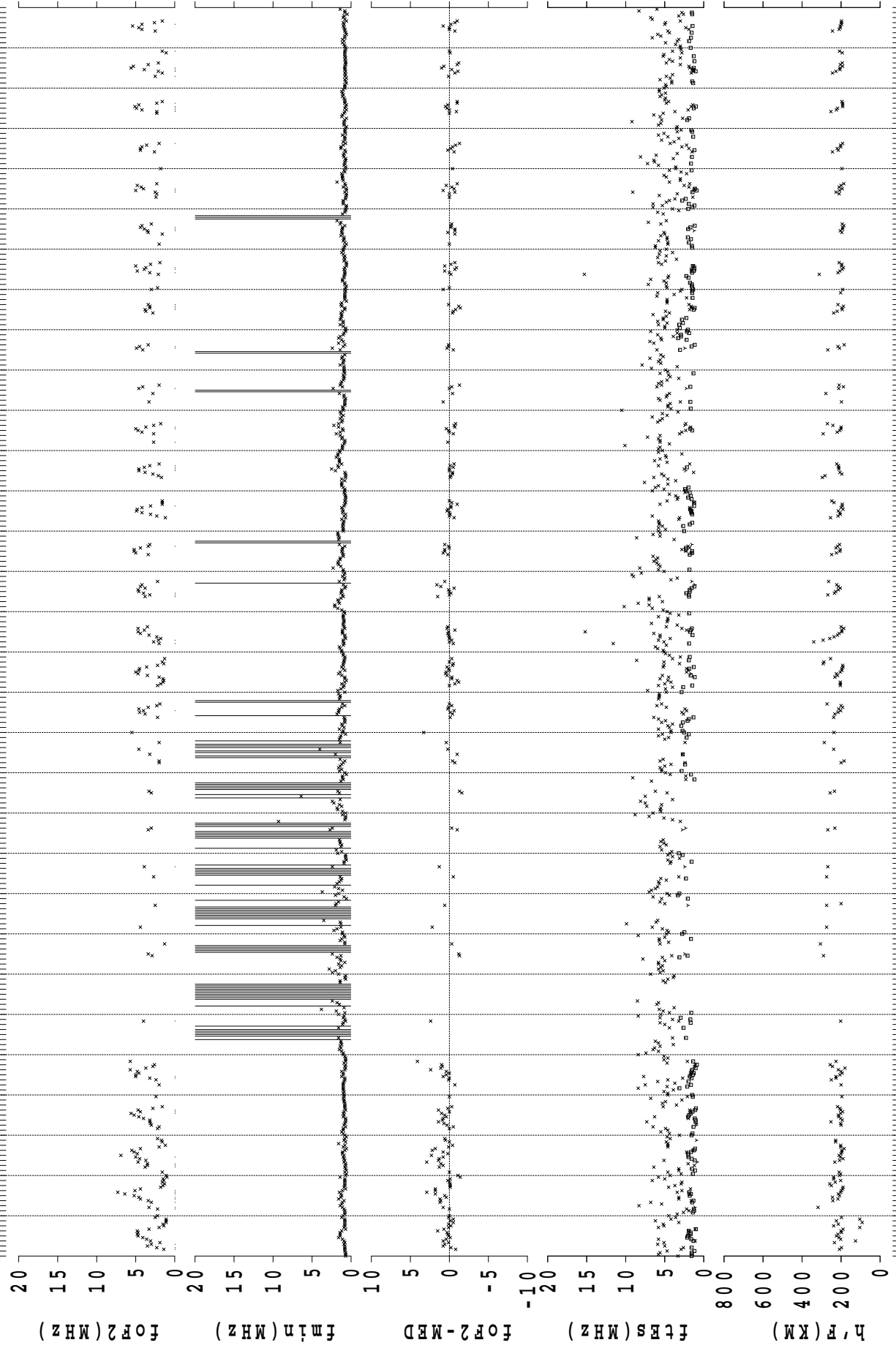
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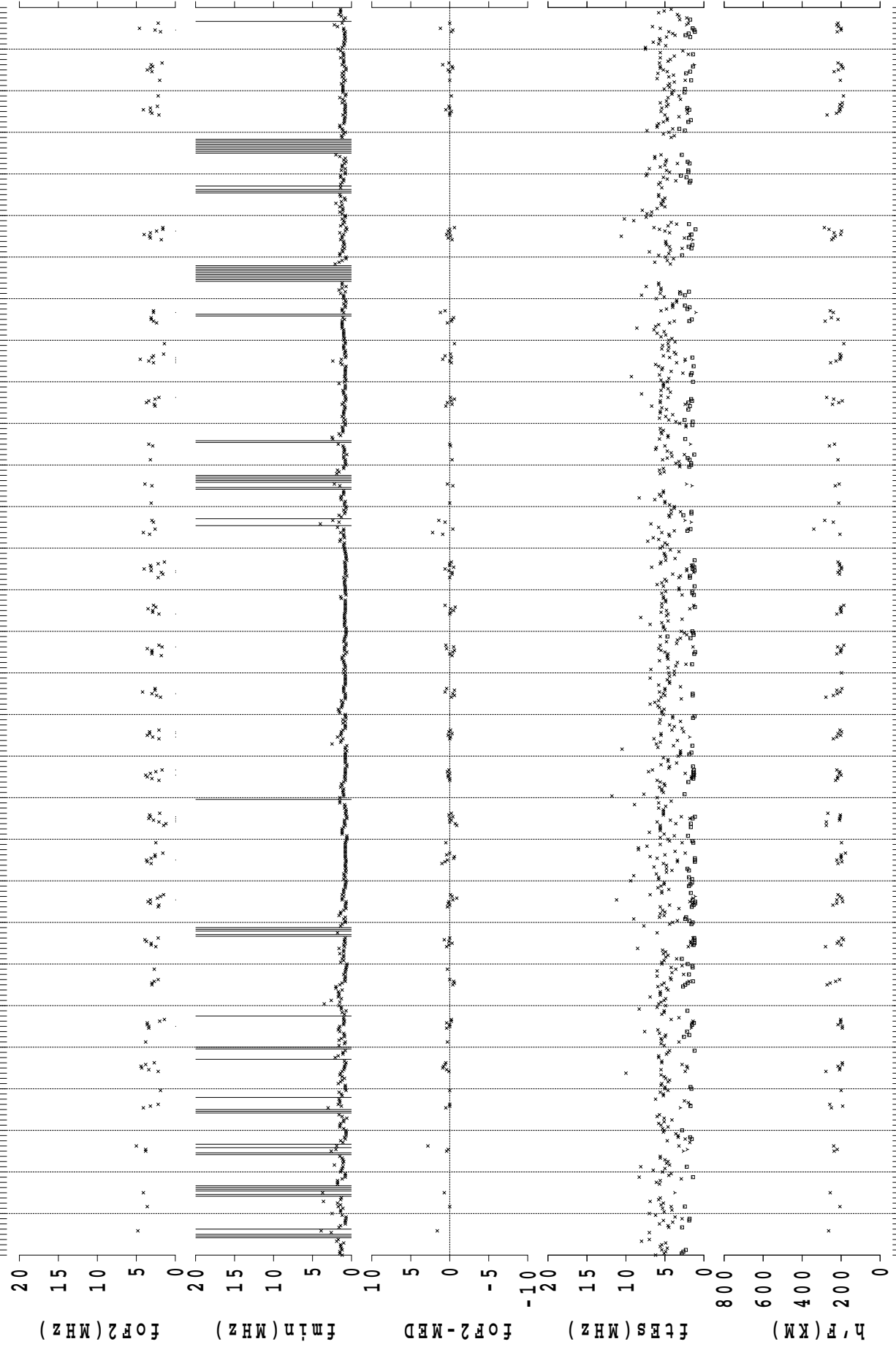
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2018 0501 -> 2018 0531(99) SYOWA-ST.



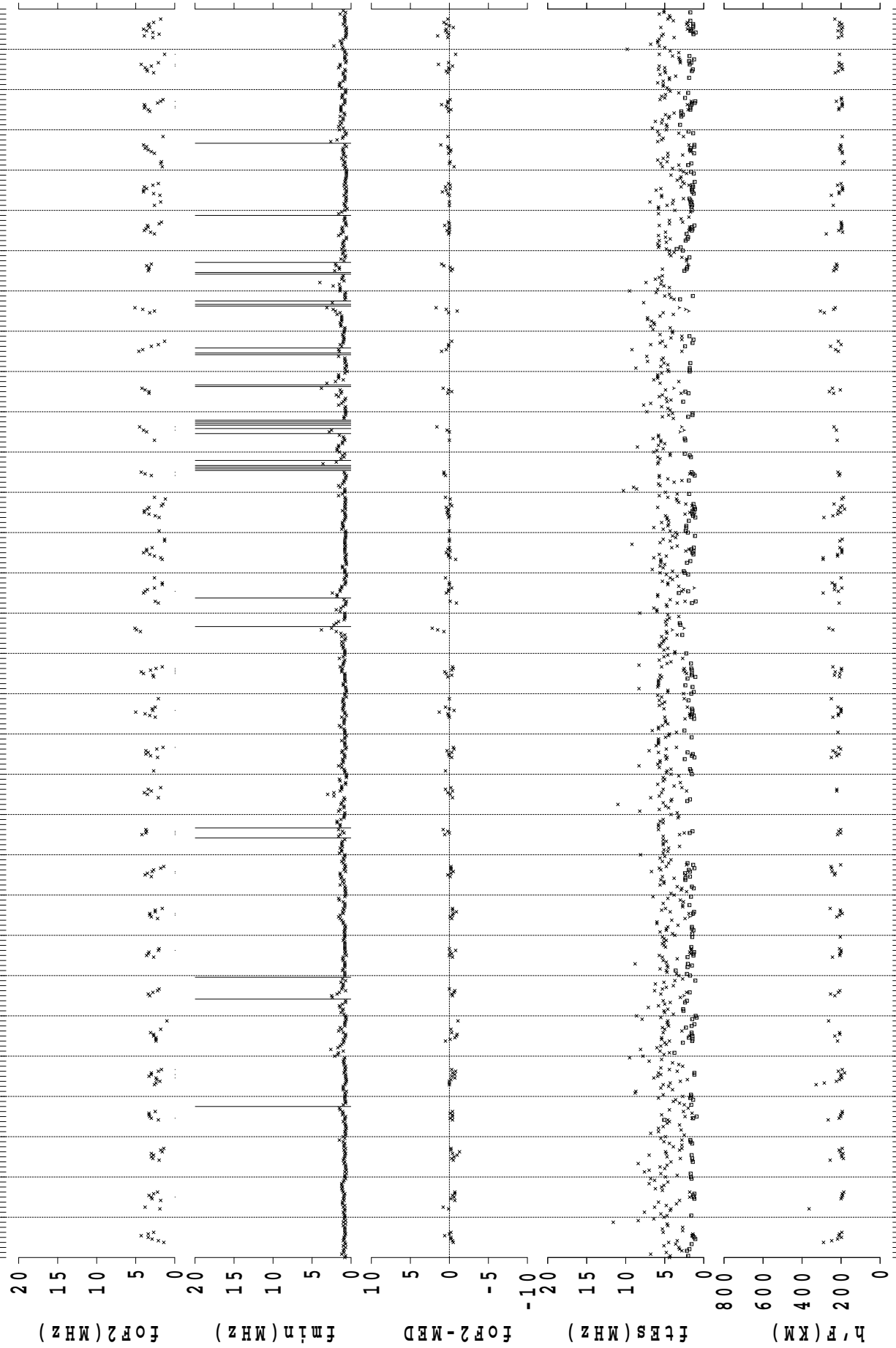
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2018 0601 -> 2018 0630(99) SYOWA-ST.

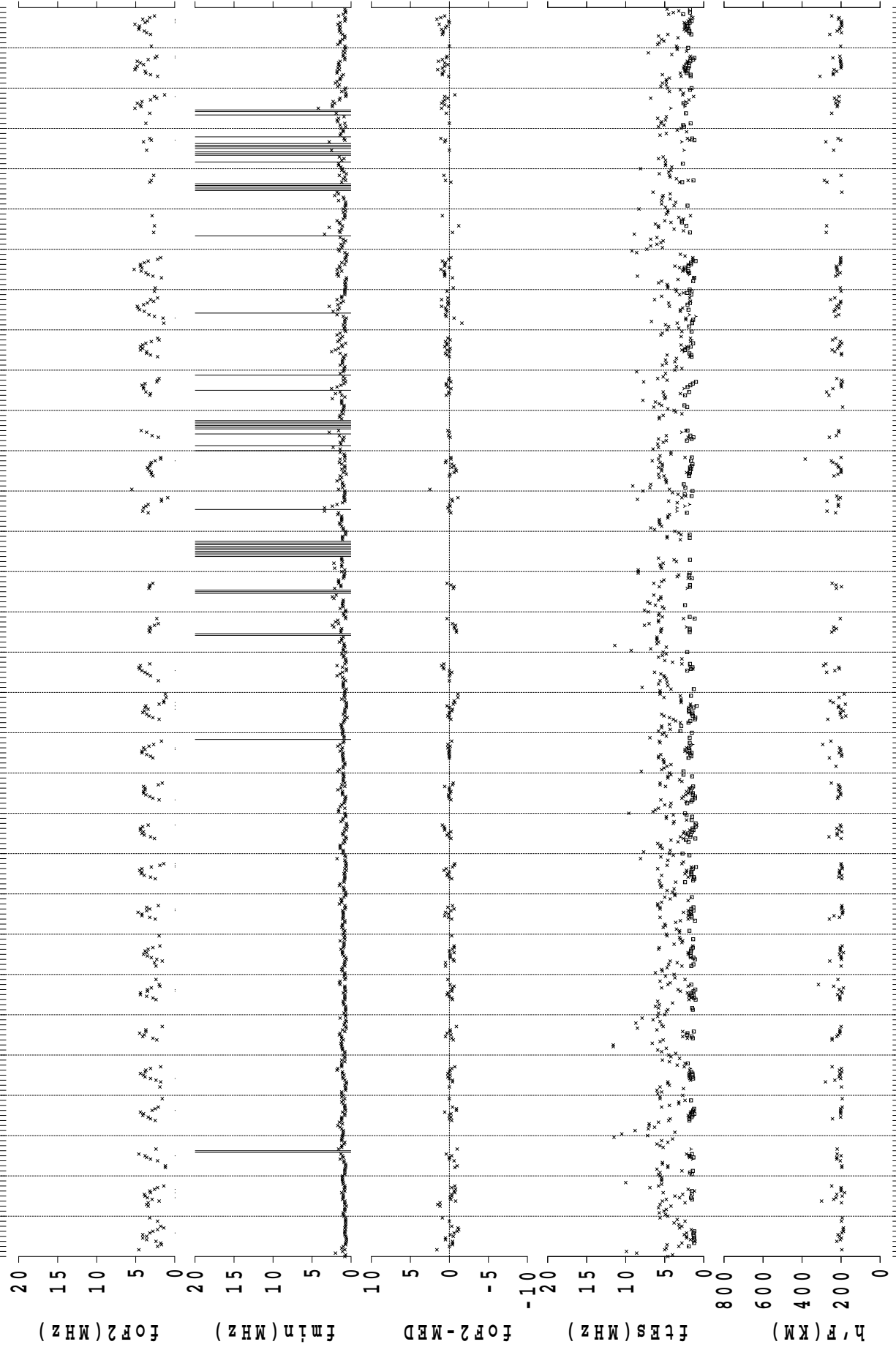


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2018 0701 -> 2018 0731(99) SYOWA-ST.

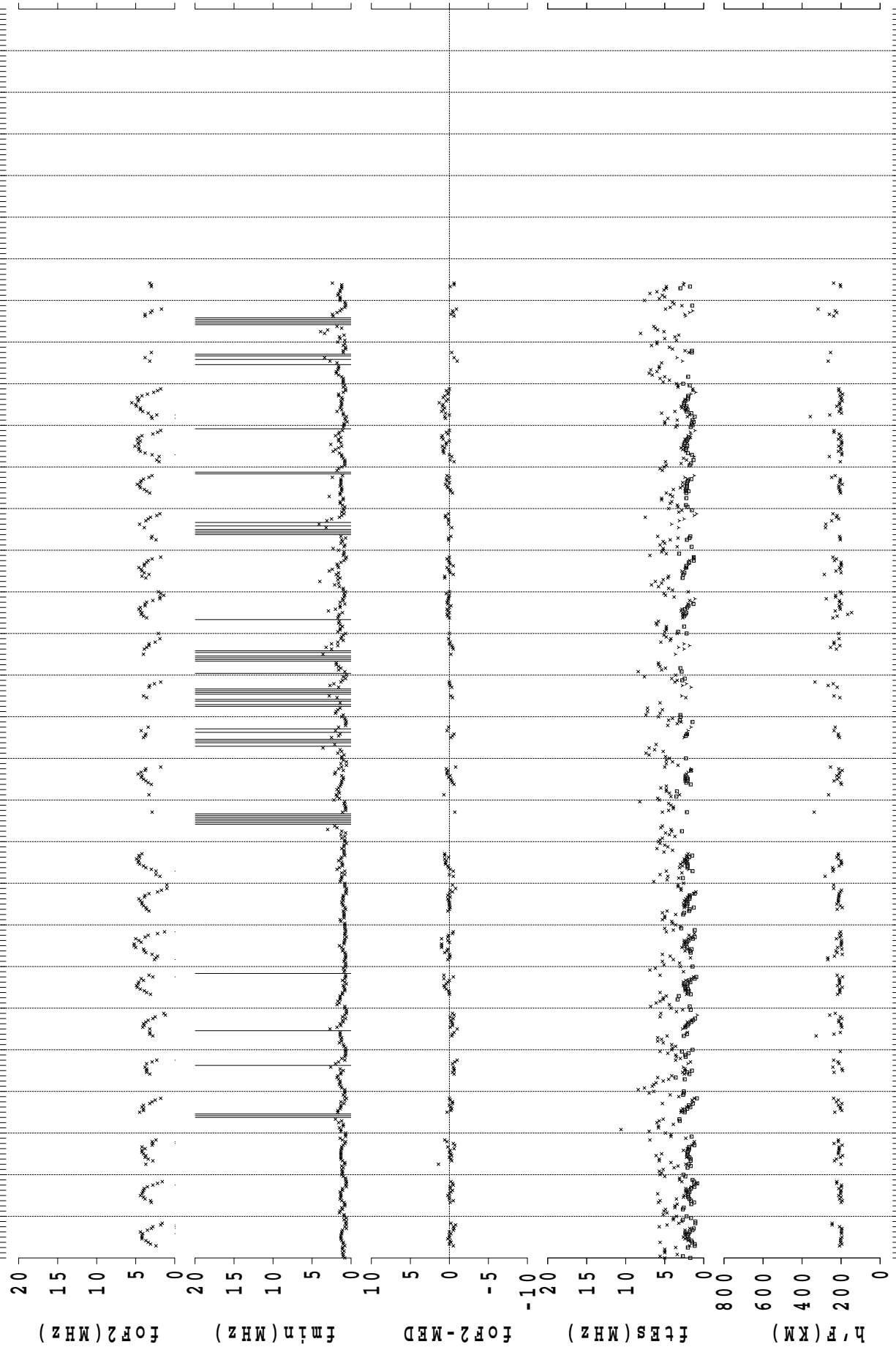


2018 0801 -> 2018 0831(99) SYOWA-ST.



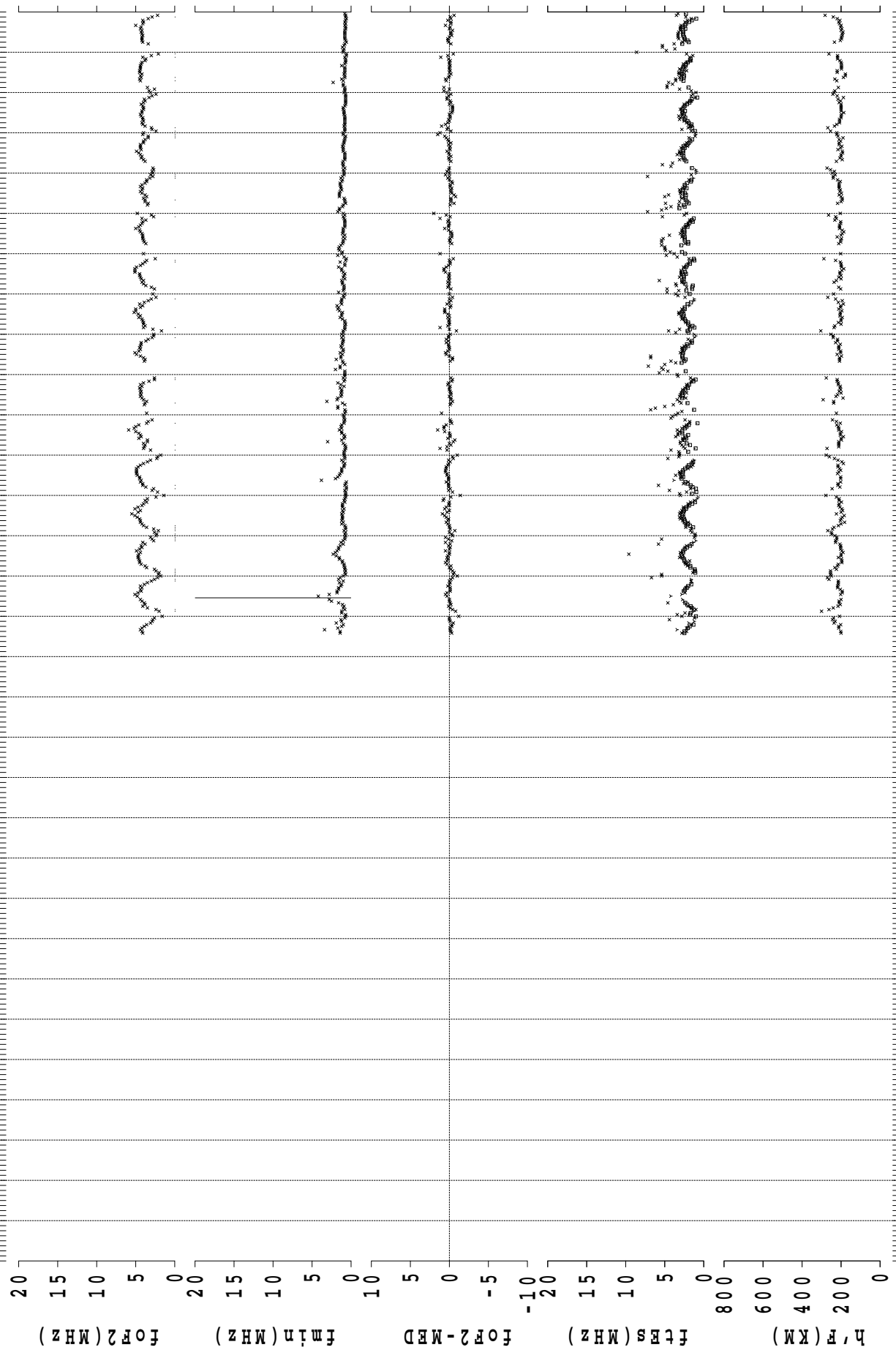
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2018 0901 -> 2018 0930(99) SYOWA-ST.



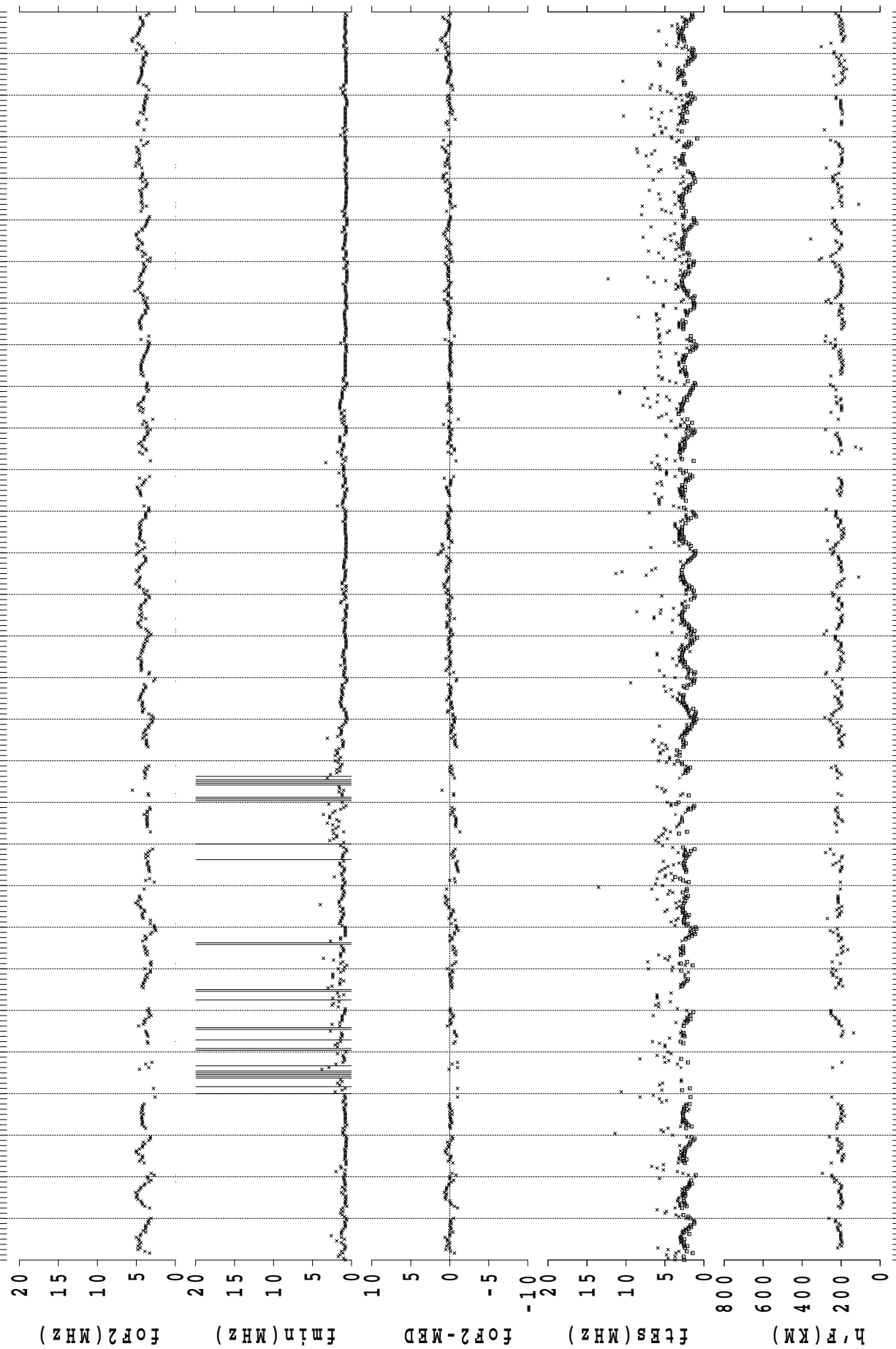
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2018 1001 -> 2018 1031(99) SYOWA-ST.



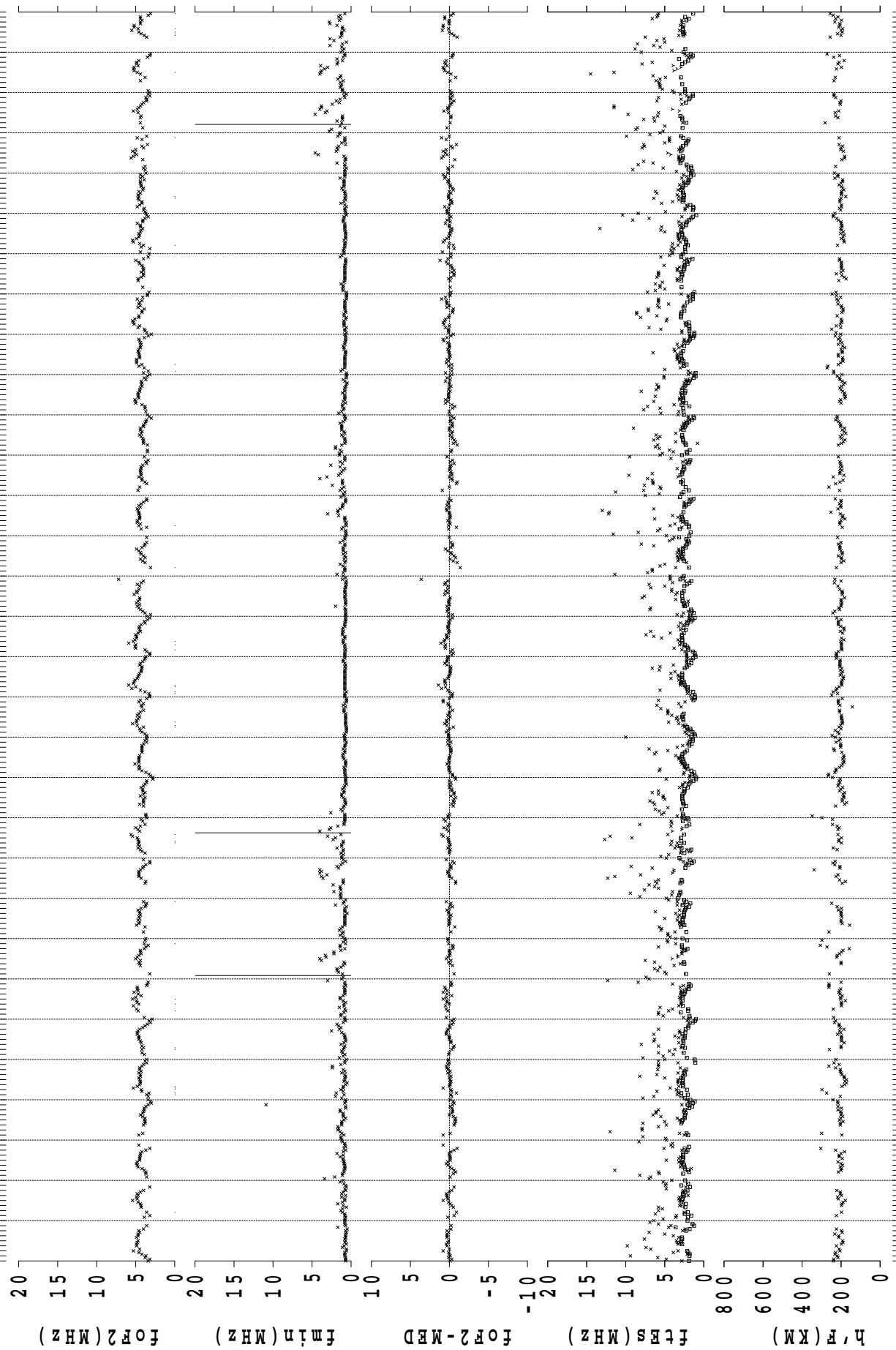
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2018 1101 -> 2018 1130(99) SYOWA-ST.



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2018 1201 -> 2018 1231(99) SYOWA-ST.

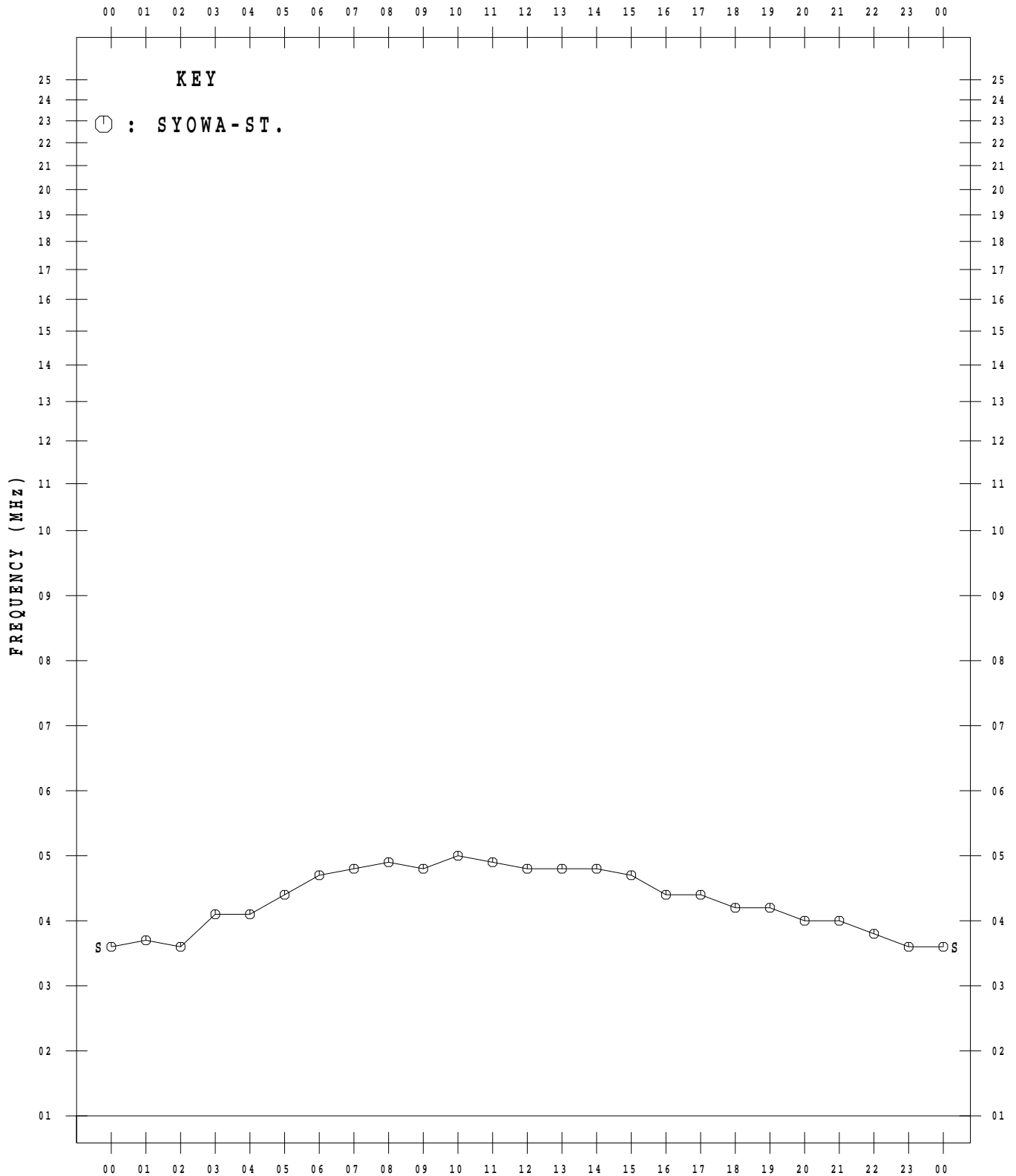


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 DAY/45 EMT

MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

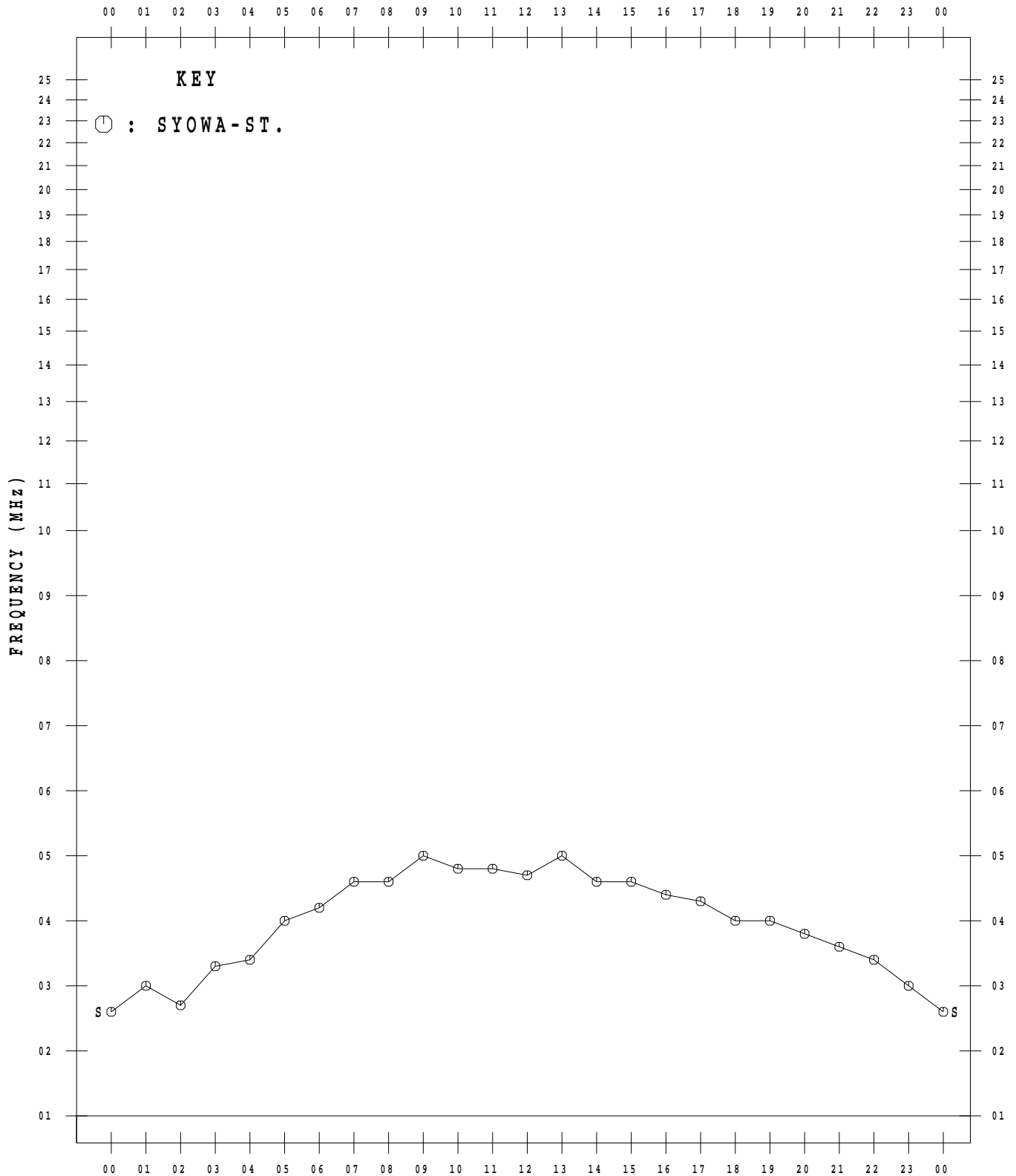
JAN. 2018



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

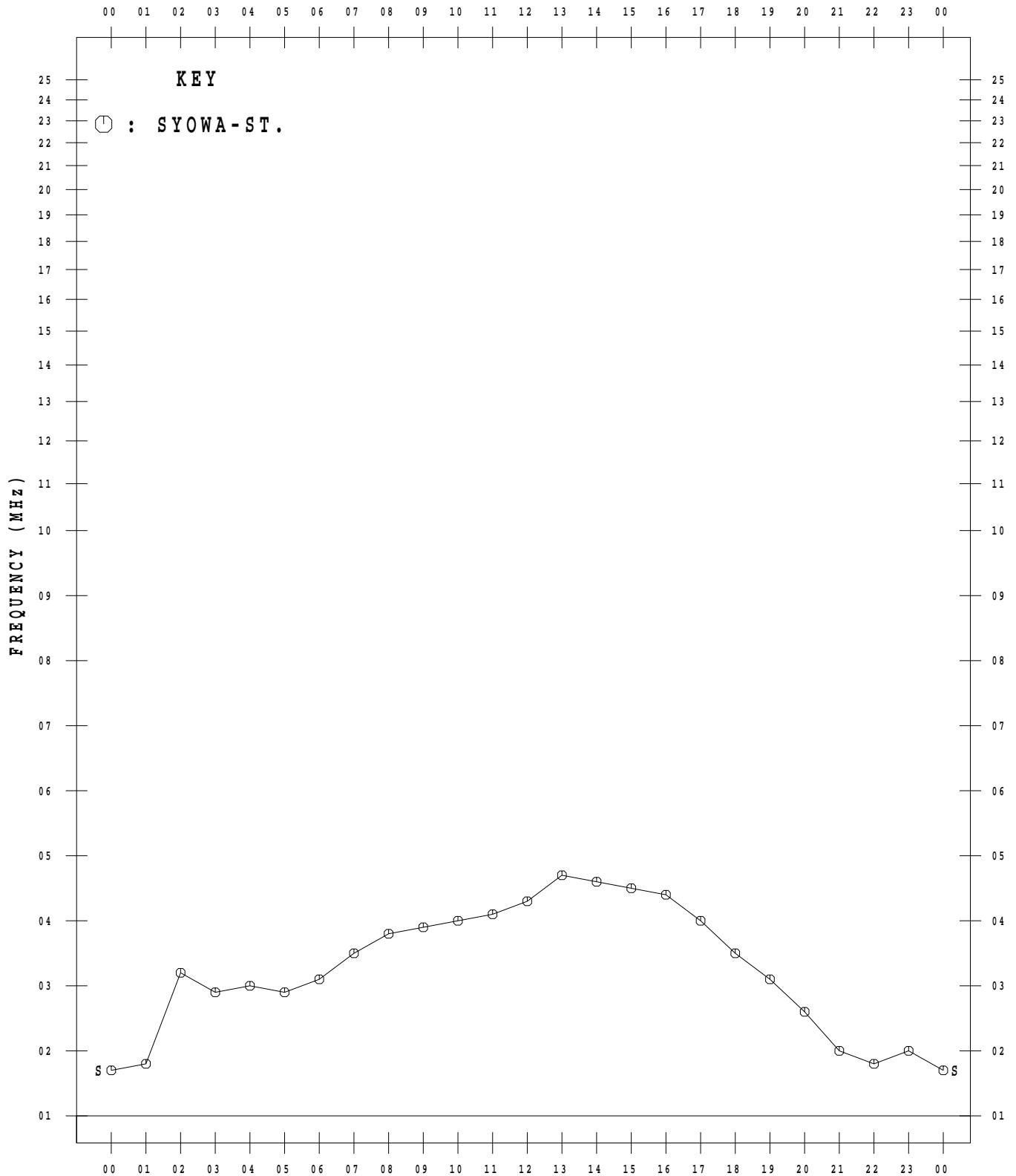
FEB. 2018



MONTHLY MEDIAN VALUES OF foF2

45°E MEAN TIME

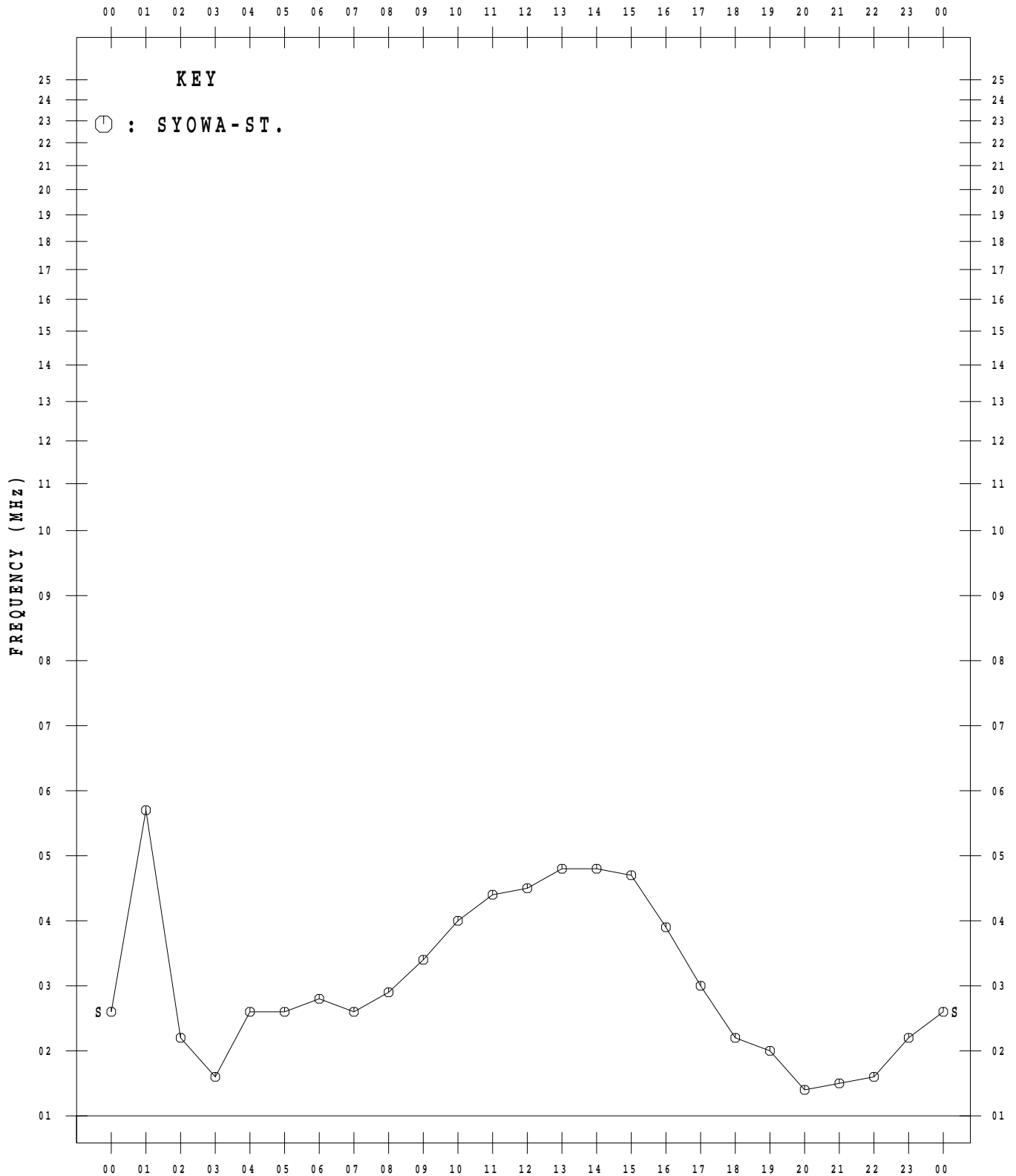
MAR. 2018



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

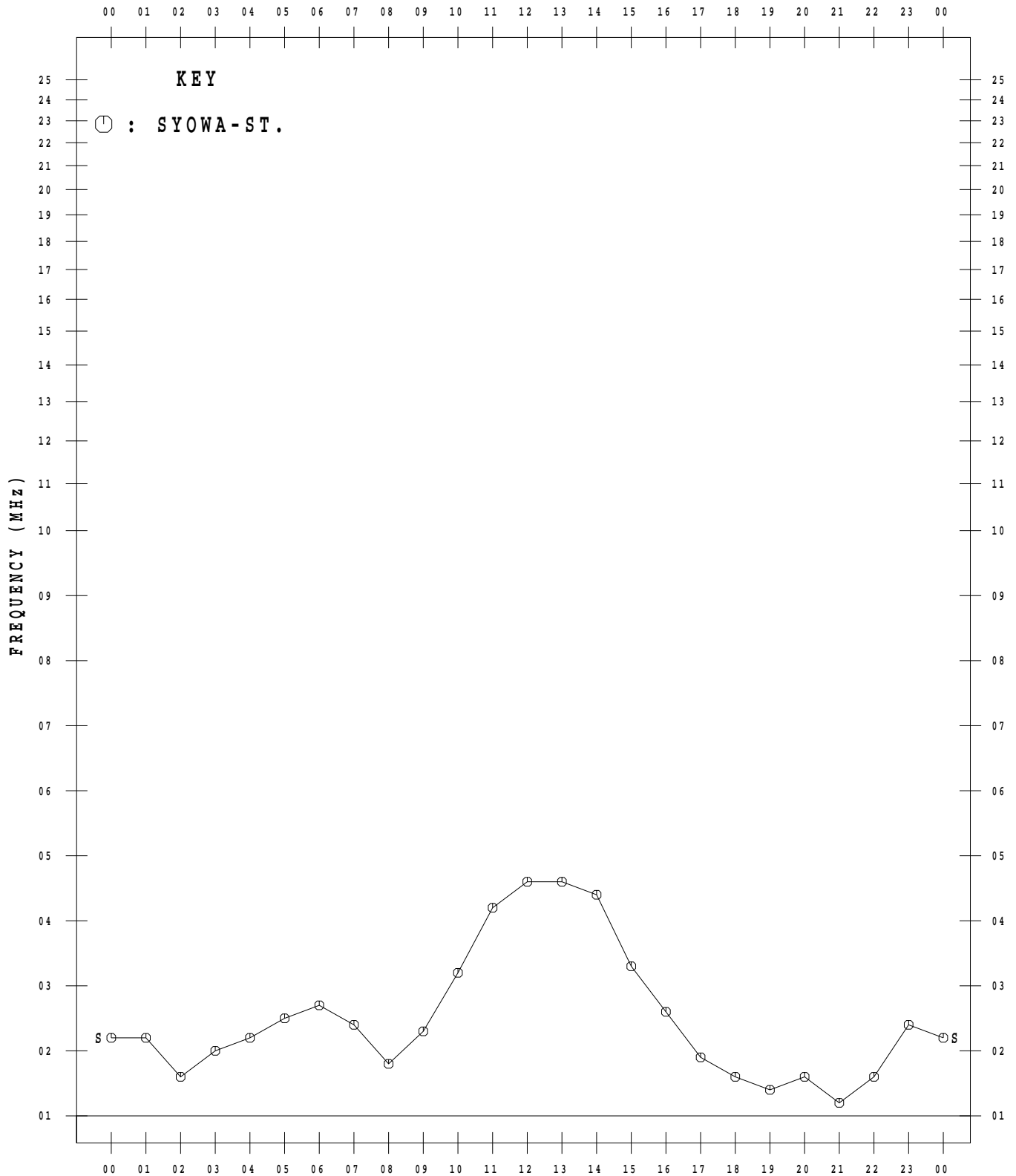
APR. 2018



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

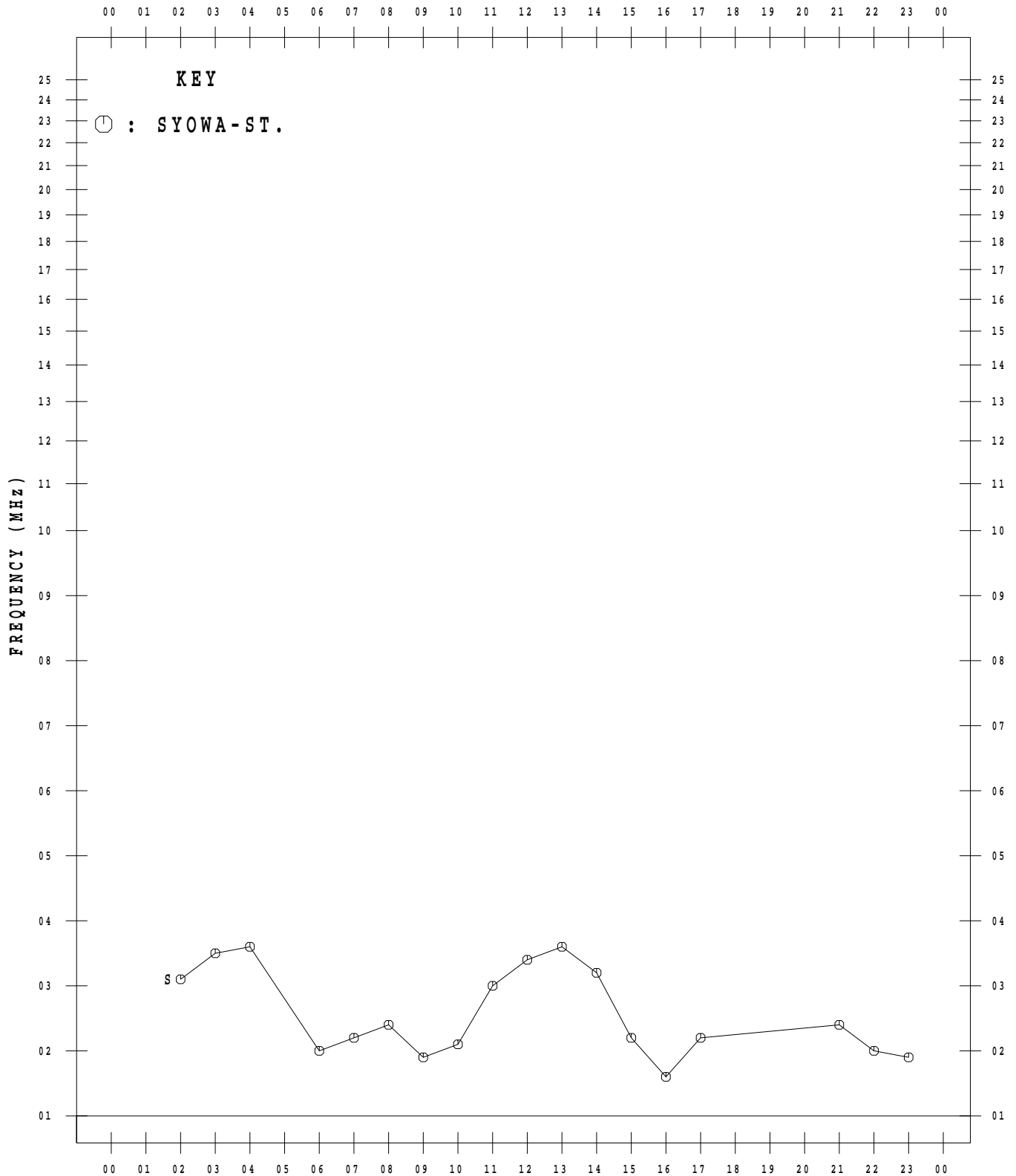
MAY 2018



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

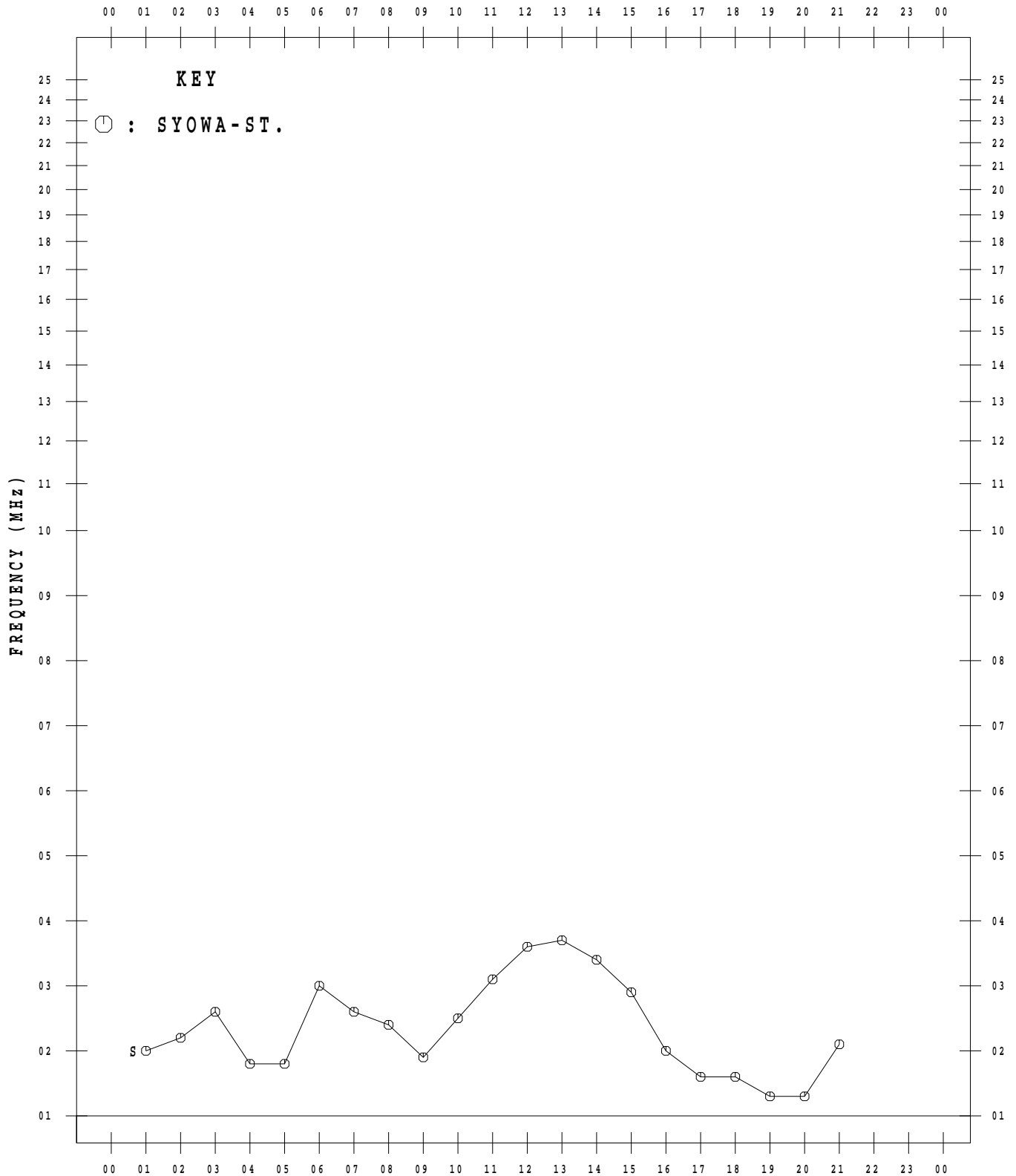
JUN. 2018



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

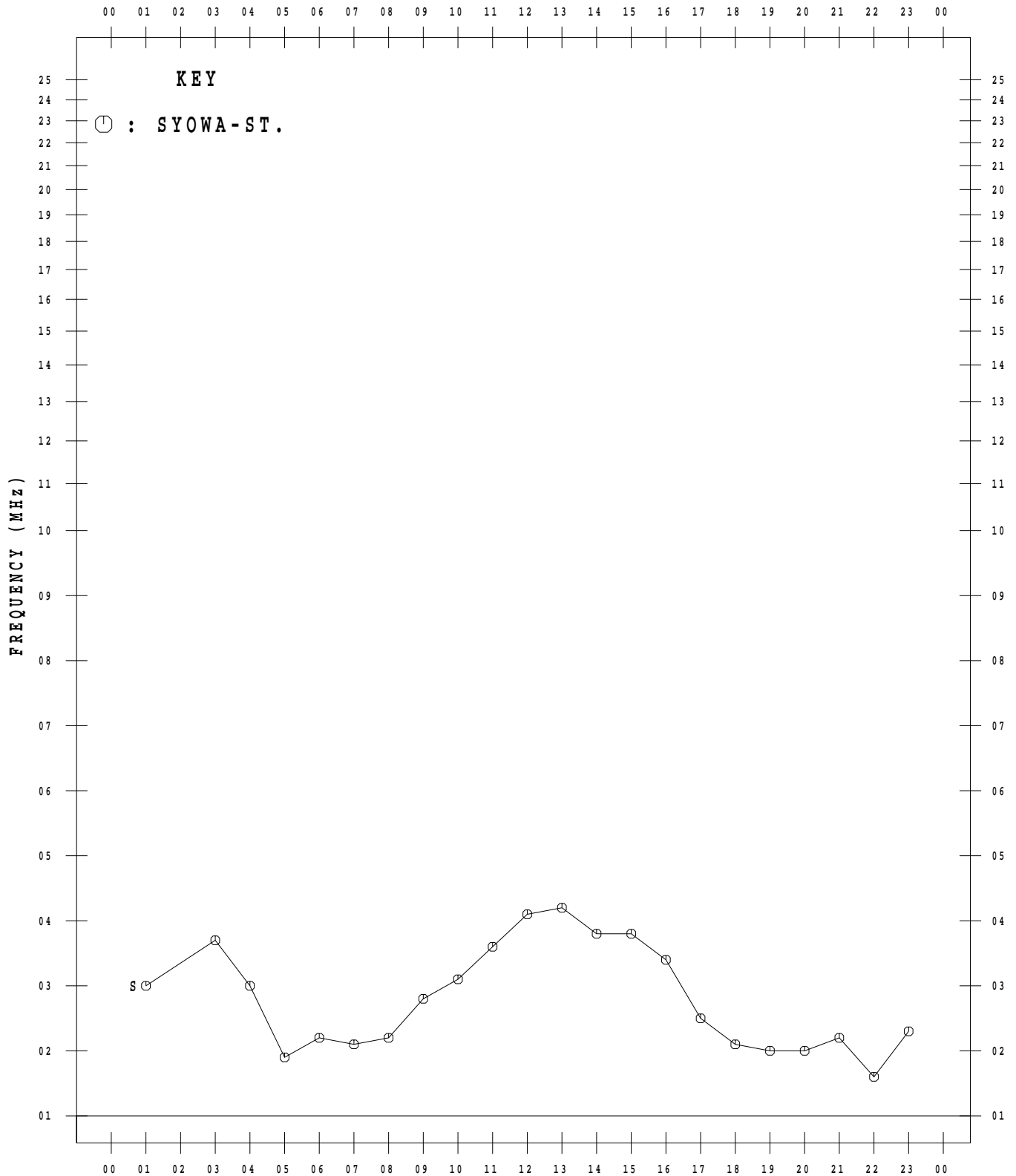
JUL. 2018



MONTHLY MEDIAN VALUES OF foF2

45°E MEAN TIME

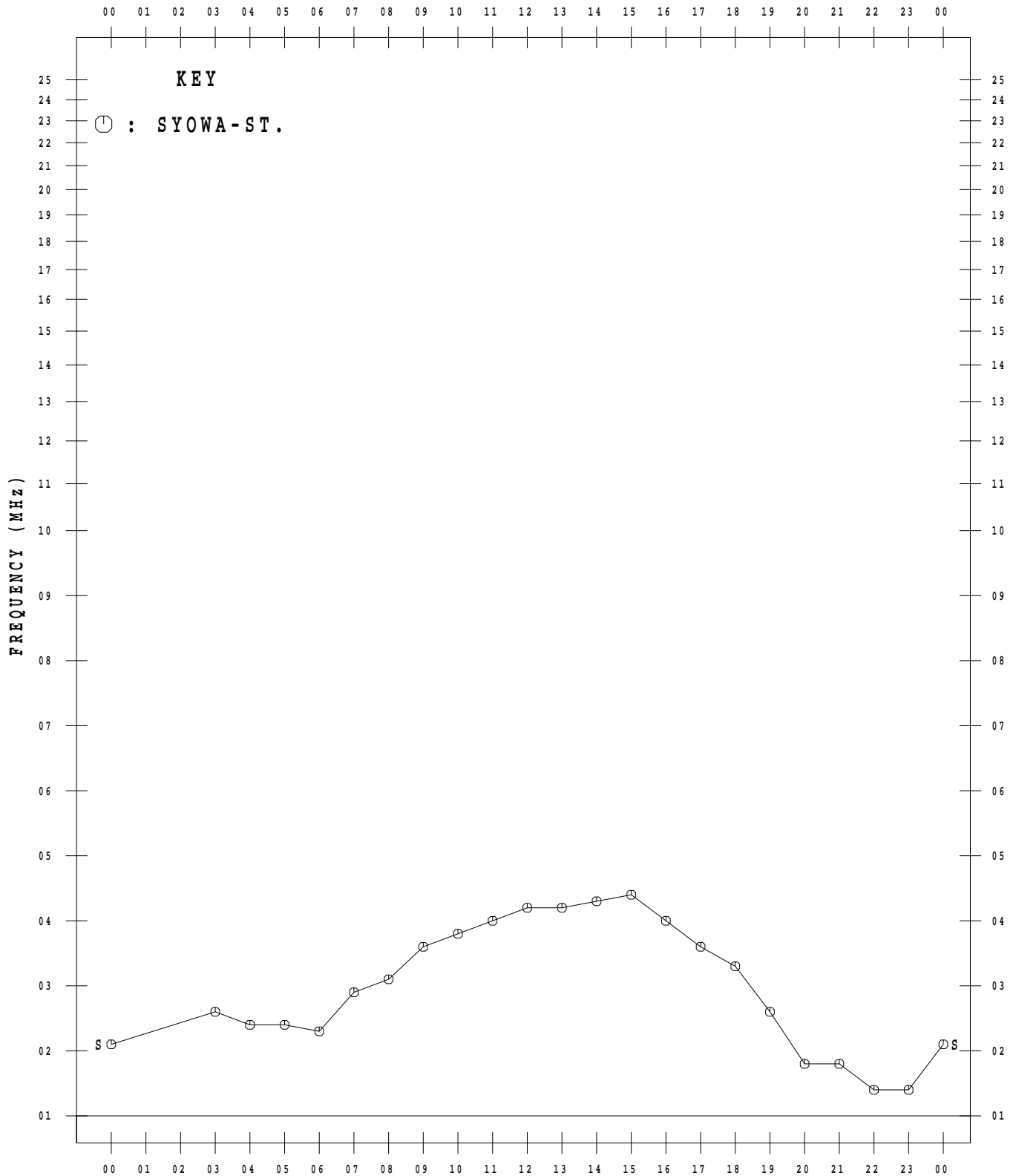
AUG. 2018



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

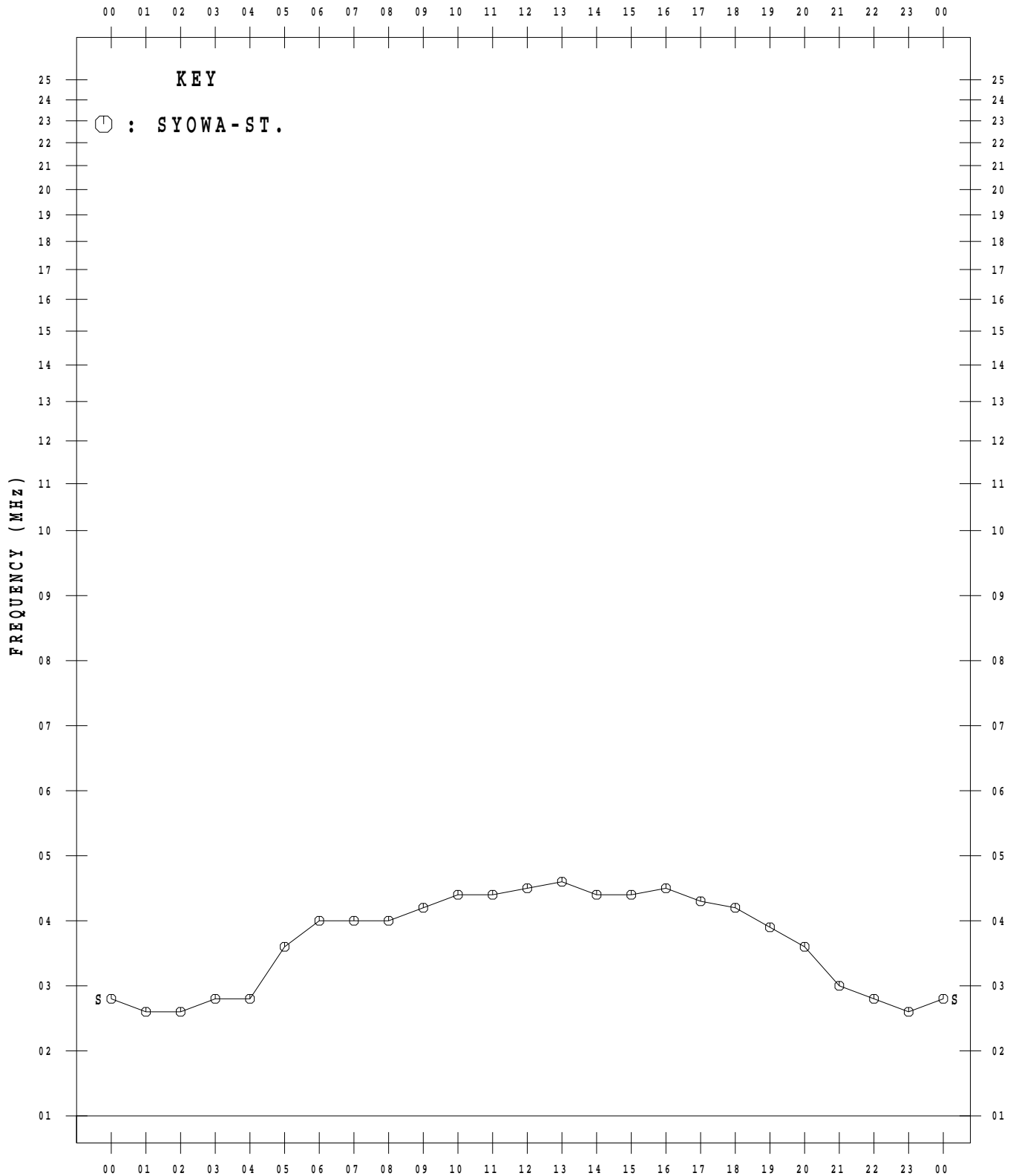
SEP. 2018



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

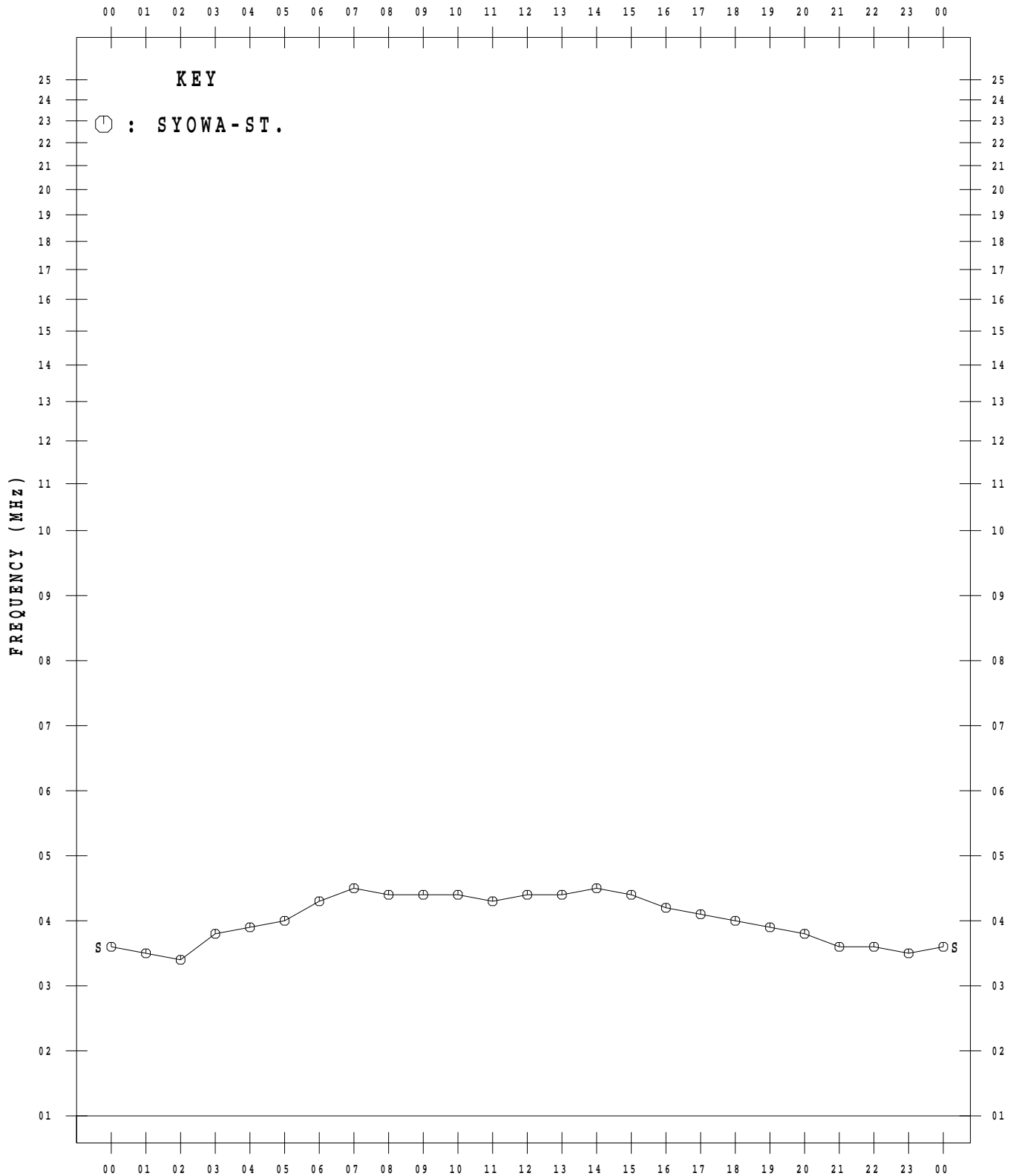
OCT. 2018



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

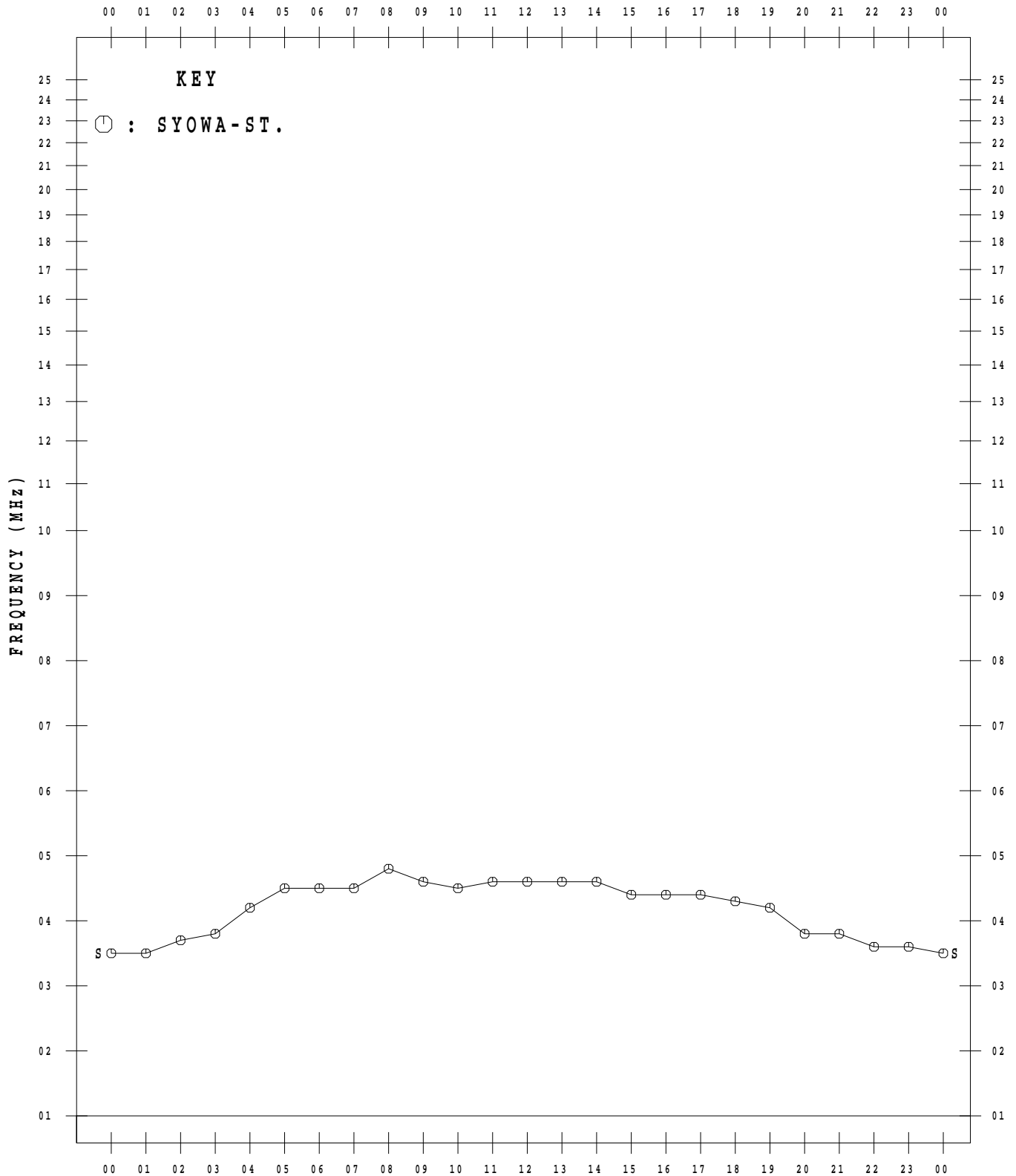
NOV. 2018



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

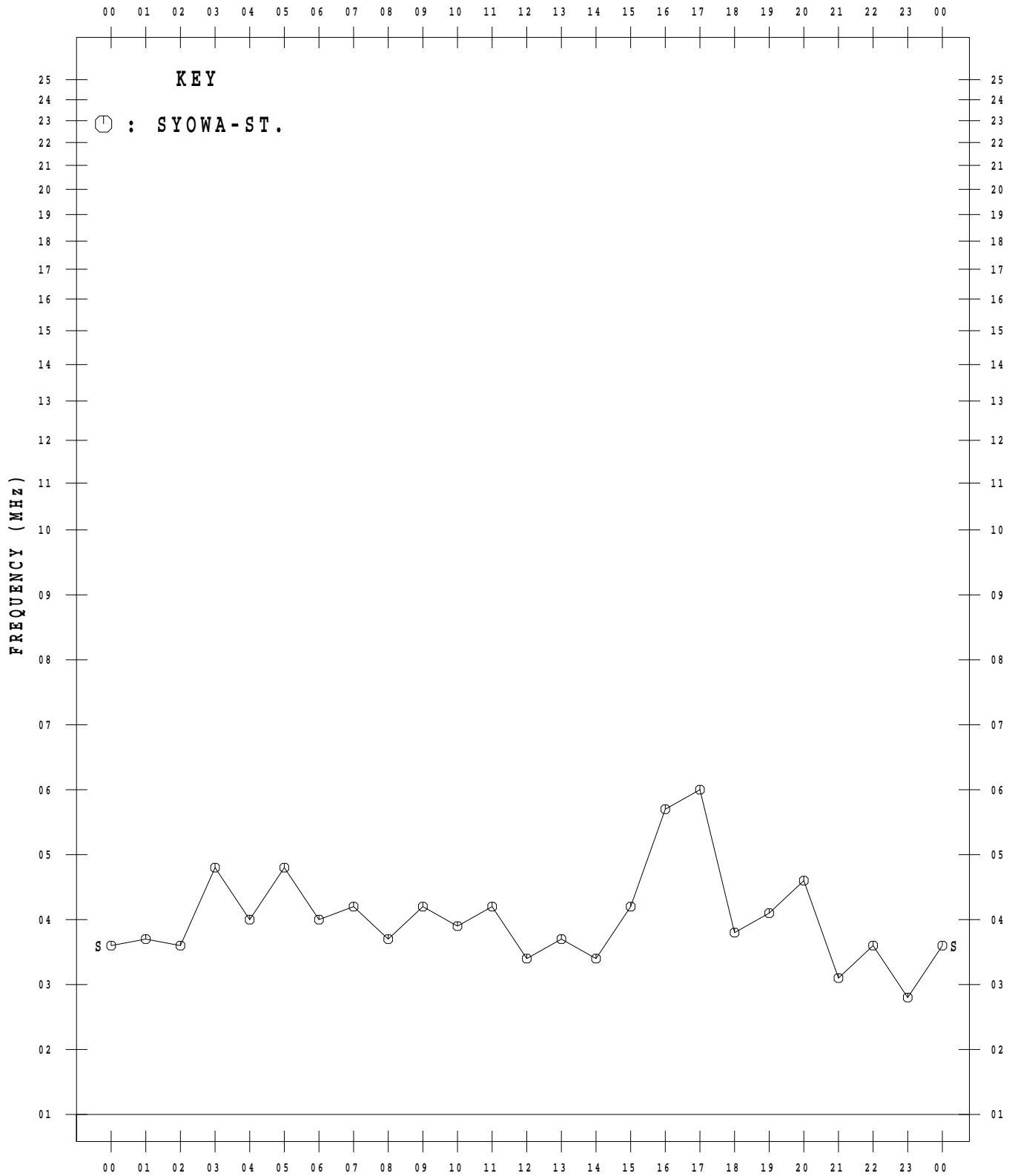
DEC. 2018



MONTHLY MEDIAN VALUES OF f_{TE}s

45°E MEAN TIME

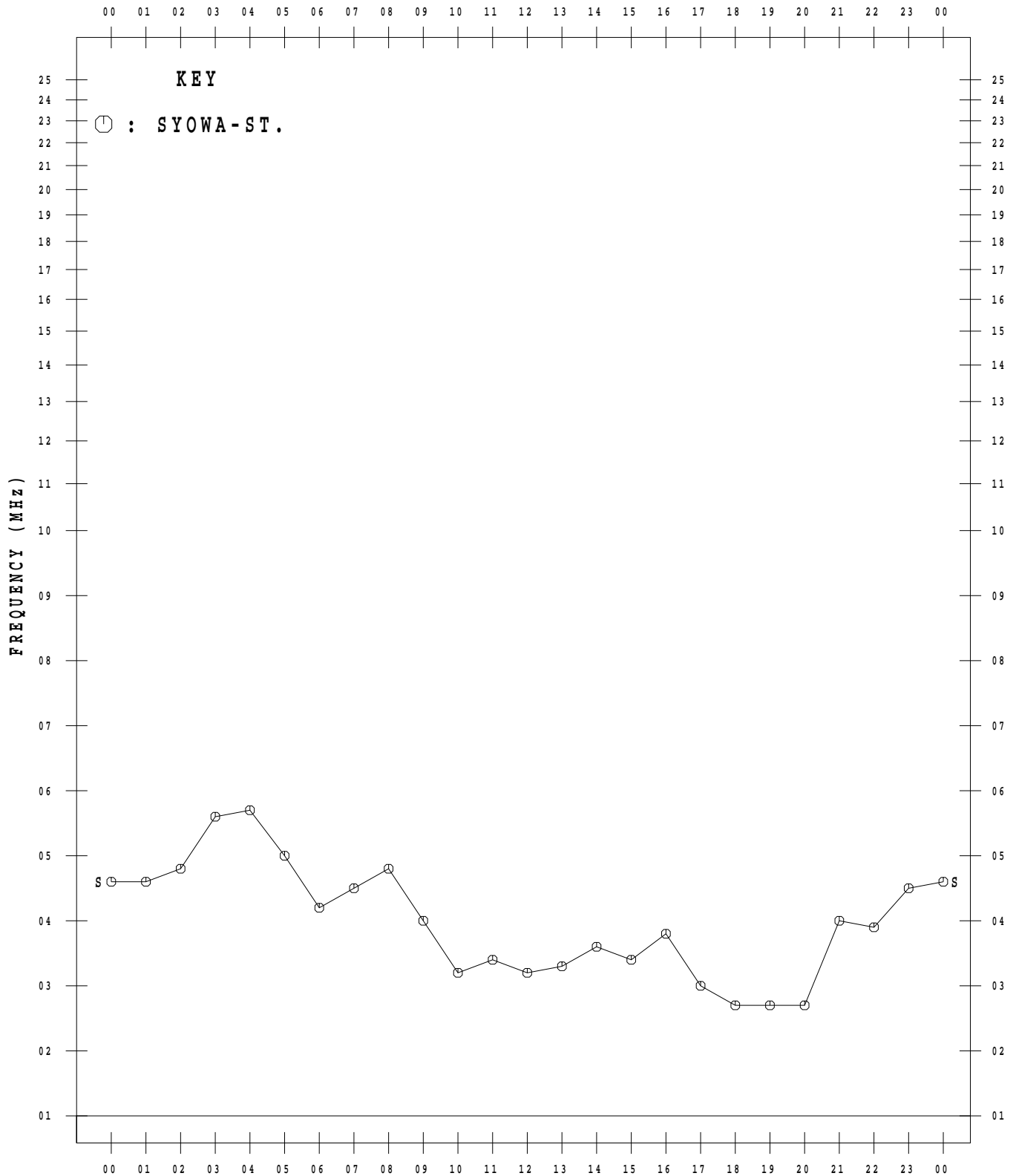
JAN. 2018



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

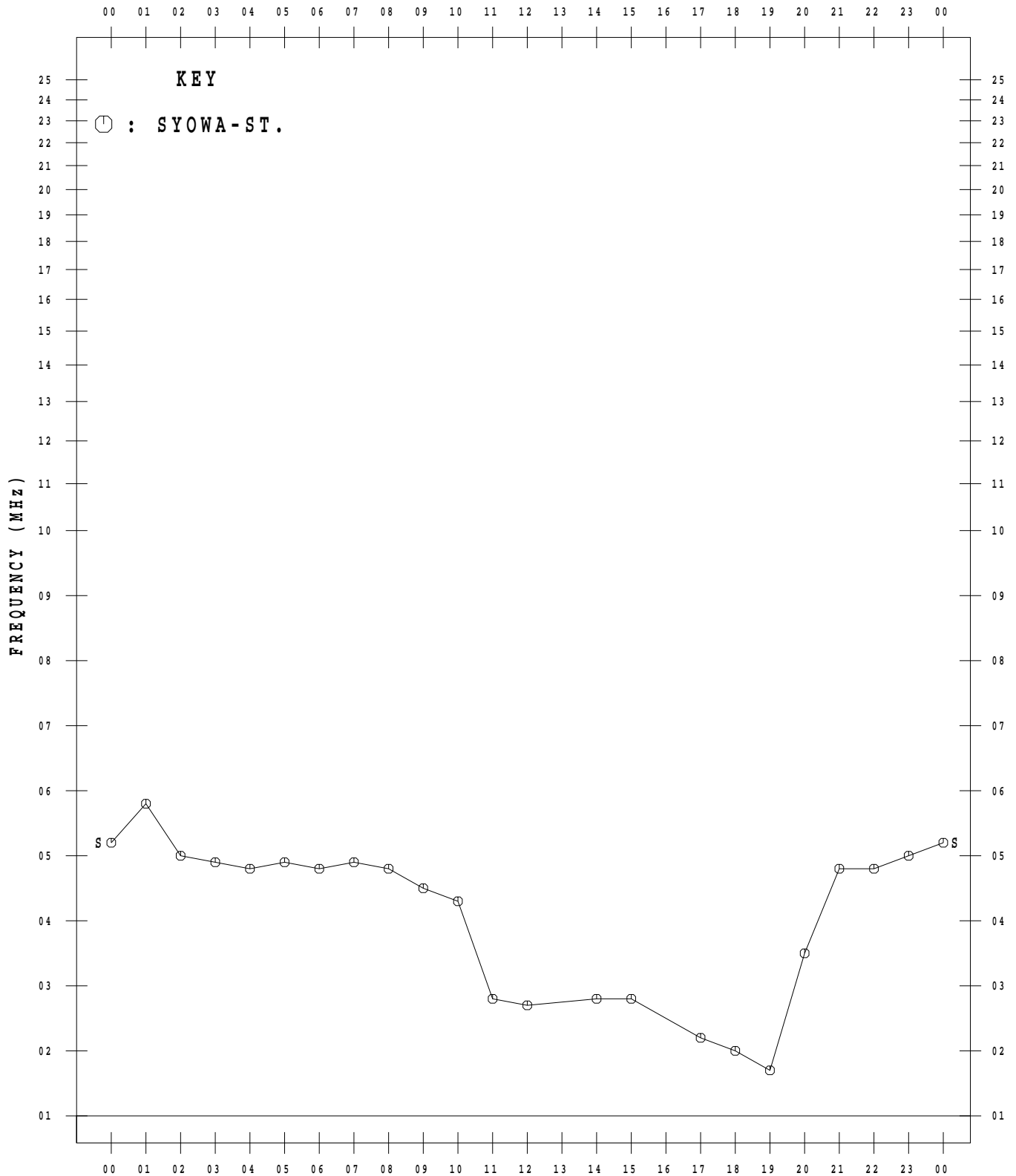
FEB. 2018



MONTHLY MEDIAN VALUES OF f_{TE}s

45°E MEAN TIME

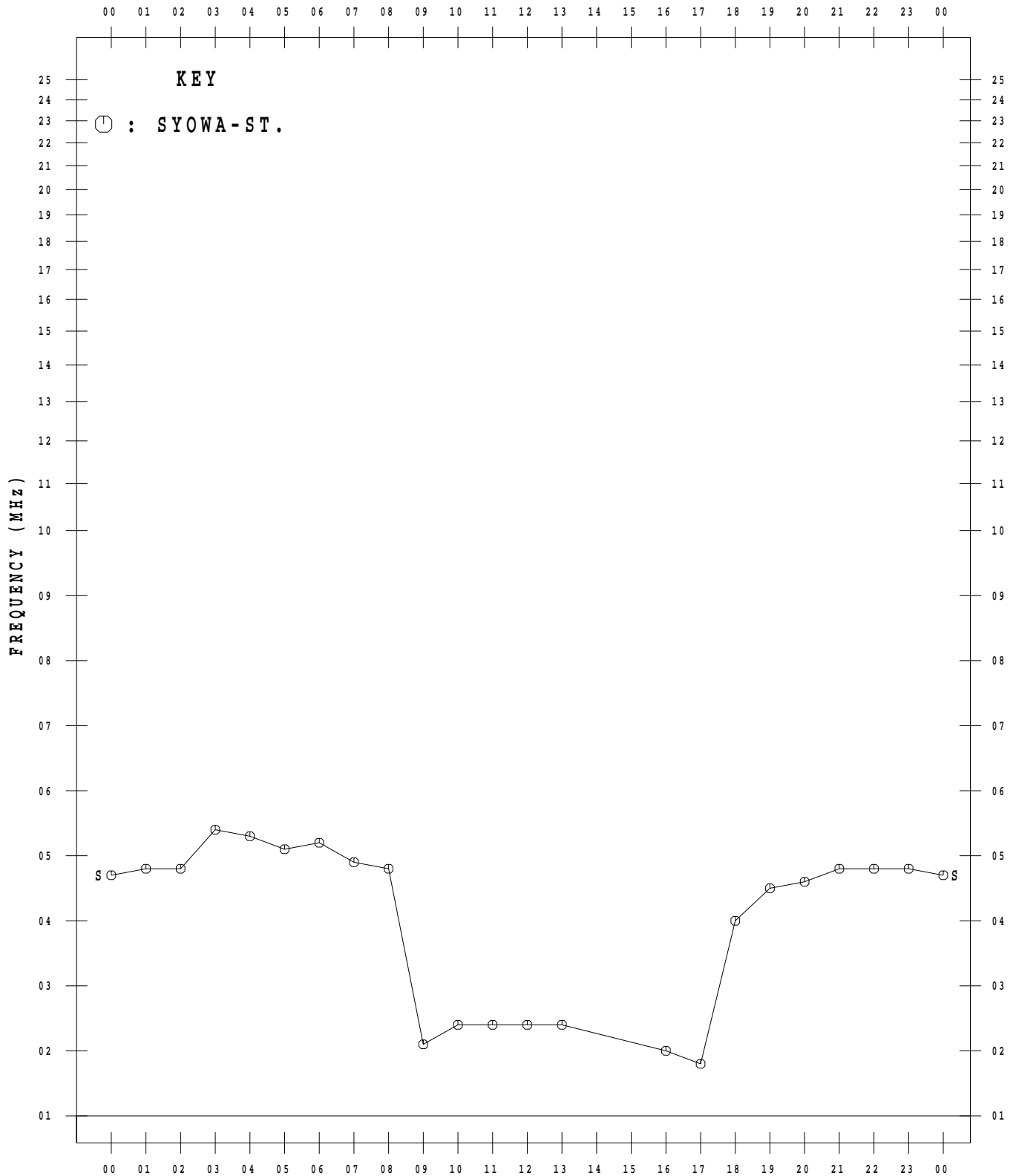
MAR. 2018



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

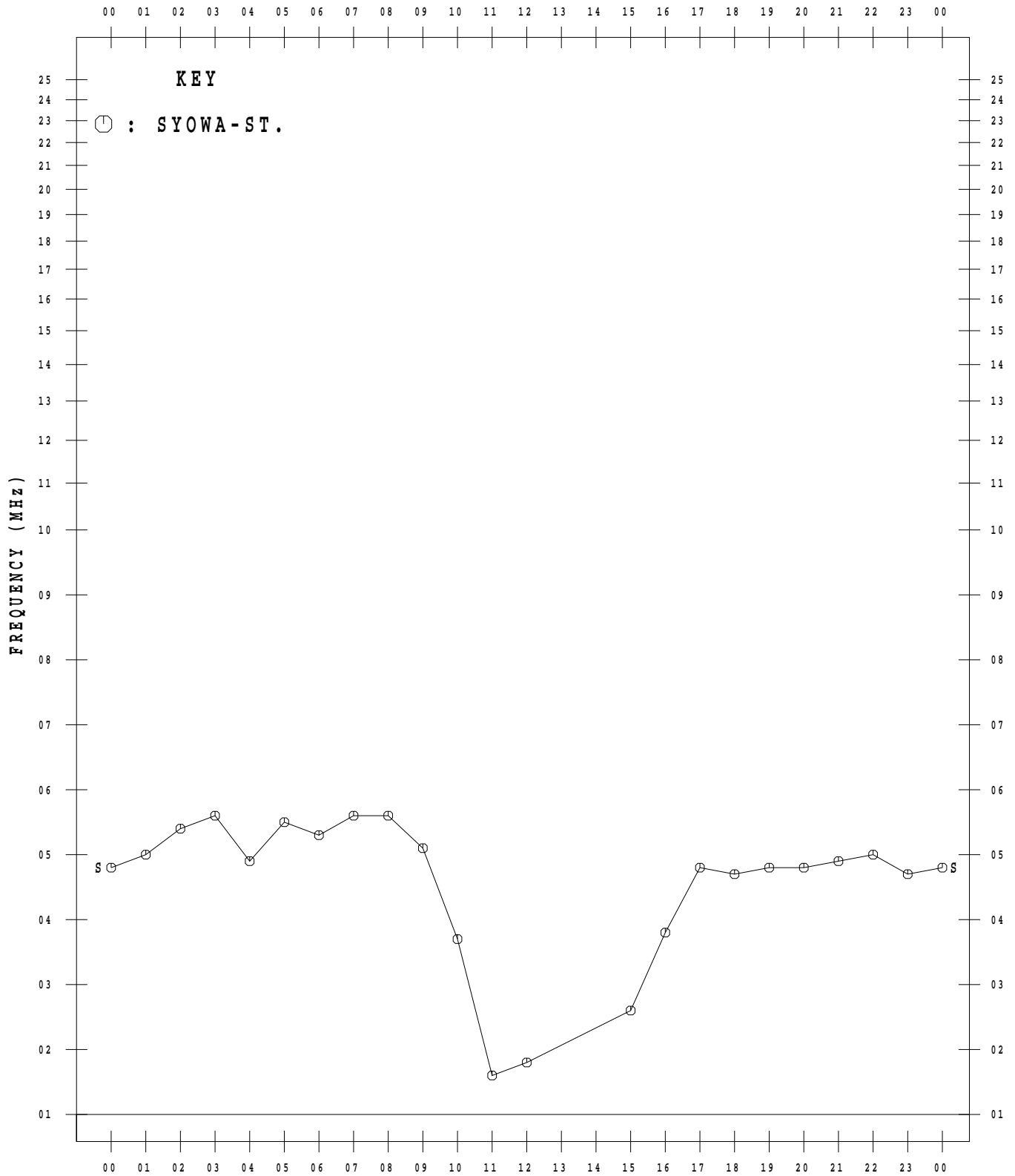
APR. 2018



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

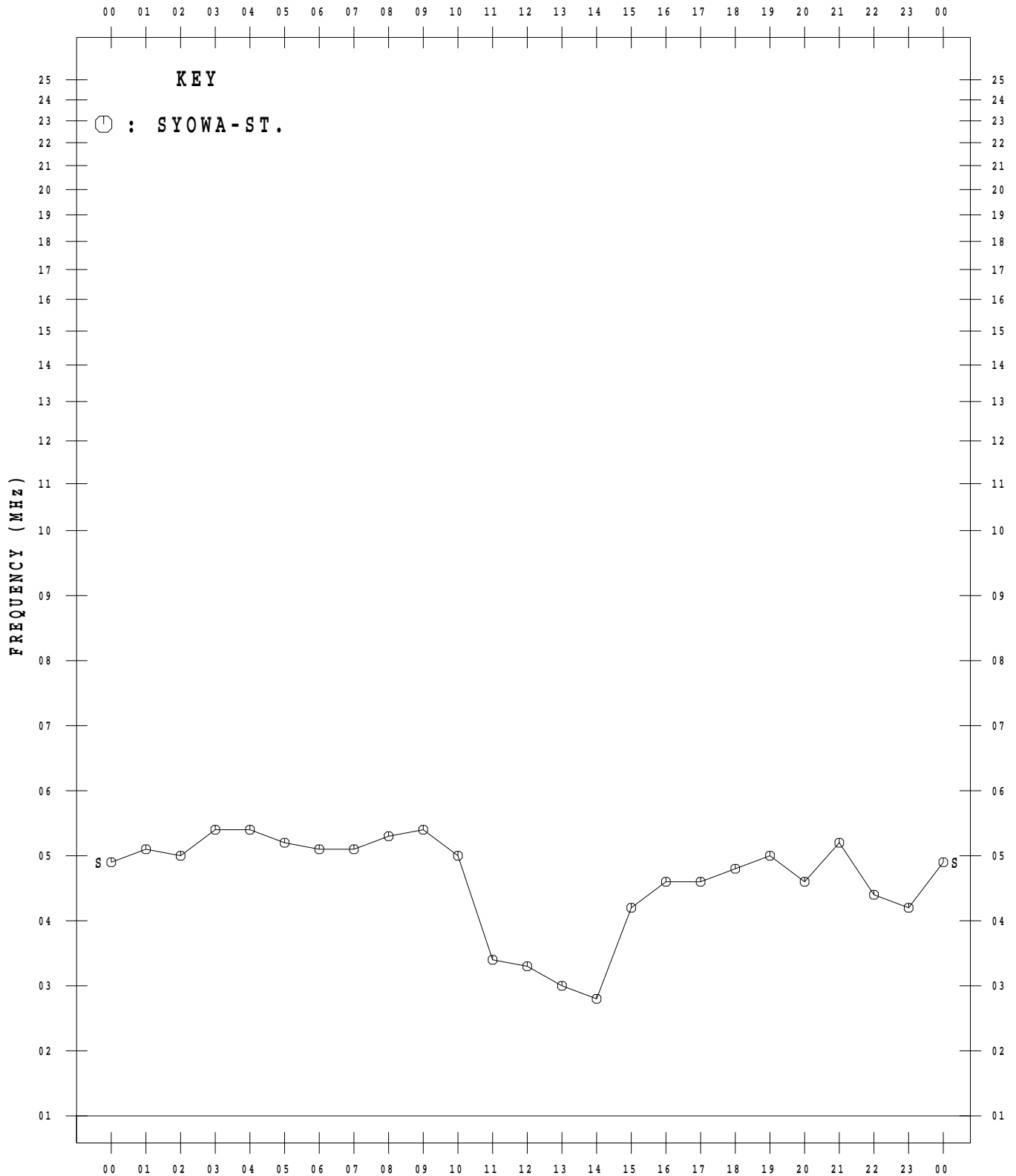
MAY 2018



MONTHLY MEDIAN VALUES OF f_{TE}s

45°E MEAN TIME

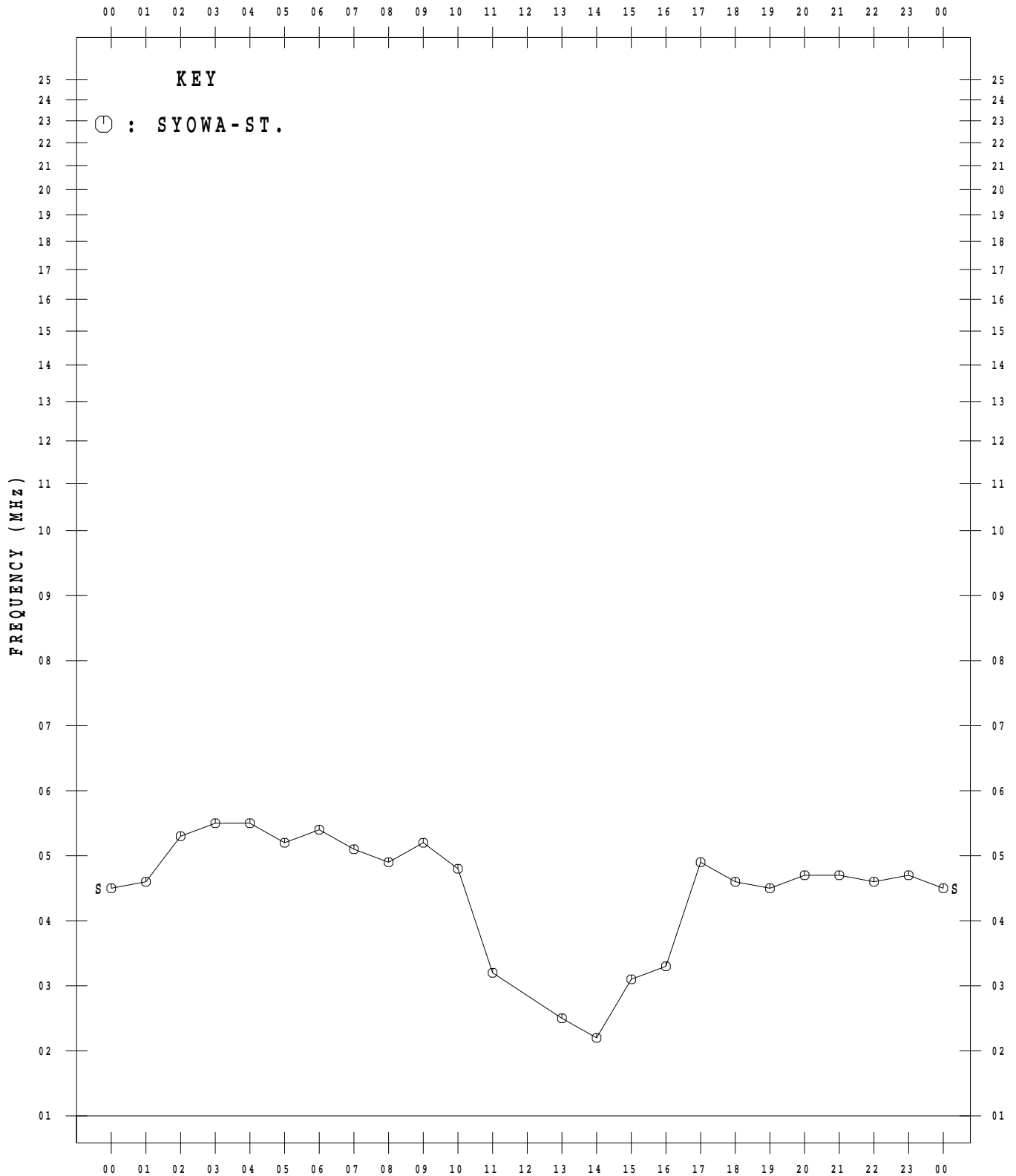
JUN. 2018



MONTHLY MEDIAN VALUES OF f_{TE}s

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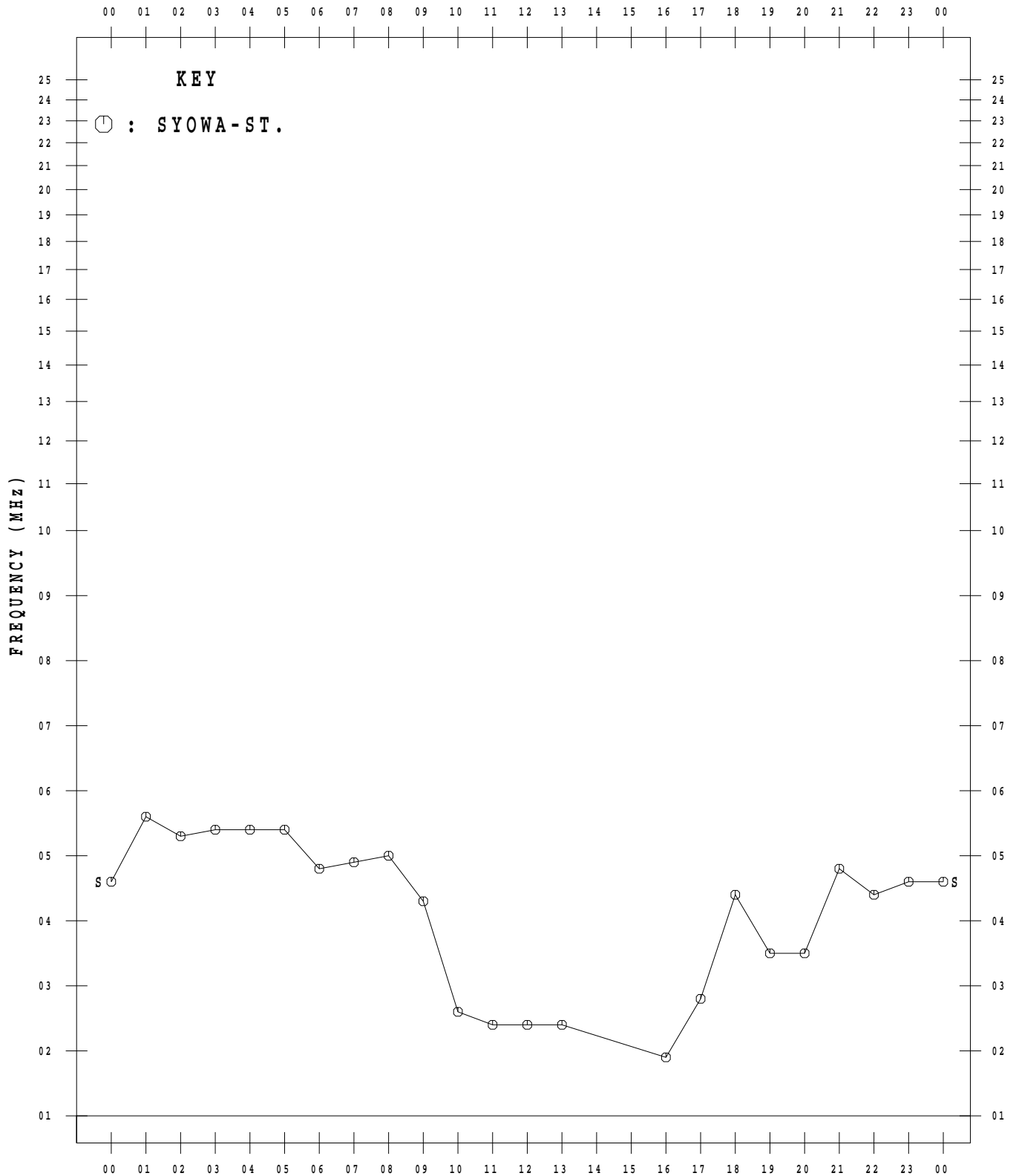
JUL. 2018



MONTHLY MEDIAN VALUES OF f_{TE}s

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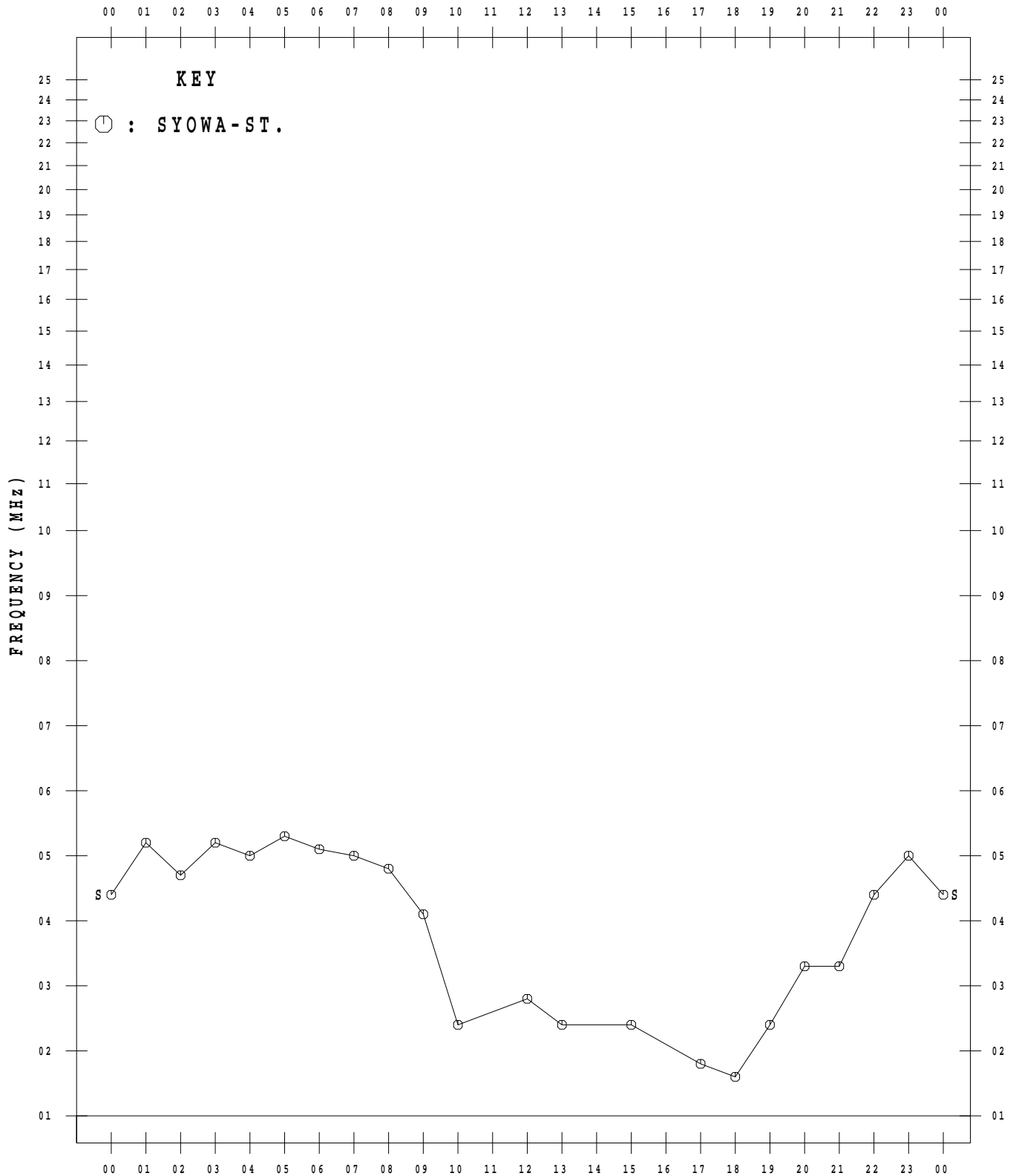
AUG. 2018



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

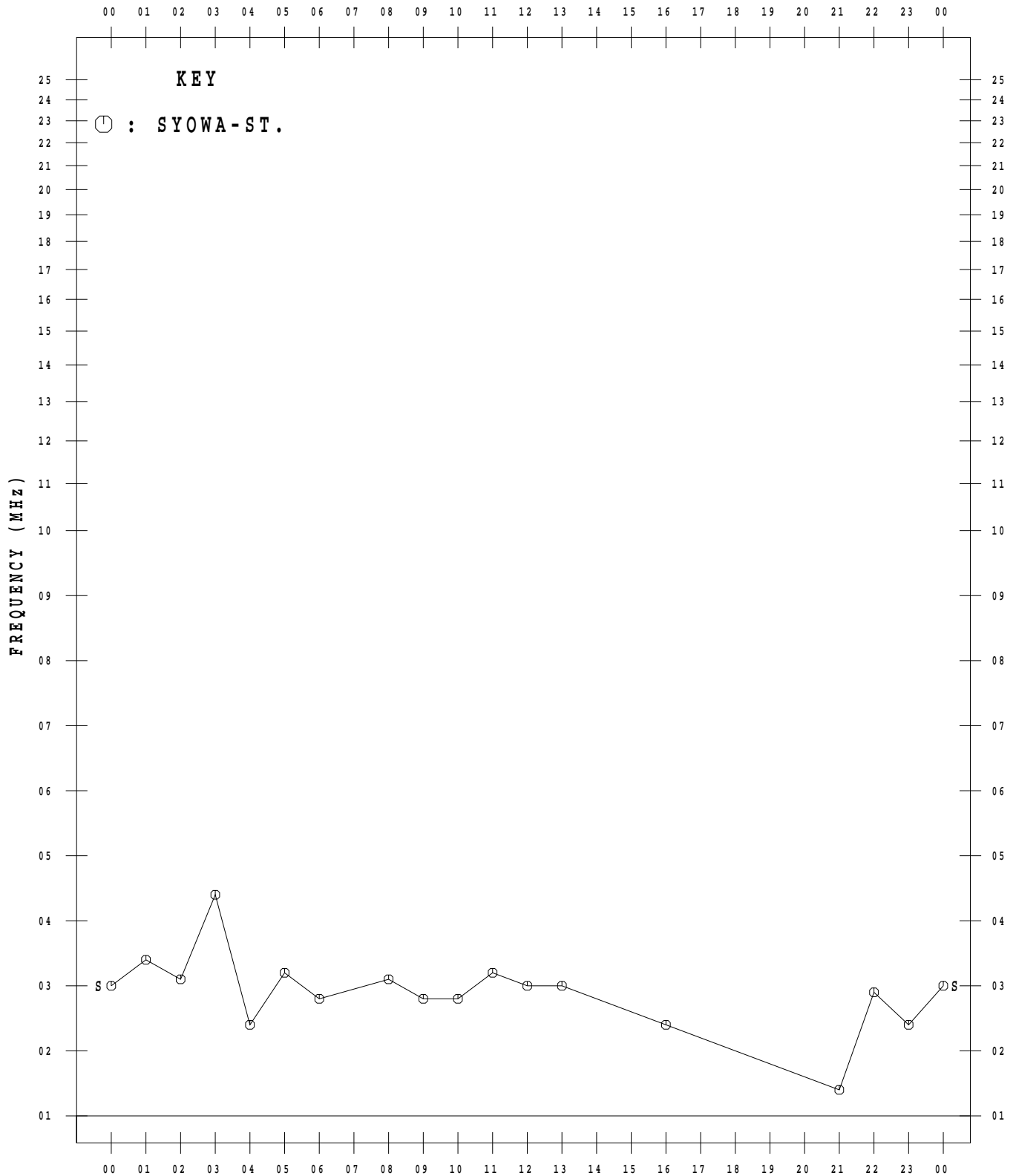
SEP. 2018



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

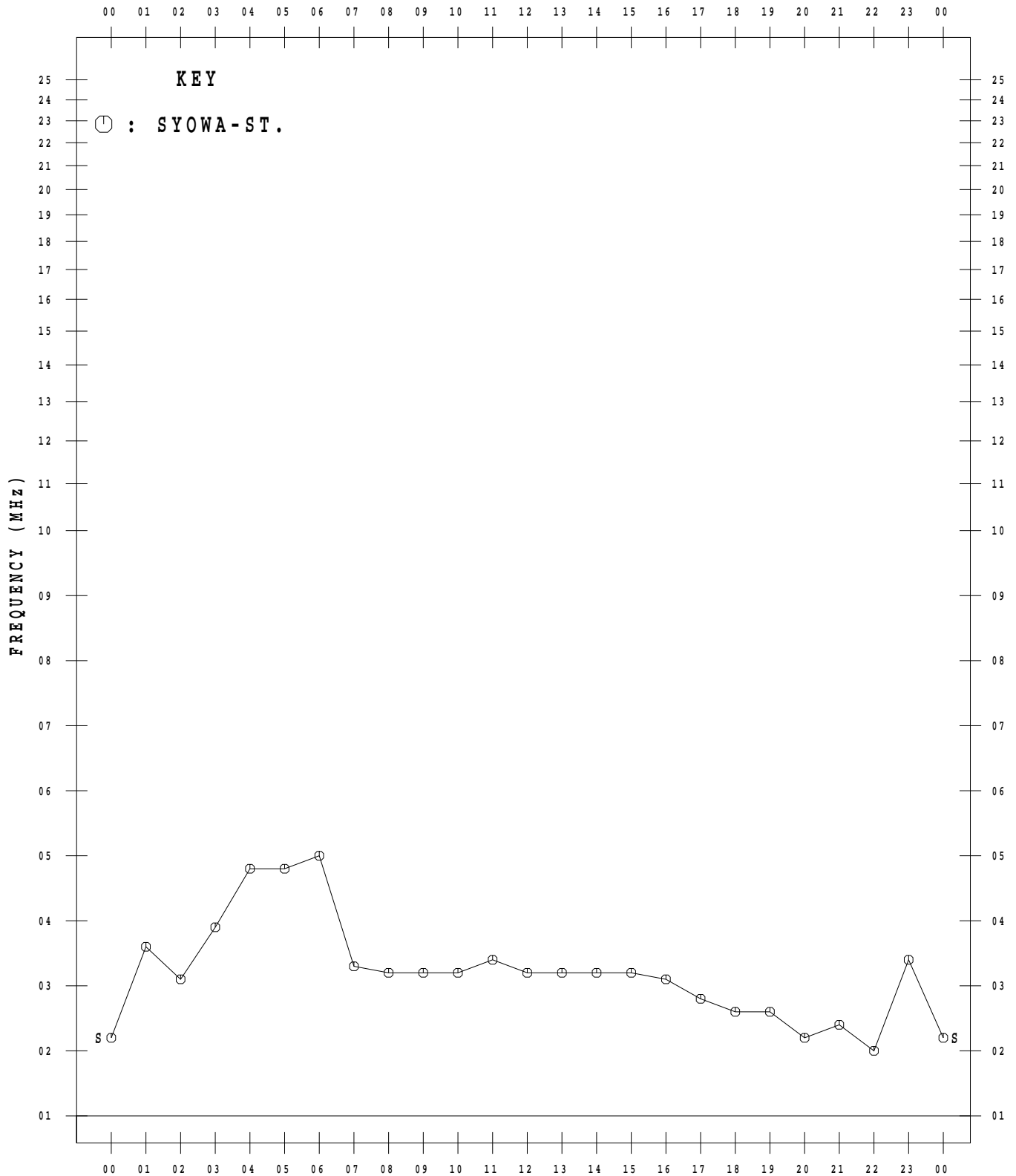
OCT. 2018



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

NOV. 2018



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

DEC. 2018

