

IONOSPHERIC DATA AT SYOWA STATION (ANTARCTICA)

January – December 2020

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NATIONAL INSTITUTE OF INFORMATION
AND COMMUNICATIONS TECHNOLOGY
TOKYO, JAPAN

INTRODUCTION

This data book summarizes the results for vertical soundings of the ionosphere at Syowa Station, Antarctica in 2020. 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 atmospheric. |
| T | Value determined by a sequence of observations, the actual observation being inconsistent or doubtful. |
| V | Forked trace that may influence the measurement. |

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

(ii) Qualifying Letters

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

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

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

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

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

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

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

Acknowledgment

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

IONOSPHERIC DATA STATION SHOWA-ST.

JAN. 2020 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 | 45 | X | X | X | X | A | X | X | X | X | X | X | X | X | X | X | X | X | A | X | X | X | X | X |
| 2 | 37 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 3 | 40 | X | A | A | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 4 | 40 | X | A | A | A | A | A | A | X | X | X | X | X | X | X | X | X | X | X | X | A | X | X | X |
| 5 | A | A | A | A | A | 66 | A | A | A | A | X | R | A | X | X | X | X | X | X | X | X | X | A | A |
| 6 | A | 83 | 36 | X | A | A | A | X | A | A | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 7 | A | X | X | X | A | A | X | X | X | B | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 8 | X | A | X | X | X | A | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 9 | A | A | A | X | A | A | A | A | A | A | A | A | X | X | X | X | X | X | X | X | X | X | X | X |
| 10 | A | A | X | A | A | A | X | X | X | X | X | B | A | X | X | X | X | X | X | X | X | X | X | X |
| 11 | X | X | X | A | A | A | A | A | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 12 | X | X | 90 | X | X | X | X | A | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 13 | 44 | 43 | 45 | 40 | 43 | 47 | 51 | 50 | 51 | 49 | 50 | 51 | 51 | 52 | 52 | 50 | 51 | 49 | 47 | 47 | A | X | X | X |
| 14 | 41 | 41 | 41 | 42 | 41 | 56 | 56 | 59 | 57 | 56 | 56 | 53 | 46 | 52 | 56 | 57 | 55 | 51 | 48 | 46 | 44 | 42 | 47 | 49 |
| 15 | 51 | 51 | 56 | 41 | 50 | 55 | 55 | 58 | 62 | 62 | 57 | 56 | 56 | 56 | 54 | 50 | 51 | 48 | 50 | 50 | 45 | 45 | 45 | 39 |
| 16 | X | A | X | X | A | A | A | A | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 17 | 44 | 47 | 46 | 50 | 57 | 54 | 58 | 60 | 65 | 58 | 57 | 54 | 53 | 49 | 50 | 50 | 48 | 46 | 46 | 45 | 44 | 47 | 41 | 41 |
| 18 | X | X | X | X | A | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 19 | 47 | 50 | 51 | 49 | 56 | 57 | 58 | 57 | 57 | 60 | 61 | 56 | 49 | 52 | 54 | 53 | A | A | X | A | X | X | X | X |
| 20 | X | X | X | X | X | X | X | X | X | X | A | A | X | X | X | X | A | X | X | X | X | X | X | X |
| 21 | X | X | X | X | 56 | 50 | 56 | 56 | 60 | 62 | 54 | 55 | 58 | 58 | 54 | 52 | 50 | 48 | 46 | 46 | 46 | 45 | A | A |
| 22 | A | 56 | 58 | 42 | 55 | X | 87 | A | A | A | A | 44 | 48 | 43 | 50 | 48 | 48 | 50 | 44 | A | X | X | X | X |
| 23 | A | A | A | B | X | X | 59 | A | X | X | X | X | X | X | X | X | X | X | X | X | A | X | X | X |
| 24 | 69 | 54 | A | A | A | A | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 25 | 38 | 38 | X | X | X | X | X | X | A | A | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 26 | X | X | X | X | X | A | A | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 27 | 44 | 43 | F | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 28 | 42 | 49 | X | X | X | X | X | A | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 29 | A | 88 | A | A | X | A | A | A | X | X | X | X | X | X | X | X | X | X | X | X | X | A | X | X |
| 30 | X | X | A | A | A | A | X | A | C | C | C | C | C | C | X | X | X | B | X | A | A | A | A | A |
| 31 | A | A | A | A | A | A | 59 | 44 | A | X | A | X | A | X | X | B | B | B | X | X | X | A | 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 | 22 | 24 | 22 | 19 | 20 | 18 | 23 | 21 | 23 | 24 | 25 | 26 | 27 | 31 | 31 | 30 | 28 | 27 | 30 | 28 | 28 | 27 | 28 | 28 |
| 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 |
| U Q | 44 | 50 | 48 | 48 | 56 | 55 | 58 | 56 | 59 | 59 | 56 | 56 | 56 | 54 | 54 | 52 | 51 | 49 | 48 | 46 | 46 | 45 | 47 | 46 |
| 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 |
| | 38 | 40 | 39 | 40 | 43 | 48 | 47 | 47 | 48 | 49 | 49 | 50 | 49 | 48 | 49 | 48 | 46 | 47 | 45 | 44 | 42 | 42 | 42 | 41 |

JAN. 2020 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JAN. 2020 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

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

JAN. 2020 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JAN. 2020 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 | G | 30 | 18 | 19 | 19 | 24 | 25 | 27 | G | 29 | 31 | 33 | 42 | 31 | 34 | 29 | 32 | 54 | 72 | 83 | 54 | 20 | 18 | 24 | | | | |
| 2 | 24 | 27 | 20 | 43 | 20 | 30 | 28 | 34 | 27 | 31 | 31 | 33 | 39 | 31 | 31 | 31 | 32 | 30 | 38 | 26 | 22 | 23 | 24 | 28 | | | | |
| 3 | 18 | 30 | 46 | 79 | 56 | 20 | 29 | 31 | 31 | 31 | 33 | 30 | 31 | G | 124 | 91 | 92 | 60 | 26 | 25 | 23 | 66 | 58 | 22 | | | | |
| 4 | 32 | 37 | 54 | 56 | 56 | 55 | 58 | 68 | 28 | 30 | 33 | 31 | 34 | 34 | 34 | 41 | 83 | 78 | 26 | G | 42 | 42 | 44 | 42 | | | | |
| 5 | 52 | 85 | 72 | 48 | 56 | 102 | 68 | 67 | 56 | 67 | 56 | 53 | 58 | 45 | G | 56 | G | 20 | 28 | 66 | 43 | 22 | 42 | 84 | 68 | | | |
| 6 | 66 | 42 | 86 | 50 | 86 | 100 | 111 | 47 | 60 | 56 | 34 | 34 | 62 | 77 | 65 | 30 | 29 | 29 | 29 | 29 | 21 | 20 | 40 | 30 | | | | |
| 7 | 47 | 38 | 42 | 46 | 44 | 28 | 28 | 66 | 58 | B | G | 30 | 40 | 40 | 30 | 34 | 54 | 58 | 59 | 23 | 23 | 19 | 35 | 21 | | | | |
| 8 | 36 | 92 | 36 | 23 | 50 | 55 | 45 | 36 | 28 | 32 | 35 | 31 | 31 | 31 | 31 | 30 | 30 | 32 | 27 | 24 | 58 | 22 | 34 | 35 | | | | |
| 9 | 52 | 54 | 55 | 42 | 90 | 54 | 62 | 46 | 60 | 91 | 68 | 49 | 55 | B | B | E | B | B | E | B | 29 | 32 | 48 | 47 | 21 | 83 | 37 | |
| 10 | 50 | 52 | 71 | 92 | 60 | 45 | 58 | 23 | 59 | 38 | B | B | E | E | B | E | B | E | B | B | E | B | 28 | 28 | 39 | 20 | G | 26 |
| 11 | 39 | 35 | E | B | 35 | 48 | 51 | 55 | 52 | 59 | A | 36 | 56 | E | B | 34 | 36 | 42 | 31 | 68 | 70 | 32 | 24 | 24 | 22 | 20 | 34 | 22 |
| 12 | 48 | 25 | 44 | 39 | 38 | 34 | 40 | 56 | 39 | 28 | 55 | 57 | 33 | G | 62 | 34 | 69 | 63 | 28 | G | 28 | 28 | 23 | 34 | 100 | 92 | 66 | |
| 13 | 13 | 28 | 42 | 30 | 26 | 32 | 27 | 27 | 29 | 32 | 52 | 30 | 31 | 43 | 32 | 45 | 30 | 28 | 52 | 71 | 59 | 65 | 60 | 22 | | | | |
| 14 | 27 | 16 | 30 | 19 | 30 | 29 | G | G | 29 | 29 | 32 | 70 | 78 | 49 | 36 | 34 | 28 | 23 | G | 36 | 27 | 26 | 22 | 29 | 16 | | | |
| 15 | 14 | 18 | 24 | 26 | 25 | 28 | 40 | 26 | 28 | 28 | 31 | 29 | 30 | 32 | 34 | 37 | 33 | 36 | 30 | 26 | 24 | 24 | 16 | 16 | | | | |
| 16 | 40 | 50 | 46 | 76 | 73 | 56 | 59 | 62 | 32 | 43 | 34 | 34 | 61 | 62 | 40 | 37 | 71 | 30 | 30 | 25 | 20 | G | 70 | 15 | | | | |
| 17 | 15 | 16 | 28 | 28 | 34 | 23 | 23 | 27 | 34 | 42 | 38 | 47 | 63 | 34 | 31 | 34 | 79 | 38 | 52 | 52 | G | 21 | 18 | 16 | | | | |
| 18 | 16 | 26 | 28 | 42 | 58 | 28 | 56 | 48 | 28 | 28 | 28 | G | 28 | 28 | 38 | 64 | 38 | 59 | 59 | 38 | 19 | 34 | 24 | 29 | | | | |
| 19 | 47 | 46 | 28 | 20 | 40 | 22 | 24 | 26 | 36 | 36 | 34 | 34 | 34 | 40 | 34 | 61 | 83 | 132 | 71 | 64 | 43 | 57 | 58 | 15 | | | | |
| 20 | 12 | 78 | 70 | 25 | 31 | 36 | 23 | 24 | 33 | 36 | 67 | 111 | 72 | 32 | 38 | 80 | 88 | 80 | 59 | 53 | 20 | 17 | 31 | 24 | | | | |
| 21 | 23 | 23 | 56 | 25 | 28 | 31 | 24 | 26 | 26 | 30 | 30 | 30 | 33 | 35 | 59 | 57 | 31 | 31 | 28 | 37 | 38 | 32 | 42 | 80 | | | | |
| 22 | 85 | 42 | 36 | 19 | 30 | 62 | 46 | 48 | 57 | 43 | 43 | G | 32 | 32 | 32 | 63 | 29 | 30 | 33 | 81 | 28 | 22 | 33 | 23 | | | | |
| 23 | 65 | 58 | 55 | B | 57 | 44 | 42 | 54 | 28 | 28 | 29 | 81 | 48 | 34 | 56 | 33 | 28 | 28 | 27 | 52 | 32 | 41 | 17 | 33 | | | | |
| 24 | 48 | 40 | 85 | 63 | 57 | 42 | 25 | 30 | G | 26 | 30 | 32 | 29 | 29 | 29 | 20 | 63 | 31 | 26 | 24 | 23 | 43 | 46 | 15 | 13 | | | |
| 25 | 17 | 13 | 14 | 17 | 20 | 56 | 23 | 28 | 53 | 49 | 35 | 28 | 30 | 32 | 30 | 30 | 72 | 29 | 28 | 26 | 24 | 23 | 39 | 20 | | | | |
| 26 | E | B | 10 | 13 | 16 | 27 | 53 | 54 | 27 | 27 | G | 31 | 31 | 31 | 31 | 31 | 32 | 27 | 45 | 25 | 28 | 23 | 22 | 53 | G | | | |
| 27 | 17 | 17 | 17 | 16 | 18 | 19 | 22 | 25 | 28 | 28 | 30 | 35 | 63 | 30 | 30 | 63 | 28 | 29 | 26 | 31 | 55 | 54 | 51 | 58 | | | | |
| 28 | 55 | 20 | 24 | 25 | 37 | 37 | 56 | 56 | 36 | 36 | 31 | 31 | 35 | 30 | 30 | 36 | 31 | 28 | 27 | 48 | 24 | 26 | 13 | E | B | 10 | | |
| 29 | 46 | 44 | 70 | 93 | 105 | 69 | 63 | 54 | 56 | 46 | 29 | 54 | 30 | 64 | G | 30 | 26 | 24 | 55 | 23 | 21 | 40 | 40 | 36 | | | | |
| 30 | 28 | 36 | 50 | 56 | 56 | 44 | 55 | 58 | C | C | C | C | C | 28 | 58 | G | 26 | B | E | B | 35 | 27 | 39 | 41 | 60 | 42 | | |
| 31 | 56 | 61 | 55 | A | 44 | A | A | G | 60 | 60 | 49 | 32 | 65 | 31 | 68 | B | B | B | B | E | B | E | B | G | 24 | 24 | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | | | |
| CNT | 31 | 31 | 31 | 29 | 31 | 30 | 30 | 31 | 29 | 29 | 29 | 29 | 30 | 30 | 30 | 30 | 29 | 28 | 31 | 31 | 31 | 31 | 31 | 31 | | | | |
| MED | 36 | 36 | 42 | 39 | 44 | 40 | 41 | 34 | 32 | 32 | 33 | 32 | 36 | 32 | 34 | 36 | 32 | 30 | 30 | 28 | 24 | 24 | 35 | 24 | | | | |
| U Q | 50 | 50 | 55 | 53 | 57 | 55 | 56 | 56 | 56 | 43 | 46 | 48 | 61 | 42 | 40 | 63 | 70 | 50 | 52 | 48 | 42 | 42 | 58 | 36 | | | | |
| L Q | 17 | 23 | 28 | 22 | 28 | 28 | 25 | 27 | 28 | 29 | 31 | 30 | 31 | 31 | 31 | 30 | 28 | 28 | 27 | 25 | 22 | 21 | G | 16 | | | | |

JAN. 2020 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JAN. 2020 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| H D | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|--------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 9 | 7 | 7 | 6 | 6 | 8 | 7 | 8 | 8 | 7 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 6 | 7 |
| 2 | 8 | 8 | 8 | 8 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 7 | 7 | 7 | 7 | 8 | 6 | 8 |
| 3 | 10 | 7 | 8 | 7 | 6 | 6 | 8 | 6 | 7 | 7 | 7 | 7 | 7 | 10 | 18 | 12 | 11 | 8 | 8 | 8 | 8 | 9 | 10 | 10 |
| 4 | 7 | 10 | 10 | 10 | 8 | 8 | 8 | 10 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 11 | 9 | 11 | 8 | 8 | 8 | 8 | 7 |
| 5 | 13 | 12 | 9 | 56 | 7 | 12 | 12 | 6 | 8 | 7 | 7 | 7 | 7 | 8 | 8 | 10 | 10 | 9 | 15 | 9 | 7 | 12 | 8 | 8 |
| 6 | 24 | 9 | 7 | 10 | 18 | 24 | 19 | 8 | 19 | 20 | 12 | 9 | 12 | 14 | 12 | 10 | 12 | 12 | 12 | 8 | 8 | 8 | 12 | 9 |
| 7 | 10 | 13 | 12 | 15 | 10 | 11 | 11 | 7 | 11 | B | 17 | 9 | 9 | 9 | 10 | 10 | 10 | 9 | 9 | 9 | 9 | 8 | 8 | 7 |
| 8 | 9 | 9 | 12 | 8 | 8 | 17 | 11 | 8 | 9 | 8 | 8 | 8 | 9 | 10 | 10 | 10 | 11 | 10 | 8 | 8 | 19 | 6 | 7 | 8 |
| 9 | 14 | 11 | 8 | 9 | 22 | 23 | 25 | 8 | 9 | 9 | 13 | 16 | 20 | 38 | 37 | 27 | 42 | 29 | 23 | 25 | 13 | 8 | 11 | 8 |
| 10 | 19 | 14 | 8 | 14 | 13 | 12 | 11 | 8 | 8 | 20 | 39 | B | 40 | 40 | 41 | 28 | 40 | B | 28 | 11 | 17 | 9 | 9 | 8 |
| 11 | 8 | 10 | 35 | 13 | 19 | 16 | 7 | 14 | 10 | 17 | 24 | 34 | 25 | 28 | 19 | 18 | 20 | 14 | 12 | 12 | 11 | 12 | 10 | 8 |
| 12 | 9 | 9 | 20 | 17 | 13 | 8 | 8 | 11 | 11 | 8 | 7 | 10 | 9 | 8 | 8 | 10 | 10 | 8 | 8 | 10 | 13 | 15 | 9 | 9 |
| 13 | 8 | 7 | 7 | 8 | 8 | 7 | 7 | 7 | 7 | 8 | 9 | 11 | 10 | 10 | 10 | 10 | 8 | 8 | 12 | 11 | 8 | 9 | 6 | 5 |
| 14 | 8 | 7 | 7 | 8 | 7 | 7 | 7 | 7 | 7 | 9 | 9 | 9 | 9 | 9 | 9 | 10 | 10 | 13 | 13 | 8 | 8 | 11 | 7 | 7 |
| 15 | 8 | 8 | 8 | 8 | 8 | 6 | 6 | 6 | 6 | 9 | 9 | 7 | 7 | 9 | 14 | 16 | 13 | 9 | 9 | 9 | 9 | 8 | 11 | 7 |
| 16 | 11 | 8 | 10 | 6 | 15 | 12 | 11 | 12 | 9 | 13 | 11 | 11 | 7 | 8 | 10 | 15 | 8 | 8 | 8 | 12 | 9 | 9 | 7 | 8 |
| 17 | 7 | 7 | 8 | 7 | 7 | 8 | 8 | 7 | 7 | 8 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 9 | 10 | 9 |
| 18 | 8 | 8 | 9 | 8 | 13 | 7 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 9 |
| 19 | 8 | 9 | 6 | 5 | 5 | 8 | 8 | 7 | 8 | 9 | 9 | 7 | 8 | 8 | 10 | 8 | 10 | 8 | 8 | 8 | 10 | 7 | 5 | 6 |
| 20 | 6 | 8 | 8 | 8 | 6 | 8 | 7 | 9 | 7 | 11 | 9 | 19 | 10 | 10 | 11 | 8 | 6 | 8 | 6 | 6 | 8 | 8 | 7 | 6 |
| 21 | 7 | 6 | 7 | 6 | 6 | 8 | 8 | 8 | 10 | 10 | 8 | 7 | 7 | 7 | 7 | 9 | 8 | 8 | 8 | 8 | 13 | 8 | 7 | 7 |
| 22 | 9 | 12 | 10 | 9 | 7 | 11 | 14 | 8 | 8 | 8 | 18 | 12 | 11 | 8 | 8 | 11 | 12 | 19 | 15 | 15 | 10 | 9 | 11 | 6 |
| 23 | 7 | 12 | 14 | B | 12 | 10 | 7 | 12 | 8 | 8 | 8 | 7 | 8 | 9 | 9 | 10 | 10 | 10 | 11 | 7 | 5 | 7 | 6 | 7 |
| 24 | 17 | 17 | 17 | 14 | 18 | 11 | 10 | 8 | 8 | 8 | 8 | 8 | 10 | 10 | 9 | 7 | 8 | 10 | 10 | 8 | 6 | 8 | 6 | 7 |
| 25 | 8 | 8 | 6 | 6 | 6 | 8 | 12 | 10 | 10 | 26 | 19 | 14 | 9 | 7 | 8 | 8 | 8 | 9 | 8 | 8 | 10 | 8 | 12 | 9 |
| 26 | 9 | 9 | 6 | 7 | 9 | 9 | 8 | 7 | 7 | 7 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 6 | 6 | 6 | 8 |
| 27 | 6 | 8 | 8 | 7 | 9 | 7 | 7 | 7 | 7 | 7 | 15 | 10 | 10 | 12 | 8 | 8 | 9 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 28 | 6 | 7 | 6 | 6 | 6 | 6 | 8 | 8 | 11 | 7 | 6 | 6 | 8 | 6 | 7 | 9 | 7 | 7 | 8 | 8 | 8 | 6 | 6 | 10 |
| 29 | 10 | 10 | 12 | 8 | 11 | 9 | 7 | 12 | 12 | 7 | 8 | 8 | 8 | 28 | 24 | 16 | 11 | 10 | 14 | 13 | 6 | 10 | 8 | 6 |
| 30 | 8 | 7 | 14 | 8 | 9 | 14 | 12 | 12 | C | C | C | C | C | 16 | 28 | 24 | 16 | B | 35 | 14 | 15 | 6 | 10 | 12 |
| 31 | 12 | 10 | 16 | 14 | 6 | 9 | 11 | 9 | 16 | 8 | 18 | 15 | 38 | 16 | 24 | B | B | B | 20 | 30 | 21 | 14 | 8 | 8 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 30 | 30 | 30 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| MED | 8 | 9 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 9 | 9 | 10 | 10 | 9 | 9 | 8 | 8 | 8 | 8 | 8 |
| U Q | 10 | 10 | 12 | 13 | 13 | 12 | 11 | 10 | 10 | 10 | 13 | 11 | 10 | 12 | 14 | 15 | 12 | 12 | 13 | 11 | 11 | 9 | 10 | 9 |
| L Q | 8 | 7 | 7 | 7 | 6 | 7 | 7 | 7 | 7 | 8 | 8 | 7 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 7 | 8 | 6 | 7 |

JAN. 2020 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JAN. 2020 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 | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | |
|-----|-----|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----------------|-----|-----|-----|-----|-----|
| 1 | 200 | 218 ^A | 218 | 212 | 202 | 196 | 212 | 198 | 198 | 188 | 188 | 212 | 200 | 102 | 196 | 180 | 196 | 198 | | A | A ^E | 222 | 202 | 218 | 194 | |
| 2 | 246 | 116 | 202 | 238 | 216 | 214 | 198 | 206 | 194 | 184 | 184 | 188 | 196 | 196 | 206 | 196 | 196 | 214 | 200 | 188 | 206 | 192 | 226 | 216 | | |
| 3 | 202 | | A | A | 244 | 208 | 200 | 208 | 206 | 196 | 186 | 192 | 200 | 198 | 222 | 204 | | A | 204 | 196 | 208 | 208 | 232 | 238 | 238 | |
| 4 | 256 | A | A | A | A | A | A | A | | 206 | 198 | 198 | 250 | 174 | 194 | 194 | 198 | 216 | 200 | 200 | | A | A | A | 280 | |
| 5 | A | A | A | A | A | A | A | A | A | A | 208 | 202 | 202 | 186 | 198 | 216 | 206 | 206 | 224 | 208 | 226 | | A | A | A | |
| 6 | A | A | 206 | A | A | A | A | A | A | A | A | H | 212 | 224 | 196 | 196 | 218 | 200 | 200 | 216 | 216 | 210 | 198 | 198 | 222 | 258 |
| 7 | A | A | A | A | 206 | 272 | 214 | 186 | 200 | | 200 | 216 | 202 | 202 | 202 | 200 | 200 | 212 | 230 | 222 | 232 | 204 | 278 | 262 | | |
| 8 | 218 | A | A | 258 | 228 | A | A | 212 | 188 | 204 | 192 | 192 | 194 | 186 | 190 | 192 | 202 | 202 | 200 | 200 | 200 | 200 | 222 | 222 | 270 | |
| 9 | A | A | A | A | A | A | A | A | A | A | A | A | 198 | | B | 198 | | B | 206 | 224 | 210 | 228 | 204 | 228 | A | |
| 10 | A | A | E A | A | A | A | A | 182 | 198 | 200 | | B | B | B | B | B | B | B | B | 204 | 232 | A | A | H | A | |
| 11 | 224 | E A | 338 | 130 | A | A | A | A | E A | E A | A | A | 222 | 214 | 200 | 208 | 204 | 204 | 204 | 186 | 192 | 214 | 232 | 232 | 244 | |
| 12 | E A | E A | E A | A | 196 | E B | 246 | 198 | A | 264 | 178 | 170 | 182 | 200 | 180 | 178 | 196 | 198 | 194 | 204 | 204 | 242 | 240 | A | E B | |
| 13 | 214 | 102 | A | 254 | 232 | 196 | 218 | 196 | 206 | 198 | 182 | 198 | 198 | 206 | 204 | 198 | 198 | 198 | 198 | 212 | | A | A | 240 | 222 | |
| 14 | 272 | 226 | A | A | 198 | 198 | 194 | 204 | 196 | 196 | 192 | 202 | 258 | 210 | 192 | 192 | 192 | 192 | 202 | 202 | 202 | 202 | 206 | 230 | 230 | |
| 15 | 236 | 248 | E A | A | 200 | 200 | 200 | 200 | 200 | 200 | 190 | 180 | 192 | H | 214 | 238 | 218 | 218 | 204 | 194 | 194 | 194 | 218 | 234 | 226 | |
| 16 | 240 | A | A | 204 | A | A | A | A | 212 | A | 202 | 222 | A | 198 | 202 | 220 | 198 | 198 | 204 | 192 | 196 | 226 | 248 | 204 | | |
| 17 | A | E A | E A | E A | 204 | 196 | 196 | 196 | 190 | 166 | 198 | A | 198 | 198 | 220 | 192 | 190 | 194 | E A | 266 | 252 | 206 | 242 | 218 | 218 | |
| 18 | 204 | A | 208 | A | 204 | 204 | 230 | E A | 198 | 198 | 186 | 186 | 186 | 202 | 198 | | 198 | 210 | 260 | 222 | 196 | 208 | 208 | 218 | | |
| 19 | E A | E A | E A | 244 | 220 | 194 | 196 | 188 | 180 | 216 | 198 | 156 | 194 | 182 | 198 | 236 | 210 | A | A | 196 | A | 240 | 216 | 222 | 212 | |
| 20 | 204 | 230 | 212 | 234 | 222 | 202 | 196 | 194 | 184 | 198 | | A | A | A | 196 | 196 | 230 | | A | 196 | 190 | 196 | 182 | 200 | 226 | 200 |
| 21 | 228 | E A | E A | E A | 222 | 200 | 212 | 198 | 204 | 186 | 192 | 184 | 184 | 198 | 194 | 198 | 192 | 192 | 220 | 198 | E A | 256 | A | A | A | |
| 22 | A | A | 206 | 194 | 216 | A | A | A | A | A | A | A | 196 | 184 | 198 | 204 | 228 | 202 | 212 | 218 | A | 226 | 204 | A | 236 | |
| 23 | A | A | A | B | A | E A | E A | A | A | 204 | 176 | 198 | 204 | 212 | 190 | 180 | 196 | 196 | 206 | 194 | | 216 | 230 | 222 | A | |
| 24 | A | A | A | A | A | A | 226 | 200 | 184 | 220 | 192 | 192 | 204 | 196 | 196 | 196 | 188 | 208 | 198 | 198 | E A | 232 | 204 | 222 | 208 | |
| 25 | E A | A | A | E A | E A | 246 | 200 | 194 | A | A | 208 | 180 | 186 | 182 | 188 | 194 | 186 | 190 | 198 | 204 | 220 | 210 | 218 | 234 | | |
| 26 | 208 | 232 | 232 | 216 | 238 | A | A | 242 | 182 | 200 | 186 | 206 | 190 | 190 | 190 | 190 | 186 | 224 | 198 | 198 | 224 | 216 | 222 | 236 | | |
| 27 | 230 | 240 | 242 | 206 | 214 | 202 | 202 | 202 | 192 | 192 | 192 | 200 | 180 | 170 | 200 | 192 | 210 | 186 | 186 | 206 | 192 | 210 | 210 | 234 | | |
| 28 | E A | 222 | 240 | E A | E A | 236 | 200 | A | A | 224 | 194 | 198 | 192 | 192 | 188 | 192 | 204 | 190 | 190 | 200 | 200 | 224 | 238 | 226 | 198 | |
| 29 | A | A | A | A | 198 | A | A | A | A | A | A | H | 176 | 182 | 182 | 224 | 206 | 206 | 206 | 206 | 206 | 198 | A | A | A | |
| 30 | E A | 288 | 294 | A | A | A | E A | A | C | C | C | C | C | C | A | 210 | 206 | B | B | 200 | A | A | A | A | | |
| 31 | A | A | A | A | A | A | 258 | 196 | A | 204 | A | 192 | A | 200 | E A | 218 | B | B | B | 218 | 258 | 214 | A | E A | E A | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | |
| CNT | 20 | 16 | 16 | 16 | 18 | 17 | 19 | 19 | 23 | 23 | 24 | 26 | 26 | 29 | 30 | 29 | 25 | 27 | 29 | 27 | 26 | 25 | 24 | 24 | | |
| MED | 222 | 230 | 216 | 218 | 210 | 201 | 200 | 199 | 198 | 198 | 192 | 195 | 198 | 196 | 200 | 198 | 198 | 204 | 200 | 203 | 209 | 208 | 224 | 221 | | |
| U Q | 246 | E A | E A | E A | E | 219 | 218 | 206 | 206 | 200 | 198 | 204 | 202 | 200 | 218 | 210 | 203 | 212 | 217 | 212 | 226 | 231 | 236 | 248 | | |
| L Q | 211 | 222 | 207 | 209 | 200 | 197 | 198 | 194 | 190 | 192 | 185 | 188 | 190 | 186 | 194 | 193 | 192 | 196 | 197 | 198 | 198 | 204 | 222 | 214 | | |

JAN. 2020 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2020 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 43 | X 41 | A | A | A | A | A | A | X 48 | X 49 | X 49 | X 51 | X 53 | X 57 | X 54 | X 52 | X 52 | X 48 | X 49 | X 44 | X 40 | X 32 | X 41 | X 34 | |
| 2 | X 38 | 77 | 52 | A | A | X 37 | X 44 | X 46 | X 47 | X 48 | X 49 | X 49 | X 44 | X 45 | X 50 | X 47 | X 46 | X 45 | X 44 | X 44 | X 43 | X 36 | A | A | |
| 3 | A | A | A | A | A | X 41 | X 44 | X 46 | A | A | X 52 | X 51 | X 51 | X 52 | X 48 | X 48 | X 45 | X 48 | X 47 | X 49 | X 50 | X 46 | X 39 | X 30 | |
| 4 | X 30 | 36 | 42 | X 41 | X 46 | X 43 | A | A | X 50 | X 57 | X 59 | X 55 | X 51 | X 50 | X 52 | X 50 | X 50 | X 46 | X 46 | X 46 | X 40 | X 41 | X 35 | A | |
| 5 | A | A | A | F | A | A | A | X 45 | X 48 | X 48 | B | X 51 | X 50 | X 52 | X 49 | X 50 | X 49 | X 48 | X 44 | X 43 | X 42 | X 42 | X 44 | X 35 | |
| 6 | A | 32 | 34 | X 35 | X 40 | X 48 | 45 | X 51 | X 52 | 77 | A | X 44 | X 45 | X 45 | X 44 | X 47 | X 48 | X 48 | X 47 | X 44 | A | A | 34 | A | |
| 7 | A | A | A | A | A | O 45 | X A | A | O 47 | X A | B | B | B | O 44 | X 50 | X 51 | X 48 | X 43 | X 41 | X 41 | X 41 | X 37 | X 30 | X 46 | |
| 8 | O 41 | X B | A | A | A | 78 | A | A | O 47 | X 47 | X 45 | X 44 | X 48 | X 51 | X 49 | X 47 | X 44 | X 44 | X 43 | X 41 | X 43 | X 32 | X A | X A | |
| 9 | A | 56 | A | A | A | A | A | A | A | X 42 | X 46 | X 47 | X 50 | X 49 | X 45 | X 49 | X 49 | X 46 | X 45 | X 44 | X 42 | X 38 | X 32 | A | |
| 10 | 55 | 48 | A | A | A | A | X 46 | X 50 | X 48 | X 52 | X 49 | B | X 56 | X 56 | X 48 | X 51 | X 46 | X 46 | X 44 | X 44 | X 42 | X 40 | X 36 | X 35 | |
| 11 | F 30 | X 32 | X 30 | X 44 | A | A | X 46 | 54 | X 48 | X 58 | X 55 | X 56 | X 52 | X 55 | X 50 | X 51 | X 50 | X 48 | X 46 | X 45 | X 45 | X 40 | X 34 | X 34 | |
| 12 | A | O 74 | X 44 | A | A | A | A | A | X 48 | X 50 | X 50 | X 50 | X 56 | X 58 | X 61 | X 56 | X 54 | X 48 | X 46 | X 50 | X 47 | X 41 | X 39 | X 39 | |
| 13 | X 38 | X 29 | X 36 | X 40 | X 44 | X 43 | X 53 | X 49 | X 53 | X 50 | X 49 | X 49 | X 51 | X 56 | X 57 | X A | X 48 | X 48 | X 47 | X 44 | X 44 | X 40 | X 36 | X 37 | |
| 14 | X 31 | X 32 | 58 | A | A | A | X 52 | X 52 | X 52 | X 58 | X 52 | X 52 | X 56 | X 56 | X 59 | X 56 | X 53 | X 48 | X 46 | X 42 | X 42 | X 39 | X 35 | X 46 | |
| 15 | X 42 | X 37 | X 70 | A | X 47 | X 58 | 64 | 70 | 69 | 67 | 54 | A | A | X 57 | X 54 | X 55 | X 58 | X 51 | X 47 | X 42 | X 42 | X 47 | X 46 | X 29 | |
| 16 | A | A | A | A | A | A | A | A | 48 | 46 | 52 | 56 | 55 | 55 | 55 | 52 | 52 | 46 | 48 | 46 | 44 | 40 | 45 | 38 | 39 |
| 17 | X 47 | X 42 | X 45 | X 42 | 55 | A | 51 | 56 | 54 | 54 | 62 | 59 | 57 | 58 | X 51 | X 47 | X 46 | X 44 | X 44 | A | X 46 | X 40 | X 32 | X 43 | |
| 18 | 79 | A | A | A | A | A | X 43 | A | A | A | A | B | B | B | O 44 | X 48 | X 49 | X 42 | A | 74 | A | A | 88 | 57 | |
| 19 | A | A | A | 52 | A | O 59 | X 40 | A | A | A | A | O 41 | B | B | B | B | B | B | B | O 45 | X 40 | X 38 | X 30 | X A | R |
| 20 | A | 56 | A | A | A | A | A | A | A | X 40 | B | O 45 | X 43 | X 42 | X 42 | X 49 | X 50 | X 44 | X 43 | X 41 | X 40 | X 34 | X A | X A | |
| 21 | A | A | A | 64 | B | B | A | A | A | A | A | A | B | B | B | O 48 | X 43 | X 39 | X 39 | X 40 | B | A | X 28 | X A | |
| 22 | A | A | A | A | A | A | A | A | X 43 | X 44 | B | O 40 | X 47 | X 47 | X 46 | X 47 | X 46 | X 44 | X 45 | X 40 | X 36 | X R | X A | X A | |
| 23 | O 34 | X A | A | A | A | X 32 | O 37 | X 41 | X 44 | X 46 | X 48 | X 49 | X 50 | X 50 | X 47 | X 50 | X 46 | X 44 | X 46 | X 40 | X 37 | X 28 | X A | X 51 | |
| 24 | A | A | A | A | A | A | A | A | O 40 | X 40 | X 41 | X 41 | X 47 | X 48 | X 49 | X 49 | X 48 | X 46 | X 44 | X 41 | X 38 | X 32 | X 29 | X 22 | |
| 25 | O 28 | X 45 | A | A | A | A | A | X 43 | X 44 | X 45 | X 46 | X 48 | X 52 | X 52 | X 53 | X 52 | X 52 | X 49 | X 44 | X 41 | X 36 | X 32 | X 35 | X 24 | |
| 26 | X 21 | X 38 | A | X 35 | X 38 | X 42 | X 44 | X 48 | X 48 | X 49 | X 49 | X 50 | X 54 | X 56 | X 64 | X 59 | X 54 | X 49 | X 46 | X 42 | X 47 | X 55 | X 48 | X 71 | |
| 27 | A | 41 | 37 | A | B | A | O 38 | X 46 | X 48 | X 48 | X 49 | X 47 | X 50 | X 56 | X 59 | X 60 | X 60 | X 49 | X 45 | X 44 | X 39 | X 36 | X 30 | X 24 | |
| 28 | O 24 | X A | A | A | 53 | A | A | A | X 43 | X 46 | X 46 | X 43 | X 48 | X 51 | X 54 | X 60 | X 52 | X 49 | X 48 | X 46 | X 41 | X 34 | X 30 | X 28 | |
| 29 | 53 | A | A | A | A | A | 57 | 51 | 50 | 49 | 49 | 49 | 53 | 58 | 59 | 54 | 50 | 50 | 42 | 45 | B | O 26 | X A | X A | |
| 30 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
| CNT | 16 | 16 | 10 | 8 | 8 | 10 | 16 | 16 | 22 | 25 | 21 | 24 | 23 | 26 | 27 | 27 | 28 | 28 | 28 | 28 | 25 | 24 | 22 | 19 | |
| MED | X 38 | 41 | 43 | 42 | 46 | 43 | 45 | 48 | 48 | 49 | 49 | 49 | 51 | 52 | 51 | 50 | 49 | 48 | 45 | 44 | 42 | 38 | 36 | 35 | |
| U Q | 45 | 52 | 52 | 48 | 54 | 58 | 52 | 52 | 50 | 53 | 53 | 51 | 54 | 56 | 55 | 54 | 52 | 48 | 46 | 44 | 44 | 41 | 40 | 46 | |
| L Q | X 30 | X 34 | X 36 | X 38 | 42 | O 41 | X 44 | X 46 | X 46 | X 46 | X 47 | O 44 | X 48 | X 49 | X 48 | X 48 | X 46 | X 44 | X 44 | X 41 | X 40 | X 32 | X 32 | X 29 | |

FEB. 2020 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2020 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 | 37 | 35 | A | A | A | A | A | A | 42 | 43 | 43 | 45 | 47 | 51 | 48 | 46 | 46 | 42 | 43 | 38 | 34 | 26 | 35 | 28 | |
| 2 | 32 | A | A | A | A | 31 | 38 | 40 | 41 | 42 | 43 | 43 | 38 | 39 | 44 | 41 | 40 | 39 | 38 | 38 | 37 | 30 | A | A | |
| 3 | A | A | A | A | A | 35 | 38 | 40 | A | A | 46 | 45 | 45 | 46 | 42 | R 42 | 39 | 42 | 41 | 43 | 44 | 39 | 28 | F 24 | |
| 4 | 24 | F 25 | F 33 | 35 | 40 | 37 | A | A | 44 | R 51 | 53 | 49 | 45 | 44 | 45 | 44 | 44 | 40 | 40 | 40 | 34 | 34 | 29 | A | |
| 5 | A | A | A | F | A | A | A | 39 | 42 | 42 | B | 45 | 44 | 46 | 43 | 44 | 43 | 42 | 38 | 37 | 36 | 36 | 38 | 29 | |
| 6 | A | F 20 | 28 | 29 | 34 | 42 | 39 | 45 | 46 | A | A | 38 | 39 | 39 | 38 | 41 | 42 | 42 | R 41 | 38 | A | A | F 25 | A | |
| 7 | A | A | A | A | A | A | R 39 | A | A | 41 | B | B | B | 38 | 44 | 45 | 42 | 37 | 35 | 35 | 35 | 31 | 24 | A | |
| 8 | R 35 | B | A | A | A | B | A | A | R 41 | 41 | 39 | R 38 | 42 | 45 | 43 | 41 | 38 | 38 | 37 | 35 | R 37 | 26 | A | A | |
| 9 | A | A | A | A | A | A | A | A | A | A | R 36 | 40 | 41 | 44 | 43 | 39 | 43 | 43 | 40 | 39 | 38 | 36 | 32 | 26 | A |
| 10 | F 19 | 42 | A | A | A | A | 40 | 44 | 42 | 46 | 43 | B | 50 | 50 | 42 | 45 | 40 | 40 | 38 | 38 | 36 | 34 | 30 | F 21 | |
| 11 | 24 | 26 | 24 | 38 | A | A | 40 | F 40 | 42 | F 46 | 49 | 50 | 49 | 46 | 49 | 44 | 45 | 44 | 42 | 40 | 39 | A | 34 | 28 | |
| 12 | A | A | U 38 | R A | A | A | A | A | 42 | 44 | 44 | 44 | 50 | 52 | 55 | 50 | 48 | 42 | 40 | 44 | 41 | 35 | 33 | 33 | |
| 13 | 32 | 23 | F 24 | F 34 | F 34 | 37 | 40 | 43 | 47 | 44 | 43 | 43 | 45 | 50 | 51 | A | 42 | 42 | 41 | 38 | 38 | 34 | 30 | 31 | |
| 14 | 25 | 26 | A | A | A | A | 46 | 46 | 46 | 52 | 46 | 46 | 50 | 50 | 53 | 50 | 47 | 42 | 40 | 36 | 36 | 33 | 29 | F 35 | |
| 15 | 36 | 31 | A | A | 32 | 52 | F 48 | F 49 | F 51 | F 50 | 48 | A | A | 50 | 48 | 49 | 52 | 45 | 41 | 36 | 36 | F 36 | F 36 | 23 | |
| 16 | A | A | A | A | A | A | A | F 39 | 40 | 46 | 50 | 49 | 49 | 49 | 46 | R 46 | 40 | 42 | 40 | 38 | 34 | F 31 | 32 | 33 | |
| 17 | 41 | 36 | 39 | F 32 | F 42 | A | F 40 | F 46 | F 48 | F 48 | F 52 | F 49 | 51 | 52 | 45 | 41 | 40 | 38 | 38 | A | 40 | R 34 | 26 | 37 | |
| 18 | A | A | A | A | A | A | 37 | A | A | A | A | B | B | B | R 38 | R 42 | R 43 | R 36 | A | A | A | A | A | A | A |
| 19 | A | A | A | A | A | A | R 34 | A | A | A | A | R 35 | B | B | B | B | B | B | 39 | 34 | 32 | 24 | A | A | |
| 20 | A | A | A | A | A | A | A | A | A | A | B | 34 | 39 | 37 | 36 | 36 | 43 | 44 | 38 | 37 | 35 | 34 | 28 | A | A |
| 21 | A | A | A | A | B | B | A | A | A | A | A | A | B | B | B | 42 | 37 | 33 | 33 | 34 | B | A | 22 | A | A |
| 22 | A | A | A | A | A | B | A | A | 37 | 38 | B | R 34 | 41 | 41 | 40 | 41 | 40 | 38 | 39 | R 34 | 30 | A | A | A | A |
| 23 | R 28 | A | A | A | A | 26 | 31 | 35 | 38 | 40 | 42 | 43 | 44 | 44 | 41 | 44 | 40 | 38 | 40 | 34 | 31 | 22 | A | A | |
| 24 | A | A | A | A | A | A | A | A | 34 | 34 | 35 | 35 | 41 | 42 | 43 | 43 | 42 | 40 | 38 | 35 | 32 | 26 | 23 | 16 | |
| 25 | R 22 | A | A | A | A | A | A | 37 | 38 | 39 | 40 | 42 | 46 | 46 | 47 | 46 | 46 | 43 | 38 | 35 | 30 | 26 | F 22 | F 18 | |
| 26 | 15 | F 16 | A | 29 | F 26 | 36 | 38 | 42 | 42 | 43 | 43 | 44 | 48 | 50 | 58 | 53 | 48 | 43 | 40 | 36 | 34 | F 35 | F 34 | A | |
| 27 | A | A | A | A | B | A | 32 | 40 | 42 | 42 | 43 | 41 | 44 | 50 | 53 | 54 | F 48 | 43 | 39 | 38 | 33 | 30 | 24 | 18 | |
| 28 | 18 | A | A | A | A | A | A | A | 37 | 40 | 40 | 37 | 42 | 45 | 48 | 54 | 46 | 43 | 42 | 40 | 35 | 28 | 24 | 22 | |
| 29 | A | A | A | A | A | A | A | 45 | 44 | 43 | 43 | 43 | 47 | 52 | 53 | 48 | 44 | 44 | 36 | 39 | B | 20 | A | A | |
| 30 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
| CNT | 14 | 10 | 6 | 6 | 6 | 8 | 15 | 16 | 22 | 24 | 21 | 24 | 24 | 26 | 27 | 27 | 28 | 28 | 28 | 27 | 25 | 24 | 21 | 15 | |
| MED | 26 | 26 | 30 | 33 | 34 | 36 | 39 | 41 | 42 | 42 | 43 | 43 | 45 | 46 | 45 | 44 | 43 | 42 | 39 | 38 | 35 | 31 | 29 | 28 | |
| U Q | 35 | 35 | 38 | 35 | 40 | 40 | F 40 | 45 | 44 | 46 | 47 | 45 | 48 | 50 | 49 | 48 | 46 | 42 | 40 | 38 | 37 | 34 | 34 | 33 | |
| L Q | 22 | F 23 | 24 | 29 | 32 | 33 | 37 | 40 | 40 | 40 | 41 | 38 | 42 | 43 | 42 | 42 | 40 | 38 | 38 | 35 | 34 | 26 | 24 | 21 | |

FEB. 2020 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2020 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

| $\begin{matrix} H \\ D \end{matrix}$ | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | |
|--------------------------------------|-----------|----------|----|----|----|----|----|----|----|----|-----------|-----------|---------------|-----------|---------------|---------------|----|-------------------|---------------|----|-----------|-----|-----|----------|----|----|
| 1 | 17 | 55 | 46 | 50 | 55 | 58 | 48 | 48 | 59 | 29 | 34 | 34 | 31 | 39 | 45 | J A 51 | 28 | 28 | 26 | G | 26 | 26 | 22 | 17 | | |
| 2 | 53 | 64 | 38 | 51 | 56 | 39 | 52 | 25 | G | 28 | 31 | 31 | 30 | 30 | 34 | 34 | 42 | 27 | 24 | 19 | 22 | 21 | 41 | 42 | | |
| 3 | 42 | 36 | 50 | 55 | 38 | 51 | 32 | 58 | 56 | 49 | 36 | 27 | 31 | G | A E B 35 | 26 | 31 | 31 | 28 | 64 | 27 | 19 | G | G | | |
| 4 | 15 | 53 | 28 | 18 | 18 | 37 | 57 | 48 | 36 | G | G | G | 18 | 17 | 30 | 43 | 42 | 32 | 28 | G | E B 60 | 21 | 84 | 58 | 29 | 42 |
| 5 | 91 | 53 | 54 | 30 | 30 | 58 | 47 | 34 | 27 | G | B | 40 | 31 | 39 | 66 | 64 | 29 | 24 | 32 | 57 | G | G | G | 15 | | |
| 6 | 36 | 30 | 16 | 68 | 49 | 54 | 30 | 25 | 25 | 53 | 59 | 55 | 30 | 58 | 27 | G | G | 22 | 28 | 57 | G | 45 | 46 | 46 | 51 | |
| 7 | 49 | 49 | 50 | 49 | 42 | 63 | 54 | 54 | 68 | 34 | B | B | B | E B 31 | 67 | E B 28 | B | B | 53 | 87 | 56 | G | 14 | 36 | | |
| 8 | 36 | B | 53 | 61 | 72 | 44 | 51 | 57 | 58 | G | 30 | 34 | G | 69 | 28 | G | 27 | 51 | E B E B 24 | 20 | 21 | 16 | 34 | 39 | | |
| 9 | 45 | 40 | 44 | 46 | 48 | 52 | 52 | 56 | 60 | 60 | E B 36 | G | E B 30 | G | 29 | 29 | G | 27 | 59 | 59 | 31 | 18 | 26 | 34 | | |
| 10 | 15 | 38 | 52 | 55 | 35 | 52 | 31 | 24 | 25 | 28 | 25 | B | E B 33 | G | G | G | 24 | G | E B 23 | 22 | 23 | 17 | 14 | 19 | | |
| 11 | 13 | 78 | 21 | 33 | 48 | 40 | 38 | 38 | 34 | 28 | 28 | 27 | 29 | 67 | 71 | 50 | 28 | G | 22 | 24 | 51 | 72 | 149 | 73 | | |
| 12 | 58 | 44 | 48 | 53 | 66 | 58 | 58 | 44 | 58 | 14 | 32 | 32 | 40 | 47 | 35 | 35 | 35 | 28 | 28 | 26 | 20 | 20 | 20 | 11 | | |
| 13 | E B 10 | 56 | 58 | 56 | 57 | 53 | 29 | G | 29 | G | 30 | 32 | 56 | 40 | 68 | 30 | 30 | 39 | 47 | 29 | 28 | 48 | 58 | | | |
| 14 | 61 | 32 | 41 | 56 | 54 | 62 | 37 | 47 | 32 | 72 | 30 | 28 | 30 | 29 | 29 | 24 | G | 28 | 28 | 59 | 15 | 18 | 20 | 20 | 43 | |
| 15 | 26 | E B 9 | 41 | 44 | 40 | 30 | 30 | 35 | 35 | 32 | 32 | 60 | 65 | 55 | 34 | 34 | 27 | 25 | 26 | 23 | 23 | 44 | 29 | 28 | | |
| 16 | 33 | 46 | 51 | 51 | 48 | 57 | 57 | 35 | 12 | 27 | 29 | 38 | 29 | 30 | 27 | 38 | 38 | 28 | 31 | 34 | 34 | G | 58 | 48 | | |
| 17 | 36 | 22 | 12 | 55 | 40 | 59 | 39 | 23 | 26 | 26 | 28 | 28 | 37 | 67 | 30 | 38 | 63 | 81 | 69 | 72 | 58 | 150 | 13 | 36 | | |
| 18 | 52 | 45 | 48 | 54 | 46 | 46 | 24 | 47 | 65 | 62 | 56 | B | B | B | E B E B 33 | 26 | 27 | 25 | 48 | 56 | 82 | 82 | 82 | 56 | | |
| 19 | 54 | 64 | 57 | 47 | 39 | 29 | G | 55 | 58 | 50 | 48 | 28 | B | B | B | B | B | B | 34 | 86 | 85 | 19 | 47 | 24 | | |
| 20 | 48 | 50 | 57 | 57 | 40 | 29 | 47 | 46 | 42 | 51 | B | E B 34 | 29 | 23 | 22 | 24 | G | E B E B E B 33 | 24 | 24 | 24 | 24 | 21 | 88 | 31 | |
| 21 | 55 | 37 | 74 | 67 | B | 49 | 46 | 55 | 56 | 54 | 52 | 46 | B | B | B | E B E B 32 | 26 | 27 | 43 | G | B | 34 | 32 | 48 | | |
| 22 | 57 | 70 | 62 | 50 | 57 | 55 | 57 | 40 | G | 26 | B | 57 | E B E B 29 | 27 | 59 | 27 | G | G | 21 | 21 | 18 | 28 | 41 | 51 | | |
| 23 | 51 | 58 | 46 | 60 | 40 | 22 | 19 | 84 | 24 | G | 27 | 26 | 29 | 29 | 28 | 24 | G | G | 24 | 24 | 20 | G | 36 | 44 | | |
| 24 | 63 | 74 | 64 | 48 | 56 | 60 | 49 | 49 | 24 | 56 | 52 | 26 | 25 | 25 | 63 | G | 25 | 12 | 20 | G | G | 11 | 12 | E B 9 | 52 | |
| 25 | 35 | 35 | 39 | 44 | 54 | 52 | 45 | G | 23 | 23 | 24 | 27 | 27 | 26 | 26 | 20 | G | G | 22 | 22 | 20 | G | 15 | 54 | 44 | 44 |
| 26 | 33 | 15 | 56 | 48 | 55 | 15 | 56 | 20 | 22 | 24 | 29 | 28 | 27 | 27 | 24 | G | G | G | 14 | 18 | 18 | 12 | 12 | 42 | | |
| 27 | 45 | 37 | 33 | 39 | 69 | 48 | 33 | 97 | 22 | 58 | 61 | 29 | 28 | 27 | 27 | 28 | G | 19 | 22 | 22 | 29 | 70 | 71 | 72 | | |
| 28 | 28 | 28 | 46 | 57 | 36 | 56 | 52 | 56 | 28 | 53 | 28 | 28 | 28 | 28 | G | 32 | 32 | 23 | 20 | 19 | 25 | 18 | 12 | 12 | | |
| 29 | 40 | 83 | 71 | 54 | 50 | 59 | 39 | 20 | 22 | 30 | G | 30 | G | 30 | G | 26 | 26 | E B 24 | 24 | 18 | 41 | B | 95 | 46 | 55 | |
| 30 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | |
| CNT | 29 | 28 | 29 | 29 | 28 | 29 | 29 | 29 | 29 | 29 | 25 | 26 | 25 | 25 | 27 | 28 | 27 | 27 | 29 | 29 | 27 | 29 | 29 | 28 | | |
| MED | 42 | 46 | 48 | 51 | 48 | 52 | 46 | 46 | 29 | 29 | 30 | 29 | 30 | 30 | 30 | 28 | 27 | G | 26 | 22 | 25 | 21 | 31 | 42 | | |
| U Q | 54 | 57 | 56 | 56 | 56 | 58 | 52 | 55 | 57 | 53 | 42 | 34 | 31 | 51 | 42 | 34 | 31 | 28 | 46 | 52 | 45 | 56 | 46 | 51 | | |
| L Q | 30 | 36 | 40 | 46 | 40 | 40 | 32 | 25 | 24 | 24 | 28 | 27 | 29 | 27 | 27 | 26 | G | G | G | 24 | 22 | G | 18 | 16 | 14 | 26 |

FEB. 2020 ftEs (0.1MHz)

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IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2020 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

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

FEB. 2020 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

FEB. 2020 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 | 214 | E A 246 | A | A | A | A | A | A | 206 | H 188 | 186 | 194 | 194 | E A E A 286 220 | A | H 194 | 194 | 200 | 192 | E A 248 | A E A 290 | 246 | A | A | |
| 2 | 234 | A | A | A | A | A | 258 | 224 | 202 | 192 | 200 | 198 | 186 | 196 | 232 | 212 | 202 | 190 | 196 | 220 | 214 | 234 | A | A | |
| 3 | A | A | A | A | A | 222 | 224 | 248 | A | A | 208 | 198 | 198 | E A E B 234 248 | 208 | 208 | 222 | 216 | 216 | E A 238 | 206 | E A 234 | 242 | A | |
| 4 | 242 | 242 | E A 294 | E A 258 | 230 | A | A | A | E A 278 | 190 | 188 | 196 | 196 | 232 | 232 | 198 | 198 | 200 | 200 | 200 | 88 | 142 | 240 | A | |
| 5 | A | A | A | A | A | A | A | A | 204 | 198 | B 224 | 178 | 196 | 212 | 212 | 194 | 202 | 202 | 212 | E A 210 | H 204 | 198 | 220 | A | |
| 6 | A | A E A 236 | 248 | 230 | 246 | H 182 | 204 | 204 | A | A | 200 | 200 | 192 | 196 | 184 | H 180 | 206 | E A 262 | 218 | A | A E A 252 | A | A | A | |
| 7 | A | A | A | A | A | 216 | A | A | 190 | B 190 | B | B | E B 216 | 218 | 202 | 204 | 204 | 204 | 234 | A | A | 234 | 204 | 218 | A |
| 8 | 206 | B | A | A | A | B | A | A | 202 | 220 | 186 | 202 | 206 | 198 | 198 | 198 | 196 | 196 | 226 | E B 220 | 220 | 216 | A | A | |
| 9 | A | A | A | A | A | A | A | A | 194 | B 194 | B | 194 | 224 | 194 | 200 | 200 | 204 | 204 | 212 | 212 | 248 | 240 | 240 | A | |
| 10 | 188 | A | A | A | A | A | 202 | 210 | 200 | H 186 | B | 192 | 196 | 208 | 200 | 200 | 198 | E A E B 216 222 | 228 | 220 | 234 | 276 | A | A | |
| 11 | 246 | 246 | 276 | A | A | A | A | A | 246 | 202 | 202 | 182 | 190 | 190 | 204 | 234 | 194 | 196 | 200 | 222 | 236 | A | 240 | 240 | A |
| 12 | A | A | 218 | A | A | A | A | A | 202 | 200 | 200 | 200 | 202 | A | 196 | A | 212 | 196 | 214 | 222 | 224 | 218 | 230 | 230 | A |
| 13 | 232 | 264 | A E A 294 | E A 270 | 202 | 232 | 206 | 200 | 216 | 200 | 196 | 196 | A | 232 | A | 196 | 194 | 204 | 204 | 204 | 204 | 212 | 232 | 216 | A |
| 14 | 202 | 262 | A | A | A | E A 240 | A | 214 | 198 | 198 | 194 | 194 | 194 | 214 | 196 | 204 | 190 | 194 | 194 | 196 | 210 | 216 | 222 | A | |
| 15 | 224 | 232 | A | A | 192 | 234 | 208 | 208 | 208 | 208 | 226 | A | A | A | H 190 | 198 | E B 194 | 210 | 200 | E A E A 212 220 | 220 | 240 | 210 | A | |
| 16 | A | A | A | A | A | A | A E A 256 | 200 | 200 | 200 | 188 | 202 | 202 | 196 | 196 | 208 | 154 | 212 | 218 | A | 218 | 236 | 236 | 236 | A |
| 17 | 244 | 228 | 228 | A | A | A | A | 198 | 208 | 196 | 184 | 196 | 206 | A | 192 | 192 | 200 | 212 | 210 | A | 226 | 258 | 230 | A | |
| 18 | A | A | A | A | A | A | 200 | A | A | A | A | B | B | B | E B 258 | 218 | 232 | 248 | E B 232 | A | A | A | A | A | A |
| 19 | A | A | A | A | A | A | 202 | A | A | A | A | 224 | B | B | B | B | B | B | A | 236 | 252 | 240 | E B 258 | 198 | A |
| 20 | A | 212 | A | A | A | A | A | A | A E A 246 | B E B 234 | 188 | 188 | 188 | 204 | B | 202 | 220 | 242 | E B 226 | 244 | A | A | A | A | |
| 21 | A | A | A | A | B | B | A | A | A | A | A | A | B | B | B | E B 226 | B | E B 224 | E A 234 | 234 | B | A | A | A | A |
| 22 | A | A | A | A | A | B | A | A | 256 | 200 | B | 220 | 236 | 210 | 200 | 220 | 204 | 198 | 224 | 226 | 232 | A | A | A | A |
| 23 | 226 | A | A | A | A | A | 206 | 194 | H 184 | 208 | H 182 | 194 | 200 | 200 | 200 | 188 | 194 | 194 | 226 | 198 | 208 | 226 | A | A | A |
| 24 | A | A | A | A | A | A | A | A | 202 | 176 | 212 | 192 | 208 | 184 | 214 | 198 | 200 | 194 | 200 | 190 | 204 | 226 | 234 | A | A |
| 25 | 214 | A | A | A | A | A | 240 | 214 | 196 | 198 | H 188 | 198 | 198 | 198 | 198 | 198 | 198 | 200 | 202 | E A 214 | 214 | 214 | 230 | 252 | A |
| 26 | 286 | 288 | A | A | E A 278 | E A 246 | 238 | 218 | 192 | 202 | 202 | 184 | 196 | 198 | 198 | 206 | 202 | 234 | 200 | 212 | 220 | 218 | 208 | A | |
| 27 | A | A | A | A | B | A | A | 208 | 188 | 176 | H 192 | 220 | 190 | 198 | 216 | 202 | 210 | 200 | 188 | 214 | E A 222 | 222 | 234 | E A 266 | A |
| 28 | E A 302 | A | A | A | A | A | A | A | 232 | 198 | 196 | 210 | 196 | 206 | 206 | H 194 | 194 | 200 | 194 | H 218 | 218 | 220 | 220 | 250 | A |
| 29 | A | A | A | A | A | A | 196 | 200 | 200 | 192 | 196 | 190 | H 204 | 196 | 204 | 208 | 208 | 200 | A | B | A | A | A | A | A |
| 30 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
| CNT | 14 | 9 | 5 | 3 | 5 | 5 | 11 | 13 | 22 | 24 | 20 | 24 | 24 | 22 | 27 | 25 | 26 | 28 | 28 | 26 | 25 | 22 | 20 | 13 | |
| MED | 227 | 246 | 232 | E A 258 | 230 | 228 | 212 | 207 | 204 | 198 | 198 | 196 | 196 | 197 | 202 | 200 | 200 | 200 | 202 | 215 | 219 | 218 | 232 | 235 | A |
| U Q | 244 | 263 | 285 | E A 294 | 274 | 246 | 238 | 232 | 214 | 202 | 201 | 206 | 202 | 206 | 218 | 210 | 204 | 207 | 218 | 222 | 233 | 236 | 238 | 251 | A |
| L Q | 214 | 230 | 223 | 248 | 211 | 212 | 202 | 200 | 200 | 193 | 187 | 194 | 191 | 194 | 196 | 197 | 194 | 195 | 200 | 212 | 212 | 212 | 219 | 221 | A |

FEB. 2020 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAR. 2020 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 | B | A | O | X | O | X | X | X | B | X | X | O | X | X | X | X | X | X | O | X | |
| 2 | X | A | | A | A | A | A | A | A | 43 | 45 | 46 | 46 | 48 | 45 | 50 | 53 | 50 | 49 | 44 | 40 | 35 | 32 | 31 | X | |
| 3 | X | 57 | X | 72 | A | A | A | A | X | X | X | X | X | X | X | X | X | X | X | X | X | | A | R | X | |
| 4 | A | A | A | A | 56 | X | O | X | A | X | O | X | X | X | X | X | B | B | B | | | R | A | A | A | |
| 5 | A | A | A | 48 | 41 | A | X | A | A | A | X | X | X | X | X | X | X | X | X | X | X | A | A | A | X | |
| 6 | X | 24 | X | 35 | 68 | A | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | |
| 7 | 29 | 28 | X | 20 | 42 | O | X | X | X | B | R | O | X | X | O | X | X | O | X | O | X | A | A | O | X | |
| 8 | O | X | X | X | X | X | X | X | X | X | X | X | O | X | X | X | X | X | X | X | X | X | O | X | B | |
| 9 | 57 | A | 57 | A | 45 | 37 | 42 | 40 | 30 | 32 | | 48 | 50 | 53 | 58 | 53 | 47 | 44 | 42 | 41 | 33 | | | A | A | |
| 10 | A | A | A | A | A | O | X | X | | X | X | X | X | X | X | X | X | X | X | X | X | X | A | A | A | |
| 11 | X | A | | A | A | A | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | A | A | A | A | |
| 12 | A | A | 52 | 90 | 74 | A | A | A | A | X | O | X | X | X | X | X | X | X | X | X | X | A | | O | X | |
| 13 | 54 | 73 | A | A | 47 | 44 | | | | 37 | 46 | 46 | 46 | 50 | 51 | 56 | 48 | 44 | 46 | 44 | 32 | | 38 | R | | |
| 14 | A | A | A | A | O | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | O | X | A | |
| 15 | 28 | A | O | X | O | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | A | A | A | |
| 16 | 60 | 57 | A | A | A | A | A | A | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | A | A | |
| 17 | A | A | A | A | A | A | A | A | 36 | 42 | 45 | 44 | 46 | 48 | 50 | 56 | 52 | 48 | 44 | 43 | 36 | 24 | | A | A | |
| 18 | A | X | A | A | A | O | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | A | A | A | A | |
| 19 | A | A | A | O | X | A | A | A | A | R | B | X | B | O | X | X | X | X | B | O | X | B | A | A | A | |
| 20 | A | A | A | A | A | A | A | X | X | X | O | X | X | X | X | X | X | X | X | X | X | A | A | A | A | |
| 21 | A | A | A | B | A | A | A | X | O | X | B | B | B | O | X | X | O | X | X | B | B | O | X | A | A | |
| 22 | 56 | 43 | A | A | A | A | A | A | X | X | X | X | X | X | X | X | X | X | X | X | X | B | O | X | A | |
| 23 | A | A | A | A | A | A | B | A | A | X | X | X | X | X | X | X | B | O | X | B | B | X | | A | A | |
| 24 | R | A | A | B | A | A | A | A | X | X | X | X | X | X | X | X | X | X | X | X | X | O | X | O | X | |
| 25 | O | X | O | X | X | A | A | A | O | X | X | X | X | X | X | X | X | X | X | X | X | O | X | X | O | X |
| 26 | A | A | A | A | A | A | A | X | X | X | X | X | X | X | X | X | X | X | X | X | X | O | X | O | X | |
| 27 | O | X | | A | A | A | A | A | A | R | X | X | X | X | X | X | X | X | X | X | X | X | A | A | A | |
| 28 | A | A | A | A | A | A | O | X | O | X | X | X | X | X | X | X | B | X | X | X | O | X | X | R | A | |
| 29 | 70 | A | A | A | A | O | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | B | A | A | R | |
| 30 | A | A | A | A | A | A | R | O | X | A | B | X | B | B | O | X | X | X | O | X | B | B | O | X | A | |
| 31 | A | A | A | A | 53 | A | A | O | X | B | A | B | B | B | B | O | X | X | B | X | O | X | 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 | 14 | 10 | 11 | 8 | 11 | 9 | 15 | 19 | 23 | 25 | 26 | 28 | 27 | 30 | 30 | 29 | 29 | 27 | 28 | 26 | 21 | 12 | 11 | 10 | | |
| MED | 29 | 44 | 38 | 42 | 45 | 31 | 34 | 36 | 41 | 43 | 46 | 47 | 50 | 50 | 52 | 50 | 49 | 46 | 43 | 38 | 32 | 28 | 32 | 30 | | |
| U Q | 56 | 57 | 46 | 63 | 56 | 34 | 41 | 39 | 43 | 46 | 47 | 50 | 51 | 53 | 56 | 53 | 52 | 48 | 44 | 40 | 34 | 37 | 86 | 33 | | |
| L Q | X | X | X | O | X | O | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | O | X | O | X | |
| | 26 | 28 | 24 | 25 | 32 | 24 | 28 | 34 | 38 | 42 | 44 | 46 | 48 | 49 | 50 | 48 | 46 | 44 | 40 | 34 | 25 | 24 | 29 | 26 | | |

MAR. 2020 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAR. 2020 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 | B | A | 28 | 34 | 32 | 36 | 38 | B | 40 | 41 | 44 | 38 | 37 | 34 | 34 | 30 | 24 | 21 | R | 19 |
| 2 | 22 | A | A | A | A | A | A | A | 37 | 39 | 40 | 40 | 42 | 39 | 44 | 47 | 44 | 43 | 38 | 34 | 29 | 26 | 25 | 27 | |
| 3 | 26 | A | 40 | R | A | A | A | A | 37 | 39 | 39 | 41 | 44 | 42 | 44 | 45 | 44 | 40 | 40 | 33 | F | A | R | 25 | |
| 4 | A | A | A | A | A | 25 | R | A | 39 | 40 | 41 | 44 | 42 | 45 | 48 | B | B | B | 38 | F | A | A | A | A | |
| 5 | A | A | A | A | A | A | A | A | 42 | 44 | 42 | 44 | 47 | 47 | 42 | 42 | 39 | 40 | 36 | A | A | A | A | 20 | |
| 6 | 20 | 18 | 18 | A | A | A | 38 | 42 | 42 | 42 | 42 | 46 | 46 | 50 | 52 | 61 | 60 | 40 | 38 | 32 | 32 | F | 28 | 26 | 22 |
| 7 | F | 20 | 22 | 16 | 14 | 18 | 29 | 33 | 34 | B | R | R | 37 | 41 | 44 | F | 43 | 46 | 43 | 40 | 38 | A | A | R | R |
| 8 | 19 | 18 | 17 | 20 | 20 | F | F | F | R | R | A | 41 | 44 | 47 | 50 | 48 | 43 | 44 | 38 | 34 | 28 | R | B | A | |
| 9 | A | A | A | A | A | F | F | F | R | R | A | 42 | 44 | 47 | F | 46 | 47 | 41 | 38 | 36 | 35 | 27 | A | A | A |
| 10 | A | A | A | A | A | A | 32 | 34 | 35 | 39 | 39 | 41 | 44 | 46 | 48 | 45 | 41 | 40 | 36 | 30 | 26 | A | A | A | |
| 11 | 15 | A | F | A | A | A | 28 | 33 | 37 | 41 | 41 | 42 | 45 | 47 | 50 | 46 | 46 | 41 | 38 | 34 | A | A | A | A | |
| 12 | A | A | F | A | A | A | A | A | A | 41 | 42 | 45 | 50 | 53 | 53 | 51 | 46 | 48 | 44 | 36 | A | A | A | R | |
| 13 | A | A | A | A | A | R | A | A | A | 31 | 40 | 40 | 40 | 44 | 45 | F | 45 | 42 | 38 | 40 | F | 33 | 26 | A | R |
| 14 | A | A | A | A | R | 21 | 26 | 30 | 32 | 36 | 42 | 41 | 45 | 47 | 49 | 49 | 46 | 43 | 39 | 32 | 26 | 21 | R | A | |
| 15 | A | A | 18 | 18 | 26 | 26 | 25 | 30 | 37 | 36 | 40 | 44 | 47 | 49 | 50 | 51 | 46 | 41 | 37 | 30 | 28 | F | A | A | |
| 16 | A | A | A | A | A | A | A | A | 35 | 37 | 39 | 44 | 47 | 51 | 42 | 44 | 48 | 44 | 40 | 36 | 24 | A | A | A | |
| 17 | A | A | A | A | A | A | A | A | 30 | 36 | 39 | 38 | 40 | 42 | 44 | 50 | 46 | 42 | 38 | 37 | 30 | R | A | A | |
| 18 | A | 50 | A | A | A | R | J | R | 23 | 31 | 29 | 36 | 40 | 44 | 42 | 44 | 45 | 44 | 40 | 38 | 38 | 30 | 26 | A | A |
| 19 | A | A | A | R | A | A | A | A | A | A | B | 38 | B | 43 | 43 | 42 | 38 | B | 36 | 27 | B | A | A | A | |
| 20 | A | A | A | A | A | A | A | A | 28 | 28 | 36 | 38 | 43 | 48 | 46 | 43 | 41 | 38 | 37 | 33 | 26 | A | A | A | |
| 21 | A | A | A | B | A | A | A | 26 | 28 | B | B | B | R | 38 | 43 | 44 | 39 | 38 | B | B | U | R | A | A | |
| 22 | A | A | A | A | A | A | A | A | 33 | 36 | 38 | 39 | 40 | 44 | 45 | 38 | 38 | 35 | 33 | B | 19 | 16 | R | A | |
| 23 | A | A | A | A | A | A | B | A | A | 36 | 38 | 39 | 40 | 41 | 48 | B | R | B | B | 26 | A | A | A | A | |
| 24 | A | A | A | B | A | A | A | A | 33 | 30 | 34 | 40 | 42 | 40 | 40 | 40 | 37 | 39 | 33 | 27 | 17 | 15 | R | A | |
| 25 | 23 | R | 20 | A | A | A | 22 | 28 | 36 | 38 | 40 | 42 | 44 | 44 | 45 | 41 | 44 | 38 | 35 | 28 | 20 | 18 | 14 | R | |
| 26 | A | A | R | A | A | A | 19 | 28 | J | R | 40 | 41 | 43 | 44 | 42 | 48 | 45 | 49 | 41 | 36 | 29 | 19 | R | 20 | |
| 27 | U | R | A | A | A | A | A | A | A | A | 38 | 40 | 42 | 42 | 43 | 42 | 43 | 42 | 34 | F | R | A | A | A | |
| 28 | A | A | A | A | A | A | 17 | 29 | 32 | 31 | 43 | 46 | V | 49 | 51 | B | 44 | 53 | 40 | 31 | 22 | 16 | A | A | |
| 29 | A | A | A | A | A | 17 | 14 | 24 | 34 | 35 | 36 | 40 | 43 | 45 | 45 | 44 | 46 | 46 | 34 | B | A | A | A | A | |
| 30 | A | A | A | A | A | A | R | R | A | B | B | B | B | 46 | 46 | 43 | 39 | 35 | B | U | R | A | A | A | |
| 31 | A | A | A | A | A | A | A | R | B | A | B | B | B | B | B | R | B | 34 | 31 | 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 | 8 | 5 | 9 | 6 | 3 | 9 | 15 | 19 | 23 | 25 | 26 | 28 | 27 | 30 | 30 | 29 | 29 | 27 | 28 | 26 | 21 | 10 | 7 | 9 | |
| MED | 20 | 22 | 20 | 28 | 20 | 21 | 28 | 29 | 35 | 37 | 40 | 41 | 44 | 44 | 45 | 44 | 43 | 40 | 37 | 31 | 26 | 20 | 25 | R | 23 |
| U Q | 22 | 44 | 37 | 38 | 26 | 27 | 32 | 31 | 37 | 40 | 41 | 44 | 45 | 47 | 48 | 46 | 46 | 42 | 38 | 34 | 28 | 24 | R | 26 | 26 |
| L Q | 18 | 18 | 18 | 18 | R | 18 | 22 | 28 | 32 | 36 | 38 | 40 | 42 | 43 | 43 | 42 | 40 | 38 | 34 | 27 | 19 | R | 16 | R | 20 |

MAR. 2020 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAR. 2020 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 | 59 | 63 | 58 | A | 58 | B | 33 | G | 45 | 30 | 25 | 25 | B | 29 | 57 | E | B | B | B | B | B | 21 | 18 | 14 | 10 | 14 | |
| 2 | 53 | 35 | 35 | 56 | 56 | 56 | 56 | 56 | 33 | 23 | 23 | G | 27 | 29 | 28 | 28 | 28 | 25 | G | 18 | 66 | 69 | 55 | 15 | | | |
| 3 | 15 | 32 | 38 | 46 | 62 | 58 | 54 | 49 | 24 | G | 28 | 26 | 29 | 29 | 20 | 26 | G | E | B | B | 21 | 18 | 15 | 34 | 27 | 26 | |
| 4 | 38 | 50 | 42 | 49 | K | G | 52 | 48 | G | 32 | G | 29 | 29 | E | B | B | B | B | G | 28 | G | 36 | 35 | 52 | E | B | |
| 5 | 49 | 38 | 29 | 39 | 27 | 50 | 48 | 51 | 52 | 52 | 24 | 25 | 30 | 27 | 27 | 27 | 26 | 25 | 30 | 36 | 41 | 51 | 37 | 8 | E | B | |
| 6 | 14 | 35 | 34 | 27 | 22 | 36 | 54 | 22 | G | 24 | 25 | 25 | 25 | 35 | 28 | E | B | B | B | G | 28 | 14 | 40 | 31 | | | |
| 7 | E | B | 47 | 28 | 56 | 58 | 49 | 14 | G | B | G | 42 | 40 | 28 | 34 | G | 28 | E | B | 48 | 158 | 80 | 79 | 58 | 28 | | |
| 8 | 46 | 53 | 53 | 48 | 53 | 45 | 21 | 21 | 21 | G | E | B | G | 31 | 28 | 29 | 27 | 26 | 22 | 22 | 27 | E | B | E | B | B | 42 |
| 9 | 44 | 43 | 42 | 36 | 45 | G | 23 | 40 | 50 | 51 | 52 | G | 25 | 29 | G | 25 | G | G | 22 | 22 | 30 | E | B | 32 | 28 | 30 | |
| 10 | 42 | 42 | 58 | 66 | 56 | 46 | 17 | 67 | 18 | G | 66 | 23 | 26 | G | 26 | 26 | 23 | 23 | 22 | 18 | 18 | 45 | 58 | 52 | | | |
| 11 | 46 | 57 | 55 | 46 | 49 | 30 | 15 | 18 | 22 | 24 | 32 | 52 | 53 | 48 | 46 | 30 | 41 | 37 | 30 | 30 | 37 | 28 | 28 | 48 | | | |
| 12 | 42 | 57 | 31 | 41 | 43 | 53 | 59 | 59 | 50 | 32 | E | B | G | G | 25 | 23 | 25 | 24 | 36 | G | 22 | 42 | 48 | 53 | 43 | | |
| 13 | 44 | 37 | 36 | 36 | 36 | 24 | 66 | 60 | 55 | G | 26 | 50 | G | 27 | 30 | 23 | 23 | 23 | 23 | 23 | 15 | 36 | 32 | 23 | | | |
| 14 | 37 | 45 | 45 | 30 | 51 | 68 | 65 | 21 | 20 | 20 | 24 | 27 | 25 | 28 | 24 | 26 | 30 | 20 | 20 | 14 | 28 | 52 | 45 | 22 | | | |
| 15 | K | 31 | 57 | 30 | 18 | 49 | 59 | 18 | G | 21 | 22 | 24 | 25 | 25 | 25 | 22 | 23 | 23 | 26 | 24 | 12 | 57 | 36 | 41 | | | |
| 16 | 43 | 45 | 56 | 57 | 60 | 58 | 58 | 49 | 22 | 21 | 26 | 25 | 25 | 25 | 25 | 22 | 24 | 22 | 14 | 14 | 46 | 52 | 47 | | | | |
| 17 | 47 | 49 | 44 | 49 | 33 | 49 | 43 | G | G | G | 20 | G | G | 25 | 23 | 18 | G | G | G | 53 | 28 | 29 | 46 | 41 | | | |
| 18 | 39 | 46 | 50 | 61 | 46 | 53 | G | G | G | G | 62 | 20 | G | G | 20 | G | 16 | 20 | 19 | G | E | B | 9 | 43 | 45 | 47 | |
| 19 | 40 | 58 | 42 | 39 | 47 | 58 | 50 | 54 | 54 | 45 | B | 62 | B | E | B | E | B | E | B | B | B | 24 | 42 | 42 | | | |
| 20 | 44 | 52 | 48 | 77 | 43 | 40 | 28 | G | G | G | E | B | E | B | G | G | 20 | 20 | 20 | 17 | 17 | 37 | 40 | 94 | 59 | | |
| 21 | 44 | 56 | 65 | B | 53 | 44 | 47 | 57 | 57 | B | B | B | E | B | E | B | E | B | B | B | E | B | 18 | 40 | 32 | 26 | |
| 22 | 39 | 36 | 50 | 56 | 52 | 55 | 53 | 64 | 18 | 32 | G | 25 | 25 | 27 | 24 | 29 | 35 | 20 | 15 | B | 30 | 28 | 37 | 67 | | | |
| 23 | 46 | 81 | 50 | 57 | 70 | 51 | 55 | 50 | 48 | G | 24 | 23 | G | 66 | 23 | E | B | B | B | B | 40 | 34 | 42 | 40 | | | |
| 24 | 28 | 28 | 36 | B | 62 | 61 | 66 | 52 | 50 | 22 | G | 22 | G | 22 | 17 | 24 | G | E | B | E | B | E | B | 11 | 10 | 21 | 35 |
| 25 | 56 | 38 | 27 | 49 | 58 | 58 | 70 | G | 50 | 23 | 64 | 15 | G | 22 | 24 | 22 | G | E | B | E | B | E | B | 9 | 61 | 64 | 21 |
| 26 | 38 | 64 | 44 | 66 | 42 | 65 | 51 | G | G | 88 | G | 24 | G | G | 29 | 23 | 23 | 23 | 30 | 57 | 45 | 44 | 50 | 39 | | | |
| 27 | 28 | 33 | 76 | 58 | 58 | 51 | 54 | 56 | 47 | 40 | G | 25 | 24 | 26 | 26 | G | 23 | 20 | 14 | 11 | 10 | 37 | 32 | 40 | | | |
| 28 | 40 | 30 | 30 | 38 | 32 | 55 | 44 | 44 | E | B | E | B | E | B | E | B | E | B | E | B | 54 | 14 | 18 | 40 | 31 | | |
| 29 | 48 | 68 | 55 | 56 | 37 | 56 | E | B | G | 22 | 22 | 23 | E | B | E | B | E | B | E | B | B | 79 | 48 | 27 | 36 | | |
| 30 | 43 | 48 | 77 | 95 | 50 | 46 | 22 | 25 | 42 | B | B | B | B | E | B | E | B | E | B | B | 32 | 38 | 40 | 57 | | | |
| 31 | 88 | 55 | 55 | 54 | 53 | 53 | 54 | 22 | B | 53 | B | B | B | B | E | B | E | B | B | E | B | 56 | 65 | 40 | 40 | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | | |
| CNT | 31 | 31 | 31 | 28 | 31 | 30 | 31 | 31 | 30 | 28 | 28 | 28 | 27 | 30 | 30 | 29 | 29 | 27 | 28 | 28 | 30 | 31 | 30 | 31 | | | |
| MED | 43 | 45 | 47 | 49 | 50 | 52 | 51 | 44 | 50 | G | 28 | G | 25 | 28 | 25 | 24 | G | 22 | 20 | 20 | 23 | 38 | 40 | 40 | | | |
| U Q | 46 | 56 | 55 | 57 | 56 | 58 | 56 | 54 | G | 32 | G | 26 | 28 | 29 | 28 | 26 | 28 | 25 | 22 | 30 | 40 | 48 | 50 | 47 | | | |
| L Q | 38 | 35 | 36 | 38 | 37 | 45 | 28 | 25 | 22 | 22 | 24 | 23 | G | 26 | 24 | G | 23 | E | B | E | B | 14 | 28 | 32 | 26 | | |

MAR. 2020 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAR. 2020 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| $\begin{matrix} H \\ D \end{matrix}$ | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | |
|--------------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|
| 1 | 16 | 13 | 13 | 10 | 11 | B | 11 | 12 | 9 | 9 | 12 | 12 | B | 18 | 18 | 30 | 26 | 24 | 20 | 16 | 14 | 9 | 6 | 9 | | |
| 2 | 10 | 8 | 8 | 12 | 18 | 19 | 19 | 10 | 10 | 9 | 10 | 10 | 10 | 10 | 8 | 8 | 14 | 20 | 12 | 9 | 9 | 11 | 9 | 8 | | |
| 3 | 8 | 8 | 10 | 16 | 16 | 14 | 14 | 9 | 9 | 10 | 14 | 12 | 12 | 12 | 12 | 12 | B | B | B | 30 | 8 | 7 | 10 | 9 | 8 | 6 |
| 4 | 9 | 15 | 14 | 13 | 12 | 10 | 9 | 20 | 10 | 13 | 13 | 13 | 16 | 28 | 25 | | | | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| 5 | 12 | 9 | 6 | 9 | 7 | 9 | 15 | 8 | 10 | 12 | 11 | 11 | 11 | 10 | 10 | 9 | 10 | 10 | 7 | 9 | 8 | 8 | 8 | 8 | 8 | |
| 6 | 9 | 7 | 7 | 7 | 8 | 7 | 8 | 9 | 9 | 8 | 10 | 11 | 10 | 10 | 12 | 37 | 28 | 15 | 12 | 12 | 9 | 9 | 9 | 9 | 9 | |
| 7 | 9 | 9 | 8 | 8 | 9 | 13 | 10 | 10 | 12 | B | 15 | 21 | 16 | 14 | 8 | 10 | 14 | 31 | 20 | 10 | 16 | 14 | 12 | 12 | | |
| 8 | 10 | 7 | 9 | 7 | 9 | 10 | 8 | 8 | 8 | 14 | 24 | 15 | 14 | 12 | 13 | 11 | 9 | 9 | 9 | 8 | 12 | 18 | B | 8 | | |
| 9 | 12 | 12 | 12 | 8 | 10 | 10 | 7 | 10 | 17 | 14 | 12 | 16 | 11 | 16 | 10 | 13 | 9 | 15 | 9 | 12 | 17 | 9 | 9 | 6 | | |
| 10 | 9 | 12 | 13 | 11 | 11 | 11 | 8 | 6 | 8 | 8 | 8 | 9 | 8 | 10 | 8 | 8 | 9 | 9 | 7 | 7 | 7 | 9 | 7 | 7 | | |
| 11 | 9 | 8 | 10 | 12 | 12 | 10 | 6 | 8 | 8 | 9 | 11 | 10 | 9 | 9 | 8 | 8 | 9 | 9 | 8 | 7 | 10 | 6 | 8 | 7 | | |
| 12 | 7 | 9 | 10 | 10 | 10 | 14 | 15 | 7 | 8 | 8 | 36 | 16 | 18 | 12 | 10 | 10 | 8 | 8 | 52 | 14 | 19 | 13 | 13 | 13 | | |
| 13 | 11 | 11 | 9 | 9 | 10 | 12 | 16 | 15 | 14 | 12 | 12 | 16 | 15 | 11 | 14 | 14 | 10 | 10 | 10 | 9 | 7 | 7 | 9 | 9 | | |
| 14 | 6 | 8 | 10 | 13 | 8 | 11 | 6 | 8 | 8 | 10 | 10 | 14 | 10 | 10 | 12 | 12 | 12 | 10 | 11 | 8 | 7 | 10 | 7 | 7 | | |
| 15 | 7 | 7 | 8 | 9 | 8 | 10 | 8 | 9 | 8 | 10 | 9 | 9 | 7 | 8 | 15 | 13 | 15 | 12 | 12 | 13 | 9 | 9 | 10 | 10 | | |
| 16 | 11 | 14 | 11 | 12 | 15 | 15 | 15 | 11 | 9 | 8 | 8 | 8 | 10 | 11 | 10 | 10 | 15 | 23 | 22 | 14 | 14 | 9 | 14 | 10 | | |
| 17 | 10 | 12 | 9 | 20 | 11 | 11 | 11 | 9 | 9 | 9 | 9 | 8 | 10 | 8 | 12 | 10 | 9 | 9 | 9 | 17 | 8 | 8 | 11 | 7 | | |
| 18 | 8 | 24 | 19 | 14 | 9 | 17 | 11 | 11 | 11 | 9 | 17 | 16 | 18 | 18 | 17 | 14 | 11 | 9 | 10 | 10 | 8 | 10 | 10 | 7 | | |
| 19 | 17 | 9 | 12 | 9 | 13 | 34 | 24 | 38 | 24 | 24 | B | 25 | B | 34 | 27 | 24 | 22 | B | 25 | 16 | B | 8 | 7 | 9 | | |
| 20 | 8 | 10 | 11 | 14 | 11 | 17 | 12 | 12 | 12 | 17 | 34 | 36 | 17 | 14 | 13 | 14 | 11 | 13 | 11 | 8 | 8 | 9 | 14 | 12 | | |
| 21 | 15 | 9 | 16 | B | 16 | 19 | 18 | 11 | 11 | B | B | B | 24 | 24 | 26 | 24 | 26 | B | B | 20 | 12 | 7 | 8 | 8 | | |
| 22 | 9 | 10 | 12 | 13 | 19 | 13 | 15 | 15 | 13 | 18 | 13 | 14 | 13 | 13 | 13 | 13 | 35 | 20 | 15 | B | 14 | 14 | 8 | 18 | | |
| 23 | 9 | 15 | 20 | 14 | 14 | 18 | 36 | 19 | 12 | 14 | 14 | 13 | 13 | 11 | 23 | B | 34 | B | B | 16 | 8 | 7 | 16 | 10 | | |
| 24 | 13 | 13 | 11 | B | 19 | 15 | 17 | 11 | 13 | 8 | 16 | 18 | 16 | 19 | 15 | 15 | 16 | 17 | 16 | 13 | 11 | 10 | 10 | 17 | | |
| 25 | 12 | 7 | 8 | 10 | 16 | 16 | 15 | 12 | 12 | 10 | 13 | 15 | 15 | 11 | 13 | 14 | 16 | 18 | 13 | 12 | 9 | 10 | 8 | 8 | | |
| 26 | 8 | 16 | 16 | 13 | 11 | 12 | 11 | 11 | 13 | 10 | 12 | 10 | 12 | 12 | 14 | 12 | 10 | 10 | 8 | 6 | 7 | 9 | 11 | 10 | | |
| 27 | 9 | 9 | 20 | 16 | 12 | 13 | 11 | 16 | 14 | 28 | 17 | 11 | 14 | 11 | 11 | 16 | 11 | 11 | 10 | 11 | 10 | 9 | 10 | 7 | | |
| 28 | 8 | 10 | 8 | 10 | 9 | 10 | 11 | 12 | 20 | 21 | 24 | 23 | 28 | 24 | B | 25 | 28 | 18 | 13 | 11 | 11 | 11 | 8 | 10 | | |
| 29 | 16 | 15 | 13 | 19 | 15 | 12 | 10 | 7 | 9 | 10 | 9 | 12 | 21 | 23 | 16 | 12 | 19 | 18 | 20 | B | 8 | 14 | 9 | 9 | | |
| 30 | 24 | 27 | 17 | 14 | 12 | 15 | 13 | 13 | 20 | B | 15 | B | B | 37 | 28 | 14 | 27 | 24 | B | B | 12 | 9 | 12 | 8 | | |
| 31 | 14 | 12 | 24 | 22 | 13 | 16 | 14 | 11 | B | 16 | B | B | B | B | 24 | 24 | B | 14 | 19 | 10 | 14 | 8 | 9 | 15 | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | |
| CNT | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | |
| MED | 9 | 10 | 11 | 12 | 11 | 13 | 11 | 11 | 11 | 10 | 13 | 14 | 14 | 12 | 13 | 13 | 14 | 15 | 12 | 11 | 10 | 9 | 9 | 9 | | |
| U Q | 12 | 13 | 14 | 14 | 15 | 16 | 15 | 12 | 13 | 17 | 17 | 18 | 18 | 19 | 18 | 24 | 26 | 24 | 20 | 16 | 14 | 10 | 11 | 10 | | |
| L Q | 8 | 8 | 9 | 9 | 9 | 10 | 9 | 9 | 9 | 9 | 10 | 11 | 10 | 10 | 10 | 10 | 10 | 10 | 9 | 9 | 8 | 8 | 8 | 7 | | |

MAR. 2020 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAR. 2020 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 | B | A | A | 200 | 188 | 188 | 186 | H | B | 220 | 208 | 236 | 202 | 210 | B | 218 | E A | E A | 246 | 260 | 290 |
| 2 | E A | A | A | A | A | A | A | A | A | 234 | 192 | 184 | H | H | 204 | 200 | 200 | 200 | 212 | 194 | 206 | 216 | A | 200 | 238 | 250 | 250 |
| 3 | 232 | A | A | A | A | A | A | A | A | 232 | 202 | 202 | 190 | 206 | 206 | 206 | 202 | H | 202 | 236 | 210 | 210 | 218 | A | A | A | |
| 4 | A | A | A | A | A | 212 | 232 | A | E A | A | A | 242 | 232 | 206 | 196 | 196 | 214 | 204 | B | B | B | 206 | E A | A | A | A | |
| 5 | A | A | A | A | 210 | A | 198 | A | A | E A | A | H | 246 | 216 | 200 | 192 | 196 | 196 | 196 | 212 | 212 | 212 | 212 | A | A | A | |
| 6 | A E A | A E A | A E A | A | A | A | A | A | 220 | 214 | 194 | 194 | 194 | 194 | 200 | 206 | B | E B | B | 216 | 206 | 206 | 204 | E A | 230 | 272 | |
| 7 | A | E A | E A | E A | A E A | A E A | 200 | 214 | 204 | B | 200 | 200 | 200 | 194 | 198 | 202 | 200 | H | 200 | E B | A | A | A | E A | 256 | A | |
| 8 | A E A | A E A | A E A | A E A | A E A | A E A | A E A | 204 | 204 | 204 | 214 | 214 | 206 | 206 | 224 | 214 | 210 | 210 | 210 | 210 | E A | 260 | E B | B | B | A | |
| 9 | A | A | A | A | A | E A | 326 | 196 | 240 | A | 190 | 198 | 198 | 192 | 192 | 194 | 194 | 200 | 200 | 200 | 242 | 240 | A | A | A | | |
| 10 | A | A | A | A | A | A | 200 | 220 | 200 | H | H | H | H | H | H | 208 | 208 | 200 | E A | 208 | 200 | 202 | 202 | A | A | A | |
| 11 | E A | A | A | A | A | A | 198 | 216 | 210 | 106 | 188 | 184 | 230 | 214 | 204 | 198 | 238 | 214 | E A | E A | 214 | 214 | A | A | A | A | |
| 12 | A | A | A | A | A | A | A | A | A | A | A | B | 220 | 198 | 190 | 202 | 196 | 198 | 212 | E A | 212 | 222 | A | A | A | 198 | |
| 13 | A | A | A | A | A | 238 | A | A | A | E A | 228 | 228 | 202 | 196 | 202 | 202 | 204 | 204 | 204 | 220 | 220 | 228 | A | A | A | A | |
| 14 | A | A | A | A | A | A | E A | 246 | 200 | H | 186 | 206 | 182 | 208 | 200 | 196 | 182 | 206 | 200 | 200 | 198 | 204 | E A | 240 | 220 | A | |
| 15 | 198 | A | 198 | 198 | 348 | 302 | 236 | 202 | 196 | 186 | 178 | H | 202 | 194 | 194 | 196 | 196 | 196 | 196 | 194 | E B | 204 | 204 | 200 | 218 | A | |
| 16 | A | A | A | A | A | A | A | A | A | 202 | 188 | 218 | 212 | 196 | 200 | 192 | 206 | 228 | 212 | E B | 224 | 220 | 252 | A | A | A | |
| 17 | A | A | A | A | A | A | A | A | 284 | 230 | 210 | 204 | 204 | 202 | 196 | 214 | 202 | 202 | 198 | 204 | 216 | A | A | A | A | | |
| 18 | A | 206 | A | A | A | A | E A | 272 | 220 | 192 | 200 | 194 | 182 | 200 | 200 | 192 | 190 | 180 | H | 198 | E A | 224 | 218 | 234 | A | A | |
| 19 | A | A | A | 200 | A | A | A | A | A | A | A | B | 214 | B | B | 218 | 228 | 220 | B | 232 | E B | 264 | B | A | A | A | |
| 20 | A | A | A | A | A | A | A | A | A | 198 | 246 | B | B | 216 | 200 | 200 | 184 | H | 202 | 202 | 216 | 240 | E B | A | A | A | |
| 21 | A | A | A | B | A | A | A | A | H | 236 | B | B | B | 204 | 198 | 212 | 218 | E B | B | B | E B | 246 | A | 204 | A | A | |
| 22 | A | A | A | A | A | A | A | A | A | A E A | 300 | 266 | 202 | 202 | 226 | 234 | 206 | 206 | A E B | 256 | 212 | B | E A | 266 | A | A | |
| 23 | A | A | A | A | A | A | B | A | A | 222 | 206 | 202 | 194 | 200 | 224 | H | 258 | B E B | B | B | E B | 258 | A | A | A | A | |
| 24 | A | A | A | B | A | A | A | A | E A | 234 | 224 | 198 | 212 | 198 | 198 | 186 | 194 | 198 | 198 | B | 216 | 232 | E B | 254 | A | A | |
| 25 | 192 | A | 196 | A | A | A | A | E A | 230 | 212 | 204 | 214 | 202 | 190 | 198 | 218 | 214 | 214 | 204 | 202 | 208 | 216 | 228 | 228 | 242 | | |
| 26 | A | A | 194 | A | A | A | E A | 330 | 202 | 208 | 188 | 198 | 198 | 172 | 192 | 232 | 206 | E A | 222 | 208 | 208 | 224 | E A | 274 | 198 | | |
| 27 | 190 | A | A | A | A | A | A | A | A | A | A | E A | 230 | 204 | 206 | 208 | 198 | 208 | 208 | 196 | 214 | E B | 252 | A | A | | |
| 28 | A | A | A | A | A | A | A | 268 | 208 | 230 | 204 | 200 | 192 | E B | H | B | 214 | 194 | 214 | 220 | 206 | 198 | 214 | 292 | A | | |
| 29 | A | A | A | A | A | 198 | E B | 310 | 214 | 220 | 210 | 204 | 204 | 186 | 206 | 202 | 208 | 216 | E B | 226 | 246 | B | A | A | A | | |
| 30 | A | A | A | A | A | A | A | A | A | 322 | A | B | B | B | B | B | 234 | 232 | E B | E B | B | B | 198 | A | A | | |
| 31 | A | A | A | A | A | A | A | A | A | B | A | B | B | B | B | B | E B | 260 | B | E A | 250 | B | A | A | A | | |
| | | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | |
| CNT | | 9 | 4 | 8 | 4 | 4 | 7 | 13 | 16 | 22 | 24 | 26 | 27 | 27 | 28 | 29 | 28 | 29 | 27 | 25 | 26 | 19 | 10 | 6 | 7 | | |
| MED | U | 250 | 265 | U | 212 | 251 | 302 | 250 | U | 215 | 213 | 208 | 200 | 200 | 202 | 198 | 200 | 204 | 204 | 205 | 206 | 208 | 213 | U | U | | |
| U Q | A E A | 278 | 287 | A E A | 283 | 312 | 331 | 302 | A E A | 270 | 225 | 232 | 223 | 214 | 208 | 204 | 206 | 213 | 214 | E | E | 219 | 240 | 252 | 254 | | |
| L Q | 195 | 227 | 197 | 199 | 250 | 212 | 199 | 206 | 200 | 189 | 194 | 192 | 194 | 195 | 197 | 197 | 197 | 200 | 200 | 203 | 212 | 204 | 228 | 228 | 198 | | |

MAR. 2020 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2020 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 | B | A | X | X | X | X | X | X | X | X | X | X | A | A | A | A | A | | | |
| 2 | A | A | A | A | A | A | A | B | A | A | X | B | B | O | X | X | B | B | O | X | A | A | A | O | X | | |
| 3 | A | 48 | A | B | A | A | A | A | A | B | B | O | X | X | X | X | X | X | X | A | A | A | A | A | | | |
| 4 | A | 87 | A | A | A | A | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | A | A | A | 62 | | |
| 5 | A | A | A | A | A | R | R | X | X | X | X | X | X | X | X | X | X | X | X | X | O | X | B | A | O | X | |
| 6 | O | X | A | A | A | A | A | X | B | X | X | X | X | X | X | X | X | X | X | O | X | A | A | R | A | | |
| 7 | A | A | A | A | A | A | A | X | X | X | X | X | X | X | X | X | X | X | X | O | X | A | A | A | 60 | | |
| 8 | A | A | A | A | A | X | X | A | X | A | X | X | X | X | X | X | X | X | B | A | A | R | A | A | A | | |
| 9 | O | X | A | A | A | B | A | A | X | X | X | X | X | X | X | X | X | X | B | B | B | B | O | X | A | | |
| 10 | A | A | A | A | A | A | B | O | X | X | X | X | X | X | X | X | X | X | X | O | X | A | A | O | X | A | |
| 11 | A | O | X | A | A | X | A | A | A | X | X | X | X | X | X | X | X | X | X | A | A | 51 | 56 | A | A | | |
| 12 | A | A | O | X | A | A | A | X | X | A | A | X | X | X | X | X | X | X | X | B | B | B | A | X | 42 | | |
| 13 | A | A | A | A | A | O | X | O | X | B | X | X | X | X | X | X | X | X | X | O | X | O | X | O | X | A | |
| 14 | A | A | A | A | A | A | 87 | A | A | B | B | X | B | B | B | O | X | O | X | O | X | R | B | B | 30 | | |
| 15 | A | A | A | A | A | A | A | A | A | B | A | X | X | X | X | X | X | X | X | X | X | X | B | B | A | | |
| 16 | 60 | A | A | A | B | A | A | A | A | A | O | X | X | X | X | X | X | X | X | R | O | X | B | B | B | | |
| 17 | B | A | A | 50 | A | A | A | O | X | X | X | X | X | X | X | X | O | X | B | R | A | A | A | O | X | 29 | |
| 18 | 41 | 64 | A | A | A | A | A | A | A | O | X | X | X | X | X | O | X | X | X | B | B | B | B | O | X | 30 | |
| 19 | A | A | A | A | A | A | A | A | O | X | X | X | X | X | X | X | X | X | X | O | X | A | A | A | A | A | |
| 20 | A | A | A | A | A | A | A | B | X | X | X | O | X | B | X | O | X | X | A | A | A | A | A | A | A | A | |
| 21 | A | 55 | A | 54 | A | A | A | A | A | X | X | X | X | X | X | X | X | X | B | O | X | A | A | A | A | A | |
| 22 | 59 | A | 80 | A | A | A | A | A | A | A | B | O | X | X | X | X | X | X | A | B | B | A | A | O | X | A | |
| 23 | A | A | A | A | A | A | A | A | O | X | B | O | X | X | X | X | X | X | A | A | A | A | B | A | A | A | |
| 24 | O | X | 46 | X | X | A | X | X | X | X | X | X | X | X | X | X | X | X | X | O | X | O | X | X | A | A | |
| 25 | A | A | A | A | A | A | A | A | A | O | X | B | O | X | X | X | X | X | O | X | O | X | A | A | A | A | |
| 26 | A | A | A | A | 44 | 46 | A | A | R | A | X | X | X | X | X | X | X | X | A | A | A | A | A | A | A | A | |
| 27 | A | A | A | A | A | A | A | A | A | O | X | X | X | B | X | X | X | X | X | B | B | A | A | A | A | A | |
| 28 | A | A | A | A | A | A | A | A | A | A | X | X | X | X | X | X | X | X | A | B | A | A | A | A | A | A | |
| 29 | A | X | A | A | A | A | A | A | A | A | X | X | X | X | V | X | X | X | O | X | A | O | X | X | B | A | |
| 30 | A | A | A | A | A | A | A | A | A | X | X | X | X | X | X | X | X | X | X | O | X | A | O | X | A | A | |
| 31 | | | | | | | | | | 28 | 36 | 47 | 51 | 52 | 49 | 54 | 54 | 53 | 28 | 24 | 19 | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | | |
| CNT | 6 | 7 | 3 | 3 | 2 | 4 | 5 | 9 | 14 | 19 | 24 | 29 | 27 | 28 | 29 | 30 | 29 | 25 | 21 | 14 | 11 | 9 | 8 | 8 | | | |
| MED | 42 | 49 | X | 52 | 41 | 40 | 33 | 29 | X | X | 42 | 44 | 48 | 50 | 52 | 50 | 47 | 38 | 31 | 25 | X | O | X | O | X | 36 | |
| U Q | 59 | 64 | 80 | 54 | | 44 | 62 | 30 | X | X | 36 | 42 | 46 | 48 | 51 | 54 | 56 | 58 | 52 | 44 | 34 | 26 | 28 | 56 | 50 | 52 | |
| L Q | O | X | O | X | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | O | X | O | X | O | X | X |
| | 35 | 46 | 50 | 50 | | 34 | 30 | 28 | 32 | 36 | 40 | 42 | 45 | 48 | 47 | 47 | 42 | 31 | 25 | 23 | 18 | 25 | 22 | 30 | 30 | | |

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2020 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 | B | A | | 32 | 34 | 34 | 40 | 46 | 46 | 42 | 44 | 36 | 28 | A | A | A | A | A | | | | | | |
| 2 | A | A | A | A | A | A | A | A | B | A | A | | 36 | | B | | 45 | 42 | 39 | | 30 | 21 | A | A | A | R | 38 | | | | |
| 3 | A | A | A | B | A | A | A | A | A | B | B | R | 41 | 42 | 44 | 41 | 41 | 40 | 36 | 28 | 20 | | A | A | A | A | A | | | | |
| 4 | A | A | A | A | A | A | | 23 | 23 | 28 | 34 | 36 | 39 | 41 | 42 | 47 | 44 | 41 | 32 | 28 | 20 | 17 | | A | A | A | A | | | | |
| 5 | A | A | A | A | A | R | R | | | 24 | 30 | 38 | 39 | 44 | 43 | 48 | 46 | 46 | 43 | 39 | 29 | 20 | R | B | A | R | 24 | | | | |
| 6 | R | A | A | A | A | A | A | | | 23 | | 36 | 44 | 42 | 48 | 51 | 54 | 53 | 46 | 40 | 25 | 20 | R | A | A | A | A | | | | |
| 7 | A | A | A | A | A | A | A | | | 22 | 34 | 46 | 52 | 49 | 52 | 58 | 57 | 65 | 48 | 37 | 25 | 18 | 16 | | A | A | A | | | | |
| 8 | A | A | A | A | A | | 33 | 31 | A | 57 | A | 35 | 38 | 42 | F | F | F | | B | A | A | A | A | A | A | A | A | | | | |
| 9 | U | R | A | A | B | B | A | A | | | 29 | 31 | 36 | 36 | 38 | 40 | 42 | 43 | 45 | 38 | | B | B | B | B | R | A | | | | |
| 10 | A | A | A | A | A | A | B | | | 25 | 29 | 34 | 36 | 38 | 39 | 46 | 48 | 46 | 42 | 33 | 24 | 14 | R | A | A | R | A | | | | |
| 11 | A | R | A | A | | A | A | A | | | 30 | 32 | 40 | 38 | 42 | 43 | 48 | 52 | 47 | 38 | 25 | | A | A | A | A | A | | | | |
| 12 | A | A | 44 | A | A | A | A | | | 23 | 30 | | A | | 40 | 44 | 47 | 50 | 48 | 43 | 38 | 38 | | B | B | A | A | J | R | 36 | |
| 13 | A | A | A | A | A | R | R | | | 24 | 25 | 20 | | B | B | V | | R | | 48 | 44 | 38 | 32 | 28 | 18 | 11 | U | R | R | R | A |
| 14 | A | A | A | A | A | A | A | A | A | A | B | B | | | 34 | | B | B | B | | 41 | 35 | 29 | 22 | 19 | | R | B | B | B | A |
| 15 | A | A | A | A | A | A | A | A | A | A | B | A | | | 35 | 38 | 41 | 38 | 40 | 35 | 30 | 20 | 24 | 14 | | B | B | B | B | A | |
| 16 | A | A | A | A | B | A | A | A | A | A | A | | | 30 | 32 | 37 | 38 | 38 | 37 | 34 | 30 | 23 | 14 | R | R | A | B | B | B | B | |
| 17 | B | A | A | A | A | A | A | | | 22 | 25 | 32 | 36 | 39 | 45 | 47 | F | F | | B | R | A | A | A | A | R | A | A | A | | |
| 18 | A | A | A | A | A | A | A | A | A | | R | 30 | 35 | 36 | 43 | 53 | 55 | 57 | 37 | 34 | 26 | | B | B | B | B | U | R | R | 24 | |
| 19 | A | A | A | A | A | A | A | A | A | | 28 | 39 | 50 | 48 | 58 | 49 | 45 | 50 | 47 | 22 | 16 | | A | A | A | A | A | A | A | A | |
| 20 | A | A | A | A | A | A | A | B | | | F | 25 | 33 | 39 | 44 | 48 | | B | R | | A | A | A | A | A | A | A | A | A | A | |
| 21 | A | A | A | A | A | A | A | A | A | A | | 28 | 33 | 38 | 40 | 39 | 38 | 42 | 40 | | B | R | 20 | 19 | | A | A | A | A | A | |
| 22 | A | A | A | A | A | A | A | A | A | A | A | | | 33 | 35 | 40 | 38 | 34 | 31 | | A | B | | B | A | A | R | A | A | A | |
| 23 | A | A | A | A | A | A | A | A | | | 20 | B | R | 34 | 38 | 39 | 39 | 41 | 38 | 35 | 24 | | F | A | A | A | B | A | A | A | |
| 24 | U | R | A | | A | F | | | | | | 26 | 32 | 38 | 42 | 42 | 44 | 44 | 45 | 36 | 22 | 16 | 17 | R | R | | A | A | A | | |
| 25 | A | A | 48 | 46 | A | A | A | A | A | | | B | R | 39 | 45 | 45 | 42 | 42 | 31 | 22 | 14 | | R | A | | A | A | A | A | | |
| 26 | A | A | A | A | F | A | A | A | A | A | | 38 | 44 | 45 | 49 | 47 | 52 | 39 | 25 | | F | F | A | A | A | A | A | A | A | A | |
| 27 | A | A | A | A | A | A | A | A | A | A | | 27 | 30 | 34 | | B | | 42 | 41 | 38 | 38 | 28 | | B | B | A | A | A | A | A | |
| 28 | A | A | A | A | A | A | A | A | A | A | | 30 | 32 | 36 | 36 | 40 | 38 | 42 | 33 | 19 | | A | B | A | A | A | A | A | A | A | |
| 29 | A | J | R | A | A | A | A | A | A | A | | 29 | 34 | 36 | 38 | 45 | 42 | 40 | 36 | 16 | 15 | | R | A | | B | A | A | A | | |
| 30 | A | A | A | A | A | A | A | A | | | 22 | 30 | F | Z | 43 | 46 | 43 | 48 | 39 | 47 | 17 | 18 | 13 | | A | R | A | A | A | | |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | | | | | | |
| CNT | 3 | 2 | 2 | 1 | 2 | 3 | 4 | 9 | 14 | 19 | 24 | 29 | 27 | 28 | 29 | 30 | 29 | 24 | 21 | 14 | 9 | 4 | 5 | 4 | | | | | | | |
| MED | U | R | R | 46 | 46 | 32 | 32 | 26 | 23 | 28 | 32 | 36 | 38 | 42 | 44 | 46 | 44 | 40 | 31 | 25 | 19 | 14 | 15 | 19 | R | R | R | R | 30 | | |
| U Q | U | R | | | | 33 | 29 | 24 | 30 | 34 | 39 | 42 | 45 | 48 | 48 | 50 | 44 | 36 | 28 | 20 | 18 | 20 | 22 | 37 | | | | | | | |
| L Q | R | | | | | R | 24 | 24 | 22 | 25 | 30 | 34 | 36 | 39 | 42 | 41 | 40 | 36 | 23 | 19 | 17 | 12 | 13 | 14 | R | R | R | R | 24 | | |

APR. 2020 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2020 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 | 42 | 53 | 54 | 49 | 34 | 53 | 54 | | B | G | G | | 52 | 23 | | G | E | B | G | G | 20 | 22 | 51 | 27 | 57 | 44 | 57 | 46 | 43 | | | | |
| 2 | 86 | 67 | 39 | 52 | 42 | 38 | 30 | 47 | 46 | 42 | | G | B | B | B | B | B | B | B | E | B | B | 23 | 57 | 57 | 45 | 42 | 98 | | | | | |
| 3 | 68 | 49 | 76 | | B | 49 | 52 | 50 | 40 | 43 | | B | E | B | E | B | G | G | G | | 25 | 16 | | G | 47 | 59 | 33 | 43 | 39 | | | | |
| 4 | 54 | 68 | 57 | 58 | 43 | K | 41 | 50 | G | G | | G | 22 | 23 | 21 | 22 | | G | G | | 22 | | G | 14 | 46 | 31 | 28 | 40 | 36 | | | | |
| 5 | 57 | 66 | 68 | 59 | 38 | K | 18 | K | 21 | G | G | G | 21 | 23 | 23 | 23 | 23 | | G | E | B | E | B | E | B | E | B | 26 | 42 | 64 | 41 | | |
| 6 | 38 | 29 | 34 | 47 | 36 | 30 | 37 | | G | B | G | 23 | 25 | 25 | 24 | 24 | 20 | | G | G | | G | 57 | K | 14 | 56 | 30 | K | 21 | 47 | | | |
| 7 | K | 27 | 55 | 55 | 55 | 56 | 27 | 47 | 57 | 16 | 21 | 22 | 22 | 23 | | G | | G | | G | E | B | B | 13 | 55 | 54 | 52 | 41 | 41 | | | | |
| 8 | 49 | 55 | 55 | 36 | 50 | 48 | 46 | 66 | 71 | 58 | 24 | 24 | 25 | 27 | 23 | 23 | 27 | | B | | | | 48 | 47 | 26 | 42 | 44 | 44 | | | | | |
| 9 | 75 | 48 | 54 | 46 | 56 | 64 | 47 | 45 | 54 | 44 | | G | 21 | 22 | 28 | 28 | 22 | | G | | G | 22 | | B | B | B | B | E | B | 16 | 32 | | |
| 10 | 33 | 33 | 71 | 47 | 44 | 59 | | B | 54 | 59 | 59 | 61 | 21 | 31 | 22 | 24 | 19 | | G | | G | 17 | 14 | 58 | 34 | K | 24 | 45 | 28 | | | | |
| 11 | K | 26 | 44 | 43 | 77 | 35 | 51 | 56 | 40 | 19 | 19 | | G | 19 | 25 | 26 | 22 | 18 | | E | B | E | B | 9 | 36 | 42 | 42 | 48 | 41 | | | | |
| 12 | 70 | 60 | 55 | 49 | 49 | 47 | 36 | K | 15 | | G | 42 | 47 | 25 | | 25 | 24 | 26 | | G | E | B | | E | B | K | | B | 40 | 50 | 46 | | |
| 13 | 85 | 110 | 57 | 40 | 43 | 48 | 53 | 32 | | B | B | 21 | 24 | 24 | | 26 | 19 | 33 | 58 | 54 | | E | B | 11 | 38 | 36 | 50 | 42 | | | | | |
| 14 | 42 | 49 | 39 | 59 | 50 | 55 | 52 | G | 28 | 39 | | B | 22 | | B | B | B | E | B | E | B | E | B | E | B | 29 | 15 | | B | 19 | | | |
| 15 | 36 | 47 | 84 | 51 | 45 | 56 | 61 | 51 | 72 | | B | E | B | 67 | E | B | 22 | 28 | 17 | 21 | 21 | 14 | 44 | 54 | 58 | | B | 50 | | | | | |
| 16 | 35 | 45 | 39 | 57 | | B | 44 | 44 | 40 | 39 | | G | 59 | 22 | | G | | 21 | 21 | E | B | E | B | 15 | 10 | 59 | 12 | 39 | 29 | | B | B | |
| 17 | B | | 32 | 91 | 42 | 46 | 44 | 43 | 64 | 66 | 20 | 19 | 19 | 26 | 21 | | G | E | B | E | B | B | | B | 28 | 48 | 44 | 48 | 51 | 49 | | | |
| 18 | 55 | 36 | 58 | 50 | 56 | 35 | 31 | 58 | 54 | 32 | | G | 21 | 21 | 40 | E | B | 34 | 30 | 20 | 17 | 48 | | B | B | 46 | | B | 19 | | | | |
| 19 | 44 | 44 | 51 | 51 | 49 | 50 | 47 | 55 | 17 | 21 | 28 | 23 | 23 | 23 | 20 | 24 | 27 | 44 | 46 | 46 | 46 | 39 | 44 | 58 | 42 | | | | | | | | |
| 20 | 46 | 46 | 46 | 30 | 34 | 42 | 42 | | B | 52 | 24 | | G | 15 | 22 | | 58 | 68 | 42 | 48 | 40 | 46 | 50 | 50 | 40 | 51 | | | | | | | |
| 21 | 50 | 34 | 44 | 50 | 57 | 57 | 26 | 46 | 55 | 56 | | G | 10 | 5 | 22 | 22 | | 16 | 26 | | B | 82 | 32 | 45 | 47 | 49 | 62 | | | | | | |
| 22 | 43 | 52 | 52 | 60 | 56 | 61 | 52 | 48 | 48 | 41 | | B | | G | | 26 | 26 | 22 | 53 | 32 | | | 52 | 40 | 43 | 30 | | | | | | | |
| 23 | 32 | 41 | 28 | 56 | 46 | 38 | 29 | 42 | 40 | | B | E | B | 21 | 24 | 22 | 33 | 108 | 18 | 58 | 59 | 53 | 48 | 43 | | B | 46 | 43 | | | | | |
| 24 | 55 | 58 | 83 | 68 | 50 | 44 | 19 | E | B | 10 | 15 | | G | 17 | | G | 19 | | 20 | 20 | 23 | E | B | E | B | E | B | 42 | | G | 44 | 40 | |
| 25 | 51 | 84 | 56 | 53 | 49 | 47 | 51 | 46 | 46 | 48 | | B | E | B | 32 | 28 | 48 | 59 | 18 | 21 | E | B | 12 | 40 | 57 | 56 | 47 | 57 | 90 | | | | |
| 26 | 60 | 55 | 52 | 55 | 31 | 31 | 50 | 50 | | G | 50 | 31 | 22 | 22 | 22 | 22 | 22 | 16 | 56 | 56 | 54 | 43 | 42 | 54 | 58 | | | | | | | | |
| 27 | 56 | 70 | 45 | 44 | 35 | 58 | 54 | 56 | 51 | 47 | 19 | 21 | | B | E | B | E | B | B | | 20 | 20 | 20 | 19 | | B | 30 | 25 | 54 | 103 | | | |
| 28 | 79 | 50 | 58 | 58 | 58 | 69 | 68 | 52 | 44 | 64 | 51 | 23 | 21 | | G | G | 33 | 58 | 52 | 64 | 114 | 32 | 32 | 53 | 68 | | | | | | | | |
| 29 | 57 | 57 | 48 | 48 | 46 | 44 | 41 | 46 | 38 | 21 | 18 | 24 | | G | G | 19 | 56 | 16 | 16 | 31 | 31 | 58 | 40 | 32 | 52 | 26 | | | | | | | |
| 30 | 56 | 43 | 54 | 50 | 50 | 56 | 45 | 36 | K | 15 | 57 | 60 | 28 | | G | | 20 | | 16 | 17 | 27 | 53 | 53 | 46 | E | B | 9 | 34 | 43 | | | | |
| 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 | 29 | 29 | 30 | 29 | 28 | 28 | 25 | 26 | 29 | 27 | 27 | 28 | 29 | 29 | 26 | 27 | 25 | 27 | 27 | 26 | 29 | | | | | | | | | |
| MED | 51 | 50 | 54 | 51 | 46 | 48 | 47 | 46 | 42 | 32 | | 23 | 24 | E | G | G | 21 | 20 | 18 | 31 | 47 | 43 | 42 | 46 | 43 | | | | | | | | |
| U Q | 58 | 58 | 58 | 58 | 50 | 56 | 52 | 53 | 53 | 49 | 31 | 28 | | G | 26 | 27 | 24 | 27 | 44 | 53 | 56 | 52 | 47 | 52 | 50 | | | | | | | | |
| L Q | 40 | 44 | 45 | 47 | 40 | 41 | 36 | 34 | | G | 24 | 21 | 22 | 22 | 22 | 22 | 18 | | G | E | B | E | B | 30 | 34 | 30 | 42 | 38 | | | | | |

APR. 2020 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2020 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| $\frac{H}{D}$ | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
|---------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 15 | 15 | 15 | 14 | 11 | 18 | 18 | B | 11 | 11 | 16 | 14 | 20 | 35 | 18 | 16 | 14 | 14 | 12 | 8 | 7 | 7 | 10 | 9 | |
| 2 | 9 | 9 | 9 | 24 | 20 | 11 | 9 | 32 | 19 | 19 | 13 | B | B | 34 | 25 | 22 | B | B | 23 | 8 | 15 | 18 | 10 | 10 | |
| 3 | 8 | 8 | 20 | B | 21 | 16 | 10 | 14 | 9 | B | B | 35 | 23 | 17 | 17 | 15 | 15 | 7 | 7 | 7 | 27 | 10 | 9 | 9 | |
| 4 | 20 | 12 | 13 | 16 | 21 | 16 | 10 | 10 | 8 | 8 | 9 | 9 | 11 | 11 | 16 | 13 | 16 | 12 | 7 | 8 | 8 | 9 | 9 | 8 | |
| 5 | 13 | 18 | 15 | 19 | 15 | 10 | 9 | 8 | 8 | 10 | 8 | 8 | 10 | 14 | 10 | 14 | 17 | 16 | 12 | 10 | 10 | 33 | 15 | 14 | |
| 6 | 8 | 8 | 12 | 11 | 13 | 11 | 10 | 8 | B | 12 | 13 | 10 | 10 | 15 | 14 | 12 | 12 | 8 | 9 | 12 | 10 | 11 | 9 | 12 | |
| 7 | 11 | 11 | 11 | 10 | 10 | 7 | 8 | 9 | 8 | 10 | 12 | 15 | 11 | 14 | 10 | 10 | 11 | 8 | 12 | 10 | 8 | 8 | 8 | 8 | |
| 8 | 11 | 16 | 18 | 20 | 12 | 11 | 9 | 14 | 16 | 9 | 14 | 10 | 11 | 27 | 23 | 23 | 11 | B | 12 | 7 | 7 | 10 | 9 | 9 | |
| 9 | 13 | 20 | 27 | 33 | 34 | 23 | 11 | 10 | 10 | 10 | 11 | 11 | 13 | 13 | 13 | 13 | 12 | 12 | B | B | B | B | 16 | 7 | |
| 10 | 8 | 9 | 15 | 17 | 14 | 10 | B | 9 | 10 | 9 | 9 | 9 | 8 | 22 | 24 | 18 | 13 | 9 | 9 | 9 | 10 | 8 | 14 | 9 | |
| 11 | 10 | 10 | 10 | 9 | 10 | 22 | 10 | 10 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 9 | 9 | 13 | 9 | 9 | 9 | 12 | 10 | 18 | |
| 12 | 14 | 11 | 24 | 18 | 13 | 10 | 9 | 9 | 8 | 22 | 17 | 13 | 15 | 15 | 14 | 26 | 8 | 15 | 12 | B | B | 8 | 14 | 12 | |
| 13 | 12 | 15 | 15 | 15 | 12 | 9 | 8 | 7 | B | B | 11 | 13 | 13 | 12 | 12 | 10 | 10 | 10 | 11 | 11 | 7 | 8 | 8 | 8 | |
| 14 | 11 | 11 | 14 | 21 | 17 | 14 | 16 | 23 | 18 | B | B | 10 | B | B | B | 28 | 24 | 15 | 13 | 12 | 12 | B | B | 8 | |
| 15 | 7 | 15 | 10 | 19 | 13 | 8 | 20 | 20 | 21 | B | 21 | 27 | 24 | 22 | 14 | 11 | 11 | 12 | 10 | 11 | 8 | 46 | B | 12 | |
| 16 | 9 | 9 | 11 | 14 | B | 15 | 16 | 14 | 20 | 14 | 16 | 11 | 10 | 14 | 13 | 12 | 15 | 10 | 9 | 8 | 9 | 8 | B | B | |
| 17 | B | 13 | 9 | 16 | 14 | 20 | 11 | 9 | 9 | 8 | 8 | 9 | 9 | 9 | 12 | 25 | 34 | B | 20 | 15 | 12 | 9 | 7 | 9 | |
| 18 | 8 | 8 | 10 | 15 | 15 | 11 | 20 | 24 | 12 | 12 | 12 | 12 | 12 | 36 | 33 | 19 | 13 | 12 | 13 | B | B | 40 | B | 12 | |
| 19 | 12 | 12 | 10 | 9 | 9 | 9 | 10 | 16 | 12 | 11 | 11 | 16 | 17 | 15 | 11 | 8 | 8 | 10 | 10 | 10 | 10 | 16 | 16 | 16 | |
| 20 | 9 | 9 | 10 | 8 | 10 | 7 | 9 | B | 13 | 12 | 8 | 7 | 6 | B | 36 | 15 | 13 | 11 | 8 | 6 | 6 | 6 | 8 | 8 | |
| 21 | 8 | 8 | 8 | 9 | 7 | 8 | 7 | 8 | 6 | 6 | 6 | 8 | 16 | 10 | 8 | 7 | 15 | B | 15 | 6 | 9 | 8 | 12 | 10 | |
| 22 | 13 | 15 | 21 | 14 | 13 | 14 | 18 | 17 | 24 | 14 | B | 18 | 18 | 17 | 13 | 11 | 10 | 8 | B | B | 13 | 10 | 7 | 7 | |
| 23 | 9 | 12 | 12 | 17 | 16 | 11 | 9 | 9 | 11 | B | 21 | 11 | 13 | 12 | 12 | 12 | 9 | 11 | 9 | 13 | 13 | 10 | 11 | 11 | |
| 24 | 11 | 10 | 10 | 22 | 14 | 10 | 8 | 10 | 9 | 9 | 8 | 9 | 9 | 8 | 12 | 10 | 10 | 10 | 11 | 10 | 8 | 8 | 12 | 11 | |
| 25 | 11 | 11 | 15 | 16 | 16 | 25 | 16 | 14 | 8 | 19 | B | 32 | 19 | 18 | 13 | 13 | 10 | 12 | 11 | 11 | 8 | 8 | 8 | 12 | |
| 26 | 12 | 8 | 14 | 14 | 15 | 6 | 16 | 10 | 16 | 16 | 11 | 12 | 11 | 11 | 10 | 10 | 10 | 10 | 17 | 13 | 8 | 12 | 12 | 10 | |
| 27 | 12 | 12 | 12 | 16 | 24 | 19 | 24 | 19 | 13 | 9 | 11 | 13 | B | 23 | 20 | 12 | 9 | 11 | B | B | 14 | 8 | 21 | 9 | |
| 28 | 18 | 18 | 10 | 12 | 16 | 16 | 29 | 12 | 10 | 10 | 11 | 12 | 12 | 8 | 11 | 8 | 18 | 13 | 11 | 78 | 7 | 9 | 8 | 8 | |
| 29 | 8 | 12 | 14 | 23 | 13 | 10 | 10 | 8 | 12 | 8 | 11 | 11 | 12 | 14 | 14 | 12 | 7 | 7 | 7 | 7 | 8 | 8 | 28 | 8 | |
| 30 | 10 | 10 | 11 | 12 | 11 | 9 | 9 | 8 | 8 | 7 | 14 | 12 | 12 | 10 | 10 | 8 | 8 | 7 | 7 | 8 | 8 | 8 | 11 | 10 | |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
| CNT | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| MED | 11 | 11 | 12 | 16 | 14 | 11 | 10 | 10 | 11 | 11 | 12 | 12 | 12 | 14 | 13 | 12 | 12 | 12 | 11 | 10 | 9 | 9 | 10 | 10 | |
| U Q | 13 | 15 | 15 | 19 | 16 | 16 | 16 | 17 | 16 | 19 | 16 | 14 | 18 | 22 | 18 | 16 | 15 | 14 | 13 | 13 | 13 | 16 | 16 | 12 | |
| L Q | 9 | 9 | 10 | 12 | 12 | 9 | 9 | 9 | 9 | 9 | 11 | 10 | 11 | 11 | 11 | 10 | 10 | 10 | 9 | 8 | 8 | 8 | 9 | 8 | |

APR. 2020 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

APR. 2020 h'F (KM)

45°E MEAN TIME (G.M.T. + 3 H)

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

| H D | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|--------|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | A | A | A | A | A | A | A | B | A | E A | E A | E B | E B | E B | E A | E A | E A | E A | E A | A | A | A | A | A |
| 2 | A | A | A | A | A | A | A | B | A | E A | E A | B | E B | E B | E B | E B | B | E B | E B | A | A | A | A | 204 |
| 3 | A | A | A | B | A | A | A | A | A | B | B | E B | E B | E B | E B | E A | E A | E A | E A | A | A | A | A | A |
| 4 | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A |
| 5 | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A |
| 6 | 196 | A | A | A | A | A | A | 198 | B | A | 222 | 202 | 202 | 202 | 202 | 208 | 204 | 196 | 196 | 234 | A | A | A | A |
| 7 | A | A | A | A | A | A | A | 198 | 206 | 200 | 200 | 194 | 200 | 200 | 210 | 210 | 200 | 198 | 194 | 222 | 228 | A | A | A |
| 8 | A | A | A | A | A | A | A | A | 200 | A | 198 | 198 | 236 | 260 | 234 | 250 | 234 | A | B | A | A | A | A | A |
| 9 | 218 | A | A | B | B | A | A | E A | E A | E A | E A | H | 210 | 210 | 202 | 218 | 200 | 204 | E A | B | B | B | 198 | |
| 10 | A | A | A | A | A | A | B | E A | E A | E A | E A | 278 | 208 | 220 | 196 | 200 | 204 | 226 | 226 | 196 | 198 | 200 | 210 | 248 |
| 11 | A | 196 | A | A | A | A | A | A | A | 204 | 204 | 186 | 194 | 218 | 220 | 210 | 210 | 210 | 212 | A | A | A | A | A |
| 12 | A | A | 212 | A | A | A | A | 210 | 224 | B | B | E A | E A | E A | E A | E B | E B | B | 290 | B | B | A | A | A |
| 13 | A | A | A | A | A | 196 | 202 | 244 | E A | E A | E A | 210 | 206 | 192 | 202 | 220 | 216 | 212 | 196 | 214 | 220 | 222 | 180 | 196 |
| 14 | A | A | A | A | A | A | A | A | A | B | B | 256 | B | B | B | 228 | 228 | 220 | E B | E B | E B | R | B | B |
| 15 | A | A | A | A | A | A | A | A | A | B | E A | E B | 290 | 242 | 232 | 224 | E A | E A | E B | 232 | 250 | 274 | B | B |
| 16 | A | A | A | A | B | A | A | A | A | A | E A | E A | 292 | 204 | 212 | 210 | 224 | 218 | 210 | 208 | 194 | 270 | 290 | A |
| 17 | B | A | A | A | A | A | A | A | A | E A | E A | 238 | 194 | 210 | 206 | 220 | 206 | 206 | 214 | 222 | A | A | A | A |
| 18 | A | A | A | A | A | A | A | A | A | E A | E A | 264 | 246 | 206 | 228 | B | E B | 232 | 208 | 206 | 222 | 226 | B | B |
| 19 | A | A | A | A | A | A | A | A | E A | E A | E A | 250 | 226 | 224 | E A | 210 | 222 | 210 | 196 | A | 196 | 188 | E A | 256 |
| 20 | A | A | A | A | A | A | A | B | B | A | 210 | 202 | 202 | B | B | A | A | A | A | A | A | A | A | A |
| 21 | A | A | A | A | A | A | A | A | A | E A | E A | 242 | 220 | 226 | 216 | 214 | 198 | 198 | E A | B | E A | 302 | 202 | A |
| 22 | A | A | A | A | A | A | A | A | A | A | A | B | E A | E A | E A | E A | E A | A | B | B | B | A | A | A |
| 23 | A | A | A | A | A | A | A | A | A | B | E B | E B | 238 | 204 | 206 | 234 | 224 | 206 | 208 | 200 | A | A | A | B |
| 24 | 234 | A | 246 | E A | A | E A | E A | E A | E A | E A | H | 200 | 200 | 192 | 216 | 208 | 200 | 200 | E B | E B | E A | 250 | 206 | |
| 25 | A | A | A | A | A | A | A | A | A | A | B | E A | E A | E A | E A | E A | A | A | E A | E A | E A | A | A | A |
| 26 | A | A | A | A | A | A | A | A | A | E A | E A | 244 | 204 | 204 | A | 204 | 210 | 212 | 212 | A | A | A | A | A |
| 27 | A | A | A | A | A | A | A | A | A | E A | E A | 372 | 228 | 218 | B | B | B | E A | E A | E A | B | B | A | A |
| 28 | A | A | A | A | A | A | A | A | A | E A | E A | 234 | 238 | 218 | 194 | 194 | 216 | 228 | 256 | A | B | A | A | A |
| 29 | E A | 274 | A | A | A | A | A | A | A | E A | E A | 252 | 216 | 216 | 216 | 200 | 196 | 196 | 196 | 196 | 244 | E A | 206 | 206 |
| 30 | A | A | A | A | A | A | A | A | A | 292 | 198 | 198 | 198 | 200 | 200 | 194 | 194 | 200 | 200 | 226 | 254 | A | A | A |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 3 | 2 | 2 | 1 | | 2 | 3 | 8 | 11 | 16 | 24 | 27 | 27 | 26 | 27 | 27 | 28 | 23 | 21 | 13 | 9 | 4 | 5 | 3 |
| MED | 218 | 235 | 229 | E A | | 206 | U | U | U | 219 | 210 | 209 | 205 | 210 | 210 | 211 | 211 | 205 | 202 | U | 210 | 219 | U | 233 |
| U Q | 234 | | | | | E A | E A | E A | E A | E A | E A | 222 | 228 | 234 | 228 | 218 | E A | E A | E A | E A | E A | 271 | 206 | 231 |
| L Q | 196 | | | | | 200 | 204 | 206 | 200 | 207 | 200 | 202 | 202 | 202 | 202 | 208 | 200 | 198 | 206 | 216 | 219 | 185 | 192 | 198 |

APR. 2020 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2020 f_{XI} (0.1MHz)

45°E MEAN TIME (G.M.T. + 3 H)

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

| H D | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----|
| 1 | A | A | A | A | A | X 45 | 56 | A | X 26 | X 38 | X 50 | X 62 | F 66 | 68 | 86 | 68 | X 46 | 47 | 48 | B | R | A | A | A | |
| 2 | A | R | A | A | B | A 39 | X 39 | R | A | A | X 44 | X 57 | X 59 | 48 | 54 | 56 | X 38 | X 27 | X 23 | B | B | B | A | A | |
| 3 | 58 | 57 | A | A | A | O 43 | X 34 | X 30 | A | B | X 39 | X 52 | X 56 | X 54 | X 54 | X 58 | X 35 | X 17 | X 22 | X 18 | A | A | B | 32 | |
| 4 | A | A | A | A | 71 | A | A | O 36 | X 32 | X 37 | X 42 | X 48 | X 54 | 70 | F 62 | 59 | 42 | 35 | B | B | A | A | B | A | |
| 5 | B | 57 | 50 | 58 | A | A | A | A | A | 46 | 65 | 48 | 64 | 68 | 60 | 68 | 41 | 21 | X 20 | X 36 | A | A | A | A | |
| 6 | 48 | A | A | A | A | A | A | A | A | A 33 | X 36 | X 41 | X 38 | X 38 | X 38 | X 38 | X 32 | X 22 | X 19 | B | B | A | O 24 | X 34 | |
| 7 | 34 | A | A | A | A | A | A | A | A | X 28 | A | 53 | 50 | 44 | 44 | 50 | 35 | 24 | A | A | A | B | B | B | |
| 8 | A 38 | X 39 | X | A | 46 | A | A | A | A | X 32 | X 38 | X 48 | 50 | 54 | 46 | 46 | 33 | 20 | A | A | O 18 | X 17 | A | A | |
| 9 | A | 42 | A | A | A | X 32 | A | A | X 19 | 43 | 49 | 52 | 56 | 59 | 45 | 46 | 38 | A | A | A | O 18 | X 18 | A | A | |
| 10 | R | A | A | A | A | A | A | A | O 19 | X 32 | X 43 | X 52 | X 49 | X 49 | X 52 | X 38 | 36 | A | O 20 | X | A | A | O 26 | X | |
| 11 | A | A | A | A | A | A | A | A | A | X 41 | X 40 | X 41 | X 54 | 64 | 59 | 49 | 27 | X 22 | A | A | A | A | A | A | 33 |
| 12 | 58 | 42 | A | X 25 | X 34 | X 33 | X 27 | X 26 | X 22 | X 39 | 46 | 48 | 53 | 51 | 45 | 36 | 23 | A | A | A | A | A | A | A | |
| 13 | 58 | A | A | A | A | A | A | A | O 22 | X 29 | X 36 | X 43 | X 55 | 52 | 54 | 46 | 28 | 22 | A | A | A | A | A | 28 | |
| 14 | A | 56 | A | A | A | X 24 | X 20 | X 20 | X 30 | 42 | 45 | 52 | 47 | 38 | 49 | 31 | X | A | A | A | A | A | A | A | |
| 15 | O 24 | X 30 | X 57 | 61 | 38 | X 30 | X 31 | A | A | O 26 | X 48 | X 49 | X 49 | X 49 | X 46 | X 33 | X 31 | X 20 | A | A | A | A | A | A | |
| 16 | A | A | A | A | A | A | A | A | A | O 25 | X 36 | X 44 | X 53 | X 54 | X 40 | X 46 | X 25 | A | B | A | A | A | A | A | |
| 17 | A | A | A | A | 41 | 29 | A | A | A | X 27 | X 38 | X 47 | X 56 | X 46 | X 45 | X 40 | 23 | A | A | A | A | X 20 | A | A | |
| 18 | A | A | 55 | 58 | A | A | A | X 19 | X 19 | 39 | 53 | 65 | 68 | 51 | 42 | 43 | 25 | 35 | A | A | A | A | A | O 28 | |
| 19 | 33 | A | A | 50 | A | A | A | X 48 | 46 | 37 | B | B | 60 | 60 | 68 | 56 | A | A | A | A | A | A | A | A | |
| 20 | A | 49 | A | A | A | A | A | A | A | X 24 | 58 | 58 | 50 | 53 | 58 | 52 | O 32 | X | A | A | A | A | A | A | |
| 21 | A | 40 | X 33 | A 42 | O 42 | X | A | 56 | A | A 24 | O 33 | X 63 | O 51 | X 65 | X 53 | X 54 | X 29 | A | A | A | A | A | A | A | |
| 22 | A | A | A | A | A | A | A | A | O 32 | X 22 | X 36 | X 45 | X 58 | X 59 | X 50 | X 51 | X 30 | A | A | A | A | A | A | X 32 | |
| 23 | A | A | A | A | A | A | A | A | B | B | O 34 | X 45 | X 48 | X 48 | X 51 | X 33 | A | A | A | A | A | A | A | A | |
| 24 | A | A | A 28 | A | A | A | A | A | A | X 32 | X 37 | X 52 | X 54 | X 48 | X 40 | X 36 | X 30 | A | A | A | A | X 34 | X 34 | A | |
| 25 | A | A | A | A | A | A | A | A | A | O 27 | X 30 | X 36 | X 41 | 56 | 44 | 38 | 30 | A | A | A | A | A | A | A | |
| 26 | 55 | 67 | A | A | X 28 | A | X 21 | X 19 | X 34 | X 22 | A | 50 | 54 | 49 | 59 | 29 | X 28 | R | R | R | A | A | A | 29 | 31 |
| 27 | A | 51 | A | A | A | A | O 28 | A | O 18 | X 30 | X 34 | X 39 | X 44 | X 37 | X 44 | X 36 | X 26 | A | A | A | A | A | A | R | R |
| 28 | A | R | B | A | A | A | A | A | A | O 21 | X 44 | X 40 | X 42 | X 40 | X 42 | O 28 | X 22 | B | A | B | B | A | A | A | |
| 29 | A | A | A | A | A | A | A | R | R | A | X 33 | X 38 | X 42 | X 42 | X 31 | X 32 | X 21 | A | A | A | A | O 17 | X 17 | X | A |
| 30 | A | A | A | A | A | A | A | A | X 30 | X 34 | A | O 78 | X 34 | X 44 | X 57 | X 52 | X 29 | B | A | A | A | A | A | 49 | A |
| 31 | A | A | A | A | A | A | A | A | A | A | X 28 | X 34 | X 40 | X 37 | X 38 | X 28 | X 21 | A | A | A | A | A | A | B | A |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
| CNT | 8 | 11 | 5 | 6 | 7 | 6 | 9 | 8 | 12 | 25 | 27 | 30 | 31 | 31 | 31 | 31 | 29 | 12 | 6 | 2 | 3 | 5 | 5 | 7 | |
| MED | 52 | 49 | 50 | 54 | 41 | 32 | 31 | 28 | 22 | 30 | 39 | 48 | 53 | 51 | 46 | 46 | 30 | 22 | 21 | 27 | O 18 | X 18 | X 26 | X 32 | |
| U Q | 58 | 57 | 56 | 58 | 46 | 43 | 48 | 34 | 31 | 38 | 46 | 52 | 56 | 59 | 57 | 52 | 35 | 31 | 23 | | 34 | 27 | 39 | 33 | |
| L Q | 34 | X 40 | X 36 | X 28 | X 34 | X 30 | X 26 | X 20 | X 19 | X 26 | X 34 | X 43 | X 48 | X 46 | X 42 | X 36 | X 26 | X 20 | X 20 | | O 18 | X 17 | X 20 | X 28 | |

MAY 2020 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2020 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 | 39 | | A | A | 20 | 32 | 44 | 56 | 60 | 54 | 73 | 50 | 40 | 31 | 33 | B | R | A | A | A | | | | |
| 2 | A | R | A | A | B | A | | 33 | R | A | A | 38 | 42 | 44 | 38 | 42 | 42 | 32 | 21 | 17 | B | B | B | A | A | | | | |
| 3 | A | U | R | A | A | A | | 28 | 24 | | A | B | 33 | 46 | 50 | 48 | 48 | 52 | 29 | 11 | 16 | 12 | A | A | B | F | | | |
| 4 | A | A | A | A | A | A | | A | Z | 30 | 26 | 31 | 36 | 42 | 48 | 64 | 56 | 43 | 32 | 19 | F | B | B | A | A | B | A | | |
| 5 | B | | A | F | A | A | | A | A | F | F | F | F | Z | F | F | F | F | R | F | A | A | A | A | A | A | A | | |
| 6 | A | A | A | A | A | A | | A | A | A | A | A | U | R | 27 | 30 | 35 | 32 | 32 | 32 | 26 | 16 | 13 | B | B | A | A | | |
| 7 | A | A | A | A | A | A | | A | A | A | | A | F | F | F | F | F | R | A | A | A | A | B | B | B | B | B | | |
| 8 | A | U | R | R | A | A | | A | A | A | | 26 | 32 | 42 | 39 | 48 | 40 | 40 | 27 | 14 | A | A | R | R | A | A | A | | |
| 9 | A | A | A | A | A | | 26 | | A | A | | 13 | 25 | 37 | 37 | 45 | 42 | 39 | 40 | 23 | A | A | A | A | R | R | A | A | |
| 10 | R | A | A | A | A | A | | A | A | R | | 13 | 26 | 37 | 46 | 43 | 43 | 46 | 32 | F | A | U | R | A | A | A | R | A | |
| 11 | A | A | A | A | A | A | | A | A | A | | 35 | 33 | 35 | 48 | 48 | 43 | 31 | 21 | 16 | A | A | A | A | A | A | A | F | 19 |
| 12 | A | A | A | | 19 | 28 | 27 | 21 | 20 | 16 | F | 25 | 40 | 42 | 47 | 45 | 39 | 30 | 17 | | A | A | A | A | A | A | A | A | A |
| 13 | A | A | A | A | A | A | | A | A | | 16 | 23 | 30 | 37 | 49 | 41 | 48 | 32 | 22 | 16 | A | A | A | A | A | A | A | A | A |
| 14 | A | A | A | A | A | | 18 | 14 | 14 | F | F | 19 | 31 | 39 | 46 | 41 | 32 | 25 | 25 | | A | A | A | A | A | A | A | A | A |
| 15 | R | | A | A | F | A | | A | A | A | | 20 | 30 | 43 | 43 | 43 | 40 | 27 | 25 | 14 | R | A | A | A | A | A | A | A | A |
| 16 | A | A | A | A | A | A | | A | A | A | | 19 | 30 | 38 | 47 | J | R | 48 | 34 | 40 | 19 | A | B | A | A | A | A | A | A |
| 17 | A | A | A | A | A | | 23 | | A | A | | 21 | 32 | 41 | 50 | 40 | 39 | 34 | 17 | | A | A | A | A | A | A | A | A | A |
| 18 | A | A | A | A | A | | A | | R | F | F | F | F | F | F | F | 36 | 27 | 19 | | A | A | A | A | A | A | A | R | 22 |
| 19 | A | A | A | A | A | | A | J | R | F | F | B | B | F | F | F | F | A | A | A | A | A | A | A | A | A | A | A | A |
| 20 | A | | A | A | A | A | | A | A | A | | 18 | 44 | 38 | 44 | J | R | F | F | R | A | A | A | A | A | A | A | A | A |
| 21 | A | A | | A | A | A | | A | A | A | | 18 | 27 | 37 | 45 | F | 46 | 47 | 48 | 23 | | A | A | A | A | A | A | A | A |
| 22 | A | A | A | A | A | | A | | R | A | R | 16 | 30 | 38 | 41 | F | F | F | F | 24 | | A | A | A | A | A | A | A | 26 |
| 23 | A | A | A | A | A | | A | | A | B | B | 28 | 39 | 42 | 42 | F | 34 | 27 | | A | A | A | A | A | A | A | A | A | A |
| 24 | A | A | A | U | R | A | | A | A | A | | 15 | 31 | 46 | 44 | 42 | 34 | 30 | 19 | | F | A | A | A | 28 | 28 | R | A | A |
| 25 | A | A | A | A | A | | A | | A | A | | 21 | 24 | 30 | 35 | F | 38 | 33 | 32 | 24 | | A | A | A | A | A | A | A | A |
| 26 | A | A | A | A | | 22 | | 15 | 13 | 28 | 15 | | A | 41 | 42 | 43 | 48 | 23 | 22 | | R | A | R | R | A | A | A | A | A |
| 27 | A | A | A | A | A | | R | | A | R | F | 13 | 28 | 33 | 38 | 31 | 38 | J | R | 30 | 20 | | A | A | A | A | A | A | A |
| 28 | A | R | B | A | A | | A | | A | A | | 15 | 30 | 34 | 36 | 34 | 30 | F | 22 | 16 | | B | A | B | B | A | A | A | A |
| 29 | A | A | A | A | A | | A | | R | R | A | | 27 | 32 | 36 | 36 | 25 | 23 | 15 | | F | A | A | A | A | R | A | A | A |
| 30 | A | A | A | A | A | | A | | A | A | | A | A | R | F | F | F | 23 | | B | A | A | A | A | A | A | A | A | A |
| 31 | A | A | A | A | A | | A | | A | A | | 22 | 28 | 34 | 31 | 32 | 22 | 15 | | A | A | A | A | A | A | B | A | A | A |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | | | | |
| CNT | 2 | 5 | 2 | 3 | 4 | 5 | 7 | 8 | 12 | 25 | 27 | 29 | 31 | 31 | 31 | 31 | 29 | 11 | 6 | 2 | 3 | 5 | 3 | 4 | | | | | |
| MED | 21 | 32 | 30 | 22 | 28 | 26 | 22 | 22 | 16 | 21 | 31 | 39 | 44 | 42 | 39 | 32 | 23 | 16 | 15 | 16 | 12 | 12 | 18 | 22 | | | | | |
| U Q | | 35 | | F | 32 | 33 | 28 | R | 28 | 25 | 26 | 37 | 42 | 48 | 47 | 45 | 40 | 26 | 19 | 17 | | 28 | 21 | 20 | 24 | | | | |
| L Q | | 26 | | 19 | 25 | 24 | 18 | 14 | R | 13 | 18 | 28 | 36 | 38 | 36 | 34 | 27 | 19 | R | 14 | 14 | 12 | 11 | 11 | 20 | | | | |

MAY 2020 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2020 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 | 54 | 26 | 42 | 40 | 46 | 46 | 41 | 46 | 45 | 47 | | G ^E B ^E | E ^B B ^E | E ^B B ^E | E ^B B ^E | G | 13 | 13 | K | K | B | 25 | 55 | 34 | 57 | | | |
| 2 | 38 | 24 | 41 | 70 | | B | 35 | 30 | 22 | 48 | 48 | G | 19 | 22 | 28 | | G | 18 | E ^B B ^E | E ^B B ^E | B | B | B | 50 | 26 | | | |
| 3 | 36 | K | 31 | 50 | 50 | 36 | 29 | 20 | K | 41 | 34 | 55 | 48 | | G | 22 | 22 | G ^E B ^E | 16 | 11 | 46 | E ^B B ^E | E ^B B ^E | B | 30 | 60 | 46 | |
| 4 | 39 | 60 | 52 | 65 | 32 | 56 | 50 | K ^E B ^E | 21 | 14 | 59 | 52 | 24 | | G | G ^E G | 18 | 14 | 11 | | B | B | 60 | 48 | B | 55 | | |
| 5 | | B | 32 | 34 | 44 | 48 | 54 | 57 | 56 | 50 | 24 | E ^B B ^E | 13 | 25 | | G | G | G | 17 | 14 | 16 | 14 | 12 | 22 | 31 | 43 | 48 | 44 |
| 6 | 41 | 52 | 58 | 79 | 56 | 50 | 61 | 52 | 58 | 47 | 66 | 45 | 48 | 50 | E ^B B ^E | 15 | 15 | 10 | G | 33 | 22 | B | B | 48 | 43 | 30 | | |
| 7 | 32 | 34 | 43 | 53 | 48 | 49 | 36 | 52 | 36 | 36 | 48 | 24 | 22 | E ^B B ^E | 18 | G | 20 | E ^B B ^E | 17 | 25 | 27 | 51 | 62 | B | B | B | | |
| 8 | 48 | 28 | 48 | 63 | 44 | 57 | 49 | 58 | 42 | | G | G | 15 | 12 | | 64 | 18 | 20 | 46 | 64 | 39 | 29 | 28 | 42 | 50 | | | |
| 9 | 33 | 46 | 70 | 49 | 49 | 44 | 55 | 60 | 81 | 47 | | G | G | 17 | 23 | 24 | 18 | 16 | 16 | 50 | 29 | 52 | E ^B B ^E | 8 | 53 | 30 | | |
| 10 | 47 | 51 | 40 | 40 | 44 | 49 | 30 | 55 | 74 | 14 | 14 | G | 12 | 18 | 19 | 20 | 16 | 14 | 28 | 28 | 54 | 42 | 50 | 51 | 38 | 24 | | |
| 11 | 25 | 63 | 78 | 51 | 96 | 78 | 66 | 61 | 52 | | G | G | 15 | 15 | | 20 | 20 | 23 | 30 | 31 | 36 | 58 | 29 | 22 | 46 | 45 | | |
| 12 | 31 | 34 | 46 | 44 | 38 | 29 | 30 | 46 | 29 | 11 | 16 | 16 | 17 | | G | G | | 8 | 62 | 38 | 36 | 26 | 26 | 30 | 30 | | | |
| 13 | 35 | 40 | 47 | 58 | 34 | 30 | 47 | 58 | 31 | 52 | | G | 22 | 18 | 18 | 20 | 15 | 15 | 44 | 30 | 48 | 58 | 48 | 56 | 27 | | | |
| 14 | 40 | 34 | 39 | 42 | 48 | K | 28 | 14 | 45 | 51 | 51 | 13 | G | G | G | G | G ^E B ^E | 14 | 8 | 41 | 56 | 44 | 44 | 44 | 42 | 32 | | |
| 15 | 31 | 33 | 48 | 27 | 19 | 47 | 40 | 58 | 60 | 44 | 16 | 16 | 16 | | G | 17 | | G | 13 | 22 | 29 | 32 | 28 | 41 | 30 | 57 | | |
| 16 | 33 | 58 | 66 | 47 | 42 | 52 | 44 | 53 | 28 | 53 | 56 | G | 16 | 18 | | G ^E B ^E | 13 | 13 | 48 | 25 | B | 55 | 55 | 53 | 48 | 57 | | |
| 17 | 30 | 45 | 40 | 53 | 50 | 44 | 48 | 67 | 44 | 12 | 20 | 68 | 16 | 18 | 15 | 19 | 16 | 51 | 30 | 30 | 33 | 62 | 40 | 56 | | | | |
| 18 | 27 | 30 | 36 | 47 | 47 | 30 | 32 | 47 | 47 | 50 | 23 | 66 | 14 | | G | G | 46 | 50 | 46 | 32 | 29 | 29 | 31 | 34 | 29 | | | |
| 19 | 27 | 54 | 54 | 37 | 65 | 51 | 55 | 56 | 26 | 51 | | B | B | 40 | | G | 22 | 27 | 48 | 54 | 42 | 47 | 70 | 64 | 51 | 44 | | |
| 20 | 33 | 42 | 53 | 51 | 70 | 55 | 57 | 46 | 45 | 49 | 26 | 22 | 29 | | G | 38 | | G | K | 10 | 29 | 36 | 42 | 48 | 31 | 42 | 34 | |
| 21 | 45 | 24 | 28 | 35 | 52 | 52 | 33 | 51 | 49 | 57 | | G | 24 | 28 | 28 | 21 | 31 | 17 | 48 | 46 | 42 | 55 | 58 | 53 | 53 | | | |
| 22 | 56 | 36 | 66 | 58 | 46 | 58 | 52 | 58 | 50 | 44 | 17 | 19 | 17 | 24 | | G ^E B ^E | E ^B B ^E | 10 | 8 | 46 | 45 | 31 | 42 | 47 | 35 | 35 | | |
| 23 | 34 | 37 | 68 | 56 | 49 | 52 | 37 | 28 | | B | B | 24 | 18 | 15 | G | 16 | 31 | 46 | 44 | 53 | 43 | 43 | 43 | 51 | 54 | 32 | | |
| 24 | 58 | 28 | 37 | 47 | 48 | 46 | 44 | 43 | 30 | 46 | 16 | 12 | G | 16 | 18 | | G | 47 | 14 | 30 | 34 | 34 | 29 | 44 | 44 | 48 | | |
| 25 | 54 | 52 | 55 | 55 | 67 | 63 | 57 | 64 | 47 | 40 | 46 | G | 27 | | G | 16 | 16 | 16 | G | G | 33 | 46 | 38 | 57 | 45 | 53 | 54 | |
| 26 | 29 | 32 | 57 | 35 | 52 | 52 | 55 | 64 | 52 | 61 | 48 | 20 | 20 | 20 | 16 | 50 | 49 | 22 | 17 | 16 | 42 | 62 | 30 | 26 | | | | |
| 27 | 38 | 38 | 83 | 53 | 36 | 49 | 46 | 28 | 47 | 68 | 14 | 17 | 24 | 16 | 16 | 14 | E ^B B ^E | 8 | 40 | 48 | 44 | 50 | 48 | 23 | 21 | | | |
| 28 | 28 | 18 | | B | 49 | 51 | 27 | 50 | 32 | 64 | 42 | | G ^E B ^E | 14 | | G | 77 | 52 | E ^B B ^E | 13 | 50 | | B | B | 46 | 42 | 50 | |
| 29 | 49 | 52 | 55 | 56 | 56 | 54 | 39 | 20 | 16 | 30 | E ^B B ^E | 12 | 14 | 20 | 20 | 53 | 48 | 42 | 30 | 28 | 28 | 28 | 28 | 30 | 19 | | | |
| 30 | 29 | 29 | 46 | 44 | 44 | 57 | 51 | 49 | 52 | 55 | 40 | 57 | 48 | 20 | 22 | 57 | 54 | 54 | 28 | 50 | 50 | 42 | 42 | 40 | | | | |
| 31 | 98 | 48 | 61 | 48 | 51 | 54 | 49 | 52 | 42 | 29 | 29 | 64 | 15 | | G | 15 | 11 | K | 12 | 24 | 31 | 28 | 40 | 44 | B | 49 | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | | | |
| CNT | 30 | 31 | 30 | 31 | 30 | 31 | 31 | 31 | 30 | 30 | 30 | 30 | 31 | 31 | 30 | 31 | 31 | 30 | 29 | 26 | 28 | 29 | 27 | 30 | | | | |
| MED | 36 | 36 | 49 | 49 | 48 | 50 | 47 | 52 | 47 | 47 | | G | 19 | 21 | | G | G | | 16 | 33 | 32 | 40 | 42 | 46 | 42 | 42 | | |
| U Q | 47 | 51 | 58 | 56 | 52 | 54 | 55 | 58 | 52 | 52 | 40 | 25 | 23 | 22 | 22 | 27 | 42 | 46 | 46 | 47 | 54 | 52 | 50 | 50 | | | | |
| L Q | 31 | 30 | 41 | 44 | 44 | 44 | 36 | 43 | 34 | 30 | 16 | 16 | 16 | | G | 16 | 14 | 12 | 25 | 28 | 30 | 29 | 36 | 34 | 30 | | | |

MAY 2020 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2020 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 | 6 | 6 | 8 | 8 | 15 | 12 | 12 | 8 | 9 | 11 | 18 | 26 | 28 | 20 | 9 | 7 | 7 | 8 | B | 15 | 11 | 14 | 11 | |
| 2 | 11 | 11 | 15 | 16 | B | 14 | 14 | 10 | 25 | 24 | 15 | 13 | 16 | 15 | 14 | 10 | 12 | 15 | 14 | B | B | B | 17 | 8 | |
| 3 | 8 | 8 | 10 | 11 | 12 | 10 | 7 | 8 | 7 | 36 | 13 | 14 | 13 | 8 | 8 | 8 | 11 | 8 | 9 | 8 | 10 | 14 | B | 8 | |
| 4 | 9 | 20 | 12 | 12 | 8 | 16 | 12 | 8 | 14 | 12 | 11 | 11 | 12 | 9 | 8 | 10 | 7 | 7 | B | B | 22 | 18 | B | 16 | |
| 5 | B | 9 | 8 | 12 | 12 | 10 | 12 | 12 | 11 | 8 | 10 | 9 | 12 | 14 | 9 | 8 | 12 | 8 | 8 | 8 | 9 | 9 | 11 | 9 | |
| 6 | 9 | 9 | 16 | 15 | 14 | 19 | 16 | 18 | 12 | 19 | 11 | 11 | 10 | 12 | 15 | 10 | 8 | 8 | 9 | B | B | 16 | 7 | 8 | |
| 7 | 6 | 7 | 8 | 13 | 14 | 11 | 9 | 15 | 12 | 10 | 18 | 8 | 19 | 18 | 12 | 12 | 17 | 13 | 13 | 22 | 20 | B | B | B | |
| 8 | 27 | 16 | 11 | 9 | 12 | 15 | 12 | 9 | 9 | 9 | 11 | 7 | 10 | 10 | 11 | 11 | 11 | 9 | 9 | 9 | 9 | 8 | 8 | 11 | |
| 9 | 9 | 10 | 10 | 14 | 11 | 9 | 8 | 8 | 7 | 9 | 8 | 12 | 13 | 13 | 11 | 5 | 7 | 7 | 8 | 8 | 8 | 7 | 7 | 8 | |
| 10 | 13 | 8 | 9 | 9 | 8 | 6 | 11 | 8 | 8 | 7 | 8 | 10 | 10 | 10 | 10 | 8 | 6 | 6 | 6 | 6 | 7 | 7 | 7 | 6 | |
| 11 | 6 | 10 | 8 | 9 | 16 | 16 | 11 | 12 | 8 | 8 | 8 | 10 | 12 | 8 | 17 | 14 | 13 | 10 | 11 | 9 | 12 | 11 | 11 | 10 | |
| 12 | 8 | 9 | 7 | 8 | 8 | 9 | 8 | 8 | 8 | 8 | 8 | 10 | 8 | 10 | 10 | 6 | 7 | 8 | 6 | 8 | 7 | 7 | 7 | 7 | |
| 13 | 7 | 8 | 12 | 12 | 9 | 11 | 10 | 7 | 7 | 8 | 7 | 10 | 8 | 10 | 8 | 8 | 7 | 7 | 8 | 8 | 11 | 14 | 14 | 10 | |
| 14 | 8 | 9 | 10 | 13 | 11 | 8 | 7 | 7 | 7 | 7 | 6 | 8 | 9 | 10 | 7 | 6 | 8 | 8 | 7 | 9 | 9 | 8 | 10 | 11 | |
| 15 | 9 | 9 | 9 | 9 | 6 | 9 | 8 | 8 | 10 | 14 | 10 | 9 | 8 | 8 | 8 | 8 | 8 | 7 | 10 | 10 | 6 | 10 | 11 | 11 | |
| 16 | 10 | 10 | 10 | 10 | 10 | 10 | 7 | 7 | 11 | 12 | 10 | 9 | 10 | 14 | 12 | 9 | 8 | 8 | B | 8 | 12 | 14 | 14 | 12 | |
| 17 | 10 | 6 | 8 | 9 | 9 | 7 | 10 | 9 | 13 | 8 | 8 | 10 | 10 | 10 | 7 | 8 | 8 | 6 | 7 | 8 | 7 | 6 | 10 | 9 | |
| 18 | 8 | 6 | 9 | 9 | 9 | 7 | 7 | 6 | 9 | 7 | 6 | 9 | 9 | 9 | 7 | 5 | 7 | 7 | 7 | 7 | 7 | 13 | 13 | 8 | |
| 19 | 8 | 8 | 8 | 7 | 7 | 7 | 13 | 8 | 7 | 7 | B | B | 16 | 10 | 9 | 11 | 8 | 8 | 10 | 13 | 13 | 14 | 12 | 12 | |
| 20 | 9 | 12 | 12 | 11 | 11 | 11 | 9 | 10 | 11 | 9 | 8 | 8 | 8 | 8 | 6 | 6 | 8 | 8 | 8 | 10 | 8 | 10 | 9 | 7 | |
| 21 | 7 | 7 | 6 | 6 | 6 | 13 | 10 | 10 | 8 | 7 | 10 | 8 | 14 | 12 | 8 | 8 | 6 | 6 | 8 | 7 | 12 | 12 | 14 | 14 | |
| 22 | 14 | 9 | 11 | 16 | 11 | 11 | 10 | 9 | 9 | 8 | 6 | 7 | 7 | 7 | 10 | 10 | 8 | 11 | 8 | 8 | 8 | 8 | 9 | 8 | |
| 23 | 9 | 9 | 10 | 17 | 16 | 15 | 11 | 10 | B | B | 16 | 14 | 10 | 9 | 8 | 8 | 8 | 8 | 9 | 17 | 11 | 13 | 10 | 7 | |
| 24 | 7 | 7 | 8 | 8 | 16 | 16 | 10 | 9 | 7 | 8 | 9 | 8 | 10 | 8 | 7 | 8 | 7 | 7 | 6 | 6 | 8 | 8 | 8 | 10 | |
| 25 | 14 | 24 | 13 | 24 | 14 | 14 | 17 | 10 | 10 | 9 | 11 | 11 | 14 | 8 | 8 | 8 | 8 | 10 | 8 | 10 | 11 | 8 | 9 | 11 | |
| 26 | 8 | 8 | 14 | 10 | 8 | 8 | 8 | 8 | 8 | 10 | 13 | 12 | 13 | 8 | 8 | 10 | 10 | 8 | 9 | 9 | 9 | 7 | 7 | 7 | |
| 27 | 7 | 14 | 14 | 13 | 11 | 8 | 7 | 10 | 8 | 7 | 7 | 7 | 6 | 6 | 6 | 6 | 8 | 6 | 8 | 8 | 10 | 8 | 8 | 10 | |
| 28 | 12 | 10 | B | 10 | 8 | 8 | 8 | 8 | 8 | 11 | 8 | 14 | 11 | 10 | 10 | 12 | 8 | B | 13 | B | B | 13 | 10 | 10 | |
| 29 | 8 | 8 | 10 | 10 | 7 | 11 | 11 | 11 | 10 | 10 | 11 | 7 | 9 | 10 | 8 | 7 | 7 | 8 | 6 | 6 | 6 | 6 | 7 | 7 | |
| 30 | 6 | 7 | 7 | 6 | 10 | 10 | 10 | 9 | 7 | 7 | 12 | 12 | 14 | 7 | 13 | 13 | 10 | 40 | 18 | 16 | 24 | 8 | 9 | 10 | |
| 31 | 34 | 21 | 17 | 22 | 19 | 14 | 10 | 10 | 8 | 8 | 8 | 7 | 8 | 9 | 10 | 7 | 7 | 6 | 8 | 10 | 10 | 12 | B | 12 | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
| CNT | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | |
| MED | 9 | 9 | 10 | 10 | 11 | 11 | 10 | 9 | 8 | 9 | 10 | 10 | 10 | 10 | 9 | 8 | 8 | 8 | 8 | 9 | 10 | 10 | 10 | 10 | |
| U Q | 11 | 10 | 12 | 13 | 14 | 14 | 12 | 10 | 11 | 11 | 11 | 12 | 13 | 12 | 11 | 10 | 10 | 9 | 10 | B | 16 | 13 | 14 | 14 | 11 |
| L Q | 8 | 8 | 8 | 9 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 9 | 8 | 8 | 7 | 7 | 7 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |

MAY 2020 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

MAY 2020 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 | 266 | 224 | E A 228 | 218 | 214 | E B 234 | 208 | 184 | 184 | 228 | 216 | B | A | A | A | A | |
| 2 | A | A | A | A | B | A | A | A | A | A | A | E A 244 | 246 | 224 | 202 | 212 | 198 | 204 | E B 246 | 230 | B | B | B | A | A |
| 3 | A | A | A | A | A | A | 198 | 198 | A | B | A | A | 212 | 196 | 212 | 194 | 200 | 186 | 208 | 210 | A | A | B | 196 | |
| 4 | A | A | A | A | A | A | A | A | E A 274 | E A 270 | E A 240 | E A 216 | E A 222 | 220 | 202 | 194 | 188 | 202 | B | B | A | A | B | A | |
| 5 | B | 246 | A | A | A | A | A | A | A | E A 246 | E B 216 | 202 | 206 | 220 | 200 | E A 216 | 208 | 214 | A | A | A | A | A | A | |
| 6 | A | A | A | A | A | A | A | A | A | A | E A 254 | E A 228 | 208 | 188 | 210 | 216 | E A 216 | 222 | 272 | B | B | A | 208 | A | |
| 7 | A | A | A | A | A | A | A | A | A | A | E A 246 | H 172 | A | 94 | 204 | 184 | 196 | 184 | 198 | A | A | A | B | B | B |
| 8 | A | A | 194 | A | A | A | A | A | A | E A 244 | H 172 | A | 94 | 204 | 184 | 196 | 184 | 198 | A | A | E B 214 | 190 | A | A | |
| 9 | A | A | A | A | A | A | A | A | A | A | 224 | 182 | 194 | 194 | 204 | 194 | 194 | A | A | A | A | 184 | A | A | |
| 10 | 202 | A | A | A | A | A | A | A | E A 246 | E A 212 | A | 206 | 196 | 190 | 190 | 202 | 190 | 184 | A | 196 | A | A | A | 192 | A |
| 11 | A | A | A | A | A | A | A | A | A | A | E A 228 | 228 | 218 | E A 214 | 204 | 200 | 220 | 276 | A | A | A | A | A | A | 212 |
| 12 | A | A | A | 194 | 212 | 202 | 198 | 198 | 198 | E A 238 | 198 | 194 | 192 | 198 | 196 | 186 | 186 | A | A | A | A | A | A | A | A |
| 13 | A | A | A | A | A | A | A | A | A | E A 328 | E A 220 | 204 | 200 | 200 | 198 | 190 | 194 | 194 | 194 | A | A | A | A | A | 204 |
| 14 | A | 202 | A | A | A | A | 212 | 280 | E A 280 | E A 200 | 196 | 196 | 196 | 198 | 194 | 200 | 182 | A | A | A | A | A | A | A | A |
| 15 | 198 | 196 | A | 202 | E A 208 | E A 310 | A | A | A | A | A | 210 | 196 | 196 | 196 | 210 | 206 | 198 | 248 | A | A | A | A | A | A |
| 16 | A | A | A | A | A | A | A | A | A | E A 240 | E A 230 | 196 | 194 | 190 | 182 | 180 | 196 | A | B | A | A | A | A | A | A |
| 17 | A | A | A | A | A | 192 | A | A | A | E A 250 | E A 216 | 194 | 202 | 202 | 192 | 202 | 222 | A | A | A | A | 196 | A | A | A |
| 18 | A | A | A | A | A | A | A | A | A | 202 | 198 | 188 | 198 | 194 | 186 | 196 | 188 | A | A | A | A | A | A | A | 188 |
| 19 | 208 | A | A | A | A | A | A | A | A | E A 280 | B | B | A | 186 | 210 | 206 | A | A | A | A | A | A | A | A | A |
| 20 | A | A | A | A | A | A | A | A | A | E A 266 | E A 218 | 204 | 204 | 194 | 206 | 196 | 188 | A | A | A | A | A | A | A | A |
| 21 | A | A | A | E A 244 | A | A | A | A | A | A | E A 248 | E A 238 | 234 | E A 212 | 204 | 204 | 196 | A | A | A | A | A | A | A | A |
| 22 | A | A | A | A | A | A | 196 | A | A | E A 296 | E A 228 | 220 | 198 | 198 | 198 | 208 | 176 | A | A | A | A | A | A | A | A |
| 23 | A | A | A | A | A | A | A | A | B | B | A | 248 | 232 | 188 | 202 | 186 | 196 | A | A | A | A | A | A | A | A |
| 24 | A | A | A | 200 | A | A | A | A | A | A | E A 258 | E A 230 | 206 | 194 | 202 | 194 | 200 | 204 | A | A | A | 214 | 260 | A | A |
| 25 | A | A | A | A | A | A | A | A | A | 216 | 248 | 246 | 228 | 212 | 210 | 200 | 196 | A | A | A | A | A | A | A | A |
| 26 | A | A | A | A | 188 | A | A | 196 | A | A | A | A | 214 | 204 | 204 | 194 | 200 | 200 | A | A | A | A | A | A | A |
| 27 | A | A | A | A | A | A | 196 | A | A | A | 234 | 206 | 214 | 190 | 206 | 206 | 186 | 198 | A | A | A | A | A | A | A |
| 28 | A | A | B | A | A | A | A | A | A | E A 278 | E A 222 | 200 | 202 | 202 | 192 | 210 | 210 | B | A | B | B | A | A | A | A |
| 29 | A | A | A | A | A | A | A | A | A | A | A | 224 | 188 | 212 | 200 | 200 | 208 | E A 220 | A | A | A | A | 188 | 202 | A |
| 30 | A | A | A | A | A | A | A | A | 220 | 212 | A | A | E A 328 | E A 266 | A | 240 | 258 | B | A | A | A | A | A | A | A |
| 31 | A | A | A | A | A | A | A | A | A | A | A | E A 232 | E A 224 | 200 | 200 | 194 | 194 | A | A | A | A | A | A | B | A |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
| CNT | 3 | 3 | 1 | 3 | 3 | 3 | 5 | 5 | 7 | 20 | 26 | 28 | 30 | 31 | 30 | 31 | 29 | 11 | 6 | 2 | 2 | 5 | 3 | 4 | |
| MED | 202 | 202 | 194 | 200 | U 200 | 197 | 198 | 198 | U 243 | U 223 | U 212 | 203 | 201 | 200 | 200 | 199 | 195 | 212 | 216 | 213 | 214 | 190 | 202 | 200 | |
| U Q | 208 | 246 | | 202 | E A 244 | E A 208 | 261 | 239 | 280 | 262 | 232 | 228 | 218 | 212 | 206 | 206 | 209 | A 248 | A 230 | | | 228 | 208 | 208 | |
| L Q | 198 | 196 | | 194 | 188 | 192 | 197 | 196 | 220 | 218 | 206 | 196 | 194 | 196 | 192 | 194 | 188 | 198 | 208 | | | 186 | 192 | 192 | |

MAY 2020 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2020 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 | A | A | A | X | X | X | O | X | X | R | R | R | A | A | A | O | X | A | | |
| 2 | A | A | A | A | A | A | A | 113 | A | A | A | B | O | X | X | O | B | B | B | A | A | B | A | A | X | | |
| 3 | A | A | A | A | A | A | A | A | A | A | X | X | X | X | X | X | R | R | R | A | A | A | A | A | A | | |
| 4 | A | A | A | A | X | X | X | O | X | O | X | X | X | X | O | X | A | R | A | A | A | A | A | A | A | | |
| 5 | A | A | A | A | X | X | A | A | A | X | X | X | X | X | X | X | X | A | A | A | A | A | B | A | R | | |
| 6 | O | X | A | A | X | A | A | A | A | A | A | X | X | X | X | O | X | R | B | A | A | R | A | A | A | | |
| 7 | A | A | A | A | A | A | A | A | A | A | A | X | X | X | X | X | A | A | A | A | A | O | X | A | 70 | | |
| 8 | A | 70 | A | A | 63 | A | A | A | A | O | X | A | 40 | 44 | 48 | 45 | 44 | A | A | A | B | B | A | A | A | | |
| 9 | A | A | A | A | A | A | A | A | A | O | X | X | X | X | X | O | X | A | A | A | A | B | O | X | O | X | A |
| 10 | A | A | A | A | A | A | A | A | A | A | A | A | B | B | O | X | B | A | A | A | A | A | B | A | A | A | |
| 11 | A | A | A | A | A | A | A | A | A | A | A | X | X | X | X | X | A | R | R | A | R | A | A | A | A | A | |
| 12 | A | A | A | A | A | A | A | A | A | A | X | 24 | 39 | 42 | 50 | 40 | B | R | R | B | A | A | A | A | A | A | |
| 13 | A | A | A | A | A | A | A | A | A | A | 32 | 32 | 40 | 54 | 61 | 28 | A | A | A | A | A | A | B | A | B | A | |
| 14 | A | A | A | A | A | A | A | A | A | B | O | X | O | X | X | O | X | A | A | A | A | A | O | X | B | A | |
| 15 | A | A | A | A | A | A | A | A | A | B | B | X | X | X | X | X | B | B | A | A | A | A | A | A | A | A | |
| 16 | A | A | A | A | A | A | A | A | A | A | X | O | X | O | X | X | O | X | A | A | A | A | A | A | A | A | |
| 17 | A | A | A | O | X | A | A | A | A | A | O | X | X | X | X | X | O | X | O | X | A | A | A | A | A | A | |
| 18 | A | A | A | A | A | A | A | A | B | A | A | 38 | 35 | 44 | 48 | A | A | A | A | A | A | A | A | R | A | A | |
| 19 | A | A | A | A | A | A | A | A | A | 24 | 31 | 38 | 36 | 42 | 42 | 28 | 20 | A | A | A | A | A | A | A | A | A | |
| 20 | A | 89 | A | 64 | A | A | A | A | A | A | A | A | 46 | 51 | 51 | 28 | A | A | A | A | A | A | A | A | A | A | |
| 21 | A | 47 | 56 | 58 | R | A | A | A | A | A | 31 | 41 | 49 | 32 | 59 | O | X | A | A | R | A | A | A | A | A | A | |
| 22 | A | A | A | A | A | A | A | 59 | 45 | A | A | 41 | 40 | 47 | 30 | 26 | A | R | A | A | A | A | A | A | A | A | |
| 23 | A | R | A | A | A | A | A | A | A | A | 45 | 33 | 34 | 40 | 39 | 27 | A | A | A | A | A | A | A | A | A | A | |
| 24 | A | A | A | A | A | A | A | A | A | A | O | X | X | X | X | X | A | A | A | A | A | A | A | A | A | A | |
| 25 | A | A | A | A | 62 | 56 | A | A | A | A | X | 26 | 38 | 37 | 46 | 37 | 25 | A | A | A | A | A | O | X | A | A | |
| 26 | A | A | A | A | A | A | A | A | A | A | 34 | 34 | 50 | 50 | 40 | A | A | A | A | A | A | A | A | A | A | A | |
| 27 | A | A | A | A | A | A | A | A | 42 | R | A | O | X | X | O | X | A | R | A | A | A | A | A | A | A | A | |
| 28 | A | 43 | O | X | A | A | A | A | A | A | X | 26 | 34 | 42 | 40 | 37 | 39 | A | A | A | R | A | A | A | O | X | 27 |
| 29 | B | A | A | A | A | A | A | A | A | A | X | 26 | 46 | 58 | 39 | 39 | A | O | X | A | A | B | A | B | A | A | |
| 30 | O | X | 28 | A | A | A | A | A | X | A | X | O | X | X | X | X | F | A | A | A | A | A | A | A | A | R | |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | | |
| CNT | 2 | 5 | 2 | 4 | 4 | 3 | 1 | 4 | 3 | 6 | 21 | 27 | 29 | 29 | 30 | 23 | 5 | 1 | | | | 5 | 2 | 3 | | | |
| MED | O | X | 32 | 47 | 46 | 48 | 49 | 31 | 23 | 52 | 42 | 23 | 29 | 38 | 42 | 44 | 40 | 28 | 21 | 20 | | O | X | O | X | X | |
| U Q | | 80 | | 61 | 62 | 56 | | 86 | 45 | 28 | 32 | 41 | 50 | 50 | 46 | 33 | 24 | | | | | 24 | | 70 | | | |
| L Q | | 36 | | 36 | 34 | 25 | | 34 | O | X | X | X | X | X | X | O | X | X | | | | O | X | O | X | 27 | |

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2020 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 | 22 | 42 | 41 | 48 | F 27 | 27 | R | R | R | A | A | A | R 25 | A | |
| 2 | A | A | A | A | A | A | A | A | A | A | A | B | R 32 | 32 | 31 | B | B | B | A | A | B | A | A J | R 34 | |
| 3 | A | A | A | A | A | A | A | A | A | A | 24 | 29 | Z 38 | F 37 | F 31 | 28 | R | R | R | A | A | A | A | A | |
| 4 | A | A | A | A | 30 | 25 | 17 | A | R 16 | R 16 | U 22 | R 37 | F 38 | F 45 | F 34 | 26 | A | R | A | A | A | A | A | A | |
| 5 | A | A | A | A | 26 | 19 | A | A | A | A | 16 | 27 | 31 | F 36 | 28 | 32 | 27 | 15 | A | A | A | A | B | A | R |
| 6 | U 22 | R A | A | A | 31 | A | A | A | A | A | A | F 23 | 40 | 44 | 34 | 42 | 40 | R | B | A | A | R | A | A | A |
| 7 | A | A | A | A | A | A | A | A | A | A | A | F 18 | 28 | 45 | 40 | 30 | 25 | A | A | A | A | A | R 12 | A | A |
| 8 | A | A | A | A | A | A | A | A | A | R 22 | A | F 28 | 38 | 42 | 30 | 38 | A | A | A | B | B | A | A | A | A |
| 9 | A | A | A | A | A | A | A | A | A | A | F 12 | 21 | 32 | 32 | 32 | 28 | R 19 | A | A | A | A | B | R 11 | 23 | A |
| 10 | A | A | A | A | A | A | A | A | A | A | A | A | B | B | 32 | B | A | A | A | A | A | B | A | A | A |
| 11 | A | A | A | A | A | A | A | A | A | A | A | 29 | 27 | 38 | 30 | 20 | A | A | A | A | A | A | A | A | A |
| 12 | A | A | A | A | A | A | A | A | A | A | 18 | F 27 | F 29 | F 34 | F 31 | B | R | A | B | A | A | A | A | A | A |
| 13 | A | A | A | A | A | A | A | A | A | A | F 20 | 26 | 26 | 40 | 41 | 22 | A | A | A | A | A | B | A | B | B |
| 14 | A | A | A | A | A | A | A | A | A | B | 20 | 26 | 27 | 32 | 27 | 18 | R | A | A | A | A | A | R 11 | B | A |
| 15 | A | A | A | A | A | A | A | A | A | B | B | 28 | 36 | 28 | 28 | 21 | B | B | A | A | A | A | A | A | A |
| 16 | A | A | A | A | A | A | A | A | A | A | 19 | 34 | U 42 | R 32 | Z 30 | Z 21 | R | A | A | A | A | A | A | A | A |
| 17 | A | A | A | R 28 | A | A | A | A | A | A | R 19 | 30 | 31 | 37 | 42 | 24 | R 20 | A | 14 | A | A | A | A | A | A |
| 18 | A | A | A | A | A | A | A | A | B | A | A | F 26 | 29 | 38 | 42 | A | A | A | A | A | A | A | R | A | A |
| 19 | A | A | A | A | A | A | A | A | A | A | F 12 | 18 | 32 | 30 | 36 | 36 | R 14 | A | A | A | A | A | A | A | A |
| 20 | A | A | A | A | A | A | A | A | A | A | A | A | F 30 | R 45 | F 38 | 22 | A | A | A | A | A | A | A | A | A |
| 21 | A | A | A | A | A | A | A | A | A | A | F 20 | F 22 | R 30 | 26 | F 38 | R 20 | A | A | R | A | A | A | A | A | A |
| 22 | A | A | A | A | A | A | A | A | A | A | A | F 26 | 34 | 34 | 24 | 20 | A | A | A | A | A | A | A | A | A |
| 23 | A | A | A | A | A | A | A | A | A | A | F 25 | 27 | 28 | 34 | 33 | 21 | A | A | A | A | A | A | A | A | A |
| 24 | A | A | A | A | A | A | A | A | A | A | 17 | 31 | 33 | U 47 | R 26 | F 26 | A | A | A | A | A | A | A | A | A |
| 25 | A | A | A | A | A | A | A | A | A | A | 20 | Z 32 | 31 | 40 | 31 | 19 | A | A | A | A | A | A | 13 | A | A |
| 26 | A | A | A | A | A | A | A | A | A | A | F 19 | 28 | 37 | F 37 | F 34 | A | A | A | A | A | A | A | A | A | A |
| 27 | A | A | A | A | A | A | A | A | A | A | A | R 24 | 36 | 32 | 42 | 20 | A | A | A | A | A | A | A | A | A |
| 28 | A | F 30 | R 30 | A | A | A | A | A | A | A | 20 | 28 | 32 | F 34 | 31 | 23 | F 23 | A | A | A | A | A | A | A | R 21 |
| 29 | B | A | A | A | A | A | A | A | A | A | 20 | F 28 | F 45 | 33 | F 26 | A | R 16 | A | A | A | B | A | B | A | A |
| 30 | R 29 | F 18 | A | A | A | A | A | J R 16 | A | R 26 | 23 | F 48 | 47 | 36 | 36 | 24 | 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 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 6 | 21 | 27 | 29 | 29 | 30 | 23 | 5 | 1 | | | | 4 | 2 | 2 | |
| MED | R 26 | F 24 | R 30 | 30 | 28 | 22 | 17 | J R 16 | R 16 | 16 | 20 | 28 | 33 | 36 | 31 | 22 | R 15 | 14 | | | | R 12 | 24 | R 28 | |
| U Q | | | | | | | | | | R 22 | 22 | 32 | 38 | 40 | 36 | 26 | R 18 | | | | | | 12 | | |
| L Q | | | | | | | | | | 12 | 19 | 27 | F 30 | 32 | 30 | 20 | 14 | | | | | | R 11 | | |

JUN. 2020 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2020 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 | 30 | 39 | 53 | 26 | 53 | 56 | 54 | 43 | 43 | 52 | 30 | 26 | 17 | 26 | 68 | 59 | 20 | 22 | K | 19 | 42 | K | 32 | 32 | 41 | 31 | |
| 2 | 68 | 108 | 48 | 57 | 57 | 58 | 61 | 50 | 52 | 62 | 56 | B | 52 | E | B | 59 | B | B | | 70 | 44 | B | 45 | 45 | 54 | | |
| 3 | 84 | 40 | 38 | 48 | 40 | 57 | 49 | 41 | 53 | 53 | 55 | 55 | 25 | 18 | G | 12 | E | B | | 12 | 32 | 32 | 41 | 52 | 57 | 56 | 30 |
| 4 | 30 | 44 | 48 | 55 | 57 | 53 | 47 | 40 | 22 | 77 | 56 | 53 | 56 | 22 | 23 | E | B | | 16 | 68 | 16 | 50 | 57 | 47 | 58 | 55 | 31 |
| 5 | 32 | 57 | 49 | 56 | 57 | 48 | 38 | 46 | 52 | 30 | 16 | 61 | 16 | 72 | 54 | 52 | 52 | 42 | 54 | 54 | 45 | B | 42 | 28 | | | |
| 6 | 33 | 40 | 47 | 54 | 47 | 45 | 81 | 41 | 52 | 58 | 68 | 59 | G | 14 | 58 | 53 | 53 | G | | 55 | 59 | 24 | 53 | 46 | 55 | | |
| 7 | 51 | 35 | 48 | 46 | 58 | 55 | 56 | 54 | 48 | 34 | 54 | 49 | 14 | G | 12 | 56 | 48 | 52 | 57 | 54 | 54 | 41 | 43 | 54 | 45 | | |
| 8 | 73 | 52 | 57 | 72 | 52 | 101 | 66 | 56 | 48 | 57 | 59 | G | G | 21 | 51 | 18 | 38 | 56 | 63 | B | B | 61 | 51 | 41 | | | |
| 9 | 40 | 46 | 62 | 34 | 58 | 48 | 29 | 47 | 58 | 78 | 43 | 57 | G | 18 | 47 | 42 | 41 | 42 | 58 | 50 | 43 | B | 42 | 55 | 41 | | |
| 10 | 41 | 78 | 52 | 62 | 34 | 49 | 57 | 57 | 47 | 50 | 56 | 60 | G | 102 | B | E | B | B | | 57 | 48 | 48 | 68 | 31 | B | 48 | 62 |
| 11 | 59 | 106 | 57 | 84 | 31 | 39 | 57 | 44 | 51 | 41 | 36 | G | G | 17 | 17 | 15 | 15 | 31 | 25 | 25 | 44 | 26 | 56 | 52 | 46 | | |
| 12 | 46 | 44 | 71 | 53 | 57 | 57 | 60 | 40 | 45 | 50 | 10 | E | B | E | B | B | B | | | B | 51 | 50 | 35 | 51 | 66 | | |
| 13 | 54 | 56 | 57 | 66 | 56 | 32 | 60 | 51 | 65 | 47 | 42 | G | G | 15 | 20 | 12 | 34 | 26 | 31 | 28 | 35 | B | 56 | B | | | |
| 14 | 54 | 49 | 28 | 42 | 50 | 48 | 67 | 38 | 24 | B | E | B | E | B | B | K | 14 | 56 | 20 | 22 | 26 | 26 | 48 | B | 24 | | |
| 15 | 30 | 32 | 26 | 56 | 71 | 51 | 32 | 54 | 52 | B | B | 60 | E | B | E | B | B | B | | 48 | 35 | 36 | 28 | 54 | 48 | | |
| 16 | 29 | 34 | 56 | 33 | 33 | 53 | 84 | 69 | 47 | 78 | 28 | G | G | 29 | 24 | 40 | 37 | 28 | 22 | 32 | 8 | 25 | 31 | 28 | | | |
| 17 | 28 | 69 | 26 | 24 | 32 | 42 | 42 | 56 | 32 | 53 | 47 | 23 | 19 | 55 | 16 | 51 | 9 | 47 | 47 | 54 | 44 | 66 | 49 | 37 | | | |
| 18 | 43 | 43 | 47 | 43 | 58 | 48 | 66 | 58 | B | 54 | 34 | G | J | A | 70 | 66 | 17 | 60 | 30 | 46 | 37 | 57 | 44 | 64 | 24 | 53 | |
| 19 | 53 | 66 | 61 | 42 | 41 | 63 | 48 | 64 | 30 | 42 | 64 | G | 22 | 25 | 32 | 32 | 29 | 45 | 27 | 27 | 27 | 45 | 30 | 31 | | | |
| 20 | 35 | 51 | 40 | 46 | 50 | 50 | 58 | 58 | 46 | 62 | 62 | 62 | 55 | G | 22 | 39 | 53 | 53 | 38 | 58 | 58 | 35 | 57 | 57 | | | |
| 21 | 57 | 53 | 42 | 36 | 25 | 56 | 48 | 47 | 51 | 36 | 44 | 16 | 48 | 21 | 18 | 60 | 58 | 57 | 21 | 42 | 34 | 26 | 26 | 27 | | | |
| 22 | 31 | 51 | 94 | 81 | 49 | 52 | 55 | 33 | 34 | 50 | 41 | 48 | G | 48 | G | 20 | 56 | 31 | 47 | 53 | 53 | 46 | 67 | 32 | | | |
| 23 | 32 | 22 | 29 | 52 | 45 | 49 | 80 | 45 | 52 | 27 | 10 | 56 | 15 | G | 26 | 46 | 54 | 56 | 55 | 43 | 32 | 54 | 57 | 49 | | | |
| 24 | 34 | 39 | 50 | 65 | 64 | 56 | 46 | 50 | 60 | 48 | 47 | 47 | 19 | G | 15 | 26 | 58 | 51 | 40 | 51 | 51 | 48 | 44 | 57 | 48 | | |
| 25 | 31 | 47 | 45 | 47 | 51 | 44 | 30 | 58 | 32 | 32 | 61 | 57 | 23 | 58 | 53 | 53 | 40 | 58 | 58 | 58 | 52 | 52 | 54 | 64 | | | |
| 26 | 58 | 34 | 40 | 58 | 112 | 65 | 38 | 57 | 38 | 26 | 56 | 17 | G | 21 | G | 21 | 37 | 53 | 40 | 67 | 41 | 41 | 31 | 34 | 34 | | |
| 27 | 50 | 74 | 57 | 59 | 50 | 68 | 56 | 57 | 30 | 34 | 68 | 44 | 68 | G | 27 | 50 | 54 | 30 | 53 | 42 | 58 | 58 | 51 | 56 | | | |
| 28 | 31 | 33 | 46 | 59 | 59 | 62 | 54 | 56 | 56 | 56 | 51 | 18 | G | G | 18 | G | 51 | 60 | 68 | 60 | 28 | 47 | 48 | 35 | 26 | | |
| 29 | B | 54 | 109 | 69 | 56 | 52 | 52 | 48 | 47 | 46 | 38 | 33 | G | G | 55 | G | 21 | 34 | 43 | 22 | 40 | B | B | 32 | 26 | | |
| 30 | 33 | 24 | 57 | 46 | 35 | 101 | 38 | 31 | 62 | 52 | 52 | G | G | G | 52 | 14 | 28 | 57 | 68 | 46 | 51 | 48 | 57 | 22 | | | |
| 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 | 29 | 28 | 29 | 29 | 30 | 29 | 30 | 27 | 28 | 27 | 29 | 28 | 27 | 26 | 29 | 29 | | | |
| MED | 40 | 46 | 48 | 54 | 52 | 52 | 54 | 50 | 48 | 50 | 47 | 33 | G | G | 22 | 41 | 42 | 42 | 48 | 44 | 41 | 47 | 51 | 41 | | | |
| U Q | 54 | 56 | 57 | 59 | 57 | 57 | 60 | 57 | 52 | 56 | 56 | 56 | 27 | 48 | 51 | 53 | 54 | 56 | 55 | 54 | 50 | 56 | 56 | 54 | | | |
| L Q | 31 | 39 | 42 | 43 | 41 | 48 | 46 | 43 | 36 | 38 | 35 | G | 18 | G | 18 | 17 | 18 | 30 | 28 | 32 | 41 | 32 | 35 | 38 | 29 | | |

JUN. 2020 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2020 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

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

JUN. 2020 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2020 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 | A | A | E A 252 | E A 220 | E A 216 | E A 186 | 202 | A | A | A | A | A | A | 190 | A |
| 2 | A | A | A | A | A | A | A | A | A | A | A | B | E B 300 | E B 264 | A | B | B | B | A | A | B | A | A | A |
| 3 | A | A | A | A | A | A | A | A | A | A | A | E A 234 | E A 228 | E A 226 | E A 214 | E A 204 | E A 228 | 202 | A | A | A | A | A | A |
| 4 | A | A | A | A | 190 | 194 | 194 | A | E A 298 | E A 242 | E A 228 | E A 226 | E A 198 | E A 208 | E A 212 | E A 208 | A | A | A | A | A | A | A | A |
| 5 | A | A | A | A | 208 | 200 | A | A | E A 250 | E A 232 | E A 200 | E A 200 | E A 198 | E A 204 | E A 212 | E A 192 | A | A | A | A | A | B | A | A |
| 6 | A | A | A | 192 | A | A | A | A | A | A | A | E A 214 | E A 216 | E A 208 | E A 202 | E A 186 | A | B | A | A | A | A | A | A |
| 7 | A | A | A | A | A | A | A | A | A | A | A | E A 252 | E A 220 | E A 216 | E A 194 | E A 196 | E A 202 | A | A | A | A | A | 198 | A |
| 8 | A | A | A | A | A | A | A | A | A | A | A | E A 268 | E A 224 | E A 216 | E A 196 | E A 196 | A | A | A | B | B | A | A | A |
| 9 | A | A | A | A | A | A | A | A | A | A | E A 262 | E A 236 | E A 218 | E A 212 | E A 204 | E A 202 | E A 192 | A | A | A | A | B | A | A |
| 10 | A | A | A | A | A | A | A | A | A | A | A | A | B | B | 200 | B | A | A | A | A | A | B | A | A |
| 11 | A | A | A | A | A | A | A | A | A | A | A | E A 234 | E A 186 | E A 218 | E A 192 | E A 192 | A | A | A | A | A | A | A | A |
| 12 | A | A | A | A | A | A | A | A | A | A | E B 266 | E B 200 | E B 196 | E B 214 | E B 204 | B | A | A | B | A | A | A | A | A |
| 13 | A | A | A | A | A | A | A | A | A | A | A | E B 232 | E B 198 | E B 212 | E B 200 | E B 184 | A | A | A | A | A | B | A | B |
| 14 | A | A | A | A | A | A | A | A | A | A | B | E B 250 | E B 196 | E B 226 | E B 190 | E B 196 | E B 200 | A | A | A | A | A | 200 | B |
| 15 | A | A | A | A | A | A | A | A | A | A | B | E B 228 | E B 194 | E B 190 | E B 186 | E B 192 | B | B | A | A | A | A | A | A |
| 16 | A | A | A | A | A | A | A | A | A | A | A | E A 242 | E A 206 | E A 190 | E A 202 | E A 198 | E A 198 | E A 196 | A | A | A | A | A | A |
| 17 | A | A | A | 204 | A | A | A | A | A | A | E A 270 | E A 206 | E A 204 | E A 200 | E A 196 | E A 212 | E A 200 | E A 240 | A | A | A | A | A | A |
| 18 | A | A | A | A | A | A | A | A | B | A | A | E A 224 | E A 240 | E A 200 | E A 202 | A | A | A | A | A | A | A | A | A |
| 19 | A | A | A | A | A | A | A | A | A | A | E A 214 | E A 260 | E A 178 | E A 192 | E A 192 | E A 192 | E A 182 | E A 192 | A | A | A | A | A | A |
| 20 | A | A | A | A | A | A | A | A | A | A | A | E A 262 | E A 204 | E A 204 | E A 204 | A | A | A | A | A | A | A | A | A |
| 21 | A | A | A | A | A | A | A | A | A | A | A | E A 230 | E A 174 | E A 200 | E A 202 | E A 202 | E A 194 | A | A | A | A | A | A | A |
| 22 | A | A | A | A | A | A | A | A | A | A | A | A | 204 | 198 | 222 | 204 | 204 | A | A | A | A | A | A | A |
| 23 | A | A | A | A | A | A | A | A | A | A | A | E A 228 | E A 216 | E A 200 | E A 184 | E A 184 | E A 190 | A | A | A | A | A | A | A |
| 24 | A | A | A | A | A | A | A | A | A | A | E A 276 | E A 236 | E A 222 | E A 202 | E A 208 | A | A | A | A | A | A | A | A | A |
| 25 | A | A | A | A | A | A | A | A | A | A | A | E A 246 | E A 202 | E A 202 | E A 206 | E A 242 | A | A | A | A | A | A | 198 | A |
| 26 | A | A | A | A | A | A | A | A | A | A | A | E A 254 | E A 218 | E A 200 | E A 214 | E A 200 | A | A | A | A | A | A | A | A |
| 27 | A | A | A | A | A | A | A | A | A | A | A | E A 228 | E A 206 | E A 222 | E A 234 | A | A | A | A | A | A | A | A | A |
| 28 | A | 188 | A | A | A | A | A | A | A | A | E A 266 | E A 216 | E A 204 | E A 208 | E A 198 | E A 224 | A | A | A | A | A | A | A | A |
| 29 | B | A | A | A | A | A | A | A | A | A | E A 276 | E A 230 | E A 208 | E A 188 | E A 202 | A | 202 | A | A | B | A | B | A | A |
| 30 | 198 | 204 | A | A | A | A | A | A | A | A | A | A | 210 | 196 | 196 | 192 | 192 | 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 | | 2 | 2 | 2 | 2 | 1 | 2 | 4 | 20 | 26 | 29 | 29 | 29 | 23 | 6 | 1 | | | | 4 | 2 | |
| MED | 198 | 196 | | 198 | 199 | 197 | 194 | 206 | 316 | 237 | 240 | 208 | 201 | 201 | 200 | 199 | 198 | 240 | | | | 199 | 196 | |
| U Q | | | | | | | | | | E A 256 | E A 263 | E A 226 | E A 223 | E A 214 | E A 204 | E A 212 | E A 202 | | | | | 212 | | |
| L Q | | | | | | | | | | | 228 | 232 | 202 | 198 | 197 | 196 | 192 | 192 | | | | 198 | | |

JUN. 2020 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUL.2020 fXI (0.1MHz)

45°E MEAN TIME (G.M.T. + 3 H)

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

| H D | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | | | | |
|--------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|----|----|---|---|---|----|---|
| 1 | A | 81 | A | 39 | A | A | A | A | A | R | A | 34 | X | X | X | X | A | A | A | A | A | A | A | A | | | | | |
| 2 | A | 55 | A | A | A | A | A | O | X | A | A | 30 | X | X | 41 | 37 | 46 | A | A | A | A | A | A | O | X | A | | | |
| 3 | A | A | A | A | A | A | A | A | A | A | A | 36 | 36 | 41 | 32 | 29 | A | A | A | A | A | A | A | A | A | | | | |
| 4 | A | A | A | A | A | A | A | A | A | A | X | 35 | 34 | 53 | 42 | 57 | 30 | 24 | X | A | R | A | A | A | R | A | | | |
| 5 | A | A | A | A | A | A | 80 | A | A | A | A | O | X | B | X | B | B | B | B | A | A | R | O | X | A | A | | | |
| 6 | 83 | A | A | A | A | A | A | A | A | A | A | A | O | X | X | 47 | 90 | 80 | A | A | A | A | O | X | A | O | X | A | |
| 7 | R | O | X | A | A | A | A | A | R | A | A | B | A | X | X | O | X | R | A | A | A | A | A | A | A | A | R | | |
| 8 | A | A | A | A | A | A | A | A | A | O | X | X | X | X | X | X | A | A | A | A | A | A | A | A | A | A | A | | |
| 9 | A | A | A | A | A | A | A | A | A | A | A | 38 | 38 | 38 | 34 | 26 | B | B | A | A | A | A | A | A | A | A | A | | |
| 10 | A | A | A | A | A | A | A | A | R | R | R | B | B | O | X | X | X | O | X | R | A | A | A | A | A | A | A | | |
| 11 | O | X | A | A | A | A | A | A | A | A | O | X | X | X | X | X | X | X | A | A | 40 | A | A | A | A | A | A | | |
| 12 | A | A | R | A | A | A | A | A | 20 | A | X | O | X | X | X | A | X | A | A | A | A | A | A | A | A | A | A | | |
| 13 | A | A | A | O | X | X | A | A | A | A | A | X | O | X | X | X | A | A | A | A | A | A | A | A | A | A | A | | |
| 14 | A | A | A | A | A | A | A | A | A | A | B | B | B | B | B | B | B | B | A | A | A | A | A | A | A | A | A | | |
| 15 | A | A | A | 64 | A | A | A | A | B | A | B | A | X | O | X | X | X | A | A | B | B | A | O | X | A | O | X | A | |
| 16 | A | A | A | A | A | A | 61 | A | A | A | A | X | A | 48 | 42 | 48 | B | B | A | A | A | A | A | X | A | A | A | | |
| 17 | A | A | A | A | A | 42 | A | A | A | A | A | X | X | 36 | 37 | 48 | 44 | 40 | 28 | A | A | A | A | A | A | A | A | | |
| 18 | A | A | A | A | A | A | A | A | A | O | X | X | X | X | X | X | X | X | A | A | A | A | A | A | A | A | A | | |
| 19 | A | A | 56 | A | X | O | X | A | A | A | A | X | X | X | O | X | X | A | A | O | X | A | A | A | A | A | O | X | A |
| 20 | A | A | A | A | 34 | 41 | A | A | A | A | X | O | X | O | X | X | X | R | O | X | A | A | A | A | A | A | A | A | |
| 21 | A | A | A | 60 | 44 | A | A | A | A | A | X | 23 | 42 | 34 | 48 | 52 | 52 | 47 | X | A | A | A | A | O | X | X | A | | |
| 22 | A | A | A | A | A | A | A | A | A | A | A | X | X | X | X | X | X | A | O | X | A | A | A | A | A | A | A | A | |
| 23 | A | A | A | A | 42 | 40 | O | X | X | A | X | X | X | X | X | X | X | 28 | R | A | O | X | A | A | A | A | A | 30 | |
| 24 | A | A | A | A | 50 | 56 | 53 | 56 | A | A | A | A | X | A | B | 47 | 39 | A | A | A | A | 115 | A | A | A | A | A | | |
| 25 | A | A | A | A | A | A | A | A | A | A | A | O | X | B | B | B | O | X | B | R | B | A | A | A | A | A | A | A | |
| 26 | 50 | 52 | 74 | A | A | A | A | A | A | X | X | X | X | X | X | X | X | O | X | A | O | X | O | X | A | A | A | A | |
| 27 | A | A | 42 | A | A | A | A | A | A | O | X | O | X | X | X | X | O | X | X | A | O | X | A | A | A | O | X | A | |
| 28 | A | X | A | A | A | A | A | A | A | A | X | X | X | X | X | X | X | X | A | A | A | A | A | A | A | A | A | A | |
| 29 | A | A | A | A | A | A | O | X | A | A | X | X | X | X | X | X | X | O | X | O | X | A | A | A | A | A | A | A | |
| 30 | A | A | R | 78 | 56 | A | A | A | A | X | X | A | 52 | 56 | 44 | 40 | 44 | 28 | X | A | A | A | A | A | A | A | A | A | |
| 31 | A | A | A | A | O | X | 40 | A | A | A | A | X | X | X | X | X | X | X | O | X | A | A | A | A | X | O | X | A | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | | | | |
| CNT | 3 | 5 | 3 | 5 | 9 | 6 | 5 | 4 | 3 | 11 | 19 | 25 | 24 | 27 | 26 | 28 | 16 | 4 | 6 | 2 | 1 | 5 | 7 | 4 | | | | | |
| MED | 50 | 52 | 56 | 60 | 42 | 40 | 53 | 33 | 20 | 24 | 30 | 37 | 42 | 41 | 42 | 36 | 30 | 21 | 20 | 17 | 115 | 28 | 27 | 34 | | | | | |
| U Q | 83 | 68 | 74 | 71 | 47 | 42 | 70 | 50 | 24 | 27 | 35 | 40 | 48 | 44 | 47 | 44 | 34 | 30 | 21 | | | 32 | 34 | 72 | | | | | |
| L Q | O | X | X | X | O | X | X | O | X | X | X | X | X | X | X | X | X | O | X | O | X | | X | O | X | A | | | |
| | 32 | 34 | 42 | 34 | 23 | 40 | 23 | 20 | 20 | 21 | 28 | 34 | 38 | 40 | 39 | 30 | 26 | 20 | 19 | | | 26 | 21 | 26 | | | | | |

JUL.2020 fXI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUL.2020 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 | 32 | A | A | A | A | A | R | A | 28 | 34 | 38 | 29 | 22 | A | A | A | A | A | A | A | A | |
| 2 | A | A | A | A | A | A | A | R | A | A | F | 18 | 24 | 38 | 35 | 30 | 22 | A | A | A | A | A | A | 21 | A |
| 3 | A | A | A | A | A | A | A | A | A | A | A | 30 | 30 | 35 | 26 | 23 | A | A | A | A | A | A | A | A | A |
| 4 | A | A | A | A | A | A | A | A | A | A | A | 29 | 28 | 36 | 36 | 34 | 24 | 18 | A | A | A | A | A | A | A |
| 5 | A | A | A | A | A | A | A | A | A | A | A | 28 | B | 34 | B | B | B | B | A | A | R | R | A | A | A |
| 6 | A | A | A | A | A | A | A | A | A | A | A | A | F | R | 41 | B | A | A | A | A | A | A | A | A | R |
| 7 | R | R | A | A | A | A | A | A | R | A | A | B | A | 32 | 32 | 28 | R | A | A | A | A | A | A | A | R |
| 8 | A | A | A | A | A | A | A | A | A | A | 11 | 22 | F | 28 | 32 | 32 | 28 | 20 | A | A | A | A | A | A | A |
| 9 | A | A | A | A | A | A | A | A | A | A | A | 32 | B | B | B | R | 28 | B | B | A | A | A | A | A | A |
| 10 | A | A | A | A | A | A | A | A | R | A | R | B | B | R | 34 | 24 | 21 | 17 | A | A | A | A | A | A | A |
| 11 | U | R | A | A | A | A | A | A | A | A | A | 20 | 25 | 32 | 29 | 36 | 26 | 26 | A | A | A | A | A | A | A |
| 12 | A | A | A | A | A | A | A | A | F | A | A | 20 | R | 31 | 29 | 39 | A | 20 | A | A | A | A | A | A | A |
| 13 | A | A | A | 22 | 12 | A | A | A | A | A | A | 22 | 27 | 32 | 38 | 53 | 21 | A | A | A | A | A | A | A | A |
| 14 | A | A | A | A | A | A | A | A | A | A | B | B | B | B | B | B | B | B | A | A | A | A | A | A | A |
| 15 | A | A | A | A | A | A | A | A | B | A | B | A | R | 30 | 34 | 33 | 23 | R | A | A | B | B | A | R | A |
| 16 | A | A | A | A | A | A | A | A | A | A | A | 23 | A | F | 34 | 36 | 36 | B | B | A | A | A | A | A | A |
| 17 | A | A | A | A | A | A | A | A | A | A | A | 21 | 30 | 31 | 42 | 30 | 34 | 22 | A | A | A | A | A | A | A |
| 18 | A | A | A | A | A | A | A | A | A | A | A | 21 | 30 | 31 | 42 | 30 | 34 | 22 | A | A | A | A | A | A | A |
| 19 | A | A | A | A | 18 | R | A | A | A | A | A | 23 | 32 | 32 | 31 | 34 | 36 | A | A | R | A | A | A | A | R |
| 20 | A | A | A | A | A | F | A | A | A | A | A | 24 | R | R | 35 | 33 | 25 | A | 13 | A | A | A | A | A | A |
| 21 | A | A | A | A | A | A | A | A | A | A | A | 17 | F | 31 | 28 | 34 | 34 | 37 | 18 | A | A | A | A | R | A |
| 22 | A | A | A | A | A | A | A | A | A | A | F | 16 | 26 | 38 | 34 | 28 | 38 | 28 | 19 | A | 13 | A | A | A | A |
| 23 | A | A | A | A | A | A | 20 | 14 | A | 15 | 25 | 35 | 36 | 34 | 32 | 29 | 20 | F | A | A | R | A | A | A | A |
| 24 | A | A | A | A | 36 | A | R | A | A | A | A | A | 31 | A | B | F | 36 | 33 | A | A | A | A | A | A | A |
| 25 | A | A | A | A | A | A | A | A | A | A | A | 25 | B | B | B | 28 | B | R | B | A | A | A | A | A | A |
| 26 | A | A | A | A | A | A | A | A | 14 | 16 | 26 | 36 | 33 | 32 | 40 | 30 | 21 | A | 14 | 12 | A | A | A | A | A |
| 27 | A | A | A | A | A | A | A | A | A | 18 | 24 | 31 | 36 | 38 | 34 | 27 | 28 | A | R | A | A | A | U | R | A |
| 28 | A | J | R | A | A | A | A | A | A | 21 | 29 | 34 | 40 | 37 | 42 | 40 | F | A | A | A | A | A | A | A | A |
| 29 | A | A | A | A | A | A | 14 | A | A | 21 | 33 | 34 | 41 | 33 | 36 | 30 | 20 | 15 | 13 | A | A | A | A | A | A |
| 30 | A | A | A | A | A | A | A | A | 18 | 20 | A | F | 38 | 50 | 34 | 38 | 22 | A | A | A | A | A | A | A | A |
| 31 | A | A | A | A | U | R | A | A | A | F | 19 | 30 | 40 | 42 | 45 | 33 | 38 | 25 | 15 | A | A | A | 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 | 1 | 2 | | 2 | 4 | 2 | 3 | 2 | 3 | 11 | 19 | 25 | 24 | 27 | 26 | 27 | 14 | 3 | 5 | 2 | | 5 | 5 | 2 | |
| MED | U | R | R | | 27 | 17 | 20 | 20 | 14 | 14 | 17 | 24 | 31 | 34 | 34 | 34 | 28 | 20 | 15 | 14 | 11 | | 22 | 21 | 24 |
| U Q | | | | | 27 | | R | | 18 | 20 | 29 | 34 | 36 | 38 | 36 | 33 | 25 | 15 | 14 | | | 26 | 24 | | |
| L Q | | | | | 14 | | 14 | | F | 15 | 22 | 28 | 32 | 32 | 32 | 23 | 18 | 13 | 13 | | | 20 | 14 | | |

JUL.2020 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUL. 2020 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

| $\begin{matrix} H \\ D \end{matrix}$ | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | | |
|--------------------------------------|----|-----|----|-----|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|----|----|----|----|----|----|
| 1 | 53 | 42 | 50 | 56 | 56 | 100 | 48 | 54 | 50 | 24 | 34 | 24 | 18 | 58 | 61 | 30 | 30 | 49 | 45 | 56 | 114 | 39 | 30 | 27 | | | |
| 2 | 69 | 42 | 91 | 56 | 55 | 44 | 56 | 45 | 26 | 68 | 48 | 56 | 22 | 66 | 58 | 48 | 53 | 56 | 58 | 58 | 46 | 59 | 48 | 56 | | | |
| 3 | 50 | 41 | 44 | 95 | 57 | 47 | 54 | 49 | 53 | 43 | 54 | 22 | 21 | 24 | 59 | 77 | 66 | 56 | 56 | 38 | 34 | 53 | 26 | 57 | | | |
| 4 | 43 | 45 | 58 | 58 | 66 | 58 | 60 | 98 | 53 | 60 | 51 | 20 | 14 | 34 | G | 14 | 41 | 33 | 24 | 32 | 45 | 48 | 23 | 30 | | | |
| 5 | 88 | 55 | 55 | 56 | 54 | 58 | 56 | 48 | 58 | 58 | 55 | 67 | E | B | B | B | B | B | | 51 | 58 | 23 | 23 | 34 | 42 | | |
| 6 | 42 | 138 | 54 | 50 | 35 | 44 | 49 | 30 | 38 | 56 | 48 | 51 | 48 | 54 | 57 | E | B | 29 | 68 | 47 | 46 | 58 | 47 | 45 | 51 | | |
| 7 | 25 | 46 | 56 | 54 | 29 | 78 | 41 | 30 | 20 | 48 | 49 | B | 59 | E | B | 57 | 63 | 29 | 50 | 70 | 42 | 32 | 32 | 42 | 23 | | |
| 8 | 43 | 43 | 57 | 57 | 66 | 52 | 50 | 50 | 50 | 34 | 16 | 57 | 62 | G | G | G | 44 | 29 | 48 | 28 | 27 | 51 | 36 | 56 | 48 | | |
| 9 | 57 | 64 | 67 | 36 | 28 | 28 | 58 | 58 | 58 | 56 | 70 | G | B | B | B | | 24 | B | B | 58 | 60 | 57 | 58 | 52 | 56 | | |
| 10 | 37 | 52 | 56 | 54 | 54 | 42 | 59 | 62 | 18 | 31 | 22 | B | B | E | B | 29 | E | B | 12 | 23 | 56 | 34 | 47 | 35 | 55 | 47 | |
| 11 | 44 | 25 | 71 | 104 | 28 | 41 | 45 | 47 | 87 | 54 | 63 | 45 | 52 | 19 | 21 | 51 | 32 | 28 | 30 | 38 | 52 | 30 | 41 | 35 | | | |
| 12 | 40 | 41 | 28 | 56 | 48 | 40 | 40 | 36 | 48 | 55 | 38 | 56 | 50 | 48 | 84 | 58 | 53 | 48 | 52 | 40 | 25 | 54 | 51 | 44 | | | |
| 13 | 34 | 42 | 39 | 53 | 29 | 25 | 34 | 58 | 49 | 49 | 39 | 46 | 48 | 26 | G | 56 | 56 | 53 | 35 | 72 | 72 | 56 | 56 | 32 | | | |
| 14 | 44 | 55 | 55 | 40 | 54 | 53 | 63 | 55 | 61 | 71 | B | B | B | B | B | B | B | | 53 | 56 | 52 | 49 | 52 | 60 | 55 | | |
| 15 | 78 | 66 | 58 | 47 | 64 | 55 | 55 | 57 | B | 57 | B | 59 | 57 | 51 | 58 | 53 | 20 | 43 | 56 | B | 59 | 58 | 48 | 46 | | | |
| 16 | 51 | 119 | 78 | 57 | 57 | 57 | 47 | 52 | 29 | 27 | 41 | 61 | 58 | 21 | 33 | B | B | 42 | 42 | 47 | 58 | 29 | 74 | 28 | | | |
| 17 | 41 | 46 | 40 | 40 | 46 | 40 | 43 | 51 | 45 | 56 | 38 | 55 | 44 | 18 | G | 57 | 50 | 43 | 30 | 44 | 58 | 54 | 52 | 52 | 29 | | |
| 18 | 39 | 31 | 41 | 54 | 46 | 46 | 44 | 39 | 67 | 40 | G | 17 | 17 | 19 | G | 62 | 53 | 34 | 59 | 46 | 68 | 51 | 54 | 37 | 51 | | |
| 19 | 57 | 48 | 38 | 79 | 25 | 22 | 39 | 47 | 50 | 34 | 34 | G | 19 | E | B | G | 54 | 59 | 60 | 42 | 39 | 52 | 59 | 55 | 46 | | |
| 20 | 41 | 71 | 36 | 44 | 48 | 59 | 59 | 59 | 50 | 50 | A | G | G | 18 | G | 16 | 11 | 28 | 42 | 28 | 47 | 51 | 58 | 28 | 54 | | |
| 21 | 31 | 46 | 50 | 40 | 40 | 46 | 55 | 59 | 50 | 50 | 11 | G | G | 22 | 26 | 29 | G | 54 | 54 | 56 | 24 | 31 | 29 | 32 | 26 | | |
| 22 | 26 | 30 | 47 | 51 | 57 | 71 | 50 | 55 | 47 | 54 | 54 | 20 | 20 | 20 | 20 | 27 | 32 | 66 | 58 | 58 | 46 | 27 | 31 | 46 | | | |
| 23 | 27 | 58 | 44 | 41 | 30 | 32 | 12 | 39 | 59 | 28 | G | 16 | 23 | 22 | G | G | 18 | 15 | 24 | 44 | 35 | 34 | 32 | 47 | 24 | | |
| 24 | 58 | 46 | 55 | 44 | 31 | 38 | 36 | 42 | 61 | 52 | 54 | 52 | 57 | B | B | B | E | B | B | 57 | 29 | 46 | 58 | 64 | 52 | 57 | 89 |
| 25 | 53 | 58 | 62 | 55 | 55 | 55 | 50 | 64 | 65 | 61 | 48 | 39 | B | B | B | E | B | 19 | 58 | 21 | B | 55 | 55 | 42 | 42 | 57 | |
| 26 | 40 | 48 | 61 | 53 | 52 | 48 | 54 | 49 | 30 | 49 | 40 | 17 | G | G | 30 | 48 | 28 | 51 | 46 | 66 | 50 | 58 | 35 | 56 | | | |
| 27 | 54 | 44 | 59 | 42 | 50 | 55 | 58 | 50 | 34 | 81 | 59 | 45 | 32 | 57 | 57 | 57 | 22 | 58 | 22 | 58 | 29 | 58 | 51 | 53 | | | |
| 28 | 59 | 50 | 49 | 56 | 65 | 56 | 56 | 40 | 54 | 41 | G | E | B | 16 | 19 | G | 22 | 12 | 43 | 38 | 47 | 32 | 37 | 56 | 48 | | |
| 29 | 36 | 54 | 48 | 87 | 48 | 52 | 42 | 35 | 58 | 26 | 26 | E | B | E | B | 29 | 50 | 58 | 50 | 47 | 28 | 30 | 36 | 53 | 32 | 55 | |
| 30 | 58 | 58 | 32 | 40 | 52 | 64 | 57 | 50 | 47 | 49 | 61 | 30 | G | G | 22 | 56 | 21 | 42 | 48 | 44 | 59 | 56 | 57 | 54 | 64 | | |
| 31 | 50 | 46 | 46 | 43 | 40 | 56 | 52 | 41 | 65 | 59 | 18 | 18 | 19 | G | G | 16 | 16 | 52 | 47 | 58 | 50 | 48 | 16 | 32 | 42 | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | | |
| CNT | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 31 | 29 | 28 | 26 | 27 | G | 26 | 27 | 27 | 29 | 30 | 30 | 31 | 31 | 31 | 31 | | |
| MED | 44 | 46 | 54 | 54 | 50 | 52 | 50 | 50 | 50 | 50 | 40 | 28 | 22 | G | 32 | 48 | 34 | 48 | 46 | 48 | 50 | 52 | 47 | 47 | | | |
| U Q | 57 | 58 | 58 | 56 | 56 | 57 | 56 | 57 | 58 | 57 | 54 | 54 | 50 | 34 | 57 | 54 | 53 | 55 | 56 | 58 | 56 | 57 | 55 | 55 | | | |
| L Q | 39 | 42 | 44 | 43 | 35 | 41 | 43 | 41 | 45 | 40 | 20 | G | G | G | 20 | G | G | 28 | 38 | 38 | 38 | 34 | 32 | 32 | 32 | | |

JUL. 2020 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUL.2020 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

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

JUL.2020 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

JUL. 2020 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 | 218 | A | A | A | A | A | A | A | E A | E A | E A | E A | | A | A | A | A | A | A | A | A | |
| 2 | A | 204 | A | A | A | A | A | A | A | A | A | 232 | 194 | E A | 214 | 200 | 208 | 206 | | A | A | A | A | A | |
| 3 | A | A | A | A | A | A | A | A | A | A | A | 196 | 194 | 200 | E A | 222 | 204 | | A | A | A | A | A | A | |
| 4 | A | A | A | A | A | A | A | A | A | A | A | 220 | 202 | 208 | 200 | 198 | 196 | 214 | | A | A | A | A | A | |
| 5 | A | A | A | A | A | A | A | A | A | A | A | E A | E A | B | E B | B | B | B | B | A | A | A | A | A | |
| 6 | A | A | A | A | A | A | A | A | A | A | A | A | A | E A | E A | E A | B | A | A | A | A | A | 202 | 212 | |
| 7 | A | A | A | A | A | A | A | A | A | A | A | A | B | A | 224 | 210 | 196 | | A | A | A | A | A | A | |
| 8 | A | A | A | A | A | A | A | A | A | 192 | 214 | E A | 232 | 200 | 196 | 200 | 200 | | A | A | A | A | A | A | |
| 9 | A | A | A | A | A | A | A | A | A | A | A | 198 | B | B | B | | B | B | A | A | A | A | A | A | |
| 10 | A | A | A | A | A | A | A | A | A | A | A | A | B | E B | E B | E A | E A | | A | A | A | A | A | A | |
| 11 | 198 | A | A | A | A | A | A | A | A | A | A | E A | E A | Q | | | | A | A | A | A | A | A | A | |
| 12 | A | A | A | A | A | A | 208 | A | 206 | A | A | 212 | 240 | 204 | 206 | 206 | 198 | | A | A | A | A | A | A | |
| 13 | A | A | A | 206 | 202 | A | A | A | A | A | A | E A | E A | E A | E A | | | A | A | A | A | A | A | A | |
| 14 | A | A | A | A | A | A | A | A | A | A | A | B | B | B | B | B | B | B | A | A | A | A | A | A | |
| 15 | A | A | A | A | A | A | A | A | A | B | A | B | A | | E A | E A | E A | | A | A | A | B | B | A | |
| 16 | A | A | A | A | A | A | A | A | A | A | E A | E A | E A | E A | E A | B | B | A | A | A | A | A | 198 | A | |
| 17 | A | A | A | A | A | A | A | A | A | A | A | E A | E A | A | | | | A | A | A | A | A | A | A | |
| 18 | A | A | A | A | A | A | A | A | A | 216 | 194 | 204 | 208 | 198 | 208 | 184 | 182 | | A | A | A | A | A | A | |
| 19 | A | A | A | A | A | 200 | A | A | A | A | E A | 218 | 204 | 174 | 214 | 200 | 194 | | A | A | 216 | A | A | 204 | |
| 20 | A | A | A | A | A | 192 | A | A | A | A | 206 | 198 | 192 | 200 | 212 | 180 | | A | E A | A | A | A | A | A | |
| 21 | A | A | A | A | A | A | A | A | A | A | A | 212 | 192 | 212 | 202 | 180 | 204 | 204 | | A | A | A | A | 204 | |
| 22 | A | A | A | A | A | A | A | A | A | A | A | 212 | 214 | 196 | 200 | 198 | 196 | 190 | | A | 186 | | A | A | |
| 23 | A | A | A | A | A | A | A | 208 | A | A | A | 264 | 198 | 198 | 198 | 210 | 206 | 200 | 202 | | A | 200 | A | A | |
| 24 | A | A | A | A | 224 | A | 204 | A | A | A | A | E A | 284 | A | B | A | | A | A | A | A | A | A | A | |
| 25 | A | A | A | A | A | A | A | A | A | A | A | A | 266 | B | B | B | E B | B | B | A | B | A | A | A | |
| 26 | A | A | A | A | A | A | A | A | 186 | 196 | 198 | 218 | 192 | 198 | 212 | 202 | 202 | | A | A | 262 | 246 | A | A | |
| 27 | A | A | 208 | A | A | A | A | A | A | A | E A | 198 | 270 | 212 | 230 | 202 | 218 | 196 | 198 | | A | A | A | A | |
| 28 | A | A | A | A | A | A | A | A | A | E A | 278 | 210 | 224 | 190 | 196 | 196 | 194 | 198 | | A | A | A | A | A | |
| 29 | A | A | A | A | A | A | A | A | A | E A | 316 | 220 | 222 | 198 | 198 | 198 | 198 | 210 | | A | A | 236 | A | A | |
| 30 | A | A | A | A | A | A | A | A | A | E A | 312 | A | E A | A | E A | | | | A | A | A | A | A | A | |
| 31 | A | A | A | A | A | A | A | A | A | A | A | 234 | 206 | 210 | 202 | 196 | 196 | 204 | 202 | 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 | 1 | 1 | 1 | 2 | 3 | 2 | 2 | 1 | 2 | 9 | 17 | 25 | 23 | 27 | 27 | 27 | 13 | 2 | 5 | 2 | | 5 | 5 | 2 | |
| MED | 198 | 204 | 208 | 212 | 202 | 196 | 206 | 208 | 196 | U | 215 | 209 | 206 | 201 | 199 | 203 | 197 | 202 | E A | A | 223 | | 202 | 206 | 208 |
| U Q | | | | 224 | | | | | | E A | 295 | 220 | 238 | 214 | 214 | 218 | 204 | 203 | | 253 | | | 214 | 212 | |
| L Q | | | | 200 | | | | | | | 197 | 206 | 198 | 196 | 198 | 198 | 196 | 197 | | 201 | | | 197 | 202 | |

JUL. 2020 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2020 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 | A | A | O | X | O | X | X | O | X | X | A | A | A | A | O | X | A | R | | | | | | |
| 2 | 30 | A | A | A | A | A | A | A | A | A | 34 | 43 | 44 | 52 | 51 | 43 | 50 | 55 | 25 | 24 | A | A | A | A | A | | | | | | |
| 3 | A | X | A | A | A | A | A | A | A | A | A | B | B | O | X | B | B | A | B | B | A | A | A | A | A | | | | | | |
| 4 | A | A | A | A | A | A | A | A | A | A | B | B | X | X | X | X | B | B | B | B | A | A | A | A | O | X | 26 | | | | |
| 5 | A | A | A | 54 | A | A | A | A | A | B | B | X | X | X | X | X | X | O | X | O | X | R | A | A | A | A | | | | | |
| 6 | A | A | A | A | A | A | A | A | A | X | X | X | X | X | X | X | X | X | B | B | A | O | X | A | A | A | | | | | |
| 7 | A | A | A | A | A | A | X | A | A | A | X | X | X | X | X | X | X | O | X | O | X | X | A | A | A | O | X | 18 | | | |
| 8 | A | A | A | A | A | A | A | A | A | B | X | X | X | X | X | X | X | X | B | B | B | A | A | B | A | A | | | | | |
| 9 | A | A | A | A | A | A | A | A | B | O | X | O | X | O | X | X | O | X | O | X | B | O | X | O | X | A | B | A | O | X | 18 |
| 10 | A | O | X | A | O | X | X | X | X | X | X | X | X | O | X | X | X | X | O | X | A | O | X | O | X | B | B | B | | | |
| 11 | A | A | A | A | A | A | A | A | A | X | X | X | X | X | X | X | X | O | X | O | X | X | A | A | A | A | A | | | | |
| 12 | A | A | A | A | A | A | A | 48 | A | A | X | X | X | X | X | X | X | X | B | B | B | A | A | A | A | A | | | | | |
| 13 | A | A | A | 64 | A | A | O | X | A | X | X | O | X | X | X | X | X | O | X | O | X | O | X | A | A | A | A | | | | |
| 14 | A | A | A | A | A | A | A | A | A | X | X | X | X | X | X | X | X | X | X | X | A | O | X | O | X | A | A | 38 | | | |
| 15 | 67 | A | A | A | X | X | X | X | X | X | X | X | X | X | X | O | X | X | X | X | O | X | O | X | A | O | X | 34 | | | |
| 16 | X | A | A | A | A | A | 56 | A | A | X | X | X | X | X | X | X | X | X | X | X | A | O | X | A | A | A | A | | | | |
| 17 | 31 | A | 22 | 54 | A | 37 | A | 41 | 26 | 40 | 46 | 46 | 50 | 51 | 49 | 43 | 40 | 30 | 20 | A | A | B | A | A | A | A | | | | | |
| 18 | A | A | A | A | A | O | X | A | A | X | O | X | O | X | X | X | X | O | X | O | X | A | R | R | A | A | A | | | | |
| 19 | A | A | A | A | 64 | A | A | A | A | B | A | X | X | X | X | X | X | X | X | X | O | X | O | X | O | X | O | X | 22 | | |
| 20 | A | A | O | X | O | X | A | A | A | X | X | X | X | X | X | X | X | X | X | B | B | A | A | A | A | A | A | | | | |
| 21 | O | X | X | A | A | X | 35 | 77 | A | 44 | 38 | 46 | 44 | 50 | 46 | 52 | 45 | 43 | 32 | 34 | 21 | X | B | B | 33 | A | A | | | | |
| 22 | A | A | A | A | A | X | A | A | B | B | O | X | O | X | X | R | X | X | O | X | O | X | B | A | A | A | A | | | | |
| 23 | A | 52 | A | A | O | X | A | A | A | A | X | X | X | X | O | X | S | X | X | X | B | B | R | A | A | A | A | | | | |
| 24 | A | A | A | A | A | A | A | X | X | R | R | R | R | B | R | R | S | S | S | S | 26 | 23 | 19 | A | A | X | 28 | | | | |
| 25 | A | X | A | A | A | A | A | 30 | 32 | X | S | S | S | O | X | X | S | X | O | X | S | X | O | X | B | A | A | A | | | |
| 26 | A | A | A | A | A | A | A | A | A | 41 | 45 | 48 | 52 | 46 | 52 | 53 | 46 | 36 | 28 | 28 | X | O | X | A | A | A | A | | | | |
| 27 | A | A | A | A | A | A | A | A | A | X | X | B | O | X | O | X | X | X | B | B | R | B | B | R | A | A | A | | | | |
| 28 | 31 | O | X | A | X | O | X | X | X | O | X | X | X | X | X | X | X | X | B | X | X | A | A | A | A | A | 58 | | | | |
| 29 | A | A | A | A | A | A | A | A | A | B | B | B | A | B | B | O | X | O | X | B | B | B | A | O | X | A | A | A | | | |
| 30 | A | A | A | A | A | A | A | R | B | B | B | B | X | X | X | X | X | X | 37 | 31 | 22 | A | A | A | A | A | A | | | | |
| 31 | A | A | A | A | A | A | A | B | B | A | B | B | B | B | B | X | X | X | O | X | A | R | 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 | 6 | 6 | 2 | 6 | 6 | 7 | 7 | 7 | 11 | 18 | 22 | 25 | 28 | 27 | 25 | 28 | 28 | 20 | 20 | 14 | 10 | 5 | 2 | 8 | | | | | | | |
| MED | 31 | 28 | 24 | 45 | 32 | 31 | 31 | 30 | 29 | 35 | 42 | 46 | 48 | 48 | 48 | 47 | 40 | 32 | 26 | 22 | 19 | 25 | 26 | 0 | X | | | | | | |
| U Q | 32 | 41 | | 54 | 34 | 35 | 56 | 41 | 32 | 38 | 45 | 48 | 50 | 51 | 50 | 49 | 45 | 34 | 30 | 24 | 20 | 35 | | 36 | | | | | | | |
| L Q | 31 | 24 | | 26 | 28 | 27 | 28 | 24 | 28 | 34 | 40 | 44 | 46 | 44 | 44 | 44 | 38 | 26 | 24 | 20 | 17 | 19 | | 0 | X | | | | | | |

AUG. 2020 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2020 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 | 23 | 32 | 38 | U R 39 | 39 | F 33 | 31 | F 28 | A | A | A | A | U R 28 | A | A | |
| 2 | A | A | A | A | A | A | A | A | A | A | F 22 | F 29 | F 37 | F 41 | 44 | 36 | 43 | 48 | 18 | 18 | A | A | A | A | A | |
| 3 | A | R 35 | A | A | A | A | A | A | A | A | A | B | B | B | B | A | B | B | A | A | A | A | A | A | A | |
| 4 | A | A | A | A | A | A | A | A | A | A | A | B | B | 39 | 37 | 47 | 37 | B | B | B | B | A | A | A | A | 20 |
| 5 | A | A | A | A | A | A | A | A | A | A | B | B | 42 | 43 | 46 | 40 | 40 | 28 | 19 | R 19 | R | R | A | A | A | A |
| 6 | A | A | A | A | A | A | A | A | A | A | 27 | 36 | 44 | 42 | F 44 | 41 | 41 | 34 | F 19 | B | A | R 21 | A | A | A | A |
| 7 | A | A | A | A | A | A | 34 | A | A | A | A | 33 | 38 | 41 | 42 | 44 | 37 | 33 | R 18 | 17 | 17 | A | A | A | R 12 | |
| 8 | A | A | A | A | A | A | A | A | A | B | 28 | 39 | 38 | 42 | 38 | F 39 | 35 | B | B | B | A | A | B | A | A | |
| 9 | A | A | A | A | A | A | A | A | B | 28 | 34 | 43 | 42 | 39 | F 38 | 39 | 34 | B | 21 | 14 | A | B | A | 12 | B | |
| 10 | A | 18 | A | R 19 | F 24 | 21 | F 21 | 12 | 14 | 24 | 34 | 42 | 41 | 45 | 37 | F 36 | 32 | 21 | A | R 13 | R 13 | B | B | B | B | |
| 11 | A | A | A | A | A | A | A | A | 22 | 27 | 36 | F 37 | 40 | 53 | 48 | 41 | 28 | F 27 | F 20 | 14 | A | A | A | A | A | |
| 12 | A | A | A | A | A | A | A | A | A | A | 35 | F 42 | F 40 | F 39 | 36 | 49 | 29 | B | B | B | A | A | A | A | A | |
| 13 | A | A | A | A | A | A | R 22 | A | 22 | 28 | 40 | 41 | 44 | 44 | 40 | F 34 | 31 | 18 | 17 | 12 | R 14 | R | A | A | A | |
| 14 | A | A | A | A | A | A | A | A | A | 29 | 35 | 42 | 42 | 36 | 44 | 37 | 31 | 20 | 20 | F 17 | F 13 | R 10 | R 14 | A | R 28 | |
| 15 | A | A | A | A | 20 | A | 17 | 25 | 22 | 29 | 34 | 36 | 43 | 38 | 42 | 36 | 29 | 20 | 17 | 13 | 10 | 14 | A | R 28 | A | |
| 16 | J R 26 | A | A | A | A | A | A | A | A | 28 | 31 | 37 | 39 | 38 | 42 | F 35 | 34 | 22 | 16 | A | 11 | A | A | A | A | |
| 17 | A | A | A | A | A | A | A | A | 20 | 34 | F 33 | F 37 | F 44 | 45 | 43 | 37 | U R 34 | 24 | 14 | A | A | B | A | A | A | |
| 18 | A | A | A | A | A | U R 21 | A | A | 23 | 30 | 36 | F 41 | F 39 | 45 | 40 | 42 | 40 | 28 | A | A | R | A | A | A | A | |
| 19 | A | A | A | A | A | A | A | A | A | B | A | 34 | 42 | 36 | 36 | 39 | 32 | 27 | 19 | 12 | R 12 | R 12 | R 12 | R 16 | R | |
| 20 | A | A | 19 | 30 | A | A | A | A | 26 | F 32 | F 40 | F 38 | 41 | 44 | 42 | 40 | 39 | 27 | F 15 | B | B | A | A | A | A | |
| 21 | R 25 | 26 | A | A | 23 | A | A | A | F 32 | 32 | 40 | 38 | 44 | 40 | F 43 | 39 | 37 | 26 | F 19 | 15 | B | B | A | A | A | |
| 22 | A | A | A | A | 24 | A | A | A | B | B | 36 | 33 | R 38 | J R 36 | R | 43 | S 35 | 29 | 26 | 18 | R | B | A | A | A | |
| 23 | A | A | A | A | 28 | A | A | A | A | 32 | 36 | S 36 | S 41 | S 33 | S 34 | S 43 | U S 37 | S | B | B | B | R | A | A | A | |
| 24 | A | A | A | A | A | A | A | 18 | 25 | A | R | R | B | R | R | S | S | S | 20 | F 13 | 13 | A | A | R 22 | A | |
| 25 | A | 14 | A | A | A | A | A | F 16 | 26 | S | S | S 42 | U S 45 | U S 38 | 38 | 36 | 35 | S 17 | F 17 | 13 | B | A | A | A | A | |
| 26 | A | A | A | A | A | A | A | A | A | F 30 | 39 | 42 | 46 | 40 | 46 | 47 | 40 | R 30 | 22 | 22 | 25 | A | A | A | A | |
| 27 | A | A | A | A | A | A | A | A | A | 31 | 34 | B | 41 | 38 | 41 | 38 | 41 | B | B | R | B | B | R | A | A | |
| 28 | A | R 18 | A | R 20 | R 22 | 29 | 22 | 18 | 30 | 33 | 42 | 42 | 42 | 39 | 47 | 47 | J R 39 | B | 28 | 20 | A | A | A | A | A | |
| 29 | A | A | A | A | A | A | A | A | A | B | B | B | A | B | B | 41 | 33 | B | B | B | A | R 30 | A | A | A | |
| 30 | A | A | A | A | A | A | A | A | B | B | B | 32 | 38 | 38 | 39 | 43 | 40 | 31 | 25 | 16 | A | A | A | A | A | |
| 31 | A | A | A | A | A | A | A | B | B | A | B | B | B | B | 46 | 43 | 55 | F 37 | 28 | A | R | 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 | 2 | 5 | 1 | 3 | 5 | 4 | 5 | 5 | 11 | 18 | 22 | 25 | 28 | 27 | 27 | 28 | 28 | 21 | 20 | 14 | 10 | 5 | 1 | 6 | R | |
| MED | R 26 | 18 | 19 | R 20 | 23 | 22 | 22 | 18 | 23 | 29 | 35 | 38 | 41 | 40 | 40 | 40 | 34 | 26 | 19 | 14 | 13 | R 19 | R 12 | 18 | R | |
| U Q | | 30 | | 30 | 26 | 26 | 28 | 22 | 26 | 32 | 36 | 42 | 42 | 45 | 43 | 43 | 39 | 30 | 22 | 17 | 14 | R 29 | | 22 | R | |
| L Q | | 16 | | R 19 | 21 | 21 | 19 | 14 | 22 | 27 | 33 | 37 | 39 | 38 | 37 | 37 | 32 | 20 | 17 | 13 | 11 | R 13 | | 12 | R | |

AUG. 2020 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2020 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 | 58 | 78 | 70 | 55 | 56 | 54 | 98 | 26 | 47 | 58 | 58 | E B 24 | 22 | 29 | 19 | G 52 | 44 | 42 | 34 | 38 | 50 | 12 | 58 | 30 | |
| 2 | 29 | 34 | 72 | 53 | 37 | 31 | 30 | 36 | 51 | 46 | 56 | 22 | 28 | 22 | 29 | G E 13 | B 42 | 52 | 45 | 48 | 48 | 27 | 34 | | |
| 3 | 51 | 87 | 60 | 102 | 92 | 51 | 99 | 66 | 67 | 56 | B B | B B | B B | B B | B B | B B | B B | B B | 41 | 29 | 71 | 48 | 42 | 42 | |
| 4 | 46 | 67 | 48 | 60 | 58 | 62 | 64 | 62 | 57 | 62 | B E 22 | B E 19 | B G | G 60 | B B | B B | B B | B B | B B | 99 | 51 | 53 | 53 | 55 | |
| 5 | 47 | 50 | 26 | 34 | 56 | 64 | 44 | 54 | 51 | B B | B G | G 22 | 59 | 23 | 22 | G 19 | 14 | 16 | 14 | 15 | 52 | 58 | 53 | 36 | |
| 6 | 40 | 37 | 57 | 85 | 83 | 36 | 26 | 38 | 39 | 26 | 52 | G G | 46 | 28 | 24 | E B 16 | 132 | 26 | B B | 41 | 31 | 57 | 53 | 53 | |
| 7 | 44 | 48 | 62 | 47 | 58 | 50 | 52 | 44 | 57 | 59 | G G | G 20 | 34 | 20 | 26 | 22 | 27 | 54 | 54 | 56 | 46 | 58 | 54 | 50 | |
| 8 | 26 | 51 | 57 | 29 | 58 | 54 | 52 | 47 | 34 | B G | 30 | 21 | 19 | G E 21 | B E 26 | B E 17 | B B | B B | B B | 54 | 110 | B B | B B | 65 | |
| 9 | 52 | 42 | 69 | 56 | 41 | 44 | 56 | 54 | B E 16 | B E 22 | B E 24 | B E 24 | E B 20 | E B 24 | E B 19 | 59 | B B | B B | 55 | 46 | 56 | B B | 32 | 41 | |
| 10 | 31 | 66 | 59 | 56 | 46 | 38 | 42 | 56 | 55 | 61 | 24 | 58 | 60 | 58 | 52 | 16 | G 14 | 28 | 26 | 38 | 46 | B B | B B | | |
| 11 | 50 | 58 | 98 | 70 | 52 | 57 | 64 | 40 | 32 | 54 | G G | 21 | 21 | 24 | 24 | 59 | G 14 | 16 | 11 | 57 | 27 | 27 | 31 | 52 | |
| 12 | 43 | 74 | 59 | 54 | 58 | 68 | 29 | 30 | 53 | 58 | E B 24 | 58 | 56 | 52 | 26 | E B 12 | B B | B B | B B | 32 | 45 | 29 | 37 | | |
| 13 | 42 | 40 | 52 | 53 | 47 | 39 | 52 | 40 | 38 | 44 | 15 | 25 | 28 | 53 | G G | 22 | 14 | 52 | 28 | 44 | 65 | 39 | 28 | 52 | |
| 14 | 28 | 34 | 86 | 52 | 37 | 54 | 48 | 40 | E B 12 | 35 | G G | 20 | 20 | 20 | 22 | G G | G G | 20 | 48 | 56 | E B 8 | 28 | 32 | 36 | |
| 15 | 41 | 47 | 38 | 41 | 41 | 41 | 45 | 50 | 13 | G G | 24 | 59 | 24 | 24 | 19 | G G | 47 | 17 | 25 | 14 | 12 | 23 | 41 | 34 | 26 |
| 16 | 56 | 36 | 28 | 47 | 47 | 54 | 48 | 57 | 53 | 49 | 19 | 19 | 20 | 21 | 25 | 24 | G 18 | 16 | 11 | 47 | 58 | 41 | 42 | 38 | |
| 17 | 33 | 40 | 34 | 41 | 42 | 41 | 53 | 57 | 57 | 49 | 19 | 24 | 32 | 27 | 23 | 23 | 16 | 31 | 48 | 46 | 31 | B B | 52 | 82 | |
| 18 | 27 | 61 | 46 | 148 | 42 | 28 | 50 | 42 | 11 | E B 21 | E B 25 | 29 | 29 | 18 | 22 | G E 22 | B E 26 | B E 58 | B E 52 | 22 | 19 | 34 | 40 | 28 | |
| 19 | 40 | 42 | 100 | 60 | 50 | 76 | 66 | 61 | 58 | B G | 41 | 56 | 23 | 29 | 23 | G G | G G | G E 10 | B B | 30 | 30 | 40 | 82 | 58 | |
| 20 | 37 | 37 | 91 | 23 | 35 | 30 | 28 | 45 | 18 | 18 | 20 | 26 | 33 | 28 | 28 | 22 | 20 | 45 | 14 | B B | B B | 58 | 53 | 39 | |
| 21 | 111 | 59 | 42 | 27 | 56 | 34 | 45 | 51 | G B | 18 | 21 | 24 | 24 | 24 | 24 | 22 | 19 | 13 | G G | 27 | B B | B B | 27 | 40 | |
| 22 | 52 | 53 | 54 | 50 | 54 | 54 | 48 | 41 | B B | 28 | 33 | 33 | 22 | G G | G G | 20 | G E 15 | B 20 | E B 13 | B 8 | B B | 39 | 42 | 38 | |
| 23 | 41 | 42 | 42 | 44 | 44 | 32 | 52 | 52 | G G | 42 | 28 | 22 | 22 | G G | G G | 16 | 15 | E B 14 | B B | B B | B B | K 27 | 34 | 34 | |
| 24 | 34 | 42 | 42 | 31 | 33 | 41 | 30 | 13 | G G | 28 | 26 | 23 | G G | B G | 23 | 23 | 20 | 21 | 10 | G 10 | 22 | 26 | 22 | 13 | |
| 25 | 23 | 21 | 22 | 21 | 21 | 21 | 21 | E B 8 | G G | 21 | 32 | 23 | S 28 | S 29 | 28 | 21 | 23 | B E 9 | B 11 | E B 8 | B B | 30 | 27 | | |
| 26 | 34 | 55 | 106 | 80 | 75 | 53 | 66 | 58 | 50 | 55 | 23 | 23 | 21 | 23 | 23 | E B 23 | B E 18 | B E 16 | B E 18 | E B 10 | B 10 | 34 | 34 | 28 | |
| 27 | 30 | 45 | 67 | 57 | 48 | 65 | 65 | 58 | 41 | 57 | 64 | B J 59 | A 61 | G 20 | 19 | E B 20 | B B | B B | B 30 | B B | K 15 | 42 | | | |
| 28 | 28 | 38 | 30 | 29 | 26 | 56 | 34 | 42 | 22 | 18 | 24 | 24 | 27 | 25 | 24 | E B 24 | B E 31 | B E 14 | B E 16 | B 47 | 35 | 48 | 46 | | |
| 29 | 81 | 39 | 48 | 106 | 59 | 52 | 68 | 70 | 56 | B B | B B | B G | 60 | B B | B E 34 | B E 23 | B B | B B | B B | 54 | 26 | 37 | 32 | | |
| 30 | 40 | 64 | 52 | 44 | 47 | 52 | 58 | 32 | B B | B B | B G | 26 | 25 | B B | G G | 20 | G 22 | E B 11 | B E 52 | 41 | 31 | 36 | 47 | | |
| 31 | 49 | 46 | 64 | 91 | 59 | 53 | 84 | B B | B B | 54 | B B | B B | B B | B B | G G | E B 33 | B E 19 | B E 17 | B E 17 | B E 53 | K 21 | 37 | 39 | 53 | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
| CNT | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 27 | 25 | 25 | 27 | 29 | 28 | 29 | 30 | 29 | 22 | 24 | 26 | 26 | 25 | 29 | 30 | |
| MED | 41 | 46 | 57 | 53 | 48 | 52 | 52 | 46 | 42 | 46 | 25 | E G 23 | 27 | 24 | 23 | E G 22 | G G | 21 | 15 | 38 | 44 | 39 | 37 | 40 | |
| U Q | 50 | 59 | 69 | 60 | 58 | 54 | 64 | 57 | 55 | 56 | 36 | 25 | 34 | 28 | 26 | 26 | 23 | 42 | 44 | 47 | 52 | 50 | 52 | 52 | |
| L Q | 31 | 39 | 42 | 41 | 41 | 38 | 42 | 40 | 22 | 24 | 22 | 22 | 22 | 22 | 22 | G G | 15 | 16 | E B 12 | 22 | 26 | 30 | 30 | 34 | |

AUG. 2020 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2020 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

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

AUG. 2020 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2020 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 | E B | E A | E B | E A | E A | 202 | 190 | 196 | A | A | A | A | 200 | A | A |
| 2 | A | A | A | A | A | A | A | A | A | 204 | 198 | 196 | 204 | 202 | 212 | E A | 240 | 204 | 200 | A | A | A | A | A |
| 3 | A | A | A | A | A | A | A | A | A | A | B | B | B | B | B | A | B | B | A | A | A | A | A | A |
| 4 | A | A | A | A | A | A | A | A | A | A | B | B | B | A | A | B | B | B | B | A | A | A | A | 208 |
| 5 | A | A | A | A | A | A | A | A | A | A | B | B | E A | E A | E A | A | A | A | A | A | A | A | A | A |
| 6 | A | A | A | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | B | A | A | A | A | A |
| 7 | A | A | A | A | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A | A | A |
| 8 | A | A | A | A | A | A | A | A | A | B | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A | B | A |
| 9 | A | A | A | A | A | A | A | A | B | E B | E B | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | B | A | 198 |
| 10 | A | A | A | A | 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 | B | B | B |
| 11 | A | A | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A | A | A |
| 12 | A | A | A | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A | A |
| 13 | A | A | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A | A |
| 14 | A | A | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A |
| 15 | A | A | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A |
| 16 | 198 | A | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A |
| 17 | A | A | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A |
| 18 | A | A | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A |
| 19 | A | A | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A |
| 20 | A | A | 198 | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A |
| 21 | 206 | 200 | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A |
| 22 | A | A | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A |
| 23 | A | A | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A |
| 24 | A | A | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A |
| 25 | A | 200 | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A |
| 26 | A | A | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A |
| 27 | A | A | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A |
| 28 | A | 208 | A | 210 | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A |
| 29 | A | A | A | A | A | A | A | A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | E A | A | A |
| 30 | A | A | A | A | B | A | A | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | A | A |
| 31 | A | A | A | A | A | A | A | B | B | A | B | B | B | B | B | B | B | B | B | B | B | 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 | 3 | 1 | 1 | 3 | 3 | 3 | 3 | 10 | 18 | 22 | 25 | 26 | 25 | 27 | 26 | 29 | 20 | 17 | 14 | 10 | 5 | 3 | 5 |
| MED | 202 | 200 | 198 | 210 | 208 | 199 | 198 | 268 | 223 | 204 | 220 | 205 | 205 | 205 | 203 | 202 | 200 | 202 | 221 | 222 | 210 | 203 | 212 | 208 |
| U Q | | 208 | | | 212 | 344 | 200 | 310 | 238 | 254 | 242 | 222 | 220 | 214 | 210 | 216 | 214 | 219 | 238 | 250 | 250 | 226 | 224 | 209 |
| L Q | | 200 | | | 202 | 194 | 196 | 252 | 218 | 202 | 204 | 202 | 202 | 202 | 198 | 198 | 195 | 199 | 210 | 216 | 206 | 197 | 202 | 201 |

AUG. 2020 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2020 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 | 86 | B | A | B | B | B | B | B | B | B | B | B | B | A | 42 | A | 53 | 48 | | |
| 2 | A | R | A | A | B | A | A | A | A | O | X | B | B | B | B | B | B | B | B | R | B | R | A | A | | |
| 3 | A | A | A | A | A | O | X | A | X | X | X | X | X | X | X | X | X | X | X | O | X | O | X | A | A | |
| 4 | A | A | A | A | A | B | A | A | O | X | X | O | X | X | X | B | O | X | X | O | X | A | A | A | A | |
| 5 | A | A | A | 60 | A | A | A | A | B | B | O | X | B | B | O | X | X | X | B | O | X | A | O | X | A | A |
| 6 | A | X | A | A | A | O | X | X | X | X | X | X | B | B | X | R | S | O | X | S | O | X | X | B | A | |
| 7 | A | A | A | A | A | A | A | X | O | X | S | O | X | X | X | S | S | S | S | S | X | O | X | X | A | |
| 8 | A | A | A | 48 | A | A | A | O | X | O | X | O | X | X | S | S | S | S | S | S | O | X | X | A | A | |
| 9 | A | A | A | R | O | X | A | A | O | X | A | B | B | B | B | B | B | B | B | B | 35 | O | X | R | A | |
| 10 | O | X | A | A | O | X | A | O | X | X | X | X | S | O | X | X | X | S | X | O | X | X | X | O | X | |
| 11 | A | A | A | A | A | O | X | X | X | X | X | X | X | X | O | X | X | X | X | O | X | X | O | X | A | |
| 12 | A | A | A | A | A | A | A | A | O | X | O | X | O | X | B | X | S | S | X | X | X | X | X | O | X | |
| 13 | A | A | 58 | 58 | 42 | 52 | B | A | X | X | X | O | X | X | X | X | X | X | X | X | X | X | O | X | X | |
| 14 | A | A | A | A | A | A | A | B | A | A | A | B | B | O | X | X | X | B | A | O | X | X | X | A | A | |
| 15 | 58 | A | A | A | A | A | A | A | O | X | A | X | O | X | X | X | B | O | X | O | X | O | X | A | 50 | |
| 16 | A | A | A | A | A | A | O | X | X | X | X | X | X | O | X | O | X | O | X | O | X | S | O | X | B | X |
| 17 | O | X | O | A | A | A | 31 | 47 | 41 | 46 | 44 | X | S | 54 | 55 | 60 | 54 | 48 | 46 | 38 | 30 | O | X | B | A | |
| 18 | A | S | A | A | A | A | A | X | X | X | X | O | X | S | S | S | X | S | S | O | X | X | B | A | X | |
| 19 | A | A | A | A | A | A | X | X | X | X | B | O | X | X | S | S | S | S | S | O | X | O | X | X | A | |
| 20 | A | A | A | A | A | A | X | X | X | X | X | X | X | X | X | X | X | X | X | S | X | X | O | X | B | |
| 21 | B | C | C | O | X | S | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | |
| 22 | A | A | X | A | A | A | A | A | O | X | X | X | X | B | B | B | R | R | X | B | O | X | O | X | A | |
| 23 | A | B | A | A | A | A | X | O | X | S | S | X | X | X | S | S | B | B | B | B | X | R | A | 46 | 68 | |
| 24 | A | A | A | A | 66 | A | A | X | B | B | B | B | B | B | B | B | B | B | B | R | X | B | O | X | A | |
| 25 | A | A | A | B | A | A | B | B | R | X | X | B | B | B | B | B | O | X | B | X | A | B | R | A | A | |
| 26 | A | A | A | O | X | A | A | A | B | B | B | B | B | B | O | X | B | B | B | B | O | X | R | A | A | |
| 27 | 44 | A | A | A | A | A | B | B | B | B | O | X | B | B | O | X | B | O | X | X | B | O | X | A | A | |
| 28 | A | A | A | B | A | A | A | B | B | B | B | B | B | B | B | B | B | B | B | A | 67 | A | A | A | A | |
| 29 | A | A | A | B | A | O | X | B | A | A | B | B | B | B | B | B | B | B | X | X | O | X | A | A | A | |
| 30 | A | A | B | A | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | O | X | O | X | A | |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | |
| CNT | 4 | 3 | 2 | 6 | 6 | 5 | 10 | 15 | 18 | 18 | 20 | 15 | 14 | 18 | 11 | 13 | 15 | 13 | 16 | 23 | 21 | 15 | 11 | 9 | | |
| MED | 36 | 38 | 42 | 53 | 38 | 36 | 28 | 35 | 40 | 42 | 42 | 44 | 49 | 48 | 49 | 49 | 47 | 43 | 37 | 33 | 26 | 24 | 24 | 31 | | |
| U Q | 51 | 38 | | 60 | 42 | 48 | 31 | 38 | 42 | 45 | 46 | 49 | 54 | 50 | 50 | 52 | 51 | 46 | 38 | 35 | 28 | 26 | 46 | 59 | | |
| L Q | O | X | O | X | O | X | O | X | O | X | X | X | X | X | X | X | X | X | X | O | X | O | X | O | X | |

SEP. 2020 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2020 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 | B | A | B | B | B | B | B | B | B | B | B | B | A | A | A | A | 41 | | | | |
| 2 | A | A | A | A | B | A | A | A | A | 30 | B | B | B | B | B | B | B | B | B | R | B | A | A | A | | | | |
| 3 | A | A | A | A | A | 22 | A | 22 | 33 | 38 | 38 | 39 | 36 | 40 | 39 | 38 | 37 | 41 | 28 | 28 | 14 | 10 | R | A | | | | |
| 4 | A | A | A | A | A | B | A | A | 31 | 34 | 40 | 44 | 53 | 50 | B | 51 | 47 | 46 | 32 | A | A | A | A | A | | | | |
| 5 | A | A | A | A | A | A | A | A | B | B | 34 | B | B | 39 | 43 | 45 | 40 | B | R | A | 18 | 13 | A | A | | | | |
| 6 | A | 32 | A | A | A | 26 | 22 | 32 | 40 | 38 | 36 | B | B | 37 | R | S | S | 27 | 28 | 26 | 30 | 23 | 16 | B | A | | | |
| 7 | A | A | A | A | A | A | A | 28 | 33 | 34 | 42 | 44 | 52 | 42 | 34 | S | S | 41 | 44 | S | 29 | 22 | 20 | 11 | A | | | |
| 8 | A | A | A | A | A | A | A | 26 | 28 | 34 | 37 | 37 | 35 | U | S | S | S | S | U | S | S | R | A | A | A | | | |
| 9 | A | A | A | R | R | A | A | 24 | 28 | 38 | B | B | B | B | B | B | B | B | B | F | 21 | 18 | 13 | A | A | | | |
| 10 | R | A | A | A | R | A | F | 15 | 26 | 34 | 40 | 44 | 43 | 42 | 43 | 43 | 41 | S | 40 | 23 | 26 | 19 | 13 | 11 | R | R | | |
| 11 | A | A | A | A | R | A | F | 27 | 29 | 36 | 39 | 43 | 43 | 44 | 44 | 43 | 42 | R | S | 46 | 37 | 31 | 22 | 21 | 20 | A | A | |
| 12 | A | A | A | A | A | A | A | A | 34 | 33 | 40 | 41 | R | B | 36 | S | S | 37 | 37 | 31 | 28 | 24 | 18 | 14 | A | A | | |
| 13 | A | A | A | A | A | A | B | A | 32 | 33 | 33 | 34 | 40 | 42 | 43 | 39 | F | 39 | 36 | 32 | 26 | 20 | 18 | 13 | 11 | R | | |
| 14 | A | A | A | A | A | A | A | B | A | A | A | B | B | R | 36 | 36 | 33 | B | A | 28 | 21 | 16 | A | A | A | A | | |
| 15 | A | A | A | A | A | A | A | A | 31 | A | 34 | 35 | 38 | 42 | B | 43 | R | 43 | 36 | 36 | B | 24 | 22 | A | R | A | | |
| 16 | A | A | A | A | A | A | 22 | 26 | 34 | 34 | 35 | 36 | 48 | 41 | 44 | 41 | 43 | S | S | S | S | 24 | 20 | 18 | B | 22 | | |
| 17 | R | 15 | A | A | A | A | F | F | 20 | 35 | 35 | 40 | 38 | S | 48 | 44 | F | 54 | 48 | 42 | 40 | R | 32 | 24 | 24 | B | A | A |
| 18 | A | S | A | A | A | A | A | A | 31 | 34 | 34 | 38 | 38 | 42 | S | S | S | 47 | 43 | S | S | 27 | 19 | B | A | U | R | |
| 19 | A | A | A | A | A | A | 23 | 33 | 36 | 40 | B | 46 | 45 | U | S | S | S | S | U | S | S | U | R | 21 | 16 | R | A | |
| 20 | A | A | A | A | A | A | 16 | 30 | 36 | 40 | 43 | 40 | 44 | 43 | 46 | 45 | 43 | 40 | 28 | 29 | 22 | 18 | 18 | R | 18 | B | A | |
| 21 | B | C | C | 20 | R | S | 22 | 27 | 34 | 32 | 36 | 36 | 39 | 44 | 44 | 48 | 45 | 37 | 34 | 27 | 21 | 16 | 14 | 15 | F | 15 | A | |
| 22 | A | A | 20 | A | A | A | A | A | 30 | 36 | 32 | 36 | B | B | B | R | R | S | B | 35 | 26 | 19 | A | A | A | A | A | |
| 23 | A | B | A | A | A | A | 25 | 31 | S | S | 36 | 36 | 37 | 36 | F | S | S | B | B | B | 36 | R | A | A | A | A | A | |
| 24 | A | A | A | A | A | A | A | 33 | B | B | B | B | B | B | B | B | B | B | B | R | 26 | B | R | A | A | R | A | |
| 25 | A | A | A | B | A | A | B | B | A | 35 | 35 | B | B | B | B | B | B | B | B | R | A | B | A | A | A | A | A | |
| 26 | A | A | A | 37 | A | A | A | B | B | B | B | B | B | 33 | B | B | B | B | B | 31 | R | A | A | A | A | A | A | |
| 27 | F | A | A | A | A | A | B | B | B | B | 35 | B | B | 40 | B | R | 39 | 38 | B | B | A | A | A | A | A | A | A | |
| 28 | A | A | A | B | A | A | A | B | B | B | B | B | B | B | B | B | B | B | B | A | A | A | A | A | A | A | A | |
| 29 | A | A | A | B | A | R | B | A | A | B | B | B | B | B | B | B | B | B | 31 | 24 | 22 | R | A | A | A | A | A | |
| 30 | A | A | B | A | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | R | 16 | R | A | A | A | A | |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | | | |
| CNT | 3 | 2 | 1 | 2 | 4 | 3 | 9 | 15 | 18 | 19 | 20 | 16 | 15 | 19 | 13 | 13 | 17 | 18 | 19 | 22 | 20 | 14 | 7 | 6 | | | | |
| MED | 22 | 24 | 20 | 28 | 26 | 26 | 22 | 29 | 34 | 35 | 36 | 38 | 42 | 42 | 43 | 42 | 40 | 37 | 31 | 26 | 20 | 17 | 14 | 22 | | | | |
| U Q | 35 | | | | 32 | 30 | 24 | 32 | 35 | 39 | 40 | 43 | 48 | 44 | 44 | 46 | 44 | 40 | 33 | 28 | 22 | 18 | 18 | 23 | | | | |
| L Q | 10 | | | | 20 | 22 | 18 | 26 | 31 | 34 | 35 | 36 | 38 | 37 | 37 | 39 | 37 | 35 | 28 | 24 | 18 | 13 | 11 | 15 | | | | |

SEP. 2020 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2020 ftEs (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| H D | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | | |
|--------|----|----|-----|----|----|-----|-----|----|----|----|----|-------|-------|-------|-------|-----|----|-----|-------|-------|-------|-------|-----|-----|-----|-----|----|
| 1 | 55 | 66 | 105 | 54 | 54 | 65 | 58 | | 72 | | B | B | B | B | B | B | B | B | B | J A | 45 | 33 | 42 | 38 | J A | | |
| 2 | 66 | 42 | 52 | 52 | | 42 | 58 | 53 | 41 | 40 | | B | B | B | B | B | B | B | B | | 25 | | 31 | 44 | J A | | |
| 3 | 44 | 34 | 42 | 51 | 40 | J A | 29 | 34 | 45 | 45 | | 25 | 23 | 20 | 25 | 22 | 51 | 20 | | G | | 16 | 42 | 27 | 31 | 32 | |
| 4 | 42 | 41 | 83 | 47 | 80 | | 48 | 44 | 55 | 55 | 20 | G E B | 36 | 32 | E B | 23 | 40 | 25 | 21 | 23 | 40 | 36 | 35 | 47 | 45 | | |
| 5 | 42 | 52 | 42 | 40 | 54 | 58 | 52 | 50 | | B | B | G | B | B | E B | 24 | 21 | 20 | | E B | 22 | 57 | 18 | 26 | 32 | 30 | |
| 6 | 38 | 36 | 29 | 26 | 40 | 53 | 42 | | G | G | G | G | B | B | G | | 27 | 23 | | G | G | G E B | 17 | 15 | 11 | B | 32 |
| 7 | 32 | 35 | 66 | 42 | 34 | 32 | 32 | | G | G | G | G E B | 25 | | 41 | 28 | 23 | | G | G E B | 20 | 15 | 12 | 14 | 14 | 30 | 27 |
| 8 | 28 | 28 | 31 | 33 | 42 | 27 | 31 | 42 | | G | G | G E B | E B | S | G | | 22 | | G E B | G | 16 | 16 | 13 | 23 | 32 | 29 | 26 |
| 9 | 26 | 26 | 26 | 28 | 33 | 43 | 54 | 44 | 28 | 28 | | B | B | B | B | | | | | B | B | | | 13 | 34 | 15 | 43 |
| 10 | 26 | 44 | 39 | 20 | 22 | 28 | 24 | 10 | | G | G | G | G | G | | 25 | 25 | 23 | | G E B | E B | E B | E B | E B | E B | E B | K |
| 11 | 29 | 28 | 27 | 55 | 41 | 29 | 24 | 12 | 17 | 20 | 23 | 23 | 28 | 26 | | G | | 22 | 18 | | G E B | 8 | 8 | 16 | 33 | 42 | |
| 12 | 42 | 41 | 65 | 42 | 63 | 42 | 33 | 42 | | G | 20 | 22 | 26 | | B E B | S | | 28 | 25 | 25 | 21 | 15 | 42 | 54 | 53 | 31 | |
| 13 | 81 | 48 | 53 | 47 | 36 | 44 | | 47 | 50 | 50 | 21 | 51 | 24 | 28 | 30 | 24 | 27 | 20 | 12 | 9 | 8 | 13 | 48 | 25 | | | |
| 14 | 33 | S | S | 31 | S | S | 27 | | 62 | 58 | 46 | | B | B | G E B | G | | 58 | E B | E B | | 48 | 18 | 34 | 27 | | |
| 15 | 36 | 66 | 48 | 53 | 50 | 48 | 48 | 43 | 41 | 64 | | G | G | G | B E B | 37 | 26 | 30 | | B E B | 17 | 21 | 52 | 14 | 36 | | |
| 16 | 40 | 40 | 52 | 45 | 38 | 35 | E B | 13 | 21 | | 25 | 26 | 27 | | G | G | 18 | 21 | 28 | 12 | 14 | 8 | 19 | | 20 | | |
| 17 | 27 | 22 | 28 | 34 | 53 | 29 | E B | 8 | 17 | | 21 | 22 | 28 | | G | 26 | 26 | E B | E B | E B | E B | E B | E B | E B | E B | 21 | 44 |
| 18 | 34 | 35 | 43 | 40 | 45 | 45 | 44 | 24 | 17 | 20 | 22 | 24 | 25 | 23 | 23 | | S | | G | | E B | 42 | | 26 | 43 | | |
| 19 | 23 | 28 | 39 | 42 | 29 | 31 | | G | G | 31 | | B E B | 36 | | G | G | 26 | 26 | | G | G | 16 | 14 | 15 | E B | E B | 31 |
| 20 | 33 | 51 | 44 | 56 | 53 | 62 | 47 | 43 | 22 | 22 | 26 | 26 | | G | G | | | 22 | 19 | 11 | 11 | 10 | 10 | 10 | | B | |
| 21 | B | C | C | 21 | 14 | S | 13 | 16 | 20 | 20 | 30 | 30 | 30 | 36 | 52 | 30 | 25 | 20 | 17 | E B | 8 | 26 | E B | E B | E B | E B | |
| 22 | 33 | 53 | 47 | 42 | 69 | 55 | 66 | 37 | 54 | 24 | | 30 | | B | B | B | G | G | 22 | 24 | 16 | 12 | 28 | 27 | 27 | | |
| 23 | 28 | | 27 | 42 | S | 33 | 34 | 30 | 22 | 23 | 24 | 24 | 60 | 26 | 29 | 26 | | B | B | B | 16 | 27 | 34 | 49 | 53 | | |
| 24 | 66 | 92 | 64 | 72 | 55 | 43 | 41 | 24 | 50 | | B | B | B | B | B | B | B | B | | 28 | | | 18 | 30 | 19 | | |
| 25 | 52 | 36 | 42 | | 53 | 53 | | B | B | 40 | | G | G | B | B | B | B | E B | B | E B | B | | 22 | 28 | 53 | | |
| 26 | 66 | 52 | 57 | 69 | 62 | 58 | 51 | 52 | | B | B | B | B | B E B | 25 | | B | B | B | G | | 22 | 32 | 36 | 27 | 47 | |
| 27 | 84 | 56 | 57 | 63 | 72 | 50 | | B | B | B | G | B | B E B | B | B E B | B | B | B | B | E B | B | 34 | 41 | 47 | S | 53 | |
| 28 | 52 | 53 | 32 | | 51 | 40 | 42 | | B | 52 | | B | B | B | B | B | B | B | | B | 44 | 27 | 40 | 100 | 59 | 91 | |
| 29 | 68 | 64 | 78 | 54 | 56 | 51 | 59 | 39 | 48 | | B | B | B | B | B | B | B | B | E B | E B | B | 31 | 50 | 49 | 53 | 40 | |
| 30 | 52 | 42 | | 56 | 56 | | B | B | B | B | B | B | B | B | E B | B | B | B | B | E B | B | 18 | 42 | 36 | 38 | 87 | |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | | |
| CNT | 29 | 28 | 28 | 28 | 29 | 28 | 26 | 24 | 26 | 22 | 21 | 17 | 15 | 20 | 17 | 20 | 20 | 19 | 23 | 30 | 27 | 28 | 28 | 29 | | | |
| MED | 40 | 42 | 44 | 44 | 50 | 43 | 42 | | 30 | | | 26 | 30 | 27 | 27 | | 24 | E G | 20 | 16 | 15 | 23 | 28 | 30 | 36 | | |
| U Q | 54 | 52 | 57 | 54 | 56 | 53 | 51 | 44 | 50 | 28 | 24 | 33 | | G | G | E B | 28 | | G | 24 | 21 | 25 | 41 | 36 | 41 | 46 | |
| L Q | 30 | 34 | 32 | 37 | 37 | 32 | 27 | 23 | | G | 21 | 22 | 25 | 25 | 26 | 25 | 23 | 22 | 20 | 16 | E B | E B | E B | E B | 26 | 27 | |

SEP. 2020 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2020 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 | 7 | 10 | 7 | 12 | 12 | 9 | B | 24 | B | B | B | B | B | B | B | B | B | B | 7 | 5 | 16 | 7 | 10 | |
| 2 | 14 | 15 | 17 | 22 | B | 9 | 21 | 29 | 19 | 10 | B | B | B | B | B | B | B | B | 9 | B | 6 | 6 | 8 | | |
| 3 | 9 | 11 | 14 | 12 | 9 | 9 | 7 | 7 | 10 | 9 | 12 | 13 | 10 | 18 | 10 | 12 | 12 | 8 | 10 | 8 | 9 | 6 | 7 | 7 | |
| 4 | 8 | 8 | 16 | 10 | 22 | B | 16 | 11 | 11 | 12 | 15 | 36 | 14 | 23 | B | 38 | 25 | 21 | 23 | 14 | 8 | 7 | 9 | 7 | |
| 5 | 8 | 8 | 8 | 10 | 20 | 16 | 16 | 11 | B | B | 12 | B | B | 29 | 24 | 14 | 20 | B | 22 | 17 | 12 | 8 | 8 | 8 | |
| 6 | 8 | 13 | 13 | 10 | 11 | 15 | 12 | 8 | 12 | 12 | 15 | B | B | 15 | 20 | 16 | 16 | 12 | 7 | 17 | 9 | 11 | B | 8 | |
| 7 | 6 | 8 | 16 | 17 | 13 | 11 | 8 | 9 | 9 | 12 | 14 | 25 | 21 | 23 | 17 | 22 | 16 | 13 | 14 | 8 | 6 | 7 | 7 | 7 | |
| 8 | 7 | 9 | 6 | 7 | 8 | 8 | 13 | 9 | 11 | 16 | 16 | 25 | 25 | 14 | 10 | 15 | 14 | 15 | 8 | 8 | 7 | 6 | 8 | 8 | |
| 9 | 8 | 8 | 9 | 7 | 7 | 12 | 10 | 9 | 11 | 14 | B | B | B | B | B | B | B | B | B | 10 | 8 | 9 | 9 | 8 | |
| 10 | 7 | 15 | 7 | 7 | 7 | 7 | 7 | 6 | 7 | 11 | 11 | 13 | 14 | 10 | 10 | 11 | 11 | 11 | 11 | 10 | 10 | 10 | 7 | 5 | |
| 11 | 7 | 7 | 8 | 8 | 7 | 8 | 10 | 7 | 9 | 10 | 12 | 12 | 12 | 18 | 12 | 12 | 11 | 10 | 8 | 8 | 8 | 8 | 8 | 9 | |
| 12 | 8 | 9 | 10 | 9 | 14 | 8 | 9 | 7 | 9 | 10 | 10 | 11 | B | 24 | 24 | 16 | 18 | 13 | 11 | 9 | 7 | 7 | 8 | 7 | |
| 13 | 13 | 10 | 10 | 10 | 11 | 11 | B | 9 | 9 | 9 | 9 | 12 | 18 | 15 | 10 | 10 | 11 | 10 | 10 | 9 | 8 | 8 | 8 | 8 | |
| 14 | 8 | 8 | 16 | 11 | 14 | 12 | 13 | B | 14 | 14 | 20 | B | B | 24 | 24 | 15 | B | 36 | 20 | 16 | 10 | 10 | 7 | 8 | |
| 15 | 8 | 11 | 14 | 14 | 12 | 12 | 10 | 25 | 21 | 21 | 12 | 15 | 12 | 18 | B | 37 | 26 | 30 | B | 17 | 14 | 20 | 9 | 7 | |
| 16 | 10 | 8 | 8 | 15 | 14 | 11 | 9 | 13 | 11 | 11 | 10 | 10 | 10 | 10 | 10 | 13 | 21 | 14 | 8 | 8 | 8 | 8 | B | 15 | |
| 17 | 10 | 8 | 10 | 12 | 8 | 8 | 8 | 8 | 9 | 11 | 12 | 16 | 15 | 11 | 12 | 28 | 22 | 24 | 26 | 16 | 14 | B | 12 | 13 | |
| 18 | 9 | 7 | 10 | 10 | 10 | 16 | 9 | 7 | 10 | 7 | 12 | 10 | 10 | 10 | 10 | 9 | 10 | 9 | 8 | 10 | 7 | B | 8 | 7 | |
| 19 | 8 | 7 | 7 | 7 | 7 | 6 | 6 | 10 | 16 | 16 | B | 36 | 21 | 15 | 11 | 12 | 12 | 10 | 10 | 13 | 10 | 10 | 10 | 15 | |
| 20 | 10 | 10 | 11 | 8 | 13 | 11 | 10 | 10 | 11 | 15 | 11 | 14 | 13 | 13 | 8 | 7 | 7 | 8 | 6 | 7 | 6 | 9 | 9 | B | |
| 21 | B | C | C | 7 | 9 | 6 | 6 | 8 | 8 | 10 | 8 | 9 | 7 | 9 | 9 | 9 | 9 | 8 | 7 | 8 | 7 | 7 | 8 | 10 | |
| 22 | 8 | 9 | 9 | 10 | 10 | 10 | 13 | 10 | 12 | 10 | 8 | 9 | B | B | B | 16 | 10 | 16 | B | 16 | 12 | 12 | 10 | 11 | |
| 23 | 12 | B | 8 | 10 | 12 | 12 | 8 | 10 | 9 | 10 | 9 | 8 | 8 | 6 | 8 | 10 | B | B | B | 15 | 14 | 6 | 6 | 9 | |
| 24 | 7 | 10 | 26 | 13 | 8 | 21 | 11 | 9 | 33 | B | B | B | B | B | B | B | B | B | 16 | 9 | B | 12 | 12 | 10 | |
| 25 | 22 | 14 | 14 | B | 17 | 21 | B | B | 18 | 13 | 13 | B | B | B | B | B | 32 | B | 20 | 18 | B | 6 | 8 | 11 | |
| 26 | 22 | 18 | 19 | 11 | 11 | 38 | 15 | 42 | B | B | B | B | B | 24 | B | B | B | B | 17 | 7 | 8 | 7 | 6 | 7 | |
| 27 | 9 | 17 | 26 | 24 | 19 | 25 | B | B | B | 18 | B | B | B | 36 | B | 34 | 24 | B | 19 | 11 | 8 | 8 | 8 | 12 | |
| 28 | 33 | 12 | 10 | B | 13 | 20 | 10 | B | 42 | B | B | B | B | B | B | B | B | B | 12 | 12 | 8 | 8 | 18 | 7 | |
| 29 | 10 | 7 | 8 | 41 | 12 | 16 | 39 | 18 | 14 | B | B | B | B | B | B | B | B | B | 16 | 18 | 7 | 8 | 7 | 8 | 14 |
| 30 | 12 | 16 | B | 12 | 17 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 18 | 6 | 7 | 7 | 17 | |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
| CNT | 30 | 29 | 29 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | |
| MED | 9 | 9 | 10 | 10 | 12 | 12 | 10 | 10 | 12 | 12 | 14 | 30 | B | 23 | 24 | 16 | 22 | 18 | 16 | 10 | 8 | 8 | 8 | 8 | |
| U Q | 12 | 14 | 16 | 14 | 14 | 16 | 16 | 29 | 21 | B | B | B | B | B | B | B | B | B | B | 26 | 16 | 12 | 10 | 9 | 11 |
| L Q | 8 | 8 | 8 | 8 | 9 | 9 | 9 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 10 | 12 | 12 | 11 | 10 | 8 | 7 | 7 | 7 | 7 | |

SEP. 2020 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

SEP. 2020 h'F (KM)

45°E MEAN TIME (G.M.T. + 3 H)

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

| H D | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
|--------|----------|-----|-----|-----|-----|-----|------------|------------|------------|-----|-----|-----|--------------|-----|--------------|-----|--------------|--------------|--------------|--------------|--------------|------------|------------|-----|---|
| 1 | A | A | A | A | A | A | A | B | A | B | B | B | B | B | B | B | B | B | B | A | A | A | A | 194 | |
| 2 | A | A | A | A | B | A | A | A | A | A | B | B | B | B | B | B | B | B | B | A | B | | A | A | |
| 3 | A | A | A | A | A | 242 | 194 | E A 236 | 204 | 198 | 228 | 208 | 194 | 224 | 196 | 198 | 196 | 208 | 194 | E A 218 | 190 | 194 | A | A | |
| 4 | 190 | A | A | A | A | B | A | A | E A 260 | 220 | 208 | 208 | 208 | 208 | B E B 232 | 224 | 222 | E B 276 | A | A | A | A | A | A | |
| 5 | A | A | A | A | A | A | A | A | B | B | 226 | B | B E B 264 | 220 | 216 | 224 | | B E B 236 | A | A E A 236 | 236 | | A | A | |
| 6 | A | A | A | 194 | A | A | E A 240 | E A 218 | 200 | 202 | | B | B | 198 | 244 | A | S | 200 | 204 | 204 | 220 | B | E B 246 | B | A |
| 7 | A | A | A | A | A | A | A | E A 226 | 204 | 200 | 200 | | A E A 238 | 202 | 212 | 208 | 212 | 220 | 222 | 230 | 206 | 272 | A | A | |
| 8 | A | A | A | A | A | A | E A 272 | A | 212 | 200 | 196 | 206 | 196 | S | A | S | A | 196 | 194 | 212 | 204 | 226 | A | A | A |
| 9 | A | A | A | 216 | 200 | | A | A | 242 | 200 | 200 | | B | B | B | B | B | B | B | 208 | 208 | E B 254 | A | A | |
| 10 | A | A | 202 | A | A | A | A | 194 | 216 | 204 | 200 | 198 | 198 | 190 | 206 | 210 | 226 | 208 | 192 | 212 | 206 | E B 254 | 202 | 194 | |
| 11 | A | A | A | A | 204 | A | E B 292 | 210 | 190 | 178 | 204 | 196 | 194 | 214 | 196 | 210 | E A 214 | 198 | 212 | 210 | 202 | 234 | A | A | |
| 12 | A | A | A | A | A | A | A | E A 260 | 194 | 204 | 206 | | B | 202 | S | 194 | 206 | 208 | 208 | 220 | 210 | 226 | 240 | A | |
| 13 | A | A | A | A | A | A | B | A | 218 | 198 | 174 | 188 | 200 | 218 | 202 | 212 | 190 | 198 | 198 | 224 | 250 | 216 | 216 | 260 | |
| 14 | A | A | A | A | A | A | A | B | A | A | A | B | B | 236 | 210 | 202 | | B | A E B 248 | E B 268 | 250 | A | A | A | |
| 15 | A | A | A | A | A | A | A | E A 278 | | 220 | 220 | 254 | 244 | A | A | B | B E B 218 | 228 | | E B 260 | 260 | | 196 | A | |
| 16 | A | A | A | A | A | A | 208 | E A 232 | 222 | 194 | 190 | 196 | 202 | 200 | 192 | 180 | 196 | 202 | 196 | 186 | 206 | 206 | B | 200 | |
| 17 | 200 | A | A | A | A | A | 232 | 206 | 206 | 206 | 194 | 196 | 204 | 212 | 204 | 214 | 214 | 214 | E B 214 | E B 240 | E B 224 | | B | A | |
| 18 | A | 234 | A | A | A | A | A | 230 | 210 | 192 | 194 | 202 | 192 | | 190 | | 206 | 210 | 204 | 208 | 208 | | 196 | A | |
| 19 | A | A | A | A | A | A | 196 | E A 226 | 208 | 194 | | B | B | 204 | 210 | 222 | 192 | 198 | 204 | 214 | 214 | E B 264 | 190 | A | |
| 20 | A | A | A | A | A | A | E A 268 | 194 | 202 | 206 | 226 | 222 | 210 | 200 | 178 | 196 | 208 | 202 | 194 | 210 | 232 | 232 | 218 | B | |
| 21 | B | C | C | A | 192 | 206 | A | E A 216 | 200 | 192 | 218 | 204 | 208 | 216 | 192 | 206 | 206 | 174 | 212 | 196 | 206 | 206 | E B 264 | 220 | |
| 22 | A | A | A | A | A | A | A | A | A | 208 | 190 | 244 | Q | B | B | B | A | 198 | 198 | | 218 | 268 | A | A | |
| 23 | A | B | A | A | A | A | A | A | S | A | 192 | 198 | 194 | 194 | 194 | | S | B | B | B | 216 | A | A | A | |
| 24 | A | A | A | A | A | A | E A 232 | | B | B | B | B | B | B | B | B | B | B | B | A E A 284 | B | A | A | A | |
| 25 | A | A | A | B | A | A | B | B | A | 206 | 198 | | B | B | B | B | E B 242 | | B | 220 | | B | A | A | |
| 26 | A | A | A | 210 | A | A | A | B | B | B | B | B | B E B 212 | B | B | B | B | B | E A 286 | A | A | A | A | A | |
| 27 | H 186 | A | A | A | A | A | B | B | B | B | 208 | | B | B | B | B | E B 228 | B | B | 240 | | A | A | A | |
| 28 | A | A | A | B | A | A | A | B | B | B | B | B | B | B | B | B | B | B | B | A | 200 | | A | A | |
| 29 | A | A | A | B | A | | B | A | A | B | B | B | B | B | B | B | B | B | B | | B | A | A | A | |
| 30 | A | A | B | A | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 192 | B E B 224 | E A 328 | A | A | |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
| CNT | 3 | 1 | 1 | 4 | 3 | 2 | 7 | 14 | 16 | 18 | 20 | 16 | 14 | 18 | 16 | 14 | 20 | 18 | 20 | 22 | 20 | 15 | 8 | 6 | |
| MED | 190 | 234 | 202 | 202 | 204 | 218 | U 211 | U 216 | 206 | 200 | 201 | 203 | 201 | 210 | 202 | 206 | 203 | 204 | 206 | 212 | 216 | U 219 | 213 | 198 | |
| U Q | 200 | | | 213 | 206 | | E 268 | E A 236 | E A 220 | 206 | 219 | 208 | 208 | 224 | 215 | 212 | 221 | 210 | 228 | 224 | 243 | E B 254 | 252 | 220 | |
| L Q | H 186 | | | 193 | 200 | | 196 | 206 | 203 | 194 | 194 | 197 | 194 | 200 | 193 | 196 | 198 | 198 | 201 | 208 | 207 | 206 | 199 | 194 | |

SEP. 2020 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT. 2020 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 | 46 | B | A | X | X | X | B | B | X | B | B | O | X | O | X | X | X | O | X | A | A | A | |
| 2 | A | A | A | A | A | B | A | A | B | O | X | X | B | O | X | B | O | X | B | B | X | O | X | A | A | A | |
| 3 | A | A | A | A | A | A | A | X | X | X | X | X | X | B | X | X | X | O | X | X | X | X | O | X | A | O | X |
| 4 | O | X | O | X | A | A | X | A | O | X | O | X | O | X | X | O | X | X | X | O | X | B | B | A | A | A | |
| 5 | A | 64 | A | A | A | O | X | X | X | X | X | X | X | X | X | X | X | X | X | X | O | X | A | A | X | A | |
| 6 | 74 | A | 77 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | C | C | |
| 15 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 16 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 17 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 18 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 19 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | O | X | O | X | O | X | O | X | A | A | |
| 20 | 55 | A | A | A | A | A | A | A | X | O | X | O | X | X | X | X | X | X | X | X | X | X | X | X | X | A | |
| 21 | A | A | 55 | 40 | A | A | A | A | X | X | X | B | X | X | X | X | X | X | X | X | X | X | X | X | X | A | |
| 22 | 58 | 59 | A | B | A | A | A | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | A | |
| 23 | A | A | A | 70 | R | A | A | A | O | X | O | X | O | X | X | X | X | X | X | X | X | X | X | X | X | X | |
| 24 | A | A | A | A | A | O | X | A | A | A | X | B | B | B | O | X | B | B | O | X | X | B | A | A | A | A | |
| 25 | B | A | A | B | B | A | A | O | X | O | X | O | X | B | B | B | O | X | O | X | X | B | X | X | A | B | |
| 26 | 85 | A | A | 56 | A | 43 | 43 | A | B | O | X | B | B | O | X | B | B | B | B | B | O | X | X | A | A | A | |
| 27 | A | A | A | B | A | A | A | X | X | O | X | O | X | B | B | B | B | B | B | B | O | X | O | X | X | X | |
| 28 | 30 | 50 | A | A | O | X | A | A | A | B | B | B | R | X | X | X | X | X | X | X | X | X | X | X | X | X | |
| 29 | 56 | B | A | A | A | A | A | O | X | X | B | B | O | X | B | B | B | B | X | X | X | X | X | X | X | X | |
| 30 | A | 52 | A | A | B | A | A | A | A | 49 | 50 | 45 | 47 | B | B | B | O | X | X | O | X | X | X | X | X | X | |
| 31 | X | A | A | A | O | X | X | X | X | X | X | X | X | O | X | X | O | X | X | X | X | X | X | X | X | X | |
| | 40 | | | | 47 | 46 | 51 | 47 | 47 | 47 | 48 | | 53 | 58 | 66 | 60 | 60 | 60 | 52 | 45 | | A | O | 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 | 8 | 5 | 3 | 3 | 3 | 4 | 4 | 9 | 12 | 14 | 14 | 9 | 12 | 9 | 13 | 13 | 13 | 15 | 18 | 15 | 13 | 10 | 10 | 7 | | | |
| MED | 56 | 52 | 55 | 56 | O | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | |
| U Q | 66 | 62 | 77 | 70 | 47 | 44 | 50 | 43 | 47 | 47 | 48 | 50 | 52 | 58 | 57 | 56 | 56 | 52 | 49 | 47 | 42 | 45 | 57 | 51 | | | |
| L Q | X | O | X | O | X | X | O | X | X | X | X | O | X | X | X | X | X | X | X | X | X | X | X | X | X | | |
| | 37 | 42 | 48 | 40 | 35 | 28 | 40 | 38 | 40 | 41 | 42 | 46 | 48 | 49 | 50 | 51 | 48 | 45 | 42 | 37 | 36 | 36 | 38 | 39 | | | |

OCT. 2020 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT. 2020 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 | F 35 | B | A | 35 | 32 | 33 | B | B | 34 | B | B | 48 | 40 | 38 | 33 | 26 | 17 | A | A | A |
| 2 | A | A | A | A | A | B | A | A | B | 33 | 37 | B | 42 | 42 | B | 43 | B | B | 34 | 31 | 32 | R | A | A |
| 3 | A | A | A | A | A | A | A | 32 | 32 | 33 | 34 | 40 | 36 | B | 45 | 50 | 46 | 41 | 40 | 31 | 27 | 22 | R | A |
| 4 | U 28 | R 29 | R 42 | A | A | 18 | A | 32 | 32 | 36 | 36 | 41 | 42 | 45 | 47 | 47 | 46 | 47 | 40 | B | B | A | A | |
| 5 | A | A | A | A | A | 27 | 30 | 34 | 36 | 38 | 40 | 44 | 44 | 48 | 50 | 47 | 50 | 56 | 43 | 24 | A | A | 47 | A |
| 6 | A | A | A | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 7 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 8 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 9 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 10 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 11 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 12 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 13 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 14 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 15 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 16 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 17 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 18 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 19 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | 51 | 44 | 43 | 36 | 32 | 28 | A | A |
| 20 | A | A | A | A | A | A | A | A | 41 | R 43 | R 46 | 46 | 50 | 51 | 52 | 50 | 46 | 46 | 44 | 42 | 37 | 40 | 22 | F 20 |
| 21 | A | A | 25 | Z 34 | A | A | A | A | 45 | 41 | 41 | B | 50 | 54 | 46 | 45 | 42 | 44 | 41 | 40 | 36 | 28 | F 40 | F A |
| 22 | R | A | A | B | A | A | A | 37 | 37 | 37 | 40 | 44 | 44 | 47 | 52 | 48 | 43 | 47 | 48 | 40 | 36 | 31 | 24 | F A |
| 23 | A | A | A | A | R | A | A | A | 39 | 40 | 38 | 42 | 44 | 42 | 42 | 43 | 43 | 44 | 42 | 41 | 36 | 29 | 32 | R 45 |
| 24 | A | A | A | A | A | A | R 42 | A | A | A | 35 | B | B | B | 46 | B | B | 36 | 33 | B | A | A | A | A |
| 25 | B | A | A | B | B | A | A | R 33 | R 35 | 35 | 36 | B | B | B | 44 | 45 | 40 | B | 36 | 32 | A | A | A | B |
| 26 | A | A | A | A | A | 37 | F 30 | A | B | R 36 | B | B | 44 | B | R 43 | B | B | 35 | 34 | 33 | 30 | A | A | A |
| 27 | A | A | A | B | A | A | A | 37 | 37 | 40 | 42 | B | B | B | B | B | B | B | 40 | 36 | B | 30 | 22 | R 34 |
| 28 | F 18 | A | A | A | 29 | A | A | A | B | B | 43 | 45 | R | 44 | 48 | 51 | 52 | 45 | 36 | A | 31 | A | A | B |
| 29 | A | B | A | A | A | A | A | 34 | 41 | R | B | B | R | B | R 45 | B | B | 39 | 39 | 28 | 30 | A | A | A |
| 30 | A | A | A | A | B | A | A | A | A | F 38 | 44 | 39 | 41 | B | B | 45 | 46 | 45 | 44 | 43 | 38 | 35 | 36 | 34 |
| 31 | 34 | A | A | A | 41 | 40 | 45 | 41 | 41 | 41 | 42 | B | 47 | R 52 | 60 | 54 | F 50 | 46 | 39 | A | 35 | F 34 | 31 | 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 | 3 | 1 | 2 | 1 | 3 | 4 | 4 | 9 | 12 | 14 | 14 | 9 | 12 | 9 | 13 | 13 | 13 | 15 | 18 | 14 | 13 | 9 | 8 | 6 |
| MED | 28 | R 29 | 34 | Z 34 | 35 | 32 | 36 | 34 | 37 | 38 | 40 | 42 | 44 | 47 | 46 | 47 | 46 | 44 | 40 | 34 | 32 | 30 | 32 | 34 |
| U Q | 34 | | | | 41 | 38 | 44 | 37 | 41 | 40 | 42 | 44 | 46 | 52 | 51 | 50 | 50 | 46 | 43 | 40 | 36 | 34 | 38 | 34 |
| L Q | F 18 | | | | 29 | 22 | 30 | 32 | 34 | 35 | 36 | 40 | 42 | 43 | 44 | 45 | 42 | 39 | 36 | 31 | 30 | 28 | 23 | F 20 |

OCT. 2020 foF2 (0.1MHz)

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IONOSPHERIC DATA STATION SHOWA-ST.

OCT.2020 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 | 52 | 52 | 62 | 62 | 35 | B | 52 | G | G | G | B | B | G | B | BE | BE | B | GE | B | GE | B | 41 | 52 | 37 | |
| 2 | 38 | 54 | 48 | 62 | 57 | B | 52 | 54 | B | 54 | G | BE | B | 26 | 26 | BE | B | B | BE | B | G | 37 | 41 | 43 | 46 |
| 3 | 46 | 76 | 52 | 58 | 56 | 56 | 48 | 28 | 55 | 23 | 25 | 57 | 53 | BE | BE | BE | BE | BE | BE | BE | BE | 15 | 54 | 49 | 48 |
| 4 | 48 | 33 | 33 | 46 | 30 | 35 | 48 | 55 | 53 | G | G | 64 | G | 30 | G | GE | B | GE | B | B | B | 58 | 50 | 30 | |
| 5 | 62 | 81 | 46 | 57 | 57 | 57 | 48 | 58 | 24 | 26 | 27 | 27 | 59 | 30 | 62 | G | G | G | G | 50 | 36 | 42 | 87 | 128 | |
| 6 | 54 | 57 | 38 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 7 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 8 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 9 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 10 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 11 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 12 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 13 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 14 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 15 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 16 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 17 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 18 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 19 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | BE | BE | BE | BE | B | 28 | 22 | 46 | 44 |
| 20 | 41 | 56 | 56 | 50 | 34 | 62 | 62 | 49 | 50 | 46 | 22 | 23 | 32 | G | G | G | G | G | G | G | 14 | 14 | 12 | 32 | |
| 21 | 41 | 48 | 27 | 56 | 51 | 56 | 50 | 66 | 35 | G | G | BE | BE | BE | BE | BE | B | G | 22 | 22 | 21 | 19 | 36 | 41 | |
| 22 | 33 | 36 | 48 | B | 52 | 59 | 44 | G | 52 | 50 | 30 | 32 | 45 | 37 | G | G | G | G | 22 | G | GE | B | 11 | 17 | 42 |
| 23 | 53 | 53 | 49 | 52 | 35 | 54 | 56 | 57 | 35 | 29 | 30 | G | G | G | G | G | G | GE | B | 15 | 11 | 8 | 41 | | |
| 24 | 55 | 62 | 72 | 58 | 64 | 70 | 59 | 52 | 69 | 51 | 46 | B | B | BE | B | B | BE | B | G | B | 47 | 59 | 41 | 59 | |
| 25 | 53 | 54 | 35 | B | B | 49 | 45 | G | 26 | 28 | 106 | B | BE | BE | B | G | B | 24 | 20 | 39 | 36 | 92 | B | | |
| 26 | 53 | 44 | 49 | 34 | 50 | 42 | 45 | B | 45 | B | B | B | 51 | BE | B | B | B | 27 | 33 | 37 | 32 | 46 | 41 | 98 | |
| 27 | 72 | G | 51 | B | 48 | 46 | 44 | 45 | 51 | 36 | 56 | B | B | B | B | B | B | BE | BE | B | B | 16 | 21 | G | |
| 28 | 14 | 40 | 41 | 41 | 28 | 49 | 48 | 57 | B | B | G | G | G | G | G | BE | B | 29 | 20 | 23 | 34 | G | 55 | 52 | |
| 29 | 30 | 69 | 56 | 40 | 40 | 44 | 49 | 34 | G | G | B | B | G | B | BE | B | B | BE | B | G | 26 | 54 | 31 | 42 | 42 |
| 30 | 44 | 46 | 48 | 52 | B | 47 | 50 | 50 | 52 | 35 | G | G | G | B | BE | BE | BE | BE | BE | B | 16 | G | G | 14 | |
| 31 | 31 | 56 | 59 | 48 | G | G | G | G | 31 | 31 | G | BE | BE | BE | BE | BE | B | GE | B | 22 | 49 | 25 | 26 | 24 | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
| CNT | 18 | 18 | 18 | 14 | 15 | 15 | 16 | 17 | 14 | 15 | 14 | 10 | 13 | 9 | 13 | 12 | 13 | 15 | 18 | 16 | 16 | 18 | 18 | 16 | |
| MED | 47 | 54 | 48 | 52 | 48 | 49 | 48 | 49 | 42 | 31 | G | GE | G | GE | BE | BE | B | GE | G | 22 | 30 | 23 | 42 | 42 | |
| U Q | 53 | 57 | 56 | 58 | 56 | 57 | 52 | 56 | 52 | 46 | G | 57 | 48 | 34 | 38 | 36 | 28 | GE | B | G | 36 | 46 | 50 | 47 | |
| L Q | 38 | 44 | 41 | 46 | 34 | 44 | 46 | G | G | G | 28 | G | G | 30 | G | G | G | G | GE | B | 14 | 19 | 21 | 31 | |

OCT.2020 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT.2020 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| $\begin{matrix} H \\ D \end{matrix}$ | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
|--------------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 21 | 12 | 21 | 12 | 9 | B | 10 | 12 | 10 | 10 | B | B | 23 | B | B | 42 | 23 | 14 | 18 | 10 | 10 | 7 | 8 | 11 | |
| 2 | 8 | 20 | 18 | 11 | 20 | B | 18 | 27 | B | 18 | 12 | B | 26 | 18 | B | 38 | B | B | 16 | 8 | 18 | 8 | 7 | 16 | |
| 3 | 8 | 15 | 10 | 11 | 18 | 13 | 10 | 10 | 8 | 12 | 25 | 23 | 22 | B | 30 | 34 | 28 | 32 | 24 | 15 | 15 | 15 | 10 | 8 | |
| 4 | 6 | 7 | 9 | 12 | 8 | 13 | 10 | 22 | 18 | 14 | 23 | 20 | 12 | 14 | 17 | 13 | 25 | 13 | 32 | B | B | 36 | 20 | 9 | |
| 5 | 7 | 10 | 10 | 26 | 9 | 8 | 7 | 8 | 10 | 10 | 10 | 10 | 11 | 11 | 9 | 9 | 14 | 17 | 10 | 10 | 9 | 7 | 7 | 20 | |
| 6 | 10 | 9 | 7 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 7 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 8 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 9 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 10 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 11 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 12 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 13 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 14 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 15 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 16 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 17 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 18 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 19 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | 42 | 34 | 36 | 25 | 18 | 11 | 10 | 9 | |
| 20 | 10 | 10 | 10 | 12 | 11 | 26 | 22 | 9 | 11 | 8 | 8 | 11 | 12 | 14 | 14 | 10 | 10 | 10 | 11 | 10 | 7 | 5 | 9 | 6 | |
| 21 | 6 | 6 | 9 | 12 | 13 | 12 | 12 | 12 | 10 | 10 | 14 | B | 36 | 28 | 29 | 26 | 24 | 13 | 11 | 9 | 7 | 9 | 10 | 7 | |
| 22 | 8 | 12 | 13 | B | 12 | 20 | 11 | 9 | 9 | 10 | 12 | 12 | 11 | 10 | 10 | 10 | 8 | 8 | 8 | 9 | 8 | 10 | 7 | 10 | |
| 23 | 10 | 12 | 13 | 13 | 20 | 12 | 12 | 12 | 11 | 9 | 10 | 10 | 14 | 10 | 10 | 10 | B | B | 8 | 12 | 8 | 18 | 8 | 20 | |
| 24 | 16 | 10 | 17 | 17 | 30 | 30 | 45 | 35 | 22 | 14 | 15 | B | B | B | 38 | B | B | 24 | 11 | B | 12 | 6 | 6 | 18 | |
| 25 | 39 | 18 | 28 | B | B | 27 | 17 | 14 | 10 | 13 | 28 | 82 | B | B | 39 | 31 | 15 | B | 15 | 10 | 8 | 9 | 10 | B | |
| 26 | 17 | 24 | 25 | 18 | 21 | 12 | 14 | 24 | B | 22 | B | B | 38 | B | 27 | B | B | 22 | 16 | 12 | 10 | 8 | 8 | 16 | |
| 27 | 16 | 26 | 40 | B | 28 | 23 | 24 | 12 | 16 | 36 | 13 | B | B | B | B | B | B | B | 34 | 26 | B | 10 | 9 | 6 | |
| 28 | 6 | 13 | 20 | 15 | 16 | 26 | 22 | 20 | B | B | 23 | 22 | 20 | 20 | 22 | 38 | 29 | 13 | 10 | 12 | 18 | 9 | 14 | B | |
| 29 | 20 | 50 | 24 | 18 | 22 | 14 | 20 | 15 | 11 | B | B | 24 | B | B | 38 | B | B | 26 | 18 | 11 | 11 | 11 | 7 | 8 | |
| 30 | 10 | 23 | 32 | 19 | B | 24 | 24 | 19 | 17 | 22 | 16 | 16 | 12 | B | B | 29 | 34 | 26 | 37 | 19 | 8 | 8 | 8 | 9 | |
| 31 | 7 | 12 | 13 | 14 | 10 | 14 | 8 | 10 | 10 | 10 | 12 | 17 | B | 39 | 43 | 30 | 38 | 25 | 11 | 22 | 10 | 9 | 8 | 5 | |
| | 00 | 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 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | |
| MED | 10 | 12 | 15 | 15 | 18 | 20 | 14 | 12 | 11 | 13 | 16 | 24 | 23 | 43 | 30 | 34 | 26 | 20 | 16 | 12 | 10 | 9 | 8 | 10 | |
| U Q | 16 | 20 | 24 | 22 | 25 | 26 | 22 | 21 | 20 | 22 | 26 | B | B | B | B | B | B | B | 32 | 24 | 19 | 18 | 11 | 10 | 18 |
| L Q | 7 | 10 | 10 | 12 | 10 | 12 | 10 | 10 | 10 | 10 | 12 | 14 | 12 | 14 | 16 | 12 | 15 | 13 | 11 | 10 | 8 | 8 | 7 | 8 | |

OCT.2020 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

OCT. 2020 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 | B | A | E A | A | B | B | B | B | B | B | B | E A | E A | E A | E A | 180 | A | A | A | |
| 2 | A | A | A | A | A | B | A | A | B | 218 | 194 | B | 212 | 202 | B | B | B | B | 210 | 230 | A | A | A | A | |
| 3 | A | A | A | A | A | A | A | E A | E A | E A | E B | E A | E A | B E | B | B | E B | E B | E B | E B | B | E A | A | A | |
| 4 | 186 | 218 | 240 | A | A | A | A | E A | E A | E A | E A | E A | 198 | 204 | 196 | A | E B | E A | E A | E A | B | A | A | A | |
| 5 | A | A | A | A | E A | E A | 322 | 224 | 190 | 210 | 204 | 224 | 198 | 192 | 206 | 198 | 202 | 202 | 226 | 196 | 196 | A | A | A | |
| 6 | A | A | A | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 7 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 8 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 9 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 10 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 11 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 12 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 13 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 14 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 15 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 16 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 17 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 18 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | |
| 19 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | B | B | B | B | A E A | A | A | A | |
| 20 | A | A | A | A | A | A | A | A | 242 | 200 | 198 | 208 | 212 | 214 | 202 | 202 | 202 | 202 | 198 | 200 | 212 | 224 | 224 | 262 | |
| 21 | A | 202 | A | A | A | A | A | A | 210 | 202 | 210 | B | B | 216 | 234 | 214 | 214 | 226 | 218 | E A | E A | E A | E A | A | |
| 22 | A | A | A | B | A | A | A | A | 216 | 170 | 198 | 212 | 244 | 214 | 204 | 198 | 218 | 192 | 198 | 216 | 210 | 210 | 230 | 282 | |
| 23 | A | A | A | A | A | A | A | A | E A | E A | 250 | 204 | 196 | 186 | 186 | 220 | 206 | 206 | 200 | 198 | 206 | 230 | E A | A | |
| 24 | A | A | A | A | A | E A | A | A | 258 | A | A | A | 206 | B | B | B | B | B | B | A | B | A | A | A | |
| 25 | B | A | A | B | B | A | A | A | 238 | 214 | 204 | B | B | B | B | B | E B | E B | A | B | 216 | 200 | A | A | |
| 26 | A | A | A | A | A | A | A | A | 238 | A | B | A | B | E B | B | B | B | B | A | A E A | 244 | 260 | A | A | |
| 27 | A | A | A | B | A | A | A | A | 224 | 216 | 216 | B | 216 | B | B | B | B | B | E B | E B | E B | B | E A | A | |
| 28 | E A | A | A | A E A | A | A | A | A | 304 | 386 | A | B | E A | 252 | 200 | 202 | 198 | 214 | B | 230 | 254 | 226 | A | A | |
| 29 | A | B | A | A | A | A | A | A | 208 | A | B | B | B | B | B | B | B | B | 208 | A | A | E A | A | A | |
| 30 | A | A | B | A | B | A | A | A | A E A | A | 242 | 190 | 212 | 212 | B | B | 208 | B | 210 | 256 | E A | 222 | 214 | 228 | |
| 31 | A | A | A | A | A | A | A | A | 240 | 206 | 198 | 206 | 200 | B | B | B | 240 | B | 202 | 216 | 246 | A E A | E A | A | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
| CNT | 2 | 2 | 1 | | 2 | 2 | 4 | 7 | 12 | 13 | 13 | 9 | 11 | 8 | 9 | 8 | 11 | 12 | 15 | 11 | 11 | 9 | 7 | 5 | |
| MED | 245 | 210 | 240 | | 291 | 280 | 235 | 220 | 209 | 203 | 204 | 208 | 207 | 205 | 204 | 206 | 208 | 212 | 212 | U | U | E | A | A | |
| U Q | | | | | | | 249 | 230 | E A | E A | E | 220 | E | 214 | 215 | 229 | 216 | E | 230 | 234 | E | E A | E A | A | |
| L Q | | | | | | | 231 | 206 | 209 | 200 | 197 | 198 | 192 | 200 | 200 | 202 | 202 | 202 | 205 | 206 | 200 | 210 | 227 | 224 | 208 |

OCT. 2020 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV.2020 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 | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|----|----|-----|-----|-----|----|-----|-----|-----|----|----|-----|----|
| 1 | 42 | 55 | O X | 47 | X | O X | X | X | 54 | 50 | 52 | 50 | X | B | O X | B | O X | X | X | X | X | 46 | A | A | A |
| 2 | A | A | A | 36 | 40 | X | X | 47 | 50 | 50 | 51 | 51 | 48 | 50 | 53 | 50 | 53 | 50 | 48 | 46 | 42 | 40 | 40 | O X | 44 |
| 3 | O X | 38 | O X | O X | A | A | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | 50 | 51 | 46 |
| 4 | 38 | 40 | 46 | 41 | 52 | 49 | 52 | 57 | 60 | 60 | 57 | 57 | 57 | 56 | 61 | 61 | 57 | 53 | 52 | 47 | O X | 43 | 50 | 50 | 48 |
| 5 | X | 39 | O X | 56 | 54 | 59 | 62 | 63 | 62 | 65 | 65 | 65 | 68 | 66 | 63 | 56 | 54 | 52 | 50 | 51 | 49 | 48 | 48 | 44 | |
| 6 | 44 | 45 | 62 | 50 | 46 | A | O X | X | X | X | X | X | X | X | X | X | X | X | X | X | O X | A | 38 | X | 35 |
| 7 | A | A | A | O X | O X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | A | X | A | |
| 8 | X | A | A | A | 50 | A | X | X | X | X | O X | X | X | X | X | X | X | X | X | X | X | X | B | B | |
| 9 | B | B | X | X | X | O X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | |
| 10 | 55 | 56 | 56 | 58 | 56 | 56 | 58 | 62 | 59 | 60 | 63 | 64 | 64 | 64 | 60 | 56 | 56 | 54 | 51 | 48 | 48 | 48 | 46 | 45 | 45 |
| 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 | X |
| 12 | A | 86 | A | A | A | X | X | 52 | 55 | 64 | 60 | 55 | 55 | 54 | 53 | 56 | 53 | 52 | 50 | 48 | 48 | 45 | 44 | 45 | 41 |
| 13 | X | A | X | X | X | O X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 14 | 44 | R | X | X | F | 62 | 60 | 61 | 61 | 60 | 64 | 58 | 61 | 65 | 63 | 61 | 56 | 56 | 53 | 46 | 50 | 48 | A | 54 | |
| 15 | 46 | 46 | A | O X | A | A | A | A | 56 | 55 | 53 | 52 | 52 | 53 | 54 | 53 | 51 | 53 | 51 | 47 | 44 | 42 | 44 | 45 | |
| 16 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 17 | 52 | 52 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 18 | X | X | X | A | A | X | X | X | X | X | O X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 19 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 20 | 44 | 56 | 59 | 47 | 52 | 60 | 70 | 73 | 70 | 70 | 71 | 66 | 64 | 68 | 68 | 60 | 63 | 57 | 52 | 52 | 50 | 50 | 54 | 56 | |
| 21 | X | X | X | X | A | B | X | O X | X | X | X | X | X | X | X | X | X | X | X | X | X | A | A | X | A |
| 22 | 43 | A | A | O X | A | A | 66 | 61 | 61 | B | O X | O X | B | B | O X | X | B | B | B | R | O X | X | A | B | |
| 23 | A | O X | 39 | A | A | A | A | O X | A | A | O X | 47 | 55 | 52 | 49 | 46 | B | B | B | O X | 46 | 45 | 44 | 42 | 37 |
| 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 | X | X | X | O X | X | 58 | 61 | 62 | 63 | 60 | 66 | 62 | 67 | 59 | 55 | 60 | 60 | B | O X | X | X | A | A | |
| 26 | A | A | 54 | A | X | X | 51 | 54 | 56 | 56 | 56 | 56 | 58 | 57 | 57 | 54 | 54 | 54 | 51 | 49 | 48 | 46 | 38 | 42 | |
| 27 | A | A | A | O X | X | A | A | X | X | X | X | X | X | X | X | O X | O X | B | O X | X | X | X | X | X | X |
| 28 | X | 46 | O X | X | A | A | A | A | O X | R | X | X | X | X | X | X | X | X | X | X | X | X | X | A | |
| 29 | A | A | 49 | 50 | 53 | 55 | 56 | 59 | 59 | 58 | 62 | 60 | 56 | 56 | 55 | 53 | 54 | 54 | 52 | 50 | 48 | 48 | 48 | 50 | |
| 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 | 51 | 52 | 53 | 56 | 58 | 57 | 64 | 61 | 71 | 68 | 65 | 69 | 68 | 69 | 62 | 59 | 57 | 58 | 58 | 58 | 58 | 57 | 53 | 52 | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
| CNT | 22 | 20 | 23 | 25 | 21 | 19 | 25 | 27 | 29 | 27 | 30 | 29 | 27 | 29 | 29 | 29 | 28 | 27 | 28 | 30 | 29 | 25 | 25 | 23 | |
| MED | X | 46 | 48 | 49 | 49 | 50 | 55 | 55 | 57 | 59 | 58 | 57 | 58 | 57 | 58 | 56 | 54 | 53 | 51 | 49 | 47 | 46 | 45 | 45 | |
| U Q | X | 50 | 53 | 56 | 54 | 54 | 58 | 61 | 62 | 62 | 63 | 64 | 64 | 64 | 64 | 62 | 60 | 56 | 56 | 54 | 52 | 50 | 49 | 50 | 48 |
| L Q | X | 42 | 44 | 42 | 42 | 48 | 49 | 50 | 51 | 53 | 53 | 52 | 55 | 54 | 56 | 54 | 54 | 53 | 51 | 50 | 47 | 44 | 44 | 42 | 42 |

IONOSPHERIC DATA STATION SHOWA-ST.

NOV.2020 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

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

NOV.2020 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV.2020 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 | 29 | G | G | 46 | 24 | 22 | 67 | G | G | G | 35 | 35 | B E B | B E B | B E B | 34 | 25 | 34 | 21 | 36 | 83 | 51 | 45 | | | |
| 2 | 50 | 60 | 45 | 48 | 48 | 20 | 27 | G | G | G | G | 53 | 53 | 31 | 40 | 30 | 59 | G | 27 | 16 | 12 | 14 | 14 | G | | |
| 3 | 57 | 30 | 26 | 21 | 50 | 56 | 56 | G | G | G | G | 31 | 30 | G | G | G | G | G | G | 18 | G | E B | B E B | G | | |
| 4 | 47 | 33 | 18 | 17 | 39 | 23 | 30 | G | 27 | G | G | 30 | 31 | 36 | 33 | 68 | 26 | G | 68 | G | E B | E B | E B | E B | | |
| 5 | E B 11 | G | 11 | G | 21 | 23 | 26 | 26 | G | G | 32 | 32 | 32 | G | G | E B | G | G | 25 | 22 | 22 | G | G | G | | |
| 6 | G | 29 | 41 | 34 | 34 | 52 | 44 | 28 | 27 | 30 | 28 | 44 | 40 | 29 | 32 | G | G | 28 | 29 | 29 | G | 42 | 42 | 24 | 56 | |
| 7 | 38 | 49 | 49 | 43 | G | 51 | 36 | 27 | 30 | 34 | 68 | 68 | 30 | 33 | 33 | 33 | 27 | 30 | G | G | 19 | 44 | 16 | 36 | | |
| 8 | 46 | 46 | 44 | 47 | 39 | 54 | 34 | G | 30 | 31 | E B E B | E B | G | G | G | G | G | G | E B | 24 | E B | B | B | B | | |
| 9 | B | E B | E B | E B | E B | E B | E B | E B | E B | E B | G | G | G | G | G | G | 28 | 26 | 26 | G | 20 | 20 | 14 | E B | | |
| 10 | E B E B 9 10 | G | 16 | 19 | 28 | G | 28 | G | 31 | 31 | G | 27 | 35 | 35 | 31 | G | 31 | G | 24 | 23 | 25 | 18 | 15 | 12 | | |
| 11 | E B E B 8 10 | 14 | 15 | 20 | 20 | G | G | 31 | 32 | G | 32 | G | G | G | G | G | 27 | 25 | 24 | 24 | 20 | 27 | 28 | 28 | | |
| 12 | 51 | 35 | 56 | 53 | 50 | 30 | G | 28 | G | G | G | 30 | 36 | 28 | G | G | 64 | G | 27 | 58 | 22 | 15 | 22 | 22 | | |
| 13 | 39 | 42 | 30 | 45 | 42 | 57 | 39 | 30 | 30 | 26 | 34 | 30 | 17 | 32 | G | G | 19 | 26 | 26 | 23 | 20 | 20 | 11 | G | | |
| 14 | G | 23 | 31 | 18 | 20 | 23 | 27 | 27 | 30 | 31 | 30 | 31 | 34 | 34 | 32 | 32 | 30 | 30 | 23 | 23 | G | 19 | 37 | 31 | | |
| 15 | 15 | 22 | 42 | 51 | 62 | 62 | 56 | 65 | 47 | 30 | 31 | 22 | 34 | 34 | 34 | 34 | 18 | 14 | 17 | 20 | 20 | 59 | G | 17 | | |
| 16 | 58 | 14 | 18 | 19 | 19 | 23 | 24 | 28 | 33 | G | 31 | 32 | 33 | 33 | 38 | 18 | 19 | 15 | 15 | 23 | 11 | 17 | G | 13 | | |
| 17 | 19 | 27 | 17 | 26 | 25 | 21 | G | G | 23 | 28 | G | 33 | 33 | 41 | 33 | 33 | 23 | 32 | 27 | 28 | 22 | 21 | 16 | G | | |
| 18 | E B 11 | 20 | 25 | 52 | 49 | 35 | 35 | 32 | 33 | 29 | 32 | 29 | 33 | 33 | 30 | 21 | 28 | 14 | 28 | 24 | 24 | 22 | 30 | 25 | | |
| 19 | 30 | 33 | 29 | 18 | 22 | 28 | 28 | 18 | G | G | 33 | 36 | 36 | 44 | 46 | 42 | 42 | 32 | 20 | 16 | 22 | 12 | 17 | G | | |
| 20 | 15 | 30 | 87 | 94 | 49 | 60 | 60 | 60 | 48 | 48 | 32 | 36 | 30 | 37 | G | G | G | G | E B | E B | 23 | 23 | 34 | 27 | | |
| 21 | 21 | 17 | 18 | 33 | 42 | B | 58 | 58 | G | 38 | 32 | 32 | 37 | 35 | 35 | G | G | G | G | 41 | 46 | 46 | 30 | 47 | | |
| 22 | 22 | 65 | 103 | 86 | 51 | 55 | 45 | 70 | 41 | B | 46 | 41 | B | B | B | 31 | 31 | B E B | B E B | 29 | 46 | 42 | 43 | 93 | | |
| 23 | 64 | 47 | 51 | 53 | 40 | 48 | 50 | 51 | 52 | 46 | 51 | B E B | B E B | G | 32 | B | B | B | E B | E B | 24 | G | 17 | 20 | | |
| 24 | 22 | 22 | 20 | 20 | 28 | 31 | 44 | 44 | 34 | 36 | G | 65 | G | 32 | G | 35 | 45 | 31 | G | 24 | G | 20 | 17 | 17 | | |
| 25 | 17 | 19 | 35 | G | 37 | 37 | 40 | G | G | G | 46 | 36 | 36 | 32 | 36 | 36 | 37 | E B | E B | E B | 33 | 58 | 51 | 55 | | |
| 26 | 44 | 71 | 58 | 50 | 56 | 37 | 29 | 27 | 30 | 32 | G | 34 | 34 | 37 | G | G | G E B | E B | E B | E B | 24 | 23 | 34 | 37 | | |
| 27 | 51 | 47 | 42 | 30 | 33 | 70 | 62 | 32 | 33 | 42 | 33 | 32 | 32 | 32 | G E B | E B | E B | E B | E B | 29 | 62 | 37 | 55 | 20 | 53 | |
| 28 | 28 | 34 | 46 | 43 | 58 | 53 | 85 | 49 | 57 | G E B | E B | 38 | G | G | 38 | 39 | 35 | 32 | 30 | 26 | 28 | 27 | 27 | 20 | 33 | 40 |
| 29 | 40 | 57 | 34 | 39 | 39 | 39 | 31 | 34 | 34 | 34 | E B | 35 | 39 | 72 | 44 | 44 | 45 | G | E B | E B | 26 | 26 | 39 | 23 | 23 | |
| 30 | E B 18 | 46 | 92 | 28 | 33 | 33 | 61 | 41 | 42 | 42 | 33 | 33 | 36 | 49 | 37 | E B | 33 | 40 | 26 | 34 | E B | E B | 26 | 34 | 33 | |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | |
| CNT | 29 | 29 | 30 | 30 | 30 | 29 | 29 | 30 | 30 | 29 | 30 | 29 | 28 | 29 | 29 | 29 | 28 | 27 | 30 | 30 | 30 | 30 | 29 | 28 | | |
| MED | 28 | 30 | 32 | 41 | 38 | 35 | G | G | G | 34 | 32 | 32 | 34 | G | G E G | G | G | 29 | 28 | 24 | G | 20 | 28 | G | | |
| U Q | 46 | 46 | 46 | 51 | 49 | 54 | 53 | 44 | 34 | G | 36 | 36 | G | 36 | 36 | 36 | 32 | G | G | G | 27 | 42 | 34 | 36 | | |
| L Q | 15 | 21 | 20 | 19 | 24 | 23 | 30 | 28 | 30 | 31 | G | G | G | 33 | 32 | G | G | G | G | G | 22 | 18 | 16 | 18 | | |

NOV.2020 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV.2020 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

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

NOV.2020 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

NOV. 2020 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 | E A | 278 | A E A | A | A | 260 | 210 | 204 | 216 | 206 | 196 | 218 | | B | B | B | B | 228 | 210 | A | 206 | A | A | A | A |
| 2 | A | A | A | A | A | 280 | 238 | 204 | H 222 | 206 | 204 | 204 | 196 | H 196 | 206 | E A 216 | 200 | 200 | 196 | 212 | 204 | 212 | E A 224 | E A 218 | 246 |
| 3 | A | A | E A | E A | E A | A | A | 244 | H 198 | 198 | 198 | 194 | 200 | 192 | 210 | 200 | 200 | 200 | 200 | 208 | 206 | E A 228 | E A 228 | E A 236 | E A 248 |
| 4 | E A | E A | E A | E A | A | A | 258 | 210 | 202 | H 180 | 202 | 196 | 212 | 212 | 208 | 208 | 208 | 200 | 200 | 212 | 212 | E B 226 | E B 236 | E B 228 | 238 |
| 5 | E B | 252 | 252 | E B 264 | 260 | 232 | 222 | 212 | 204 | 198 | 196 | 208 | 208 | 200 | 200 | 208 | 224 | 194 | 210 | 200 | E B 232 | E A 226 | 202 | 202 | 238 |
| 6 | E A | E A | A | A | A | 198 | A | A | 220 | 196 | 196 | 202 | 194 | 194 | 194 | 212 | 198 | 200 | 204 | A | 230 | A | A | E A 266 | E A 220 |
| 7 | A | A | A | A | A | 194 | E A 290 | 216 | 200 | 196 | 196 | 204 | 204 | 204 | 214 | 210 | 200 | 208 | 216 | 210 | | A | A | A | A |
| 8 | A | A | A | A | A | A | E A 274 | 222 | 196 | 214 | | B E B 232 | 202 | 202 | 190 | 208 | 206 | 198 | 200 | 210 | E B 232 | E A 236 | | B | B |
| 9 | B | B | E B 252 | E B 260 | E B 280 | 236 | 354 | 222 | 204 | 204 | 196 | 200 | 204 | 202 | 198 | 198 | 206 | 200 | 202 | 202 | 202 | 202 | E A 242 | E A 220 | 220 |
| 10 | B | E B 246 | E B 256 | 244 | 232 | 222 | 220 | 202 | 198 | 208 | 200 | 198 | 192 | 192 | 186 | 200 | 200 | 188 | 212 | 204 | 204 | 212 | 206 | 210 | |
| 11 | B | 210 | E A 248 | 238 | 226 | 212 | 212 | 206 | 206 | 200 | 200 | 200 | 204 | 200 | H 210 | 200 | H 194 | 194 | 202 | 212 | 224 | E A 244 | E A 258 | E A 258 | |
| 12 | A | 248 | A | A | A | 252 | 230 | 218 | 212 | 208 | 202 | 202 | 200 | 196 | 198 | 198 | 202 | 208 | 206 | 206 | 208 | | A | Q 234 | A |
| 13 | A | A | A | A | A | A | 236 | 212 | 212 | 202 | 212 | 202 | 194 | 194 | 184 | 198 | 198 | 198 | 198 | 196 | 234 | E A 234 | E A 232 | E A 250 | |
| 14 | 264 | 234 | E A 298 | E A 256 | 236 | 220 | 208 | 200 | 194 | 194 | 198 | 198 | 194 | 190 | 228 | 200 | 194 | 208 | 198 | 198 | 220 | 214 | | E A 304 | |
| 15 | E A | E A | A | A | A | A | A | A | A | | 198 | 208 | 200 | 186 | 190 | 190 | 198 | 192 | 200 | 190 | 222 | 192 | 192 | A | 248 |
| 16 | E A | A | E B 250 | 238 | 224 | 216 | 200 | 200 | 200 | 200 | 204 | 198 | 198 | 194 | 204 | 206 | 206 | 200 | 216 | 200 | | 206 | 198 | 230 | |
| 17 | 236 | A | E A 234 | 234 | 230 | 210 | 210 | 202 | 196 | H 198 | 192 | 196 | 204 | 204 | 204 | 204 | 196 | 202 | 202 | 202 | 196 | E A 228 | 224 | 206 | |
| 18 | B | A | E A 286 | A | A | A | E A 230 | E A 182 | H 182 | 196 | 202 | 204 | 196 | 196 | 198 | 194 | 208 | 206 | 202 | 204 | 210 | 222 | 222 | 244 | Q |
| 19 | E A | E A | E A 284 | 238 | E A 240 | 238 | 210 | 200 | 200 | 194 | 196 | 196 | 204 | 220 | A | 202 | 202 | 202 | 214 | 196 | 196 | 212 | 196 | 226 | 202 |
| 20 | A | A | A | A | B | A | A | A | A | | 202 | 188 | 214 | 196 | 212 | 224 | 214 | 208 | 208 | 232 | 226 | E A 240 | 234 | A | 306 |
| 21 | E A | E A | E A 280 | 270 | 244 | 220 | A | B | A | A | 220 | 200 | 190 | 182 | 196 | 206 | 214 | 204 | 202 | 234 | 202 | E A 240 | A | E A 254 | A |
| 22 | E A | A | A | A | A | A | A | A | A | | 202 | | 248 | B | B | B | 196 | 192 | B E B 226 | A | | 222 | A | A | B |
| 23 | A | B | A | A | A | A | A | E A 256 | A | A | A | A | B | E B 240 | E A 258 | 194 | | B | B | B | 212 | 224 | 208 | 226 | E A 234 |
| 24 | E A | A | E A 276 | 268 | 258 | 256 | 286 | E A 292 | 220 | 178 | 178 | 198 | 186 | 202 | 204 | 218 | 212 | 210 | 210 | A | 210 | 210 | 208 | 218 | 200 |
| 25 | E A | E A | E A 244 | 260 | A | A | A | | 242 | 206 | 200 | | 222 | 212 | 210 | 210 | 202 | | B | B | B E B 234 | E A 266 | A | A | A |
| 26 | A | A | A | A | A | A | | 204 | 196 | 188 | 196 | 188 | 184 | 202 | 204 | 204 | 202 | 202 | 214 | 214 | 214 | 200 | 230 | A | A |
| 27 | A | A | A | A | A | A | A | A | 200 | 200 | | 212 | 200 | 194 | 212 | 198 | | 216 | B | 216 | 228 | E A 250 | E A 250 | E A 240 | E A 274 |
| 28 | 216 | A | 206 | A | A | A | A | A | E A 298 | 206 | E B 218 | 216 | 190 | 190 | 208 | 226 | 202 | 216 | 214 | 216 | E A 262 | E A 236 | A | A | A |
| 29 | A | A | A | A | A | A | | 236 | 212 | 202 | 204 | 228 | 216 | A | A | 226 | 216 | 228 | E A 254 | B E B 226 | 226 | 234 | 250 | 250 | A |
| 30 | 248 | E B 272 | E A 284 | A | 244 | 218 | 192 | A | 202 | 230 | 202 | 194 | 198 | 194 | 208 | E A 240 | E B 230 | 204 | 206 | | B | 238 | 218 | E B 238 | 240 |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | | 15 | 12 | 17 | 12 | 12 | 15 | 21 | 24 | 27 | 26 | 28 | 28 | 27 | 26 | 29 | 27 | 27 | 27 | 25 | 28 | 25 | 23 | 20 | 20 |
| MED | | E A 248 | E A 255 | E A 264 | 239 | 233 | 221 | 211 | 204 | 200 | 200 | 200 | 200 | 197 | 200 | 204 | 202 | 201 | 205 | 208 | 208 | 213 | 223 | E A 230 | E A 245 |
| U Q | | E A 276 | E A 271 | E A 285 | 257 | 250 | 252 | 239 | 219 | 206 | 204 | 208 | 210 | 204 | 206 | 211 | 210 | 208 | 210 | 213 | 226 | E 235 | E A 236 | E A 239 | E A 254 |
| L Q | | 242 | 247 | E A 246 | 236 | 228 | 212 | 206 | 200 | 196 | 196 | 196 | 198 | 194 | 194 | 198 | 198 | 198 | 200 | 202 | 204 | 208 | 214 | 219 | 225 |

NOV. 2020 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

DEC.2020 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 44 | X 48 | X 41 | A | A | X 50 | X 48 | X 55 | X 64 | X 65 | X 64 | X 62 | X 57 | X 55 | X 55 | X 55 | X 56 | X 54 | X 54 | X 53 | X 51 | X 51 | X 50 | X 49 |
| 2 | X 50 | X 52 | X 59 | X 55 | X 53 | X 67 | X 73 | X 76 | X 81 | X 84 | X 85 | X 84 | X 70 | X 61 | X 60 | X 54 | X 55 | X 57 | X 54 | X 56 | X 56 | X 52 | X 55 | X 54 |
| 3 | X 53 | X 54 | X 53 | X 58 | X 64 | X 60 | X 65 | X 70 | X 71 | X 71 | X 67 | X 65 | X 67 | X 67 | X 66 | X 66 | X 64 | X 58 | X 56 | X 52 | X 54 | X 50 | X 50 | X 42 |
| 4 | X 45 | X 54 | X 55 | X 58 | X 61 | X 64 | X 71 | X 74 | X 74 | X 73 | X 74 | X 72 | X 63 | X 61 | X 60 | X 58 | X 56 | X 58 | X 58 | X 58 | X 58 | X 58 | X 53 | X 53 |
| 5 | X 55 | X 60 | X 60 | X 69 | X 61 | X 71 | X 71 | X 72 | X 77 | X 78 | X 79 | X 68 | X 62 | X 61 | X 62 | X 65 | X 59 | X 64 | X 56 | X 57 | X 54 | X 55 | X 55 | X 48 |
| 6 | X 57 | F 43 | X 44 | A | A | X 49 | X 53 | X 54 | X 59 | X 66 | X 66 | X 64 | X 65 | X 60 | X 60 | X 60 | X 62 | X 60 | X 53 | X 53 | X 52 | X 50 | X 50 | X 41 |
| 7 | X 91 | X 38 | X 47 | X 54 | X 59 | X 65 | X 65 | X 71 | X 76 | X 75 | X 75 | X 72 | X 68 | X 68 | X 62 | X 59 | X 57 | X 52 | X 53 | X 51 | X 53 | X 51 | X 54 | X 54 |
| 8 | X 44 | X 50 | X 53 | X 52 | X 55 | X 59 | X 59 | X 59 | X 64 | X 62 | X 56 | X 56 | X 62 | X 64 | X 61 | X 57 | X 57 | X 54 | X 52 | X 48 | X 54 | X 54 | X 50 | X 50 |
| 9 | X 49 | X 46 | X 48 | A | X 51 | X 55 | X 55 | X 55 | A | X 62 | X 66 | X 62 | X 58 | X 57 | X 55 | A | X 53 | X 52 | X 54 | X 53 | X 48 | X 71 | X 51 | X 44 |
| 10 | A | X 57 | X 44 | X 40 | X A | X A | X A | X A | A | X 52 | X 56 | X 51 | X 56 | X 51 | X 53 | X 52 | X 51 | X 55 | X 56 | X 53 | X 50 | X 48 | X 43 | X 43 |
| 11 | A | X 43 | X 43 | X 44 | X A | X A | A | X 47 | X 48 | X 51 | X 51 | X 52 | X 51 | X 53 | X 53 | X 53 | X 52 | X 51 | X 52 | X 52 | X 48 | X 45 | X 42 | X 37 |
| 12 | X 42 | X 38 | X 43 | X 46 | X 44 | X A | X A | X 49 | X 56 | X 52 | X 54 | X 58 | X 54 | X 54 | X 53 | X 51 | X 51 | X 53 | X 53 | X 50 | X 53 | X 50 | X 53 | X 46 |
| 13 | X 51 | X 42 | X 56 | A | X 49 | X A | X 49 | X 51 | X 51 | X 51 | X 52 | X 54 | X 54 | X 55 | X 52 | X 49 | X 50 | X 51 | X 48 | X 50 | X 48 | X 47 | X 40 | X 40 |
| 14 | X 40 | X 40 | X 48 | X 48 | X 57 | X 64 | X 67 | X 67 | X 78 | X 71 | X 62 | X 60 | X 54 | X 54 | X A | X 56 | X 50 | X 54 | X 58 | X 47 | X 43 | X 41 | X 43 | X 43 |
| 15 | X 43 | X 45 | X 48 | X A | X 52 | X 67 | X 66 | X 68 | X 67 | X 66 | X 68 | X 64 | X 68 | X 61 | X 56 | X 55 | X 54 | X 52 | X 49 | X 53 | X 50 | X 51 | X 51 | X 56 |
| 16 | X 47 | X 58 | X 49 | X 49 | X 54 | X 52 | X 66 | X 71 | X 66 | X 70 | X 69 | X 65 | X 62 | X 62 | X 62 | X 57 | X 53 | X 53 | X 56 | X 53 | X 54 | X 46 | X 44 | X 42 |
| 17 | X 42 | X 47 | X 44 | X 53 | X 54 | X 58 | X 70 | X 72 | X 70 | X 70 | X 66 | X 64 | X 64 | X 67 | X 61 | X 57 | X 56 | X 55 | X 52 | X 52 | X 56 | X 56 | X 58 | X 59 |
| 18 | X 52 | X 47 | X 43 | A | X 49 | X 57 | X 69 | X 76 | X 76 | X 75 | X 73 | X 62 | X 57 | X 57 | X 55 | X 57 | X 54 | X 55 | X 54 | X 56 | X 58 | X 52 | X 48 | X 44 |
| 19 | X 47 | X 44 | X 44 | X 92 | X 46 | X 65 | X 73 | X 72 | X 71 | X 69 | X 63 | X 68 | X 62 | X 66 | X 58 | X 61 | X 64 | X 57 | X 53 | X 58 | X 48 | X 43 | X 44 | X 44 |
| 20 | A | A | A | X 54 | R 56 | X 66 | X 67 | X 64 | X 65 | X 56 | X 56 | X 59 | X 59 | X 59 | X 56 | X 56 | X 58 | X 58 | X 56 | X 50 | X 50 | X 48 | X 49 | X 49 |
| 21 | X 46 | X 39 | X 50 | X 50 | X 56 | X 58 | X A | X A | X A | X A | X 51 | X 59 | X 59 | X 59 | X 51 | X 51 | X 54 | X 56 | X 61 | X 61 | X 57 | X 55 | X 49 | X 49 |
| 22 | A | A | X 66 | X A | X 48 | X 57 | X A | X 45 | X 56 | X 52 | X 50 | X 54 | X 52 | X 55 | X 52 | X 52 | X 46 | X 50 | X 50 | X 44 | X 44 | X 44 | X 57 | X 57 |
| 23 | A | A | A | A | X 42 | X 45 | X 53 | X 55 | X 56 | X 53 | X 60 | X 61 | X 60 | X 60 | X 58 | X 54 | X 45 | X 48 | X 46 | X 46 | X 40 | X 41 | X 41 | X 41 |
| 24 | X 41 | A | A | C 47 | X 53 | X 58 | X A | X A | R 50 | X 52 | X 60 | X 66 | X 58 | X 58 | X 54 | X 54 | X 54 | X C | X C | X 44 | X 47 | X 54 | X 52 | X 47 |
| 25 | X 45 | A | A | A | X A | X 58 | X 60 | X 65 | X 63 | X 63 | X 57 | X 56 | X 56 | X 54 | X 56 | X 55 | X 52 | X 53 | X 50 | X 49 | X 50 | X 50 | X 52 | X 52 |
| 26 | X 56 | X 49 | X 54 | X 56 | X 69 | X 66 | X 69 | X 72 | X 82 | X 75 | X 72 | X 68 | X 66 | X 59 | X 57 | X 52 | X 56 | X 56 | X 56 | X 56 | X 54 | X 54 | X 46 | X 46 |
| 27 | X 44 | X 41 | X 46 | X 53 | X 57 | X 58 | X 50 | X 65 | X A | X 66 | X 67 | X 64 | X 60 | X 60 | X 59 | X 62 | X 60 | X 60 | X 60 | X 54 | X 55 | X 49 | X 44 | X 45 |
| 28 | X 51 | X 54 | X 44 | X 37 | X A | X A | X A | X A | X A | X 55 | X 54 | X 54 | X 56 | X 55 | X 54 | X 58 | X 52 | X 52 | X 54 | X 55 | X 53 | X 49 | X 47 | X 41 |
| 29 | X 40 | X 48 | X 52 | X 42 | X A | X 55 | X A | X A | X A | X 66 | X 66 | X 55 | X 57 | X 56 | X 56 | X 57 | X 57 | X 57 | X 58 | X 56 | X 50 | X 46 | X 43 | X 44 |
| 30 | X 45 | X A | X A | X A | X A | X 57 | X A | X A | X A | X 52 | X 51 | X 50 | X 54 | X 54 | X 59 | X 54 | X 51 | X 51 | X 54 | X 51 | X 46 | X 47 | X 46 | X 42 |
| 31 | X 47 | X 44 | X A | X A | X 44 | X 45 | X 52 | X 56 | X 62 | X 57 | X 54 | X 55 | X 55 | X 53 | X 53 | X 53 | X 53 | X 51 | X 52 | X 52 | X 52 | X 49 | X 47 | 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 | 26 | 25 | 25 | 17 | 18 | 25 | 21 | 22 | 23 | 28 | 30 | 30 | 31 | 31 | 31 | 29 | 31 | 29 | 30 | 31 | 31 | 31 | 30 | 30 |
| MED | X 46 | X 47 | X 48 | X 53 | X 54 | X 57 | X 65 | X 68 | X 66 | X 66 | X 62 | X 59 | X 59 | X 57 | X 57 | X 56 | X 55 | X 54 | X 53 | X 51 | X 50 | X 48 | X 45 | X 45 |
| U Q | X 51 | X 53 | X 54 | X 57 | X 59 | X 62 | X 69 | X 72 | X 74 | X 72 | X 69 | X 64 | X 64 | X 61 | X 61 | X 58 | X 57 | X 58 | X 56 | X 56 | X 54 | X 54 | X 51 | X 50 |
| L Q | X 44 | X 42 | X 44 | X 48 | X 47 | X 50 | X 56 | X 55 | X 56 | X 58 | X 56 | X 54 | X 56 | X 55 | X 54 | X 54 | X 53 | X 52 | X 52 | X 52 | X 50 | X 48 | X 44 | X 42 |

DEC.2020 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

DEC. 2020 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 | | 38 | 42 | 35 | A | A | 44 | 42 | 49 | 58 | 59 | 58 | 56 | 51 | 49 | 49 | 49 | 50 | 48 | 48 | 47 | 45 | 45 | 44 | 43 | |
| 2 | | 44 | 46 | 48 | F | F | 53 | 67 | 70 | F | F | F | F | 56 | 55 | 54 | 48 | 49 | 51 | 48 | 50 | 50 | 46 | 49 | 48 | |
| 3 | | 47 | 48 | 46 | Z | Z | 54 | 54 | 59 | 64 | 65 | 61 | 59 | 61 | 61 | 60 | 60 | 58 | 52 | 50 | 46 | 48 | 44 | 44 | 36 | |
| 4 | | 39 | 48 | 49 | 52 | 55 | 58 | 65 | 68 | 68 | 67 | 68 | 66 | 57 | 55 | 54 | 52 | 50 | 52 | 52 | 52 | 52 | 52 | 47 | 47 | |
| 5 | | 49 | F | 54 | F | 55 | F | 58 | 65 | 66 | F | 72 | 73 | 62 | 56 | 55 | 56 | 59 | 53 | 58 | 50 | 51 | 48 | 49 | F | |
| 6 | | 51 | 37 | 38 | A | A | 43 | 47 | 48 | R | 53 | 60 | 60 | 58 | 59 | 54 | 54 | 54 | 56 | 54 | 47 | 47 | 46 | 44 | 35 | |
| 7 | A | U | R | F | F | F | F | 54 | 59 | 65 | 70 | 69 | 69 | 66 | 62 | 62 | 56 | 53 | 51 | 46 | 47 | 45 | 47 | 45 | 48 | |
| 8 | 38 | 44 | 47 | 46 | F | F | 44 | 49 | A | A | 53 | 58 | 56 | 50 | 50 | 56 | 58 | 55 | 51 | 51 | R | 46 | 42 | 48 | 44 | |
| 9 | F | 31 | 40 | 42 | A | A | 45 | 49 | 49 | A | A | 56 | 60 | 56 | 52 | 51 | 49 | A | 47 | 46 | 48 | 47 | 42 | F | F | |
| 10 | A | F | 42 | 38 | A | R | A | A | A | A | A | 46 | 50 | 45 | R | 50 | 45 | 47 | 46 | 45 | 49 | 50 | 47 | 44 | 37 | |
| 11 | A | 37 | 37 | 38 | A | A | A | A | 41 | 42 | 45 | 45 | 46 | 45 | 47 | 47 | 47 | 46 | 45 | A | 46 | 46 | 42 | 39 | 36 | |
| 12 | 36 | 32 | 37 | 40 | 38 | A | A | A | 43 | 46 | 46 | 48 | 52 | 48 | 48 | 47 | 45 | 46 | A | 47 | 47 | 44 | 47 | A | 40 | |
| 13 | Z | 45 | 36 | A | A | A | 43 | A | 43 | 45 | 45 | 45 | 46 | 48 | 48 | 49 | 46 | 43 | 44 | 45 | 42 | 44 | 42 | 41 | 34 | |
| 14 | U | R | 34 | 34 | 42 | 42 | A | 51 | 58 | 61 | 61 | 72 | 65 | 56 | 54 | 48 | 48 | A | 50 | 44 | 48 | 52 | 41 | 37 | 35 | |
| 15 | 37 | 39 | 42 | A | 46 | F | 54 | 60 | 62 | 61 | 60 | 62 | 58 | 62 | 55 | 50 | 49 | 48 | 46 | 43 | 47 | 44 | 45 | 45 | 50 | |
| 16 | F | 37 | 52 | 43 | 43 | 48 | 46 | 60 | 59 | F | F | Z | 60 | 63 | 59 | 56 | 56 | 56 | 51 | 47 | 47 | 50 | 47 | 48 | 38 | |
| 17 | 36 | F | 35 | 38 | 47 | 48 | 52 | 64 | 66 | 64 | 64 | 60 | 58 | 58 | 61 | 55 | 51 | 50 | 49 | 46 | 46 | 50 | 50 | 52 | 53 | |
| 18 | F | 36 | B | 37 | A | 43 | 51 | 63 | 70 | 70 | 69 | 67 | 56 | 51 | 51 | 49 | 51 | 48 | 49 | 48 | 50 | 52 | 46 | 42 | 37 | |
| 19 | 41 | 38 | 38 | A | A | 40 | 59 | 67 | 66 | 65 | F | 57 | 57 | F | 56 | 56 | 60 | 52 | 55 | 58 | 51 | 47 | 52 | 42 | 37 | |
| 20 | A | A | A | U | R | A | 50 | 60 | 61 | A | A | A | A | 50 | 53 | 53 | 53 | 50 | 50 | 52 | 52 | 50 | 44 | 44 | 42 | 43 |
| 21 | 40 | 33 | 44 | 44 | 50 | 52 | A | A | A | A | A | 45 | 53 | 53 | 45 | 45 | 48 | 50 | 55 | 55 | 51 | 49 | 43 | 43 | A | |
| 22 | A | A | A | A | A | 42 | 51 | A | 39 | A | F | 47 | 46 | 44 | 48 | 46 | 49 | 46 | 46 | 40 | 44 | 44 | 38 | 38 | A | |
| 23 | A | A | A | A | A | 36 | A | A | 39 | 47 | 49 | 50 | 47 | 54 | 55 | 54 | 48 | F | 48 | 39 | J | R | 40 | 34 | 35 | |
| 24 | 35 | A | A | C | 41 | 47 | 52 | A | A | R | 44 | 46 | 54 | 60 | 52 | 52 | 48 | C | C | 38 | 41 | 48 | 46 | 41 | 41 | |
| 25 | 39 | A | A | A | A | A | 52 | 54 | 59 | 57 | 56 | C | 51 | 50 | 50 | 48 | 50 | 49 | 46 | 47 | 44 | 43 | 44 | 46 | 46 | |
| 26 | F | 43 | 43 | 48 | 50 | 63 | 60 | 63 | 66 | F | F | F | 62 | 60 | 53 | 51 | 46 | 50 | 50 | 50 | 50 | 48 | 48 | 40 | V | |
| 27 | 38 | 35 | 40 | 47 | 51 | F | 48 | 44 | 59 | A | F | Z | 53 | 61 | 58 | 54 | 54 | 53 | 56 | 54 | 54 | 54 | 48 | 49 | 38 | |
| 28 | F | 41 | 48 | 38 | A | A | 31 | A | A | A | A | 49 | 48 | 48 | 50 | 49 | 48 | 52 | 46 | 46 | 48 | 49 | 47 | 43 | 35 | |
| 29 | 34 | F | 35 | 46 | 36 | A | A | 49 | A | A | F | F | 52 | 54 | 49 | 51 | 50 | 50 | 51 | 51 | 52 | 50 | 44 | 40 | 37 | |
| 30 | 39 | A | A | A | A | 51 | A | A | A | A | 46 | 45 | 44 | 48 | 48 | 53 | 48 | 45 | 45 | 48 | 45 | 40 | 41 | 40 | 36 | |
| 31 | Z | 40 | 38 | A | A | 38 | 39 | A | 46 | 50 | 56 | 51 | 48 | 49 | 49 | 47 | 47 | 47 | 45 | 46 | 46 | 46 | 46 | 43 | 39 | |
| | | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
| CNT | | 25 | 25 | 23 | 16 | 18 | 25 | 21 | 22 | 23 | 28 | 30 | 30 | 31 | 31 | 31 | 29 | 31 | 29 | 30 | 31 | 31 | 31 | 30 | 29 | |
| MED | | 39 | 39 | 42 | 45 | 48 | 50 | 59 | 61 | 58 | 58 | 56 | 56 | 53 | 53 | 51 | 51 | 49 | 49 | 48 | 47 | 45 | 44 | 42 | 38 | |
| U Q | | 42 | 45 | 46 | 48 | 51 | F | 54 | 63 | 66 | 65 | 65 | 62 | 58 | 56 | 55 | 55 | 52 | 51 | 52 | 50 | 50 | 48 | 47 | 45 | 44 |
| L Q | | 36 | 35 | 38 | 42 | 41 | 44 | 50 | 49 | 50 | 50 | 49 | 48 | 50 | 49 | 48 | 48 | 47 | 46 | 46 | 46 | 44 | 41 | 38 | 36 | |

DEC. 2020 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

DEC.2020 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 | 22 | 42 | 42 | 46 | 48 | 33 ^G | 33 ^G | 33 ^G | 32 | 40 | 37 | 51 | 67 | 33 | 35 | 36 | 38 | 30 ^G | 27 ^G | 24 ^G | 18 ^G | 21 | 32 | 22 |
| 2 | 19 ^E | 10 ^B | 25 | 28 | 24 | 40 | 27 ^G | 27 ^G | 48 | 33 | 47 | 50 | 38 | 35 | 105 | 34 | 32 | 34 | 44 | 34 | 34 | 30 | 20 | 29 ^G |
| 3 | 32 | 32 | 27 | 25 | 26 | 32 | 42 | 78 | 41 | 58 | 55 | 42 | 48 | 48 | 41 | 58 | 40 | 28 | 20 ^G | 20 ^G | 24 | 22 | 22 | 17 ^G |
| 4 | 22 | 70 | 28 | 28 | 62 | 27 | 28 | 38 | 40 | 32 | 36 | 36 | 36 | 38 | 38 | 67 | 45 | 56 | 42 | 68 | 21 | 24 | 23 ^G | |
| 5 | 18 | 25 | 25 | 22 | 28 | 26 | 34 | 34 | 38 | 38 | 36 | 62 | 52 | 77 | 106 | 49 | 33 ^G | 22 ^G | 24 | 24 | 68 | 30 | 30 ^G | |
| 6 | 30 | 35 | 58 | 58 | 56 | 29 ^G | 35 | 35 | 35 | 38 | 36 | 38 | 38 | 37 | 40 | 90 | 32 ^G | 32 ^G | 16 ^G | 24 | 22 | 49 | 32 | |
| 7 | 45 | 39 | 40 | 40 | 36 | 31 | 52 | 32 | 34 | 34 | 36 | 34 | 36 | 44 | 37 | 37 | 33 | 36 | 29 | 32 | 35 | 26 | 26 | 29 |
| 8 | 56 | 17 ^G | 32 | 22 ^G | 27 | 34 | 46 | 56 | 38 | 38 | 42 | 114 | 35 | 34 | 38 | 34 | 25 ^G | 38 | 38 | 107 | 24 | 58 | 44 | 48 ^G |
| 9 | 30 | 43 | 88 | 90 | 58 | 50 | 41 | 46 | 63 | 36 | 36 | 31 | 36 | 36 | 59 | 66 | 50 | 32 ^G | 32 | 48 | 23 | 35 | 35 ^G | |
| 10 | 81 | 36 | 55 | 56 | 39 | 57 | 53 | 54 | 40 | 38 | 34 | 39 | 37 ^G | 37 | 45 | 39 | 45 | 31 | 46 | 37 | 33 | 26 | 20 | 48 |
| 11 | 40 | 41 | 37 | 27 | 47 | 80 | 59 | 57 | 92 | 56 | 35 | 34 | 67 | 42 | 36 | 40 | 28 | 31 | 27 | 28 | 21 | 55 | 22 | |
| 12 | 22 | 18 | 24 | 38 | 52 | 58 | 42 | 33 | 34 | 34 | 34 | 40 | 50 | 63 | 34 | 34 | 59 | 70 | 38 | 40 | 40 | 100 | 28 | |
| 13 | 36 | 31 | 31 | 52 | 60 | 104 | 57 | 58 | 59 | 35 | 43 | 51 | 41 | 70 | 35 | 36 | 54 | 53 | 36 | 28 | 24 ^G | 20 | 56 | 32 |
| 14 | 37 | 37 | 29 | 30 | 84 | 40 | 30 | 32 | 128 | 36 | 43 | 90 | 41 | 36 | 40 | 75 | 30 | 58 | 30 | 21 | 24 | 36 | | |
| 15 | 22 | 29 | 40 | 40 | 32 | 41 | 34 | 42 | 49 | 96 | 44 | 44 | 35 | 33 | 30 | 30 | 16 ^G | 30 | 55 | 40 | 54 | 81 | 29 | 39 |
| 16 | 34 | 38 | 26 | 32 | 44 | 45 | 45 | 38 | 32 | 42 | 59 | 57 | 44 | 41 | 38 | 28 | 30 | 35 | 25 | 23 | 18 | 22 ^G | | |
| 17 | 18 | 56 | 48 | 41 | 38 | 39 | 27 | 38 | 30 | 38 | 74 | 49 | 78 | 38 | 121 | 109 | 36 | 36 | 82 | 58 | 38 | 29 | 18 ^G | 18 ^G |
| 18 | 18 | 34 | 34 | 43 | 28 | 28 | 30 | 30 | 33 | 46 | 34 | 34 | 34 | 41 | 68 | 66 | 36 | 34 | 30 | 30 | 22 | 22 | 20 | 22 |
| 19 | 28 | 28 | 31 | 60 | 58 | 38 | 31 | 34 | 34 | 34 | 36 | 54 | 44 | 44 | 41 | 41 | 46 | 31 | 24 ^G | 20 | 32 | 37 | | |
| 20 | 54 | 42 | 68 | 58 | 49 | 40 | 28 | 40 | 42 | 36 | 29 | 46 | 38 | 38 | 33 | 33 | 25 | 24 | 24 | 20 | 30 | 30 | | |
| 21 | 27 | 35 | 26 | 26 | 30 | 26 | 69 | 59 | 68 | 56 | 54 | 35 | 35 | 62 | 54 | 32 | 38 | 29 | 29 | 27 | 30 | 28 | 19 | 44 |
| 22 | 58 | 59 | 84 | 84 | 44 | 64 | 26 | 22 | 54 | 58 | 38 | 32 | 74 | 86 | 130 | 86 | 30 | 70 | 27 | 27 | 24 ^E | 32 | 46 ^B | |
| 23 | 46 | 59 | 66 | 64 | 56 | 56 | 58 | 106 | 56 | 32 ^E | 35 ^B | 35 ^B | 35 ^B | 75 | 75 | 75 | 115 | 59 | 114 | 21 | 28 | 31 | | |
| 24 | 43 | 70 | 50 | 58 | 57 | 36 | 60 | 60 | 57 | 38 | 37 | 37 | 37 | 37 | 39 | 32 | 46 | 38 | 27 | 37 | 26 | 40 | 53 | 22 ^G |
| 25 | 33 | 51 | 60 | 51 | 46 | 39 | 28 | 29 | 34 | 37 | 36 | 37 | 37 | 37 | 39 | 32 | 46 | 38 | 27 | 37 | 26 | 40 | 53 | 22 ^B |
| 26 | 25 | 36 | 28 | 28 | 31 | 24 | 30 | 32 | 33 | 25 | 21 | 52 | 47 | 75 | 66 | 44 | 66 | 35 | 29 | 16 | 24 | 20 | | |
| 27 | 35 | 29 | 32 | 36 | 36 | 40 | 47 | 47 | 85 | 42 | 35 | 38 | 36 | 52 | 71 | 45 | 42 | 37 | 32 | 68 | 58 | 20 | 35 | 36 |
| 28 | 44 | 44 | 36 | 48 | 66 | 60 | 55 | 66 | 69 | 36 | 34 | 62 | 70 | 95 | 32 ^G | 40 ^G | 35 | 35 | 28 | 27 | 24 | 20 | 22 | |
| 29 | 54 | 43 | 54 | 54 | 130 | 38 | 89 | 85 | 124 | 73 | 34 | 34 | 34 | 34 | 46 | 40 | 91 | 64 | 18 | 28 | 58 | 26 | | |
| 30 | 32 | 50 | 50 | 48 | 85 | 44 | 71 | 68 | 57 | 32 ^G | 58 | 33 | 33 | 34 | 29 | 29 | 29 | 28 | 25 | 25 | 62 | 107 | 39 | |
| 31 | 28 | 69 | 64 | 67 | 60 | 60 | 71 | 25 ^G | 32 ^G | 32 | 32 | 104 | 36 | 36 | 36 | 90 | 33 | 32 | 28 | 34 | 26 | 18 | 18 | |
| | 00 | 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 | 30 | 31 | 31 | 31 | 31 | 30 | 30 | 30 | 31 | 31 | 31 | 31 | 30 |
| MED | 32 | 37 | 37 | 42 | 47 | 40 | 41 | 40 | 41 | 36 | 36 | 40 | 38 | 38 | 40 | 40 | 36 | 34 | 30 | 32 | 22 | 30 | 28 | |
| U Q | 44 | 50 | 54 | 56 | 58 | 57 | 55 | 58 | 60 | 42 | 43 | 51 | 52 | 52 | 66 | 58 | 45 | 38 | 38 | 40 | 34 | 35 | 44 | 36 |
| L Q | 22 | 30 | 29 | 28 | 32 | 33 | 32 | 34 | 34 | 34 | 34 | 35 | 36 | 36 | 34 | 33 | 31 | 27 | 25 | 24 | 21 | 20 | 22 | |

DEC.2020 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

DEC.2020 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| $\begin{matrix} H \\ D \end{matrix}$ | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|--------------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 12 | 12 | 13 | 16 | 24 | 16 | 16 | 14 | 12 | 12 | 12 | 10 | 14 | 14 | 14 | 12 | 14 | 12 | 10 | 10 | 9 | 9 | 9 | 9 |
| 2 | 8 | 11 | 12 | 11 | 11 | 11 | 11 | 10 | 10 | 15 | 16 | 18 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 10 | 16 | 11 | 11 | 12 |
| 3 | 15 | 13 | 16 | 19 | 14 | 14 | 14 | 12 | 12 | 12 | 12 | 10 | 10 | 10 | 10 | 12 | 12 | 12 | 10 | 12 | 13 | 13 | 13 | 10 |
| 4 | 9 | 9 | 8 | 9 | 8 | 9 | 8 | 8 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 8 | 8 | 8 | 8 | 8 | 8 | 6 | 7 | 7 |
| 5 | 7 | 7 | 8 | 8 | 8 | 8 | 7 | 7 | 8 | 8 | 9 | 10 | 10 | 10 | 10 | 9 | 9 | 12 | 10 | 10 | 8 | 7 | 5 | 9 |
| 6 | 9 | 9 | 11 | 14 | 12 | 9 | 9 | 8 | 10 | 10 | 12 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 9 | 8 | 9 | 13 | 14 | 9 |
| 7 | 9 | 10 | 9 | 8 | 8 | 8 | 7 | 7 | 8 | 8 | 10 | 10 | 11 | 11 | 8 | 10 | 8 | 8 | 9 | 8 | 8 | 8 | 7 | 9 |
| 8 | 8 | 7 | 8 | 8 | 9 | 9 | 12 | 10 | 9 | 8 | 8 | 8 | 8 | 8 | 11 | 10 | 10 | 12 | 9 | 9 | 9 | 10 | 9 | 10 |
| 9 | 10 | 18 | 14 | 13 | 13 | 11 | 14 | 12 | 16 | 18 | 10 | 7 | 9 | 9 | 10 | 8 | 11 | 10 | 10 | 10 | 8 | 10 | 10 | 10 |
| 10 | 24 | 16 | 10 | 12 | 10 | 17 | 13 | 10 | 8 | 10 | 9 | 8 | 9 | 7 | 7 | 7 | 7 | 8 | 7 | 7 | 7 | 7 | 7 | 9 |
| 11 | 12 | 11 | 11 | 8 | 14 | 14 | 10 | 8 | 10 | 8 | 8 | 8 | 10 | 10 | 10 | 8 | 11 | 10 | 7 | 7 | 7 | 8 | 16 | 7 |
| 12 | 6 | 6 | 8 | 10 | 10 | 10 | 9 | 8 | 9 | 9 | 9 | 8 | 11 | 9 | 9 | 11 | 9 | 9 | 9 | 8 | 6 | 8 | 11 | 8 |
| 13 | 8 | 8 | 18 | 10 | 13 | 11 | 11 | 9 | 9 | 9 | 9 | 9 | 6 | 6 | 10 | 8 | 7 | 7 | 7 | 7 | 7 | 9 | 11 | 8 |
| 14 | 8 | 8 | 13 | 10 | 9 | 9 | 8 | 8 | 8 | 8 | 7 | 8 | 7 | 9 | 7 | 8 | 8 | 8 | 10 | 9 | 8 | 6 | 9 | 6 |
| 15 | 9 | 8 | 8 | 8 | 8 | 7 | 8 | 8 | 8 | 9 | 9 | 9 | 9 | 9 | 9 | 10 | 10 | 10 | 8 | 8 | 7 | 8 | 8 | 5 |
| 16 | 8 | 8 | 10 | 6 | 8 | 10 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 10 | 8 | 7 | 7 | 7 | 7 | 8 |
| 17 | 8 | 6 | 8 | 8 | 6 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 7 | 6 | 7 | 8 | 8 | 5 |
| 18 | 8 | 6 | 7 | 8 | 8 | 7 | 8 | 8 | 7 | 7 | 9 | 8 | 6 | 10 | 9 | 9 | 9 | 9 | 8 | 7 | 7 | 7 | 8 | 8 |
| 19 | 8 | 8 | 11 | 11 | 7 | 7 | 9 | 8 | 8 | 8 | 9 | 8 | 10 | 8 | 8 | 8 | 8 | 12 | 8 | 8 | 8 | 8 | 8 | 10 |
| 20 | 10 | 10 | 10 | 10 | 8 | 8 | 8 | 8 | 10 | 8 | 11 | 22 | 12 | 12 | 12 | 9 | 9 | 15 | 11 | 13 | 10 | 8 | 8 | 7 |
| 21 | 7 | 7 | 7 | 7 | 11 | 8 | 10 | 10 | 8 | 9 | 12 | 12 | 9 | 21 | 21 | 18 | 12 | 12 | 8 | 14 | 12 | 10 | 8 | 8 |
| 22 | 10 | 11 | 12 | 9 | 7 | 8 | 8 | 20 | 10 | 23 | 18 | 11 | 12 | 13 | 25 | 20 | 18 | 13 | 16 | 13 | 24 | 10 | 8 | 13 |
| 23 | 10 | 14 | 20 | 16 | 12 | 8 | 25 | 24 | 10 | 9 | 34 | 35 | 18 | 16 | 22 | 24 | 23 | 26 | 26 | 25 | 8 | 8 | 7 | 8 |
| 24 | 8 | 8 | 11 | C | 9 | 8 | 8 | 16 | 16 | 14 | 8 | 10 | 22 | 34 | 25 | 24 | 40 | C | C | 9 | 9 | 8 | 8 | 6 |
| 25 | 6 | 8 | 19 | 12 | 23 | 11 | 9 | 9 | 10 | 18 | 18 | C | 12 | 10 | 11 | 10 | 10 | 10 | 8 | 11 | 8 | 8 | 7 | 7 |
| 26 | 8 | 8 | 8 | 8 | 7 | 8 | 8 | 8 | 9 | 9 | 9 | 9 | 9 | 20 | 18 | 18 | 13 | 9 | 10 | 8 | 8 | 8 | 7 | B |
| 27 | 6 | 6 | 7 | 8 | 11 | 12 | 9 | 9 | 14 | 6 | 8 | 8 | 8 | 9 | 9 | 7 | 7 | 9 | 13 | 12 | 8 | 8 | 9 | 12 |
| 28 | 12 | 9 | 12 | 8 | 8 | 10 | 8 | 8 | 7 | 7 | 8 | 8 | 10 | 24 | 10 | 14 | 16 | 12 | 9 | 15 | 14 | 7 | 6 | 7 |
| 29 | 10 | 8 | 11 | 7 | 19 | 14 | 10 | 10 | 20 | 9 | 9 | 9 | 9 | 9 | 8 | 10 | 12 | 8 | 8 | 8 | 15 | 9 | 10 | 8 |
| 30 | 8 | 13 | 12 | 7 | 10 | 12 | 18 | 18 | 11 | 11 | 11 | 9 | 9 | 10 | 21 | 15 | 15 | 10 | 8 | 14 | 8 | 8 | 10 | 8 |
| 31 | 8 | 16 | 11 | 12 | 12 | 10 | 14 | 8 | 7 | 9 | 9 | 8 | 8 | 10 | 11 | 10 | 10 | 12 | 12 | 9 | 8 | 8 | 7 | 7 |
| | 00 | 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 | 30 | 31 | 31 | 31 | 31 | 31 | 30 | 30 | 31 | 31 | 31 | 31 | 31 |
| MED | 8 | 8 | 11 | 9 | 10 | 9 | 9 | 8 | 9 | 9 | 9 | 9 | 9 | 10 | 10 | 10 | 10 | 10 | 9 | 9 | 8 | 8 | 8 | 8 |
| U Q | 10 | 11 | 12 | 12 | 12 | 11 | 12 | 10 | 10 | 11 | 12 | 10 | 11 | 13 | 13 | 13 | 13 | 12 | 10 | 12 | 9 | 9 | 10 | 10 |
| L Q | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 9 | 9 | 8 | 8 | 9 | 8 | 8 | 7 | 8 | 7 | 7 |

DEC.2020 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION SHOWA-ST.

DEC. 2020 h'F (KM)

45°E MEAN TIME (G.M.T. + 3 H)

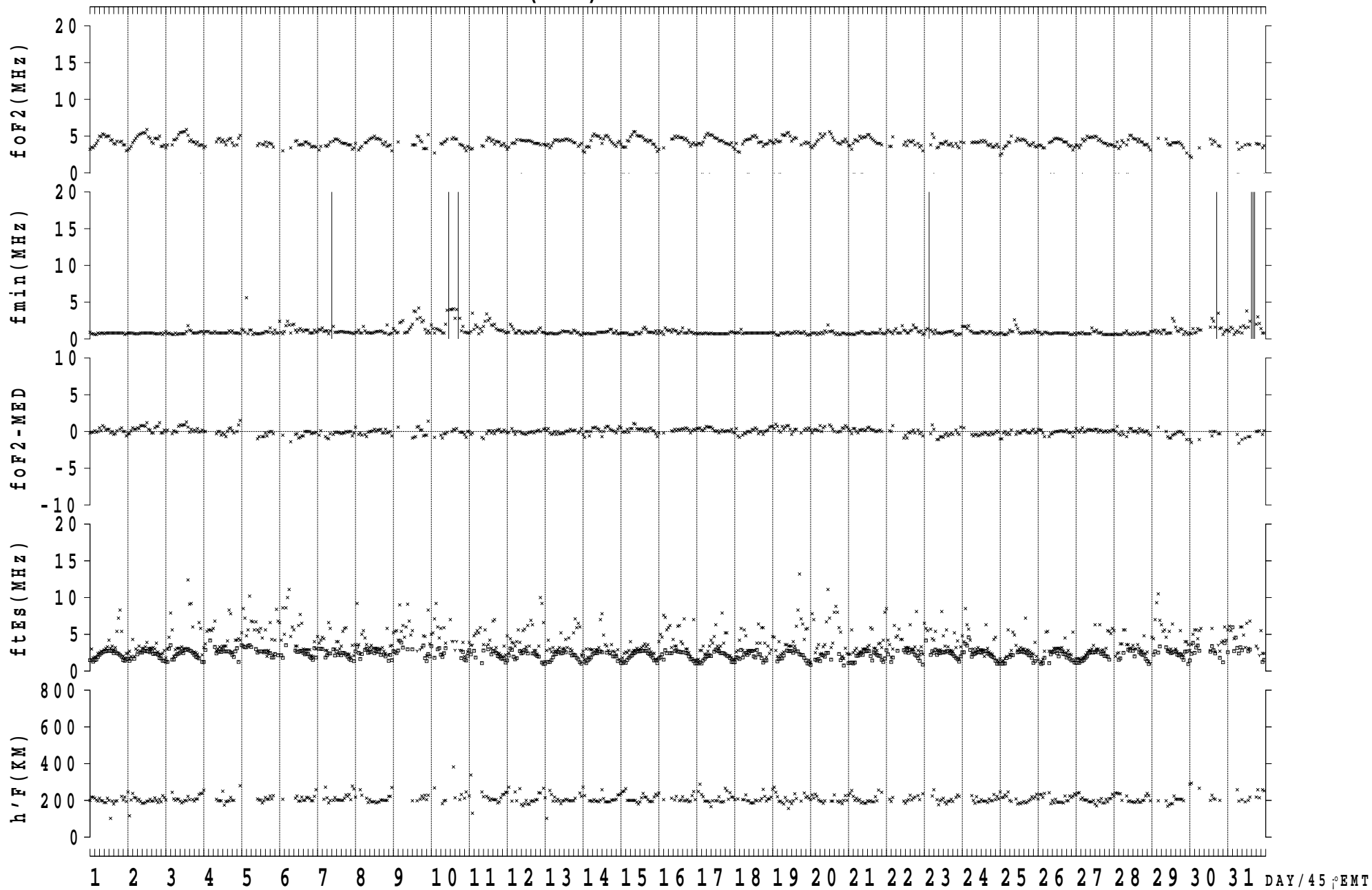
LAT. 69°00.4'S LON. 039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC IN MANUAL SCALING

| D | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
|-----|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-----|-----|------------|------------|------------------|------------|------------|----------|------------|------------|------------|------------|------------|
| 1 | E A 246 | E A 246 | A | A | A | E A 314 | E A 238 | 208 | 206 | 190 | 226 | 200 | 230 | 202 | 198 | 208 | 204 | 192 | 210 | 202 | 196 | 238 | E A 242 | E A 214 | |
| 2 | 208 | E A 260 | A | 242 | 228 | E B 206 | H 200 | 208 | 216 | 202 | 216 | 190 | 192 | 192 | 200 | 200 | 184 ^H | 232 | 218 | 210 | E A 214 | E A 214 | 224 | E A 242 | |
| 3 | E A 254 | E A 262 | E A 318 | A | E A 246 | E A 234 | E A 224 | E A 232 | 214 | 208 | A | A | 208 | 236 | 200 | 200 | E A 350 | 214 | 206 | H 190 | H 194 | 214 | 214 | E A 234 | A 230 |
| 4 | E A 254 | E A 248 | E A 234 | E A 232 | E A 224 | 210 | 202 | 224 | 206 | 224 | 196 | 200 | 200 | 200 | 200 | 212 | 212 | A | 212 | 220 | 214 | 214 | 230 | E A 230 | |
| 5 | E A 240 | E A 260 | 242 | 238 | 232 | 220 | 204 | 204 | 216 | 216 | 198 | A | A | A | A | A | 200 | 200 | 190 | 196 | 228 | E A 254 | E A 234 | 238 | |
| 6 | 266 | A | A | A | A | 248 | 232 | A | H 186 | H 186 | 178 | 202 | 202 | 212 | 202 | 198 | 200 | 200 | 200 | 196 | 214 | 220 | 228 | A | |
| 7 | A | A | E A 278 | E A 218 | 218 | A | 204 | 202 | 198 | 198 | 198 | 198 | 212 | 192 | 198 | 200 | 198 | 198 | 208 | 214 | 216 | 214 | E A 230 | E A 224 | |
| 8 | E A 228 | 202 | E A 232 | 236 | 214 | E A 262 | A | A | 228 | 188 | 194 | 188 | 188 | 190 | 214 | 202 | 202 | 214 | 214 | A | 202 | 220 | 248 | 228 | |
| 9 | E A 292 | E A 322 | A | A | A | A | E A 270 | 270 | A | E A 218 | E A 264 | 200 | 200 | 200 | A | A | A | A | 200 | 192 | E A 264 | 210 | A | A | |
| 10 | A | E A 284 | A | E A 274 | A | A | A | A | E A 264 | 198 | 200 | 212 | 194 | 196 | 208 | E A 276 | 208 | A | 224 | 220 | 220 | 196 | A | A | |
| 11 | A | A | E A 206 | 288 | A | A | E A 262 | 204 | 186 | 176 | 198 | 198 | 210 | 210 | 198 | 204 | 196 | 234 | 216 | 200 | 210 | E A 236 | E A 260 | | |
| 12 | E A 254 | E A 284 | 238 | A | A | A | A | 214 | 196 | 202 | 194 | 188 | 212 | 210 | 200 | A | A | E A 232 | 210 | 210 | 216 | A | E A 240 | | |
| 13 | E A 264 | A | A | A | A | A | A | 248 | 202 | 190 | 206 | A | 200 | 200 | 202 | 188 | 202 | 202 | 202 | 212 | 212 | 218 | 234 | 270 | |
| 14 | A | A | A | A | A | A | 214 | 202 | 198 | 200 | 206 | A | 190 | 198 | 196 | A | 196 | 208 | E A 228 | 210 | 218 | 204 | E A 258 | E A 236 | |
| 15 | A | E A 250 | A | A | A | 222 | 206 | 200 | 194 | 194 | E A 226 | 200 | 194 | 188 | 188 | 202 | 192 | 192 | 192 | 206 | E A 236 | 216 | 216 | 222 | |
| 16 | 244 | A | A | E A 244 | E A 232 | A | A | 232 | 198 | 218 | 242 | 188 | 192 | 204 | 194 | 200 | 192 | 222 | 216 | 204 | 204 | 218 | E A 244 | | |
| 17 | E A 248 | E A 248 | A | E A 240 | 210 | 202 | 194 | 204 | 208 | A | 194 | A | 196 | A | A | 196 | 196 | 208 | 208 | 222 | 210 | 204 | E A 218 | | |
| 18 | A | E A 282 | 192 | A | A | 200 | 200 | 198 | 198 | 190 | 196 | 192 | 186 | 200 | 200 | 198 | 198 | 190 | 186 | H 206 | 210 | 210 | 220 | E A 230 | |
| 19 | E A 238 | E A 246 | E A 284 | A | A | 206 | H 202 | 202 | 204 | 182 | 198 | 198 | 198 | 202 | 202 | 204 | 206 | 202 | 196 | 210 | 202 | 214 | 236 | E A 260 | |
| 20 | A | A | A | A | A | A | 208 | 196 | 196 | 196 | 198 | 198 | 200 | 212 | 202 | 192 | 202 | 194 | 212 | 212 | 212 | 212 | 212 | E A 248 | |
| 21 | E A 248 | A | A | 222 | 224 | 224 | A | A | A | A | A | 210 | 210 | 210 | 210 | 208 | 198 | 224 | 204 | 210 | 240 | 242 | 212 | A | |
| 22 | A | A | A | A | A | 252 | 202 | A | E A 254 | A | 238 | 198 | 220 | 220 | 202 | 192 | 204 | 192 | 218 | 234 | 224 | 210 | A | A | |
| 23 | A | A | A | A | A | A | A | A | 198 | 196 | 202 | E B 232 | 210 | 202 | 222 | 200 | 202 | 200 | 194 | A | A | A | 198 | E A 246 | |
| 24 | A | A | A | C | A | 240 | A | A | A | A | 200 | 218 | 220 | 208 | 202 | 224 | 206 | B | C | C | E A 250 | E A 252 | 230 | E A 234 | E A 242 |
| 25 | A | A | A | A | A | A | 210 | 206 | 198 | H 228 | 198 | C | 200 | 198 | 206 | 196 | 196 | 216 | 216 | 216 | 208 | E A 234 | 218 | 234 | |
| 26 | E A 242 | E A 260 | E A 260 | 228 | 218 | 218 | 204 | 200 | 198 | 206 | 198 | A | 200 | A | E A 224 | 210 | A | 206 | 206 | 202 | 200 | 206 | 226 | B | |
| 27 | 208 | E A 318 | E A 274 | A | A | A | 204 | A | A | A | 204 | 202 | 200 | 200 | A | A | 208 | 208 | 200 | A | 226 | 226 | 224 | A | |
| 28 | A | A | A | E A 298 | A | A | A | A | A | A | 200 | 212 | 218 | 204 | E A 218 | 208 | 194 | 212 | E A 250 | 224 | 224 | 212 | 218 | 228 | 228 |
| 29 | E B 252 | A | E A 296 | 198 | A | A | A | A | A | A | 218 | 202 | 202 | 202 | 202 | 202 | 202 | A | 202 | 198 | 222 | 202 | 196 | E A 256 | 258 |
| 30 | E A 278 | A | A | A | E A 246 | A | A | A | A | A | 200 | 202 | 202 | 216 | 206 | 212 | 208 | 208 | 202 | 216 | 212 | E A 236 | E A 232 | 232 | E A 264 |
| 31 | E A 310 | E A 286 | A | A | A | A | A | 206 | 194 | 190 | 186 | 200 | 200 | 196 | H 204 | 208 | 202 | 196 | 216 | 216 | 218 | 202 | H 202 | 202 | |
| | 00 | 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 | 12 | 11 | 13 | 18 | 17 | 19 | 23 | 28 | 28 | 26 | 27 | 28 | 27 | 27 | 26 | 28 | 29 | 29 | 30 | 29 | 27 | 24 | |
| MED | E A 248 | E A 260 | E A 251 | 232 | 221 | 218 | 204 | 205 | 202 | 199 | 199 | 200 | 200 | 200 | 202 | 201 | 202 | 200 | 208 | 211 | 213 | 214 | 220 | E A 237 | |
| U Q | E A 264 | E A 284 | E A 279 | E A 246 | E A 242 | E A 246 | 223 | 214 | 208 | 207 | 214 | 202 | 210 | 208 | 210 | 208 | 206 | 207 | 217 | 221 | 222 | 222 | 234 | E A 247 | |
| L Q | E A 240 | E A 248 | 233 | 222 | 218 | 210 | 202 | 200 | 196 | 192 | 197 | 198 | 200 | 196 | 200 | 198 | 198 | 196 | 199 | 209 | 208 | 210 | 216 | E A 228 | |

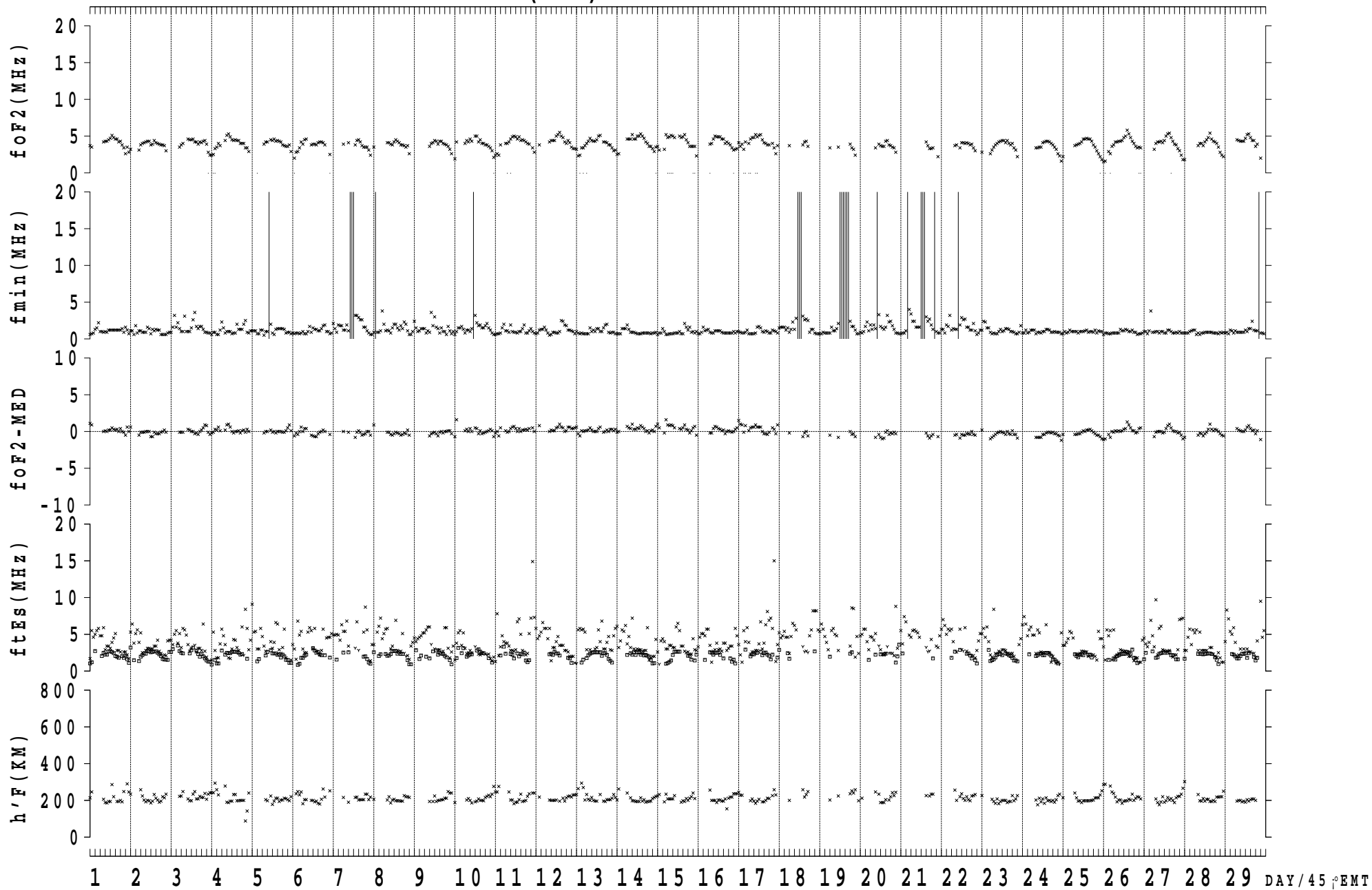
DEC. 2020 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

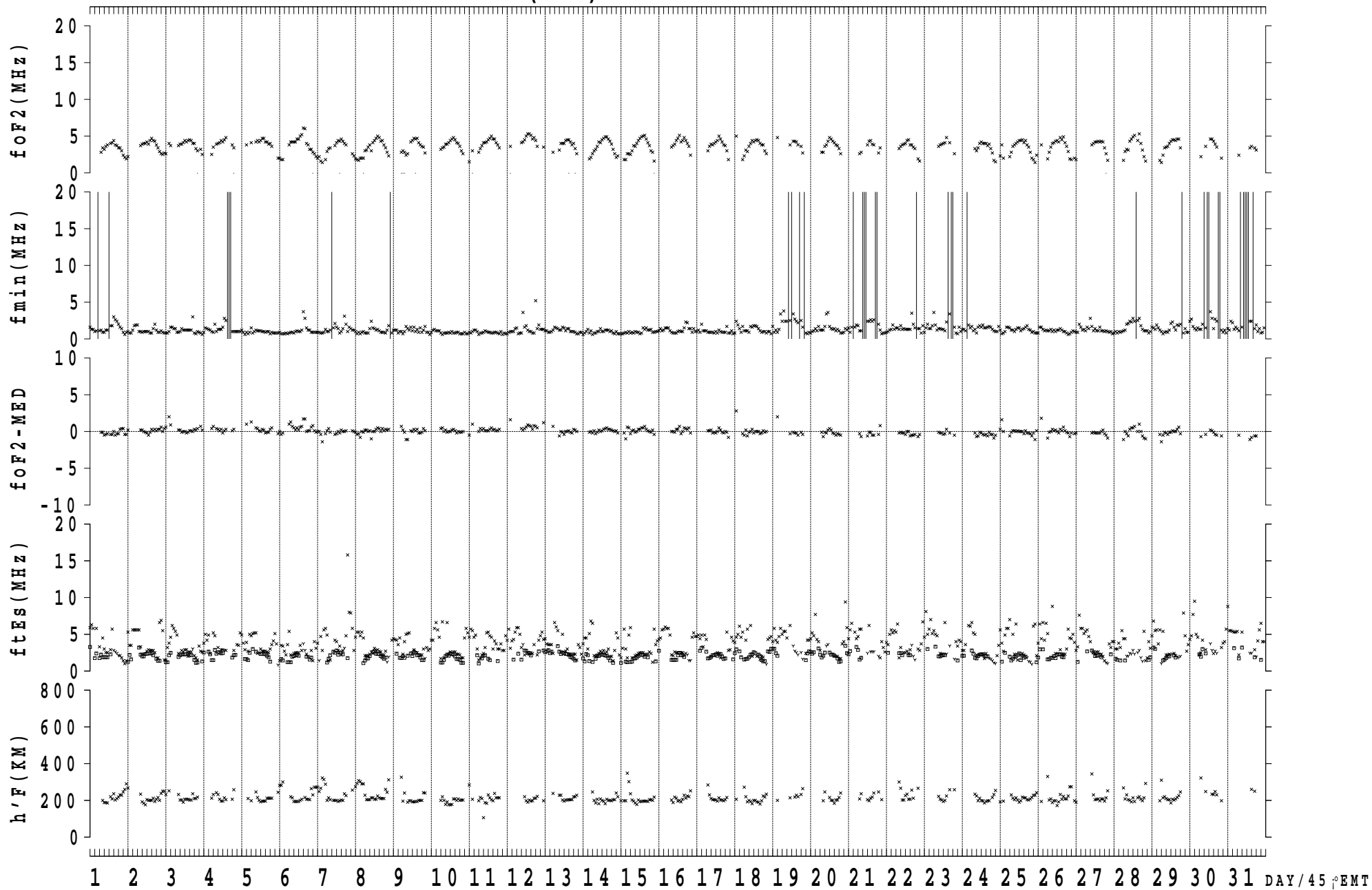
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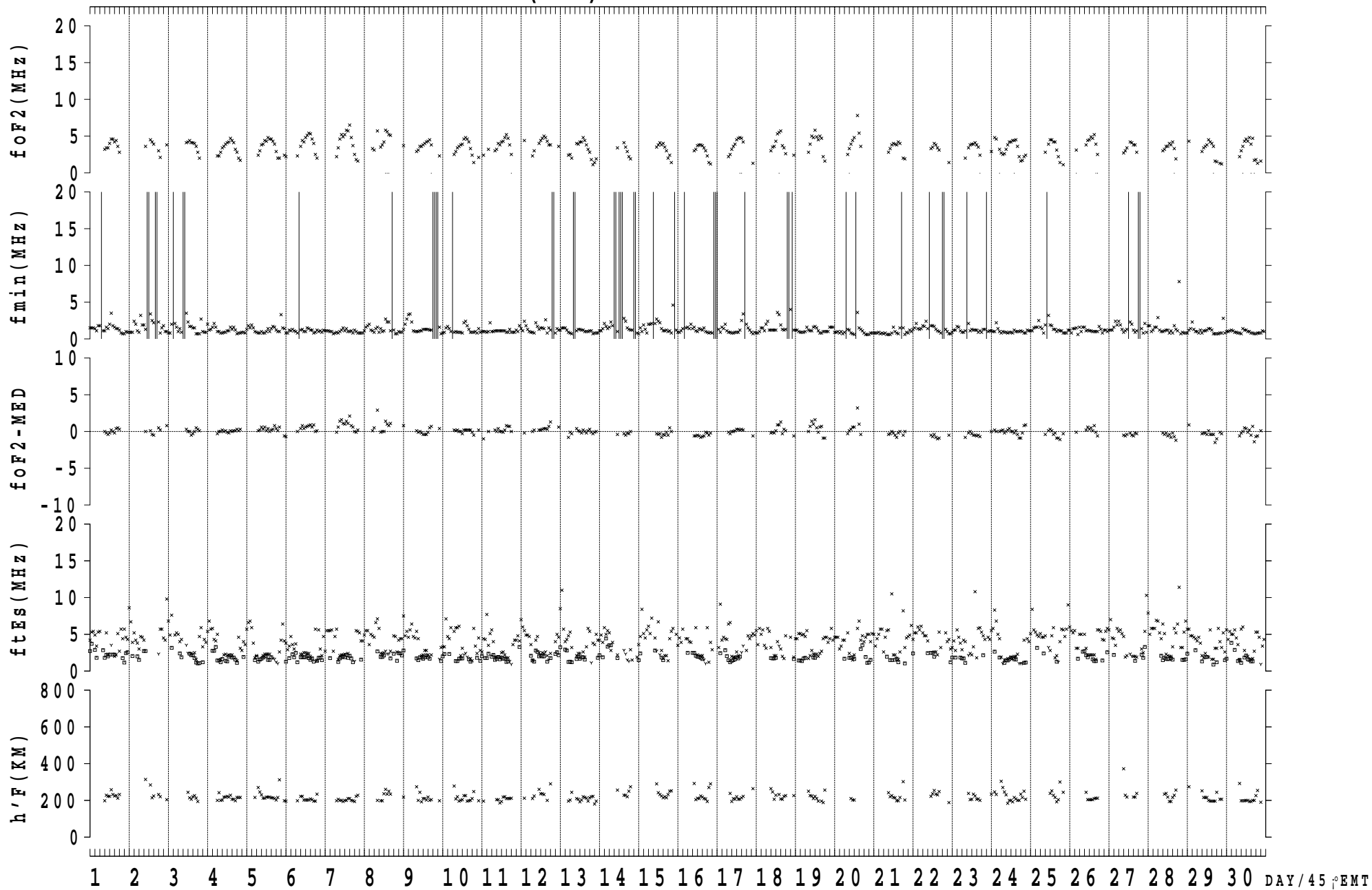
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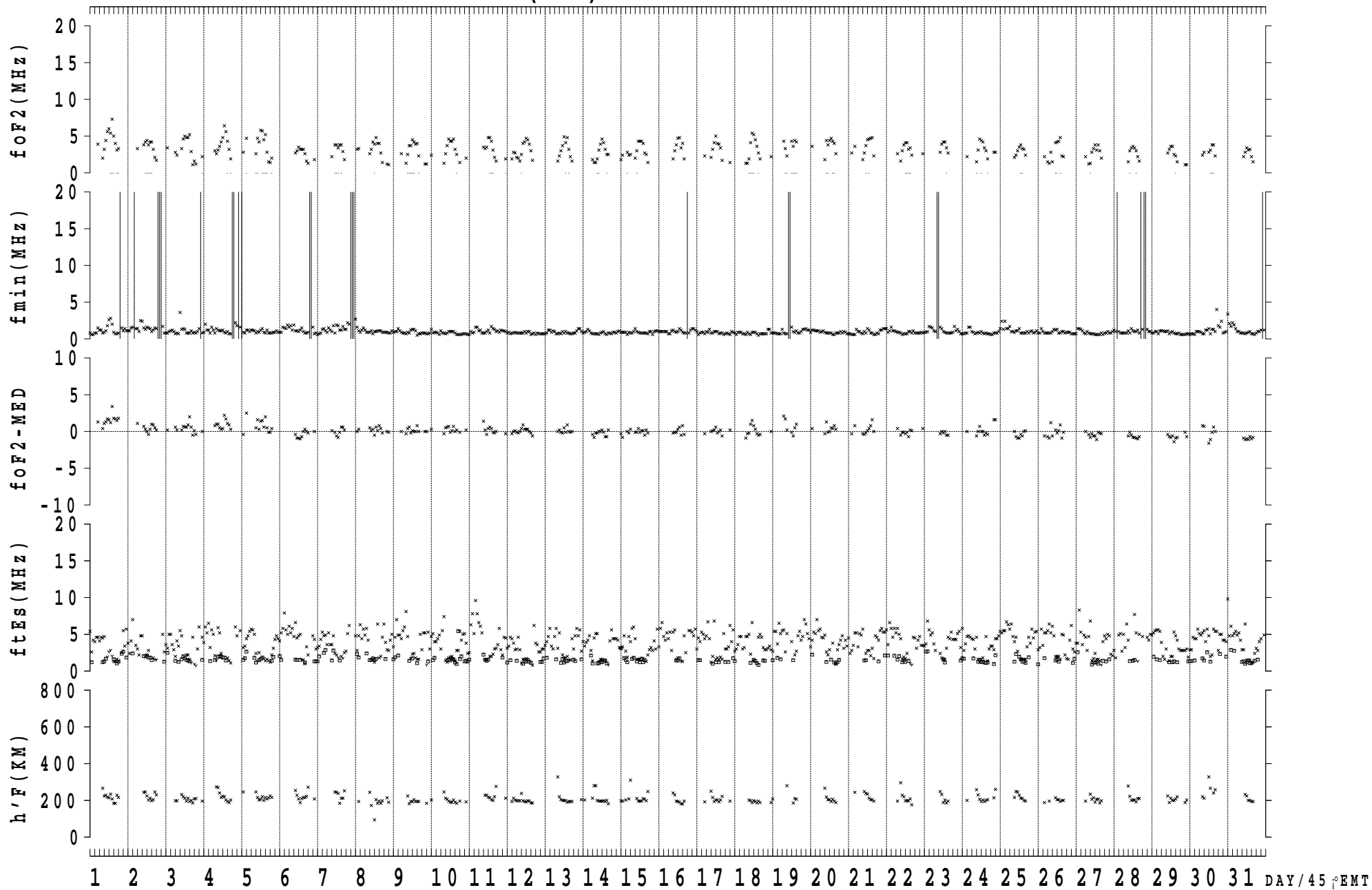
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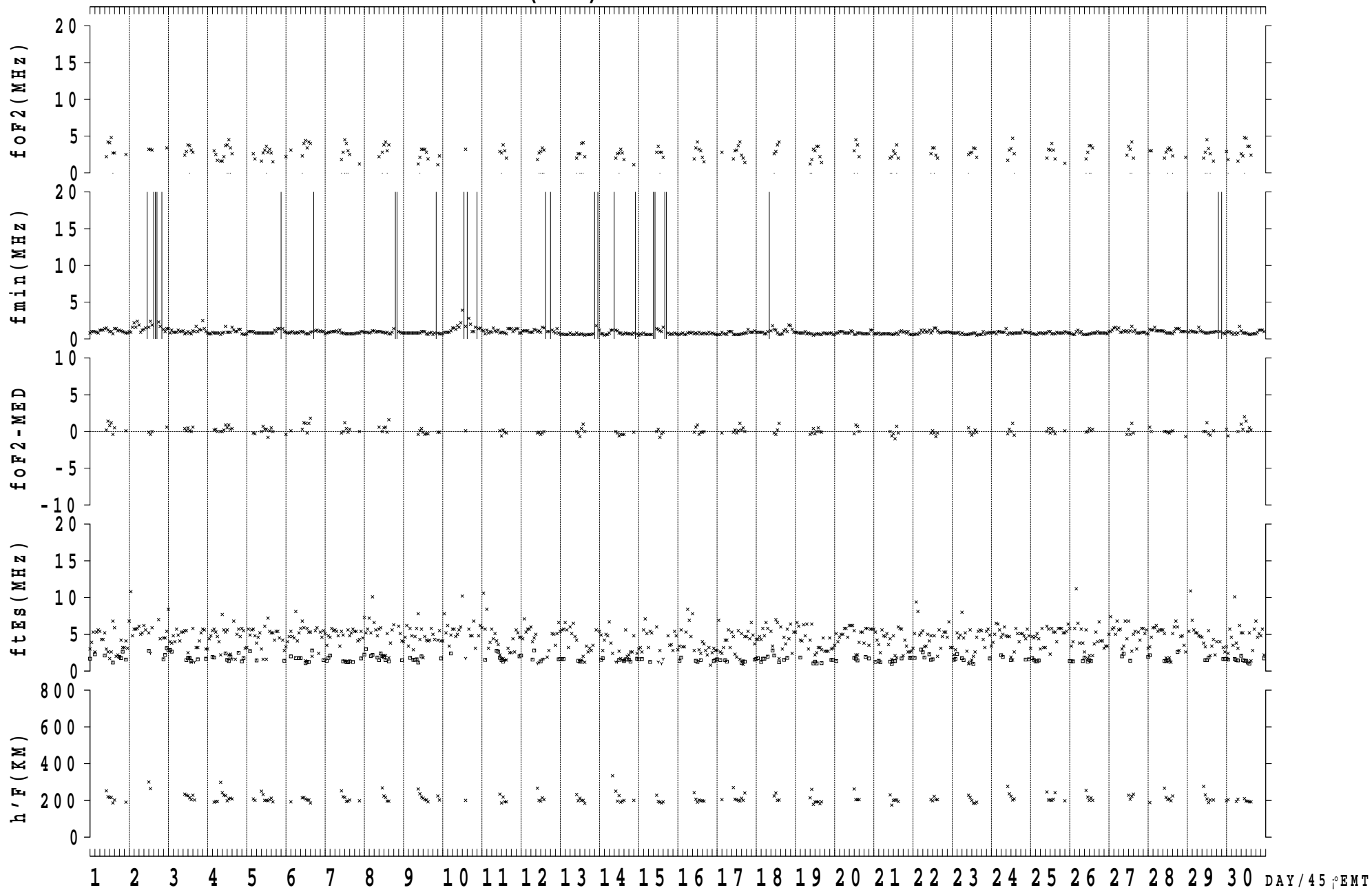
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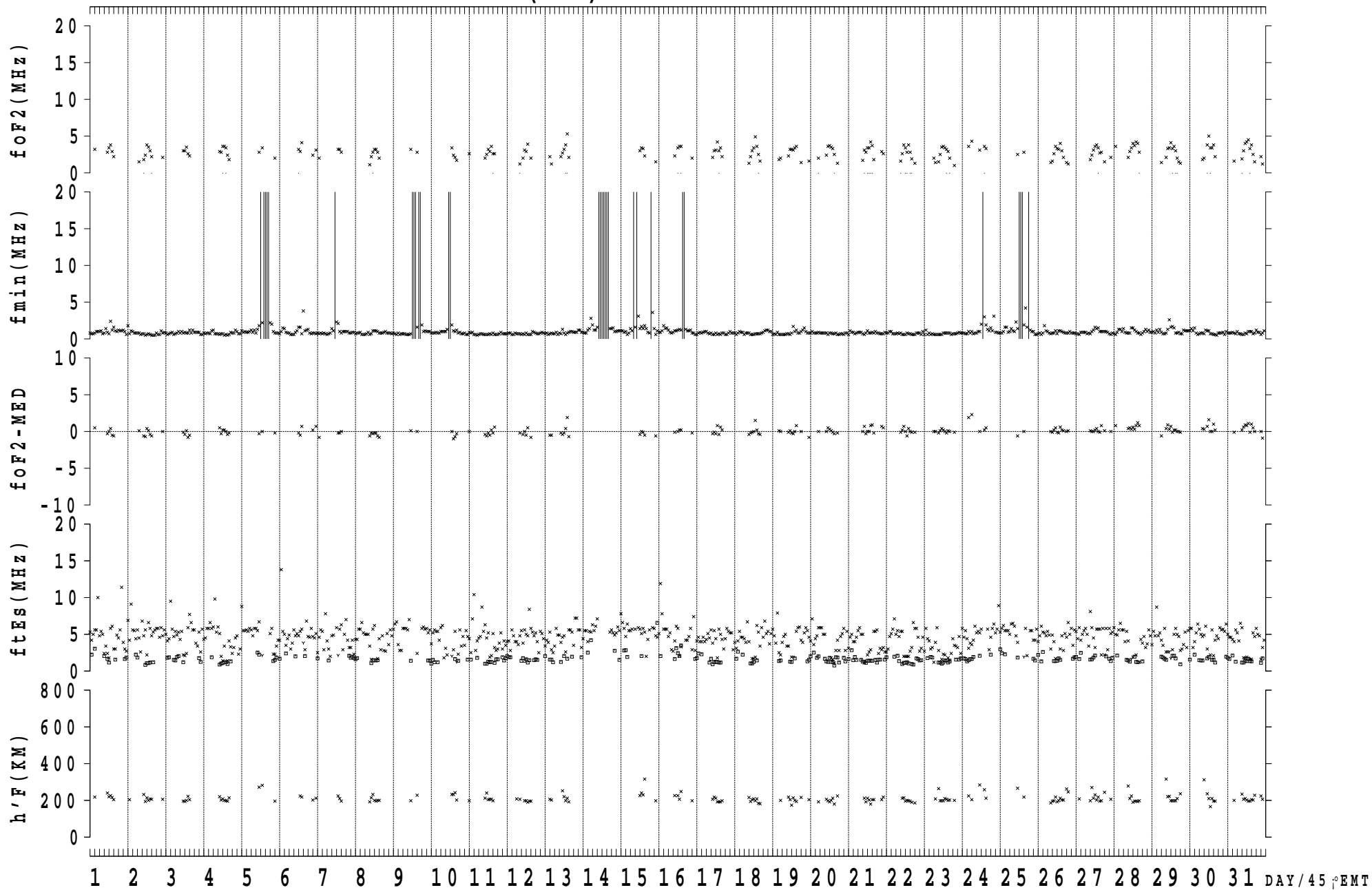
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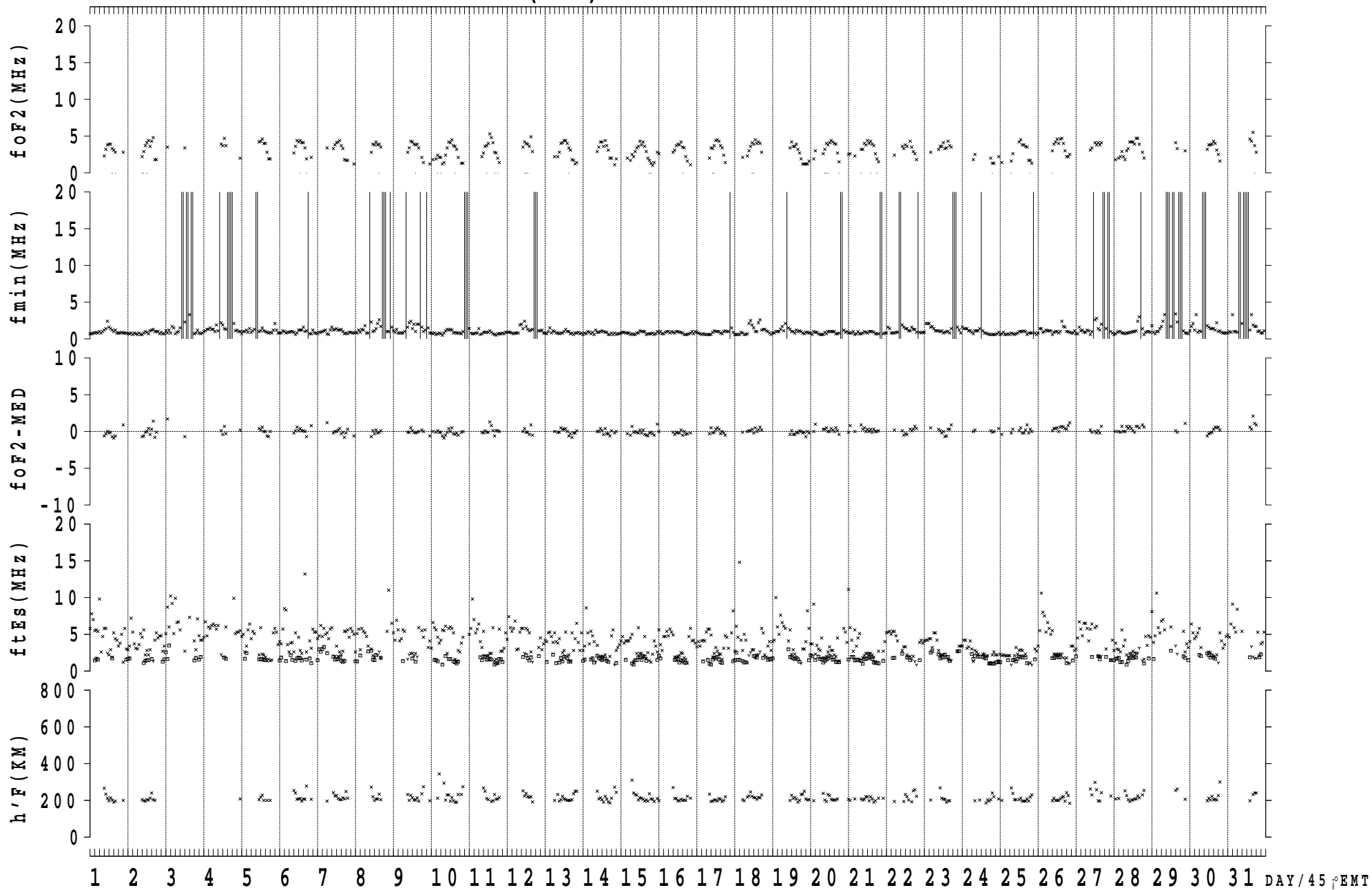
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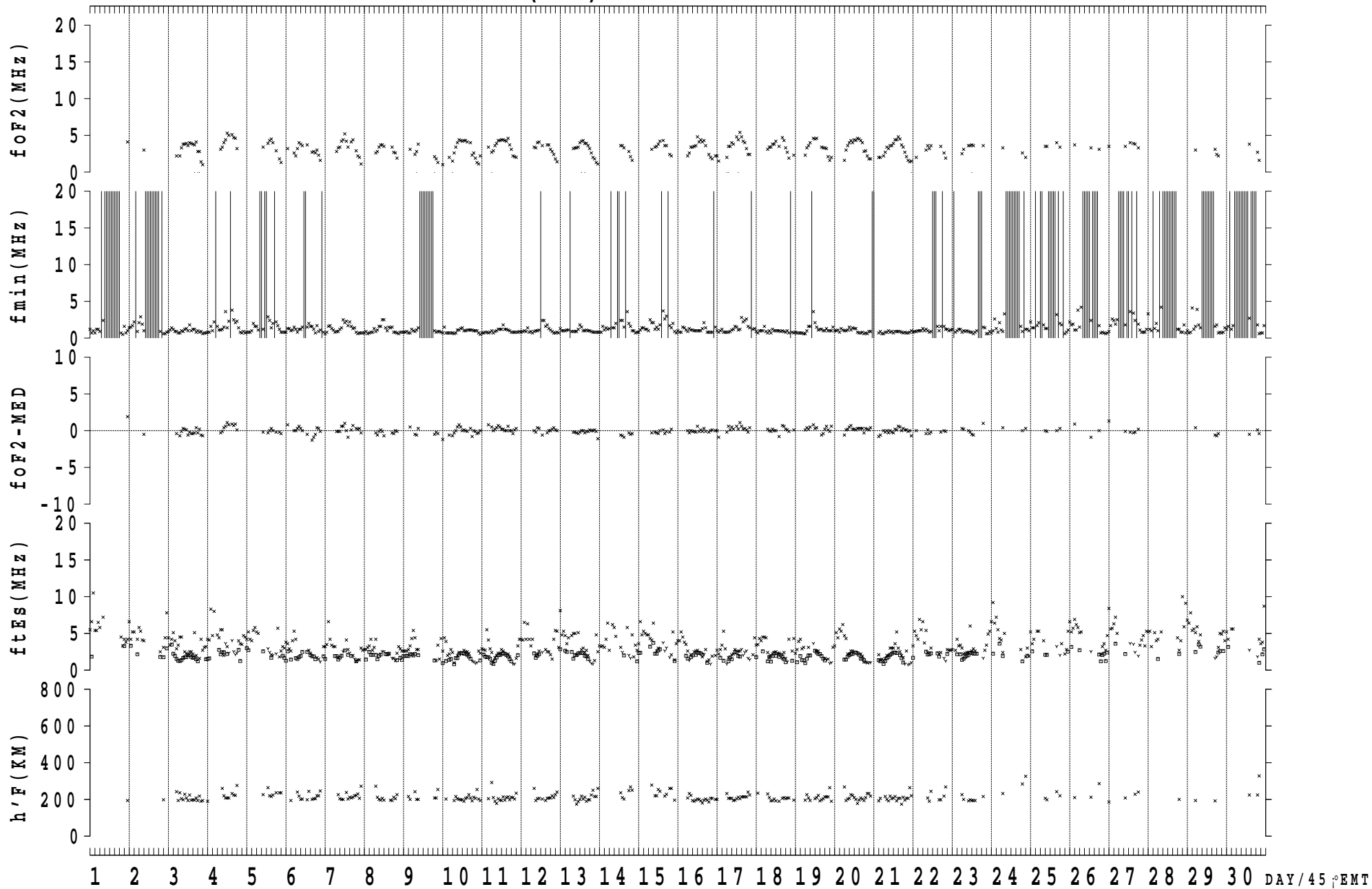
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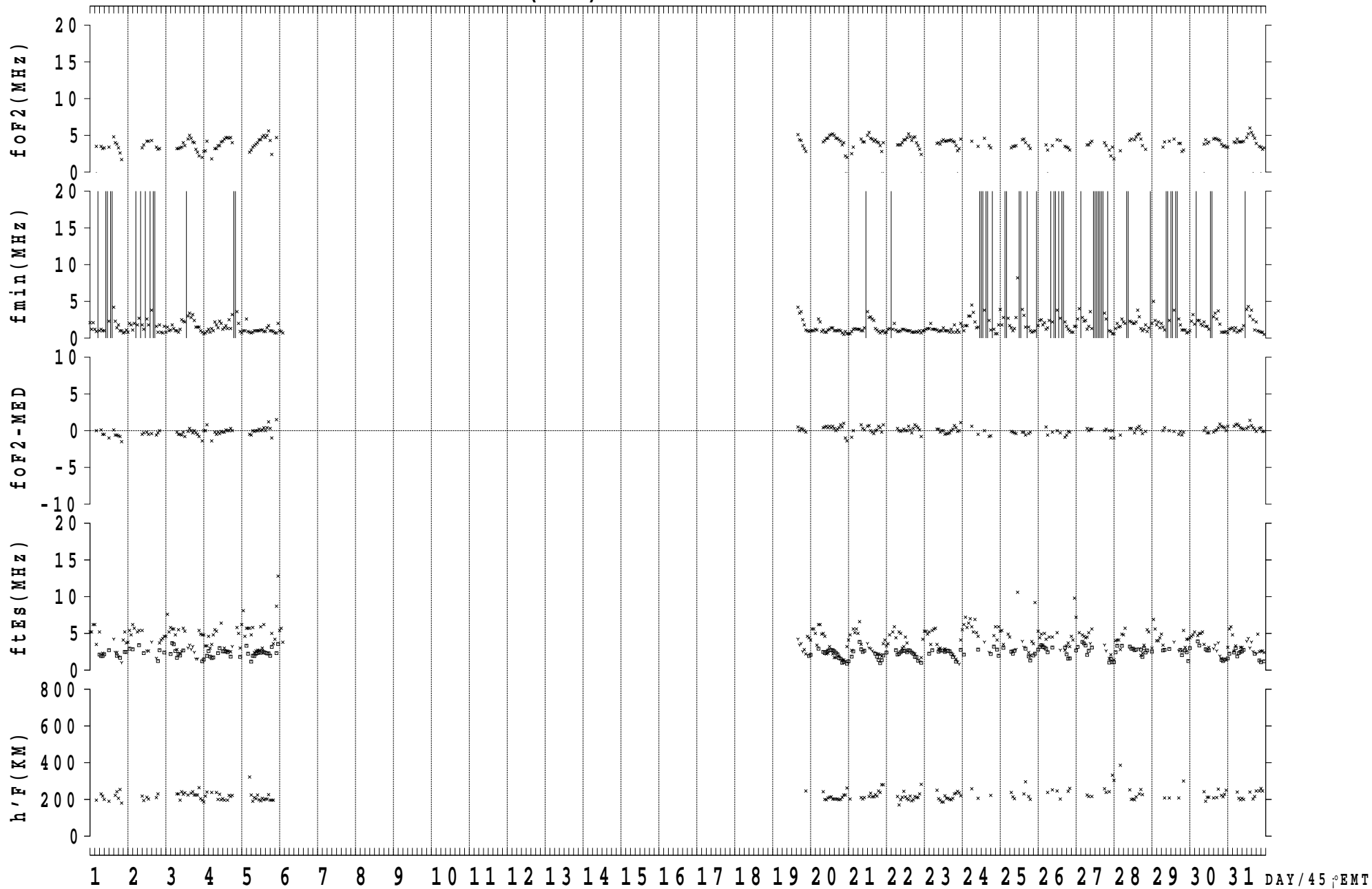
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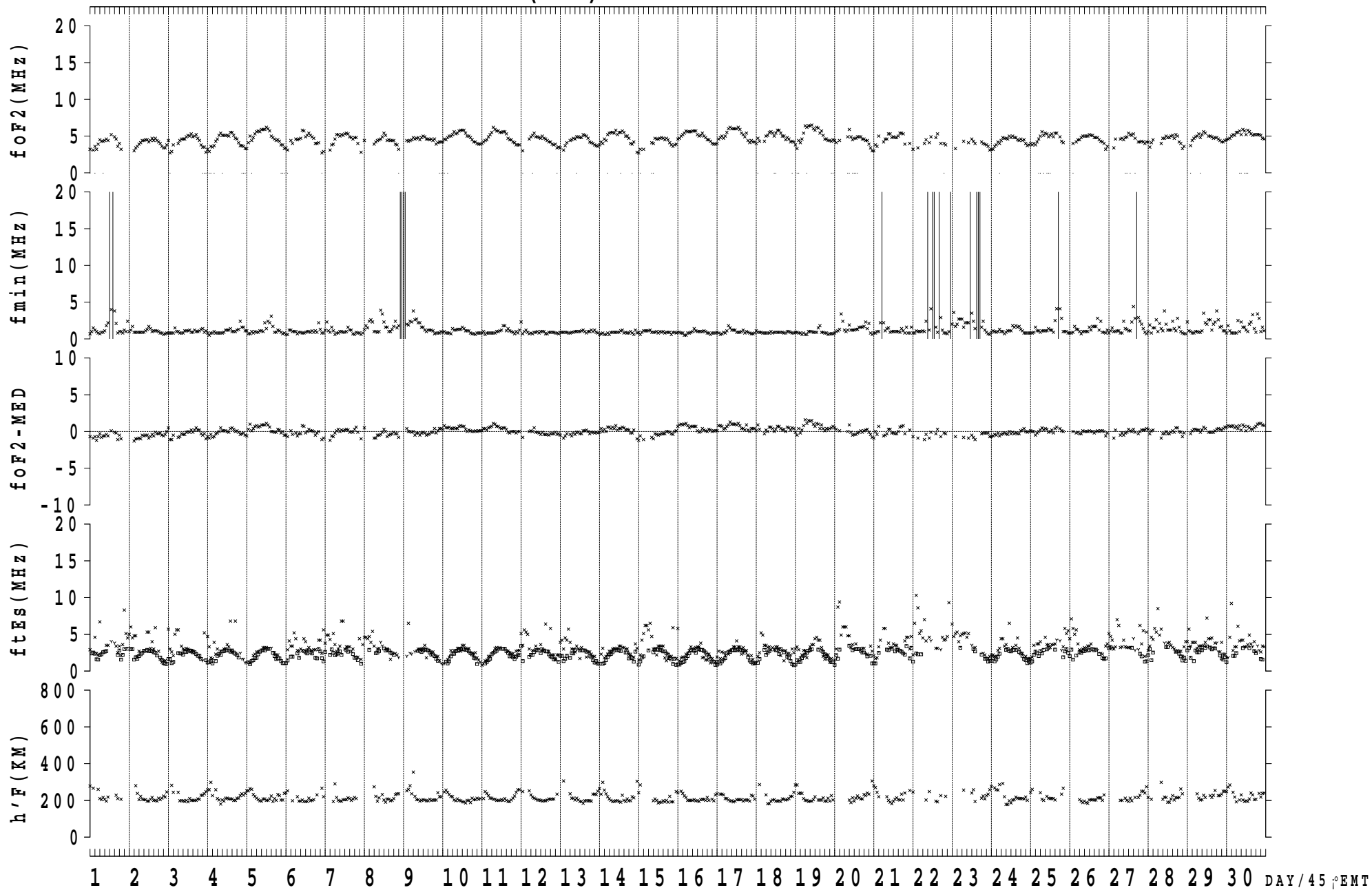
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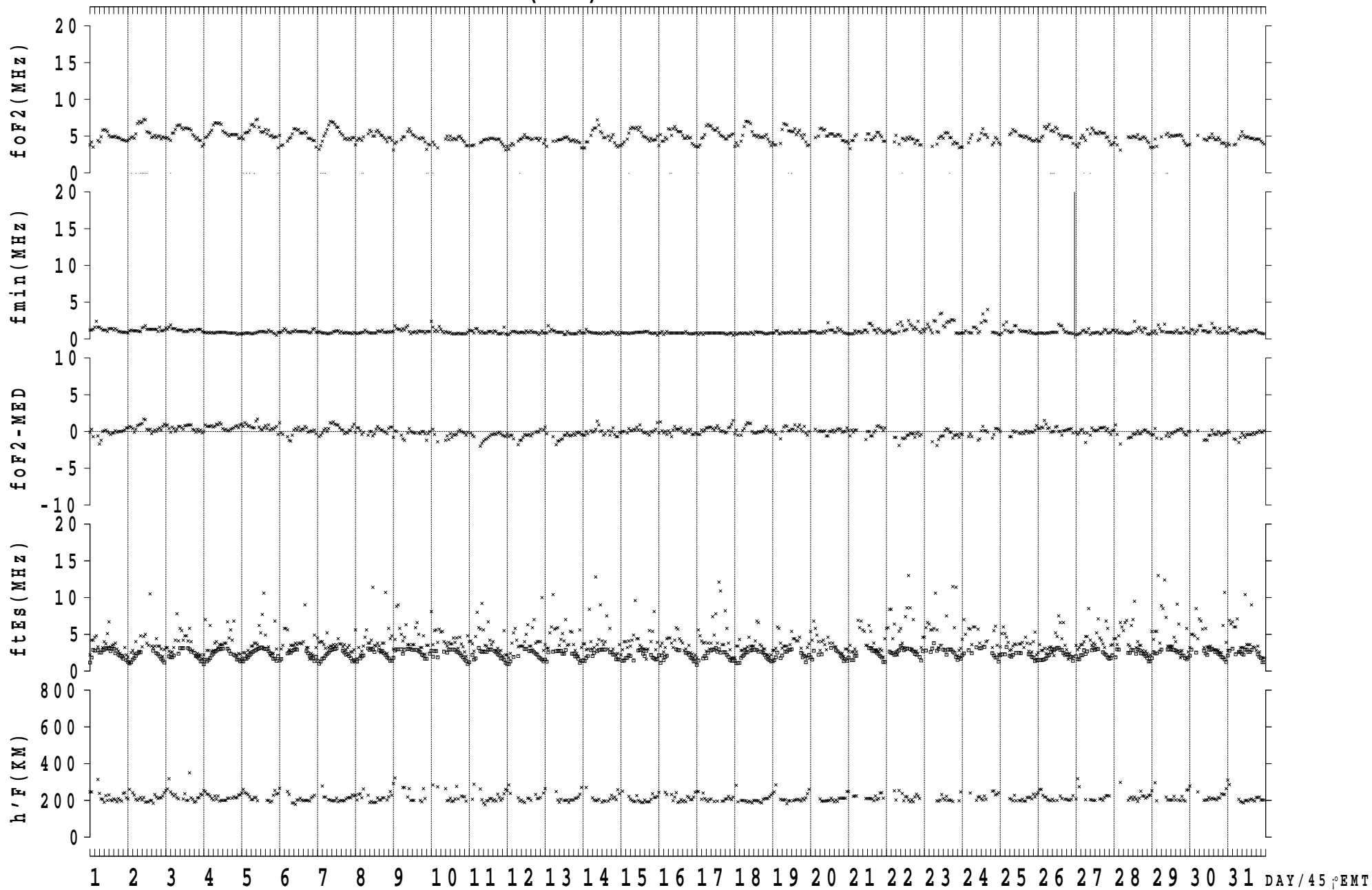
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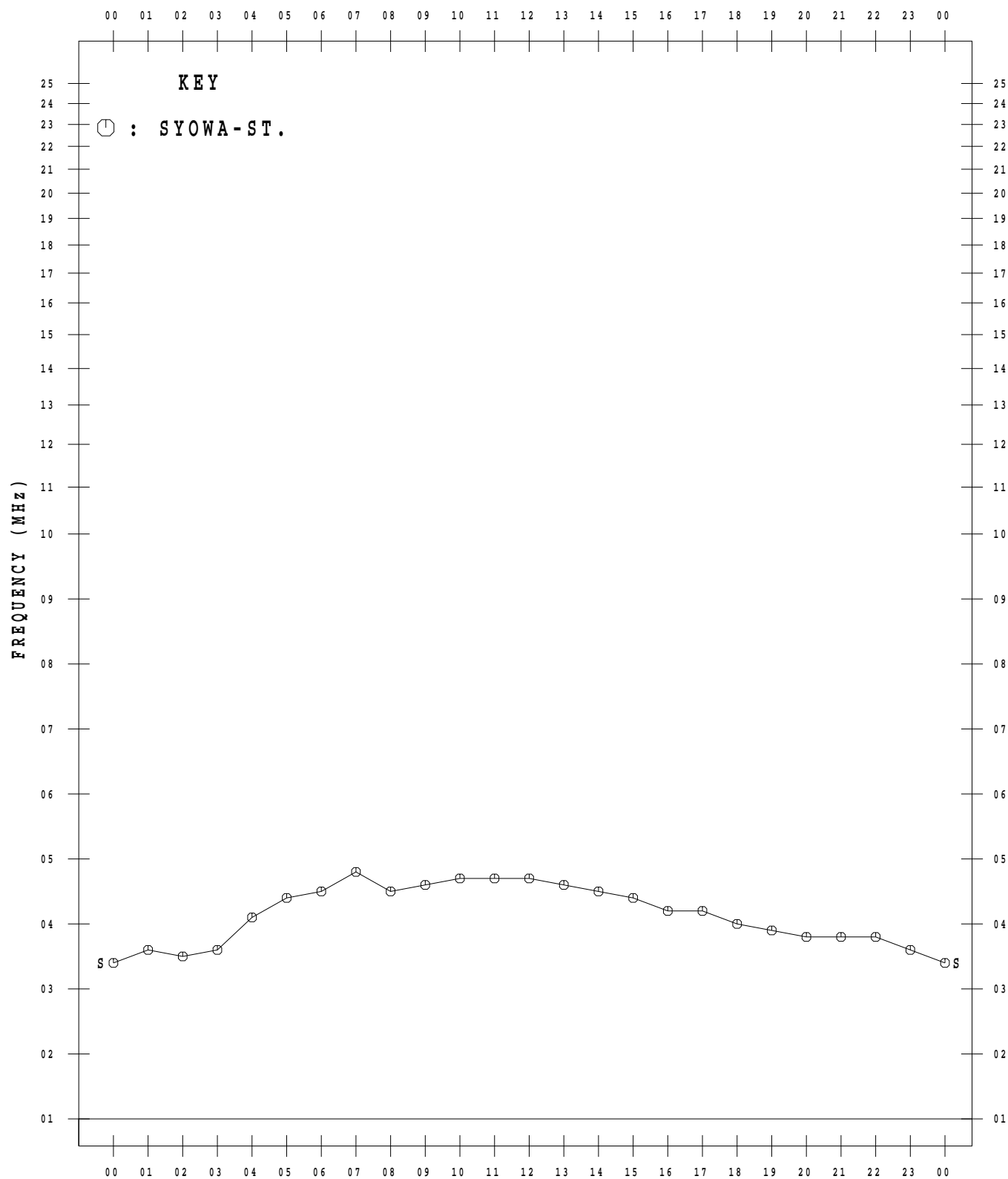
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MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

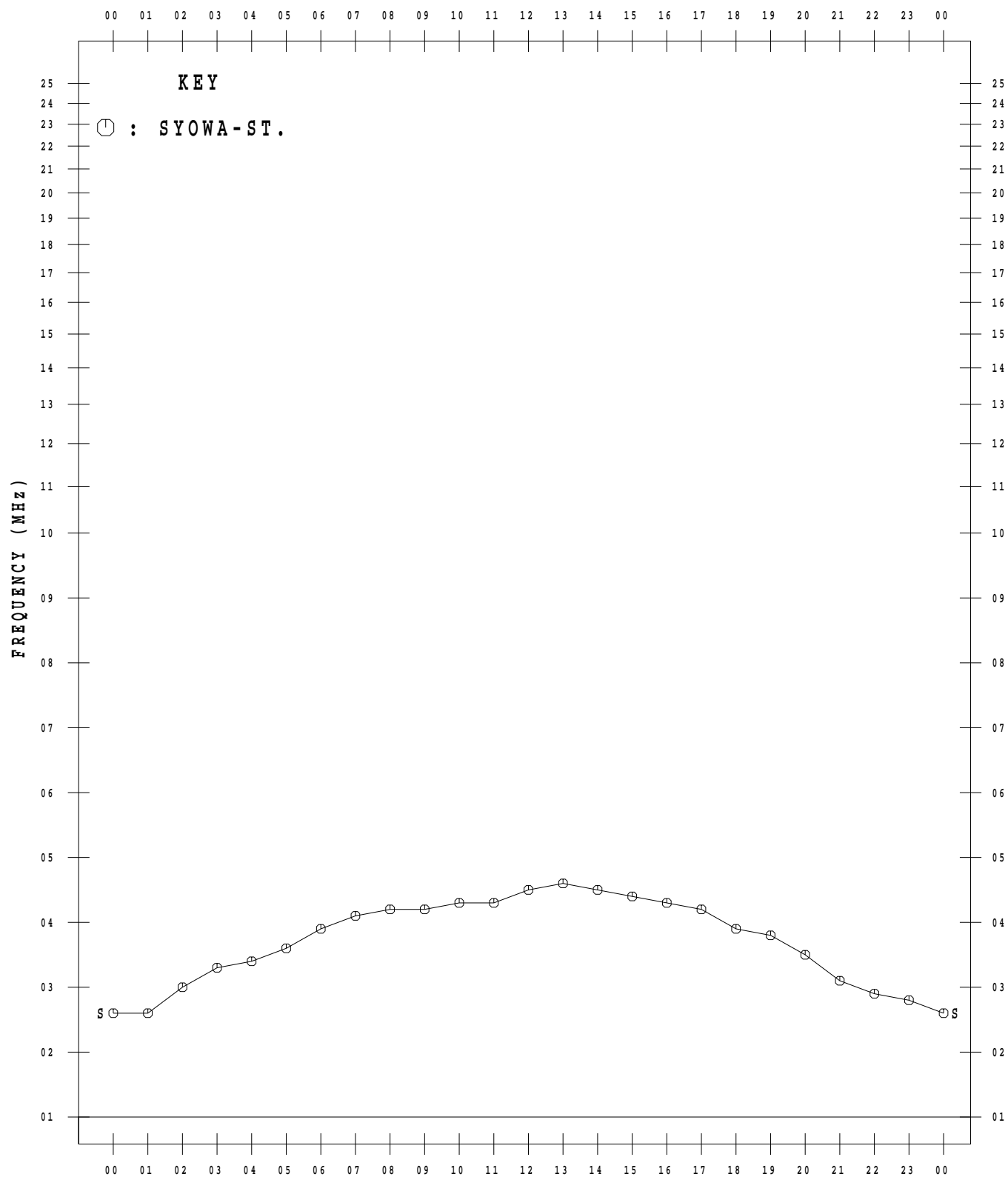
JAN. 2020



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

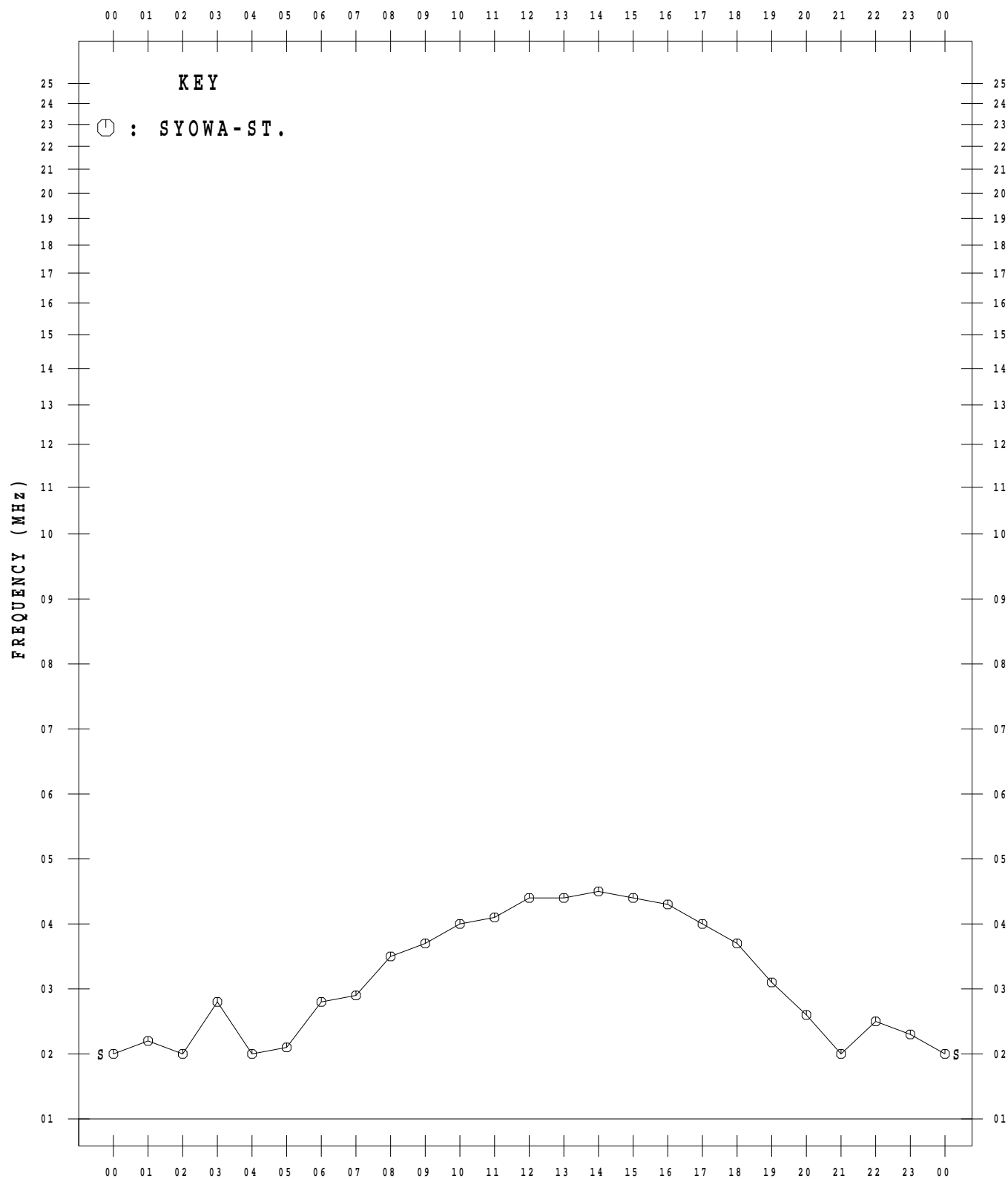
FEB. 2020



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

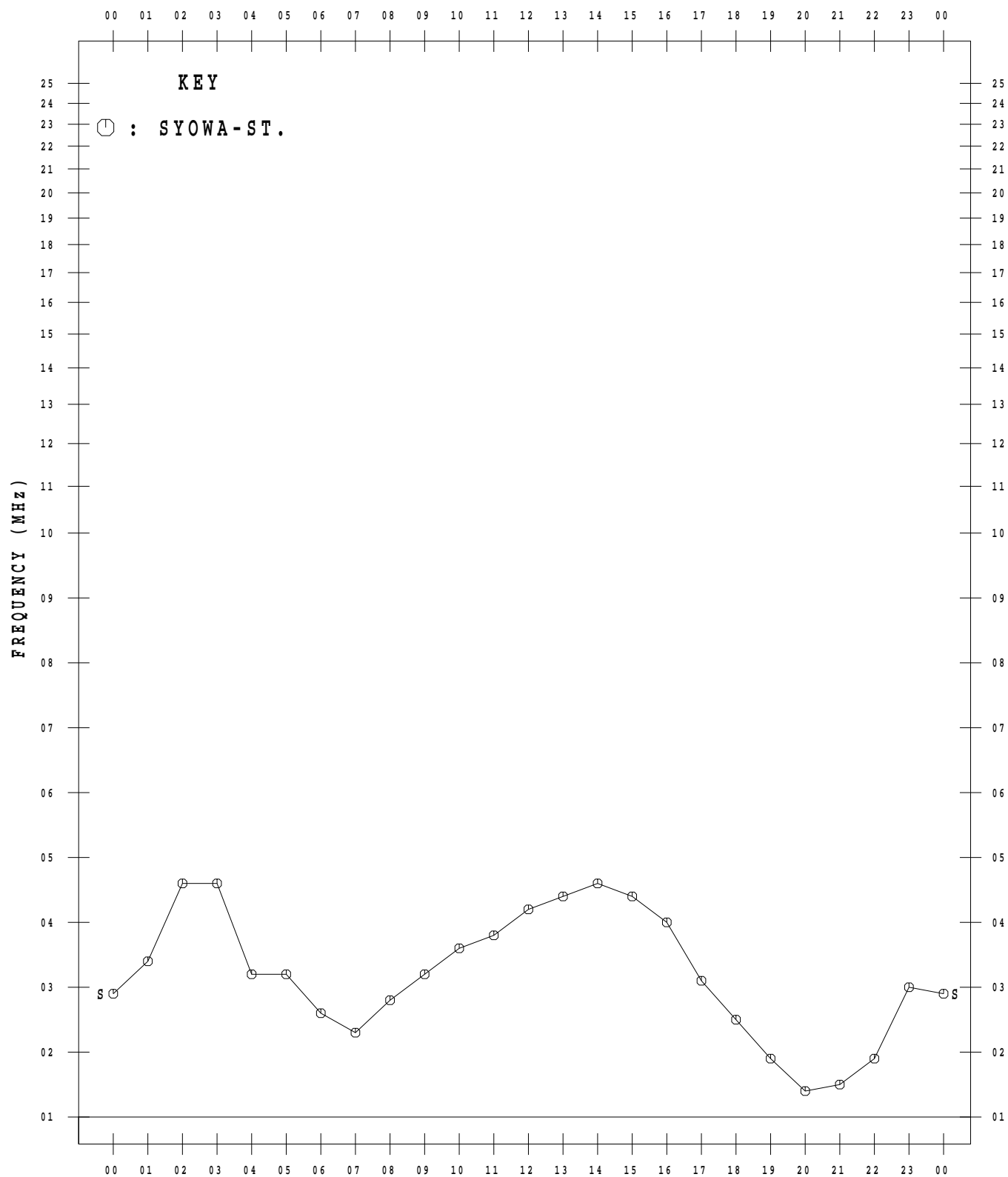
MAR. 2020



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

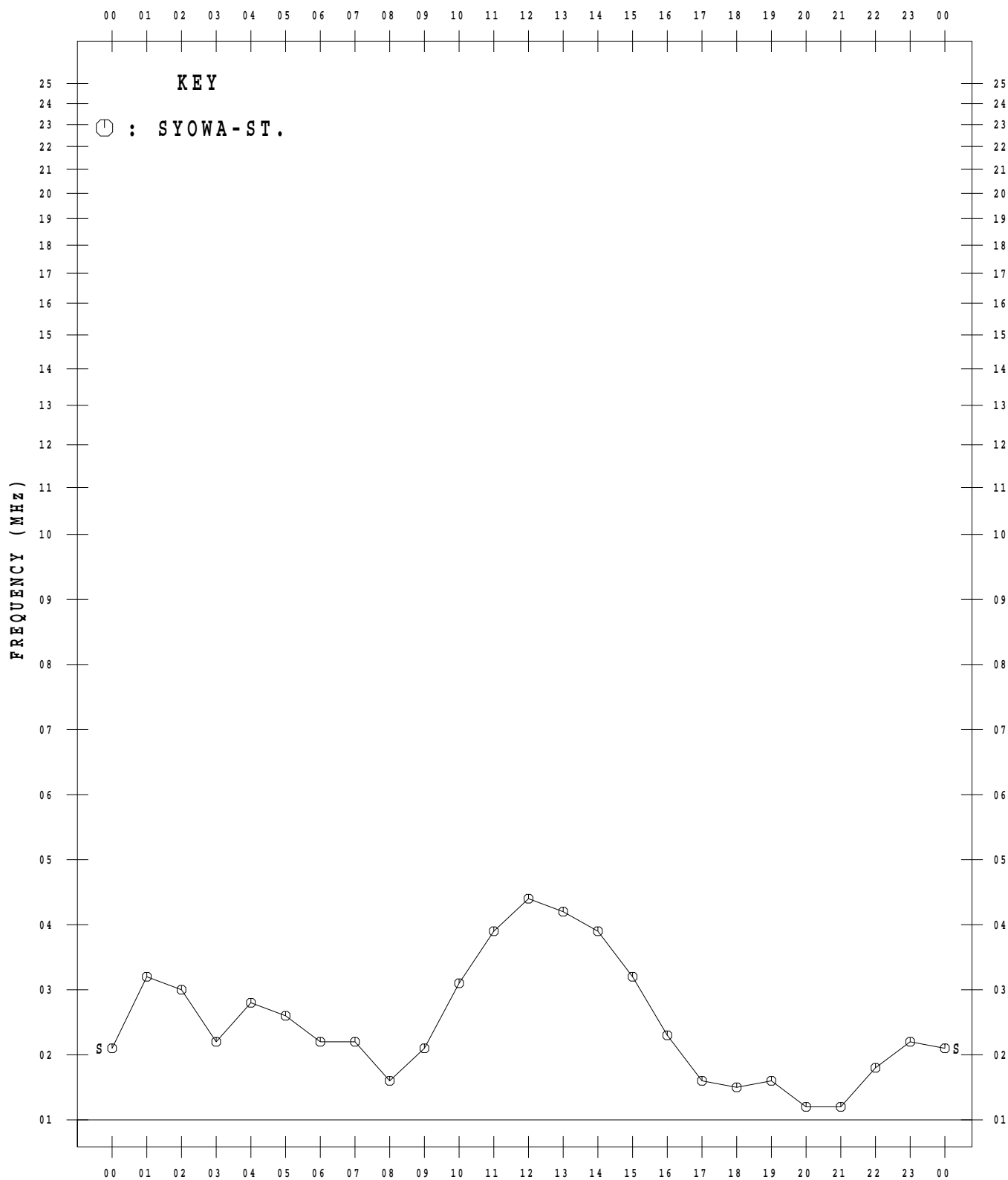
APR. 2020



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

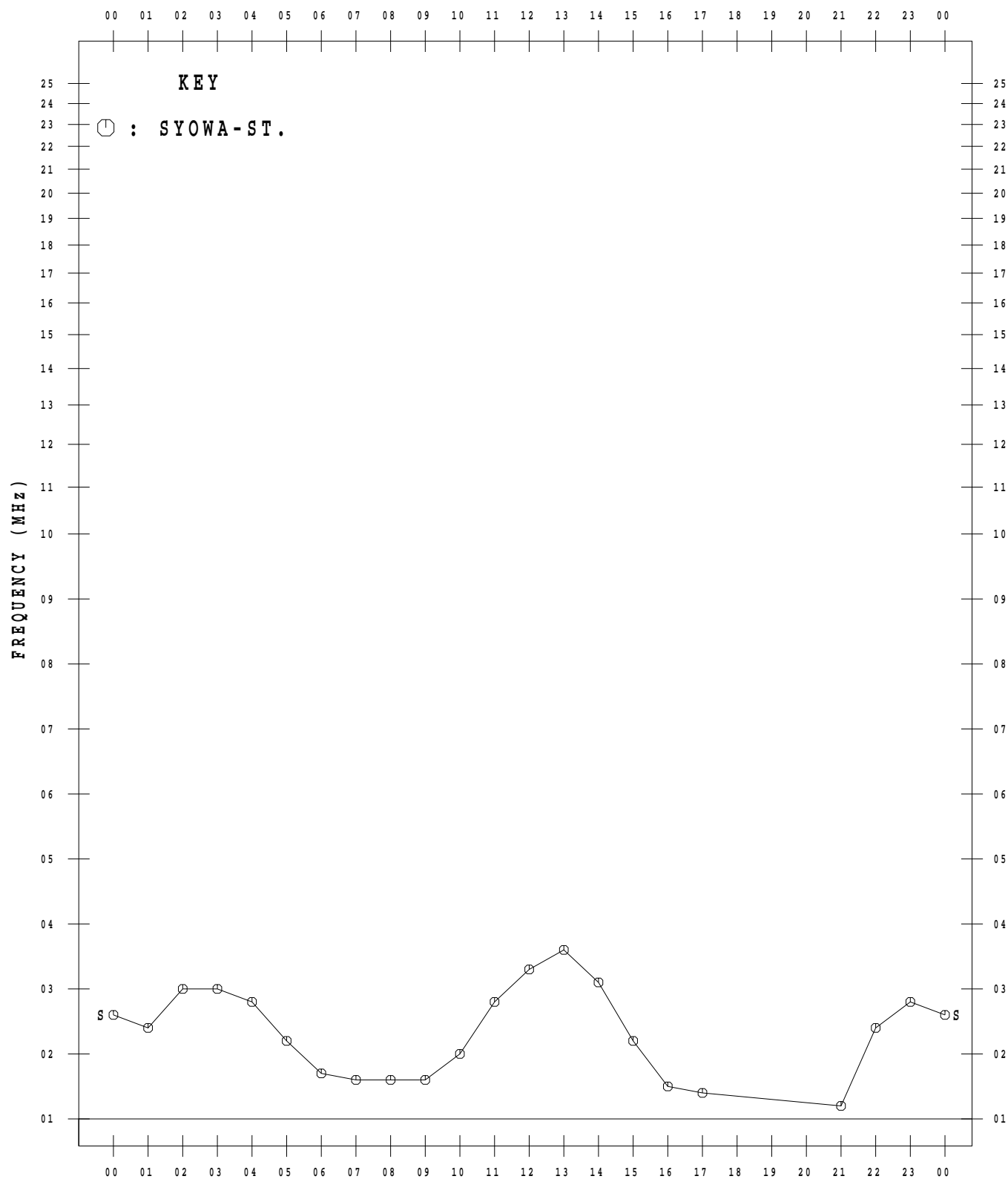
MAY 2020



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

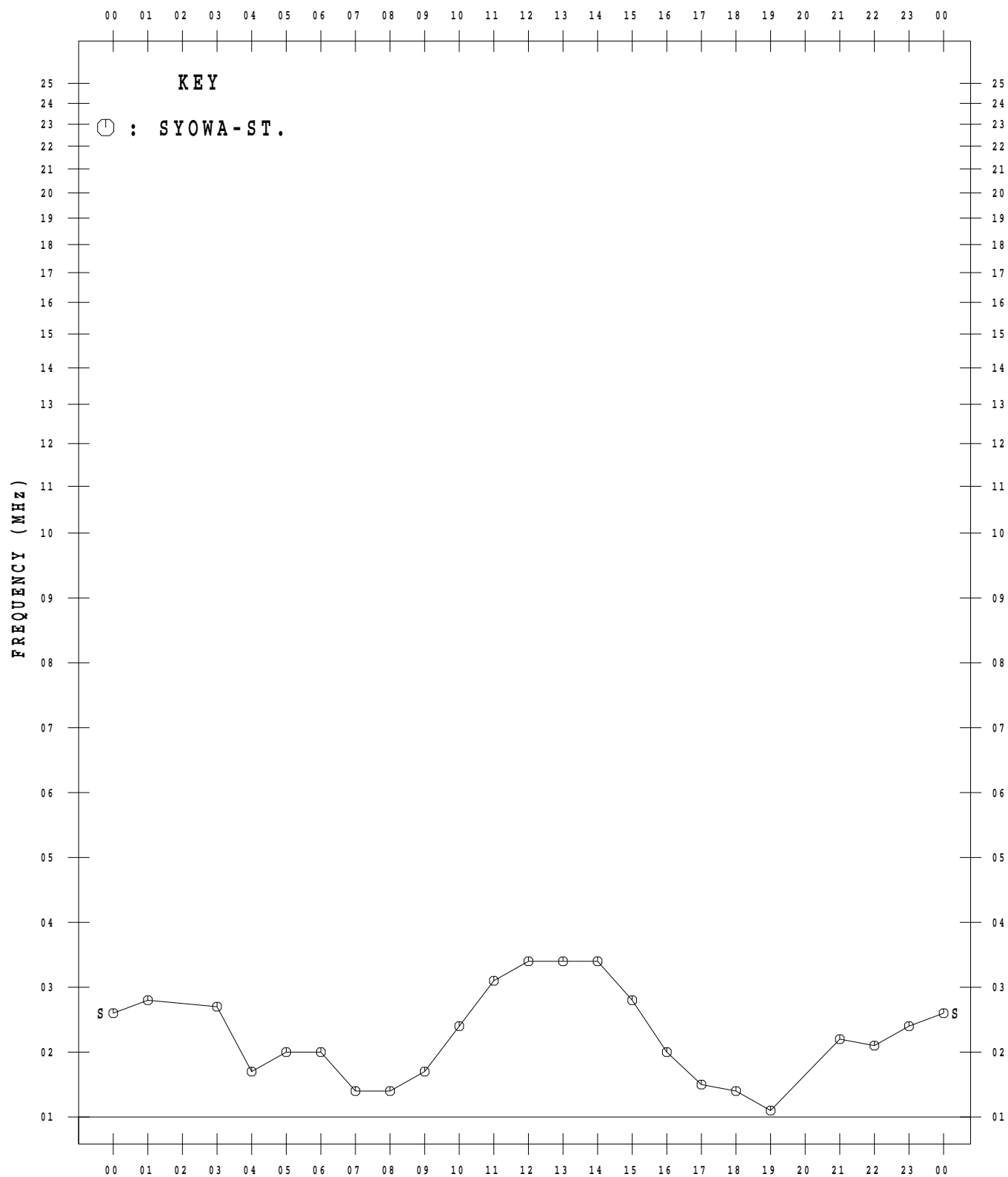
JUN. 2020



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

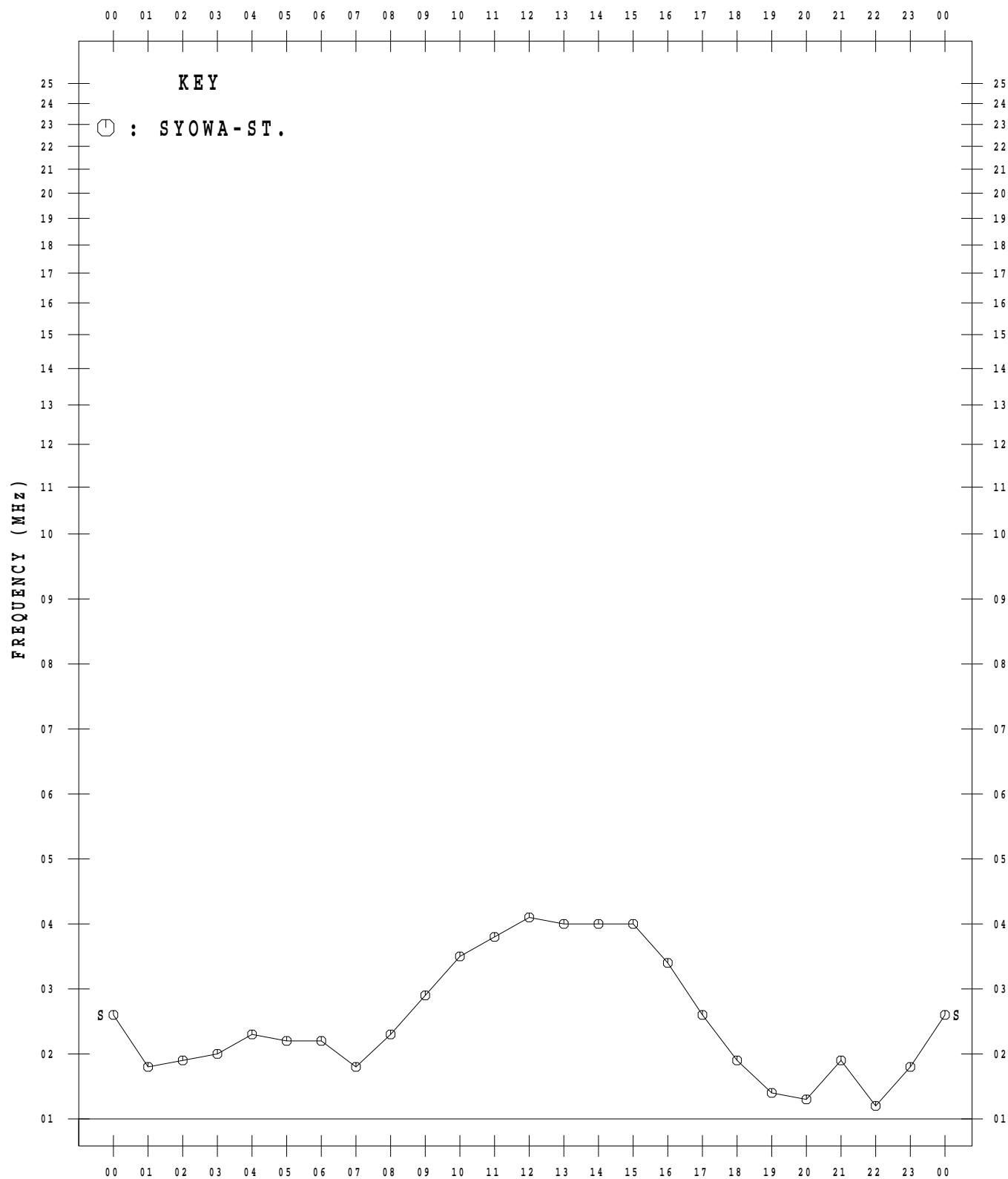
JUL. 2020



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

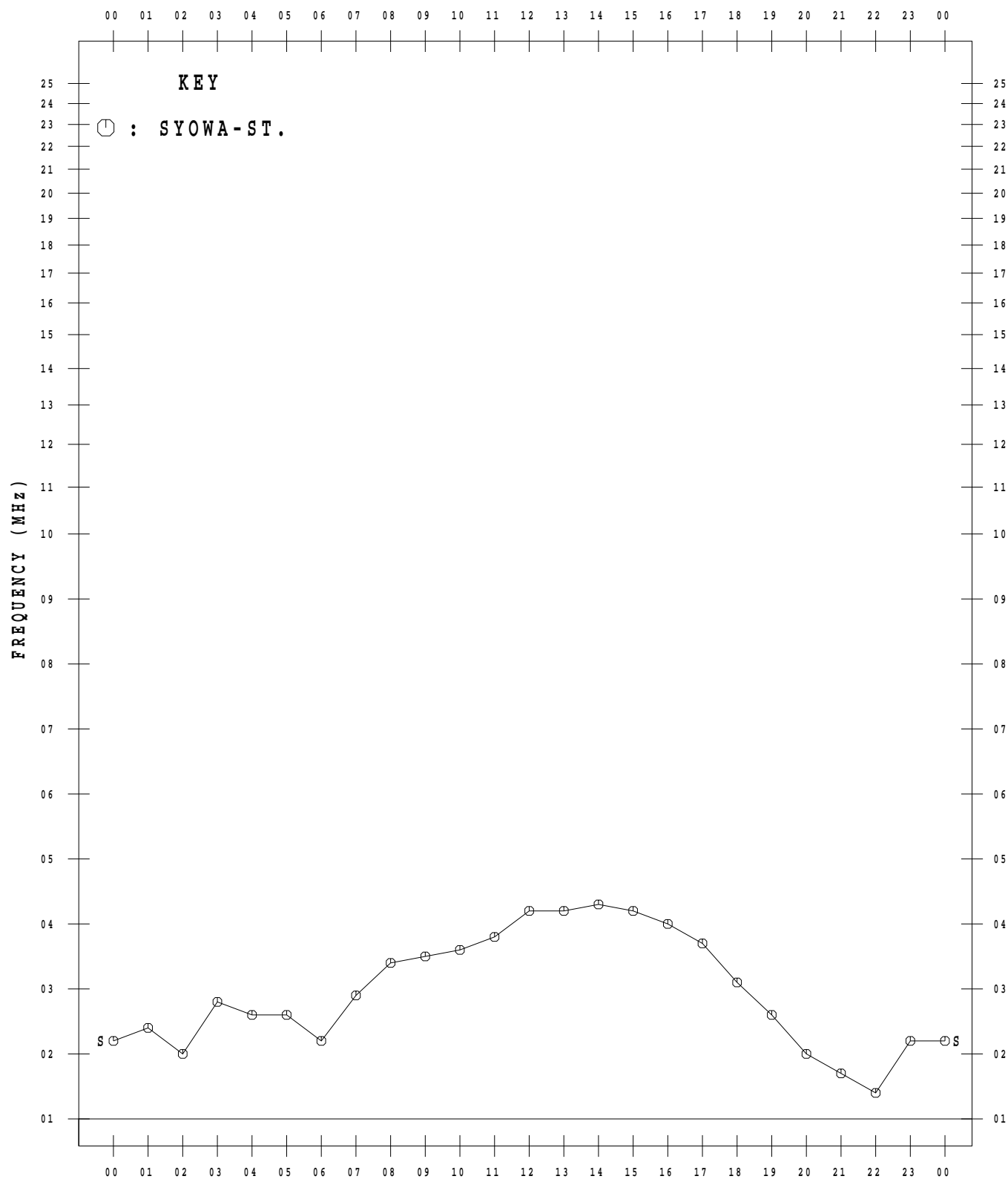
AUG. 2020



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

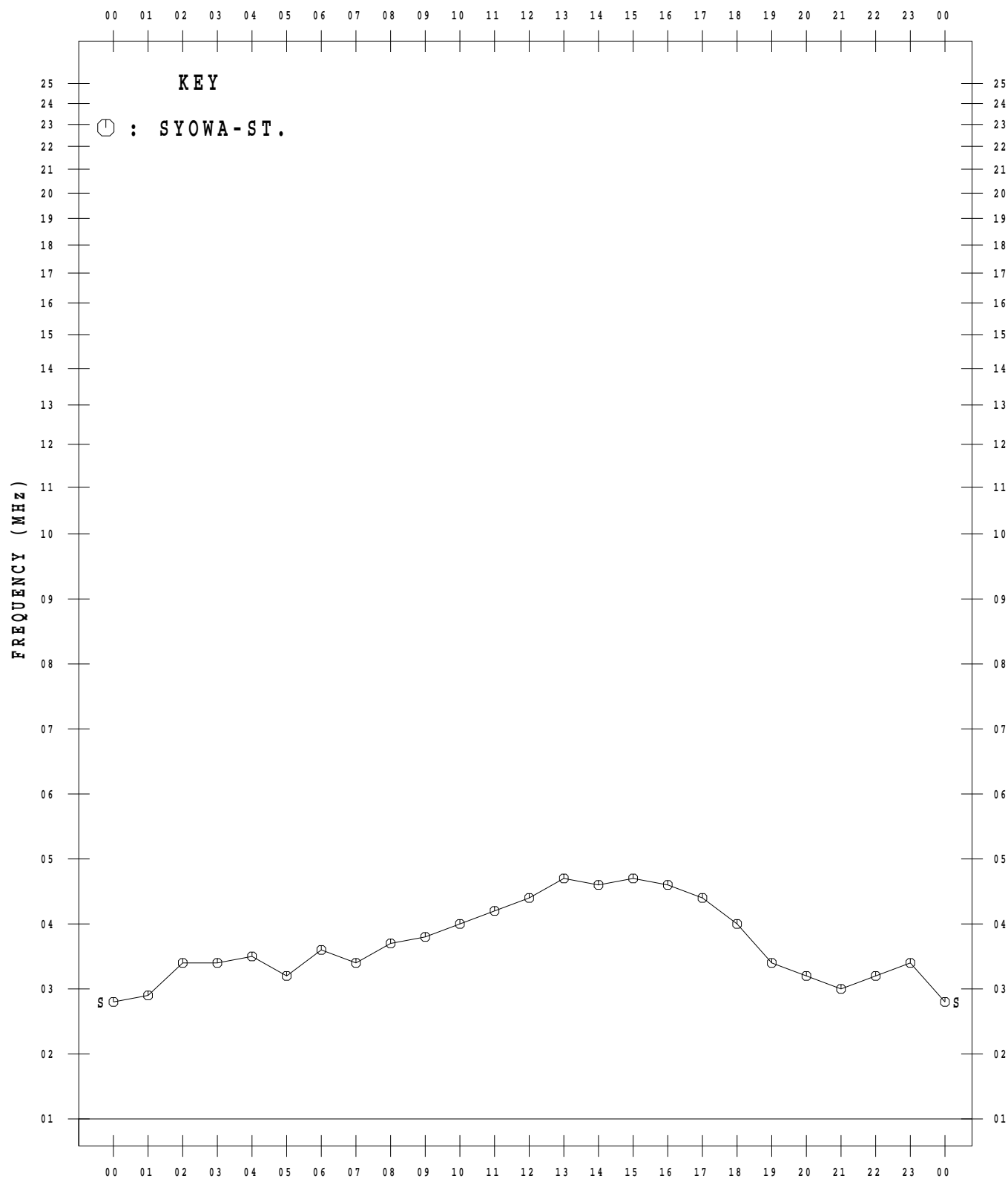
SEP. 2020



MONTHLY MEDIAN VALUES OF f_oF_2

45°E MEAN TIME

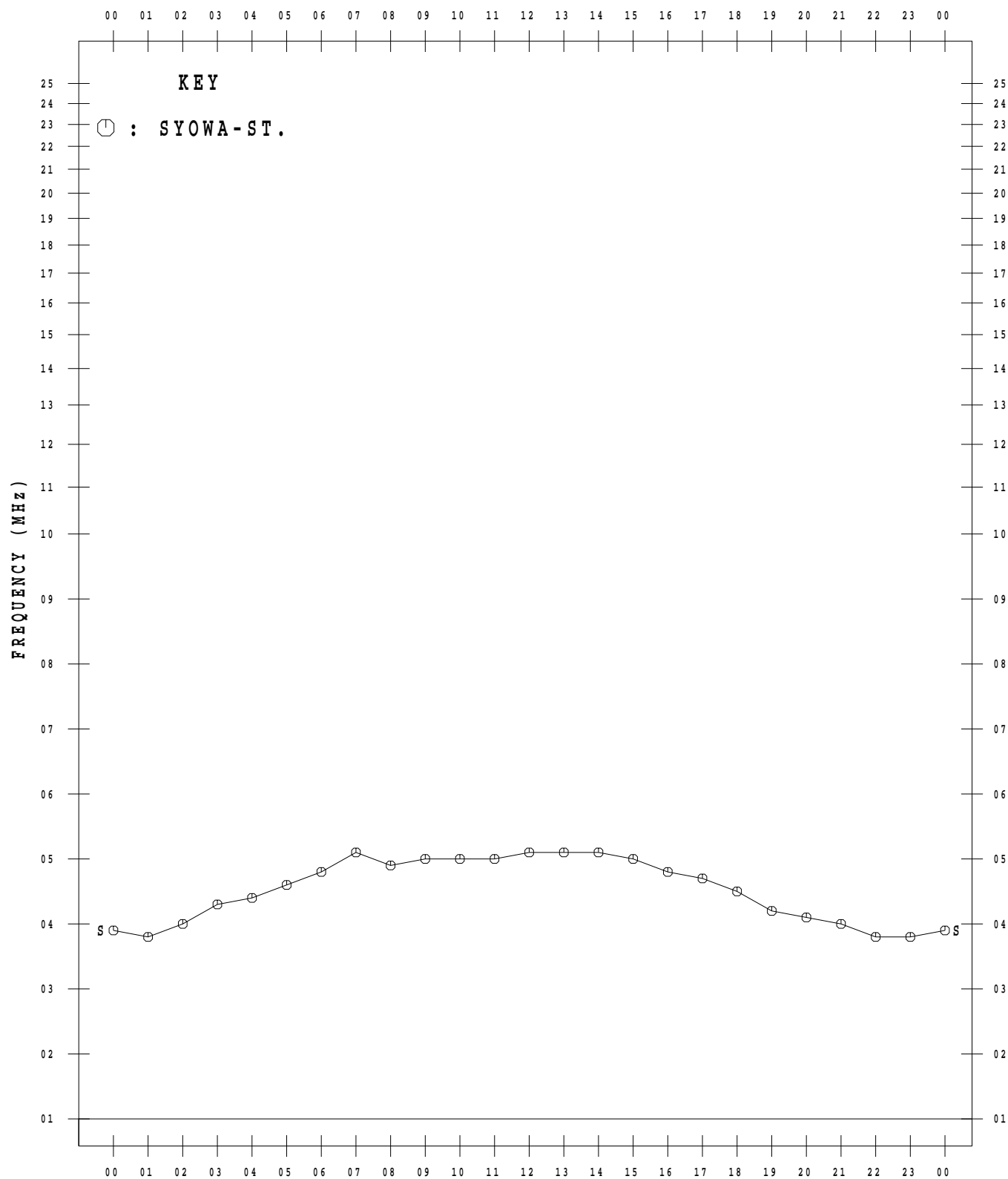
OCT. 2020



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

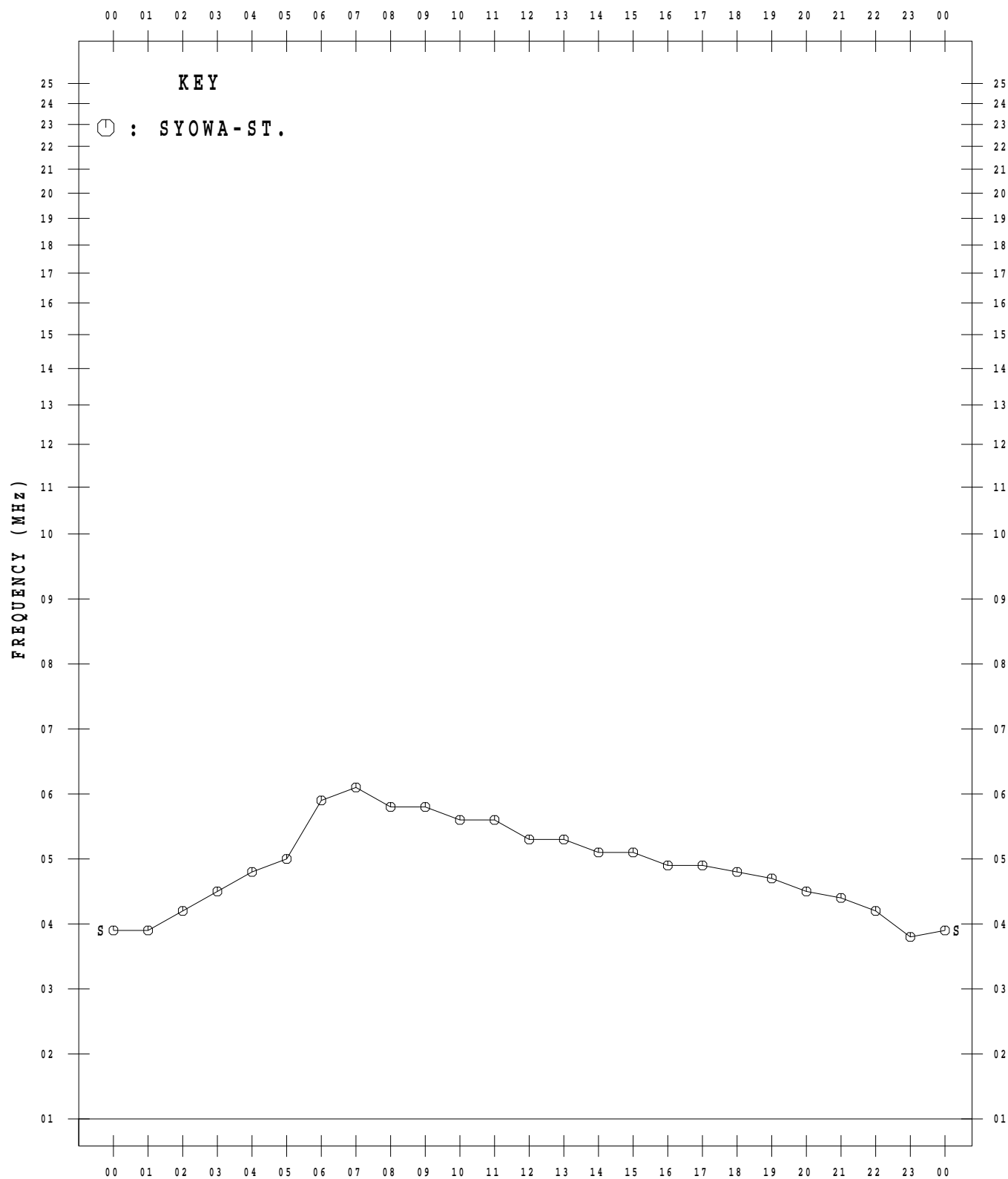
NOV. 2020



MONTHLY MEDIAN VALUES OF f_oF₂

45°E MEAN TIME

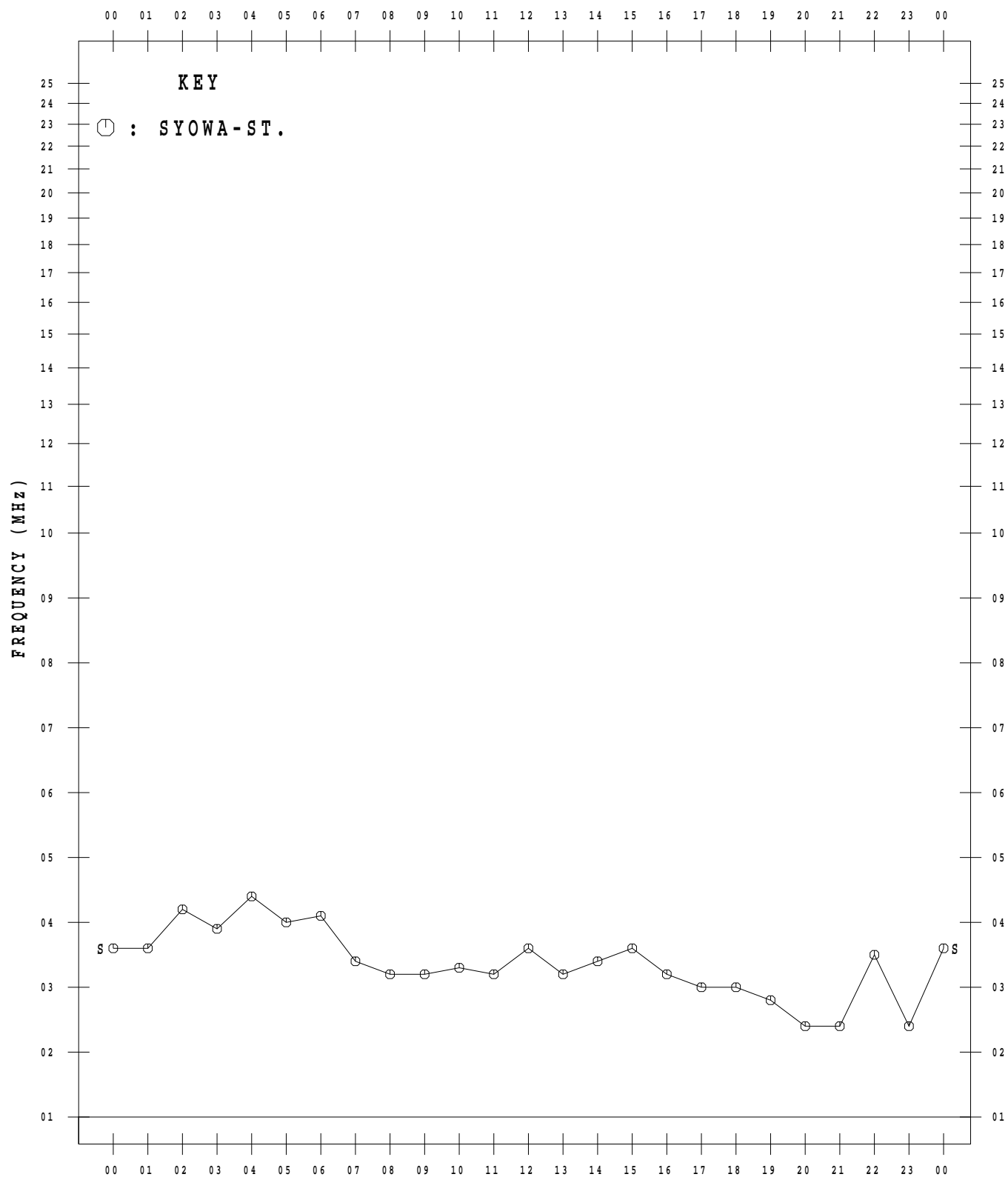
DEC. 2020



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

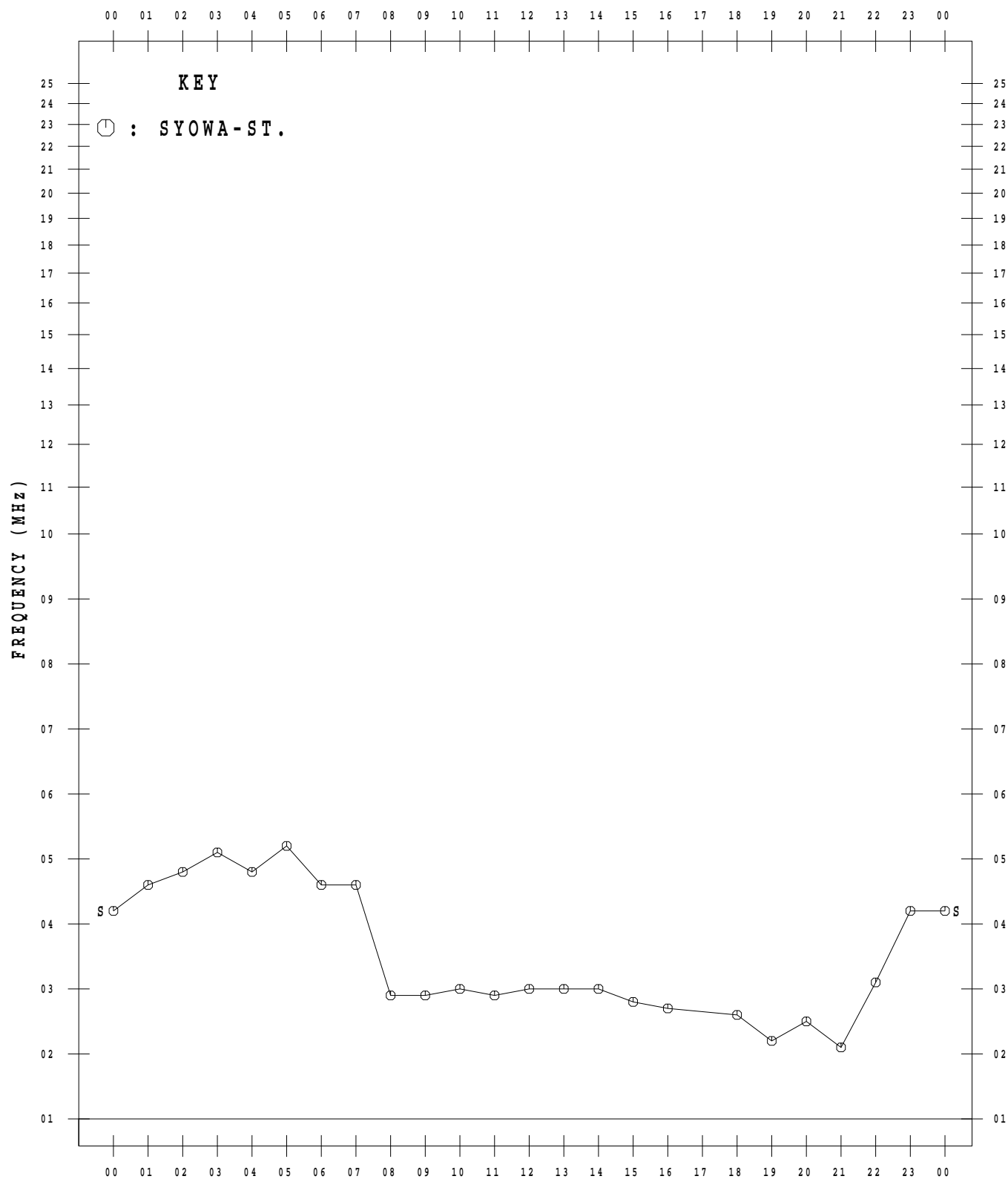
JAN. 2020



MONTHLY MEDIAN VALUES OF f_{tEs}

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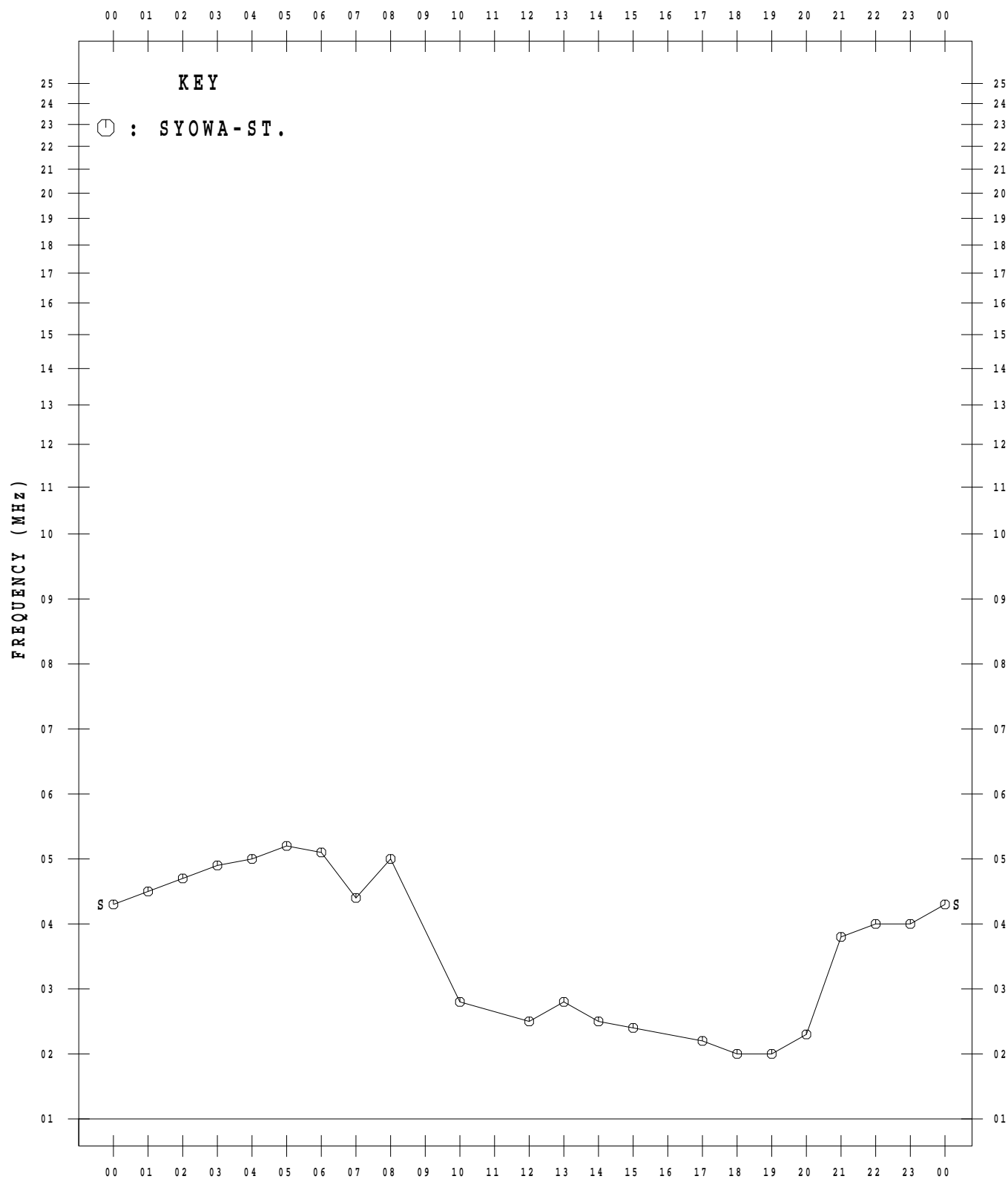
FEB. 2020



MONTHLY MEDIAN VALUES OF f_{TE}s

45°E MEAN TIME

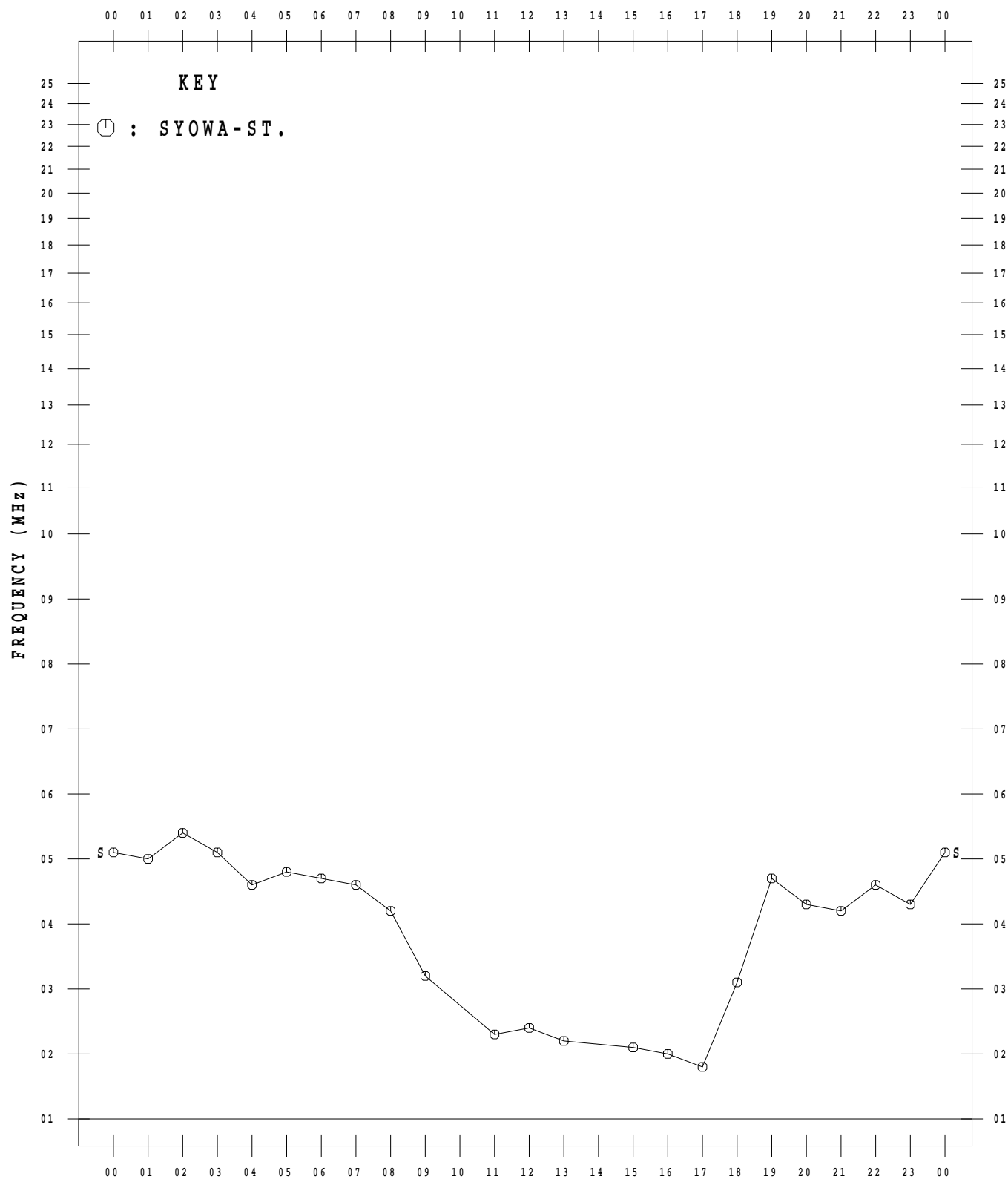
MAR. 2020



MONTHLY MEDIAN VALUES OF f_{TE}s

45°E MEAN TIME

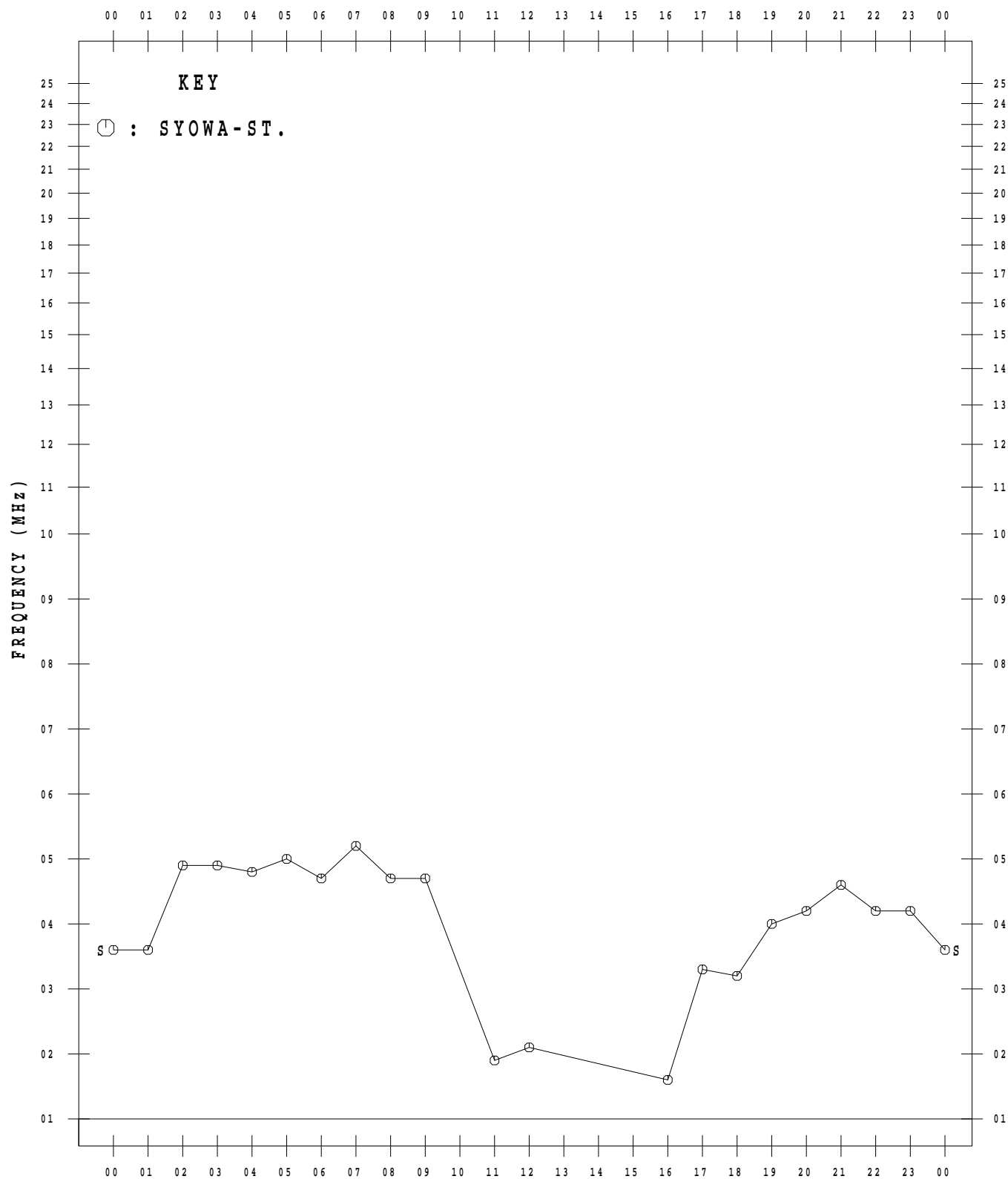
APR. 2020



MONTHLY MEDIAN VALUES OF f_{TE}s

45°E MEAN TIME

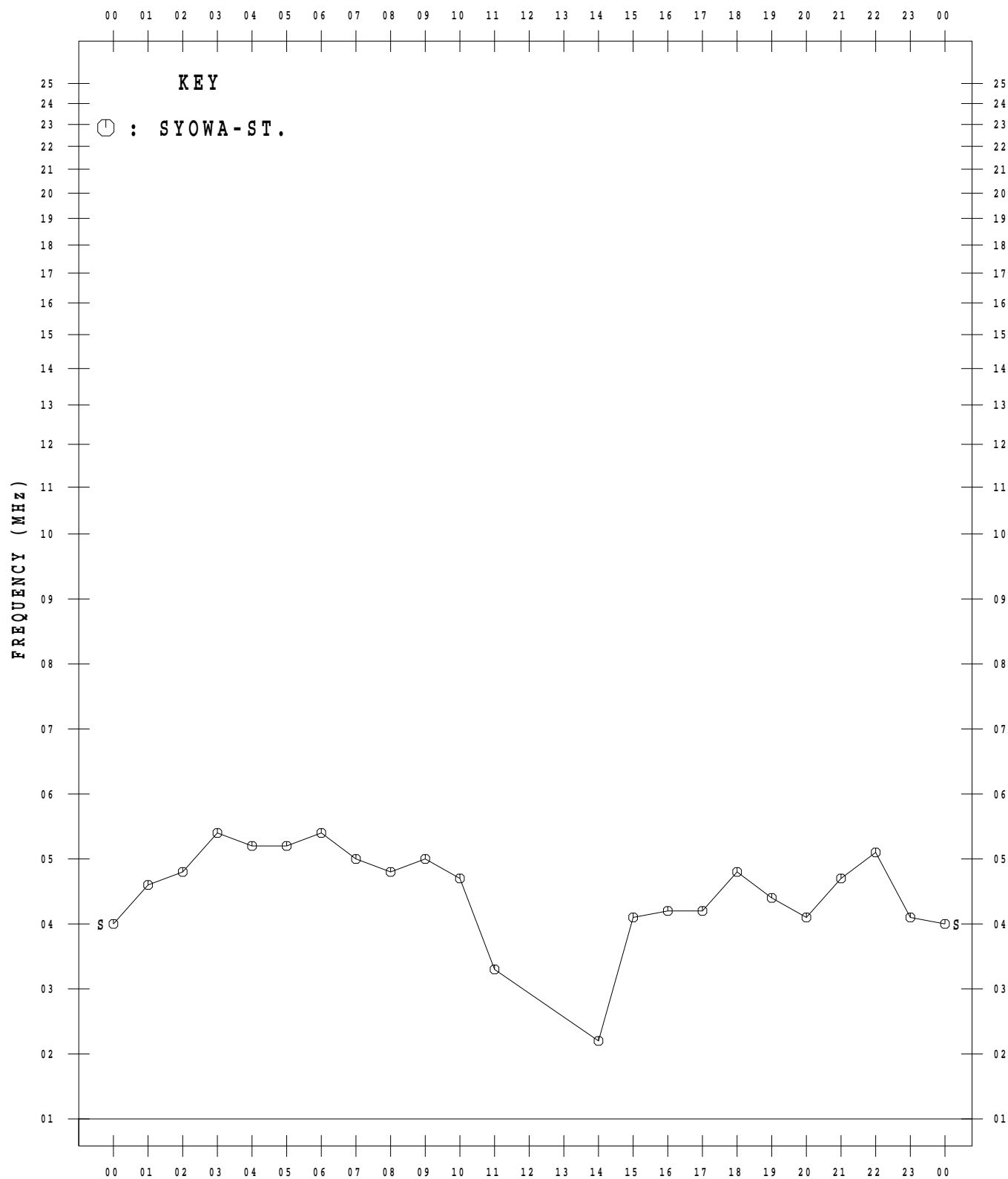
MAY 2020



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

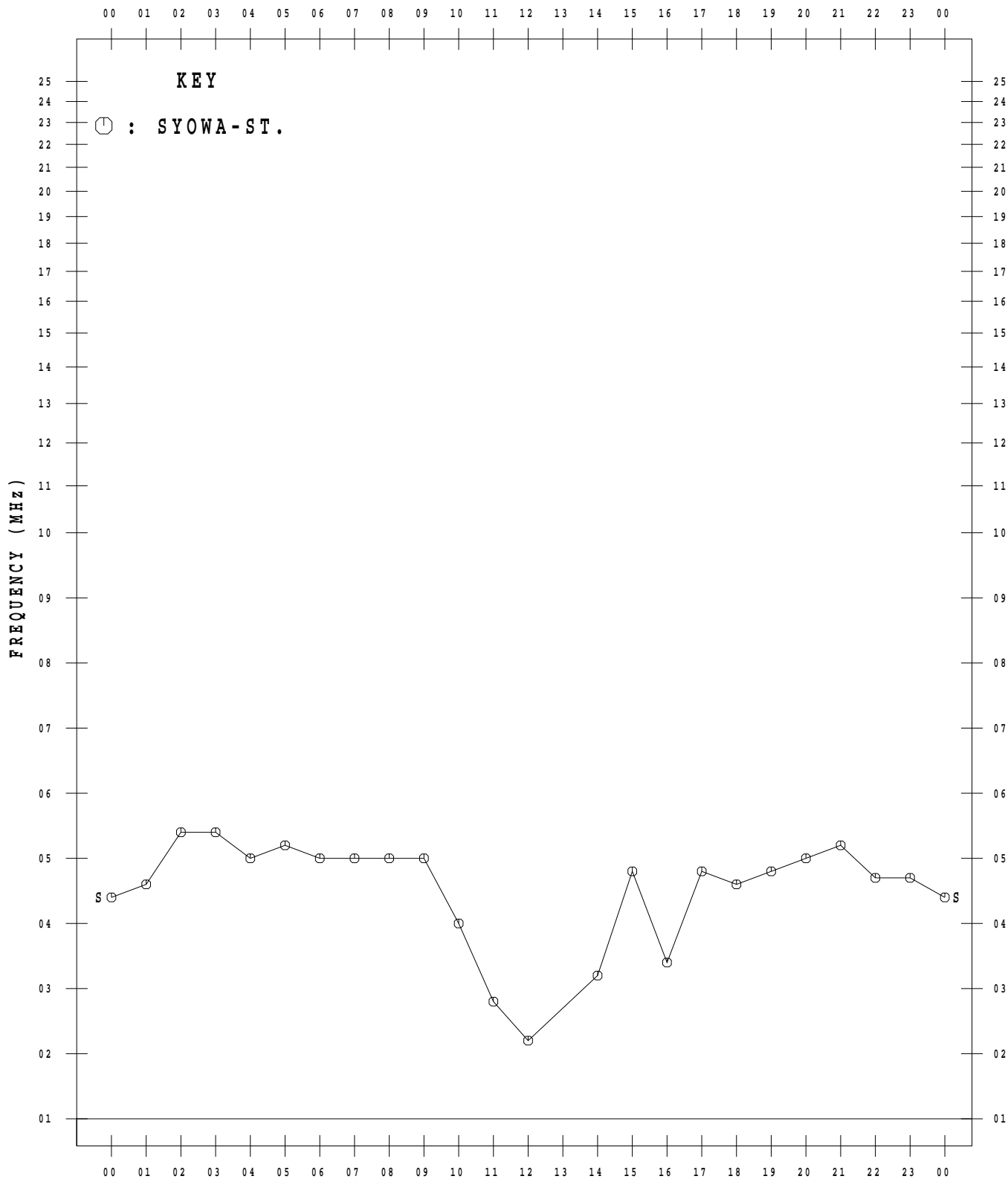
JUN. 2020



MONTHLY MEDIAN VALUES OF f_{tEs}

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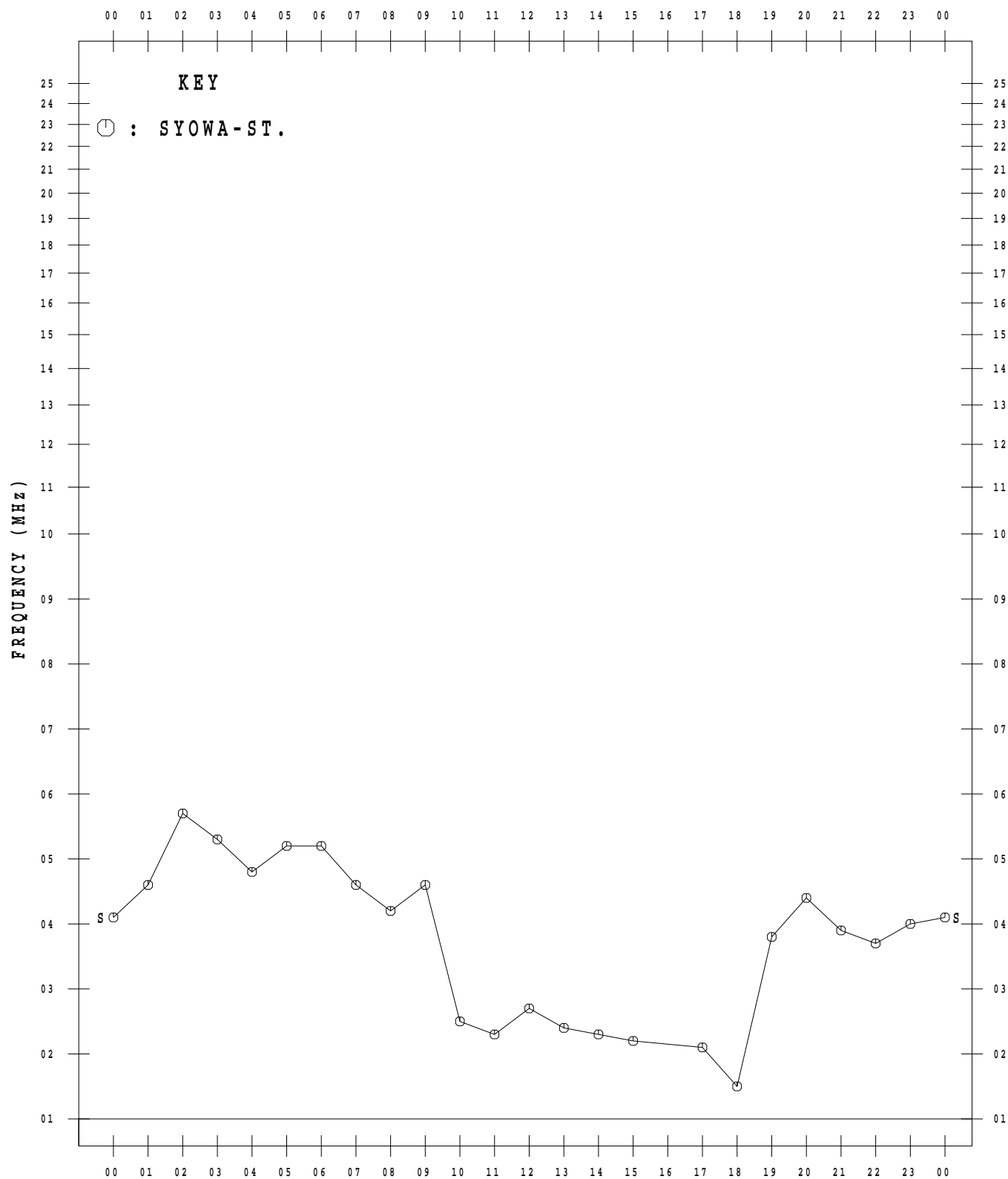
JUL. 2020



MONTHLY MEDIAN VALUES OF f_{TE}s

45°E MEAN TIME

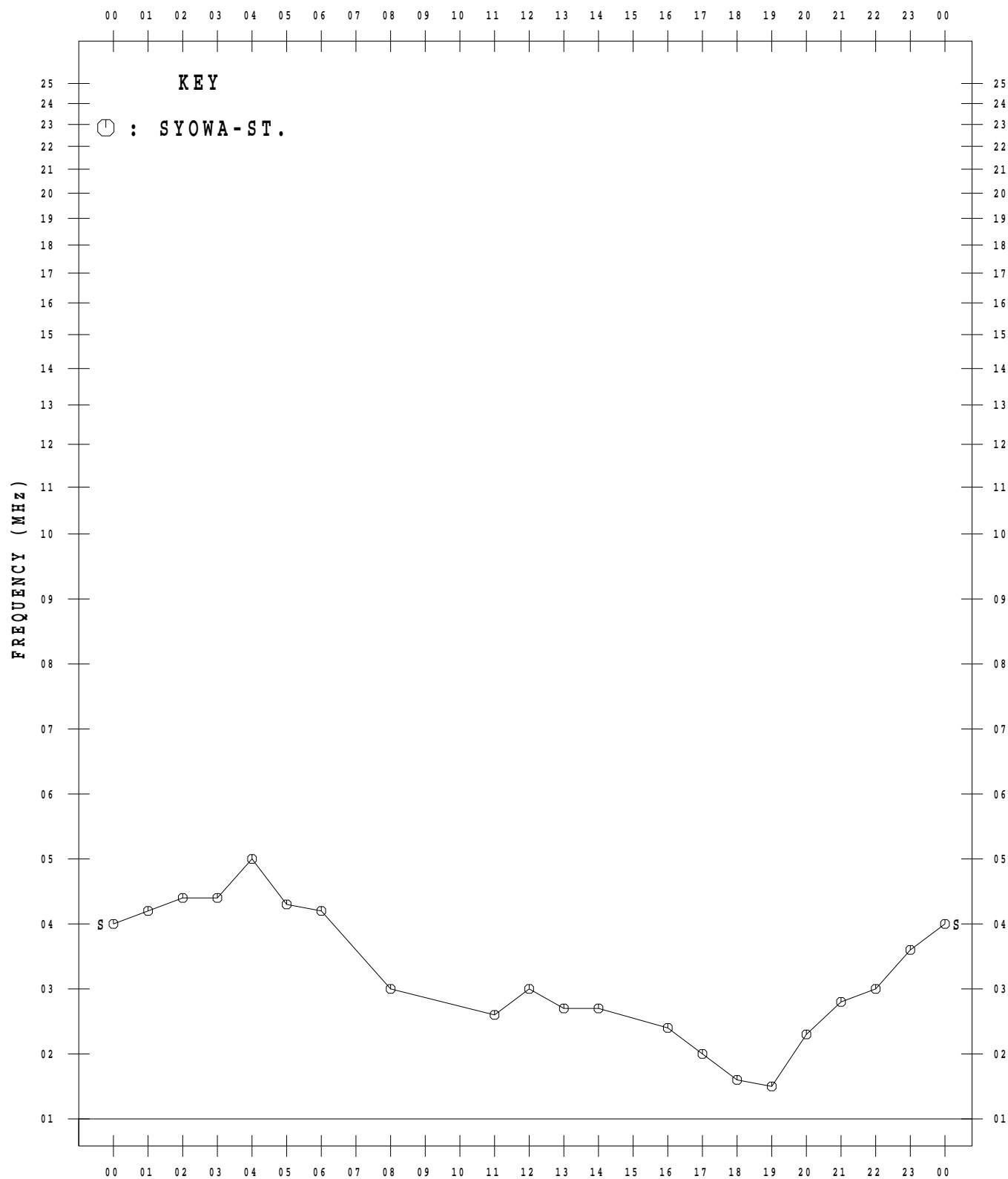
AUG. 2020



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

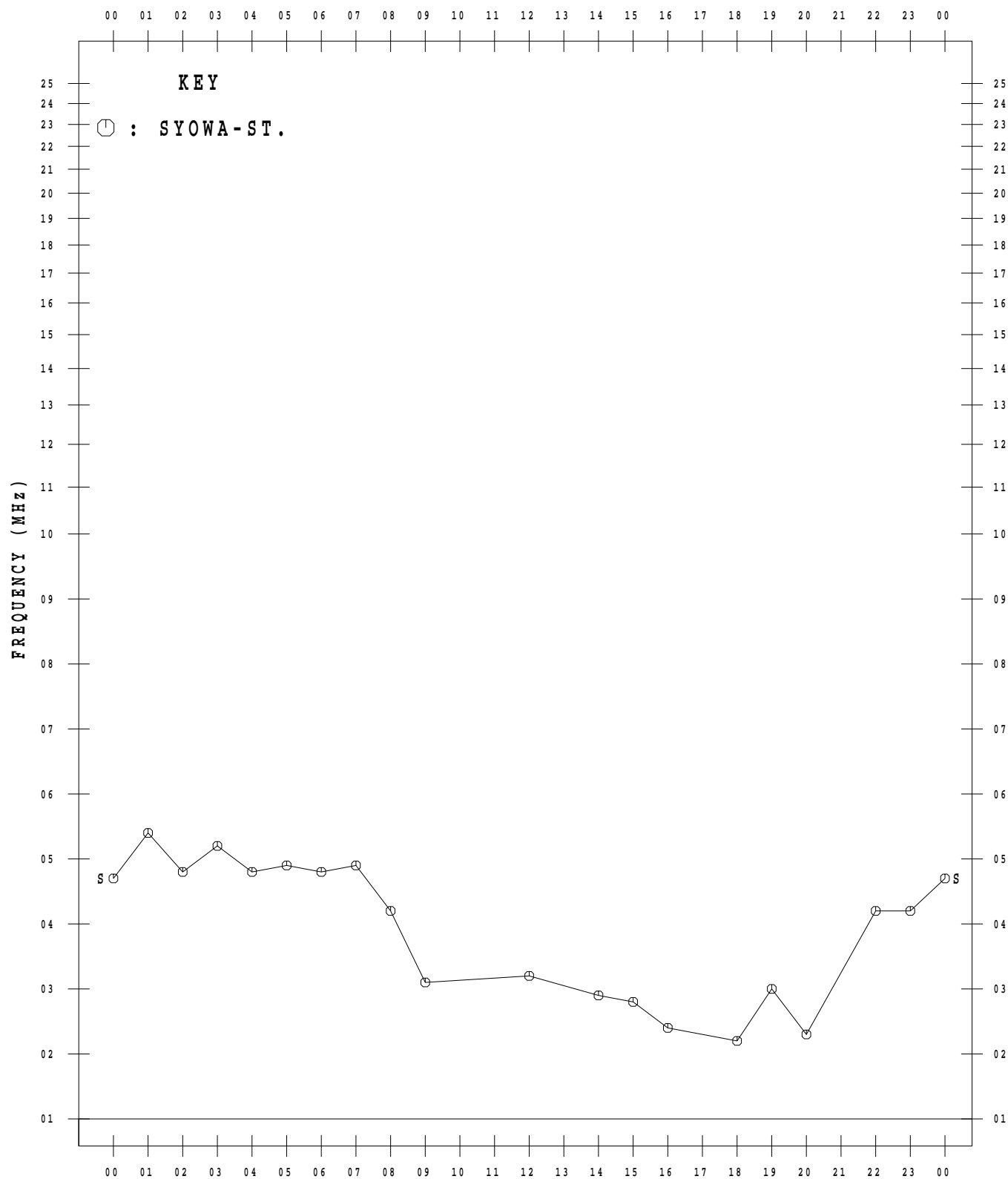
SEP. 2020



MONTHLY MEDIAN VALUES OF f_tE_s

45°E MEAN TIME

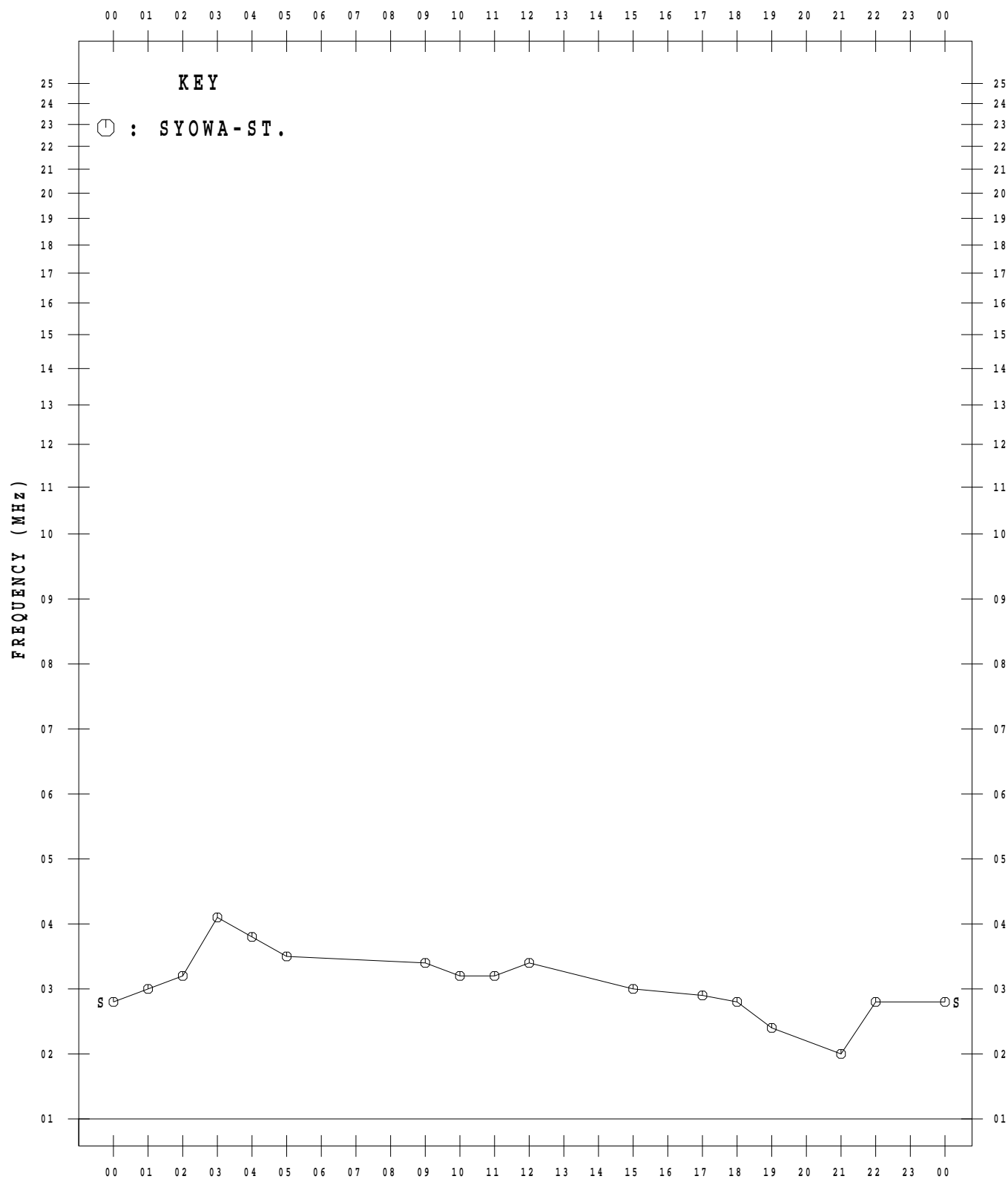
OCT. 2020



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

NOV. 2020



MONTHLY MEDIAN VALUES OF f_{tEs}

45°E MEAN TIME

DEC. 2020

