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# IONOSPHERIC DATA AT SYOWA STATION

# (ANTARCTICA)

January – December 2013

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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 2013. The observations were conducted by the National Institute of Information and Communications Technology. The location of the station, specifications of the ionosonde, and symbols used in this data book are as follows:

| Geographic | | Geomagnetic * | |
|---|---|---|---|
| Latitude | Longitude | Latitude (Deg.) | Longitude (Deg.) |
| 69°00.4'S | 39°35.4'E | - 70.4 | 85.6 |

* Geomagnetic latitude and longitude were calculated using IGRF-11(2013).

SPECIFICATIONS OF THE IONOSONDE USED AT SYOWA STATION (until Oct 2013)

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

SPECIFICATIONS OF THE IONOSONDE USED AT SYOWA STATION (from Nov 2013)

| Items | Specifications |
|---|---|
| Frequency Range | 0.5MHz - 16MHz |
| Transmitting Power | 100W |
| Duration of Sweep | max 155s |
| Transmitted Pulse Width | 500 μs |
| Pulse Repetition Frequency | 1kHz |
| Height Range | 0 - 1000km |
| Recording Media | Hard drive |
| Power Supply | 100V-AC, 1.5kVA |
| Transmitting Antenna and Receiving Antenna | 40m-high vertical delta antennas terminated by 400Ω |

## OBSERVERS

Observer: H. Kitauchi

Scaler: K. Fukushima

## DESCRIPTION

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

b. Characteristics of Ionosphere

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

Symbols

( i ) Descriptive Letters.
The following letters are entered after, or used to replace, numerical values on the monthly tabulation sheets.

A Measurement influenced by, or impossible because of, the presence of a lower thin layer, for example, *Es*.
B Measurement influenced by, or impossible because of, absorption in the vicinity of *fmin*.
C Measurement influenced by, or impossible because of, any non-ionospheric reason.
D Measurement influenced by, or impossible because of, the upper limit of the normal frequency range.
E Measurement influenced by, or impossible because of, the lower limit of the normal frequency range.
F Measurement influenced by, or impossible because of, the presence of spread echoes.
G Measurement influenced or impossible because the ionization density of the layer is too small to enable it to be made accurately.
H Measurement influenced by, or impossible because of, the presence of stratification.
K Presence of particle *E* layer.
L Measurement influenced or impossible because the trace has no sufficiently definite cusp between layers.
M Interpretation of measurement questionable because ordinary and extraordinary components are not distinguishable.
N Conditions are such that the measurement cannot be interpreted.
O Measurement refers to the ordinary component.
P Spur type spread present.

Q Range spread present.
R Measurement influenced by, or impossible because of, attenuation in the vicinity of a critical frequency.
S Measurement influenced by, or impossible because of, interference or atmospherics.
T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
V Forked trace that may influence the measurement.
W Measurement influenced or impossible because the echo lies outside the recorded height range.
X Measurement refers to the extraordinary component.
Y Lacuna phenomena, severe layer tilt .
Z Third magneto- electronic component present.

( ii ) Qualifying Letters

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

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

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

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

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

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

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

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

# IONOSPHERIC DATA STATION SHOWA-ST.

**JAN. 2013** fxI (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | X 56 | 56 | X 59 | X 65 | X 71 | O X 72 | X 72 | X 80 | R | X 86 | O X 84 | X 80 | O X 84 | O X 82 | X 76 | X 74 | X 67 | X 65 | X 63 | X 62 | X 63 | R | X 63 | X 63 |
| 2 | X 60 | X 58 | X 66 | X 72 | O X 83 | X 93 | O X 89 | X 99 | O X 100 | X 100 | X 91 | X 92 | O X 90 | X 92 | O X 85 | X 82 | O X 80 | O X 73 | X 71 | X 71 | 72 | X 68 | O X 65 | O X 64 |
| 3 | X 54 | 55 | X 51 | X 52 | X 56 | X 63 | X 76 | X 84 | X 84 | O X 87 | X 84 | X 83 | R | X 76 | O X 73 | O X 66 | X 66 | O X 66 | O X 65 | R | X 65 | X 64 | X 64 | O X 63 |
| 4 | X 57 | X 64 | X 71 | X 80 | X 80 | 73 | 74 | X 95 | X 96 | X 100 | O X 96 | R | O X 89 | X 82 | X 76 | O X 72 | X 71 | X 68 | O X 65 | X 65 | X 67 | 68 | O X 71 | X 68 |
| 5 | 66 | X 64 | 69 | X 67 | X 75 | X 87 | X 93 | X 96 | X 100 | X 101 | O X 102 | X 102 | R | O X 90 | R | R | C | X 72 | X 67 | O X 66 | 69 | X 67 | X 64 | X 63 |
| 6 | X 58 | X 56 | X 57 | X 65 | X 75 | X 81 | X 90 | X 92 | X 95 | O X 99 | Y | O X 96 | R | O X 86 | O X 79 | X 77 | X 71 | X 70 | X 68 | X 65 | X 66 | X 62 | X 54 | 54 |
| 7 | X 56 | O X 57 | X 60 | O X 61 | O X 62 | X 66 | X 74 | X 77 | O X 87 | O X 88 | R | R | R | O X 74 | O X 68 | R | R | O X 65 | X 67 | X 64 | X 62 | O X 62 | O X 60 | X 58 |
| 8 | X 57 | 71 | 65 | 68 | X 70 | O X 72 | X 78 | X 89 | X 94 | X 94 | X 94 | X 94 | O X 86 | X 78 | O X 72 | R | X 69 | X 67 | X 64 | X 58 | X 64 | X 64 | X 51 | X 48 |
| 9 | X 49 | O X 50 | X 56 | R | R | R | X 71 | X 69 | X 72 | X 81 | X 86 | O X 76 | X 79 | O X 73 | O X 73 | O X 72 | O X 70 | X 71 | O X 71 | X 69 | X 62 | X 62 | X 59 | 56 |
| 10 | X 45 | X 51 | O X 50 | X 58 | X 66 | X 72 | 68 | X 81 | X 87 | X 91 | O X 93 | R | O X 82 | O X 85 | R | O X 69 | X 68 | X 64 | X 69 | X 66 | X 63 | X 63 | X 62 | X 62 |
| 11 | X 58 | X 58 | X 58 | X 64 | 71 | X 81 | X 89 | X 97 | O X 96 | X 94 | O X 98 | X 98 | X 92 | R | X 81 | R | X 68 | X 67 | X 71 | X 67 | X 65 | X 65 | X 63 | 62 |
| 12 | X 64 | 70 | 64 | X 62 | X 62 | O X 63 | O X 64 | R | 76 | X 95 | X 95 | O X 93 | R | X 76 | Y | X 71 | X 70 | X 64 | X 62 | X 62 | X 64 | X 58 | X 51 | X 47 |
| 13 | X 60 | X 64 | O X 64 | X 64 | A | B | R | X 68 | O X 72 | X 74 | Y | O X 86 | O X 86 | X 80 | O X 75 | X 70 | O X 67 | O X 64 | X 61 | R | X 56 | X 50 | X 49 | R |
| 14 | R | X 47 | B | B | X 56 | R | B | R | X 58 | O X 65 | B | C | C | C | C | C | C | C | C | C | C | X 51 | X 55 | X 52 |
| 15 | O X 48 | X 49 | X 49 | R | R | R | R | X 68 | X 68 | X 75 | X 81 | R | X 76 | O X 77 | X 79 | X 78 | X 78 | O X 75 | O X 68 | X 62 | X 61 | X 59 | O X 56 | X 55 |
| 16 | X 56 | X 57 | X 57 | X 64 | X 71 | X 70 | X 80 | X 92 | R | X 96 | C | C | R | O X 85 | X 78 | B | X 80 | X 76 | O X 76 | X 72 | X 67 | X 70 | X 52 | X 46 |
| 17 | O X 46 | R | B | Y | A | R | X 65 | X 70 | X 70 | X 81 | X 81 | O X 75 | A | X 73 | A | B | X 78 | O X 75 | X 65 | B | R | A | X 43 | A |
| 18 | B | B | 94 | R | R | R | B | B | B | B | B | B | B | R | Y | R | B | O X 66 | X 65 | X 65 | X 60 | X 57 | X 56 | 52 |
| 19 | 40 | 39 | X 39 | O X 49 | A | Y | R | R | X 61 | X 65 | O X 67 | R | R | R | O X 67 | O X 64 | X 63 | O X 62 | R | O X 62 | O X 64 | O X 64 | X 56 | X 49 |
| 20 | A | O X 56 | R | Y | B | B | B | B | B | R | B | B | B | B | B | B | B | B | B | B | R | O X 58 | O X 53 | O X 48 |
| 21 | O X 49 | X 52 | X 58 | B | O X 52 | Y | R | R | R | R | 71 | O X 71 | O X 70 | O X 69 | X 70 | X 68 | X 66 | X 64 | X 64 | R | X 57 | O X 56 | 53 | X 47 |
| 22 | O X 45 | X 44 | X 50 | 42 | X 58 | X 68 | X 76 | X 76 | X 77 | X 80 | O X 76 | R | Y | O X 72 | O X 72 | O X 68 | X 67 | X 62 | X 62 | X 60 | X 58 | X 55 | X 55 | X 56 |
| 23 | O X 63 | X 68 | X 68 | X 70 | 70 | X 75 | X 82 | X 82 | X 92 | X 94 | X 94 | 80 | X 81 | O X 75 | O X 75 | O X 73 | O X 68 | X 64 | X 58 | X 56 | X 57 | X 57 | X 59 | X 54 |
| 24 | X 58 | X 58 | B | B | R | R | B | B | X 87 | X 88 | O X 94 | O X 84 | X 87 | O X 82 | X 82 | O X 73 | O X 71 | R | O X 61 | X 56 | X 56 | X 56 | X 56 | X 56 |
| 25 | X 65 | 68 | X 72 | O X 74 | X 76 | X 81 | X 87 | X 89 | X 89 | X 93 | X 94 | O X 87 | X 88 | X 89 | O X 84 | X 82 | X 76 | R | O X 69 | X 64 | X 62 | X 57 | X 52 | O X 48 |
| 26 | O X 48 | 89 | R | B | A | X 52 | 60 | 63 | 68 | X 68 | X 72 | O X 66 | O X 74 | B | O X 72 | O X 66 | O X 65 | O X 62 | Y | R | O X 48 | R | R | B |
| 27 | R | B | 53 | O X 37 | 40 | B | A | R | R | R | R | Y | B | B | B | B | B | R | R | O X 50 | X 50 | X 43 | B | X 42 |
| 28 | X 40 | O X 46 | X 44 | O X 48 | O X 51 | O X 63 | X 68 | 66 | 68 | X 74 | X 74 | O X 77 | X 77 | O X 70 | X 67 | X 66 | X 62 | X 61 | X 61 | O X 58 | B | X 50 | 37 | O X 35 |
| 29 | O X 40 | A | R | B | B | B | R | 72 | X 81 | X 75 | X 64 | Y | O X 69 | O X 70 | Y | O X 66 | O X 67 | O X 68 | O X 66 | X 62 | X 58 | O X 52 | O X 50 | O X 48 |
| 30 | X 45 | X 46 | O X 49 | X 54 | X 62 | X 71 | X 71 | 79 | C | C | C | B | O X 72 | R | O X 70 | O X 69 | O X 64 | O X 66 | R | R | O X 57 | X 60 | X 56 | X 48 |
| 31 | X 43 | O X 46 | 50 | X 49 | O X 56 | X 68 | X 80 | X 82 | X 87 | O X 80 | O X 82 | O X 78 | O X 74 | O X 73 | O X 73 | X 72 | X 70 | X 65 | X 64 | X 64 | X 58 | X 54 | X 53 | 60 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 27 | 27 | 25 | 21 | 21 | 19 | 21 | 23 | 24 | 26 | 22 | 18 | 18 | 23 | 22 | 21 | 25 | 26 | 25 | 23 | 27 | 28 | 29 | 28 |
| MED | X 56 | X 56 | X 58 | X 64 | X 66 | X 72 | X 76 | X 81 | X 86 | X 88 | X 85 | O X 84 | O X 82 | O X 77 | O X 74 | O X 71 | X 68 | X 66 | X 65 | X 64 | X 62 | X 58 | X 56 | X 54 |
| U Q | X 58 | 64 | X 66 | X 68 | X 73 | X 81 | X 84 | X 92 | X 93 | X 94 | O X 94 | X 93 | X 87 | O X 85 | X 79 | X 74 | X 71 | X 70 | O X 68 | X 66 | X 65 | X 64 | X 61 | X 61 |
| L Q | X 45 | X 49 | X 50 | X 50 | X 56 | X 66 | X 70 | X 70 | X 71 | X 75 | X 76 | O X 77 | O X 74 | O X 73 | O X 72 | O X 67 | X 66 | X 64 | X 62 | X 60 | X 57 | X 56 | X 52 | X 48 |

**JAN. 2013** fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

## JAN. 2013 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 | 50 | F 46 | 53 | 59 | 65 | 66 | 66 | 74 | R | 80 | 78 | J R 74 | U R 78 | U R 76 | J R 70 | 68 | 61 | 59 | 57 | J R 56 | 57 | R | 57 | 57 |
| 2 | J R 54 | J R 52 | J R 60 | 66 | 77 | J R 86 | U R 83 | 93 | 94 | 94 | J R 85 | J R 86 | R 84 | J R 86 | R 79 | J R 76 | R 74 | 67 | 65 | 65 | F 62 | 62 | 59 | S 58 |
| 3 | 48 | F 45 | 45 | J R 45 | 50 | 57 | 70 | 78 | 78 | R 81 | J R 78 | J R 77 | R | J R 70 | U R 67 | R 60 | 60 | 60 | 59 | R | 59 | 58 | 58 | 57 |
| 4 | 51 | J R 58 | 65 | J R 74 | 74 | F 64 | F 64 | 89 | J R 90 | J R 94 | 90 | R | R 83 | J R 76 | 70 | 66 | 65 | J R 62 | 59 | J R 59 | 61 | F 58 | 65 | J R 62 |
| 5 | F 56 | 58 | F 58 | 61 | 69 | 81 | J R 87 | J R 90 | 94 | 95 | R 96 | J R 96 | R | U R 84 | R | R | C | 66 | 61 | 60 | F 60 | 61 | 58 | 57 |
| 6 | 52 | 50 | 51 | 59 | 69 | J R 75 | J R 84 | J R 86 | J R 89 | 93 | Y | U R 90 | R | U R 80 | R 73 | J R 71 | J R 65 | 64 | 62 | 59 | 60 | 56 | J R 48 | F 40 |
| 7 | 50 | 51 | 54 | 55 | 56 | 60 | 68 | 71 | 81 | R 82 | R | R | R | U R 68 | R 62 | R | R | U R 59 | 61 | 58 | 56 | 56 | 54 | 52 |
| 8 | 51 | F 58 | F 57 | F 56 | 64 | 66 | 72 | J R 83 | J R 88 | J R 88 | J R 88 | J R 88 | R 80 | 72 | R 66 | R | 63 | 61 | 58 | J R 52 | 58 | 58 | 45 | 42 |
| 9 | 43 | U R 44 | J R 50 | R | R | R | J R 65 | 63 | 66 | 75 | J R 80 | 70 | J R 73 | R 67 | 67 | 66 | 64 | 65 | 65 | 63 | 56 | 56 | J R 53 | F 46 |
| 10 | 39 | 45 | R 44 | 52 | 60 | 66 | F 57 | 75 | J R 81 | J R 85 | U R 87 | R | U R 76 | 79 | A | R 63 | J R 62 | J R 58 | 63 | 60 | 57 | 57 | 56 | 56 |
| 11 | 52 | 52 | 52 | 58 | F 61 | 75 | J R 83 | 91 | R 90 | J R 88 | 91 | 92 | J R 86 | R | J R 75 | R | 62 | 61 | 65 | 61 | 59 | 59 | 57 | 56 |
| 12 | 58 | F 59 | F 52 | 56 | 56 | R 57 | U R 58 | R | F 65 | J R 89 | 89 | R 87 | U R 82 | 70 | Y | 65 | 64 | 58 | 56 | 56 | 58 | 52 | 45 | 41 |
| 13 | 54 | 58 | 58 | 58 | A | B | R | 62 | 66 | J R 68 | Y | R 80 | U R 80 | R 74 | U R 69 | 64 | 61 | 58 | J R 55 | R | 50 | 44 | 43 | R |
| 14 | R | 41 | B | B | J R 50 | R | B | R | 52 | 59 | B | C | C | C | C | C | C | C | C | C | C | 45 | 49 | J R 46 |
| 15 | 42 | 43 | 43 | R | R | R | R | 62 | 62 | 69 | J R 75 | R | J R 70 | R 71 | J R 73 | J R 72 | J R 72 | R 69 | R 62 | J R 56 | 55 | J R 53 | R 48 | 49 |
| 16 | 50 | 53 | J R 51 | 58 | J R 65 | 64 | 74 | J R 86 | R | 90 | C | C | D R 68 | R 79 | J R 72 | B | J R 74 | J R 70 | 70 | 66 | 61 | J R 64 | 46 | 40 |
| 17 | R 40 | R | B | Y | A | R | J R 59 | J R 64 | 64 | 75 | 75 | R 69 | A | J R 67 | A | B | 72 | R 69 | 59 | B | R | A | 37 | A |
| 18 | B | B | R | R | R | A | B | B | B | B | B | B | B | R | Y | R | B | 60 | 59 | 59 | J R 54 | 51 | 50 | F 43 |
| 19 | F 30 | F 26 | 33 | R 43 | A | Y | R | R | 55 | 59 | R 61 | R | R | R | R 61 | R 58 | 57 | 56 | R | R 56 | 58 | R 58 | J R 50 | 43 |
| 20 | A | R 50 | R | Y | B | B | B | B | B | R | B | B | B | B | B | B | B | B | B | B | R | U R 52 | R 47 | 42 |
| 21 | 43 | 46 | 52 | B | R 46 | Y | R | R | R | R | 65 | R 65 | U R 64 | 63 | 64 | 62 | 60 | 58 | 58 | R | 51 | 50 | F 42 | 41 |
| 22 | 39 | 38 | 44 | F 31 | 52 | 62 | 70 | 70 | 71 | 74 | R 70 | R | Y | U R 66 | R 66 | 62 | 61 | 56 | 56 | 54 | 52 | 49 | 49 | 50 |
| 23 | 57 | J R 62 | 62 | 64 | F 57 | 69 | 76 | 76 | J R 86 | J R 88 | J R 88 | F 70 | J R 74 | R 69 | R 69 | R 67 | 62 | 58 | J R 52 | 50 | 51 | J R 51 | 53 | 48 |
| 24 | 52 | 52 | B | B | R | R | B | B | 81 | 82 | 88 | R 78 | J R 81 | U R 76 | J R 76 | R 67 | R 65 | R | R 55 | 50 | 50 | 50 | 50 | 50 |
| 25 | 59 | F 58 | 66 | 68 | J R 70 | J R 75 | 81 | J R 83 | J R 83 | J R 87 | R 88 | R 81 | J R 82 | J R 83 | R 78 | J R 76 | J R 70 | A | R 63 | 58 | 56 | 51 | 46 | R 42 |
| 26 | R 42 | A | A | B | A | 46 | F 49 | F 57 | F 60 | 62 | 66 | R 60 | 68 | B | R 66 | R 60 | 59 | R 56 | Y | R | 42 | R | R | B |
| 27 | R | B | R 28 | 31 | F 28 | B | A | R | R | R | R | Y | B | B | B | B | B | R | R | R 44 | 44 | 37 | B | 36 |
| 28 | 34 | 40 | 38 | 42 | R 45 | 57 | 62 | F 56 | F 57 | 68 | 68 | 71 | 71 | 64 | 61 | 60 | 56 | J R 55 | J R 55 | U R 52 | B | 44 | F 28 | 29 |
| 29 | 34 | A | R | B | B | B | R | F 60 | J R 75 | J R 69 | 58 | Y | R 63 | U R 64 | Y | R 60 | 61 | R 62 | 60 | 56 | J R 52 | 46 | 44 | 42 |
| 30 | 39 | 40 | 43 | 48 | 56 | 65 | 65 | F 68 | C | C | C | B | U R 66 | R | R 64 | U R 63 | R 58 | R 60 | R | R | R 51 | J R 54 | J R 50 | 42 |
| 31 | 37 | R 40 | F 37 | 43 | R 50 | 62 | J R 74 | 76 | 81 | U R 74 | R 76 | R 72 | R 68 | 67 | 67 | 66 | 64 | 59 | 58 | 58 | 52 | 48 | 47 | F 50 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 27 | 26 | 24 | 21 | 21 | 19 | 21 | 23 | 24 | 26 | 22 | 18 | 20 | 23 | 22 | 21 | 25 | 26 | 25 | 23 | 27 | 28 | 29 | 28 |
| MED | 50 | 50 | 52 | 56 | 57 | 65 | 70 | 75 | 80 | 82 | R 79 | R 78 | R 76 | R 71 | R 68 | R 65 | 62 | 60 | 59 | 58 | 56 | 52 | 49 | 46 |
| U Q | 52 | 58 | 58 | 60 | 67 | J R 75 | R 78 | 86 | J R 87 | 88 | 88 | R 87 | R 82 | R 79 | R 73 | J R 68 | J R 65 | 64 | 62 | 60 | 59 | 58 | 55 | 54 |
| L Q | 39 | 43 | 44 | 44 | R 50 | 60 | 63 | 63 | 64 | 69 | 70 | R 70 | R 68 | 67 | R 66 | R 61 | 60 | 58 | R 56 | 54 | 51 | 50 | 46 | 42 |

JAN. 2013 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**JAN. 2013** 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 | 22 | 24 | 26 | 29 | 30 | 30 | 30 | 37 | 31 | 32 | 35 | 38 | 35 | 42 | G | 31 | 30 | G 18 | 31 | 34 | 38 | 35 | 70 | 45 |
| 2 | 32 | 32 | 30 | 42 | 33 | 27 | 32 | 33 | 41 | 37 | G 25 | G 22 | 37 | 37 | 38 | G 28 | 37 | 31 | 28 | 27 | 27 | 34 | 30 | 32 |
| 3 | 38 | 40 | 44 | 44 | 40 | 28 | 32 | 32 | 36 | 36 | G | 35 | 36 | 40 | 36 | 38 | 33 | 40 | 36 | 35 | 40 | 82 | 42 | 29 |
| 4 | 29 | 40 | 30 | 30 | 39 | 40 | 39 | 32 | 31 | 33 | 34 | 41 | G 33 | 43 | 44 | 44 | 44 | 33 | 42 | 69 | 64 | 44 | 42 | 42 |
| 5 | 32 | 28 | 32 | 39 | 49 | 32 | 38 | 29 | 68 | 44 | 40 | 41 | 39 | 38 | 61 | 58 | C | 72 | 55 | 30 | 32 | 30 | 30 | 46 |
| 6 | 35 | 39 | 64 | G | 25 | 27 | 29 | 34 | 34 | 38 | G 30 | 30 | 38 | G 30 | 38 | 43 | 40 | 40 | 40 | 37 | 30 | 30 | 30 | 28 |
| 7 | 27 | G 18 | 34 | 76 | 43 | 33 | G 26 | 32 | G 22 | G 22 | 39 | 40 | 56 | G 28 | 43 | G 20 | G 27 | 40 | 61 | 51 | 32 | 25 | 33 | 26 |
| 8 | 20 | 30 | 32 | 30 | 31 | 34 | 33 | G 22 | 35 | 37 | 37 | 33 | 40 | 42 | 43 | 36 | 38 | 48 | 41 | G 19 | 27 | 24 | 29 | 34 |
| 9 | 37 | 39 | 42 | G 24 | 34 | 40 | 47 | G 24 | G 25 | G 22 | G 23 | 40 | 40 | 40 | 34 | G | 34 | 35 | 32 | 30 | 29 | 29 | 43 | 32 |
| 10 | 35 | 37 | 41 | 32 | G 20 | 32 | 40 | G | 36 | G 19 | G | 45 | 38 | 76 | 76 | 60 | 72 | 67 | 58 | 40 | 33 | 32 | 28 | 44 |
| 11 | 50 | 33 | G | 26 | 29 | 33 | 27 | 30 | G 20 | G 24 | 38 | G 26 | G 24 | G 24 | 44 | 58 | 40 | 36 | G 22 | 43 | 66 | 52 | 41 | 33 |
| 12 | 24 | 35 | 71 | 42 | 44 | 37 | 47 | 41 | 32 | G 22 | 28 | 28 | G | G 22 | G | G 22 | G 17 | G 17 | 28 | 32 | 40 | 31 | 27 | 30 |
| 13 | 33 | 32 | 32 | 52 | 58 | B | 36 | G 24 | G 24 | G 18 | G 25 | 34 | G 22 | 33 | 32 | 32 | 30 | 28 | 33 | 34 | G | 35 | 42 | 41 |
| 14 | 43 | Q 32 | B | B | 36 | 32 | B | 32 | 35 | 33 | B | C | C | C | C | C | C | C | C | C | C | 34 | 31 | 26 |
| 15 | 24 | 30 | 34 | 36 | 33 | 37 | 37 | 31 | 28 | G 28 | G 24 | 41 | E B 38 | 27 | 32 | 39 | 31 | E B 56 | E B 38 | 29 | 29 | 22 | G | 18 |
| 16 | G 15 | 20 | G 16 | 27 | 25 | 33 | G 20 | 35 | E B 48 | G 25 | C | C | E B 48 | 40 | 40 | B | G 32 | G 28 | E B 54 | 28 | G | 24 | G | 24 |
| 17 | 35 | G 28 | B | G 30 | 71 | 41 | 33 | 33 | 36 | G 27 | G 22 | 42 | 76 | 59 | 76 | B | 31 | 32 | G | B | 34 | 58 | 32 | 76 |
| 18 | B | B | 39 | 46 | 42 | 66 | B | B | B | B | B | B | B | 40 | G | 35 | B | G | 36 | 27 | G | G | G | 31 |
| 19 | 27 | G | 31 | 37 | 66 | G | 35 | G 18 | G 18 | G | 33 | G | E B 37 | 37 | G 26 | 31 | 34 | 34 | 31 | G | G 19 | G | G | 24 |
| 20 | 65 | 41 | 41 | G | B | B | B | B | B | G 23 | B | B | B | B | B | B | B | B | B | B | 56 | E B 30 | E B 29 | 34 |
| 21 | 27 | 32 | 40 | B | 34 | 33 | 40 | 42 | 41 | 36 | G 22 | 30 | G | E B 54 | 41 | 40 | E B 54 | 31 | 30 | E B 33 | 32 | 27 | G 15 | G |
| 22 | E B 20 | 31 | G 16 | G 18 | 25 | G 19 | 36 | 36 | 31 | 35 | 35 | G 22 | G 22 | G 22 | 36 | G 22 | G 22 | 30 | G 21 | G 20 | 32 | 32 | 44 | 18 |
| 23 | 23 | 24 | 26 | 27 | 26 | G | 28 | 29 | 38 | G | G | 38 | 37 | E B 35 | 36 | E B 56 | G 22 | G 20 | G 18 | 26 | G 20 | G | E B 18 | E B 14 |
| 24 | E B 15 | E B 17 | B | B | 42 | 42 | B | B | G | G 21 | 35 | 37 | G | G 25 | G 23 | G | G | E B 30 | G 16 | G 22 | 24 | 22 | 30 | 18 |
| 25 | 16 | E B 14 | G | 24 | 25 | 27 | 27 | G | 32 | 38 | G | 43 | 40 | E B 37 | 58 | 70 | 66 | 69 | G | 27 | 26 | 23 | G | E B 25 |
| 26 | E B 19 | 41 | 42 | B | 80 | 36 | 32 | 33 | 40 | 41 | G 26 | G 27 | G 24 | B | E B 54 | E B 56 | 31 | G 18 | G 18 | 39 | 42 | 41 | 42 | B |
| 27 | 39 | B | 18 | 28 | G 15 | B | 48 | 33 | 41 | 39 | G 22 | G | B | B | B | B | B | G 24 | G 18 | 26 | 27 | 27 | B | G 16 |
| 28 | 28 | 32 | 29 | E B 23 | G 22 | 30 | 37 | 39 | 31 | 31 | G 20 | 34 | G | 36 | 60 | 39 | 35 | 30 | 27 | E B 25 | B | 22 | G | E B 17 |
| 29 | 29 | 52 | K 34 | B | B | B | 38 | 32 | 32 | 26 | G 22 | G | 40 | G | G | E B 36 | G | G 22 | G | 26 | 23 | E B 20 | E B 18 | 15 |
| 30 | 28 | E B 13 | 16 | 18 | 18 | 31 | 25 | E B 27 | C | C | C | B | G | 42 | 35 | 35 | 33 | 27 | 25 | G | G 18 | 20 | G 15 | E B 14 |
| 31 | E B 13 | 28 | 29 | 33 | 24 | G 17 | G 17 | G | G 22 | 22 | G 22 | 36 | 42 | 41 | 35 | G | 37 | G 26 | G | G 20 | 22 | G | E B 15 | E B 14 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 30 | 29 | 28 | 26 | 29 | 27 | 27 | 28 | 28 | 29 | 26 | 26 | 27 | 27 | 28 | 26 | 26 | 29 | 29 | 28 | 29 | 31 | 30 | 30 |
| MED | 28 | 32 | 32 | G | 33 | 32 | 33 | 32 | 32 | G | G | 34 | 36 | 37 | 36 | 36 | E G 33 | 30 | 29 | 28 | 29 | 28 | 30 | 27 |
| U Q | 35 | 38 | 40 | 39 | 42 | 37 | 38 | 34 | 37 | 36 | 35 | 40 | 40 | 42 | 44 | 44 | 38 | 40 | 39 | 34 | 36 | 34 | 41 | 34 |
| L Q | 22 | 26 | 26 | 27 | 25 | G 27 | 28 | G | G | G 22 | G 23 | G | G | G 30 | G 32 | G | G 31 | G 26 | G | G 26 | G 22 | 22 | G | 18 |

**JAN. 2013** ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**JAN. 2013** fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 13 | 13 | 12 | 12 | 12 | 12 | 12 | 13 | 14 | 13 | 13 | 16 | 14 | 14 | 16 | 18 | 12 | 12 | 12 | 12 | 12 | 13 | 13 | 12 |
| 2 | 12 | 13 | 13 | 12 | 14 | 13 | 13 | 12 | 14 | 12 | 14 | 15 | 18 | 18 | 16 | 19 | 14 | 12 | 12 | 18 | 15 | 13 | 16 | 14 |
| 3 | 12 | 12 | 12 | 13 | 12 | 11 | 12 | 11 | 12 | 15 | 17 | 14 | 14 | 15 | 14 | 15 | 14 | 14 | 12 | 13 | 13 | 11 | 14 | 14 |
| 4 | 12 | 11 | 12 | 12 | 12 | 12 | 13 | 12 | 14 | 12 | 14 | 14 | 18 | 14 | 15 | 15 | 14 | 13 | 12 | 13 | 12 | 13 | 13 | 12 |
| 5 | 12 | 12 | 13 | 13 | 13 | 13 | 12 | 12 | 14 | 13 | 14 | 14 | 13 | 14 | 16 | 14 | C | 13 | 12 | 12 | 12 | 13 | 13 | 11 |
| 6 | 13 | 12 | 12 | 12 | 12 | 13 | 13 | 13 | 12 | 13 | 15 | 15 | 13 | 15 | 14 | 13 | 12 | 13 | 12 | 12 | 12 | 13 | 18 | 13 |
| 7 | 12 | 12 | 14 | 13 | 14 | 12 | 13 | 12 | 13 | 12 | 14 | 13 | 20 | 18 | 14 | 13 | 14 | 13 | 13 | 13 | 13 | 14 | 11 | 12 |
| 8 | 13 | 13 | 13 | 14 | 13 | 12 | 13 | 14 | 13 | 14 | 14 | 14 | 14 | 17 | 17 | 14 | 13 | 13 | 13 | 13 | 13 | 14 | 12 | 13 |
| 9 | 13 | 12 | 12 | 16 | 18 | 22 | 14 | 15 | 14 | 15 | 13 | 14 | 16 | 14 | 19 | 18 | 13 | 16 | 14 | 17 | 15 | 12 | 11 | 13 |
| 10 | 12 | 13 | 14 | 14 | 13 | 13 | 14 | 12 | 12 | 13 | 24 | 18 | 14 | 21 | 17 | 17 | 15 | 13 | 12 | 12 | 13 | 12 | 14 | 12 |
| 11 | 14 | 12 | 13 | 13 | 13 | 13 | 14 | 15 | 14 | 16 | 18 | 14 | 19 | 14 | 14 | 16 | 13 | 13 | 20 | 19 | 15 | 14 | 12 | 12 |
| 12 | 13 | 11 | 14 | 13 | 15 | 15 | 16 | 16 | 14 | 17 | 14 | 13 | 13 | 18 | 13 | 16 | 13 | 13 | 14 | 13 | 12 | 13 | 13 | 13 |
| 13 | 14 | 12 | 13 | 15 | 20 | B | 13 | 22 | 20 | 15 | 18 | 19 | 19 | 18 | 16 | 18 | 15 | 13 | 13 | 19 | 23 | 14 | 13 | 18 |
| 14 | 264 | 17 | B | B | 13 | 17 | B | 16 | 14 | 13 | B | C | C | C | C | C | C | C | C | C | C | 14 | 13 | 14 |
| 15 | 14 | 13 | 13 | 16 | 17 | 22 | 16 | 13 | 16 | 17 | 17 | 18 | 38 | 23 | 17 | 17 | 19 | 56 | 38 | 17 | 19 | 13 | 17 | 12 |
| 16 | 12 | 13 | 12 | 13 | 13 | 13 | 14 | 16 | 48 | 24 | C | C | 48 | 13 | 24 | B | 24 | 26 | 54 | 25 | 18 | 15 | 17 | 15 |
| 17 | 18 | 20 | B | 24 | 20 | 31 | 20 | 22 | 14 | 18 | 20 | 25 | 21 | 20 | 21 | B | 15 | 16 | 13 | B | 16 | 16 | 22 | 28 |
| 18 | B | B | 15 | 21 | 14 | 59 | B | B | B | B | B | B | B | 24 | 20 | 23 | B | 22 | 13 | 12 | 14 | 17 | 15 | 17 |
| 19 | 14 | 13 | 17 | 13 | 23 | 22 | 16 | 13 | 14 | 19 | 13 | 13 | 37 | 18 | 16 | 13 | 15 | 14 | 13 | 12 | 11 | 14 | 13 | 12 |
| 20 | 14 | 24 | 21 | 23 | B | B | B | B | B | 19 | B | B | B | B | B | B | B | B | B | B | 34 | 30 | 29 | 17 |
| 21 | 19 | 13 | 12 | B | 18 | 20 | 27 | 22 | 20 | 20 | 19 | 18 | 14 | 54 | 17 | 33 | 54 | 22 | 22 | 33 | 20 | 22 | 13 | 12 |
| 22 | 20 | 12 | 13 | 15 | 13 | 13 | 12 | 11 | 13 | 12 | 12 | 12 | 17 | 18 | 17 | 17 | 16 | 12 | 15 | 12 | 13 | 13 | 13 | 12 |
| 23 | 12 | 11 | 12 | 13 | 12 | 12 | 12 | 12 | 16 | 12 | 16 | 14 | 23 | 35 | 30 | 56 | 19 | 13 | 13 | 14 | 14 | 18 | 18 | 14 |
| 24 | 15 | 17 | B | B | 22 | 21 | B | B | 19 | 14 | 15 | 24 | 21 | 19 | 19 | 19 | 19 | 30 | 13 | 15 | 12 | 13 | 13 | 12 |
| 25 | 12 | 14 | 12 | 12 | 13 | 13 | 16 | 13 | 13 | 13 | 19 | 16 | 20 | 37 | 18 | 27 | 25 | 26 | 23 | 13 | 13 | 13 | 15 | 25 |
| 26 | 19 | 16 | 18 | B | 16 | 12 | 13 | 12 | 13 | 16 | 18 | 21 | 14 | B | 54 | 56 | 24 | 14 | 13 | 13 | 13 | 13 | 14 | B |
| 27 | 29 | B | 14 | 12 | 13 | B | 13 | 18 | 23 | 23 | 16 | 22 | B | B | B | B | B | 20 | 15 | 13 | 13 | 12 | B | 12 |
| 28 | 13 | 13 | 12 | 23 | 21 | 12 | 14 | 18 | 14 | 13 | 15 | 14 | 23 | 20 | 18 | 19 | 18 | 20 | 18 | 25 | B | 14 | 14 | 17 |
| 29 | 13 | 18 | 23 | B | B | B | 21 | 17 | 14 | 14 | 17 | 17 | 22 | 26 | 20 | 36 | 20 | 18 | 18 | 14 | 16 | 21 | 18 | 12 |
| 30 | 13 | 13 | 14 | 12 | 13 | 13 | 12 | 27 | C | C | C | B | 19 | 32 | 30 | 21 | 19 | 22 | 18 | 18 | 13 | 13 | 12 | 13 |
| 31 | 13 | 14 | 13 | 14 | 15 | 14 | 13 | 13 | 13 | 13 | 16 | 16 | 21 | 19 | 18 | 19 | 15 | 18 | 12 | 14 | 15 | 14 | 15 | 14 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 30 | 29 | 29 | 30 | 30 | 30 | 30 | 29 | 30 | 30 | 30 | 30 | 31 | 31 | 31 |
| MED | 13 | 13 | 13 | 14 | 14 | 13 | 14 | 14 | 14 | 14 | 16 | 16 | 19 | 18 | 17 | 18 | 15 | 14 | 13 | 14 | 13 | 13 | 14 | 13 |
| U Q | 15 | 16 | 15 | B 23 | 18 | 22 | 16 | 18 | 16 | 17 | 18 | 20 | 23 | 26 | 20 | 33 | 22 | 22 | 18 | 18 | 16 | 14 | 17 | 15 |
| L Q | 12 | 12 | 12 | 13 | 13 | 12 | 13 | 12 | 13 | 13 | 14 | 14 | 14 | 15 | 16 | 16 | 14 | 13 | 12 | 13 | 13 | 13 | 13 | 12 |

**JAN. 2013** fmin (0.1MHz)

# IONOSPHERIC DATA STATION SHOWA-ST.

**JAN. 2013** 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 234 | Q 234 | 242 | 220 | 222 | 206 | 216 | 204 | 192 | A | 200 | 206 | E A 222 | A | 196 | 202 | 200 | 206 | 206 | 200 | E A 240 | 224 | 238 | 218 |
| 2 | 234 | 244 | A 238 | A | 220 | 200 | 212 | 202 | 200 | 194 | 186 | 200 | 200 | A 218 | 210 | 206 | 212 | 192 | 200 | 212 | 228 | 230 | 236 | 230 |
| 3 | 224 | A 252 | A | 214 | 214 | 196 | 200 | 200 | 200 | 200 | 200 | 192 | 198 | 212 | 212 | 202 | 194 | 202 | 200 | 208 | E A 238 | E A 290 | 220 | 228 |
| 4 | 202 | A 256 | A 242 | A 242 | E A 236 | A 236 | 196 | 182 | 188 | E A 228 | 204 | 204 | Y | 212 | A | A | 200 | H 184 | 206 | E A 244 | E A 232 | 232 | 232 | 226 |
| 5 | 226 | 256 | 238 | 238 | 218 | 208 | 196 | 194 | 212 | A | 196 | A | 208 | 208 | A | A | C | A | A 242 | 196 | 216 | 220 | 220 | 240 |
| 6 | 234 | E A 268 | E A 272 | 224 | 212 | 216 | 202 | 200 | 200 | 204 | Y | Y | 212 | 206 | 218 | 214 | 200 | 200 | 200 | 202 | 200 | 216 | 204 | 222 |
| 7 | 216 | 218 | 240 | 206 | 208 | E A 260 | 232 | 200 | 194 | 194 | A | 210 | A | 210 | A | 196 | 200 | A 222 | A | E A 250 | 218 | 230 | 222 | A 224 |
| 8 | 234 | Q 258 | A 226 | 238 | 228 | 208 | 194 | 194 | 204 | 198 | 204 | 198 | 198 | E A 232 | Y | 198 | 202 | 194 | 196 | 216 | 220 | 220 | 220 | 198 |
| 9 | 234 | A | A | A | A | A | 232 | 194 | A | 198 | 210 | 228 | 200 | 206 | 206 | 196 | 204 | 200 | 218 | 222 | 222 | 210 | 232 | Q 242 |
| 10 | E A 278 | 230 | A | 220 | A | 256 | A | 222 | 200 | 196 | 198 | A | 198 | A | A | A | A | A | A | 224 | 224 | 244 | 230 | 242 |
| 11 | 238 | 240 | 238 | 228 | 234 | 218 | 218 | 208 | 198 | Y | 214 | Y | 204 | E Y 214 | A | A | 196 | 196 | Y | A 228 | 242 | A 236 | 246 | 212 |
| 12 | Q 256 | 270 | 242 | 224 | 232 | E A 240 | A | A | 240 | 198 | 228 | 198 | Y | Y | Y | 198 | 208 | E Y 208 | 200 | 206 | 224 | 210 | 200 | 208 |
| 13 | A | A | A | A | A | B | A | Y | Y | 208 | Y | 208 | Y | 208 | 220 | 208 | 198 | 202 | 212 | A | 226 | E A 254 | 242 | A |
| 14 | A | 200 | B | B | A | A | B | A | A | 200 | B | C | C | C | C | C | C | C | C | C | C | E A 244 | A 244 | E A 238 |
| 15 | 256 | E A 286 | E A 306 | A | A | A | A | A | 204 | 214 | Y | 194 | 202 | Y | 208 | 208 | Y | B | E B | 212 | 212 | 228 | E A 248 | A 238 |
| 16 | 194 | 228 | E A 262 | 252 | 242 | 234 | 216 | 204 | B | Y | C | C | B | 204 | 212 | B | A | Y | B | 226 | 220 | 224 | 232 | A |
| 17 | A | A | B | Y | A | A | A | 216 | A | 208 | 208 | A | A | A | A | B | 202 | 202 | 200 | B | A | 200 | 218 | A |
| 18 | B | B | A | A | A | A | B | B | B | B | B | B | B | A | Y | 218 | B | Y | E A 216 | 216 | 232 | 232 | 236 | 210 |
| 19 | Q 252 | Q 300 | A | 196 | A | Y | A | A | 196 | 196 | 202 | 196 | 196 | A | 196 | 196 | 202 | 196 | 208 | 208 | 218 | E Y 238 | 240 | Q 240 |
| 20 | E A 220 | A | A | Y | B | B | B | B | B | 200 | B | B | B | B | B | B | B | B | B | B | A | E B 248 | E B 248 | E A 248 |
| 21 | 274 | 274 | A | B | A | Y | A | A | A | A | 202 | 210 | 198 | B | 214 | 212 | B | 208 | E A 230 | B 230 | E A 234 | A 248 | E A 248 | Q 228 |
| 22 | 252 | 234 | A | A | 244 | 242 | A 220 | 196 | 194 | 198 | 202 | 202 | Y | Y | A 214 | 196 | 196 | 196 | 196 | 194 | 204 | 218 | E A 230 | A 236 |
| 23 | 242 | 248 | 258 | 242 | 204 | 224 | 226 | 206 | A | 198 | 194 | 200 | A | B | Y | B | 198 | 196 | 196 | 200 | 226 | 226 | 228 | 228 |
| 24 | 234 | 248 | B | B | A | A | B | B | 196 | 214 | 196 | 204 | 196 | Y | Y | Y | 196 | 196 | 196 | 200 | Q 216 | 222 | Q 226 | Q 236 |
| 25 | Q 244 | Q 240 | Q 264 | Q 230 | 224 | 222 | 222 | 214 | 208 | 202 | 202 | A | 202 | 196 | A | A | E A 280 | A | 272 | H 184 | A 214 | 220 | E A 232 | 226 |
| 26 | 254 | A | A | B | A | 260 | 194 | 202 | 200 | A | Y | Y | 210 | B | B | B | 218 | 200 | Y | A | A | A | A | B |
| 27 | A | B | 200 | 200 | A | B | A | A | A | A | 206 | Y | B | B | B | B | B | 200 | 210 | 198 | 204 | 196 | B | A |
| 28 | A 218 | A | A 230 | B 352 | A | 260 | A | 246 | 218 | 208 | 202 | 202 | 202 | 202 | A | 224 | H 188 | 218 | 202 | 214 | B | 204 | A | 270 |
| 29 | A | A | A | B | B | B | A | 234 | 202 | 198 | 200 | Y | 212 | Y | Y | 204 | 204 | 204 | 200 | 210 | 210 | 210 | 218 | 222 |
| 30 | 234 | 260 | 264 | 256 | 226 | 224 | 214 | 206 | C | C | C | B | Y | A | Y | 206 | Y | 198 | 198 | E Y 228 | 218 | 224 | 212 | 222 |
| 31 | 246 | 294 | A 294 | A | A | 226 | 200 | 200 | 196 | 196 | 196 | A | A | A | 196 | Y | 196 | 204 | 214 | 222 | 214 | 214 | Q 228 | Q 222 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 24 | 22 | 17 | 17 | 15 | 19 | 17 | 21 | 20 | 22 | 21 | 16 | 17 | 13 | 12 | 17 | 21 | 23 | 23 | 26 | 26 | 30 | 28 | 26 |
| MED | 234 | 248 | 240 | 228 | 223 | 223 | 214 | 202 | 200 | 198 | 202 | 202 | 201 | 207 | 211 | 204 | 200 | 200 | 201 | 210 | 218 | 222 | 229 | 227 |
| U Q | 252 | 268 | A 264 | 242 | 234 | 242 | 221 | 211 | 204 | 208 | 205 | 207 | 209 | 213 | 214 | 210 | 204 | 204 | 214 | 224 | E A 228 | E A 236 | 239 | 238 |
| L Q | 225 | 234 | 238 | 217 | 214 | 208 | 198 | 198 | 196 | 198 | 197 | 198 | 198 | 205 | 201 | 197 | 196 | 196 | 200 | 200 | 214 | 216 | 220 | 222 |

**JAN. 2013** h′F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**FEB. 2013** fxI (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

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

**FEB. 2013** fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**FEB. 2013** foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 51 | F 46 | R 52 | R 46 | B | R | F 58 | 73 | 75 | 76 | 72 | U R 72 | 70 | 66 | J R 64 | 66 | 68 | 59 | J R 56 | 56 | 56 | 53 | F 55 | F 41 |
| 2 | F 46 | F 43 | F 40 | R | A | A | Y | B | R | B | B | B | B | B | B | B | B | R 59 | J R 50 | R 43 | R 43 | 40 | R | 34 |
| 3 | R 34 | R 37 | B | B | B | R 41 | Y | R | R | 57 | R 59 | 61 | 60 | 55 | R | J R 53 | J R 51 | 56 | R | 50 | R | 50 | 48 | 41 |
| 4 | 24 | R 33 | R 33 | A | 39 | A | R | R 56 | F 59 | J R 64 | U R 65 | R 66 | 65 | J R 60 | R | R | R 58 | 59 | 56 | 52 | R | R 32 | 25 | 34 |
| 5 | 41 | 40 | 40 | J R 41 | J R 50 | R | 58 | 63 | 71 | R 72 | 78 | B | R 73 | 69 | 63 | 62 | 59 | 60 | R 58 | 54 | 51 | 47 | J R 46 | 45 |
| 6 | 44 | F 45 | 51 | 51 | J R 52 | 58 | 64 | A | R 78 | R 78 | J R 78 | U R 78 | U R 74 | J R 74 | U R 69 | 66 | 57 | 56 | 56 | J R 54 | J R 50 | 46 | 41 | F 37 |
| 7 | 37 | 24 | R 40 | F 49 | Y | R | A | 72 | 74 | J R 76 | F 70 | F 69 | R 72 | 68 | F 67 | F 66 | 68 | U R 63 | 62 | J R 52 | J R 50 | 49 | J R 45 | 36 |
| 8 | R 32 | A | F 38 | 41 | R 41 | R | A | A | 60 | 60 | 63 | B | 65 | 67 | C | R 64 | J R 63 | 62 | B | Y | R 45 | R 44 | F 41 | 32 |
| 9 | A | J R 42 | F 32 | R 41 | B | B | 41 | A | 64 | R 66 | R 66 | 67 | 63 | 63 | 62 | 62 | 59 | 58 | 58 | 52 | 50 | 47 | 40 | 36 |
| 10 | Z 24 | R 41 | F 43 | R 45 | B | U R 47 | 60 | 64 | 70 | B | 69 | 71 | B | R 69 | 68 | 68 | 62 | 60 | 56 | 56 | 47 | 42 | 32 | R |
| 11 | R 29 | A | A | A | B | B | B | B | A | 58 | 58 | 58 | R 63 | 67 | 66 | R | 62 | 62 | 61 | 54 | 48 | 44 | 42 | 41 |
| 12 | A | A | A | A | A | R 41 | R 46 | 61 | 62 | 63 | 62 | 66 | R 66 | R | D R 60 | J R 62 | R 61 | R 59 | 51 | 50 | 45 | 41 | A | A |
| 13 | A | 47 | B | R | R | B | B | A | B | R | R 60 | R 59 | R 61 | 56 | 60 | 65 | 64 | 59 | 58 | J R 52 | 51 | 46 | R | A |
| 14 | A | A | A | Y | B | Y | R | B | Y | B | B | Y | Y | B | B | U R 65 | J R 63 | B | B | B | B | R 42 | 31 | A |
| 15 | A | 28 | 28 | F 31 | 40 | R | 52 | J R 52 | 58 | R | R 62 | U R 63 | U R 64 | R 63 | 61 | U R 58 | J R 56 | 56 | A | 47 | 46 | 33 | Y | F 24 |
| 16 | R 28 | B | 38 | F 41 | F 42 | 51 | R | 64 | 69 | R 71 | 71 | J R 71 | U R 66 | 60 | R 63 | J R 60 | J R 59 | 61 | 60 | 51 | B | R | A | J R 34 |
| 17 | A | R | F 26 | F 30 | R 36 | U R 42 | R | 52 | J R 56 | R 57 | 58 | R 58 | B | R 60 | B | 64 | U R 64 | 58 | 50 | 44 | A | A | A | A |
| 18 | A | A | F 24 | F 30 | F 26 | R | R 49 | 52 | 59 | 60 | 61 | U R 62 | R | R 60 | R 57 | R | 56 | 50 | J R 50 | 46 | 43 | 40 | 40 | 34 |
| 19 | A | A | R | F 46 | B | Y | 58 | S 60 | B | R 63 | J R 64 | R 63 | R 64 | 66 | U R 65 | 68 | R 66 | 61 | 50 | 47 | R | R | R | R |
| 20 | A | A | 33 | 39 | R | A | R | 51 | 60 | 62 | F 61 | R 59 | R 61 | 63 | J R 61 | 70 | 67 | R 66 | B | U R 40 | 40 | 40 | F 27 | A |
| 21 | 29 | A | A | F 33 | B | A | Y | B | B | R | B | 56 | R 58 | R 58 | R 58 | 56 | 55 | 54 | J R 53 | J R 47 | 44 | 28 | A | A |
| 22 | A | A | F 20 | A | A | A | B | B | A | A | R | R | R | B | B | R | B | B | B | 40 | R | A | A | A |
| 23 | A | B | A | R | R | Y | B | B | 43 | Y | R | R | R | R | R | R | B | B | R | R | 39 | A | A | A |
| 24 | A | A | R | A | B | Y | R | R | R | B | B | B | R | 57 | B | R 59 | 54 | J R 54 | 50 | J R 44 | 40 | 33 | A | A |
| 25 | A | A | A | F 26 | F 30 | R 38 | R 42 | 48 | J R 52 | J R 55 | R 55 | R 60 | R 62 | U R 59 | 61 | 62 | 60 | 54 | 49 | 50 | 46 | 43 | 40 | 40 |
| 26 | 35 | A | F 24 | A | R | A | R 46 | 52 | J R 60 | B | 65 | 62 | 58 | J R 63 | 71 | U R 69 | 68 | 62 | 60 | 57 | 46 | R | A | A |
| 27 | A | A | F 27 | R 31 | A | R 33 | R 44 | R 48 | J R 50 | J R 52 | R | R 60 | R | R | R 60 | J R 54 | J R 54 | 56 | 56 | 50 | 46 | 40 | 34 | 33 |
| 28 | 26 | A | A | F 30 | Y | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 29 | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 14 | 11 | 17 | 17 | 9 | 8 | 12 | 15 | 18 | 17 | 20 | 20 | 18 | 21 | 18 | 21 | 24 | 24 | 20 | 24 | 20 | 21 | 15 | 15 |
| MED | 33 | 41 | F 33 | F 41 | 40 | R 42 | 50 | 56 | 60 | R 63 | 64 | R 62 | R 64 | 63 | 62 | 64 | 60 | 59 | 56 | 50 | 46 | 42 | 40 | 36 |
| U Q | 41 | F 45 | 40 | 46 | J R 46 | 49 | 58 | 64 | 70 | R 72 | 70 | 68 | R 66 | 67 | 66 | 66 | 64 | 61 | 58 | 53 | 50 | 46 | 45 | 41 |
| L Q | 28 | 33 | F 26 | F 30 | F 33 | R 40 | R 45 | 52 | J R 58 | R 58 | 60 | R 60 | R 61 | 60 | R 60 | R 60 | 56 | 56 | 50 | 46 | 44 | 40 | 32 | 34 |

**FEB. 2013** foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**FEB. 2013** 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 | E B 13 | 21 | E B 42 | 41 | B | 41 | G | G 17 | G 23 | G 22 | G 23 | G 24 | 43 | 43 | 48 | 34 | G 27 | G | G 22 | G 22 | 26 | 30 | 20 | 22 |
| 2 | 29 | K 32 | 36 | 45 | 69 | 55 | G 18 | B | 39 | B | B | B | B | B | B | B | B | 29 | 31 | G | G | 20 | 32 | 28 |
| 3 | 25 | 36 | B | B | B | 37 | G | 36 | 36 | G 22 | G 24 | G 22 | 42 | 36 | 33 | G 28 | 27 | 32 | G | G 18 | G | G | G | 15 |
| 4 | 34 | 27 | 31 | 42 | 45 | 41 | 31 | 31 | G 20 | G 21 | G 20 | 35 | 67 | 43 | E B 36 | 38 | 38 | 29 | 26 | G 18 | 28 | G | 14 | E B 15 |
| 5 | E B 16 | 25 | 29 | 29 | 34 | 34 | G 16 | 41 | G 21 | G | 32 | B | E B 48 | Y | 34 | 33 | G 22 | G 25 | G 21 | E B 24 | G 17 | G 19 | 19 | 22 |
| 6 | 36 | E B 14 | 35 | 36 | G 22 | 30 | 30 | 79 | 37 | 32 | 45 | 43 | 36 | 41 | 38 | G 23 | G 22 | 40 | 34 | 34 | G 18 | G 20 | 29 | 29 |
| 7 | 24 | 30 | 32 | 41 | G 25 | 39 | 42 | G 19 | G 18 | E B 56 | E B 55 | G 23 | E B 57 | Y | E B 53 | G 24 | E B 52 | E B 48 | E B 39 | E B 26 | 29 | 25 | E B 23 | 36 |
| 8 | K 38 | K 36 | 47 | 40 | 26 | 41 | 52 | 50 | 47 | 28 | 31 | B | G | G 23 | C | 34 | E B 54 | 25 | B | G 28 | G 26 | 26 | 21 | 30 |
| 9 | K 36 | 42 | 57 | K 34 | B | B | 36 | 42 | 36 | E B 54 | E B 56 | E B 53 | 48 | G | 33 | 32 | G 18 | G 25 | G 17 | G 17 | E B 22 | G 15 | E B 16 | E S 16 |
| 10 | 19 | K 25 | K 37 | 30 | B | 33 | 35 | 34 | 36 | B | 32 | 32 | B | E B 56 | 32 | 22 | 24 | G 21 | G | G | 23 | 17 | 17 | 30 |
| 11 | 38 | 39 | 39 | 40 | B | B | B | B | 40 | 42 | G 21 | G 23 | 38 | 33 | G | G 29 | 34 | G 17 | G 17 | 23 | G 17 | E B 19 | 25 | 28 |
| 12 | 57 | 57 | 58 | K 36 | 40 | 37 | 33 | 30 | G | 32 | G | G 22 | 38 | 36 | 35 | 43 | 32 | 29 | 31 | 28 | G 15 | G | 36 | K 39 |
| 13 | 40 | 34 | B | 42 | 43 | B | B | 58 | B | 39 | G 22 | G 21 | 34 | 34 | 32 | 32 | G 24 | G 22 | 18 | 24 | 22 | 23 | 39 | 93 |
| 14 | 37 | K 39 | 42 | 30 | B | G | 33 | B | G 32 | B | B | G 27 | G 32 | B | B | E B 57 | E B 56 | B | B | B | B | E B 25 | 30 | 36 |
| 15 | 35 | 34 | 28 | 28 | 34 | 36 | 36 | 32 | G 24 | G 19 | G | E B 52 | G | 33 | 32 | 42 | 31 | 30 | 57 | 34 | 32 | 24 | 30 | 26 |
| 16 | 35 | B | 34 | 22 | 20 | 32 | 32 | 28 | 26 | 32 | G | G | G 20 | 23 | 31 | G 25 | G 23 | G 25 | 25 | 23 | B | 36 | 43 | 43 |
| 17 | 40 | 31 | 31 | 64 | 41 | G 22 | G 25 | 34 | 42 | 40 | G 22 | G 22 | B | E B 33 | B | G 22 | G 22 | G 18 | 25 | 38 | 41 | 52 | 97 | 46 |
| 18 | 32 | 34 | 56 | 46 | 42 | G 24 | G 16 | G 18 | G 18 | G 16 | G 21 | G 22 | 32 | 32 | 32 | 28 | 33 | G 17 | G 17 | G | G | E B 14 | E B 13 | 20 |
| 19 | 58 | 42 | 34 | 57 | B | G | G 21 | G 20 | B | 31 | 29 | G 22 | E B 53 | E B 55 | E B 47 | G 26 | G 26 | 27 | 26 | 31 | 40 | 39 | 39 | 37 |
| 20 | 44 | 41 | K 34 | 30 | 34 | 47 | 39 | 36 | G 16 | G 16 | G 18 | 36 | 44 | 38 | 32 | E B 49 | G | E B 44 | B | G | 42 | E B 18 | 29 | K 34 |
| 21 | 31 | K 34 | 35 | 68 | B | 55 | 28 | B | B | 40 | B | E B 34 | B | 34 | 33 | G 25 | G 22 | 27 | G 19 | 22 | G 18 | 35 | 41 | 36 |
| 22 | 42 | 42 | 32 | 49 | 47 | 40 | B | B | 47 | 48 | 42 | 34 | G 22 | B | B | G | B | B | B | G 22 | 37 | 40 | 40 | 40 |
| 23 | 59 | B | 38 | 38 | 38 | G 19 | B | B | E B 38 | G | G 20 | 32 | G 23 | G 22 | G | G | B | B | E B 24 | 23 | 31 | 40 | 40 | 41 |
| 24 | 69 | 42 | 34 | 39 | B | G 31 | 41 | 40 | 28 | B | B | B | G 27 | G 27 | B | G 22 | G 22 | G 22 | 24 | E B 23 | 18 | 22 | 32 | 34 |
| 25 | 38 | 40 | 42 | 33 | G 16 | G | G 16 | G | G 22 | G 18 | G 21 | G 21 | G 23 | 33 | 32 | 30 | 28 | G 20 | G | 27 | 17 | E B 13 | E B 12 | 22 |
| 26 | 26 | 68 | 44 | 47 | 40 | 42 | 49 | 40 | 24 | B | 38 | 37 | E B 31 | E B 57 | E B 30 | G 24 | 40 | 51 | 36 | 36 | 32 | 36 | 44 | 42 |
| 27 | 44 | 69 | 43 | 41 | 44 | 38 | 32 | G 22 | G 18 | G 20 | 30 | 35 | 43 | 38 | 46 | 42 | 30 | 34 | 32 | 34 | 40 | 30 | 22 | 17 |
| 28 | 30 | 34 | 52 | 39 | 29 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 29 | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 28 | 26 | 26 | 27 | 19 | 24 | 23 | 21 | 24 | 22 | 23 | 23 | 23 | 22 | 21 | 26 | 24 | 24 | 23 | 26 | 25 | 27 | 27 | 27 |
| MED | 36 | 35 | 36 | 40 | 38 | 36 | 32 | 34 | 28 | E G 30 | G | G | E G 36 | 34 | 32 | G | G | E G 26 | 24 | 26 | G | 22 | 29 | 30 |
| U Q | 41 | 42 | 43 | 45 | 43 | 41 | 36 | 40 | 38 | 40 | 32 | 35 | 44 | 41 | 37 | 34 | 34 | 31 | 31 | 28 | 32 | 35 | 39 | 39 |
| L Q | 30 | 31 | 34 | 33 | G 26 | G | G 25 | G | G 22 | G 21 | G 21 | G 22 | G 31 | G 32 | 32 | G 25 | G 22 | G 22 | G 21 | G 23 | G 18 | E B 19 | 19 | 22 |

**FEB. 2013** ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**FEB. 2013** fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 13 | 12 | 42 | 22 | B | 18 | 14 | 14 | 14 | 14 | 18 | 16 | 17 | 18 | 15 | 14 | 23 | 21 | 15 | 12 | 20 | 14 | 14 | 14 |
| 2 | 17 | 12 | 14 | 17 | 15 | 66 | 15 | B | 13 | B | B | B | B | B | B | B | B | 23 | 20 | 23 | 19 | 12 | 13 | 16 |
| 3 | 16 | 14 | B | B | B | 14 | 19 | 15 | 16 | 13 | 15 | 16 | 18 | 18 | 15 | 16 | 15 | 15 | 18 | 15 | 14 | 16 | 13 | 12 |
| 4 | 13 | 20 | 13 | 13 | 13 | 18 | 19 | 14 | 14 | 14 | 16 | 18 | 17 | 15 | 36 | 24 | 13 | 19 | 17 | 15 | 21 | 15 | 13 | 15 |
| 5 | 16 | 12 | 13 | 13 | 14 | 16 | 14 | 15 | 13 | 14 | 15 | B | 48 | 30 | 18 | 13 | 16 | 16 | 15 | 24 | 15 | 13 | 13 | 12 |
| 6 | 13 | 14 | 14 | 13 | 19 | 14 | 14 | 13 | 13 | 16 | 17 | 18 | 18 | 22 | 16 | 16 | 12 | 14 | 16 | 13 | 12 | 13 | 13 | 14 |
| 7 | 15 | 13 | 15 | 12 | 20 | 20 | 14 | 13 | 13 | 56 | 55 | 19 | 57 | 18 | 53 | 20 | 52 | 48 | 39 | 26 | 13 | 15 | 23 | 13 |
| 8 | 14 | 12 | 13 | 14 | 16 | 23 | 18 | 16 | 21 | 13 | 21 | B | 24 | 16 | C | 24 | 54 | 20 | B | 26 | 22 | 17 | 13 | 14 |
| 9 | 13 | 23 | 13 | 14 | B | B | 22 | 25 | 20 | 54 | 55 | 53 | 15 | 12 | 14 | 15 | 13 | 14 | 13 | 13 | 22 | 13 | 16 | 16 |
| 10 | 12 | 13 | 14 | 15 | B | 16 | 14 | 17 | 20 | B | 17 | 16 | B | 56 | 20 | 18 | 17 | 15 | 16 | 20 | 15 | 13 | 13 | 24 |
| 11 | 12 | 15 | 19 | 30 | B | B | B | B | 20 | 14 | 16 | 16 | 12 | 18 | 14 | 18 | 15 | 14 | 13 | 12 | 12 | 19 | 12 | 12 |
| 12 | 15 | 13 | 14 | 23 | 24 | 13 | 13 | 13 | 14 | 14 | 15 | 15 | 16 | 19 | 14 | 15 | 15 | 15 | 14 | 13 | 13 | 12 | 12 | 13 |
| 13 | 12 | 15 | B | 16 | 24 | B | B | 19 | B | 17 | 19 | 17 | 15 | 18 | 18 | 18 | 18 | 18 | 13 | 14 | 12 | 11 | 13 | 11 |
| 14 | 24 | 12 | 12 | 23 | B | 24 | 17 | B | 28 | B | B | 22 | 30 | B | B | 57 | 56 | B | B | B | B | 25 | 16 | 12 |
| 15 | 12 | 13 | 15 | 13 | 13 | 20 | 16 | 16 | 15 | 13 | 24 | 52 | 30 | 20 | 14 | 19 | 13 | 15 | 12 | 13 | 12 | 12 | 26 | 13 |
| 16 | 12 | B | 14 | 14 | 14 | 12 | 14 | 15 | 12 | 14 | 13 | 13 | 15 | 20 | 18 | 23 | 19 | 18 | 16 | 13 | B | 13 | 15 | 15 |
| 17 | 13 | 23 | 11 | 12 | 14 | 16 | 20 | 14 | 19 | 16 | 17 | 15 | B | 33 | B | 14 | 18 | 15 | 14 | 14 | 14 | 27 | 13 | 11 |
| 18 | 23 | 17 | 12 | 12 | 13 | 20 | 13 | 12 | 13 | 13 | 14 | 15 | 18 | 16 | 17 | 19 | 17 | 13 | 14 | 13 | 15 | 14 | 13 | 13 |
| 19 | 19 | 13 | 21 | 14 | B | 27 | 15 | 16 | B | 20 | 19 | 15 | 53 | 55 | 47 | 19 | 18 | 25 | 26 | 12 | 14 | 12 | 14 | 13 |
| 20 | 13 | 12 | 13 | 19 | 24 | 14 | 14 | 16 | 14 | 12 | 16 | 18 | 15 | 12 | 17 | 49 | 22 | 44 | B | 23 | 15 | 18 | 11 | 12 |
| 21 | 13 | 12 | 12 | 12 | B | 19 | 18 | B | B | 20 | B | 34 | 21 | 19 | 19 | 15 | 18 | 14 | 15 | 12 | 13 | 12 | 12 | 12 |
| 22 | 13 | 16 | 12 | 18 | 26 | 16 | B | B | 18 | 28 | 23 | 28 | 17 | B | B | 21 | B | B | B | 17 | 13 | 14 | 14 | 13 |
| 23 | 21 | B | 14 | 25 | 23 | 15 | B | B | 38 | 18 | 15 | 15 | 20 | 18 | 18 | 20 | B | B | 24 | 18 | 13 | 11 | 14 | 13 |
| 24 | 24 | 18 | 21 | 19 | B | 30 | 18 | 21 | 20 | B | B | B | 23 | 24 | B | 19 | 19 | 13 | 16 | 23 | 13 | 13 | 12 | 12 |
| 25 | 11 | 15 | 13 | 14 | 13 | 15 | 15 | 13 | 16 | 13 | 13 | 15 | 20 | 19 | 17 | 15 | 16 | 14 | 13 | 13 | 12 | 13 | 12 | 12 |
| 26 | 13 | 13 | 12 | 16 | 22 | 20 | 16 | 13 | 14 | B | 13 | 20 | 31 | 57 | 30 | 13 | 12 | 13 | 13 | 15 | 12 | 16 | 13 | 14 |
| 27 | 12 | 14 | 13 | 14 | 16 | 13 | 13 | 12 | 12 | 13 | 13 | 19 | 18 | 18 | 19 | 15 | 13 | 14 | 13 | 14 | 16 | 13 | 14 | 12 |
| 28 | 12 | 12 | 19 | 13 | 16 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 29 | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 28 | 28 | 28 | 28 | 28 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 26 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 |
| MED | 13 | 14 | 14 | 14 | 22 | 18 | 16 | 16 | 16 | 16 | 17 | 18 | 20 | 19 | 18 | 18 | 18 | 15 | 16 | 14 | 14 | 13 | 13 | 13 |
| U Q | 16 | 16 | 17 | 19 | B | 24 | B 19 | B 25 | 20 | B 54 | B 24 | B 34 | 31 | 33 | B 47 | 21 | 23 | 23 | B 24 | 23 | 19 | 16 | 14 | 14 |
| L Q | 12 | 12 | 13 | 13 | 14 | 15 | 14 | 13 | 13 | 13 | 15 | 15 | 17 | 18 | 16 | 15 | 15 | 14 | 13 | 13 | 13 | 12 | 13 | 12 |

**FEB. 2013** fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**FEB. 2013** 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 | Q 230 | 238 | 212 | 200 | B | A | Y | 200 | 200 | 240 | 204 | Y | A | A | A | 200 | 198 | 214 | 196 | 214 | 224 | 234 | 218 | Q 236 |
| 2 | 252 | 266 | 192 | A | A | A | Y | B | A | B | B | B | B | B | B | B | B | 218 | 200 | Y | 200 | 200 | A | A |
| 3 | A | 236 | B | B | B | 222 | Y | A | A | 204 | 204 | Y | A | 204 | 196 | Y | 202 | 202 | 210 | 228 | 204 | 234 | 224 | 224 |
| 4 | A | A | A | A | 232 | A | A | A | 200 | 200 | Y | 200 | 222 | 206 | 204 | 216 | 198 | 210 | 210 | 210 | 228 | A | 202 | B 256 |
| 5 | 250 | 278 | 284 | 302 | 302 | A | 202 | A | 202 | 210 | 190 | B | B | Y | 212 | 206 | 218 | 208 | 198 | 198 | 220 | 220 | 226 | Q 226 |
| 6 | Q 240 | Q 250 | Q 258 | 242 | A | A 238 | 208 | A | 208 | 210 | 210 | A 222 | 198 | A | 202 | 198 | 198 | A | 210 | 212 | 216 | 218 | 230 | Q 248 |
| 7 | 258 | A | A | A | Y | A | A | A | 196 | B | B | 210 | B | Y | B | 206 | B | B | B | 226 | A 234 | E A 248 | 258 | A |
| 8 | A | A | A | A 240 | 196 | A | A | A | E A 288 | 194 | 200 | B | 196 | Y | C | 198 | B | 214 | B | Y | Y | A 236 | Q 264 | 308 |
| 9 | A | 212 | A | 264 | B | B | A | A | A | B | B | B | A 222 | Y | 208 | 202 | 208 | 208 | 202 | 212 | E B 222 | 222 | Q 222 | E S 252 |
| 10 | 302 | A | A | A | B | A | 202 | 198 | A | B | 214 | 200 | B | B | A 228 | 194 | 194 | 194 | 210 | 228 | 228 | 236 | 266 | A |
| 11 | A | A | A | A | B | B | B | B | A | A | 198 | 222 | A | A | 206 | E Y 236 | 198 | 206 | 200 | 200 | 192 | 226 | 226 | 248 |
| 12 | A | A | A | A | A | A | 274 | 204 | 198 | 200 | E Y 226 | Y | 218 | A 228 | Y | A | 206 | 204 | 204 | 208 | 218 | 224 | A | A |
| 13 | A | A | B | A | A | B | B | A | B | A | 198 | 210 | 204 | 208 | 196 | 212 | 206 | Y | 206 | 208 | 226 | 222 | A | A |
| 14 | A | A | A | Y | B | Y | A | B | Y | B | B | Y | Y | B | B | B | B | B | B | B | B | 262 | 290 | A |
| 15 | A | A | A | 248 | A | A | A 238 | A | E A 256 | 222 | Y | B | 230 | Y | 204 | A 218 | E A 232 | 208 | A | 222 | 222 | 230 | Y | E A 296 |
| 16 | A 238 | B | 232 | E A 326 | E A 310 | 278 | A | E A 246 | 208 | 214 | 216 | 200 | 216 | A 234 | E A 248 | 206 | 206 | 210 | 210 | 214 | B | A | A | A |
| 17 | A | A | A | 258 | E A 250 | A | A | A | A | 204 | 208 | 196 | B | E B 224 | B | E Y 224 | 196 | 212 | 212 | A | A | A | A | A |
| 18 | A | A | 206 | 198 | A | A | A | 224 | 208 | 198 | 190 | 206 | 198 | 220 | 220 | 204 | 204 | 204 | 210 | 194 | 218 | 230 | 228 | 236 |
| 19 | A | A | A | A | B | Y | A 228 | 224 | B | A 254 | 220 | Y 214 | B | B | 320 | E Y 226 | 216 | 230 | 202 | 236 | A | A | A | A |
| 20 | A | A | A | A | A | A | A | A 224 | 202 | 226 | 214 | E A 230 | 198 | 230 | 218 | B | 218 | B | B | A | 208 | 268 | 248 | A |
| 21 | A | A | A | 228 | B | A | Y | B | B | A | B | E B 232 | Y | 218 | 210 | 206 | 192 | 198 | 226 | 226 | 228 | 212 | 218 | A |
| 22 | A | A | A | A | A | A | B | B | A | A | A | A | A | B | B | Y 226 | B | B | B | E A 252 | A | A | A | A |
| 23 | A | B | A | A | A | Y | B | B | B | Y | Y | 198 | 208 | 200 | 200 | 210 | B | B | 226 | 218 | E B 254 | A | A | A |
| 24 | A | A | A | A | B | Y | A | A | A | B | B | B | Y 216 | E A 260 | B | 218 | 208 | 208 | 218 | 218 | 228 | 246 | A | A |
| 25 | A | A | A | 226 | Y | Y | 250 | 218 | 218 | 200 | 202 | 220 | 200 | 204 | 214 | 226 | 198 | 204 | 218 | 218 | 212 | 214 | 224 | Q 232 |
| 26 | E A 274 | A | 216 | A | A | A | A | 226 | 196 | B | 198 | 196 | 212 | B | 212 | 214 | 224 | E A 242 | E A 230 | E A 226 | E A 238 | A | A | A |
| 27 | A | A | A | 226 | A | E A 230 | 230 | 244 | 204 | 198 | 216 | 222 | A | E A 274 | A | E A 236 | 198 | 198 | E A 226 | E A 212 | A 212 | 230 | 244 | 244 |
| 28 | 294 | A | A | 230 | Y | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 29 | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 9 | 6 | 7 | 13 | 5 | 4 | 8 | 10 | 14 | 15 | 17 | 16 | 14 | 13 | 17 | 22 | 21 | 20 | 21 | 22 | 21 | 20 | 16 | 12 |
| MED | 251 | 244 | 216 | 235 | 241 | 234 | 229 | 222 | 202 | 204 | 204 | 206 | 210 | 213 | 209 | 208 | 203 | 208 | 210 | 214 | 220 | 229 | 227 | 241 |
| U Q | 284 | 266 | 258 | 261 | 306 | 258 | 244 | 226 | 208 | 222 | 215 | 222 | 218 | A 232 | 219 | E Y 224 | 212 | 213 | 218 | 226 | 228 | 236 | 253 | 254 |
| L Q | Q 239 | 236 | 206 | 226 | 214 | 226 | 205 | 204 | 200 | 200 | 198 | 200 | 198 | 205 | 203 | 204 | 198 | 204 | 202 | 210 | 212 | 221 | 223 | 234 |

**FEB. 2013** h′F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**MAR. 2013** fxI (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | B | 72 | B | R | R | Y | R | X 68 | A | A |
| 2 | 51 | R | B | Y | B | B | B | B | B | B | B | B | B | B | B | X 47 | O X 54 | X 57 | X 49 | X 46 | O X 35 | A | A | A |
| 3 | A | R | O X 40 | R | O X 39 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | X 51 | X 45 | O X 28 | O X 28 | A |
| 4 | A | A | 50 | A | X 32 | 71 | B | B | R | O X 56 | B | B | B | O X 63 | X 65 | B | B | B | B | B | O X 49 | X 43 | X 42 | X 38 |
| 5 | X 30 | A | A | R | B | B | R | R | X 57 | O X 62 | X 62 | B | O X 73 | O X 73 | O X 68 | R | X 68 | X 64 | O X 62 | X 57 | X 52 | X 46 | 35 | O X 28 |
| 6 | O X 23 | B | B | B | A | A | B | B | B | X 62 | X 61 | Y | O X 65 | O X 73 | X 72 | X 68 | X 67 | X 67 | X 60 | X 59 | X 48 | X 43 | X 43 | X 42 |
| 7 | X 42 | 66 | 54 | 32 | 31 | O X 38 | O X 48 | O X 54 | O X 67 | X 75 | X 82 | B | O X 86 | X 82 | O X 82 | B | X 78 | O X 71 | O X 65 | X 62 | X 58 | X 58 | X 56 | X 54 |
| 8 | 50 | 44 | O X 33 | 40 | 40 | X 58 | B | B | O X 67 | X 76 | X 79 | B | O X 85 | O X 86 | O X 83 | X 88 | O X 84 | X 77 | X 68 | X 60 | X 52 | X 45 | X 47 | 32 |
| 9 | R | R | A | A | A | A | R | R | X 75 | X 79 | O X 80 | O X 80 | X 80 | O X 77 | O X 74 | X 76 | O X 74 | B | B | B | O X 45 | O X 45 | B | O X 36 |
| 10 | 66 | 44 | X 40 | 52 | 53 | 60 | X 44 | O X 44 | X 66 | X 74 | O X 86 | O X 87 | X 88 | X 93 | X 98 | X 88 | X 80 | X 72 | X 68 | X 58 | X 55 | X 43 | 34 | R |
| 11 | O X 34 | A | A | A | A | A | B | R | X 62 | X 72 | O X 73 | O X 73 | O X 77 | X 79 | X 78 | X 80 | X 74 | X 64 | X 58 | X 54 | X 51 | X 46 | X 41 | X 41 |
| 12 | X 41 | X 41 | 41 | 41 | R | A | O X 48 | X 58 | X 72 | X 77 | X 78 | X 89 | O X 88 | O X 88 | O X 93 | X 88 | X 87 | X 76 | X 66 | X 64 | X 58 | 58 | X 44 | B |
| 13 | R | 58 | 65 | B | R | R | R | O X 53 | O X 66 | X 74 | X 76 | X 80 | X 80 | X 80 | O X 77 | X 87 | X 84 | X 75 | X 70 | X 60 | X 56 | C | C | C |
| 14 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | X 94 | O X 94 | X 94 | O X 84 | O X 74 | X 66 | X 59 | X 56 | X 49 | X 41 |
| 15 | 41 | 40 | R | X 29 | X 30 | 47 | 43 | 55 | O X 66 | B | B | X 67 | O X 80 | X 82 | X 81 | X 81 | X 88 | X 77 | O X 74 | X 63 | X 62 | X 57 | X 46 | X 46 |
| 16 | X 40 | X 38 | A | A | O X 49 | B | B | B | B | B | B | B | B | B | B | B | O X 76 | B | O X 67 | O X 58 | O X 46 | O X 38 | B | B |
| 17 | B | B | Y | R | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | X 31 | A | A |
| 18 | 80 | A | A | R | R | R | B | O X 48 | O X 54 | X 62 | R | R | B | B | Y | R | X 59 | X 56 | X 56 | X 53 | X 45 | X 38 | X 37 | 41 |
| 19 | X 42 | O X 36 | A | O X 39 | Y | R | 39 | X 51 | O X 55 | O X 56 | X 74 | X 76 | X 76 | X 78 | O X 74 | O X 77 | X 71 | X 61 | X 57 | X 54 | O X 44 | X 35 | X 32 | R |
| 20 | A | O X 40 | R | B | R | B | R | B | B | B | B | B | X 78 | X 77 | X 79 | O X 78 | X 76 | B | B | X 64 | 36 | R | R | R |
| 21 | O X 62 | A | R | C | B | B | B | B | B | B | B | B | B | B | B | X 57 | X 54 | B | O X 50 | O X 49 | O X 43 | X 37 | X 31 | X 24 |
| 22 | A | 51 | R | R | X 32 | 38 | X 38 | R | O X 48 | O X 64 | X 66 | O X 68 | O X 76 | O X 83 | O X 79 | 81 | X 73 | O X 55 | O X 50 | X 46 | X 39 | X 28 | A | A |
| 23 | R | R | B | A | O X 38 | 42 | 41 | X 43 | O X 48 | X 58 | X 61 | O X 66 | X 70 | R | B | X 96 | X 76 | B | B | X 49 | O X 28 | R | A | 57 |
| 24 | A | R | A | B | A | A | A | X 47 | R | X 59 | X 70 | O X 71 | X 69 | B | X 66 | O X 65 | O X 64 | X 63 | X 56 | X 48 | B | O X 34 | O X 28 | A |
| 25 | R | Y | R | O X 31 | 42 | 52 | 48 | X 49 | X 56 | X 66 | X 72 | X 77 | O X 78 | X 79 | X 77 | X 71 | X 73 | X 67 | X 52 | X 50 | X 42 | X 39 | X 39 | X 36 |
| 26 | 34 | 28 | 51 | 68 | 94 | A | 60 | 58 | X 63 | 68 | O X 75 | X 76 | X 82 | O X 85 | X 88 | X 82 | X 78 | X 72 | 68 | X 46 | X 38 | 32 | X 27 | O X 27 |
| 27 | X 22 | X 20 | 66 | X 52 | 52 | 44 | 39 | Y | B | B | X 65 | 71 | X 84 | X 94 | X 98 | 78 | B | B | X 41 | O X 38 | 59 | Y | R | 68 |
| 28 | A | B | B | B | Y | B | R | R | X 46 | O X 50 | X 57 | X 64 | X 62 | B | B | B | B | B | B | O X 40 | X 27 | 42 | O X 36 | A |
| 29 | A | A | 68 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | O X 54 | X 56 | 52 | 66 | A | B | 58 |
| 30 | A | A | A | B | B | B | B | B | B | B | B | R | R | B | B | B | R | R | B | X 41 | O X 34 | O X 24 | O X 27 | A |
| 31 | 60 | B | A | R | B | A | R | R | R | R | O X 56 | X 60 | X 67 | O X 69 | X 73 | X 76 | X 62 | O X 52 | X 48 | O X 37 | X 36 | X 30 | A | 57 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 16 | 12 | 10 | 9 | 12 | 9 | 10 | 11 | 16 | 18 | 18 | 15 | 20 | 18 | 20 | 21 | 23 | 19 | 22 | 27 | 28 | 25 | 19 | 17 |
| MED | X 42 | 40 | 50 | 40 | 40 | 47 | 44 | X 51 | X 62 | X 65 | X 72 | X 73 | X 78 | X 80 | X 78 | X 78 | X 74 | X 67 | X 59 | X 53 | X 46 | X 42 | X 37 | X 41 |
| U Q | 56 | 48 | 65 | 52 | 50 | 59 | O X 48 | 55 | O X 66 | X 74 | X 78 | X 80 | X 83 | O X 85 | X 86 | X 88 | X 80 | X 75 | X 68 | X 60 | X 56 | X 46 | X 44 | 56 |
| L Q | X 34 | X 37 | O X 40 | X 32 | X 32 | 40 | 39 | X 47 | O X 54 | O X 59 | X 62 | X 67 | X 72 | O X 77 | X 74 | X 72 | X 67 | O X 57 | X 52 | X 46 | X 38 | X 33 | O X 31 | X 34 |

**MAR. 2013** fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**MAR. 2013** foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

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

**MAR. 2013** foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**MAR. 2013** ftEs (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | B | E B 28 | B | G 30 | 34 | G 25 | 41 | 44 | 42 | 36 |
| 2 | 37 | 32 | B | 20 | B | B | B | B | B | B | B | B | B | B | B | 24 | G 18 | G 21 | G 17 | 22 | E B 18 | 35 | 37 | 39 |
| 3 | 41 | 30 | 58 | G 23 | 32 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | E B 23 | K 17 | K 14 | 28 | 34 |
| 4 | 33 | 56 | 58 | 49 | 29 | E B 45 | B | B | 32 | 30 | B | B | B | E B 36 | 30 | B | B | B | B | B | E B 25 | E B 14 | E B 14 | E B 12 |
| 5 | 18 | 33 | 35 | 32 | B | B | 32 | 32 | G | G 27 | G 26 | B | E B 56 | 44 | 33 | G 26 | G 21 | G | G 16 | G 18 | E B 15 | E B 13 | G 16 | E S 17 |
| 6 | 14 | B | B | 42 | 41 | 71 | B | B | B | G 22 | G 20 | G 22 | G 22 | 32 | G | 30 | 28 | G 19 | 15 | 18 | E B 13 | 22 | E B 13 | 16 |
| 7 | 21 | 16 | 18 | 28 | 22 | E B 19 | 19 | G | G 18 | E B 29 | G 25 | B | E B 55 | G 34 | E B 30 | B | E B 58 | E B 38 | E B 29 | E B 21 | E B 20 | E B 20 | E B 15 | E B 17 |
| 8 | E B 15 | 33 | 35 | 35 | 30 | K 27 | B | B | E B 25 | E B 27 | G 21 | B | E B 61 | 33 | G 24 | 31 | G 22 | G 18 | G 17 | 18 | E B 14 | E B 12 | E B 12 | K 32 |
| 9 | 30 | K 21 | 34 | 42 | 51 | 40 | 28 | 34 | G 25 | G 21 | G 17 | E B 29 | G 23 | E B 55 | E B 64 | E B 36 | E B 55 | B | B | B | E B 29 | E B 38 | B | E B 19 |
| 10 | 33 | 33 | K 30 | 25 | 29 | 19 | 28 | E B 26 | G 22 | 31 | 27 | 33 | 35 | 43 | 61 | 76 | 46 | 49 | G 18 | G | 16 | 27 | E B 13 | 28 |
| 11 | 42 | 58 | 58 | 42 | 42 | 38 | B | 39 | 25 | G 22 | G 23 | G 23 | E B 38 | 31 | 32 | 26 | G 22 | 28 | 23 | 20 | E B 15 | E B 13 | E B 13 | 26 |
| 12 | E B 13 | E B 14 | 30 | 31 | K 32 | 42 | 31 | G 21 | G 18 | G 22 | 28 | 30 | E B 37 | 46 | 30 | 39 | 34 | 27 | G 16 | 19 | 26 | 30 | E B 14 | B |
| 13 | 22 | K 32 | 40 | B | 42 | 37 | 41 | G 23 | G 25 | G 22 | 33 | 30 | 29 | 31 | 28 | 34 | G 21 | 29 | 20 | 28 | 20 | C | C | C |
| 14 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | 41 | 36 | 24 | G 18 | 22 | 18 | 22 | 14 | E B 14 | 33 |
| 15 | 30 | 32 | 32 | 42 | 44 | 28 | E B 17 | 22 | G | B | B | G | 33 | G 26 | G 21 | G 21 | E B 54 | 26 | E B 26 | E B 19 | 19 | 21 | E B 14 | 16 |
| 16 | E B 13 | 17 | 40 | 53 | 46 | B | B | B | B | B | B | B | B | B | B | B | E B 57 | B | E B 38 | E B 37 | E B 24 | E B 19 | B | B |
| 17 | B | B | 28 | 35 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | E B 21 | 33 | 36 |
| 18 | 43 | 34 | 37 | 32 | 28 | K 24 | B | E B 34 | E B 26 | E B 27 | E B 27 | E B 30 | B | B | G | E B 27 | E B 28 | E B 23 | E B 24 | E B 19 | E B 14 | E B 15 | E B 13 | E B 14 |
| 19 | 21 | K 21 | 42 | 40 | 19 | 37 | K 33 | G 23 | E B 21 | E B 23 | 28 | G 29 | 28 | G 27 | 30 | G 24 | 30 | G 20 | E B 19 | 19 | E B 20 | 15 | E B 14 | K 27 |
| 20 | 55 | 62 | 37 | B | 40 | B | 36 | B | B | B | B | B | E B 40 | E B 54 | E B 48 | E B 57 | E B 26 | B | B | E B 26 | E B 14 | 36 | 24 | G 20 |
| 21 | 77 | 40 | 39 | C | B | B | B | B | B | B | B | B | B | B | B | B | E B 31 | B | E B 23 | E B 26 | E B 26 | E B 14 | 14 | E B 13 |
| 22 | 34 | 31 | 31 | K 20 | 24 | K 17 | E B 17 | E B 27 | E B 26 | G | G 24 | E B 30 | E B 31 | E B 31 | E B 56 | E B 26 | E B 24 | E B 37 | E B 29 | E B 17 | E B 14 | E B 12 | 52 | K 35 |
| 23 | 32 | 32 | B | 41 | K 32 | K 20 | K 17 | E B 18 | E B 20 | G 22 | G 22 | E B 27 | E B 28 | E B 44 | B | E B 31 | G 22 | B | B | E B 24 | 30 | 20 | 45 | 85 |
| 24 | 41 | 36 | 52 | B | 44 | 42 | 42 | E B 30 | E B 25 | E B 30 | E B 27 | E B 45 | E B 30 | B | E B 28 | E B 28 | E B 26 | E B 24 | E B 20 | E B 15 | B | E B 17 | E B 20 | 28 |
| 25 | 28 | 18 | 24 | 33 | K 24 | E B 20 | E S 16 | E B 16 | G 18 | G 18 | 26 | G 16 | 29 | 29 | 28 | G 22 | 24 | 22 | G 15 | 15 | 22 | 18 | 25 | 17 |
| 26 | E B 12 | 35 | 52 | 34 | 42 | 50 | 33 | G | G 17 | 24 | G 19 | 28 | 29 | 29 | G | G | G 22 | G 17 | 18 | 16 | E B 13 | E B 13 | E B 14 | E B 14 |
| 27 | E B 14 | E B 13 | E B 13 | E B 24 | E B 12 | 34 | 38 | G | B | B | 49 | 49 | 49 | 27 | G | E B 31 | B | B | 32 | K 37 | 52 | K 37 | K 36 | 39 |
| 28 | 73 | B | B | B | 19 | B | 37 | 37 | G 24 | G 24 | G 22 | G 24 | G 22 | B | B | B | B | B | B | E B 21 | 16 | 35 | 36 | 36 |
| 29 | 37 | 35 | 37 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | E B 29 | 35 | 52 | 42 | 77 | B | 36 |
| 30 | 44 | 45 | 96 | B | B | B | B | B | B | B | B | E B 27 | E B 27 | B | B | B | E B 30 | E B 21 | B | E B 19 | E B 19 | E B 13 | 31 | K 32 |
| 31 | 41 | B | 41 | K 28 | B | 47 | 32 | 34 | E B 29 | E B 28 | E B 25 | E B 27 | 29 | E B 33 | E B 30 | E B 54 | 48 | E B 23 | E B 25 | E B 15 | E B 12 | 15 | K 34 | 36 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 28 | 25 | 25 | 22 | 22 | 19 | 17 | 18 | 19 | 19 | 19 | 18 | 21 | 19 | 21 | 22 | 24 | 21 | 23 | 28 | 29 | 30 | 27 | 28 |
| MED | 32 | 32 | 37 | 34 | 32 | 36 | 32 | G | G 24 | G 23 | G 24 | 28 | 28 | 32 | 29 | E G 29 | U 24 | 23 | U 20 | 19 | E B 19 | 16 | 16 | 28 |
| U Q | 41 | 36 | 47 | 42 | 42 | 42 | 36 | 34 | E B 25 | E B 28 | 27 | 30 | E B 39 | E B 44 | 37 | 36 | E B 40 | 30 | 29 | G | 26 | 30 | 34 | 36 |
| L Q | E B 20 | 21 | 30 | 28 | 24 | 20 | E 18 | 23 | G 20 | G 22 | G 22 | G 27 | 28 | 29 | G | G 26 | G 22 | G 20 | G 17 | 18 | E B 14 | E B 14 | E B 14 | E B 17 |

**MAR. 2013** ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**MAR. 2013** fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | B | 28 | B | 19 | 14 | 14 | 13 | 14 | 13 | 28 |
| 2 | 12 | 20 | B | 14 | B | B | B | B | B | B | B | B | B | B | B | 19 | 16 | 19 | 14 | 16 | 18 | 15 | 12 | 13 |
| 3 | 15 | 20 | 15 | 17 | 18 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 23 | 13 | 12 | 11 | 15 |
| 4 | 18 | 13 | 23 | 21 | 13 | 45 | B | B | 20 | 16 | B | B | B | 36 | 18 | B | B | B | B | B | 25 | 14 | 14 | 12 |
| 5 | 12 | 12 | 12 | 24 | B | B | 19 | 17 | 16 | 16 | 17 | B | 56 | 30 | 22 | 20 | 16 | 16 | 13 | 16 | 15 | 13 | 12 | 18 |
| 6 | 11 | B | B | 38 | 24 | 38 | B | B | B | 19 | 18 | 19 | 20 | 22 | 23 | 20 | 16 | 16 | 14 | 13 | 13 | 12 | 13 | 12 |
| 7 | 12 | 12 | 12 | 12 | 12 | 19 | 13 | 19 | 15 | 29 | 20 | B | 55 | 29 | 30 | B | 58 | 38 | 29 | 21 | 20 | 20 | 15 | 17 |
| 8 | 15 | 12 | 13 | 12 | 12 | 14 | B | B | 25 | 27 | 17 | B | 61 | 23 | 19 | 14 | 15 | 13 | 14 | 13 | 14 | 12 | 12 | 12 |
| 9 | 12 | 12 | 13 | 24 | 12 | 22 | 19 | 23 | 18 | 16 | 15 | 29 | 16 | 55 | 64 | 36 | 55 | B | B | B | 29 | 38 | B | 19 |
| 10 | 12 | 12 | 12 | 12 | 12 | 13 | 15 | 26 | 18 | 18 | 22 | 28 | 30 | 20 | 18 | 15 | 14 | 13 | 13 | 15 | 12 | 12 | 13 | 12 |
| 11 | 13 | 12 | 14 | 22 | 21 | 12 | B | 22 | 17 | 16 | 18 | 18 | 38 | 23 | 23 | 19 | 16 | 14 | 12 | 12 | 15 | 13 | 13 | 13 |
| 12 | 13 | 14 | 12 | 12 | 17 | 16 | 16 | 16 | 15 | 18 | 16 | 27 | 37 | 28 | 22 | 16 | 15 | 13 | 13 | 12 | 12 | 12 | 14 | B |
| 13 | 18 | 13 | 14 | B | 16 | 24 | 17 | 16 | 19 | 15 | 15 | 18 | 15 | 17 | 16 | 18 | 15 | 14 | 14 | 14 | 13 | C | C | C |
| 14 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | 15 | 20 | 15 | 14 | 14 | 12 | 12 | 12 | 14 | 12 |
| 15 | 12 | 12 | 12 | 13 | 13 | 13 | 18 | 15 | 20 | B | B | 24 | 16 | 18 | 15 | 16 | 54 | 19 | 26 | 19 | 13 | 12 | 14 | 12 |
| 16 | 13 | 12 | 12 | 13 | 12 | B | B | B | B | B | B | B | B | B | B | B | 57 | B | 38 | 37 | 24 | 19 | B | B |
| 17 | B | B | 26 | 30 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 21 | 28 | 26 |
| 18 | 26 | 23 | 25 | 23 | 20 | 14 | B | 34 | 26 | 27 | 27 | 30 | B | B | 30 | 27 | 28 | 23 | 24 | 19 | 14 | 15 | 13 | 14 |
| 19 | 12 | 12 | 13 | 12 | 15 | 19 | 13 | 16 | 20 | 24 | 19 | 22 | 20 | 20 | 15 | 15 | 16 | 15 | 19 | 13 | 20 | 13 | 14 | 12 |
| 20 | 13 | 13 | 17 | B | 23 | B | 22 | B | B | B | B | B | 40 | 54 | 48 | 57 | 26 | B | B | 26 | 14 | 12 | 12 | 13 |
| 21 | 13 | 15 | 13 | C | B | B | B | B | B | B | B | B | B | B | B | 27 | 31 | B | 23 | 26 | 26 | 14 | 11 | 13 |
| 22 | 12 | 12 | 12 | 12 | 12 | 14 | 17 | 27 | 26 | 12 | 22 | 30 | 31 | 31 | 56 | 26 | 24 | 36 | 29 | 17 | 14 | 12 | 12 | 12 |
| 23 | 12 | 12 | B | 16 | 13 | 13 | 12 | 18 | 20 | 17 | 19 | 26 | 28 | 44 | B | 31 | 20 | B | B | 24 | 13 | 13 | 12 | 13 |
| 24 | 14 | 14 | 24 | B | 21 | 25 | 16 | 30 | 25 | 30 | 27 | 45 | 30 | B | 28 | 28 | 26 | 24 | 20 | 15 | B | 17 | 20 | 12 |
| 25 | 18 | 13 | 12 | 15 | 12 | 20 | ES 16 | 16 | 16 | 14 | 15 | 14 | 16 | 19 | 13 | 16 | 15 | 13 | 12 | 12 | 14 | 13 | 13 | 14 |
| 26 | 12 | 12 | 11 | 12 | 22 | 19 | 13 | 13 | 15 | 15 | 16 | 14 | 18 | 16 | 14 | 18 | 18 | 13 | 12 | 12 | 13 | 13 | 14 | 14 |
| 27 | 14 | 13 | 13 | 24 | 12 | 13 | 12 | 28 | B | B | 22 | 16 | 20 | 13 | 15 | 31 | B | B | 19 | 13 | 12 | 30 | 22 | 14 |
| 28 | 18 | B | B | B | 14 | B | 22 | 23 | 18 | 21 | 21 | 19 | 20 | B | B | B | B | B | B | 21 | 12 | 12 | 12 | 14 |
| 29 | 12 | 12 | 19 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 29 | 17 | 11 | 13 | 13 | B | 14 |
| 30 | 17 | 24 | 15 | B | B | B | B | B | B | B | B | 26 | 27 | B | B | B | 30 | 21 | B | 19 | 19 | 13 | 11 | 20 |
| 31 | 14 | B | 27 | 16 | B | 18 | 14 | 18 | 29 | 28 | 25 | 27 | 27 | 33 | 30 | 54 | 19 | 23 | 25 | 15 | 12 | 13 | 15 | 13 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 29 | 29 | 29 | 28 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 30 | 30 |
| MED | 13 | 13 | 14 | 19 | 17 | 22 | 19 | 27 | 25 | 27 | 22 | 29 | 31 | 33 | 30 | 27 | 26 | 23 | 20 | 16 | 14 | 13 | 13 | 14 |
| U Q | 16 | 20 | 24 | B 34 | B | B | B | B | B | B | B | B | B | B | B | B | B 58 | B | B | 23 | 20 | 15 | 15 | 17 |
| L Q | 12 | 12 | 12 | 12 | 12 | 14 | 16 | 18 | 18 | 16 | 18 | 20 | 20 | 21 | 18 | 18 | 16 | 14 | 14 | 13 | 13 | 12 | 12 | 12 |

**MAR. 2013** fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**MAR. 2013** h′F (KM) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | B | 216 | B | 230 | A | Y | A | A | A | A |
| 2 | 196 | A | B | Y | B | B | B | B | B | B | B | B | B | B | B | 194 | A 216 | 222 | A 198 | 196 | 270 | A | A | A |
| 3 | A | A | 228 | A | E A 360 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 230 | 246 | E A 308 | 200 | A |
| 4 | A | 196 | A | A | 258 | 210 | B | B | A | A | B | B | B | 220 | 210 | B | B | B | B | B | 226 | 234 | 238 | 246 |
| 5 | E A 304 | A | A | A | B | B | A | E A 270 | Y | 212 | 188 | B | B | A | 208 | 208 | 198 | 214 | 222 | 206 | 214 | 216 | 252 | S |
| 6 | E A 308 | B | B | B | A | A | B | B | B | 222 | H 186 | Y | 216 | 220 | 218 | 210 | 194 | 208 | 216 | 220 | 208 | Q 208 | Q 220 | Q 222 |
| 7 | Q 238 | Q 280 | A | A | A | E B 304 | A 228 | Y 224 | 224 | 212 | 204 | B | E B 274 | Y | 220 | B | E B 262 | E B 236 | 218 | 218 | 218 | 236 | Q 236 | Q 264 |
| 8 | Q 240 | A 288 | A | 228 | 240 | A | B | B | 228 | 216 | 210 | B | B | 218 | 204 | 214 | 198 | 208 | Q 202 | 202 | 206 | 214 | 226 | A 272 |
| 9 | A | A | A | A | A | A | A | A | E A 272 | 206 | E Y 230 | H 186 | 198 | B | B | 242 | B | B | B | B | 222 | E B 254 | B | 264 |
| 10 | A | E A 262 | A | A | A | E A 344 | E A 252 | E B 250 | 212 | 216 | 206 | 202 | 202 | A | E A 246 | 202 | 208 | 208 | 192 | 200 | 200 | 226 | E B 234 | A |
| 11 | A | A | A | A | A | A | B | A | 216 | 206 | 192 | 200 | E B 250 | 210 | 218 | 218 | 206 | 218 | 206 | 206 | 218 | 214 | 218 | 226 |
| 12 | 246 | 262 | E A 282 | E A 352 | A | A | A | A 302 | 222 | 200 | 200 | 200 | E B 236 | E A 250 | 220 | 214 | 210 | 204 | 210 | 210 | 206 | Q 222 | E B 272 | B |
| 13 | A | A | 200 | B | A | A | A | A | 240 | 214 | 230 | 200 | 200 | 200 | 200 | 200 | 210 | 210 | 208 | Q 204 | Q 204 | C | C | C |
| 14 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | 204 | 204 | 202 | 198 | 204 | 202 | 208 | 230 | Q 246 | Q 300 |
| 15 | 300 | E A 294 | A | A | A | A | E B 294 | E A 248 | 236 | B | B | 220 | 208 | 208 | 198 | 214 | E B 240 | E A 220 | Q 212 | Q 206 | Q 206 | Q 210 | Q 222 | Q 242 |
| 16 | Q 258 | 276 | A | A | A | B | B | B | B | B | B | B | B | B | B | B | E B 270 | B | E B 240 | B 262 | 236 | 290 | B | B |
| 17 | B | B | Y | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | A | A |
| 18 | A | A | A | A | A | A | B | B | E B 290 | B 250 | E B 254 | 216 | B | B | Y | 230 | E B 246 | 222 | B 222 | 214 | 214 | 226 | 242 | Q 278 |
| 19 | 260 | A 324 | A | E A 312 | Y | A | A | E A 310 | 220 | H 186 | 228 | 218 | 218 | 228 | 210 | 210 | 220 | A 218 | A 212 | 212 | 226 | 244 | E B 256 | A |
| 20 | A | 222 | A | B | A | B | A | B | B | B | B | B | B | B | E B 258 | E B 252 | E B 210 | B | B | 218 | E B 282 | A | A | A |
| 21 | A 218 | A | A | C | B | B | B | B | B | B | B | B | B | B | B | 224 | E B 254 | B | E B 234 | 242 | E B 268 | B 234 | 256 | B 314 |
| 22 | A | A | A | A | A | A | B 278 | B | B | 210 | 200 | B 212 | 222 | 222 | B | E B 226 | 216 | B 224 | E B 220 | 210 | 214 | E B 232 | A | A |
| 23 | A | A | B | A | 244 | A | E A 310 | E B 242 | 198 | 206 | 196 | H 188 | 214 | B | B | 224 | 208 | B | B | 216 | A | A | A | A |
| 24 | A | A | A | B | A | A | A | B | E B 240 | E B 248 | 210 | B | 210 | B | 200 | 206 | E B 220 | 200 | 216 | 204 | B | E B 270 | B | A |
| 25 | A | Y | A | A | A | E B 304 | 290 | 236 | Y 226 | 218 | 204 | 198 | 198 | 198 | 214 | 202 | 214 | Q 198 | 196 | 196 | 218 | 240 | 236 | 236 |
| 26 | B 252 | A | A | A | A | A | A | A 250 | 196 | 196 | 196 | 206 | 206 | 200 | Y 206 | 206 | 206 | 202 | Q 190 | Q 198 | Q 206 | E B 238 | 238 | E B 268 |
| 27 | E B 266 | E B 280 | B | B 344 | E B 354 | E A 350 | A | Y | B | B | A 242 | 194 | 208 | 210 | 228 | E B 242 | B | B | A | E A 278 | A | A | A | A |
| 28 | A | B | B | B | Y | B | A | A | A | A | E A 220 | 234 | 208 | B | B | B | B | B | B | 210 | A 276 | 220 | 220 | A |
| 29 | A | A | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | E B 308 | E A 280 | F | 270 | A | B | A |
| 30 | A | A | A | B | B | B | B | B | B | B | B | B 214 | E B 232 | B | B | B | 236 | 236 | B | 220 | E B 252 | E B 312 | A 254 | A |
| 31 | A | B | A | A | B | A | A | A | E B 258 | E B 238 | 214 | 202 | 222 | E B 248 | E B 244 | E B 246 | E A 216 | 206 | 220 | 216 | B 220 | A 286 | A | A |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 12 | 10 | 3 | 4 | 5 | 5 | 6 | 9 | 15 | 17 | 19 | 16 | 18 | 13 | 18 | 23 | 23 | 21 | 21 | 26 | 26 | 23 | 18 | 12 |
| MED | 247 | 270 | U 214 | U 299 | 249 | E 304 | U 262 | E A 250 | 221 | 211 | 203 | 202 | 210 | 214 | 210 | 211 | 210 | 211 | 209 | 210 | 216 | 228 | 236 | 260 |
| U Q | E 283 | A 288 | E A 282 | E A 348 | E 357 | E A 347 | E A 294 | E A 286 | E 240 | B 220 | 228 | 215 | E B 222 | 225 | E 220 | E B 226 | E B 236 | 223 | 221 | 218 | 246 | E 254 | 252 | 275 |
| L Q | 239 | 262 | 200 | 270 | 242 | 257 | A 252 | 239 | 216 | 206 | 196 | 199 | 206 | 204 | 204 | 206 | 206 | 205 | 203 | 204 | 208 | 220 | 222 | 239 |

**MAR. 2013** h′F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**APR. 2013** fxI (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B | A | A | R | A | B | A | R | B | B | B | O X 68 | O X 73 | B | O X 87 | O X 86 | X 82 | O X 71 | B | 52 | O X 34 | B | B | B |
| 2 | R | A | R | B | B | B | B | X 40 | O X 52 | O X 52 | X 63 | X 71 | X 81 | X 88 | O X 86 | O X 86 | X 83 | X 66 | X 51 | X 41 | X 33 | 31 | 30 | B |
| 3 | B | A | A | A | R | 41 | O X 36 | O X 40 | X 48 | X 61 | X 67 | X 68 | X 78 | O X 86 | X 95 | O X 88 | O X 87 | X 70 | X 59 | X 44 | X 42 | 37 | O X 25 | O X 23 |
| 4 | B | B | A | A | R | 39 | 35 | B | B | O X 55 | X 66 | 72 | X 78 | X 83 | X 89 | X 99 | X 86 | 78 | 70 | X 50 | O X 45 | 40 | X 34 | O X 26 |
| 5 | B | A | A | 32 | O X 31 | 36 | 43 | 43 | X 46 | B | O X 64 | O X 72 | X 81 | O X 82 | O X 83 | X 82 | X 82 | X 70 | O X 52 | X 47 | X 47 | X 39 | X 28 | O X 23 |
| 6 | A | 43 | 53 | A | A | 43 | A | 42 | 58 | X 55 | O X 56 | X 68 | X 80 | O X 75 | X 79 | X 79 | X 80 | O X 73 | X 69 | X 48 | X 40 | O X 32 | A | R |
| 7 | R | O X 30 | A | A | A | A | A | B | B | B | O X 64 | X 74 | X 80 | X 79 | X 80 | X 80 | X 79 | X 80 | X 79 | 69 | X 40 | O X 31 | O X 28 | O X 24 |
| 8 | R | R | 56 | X 31 | 29 | 51 | X 32 | X 40 | X 61 | X 70 | X 78 | X 89 | X 90 | R | X 92 | X 90 | X 90 | X 80 | O X 56 | X 54 | X 38 | O X 32 | O X 24 | O X 23 |
| 9 | B | B | B | B | R | 39 | 43 | 66 | X 47 | X 61 | X 73 | X 80 | O X 85 | X 102 | X 93 | X 90 | X 91 | X 79 | X 79 | X 58 | X 45 | O X 37 | O X 30 | B |
| 10 | B | B | B | O X 36 | O X 38 | B | B | X 34 | O X 57 | 71 | X 82 | X 91 | X 89 | X 86 | X 92 | X 104 | X 106 | O X 100 | X 75 | X 63 | X 45 | 38 | X 31 | O X 27 |
| 11 | 68 | A | 43 | 55 | 56 | 64 | 66 | 56 | 69 | 69 | X 79 | O X 86 | X 99 | X 100 | X 106 | R | X 93 | X 81 | X 70 | X 57 | X 48 | X 39 | O X 28 | B |
| 12 | B | A | A | A | A | O X 46 | 57 | X 48 | B | O X 65 | B | O X 75 | X 76 | X 90 | X 90 | O X 90 | X 106 | X 83 | O X 69 | X 42 | 47 | O X 32 | B | B |
| 13 | B | B | B | B | R | X 50 | B | B | B | X 66 | X 75 | X 89 | O X 106 | X 101 | X 91 | X 91 | X 92 | X 83 | X 69 | X 52 | X 31 | X 28 | O X 24 | X 23 |
| 14 | O X 22 | O X 23 | B | A | A | A | O X 42 | R | B | X 67 | X 68 | X 72 | O X 85 | O X 111 | X 100 | X 94 | X 92 | X 91 | X 91 | X 74 | 44 | 32 | O X 22 | A |
| 15 | A | A | O X 32 | 52 | 42 | 42 | 42 | 32 | X 45 | X 56 | O X 66 | X 72 | X 81 | O X 88 | O X 85 | X 95 | X 70 | O X 63 | X 47 | X 47 | 37 | B | B | B |
| 16 | A | B | 36 | 30 | 39 | 36 | 41 | 32 | X 39 | X 58 | X 70 | O X 90 | X 92 | X 99 | X 93 | O X 98 | X 70 | X 54 | X 47 | 42 | 32 | 34 | A | 76 |
| 17 | A | A | A | A | A | A | A | 57 | X 52 | O X 63 | X 64 | X 70 | X 86 | X 94 | X 97 | X 96 | X 94 | X 76 | X 55 | 40 | O X 31 | B | B | B |
| 18 | B | B | B | B | 57 | O X 38 | A | X 58 | 52 | X 59 | X 73 | X 87 | X 89 | X 91 | X 106 | X 107 | X 82 | X 50 | X 46 | X 46 | X 28 | B | B | R |
| 19 | B | B | B | B | B | B | B | B | X 39 | X 57 | X 64 | X 86 | X 86 | X 90 | X 105 | X 98 | X 90 | X 49 | X 38 | X 43 | X 28 | O X 28 | O X 28 | X 22 |
| 20 | B | R | O X 36 | 38 | 43 | 43 | 36 | 43 | 43 | X 56 | X 64 | X 76 | O X 86 | X 87 | X 87 | X 87 | X 84 | 62 | X 43 | X 32 | O X 26 | O X 23 | O X 23 | Y |
| 21 | Y | B | A | A | O X 38 | 42 | 49 | 52 | 59 | 68 | 70 | X 81 | O X 102 | 76 | X 93 | X 90 | O X 86 | X 47 | X 38 | 31 | O X 22 | B | B | B |
| 22 | B | 33 | 33 | 42 | A | O X 38 | A | O X 40 | B | X 57 | 70 | X 82 | O X 97 | X 99 | X 108 | X 100 | 80 | 58 | 44 | 38 | 30 | O X 22 | 25 | B |
| 23 | B | B | R | 37 | 34 | 37 | 40 | 42 | 45 | X 50 | 69 | X 82 | X 89 | X 99 | X 101 | X 102 | X 89 | O X 74 | X 48 | 41 | 29 | 26 | X 23 | A |
| 24 | 57 | 46 | A | A | A | B | A | R | A | A | R | X 58 | X 61 | X 70 | X 71 | O X 78 | 78 | 62 | R | R | A | A | 91 | B |
| 25 | A | A | R | O X 36 | B | B | A | R | A | O X 46 | O X 56 | X 62 | O X 60 | B | O X 57 | B | B | O X 46 | X 29 | B | R | 57 | A | A |
| 26 | A | B | B | B | A | A | B | B | B | B | B | B | B | B | X 68 | B | B | B | X 32 | A | R | A | A | A |
| 27 | B | A | B | B | B | B | B | A | B | B | B | B | O X 66 | B | B | X 80 | O X 65 | O X 47 | X 35 | 42 | B | B | B | R |
| 28 | R | A | R | R | R | R | 32 | 33 | 41 | O X 57 | X 72 | X 78 | X 89 | X 89 | X 93 | X 101 | 88 | X 65 | O X 65 | B | B | B | B | O X 34 |
| 29 | B | A | R | O X 36 | B | B | X 26 | O X 30 | X 39 | O X 50 | O X 67 | O X 78 | O X 87 | X 93 | O X 98 | X 90 | X 66 | O X 49 | O X 48 | B | B | B | B | B |
| 30 | 45 | B | O X 36 | A | R | R | A | A | 42 | X 55 | X 61 | B | R | O X 102 | X 101 | X 94 | X 74 | X 68 | X 64 | X 46 | O X 30 | O X 24 | O X 22 | 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 | 5 | 8 | 11 | 10 | 16 | 15 | 19 | 19 | 24 | 25 | 27 | 28 | 25 | 29 | 27 | 28 | 29 | 28 | 25 | 24 | 20 | 17 | 10 |
| MED | 51 | 33 | 36 | 36 | 38 | 42 | 41 | 42 | X 47 | X 58 | X 67 | X 76 | X 86 | X 90 | X 92 | X 90 | X 85 | X 70 | X 54 | X 46 | X 36 | X 32 | O X 28 | O X 24 |
| U Q | 62 | 44 | 48 | 42 | 43 | 44 | 43 | 52 | 57 | X 66 | X 72 | X 86 | X 89 | X 99 | X 99 | X 98 | X 90 | X 80 | X 69 | X 53 | X 44 | 38 | X 30 | O X 27 |
| L Q | 34 | O X 26 | 34 | 32 | 34 | 38 | 35 | 34 | X 42 | O X 55 | X 64 | X 71 | X 79 | X 84 | X 86 | X 86 | X 80 | X 56 | X 45 | 42 | X 30 | O X 28 | O X 24 | X 23 |

**APR. 2013** fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**APR. 2013** 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 | B | A | A | A | A | B | A | A | B | B | B | 62 | U R 67 | B | U R 81 | U R 80 | 76 | 65 | B | F 42 | 28 | B | B | B |
| 2 | A | A | A | B | B | B | B | 34 | R 46 | U R 46 | 57 | 65 | J R 75 | J R 82 | R 80 | 80 | J R 77 | 60 | 45 | 35 | 27 | F 20 | F 20 | B |
| 3 | B | A | A | A | R | F 30 | R 30 | F 30 | 42 | 55 | 61 | 62 | 72 | U R 80 | J R 89 | R 82 | 81 | 64 | 53 | 38 | 36 | F 26 | R 19 | 17 |
| 4 | B | B | A | A | A | F 25 | F 26 | B | B | U R 49 | 60 | F 62 | 72 | 77 | 83 | 93 | J R 80 | F 68 | F 57 | 44 | 39 | F 32 | 28 | 20 |
| 5 | B | A | A | F 21 | R 25 | F 23 | F 26 | F 25 | 40 | B | R 58 | R 66 | J R 75 | 76 | 77 | J R 76 | J R 76 | 64 | R 46 | 41 | 41 | 33 | 22 | R 17 |
| 6 | A | R 23 | F 40 | A | A | F 33 | A | F 32 | F 48 | J R 49 | U R 50 | J R 62 | J R 74 | 69 | J R 73 | J R 73 | J R 74 | 67 | 63 | 42 | 34 | R 26 | A | A |
| 7 | R | R 24 | A | A | A | A | A | B | B | B | 58 | 68 | J R 74 | J R 73 | J R 74 | J R 74 | J R 73 | J R 74 | J R 73 | F 59 | J R 34 | R 25 | R 22 | R 18 |
| 8 | A | A | A | 25 | F 20 | F 21 | 26 | 34 | 55 | 64 | J R 72 | J R 83 | J R 84 | R | J R 86 | J R 84 | J R 84 | J R 74 | 50 | 48 | 32 | 26 | 18 | 17 |
| 9 | B | B | B | B | R | F 30 | F 24 | F 30 | 41 | 55 | 67 | J R 74 | 79 | J R 97 | J R 87 | J R 84 | J R 85 | J R 73 | J R 73 | 52 | 39 | 31 | 24 | B |
| 10 | B | B | B | R 30 | R 32 | B | B | 28 | 51 | F 61 | 76 | 85 | J R 83 | J R 80 | J R 86 | J R 98 | J R 100 | S 94 | 69 | 57 | 39 | F 28 | 25 | R 21 |
| 11 | A | A | F 34 | F 38 | F 48 | F 50 | F 46 | F 42 | F 56 | F 59 | 73 | R 80 | 93 | J R 94 | J R 100 | R | J R 87 | J R 75 | J R 64 | 51 | 42 | 33 | R 22 | B |
| 12 | B | A | A | A | A | R 40 | F 43 | 42 | B | 59 | B | R 69 | J R 70 | J R 84 | J R 84 | R 84 | J R 100 | J R 77 | 63 | 36 | F 38 | R 26 | B | B |
| 13 | B | B | B | B | R | J R 44 | B | B | B | J R 60 | 69 | J R 83 | R 100 | J R 95 | J R 85 | J R 85 | J R 86 | 77 | J R 63 | R 46 | 25 | 22 | R 18 | 17 |
| 14 | R 16 | R 17 | B | A | A | A | R 36 | A | B | 61 | 62 | J R 66 | R 79 | R 105 | J R 94 | J R 88 | J R 86 | J R 85 | 85 | 68 | F 35 | F 23 | R 16 | A |
| 15 | A | A | R 26 | F 31 | F 26 | F 24 | F 26 | F 24 | 39 | 50 | R 60 | 66 | 75 | R 82 | R 79 | 89 | J R 64 | R 57 | 41 | 41 | F 27 | B | B | B |
| 16 | A | B | F 20 | F 20 | F 24 | F 25 | F 25 | F 22 | 33 | 52 | 64 | 84 | J R 86 | J R 93 | J R 87 | 92 | J R 64 | 48 | 41 | F 34 | F 22 | F 25 | A | A |
| 17 | A | A | A | A | A | A | A | F 47 | 46 | 57 | 58 | J R 64 | 80 | J R 88 | 91 | 90 | 88 | 70 | 49 | F 30 | R 25 | B | B | B |
| 18 | B | B | B | B | R 39 | 32 | A | J R 52 | F 40 | 53 | 67 | 81 | J R 83 | J R 85 | J R 100 | J R 101 | 76 | 44 | 40 | J R 40 | R 22 | B | B | A |
| 19 | B | B | B | B | B | B | B | B | 33 | J R 51 | J R 58 | 80 | 80 | J R 84 | J R 99 | R 92 | J R 84 | 43 | 32 | 37 | 22 | R 22 | R 22 | 16 |
| 20 | B | A | R 30 | F 26 | F 33 | F 24 | F 21 | F 30 | F 33 | 50 | 58 | 70 | R 80 | 81 | 81 | J R 81 | 78 | F 52 | 37 | 26 | R 20 | R 17 | R 17 | Y |
| 21 | Y | B | A | A | R 32 | F 25 | F 26 | F 26 | F 36 | F 56 | F 58 | 75 | 96 | F 66 | J R 87 | J R 84 | R 80 | 41 | 32 | F 21 | R 16 | B | B | B |
| 22 | B | F 23 | F 22 | F 32 | A | R 32 | A | R 34 | B | 51 | F 59 | 76 | 91 | 93 | 102 | 94 | F 66 | F 49 | F 33 | F 26 | F 20 | R 16 | F 15 | B |
| 23 | B | B | R | F 26 | F 23 | F 25 | F 26 | F 26 | F 34 | 44 | F 59 | J R 76 | J R 83 | 93 | J R 95 | J R 96 | 83 | R 68 | 42 | F 30 | F 20 | F 16 | R 17 | A |
| 24 | A | F 34 | A | A | A | B | A | R | A | A | R | 52 | 55 | 64 | 65 | U R 72 | F 68 | F 52 | R | R | A | A | A | B |
| 25 | A | A | A | R 30 | B | B | A | A | A | R 40 | R 50 | R 56 | R 54 | B | R 51 | B | B | R 40 | 23 | B | A | A | A | A |
| 26 | A | B | B | B | A | A | B | B | B | B | B | B | B | B | 62 | B | B | B | 26 | A | A | A | A | A |
| 27 | B | A | B | B | B | B | B | A | B | B | B | B | R 60 | B | B | 74 | R 59 | U R 41 | 29 | F 32 | B | B | B | R |
| 28 | R | A | A | A | A | R | F 22 | F 23 | F 31 | 51 | J R 66 | J R 72 | 83 | J R 83 | J R 87 | J R 96 | F 77 | 59 | R 59 | B | B | B | B | R 28 |
| 29 | B | A | A | R 30 | B | B | 20 | R 24 | 33 | R 44 | 61 | R 72 | R 81 | J R 87 | R 92 | J R 84 | 60 | R 43 | R 42 | B | B | B | B | B |
| 30 | A | B | R 30 | A | A | A | A | A | F 31 | 49 | 55 | B | R | J R 96 | J R 95 | J R 88 | 68 | 62 | 58 | 40 | R 24 | 18 | R 16 | 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 | 5 | 7 | 11 | 10 | 16 | 15 | 19 | 19 | 24 | 25 | 27 | 28 | 25 | 29 | 27 | 28 | 29 | 28 | 25 | 24 | 19 | 16 | 9 |
| MED | R 16 | R 23 | F 30 | F 30 | F 29 | F 28 | F 26 | F 30 | 40 | 52 | 60 | 70 | R 80 | J R 84 | J R 86 | J R 84 | J R 78 | 64 | 48 | 40 | 28 | 25 | R 20 | 17 |
| U Q | | 29 | F 34 | F 31 | F 33 | R 32 | 30 | 34 | 46 | 58 | 66 | 80 | R 83 | J R 93 | J R 93 | J R 92 | J R 84 | J R 74 | 63 | 47 | 37 | 28 | 22 | R 20 |
| L Q | | 20 | F 22 | F 25 | F 24 | F 24 | F 24 | F 25 | 33 | R 49 | 58 | 64 | R 73 | 78 | R 80 | R 80 | 70 | 48 | 38 | F 33 | 22 | 20 | R 17 | 17 |

**APR. 2013** foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**APR. 2013** 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 | B 29 | 35 | 35 | 32 | 41 | B | 43 | 45 | B | B | B | E B 46 | E B 30 | B | E B 53 | E B 54 | E B 56 | E B 28 | B | E B 16 | E B 18 | B | B | B |
| 2 | K 29 | 36 | K 30 | B | B | B | B | 32 | E B 28 | E B 23 | G 24 | G 29 | 28 | G 22 | G 22 | G 22 | G | G 16 | K 15 | 29 | E B 13 | E B 12 | 22 | B |
| 3 | B | K 30 | 32 | 32 | 25 | K 22 | 37 | K 32 | G | G | G 22 | G | G 23 | G 22 | G | G 22 | 22 | E B 17 | E B 13 | E B 14 | E B 15 | E B 13 | E B 12 | E B 12 |
| 4 | B | B | K 28 | 40 | 34 | 29 | E B 17 | B | B | G | G 25 | G 21 | G 20 | 21 | 22 | 26 | G 21 | G | E B 17 | E B 16 | E B 19 | E B 20 | E B 23 | 20 |
| 5 | B | 32 | 50 | 30 | 31 | K 18 | E B 14 | 18 | E B 17 | B | E B 45 | E B 56 | G | E B 27 | E B 32 | E B 27 | E B 28 | E B 16 | E B 18 | E B 16 | E B 13 | E B 13 | E B 14 | E B 12 |
| 6 | 32 | 33 | 36 | 46 | 42 | 42 | 45 | 40 | G 16 | G | G 22 | G 21 | E B 28 | G 22 | G 18 | G 20 | 26 | E B 21 | E B 19 | E B 16 | E B 15 | E B 12 | 33 | 24 |
| 7 | K 20 | 28 | 42 | 33 | 45 | 50 | 42 | B | B | B | 31 | G 24 | G 20 | G 20 | G 20 | G 16 | G | E B 25 | E B 19 | 21 | E B 25 | E B 18 | E B 14 | 15 |
| 8 | K 25 | 29 | 31 | 30 | 22 | E B 13 | E B 15 | E B 17 | E B 19 | E B 27 | E B 26 | E B 28 | E B 29 | E B 40 | E B 30 | E B 28 | E B 25 | E B 19 | 23 | E B 18 | E B 16 | E B 13 | E B 13 | E B 13 |
| 9 | B | B | B | B | K 30 | K 27 | E B 18 | E B 14 | G 14 | 22 | 24 | 26 | 29 | 28 | G 22 | 24 | 21 | E B 21 | E B 16 | E B 14 | E B 13 | E B 13 | E B 13 | B |
| 10 | B | B | B | E B 24 | E B 24 | B | B | E B 16 | E B 16 | 21 | G | 28 | 26 | 25 | 22 | 32 | G 17 | 21 | G 21 | 21 | 20 | 25 | 16 | E B 14 |
| 11 | 32 | 60 | 35 | 20 | E S 16 | 16 | 27 | E B 13 | G | G 16 | 26 | 28 | 33 | G | G 22 | E B 28 | E B 40 | E B 56 | E B 27 | E B 17 | E B 18 | E B 18 | E B 16 | B |
| 12 | B | 33 | 70 | 42 | 44 | 37 | 21 | E B 29 | B | E B 31 | B | E B 55 | E B 28 | E B 28 | E B 26 | G 22 | E B 24 | E B 24 | E B 15 | E B 13 | E B 13 | E B 15 | B | B |
| 13 | B | B | B | B | G 22 | 60 | B | B | B | E B 40 | E B 39 | E B 26 | E B 26 | G | G | E B 25 | E B 19 | E B 17 | E B 14 | E B 13 | E B 13 | E B 13 | E B 12 | E B 12 |
| 14 | E B 12 | 13 | B | 41 | 42 | 42 | 34 | 40 | B | 38 | 34 | E B 33 | G 18 | E B 33 | E B 55 | G | E B 19 | E B 16 | E B 13 | E B 13 | E B 13 | 30 | 33 | 41 |
| 15 | 36 | 38 | 35 | 29 | 41 | 32 | 29 | 27 | G | G 20 | 26 | 25 | 35 | 29 | 26 | 62 | G 16 | K 15 | E B 12 | 20 | 20 | B | B | B |
| 16 | 27 | B | 30 | 33 | 30 | E B 14 | E B 14 | 28 | E B 18 | G | G 26 | G 21 | G 21 | G 18 | 31 | G 16 | 26 | 35 | 30 | E B 12 | E B 13 | 29 | 37 | 32 |
| 17 | 66 | 44 | 44 | 41 | 57 | 52 | 42 | 34 | 19 | 22 | G 18 | G 20 | K 20 | 25 | G | G 23 | 22 | E B 20 | E B 13 | 22 | E B 17 | B | B | B |
| 18 | B | B | B | B | E B 36 | 33 | 43 | 38 | E B 14 | E B 16 | G 17 | G 17 | 32 | G 22 | G 16 | G 19 | 22 | 21 | E B 23 | E B 17 | E B 14 | B | B | 24 |
| 19 | B | B | B | B | B | B | B | B | E B 18 | E B 21 | E B 22 | G | G 21 | G 19 | G | G | E B 18 | E B 14 | E B 12 | E B 13 | B 12 | E B 13 | B 12 | E B 12 |
| 20 | B | 24 | 33 | 32 | 33 | 29 | E B 15 | E S 16 | E B 14 | G | G | G 18 | 24 | G 17 | G 21 | 29 | 19 | E B 18 | 16 | E B 15 | E B 13 | E B 14 | E B 12 | 16 |
| 21 | 21 | B | 30 | 42 | 42 | 40 | 30 | E B 14 | E B 13 | G | 22 | G 18 | G 19 | G 20 | 40 | 33 | G | E B 12 | E B 13 | E B 14 | E B 12 | B | B | B |
| 22 | B | E B 23 | E B 21 | E B 24 | 67 | 40 | 48 | 34 | B | 32 | 33 | 29 | 26 | G 17 | G 20 | 28 | 28 | 27 | 27 | E B 14 | E B 13 | E B 12 | E B 12 | B |
| 23 | B | B | 41 | 35 | 29 | E B 12 | E B 14 | E B 14 | E B 16 | G 16 | G 16 | G | G 20 | G 22 | 28 | 28 | 18 | E B 12 | E B 12 | E B 13 | E B 13 | E B 13 | E B 13 | K 22 |
| 24 | 39 | 71 | 48 | 90 | 46 | B | 59 | 34 | 60 | 49 | 37 | 29 | E B 23 | E B 30 | E B 24 | E B 30 | E B 28 | E B 16 | 42 | 34 | 72 | 73 | 75 | B |
| 25 | 40 | 66 | 39 | 26 | B | B | 40 | 33 | 43 | 19 | E B 19 | E B 22 | E B 28 | B | E B 25 | B | B | E B 26 | E B 18 | B | 34 | 32 | 41 | 34 |
| 26 | 42 | B | B | B | 40 | 42 | B | B | B | B | B | B | B | B | E B 54 | B | B | B | 31 | 36 | 31 | 32 | 39 | 40 |
| 27 | B | 50 | B | B | B | B | B | 42 | B | B | B | B | E B 54 | B | B | E B 39 | E B 54 | E B 15 | E B 19 | E B 13 | B | B | B | 18 |
| 28 | 23 | 42 | 34 | K 32 | 32 | 24 | K 18 | E B 15 | E B 15 | E B 26 | E B 22 | G | E B 29 | 25 | G | E B 21 | E B 22 | E B 20 | G | B | B | B | B | 33 |
| 29 | B | K 36 | 34 | 47 | B | B | E B 19 | E B 14 | E B 16 | E B 18 | E B 22 | E B 25 | E B 28 | E B 29 | E B 24 | E B 21 | E B 19 | E B 24 | E B 18 | B | B | B | B | B |
| 30 | 29 | B | 44 | 34 | 32 | 36 | 40 | 48 | K 30 | G | E B 22 | B | E B 56 | E B 27 | E B 33 | E B 25 | E B 23 | E B 22 | E B 14 | E B 13 | E B 14 | E B 13 | E B 12 | 32 |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 15 | 19 | 22 | 23 | 25 | 22 | 24 | 25 | 21 | 25 | 26 | 27 | 29 | 26 | 29 | 28 | 28 | 29 | 29 | 27 | 27 | 22 | 21 | 19 |
| MED | 29 | 35 | 35 | 33 | 34 | 32 | 30 | 29 | E B 16 | G | 23 | 26 | U 23 | G | 22 | 24 | 20 | E B 20 | E B 18 | E B 16 | E B 14 | E B 14 | E B 14 | 20 |
| U Q | 39 | 44 | 42 | 41 | 42 | 42 | 42 | 36 | 19 | E B 26 | 26 | G | 29 | E B 28 | E B 30 | 28 | E B 26 | E B 24 | G | 20 | 19 | 25 | 33 | 32 |
| L Q | 23 | 29 | 31 | 30 | 30 | 22 | E B 18 | E B 16 | E B 16 | G | E B 22 | G 21 | G 21 | G 21 | G 22 | G 22 | 19 | E B 16 | E B 14 | E B 13 | E B 13 | E B 13 | E B 12 | E B 13 |

**APR. 2013** ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**APR. 2013** fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B 12 | 20 | 20 | 20 | 30 | B | 19 | 24 | B | B | B | 46 | 30 | B | 53 | 54 | 56 | 28 | B | 16 | 18 | B | B | B |
| 2 | 12 | 14 | 16 | B | B | B | B | 23 | 28 | 23 | 20 | 25 | 22 | 20 | 20 | 20 | 16 | 15 | 12 | 12 | 13 | 12 | 11 | B |
| 3 | B 12 | 23 | 27 | 16 | 13 | 14 | 14 | 16 | 16 | 18 | 20 | 19 | 16 | 20 | 20 | 16 | 17 | 12 | 14 | 15 | 13 | 12 | 12 |
| 4 | B | B 12 | 27 | 14 | 13 | 17 | B | B 21 | 20 | 16 | 16 | 18 | 18 | 14 | 19 | 14 | 17 | 16 | 19 | 20 | 23 | 15 |
| 5 | B 12 | 14 | 12 | 15 | 12 | 14 | 12 | 17 | B 45 | 56 | 23 | 27 | 32 | 27 | 29 | 16 | 18 | 16 | 13 | 13 | 14 | 12 |
| 6 | 14 | 13 | 13 | 15 | 14 | 14 | 13 | 13 | 13 | 14 | 20 | 20 | 28 | 18 | 14 | 16 | 21 | 21 | 19 | 16 | 15 | 12 | 12 | 13 |
| 7 | 12 | 12 | 15 | 12 | 14 | 15 | 22 | B | B | B 20 | 20 | 16 | 13 | 18 | 14 | 16 | 24 | 19 | 13 | 25 | 18 | 14 | 13 |
| 8 | 20 | 15 | 13 | 12 | 11 | 13 | 15 | 17 | 19 | 27 | 26 | 28 | 29 | 40 | 30 | 28 | 25 | 19 | 12 | 18 | 16 | 13 | 13 | 13 |
| 9 | B | B | B | B 14 | 12 | 18 | 15 | 13 | 12 | 13 | 16 | 17 | 14 | 18 | 13 | 14 | 21 | 16 | 14 | 13 | 13 | 13 | B |
| 10 | B | B | B | 24 | 24 | B | B 15 | 16 | 15 | 14 | 13 | 18 | 18 | 13 | 14 | 14 | 13 | 14 | 13 | 13 | 12 | 13 | 14 |
| 11 | 12 | 12 | 14 | 12 | E S 16 | 13 | 13 | 13 | 13 | 13 | 12 | 14 | 12 | 15 | 20 | 28 | 40 | 56 | 27 | 17 | 18 | 18 | 16 | B |
| 12 | B | 20 | 19 | 19 | 22 | 19 | 17 | 29 | B 30 | B 55 | 28 | 28 | 26 | 18 | 24 | 24 | 15 | 13 | 13 | 15 | B | B |
| 13 | B | B | B | B 12 | 19 | B | B | B 40 | 38 | 26 | 26 | 19 | 16 | 25 | 20 | 17 | 14 | 13 | 13 | 13 | 12 | 12 |
| 14 | 12 | 13 | B | 14 | 18 | 20 | 20 | 23 | B 17 | 25 | 33 | 16 | 33 | 55 | 16 | 19 | 16 | 13 | 13 | 13 | 12 | 12 | 12 |
| 15 | 11 | 13 | 13 | 12 | 12 | 12 | 12 | 12 | 12 | 15 | 12 | 14 | 15 | 14 | 14 | 15 | 12 | 12 | 12 | 12 | 12 | B | B | B |
| 16 | 14 | B | 12 | 12 | 12 | 14 | 14 | 15 | 18 | 16 | 17 | 19 | 16 | 12 | 13 | 13 | 12 | 12 | 12 | 12 | 13 | 13 | 12 | 13 |
| 17 | 14 | 13 | 13 | 16 | 16 | 17 | 13 | 14 | 12 | 13 | 13 | 15 | 15 | 14 | 18 | 15 | 13 | 20 | 13 | 14 | 17 | B | B | B |
| 18 | B | B | B | B 36 | 15 | 14 | 24 | 14 | 16 | 14 | 14 | 14 | 16 | 14 | 15 | 14 | 15 | 23 | 17 | 14 | B | B | 13 |
| 19 | B | B | B | B | B | B | B | B 17 | 21 | 22 | 20 | 19 | 18 | 17 | 18 | 18 | 14 | 12 | 13 | 12 | 13 | 12 | 12 |
| 20 | B | 12 | 12 | 12 | 13 | 15 | 15 | E S 16 | 14 | 14 | 14 | 16 | 16 | 14 | 13 | 19 | 13 | 18 | 14 | 15 | 13 | 13 | 12 | 13 |
| 21 | 13 | B | 12 | 13 | 13 | 13 | 17 | 14 | 13 | 13 | 14 | 12 | 13 | 14 | 13 | 13 | 14 | 12 | 13 | 14 | 12 | B | B | B |
| 22 | B | 23 | 21 | 24 | 14 | 12 | 13 | 16 | B 19 | 13 | 13 | 13 | 13 | 13 | 12 | 12 | 12 | 13 | 14 | 13 | 12 | 12 | B |
| 23 | B | B 14 | 12 | 13 | 12 | 14 | 14 | 16 | 13 | 13 | 18 | 18 | 17 | 13 | 12 | 13 | 12 | 12 | 13 | 13 | 13 | 13 | 13 |
| 24 | 12 | 13 | 15 | 26 | 26 | B | 26 | 25 | 26 | 28 | 29 | 22 | 23 | 30 | 24 | 30 | 28 | 16 | 13 | 13 | 18 | 12 | 17 | B |
| 25 | 25 | 25 | 25 | 16 | B | B | 13 | 28 | 12 | 14 | 19 | 22 | 28 | B | 25 | B | B | 26 | 18 | B | 12 | 12 | 12 | 20 |
| 26 | 14 | B | B | B | 19 | 25 | B | B | B | B | B | B | B | B | 54 | B | B | B | 13 | 13 | 12 | 12 | 12 | 12 |
| 27 | B | 14 | B | B | B | B | B | 21 | B | B | B | B | 54 | B | B | 39 | 54 | 15 | 19 | 13 | B | B | B | 12 |
| 28 | 12 | 12 | 27 | 23 | 13 | 13 | 13 | 15 | E S 15 | 26 | 22 | 20 | 29 | 18 | 18 | 21 | 22 | 20 | 20 | B | B | B | B | 12 |
| 29 | B | 14 | 16 | 16 | B | B | 19 | 14 | 16 | 18 | 22 | 25 | 28 | 29 | 23 | 21 | 19 | 24 | 18 | B | B | B | B | B |
| 30 | 12 | B | 14 | 15 | 20 | 24 | 13 | 12 | 12 | 14 | 22 | B | 56 | 27 | 33 | 25 | 23 | 22 | 14 | 13 | 14 | 13 | 12 | 12 |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| MED | B 18 | 16 | 18 | 16 | 15 | 16 | 16 | 16 | 18 | 20 | 20 | 19 | 18 | 18 | 18 | 19 | 17 | 14 | 14 | 13 | 13 | 13 | 13 |
| U Q | B | B | B | B 27 | B 26 | B | B 22 | B 25 | B | B 28 | 26 | 28 | 28 | 29 | 26 | 27 | 25 | 22 | 18 | 16 | 18 | B | B | B |
| L Q | 12 | 13 | 13 | 12 | 13 | 13 | 13 | 14 | 13 | 14 | 14 | 16 | 16 | 14 | 14 | 14 | 14 | 14 | 13 | 13 | 13 | 12 | 12 | 12 |

**APR. 2013** fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**APR. 2013** 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 | B | A | A | A | A | B | A | A | B | B | B | E 266 | E B 248 | B | E B 268 | E B 240 | E B 228 | 208 | B | 222 | E B 260 | B | B | B |
| 2 | A | A | A | B | B | B | B | E A 368 | E B 280 | 208 | 198 | 216 | 216 | E A 218 | Y | Y | E A 210 | E A 202 | Q 196 | 198 | B 210 | E B 230 | A | B |
| 3 | B | A | A | A | A | A | A | A | E A 258 | 210 | 220 | E Y 216 | 206 | 216 | 210 | A 216 | 206 | 192 | 196 | 196 | 206 | 216 | B 262 | E B 262 |
| 4 | B | B | 206 | A | A | 240 | B | B | B | A 234 | 198 | 196 | 218 | 208 | 220 | A 212 | 196 | Q 210 | 210 | 224 | 230 | B 250 | 216 | E B 290 |
| 5 | B | A | A | A | 204 | 202 | B | E A 282 | Q 230 | B | B | B | 216 | 216 | 222 | 222 | 212 | 194 | 194 | 202 | 206 | 214 | 214 | B |
| 6 | A | E A 234 | A 220 | A | A | A | A | A | Q 250 | 208 | E A 224 | E Y 224 | E B 222 | 202 | 228 | 226 | 208 | 200 | 200 | 204 | 222 | 222 | 222 | A |
| 7 | A | 222 | A | A | A | A | A | B | B | B | E A 244 | E A 240 | 224 | 222 | 218 | 228 | 216 | 216 | 208 | 206 | E B 258 | E B 268 | E B 250 | E B 320 |
| 8 | A | A | A | A | A | E B 334 | B | 276 | E B 232 | 216 | 222 | E B 224 | B 214 | B 220 | 208 | 216 | 208 | 196 | 202 | 204 | 214 | 226 | E B 250 | E B 278 |
| 9 | B | B | B | B | A | 198 | B | Q 274 | 200 | 204 | 218 | 218 | 218 | 208 | E A 218 | 218 | 198 | 204 | 208 | 198 | 210 | 216 | 216 | B |
| 10 | B | B | B | B | E B 344 | B | B | E B 296 | B 226 | 222 | 212 | 212 | 204 | 204 | 218 | 208 | 198 | 190 | 196 | 208 | 208 | 220 | A 236 | B |
| 11 | A | A | A | Q 330 | Q 306 | Q 322 | Q 304 | Q 262 | 200 | 212 | 200 | 220 | 200 | 210 | E Y 224 | 218 | 208 | 222 | 192 | 206 | Q 206 | 222 | E B 296 | B |
| 12 | B | A | A | A | A | A | Q 340 | E B 324 | B | E B 240 | B | 248 | 218 | 218 | 222 | 216 | 202 | 198 | 190 | 198 | Q 210 | 214 | B | B |
| 13 | B | B | B | B | A | A | B | B | B | E B 242 | 238 | 230 | 216 | 208 | 208 | 224 | 204 | 194 | 202 | 198 | 200 | E B 248 | E B 272 | E B 280 |
| 14 | E B 304 | E B 306 | B | A | A | A | A | A | B | 224 | 234 | E B 252 | A | E B 248 | 230 | 196 | 208 | 208 | 200 | 194 | 212 | 248 | A | A |
| 15 | A | A | A 216 | A | A | A | E A 290 | A | E A 234 | 192 | 212 | 200 | 212 | A 220 | 208 | 198 | Y | Q 204 | 194 | Q 194 | Q 194 | B | B | B |
| 16 | A | B | A | 206 | A 240 | E B 380 | E B 318 | A | E B 244 | 214 | 198 | E A 218 | 208 | E A 212 | E A 200 | 194 | 194 | 198 | 198 | Q 188 | Q 210 | 200 | A | A |
| 17 | A | A | A | A | A | A | A | 212 | 226 | 226 | E A 218 | 208 | 198 | 216 | 208 | 196 | 196 | 196 | 214 | Q 212 | E B 278 | B | B | B |
| 18 | B | B | B | B | 228 | 190 | A | E A 310 | Q 248 | 188 | 214 | 196 | 194 | 198 | 206 | 176 | 188 | 194 | 210 | 200 | 210 | B | B | 210 |
| 19 | B | B | B | B | B | B | B | B | 242 | 214 | 198 | 214 | 198 | 198 | 204 | 200 | 192 | 182 | Q 188 | 206 | 196 | 262 | 254 | 248 |
| 20 | B | A | 192 | A | E S 324 | S | B | S 292 | 224 | 208 | 198 | H 190 | 194 | 198 | 218 | 212 | 182 | 194 | 194 | 212 | 212 | B 268 | B 228 | Y |
| 21 | Y | B | A | A | 200 | A | Q 284 | Q 278 | 236 | Q 214 | Q 204 | 204 | Q 208 | 194 | 196 | Q 196 | 192 | 176 | 188 | 200 | E B 246 | B | B | B |
| 22 | B | B | B | B | A | E A 228 | A | A | B | E A 256 | 196 | 194 | 210 | 206 | 206 | 202 | Q 186 | Q 198 | Q 198 | 212 | 200 | E B 272 | E B 212 | B |
| 23 | B | B | A | A | A | 198 | Q 302 | Q 260 | E B 244 | Q 208 | 204 | A 202 | 204 | 204 | A 196 | 194 | Q 192 | Q 186 | Q 190 | Q 202 | E B 210 | E B 242 | E B 260 | A |
| 24 | A | 254 | A | A | A | B | A | A | A | A | A | A 204 | E B 250 | E B 270 | B 258 | B | B | 268 | A | A | A | A | A | B |
| 25 | A | A | A | 186 | B | B | A | A | A | A | 204 | 232 | E B 246 | B | E B 236 | B | B | E B 228 | B | B | A | A | A | A |
| 26 | A | B | B | B | A | A | B | B | B | B | B | B | B | B | B | B | B | B | A 278 | A | A | A | A | A |
| 27 | B | A | B | B | B | B | B | A | B | B | B | B | B | B | B | B | E B 242 | 194 | B 222 | 216 | B | B | B | A |
| 28 | A | A | A | A | A | A | A | B | S 240 | 206 | 206 | 206 | 212 | 214 | 200 | 200 | 194 | Q 226 | E A 226 | B | B | B | B | 226 |
| 29 | B | A | A | E A 298 | B | B | B | B | 272 | B | 224 | 218 | 208 | 206 | 206 | 194 | 184 | 210 | 198 | B | B | B | B | B |
| 30 | 200 | B | 208 | A | A | A | A | A | A | Y | 222 | B | 244 | 218 | 222 | 198 | 192 | B 222 | 206 | 196 | E B 224 | E B 224 | E B 262 | A |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 2 | 4 | 5 | 4 | 7 | 9 | 6 | 12 | 18 | 21 | 24 | 26 | 27 | 26 | 27 | 25 | 26 | 29 | 27 | 25 | 24 | 19 | 15 | 8 |
| MED | 252 | 236 | 208 | U 224 | U 222 | U 213 | Q 300 | U 258 | 233 | 211 | 208 | 210 | 210 | 209 | 213 | 205 | 196 | 198 | 198 | 202 | 208 | 221 | U 233 | E B 270 |
| U Q | | 280 | A 218 | 314 | E 324 | E B 328 | 318 | E 303 | 248 | 225 | 222 | 224 | E B 218 | 218 | 222 | 218 | 208 | 210 | 208 | 210 | E B 223 | B 250 | E B 262 | E B 285 |
| L Q | | 228 | 199 | 196 | 204 | 198 | 290 | Q 268 | 226 | 208 | 199 | 204 | 204 | 204 | 206 | 196 | 192 | 194 | 194 | 198 | 206 | 216 | 216 | 237 |

**APR. 2013** h′F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

## MAY 2013 fxI (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

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

MAY 2013 fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

## MAY 2013 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 | R 30 | A | B | B | A | A | B | A | B | B | B | B | B | B | F 94 | F 42 | B | R | R 51 | F 41 | F 20 | 21 | B |
| 2 | B | A | A | B | B | B | A | B | B | B | B | B | B | J R 83 | B | B | B | F 49 | B | B | R 24 | A | A | A |
| 3 | A | B | B | R | R | A | B | B | R 33 | 39 | 58 | J R 72 | J R 64 | J R 74 | J R 73 | Z 81 | Z 61 | F 39 | R 42 | R 41 | B | R | 17 | A |
| 4 | R | R | A | A | A | A | R | R 31 | F 32 | J R 46 | U R 65 | R 71 | 94 | R 101 | 94 | F 87 | F 70 | 52 | F 38 | F 21 | 17 | A | R 24 | A |
| 5 | A | R 32 | A | A | B | R 32 | B | B | R | B | B | B | 65 | F 68 | J R 69 | 65 | Z 65 | 64 | B | R 32 | B | R | A | F 21 |
| 6 | A | A | A | R 27 | A | 24 | B | B | 64 | B | B | B | B | B | J R 82 | J R 83 | J R 80 | F 68 | 51 | F 40 | F 22 | R 17 | A | A |
| 7 | A | A | A | A | A | A | B | A | B | B | B | B | B | B | R 75 | U R 73 | R 61 | 54 | 44 | R 28 | B | B | R | R |
| 8 | R 26 | A | A | R 29 | R 42 | B | B | B | R 34 | F 46 | R 49 | R 71 | 75 | 79 | 89 | 76 | U R 71 | R 69 | 41 | F 28 | B | B | Y | B |
| 9 | A | A | R 22 | R 29 | A | F 25 | A | F 38 | 41 | 43 | R 50 | 72 | 78 | J R 99 | B | J R 74 | 52 | 57 | 44 | 27 | B | B | B | B |
| 10 | B | B | B | B | R 28 | R 28 | F 20 | A | F 28 | B | R 66 | R 68 | J R 74 | R 80 | R 96 | J R 86 | R 63 | F 46 | F 40 | 24 | B | B | B | B |
| 11 | B | B | B | B | B | B | B | B | B | B | B | J R 75 | J R 88 | J R 75 | J R 85 | 86 | R 51 | R 38 | R 35 | 31 | B | B | B | B |
| 12 | B | B | A | A | A | B | B | A | B | R 41 | F 57 | 67 | 82 | 82 | J R 89 | R 69 | R 57 | F 32 | F 30 | B | B | B | B | B |
| 13 | B | B | B | B | B | B | B | B | B | B | R 44 | R 60 | 81 | 93 | F 64 | F 69 | R 50 | 28 | 33 | 27 | 18 | R 17 | B | B |
| 14 | Y | A | A | F 24 | 26 | F 28 | F 27 | F 48 | F 49 | 35 | 57 | B | B | B | J R 88 | J R 94 | B | R 78 | U R 44 | B | A | A | A | A |
| 15 | A | 33 | R | R 32 | R 33 | R 26 | F 24 | F 24 | F 23 | 37 | 53 | 60 | 80 | R 83 | J R 85 | J R 80 | 62 | F 60 | R 51 | F 28 | B | B | B | B |
| 16 | B | A | A | R | F 28 | A | B | A | B | F 47 | B | R 61 | B | U R 77 | J R 81 | R 71 | J R 50 | R | 39 | B | B | B | A | A |
| 17 | A | A | B | B | A | B | B | B | B | B | B | B | 63 | U R 65 | B | J R 73 | B | B | B | B | B | A | B | A |
| 18 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 34 | R 32 | B | B | A | A | A |
| 19 | A | A | A | B | A | B | B | B | A | B | B | B | B | B | R 95 | R 72 | B | 37 | R | B | A | A | A | A |
| 20 | A | R 33 | R | A | A | A | A | 40 | 41 | 43 | 57 | U R 64 | R 74 | U R 74 | J R 82 | F 58 | 37 | 35 | 27 | 21 | B | B | A | A |
| 21 | R 29 | A | A | A | A | R 29 | A | A | B | B | R 42 | 66 | B | U R 79 | B | J R 78 | B | B | 24 | B | B | B | B | A |
| 22 | A | A | A | A | B | B | A | 34 | F 33 | 40 | B | R 58 | J R 72 | 75 | J R 80 | J R 76 | R 59 | B | J R 38 | B | R | A | A | B |
| 23 | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 24 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | A | A | A | A |
| 25 | B | B | R | B | B | B | B | B | Y | B | B | B | B | B | R 44 | B | R 60 | 43 | 26 | R | A | A | B | 31 |
| 26 | B | B | A | A | R 28 | R 26 | 27 | B | B | B | B | B | B | B | B | B | B | B | R 34 | A | Y | F 34 | A | A |
| 27 | B | Y | A | B | B | R | A | B | B | B | B | B | B | B | B | B | B | B | B | B | R | A | A | A |
| 28 | B | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 29 | B | B | B | A | Y |
| 29 | A | 31 | R 32 | R | Y | Y | B | R 17 | 19 | R 26 | J R 36 | 59 | J R 61 | R 55 | J R 52 | 43 | 34 | F 15 | R 19 | 21 | B | B | B | B |
| 30 | Y | R | R 30 | A | A | 24 | 25 | F 22 | F 22 | F 22 | 38 | 54 | J R 66 | R 56 | B | J R 54 | 26 | R 25 | 21 | B | B | A | A | B |
| 31 | A | B | A | A | 28 | 24 | B | 24 | F 20 | F 21 | 35 | J R 52 | F 55 | Z 64 | 64 | U R 48 | 29 | 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 | 5 | 3 | 5 | 7 | 10 | 5 | 9 | 13 | 13 | 14 | 16 | 16 | 19 | 19 | 23 | 20 | 20 | 22 | 14 | 5 | 4 | 3 | 2 |
| MED | R 28 | R 32 | R 30 | R 29 | R 28 | 26 | F 25 | 31 | F 33 | 40 | 52 | R 65 | 74 | R 77 | J R 82 | R 74 | 58 | 44 | 36 | 28 | 22 | 18 | 21 | 26 |
| U Q | | 33 | R 32 | R 30 | R 33 | R 28 | 27 | F 39 | 41 | 44 | 57 | R 71 | 80 | R 83 | R 89 | 83 | 62 | 58 | 42 | R 32 | 32 | F 27 | R 24 | |
| L Q | | 30 | R 22 | 26 | 28 | 24 | F 22 | 23 | F 22 | 30 | 42 | 60 | 64 | R 68 | R 69 | 69 | 46 | 34 | 29 | 24 | 18 | R 17 | 17 | |

MAY 2013 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

## MAY 2013 ftEs (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 41 | 44 | 62 | B | B | 57 | 30 | B | 41 | B | B | B | B | B | B | E B 26 | 30 | B | 32 | G | E B 12 | 46 | 72 | B |
| 2 | B | 68 | 37 | B | B | B | 32 | B | B | B | B | B | B | E B 35 | B | B | B | E B 28 | B | B | E B 16 | 32 | 37 | 49 |
| 3 | 32 | B | B | 33 | K 33 | K 32 | B | B | 19 | 19 | E B 25 | E B 29 | E B 30 | G 21 | E B 63 | G 18 | 20 | 21 | E B 24 | E B 14 | B | 24 | K 20 | K 23 |
| 4 | 25 | K 17 | 29 | 36 | 42 | K 28 | 22 | 35 | 21 | 20 | G 21 | G | E B 23 | E B 58 | E B 64 | E B 19 | E B 14 | E B 20 | 20 | E B 14 | 22 | 37 | 33 | 38 |
| 5 | 38 | 40 | 41 | 32 | B | 32 | B | B | 28 | B | B | B | E B 39 | E B 34 | E B 22 | 26 | E B 24 | 21 | B | E B 19 | B | 30 | 31 | K 19 |
| 6 | 27 | 30 | 32 | 34 | 33 | 32 | B | B | E B 53 | B | B | B | B | B | E B 36 | E B 38 | E B 15 | E B 25 | E B 15 | E B 14 | E B 14 | 16 | 32 | 37 |
| 7 | 47 | 57 | 52 | 42 | 42 | 60 | B | 36 | B | B | B | B | B | B | E B 56 | E B 57 | E B 29 | E B 16 | E B 20 | E B 14 | B | B | 24 | K 21 |
| 8 | 40 | 40 | K 34 | 36 | 32 | B | B | B | 36 | 28 | E B 29 | E B 57 | E B 56 | E B 28 | E B 31 | E B 29 | E B 30 | E B 26 | E B 19 | E B 15 | B | B | 17 | B |
| 9 | 34 | 38 | K 21 | 34 | K 33 | 33 | 40 | K 21 | E B 14 | 54 | E B 26 | E B 28 | E B 29 | E B 22 | B | E B 62 | E B 28 | E B 30 | E B 20 | E B 19 | B | B | B | B |
| 10 | B | B | B | B | 36 | 27 | E B 14 | 32 | 29 | B | E B 55 | E B 62 | E B 48 | E B 28 | E B 40 | E B 29 | E B 37 | E B 16 | E B 16 | E B 18 | B | B | B | B |
| 11 | B | B | B | B | B | B | B | B | B | B | B | E B 26 | E B 25 | E B 20 | E B 22 | E B 27 | E B 27 | E B 20 | E B 24 | E B 19 | B | B | B | B |
| 12 | B | B | 56 | 42 | 58 | B | B | 43 | B | E B 22 | E B 31 | E B 24 | E B 22 | E B 21 | E B 23 | E B 27 | E B 26 | E B 26 | E B 19 | B | B | B | B | B |
| 13 | B | B | B | B | B | B | B | B | B | B | E B 38 | E B 49 | E B 28 | E B 23 | E B 23 | E B 15 | E B 18 | E B 16 | E B 15 | E B 16 | E B 13 | E B 12 | B | B |
| 14 | 16 | 32 | 40 | 63 | 28 | 32 | E B 19 | E B 46 | 26 | E B 15 | E B 16 | B | B | B | E B 24 | E B 24 | B | E B 40 | E B 34 | B | K 32 | 30 | 31 | 41 |
| 15 | 40 | 42 | 32 | 42 | 37 | 30 | K 16 | 16 | 15 | E B 13 | E B 18 | E B 20 | E B 23 | E B 19 | E B 22 | E B 15 | E B 12 | 19 | E B 23 | K 21 | B | B | B | B |
| 16 | B | 28 | 28 | 26 | K 21 | 29 | B | 40 | B | E B 31 | B | E B 57 | B | E B 40 | E B 54 | E B 61 | E B 23 | E B 26 | E B 12 | B | B | B | 70 | 62 |
| 17 | 58 | 72 | B | B | 41 | B | B | B | B | B | B | B | E B 28 | E B 56 | B | E B 54 | B | B | B | B | B | 31 | B | 29 |
| 18 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | E B 23 | E B 26 | B | B | 29 | 31 | 39 |
| 19 | 34 | 33 | 32 | B | 33 | B | B | B | 34 | B | B | B | B | B | E B 54 | E B 62 | B | E B 26 | 30 | B | 30 | 32 | 40 | 35 |
| 20 | 32 | 30 | 29 | 42 | 104 | 42 | 40 | 37 | K 24 | K 19 | E B 20 | E B 26 | G | 31 | E B 20 | E B 19 | 27 | E B 18 | 38 | E B 13 | B | B | K 31 | 41 |
| 21 | 42 | 36 | 36 | 38 | 36 | 36 | K 30 | 42 | B | B | K 29 | E B 34 | B | E B 40 | B | E B 55 | B | B | E B 19 | B | B | B | B | K 32 |
| 22 | 35 | K 27 | 41 | 41 | 68 | B | 36 | 20 | G 16 | 16 | B | E B 39 | E B 28 | 40 | E B 20 | 31 | 17 | B | E B 19 | B | 24 | 30 | 38 | B |
| 23 | 37 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 24 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | K 26 | 36 | 44 | 58 |
| 25 | B | B | K 28 | B | B | B | B | B | 27 | B | B | B | B | B | E B 24 | B | E B 23 | E B 24 | E B 16 | 32 | 71 | 41 | B | 68 |
| 26 | B | B | 40 | 34 | 36 | 31 | 34 | B | B | B | B | B | B | B | B | B | B | B | E B 27 | K 35 | 19 | 39 | 42 | 69 |
| 27 | B | 27 | 30 | B | B | 26 | 38 | B | B | B | B | B | B | B | B | B | B | B | B | B | K 17 | 40 | 34 | 78 |
| 28 | B | 33 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | E B 24 | B | B | B | 27 | 17 |
| 29 | 28 | 28 | 31 | K 21 | 17 | 17 | B | 14 | 14 | 33 | K 16 | 24 | G 17 | E B 21 | E B 18 | 17 | 34 | K 23 | 16 | 27 | B | B | B | B |
| 30 | 16 | 24 | E B 20 | 38 | 36 | E B 18 | 25 | 28 | 16 | 22 | E B 14 | 16 | E B 19 | K 26 | B | E B 30 | E B 14 | E B 17 | E B 14 | B | B | 31 | K 24 | B |
| 31 | 40 | B | 32 | 42 | E B 22 | E B 18 | B | E B 15 | E B 13 | E B 12 | E B 23 | E B 18 | 21 | 28 | 26 | E B 22 | 24 | B | B | B | B | B | 45 | 48 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 19 | 20 | 22 | 18 | 20 | 18 | 13 | 14 | 17 | 13 | 14 | 16 | 16 | 19 | 19 | 23 | 20 | 21 | 24 | 16 | 12 | 17 | 20 | 19 |
| MED | 35 | 33 | 32 | 37 | 36 | 32 | 30 | 32 | 22 | 20 | E B 24 | E B 27 | E B 26 | E B 28 | E B 24 | E B 27 | E B 24 | E B 23 | E B 20 | E B 18 | 20 | 31 | 32 | 39 |
| U Q | 40 | 41 | 40 | 42 | 42 | 33 | 37 | 40 | 32 | 30 | E B 29 | E B 44 | E B 30 | E B 40 | E B 54 | E B 54 | E B 28 | E B 26 | E B 25 | G | 28 | 38 | 41 | 58 |
| L Q | 28 | 28 | 29 | 34 | 32 | 27 | 20 | 20 | 16 | E B 16 | E B 18 | E B 22 | 22 | E B 21 | E B 22 | E B 19 | E B 18 | 18 | E B 16 | E B 14 | E B 15 | 30 | 29 | K 29 |

MAY 2013 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**MAY 2013** fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 12 | 12 | 19 | B | B | 27 | 13 | B | 18 | B | B | B | B | B | B | 26 | 14 | B | 12 | 27 | 12 | 12 | 14 | B |
| 2 | B | 12 | 16 | B | B | B | 24 | B | B | B | B | B | B | 35 | B | B | B | 28 | B | B | 16 | 12 | 12 | 12 |
| 3 | 19 | B | B | 23 | 15 | 20 | B | B | 14 | 14 | 25 | 29 | 30 | 19 | 63 | 15 | 14 | 16 | 24 | 14 | B | 12 | 11 | 12 |
| 4 | 12 | 12 | 12 | 20 | 22 | 15 | 13 | 13 | 12 | 13 | 18 | 19 | 23 | 58 | 64 | 19 | 14 | 20 | 13 | 14 | 12 | 12 | 12 | 12 |
| 5 | 14 | 16 | 18 | 20 | B | 15 | B | B | 20 | B | B | B | 39 | 34 | 22 | 15 | 24 | 14 | B | 19 | B | 18 | 12 | 12 |
| 6 | 13 | 12 | 12 | 12 | 12 | 13 | B | B | 53 | B | B | B | B | B | 36 | 38 | 15 | 25 | 15 | 14 | 14 | 12 | 12 | 12 |
| 7 | 14 | 13 | 12 | 13 | 12 | 20 | B | 26 | B | B | B | B | B | B | 56 | 57 | 29 | 16 | 20 | 14 | B | B | 11 | 13 |
| 8 | 13 | 12 | 14 | 12 | 17 | B | B | B | 18 | 15 | 29 | 57 | 56 | 28 | 31 | 29 | 30 | 26 | 19 | 15 | B | B | 12 | B |
| 9 | 34 | 12 | 13 | 12 | 19 | 14 | 12 | 14 | 14 | 19 | 26 | 28 | 29 | 22 | B | 62 | 28 | 30 | 20 | 19 | B | B | B | B |
| 10 | B | B | B | B | 12 | 13 | 14 | 19 | 14 | B | 55 | 62 | 48 | 28 | 40 | 29 | 37 | 16 | 16 | 18 | B | B | B | B |
| 11 | B | B | B | B | B | B | B | B | B | B | B | 26 | 25 | 20 | 22 | 27 | 27 | 20 | 24 | 19 | B | B | B | B |
| 12 | B | B | 12 | 12 | 28 | B | B | 20 | B | 22 | 31 | 24 | 22 | 21 | 23 | 27 | 26 | 26 | 19 | B | B | B | B | B |
| 13 | B | B | B | B | B | B | B | B | B | B | 38 | 49 | 28 | 23 | 23 | 15 | 18 | 16 | 15 | 16 | 13 | 12 | B | B |
| 14 | 12 | 12 | 12 | 12 | 13 | 14 | 19 | 46 | 19 | 15 | 16 | B | B | B | 24 | 24 | B | 40 | 34 | B | 13 | 13 | 16 | 12 |
| 15 | 15 | 13 | 19 | 14 | 13 | 12 | 13 | 12 | 12 | 13 | 18 | 20 | 23 | 20 | 22 | 15 | 12 | 12 | 23 | 12 | B | B | B | B |
| 16 | B | 15 | 15 | 13 | 16 | 19 | B | 27 | B | 31 | B | 57 | B | 40 | 54 | 61 | 24 | 26 | 12 | B | B | B | 22 | 23 |
| 17 | 28 | 27 | B | B | 25 | B | B | B | B | B | B | B | 28 | 56 | B | 54 | B | B | B | B | B | 18 | B | 26 |
| 18 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 23 | 26 | B | B | 18 | 18 | 25 |
| 19 | 29 | 22 | 20 | B | 29 | B | B | B | 23 | B | B | B | B | B | 54 | 62 | B | 26 | 23 | B | 19 | 20 | 16 | 18 |
| 20 | 22 | 19 | 18 | 20 | 20 | 19 | 18 | 18 | 13 | 12 | 20 | 26 | 19 | 20 | 20 | 19 | 13 | 18 | 13 | 13 | B | B | 14 | 14 |
| 21 | 13 | 19 | 20 | 20 | 20 | 15 | 18 | 20 | B | B | 24 | 34 | B | 40 | B | 55 | B | B | 19 | B | B | B | B | 12 |
| 22 | 12 | 12 | 14 | 13 | 56 | B | 24 | 14 | 13 | 12 | B | 39 | 28 | 17 | 19 | 19 | 14 | B | 19 | B | 13 | 16 | 20 | B |
| 23 | 22 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 24 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 21 | 26 | 25 | 18 |
| 25 | B | B | 21 | B | B | B | B | B | 21 | B | B | B | B | B | 24 | B | 23 | 24 | 16 | 27 | 31 | 14 | B | 12 |
| 26 | B | B | 20 | 13 | 13 | 16 | 14 | B | B | B | B | B | B | B | B | B | B | B | 27 | 12 | 14 | 13 | 13 | 14 |
| 27 | B | 23 | 20 | B | B | 22 | 22 | B | B | B | B | B | B | B | B | B | B | B | B | B | 14 | 13 | 21 | 26 |
| 28 | B | 21 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 24 | B | B | B | 12 | 13 |
| 29 | 12 | 12 | 14 | 14 | 13 | 14 | B | 12 | 12 | 12 | 13 | 13 | 14 | 21 | 18 | 13 | 14 | 13 | 13 | 12 | B | B | B | B |
| 30 | 12 | 13 | 20 | 12 | 12 | 18 | 11 | 12 | 12 | 13 | 14 | 14 | 19 | 15 | B | 30 | 14 | 17 | 14 | B | B | 12 | 12 | B |
| 31 | 14 | B | 12 | 12 | 22 | 18 | B | 14 | 13 | 12 | 23 | 18 | 14 | 13 | 15 | 20 | 13 | B | B | B | B | B | 12 | 169 |
| | 00 | 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 | 22 | 19 | 19 | 20 | 22 | 20 | B | B | 23 | B | B | 62 | 56 | 40 | 54 | 30 | 27 | 26 | 20 | 27 | B | 20 | 18 | 25 |
| U Q | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B 34 | B | B | B | B | B |
| L Q | 13 | 12 | 14 | 13 | 13 | 15 | 18 | 18 | 14 | 14 | 24 | 26 | 25 | 21 | 23 | 19 | 14 | 17 | 15 | 14 | 14 | 13 | 12 | 12 |

**MAY 2013** fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**MAY 2013** 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 | 222 | A | B | B | A | A | B | A | B | B | B | B | B | B | B | E A 280 | B | A | Y | 196 | 204 | E A 262 | B |
| 2 | B | A | A | B | B | B | A | B | B | B | B | B | B | 218 | B | B | B | Q 198 | B | B | E B 266 | A | A | A |
| 3 | A | B | B | A | 218 | A | B | B | A | E A 260 | E B 234 | E B 222 | 218 | E A 224 | E B 250 | E A 216 | 184 | Q 202 | E B 274 | Q 226 | B | A | 240 | A |
| 4 | A | 210 | A | A | A | A | 226 | A 224 | A | 220 | 202 | 214 | 202 | E B 220 | 220 | Q 206 | Q 190 | 212 | Q 224 | B 246 | A 232 | A | 218 | A |
| 5 | A | 206 | A | A | B | A | B | B | 218 | B | B | B | 258 | 230 | E B 224 | 198 | 204 | 224 | B | 210 | B | A | A | A 274 |
| 6 | A | A | A | 220 | A | A | B | B | B | B | B | B | B | B | E B 220 | 220 | Q 190 | 216 | Q 212 | 208 | 214 | A 246 | A | A |
| 7 | A | A | A | 230 | A | A | B | A | B | B | B | B | B | B | E B 254 | 254 | 224 | 210 | 218 | B 226 | B | B | A | A |
| 8 | 232 | A | A | 222 | 196 | B | B | B | A | E A 256 | 212 | 240 | 234 | 214 | 202 | 206 | 226 | 212 | Q 194 | 236 | B | B | Y | B |
| 9 | A | A | A | 230 | A | A | A | A | Q 272 | 230 | E B 234 | 222 | 214 | 214 | B | 224 | 208 | 210 | 234 | 206 | B | B | B | B |
| 10 | B | B | B | B | A | 206 | B | A | A | B | B | B | 210 | 198 | 216 | 216 | 220 | Q 198 | Q 216 | E B 232 | B | B | B | B |
| 11 | B | B | B | B | B | B | B | B | B | B | B | 218 | 206 | 200 | 206 | 200 | 222 | 220 | B 256 | 216 | B | B | B | B |
| 12 | B | B | A | A | A | B | B | A | B | 270 | E B 226 | 202 | 210 | 200 | 214 | 202 | 192 | E B 262 | 212 | B | B | B | B | B |
| 13 | B | B | B | B | B | B | B | B | B | B | E B 262 | E B 288 | 208 | 212 | 192 | 210 | 188 | B 244 | 222 | 212 | B | E B 222 | B | B |
| 14 | Y | A | A | A | A | A | B | B | A | 264 | 206 | B | B | B | E B 240 | 204 | B | 236 | 232 | B | A | A | A | A |
| 15 | A | 236 | A | 234 | 220 | 210 | A | A | A | 258 | 222 | 206 | 216 | 202 | 208 | 208 | 182 | 198 | 222 | 212 | B | B | B | B |
| 16 | B | A | A | A | A | A | B | A | B | E B 326 | B | B | B | E B 240 | E B 256 | 256 | 228 | 250 | 202 | B | B | B | A | A |
| 17 | A | A | B | B | A | B | B | B | B | B | B | B | 218 | E B 244 | B | 246 | B | B | B | B | B | A | B | A |
| 18 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 232 | E B 314 | B | B | A | A | A |
| 19 | B | A | A | B | A | B | B | B | A | B | B | B | B | B | E B 278 | E B 254 | B | 276 | A | B | A | A | A | A |
| 20 | A | 198 | A | A | A | A | A | 216 | A | 246 | 220 | 216 | 202 | 202 | 210 | Q 190 | 218 | 228 | 228 | E B 250 | B | B | A | A |
| 21 | A 216 | A | A | A | A | 224 | A | A | B | B | A | E B 246 | B | 228 | B | 234 | B | B | E B 282 | B | B | B | B | A |
| 22 | A | A | A | A | B | B | A | A | E A 342 | A 266 | B | 232 | 226 | 208 | 214 | 210 | 210 | B | 250 | B | A | A | A | B |
| 23 | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 24 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | A | A | A | A |
| 25 | B | B | A | B | B | B | B | B | Y | B | B | B | B | B | 254 | B | Q 258 | 238 | 254 | A | A | A | B | A |
| 26 | B | B | A | A | A | 194 | A | B | B | B | B | B | B | B | B | B | B | B | E B 256 | A | Y | 222 | A | A |
| 27 | B | Y | A | B | B | A | A | B | B | B | B | B | B | B | B | B | B | B | B | B | A | A | A | A |
| 28 | B | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 214 | B | B | B | A | Y |
| 29 | A | E A 256 | A | A | Y | Y | B | A | A 288 | E A 272 | 200 | 206 | 194 | 198 | 198 | 190 | 202 | A 276 | A | 226 | B | B | B | B |
| 30 | Y | A | B | A | A | B | A | A | A | A 250 | 222 | 206 | 210 | 192 | B | 192 | 208 | B 238 | 242 | B | B | A | A | B |
| 31 | A | B | A | A | B | B | B | B | B 256 | E B 272 | 226 | 214 | Q 208 | Q 208 | 196 | 196 | A 222 | 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 | 6 | | 5 | 3 | 4 | 1 | 2 | 5 | 13 | 12 | 14 | 16 | 19 | 19 | 22 | 20 | 21 | 21 | 13 | 4 | 4 | 3 | 1 |
| MED | 224 | 212 | | 230 | 218 | 208 | 226 | 220 | 264 | 255 | 213 | 214 | 210 | 207 | 207 | 208 | 208 | 222 | 223 | 219 | 214 | 222 | U 229 | A 274 |
| U Q | | 236 | | 232 | 220 | 217 | | | A 315 | E 271 | E B 230 | 232 | 218 | E 224 | E B 250 | 224 | 223 | 241 | E B 255 | B 234 | 249 | 234 | E A 262 | |
| L Q | | 206 | | 221 | 196 | 200 | | | 237 | 248 | 209 | 206 | 207 | 200 | 206 | 200 | 191 | 210 | 215 | 211 | 205 | 213 | 218 | |

**MAY 2013** h′F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2013 fxI (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 52 | A | A | A | A | R | B | B | B | R | B | R | B | B | 56 | B | X 31 | A | R | A | A | A | A | A |
| 2 | A | 41 | A | A | A | B | R | R | B | B | B | B | B | B | X 75 | B | B | B | R | B | R | R | A | A |
| 3 | A | A | R | A | B | B | A | B | B | R | X 42 | 66 | O X 56 | X 64 | X 67 | B | B | B | B | B | O X 25 | A | A | O X 33 |
| 4 | B | R | R | R | R | B | B | B | X 32 | B | B | B | B | B | B | B | B | B | B | B | B | B | A | 53 |
| 5 | A | O X 31 | A | B | A | A | A | A | A | A | X 41 | X 51 | B | X 64 | O X 76 | X 58 | B | B | B | B | B | B | Y | R |
| 6 | R | O X 35 | A | A | A | A | A | B | B | O X 41 | 53 | B | B | B | B | B | B | B | B | A | R | A | A | A |
| 7 | A | B | B | B | B | A | Y | B | B | A | B | B | B | B | B | B | B | O X 36 | B | B | B | B | B | A |
| 8 | O X 38 | O X 40 | O X 37 | O X 38 | R | O X 37 | B | R | B | O X 40 | O X 40 | 54 | B | X 73 | X 72 | B | B | B | B | B | B | B | R | Y |
| 9 | R | R | 37 | A | R | A | X 31 | Y | B | B | B | B | R | 70 | B | X 70 | B | B | 36 | A | R | 56 | O X 28 | R |
| 10 | R | R | R | X 33 | O X 36 | B | B | B | B | B | B | B | O X 58 | X 65 | B | O X 68 | B | O X 42 | X 34 | B | B | B | A | A |
| 11 | A | A | A | 43 | 52 | 43 | 41 | R | O X 28 | A | 40 | 53 | 56 | O X 65 | 60 | 43 | B | 51 | X 52 | B | B | O X 32 | A | A |
| 12 | A | A | A | A | A | O X 36 | O X 37 | X 38 | X 43 | 33 | O X 36 | O X 46 | O X 57 | 66 | B | 52 | X 32 | B | B | B | B | B | B | Y |
| 13 | O X 22 | A | O X 31 | A | A | A | A | A | O X 33 | X 31 | X 36 | X 51 | X 52 | X 50 | O X 48 | O X 48 | O X 26 | X 26 | B | B | O X 22 | B | B | B |
| 14 | R | A | 50 | A | A | A | O X 31 | 31 | 31 | O X 33 | O X 41 | X 56 | X 58 | X 61 | X 56 | 61 | O X 28 | B | O X 24 | O X 22 | B | B | B | Y |
| 15 | X 26 | X 28 | A | A | A | A | A | X 46 | A | O X 34 | X 38 | X 49 | X 59 | X 62 | 66 | 49 | 37 | 41 | O X 28 | B | B | B | B | R |
| 16 | R | 50 | X 40 | 32 | 34 | 34 | X 35 | 35 | 34 | 31 | 37 | X 51 | X 51 | O X 53 | O X 49 | X 43 | X 29 | 38 | B | B | O X 25 | B | B | B |
| 17 | O X 27 | B | A | 31 | O X 37 | A | A | A | 49 | 48 | X 46 | 55 | X 58 | 73 | 69 | 50 | O X 40 | X 34 | B | B | B | B | B | R |
| 18 | 51 | 47 | 32 | 30 | 30 | 38 | A | A | A | A | 48 | X 52 | X 56 | X 59 | X 58 | X 46 | 35 | 35 | 35 | 27 | B | A | A | A |
| 19 | A | A | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 20 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 21 | A | A | O X 41 | A | A | A | O X 34 | B | B | R | B | B | B | B | B | B | B | 31 | 28 | B | B | R | A | A |
| 22 | A | A | A | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 58 | B | R |
| 23 | A | R | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | O X 33 | B | A | A | A | A |
| 24 | A | A | A | B | R | B | A | B | B | B | R | B | X 44 | B | B | B | 69 | B | B | R | R | 52 | A | B |
| 25 | B | R | R | B | B | B | B | A | B | R | B | B | B | B | B | B | B | B | B | B | B | B | A | R |
| 26 | A | A | R | R | A | R | B | X 28 | X 30 | 29 | 40 | X 43 | O X 44 | X 55 | O X 68 | 52 | 30 | X 29 | X 27 | R | R | A | R | A |
| 27 | A | A | A | A | A | R | R | O X 39 | O X 38 | X 29 | 38 | X 48 | X 50 | X 64 | O X 68 | 51 | O X 29 | B | B | B | O X 21 | A | X 32 | A |
| 28 | 51 | 41 | A | B | A | B | A | A | X 49 | 48 | X 42 | B | X 62 | X 67 | X 75 | X 80 | B | X 62 | A | 72 | A | A | A | A |
| 29 | A | A | A | B | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | A | A | A | A | 42 |
| 30 | A | A | A | X 35 | A | 50 | R | A | B | B | B | B | O X 48 | X 49 | X 64 | X 60 | O X 62 | B | B | B | B | R | A | O X 37 |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 7 | 8 | 7 | 7 | 5 | 6 | 6 | 6 | 10 | 11 | 15 | 13 | 15 | 17 | 16 | 15 | 12 | 11 | 9 | 3 | 4 | 4 | 2 | 4 |
| MED | X 38 | 40 | X 37 | 33 | 36 | 38 | X 34 | X 36 | X 34 | X 33 | X 40 | X 51 | X 56 | X 64 | X 66 | X 52 | X 32 | X 36 | X 33 | 27 | O X 24 | 54 | X 30 | 40 |
| U Q | 51 | 44 | 41 | 38 | 44 | 43 | 37 | X 39 | X 43 | 41 | 42 | 54 | X 58 | 66 | X 70 | X 61 | 38 | X 42 | 36 | 72 | O X 25 | 57 | | 48 |
| L Q | X 26 | O X 33 | 32 | 31 | 32 | 36 | X 31 | 31 | X 31 | 31 | 38 | X 48 | X 50 | X 57 | X 57 | X 48 | O X 29 | X 31 | X 28 | O X 22 | O X 22 | 42 | | O X 35 |

JUN. 2013 fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

## JUN. 2013 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A | A | A | A | A | A | B | B | B | A | B | R | B | B | F 40 | B | 25 | A | R | A | A | A | A | A |
| 2 | A | F 24 | A | A | A | B | A | A | B | B | B | B | B | B | 69 | B | B | B | R | B | R | R | A | A |
| 3 | A | A | R | A | B | B | A | B | B | A | 36 | F 56 | R 50 | J R 58 | 61 | B | B | B | B | B | R 19 | A | A | R 27 |
| 4 | B | A | A | A | A | B | B | B | 26 | B | B | B | B | B | B | B | B | B | B | B | B | B | A | A |
| 5 | A | R 25 | A | B | A | A | A | A | A | A | 35 | 45 | B | 58 | R 70 | J R 52 | B | B | B | B | B | B | Y | R |
| 6 | A | R 29 | A | A | A | A | A | B | B | R 35 | F 40 | B | B | B | B | B | B | B | B | A | R | A | A | A |
| 7 | A | B | B | B | B | A | Y | B | B | A | B | B | B | B | B | B | B | R 30 | B | B | B | B | B | A |
| 8 | 32 | R 34 | 31 | R 32 | A | R 31 | B | A | B | R 34 | R 34 | Z 48 | B | 67 | 66 | B | B | B | B | B | B | B | R | Y |
| 9 | R | R | F 26 | A | A | A | 25 | Y | B | B | B | B | R | F 60 | B | 64 | B | B | F 27 | A | R | A | R 22 | A |
| 10 | R | R | A | J R 27 | R 30 | B | B | B | B | B | B | B | U R 52 | 59 | B | R 62 | B | R 36 | 28 | B | B | B | A | A |
| 11 | A | A | A | F 32 | A | F 32 | A 32 | R | R 22 | A | F 31 | F 41 | F 42 | 59 | F 49 | F 34 | B | F 41 | 46 | B | B | R 26 | A | A |
| 12 | A | A | A | A | A | R 30 | 31 | 32 | 37 | F 23 | 30 | 40 | 51 | F 56 | B | F 42 | 26 | B | B | B | B | B | B | Y |
| 13 | R 16 | A | R 25 | A | A | A | A | A | 27 | 25 | 30 | 45 | 46 | 44 | 42 | 42 | R 20 | 20 | B | B | R 16 | B | B | B |
| 14 | A | A | A | A | A | A | 25 | F 20 | F 21 | R 27 | R 35 | 50 | 52 | J R 55 | 50 | 42 | R 22 | B | R 18 | R 16 | B | B | B | Y |
| 15 | 20 | 22 | A | A | A | A | A | 40 | A | 28 | 32 | 43 | J R 53 | 56 | F 56 | F 40 | F 28 | F 26 | R 22 | B | B | B | B | R |
| 16 | R | A | 34 | F 22 | F 25 | F 24 | 29 | F 26 | F 23 | F 21 | F 26 | J R 45 | 45 | R 47 | R 43 | J R 37 | F 23 | F 23 | B | B | R 19 | B | B | B |
| 17 | R 21 | B | A | F 22 | R 31 | A | A | A | F 38 | F 38 | 40 | F 42 | 52 | F 63 | F 56 | J R 44 | R 34 | 28 | B | B | B | B | B | R |
| 18 | A | A | F 21 | F 20 | F 20 | F 28 | A | A | A | A | F 39 | 46 | 50 | 53 | J R 52 | 40 | F 24 | F 25 | F 24 | F 17 | B | A | A | A |
| 19 | A | A | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 20 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 21 | A | A | 35 | A | A | A | R 28 | B | B | R | B | B | B | B | B | B | B | F 22 | F 17 | B | B | R | A | A |
| 22 | A | A | A | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | A | B | A |
| 23 | A | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | R 27 | B | A | A | A | A |
| 24 | A | A | A | B | R | B | A | B | B | B | R | B | J R 38 | B | B | B | F 59 | B | B | R | R | R | A | B |
| 25 | B | R | R | B | B | B | B | A | B | R | B | B | B | B | B | B | B | B | B | B | B | B | A | R |
| 26 | A | A | R | R | A | A | B | 22 | 24 | F 19 | F 28 | J R 37 | R 38 | J R 49 | 62 | F 40 | F 22 | 23 | R 21 | A | R | A | R | A |
| 27 | A | A | A | A | A | A | A | R 33 | R 32 | 23 | F 28 | 42 | 44 | 58 | 62 | F 41 | R 23 | B | B | B | R 15 | A | J R 26 | A |
| 28 | F 38 | F 30 | A | B | A | B | A | A | 43 | F 38 | J R 36 | B | 56 | 61 | 69 | 74 | B | 56 | A | A | A | A | A | A |
| 29 | A | A | A | B | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | A | A | A | A | F 28 |
| 30 | A | A | A | 29 | A | R 31 | R | A | B | B | B | B | R 42 | 43 | 58 | J R 54 | R 56 | B | B | B | B | A | A | R 31 |
| 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 | 5 | 6 | 6 | 7 | 4 | 6 | 6 | 6 | 10 | 11 | 15 | 13 | 15 | 17 | 16 | 15 | 12 | 11 | 9 | 2 | 4 | 1 | 2 | 3 |
| MED | 21 | 27 | 28 | F 27 | 28 | 30 | 28 | 29 | 26 | 27 | 34 | 45 | 50 | 58 | 57 | 42 | 24 | 26 | 24 | 16 | R 18 | R 26 | R 24 | R 28 |
| U Q | 35 | 30 | 34 | 32 | R 30 | 31 | 31 | 33 | 37 | F 35 | 36 | 47 | 52 | 60 | 64 | 54 | 31 | 36 | 28 | | R 19 | | | R 31 |
| L Q | 18 | 24 | 25 | F 22 | F 22 | F 28 | 25 | 22 | F 23 | F 23 | F 30 | 42 | R 42 | 51 | 50 | 40 | 22 | 23 | R 20 | | R 16 | | | R 27 |

JUN. 2013 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**JUN. 2013** 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 | 69 | 58 | 74 | 70 | 42 | 29 | B | B | B | 29 | B | K 18 | B | B | 29 | B | K 14 | 32 | 29 | 34 | 34 | 47 | 41 | 42 |
| 2 | 56 | 79 | 96 | 57 | 37 | B | 32 | 35 | B | B | B | B | B | B | E B 39 | B | B | B | 27 | B | G 18 | K 30 | 43 | 42 |
| 3 | 31 | 37 | K 29 | 54 | B | B | 42 | B | B | 33 | 33 | 20 | E B 19 | E B 58 | B 39 | B | B | B | B | B | E B 13 | K 38 | K 31 | 37 |
| 4 | B | 29 | 32 | 33 | K 32 | B | B | B | 29 | B | B | B | B | B | B | B | B | B | B | B | B | B | 32 | 33 |
| 5 | 34 | 38 | 41 | B | 40 | 41 | 40 | 42 | 42 | 41 | 32 | E B 19 | B | E B 26 | E B 54 | E B 37 | B | B | B | B | B | B | 17 | 25 |
| 6 | 28 | 37 | 40 | 39 | 99 | 42 | 50 | B | B | E B 24 | E B 21 | B | B | B | B | B | B | B | B | 42 | 32 | 35 | 66 | 70 |
| 7 | 70 | B | B | B | B | 67 | 28 | B | B | 87 | B | B | B | B | B | B | B | E B 28 | B | B | B | B | B | 35 |
| 8 | 42 | 38 | 38 | 41 | 34 | 34 | B | 28 | B | 32 | 30 | 31 | B | E B 28 | E B 24 | B | B | B | B | B | B | B | 32 | 18 |
| 9 | 22 | 31 | 31 | 36 | 32 | 34 | 17 | 22 | B | B | B | B | E B 29 | E B 19 | B | 36 | B | B | E B 16 | 38 | 22 | 41 | 21 | 28 |
| 10 | 24 | 23 | 32 | 37 | 37 | B | B | B | B | B | B | B | E B 28 | E B 27 | B | E B 30 | B | E B 31 | E B 20 | B | B | B | 29 | 32 |
| 11 | 33 | 38 | 35 | 41 | 35 | 30 | 32 | 16 | 30 | 62 | 32 | 38 | 34 | 33 | 46 | E B 20 | B | E B 14 | E B 19 | B | B | 35 | 37 | 39 |
| 12 | 39 | 45 | 38 | 56 | 52 | 50 | 50 | 36 | 33 | 32 | K 23 | 22 | 28 | 42 | B | 27 | E B 13 | B | B | B | B | B | B | 18 |
| 13 | 21 | 25 | 33 | 42 | 42 | 41 | 41 | 30 | 25 | K 16 | 17 | 24 | 20 | E B 15 | E B 14 | E B 14 | 15 | E B 12 | B | B | E B 12 | B | B | B |
| 14 | 28 | 33 | 26 | 34 | 40 | 42 | 34 | 28 | 28 | 33 | 32 | 20 | 28 | 22 | 22 | 22 | E B 13 | B | 23 | E B 13 | B | B | B | 16 |
| 15 | 28 | 37 | 40 | 66 | 51 | 45 | 56 | 33 | 42 | 33 | 16 | 18 | 20 | K 20 | 20 | 16 | E B 13 | 25 | 15 | B | B | B | B | 20 |
| 16 | 21 | 32 | 36 | 67 | 66 | 32 | 44 | 33 | E B 12 | E B 14 | E B 13 | 40 | 22 | 21 | 17 | E B 14 | 18 | E B 12 | B | B | 29 | B | B | B |
| 17 | E B 17 | B | 34 | 32 | 34 | 66 | 50 | 42 | 40 | 24 | 24 | E B 14 | 25 | E B 20 | E B 18 | E B 23 | E B 25 | E B 19 | B | B | B | B | B | 22 |
| 18 | 32 | 32 | 30 | 22 | 24 | 31 | 56 | 68 | 52 | 40 | 40 | 32 | 30 | 21 | 20 | 29 | 18 | 28 | 25 | 32 | B | 36 | 46 | 36 |
| 19 | 36 | 39 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 20 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 21 | 44 | 43 | 86 | 60 | 42 | 42 | 44 | B | B | 31 | B | B | B | B | B | B | B | E B 18 | E B 14 | B | B | K 26 | 30 | 34 |
| 22 | 65 | 42 | 58 | 34 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 64 | B | K 30 |
| 23 | 41 | 34 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | E B 18 | B | 28 | 42 | 32 | 34 |
| 24 | 36 | 42 | 40 | B | K 31 | B | 47 | B | B | B | 31 | B | E B 27 | B | B | B | E B 22 | B | B | 28 | 32 | 26 | 61 | B |
| 25 | B | K 31 | K 31 | B | B | B | B | 29 | B | 31 | B | B | B | B | B | B | B | B | B | B | B | B | 28 | K 20 |
| 26 | 33 | 31 | 23 | 24 | 38 | 30 | B | K 21 | 14 | E B 13 | E B 12 | E B 20 | E B 21 | K 18 | 26 | 18 | E B 14 | 25 | 22 | 21 | 25 | 31 | 17 | 29 |
| 27 | 32 | 30 | 42 | 42 | 34 | 35 | 33 | 34 | K 29 | 29 | 26 | 17 | E B 16 | 28 | E B 20 | E B 17 | E B 15 | B | B | B | E B 13 | 30 | 39 | 57 |
| 28 | 71 | 70 | 40 | B | 74 | B | 40 | 43 | 37 | K 20 | E B 29 | B | E B 25 | E B 20 | E B 31 | E B 24 | B | E B 26 | 41 | 72 | 42 | 100 | 50 | 44 |
| 29 | 39 | 51 | 50 | B | 38 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 42 | 44 | 40 | 67 | 69 |
| 30 | 56 | 39 | 44 | 29 | 36 | 39 | 18 | 36 | B | B | B | B | E B 25 | E B 18 | 18 | 29 | K 22 | B | B | B | B | K 28 | 39 | 41 |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 27 | 27 | 26 | 21 | 23 | 18 | 19 | 17 | 13 | 19 | 16 | 14 | 16 | 17 | 16 | 15 | 12 | 12 | 12 | 9 | 13 | 16 | 20 | 25 |
| MED | 34 | 37 | 38 | 41 | 38 | 40 | 41 | 33 | 30 | 31 | 26 | 20 | 24 | E B 21 | 21 | E B 23 | E B 15 | E B 25 | 21 | 34 | 28 | 36 | 34 | 34 |
| U Q | 44 | 42 | 42 | 56 | 42 | 42 | 50 | 39 | 41 | 33 | 32 | 31 | 28 | 28 | E B 35 | 29 | 20 | 28 | 26 | 42 | 33 | 42 | 44 | 42 |
| L Q | 28 | 31 | 32 | 34 | 34 | 32 | 32 | 28 | 26 | E B 24 | E B 19 | 18 | E B 20 | E B 20 | E B 19 | E B 17 | E B 14 | E B 16 | E B 17 | 24 | E B 16 | K 30 | 30 | 24 |

# IONOSPHERIC DATA STATION SHOWA-ST.

JUN. 2013 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 14 | 12 | 12 | 24 | 20 | 15 | B | B | B | 22 | B | 14 | B | B | 13 | B | 12 | 15 | 20 | 21 | 12 | 14 | 12 | 14 |
| 2 | 12 | 12 | 14 | 18 | 12 | B | 26 | 15 | B | B | B | B | B | B | 39 | B | B | B | 20 | B | 13 | 12 | 12 | 23 |
| 3 | 24 | 23 | 21 | 23 | B | B | 20 | B | B | 22 | 18 | 15 | 19 | 58 | 39 | B | B | B | B | B | 13 | 12 | 12 | 12 |
| 4 | B | 23 | 23 | 18 | 24 | B | B | B | 20 | B | B | B | B | B | B | B | B | B | B | B | B | B | 12 | 12 |
| 5 | 12 | 12 | 23 | B | 30 | 24 | 23 | 15 | 16 | 15 | 16 | 19 | B | 26 | 54 | 37 | B | B | B | B | B | B | 14 | 13 |
| 6 | 12 | 12 | 18 | 18 | 21 | 16 | 14 | B | B | 24 | 21 | B | B | B | B | B | B | B | B | 13 | 20 | 12 | 16 | 22 |
| 7 | 28 | B | B | B | B | 20 | 22 | B | B | 24 | B | B | B | B | B | B | B | 28 | B | B | B | B | B | 13 |
| 8 | 13 | 15 | 13 | 16 | 20 | 13 | B | 14 | B | 14 | 18 | 13 | B | 28 | 24 | B | B | B | B | B | B | B | 16 | 13 |
| 9 | 13 | 13 | 12 | 12 | 12 | 13 | 13 | 17 | B | B | B | B | 29 | 19 | B | 22 | B | B | 16 | 14 | 12 | 13 | 14 | 13 |
| 10 | 13 | 13 | 12 | 12 | 13 | B | B | B | B | B | B | B | 28 | 27 | B | 30 | B | 31 | 20 | B | B | B | 14 | 12 |
| 11 | 12 | 12 | 12 | 12 | 12 | 12 | 24 | 13 | 13 | 14 | 14 | 14 | 19 | 20 | 12 | 20 | B | 14 | 19 | B | B | 12 | 12 | 13 |
| 12 | 11 | 12 | 12 | 18 | 13 | 13 | 13 | 12 | 12 | 12 | 14 | 13 | 20 | 14 | B | 19 | 13 | B | B | B | B | B | B | 14 |
| 13 | 12 | 12 | 12 | 14 | 14 | 13 | 13 | 15 | 14 | 12 | 12 | 12 | 12 | 15 | 14 | 14 | 13 | 12 | B | B | 12 | B | B | B |
| 14 | 12 | 12 | 12 | 13 | 13 | 12 | 12 | 13 | 14 | 14 | 20 | 13 | 11 | 13 | 12 | 13 | 13 | B | 12 | 13 | B | B | B | 12 |
| 15 | 12 | 12 | 12 | 12 | 13 | 14 | 14 | 14 | 13 | 13 | 11 | 13 | 13 | 13 | 13 | 13 | 13 | 12 | 13 | B | B | B | B | 12 |
| 16 | 12 | 12 | 12 | 12 | 12 | 13 | 13 | 13 | 12 | 14 | 13 | 14 | 14 | 12 | 13 | 14 | 13 | 12 | B | B | 12 | B | B | B |
| 17 | 17 | B | 12 | 13 | 12 | 12 | 15 | 20 | 13 | 13 | 13 | 14 | 14 | 20 | 18 | 23 | 25 | 18 | B | B | B | B | B | 13 |
| 18 | 12 | 14 | 15 | 13 | 12 | 12 | 13 | 13 | 16 | 14 | 16 | 14 | 12 | 12 | 13 | 11 | 14 | 13 | 13 | 12 | B | 12 | 14 | 11 |
| 19 | 11 | 12 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 20 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 21 | 12 | 13 | 13 | 14 | 26 | 20 | 14 | B | B | 24 | B | B | B | B | B | B | B | 18 | 14 | B | B | 20 | 12 | 12 |
| 22 | 12 | 12 | 15 | 12 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 17 | B | 22 |
| 23 | 19 | 24 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 18 | B | 15 | 19 | 21 | 19 |
| 24 | 25 | 23 | 26 | B | 24 | B | 23 | B | B | B | 20 | B | 27 | B | B | B | 22 | B | B | 13 | 14 | 20 | 13 | B |
| 25 | B | 21 | 20 | B | B | B | B | 23 | B | 27 | B | B | B | B | B | B | B | B | B | B | B | B | 13 | 11 |
| 26 | 12 | 19 | 18 | 14 | 14 | 13 | B | 12 | 12 | 13 | 12 | 20 | 21 | 13 | 12 | 12 | 14 | 13 | 12 | 14 | 13 | 12 | 12 | 11 |
| 27 | 12 | 19 | 14 | 16 | 20 | 15 | 14 | 15 | 19 | 16 | 14 | 12 | 16 | 16 | 20 | 199 | 15 | B | B | B | 13 | 12 | 12 | 19 |
| 28 | 13 | 15 | 21 | B | 38 | B | 14 | 24 | 12 | 13 | 29 | B | 25 | 20 | 31 | 24 | B | 26 | 12 | 20 | 12 | 13 | 14 | 16 |
| 29 | 14 | 13 | 17 | B | 20 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 12 | 14 | 13 | 19 | 12 |
| 30 | 26 | 18 | 20 | 11 | 14 | 14 | 12 | 29 | B | B | B | B | 25 | 18 | 11 | 13 | 14 | B | B | B | B | 11 | 15 | 13 |
| 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 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 |
| MED | 12 | 13 | 14 | 16 | 20 | 16 | 21 | 22 | B | 22 | 20 | B | 28 | 26 | 39 | 118 | B | B | B | B | B | 20 | 14 | 13 |
| U Q | 18 | 20 | 20 | B | B 28 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 19 |
| L Q | 12 | 12 | 12 | 12 | 13 | 13 | 14 | 14 | 14 | 14 | 14 | 14 | 18 | 16 | 13 | 16 | 14 | 16 | 17 | 17 | 13 | 12 | 12 | 12 |

JUN. 2013 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**JUN. 2013** 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 | 220 | A | A | A | A | A | B | B | B | A | B | A | B | B | Q 256 | B | 200 | A | A | A | A | A | A | A |
| 2 | A | Q 196 | A | A | A | B | A | A | B | B | B | B | B | B | E B 272 | B | B | B | A | B | A | A | A | A |
| 3 | A | A | A | A | B | B | A | B | B | A | Q 270 | Q 212 | 204 | E B 252 | 220 | B | B | B | B | B | 230 | A | A | 212 |
| 4 | B | A | A | A | A | B | B | B | 268 | B | B | B | B | B | B | B | B | B | B | B | B | B | A | A |
| 5 | A | A 234 | A | B | A | A | A | A | A | A | E A 254 | 218 | B | 216 | 230 | E B 268 | B | B | B | B | B | B | Y | A |
| 6 | A | A 250 | A | A | A | A | A | B | B | E B 278 | E B 276 | B | B | B | B | B | B | B | B | A | A | A | A | A |
| 7 | A | B | B | B | B | A | A | B | B | A | B | B | B | B | B | B | B | E B 270 | B | B | B | B | B | A |
| 8 | A 230 | 252 | A 252 | 214 | A | 206 | B | A | B | A | A | A 252 | B | 238 | 212 | B | B | B | B | B | B | B | A | Y |
| 9 | A | A | 212 | A | A | A | A | Y | B | B | B | B | 246 | Q 188 | B | 220 | B | B | 244 | A | A | A | A | A |
| 10 | A | A | A | A | A | B | B | B | B | B | B | B | 218 | 244 | B | 228 | B | E B 242 | 230 | B | B | B | A | 216 |
| 11 | A | A | A | 222 | A | A | A | E A 316 | E A 284 | A | Q 224 | Q 198 | Q 230 | Q 200 | Q 200 | 212 | B | 264 | 220 | B | B | 222 | A | A |
| 12 | A | A | A | A | A | A 216 | A | 216 | A | A E 266 | A 314 | 202 | Q 140 | 200 | B | 210 | 214 | B | B | B | B | B | B | Y |
| 13 | A | A | 202 | A | A | A | A | A | A | A 230 | 230 | 214 | 204 | 196 | 192 | 188 | A | B 216 | B | B | E B 240 | B | B | B |
| 14 | A | A | A | A | A | A | A | A | A | A | A | Q 204 | Q 204 | 190 | 184 | Q 192 | 198 | B | A 224 | B 252 | B | B | B | A |
| 15 | A | E A 232 | A | A | A | A | A | A | A | A | A 256 | 214 | Q 216 | Q 214 | 198 | Q 206 | Q 200 | Q 238 | 214 | B | B | B | B | A |
| 16 | A | A | 214 | A | A | A | A | Q 278 | Q 234 | 214 | 226 | 216 | 220 | H 184 | 184 | 192 | 196 | Q 206 | B | B | E A 248 | B | B | B |
| 17 | 200 | B | A | 202 | A | A | A | A | 202 | Q 292 | Q 246 | Q 236 | Q 226 | 208 | 224 | 214 | 226 | 236 | B | B | B | B | B | A |
| 18 | A | A | A 286 | A | A | A | A | A | A | A | E A 276 | 238 | 230 | 192 | Q 204 | Q 210 | 224 | 224 | Q 210 | A 240 | B | A | A | A |
| 19 | A | A | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 20 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 21 | A | A | 236 | A | A | A | 218 | B | B | A | B | B | B | B | B | B | B | E B 248 | E B 244 | B | B | A | A | A |
| 22 | A | A | A | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | A | B | A |
| 23 | A | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | E B 278 | B | A | A | A | A |
| 24 | A | A | A | B | A | B | A | B | B | B | A | B | 246 | B | B | B | Q 206 | B | B | A | A | A | A | B |
| 25 | B | A | A | B | B | B | B | A | B | A | B | B | B | B | B | B | B | B | B | B | B | B | A | A |
| 26 | 206 | A | A | A | A | A | B | A | E A 270 | E B 244 | 226 | 206 | 208 | 208 | Q 192 | Q 192 | A 240 | A 256 | 220 | A | 258 | A | A | A |
| 27 | 212 | A | 200 | A | A | A | A | A | A | A | E A | 198 | 204 | Q 196 | 198 | Q 184 | 214 | B | B | B | E B 292 | 200 | 220 | A |
| 28 | 200 | 206 | A | B | A | B | A | A | 214 | 204 | E B 304 | B | 232 | 246 | 236 | 230 | B | B 266 | A | A | A | A | A | A |
| 29 | A | A | A | B | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | A | A | A | A | A |
| 30 | A | A | A | 194 | A | A | 198 | A | B | B | B | B | 202 | 204 | 216 | Q 230 | Q 216 | B | B | B | B | 218 | 214 | 214 |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 6 | 6 | 7 | 4 | | 2 | 2 | 3 | 6 | 7 | 12 | 13 | 16 | 17 | 16 | 15 | 11 | 11 | 9 | 2 | 5 | 3 | 2 | 3 |
| MED | 209 | 233 | 214 | 208 | | 211 | 208 | U 247 | U 230 | 237 | U 240 | 214 | 217 | 202 | 205 | 210 | 214 | 239 | 222 | 246 | E 248 | 218 | 217 | 214 |
| U Q | 220 | 250 | A 252 | 218 | | | | E A 316 | E A 270 | 278 | E 276 | 227 | 230 | 227 | 227 | 228 | 224 | B 264 | E B 244 | | 275 | 222 | | 216 |
| L Q | 200 | 206 | 202 | 198 | | | | 216 | 214 | 214 | 228 | 203 | 204 | 194 | 195 | 192 | 200 | 224 | 217 | | 235 | 200 | | 212 |

**JUN. 2013** h′F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

JUL. 2013 fxI (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | O X 38 | R | O X 36 | B | R | A | A | B | R | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 2 | Y | Y | B | A | B | A | A | A | A | A | X 38 | X 46 | X 46 | 81 | 52 | B | B | B | B | A | R | B | B | B |
| 3 | A | A | R | A | A | R | R | X 31 | X 31 | X 31 | 40 | 49 | 58 | X 63 | X 66 | 42 | 48 | X 35 | X 25 | X 24 | B | B | B | A |
| 4 | R | R | R | A | A | 33 | 34 | 33 | 31 | 31 | X 36 | O X 46 | X 60 | 56 | 57 | X 48 | O X 29 | X 36 | B | B | B | B | B | B |
| 5 | R | O X 23 | A | A | A | A | A | A | A | A | R | O X 48 | X 56 | X 64 | O X 58 | X 57 | X 43 | X 43 | O X 25 | X 27 | B | B | R | A |
| 6 | 32 | 92 | A | A | A | A | R | A | B | B | A | B | B | B | 70 | 49 | R | A | A | A | A | A | A | A |
| 7 | 49 | A | A | B | B | B | A | R | A | B | B | B | B | B | R | B | O X 44 | B | B | S | S | S | S | S |
| 8 | S | S | S | S | S | R | R | 68 | B | R | O X 36 | O X 54 | B | B | B | B | B | B | B | B | B | B | R | A |
| 9 | A | A | A | A | R | X 32 | 31 | X 24 | X 24 | X 27 | X 37 | X 51 | B | B | 63 | X 56 | O X 42 | O X 34 | O X 30 | X 25 | B | B | A | A |
| 10 | A | A | 64 | B | A | A | B | B | B | B | B | B | B | B | B | B | X 70 | B | B | A | A | 32 | A | A |
| 11 | A | A | A | B | B | A | A | B | B | B | B | B | B | B | B | 81 | O X 50 | R | 70 | 59 | R | A | B | R |
| 12 | R | A | A | A | A | B | A | A | B | B | B | B | B | B | B | B | B | X 36 | B | B | B | B | B | A |
| 13 | B | A | A | A | A | A | A | A | B | R | 51 | X 53 | X 64 | X 65 | 73 | X 53 | 57 | 50 | O X 31 | B | B | R | 70 | A |
| 14 | A | A | A | B | R | B | R | B | B | B | B | B | B | B | B | O X 90 | B | B | A | A | A | A | B | X 32 |
| 15 | A | 59 | A | R | B | R | A | R | B | B | B | B | B | B | B | B | R | B | A | R | 63 | A | A | A |
| 16 | A | A | A | A | O X 37 | O X 35 | R | X 26 | B | B | B | O X 50 | O X 53 | O X 59 | O X 63 | X 71 | O X 39 | O X 36 | B | R | Y | A | R | O X 33 |
| 17 | A | A | O X 38 | R | A | A | X 31 | 34 | R | 42 | X 46 | X 68 | O X 66 | X 63 | X 58 | 64 | 40 | X 32 | 30 | A | A | B | A | R |
| 18 | A | A | 58 | 58 | A | X 54 | A | 59 | 45 | 41 | 46 | X 55 | X 58 | X 60 | X 74 | O X 64 | X 63 | X 62 | 42 | A | A | X 34 | A | A |
| 19 | A | O X 37 | A | A | O X 36 | R | A | B | R | R | 40 | B | B | B | B | B | B | X 57 | B | A | A | A | R | A |
| 20 | A | A | A | B | B | B | B | R | R | O X 30 | O X 44 | O X 56 | O X 57 | O X 72 | O X 54 | X 56 | O X 38 | O X 33 | X 31 | O X 24 | O X 23 | Y | R | A |
| 21 | A | A | X 35 | R | R | O X 29 | 30 | 29 | 30 | X 31 | X 48 | X 64 | 68 | 68 | 66 | O X 52 | X 38 | X 40 | 32 | O X 27 | B | B | B | A |
| 22 | A | A | A | A | O X 32 | 36 | 40 | 36 | 34 | 34 | 44 | X 59 | X 58 | O X 62 | X 83 | X 59 | X 48 | X 38 | 34 | 25 | B | A | A | A |
| 23 | A | B | A | A | A | A | A | A | B | B | O X 45 | X 62 | X 58 | O X 70 | X 63 | 57 | A | X 36 | O X 31 | B | B | B | R | A |
| 24 | A | A | A | A | A | B | A | 31 | X 32 | X 32 | X 49 | X 58 | O X 69 | X 64 | X 63 | X 62 | 42 | 32 | X 32 | B | B | B | R | A |
| 25 | A | A | O X 27 | A | A | X 30 | X 39 | 33 | R | B | A | O X 52 | X 67 | X 71 | 70 | 68 | 43 | 44 | 42 | X 23 | B | 28 | A | A |
| 26 | 34 | A | A | A | A | A | 84 | R | R | B | B | O X 50 | B | R | B | B | X 51 | O X 46 | B | B | R | R | R | A |
| 27 | A | A | A | A | A | B | B | A | A | O X 32 | B | B | X 57 | O X 54 | B | B | B | X 58 | O X 43 | B | B | 70 | A | O X 40 |
| 28 | A | A | Y | O X 37 | A | A | Y | B | B | B | B | B | B | B | B | B | B | O X 50 | B | B | B | B | Y | A |
| 29 | A | A | A | A | A | A | Y | B | O X 38 | O X 39 | R | B | B | X 67 | X 67 | B | B | X 41 | X 40 | B | B | B | B | A |
| 30 | B | B | A | O X 35 | A | X 33 | A | A | A | X 40 | X 50 | O X 65 | X 70 | X 75 | B | B | O X 56 | B | B | B | B | R | O X 28 | A |
| 31 | A | A | O X 35 | R | A | A | A | A | A | X 37 | O X 52 | O X 62 | X 67 | X 68 | 68 | O X 66 | B | B | O X 36 | B | B | O X 24 | A | 27 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 4 | 4 | 7 | 3 | 3 | 8 | 7 | 11 | 8 | 13 | 16 | 19 | 17 | 18 | 18 | 18 | 18 | 20 | 16 | 8 | 2 | 5 | 2 | 4 |
| MED | 36 | 48 | O X 36 | O X 37 | O X 36 | X 33 | 34 | 33 | 32 | X 32 | X 44 | X 54 | X 58 | X 64 | X 64 | X 58 | X 44 | X 39 | X 32 | X 25 | 43 | 32 | 49 | X 32 |
| U Q | 44 | 76 | 58 | 58 | O X 37 | X 36 | 40 | 36 | 36 | 40 | X 48 | X 62 | X 67 | X 70 | 70 | X 66 | X 51 | X 48 | 41 | X 27 | | 52 | | O X 36 |
| L Q | 33 | O X 30 | X 35 | O X 35 | O X 32 | X 31 | 31 | X 29 | 30 | X 31 | X 39 | O X 50 | X 57 | O X 62 | X 58 | X 53 | O X 40 | X 36 | X 30 | X 24 | | 26 | | 30 |

JUL. 2013 fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

JUL. 2013 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 | R 32 | R | R 30 | B | A | A | A | B | R | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 2 | Y | Y | B | A | B | A | A | A | A | A | 32 | 40 | 40 | F 68 | 46 | B | B | B | B | A | R | B | B | B |
| 3 | A | A | R | A | A | A | A | 25 | 25 | 25 | F 30 | F 40 | F 40 | 57 | F 56 | F 31 | F 38 | 29 | 19 | R 18 | B | B | B | A |
| 4 | R | R | A | A | A | F 21 | F 23 | F 21 | F 20 | F 20 | 30 | U R 40 | 54 | F 44 | 48 | 42 | R 23 | 30 | B | B | B | B | B | B |
| 5 | A | R 19 | A | A | A | A | A | A | A | A | A | 42 | 50 | 58 | R 52 | 51 | 37 | 37 | 19 | 21 | B | B | A | A |
| 6 | F 22 | A | A | A | A | A | A | A | B | B | A | B | B | B | F 56 | F 39 | R | A | A | A | A | A | A | A |
| 7 | F 27 | A | A | B | B | B | A | A | A | B | B | B | B | B | R | B | U R 38 | B | B | S | S | S | S | S |
| 8 | S | S | S | S | S | A | R | Y | B | A | R 30 | 48 | B | B | B | B | B | B | B | B | B | B | A | A |
| 9 | A | A | A | A | A | 26 | F 20 | 18 | 18 | 21 | 31 | J R 45 | B | B | F 53 | J R 50 | R 36 | R 28 | 24 | 19 | B | B | A | A |
| 10 | A | A | A | B | A | A | B | B | B | B | B | B | B | B | B | B | 64 | B | B | A | A | F 24 | A | A |
| 11 | A | A | A | B | B | A | A | B | B | B | B | B | B | B | B | F 70 | R 44 | R | R 50 | F 46 | R | A | B | R |
| 12 | R | A | A | A | A | B | A | A | B | B | B | B | B | B | B | B | B | 30 | B | B | B | B | B | A |
| 13 | B | A | A | A | A | A | A | A | B | A | F 40 | 47 | 58 | 59 | F 62 | 47 | F 42 | F 34 | 25 | B | B | R | A | A |
| 14 | A | A | A | B | A | B | A | B | B | B | B | B | B | B | B | R 84 | B | B | A | A | A | A | B | 26 |
| 15 | A | A | A | R | B | R | A | A | B | B | B | B | B | B | B | B | R | B | A | A | R 31 | A | A | A |
| 16 | A | A | A | A | R 31 | R 29 | A | 20 | B | B | B | R 44 | 47 | 53 | 57 | 65 | R 33 | R 30 | B | A | Y | A | A | R 27 |
| 17 | A | A | R 32 | A | A | A | 25 | F 24 | A | F 30 | 40 | 62 | R 60 | 57 | J R 52 | F 53 | F 26 | 26 | F 20 | A | A | B | A | R |
| 18 | A | A | A | F 33 | A | 48 | A | F 31 | F 30 | Z 31 | F 31 | 49 | 52 | 54 | 68 | 58 | 57 | 56 | Z 34 | A | A | 28 | A | A |
| 19 | A | R 31 | A | A | R 30 | A | A | B | A | A | F 31 | B | B | B | B | B | B | J R 51 | B | A | A | A | R | A |
| 20 | A | A | A | B | B | B | B | R | R | R 24 | R 38 | 50 | U R 51 | R 66 | U R 48 | 50 | 32 | R 27 | 25 | 18 | R 17 | Y | R | A |
| 21 | A | A | 29 | A | A | R 23 | F 19 | F 18 | F 20 | 25 | 42 | 58 | F 58 | F 58 | F 57 | R 46 | 32 | 34 | F 24 | 21 | B | B | B | A |
| 22 | A | A | A | A | R 26 | F 24 | F 26 | F 25 | F 24 | F 24 | F 35 | J R 59 | 52 | J R 56 | 77 | J R 53 | 42 | 32 | F 24 | F 14 | B | A | A | A |
| 23 | A | B | A | A | A | A | A | A | B | B | R 39 | 56 | 52 | R 64 | 57 | Z 51 | A | 30 | R 25 | B | B | B | R | A |
| 24 | A | A | A | A | A | B | A | Z 25 | 26 | 26 | 43 | 52 | 63 | 58 | 57 | 56 | F 30 | F 24 | 26 | B | B | B | R | A |
| 25 | A | A | R 21 | A | A | 24 | 33 | F 22 | A | B | A | 46 | 61 | 65 | 64 | F 58 | F 32 | F 34 | F 27 | 17 | B | F 17 | A | A |
| 26 | F 24 | A | A | A | A | A | A | R | A | B | B | R 44 | B | R | B | B | 45 | 40 | B | B | R | R | A | A |
| 27 | A | A | A | A | A | B | B | A | A | 26 | B | B | 51 | R 48 | B | B | B | J R 51 | U R 37 | B | B | A | A | R 34 |
| 28 | A | A | Y | 31 | A | A | Y | B | B | B | B | B | B | B | B | B | B | R 44 | B | B | B | B | Y | A |
| 29 | A | A | A | A | A | A | Y | B | R 32 | 33 | R | B | B | J R 61 | J R 61 | B | B | 35 | 34 | B | B | B | B | A |
| 30 | B | B | A | R 29 | A | 27 | A | A | A | 34 | 44 | R 59 | 64 | 69 | B | B | R 50 | B | B | B | B | R | R 22 | A |
| 31 | A | A | R 29 | A | A | A | A | A | A | 31 | 46 | 56 | 61 | J R 62 | F 59 | U R 60 | B | B | 30 | B | B | R 18 | A | F 16 |
| | 00 | 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 | 2 | 5 | 3 | 3 | 8 | 6 | 10 | 8 | 13 | 16 | 19 | 17 | 18 | 18 | 18 | 18 | 20 | 16 | 8 | 2 | 4 | 1 | 4 |
| MED | F 26 | R 25 | R 29 | 31 | R 30 | 25 | F 24 | F 23 | 24 | 26 | 36 | 48 | 52 | 58 | 57 | 52 | 38 | 33 | 25 | 18 | R 24 | 21 | R 22 | 26 |
| U Q | 30 | | R 31 | F 33 | R 31 | 28 | 26 | F 25 | 28 | 31 | 41 | 56 | 60 | 64 | 61 | 58 | 44 | 38 | 32 | 21 | | 26 | | R 30 |
| L Q | F 23 | | 25 | R 29 | R 26 | 24 | F 20 | 20 | F 20 | 24 | 31 | 44 | 50 | 56 | R 52 | 47 | 32 | 30 | 24 | 18 | | 18 | | 21 |

JUL. 2013 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

JUL. 2013 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 | 38 | 32 | 56 | B | 34 | 50 | 47 | B | 33 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 2 | 21 | 22 | B | 30 | B | 34 | 34 | 65 | 65 | 50 | 23 | 60 | 29 | 25 | 30 | B | B | B | B | 36 | 25 | B | B | B |
| 3 | 28 | 31 | 26 | 42 | 35 | 39 | K 33 | 38 | 33 | 27 | 32 | 23 | 20 | 30 | 24 | 40 | 16 | 41 | 28 | E B 12 | B | B | B | 28 |
| 4 | 20 | 18 | 30 | K 34 | 35 | 31 | 30 | 16 | E B 13 | 20 | E B 14 | E B 19 | E B 18 | 20 | 21 | E B 15 | E B 19 | 16 | B | B | B | B | B | B |
| 5 | 31 | 27 | 38 | 68 | 59 | 44 | 46 | 69 | 43 | 50 | 34 | 28 | E B 29 | E B 38 | 30 | 23 | E B 19 | E B 12 | 40 | 16 | B | B | 30 | 68 |
| 6 | 40 | 39 | 46 | 46 | 43 | 69 | 35 | 82 | B | B | 49 | B | B | B | 41 | 32 | 34 | 36 | 61 | 57 | 85 | 34 | 67 | 69 |
| 7 | 34 | 44 | 65 | B | B | B | 37 | 36 | 37 | B | B | B | B | B | E B 27 | B | E B 23 | B | B | 23 | S 28 | 25 | S | 24 |
| 8 | 25 | 29 | 30 | 32 | 41 | 32 | 26 | 33 | B | 34 | 38 | E B 26 | B | B | B | B | B | B | B | B | B | B | 30 | 34 |
| 9 | 35 | 35 | 40 | 30 | 30 | 32 | 26 | 31 | 43 | 21 | E B 12 | 16 | B | B | E B 19 | 26 | 34 | 70 | E B 13 | E B 13 | B | B | 31 | 32 |
| 10 | 35 | 32 | 44 | B | 52 | 43 | B | B | B | B | B | B | B | B | B | B | E B 54 | B | B | 105 | 92 | 67 | 105 | 87 |
| 11 | 40 | 50 | 50 | B | B | 39 | 41 | B | B | B | B | B | B | B | B | E B 24 | E B 38 | 32 | 38 | 41 | 36 | 42 | B | 32 |
| 12 | 32 | 36 | 36 | 32 | 36 | B | 40 | 41 | B | B | B | B | B | B | B | B | B | E B 24 | B | B | B | B | B | 33 |
| 13 | B | 92 | 44 | 42 | 43 | 43 | 40 | 52 | B | 35 | 36 | 20 | 25 | 20 | 17 | E B 16 | E B 14 | K 18 | E B 18 | B | B | 21 | 42 | 50 |
| 14 | 52 | 52 | 42 | B | 36 | B | 34 | B | B | B | B | B | B | B | B | E B 55 | B | B | 38 | 74 | 72 | 68 | B | 58 |
| 15 | 51 | 42 | 46 | 22 | B | 38 | 42 | 34 | B | B | B | B | B | B | B | B | E B 30 | B | 37 | 32 | 37 | 40 | 42 | 48 |
| 16 | 37 | 38 | 42 | 42 | 33 | 34 | K 32 | 18 | B | B | B | 28 | E B 29 | 36 | E B 19 | 31 | 25 | E B 20 | B | 23 | 16 | 39 | 33 | 34 |
| 17 | 38 | 38 | 37 | 37 | 70 | 43 | 16 | E B 12 | K 30 | 29 | 17 | E B 17 | 22 | 40 | 33 | 26 | 31 | 22 | 31 | 34 | 40 | B | 43 | 18 |
| 18 | 39 | 44 | 41 | 64 | 59 | 41 | 44 | 34 | 33 | 70 | 35 | 20 | 22 | 28 | 29 | 24 | E B 19 | 16 | E B 12 | 41 | 39 | 36 | 42 | 43 |
| 19 | 47 | 56 | 45 | 33 | 27 | 32 | 71 | B | 40 | 38 | 18 | B | B | B | B | B | B | 28 | B | 37 | 34 | 34 | K 26 | 35 |
| 20 | 42 | 44 | 40 | B | B | B | B | 25 | 22 | K 19 | 18 | E B 18 | G 23 | E B 22 | E B 18 | E B 14 | E B 18 | E B 16 | E B 14 | E B 13 | E B 13 | 16 | K 21 | 27 |
| 21 | 32 | 30 | 39 | 31 | 30 | 32 | 17 | K 16 | 24 | K 16 | E B 14 | 21 | E B 21 | E B 24 | E B 28 | 31 | 32 | 30 | E B 20 | 30 | B | B | B | 32 |
| 22 | 34 | 42 | 33 | 35 | 27 | 27 | E S 15 | E S 14 | E B 13 | E B 12 | 18 | E B 17 | E B 18 | E B 18 | 20 | E B 13 | 16 | 42 | E B 12 | E B 12 | B | 40 | 24 | 23 |
| 23 | 40 | B | 40 | 32 | 38 | 43 | 47 | 40 | B | B | E B 21 | 18 | 26 | 25 | E B 19 | 16 | 43 | E B 15 | E B 15 | B | B | B | 21 | 34 |
| 24 | 36 | 48 | 33 | 43 | 44 | B | 35 | 20 | E B 13 | 14 | 32 | G 16 | E B 19 | 20 | 18 | G 14 | 25 | 15 | E B 19 | B | B | B | 16 | 36 |
| 25 | 39 | 32 | 49 | 68 | 30 | 40 | 33 | 32 | 31 | B | 30 | 31 | 25 | G 22 | 32 | G 17 | E B 13 | G | E B 12 | E B 12 | B | 30 | 68 | 67 |
| 26 | 67 | 31 | 45 | 87 | 50 | 41 | 68 | 37 | 43 | B | B | E B 26 | B | E B 21 | B | B | E B 15 | E B 20 | B | B | K 34 | 18 | 38 | K 38 |
| 27 | 50 | 45 | 34 | 45 | 49 | B | B | 42 | 32 | 32 | B | B | 25 | E B 20 | B | B | B | E B 32 | E B 26 | B | B | 38 | 73 | 43 |
| 28 | 72 | 49 | 32 | K 30 | 43 | 43 | 34 | B | B | B | B | B | B | B | B | B | B | E B 38 | B | B | B | B | 28 | 34 |
| 29 | 39 | 55 | 57 | 40 | 52 | 44 | 33 | B | 30 | 24 | G 22 | B | B | E B 50 | E B 62 | B | B | E B 16 | E B 17 | B | B | B | B | 37 |
| 30 | B | B | 32 | 46 | 50 | 80 | 40 | 49 | 46 | 33 | 32 | 30 | 30 | E B 28 | B | B | E B 24 | B | B | B | B | 18 | 23 | 31 |
| 31 | 34 | 32 | 34 | 34 | 43 | 62 | 36 | 40 | 34 | 29 | 32 | 39 | E B 23 | E B 20 | E B 19 | E B 21 | B | B | E B 26 | B | B | 26 | K 31 | 30 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 29 | 29 | 30 | 25 | 26 | 25 | 28 | 24 | 20 | 18 | 20 | 19 | 17 | 19 | 19 | 18 | 21 | 22 | 19 | 18 | 13 | 17 | 21 | 28 |
| MED | 38 | 38 | 40 | 37 | 42 | 41 | 35 | 35 | 33 | 29 | 26 | 20 | 22 | 22 | U 22 | 23 | E B 24 | 19 | E B 20 | 31 | 36 | 34 | 31 | 34 |
| U Q | 41 | 46 | 45 | 46 | 50 | 44 | 42 | 42 | 42 | 35 | 33 | 28 | 28 | 30 | 30 | 31 | 33 | 32 | 37 | 41 | 56 | 40 | 42 | 46 |
| L Q | 33 | 32 | 34 | 32 | 34 | 33 | 32 | 22 | 27 | 20 | 18 | E B 18 | E B 20 | E B 20 | E B 19 | E B 16 | E B 17 | E B 16 | E B 14 | E B 13 | 26 | 23 | 25 | 32 |

JUL. 2013 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

JUL. 2013 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 15 | 19 | 13 | B | 30 | 20 | 22 | B | 24 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 2 | 16 | 20 | B | 13 | B | 18 | 13 | 12 | 16 | 15 | 16 | 19 | 13 | 17 | 14 | B | B | B | B | 17 | 19 | B | B | B |
| 3 | 13 | 13 | 13 | 12 | 13 | 13 | 12 | 14 | 12 | 12 | 13 | 13 | 12 | 13 | 14 | 13 | 12 | 13 | 12 | 12 | B | B | B | 12 |
| 4 | 12 | 13 | 12 | 12 | 14 | 12 | 13 | 13 | 13 | 13 | 14 | 19 | 18 | 13 | 14 | 15 | 19 | 13 | B | B | B | B | B | B |
| 5 | 12 | 11 | 12 | 14 | 16 | 13 | 14 | 29 | 14 | 26 | 20 | 20 | 29 | 38 | 19 | 14 | 19 | 12 | 12 | 12 | B | B | 17 | 12 |
| 6 | 11 | 11 | 18 | 13 | 14 | 20 | 21 | 19 | B | B | 28 | B | B | B | 13 | 14 | 14 | 14 | 13 | 13 | 12 | 13 | 13 | 14 |
| 7 | 14 | 14 | 15 | B | B | B | 20 | 19 | 22 | B | B | B | B | B | 27 | B | 23 | B | B | 14 | 14 | 14 | S | 14 |
| 8 | 13 | 14 | 14 | 12 | 15 | 12 | 12 | 23 | B | 20 | 20 | 26 | B | B | B | B | B | B | B | B | B | B | 13 | 11 |
| 9 | 12 | 12 | 11 | 11 | 11 | 12 | 12 | 12 | 12 | 12 | 12 | 13 | B | B | 19 | 23 | 23 | 21 | 13 | 13 | B | B | 12 | 13 |
| 10 | 20 | 12 | 13 | B | 17 | 18 | B | B | B | B | B | B | B | B | B | B | 54 | B | B | 14 | 15 | 12 | 16 | 18 |
| 11 | 23 | 13 | 26 | B | B | 24 | 28 | B | B | B | B | B | B | B | B | 24 | 38 | 19 | 13 | 13 | 12 | 12 | B | 26 |
| 12 | 22 | 24 | 18 | 14 | 16 | B | 24 | 23 | B | B | B | B | B | B | B | B | B | 25 | B | B | B | B | B | 13 |
| 13 | B | 13 | 13 | 17 | 16 | 13 | 21 | 21 | B | 22 | 12 | 14 | 12 | 15 | 14 | 16 | 14 | 16 | 18 | B | B | 12 | 12 | 12 |
| 14 | 18 | 12 | 12 | B | 20 | B | 24 | B | B | B | B | B | B | B | B | 55 | B | B | 13 | 21 | 29 | 13 | B | 12 |
| 15 | 16 | 16 | 14 | 15 | B | 23 | 14 | 16 | B | B | B | B | B | B | B | B | 30 | B | 12 | 13 | 12 | 12 | 12 | 12 |
| 16 | 12 | 20 | 16 | 16 | 18 | 14 | 13 | 12 | B | B | B | 22 | 29 | 18 | 19 | 16 | 16 | 20 | B | 18 | 13 | 11 | 12 | 12 |
| 17 | 12 | 12 | 12 | 12 | 11 | 11 | 12 | 12 | 12 | 13 | 11 | 17 | 20 | 13 | 16 | 13 | 12 | 13 | 13 | 13 | 16 | B | 13 | 12 |
| 18 | 12 | 12 | 13 | 14 | 19 | 16 | 13 | 13 | 14 | 12 | 13 | 14 | 16 | 14 | 12 | 14 | 19 | 12 | 12 | 14 | 18 | 12 | 15 | 19 |
| 19 | 16 | 12 | 17 | 13 | 12 | 13 | 16 | B | 19 | 19 | 14 | B | B | B | B | B | B | 24 | B | 12 | 12 | 11 | 14 | 12 |
| 20 | 20 | 19 | 20 | B | B | B | B | 20 | 15 | 14 | 16 | 18 | 19 | 22 | 18 | 14 | 18 | 16 | 14 | 13 | 13 | 12 | 13 | 13 |
| 21 | 11 | 13 | 12 | 14 | 12 | 12 | 12 | 12 | 13 | 13 | 14 | 15 | 21 | 24 | 28 | 16 | 19 | 12 | 20 | 13 | B | B | B | 13 |
| 22 | 12 | 12 | 12 | 13 | 14 | 13 | E 15 | SE S 14 | 13 | 12 | 12 | 17 | 18 | 17 | 14 | 13 | 12 | 12 | 12 | 12 | B | 18 | 12 | 11 |
| 23 | 13 | B | 19 | 18 | 14 | 19 | 12 | 13 | B | B | 21 | 14 | 15 | 15 | 19 | 14 | 13 | 15 | 15 | B | B | B | 12 | 13 |
| 24 | 12 | 12 | 12 | 13 | 16 | B | 12 | 11 | 13 | 12 | 13 | 15 | 19 | 14 | 13 | 12 | 12 | 13 | 19 | B | B | B | 12 | 11 |
| 25 | 12 | 12 | 12 | 12 | 13 | 14 | 13 | 13 | 12 | B | 20 | 18 | 18 | 17 | 13 | 13 | 13 | 11 | 12 | 12 | B | 12 | 14 | 12 |
| 26 | 12 | 18 | 14 | 13 | 17 | 12 | 16 | 18 | 20 | B | B | 26 | B | 21 | B | B | 15 | 20 | B | B | 14 | 12 | 12 | 12 |
| 27 | 12 | 13 | 12 | 13 | 19 | B | B | 19 | 18 | 14 | B | B | 16 | 20 | B | B | B | 32 | 26 | B | B | 12 | 14 | 12 |
| 28 | 27 | 21 | 28 | 13 | 19 | 24 | 26 | B | B | B | B | B | B | B | B | B | B | 38 | B | B | B | B | 26 | 12 |
| 29 | 12 | 23 | 13 | 15 | 15 | 19 | 27 | B | 13 | 15 | 20 | B | B | 50 | 62 | B | B | 16 | 17 | B | B | B | B | 14 |
| 30 | B | B | 12 | 11 | 12 | 12 | 12 | 12 | 13 | 14 | 14 | 17 | 22 | 27 | B | B | 24 | B | B | B | B | 12 | 12 | 12 |
| 31 | 12 | 12 | 13 | 12 | 26 | 14 | 20 | 13 | 13 | 11 | 13 | 19 | 23 | 20 | 19 | 21 | B | B | 26 | B | B | 12 | 12 | 12 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 31 |
| MED | 13 | 13 | 13 | 13 | 16 | 16 | 15 | 18 | 18 | 20 | 20 | 20 | 29 | 24 | 19 | 23 | 23 | 20 | 19 | 17 | B | 14 | 14 | 12 |
| U Q | 18 | 19 | 17 | B 17 | B 20 | B 24 | 24 | B 29 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 14 |
| L Q | 12 | 12 | 12 | 12 | 14 | 13 | 12 | 13 | 13 | 13 | 13 | 17 | 18 | 17 | 14 | 14 | 14 | 13 | 13 | 13 | 14 | 12 | 12 | 12 |

# IONOSPHERIC DATA STATION SHOWA-ST.

JUL. 2013 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 246 | A | 238 | B | A | A | A | B | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 2 | Y | Y | B | A | B | A | A | A | A | A | 230 | 204 | 198 | Q 202 | Q 196 | B | B | B | B | 198 | A | B | B | B |
| 3 | A | A | A | A | A | 210 | 218 | 202 | A 284 | A 244 | Q 220 | Q 202 | Q 192 | Q 200 | Q 200 | Q 234 | Q 226 | 202 | A 252 | 232 | B | B | B | A |
| 4 | A | A | A | A | A | A | E A 340 | 316 | E B 300 | E A 288 | 220 | 194 | 212 | Q 194 | Q 198 | Q 198 | E B 316 | 210 | B | B | B | B | B | B |
| 5 | A | A | A | A | A | A | A | A | A | A | A | A 278 | 260 | 244 | A 236 | 216 | Q 234 | 202 | 224 | A 234 | B | B | A | A |
| 6 | 218 | 212 | A | A | A | A | A | A | B | B | A | B | B | B | Q 324 | E A 322 | A | A | A | A | A | A | A | A |
| 7 | 206 | 216 | A | B | B | B | A | A | A | B | B | B | B | B | 228 | B | E B 252 | B | B | A | A | A | S | S |
| 8 | A | A | A | A | A | A | A | Y | B | A | A | 252 | B | B | B | B | B | B | B | B | B | B | A | 202 |
| 9 | 204 | A | A | A | A | E A 372 | A | A 304 | E A 304 | E A 264 | 232 | 220 | B | B | 200 | 214 | 228 | A 244 | 232 | E B 276 | B | B | A | A |
| 10 | A | A | A | B | A | A | B | B | B | B | B | B | B | B | B | B | E B 320 | B | B | A | A | A | A | A |
| 11 | A | A | A | B | B | A | A | B | B | B | B | B | B | B | B | Q 234 | B | A | A | 202 | A | A | B | A |
| 12 | A | A | A | A | A | B | A | A | B | B | B | B | B | B | B | B | B | E B 276 | B | B | B | B | B | A |
| 13 | B | A | A | A | A | A | A | A | B | A | E A 266 | Q 226 | 204 | 198 | 208 | 192 | Q 238 | 234 | 224 | B | B | A | A | A |
| 14 | A | A | A | B | A | B | A | B | B | B | B | B | B | B | B | 290 | B | B | A | A | A | A | B | E A 252 |
| 15 | A | A | A | A | B | A | A | A | B | B | B | B | B | B | B | B | 284 | B | A | A | A | A | A | A |
| 16 | A | A | A | A | A 206 | 196 | A | 196 | B | B | B | A 222 | B | E A 214 | Q 226 | Q 198 | A 222 | E B 268 | B | A | A | A | A | 254 |
| 17 | 196 | A | 216 | 208 | A | A | A | B | A | A 260 | 220 | 212 | 212 | Q 212 | 222 | Q 202 | Q 188 | A 230 | 230 | A | A | B | A | 210 |
| 18 | A | A | A | 196 | A | 198 | A | 214 | 214 | Q 262 | Q 248 | Q 202 | 196 | Q 192 | Q 186 | Q 226 | 220 | Q 220 | Q 248 | 220 | A | A | A | A |
| 19 | A | 224 | A | A | 236 | A | A | B | A | A | Q 272 | B | B | B | B | B | B | 232 | B | A | A | A | A | A |
| 20 | A | A | A | B | B | B | B | R | R | E A 338 | 228 | 216 | 218 | 202 | 196 | 198 | 206 | 206 | 208 | 228 | 216 | Y | A | A |
| 21 | A | A | 214 | A | A | 224 | E A 340 | E A 326 | A 294 | 286 | 228 | Q 212 | Q 228 | 214 | 226 | Q 200 | 208 | 200 | E B 256 | 216 | B | B | B | A |
| 22 | A | A | A | 216 | A | A | E S 320 | S 276 | Q 250 | 236 | 216 | 200 | 200 | 196 | 214 | 188 | 202 | 198 | 216 | 216 | B | A | A | A |
| 23 | A | B | A | A | A | A | A | A | B | B | 258 | 212 | 216 | 212 | 210 | 200 | A | 226 | 226 | B | B | B | A | A |
| 24 | 200 | A | 220 | A | A | B | A | A | E B 256 | 268 | 222 | 206 | 210 | 196 | 200 | Q 196 | 186 | 200 | 250 | B | B | B | 204 | A |
| 25 | A | A | 206 | A | A | A | A | A | A | B | A | 216 | 230 | 232 | Q 202 | Q 198 | Q 196 | Q 214 | Q 192 | B | B | A | A | A |
| 26 | A | A | A | A | A | A | A | A | A | B | B | 260 | B | 214 | B | B | 214 | 246 | B | B | A | Y | A | A |
| 27 | A | A | A | A | A | B | B | A | A | A | B | B | E A 228 | E B 216 | B | B | B | 208 | 240 | B | B | A | A | 206 |
| 28 | A | A | Y | 194 | A | A | A | B | B | B | B | B | B | B | B | B | B | E B 282 | B | B | B | B | Y | A |
| 29 | A | A | A | A | A | A | Y | B | A | E A 258 | 214 | B | B | B | B | B | B | E B 226 | 210 | B | B | B | B | A |
| 30 | B | B | A | 226 | A | A | A | A | A | A | E A 256 | 214 | 210 | 210 | B | B | 210 | B | B | B | B | 200 | 196 | A |
| 31 | A | A | 218 | 218 | A | A | A | A | A | A | 206 | 206 | 200 | 200 | Q 200 | 234 | B | B | B 232 | B | B | 206 | 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 | 3 | 6 | 6 | 2 | 5 | 4 | 7 | 7 | 10 | 16 | 19 | 16 | 18 | 18 | 18 | 18 | 20 | 15 | 9 | 1 | 2 | 2 | 5 |
| MED | 204 | 216 | 217 | 212 | 221 | 204 | E 330 | U 245 | U 267 | A 257 | 224 | 212 | 210 | 204 | 205 | 200 | 215 | 215 | 228 | 218 | 216 | 203 | 200 | 208 |
| U Q | 218 | 224 | 220 | 218 | | 298 | E A 340 | 316 | E 300 | E A 286 | 252 | 222 | 223 | 214 | 226 | 234 | E B 238 | 239 | 248 | 233 | | | | 253 |
| L Q | 200 | 212 | 214 | 196 | | 197 | 269 | 202 | 250 | A 258 | 220 | 204 | 200 | 198 | Q 200 | 198 | 206 | 204 | 216 | 209 | | | | 204 |

JUL. 2013 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**AUG. 2013** fxI (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | R | R | A | A | R | A | A | B | B | R | X 45 | X 60 | O X 66 | X 69 | O X 74 | X 70 | 57 | 58 | 38 | R | R | B | B | R |
| 2 | R | R | O X 27 | A | C | C | C | C | C | C | C | C | C | C | C | B | X 43 | O X 38 | O X 34 | B | B | B | R | R |
| 3 | A | R | A | Y | A | R | B | R | X 29 | X 40 | O X 57 | X 61 | X 68 | O X 59 | X 61 | X 65 | O X 47 | X 41 | X 40 | X 27 | A | B | B | R |
| 4 | R | 72 | A | A | A | 31 | 42 | 44 | 36 | 42 | X 50 | B | X 66 | B | B | X 68 | O X 48 | O X 37 | X 37 | R | A | 86 | A | A |
| 5 | A | O X 38 | A | A | A | B | A | A | B | S | S | S | B | S | B | B | B | B | B | B | B | B | A | A |
| 6 | A | A | B | A | A | B | A | B | B | B | B | B | B | B | X 70 | X 72 | B | B | B | B | B | B | A | Y |
| 7 | A | R | R | A | A | A | A | A | 31 | O X 46 | O X 47 | O X 66 | R | O X 58 | X 57 | O X 56 | X 56 | 41 | 44 | X 20 | B | B | B | B |
| 8 | B | B | B | A | A | A | R | O X 26 | 30 | O X 50 | X 56 | X 62 | O X 70 | X 69 | X 66 | 66 | 60 | O X 36 | 39 | 34 | B | B | B | B |
| 9 | B | A | R | R | B | X 28 | X 32 | 32 | 32 | B | B | B | O X 67 | X 74 | O X 73 | O X 72 | O X 49 | X 48 | B | B | B | Y | Y | A |
| 10 | A | A | A | A | A | A | A | X 32 | 35 | 42 | O X 48 | X 67 | 72 | 78 | X 74 | 85 | O X 59 | O X 48 | X 50 | B | R | B | R | B |
| 11 | R | 39 | R | 60 | O X 37 | B | B | B | B | O X 48 | X 60 | O X 67 | O X 74 | X 75 | B | B | B | O X 40 | O X 46 | B | Y | B | B | B |
| 12 | R | R | R | R | X 27 | 29 | S | B | B | B | B | O X 68 | X 70 | 76 | 67 | X 60 | O X 54 | O X 54 | O X 32 | O X 30 | B | B | R | A |
| 13 | A | A | 69 | A | A | O X 38 | 45 | X 44 | 44 | X 49 | X 52 | O X 66 | O X 74 | X 70 | X 64 | X 64 | 69 | 51 | 40 | O X 24 | A | X 34 | A | A |
| 14 | A | A | B | A | B | A | B | B | B | B | B | B | O X 68 | X 65 | X 65 | X 68 | X 57 | X 43 | O X 34 | B | O X 24 | B | O X 35 | A |
| 15 | A | A | B | A | A | B | B | B | B | O X 45 | O X 54 | R | B | B | B | B | B | B | B | B | A | A | A | A |
| 16 | A | A | A | R | B | B | B | B | B | B | B | B | B | B | B | B | B | R | 56 | A | A | A | A | A |
| 17 | A | B | B | B | B | B | B | B | A | B | B | B | B | O X 74 | B | B | 77 | O X 72 | B | B | B | B | B | R |
| 18 | R | R | R | A | A | R | R | O X 30 | X 35 | X 40 | O X 49 | B | O X 74 | R | O X 86 | O X 74 | B | 66 | 50 | X 28 | B | Y | O X 34 | O X 39 |
| 19 | B | R | B | A | R | O X 38 | B | B | O X 38 | O X 47 | O X 63 | O X 69 | X 79 | O X 74 | O X 73 | O X 72 | X 66 | X 55 | X 44 | 50 | X 28 | B | B | B |
| 20 | R | R | R | R | R | A | A | 35 | X 40 | O X 54 | X 63 | X 72 | X 79 | O X 77 | X 72 | 77 | X 72 | 58 | X 39 | O X 30 | B | B | B | B |
| 21 | A | X 59 | A | A | R | X 32 | A | B | B | B | B | B | X 64 | B | B | B | X 70 | B | O X 40 | X 34 | R | O X 29 | X 33 | A |
| 22 | 33 | O X 45 | A | A | B | A | R | R | O X 39 | B | B | O X 58 | B | B | B | X 68 | X 66 | X 61 | X 52 | B | B | R | R | A |
| 23 | A | O X 38 | O X 39 | R | A | B | B | B | B | B | B | B | B | B | B | B | B | B | X 61 | R | B | B | R | A |
| 24 | A | R | A | B | B | R | R | B | B | X 56 | X 67 | O X 72 | R | O X 72 | B | O X 69 | B | 72 | X 82 | O X 33 | R | B | B | R |
| 25 | R | O X 35 | R | R | O X 38 | R | 33 | X 33 | X 40 | B | B | O X 74 | O X 74 | X 80 | O X 105 | X 105 | X 101 | X 70 | O X 70 | O X 44 | Y | A | R | R |
| 26 | A | O X 37 | 53 | O X 38 | O X 37 | R | A | A | X 47 | O X 51 | O X 52 | X 68 | B | O X 72 | O X 73 | B | B | R | O X 52 | 42 | O X 28 | B | B | R |
| 27 | O X 30 | A | A | A | O X 36 | A | B | A | X 50 | X 51 | X 63 | X 68 | R | O X 73 | X 89 | B | X 79 | B | B | X 41 | A | 73 | 76 | A |
| 28 | A | X 28 | A | A | B | B | A | B | B | R | B | B | B | B | B | B | O X 50 | O X 48 | O X 39 | B | B | B | B | R |
| 29 | R | R | R | A | A | O X 29 | X 29 | 34 | X 46 | O X 50 | O X 51 | R | 68 | X 80 | O X 74 | O X 58 | X 68 | O X 58 | O X 60 | X 31 | O X 26 | A | B | B |
| 30 | B | R | A | X 34 | X 34 | O X 30 | B | B | O X 42 | O X 52 | X 63 | O X 74 | X 85 | X 79 | O X 74 | X 74 | O X 72 | 79 | B | X 41 | R | R | A | 54 |
| 31 | A | R | X 39 | A | R | A | R | R | B | B | B | B | B | B | B | B | O X 62 | B | B | B | R | R | 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 | 2 | 9 | 5 | 3 | 6 | 8 | 5 | 9 | 16 | 16 | 17 | 16 | 17 | 19 | 18 | 19 | 22 | 22 | 23 | 15 | 4 | 4 | 4 | 2 |
| MED | 32 | O X 38 | X 39 | X 38 | O X 36 | X 30 | 33 | X 33 | X 38 | O X 48 | X 54 | O X 68 | X 70 | X 74 | X 73 | X 69 | X 61 | X 52 | X 44 | X 33 | O X 27 | 54 | X 34 | 46 |
| U Q | | X 52 | 61 | 60 | O X 37 | O X 35 | 44 | 40 | X 43 | O X 51 | X 63 | O X 70 | X 74 | X 77 | O X 74 | X 74 | X 70 | 61 | X 52 | 41 | X 28 | 80 | 56 | |
| L Q | | O X 36 | X 33 | X 34 | X 34 | X 29 | X 30 | O X 31 | 34 | X 44 | O X 50 | X 64 | X 68 | X 69 | X 66 | X 65 | O X 54 | O X 41 | X 39 | X 28 | O X 25 | X 32 | X 34 | |

**AUG. 2013** fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

## AUG. 2013 foF2 (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A | A | A | A | A | A | A | B | B | R | 39 | 54 | 60 | 63 | 68 | 64 | F 47 | F 46 | F 28 | A | R | B | B | A |
| 2 | A | A | R 21 | A | C | C | C | C | C | C | C | C | C | C | C | B | 37 | R 32 | R 28 | B | B | B | R | A |
| 3 | A | A | A | Y | A | R | B | A | 23 | 34 | R 51 | J R 55 | R 62 | 53 | J R 55 | 59 | U R 41 | 35 | 34 | 21 | A | B | B | A |
| 4 | A | R 28 | A | A | A | F 23 | F 28 | F 26 | F 24 | F 31 | 44 | B | 60 | B | B | J R 62 | R 42 | 31 | 31 | A | A | A | A | A |
| 5 | A | R 32 | A | A | A | B | A | A | B | S | S | S | B | S | B | B | B | B | B | B | B | B | A | A |
| 6 | A | A | B | A | A | B | A | B | B | B | B | B | B | B | J R 64 | 66 | B | B | B | B | B | B | A | Y |
| 7 | A | A | A | A | A | A | A | A | F 21 | R 40 | R 41 | R 60 | R | R 52 | J R 51 | R 50 | J R 50 | F 28 | F 33 | 14 | B | B | B | B |
| 8 | B | B | B | A | A | A | A | 20 | F 21 | 44 | 50 | J R 56 | 64 | 63 | 60 | F 58 | F 50 | 30 | F 30 | F 24 | B | B | B | B |
| 9 | B | A | A | A | B | 22 | F 26 | F 21 | F 20 | B | B | B | R 61 | 68 | R 67 | 66 | R 43 | J R 42 | B | B | B | Y | Y | A |
| 10 | A | A | A | A | A | A | A | 26 | F 24 | F 31 | 42 | 61 | F 60 | F 67 | 68 | F 72 | R 53 | 42 | 44 | B | R | B | R | B |
| 11 | R | A | R | 31 | R 31 | B | B | B | B | R 42 | 54 | R 61 | R 68 | R 69 | B | B | B | U R 34 | R 40 | B | Y | B | B | B |
| 12 | R | A | A | A | 21 | F 19 | S | B | B | B | B | R 62 | 64 | F 66 | F 58 | 54 | 48 | R 48 | 26 | R 24 | B | B | R | A |
| 13 | A | A | A | A | A | R 32 | F 34 | 38 | Z 38 | 43 | 46 | R 60 | 68 | 64 | 58 | 58 | F 57 | F 41 | F 29 | 18 | A | 28 | A | A |
| 14 | A | A | B | A | B | A | B | B | B | B | B | B | R 62 | 59 | 59 | 62 | 51 | 37 | R 28 | B | R 18 | B | R 29 | A |
| 15 | A | A | B | A | A | B | B | B | B | 39 | R 48 | R | B | B | B | B | B | B | B | B | A | A | A | A |
| 16 | A | A | A | R | B | B | B | B | B | B | B | B | B | B | B | B | B | R | F 46 | A | A | A | A | A |
| 17 | A | B | B | B | B | B | B | B | A | B | B | B | B | U R 68 | B | B | F 69 | R 66 | B | B | B | B | B | R |
| 18 | A | A | A | A | A | R | R | 24 | 29 | J R 34 | R 43 | B | 68 | R | 80 | R 68 | B | F 56 | Z 44 | 22 | B | Y | R 28 | R 33 |
| 19 | B | A | B | A | R | R 32 | B | B | R 32 | R 41 | 57 | R 63 | 73 | U R 68 | 67 | R 66 | 60 | 49 | 38 | F 40 | 22 | B | B | B |
| 20 | A | A | A | R | R | A | A | F 23 | 34 | 48 | 57 | 66 | 73 | 71 | J R 66 | F 67 | 66 | F 44 | 33 | 24 | B | B | B | B |
| 21 | A | J R 53 | A | A | R | 26 | A | B | B | B | B | B | 58 | B | B | B | J R 64 | B | 34 | 28 | A | R 23 | J R 27 | A |
| 22 | F 21 | R 39 | A | A | B | A | A | R | R 33 | B | B | R 52 | B | B | B | 62 | R 60 | 55 | J R 46 | B | B | A | R | A |
| 23 | A | R 32 | R 33 | R | A | B | B | B | B | B | B | B | B | B | B | B | B | B | J R 55 | R | B | B | R | A |
| 24 | A | A | A | B | B | A | A | B | B | 50 | R 61 | R 66 | R | R 66 | B | R 63 | B | F 63 | J R 75 | R 27 | A | B | B | R |
| 25 | A | R 29 | A | A | R 32 | A | F 22 | 27 | 34 | B | B | R 68 | 68 | J R 74 | 99 | J R 99 | J R 95 | 64 | 64 | 38 | Y | A | A | A |
| 26 | A | R 31 | A | R 32 | R 31 | A | A | A | 41 | R 45 | R 46 | J R 62 | B | R 66 | R 67 | B | B | R | R 46 | F 30 | R 22 | B | B | R |
| 27 | R 24 | A | A | A | R 30 | A | B | A | 44 | 45 | 57 | J R 62 | R | R 67 | J R 83 | B | J R 73 | B | B | 35 | A | A | A | A |
| 28 | A | 22 | A | A | B | B | A | B | B | A | B | B | B | B | B | B | R 44 | 42 | R 33 | B | B | B | B | R |
| 29 | A | A | R | A | A | 23 | 23 | F 24 | 40 | R 44 | R 45 | D R 44 | J R 63 | J R 74 | R 68 | U R 52 | J R 62 | R 52 | R 54 | 25 | R 20 | A | B | B |
| 30 | B | R | A | R 28 | J R 28 | R 24 | B | B | R 36 | R 46 | J R 57 | R 68 | J R 79 | 73 | 68 | 68 | 66 | F 62 | B | 35 | A | R | A | A |
| 31 | A | A | 33 | A | R | A | A | A | B | B | B | B | B | B | B | B | R 56 | B | B | B | R | R | 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 | 2 | 8 | 3 | 3 | 6 | 8 | 5 | 9 | 16 | 16 | 17 | 17 | 17 | 19 | 18 | 19 | 22 | 22 | 23 | 15 | 4 | 2 | 3 | 1 |
| MED | 22 | R 32 | R 33 | R 31 | R 30 | 24 | F 26 | 24 | 32 | 42 | 48 | R 62 | 64 | 67 | 67 | 63 | R 54 | 43 | 34 | 25 | R 21 | 26 | R 28 | R 33 |
| U Q | | R 36 | R 33 | R 32 | R 31 | R 29 | F 31 | 26 | 37 | 45 | 57 | R 64 | 68 | R 69 | 68 | 67 | 64 | 55 | R 46 | 35 | 22 | | R 29 | |
| L Q | | R 28 | R 21 | R 28 | 28 | 22 | 22 | F 22 | F 24 | 36 | 44 | R 56 | 60 | 63 | 59 | 58 | R 47 | 35 | 30 | 22 | R 19 | | J R 27 | |

AUG. 2013 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**AUG. 2013** 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 | 27 | 23 | 30 | 30 | K 26 | 40 | 46 | B | B | 32 | E B 21 | 26 | 26 | 24 | G | 24 | E B 14 | 22 | E B 14 | 26 | 20 | B | B | 31 |
| 2 | 34 | 32 | 26 | 29 | C | C | C | C | C | C | C | C | C | C | C | B | E B 20 | E B 25 | E B 20 | B | B | B | 21 | 24 |
| 3 | 32 | 29 | 42 | 17 | 32 | 23 | B | 32 | 18 | E B 12 | 22 | 32 | 37 | 24 | 22 | E B 20 | E B 18 | 18 | E B 13 | E B 12 | 49 | B | B | 22 |
| 4 | 31 | 47 | 59 | 52 | 44 | 48 | 35 | 36 | 21 | 31 | 35 | B | E B 23 | B | B | E B 60 | E B 31 | E B 23 | E B 15 | 32 | 73 | 41 | 42 | 44 |
| 5 | 70 | 70 | 53 | 69 | 41 | B | 41 | 41 | B | S | S | S | B | S | B | B | B | B | B | B | B | B | 28 | 38 |
| 6 | 69 | 60 | B | 58 | 40 | B | 36 | B | B | B | B | B | B | B | E B 56 | E B 55 | B | B | B | B | B | B | 27 | 18 |
| 7 | 33 | 30 | 34 | 40 | 40 | 41 | 34 | 34 | 30 | G 16 | E B 24 | E B 28 | E B 25 | E B 26 | E B 26 | E B 31 | E B 20 | E B 13 | E B 13 | E B 13 | B | B | B | B |
| 8 | B | B | B | 29 | 33 | 55 | 28 | 27 | E B 12 | G | G | G 21 | E B 26 | E B 26 | E B 28 | E B 21 | 22 | E B 18 | E B 16 | E B 14 | B | B | B | B |
| 9 | B | 28 | 24 | 28 | B | E B 16 | E B 14 | E B 13 | E B 12 | B | B | B | E B 29 | E B 27 | E B 30 | E B 38 | E B 29 | E B 30 | B | B | B | 16 | 16 | 40 |
| 10 | 39 | 36 | 44 | 44 | 51 | 50 | 42 | 31 | 40 | 22 | E B 23 | E B 38 | 32 | G | 31 | E B 27 | E B 26 | E B 20 | E B 21 | B | 21 | B | 23 | B |
| 11 | 26 | 33 | 32 | 33 | 18 | B | B | B | B | E B 17 | G 17 | E B 24 | E B 40 | E B 38 | B | B | B | E B 22 | E B 22 | B | 16 | B | B | B |
| 12 | 15 | 32 | 35 | 35 | 25 | 16 | S | B | B | B | B | E B 27 | E B 26 | 24 | 24 | E B 26 | E B 18 | 16 | E B 15 | E B 13 | B | B | 23 | 32 |
| 13 | 55 | 57 | 40 | 50 | 48 | 45 | K 21 | E S 16 | E S 16 | 16 | G | G 20 | G 24 | 24 | 24 | 21 | 17 | 20 | E B 15 | E B 12 | 40 | 40 | 38 | 47 |
| 14 | 72 | 50 | B | 72 | B | 41 | B | B | B | B | B | B | E B 39 | E B 26 | G | G | 16 | E B 14 | E B 19 | B | E B 14 | B | E B 14 | 39 |
| 15 | 69 | 44 | B | 33 | 58 | B | B | B | B | 33 | E B 29 | E B 27 | B | B | B | B | B | B | B | B | 46 | 41 | 44 | 44 |
| 16 | 52 | 73 | 58 | 22 | B | B | B | B | B | B | B | B | B | B | B | B | B | E B 28 | E B 20 | 40 | 44 | 42 | 40 | 42 |
| 17 | 40 | B | B | B | B | B | B | B | 39 | B | B | B | B | E B 56 | B | B | E B 20 | E B 57 | B | B | B | B | B | 21 |
| 18 | 31 | 33 | 33 | 40 | 40 | 26 | 23 | 17 | E B 12 | E B 18 | E B 31 | B | E B 40 | E B 30 | E B 25 | E B 41 | B | E B 19 | 16 | E B 13 | B | 16 | 33 | 34 |
| 19 | B | 32 | B | 41 | 24 | 37 | B | B | G | E B 19 | 25 | G | 32 | 28 | 28 | 22 | E B 19 | 15 | 18 | 17 | E B 12 | B | B | B |
| 20 | 26 | 26 | 29 | 22 | 22 | 45 | 37 | E S 16 | E B 17 | 23 | 29 | G | 40 | 43 | G 27 | G | 24 | 22 | E B 16 | E B 16 | B | B | B | B |
| 21 | 30 | 32 | 45 | 40 | 32 | 46 | 43 | B | B | B | B | B | E B 28 | B | B | B | E B 57 | B | E B 25 | E B 21 | 33 | 24 | 41 | 42 |
| 22 | 31 | 63 | 42 | 42 | B | 44 | 43 | 32 | 32 | B | B | E B 40 | B | B | B | E B 39 | E B 26 | E B 21 | E B 18 | B | B | 31 | 16 | 67 |
| 23 | 94 | 69 | 40 | 30 | 69 | B | B | B | B | B | B | B | B | B | B | B | B | B | E B 40 | 34 | B | B | 27 | 63 |
| 24 | 33 | 34 | 44 | B | B | 35 | 34 | B | B | E B 23 | G 20 | G 23 | E B 30 | E B 31 | B | E B 38 | B | E B 52 | E B 38 | E B 21 | 30 | B | B | 20 |
| 25 | K 31 | K 33 | 34 | 34 | 34 | K 33 | 30 | 26 | 27 | B | B | E B 64 | E B 38 | E B 27 | E B 26 | E B 56 | E B 38 | E B 28 | E B 28 | E B 25 | 20 | 37 | 35 | 32 |
| 26 | 41 | 60 | 32 | K 28 | 34 | 32 | 58 | 55 | 38 | G | E B 30 | E B 51 | B | E B 36 | E B 30 | B | B | E B 38 | E B 19 | E B 13 | E B 14 | B | B | E B 14 |
| 27 | 29 | 41 | 42 | 45 | 71 | 70 | B | 42 | G | E B 19 | E B 21 | E B 30 | E B 28 | E B 28 | B 26 | B | E B 23 | B | B | E B 20 | 41 | 72 | 46 | 70 |
| 28 | 44 | 67 | 42 | 32 | B | B | 30 | B | B | 43 | B | B | B | B | B | B | E B 24 | E B 20 | E B 21 | B | B | B | B | 22 |
| 29 | 34 | 30 | K 31 | 39 | 42 | G | E B 19 | E B 14 | E B 16 | E B 20 | E B 25 | G 23 | 32 | G | E B 39 | E B 37 | E B 26 | E B 21 | E B 18 | E B 13 | 27 | 31 | B | B |
| 30 | B | 24 | 29 | 28 | 29 | 27 | B | B | E B 21 | E B 26 | E B 37 | E B 37 | E S 34 | E S 30 | E S 30 | E S 30 | E S 19 | E S 23 | B | E B 14 | 34 | 23 | 43 | 35 |
| 31 | 71 | 34 | 76 | 43 | E B 47 | 38 | 32 | 38 | B | B | B | B | B | B | B | B | E B 30 | B | B | B | 30 | 25 | K 28 | 34 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 27 | 29 | 25 | 29 | 23 | 22 | 19 | 16 | 17 | 18 | 17 | 18 | 20 | 20 | 18 | 19 | 22 | 24 | 23 | 19 | 18 | 13 | 19 | 24 |
| MED | 34 | 34 | 40 | 35 | U 37 | 39 | 34 | 32 | E G 18 | 19 | E B 24 | E B 27 | E B 31 | E B 27 | G | E B 30 | E B 22 | E B 22 | E B 18 | E B 16 | 30 | 31 | 28 | 34 |
| U Q | 55 | 58 | 44 | 44 | 47 | 45 | 42 | 37 | 31 | 26 | E B 30 | E B 37 | E B 38 | E B 30 | E B 30 | E B 39 | E B 26 | E B 26 | E B 21 | 25 | 41 | 41 | 41 | 43 |
| L Q | 31 | 31 | 32 | 29 | 29 | 27 | 28 | E 16 | E B 16 | G 16 | G | G | E B 26 | 24 | 26 | 21 | E B 19 | E B 18 | E B 15 | E B 13 | E B 20 | 24 | 23 | 23 |

**AUG. 2013** ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**AUG. 2013** fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 12 | 12 | 12 | 12 | 14 | 20 | 14 | B | B | 20 | 21 | 17 | 16 | 15 | 15 | 13 | 14 | 11 | 14 | 12 | 13 | B | B | 17 |
| 2 | 13 | 12 | 13 | 13 | C | C | C | C | C | C | C | C | C | C | C | B | 20 | 25 | 20 | B | B | B | 12 | 13 |
| 3 | 12 | 12 | 13 | 14 | 12 | 12 | B | 13 | 13 | 12 | 14 | 18 | 18 | 20 | 20 | 20 | 18 | 15 | 13 | 12 | 13 | B | B | 12 |
| 4 | 12 | 12 | 14 | 13 | 13 | 13 | 13 | 12 | 12 | 12 | 13 | B | 23 | B | B | 60 | 31 | 23 | 15 | 12 | 18 | 13 | 12 | 14 |
| 5 | 14 | 13 | 18 | 13 | 18 | B | 14 | 19 | B | S | S | S | B | S | B | B | B | B | B | B | B | B | 12 | 12 |
| 6 | 21 | 13 | B | 22 | 24 | B | 16 | B | B | B | B | B | B | B | 56 | 54 | B | B | B | B | B | B | 15 | 13 |
| 7 | 12 | 14 | 14 | 16 | 26 | 16 | 14 | 12 | 13 | 12 | 24 | 28 | 25 | 26 | 26 | 31 | 20 | 13 | 13 | 13 | B | B | B | B |
| 8 | B | B | B | 13 | 13 | 12 | 22 | 12 | 12 | 12 | 16 | 16 | 26 | 26 | 28 | 21 | 14 | 18 | 16 | 14 | B | B | B | B |
| 9 | B | 12 | 12 | 19 | B | 16 | 14 | 13 | 12 | B | B | B | 29 | 27 | 30 | 39 | 29 | 30 | B | B | B | 12 | 12 | 13 |
| 10 | 12 | 13 | 13 | 17 | 14 | 20 | 13 | 12 | 13 | 13 | 23 | 38 | 19 | 20 | 20 | 27 | 26 | 20 | 21 | B | 13 | B | 12 | B |
| 11 | 12 | 12 | 12 | 12 | 13 | B | B | B | B | 17 | 15 | 24 | 40 | 38 | B | B | B | 22 | 22 | B | 13 | B | B | B |
| 12 | 12 | 12 | 14 | 14 | 12 | 12 | S | B | B | B | B | 27 | 26 | 20 | 19 | 27 | 18 | 13 | 15 | 13 | B | B | 14 | 12 |
| 13 | 12 | 14 | 26 | 14 | 20 | 14 | 13 | 16 | 16 | 12 | 14 | 19 | 16 | 19 | 15 | 19 | 14 | 16 | 15 | 12 | 12 | 13 | 13 | 12 |
| 14 | 12 | 12 | B | 14 | B | 26 | B | B | B | B | B | B | 39 | 26 | 20 | 16 | 14 | 14 | 19 | B | 14 | B | 14 | 12 |
| 15 | 26 | 20 | B | 25 | 20 | B | B | B | B | 19 | 29 | 27 | B | B | B | B | B | B | B | B | 12 | 14 | 14 | 13 |
| 16 | 24 | 13 | 13 | 13 | B | B | B | B | B | B | B | B | B | B | B | B | B | 28 | 20 | 14 | 15 | 12 | 12 | 25 |
| 17 | 20 | B | B | B | B | B | B | B | 28 | B | B | B | B | 56 | B | B | 20 | 57 | B | B | B | B | B | 13 |
| 18 | 12 | 15 | 18 | 27 | 18 | 13 | 13 | 13 | 12 | 18 | 30 | B | 40 | 30 | 25 | 41 | B | 19 | 13 | 13 | B | 13 | 13 | 14 |
| 19 | B | 26 | B | 17 | 18 | 16 | B | B | 15 | 19 | 20 | 14 | 20 | 14 | 14 | 16 | 19 | 12 | 12 | 13 | 12 | B | B | B |
| 20 | 12 | 12 | 13 | 12 | 12 | 13 | 13 | 16 | 17 | 15 | 15 | 19 | 17 | 16 | 18 | 15 | 14 | 14 | 16 | 16 | B | B | B | B |
| 21 | R 15 | 14 | 15 | 14 | 18 | 13 | 13 | B | B | B | B | B | 28 | B | B | B | 57 | B | 25 | 21 | 28 | 13 | 13 | 14 |
| 22 | 12 | 15 | 14 | 14 | B | 24 | 20 | 27 | 14 | B | B | 40 | B | B | B | 39 | 26 | 21 | 18 | B | B | 14 | 13 | 19 |
| 23 | 21 | 14 | 12 | 25 | 14 | B | B | B | B | B | B | B | B | B | B | B | B | B | 40 | 14 | B | B | 12 | 22 |
| 24 | 26 | 12 | 18 | B | B | 16 | 14 | B | B | 23 | 18 | 20 | 30 | 31 | B | 39 | B | 52 | 38 | 21 | 18 | B | B | 13 |
| 25 | 13 | 12 | 13 | 12 | 20 | 14 | 11 | 12 | 12 | B | B | 64 | 38 | 27 | 26 | 56 | 38 | 28 | 29 | 25 | 13 | 12 | 16 | 13 |
| 26 | 16 | 14 | 14 | 15 | 13 | 20 | 20 | 14 | 13 | 16 | 30 | 51 | B | 36 | 30 | B | B | 38 | 19 | 13 | 14 | B | B | 14 |
| 27 | 16 | 18 | 18 | 16 | 13 | 19 | B | 18 | 13 | 19 | 21 | 30 | 28 | 28 | 21 | B | 23 | B | B | 20 | 12 | 13 | 12 | 12 |
| 28 | 12 | 13 | 16 | 13 | B | B | 16 | B | B | 20 | B | B | B | B | B | B | 24 | 20 | 21 | B | B | B | B | 12 |
| 29 | 12 | 18 | 18 | 17 | 18 | 17 | 19 | 14 | 16 | 20 | 25 | 20 | 21 | 18 | 39 | 37 | 26 | 21 | 18 | 13 | 12 | 13 | B | B |
| 30 | B | 12 | 12 | 12 | 12 | 12 | B | B | 22 | 26 | 37 | 37 | 34 | E S 30 | E S 30 | E S 30 | 19 | 23 | B | 14 | 13 | 13 | 26 | 12 |
| 31 | 13 | 25 | 13 | 16 | 47 | 14 | 14 | 20 | B | B | B | B | B | B | B | B | 30 | B | B | B | 22 | 12 | 12 | 13 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 31 | 31 | 31 | 31 | 30 | 30 | 29 | 30 | 30 | 29 | 29 | 29 | 30 | 29 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| MED | 13 | 13 | 14 | 14 | 18 | 16 | 16 | 24 | 20 | 20 | 30 | 38 | 32 | 30 | 30 | 41 | 26 | 23 | 20 | 20 | 18 | B | 14 | 13 |
| U Q | 21 | 15 | B 18 | 17 | B 47 | B | B | B | B | B | B | B | B | B | B | B | B | B 57 | B | B | B | B | B | B 25 |
| L Q | 12 | 12 | 13 | 13 | 13 | 13 | 14 | 13 | 13 | 16 | 19 | 20 | 23 | 20 | 20 | 27 | 19 | 16 | 15 | 13 | 13 | 13 | 12 | 12 |

**AUG. 2013** fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

AUG. 2013 h′F (KM) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A | A | A | A | A | A | A | B | B | A | B | 216 | 190 | 204 | 210 | 194 | 198 | Q 212 | Q 194 | A | A | B | B | 196 |
| 2 | A | A 232 | | A | C | C | C | C | C | C | C | C | C | C | C | B | 204 | 224 | E B 254 | B | B | B | A | A |
| 3 | A | A | A | Y | A | A | B | A | E A 298 | 212 | 202 | E A 240 | 220 | 194 | 202 | 198 | 196 | 206 | 212 | 200 | A | B | B | A |
| 4 | A | 226 | A | A | A | 226 | A | E A 296 | Q 240 | Q 224 | E A 228 | B | 224 | B | B | E B 262 | 226 | E B 252 | 222 | A | A | A | A | A |
| 5 | A | 198 | A | A | A | B | A | A | B | S | S | S | B | S | B | B | B | B | B | B | B | B | 204 | A |
| 6 | A | A | B | A | A | B | 202 | B | B | B | B | B | B | B | E B 224 | 238 | B | B | B | B | B | B | A | A |
| 7 | A | A | A | A | A | A | A | A | A | E A 222 | 202 | 220 | E B 218 | 194 | 204 | 196 | 212 | B 212 | Q 210 | E B 272 | B | B | B | B |
| 8 | B | B | B | A | A | A | A | A | E B 272 | 214 | 192 | 202 | E B 224 | 206 | 206 | E B 212 | 194 | E B 216 | 224 | 196 | B | B | B | B |
| 9 | B | A | A | A | B | 336 | 306 | E B 296 | E B 266 | B | B | B | 210 | 210 | E B 218 | B 218 | 214 | 226 | B | B | B | Y | Y | A |
| 10 | A | A | A | A | A | A | A | A | E A 284 | A | B | B | 200 | A | E A 206 | 208 | 224 | 252 | 212 | B | A | B | A | B |
| 11 | 196 | A | A 220 | | A | B | B | B | B | 242 | E A 204 | 204 | E B 232 | 224 | B | B | B | 218 | E B 204 | B | Y | B | B | B |
| 12 | A | A | A | A | A | E A 318 | S | B | B | B | B | 200 | 206 | 206 | 196 | 218 | 198 | Q 218 | 218 | 216 | B | B | A | A |
| 13 | A | A | A | A | A | 226 | A | E S 280 | S 226 | 196 | 214 | 204 | 212 | E A 246 | 208 | 196 | 196 | Q 206 | Q 210 | E B | 210 | 234 | 220 | A |
| 14 | A | A | B | A | B | A | B | B | B | B | B | B | B | 214 | E A 220 | 212 | Q 208 | 194 | E B 244 | B | E B 260 | B | 204 | A |
| 15 | A | A | B | A | A | B | B | B | B | A | 248 | E B 240 | B | B | B | B | B | B | B | B | A | A | A | A |
| 16 | A | A | A | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 218 | A | A | A | A | A |
| 17 | A | B | B | B | B | B | B | B | A | B | B | B | B | E B 246 | B | B | Q 234 | B 210 | B | B | B | B | B | A |
| 18 | A | A | A | A | A | A | A | A | B | 230 | E B 252 | B | 250 | 228 | 216 | E B 216 | B | 198 | Q 212 | 212 | B | Y | 224 | 224 |
| 19 | B | A | B | A | A | 224 | | B | B | E A 274 | E B 230 | 222 | 194 | 210 | 202 | 202 | 198 | 208 | Q 194 | Q 204 | Q 212 | E B 234 | B | B | B |
| 20 | A | A | A | A | 216 | A | 210 | S | E B 262 | 204 | A 212 | 206 | 194 | 212 | Q 212 | Q 218 | Q 190 | 206 | 206 | E B 228 | B | B | B | B |
| 21 | A | 224 | A | A | E A 248 | 226 | A | B | B | B | B | B | B | B | B | B | B | B | E B 278 | E B 270 | A | A | A 232 | A |
| 22 | 202 | A | A | A | B | A | A | A | A | B | B | B | B | B | B | E B 222 | E B 238 | 202 | 214 | B | B | A | A | A |
| 23 | A | A | 202 | A | A | B | B | B | B | B | B | B | B | B | B | B | B | B | E B 252 | A | B | B | A | A |
| 24 | A | A | A | B | B | A | A | B | B | Q 222 | 198 | E A | 226 | E B 226 | B | 218 | B | E B 274 | 228 | E B 268 | A | B | B | A |
| 25 | A | E A 284 | A | A | 204 | 220 | A | A 248 | E A 272 | B | B | B | 244 | 228 | 222 | E B 240 | 212 | 228 | 232 | E B 240 | Y | A | A | A |
| 26 | A | 214 | A | A | 214 | 226 | A | A | 212 | A | E B 236 | E B 272 | B | E B 262 | 234 | B | B | 238 | 210 | 196 | 224 | B | B | A |
| 27 | A | A | A | A | A | A | B | A | A | 220 | 214 | 236 | 226 | 226 | 220 | B | 228 | B | B | 232 | A | A | 198 | A |
| 28 | A | 200 | A | A | B | B | A | B | B | A | B | B | B | B | B | B | E B 234 | E B 228 | E B 238 | B | B | B | B | A |
| 29 | A | A | A | A | A | A | B | B | E B 242 | 216 | 210 | E A 230 | 208 | 210 | 210 | 204 | 206 | 202 | 220 | B 224 | 200 | A | B | B |
| 30 | B | A | A | A | A | A | B | B | B | 224 | E B 238 | E B 242 | S 218 | S | 210 | E S 210 | Q 194 | E S 232 | B | 212 | A | A | A | A |
| 31 | A | A | 224 | A | 234 | A | A | A | B | B | B | B | B | B | B | B | E B 226 | B | B | B | 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 | 6 | 3 | 1 | 5 | 8 | 3 | 4 | 11 | 13 | 15 | 14 | 18 | 18 | 18 | 19 | 21 | 23 | 23 | 14 | 5 | 1 | 6 | 2 |
| MED | 199 | 213 | 224 | 220 | 215 | 226 | 210 | E 288 | E 266 | 221 | 208 | 210 | 214 | 210 | 208 | 208 | 206 | 211 | 214 | U 209 | U 212 | 234 | 212 | 210 |
| U Q | | 226 | 232 | | 241 | 272 | 306 | E 296 | E A 274 | 227 | E B 236 | E B 240 | 226 | E 228 | 220 | E B 218 | 226 | 228 | E B 232 | E B 240 | E B 247 | | 224 | |
| L Q | | 200 | 202 | | 209 | 225 | 202 | 264 | 240 | 213 | 202 | 204 | 208 | 206 | 206 | 198 | 197 | 206 | 210 | 212 | 205 | | 204 | |

AUG. 2013 h′F (KM)

# IONOSPHERIC DATA STATION SHOWA-ST.

**SEP.2013** fxI (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | R | O X 38 | A | A | R | B | B | A | A | B | B | B | B | B | O X 67 | B | X 66 | O X 66 | X 63 | B | A | A | A | A |
| 2 | A | R | B | A | A | A | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | R | O X 37 | R |
| 3 | R | B | R | A | A | O X 31 | X 32 | X 38 | B | B | O X 57 | B | B | O X 72 | O X 79 | O X 76 | X 79 | X 72 | R | B | R | R | R | B |
| 4 | S | S | S | S | S | S | 37 | 38 | O X 48 | R | R | O X 57 | 72 | X 74 | X 81 | X 81 | B | O X 68 | O X 56 | 41 | O X 31 | X 27 | B | A |
| 5 | A | O X 30 | A | O X 26 | X 28 | 30 | 38 | 38 | 51 | X 58 | X 64 | X 74 | X 80 | O X 89 | X 82 | X 81 | X 78 | X 57 | C | C | C | C | C | C |
| 6 | C | C | C | C | C | C | C | C | C | B | X 68 | 77 | X 80 | O X 86 | X 81 | X 73 | O X 72 | B | O X 59 | X 50 | X 31 | O X 30 | A | A |
| 7 | A | B | A | B | A | O X 34 | A | X 39 | X 44 | B | B | X 76 | X 72 | X 75 | 82 | X 65 | X 66 | X 62 | X 56 | X 42 | B | B | B | B |
| 8 | B | R | R | A | A | O X 40 | 40 | R | B | B | X 58 | X 68 | O X 74 | X 67 | O X 88 | X 80 | X 74 | X 69 | O X 64 | X 52 | X 32 | B | Y | B |
| 9 | B | B | B | B | B | B | B | B | B | B | O X 71 | X 76 | B | O X 70 | B | B | B | O X 63 | R | X 48 | X 42 | 28 | B | B |
| 10 | B | B | 59 | O X 35 | R | 32 | 33 | X 40 | X 49 | X 62 | X 69 | X 74 | X 76 | X 80 | B | B | X 75 | X 73 | O X 57 | O X 44 | X 35 | A | B | B |
| 11 | A | A | 44 | 44 | O X 38 | B | A | X 46 | O X 50 | O X 57 | X 67 | R | O X 76 | B | B | X 78 | X 72 | X 65 | R | O X 40 | X 36 | A | A | O X 29 |
| 12 | A | A | A | B | A | A | 42 | X 47 | O X 47 | B | B | O X 63 | X 66 | X 74 | X 78 | X 81 | X 77 | X 62 | X 62 | O X 54 | O X 38 | X 31 | O X 24 | 69 |
| 13 | 49 | A | A | B | B | A | A | X 47 | X 50 | O X 51 | R | O X 55 | B | B | O X 63 | O X 63 | X 64 | X 65 | O X 56 | X 47 | R | R | A | A |
| 14 | R | A | R | R | R | R | R | X 40 | O X 44 | B | B | X 59 | B | O X 73 | O X 72 | X 70 | X 69 | B | B | B | B | B | B | B |
| 15 | B | B | B | B | B | X 31 | X 31 | B | O X 49 | X 56 | O X 63 | X 68 | X 68 | X 67 | X 66 | X 69 | X 69 | X 69 | X 55 | 48 | X 45 | 34 | 28 | X 22 |
| 16 | B | A | A | O X 36 | A | A | R | R | X 42 | O X 57 | B | X 66 | X 68 | O X 68 | O X 68 | B | O X 67 | X 65 | O X 60 | R | O X 38 | O X 28 | B | A |
| 17 | B | A | B | A | B | R | B | A | B | B | R | O X 42 | B | B | B | X 67 | X 64 | X 64 | O X 56 | X 50 | X 42 | O X 38 | O X 28 | A |
| 18 | A | A | 70 | O X 38 | A | A | B | R | O X 46 | O X 48 | O X 52 | X 60 | O X 66 | X 71 | X 78 | X 79 | X 66 | X 66 | X 57 | 48 | 40 | R | A | A |
| 19 | R | B | R | B | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | O X 41 | B | A | A | A |
| 20 | A | B | A | B | R | A | B | R | R | B | B | B | B | B | B | B | B | B | B | B | X 38 | O X 32 | O X 24 | X 24 |
| 21 | 53 | A | R | X 32 | R | A | B | B | O X 57 | B | O X 58 | B | X 64 | B | B | B | X 78 | X 80 | X 73 | O X 48 | O X 29 | B | B | B |
| 22 | B | A | B | A | A | R | B | B | B | O X 46 | O X 63 | B | B | B | O X 69 | B | X 67 | B | B | C | O X 50 | 46 | X 34 | X 29 |
| 23 | B | B | 28 | O X 34 | 56 | O X 40 | O X 49 | O X 49 | B | B | B | X 76 | X 76 | B | B | X 84 | B | X 73 | O X 58 | X 58 | X 50 | 34 | A | A |
| 24 | A | 42 | 47 | B | O X 38 | A | A | X 57 | X 62 | X 66 | X 72 | X 83 | R | O X 88 | O X 88 | X 88 | X 104 | 70 | X 56 | 40 | A | A | A | A |
| 25 | A | X 39 | A | 54 | A | A | A | X 52 | X 57 | X 68 | O X 72 | B | 75 | X 88 | X 78 | X 75 | X 70 | X 65 | X 58 | 58 | X 54 | X 41 | X 37 | X 36 |
| 26 | X 31 | 30 | 30 | 30 | 42 | 56 | 48 | X 59 | X 71 | X 80 | X 82 | X 88 | X 88 | X 91 | X 84 | X 80 | X 77 | X 70 | O X 64 | X 56 | X 47 | X 45 | 40 | 34 |
| 27 | 30 | 51 | 43 | 48 | 54 | 46 | 56 | X 63 | X 77 | X 88 | X 91 | X 88 | O X 87 | O X 87 | X 92 | X 92 | X 91 | X 75 | X 62 | X 58 | X 60 | 54 | 46 | 34 |
| 28 | 29 | 27 | 40 | 44 | 48 | 59 | B | 70 | 71 | X 74 | X 82 | O X 89 | X 88 | X 89 | X 88 | X 87 | 86 | X 80 | X 68 | X 56 | X 46 | X 43 | X 40 | 40 |
| 29 | 32 | 30 | 33 | 42 | 65 | 63 | X 47 | X 63 | X 78 | O X 83 | O X 87 | X 91 | X 96 | X 99 | X 93 | X 88 | X 85 | X 70 | 66 | X 60 | X 49 | X 43 | 42 | 37 |
| 30 | 58 | 66 | A 50 | 56 | | A | A | X 66 | X 74 | O X 86 | X 86 | O X 89 | O X 90 | X 88 | X 83 | O X 77 | O X 77 | B | B | B | O X 46 | 53 | 43 | O X 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 | 7 | 9 | 9 | 13 | 9 | 11 | 11 | 17 | 19 | 15 | 18 | 21 | 19 | 20 | 21 | 21 | 24 | 23 | 20 | 21 | 21 | 16 | 12 | 11 |
| MED | 32 | 38 | 43 | 38 | 48 | 40 | 40 | X 47 | X 50 | X 62 | X 68 | X 74 | X 76 | X 78 | X 81 | X 79 | X 73 | X 68 | X 58 | X 48 | X 42 | X 36 | X 37 | X 34 |
| U Q | 53 | 46 | 53 | 46 | 56 | 56 | 48 | X 61 | X 71 | X 80 | X 82 | X 86 | X 87 | X 88 | X 86 | X 82 | X 78 | X 72 | X 64 | X 56 | X 48 | 44 | 41 | 37 |
| L Q | 30 | 30 | 32 | X 33 | O X 38 | X 31 | X 33 | X 40 | O X 47 | O X 56 | O X 63 | O X 62 | X 68 | X 72 | O X 70 | X 72 | X 67 | X 65 | X 56 | X 43 | X 36 | X 30 | O X 28 | X 29 |

**SEP.2013** fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**SEP. 2013** 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 | R 32 | A | A | A | B | B | A | A | B | B | B | B | B | R 61 | B | 60 | R 60 | 57 | B | A | A | A | A |
| 2 | A | A | B | A | A | A | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | A | 31 | A |
| 3 | R | B | R | A | A | 25 | 26 | 32 | B | B | U R 51 | B | B | R 66 | R 72 | 70 | J R 73 | 66 | R | B | R | R | R | B |
| 4 | S | S | S | S | S | S | F 29 | F 28 | 42 | R | R | U R 51 | F 64 | R 68 | J R 75 | J R 75 | B | R 62 | R 50 | F 30 | 25 | 21 | B | A |
| 5 | A | R 24 | A | R 20 | 22 | F 22 | F 21 | F 26 | F 41 | J R 52 | 58 | 68 | J R 74 | J R 83 | J R 76 | J R 75 | 72 | J R 51 | C | C | C | C | C | C |
| 6 | C | C | C | C | C | C | C | C | C | B | 62 | F 67 | J R 74 | 80 | J R 75 | 67 | R 66 | B | R 53 | 44 | 25 | R 24 | A | A |
| 7 | A | B | A | B | A | R 28 | A | 33 | 38 | B | B | J R 70 | 66 | 69 | J R 76 | J R 59 | J R 60 | J R 56 | 56 | J R 36 | B | B | B | B |
| 8 | B | R | R | A | A | R 34 | F 30 | A | B | B | 52 | 62 | 68 | J R 61 | R 82 | 74 | 68 | J R 63 | R 58 | 46 | 26 | B | Y | B |
| 9 | B | B | B | B | B | B | B | B | B | B | 65 | J R 70 | B | R 64 | B | B | B | 57 | R | J R 42 | J R 36 | F 20 | B | B |
| 10 | B | B | A | R 29 | A | 22 | F 22 | 34 | J R 43 | 56 | 63 | 68 | J R 70 | J R 74 | B | B | 69 | 67 | R 51 | 38 | 29 | A | B | B |
| 11 | A | A | A | A | R 32 | B | A | 40 | R 44 | 51 | 61 | R | R 70 | B | B | J R 72 | 66 | 59 | R | R 34 | 30 | A | A | R 23 |
| 12 | A | A | A | B | A | A | F 31 | 41 | R 41 | B | B | R 57 | J R 60 | 68 | J R 72 | J R 75 | J R 71 | J R 56 | 57 | U R 48 | 32 | 25 | R 18 | A |
| 13 | F 21 | A | A | B | B | A | A | 41 | 44 | R 45 | R | U R 49 | B | B | R 57 | R 57 | 58 | 59 | R 50 | 41 | R | R | A | A |
| 14 | A | A | A | A | R | A | A | 34 | R 38 | B | B | 53 | B | R 67 | R 66 | J R 64 | 63 | B | B | B | B | B | B | B |
| 15 | B | B | B | B | B | 25 | 25 | B | 43 | 50 | 57 | 62 | J R 62 | J R 61 | J R 60 | J R 63 | J R 63 | J R 63 | J R 49 | F 38 | 39 | F 24 | F 18 | 16 |
| 16 | B | A | A | 30 | A | A | A | A | J R 36 | R 51 | B | J R 60 | 62 | 62 | R 62 | B | 61 | 59 | 54 | R | 32 | R 22 | B | A |
| 17 | B | A | B | A | B | R | B | A | B | B | R | R 36 | B | B | B | 61 | J R 57 | J R 58 | 50 | 44 | 36 | R 32 | R 22 | A |
| 18 | A | A | F 30 | R 32 | A | A | B | A | R 40 | R 42 | R 46 | J R 54 | 60 | 65 | J R 72 | 73 | 60 | 60 | J R 51 | F 39 | F 29 | A | A | A |
| 19 | A | B | R | B | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | R 35 | B | A | A | A |
| 20 | A | B | A | B | R | A | B | R | A | B | B | B | B | B | B | B | B | B | B | B | 32 | R 26 | R 18 | 18 |
| 21 | A | A | R | J R 26 | A | A | B | B | R 51 | B | R 52 | B | J R 58 | B | B | B | J R 72 | J R 74 | 67 | 42 | 23 | B | B | B |
| 22 | B | A | B | A | A | A | B | B | B | R 40 | R 57 | B | B | B | R 63 | B | J R 61 | B | B | C | 44 | 40 | 28 | R 23 |
| 23 | B | B | Y | R 28 | 28 | 34 | 43 | R 43 | B | B | B | J R 70 | J R 70 | B | B | 78 | B | 67 | 52 | J R 52 | 44 | F 24 | A | A |
| 24 | A | A | F 31 | B | 32 | A | A | J R 51 | 56 | 60 | 66 | R 77 | U R 80 | 82 | R 82 | J R 82 | J R 98 | F 58 | 50 | F 28 | A | A | A | A |
| 25 | A | 33 | A | F 29 | A | A | A | 46 | 51 | 62 | 66 | B | J R 69 | 82 | 72 | 69 | 64 | 59 | 52 | 52 | 48 | 35 | 31 | 30 |
| 26 | 25 | F 20 | F 16 | F 18 | F 23 | F 27 | F 38 | 53 | 65 | J R 74 | 76 | 82 | 82 | 85 | 78 | 74 | 71 | 64 | S 58 | 50 | 41 | 39 | F 29 | F 22 |
| 27 | F 18 | F 21 | F 16 | F 16 | F 19 | F 27 | F 40 | 57 | 71 | 82 | J R 85 | 82 | 81 | R 81 | J R 86 | 86 | 85 | 69 | 56 | 52 | 54 | F 42 | F 31 | F 23 |
| 28 | F 18 | F 18 | F 19 | F 27 | F 31 | F 21 | B | F 56 | F 59 | 68 | J R 76 | R 83 | 82 | 83 | 82 | 81 | 80 | J R 74 | J R 62 | 50 | 40 | 37 | 34 | F 29 |
| 29 | F 15 | F 15 | F 18 | F 19 | F 20 | F 28 | 41 | 57 | 72 | 77 | 81 | 85 | 90 | 93 | 87 | 82 | 79 | 64 | F 55 | 54 | 43 | 37 | F 32 | F 27 |
| 30 | 22 | A | A | F 23 | F 34 | A | A | 60 | 68 | 80 | 80 | 83 | R 84 | 82 | J R 77 | R 71 | R 71 | B | B | B | 40 | F 38 | F 28 | R 27 |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 6 | 7 | 6 | 12 | 9 | 11 | 11 | 17 | 19 | 15 | 18 | 21 | 20 | 20 | 21 | 21 | 24 | 23 | 20 | 21 | 21 | 16 | 12 | 10 |
| MED | F 20 | F 21 | F 18 | 26 | F 28 | 27 | F 30 | 41 | 44 | 56 | 62 | R 68 | R 70 | 72 | R 75 | 73 | 67 | 60 | 54 | 42 | 36 | 29 | 28 | 23 |
| U Q | 22 | 32 | F 30 | 29 | 32 | R 28 | 40 | 54 | 59 | 74 | 76 | 80 | 80 | 82 | 80 | 76 | 72 | 66 | 57 | 50 | 42 | 38 | 31 | 27 |
| L Q | F 18 | F 18 | F 16 | F 20 | F 21 | F 22 | F 25 | 34 | R 41 | R 50 | R 57 | R 56 | 63 | R 66 | R 64 | R 66 | 61 | J R 58 | R 50 | 37 | 29 | F 24 | R 20 | 22 |

**SEP. 2013** foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**SEP. 2013** 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 | 26 | 35 | 42 | 44 | 32 | B | B | 42 | 44 | B | B | B | B | B | E B 40 | B | E B 37 | E B 26 | E B 30 | B | 30 | 36 | 42 | 37 |
| 2 | 36 | 31 | B | 41 | 43 | 37 | 42 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 35 | 41 | 34 |
| 3 | 25 | B | 28 | 32 | 35 | K 18 | K 16 | E B 21 | B | B | E B 29 | B | B | E B 40 | E B 55 | 39 | 31 | E B 19 | E B 28 | B | 33 | 33 | K 16 | B |
| 4 | S | 33 | S | S | S | S | 18 | E S 16 | E B 19 | E B 27 | G 23 | G 23 | 28 | G | E B 24 | 27 | B | E B 29 | E B 26 | 19 | E B 15 | E B 12 | B | 31 |
| 5 | 39 | 32 | 34 | 34 | E B 14 | E B 12 | E B 15 | E S 17 | 23 | 23 | 28 | 28 | 29 | E B 29 | E B 29 | G 23 | 50 | E B 20 | C | C | C | C | C | C |
| 6 | C | C | C | C | C | C | C | C | C | B | E B 26 | G | E B 28 | E B 27 | G | G | E B 28 | B | E B 31 | E B 14 | E B 12 | 24 | 34 | 60 |
| 7 | 32 | B | 50 | B | 39 | 33 | 39 | 33 | G | B | B | E B 38 | G 22 | E B 28 | E B 30 | E B 27 | G | E B 26 | E B 18 | E B 20 | B | B | B | B |
| 8 | B | 16 | 24 | 41 | 43 | 40 | 32 | 32 | B | B | E B 27 | G | E B 28 | E B 26 | E B 27 | G | E B 26 | E B 23 | E B 30 | E B 18 | E B 16 | B | 17 | B |
| 9 | B | B | B | B | B | B | B | B | B | B | E B 28 | E B 49 | B | E B 50 | B | B | B | E B 29 | E B 26 | E B 19 | E B 15 | E B 13 | B | B |
| 10 | B | B | 28 | 33 | 33 | 26 | E S 16 | E S 16 | G 19 | E B 23 | G 22 | G 24 | E B 28 | E B 28 | B | B | E B 38 | E B 26 | E B 28 | E B 20 | 16 | 39 | B | B |
| 11 | 46 | 42 | 35 | 35 | 32 | B | 41 | 31 | G 16 | G 21 | G 22 | G 24 | G 24 | B | B | G 21 | G 16 | E B 20 | E B 30 | E B 27 | E B 14 | 38 | 31 | 23 |
| 12 | 29 | 30 | 70 | B | 52 | 45 | E B 24 | G 17 | 19 | B | B | E B 28 | E B 30 | G | G 24 | G 22 | G 18 | E B 28 | E B 26 | E B 23 | E B 14 | E B 14 | E B 12 | 38 |
| 13 | 28 | 69 | 59 | B | B | 46 | 44 | 30 | G 16 | G 16 | G 18 | G 22 | B | B | E B 28 | E B 38 | G | E B 20 | E B 23 | E B 14 | 34 | 28 | 42 | 38 |
| 14 | 39 | 40 | 36 | 35 | 27 | 39 | 40 | 26 | E B 20 | B | B | G 22 | B | E B 48 | E B 61 | E B 26 | E B 20 | B | B | B | B | B | B | B |
| 15 | B | B | B | B | B | 21 | 31 | B | E B 26 | E B 26 | E B 26 | G 23 | G | G 21 | G 24 | G 21 | G 18 | E B 27 | E B 15 | E B 14 | E B 12 | E B 12 | E B 12 | E B 12 |
| 16 | B | 34 | 32 | 16 | 50 | 50 | 31 | 32 | G 17 | G 17 | B | G | E B 38 | E B 51 | E B 49 | B | E B 24 | E B 29 | E B 15 | E B 15 | E B 17 | E B 15 | B | 30 |
| 17 | B | 30 | B | K 30 | B | K 22 | B | 34 | B | B | G 30 | E B 28 | B | B | B | E B 27 | E B 28 | G | E B 17 | E B 13 | E B 14 | E B 25 | E B 19 | 42 |
| 18 | 35 | 90 | 65 | 50 | 71 | 43 | B | 35 | 32 | G 19 | G 22 | 30 | G 18 | G 17 | 28 | 30 | 28 | G 16 | E B 16 | E B 13 | 30 | 32 | 28 | 25 |
| 19 | 40 | B | 31 | B | 38 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | E B 27 | B | 31 | 31 | 45 |
| 20 | 28 | B | 33 | B | K 23 | 48 | B | 33 | 39 | B | B | B | B | B | B | B | B | B | B | B | E B 18 | E B 21 | E B 15 | 17 |
| 21 | 27 | 36 | 24 | E B 20 | 32 | 42 | B | B | E B 29 | B | E B 36 | B | E B 30 | B | B | B | E B 25 | E B 24 | E B 19 | E B 13 | E B 17 | B | B | B |
| 22 | B | 35 | B | K 33 | 33 | 31 | B | B | B | E B 30 | E B 30 | B | B | B | E B 49 | B | E B 46 | B | B | C | E B 28 | E B 20 | E B 20 | E B 14 |
| 23 | B | B | 17 | E B 24 | 28 | 33 | 30 | E B 24 | B | B | B | E B 29 | G | B | B | E B 29 | B | E B 30 | E B 25 | E B 20 | E B 14 | E B 12 | 31 | 36 |
| 24 | K 36 | K 30 | 33 | B | K 30 | 43 | 51 | 37 | 30 | G 21 | G | 30 | 31 | 28 | 31 | G | E B 56 | G | 39 | 35 | 38 | 36 | 39 | 40 |
| 25 | 40 | 66 | 101 | 33 | 43 | 49 | 37 | 34 | 30 | E B 29 | E B 32 | B | E B 54 | E B 32 | G | G | E B 25 | G | E B 22 | E B 20 | E B 20 | E B 15 | E B 13 | E B 12 |
| 26 | E B 12 | 38 | 31 | 40 | E S 15 | E S 16 | G 15 | G 17 | 25 | G | E B 28 | G | 30 | G 22 | 30 | 30 | G | G 16 | G 16 | E B 12 | E B 12 | E B 12 | E B 12 | E B 13 |
| 27 | E B 12 | E B 17 | E B 14 | 28 | E B 12 | E B 12 | 16 | 29 | 30 | 30 | 30 | 30 | 30 | 32 | 32 | 30 | 33 | 30 | 24 | 17 | E B 12 | E B 12 | 33 | E B 12 |
| 28 | 24 | 29 | 26 | 27 | 21 | E B 13 | B | 37 | G 21 | G 18 | G 21 | 32 | 32 | 32 | 30 | 28 | 26 | 24 | G | E B 13 | E B 13 | E B 12 | 29 | E B 12 |
| 29 | E B 13 | E B 12 | E B 13 | 28 | E B 14 | E B 13 | 18 | 28 | 30 | 28 | G | 31 | 33 | 33 | 36 | 35 | 31 | 24 | G | 15 | E B 12 | E B 12 | E B 12 | E B 12 |
| 30 | 32 | 38 | 34 | 26 | 42 | 42 | 45 | 26 | G | G | E B 54 | E B 34 | G 24 | E B 54 | E B 30 | B 31 | E B 55 | B | B | B | E B 22 | E B 14 | E B 14 | E B 16 |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 20 | 21 | 23 | 20 | 24 | 24 | 20 | 23 | 21 | 16 | 21 | 22 | 20 | 20 | 21 | 21 | 24 | 23 | 23 | 22 | 25 | 25 | 22 | 22 |
| MED | 30 | 34 | 33 | 33 | 32 | 35 | 31 | 30 | E G 23 | G | U 26 | E G 28 | E G 28 | E B 28 | E B 30 | 26 | E G 27 | E B 24 | E B 24 | E B 18 | E B 16 | E B 20 | 24 | 28 |
| U Q | 38 | 39 | 42 | 38 | 42 | 43 | 40 | 34 | 30 | E B 28 | G | 30 | 30 | E B 36 | E B 38 | 30 | E B 35 | E B 28 | E B 28 | E B 20 | 25 | 32 | 33 | 38 |
| L Q | 26 | 30 | 26 | 28 | E 25 | E B 20 | 17 | E 21 | G 19 | G 20 | G 22 | G 24 | G | G | G | G | G | G 19 | G | E B 14 | E B 14 | E B 12 | E B 14 | E B 13 |

**SEP. 2013** ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**SEP.2013** fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 13 | 14 | 26 | 25 | 14 | B | B | 19 | 20 | B | B | B | B | B | 40 | B | 37 | 26 | 30 | B | 12 | 12 | 22 | 20 |
| 2 | 24 | 15 | B | 20 | 18 | 20 | 20 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 19 | 15 | 12 |
| 3 | 17 | B | 14 | 13 | 13 | 12 | 12 | 21 | B | B | 29 | B | B | 40 | 55 | 16 | 19 | 19 | 28 | B | 16 | 13 | 12 | B |
| 4 | S | 15 | S | S | S | S | 12 | 16 | 18 | 27 | 16 | 17 | 21 | 19 | 24 | 20 | B | 29 | 26 | 14 | 15 | 12 | B | 12 |
| 5 | 13 | 12 | 12 | 11 | 14 | 12 | 15 | 17 | 14 | 16 | 22 | 17 | 18 | 29 | 29 | 19 | 18 | 18 | C | C | C | C | C | C |
| 6 | C | C | C | C | C | C | C | C | C | B | 26 | 18 | 28 | 27 | 22 | 14 | 28 | B | 31 | 14 | 12 | 12 | 22 | 16 |
| 7 | 18 | B | 24 | B | 16 | 15 | 12 | 12 | 20 | B | B | 38 | 20 | 28 | 30 | 27 | 16 | 26 | 20 | 20 | B | B | B | B |
| 8 | B | 12 | 12 | 21 | 14 | 14 | 14 | 12 | B | B | 27 | 26 | 28 | 26 | 27 | 20 | 26 | 23 | 30 | 18 | 16 | B | 14 | B |
| 9 | B | B | B | B | B | B | B | B | B | B | 28 | 49 | B | 50 | B | B | B | 29 | 26 | 19 | 15 | 13 | B | B |
| 10 | B | B | 12 | 12 | 12 | 12 | 16 | 16 | 14 | 23 | 20 | 17 | 28 | 28 | B | B | 38 | 26 | 28 | 20 | 13 | 13 | B | B |
| 11 | 14 | 19 | 17 | 19 | 20 | B | 13 | 14 | 14 | 15 | 16 | 19 | 18 | B | B | 20 | 15 | 20 | 30 | 27 | 14 | 11 | 12 | 12 |
| 12 | 12 | 12 | 13 | B | 21 | 15 | 24 | 12 | 11 | B | B | 28 | 30 | 24 | 19 | 19 | 13 | 28 | 26 | 23 | 14 | 14 | 12 | 12 |
| 13 | 11 | 13 | 22 | B | B | 19 | 13 | 12 | 13 | 12 | 15 | 19 | B | B | 28 | 38 | 18 | 20 | 23 | 14 | 13 | 12 | 12 | 13 |
| 14 | 16 | 12 | 16 | 14 | 19 | 16 | 13 | 13 | 20 | B | B | 18 | B | 48 | 61 | 26 | 20 | B | B | B | B | B | B | B |
| 15 | B | B | B | B | B | 12 | 15 | B | 26 | 26 | 26 | 19 | 20 | 16 | 20 | 20 | 14 | 27 | 15 | 14 | 12 | 12 | 12 | 12 |
| 16 | B | 12 | 12 | 12 | 13 | 15 | 14 | 13 | 14 | 15 | B | 21 | 38 | 51 | 49 | B | 24 | 29 | 15 | 15 | 17 | 15 | B | 12 |
| 17 | B | 11 | B | 18 | B | 14 | B | 27 | B | B | 20 | 28 | B | B | B | 27 | 28 | 17 | 17 | 13 | 14 | 25 | 19 | 23 |
| 18 | 13 | 14 | 12 | 13 | 15 | 22 | B | 16 | 15 | 14 | 14 | 17 | 15 | 13 | 12 | 19 | 13 | 14 | 16 | 13 | 13 | 20 | 12 | 13 |
| 19 | 13 | B | 28 | B | 30 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 27 | B | 13 | 13 | 12 |
| 20 | 20 | B | 28 | B | 20 | 15 | B | 20 | 20 | B | B | B | B | B | B | B | B | B | B | B | 18 | 21 | 14 | 13 |
| 21 | 12 | 12 | 18 | 20 | 24 | 20 | B | B | 29 | B | 36 | B | 30 | B | B | B | 25 | 24 | 19 | 13 | 17 | B | B | B |
| 22 | B | 14 | B | 15 | 14 | 20 | B | B | B | 30 | 30 | B | B | B | 49 | B | 46 | B | B | C | 28 | 20 | 20 | 14 |
| 23 | B | B | 13 | 24 | 13 | 19 | 13 | 24 | B | B | B | 29 | 26 | B | B | 29 | B | 30 | 25 | 20 | 14 | 12 | 13 | 14 |
| 24 | 15 | 26 | 13 | B | 17 | 26 | 27 | 12 | 14 | 15 | 15 | 17 | 17 | 17 | 18 | 19 | 56 | 22 | 12 | 12 | 12 | 12 | 12 | 18 |
| 25 | 14 | 20 | 20 | 12 | 16 | 15 | 13 | 14 | 19 | 29 | 32 | B | 54 | 32 | 22 | 19 | 25 | 19 | 22 | 20 | 19 | 15 | 13 | 12 |
| 26 | 12 | 12 | 12 | 12 | E S 15 | E S 16 | 12 | 15 | 14 | 16 | 28 | 18 | 17 | 13 | 16 | 14 | 12 | 13 | 14 | 12 | 12 | 12 | 12 | 13 |
| 27 | 12 | 17 | 14 | 12 | 12 | 12 | 12 | 13 | 12 | 13 | 16 | 14 | 16 | 17 | 16 | 19 | 14 | 13 | 14 | 12 | 12 | 12 | 12 | 12 |
| 28 | 12 | 12 | 12 | 13 | 13 | 13 | B | 19 | 18 | 14 | 14 | 12 | 14 | 16 | 15 | 16 | 15 | 14 | 12 | 13 | 13 | 12 | 12 | 12 |
| 29 | 13 | 12 | 13 | 13 | 14 | 13 | 12 | 13 | 12 | 14 | 20 | 20 | 20 | 17 | 15 | 14 | 13 | 12 | 13 | 12 | 12 | 12 | 13 | 12 |
| 30 | 13 | 12 | 12 | 7 | 12 | 22 | 14 | 16 | 21 | 20 | 54 | 34 | 22 | 54 | 30 | 31 | 55 | B | B | B | 22 | 14 | 14 | 16 |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 28 | 29 | 28 | 28 | 28 | 28 | 29 | 29 | 29 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 29 | 28 | 29 | 29 | 29 | 29 |
| MED | 14 | 14 | 15 | 18 | 16 | 16 | 15 | 16 | 20 | 30 | 28 | 24 | 28 | 36 | 30 | 23 | 25 | 26 | 26 | 18 | 14 | 13 | 14 | 13 |
| U Q | B | B | B 27 | B | 20 | 21 | B | B 26 | B | B | B | B | B | B | B | B | B 55 | B 30 | B 30 | B 27 | 18 | 20 | B | B |
| L Q | 13 | 12 | 12 | 12 | 14 | 14 | 13 | 13 | 14 | 15 | 20 | 18 | 20 | 19 | 20 | 19 | 15 | 19 | 16 | 13 | 12 | 12 | 12 | 12 |

**SEP.2013** fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**SEP. 2013** 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 242 | A | A | A | B | B | A | A | B | B | B | B | B | 222 | B | 226 | 230 | E B 230 | B | A | A | A | A |
| 2 | A | A | B | A | A | A | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | A | E A 228 | A |
| 3 | A | B | A | A | A | A | A 322 | B | B | B | 222 | B | B | E B 260 | B | Q 210 | 210 | 206 | 210 | B | A | A | A | B |
| 4 | S | A | S | S | S | S | 334 | S | 230 | E B 248 | E A 224 | 196 | 216 | 196 | B 202 | 224 | B | B 208 | 208 | 208 | 234 | 222 | B | A |
| 5 | A | A | A | A | B | B | E B 328 | 246 | E A 230 | 214 | E A 216 | 202 | 212 | 214 | 214 | 212 | 198 | 192 | C | C | C | C | C | C |
| 6 | C | C | C | C | C | C | C | C | C | B | E B 246 | 204 | 204 | 200 | 212 | 188 | 204 | B | 204 | 204 | 222 | 202 | A | A |
| 7 | A | B | A | B | A | A | A | A | A | B | B | E B 248 | 198 | E B 220 | 218 | 210 | 202 | 198 | 208 | 214 | B | B | B | B |
| 8 | B | R | A | A | A | 204 | A 222 | A | B | B | 222 | 216 | E B 216 | 196 | 224 | A 206 | 206 | 212 | 216 | 208 | 236 | B | Y | B |
| 9 | B | B | B | B | B | B | B | B | B | B | 220 | 246 | B | E B 252 | B | B | B | 206 | 206 | 206 | 204 | E B 234 | B | B |
| 10 | B | B | A | 198 | A | 220 | S | S 240 | 226 | 200 | 200 | E A 218 | B 210 | 220 | B | B | 220 | 204 | B 204 | 248 | 216 | A | B | B |
| 11 | 188 | A | A | A | A | B | A | A | 230 | A | A 218 | 202 | 196 | B | B | A 222 | 198 | 206 | 206 | E B 248 | 210 | A | A | A |
| 12 | A | A | A | B | A | A | B | A | 216 | B | B | 216 | 232 | 208 | 190 | 210 | A | 204 | 222 | 222 | 240 | 230 | E B 266 | 234 |
| 13 | A | A | A | B | B | A | A | A | 234 | 218 | 208 | 198 | B | B | 204 | E B 232 | 216 | 216 | 204 | 214 | A | A | A | A |
| 14 | A | A | A | A | A | A | A | A | 226 | B | B | 204 | B | B | B | 226 | B 204 | B | B | B | B | B | B | B |
| 15 | B | B | B | B | B | 200 | A | B | E B 272 | B 220 | 212 | 202 | B 216 | 204 | 204 | 200 | 196 | 198 | 204 | 204 | 188 | Q 214 | E B 224 | E B 260 |
| 16 | B | A | A | A | A | A | A | A | E Y 232 | 200 | B | 220 | B | B | B | B | 210 | 206 | 206 | 192 | 220 | E B 260 | B | A |
| 17 | B | A | B | A | B | A | B | A | B | B | A | 198 | B | B | B | 220 | 228 | 220 | 208 | 208 | 208 | E B 264 | E B 256 | A |
| 18 | A | A | A | A | A | A | B | A | A | 202 | 202 | 222 | 208 | 208 | 224 | 206 | 216 | Q 200 | 196 | Q 206 | E A 310 | A | 198 | A |
| 19 | A | B | A | B | A | B | B | B | B | B | B | B | B | B | B | B | B | B | B | E B 274 | B | A | A | A |
| 20 | A | B | A | B | A | A | B | A | A | B | B | B | B | B | B | B | B | B | B | B | 206 | E B 248 | 230 | E A 278 |
| 21 | A | A | A | B | A | A | B | B | E B 236 | B | E B 244 | B | 216 | B | B | B | 224 | 224 | 206 | 212 | 238 | B | B | B |
| 22 | B | A | B | A | A | A | B | B | B | E B 228 | 218 | B | B | B | E B 252 | B | E B 238 | B | B | C | 226 | 224 | 234 | E B 236 |
| 23 | B | B | Y | B | A | A | A | E B 274 | B | B | B | 208 | 214 | B | B | 214 | B | 214 | 196 | 204 | 210 | 204 | A | A |
| 24 | A | A | A | B | A | A | A | A 220 | 194 | 196 | 200 | 220 | 220 | 206 | 206 | 218 | 228 | 196 | A | A | A | A | A | A |
| 25 | A | A | A | 200 | A | A | A | 248 | 256 | 228 | E B 226 | B | E B 294 | 234 | 208 | 208 | 214 | 208 | 208 | 214 | 214 | 214 | 218 | 224 |
| 26 | Q 250 | E A 322 | E A 348 | E A 348 | E S 334 | E S 308 | E A 250 | 226 | 208 | 204 | 196 | 196 | 198 | 202 | 202 | 196 | 196 | 200 | 190 | Q 194 | Q 202 | Q 210 | Q 200 | Q 232 |
| 27 | Q 266 | E B 350 | E B 376 | A 366 | E B 334 | E B 276 | E A 222 | 210 | 210 | 210 | 198 | 198 | 208 | 200 | 200 | 216 | 224 | 208 | 196 | 200 | 208 | Q 208 | Q 208 | Q 232 |
| 28 | A 328 | A | A | E A 352 | A 338 | Q 284 | B | A 220 | 202 | 188 | H 182 | 208 | 200 | 214 | 214 | 202 | 212 | 212 | 194 | 194 | 204 | 212 | Q 228 | 228 |
| 29 | Q 238 | E B 306 | 312 | E B 340 | E B 326 | E B 252 | 230 | 218 | 202 | 208 | 204 | 204 | 206 | 208 | 208 | 204 | 216 | 204 | 192 | 202 | 198 | Q 208 | Q 214 | 214 |
| 30 | A | A | A | 236 | A | A | A | A 264 | 206 | 198 | B | E B 216 | 214 | E B 260 | 222 | 210 | E B 228 | B | B | B | 218 | Q 204 | Q 210 | B |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 5 | 4 | 3 | 7 | 4 | 7 | 7 | 10 | 17 | 15 | 19 | 22 | 19 | 18 | 18 | 21 | 23 | 23 | 22 | 21 | 21 | 16 | 13 | 9 |
| MED | Q 250 | E 314 | E 348 | U 270 | E 334 | U 228 | A 240 | 228 | 217 | 205 | 209 | 204 | 210 | 206 | 209 | 210 | 212 | 206 | 206 | 207 | 212 | 211 | 217 | 228 |
| U Q | 297 | E 336 | E B 376 | A 352 | 336 | 284 | 328 | 248 | E 233 | B 220 | E B 222 | 218 | 216 | E B 220 | 222 | 219 | 224 | 212 | 208 | 214 | 230 | E B 232 | 232 | E B 248 |
| L Q | 213 | 274 | 312 | 200 | E B 330 | 204 | A 222 | 220 | 207 | 200 | 200 | 202 | 204 | 202 | 204 | 205 | 204 | 200 | 196 | 203 | 205 | Q 208 | Q 209 | 226 |

**SEP. 2013** h′F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

OCT. 2013 fxI (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

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

OCT. 2013 fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

OCT. 2013 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 | B | B | R | B | B | B | B | B | B | R 63 | R 68 | R 82 | 83 | R 81 | 82 | 82 | 79 | R | B | B | B | B | B | B |
| 2 | B | B | B | B | B | B | B | B | B | B | B | R | R | B | B | R | R | B | R | B | B | R | A | A |
| 3 | B | A | R | A | A | B | B | B | R 44 | R 44 | U R 46 | R | R | R 52 | R 49 | B | 52 | 54 | 52 | B | 40 | 35 | 27 | 21 |
| 4 | F 23 | F 25 | F 24 | F 23 | F 28 | 34 | 43 | R 49 | J R 53 | 63 | 69 | 75 | Y 76 | 70 | 65 | 63 | 64 | 56 | 54 | 48 | 41 | 33 | F 34 | F 34 |
| 5 | F 33 | F 32 | F 30 | F 36 | 40 | F 50 | R 42 | 66 | J R 74 | 76 | U R 78 | 80 | J R 83 | 81 | 80 | 77 | F 72 | 66 | 59 | 54 | 39 | 39 | 33 | F 30 |
| 6 | F 28 | F 26 | F 23 | F 20 | F 34 | F 51 | J R 52 | R 66 | 75 | J R 76 | R 78 | R 83 | R 84 | J R 85 | J R 86 | 83 | J R 80 | 68 | J R 64 | 57 | 51 | 43 | F 35 | F 35 |
| 7 | F 26 | F 28 | F 36 | F 40 | F 29 | F 37 | F 57 | F 56 | R 58 | R 67 | F 62 | R 70 | R 73 | R 92 | J R 94 | F 83 | 83 | 76 | 72 | F 59 | Z 48 | F 20 | 30 | A |
| 8 | A | A | A | F 33 | F 38 | F 42 | F 48 | F 57 | F 56 | F 57 | 63 | F 66 | 78 | 81 | 89 | 91 | 90 | 81 | F 66 | F 56 | F 52 | F 48 | F 27 | F 37 |
| 9 | A | A | F 47 | F 47 | A | A | R 48 | F 32 | B | B | B | B | B | B | B | 60 | R 43 | B | 46 | 44 | F 24 | 24 | F 24 | 27 |
| 10 | A | A | A | F 25 | A | B | A | A | A | B | R | R 42 | R 56 | R 60 | 60 | R 63 | 65 | 63 | F 59 | 48 | B | R 43 | F 29 | F 16 |
| 11 | A | 27 | 42 | F 30 | R 42 | A | B | A | B | 65 | R 64 | R 65 | 70 | 67 | B | 67 | R 62 | J R 61 | 60 | 60 | 57 | 52 | F 31 | F 22 |
| 12 | 22 | 34 | F 32 | F 47 | 56 | F 56 | F 62 | 66 | R 69 | F 70 | 82 | F 82 | 87 | 92 | 81 | 80 | 87 | 80 | 74 | 62 | 53 | 50 | F 29 | F 26 |
| 13 | A | A | A | A | 44 | R | R | 51 | F 56 | F 57 | 64 | 68 | 74 | 78 | 73 | 76 | J R 76 | J R 74 | 64 | 56 | 53 | 49 | 44 | 36 |
| 14 | F 21 | F 19 | F 21 | F 38 | F 41 | F 46 | A | F 55 | B | B | B | F 60 | 64 | 74 | 87 | 91 | 84 | 60 | 41 | F 29 | A | A | F 56 | F 56 |
| 15 | F 40 | F 52 | A | F 42 | R | A | B | A | B | B | B | B | B | R 60 | R | B | B | B | R | 48 | 45 | F 34 | F 28 | F 27 |
| 16 | F 35 | A | A | R | B | B | B | B | B | F 58 | 58 | U R 65 | 68 | 75 | 79 | J R 72 | R 70 | R 64 | 59 | 42 | R 40 | R | A | F 22 |
| 17 | R 20 | R 23 | A | R | B | R | B | B | B | 64 | B | B | R 70 | 81 | 81 | J R 82 | B | B | R 65 | R 47 | R 32 | A | A | A |
| 18 | A | C | C | C | C | C | C | C | C | B | 75 | 78 | 76 | J R 73 | 72 | 68 | 68 | 68 | F 68 | 61 | 50 | 49 | F 49 | F 46 |
| 19 | F 27 | F 22 | F 26 | F 42 | F 54 | F 64 | F 80 | 90 | 94 | 92 | U R 85 | R 82 | R 83 | R 82 | R 80 | J R 87 | 86 | 72 | 69 | 63 | 55 | F 52 | F 47 | F 40 |
| 20 | F 39 | F 31 | F 41 | F 44 | F 56 | F 64 | 76 | F 81 | 94 | 95 | 94 | U R 95 | 96 | 91 | 86 | 80 | J R 74 | 75 | 69 | 62 | 57 | 50 | 40 | F 31 |
| 21 | F 24 | F 33 | F 40 | F 46 | F 64 | F 66 | F 64 | F 70 | F 80 | 86 | 92 | J R 94 | 94 | D R 82 | J R 92 | J R 88 | 86 | F 87 | 71 | 66 | 60 | 51 | F 37 | F 40 |
| 22 | F 45 | F 53 | F 54 | F 57 | F 64 | 78 | R 92 | 93 | 93 | J R 93 | J R 100 | 95 | J R 96 | 96 | 93 | 86 | 76 | J R 72 | 69 | F 64 | 62 | 58 | 42 | 32 |
| 23 | 24 | F 32 | A | A | F 48 | F 58 | 65 | 67 | R 68 | R 69 | U R 69 | F 61 | 66 | 70 | J R 72 | 70 | 70 | 67 | 66 | 64 | 57 | 51 | 50 | 53 |
| 24 | 57 | 54 | F 53 | F 56 | F 64 | F 64 | F 59 | F 69 | 91 | J R 90 | J R 85 | R 88 | 88 | J R 87 | 86 | J R 85 | 82 | J R 76 | 68 | 65 | 66 | 56 | 56 | F 56 |
| 25 | 54 | F 58 | F 58 | F 60 | 68 | 76 | 83 | 86 | 88 | J R 91 | U R 92 | B | 81 | 75 | 80 | 77 | J R 73 | 69 | C | 70 | J R 63 | 57 | 57 | F 42 |
| 26 | F 44 | F 36 | F 34 | R 45 | 51 | F 58 | 69 | 80 | 83 | J R 84 | 88 | J R 87 | J R 83 | 79 | 80 | 80 | 76 | 73 | 70 | 65 | F 58 | F 50 | F 46 | F 40 |
| 27 | F 37 | F 25 | F 29 | F 40 | F 50 | F 57 | F 69 | 76 | 77 | 80 | 85 | 87 | 87 | 87 | 83 | 81 | 76 | 68 | 65 | 65 | 61 | 56 | 50 | F 32 |
| 28 | F 26 | F 28 | 33 | F 47 | F 57 | F 60 | 88 | 93 | 90 | J R 90 | 90 | D R 85 | D R 82 | D R 83 | J R 87 | U R 80 | 76 | J R 72 | 67 | 59 | 58 | 58 | 52 | F 56 |
| 29 | F 56 | F 56 | F 58 | F 56 | 70 | F 70 | 83 | 93 | 90 | R 92 | U R 93 | U R 95 | R 102 | 106 | 106 | 107 | 104 | F 94 | 74 | 63 | 60 | 52 | 34 | F 56 |
| 30 | A | A | R 45 | B | F 58 | 56 | 62 | R | 65 | F 70 | R 82 | D Y 70 | J R 84 | J R 91 | R 101 | R 96 | 91 | 65 | C | 37 | 42 | A | A | A |
| 31 | F 36 | B | F 40 | R 41 | 46 | R 44 | R | R | 63 | 65 | 65 | 63 | 65 | 66 | 70 | 68 | 64 | 62 | 61 | C | C | 57 | 61 | R 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 | 21 | 20 | 20 | 22 | 22 | 20 | 19 | 20 | 21 | 25 | 25 | 25 | 27 | 29 | 27 | 28 | 28 | 26 | 26 | 27 | 26 | 25 | 26 | 26 |
| MED | F 33 | F 32 | F 38 | F 42 | F 50 | F 58 | 64 | 68 | 75 | 70 | 78 | R 81 | 82 | 81 | 81 | 80 | 76 | 68 | 66 | 59 | 53 | 50 | 38 | F 36 |
| U Q | F 42 | F 44 | F 46 | F 47 | F 58 | F 64 | 80 | 84 | 90 | J R 90 | 89 | R 87 | 87 | 87 | R 87 | 86 | 84 | 75 | 69 | 64 | 58 | 54 | 50 | F 42 |
| L Q | 24 | F 26 | F 30 | F 36 | F 41 | F 48 | R 52 | F 56 | 60 | 64 | 64 | 66 | 70 | 72 | 73 | 71 | 69 | 64 | 59 | 48 | 42 | 41 | F 30 | F 27 |

OCT. 2013 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

OCT. 2013 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 | B | B | E B 30 | B | B | B | B | B | B | E B 56 | E B 38 | G 24 | G 24 | 32 | G 27 | 31 | E B 26 | E B 55 | B | B | B | B | B | B |
| 2 | B | B | B | B | B | B | B | B | B | B | B | 36 | 34 | B | B | G | G | B | E B 32 | B | B | 32 | 38 | 71 |
| 3 | B | 40 | K 29 | 33 | 40 | B | B | B | E B 31 | E B 31 | E B 31 | E B 32 | G | E B 29 | E B 27 | B | G | E B 25 | E B 23 | B | E B 23 | E B 13 | E B 16 | E B 14 |
| 4 | 31 | K 18 | K 18 | E B 15 | 16 | E B 15 | G | G | G 20 | 31 | 30 | 30 | 30 | 34 | G 26 | 29 | 27 | G 19 | G | G | E B 12 | E B 12 | E B 11 | E B 12 |
| 5 | E B 12 | E B 13 | E B 12 | E B 12 | E B 13 | E B 14 | 19 | G 20 | 27 | 26 | 30 | G 33 | E B 40 | 32 | 30 | G 20 | G 18 | G 21 | G 17 | G | 21 | E B 12 | E B 12 | E B 12 |
| 6 | E B 12 | E B 12 | E B 12 | E B 12 | E B 13 | E B 12 | G | 24 | 31 | 32 | G 32 | 32 | E B 33 | 33 | E B 57 | E B 30 | G | 32 | 19 | G | E B 15 | E B 12 | E B 12 | E B 12 |
| 7 | 26 | 40 | 41 | 21 | 16 | 23 | 24 | 35 | E B 53 | E B 57 | G | E B 55 | E B 48 | E B 37 | E B 39 | E B 55 | G 24 | G | G 18 | E B 22 | 12 | 34 | 36 | 33 |
| 8 | 42 | 32 | 50 | 40 | 38 | 37 | 41 | 42 | 37 | 33 | 36 | 32 | 32 | 35 | G 25 | 31 | G 22 | E B 27 | E B 31 | E B 26 | E B 23 | E B 19 | 41 | 78 |
| 9 | 68 | 58 | 42 | 42 | 44 | 60 | 38 | 36 | B | B | B | B | B | B | B | G | E B 31 | B | E B 34 | G | 34 | 19 | 32 | 32 |
| 10 | 36 | 70 | 42 | 40 | 56 | B | 37 | 46 | 41 | B | G | 32 | G 24 | E B 40 | E B 31 | E B 55 | 28 | E B 26 | 22 | E B 22 | B | E B 24 | 30 | 25 |
| 11 | 32 | 35 | 35 | 31 | 40 | 42 | B | 42 | B | 35 | E B 61 | E B 41 | 32 | E B 34 | B | E B 31 | E B 54 | E B 55 | E B 40 | E B 37 | E B 23 | E B 17 | E B 12 | E B 13 |
| 12 | 26 | K 30 | 36 | 35 | 32 | G | G | E B 26 | E B 55 | 34 | 30 | 33 | 32 | G | G 28 | G 23 | 27 | E B 26 | E B 26 | E B 20 | E B 13 | E B 12 | K 24 | 37 |
| 13 | 42 | 52 | 41 | 43 | 38 | 41 | 44 | 36 | G 24 | 30 | G 22 | 28 | 32 | 35 | 33 | 33 | 34 | 30 | 24 | 24 | E B 14 | E B 12 | E B 14 | 30 |
| 14 | 20 | 28 | 28 | 34 | 35 | 44 | 58 | 44 | B | B | B | G 27 | E B 30 | G 22 | G | 28 | G | 40 | G | 31 | 44 | 72 | 50 | 70 |
| 15 | 43 | 51 | 115 | 42 | 25 | 57 | B | 41 | B | B | B | B | B | E B 32 | G | B | B | B | E B 34 | 24 | 33 | E B 14 | 16 | 40 |
| 16 | 72 | 42 | 42 | 40 | B | B | B | B | B | G 25 | G | E B 54 | E B 56 | E B 56 | E B 54 | G 18 | E B 31 | E B 56 | E B 28 | 27 | 40 | 39 | 42 | 23 |
| 17 | 17 | 30 | K 34 | 42 | B | 40 | B | B | B | E B 55 | B | B | E B 56 | E B 56 | E B 55 | E B 60 | B | B | E B 56 | E B 28 | 34 | 37 | 38 | 36 |
| 18 | 36 | C | C | C | C | C | C | C | C | B | 36 | 18 | 34 | 31 | 36 | 32 | E B 29 | 32 | 24 | 23 | 23 | 24 | 20 | E B 13 |
| 19 | E B 13 | 32 | E B 12 | 17 | 30 | G 20 | G | 27 | E B 32 | 32 | 32 | 36 | 38 | G | 28 | 28 | G 22 | 21 | 29 | 21 | G | E B 12 | E B 12 | E B 12 |
| 20 | E B 12 | E B 12 | E B 12 | E B 13 | E B 15 | G | 32 | 31 | 24 | 30 | G | E B 55 | 33 | E B 36 | 30 | G 26 | G 22 | 32 | 32 | 21 | 27 | 27 | 23 | E B 12 |
| 21 | 21 | 26 | 49 | 30 | 26 | 28 | 41 | 35 | 34 | 34 | G 26 | G 23 | 36 | 35 | 34 | 19 | G 18 | G 16 | G 19 | 25 | 33 | 29 | 22 | E B 12 |
| 22 | 21 | 21 | E B 14 | E B 13 | 23 | G 21 | 24 | 27 | 32 | 34 | 36 | 34 | 38 | 34 | 36 | G | G 25 | G 21 | G | 30 | 35 | 39 | 32 | 32 |
| 23 | 31 | 44 | 44 | 44 | G 19 | G 20 | 17 | 33 | G 22 | E B 56 | E B 56 | 32 | G 25 | G 26 | E B 57 | G 28 | 30 | 32 | E B 25 | G | G 14 | 20 | 29 | 32 |
| 24 | 31 | 69 | 28 | 20 | 24 | 31 | 52 | G 22 | 30 | 31 | 40 | 35 | 37 | 44 | 46 | 47 | 58 | 40 | 30 | G 19 | 27 | 23 | 22 | 20 |
| 25 | 26 | 20 | E B 12 | E B 14 | 23 | 26 | 26 | 32 | G 31 | G 24 | G 29 | B | G 34 | 35 | 47 | G 28 | 28 | G 24 | C | G 18 | G 15 | 16 | 19 | 20 |
| 26 | E B 12 | 16 | 18 | 43 | 32 | 27 | 30 | 31 | 33 | 35 | 33 | 40 | G 33 | 36 | G 29 | 29 | 29 | 32 | G 22 | G 16 | G 17 | 21 | E B 13 | 68 |
| 27 | 31 | 26 | 18 | E B 16 | 21 | 29 | 50 | 30 | 34 | 34 | 40 | 35 | 24 | 34 | 41 | 39 | 31 | G 19 | G 23 | 28 | G 19 | 18 | E B 15 | 24 |
| 28 | E B 13 | 21 | 24 | 22 | 26 | G 26 | G 17 | G 17 | E B 55 | 34 | 38 | 43 | 43 | 48 | 48 | 38 | G 28 | G 20 | G 22 | G 21 | G 15 | E B 16 | E B 13 | 24 |
| 29 | 22 | E B 12 | E B 13 | E B 16 | G 16 | 25 | G | G | G 22 | 34 | 37 | 37 | 48 | 44 | 45 | 39 | 39 | 41 | 31 | 25 | E B 22 | E B 18 | 34 | 91 |
| 30 | 42 | 44 | K 32 | B | G 32 | G 26 | 40 | G 32 | 26 | 22 | G 24 | G 32 | E B 60 | E B 56 | E B 56 | E B 57 | E B 40 | 30 | C | G 22 | 35 | 42 | 70 | 62 |
| 31 | 58 | B | 44 | 34 | 69 | G 23 | G 22 | G 23 | G 26 | G 25 | G 22 | 43 | G 34 | 34 | 34 | G 22 | G 22 | 41 | 29 | C | C | G 15 | 24 | 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 | 28 | 27 | 29 | 27 | 26 | 25 | 23 | 25 | 22 | 25 | 26 | 27 | 29 | 29 | 28 | 29 | 29 | 27 | 28 | 27 | 27 | 30 | 30 | 30 |
| MED | 28 | 30 | 30 | 31 | 26 | G | 26 | GU | 28 | 32 | G | 32 | 33 | 33 | E G 34 | E G 29 | G | 28 | 23 | G | 23 | 18 | 22 | 28 |
| U Q | 39 | 44 | 42 | 40 | 38 | 38 | 41 | 36 | 34 | E B 34 | 37 | E B 40 | E B 39 | E B 38 | E B 46 | 38 | 31 | 40 | E B 31 | 26 | 33 | 29 | 34 | 40 |
| L Q | E B 18 | E B 20 | E B 16 | E B 16 | 19 | G 22 | G | G 26 | G 26 | 30 | G 30 | 32 | 32 | 32 | G | G 28 | G 24 | G 21 | G 22 | G 21 | E B 15 | E B 14 | E B 14 | E B 13 |

OCT. 2013 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

OCT. 2013 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B | B | 30 | B | B | B | B | B | B | 56 | 38 | 19 | 16 | 19 | 20 | 18 | 26 | 55 | B | B | B | B | B | B |
| 2 | B | B | B | B | B | B | B | B | B | B | B | 28 | 28 | B | B | 23 | 20 | B | 32 | B | B | 20 | 23 | 20 |
| 3 | B | 20 | 23 | 20 | 28 | B | B | B | 31 | 31 | 31 | 32 | 25 | 29 | 27 | B | 19 | 25 | 23 | B | 23 | 13 | 16 | 14 |
| 4 | 13 | 12 | 11 | 15 | 12 | 15 | 15 | 15 | 17 | 14 | 16 | 21 | 18 | 19 | 17 | 19 | 16 | 16 | 14 | 12 | 12 | 12 | 11 | 12 |
| 5 | 12 | 13 | 12 | 12 | 13 | 14 | 15 | 15 | 14 | 14 | 19 | 27 | 40 | 21 | 20 | 18 | 15 | 12 | 12 | 13 | 11 | 12 | 12 | 12 |
| 6 | 12 | 12 | 12 | 12 | 13 | 12 | 13 | 12 | 13 | 12 | 18 | 14 | 32 | 30 | 57 | 30 | 17 | 13 | 13 | 12 | 16 | 12 | 12 | 12 |
| 7 | 11 | 13 | 14 | 12 | 12 | 12 | 12 | 23 | 53 | 57 | 15 | 55 | 48 | 37 | 39 | 55 | 20 | 19 | 14 | 22 | 12 | 12 | 12 | 16 |
| 8 | 12 | 19 | 20 | 17 | 15 | 12 | 14 | 14 | 24 | 16 | 19 | 18 | 15 | 12 | 14 | 15 | 15 | 27 | 31 | 26 | 23 | 19 | 13 | 12 |
| 9 | 17 | 14 | 12 | 12 | 33 | 21 | 15 | 14 | B | B | B | B | B | B | B | 21 | 32 | B | 34 | 16 | 12 | 12 | 12 | 11 |
| 10 | 12 | 19 | 12 | 12 | 16 | B | 18 | 24 | 20 | B | 28 | 20 | 20 | 40 | 31 | 55 | 19 | 26 | 14 | 22 | B | 24 | 13 | 12 |
| 11 | 14 | 12 | 12 | 12 | 23 | 27 | B | 28 | B | 18 | 61 | 41 | 21 | 34 | B | 31 | 54 | 55 | 40 | 37 | 23 | 17 | 12 | 13 |
| 12 | 12 | 12 | 13 | 12 | 13 | 15 | 15 | 26 | 55 | 22 | 15 | 15 | 15 | 22 | 18 | 18 | 20 | 26 | 26 | 20 | 13 | 12 | 12 | 12 |
| 13 | 11 | 29 | 22 | 12 | 13 | 25 | 21 | 13 | 14 | 14 | 14 | 14 | 16 | 15 | 16 | 15 | 13 | 14 | 12 | 13 | 14 | 12 | 14 | 12 |
| 14 | 11 | 12 | 12 | 12 | 14 | 18 | 16 | 13 | B | B | B | 24 | 30 | 18 | 16 | 14 | 23 | 16 | 12 | 16 | 12 | 13 | 12 | 14 |
| 15 | 14 | 16 | 12 | 12 | 14 | 15 | B | 19 | B | B | B | B | B | 32 | 22 | B | B | B | 34 | 15 | 12 | 14 | 12 | 12 |
| 16 | 12 | 19 | 32 | 26 | B | B | B | B | B | 18 | 21 | 54 | 56 | 56 | 54 | 15 | 31 | 56 | 28 | 13 | 13 | 14 | 12 | 12 |
| 17 | 13 | 11 | 12 | 26 | B | 26 | B | B | B | 55 | B | B | 56 | 56 | 55 | 60 | B | B | 56 | 28 | 17 | 12 | 12 | 12 |
| 18 | 12 | C | C | C | C | C | C | C | C | B | 16 | 19 | 23 | 23 | 20 | 19 | 29 | 12 | 12 | 18 | 13 | 11 | 12 | 13 |
| 19 | 13 | 11 | 12 | 12 | 13 | 15 | 20 | 14 | 32 | 14 | 19 | 22 | 24 | 28 | 21 | 21 | 18 | 14 | 16 | 12 | 13 | 12 | 12 | 12 |
| 20 | 12 | 12 | 12 | 13 | 15 | 12 | 13 | 12 | 18 | 20 | 23 | 55 | 19 | 36 | 23 | 20 | 16 | 12 | 15 | 14 | 12 | 12 | 12 | 12 |
| 21 | 12 | 12 | 11 | 12 | 12 | 12 | 13 | 13 | 12 | 13 | 13 | 12 | 16 | 14 | 13 | 12 | 12 | 13 | 12 | 12 | 13 | 12 | 12 | 12 |
| 22 | 12 | 12 | 14 | 13 | 13 | 16 | 13 | 15 | 15 | 14 | 14 | 15 | 16 | 16 | 15 | 21 | 14 | 14 | 14 | 13 | 12 | 12 | 12 | 12 |
| 23 | 12 | 16 | 14 | 14 | 14 | 13 | 14 | 14 | 16 | 56 | 56 | 17 | 18 | 23 | 57 | 20 | 20 | 24 | 25 | 17 | 12 | 14 | 11 | 11 |
| 24 | 12 | 12 | 12 | 11 | 12 | 14 | 18 | 13 | 13 | 16 | 15 | 20 | 14 | 19 | 24 | 27 | 19 | 18 | 13 | 17 | 12 | 12 | 12 | 12 |
| 25 | 12 | 12 | 12 | 14 | 12 | 12 | 17 | 12 | 28 | 18 | 19 | B | 20 | 23 | 16 | 13 | 13 | 13 | C | 14 | 13 | 12 | 12 | 12 |
| 26 | 12 | 13 | 12 | 13 | 13 | 12 | 12 | 12 | 13 | 16 | 18 | 14 | 18 | 16 | 20 | 15 | 14 | 13 | 12 | 12 | 13 | 12 | 12 | |
| 27 | 12 | 12 | 12 | 16 | 12 | 12 | 14 | 14 | 14 | 14 | 14 | 14 | 15 | 16 | 15 | 13 | 16 | 13 | 12 | 13 | 14 | 12 | 15 | 12 |
| 28 | 13 | 12 | 12 | 12 | 14 | 19 | 12 | 12 | 55 | 18 | 18 | 17 | 14 | 18 | 15 | 27 | 14 | 15 | 20 | 13 | 14 | 15 | 13 | 12 |
| 29 | 12 | 12 | 13 | 16 | 15 | 18 | 18 | 19 | 18 | 17 | 17 | 15 | 14 | 16 | 15 | 20 | 15 | 16 | 12 | 19 | 22 | 18 | 20 | 20 |
| 30 | 18 | 19 | 21 | B | 22 | 23 | 22 | 23 | 16 | 14 | 20 | 28 | 60 | 56 | 56 | 57 | 40 | 18 | C | 19 | 18 | 16 | 17 | 14 |
| 31 | 14 | B | 15 | 24 | 17 | 16 | 16 | 16 | 18 | 18 | 19 | 22 | 14 | 18 | 18 | 15 | 16 | 16 | 14 | C | C | 13 | 11 | 22 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 31 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 29 | 30 | 30 | 31 | 31 | 30 |
| MED | 12 | 12 | 12 | 13 | 14 | 16 | 16 | 15 | 22 | 18 | 19 | 21 | 20 | 23 | 20 | 20 | 19 | 16 | 14 | 16 | 13 | 12 | 12 | 12 |
| U Q | 14 | 19 | 15 | 17 | 22 | B 25 | B 22 | B 24 | B | B 56 | B 38 | 41 | 32 | 36 | 54 | 30 | 26 | 27 | 30 | 22 | 18 | 15 | 13 | 14 |
| L Q | 12 | 12 | 12 | 12 | 13 | 12 | 14 | 13 | 15 | 14 | 16 | 15 | 16 | 18 | 16 | 15 | 15 | 13 | 12 | 13 | 12 | 12 | 12 | 12 |

OCT. 2013 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

OCT. 2013 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 | B | B | 212 | B | B | B | B | B | B | B | E B 252 | 194 | 198 | 212 | 204 | 216 | 216 | E B 248 | B | B | B | B | B | B |
| 2 | B | B | B | B | B | B | B | B | B | B | B | A | A | B | B | 238 | 238 | B | B | B | B | A | A | A |
| 3 | B | A | A | A | A | B | B | B | E B 264 | 216 | E B 230 | E B 242 | 232 | E B 218 | 212 | B | Q 212 | E B 230 | 216 | B | E B 234 | 222 | 238 | E B 282 |
| 4 | A 318 | 318 | E A 330 | Q 330 | Q 288 | 268 | 236 | E A 218 | A 206 | 220 | 220 | 194 | 190 | 198 | 196 | 200 | Q 222 | Q 214 | Q 208 | Q 204 | 196 | 206 | Q 224 | Q 214 |
| 5 | Q 226 | Q 244 | Q 264 | Q 272 | Q 272 | E B 244 | E B 222 | 210 | 222 | H 196 | 196 | 208 | E B 266 | 202 | 192 | Q 196 | Q 204 | 208 | 200 | 196 | 194 | Q 202 | 214 | 218 |
| 6 | Q 228 | Q 246 | Q 246 | Q 276 | 274 | 252 | 208 | 218 | 214 | 220 | 204 | 208 | B 212 | 212 | E B 256 | B 218 | 206 | Q 206 | Q 202 | 194 | 202 | Q 202 | Q 210 | Q 228 |
| 7 | E A 294 | 298 | A | Q 326 | Q 306 | E A 264 | A 254 | A | B | B | 198 | B | E B 288 | E B 244 | E B 240 | 266 | A 206 | A | Q 206 | 212 | Q 202 | 260 | A | A |
| 8 | A | A | A | A | 190 | A | A 230 | A | A 238 | 210 | 210 | 210 | 198 | 208 | 190 | 206 | 228 | 212 | 212 | B 218 | 238 | 230 | 234 | A |
| 9 | A | A | 234 | A | A | A | A | 200 | B | B | B | B | B | B | B | 226 | E B 254 | B | E B | E A 260 | 216 | E A 324 | A | A |
| 10 | A | A | A | A | A | B | A | A | A | B | A | 202 | 216 | E B 292 | 214 | E B 324 | 226 | 232 | Q 234 | 218 | B | 238 | Q 230 | 278 |
| 11 | A | 230 | 238 | E A 374 | A | A | B | A | B | E A 264 | B | E B 276 | 208 | E B 238 | B | E B 232 | E B 266 | E B 266 | E B 242 | E B 246 | 222 | Q 210 | Q 244 | Q 274 |
| 12 | A 280 | 218 | A | 218 | 218 | A 234 | Q 238 | E B 228 | B | Y | 212 | 202 | 202 | 222 | 204 | 204 | 214 | 216 | 218 | 216 | Q 198 | Q 218 | Q 246 | A 320 |
| 13 | A | A | A | A | 212 | A | A | 246 | 210 | 202 | H 202 | 216 | 210 | 202 | 202 | 202 | 198 | Q 216 | 212 | Q 202 | 208 | 200 | 206 | Q 224 |
| 14 | A | A | A | A | 232 | 232 | A | 206 | B | B | B | 206 | 204 | 212 | 202 | 220 | 236 | A | E A 230 | A | A | A | Q 212 | A |
| 15 | A | E A 246 | A | A | E Y 280 | A | B | A | B | B | B | B | B | 226 | 206 | B | B | B | E B 242 | 244 | Q 242 | Q 248 | Q 252 | 218 |
| 16 | 242 | A | A | A | B | B | B | B | B | 224 | 208 | B | B | B | B | 214 | E B 232 | B | 232 | 202 | A | A | A | E A 294 |
| 17 | A 342 | A | A | A | B | A | B | B | B | B | B | B | B | B | B | B | B | B | E B 280 | E B 232 | A | A | A | A |
| 18 | A | C | C | C | C | C | C | C | C | B | 212 | 206 | Y | E Y 226 | 224 | Y | 218 | Q 218 | Q 218 | 198 | 198 | 208 | Q 222 | Q 226 |
| 19 | Q 292 | Q 300 | Q 270 | Q 270 | Q 270 | 242 | 216 | 210 | 222 | 216 | 220 | 202 | 216 | Y 206 | Y | Q 206 | Q 216 | Q 216 | 198 | Q 200 | Q 216 | Q 222 | Q 222 |
| 20 | Q 248 | Q 274 | Q 274 | Q 274 | Q 264 | 242 | 234 | 198 | 210 | 210 | 210 | B | 210 | 230 | 202 | 210 | 210 | 198 | 212 | 206 | 204 | Q 200 | 222 | Q 264 |
| 21 | Q 318 | Q 334 | Q 334 | F 334 | 328 | 300 | 252 | 238 | 206 | 206 | 214 | 212 | 212 | 212 | 202 | 210 | 210 | Q 224 | 202 | 188 | 208 | Q 208 | Q 226 | Q 226 |
| 22 | Q 232 | Q 248 | Q 264 | Q 276 | Q 260 | 226 | 240 | 216 | 206 | 206 | 206 | 196 | 204 | 204 | 220 | 202 | 202 | 214 | 220 | Q 208 | 216 | Q 208 | Q 246 | 272 |
| 23 | 236 | A | A | A | A | 236 | 236 | 218 | 198 | B | B | 224 | 216 | 216 | B | 240 | 206 | A | 238 | 216 | 216 | 216 | 226 | Q 234 |
| 24 | Q 244 | Q 264 | Q 276 | Q 292 | 262 | A 262 | 204 | 208 | 208 | 218 | 226 | 212 | 212 | A | A | A | A | 214 | 214 | 222 | 222 | 192 | Q 218 | Q 210 |
| 25 | Q 240 | Q 258 | 258 | 292 | 262 | 234 | 242 | 210 | 214 | 202 | 200 | B | 232 | E A 230 | 206 | 214 | 210 | 210 | C | 218 | 212 | 196 | Q 212 | Q 212 |
| 26 | Q 234 | Q 252 | Q 312 | A | A | 212 | 240 | 222 | 204 | 214 | 206 | 206 | 206 | 198 | 214 | 208 | 208 | 208 | Q 228 | Q 222 | Q 206 | Q 206 | Q 216 | Q 236 |
| 27 | Q 276 | Q 298 | Q 292 | Q 310 | Q 260 | Q 252 | 232 | 206 | 206 | 206 | 206 | 206 | 192 | 196 | 198 | 198 | 198 | 202 | 216 | 216 | 214 | Q 206 | Q 232 | 290 |
| 28 | Q 276 | Q 286 | 324 | E A 298 | E A 294 | 270 | 224 | 230 | B | 228 | 220 | A | A | A | 206 | E A 240 | 222 | 218 | A | 210 | 222 | 222 | 218 | 232 |
| 29 | Q 228 | Q 272 | Q 266 | 286 | E A 256 | 246 | 232 | 218 | 214 | 214 | 216 | 206 | A 230 | E A 250 | 208 | 228 | 222 | 228 | A 214 | 218 | E B 218 | 228 | A | 206 |
| 30 | A | A | A | B | A | 252 | 202 | A | 196 | 216 | 216 | Y | B | B | B | B | 224 | 208 | C | A | A | A | A | A |
| 31 | Q 244 | B | Q 310 | A | E A 286 | 208 | E A 242 | 206 | 218 | 196 | 224 | A | 198 | 210 | 206 | 214 | 204 | 204 | 230 | C | C | A | 230 | E A 218 |
| | 00 | 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 | 17 | 17 | 15 | 19 | 19 | 19 | 19 | 18 | 20 | 23 | 20 | 23 | 23 | 23 | 24 | 28 | 23 | 25 | 25 | 23 | 24 | 23 | 23 |
| MED | 244 | Q 264 | Q 268 | Q 284 | 262 | 243 | 233 | 213 | 210 | 213 | 211 | 206 | 209 | 207 | 205 | 212 | 212 | 213 | 215 | 212 | 210 | 208 | Q 224 | Q 227 |
| U Q | A 292 | Q 298 | Q 311 | 326 | 286 | 262 | 240 | 222 | 218 | 219 | 220 | 212 | 216 | E 230 | 214 | 230 | 225 | 224 | 231 | 220 | 222 | 225 | Q 234 | 274 |
| L Q | Q 234 | 246 | 252 | Q 274 | 256 | 234 | 222 | 206 | 206 | 206 | 206 | 202 | 202 | 204 | 202 | 205 | 206 | 208 | 212 | 202 | 202 | 204 | Q 216 | 218 |

OCT. 2013 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

NOV. 2013 fxI (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | X 48 | R | 42 | X 46 | 57 | 91 | A | A | A | A | X 61 | X 61 | 66 | X 65 | X 71 | X 71 | X 68 | X 60 | X 60 | X 56 | X 54 | X 50 | X 50 | 56 |
| 2 | X 40 | 48 | 47 | X 52 | A | A | X 55 | X 60 | X 70 | X 72 | X 73 | X 75 | X 74 | X 72 | V 77 | X 71 | X 72 | X 68 | X 69 | X 64 | X 60 | X 58 | X 59 | 64 |
| 3 | 54 | 46 | A | A | O X 56 | O X 57 | A | A | X 79 | 84 | X 81 | 81 | X 83 | 83 | X 73 | X 70 | X 68 | X 68 | X 65 | 64 | X 64 | X 59 | X 56 | 58 |
| 4 | 51 | 56 | 53 | 64 | 68 | 80 | 85 | 93 | X 90 | 96 | X 92 | 88 | 92 | X 84 | O X 84 | X 83 | X 78 | X 73 | X 60 | X 56 | X 44 | X 43 | 48 | R |
| 5 | 44 | X 50 | A | X 53 | X 56 | A | A | A | 69 | 73 | 70 | X 70 | X 72 | 73 | X 79 | X 79 | X 73 | X 67 | X 60 | X 54 | X 55 | X 50 | X 52 | X 52 |
| 6 | X 49 | 49 | 56 | 67 | 78 | 80 | X 93 | X 102 | 100 | X 99 | X 98 | X 100 | 104 | X 100 | X 94 | X 83 | X 77 | X 76 | X 71 | X 66 | X 68 | 62 | 36 | 46 |
| 7 | 50 | 58 | X 50 | 66 | 67 | 78 | 77 | X 77 | 83 | B | X 61 | 78 | X 72 | 81 | X 86 | 99 | X 64 | X 66 | X 62 | X 60 | X 56 | X 58 | 58 | 55 |
| 8 | A | A | X 46 | A | R | R | O X 55 | X 64 | X 69 | X 80 | X 80 | X 69 | X 70 | X 72 | X 74 | X 74 | X 79 | X 75 | X 70 | X 63 | X 63 | X 64 | X 60 | X 60 |
| 9 | X 61 | 63 | 69 | 66 | X 73 | 82 | A | X 64 | A | B | A | X 52 | R | X 72 | 76 | R | X 53 | X 60 | X 58 | X 63 | X 60 | X 58 | X 48 | 48 |
| 10 | 70 | A | 70 | 56 | X 68 | X 58 | 60 | X 55 | X 63 | X 68 | X 70 | 71 | X 74 | X 79 | X 76 | X 74 | X 69 | X 60 | X 57 | X 56 | 51 | 56 | 52 | A |
| 11 | A | A | B | 55 | 56 | 66 | B | A | B | 55 | R | B | 68 | 79 | O X 73 | 61 | X 61 | X 57 | X 47 | X 47 | X 54 | 50 | X 46 | X 48 |
| 12 | X 44 | X 46 | O X 52 | X 47 | X 47 | X 51 | X 57 | 61 | 72 | X 72 | X 70 | X 66 | X 66 | X 67 | X 68 | X 67 | X 66 | 66 | X 63 | X 62 | X 62 | X 62 | X 63 | X 61 |
| 13 | X 64 | X 66 | X 70 | X 76 | X 79 | X 89 | X 95 | X 97 | X 99 | X 99 | X 99 | X 96 | X 92 | X 92 | X 82 | X 83 | X 82 | X 71 | X 69 | X 63 | X 58 | X 60 | X 53 | X 51 |
| 14 | X 51 | 58 | X 64 | X 66 | 76 | 86 | 95 | X 102 | X 101 | X 98 | X 98 | X 96 | X 93 | X 92 | X 83 | X 78 | X 73 | X 73 | X 72 | X 74 | X 64 | 64 | 51 | 47 |
| 15 | 48 | X 53 | O X 56 | 58 | X 41 | A | X 67 | R | X 67 | X 64 | 80 | 76 | 75 | X 78 | 86 | V 80 | X 75 | X 77 | X 69 | X 54 | X 47 | X 50 | 70 | A |
| 16 | 51 | X 54 | R | 58 | R | O X 59 | R | A | X 51 | X 66 | 65 | X 59 | X 60 | X 63 | X 61 | X 64 | X 66 | X 60 | X 58 | X 56 | X 53 | X 53 | X 51 | X 50 |
| 17 | X 48 | O X 48 | A | 64 | X 65 | 67 | O X 69 | X 60 | 68 | X 69 | X 70 | X 78 | X 74 | X 68 | X 71 | X 72 | X 71 | X 68 | X 64 | X 66 | X 65 | X 61 | X 60 | X 58 |
| 18 | 58 | 59 | 61 | X 62 | 65 | X 60 | X 66 | X 78 | X 84 | X 82 | X 86 | X 88 | X 88 | X 83 | X 76 | X 74 | X 71 | X 72 | X 69 | X 68 | X 66 | X 64 | X 60 | X 63 |
| 19 | X 65 | X 68 | X 77 | X 83 | X 90 | X 98 | X 104 | X 107 | X 109 | X 112 | X 108 | X 102 | X 94 | X 87 | X 83 | 84 | X 80 | X 76 | X 77 | X 74 | X 67 | X 54 | 51 | 53 |
| 20 | X 50 | 58 | 62 | 69 | X 55 | X 58 | 67 | 67 | X 71 | X 77 | X 77 | X 82 | X 83 | X 80 | X 78 | X 78 | X 81 | X 78 | X 70 | X 65 | X 62 | X 58 | X 59 | 56 |
| 21 | 64 | X 68 | 72 | X 76 | 87 | 92 | 100 | 100 | X 106 | 106 | X 96 | X 94 | X 90 | X 86 | X 80 | X 83 | X 80 | X 73 | X 72 | X 67 | X 68 | X 69 | X 66 | X 58 |
| 22 | 58 | X 56 | 70 | 66 | X 67 | X 72 | X 86 | 106 | 108 | X 101 | X 94 | 99 | X 89 | 91 | X 80 | X 76 | X 73 | X 68 | X 67 | X 66 | X 69 | X 66 | 67 | 69 |
| 23 | 61 | 70 | X 59 | 64 | X 72 | X 86 | X 88 | 71 | 75 | X 82 | X 92 | X 95 | 98 | X 82 | X 88 | X 88 | 94 | X 76 | X 69 | X 69 | X 68 | X 64 | 58 | V 50 |
| 24 | X 56 | 59 | 67 | 72 | X 70 | X 79 | X 85 | X 87 | 106 | 100 | 92 | X 85 | X 84 | X 82 | X 76 | X 81 | X 78 | X 76 | X 70 | X 73 | X 69 | X 71 | X 72 | X 68 |
| 25 | X 70 | X 69 | X 72 | V 78 | 80 | 85 | X 81 | X 90 | X 103 | X 105 | X 92 | X 90 | X 83 | X 82 | X 77 | X 69 | X 67 | X 68 | X 65 | X 65 | X 64 | X 64 | X 62 | X 58 |
| 26 | X 56 | 63 | X 67 | 80 | X 83 | 98 | X 94 | X 108 | X 106 | X 110 | X 109 | X 100 | X 94 | X 88 | X 80 | X 76 | X 72 | X 70 | X 65 | X 63 | X 66 | X 66 | 68 | 66 |
| 27 | 71 | 65 | 69 | 74 | 87 | X 103 | 106 | X 104 | X 107 | X 107 | X 110 | X 106 | X 98 | X 93 | X 86 | X 81 | X 76 | X 74 | X 70 | X 72 | X 74 | X 72 | X 73 | 73 |
| 28 | X 70 | 75 | 83 | 88 | 94 | X 101 | X 106 | X 109 | X 111 | X 110 | X 108 | X 102 | X 99 | X 96 | X 87 | X 83 | X 80 | X 76 | X 72 | X 71 | 68 | X 62 | X 62 | X 62 |
| 29 | 62 | 55 | 63 | 68 | O X 63 | 72 | 85 | 93 | X 97 | X 98 | X 102 | X 98 | X 105 | X 105 | 97 | 93 | X 83 | 77 | X 74 | X 64 | X 54 | 75 | 56 | A |
| 30 | A | X 51 | X 56 | X 63 | O X 42 | A | 61 | 74 | X 79 | X 82 | X 83 | X 82 | X 86 | X 86 | X 88 | X 86 | 79 | X 66 | X 56 | 53 | X 53 | X 48 | X 52 | 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 | 27 | 26 | 25 | 28 | 27 | 25 | 24 | 24 | 27 | 27 | 28 | 29 | 29 | 30 | 30 | 29 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 25 |
| MED | X 56 | 58 | 63 | 66 | X 68 | 80 | X 85 | X 88 | X 84 | X 84 | X 89 | X 85 | X 84 | X 82 | X 80 | X 78 | X 73 | X 70 | X 68 | X 64 | X 62 | X 60 | X 58 | 58 |
| U Q | X 64 | X 65 | 70 | 73 | 79 | 90 | X 94 | X 102 | X 106 | X 101 | X 98 | X 97 | X 94 | X 88 | X 86 | X 83 | X 79 | X 76 | X 70 | X 67 | X 67 | X 64 | X 62 | 62 |
| L Q | X 49 | X 51 | 54 | 58 | X 56 | X 63 | X 66 | X 66 | X 70 | X 72 | X 72 | X 73 | X 73 | X 73 | X 76 | X 72 | X 68 | X 66 | X 60 | X 56 | X 54 | X 54 | 51 | 50 |

NOV. 2013 fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

## NOV. 2013 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 | 42 | A | F 33 | 40 | F 47 | 30 | A | A | A | A | 55 | 55 | F 56 | 59 | 65 | 65 | 62 | 54 | 54 | 50 | 48 | 44 | 44 | A |
| 2 | 34 | F 34 | F 38 | 46 | A | A | 49 | 54 | 64 | 66 | 67 | 69 | 68 | 66 | V 70 | 65 | 66 | 62 | 63 | 58 | 54 | 52 | 53 | F 43 |
| 3 | F 30 | F 36 | A | A | R 50 | R 51 | A | A | 73 | F 71 | 75 | F 70 | 77 | F 72 | 67 | 64 | 62 | 62 | 59 | F 54 | 58 | 53 | 50 | A |
| 4 | F 40 | F 42 | F 43 | F 47 | F 51 | F 64 | F 72 | F 80 | 84 | F 85 | 86 | F 73 | F 80 | 78 | R 78 | 77 | 72 | 67 | 54 | 50 | 38 | 37 | F 35 | A |
| 5 | F 36 | 44 | A | 47 | 50 | A | A | A | F 58 | F 62 | F 59 | 64 | 66 | F 64 | 73 | 73 | 67 | 61 | 54 | 48 | 49 | 44 | 46 | 46 |
| 6 | 43 | F 36 | F 44 | F 47 | F 65 | F 66 | 87 | 96 | F 87 | 93 | 92 | 94 | F 93 | 94 | 88 | 77 | 71 | 70 | 65 | 60 | 62 | F 52 | F 28 | F 29 |
| 7 | F 33 | F 40 | 44 | F 54 | F 49 | F 68 | F 66 | 71 | F 64 | B | 55 | F 63 | 66 | F 72 | 80 | F 83 | 58 | 60 | 56 | 54 | 50 | 52 | Z 50 | F 42 |
| 8 | A | A | 40 | A | A | A | R 49 | 58 | 63 | 74 | 74 | 63 | 64 | 66 | 68 | 68 | 73 | 69 | 64 | 57 | 57 | 58 | 54 | 54 |
| 9 | 55 | F 52 | F 54 | Z 57 | 67 | R 49 | A | 58 | A | B | A | R 46 | R | 66 | F 66 | R | R 47 | 54 | 52 | 57 | 54 | 52 | 42 | Z 40 |
| 10 | A | A | A | F 44 | 62 | 52 | A | R 49 | 57 | 62 | 64 | 65 | 68 | 73 | 70 | 68 | 63 | 54 | 51 | 50 | F 36 | F 39 | F 42 | A |
| 11 | A | A | B | F 41 | F 46 | F 57 | B | A | B | F 40 | A | B | F 59 | F 69 | R 67 | F 52 | 55 | 51 | 41 | 41 | 48 | F 42 | 40 | 42 |
| 12 | 38 | 40 | 46 | 41 | 41 | 45 | 51 | F 46 | F 58 | 66 | 64 | 60 | 60 | 61 | 62 | 61 | 60 | 60 | 57 | 56 | 56 | 56 | 57 | 55 |
| 13 | 58 | 60 | 64 | 70 | 73 | 83 | 89 | 91 | 93 | 93 | 93 | 90 | 86 | 86 | 76 | 77 | 76 | 65 | 63 | 57 | 52 | 54 | 47 | 45 |
| 14 | 45 | F 48 | 58 | 60 | F 63 | F 75 | F 83 | 96 | 95 | 92 | 92 | 90 | 87 | J R 86 | 77 | 72 | 67 | 67 | 66 | 68 | 58 | F 48 | Z 43 | Z 39 |
| 15 | Z 42 | 47 | 50 | F 50 | 35 | A | 61 | A | 61 | 58 | F 65 | F 65 | F 62 | 71 | F 71 | V 72 | 69 | 71 | 63 | 48 | 41 | 44 | F 44 | A |
| 16 | F 43 | 48 | R | F 47 | R | R 53 | A | A | 45 | 60 | F 54 | 53 | 54 | 57 | 55 | 58 | 60 | 54 | 52 | 50 | 47 | 47 | 45 | 44 |
| 17 | 42 | R 42 | A | F 49 | 59 | Z 61 | R 63 | 54 | F 51 | 63 | 64 | 72 | 68 | 62 | 65 | 66 | 65 | 62 | 58 | 60 | 59 | 55 | 54 | 52 |
| 18 | F 47 | Z 52 | Z 54 | 56 | F 55 | 54 | 60 | 72 | 78 | 76 | 80 | 82 | 82 | 77 | 70 | 68 | 65 | 66 | 63 | 62 | 60 | 58 | 54 | 57 |
| 19 | 59 | 62 | 71 | 77 | 84 | 92 | 98 | 101 | 103 | 106 | 102 | 96 | 88 | 81 | 77 | 78 | 74 | 70 | 71 | 68 | 61 | 48 | F 40 | F 41 |
| 20 | 44 | F 47 | F 52 | F 53 | 49 | 52 | F 54 | F 56 | 65 | 71 | 71 | 76 | 77 | 74 | 72 | 72 | 75 | 72 | 64 | 59 | 56 | 52 | 53 | 50 |
| 21 | F 54 | 62 | F 60 | 70 | F 78 | F 80 | F 83 | F 88 | 100 | F 93 | 90 | 88 | 85 | 80 | 74 | 76 | 74 | 67 | 66 | 61 | 62 | 63 | 60 | 52 |
| 22 | F 44 | 50 | F 55 | F 55 | 61 | 66 | 80 | Z 98 | V 98 | 95 | 88 | Z 93 | 83 | F 79 | 74 | 70 | 67 | 62 | 61 | 60 | J R 63 | 60 | F 58 | F 58 |
| 23 | 55 | F 56 | 53 | F 55 | 66 | 80 | 82 | F 60 | F 64 | 76 | 86 | 89 | F 83 | 76 | 82 | 82 | F 78 | 70 | 63 | 63 | 62 | 58 | F 48 | V 44 |
| 24 | 50 | F 50 | F 57 | Z 63 | 64 | 73 | 79 | 81 | F 79 | F 83 | F 80 | 79 | 78 | 76 | 70 | 75 | 72 | 70 | 64 | 67 | 63 | 65 | 66 | 62 |
| 25 | 64 | 63 | 66 | V 71 | Z 72 | F 71 | 75 | 84 | 97 | 99 | 86 | 84 | 77 | 76 | 71 | 63 | 61 | 62 | 59 | J R 59 | 58 | 58 | 56 | 52 |
| 26 | 50 | F 51 | 61 | F 68 | 77 | F 87 | 88 | F 96 | 100 | J R 104 | 103 | 94 | 88 | 82 | 74 | 70 | 66 | 64 | 59 | 57 | 60 | 60 | F 56 | F 55 |
| 27 | F 56 | F 50 | F 51 | F 61 | F 73 | F 86 | F 96 | 98 | 101 | 101 | 104 | 100 | 92 | 87 | 80 | 75 | 70 | 68 | 64 | 66 | 68 | 66 | 67 | F 62 |
| 28 | 64 | F 60 | F 73 | F 73 | F 84 | 95 | 100 | 103 | 105 | 104 | 102 | 96 | 93 | 90 | 81 | 77 | 74 | 70 | 66 | 65 | F 59 | 56 | 56 | 56 |
| 29 | F 43 | F 43 | F 44 | F | 57 | F 62 | F 75 | F 72 | 91 | 92 | 96 | 92 | 99 | 99 | F 87 | F 79 | 77 | F 66 | 68 | 58 | 48 | 40 | F 44 | A |
| 30 | A | 45 | 50 | 57 | R 36 | A | F 52 | Z 66 | 73 | 77 | 77 | 76 | 80 | 80 | 82 | 80 | F 70 | 60 | 50 | Z 46 | 47 | 42 | 46 | A |
| 31 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 26 | 26 | 24 | 27 | 27 | 25 | 23 | 24 | 27 | 27 | 28 | 29 | 29 | 30 | 30 | 29 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 23 |
| MED | 44 | F 48 | 52 | F 55 | 61 | 66 | 75 | 76 | 78 | 77 | 80 | 76 | 78 | 76 | 72 | 72 | 67 | 64 | 62 | 58 | 56 | 52 | 49 | 50 |
| U Q | 55 | 52 | 59 | 63 | 72 | 80 | 87 | 96 | 97 | 93 | 92 | 91 | 86 | 81 | 78 | 77 | 73 | 69 | 64 | 61 | 60 | 58 | 56 | 55 |
| L Q | F 42 | F 42 | F 44 | 47 | 49 | 52 | 60 | 58 | 63 | 66 | 64 | 64 | 66 | 66 | 68 | 66 | 62 | 60 | 54 | 50 | 48 | 44 | 44 | 42 |

NOV. 2013 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

NOV. 2013 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 | 80 | 44 | 39 | 36 | 29 | 26 | 43 | 44 | 56 | 56 | 40 | 36 | G | 85 | G 26 | 31 | 30 | 28 | E B 25 | G | 27 | 29 | K 32 | 32 |
| 2 | K 28 | K 32 | K 32 | 31 | 53 | 46 | 46 | 46 | G 23 | G 23 | G | G 21 | G 34 | G 23 | G 23 | 36 | G 24 | G 23 | G 16 | 22 | G 12 | G 13 | 13 | 12 |
| 3 | 22 | 28 | 54 | 48 | 28 | 48 | 56 | 65 | 49 | 39 | E B 48 | E B 38 | 35 | G 21 | G 20 | E B 32 | 106 | 28 | G 22 | 24 | G 19 | 21 | 20 | 80 |
| 4 | 36 | 25 | 24 | G 16 | 29 | G 20 | G 17 | 11 | G 26 | G | E B 46 | G 23 | G | 29 | 130 | E B 37 | E B 47 | E B 40 | 26 | 23 | 27 | 17 | 23 | K 35 |
| 5 | 35 | 49 | 48 | 37 | 45 | 59 | 93 | 54 | 47 | 34 | 31 | 32 | K | E B 35 | G 22 | G | G 22 | 27 | 25 | G | 21 | 21 | 23 | 115 |
| 6 | 15 | 20 | 14 | 148 | 25 | 33 | 27 | 27 | G 22 | 29 | 38 | 36 | 34 | 39 | 33 | G 20 | 31 | G 17 | G 19 | 24 | G 12 | 21 | K 28 | K 11 |
| 7 | K 21 | K 32 | 47 | 45 | G 32 | 40 | 58 | 51 | 61 | B | E B 38 | 30 | G 28 | 30 | 30 | G 29 | E B 34 | 34 | 34 | 30 | 26 | 20 | 32 | 96 |
| 8 | 113 | 58 | 31 | 79 | 47 | 43 | 46 | 45 | 34 | 34 | 31 | 92 | 32 | 32 | G | 32 | 29 | 26 | G 20 | G 14 | 20 | 17 | 14 | 12 |
| 9 | 16 | 26 | 27 | G | 29 | 36 | 44 | 33 | 63 | B | 63 | 61 | G | E B 34 | G 34 | 32 | 35 | 32 | 31 | 31 | 29 | 30 | 57 | 34 |
| 10 | 41 | 68 | 52 | 24 | 23 | 42 | 52 | 46 | 46 | 34 | 33 | 30 | 34 | E B 38 | E B 34 | 28 | E B 34 | 31 | 89 | G | 24 | 29 | 22 | 48 |
| 11 | 53 | 99 | B | 35 | 32 | 39 | B | 52 | B | 28 | 45 | B | 34 | E B 38 | E B 51 | E B 36 | 36 | 37 | 30 | 27 | 39 | 38 | 31 | 30 |
| 12 | 25 | 33 | 42 | 30 | 27 | 32 | 46 | 39 | 30 | 86 | 36 | 35 | 35 | 34 | 34 | 33 | G 22 | 30 | G 20 | G 18 | 22 | 23 | 16 | 15 |
| 13 | 14 | 15 | 143 | 20 | 21 | 23 | 28 | G 18 | 45 | G 30 | G 25 | G 29 | 38 | 35 | 100 | G 28 | G 23 | G | E B 30 | E B 25 | 32 | 23 | G 16 | 19 |
| 14 | 32 | 14 | K 17 | 14 | G 12 | G 24 | G 20 | G 18 | 37 | 33 | 51 | 52 | 73 | 48 | 37 | 56 | 34 | 32 | 28 | 28 | 23 | G | G 10 | 16 |
| 15 | 25 | 35 | 39 | 46 | 24 | 57 | 55 | 56 | E B 47 | 36 | 38 | G 28 | G 29 | G 32 | 34 | 34 | G 26 | G 30 | 29 | 32 | 17 | 40 | 42 | 52 |
| 16 | 38 | 22 | 45 | 91 | 35 | 29 | 53 | 61 | 38 | G 30 | 38 | 32 | 34 | 36 | 32 | 32 | 32 | 32 | 32 | 27 | 58 | 23 | 31 | K 34 |
| 17 | K 30 | 59 | 78 | 30 | 39 | 36 | 51 | 48 | 34 | 93 | G | G 27 | G 24 | G 15 | 33 | 101 | E B 31 | 31 | G | 30 | 26 | 20 | G 11 | 18 |
| 18 | 29 | 35 | 34 | 29 | 42 | 51 | 42 | 32 | G 21 | G 23 | 33 | 36 | 34 | 40 | 92 | 34 | 114 | G 14 | 28 | G | 22 | 18 | 17 | 15 |
| 19 | 18 | 18 | G 21 | 20 | 29 | 27 | 29 | 32 | 32 | 37 | 37 | 37 | 142 | 151 | 67 | 64 | 66 | 42 | 29 | 30 | G 17 | 23 | G | 27 |
| 20 | K 31 | 34 | 32 | 38 | 30 | 30 | 34 | 48 | 34 | G | G 24 | G 24 | 34 | 37 | 33 | 32 | 30 | 33 | 37 | 28 | 26 | 38 | 18 | 18 |
| 21 | 24 | 24 | 24 | 36 | 32 | 34 | 29 | 40 | G 30 | 34 | 34 | G 22 | 41 | 51 | 42 | 42 | 41 | G 20 | G 15 | 25 | 24 | G 15 | G 12 | 16 |
| 22 | 16 | K 15 | 31 | 45 | 31 | 30 | G 12 | 33 | G | 32 | 34 | 36 | 47 | 36 | 39 | G 20 | 34 | 34 | G 21 | 28 | 24 | 22 | 20 | 16 |
| 23 | 20 | 17 | 30 | 27 | G 15 | G 13 | 18 | 35 | 49 | G | 34 | 32 | 50 | 41 | G 32 | G 25 | E B 43 | 32 | 38 | 37 | 37 | 24 | 31 | 31 |
| 24 | 30 | 27 | 28 | 31 | G 18 | 112 | G 14 | 29 | 32 | 32 | 33 | 33 | 39 | 116 | 88 | 38 | 40 | 63 | 38 | 74 | 48 | 31 | 18 | 17 |
| 25 | 16 | 20 | 17 | G 16 | 34 | 38 | 33 | 33 | G 21 | 34 | 38 | 45 | G | 30 | 32 | 60 | 42 | 56 | 32 | G 22 | 34 | G 19 | 24 | 25 |
| 26 | 28 | G | 47 | 48 | 32 | 36 | 28 | 33 | 34 | 41 | 38 | 35 | 46 | 72 | 63 | 37 | G 24 | 36 | 36 | 27 | G 14 | 23 | 26 | 20 |
| 27 | 15 | G 12 | 15 | 22 | 50 | 35 | 28 | 32 | 34 | 34 | 36 | 44 | 52 | 40 | 40 | 35 | 33 | 32 | 35 | G | 36 | 43 | 35 | 31 |
| 28 | 19 | 20 | G | 36 | 35 | 26 | 31 | G 32 | 52 | 148 | 147 | 152 | 40 | 36 | 39 | 33 | 36 | G 21 | G 29 | 38 | 28 | 37 | G 14 | 28 |
| 29 | 27 | G 18 | 26 | 33 | 90 | 53 | 45 | 39 | 34 | 34 | 34 | 34 | G 30 | 33 | 33 | 32 | 32 | 32 | 30 | G 19 | 26 | 35 | 40 | 58 |
| 30 | 103 | 39 | G | G 15 | 26 | 52 | 38 | 30 | G 22 | 111 | 34 | 46 | 42 | 39 | 46 | 54 | 33 | G 33 | 29 | G 29 | 31 | 57 | 65 | 110 |
| 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 | 29 | 30 | 30 | 30 | 29 | 30 | 29 | 28 | 30 | 29 | 29 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| MED | 28 | 26 | 31 | 32 | 30 | 36 | 38 | 37 | 34 | 34 | 35 | 34 | 34 | 36 | G | 32 | 33 | 32 | E G 29 | 28 | 26 | 23 | 22 | 28 |
| U Q | 35 | 35 | 46 | 45 | 35 | 46 | 48 | 48 | 47 | 38 | 38 | 41 | 42 | 40 | 46 | 37 | 40 | 34 | 32 | 30 | 31 | 31 | 31 | 35 |
| L Q | 19 | 18 | G | 22 | 26 | 29 | 28 | 32 | G | G | 33 | G 30 | G | 32 | G 32 | G 31 | G 30 | G 28 | G 25 | 24 | G 21 | 20 | G | 16 |

NOV. 2013 ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

NOV. 2013 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 13 | 13 | 14 | 14 | 12 | 10 | 18 | 12 | 24 | 20 | 12 | 20 | 18 | 16 | 18 | 18 | 14 | 19 | 25 | 19 | 15 | 12 | 7 | 14 |
| 2 | 23 | 9 | 9 | 10 | 21 | 12 | 16 | 16 | 18 | 13 | 13 | 14 | 11 | 9 | 13 | 10 | 12 | 12 | 12 | 12 | 8 | 9 | 9 | 9 |
| 3 | 8 | 9 | 18 | 24 | 12 | 38 | 15 | 15 | 16 | 22 | 48 | 38 | 22 | 17 | 10 | 32 | 20 | 17 | 18 | 15 | 14 | 9 | 8 | 8 |
| 4 | 16 | 18 | 13 | 12 | 17 | 12 | 8 | 8 | 13 | 25 | 46 | 15 | 14 | 9 | 10 | 37 | 46 | 40 | 12 | 9 | 9 | 12 | 8 | 8 |
| 5 | 17 | 14 | 18 | 9 | 12 | 13 | 20 | 11 | 14 | 9 | 9 | 13 | 23 | 35 | 14 | 18 | 15 | 12 | 13 | 11 | 8 | 12 | 10 | 9 |
| 6 | 8 | 7 | 8 | 8 | 10 | 14 | 11 | 7 | 10 | 12 | 10 | 9 | 14 | 14 | 12 | 12 | 10 | 9 | 13 | 10 | 9 | 9 | 16 | 7 |
| 7 | 10 | 12 | 19 | 14 | 25 | 14 | 21 | 20 | 26 | B | 38 | 17 | 14 | 17 | 16 | 22 | 34 | 21 | 14 | 12 | 12 | 12 | 10 | 12 |
| 8 | 10 | 12 | 8 | 12 | 10 | 14 | 14 | 15 | 10 | 11 | 11 | 14 | 15 | 16 | 15 | 17 | 16 | 14 | 11 | 8 | 10 | 8 | 11 | 8 |
| 9 | 8 | 8 | 7 | 17 | 13 | 19 | 9 | 10 | 25 | B | 17 | 24 | 26 | 34 | 11 | 14 | 11 | 10 | 13 | 10 | 14 | 11 | 11 | 8 |
| 10 | 9 | 18 | 19 | 17 | 11 | 13 | 24 | 20 | 13 | 14 | 12 | 10 | 13 | 37 | 34 | 22 | 34 | 28 | 20 | 12 | 12 | 10 | 7 | 25 |
| 11 | 10 | 20 | B | 16 | 17 | 18 | B | 20 | B | 10 | 14 | B | 17 | 38 | 51 | 36 | 14 | 11 | 14 | 11 | 12 | 9 | 11 | 9 |
| 12 | 9 | 10 | 10 | 16 | 11 | 10 | 14 | 10 | 11 | 14 | 14 | 10 | 10 | 12 | 9 | 12 | 10 | 10 | 10 | 10 | 8 | 8 | 8 | 8 |
| 13 | 8 | 6 | 8 | 9 | 10 | 10 | 12 | 12 | 12 | 17 | 19 | 20 | 21 | 16 | 18 | 15 | 12 | 24 | 30 | 25 | 14 | 13 | 8 | 11 |
| 14 | 8 | 8 | 10 | 7 | 8 | 9 | 9 | 10 | 12 | 12 | 16 | 19 | 19 | 12 | 14 | 14 | 14 | 10 | 9 | 9 | 9 | 10 | 6 | 8 |
| 15 | 8 | 10 | 20 | 38 | 9 | 38 | 14 | 17 | 47 | 12 | 18 | 20 | 11 | 17 | 18 | 14 | 16 | 23 | 18 | 8 | 12 | 10 | 10 | 9 |
| 16 | 7 | 7 | 8 | 8 | 7 | 11 | 12 | 9 | 10 | 8 | 11 | 15 | 20 | 9 | 13 | 13 | 9 | 11 | 8 | 8 | 8 | 7 | 8 | 8 |
| 17 | 8 | 11 | 8 | 6 | 12 | 8 | 10 | 11 | 9 | 8 | 24 | 21 | 17 | 10 | 10 | 14 | 31 | 15 | 18 | 16 | 12 | 8 | 8 | 9 |
| 18 | 8 | 8 | 11 | 10 | 15 | 16 | 14 | 12 | 8 | 9 | 11 | 10 | 9 | 12 | 12 | 9 | 10 | 9 | 8 | 10 | 8 | 8 | 8 | 11 |
| 19 | 10 | 8 | 8 | 8 | 10 | 11 | 8 | 8 | 9 | 13 | 14 | 17 | 15 | 14 | 18 | 14 | 11 | 10 | 11 | 12 | 11 | 11 | 12 | 10 |
| 20 | 11 | 12 | 13 | 18 | 12 | 12 | 9 | 14 | 10 | 16 | 10 | 9 | 10 | 10 | 10 | 10 | 13 | 18 | 19 | 14 | 14 | 9 | 7 | 7 |
| 21 | 14 | 14 | 10 | 18 | 13 | 11 | 11 | 26 | 10 | 12 | 9 | 12 | 10 | 16 | 15 | 13 | 9 | 10 | 10 | 12 | 10 | 8 | 7 | 7 |
| 22 | 6 | 7 | 8 | 10 | 9 | 8 | 8 | 8 | 8 | 8 | 10 | 9 | 11 | 9 | 9 | 9 | 8 | 8 | 12 | 8 | 7 | 6 | 6 | 7 |
| 23 | 8 | 6 | 10 | 6 | 6 | 7 | 8 | 11 | 8 | 8 | 9 | 8 | 14 | 16 | 18 | 19 | 43 | 23 | 17 | 20 | 22 | 17 | 6 | 7 |
| 24 | 7 | 8 | 8 | 8 | 9 | 8 | 8 | 10 | 11 | 12 | 9 | 10 | 9 | 12 | 12 | 10 | 13 | 9 | 8 | 10 | 7 | 8 | 6 | 7 |
| 25 | 7 | 6 | 6 | 7 | 8 | 6 | 8 | 10 | 10 | 10 | 9 | 10 | 12 | 14 | 10 | 14 | 12 | 8 | 7 | 7 | 8 | 7 | 6 | 8 |
| 26 | 6 | 10 | 8 | 6 | 9 | 7 | 8 | 8 | 9 | 9 | 10 | 8 | 8 | 11 | 11 | 11 | 10 | 8 | 8 | 7 | 7 | 10 | 8 | 7 |
| 27 | 6 | 7 | 8 | 8 | 8 | 8 | 8 | 7 | 8 | 8 | 9 | 12 | 10 | 9 | 10 | 8 | 8 | 8 | 9 | 7 | 10 | 7 | 7 | 8 |
| 28 | 6 | 7 | 7 | 8 | 7 | 8 | 8 | 8 | 8 | 9 | 9 | 10 | 8 | 10 | 10 | 9 | 8 | 8 | 9 | 8 | 7 | 6 | 6 | 7 |
| 29 | 7 | 8 | 12 | 15 | 14 | 11 | 8 | 8 | 8 | 8 | 8 | 6 | 8 | 10 | 15 | 10 | 10 | 12 | 10 | 9 | 7 | 10 | 8 | 12 |
| 30 | 13 | 14 | 24 | 8 | 13 | 12 | 12 | 10 | 6 | 8 | 13 | 22 | 15 | 8 | 8 | 8 | 15 | 9 | 7 | 8 | 10 | 7 | 8 | 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 | 8 | 9 | 10 | 10 | 11 | 11 | 11 | 10 | 10 | 12 | 12 | 14 | 14 | 13 | 12 | 14 | 12 | 11 | 12 | 10 | 10 | 9 | 8 | 8 |
| U Q | 10 | 12 | 14 | 16 | 13 | 14 | 14 | 15 | 14 | 14 | 16 | 20 | 17 | 16 | 16 | 18 | 16 | 18 | 17 | 12 | 12 | 11 | 10 | 10 |
| L Q | 7 | 7 | 8 | 8 | 9 | 8 | 8 | 8 | 9 | 9 | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 9 | 9 | 8 | 8 | 8 | 7 | 7 |

NOV. 2013 fmin (0.1MHz)

# IONOSPHERIC DATA STATION SHOWA-ST.

NOV. 2013 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 | 204 | A | A | A | A | A | A | A | A | A | 208 | 208 | 208 | E A 234 | 222 | 222 | 226 | 226 | 214 | E A 242 | E A 252 | E A 256 | A | 196 |
| 2 | A | 230 | 230 | A | A | A | A | A | E A 246 | E A 216 | 210 | 204 | 216 | 208 | 204 | 228 | 222 | 202 | 218 | 230 | E A 234 | A 208 | 232 | 230 |
| 3 | A 306 | A | A | A | A | B | A | A | A | E A 264 | B | E B 244 | 216 | H 196 | 214 | 214 | 214 | 230 | 230 | E A 236 | E A 236 | A | 222 | A |
| 4 | A | Q 320 | 344 | A | A | 234 | 228 | 228 | 212 | E A 238 | B | 204 | 204 | H 188 | 204 | 240 | B | B | 226 | 216 | A | 206 | 298 | A |
| 5 | A | A | A | A | A | A | A | A | 344 | 226 | 212 | 212 | E A 216 | E B 218 | 210 | 212 | 206 | 212 | 224 | H 174 | A | E A 252 | 246 | 238 |
| 6 | 260 | 276 | Q 270 | E A 274 | E A 268 | A | 222 | 206 | 206 | 210 | 220 | 220 | 196 | 200 | 200 | 210 | 210 | 216 | 216 | 228 | 200 | 198 | A | Q 250 |
| 7 | E A 304 | A | A | A | E A 290 | A | A | A | A | B | E B 268 | 228 | 214 | 224 | 224 | 224 | 244 | 252 | E A 260 | E A 252 | A | A | 300 | A |
| 8 | A | A | 308 | A | A | A | A | E A 288 | 220 | 230 | 216 | 256 | 208 | 210 | 216 | 216 | H 216 | 210 | 210 | 226 | 202 | A 212 | 238 | 248 |
| 9 | 248 | A 278 | 308 | A | E A 270 | A | A | 202 | A | B | A | E A 230 | E A 230 | E B 276 | 244 | A | 234 | E A 260 | 270 | A | A | E A 272 | 296 | A |
| 10 | A | A | A | A | E A 258 | A | A | A | E A 280 | 204 | 204 | 212 | 212 | B | 238 | 216 | 230 | 230 | A 236 | 236 | E A 296 | A | A | A |
| 11 | A | A | B | A | A | A | B | A | B | Y | A | B | E A 246 | E B 246 | B | E B 238 | E A 234 | E A 292 | A | E A 278 | E A 260 | A | A | 286 |
| 12 | A | 328 | A | A | E A 320 | E A 356 | A | A | 220 | 204 | 218 | 200 | 214 | H 198 | 210 | 210 | 206 | 214 | 214 | A 228 | E A 236 | E A 232 | E A 240 | 250 |
| 13 | 258 | 270 | E A 276 | 276 | 244 | 236 | 230 | 214 | 214 | E Y 232 | 216 | 202 | 210 | 202 | 202 | 212 | 212 | 218 | E B 218 | 218 | A | A | A | 254 |
| 14 | 236 | 250 | 264 | 264 | 252 | 232 | 224 | 214 | 204 | 206 | E A 230 | E A 336 | A 198 | A 218 | 220 | 220 | 212 | 212 | 218 | E A 230 | 230 | E A 252 | E A 254 | 274 |
| 15 | 300 | 330 | A | B | E A 272 | A | A | A | B | 208 | 222 | 212 | H 204 | 212 | 212 | 212 | 212 | 228 | 228 | E A 266 | 262 | A | A | A |
| 16 | A | 268 | A | A | A | A | A | A | 204 | 208 | 242 | 216 | 240 | 222 | 220 | 212 | 212 | 220 | 224 | 242 | A | E A 260 | A | 314 |
| 17 | A | A | A | E A 296 | A | 310 | 248 | A | 214 | 206 | Y | E Y 222 | 222 | 196 | 206 | 228 | 222 | 222 | 222 | 234 | E B 246 | E B 246 | E A 272 | 262 |
| 18 | 298 | 324 | E A 350 | A | A | A | A | 222 | 216 | 204 | 194 | 214 | H 194 | 204 | 196 | 212 | 216 | 210 | 210 | 234 | E A 244 | E A 248 | E A 244 | 252 |
| 19 | 258 | 262 | E A 264 | E A 256 | 248 | 242 | 222 | 210 | 202 | 206 | 196 | 222 | E A 290 | 208 | E A 360 | E A 330 | E A 296 | E A 238 | 220 | E A 226 | 196 | A | A | E A 348 |
| 20 | A | A | A | A | 268 | A | E A 268 | A | 210 | 192 | 206 | 206 | 212 | 222 | 210 | 202 | 214 | 222 | 222 | 232 | E A 256 | E A 246 | 248 | 262 |
| 21 | 288 | 278 | E A 278 | A | 266 | 246 | 214 | A | 202 | 202 | 202 | 208 | 208 | 202 | H 188 | 202 | 212 | 210 | 204 | 222 | 222 | 202 | A | 200 |
| 22 | 258 | 266 | A | A | E A 306 | 252 | 216 | 194 | H 186 | 202 | H 190 | 210 | 244 | H 194 | 200 | 200 | 200 | 206 | 194 | E A 224 | E A 238 | A 214 | E A 240 | Q 250 |
| 23 | 200 | A 206 | A | A 218 | 246 | 220 | 218 | A 214 | A | 226 | 206 | 200 | A E 212 | E A 242 | 224 | 230 | B | 230 | E A 254 | E A E A 278 | E A 274 | 258 | E A 280 | A |
| 24 | E A 240 | E A 236 | 222 | 200 | 254 | 232 | 232 | 208 | 208 | 210 | 196 | 190 | 202 | 228 | A | 200 | E A 206 | E A 278 | 208 | E A 266 | E A 234 | E A 242 | A 232 | A 230 |
| 25 | E A 244 | A | E A 230 | 240 | 250 | 232 | 212 | 238 | 202 | H 192 | 208 | 218 | 198 | 206 | 194 | A | 206 | A | E A 224 | 216 | 228 | E A 234 | A | E A 236 |
| 26 | E A 246 | 220 | A 240 | E A 266 | 238 | 228 | 208 | 200 | 210 | 228 | 204 | H 190 | A 214 | A | A | 196 | 206 | 202 | 204 | 208 | 218 | 218 | A | Q 228 |
| 27 | Q 246 | A | A | 258 | A | 216 | 202 | 202 | 202 | 182 | 214 | 196 | E A 278 | 194 | H 178 | H 174 | 202 | 202 | 202 | 202 | 238 | 226 | 226 | E A 228 |
| 28 | 232 | E A 246 | 256 | E A 246 | 238 | 236 | 212 | 200 | A | E A 304 | A | A | 206 | H 186 | 212 | 204 | 204 | 194 | 206 | 230 | 218 | 228 | 234 | E A 238 |
| 29 | E A 252 | A | A | 198 | A | A | E A 310 | E A 266 | 222 | 212 | 212 | 196 | 200 | 196 | 196 | 196 | 212 | 206 | 212 | 212 | A 230 | A | A | A |
| 30 | A | A | A | 198 | 222 | A | 212 | 192 | 198 | 202 | 198 | 196 | 204 | 204 | 220 | A | 202 | 202 | 224 | 196 | A | 220 | 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 | 19 | 17 | 14 | 13 | 18 | 14 | 17 | 17 | 22 | 26 | 24 | 28 | 30 | 28 | 27 | 27 | 28 | 28 | 29 | 29 | 23 | 22 | 17 | 21 |
| MED | 250 | 268 | 258 | U 237 | 247 | 234 | 219 | 208 | 208 | 206 | 208 | 208 | 210 | 204 | 210 | 212 | 212 | 214 | 217 | 224 | E A 236 | U 216 | 241 | 249 |
| U Q | 288 | 299 | 308 | E A 270 | E A 270 | 246 | 231 | 225 | 220 | E A 226 | 217 | 221 | 216 | 222 | 220 | 224 | 222 | 230 | 225 | E A 239 | E A 252 | E A 252 | 276 | 262 |
| L Q | 240 | A 241 | 240 | 209 | 246 | 232 | 212 | 201 | 202 | 204 | 203 | 201 | 204 | H 197 | 200 | 202 | 206 | 208 | 210 | 217 | 222 | 214 | 233 | 230 |

NOV. 2013 h′F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

DEC.2013 fxI (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A | A | A | 62 | 60 | A | A | A | A | X 53 | O X 60 | X 65 | X 79 | 86 | X 76 | X 73 | X 76 | X 73 | X 62 | X 61 | X 66 | X 62 | X 64 | X 63 |
| 2 | X 65 | X 68 | X 70 | X 78 | X 83 | X 87 | X 87 | X 93 | X 92 | X 90 | X 90 | X 88 | X 88 | X 84 | X 76 | X 71 | X 68 | X 69 | X 66 | X 63 | X 66 | X 64 | X 63 | X 63 |
| 3 | X 63 | X 68 | X 68 | 72 | 80 | 84 | 74 | 86 | 86 | 91 | 94 | 96 | 93 | X 95 | X 101 | X 102 | X 94 | 68 | X 50 | X 49 | X 60 | X 58 | 56 | X 56 |
| 4 | X 56 | X 55 | X 52 | A | A | A | A | 73 | 74 | X 80 | X 76 | X 72 | X 80 | X 75 | X 75 | X 73 | X 71 | X 66 | X 66 | X 67 | X 63 | X 57 | X 46 | X 54 |
| 5 | 56 | 57 | 65 | 67 | 64 | 60 | 71 | X 72 | 81 | 88 | 87 | 87 | X 87 | X 91 | X 96 | 96 | X 95 | X 84 | X 74 | X 65 | X 69 | X 61 | X 57 | X 55 |
| 6 | 58 | 64 | 70 | X 78 | 86 | 93 | X 98 | X 98 | X 97 | X 99 | X 98 | X 98 | X 87 | X 78 | X 76 | X 71 | X 74 | X 70 | X 67 | X 68 | 72 | X 68 | X 58 | X 53 |
| 7 | 66 | X 55 | 59 | 86 | A | A | X 73 | 78 | X 81 | 93 | 92 | X 88 | X 84 | X 80 | X 76 | X 76 | X 77 | X 74 | X 68 | X 66 | X 66 | X 64 | X 62 | X 56 |
| 8 | X 53 | 63 | X 58 | X 54 | 81 | X 65 | A | A | A | X 55 | X 54 | O X 60 | O X 65 | O X 58 | O X 65 | X 62 | O X 61 | X 63 | X 54 | 52 | X 54 | X 56 | 60 | 57 |
| 9 | X 48 | X 53 | X 56 | X 58 | X 65 | 76 | 80 | 88 | 92 | X 90 | 87 | X 79 | X 72 | X 69 | X 69 | A | X 69 | X 66 | X 60 | X 54 | X 51 | X 52 | X 54 | X 54 |
| 10 | 53 | X 50 | A | X 56 | 66 | 78 | 82 | X 71 | 75 | 78 | X 74 | 83 | 90 | X 82 | X 80 | X 80 | X 81 | X 71 | X 69 | X 66 | X 64 | X 64 | X 64 | X 67 |
| 11 | X 69 | X 72 | 82 | 78 | 72 | 76 | X 84 | X 90 | V 100 | 108 | 108 | 102 | X 90 | X 85 | X 78 | X 75 | X 74 | X 72 | X 69 | X 69 | X 67 | X 67 | X 58 | X 59 |
| 12 | X 64 | 64 | X 60 | 73 | 83 | 91 | 99 | 96 | 103 | X 102 | X 104 | X 111 | X 106 | X 96 | X 88 | X 84 | X 81 | X 73 | X 72 | X 67 | X 66 | X 64 | X 64 | X 64 |
| 13 | X 63 | X 66 | X 68 | 74 | 72 | O X 78 | X 90 | X 95 | X 102 | X 105 | X 106 | X 103 | X 94 | X 86 | X 81 | X 79 | X 74 | X 75 | X 68 | X 67 | X 67 | X 68 | X 70 | X 70 |
| 14 | X 70 | 77 | 80 | 79 | 87 | X 64 | A | A | A | R | 76 | X 70 | R | X 72 | X 70 | X 69 | X 69 | X 71 | X 68 | 69 | 65 | 56 | X 56 | A |
| 15 | 59 | 55 | 89 | X 55 | A | A | X 56 | X 61 | 63 | X 66 | X 66 | X 70 | X 71 | X 75 | X 71 | X 67 | X 67 | X 67 | X 64 | X 60 | X 63 | X 61 | X 61 | X 60 |
| 16 | 54 | X 53 | X 58 | X 66 | X 64 | 77 | X 76 | 77 | X 68 | X 65 | X 67 | 76 | 71 | X 72 | X 72 | X 74 | X 73 | O X 67 | X 65 | X 63 | X 60 | X 52 | X 54 | X 59 |
| 17 | X 58 | X 66 | X 63 | X 60 | X 62 | X 74 | X 73 | X 77 | X 83 | X 83 | X 84 | X 89 | X 87 | X 81 | X 75 | X 76 | O X 70 | A | X 66 | X 64 | X 68 | X 59 | 50 | 56 |
| 18 | X 58 | X 58 | X 63 | X 62 | X 72 | V 82 | X 87 | 75 | A | X 70 | X 79 | X 84 | X 87 | X 84 | X 79 | O X 79 | X 76 | X 73 | X 72 | X 66 | X 63 | X 59 | X 54 | X 56 |
| 19 | X 62 | X 62 | X 57 | X 58 | 65 | A | X 58 | R | R | X 71 | X 76 | X 76 | X 78 | O X 75 | O X 76 | X 76 | X 73 | X 72 | X 67 | X 63 | X 53 | X 48 | O X 49 | 56 |
| 20 | X 53 | O X 58 | X 60 | A | A | X 57 | X 66 | X 64 | R | O X 62 | X 65 | X 61 | X 61 | X 62 | X 64 | O X 63 | X 64 | X 62 | X 64 | X 58 | X 55 | X 53 | X 54 | X 62 |
| 21 | X 50 | X 53 | B | B | R | X 62 | O X 68 | X 71 | X 84 | X 89 | X 89 | X 84 | X 82 | X 78 | X 74 | X 70 | X 69 | X 65 | X 65 | X 65 | X 65 | X 66 | X 65 | X 63 |
| 22 | X 63 | X 67 | X 72 | X 79 | X 87 | X 98 | X 96 | X 100 | X 100 | X 99 | X 99 | X 95 | X 92 | X 87 | X 80 | A | X 70 | X 69 | X 70 | X 68 | X 64 | X 65 | X 66 | X 70 |
| 23 | X 69 | X 72 | X 79 | X 81 | 80 | X 82 | X 102 | X 106 | X 108 | X 108 | X 107 | X 104 | X 96 | X 86 | X 82 | X 79 | X 76 | X 74 | X 73 | X 72 | X 72 | X 66 | X 69 | X 66 |
| 24 | X 59 | 61 | 64 | X 73 | X 85 | X 96 | X 108 | X 111 | X 111 | X 114 | X 108 | X 102 | X 98 | X 94 | X 86 | X 77 | X 74 | X 70 | X 68 | X 68 | X 68 | X 72 | X 67 | X 58 |
| 25 | X 60 | X 56 | X 62 | A | 66 | X 79 | X 86 | X 95 | X 101 | 109 | X 95 | X 101 | 110 | 105 | 106 | X 98 | X 88 | R | F | 67 | 64 | 53 | 61 | X 49 |
| 26 | X 44 | 50 | X 54 | X 56 | X 58 | X 64 | 66 | X 73 | X 79 | 87 | X 85 | X 77 | X 75 | 70 | 70 | X 69 | X 68 | 68 | X 65 | X 64 | X 63 | X 62 | X 62 | X 62 |
| 27 | X 67 | X 70 | X 77 | X 82 | X 90 | X 97 | 107 | X 107 | X 106 | X 107 | X 105 | X 100 | X 101 | X 89 | X 79 | X 77 | X 71 | X 72 | B | X 69 | X 70 | X 71 | X 68 | V 64 |
| 28 | X 64 | X 68 | X 69 | 69 | 72 | 88 | 94 | X 104 | X 104 | X 100 | X 98 | X 96 | X 94 | X 88 | X 82 | X 77 | X 74 | X 72 | X 70 | X 70 | X 73 | 73 | X 68 | 74 |
| 29 | X 72 | 72 | X 82 | X 58 | X 59 | 87 | 98 | 100 | 110 | R | X 107 | X 103 | O X 96 | 89 | X 90 | X 83 | X 79 | 73 | X 64 | X 66 | X 63 | X 59 | 58 | B |
| 30 | B | B | B | B | B | B | B | B | 98 | X 97 | X 101 | X 100 | X 99 | X 96 | X 92 | 90 | 82 | 77 | X 71 | 72 | X 64 | X 58 | X 59 | X 65 |
| 31 | X 64 | X 64 | 72 | X 69 | 75 | X 76 | 91 | X 94 | X 97 | X 98 | X 97 | X 94 | X 91 | X 88 | X 83 | X 77 | X 74 | X 71 | X 70 | X 68 | X 71 | X 64 | X 64 | X 67 |
| | 00 | 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 | 27 | 26 | 25 | 25 | 26 | 26 | 25 | 29 | 31 | 31 | 30 | 31 | 31 | 29 | 31 | 29 | 29 | 31 | 31 | 31 | 31 | 29 |
| MED | X 60 | X 63 | X 65 | X 69 | 72 | X 78 | X 85 | X 89 | X 97 | X 90 | X 90 | X 88 | X 88 | X 84 | X 78 | X 76 | X 74 | X 71 | X 67 | X 66 | X 65 | X 62 | X 61 | X 60 |
| U Q | X 64 | X 68 | X 72 | X 78 | X 83 | X 88 | X 96 | X 98 | X 102 | X 101 | X 101 | X 100 | X 94 | X 89 | X 83 | X 80 | X 77 | X 73 | X 70 | X 68 | X 68 | X 66 | X 64 | X 64 |
| L Q | X 55 | X 55 | X 59 | X 58 | X 64 | X 70 | X 73 | X 73 | 81 | X 74 | X 76 | X 76 | X 79 | X 75 | X 74 | X 71 | X 69 | X 68 | X 64 | X 63 | X 63 | X 57 | X 56 | X 56 |

DEC.2013 fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

DEC. 2013 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 | F 46 | F 47 | A | A | A | A | 47 | R 54 | 59 | 73 | F 74 | 70 | 67 | 70 | 67 | 56 | 55 | 60 | 56 | 58 | 57 |
| 2 | 59 | 62 | 64 | 72 | 77 | 81 | 81 | 87 | 86 | 84 | 84 | 82 | 82 | 78 | 70 | 65 | 62 | 63 | 60 | 57 | 60 | 58 | 57 | 57 |
| 3 | 57 | 62 | 62 | F 62 | F 68 | F 60 | F 64 | F 68 | F 69 | F 72 | F 84 | Z 86 | F 82 | 89 | 95 | 96 | 88 | F 55 | 44 | 43 | 54 | 52 | F 41 | 50 |
| 4 | 50 | 49 | 46 | A | A | A | A | F 58 | F 57 | 74 | 70 | 66 | 74 | 69 | 69 | 67 | 65 | 60 | 60 | 61 | 57 | 51 | 40 | 48 |
| 5 | F 48 | F 44 | F 51 | F 56 | F 48 | F 50 | Z 62 | 66 | F 67 | F 58 | Z 77 | F 74 | 81 | 85 | 90 | F 84 | 89 | 78 | 68 | 59 | 63 | 55 | 51 | 49 |
| 6 | F 50 | F 50 | Z 60 | 72 | Z 76 | Z 85 | 92 | 92 | 91 | 93 | 92 | J R 92 | 81 | 72 | 70 | 65 | 68 | 64 | 61 | 62 | F 62 | 62 | 52 | 47 |
| 7 | F 56 | 49 | F 48 | 60 | A | A | 67 | F 66 | 75 | F 80 | 86 | 82 | 78 | 74 | 70 | 70 | 71 | 68 | 62 | 60 | 60 | 58 | 56 | 50 |
| 8 | 47 | F 47 | 52 | 48 | F 52 | 59 | A | A | A | 49 | 48 | 54 | 59 | 52 | 59 | 56 | 55 | 57 | 48 | 46 | 48 | 50 | F 48 | F 45 |
| 9 | 42 | 47 | 50 | 52 | 59 | Z 67 | F 60 | F 73 | F 81 | 84 | F 75 | 73 | 66 | 63 | 63 | A | 63 | 60 | 54 | 48 | 45 | 46 | 48 | 48 |
| 10 | Z 46 | 44 | A | 50 | F 56 | F 62 | Z 74 | 65 | F 65 | F 64 | 68 | 77 | Z 82 | 76 | 74 | 74 | 75 | 65 | 63 | 60 | 58 | 58 | 58 | 61 |
| 11 | 63 | 66 | F 70 | F 60 | F 62 | F 66 | 77 | 84 | V 90 | Z 101 | Z 99 | Z 94 | 84 | 79 | 72 | 69 | 68 | 66 | 63 | 63 | 61 | 61 | 52 | 53 |
| 12 | 58 | F 53 | 54 | F 59 | F 62 | F 78 | F 85 | F 82 | F 90 | 96 | 98 | 105 | 100 | 90 | 82 | 78 | 75 | 67 | 66 | 61 | 60 | 58 | 58 | 58 |
| 13 | 57 | 60 | 62 | F 60 | F 61 | 72 | 84 | 89 | 96 | 99 | 100 | 97 | 88 | 80 | 75 | 73 | 68 | 69 | 62 | 61 | 61 | 62 | 64 | 64 |
| 14 | 64 | F 62 | F 68 | F 66 | F 75 | 58 | A | A | A | R | F 66 | 64 | R | 66 | 64 | 63 | 63 | 65 | 62 | A | A | F 46 | J R 50 | A |
| 15 | F 51 | F 42 | R 34 | 49 | A | A | 50 | 55 | F 54 | 60 | 60 | 64 | 65 | 69 | 65 | 61 | 61 | 61 | 58 | 54 | 57 | 55 | 55 | 54 |
| 16 | F 45 | 47 | 52 | Z 60 | 58 | F 63 | 70 | F 63 | 62 | 59 | 61 | F 64 | F 62 | 66 | 66 | 68 | 67 | R 61 | 59 | 57 | 54 | 46 | 48 | 53 |
| 17 | 52 | 60 | 57 | 54 | 56 | R 68 | 67 | 71 | 77 | 77 | 78 | 83 | 81 | 75 | 69 | 70 | R 64 | A | 60 | 58 | 62 | 53 | F 41 | F 49 |
| 18 | 52 | 52 | 57 | 56 | 66 | V 76 | 81 | F 62 | A | 64 | 73 | 78 | 81 | 78 | 73 | 73 | 70 | 67 | 66 | 60 | 57 | 53 | 48 | 50 |
| 19 | 56 | 56 | 51 | 52 | F 55 | A | 52 | R | R | 65 | 70 | 70 | 72 | R 69 | 70 | 70 | 67 | 66 | 61 | 57 | 47 | 42 | 43 | Z 48 |
| 20 | 47 | R 52 | 54 | A | A | 51 | 60 | 58 | R | 56 | 59 | 55 | 55 | 56 | 58 | R 57 | 58 | 56 | 58 | 52 | 49 | 47 | 48 | 56 |
| 21 | 44 | 47 | B | B | R | 56 | 62 | 65 | 78 | 83 | 83 | 78 | 76 | 72 | 68 | 64 | 63 | 59 | 59 | 59 | 59 | 60 | 59 | 57 |
| 22 | 57 | 61 | 66 | 73 | 81 | 92 | 90 | 94 | R 94 | 93 | 93 | 89 | 86 | 81 | 74 | A | 64 | 63 | 64 | 62 | 58 | 59 | 60 | 64 |
| 23 | 63 | 66 | 73 | 75 | Z 72 | 76 | 96 | 100 | 102 | 102 | 101 | 98 | 90 | 80 | 76 | 73 | 70 | 68 | 67 | 66 | 66 | 60 | 63 | 60 |
| 24 | 53 | F 52 | F 53 | 67 | 79 | 90 | 102 | 105 | 105 | 108 | 102 | 96 | 92 | 87 | 80 | 71 | 68 | 64 | 62 | 62 | 62 | 66 | 61 | 52 |
| 25 | 54 | 50 | 56 | A | F 56 | 73 | 80 | 89 | 95 | F 97 | 89 | 95 | F 102 | F 95 | F 95 | 92 | 82 | R | F 60 | F 58 | F 50 | F 44 | F 53 | 43 |
| 26 | 38 | F 39 | 48 | 50 | 52 | 58 | F 53 | 67 | 73 | F 73 | 79 | 71 | 69 | 64 | 64 | 63 | 62 | 62 | 59 | 58 | 57 | 56 | 56 | 56 |
| 27 | 61 | 64 | 71 | 76 | 84 | 92 | F 97 | 101 | 100 | 101 | 99 | 94 | 95 | 83 | 73 | 71 | 65 | J R 66 | B | 63 | 64 | 65 | 62 | V 58 |
| 28 | 58 | 62 | 63 | F 54 | F 60 | F 79 | F 82 | 98 | 98 | 94 | 92 | 90 | 88 | 82 | 76 | 71 | 68 | 66 | 64 | 64 | 67 | F 64 | 62 | F 64 |
| 29 | 66 | F 63 | 76 | 52 | 53 | F 72 | F 72 | F 84 | F 85 | R | 101 | 97 | R 90 | 83 | 84 | 77 | 72 | F 61 | 58 | 60 | 57 | 52 | F 47 | B |
| 30 | B | B | B | B | B | B | B | B | Z 91 | 91 | 95 | 94 | 93 | 90 | 86 | F 78 | F 65 | F 61 | 65 | F 62 | 58 | 52 | 53 | 59 |
| 31 | 58 | 58 | F 61 | 63 | F 64 | 70 | F 76 | 88 | 91 | 92 | 91 | 88 | 85 | 82 | 77 | 71 | 68 | 65 | 64 | 62 | 65 | 58 | 58 | 61 |
| | 00 | 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 | 27 | 26 | 25 | 25 | 26 | 26 | 25 | 29 | 31 | 31 | 30 | 31 | 31 | 29 | 31 | 29 | 30 | 30 | 30 | 31 | 31 | 29 |
| MED | 54 | 52 | 57 | 60 | F 61 | 70 | 75 | 78 | 86 | 83 | 84 | 82 | 82 | 78 | 72 | 70 | 68 | 64 | 61 | 60 | 58 | 56 | 53 | 54 |
| U Q | 58 | 62 | 64 | 66 | 74 | 78 | 84 | 89 | 94 | 95 | 95 | 94 | 88 | 83 | 77 | 74 | 70 | 66 | 64 | 62 | 62 | 60 | 58 | 58 |
| L Q | 48 | 47 | 51 | 52 | F 56 | 60 | 62 | 65 | F 71 | 64 | 70 | 70 | 73 | 69 | 68 | 65 | 63 | 61 | 59 | 57 | 57 | 51 | 48 | 49 |

DEC. 2013 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

**DEC.2013** 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 | 58 | 87 | 30 | 28 | 127 | 61 | 58 | 86 | 77 | G 35 | 110 | 35 | 32 | 34 | 34 | G 26 | 30 | 33 | 30 | 25 | 86 | 54 | 18 |
| 2 | 16 | 17 | 24 | 34 | 32 | G 18 | 126 | 39 | 31 | 34 | 34 | 60 | 36 | 36 | 36 | 84 | G 28 | 29 | 29 | 27 | 32 | 32 | 25 | 18 |
| 3 | 54 | 17 | G 16 | G | G | 32 | 36 | 38 | 33 | 33 | 33 | 43 | 39 | 34 | E B 35 | 35 | 35 | 30 | G 22 | 60 | G | 38 | 37 | 40 |
| 4 | G | 37 | 38 | 82 | 56 | 58 | 50 | 50 | 33 | 40 | 106 | 40 | 36 | 102 | 144 | 33 | 33 | 42 | G 27 | 29 | 29 | G | 36 | 40 |
| 5 | 40 | 40 | 37 | 34 | 36 | 32 | 51 | 43 | 105 | 42 | 38 | 120 | 53 | 38 | 38 | 37 | 33 | 34 | G | 30 | 77 | 35 | 109 | 31 |
| 6 | G | 34 | 32 | 93 | 52 | 41 | 62 | 32 | 34 | 44 | 36 | 45 | 149 | 59 | 40 | 106 | 112 | 103 | 40 | 27 | 27 | 21 | G 12 | 141 |
| 7 | 32 | 43 | 28 | 71 | 62 | 56 | 47 | 34 | 37 | 38 | 38 | 39 | 37 | 36 | 37 | 38 | 36 | 32 | 34 | 34 | 33 | 80 | G | 25 |
| 8 | 37 | 29 | 56 | 42 | 29 | 32 | 103 | 78 | 69 | 62 | 40 | 37 | 62 | 35 | 38 | 68 | 68 | 33 | G 23 | 34 | 35 | 35 | 40 | 39 |
| 9 | 108 | 39 | G 21 | 29 | G | 40 | 34 | 32 | G 17 | 33 | 36 | 36 | 35 | 42 | 86 | 77 | 36 | 35 | 31 | 30 | 27 | 26 | 46 | 40 |
| 10 | 30 | 36 | 84 | 44 | 46 | 43 | 46 | 77 | 42 | 36 | 38 | 33 | 38 | 38 | G 28 | 35 | 32 | 34 | 125 | 132 | 90 | G | E B 23 | 26 |
| 11 | 20 | 25 | 32 | 32 | 41 | 41 | 34 | 35 | 33 | 35 | 40 | 37 | 40 | 38 | 104 | 85 | 37 | 33 | 42 | 90 | 29 | E B 25 | 20 | 20 |
| 12 | 20 | 26 | G 12 | 37 | 29 | 28 | 29 | 33 | 37 | 35 | 40 | 49 | 38 | 50 | 46 | 36 | 37 | 37 | 30 | 32 | 27 | 32 | 30 | 20 |
| 13 | 20 | 31 | 23 | G | 30 | 34 | 31 | 33 | 36 | 36 | 43 | 45 | 48 | 44 | 40 | 40 | 105 | 36 | 27 | 30 | 32 | 36 | 26 | 38 |
| 14 | 33 | 34 | 36 | 25 | 49 | 110 | 107 | 47 | 50 | 39 | G | 39 | 39 | 39 | 39 | 36 | 34 | 38 | 29 | 42 | 42 | 24 | 57 | 132 |
| 15 | 42 | 29 | G 23 | 23 | 57 | 58 | 44 | 63 | 94 | G 25 | 37 | G | 50 | 50 | 36 | 36 | 36 | G 22 | G | 28 | 27 | 87 | 24 | 19 |
| 16 | 20 | 20 | 27 | 29 | 29 | 36 | 40 | 37 | 37 | 40 | 35 | G | 32 | 32 | 36 | 49 | E B 45 | E B 45 | G | G | 38 | 59 | G | 20 |
| 17 | 18 | G | 33 | 33 | 37 | 46 | 35 | 32 | 33 | 32 | 38 | 33 | 54 | 62 | 55 | 55 | 59 | 62 | 36 | 32 | 26 | 23 | 23 | 20 |
| 18 | 19 | 21 | 24 | X 61 | 24 | 25 | G 21 | G 20 | 66 | G 22 | G | G 28 | 31 | E B 41 | E B 40 | 44 | G 20 | G | 27 | G | 26 | 24 | 22 | E B 29 |
| 19 | 21 | G 20 | 37 | 37 | 40 | 56 | 33 | 28 | 48 | 40 | G 25 | 34 | 34 | 39 | 38 | 32 | G 28 | 32 | 32 | G 21 | G | 39 | 37 | 37 |
| 20 | 33 | 41 | 34 | 78 | 79 | 39 | 30 | G 24 | G 22 | 31 | G | 32 | 32 | 33 | 32 | E B 40 | 35 | 29 | G 22 | G | 26 | 35 | 32 | 40 |
| 21 | 40 | 32 | B | B | 50 | 33 | 40 | 42 | 31 | 32 | 31 | 26 | 31 | 30 | 33 | 36 | 34 | G 17 | 32 | G 17 | 26 | 24 | 34 | 32 |
| 22 | 26 | 20 | 20 | 22 | 25 | 31 | 28 | G 21 | 33 | G 28 | 28 | 37 | 67 | 81 | 73 | 80 | 62 | 53 | 52 | 58 | 48 | 32 | 28 | 20 |
| 23 | 22 | 24 | 35 | 23 | 30 | E B 46 | 24 | 30 | 36 | 37 | 37 | 38 | 124 | 104 | 104 | 66 | 65 | 46 | 44 | 40 | 40 | 40 | 44 | 33 |
| 24 | 50 | 24 | 29 | 26 | 39 | 49 | 40 | 47 | 41 | 43 | G | 37 | 37 | 42 | 74 | 42 | 54 | 35 | 35 | 31 | 30 | 26 | 25 | 22 |
| 25 | 22 | 32 | 44 | 58 | 49 | 41 | 29 | G 18 | 34 | 34 | 35 | G 20 | 32 | 34 | 40 | 32 | 35 | 35 | 40 | 44 | 44 | 44 | 40 | 40 |
| 26 | 36 | 34 | 34 | 29 | 26 | 29 | G 22 | 41 | G 34 | 41 | G | 33 | G | 30 | 47 | 34 | G | 31 | G 22 | 30 | 30 | 30 | 22 | 22 |
| 27 | G 13 | G | G | 23 | 24 | 24 | 28 | 32 | 46 | G | 36 | 38 | 50 | 43 | 45 | 45 | 45 | 68 | B | 55 | 61 | 49 | 37 | 39 |
| 28 | 30 | G 19 | 21 | 22 | 25 | G 19 | 25 | G | 30 | 35 | 47 | 109 | 124 | 106 | 94 | 114 | 52 | 41 | 30 | 36 | 35 | 48 | 24 | 78 |
| 29 | E B 18 | 44 | E B 35 | 60 | E B 39 | 52 | E B 44 | E B 37 | 42 | 42 | 38 | 55 | 127 | 112 | 71 | 32 | E B 34 | 34 | 37 | 33 | 26 | 23 | 20 | B |
| 30 | B | B | B | B | B | B | B | B | 36 | 35 | 37 | 37 | 112 | 38 | 54 | 117 | 138 | 34 | 92 | 32 | 34 | 24 | 36 | 67 |
| 31 | 116 | 52 | 89 | 30 | 50 | 88 | 50 | 34 | 34 | G 30 | 38 | 36 | 36 | 37 | 37 | 36 | 34 | 44 | 60 | 43 | 28 | 29 | 23 | 25 |
| | 00 | 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 | 29 | 29 | 30 | 30 | 30 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 31 | 31 | 31 | 31 | 30 |
| MED | 28 | 30 | 32 | 32 | 35 | 40 | 37 | 34 | 36 | 35 | 36 | 37 | 38 | 38 | 40 | 40 | 36 | 34 | 32 | 32 | 30 | 32 | 28 | 32 |
| U Q | 40 | 37 | 37 | 51 | 49 | 52 | 50 | 43 | 46 | 40 | 38 | 45 | 54 | 50 | 71 | 68 | 54 | 42 | 40 | 42 | 38 | 40 | 37 | 40 |
| L Q | 20 | 20 | G | 24 | 28 | 32 | 29 | G 32 | 33 | G 32 | G | 33 | 35 | 35 | 36 | 35 | G 33 | 31 | G | G 28 | 26 | 24 | 23 | 20 |

**DEC.2013** ftEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

DEC.2013 fmin (0.1MHz) 45°E MEAN TIME (G.M.T. + 3 H)

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

| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 18 | 9 | 6 | 6 | 8 | 21 | 12 | 15 | 14 | 8 | 25 | 27 | 15 | 21 | 13 | 12 | 17 | 9 | 8 | 7 | 8 | 10 | 7 | 8 |
| 2 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 10 | 9 | 11 | 10 | 16 | 16 | 16 | 18 | 14 | 13 | 9 | 12 | 9 | 9 | 8 | 7 | 8 |
| 3 | 7 | 6 | 8 | 10 | 10 | 9 | 8 | 9 | 8 | 9 | 9 | 7 | 8 | 18 | 35 | 16 | 15 | 8 | 10 | 9 | 11 | 8 | 8 | 11 |
| 4 | 17 | 18 | 24 | 16 | 11 | 15 | 15 | 12 | 12 | 9 | 10 | 8 | 8 | 10 | 10 | 10 | 9 | 9 | 7 | 7 | 8 | 9 | 9 | 8 |
| 5 | 16 | 12 | 12 | 9 | 12 | 13 | 10 | 18 | 8 | 10 | 10 | 12 | 10 | 20 | 12 | 24 | 19 | 24 | 20 | 13 | 11 | 9 | 8 | 9 |
| 6 | 16 | 9 | 8 | 8 | 8 | 7 | 8 | 9 | 8 | 8 | 8 | 10 | 9 | 10 | 7 | 9 | 9 | 7 | 8 | 7 | 8 | 8 | 7 | 9 |
| 7 | 20 | 10 | 7 | 17 | 15 | 16 | 14 | 7 | 7 | 10 | 16 | 15 | 12 | 10 | 9 | 10 | 9 | 11 | 8 | 9 | 11 | 10 | 11 | 9 |
| 8 | 10 | 8 | 14 | 8 | 8 | 6 | 9 | 13 | 8 | 8 | 8 | 12 | 15 | 11 | 12 | 11 | 16 | 8 | 18 | 8 | 8 | 9 | 16 | 19 |
| 9 | 13 | 16 | 16 | 13 | 9 | 15 | 178 | 8 | 9 | 13 | 10 | 13 | 14 | 14 | 16 | 13 | 11 | 10 | 8 | 7 | 8 | 9 | 10 | 8 |
| 10 | 24 | 24 | 22 | 14 | 21 | 14 | 11 | 18 | 14 | 11 | 11 | 11 | 8 | 9 | 12 | 9 | 8 | 12 | 13 | 16 | 13 | 13 | 23 | 14 |
| 11 | 8 | 7 | 8 | 8 | 13 | 8 | 6 | 8 | 8 | 8 | 10 | 12 | 14 | 13 | 12 | 10 | 8 | 11 | 14 | 8 | 14 | 25 | 10 | 8 |
| 12 | 6 | 6 | 8 | 7 | 8 | 8 | 8 | 9 | 7 | 9 | 12 | 12 | 13 | 10 | 12 | 14 | 11 | 11 | 11 | 10 | 7 | 9 | 7 | 6 |
| 13 | 8 | 7 | 8 | 8 | 11 | 8 | 8 | 9 | 8 | 9 | 11 | 9 | 10 | 8 | 8 | 8 | 8 | 8 | 10 | 7 | 8 | 8 | 7 | 8 |
| 14 | 7 | 8 | 8 | 8 | 33 | 9 | 9 | 12 | 20 | 10 | 8 | 9 | 10 | 12 | 11 | 8 | 8 | 8 | 11 | 15 | 16 | 14 | 11 | 12 |
| 15 | 14 | 14 | 14 | 12 | 15 | 12 | 13 | 14 | 11 | 10 | 10 | 10 | 8 | 11 | 10 | 9 | 8 | 9 | 8 | 11 | 8 | 7 | 7 | 8 |
| 16 | 6 | 7 | 8 | 6 | 8 | 6 | 8 | 8 | 9 | 13 | 13 | 16 | 21 | 13 | 8 | 12 | 45 | 45 | 22 | 18 | 10 | 12 | 8 | 13 |
| 17 | 9 | 8 | 9 | 13 | 12 | 13 | 13 | 10 | 10 | 14 | 12 | 14 | 16 | 14 | 14 | 12 | 13 | 11 | 11 | 8 | 10 | 7 | 9 | 9 |
| 18 | 12 | 8 | 7 | 56 | 10 | 9 | 10 | 11 | 14 | 13 | 11 | 14 | 17 | 40 | 40 | 25 | 14 | 16 | 12 | 10 | 8 | 11 | 14 | 29 |
| 19 | 12 | 18 | 11 | 10 | 12 | 14 | 13 | 12 | 13 | 10 | 11 | 10 | 11 | 10 | 12 | 12 | 11 | 11 | 9 | 9 | 16 | 8 | 16 | 18 |
| 20 | 24 | 14 | 12 | 9 | 8 | 10 | 12 | 10 | 28 | 13 | 14 | 12 | 12 | 14 | 15 | 40 | 16 | 10 | 12 | 13 | 9 | 7 | 9 | 10 |
| 21 | 14 | 14 | B | B | 19 | 14 | 20 | 13 | 11 | 14 | 15 | 14 | 20 | 17 | 15 | 10 | 14 | 11 | 13 | 12 | 10 | 11 | 8 | 7 |
| 22 | 8 | 8 | 11 | 10 | 9 | 9 | 10 | 12 | 10 | 18 | 16 | 15 | 15 | 15 | 16 | 14 | 17 | 12 | 12 | 9 | 9 | 10 | 6 | 8 |
| 23 | 10 | 9 | 7 | 9 | 8 | 46 | 18 | 15 | 8 | 9 | 11 | 13 | 10 | 10 | 10 | 11 | 12 | 11 | 12 | 10 | 9 | 10 | 9 | 11 |
| 24 | 10 | 8 | 8 | 8 | 8 | 10 | 10 | 5 | 10 | 9 | 11 | 12 | 13 | 12 | 10 | 10 | 10 | 10 | 11 | 9 | 9 | 10 | 8 | 8 |
| 25 | 7 | 9 | 17 | 17 | 13 | 9 | 8 | 11 | 10 | 12 | 13 | 9 | 16 | 18 | 13 | 22 | 12 | 11 | 10 | 12 | 13 | 10 | 11 | 14 |
| 26 | 10 | 9 | 14 | 13 | 13 | 10 | 13 | 10 | 28 | 17 | 10 | 14 | 12 | 16 | 16 | 13 | 14 | 11 | 13 | 12 | 12 | 10 | 9 | 10 |
| 27 | 9 | 8 | 12 | 12 | 12 | 11 | 12 | 14 | 12 | 12 | 15 | 20 | 18 | 16 | 12 | 14 | 11 | 8 | B | 11 | 10 | 9 | 9 | 9 |
| 28 | 8 | 8 | 8 | 9 | 10 | 11 | 11 | 10 | 10 | 10 | 14 | 10 | 11 | 11 | 12 | 12 | 13 | 11 | 10 | 8 | 9 | 11 | 11 | 14 |
| 29 | 18 | 16 | 35 | 33 | 39 | 35 | 44 | 37 | 19 | 13 | 33 | 36 | 31 | 14 | 14 | 20 | 34 | 19 | 13 | 13 | 10 | 9 | 11 | B |
| 30 | B | B | B | B | B | B | B | B | 9 | 10 | 16 | 15 | 10 | 13 | 11 | 13 | 14 | 12 | 12 | 18 | 11 | 8 | 18 | 11 |
| 31 | 10 | 9 | 6 | 7 | 7 | 10 | 10 | 7 | 8 | 11 | 10 | 11 | 7 | 10 | 14 | 14 | 14 | 10 | 10 | 7 | 8 | 12 | 9 | 9 |
| | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| CNT | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| MED | 10 | 9 | 9 | 10 | 11 | 10 | 11 | 11 | 10 | 10 | 11 | 12 | 12 | 13 | 12 | 12 | 13 | 11 | 11 | 9 | 9 | 9 | 9 | 9 |
| U Q | 16 | 14 | 14 | 14 | 13 | 14 | 13 | 14 | 13 | 13 | 14 | 15 | 16 | 16 | 15 | 14 | 15 | 11 | 13 | 12 | 11 | 11 | 11 | 13 |
| L Q | 8 | 8 | 8 | 8 | 8 | 9 | 8 | 9 | 8 | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 9 | 9 | 10 | 8 | 8 | 8 | 8 | 8 |

DEC.2013 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION SHOWA-ST.

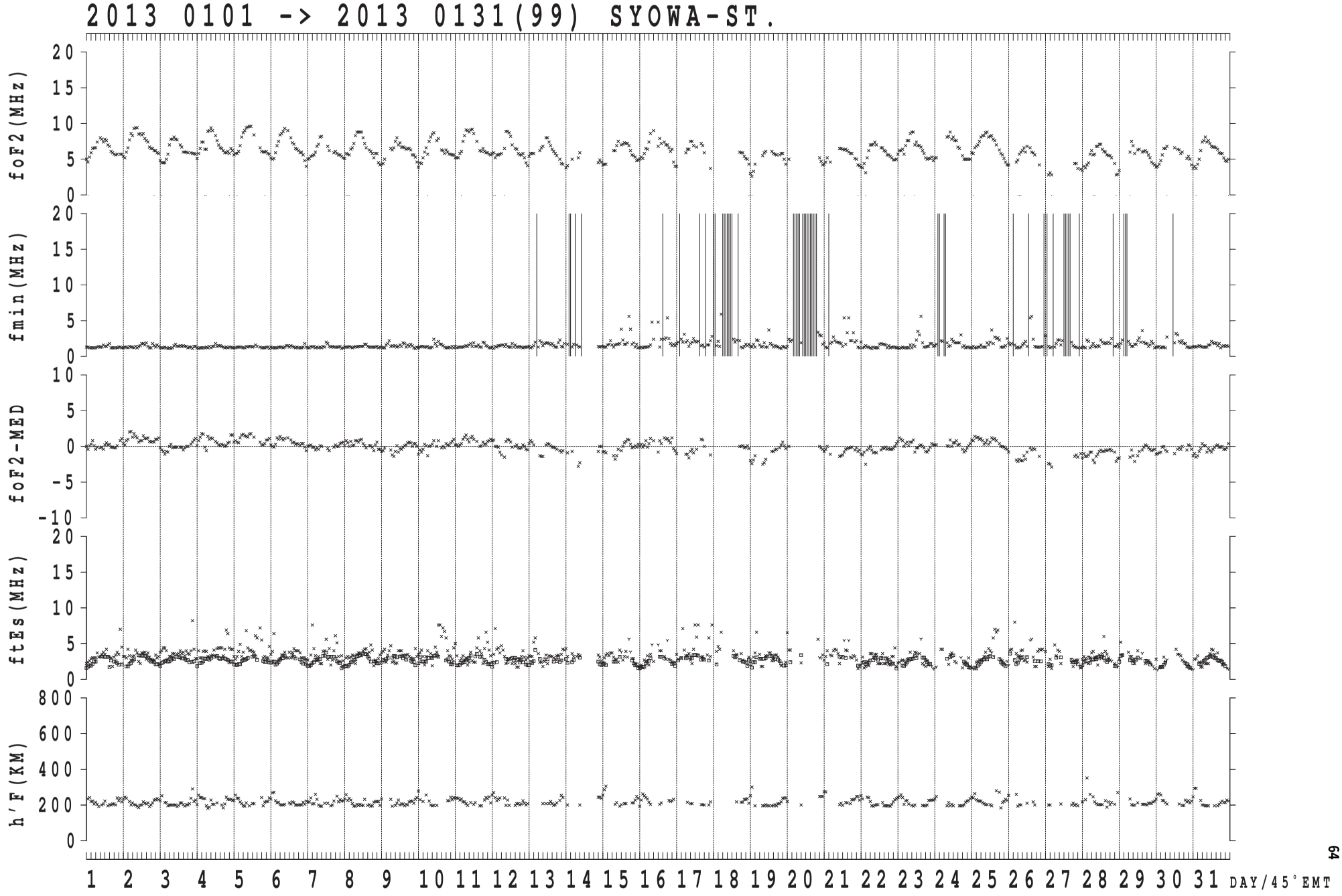
DEC.2013 h'F (KM) 45°E MEAN TIME (G.M.T. + 3 H)

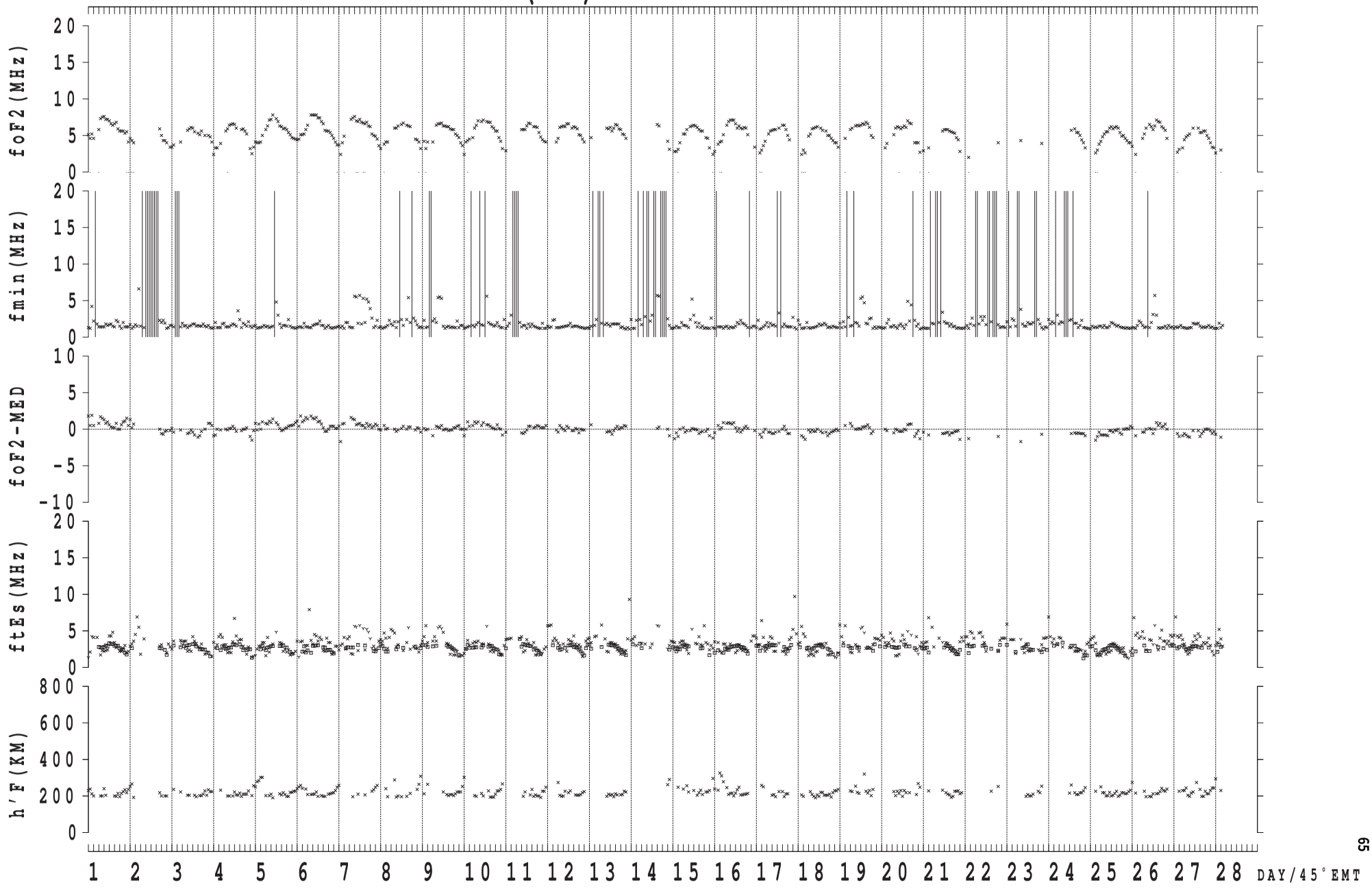
LAT.69°00.4'S LON.039°35.4'E SWEEP 1.0MHz TO 15.0MHz IN 15.0SEC IN MANUAL SCALING

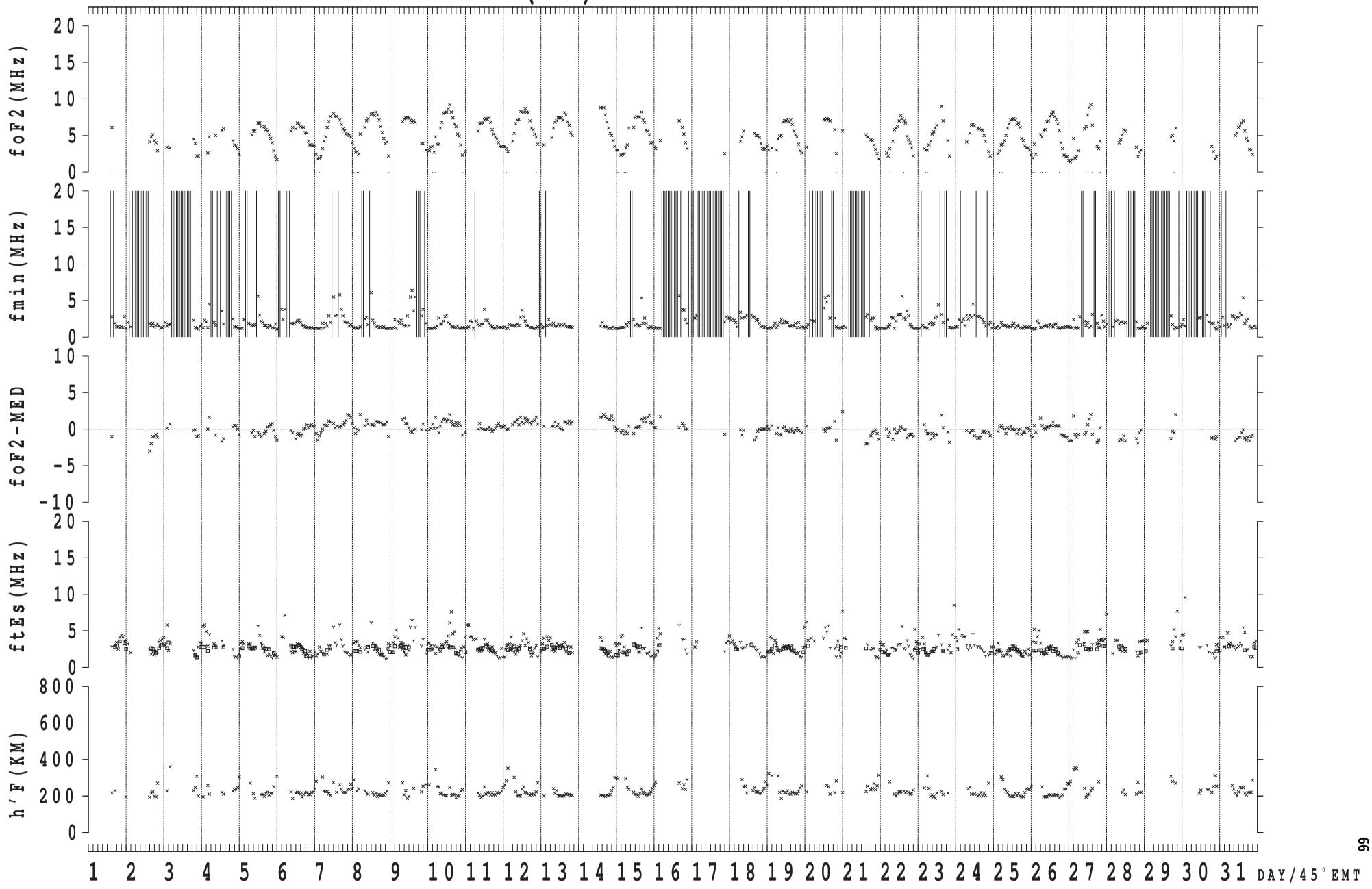
| D \ H | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A | A | A | 200 | E A 278 | A | A | A | A | E A 252 | 202 | 194 | H 188 | 232 | 212 | 212 | 210 | 214 | 210 | 202 | 250 | 242 | E A 296 | 248 |
| 2 | 214 | E A 258 | E A 258 | 266 | 240 | 228 | 212 | 212 | H 192 | 212 | 210 | 202 | 202 | 206 | 192 | 202 | 202 | 220 | 206 | 208 | E A 240 | E A 232 | 242 | E A 244 |
| 3 | E A 290 | 258 | 246 | 268 | 238 | A 238 | E A 268 | E A 260 | 228 | 198 | 194 | 186 | 214 | 196 | 214 | H 206 | 214 | 214 | 214 | A 238 | 192 | 218 | A | A |
| 4 | A | A | A | A | A | A | A | A | A 220 | 210 | 208 | 198 | 196 | 196 | 214 | 198 | 204 | 204 | 212 | E A 218 | 230 | E A 260 | A | A |
| 5 | A | A | A | E A 338 | A | A 216 | A | A | E A 290 | 242 | 220 | 202 | 264 | 210 | 210 | 200 | 216 | 202 | 230 | 230 | 236 | E A 238 | A | A |
| 6 | A | 238 | A 280 | E A 306 | 248 | 248 | A | H 204 | 212 | 206 | 192 | 198 | A | E A 230 | 198 | 198 | 198 | 212 | 212 | 230 | A 218 | E A 234 | 196 | 198 |
| 7 | A | A | 198 | A | A | A | A | 210 | 192 | E A 238 | A 212 | A 212 | 224 | 204 | 210 | 202 | 204 | 204 | 194 | 222 | 234 | E A 242 | 198 | E A 282 |
| 8 | A | A | A | A | 212 | E A 264 | A | A | A | 194 | 194 | 224 | A 238 | 200 | A 226 | 224 | 216 | 214 | 208 | A | A | A | A | A |
| 9 | A | A | E A | A | 272 | 272 | E A 266 | 210 | 210 | 200 | 200 | E A 210 | 192 | 206 | 206 | A | H 208 | 208 | 208 | 226 | 252 | 256 | E A 274 | E A 266 |
| 10 | E A 316 | E A 298 | A | A | A | A | A 232 | A | 194 | 194 | 218 | E A 208 | 218 | 218 | 210 | 206 | H 202 | 212 | E A 258 | 240 | E A 268 | 260 | 246 | E A 260 |
| 11 | 248 | E A 280 | E A 278 | E A 274 | E A 326 | A 226 | 242 | 210 | H 198 | 190 | 200 | 200 | H 184 | 210 | 200 | 192 | 202 | 222 | 210 | 206 | 234 | 236 | 236 | A 238 |
| 12 | H 192 | E A 248 | 282 | E A 286 | 276 | 218 | 210 | 198 | 198 | H 192 | 222 | 222 | 198 | 208 | 208 | 202 | 204 | 196 | 206 | 218 | 236 | 238 | E A 246 | 248 |
| 13 | 244 | 240 | 270 | 274 | A 306 | 284 | 214 | 208 | 198 | 228 | 200 | 200 | 208 | 204 | 192 | 208 | 232 | 214 | 208 | 226 | 236 | E A 244 | 242 | 250 |
| 14 | 254 | E A 278 | E A 286 | 250 | E A 286 | A | A | A | A | 214 | 192 | H 178 | 202 | 194 | 220 | H 208 | H 218 | 214 | 214 | A | A | 188 | 188 | A |
| 15 | A | A | A | A | A | A | A | 258 | 206 | 200 | 228 | 218 | 218 | 194 | 222 | 206 | 222 | 210 | 222 | 210 | 224 | 230 | E A 256 | 264 |
| 16 | E A 260 | 260 | A 228 | E A 296 | E A 290 | 264 | E A 306 | 240 | 208 | 196 | 196 | A E 214 | E A 244 | 224 | 192 | A 228 | B | B | E A 242 | 224 | A 236 | E A 254 | 274 | E A 250 |
| 17 | 254 | 222 | A | A | A | A | E A 252 | A 214 | 210 | 200 | 210 | A 216 | A | E A 260 | E A 316 | E A 226 | A | A | 216 | E A 234 | 228 | 236 | A | A |
| 18 | A | E A 274 | A | E A 280 | 262 | 246 | 226 | E A 224 | A | E A 264 | 214 | A 214 | A E 240 | Y E 248 | B E 234 | E A 234 | E A 214 | 222 | E Y 236 | 238 | 228 | 228 | 236 | E B 274 |
| 19 | 198 | A | A | A | A | A | A | A | E A 260 | 200 | E A 220 | 216 | 212 | 208 | 208 | 208 | 208 | 228 | 238 | 246 | A | A | E A 286 | E A 286 |
| 20 | A | A | A | A | A | A | 286 | E A 252 | A | E A 216 | E A 200 | E A 208 | A 208 | E A 212 | A E 212 | B E 262 | 212 | 212 | E A 234 | 226 | 226 | A | 264 | E A 302 |
| 21 | A | A | B | B | A | A 302 | E A 252 | E A 252 | 206 | 194 | 218 | 224 | 196 | 210 | Y E 220 | 220 | 226 | 238 | A 220 | 222 | 230 | 238 | E A 256 | E A 256 |
| 22 | 254 | A 266 | E A 258 | E A 244 | 268 | 234 | A 218 | 218 | 218 | 212 | 200 | 200 | A 236 | A | A | A | A | 206 | 226 | A | E A 234 | 246 | 236 | 256 |
| 23 | E A 250 | E A 250 | 206 | 258 | 258 | B | E Y 258 | E Y 254 | 208 | 196 | H 188 | 200 | 222 | 200 | 196 | A | E A 244 | 218 | E A 232 | 224 | E A 234 | E A 232 | E A 248 | E A 234 |
| 24 | E A 260 | E A 260 | Q 238 | 246 | E A 264 | 212 | 226 | E A 252 | 208 | 212 | 206 | 206 | 206 | 206 | A | 232 | 198 | 196 | E A 228 | 234 | E A 222 | 230 | 222 | 220 |
| 25 | A 212 | A | A | A | A | E A 290 | 216 | 194 | H 188 | 212 | 208 | 198 | E A 226 | 204 | 236 | 222 | E A 248 | A E 244 | E A 254 | E A 272 | A | A | A E | E A 252 |
| 26 | E A 252 | A 244 | 214 | 204 | A 264 | A 252 | E A 230 | A 224 | A | 214 | 196 | 196 | 210 | 216 | E A 238 | 204 | 202 | 216 | 210 | 214 | 224 | E A 262 | 222 | 230 |
| 27 | 238 | 258 | 250 | 260 | 238 | 226 | 218 | 204 | A 222 | 196 | A 208 | 200 | E A 262 | 204 | 204 | A 212 | A 212 | A | B | E A 262 | A | E A 254 | E A 238 | E A 234 |
| 28 | A | A 240 | 248 | 232 | E A 238 | A E 232 | E A 214 | 202 | 210 | 210 | 210 | A | A 220 | A 224 | A | A E 288 | E A 300 | 204 | 208 | 196 | 224 | E A 244 | E A 240 | E A 252 |
| 29 | 242 | E A 264 | B | E B 216 | B | A | B | E B 244 | 240 | 204 | 240 | A | A | A | A | 206 | E B 226 | 208 | E A 228 | 204 | 218 | 238 | E A 240 | B |
| 30 | B | B | B | B | B | B | B | B | 202 | 196 | 190 | H 178 | H 184 | 200 | A | A | E A 240 | 210 | E A 212 | A 224 | A 224 | 224 | E B 250 | E A 256 |
| 31 | E A 250 | E A 252 | 252 | E A 252 | 248 | A | E A 246 | 202 | 220 | 198 | H 194 | 194 | H 178 | H 174 | A 222 | 212 | 216 | 236 | A | E A 240 | 238 | 192 | E A 240 | Q 244 |
| | 00 | 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 | 19 | 16 | 19 | 19 | 18 | 20 | 23 | 25 | 31 | 31 | 29 | 28 | 29 | 26 | 27 | 28 | 28 | 29 | 28 | 26 | 27 | 25 | 24 |
| MED | U 238 | E A 258 | 242 | U 246 | 256 | 238 | 222 | 209 | 208 | 202 | 204 | 201 | 208 | 205 | 210 | 207 | 208 | 213 | 211 | 224 | 230 | 234 | 232 | E A 251 |
| U Q | E A 254 | E A 266 | A 274 | E A 280 | E A 278 | 264 | E A 255 | E A 252 | A 220 | 214 | 214 | 214 | A 225 | 217 | A E 222 | E A 224 | E 224 | 219 | E A 231 | 236 | 236 | E A 246 | E A 256 | E A 262 |
| L Q | 238 | 244 | 233 | 244 | 240 | 226 | 217 | 204 | 198 | 196 | 196 | 198 | 197 | 200 | 204 | 202 | 204 | 207 | 209 | 216 | 224 | 230 | 236 | A 241 |

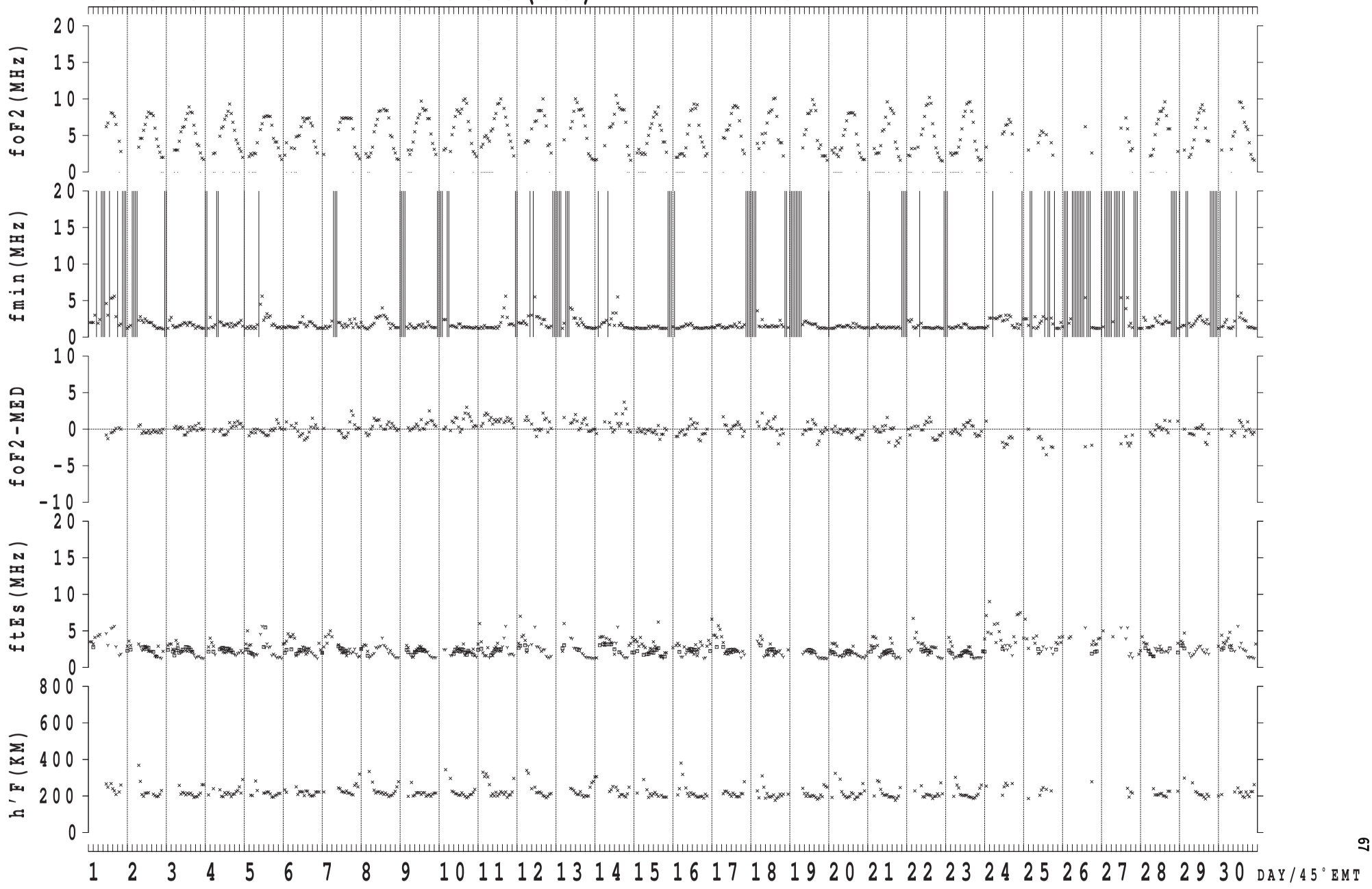
DEC.2013 h'F (KM)

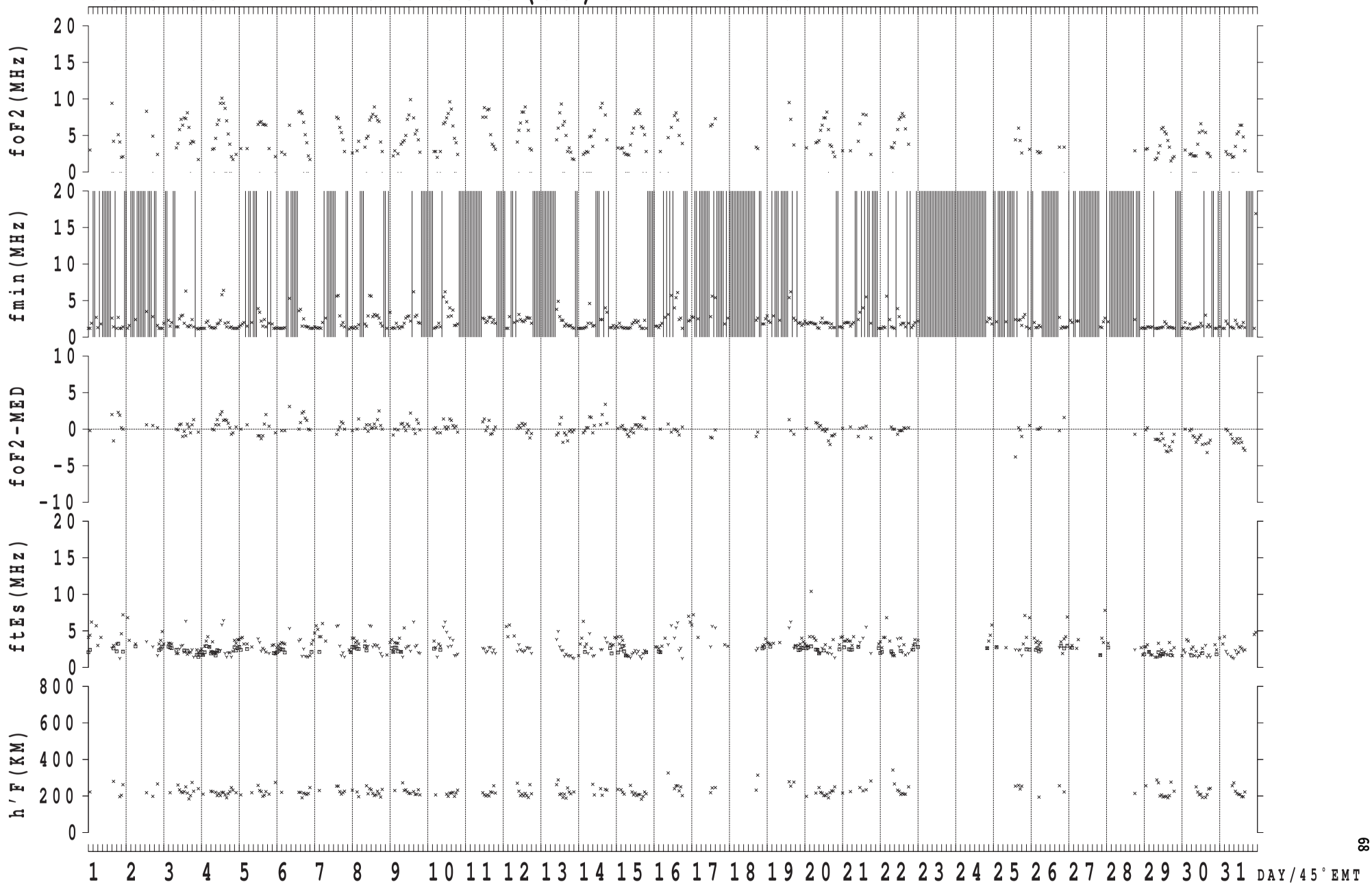
NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

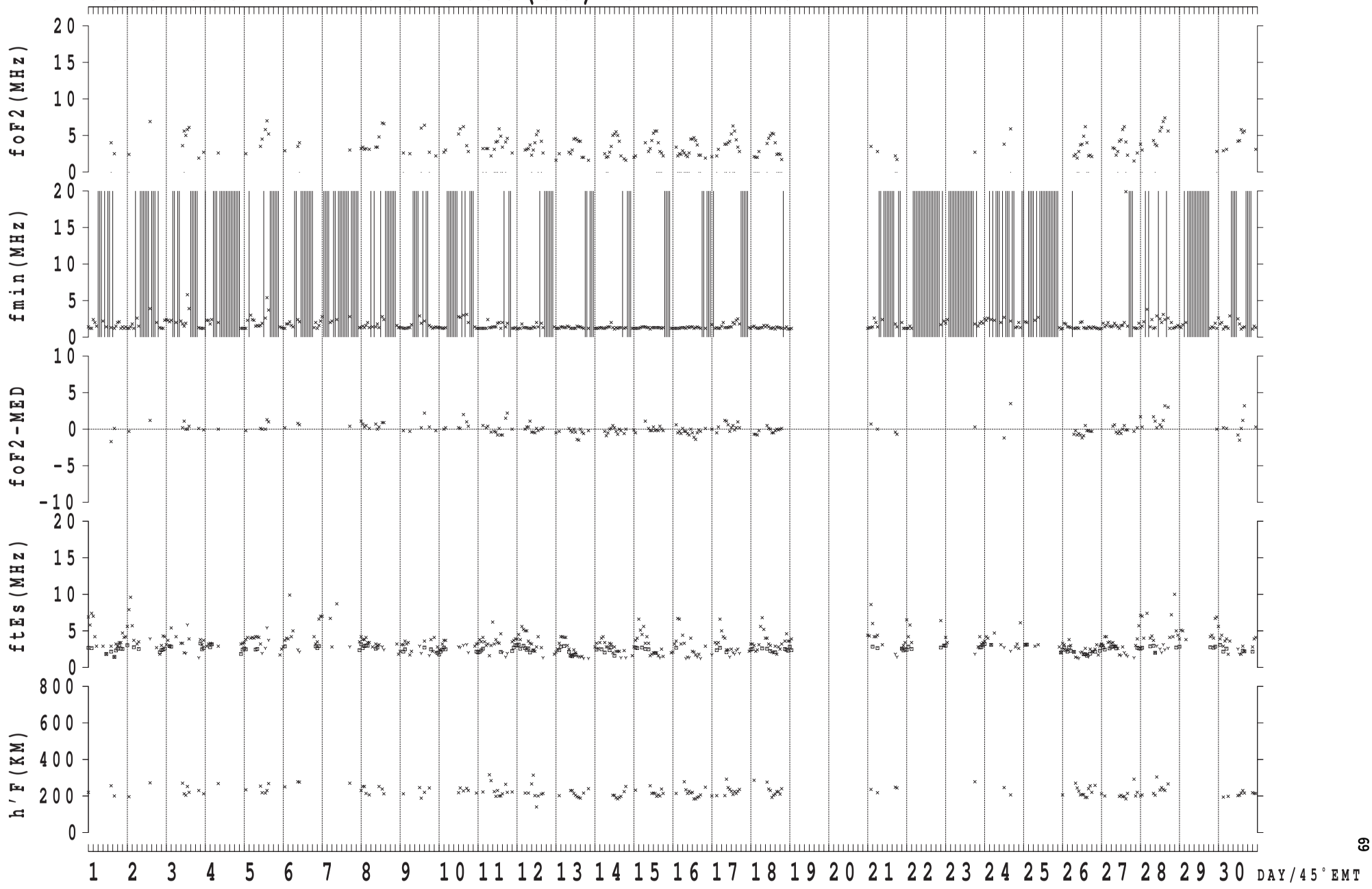

2013 0101 -> 2013 0131(99) SYOWA-ST.
foF2(MHz)
fmin(MHz)
foF2-MED
ftEs(MHz)
h'F(KM)
DAY/45°EMT

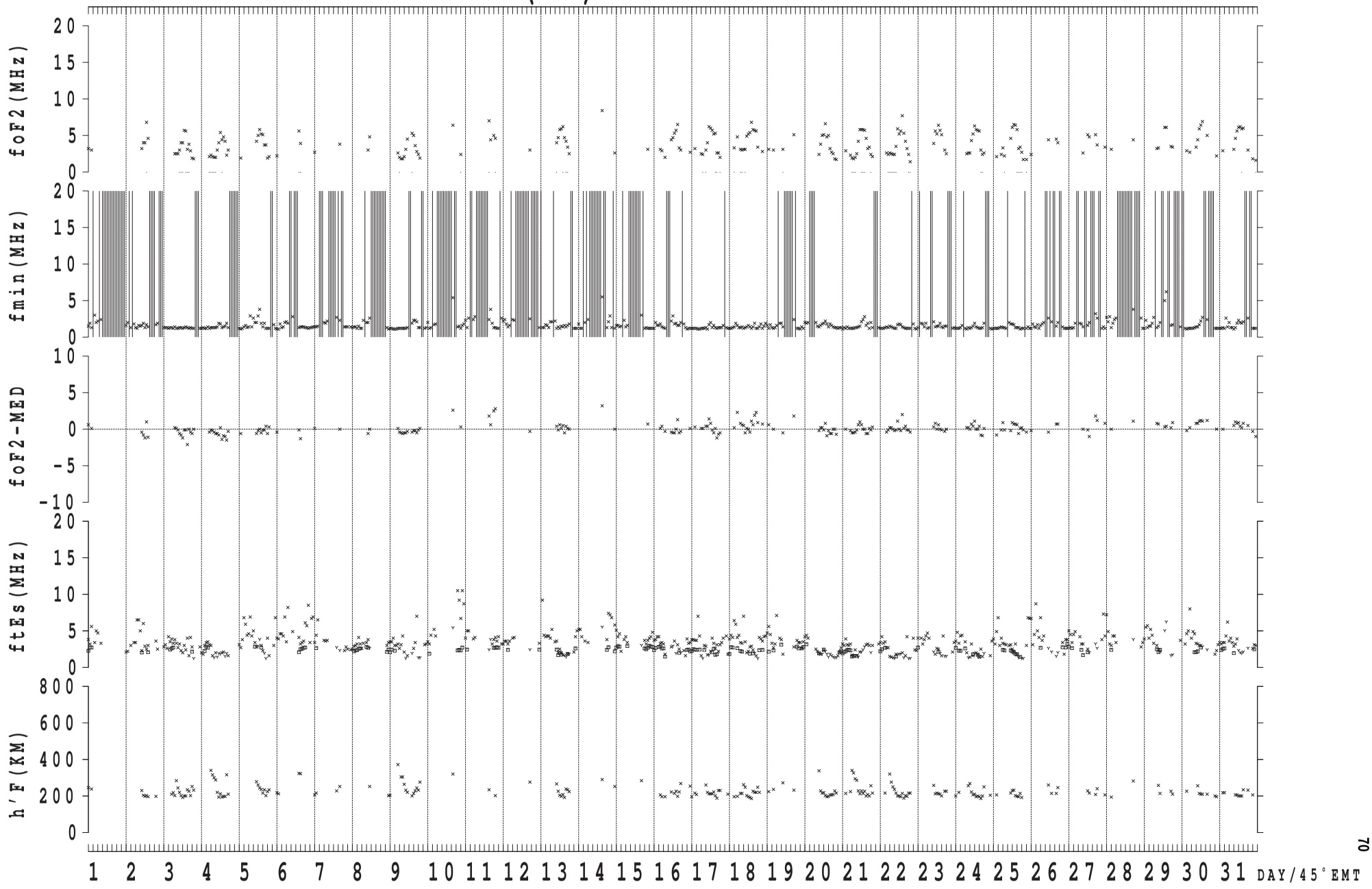

2013 0201 -> 2013 0228(99) SYOWA-ST.
foF2(MHz)
fmin(MHz)
foF2-MED
ftEs(MHz)
h'F(KM)
DAY/45°EMT

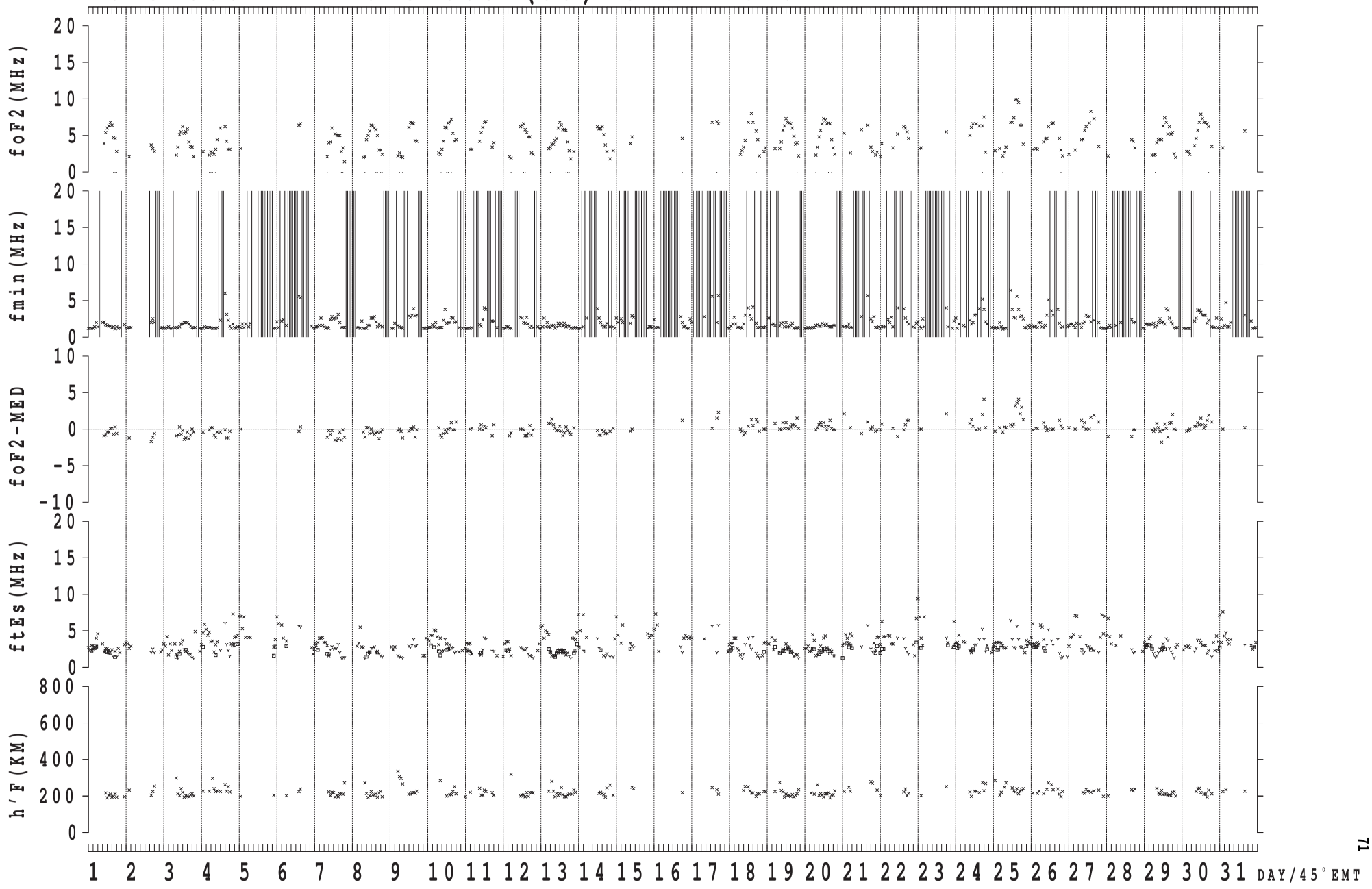

2013 0301 -> 2013 0331(99) SYOWA-ST.
foF2(MHz)
fmin(MHz)
foF2-MED
ftEs(MHz)
h'F(KM)
DAY/45°EMT
99

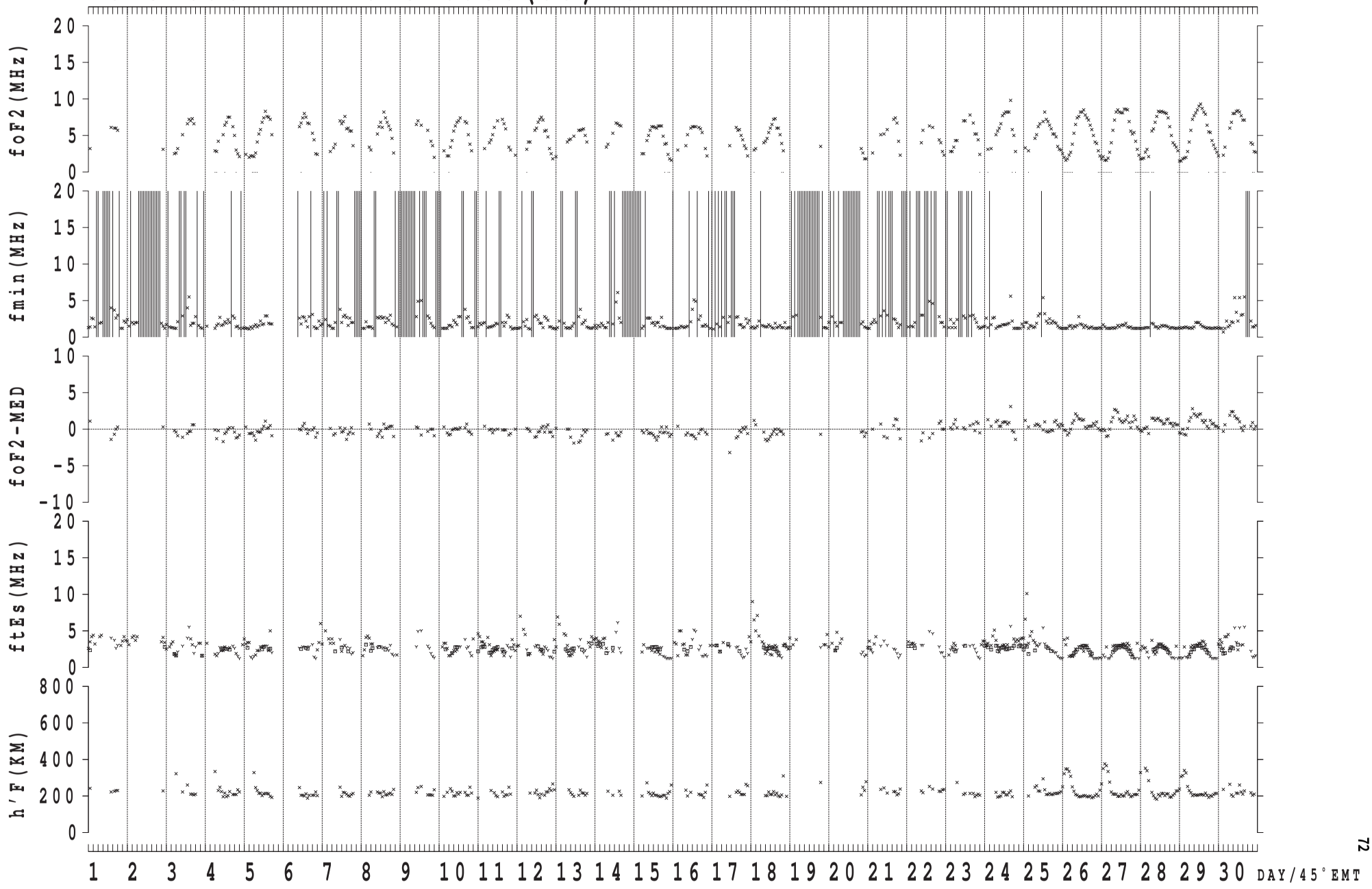

2013 0401 -> 2013 0430(99) SYOWA-ST.
foF2(MHz)
fmin(MHz)
foF2-MED
ftEs(MHz)
h'F(KM)
DAY/45°EMT

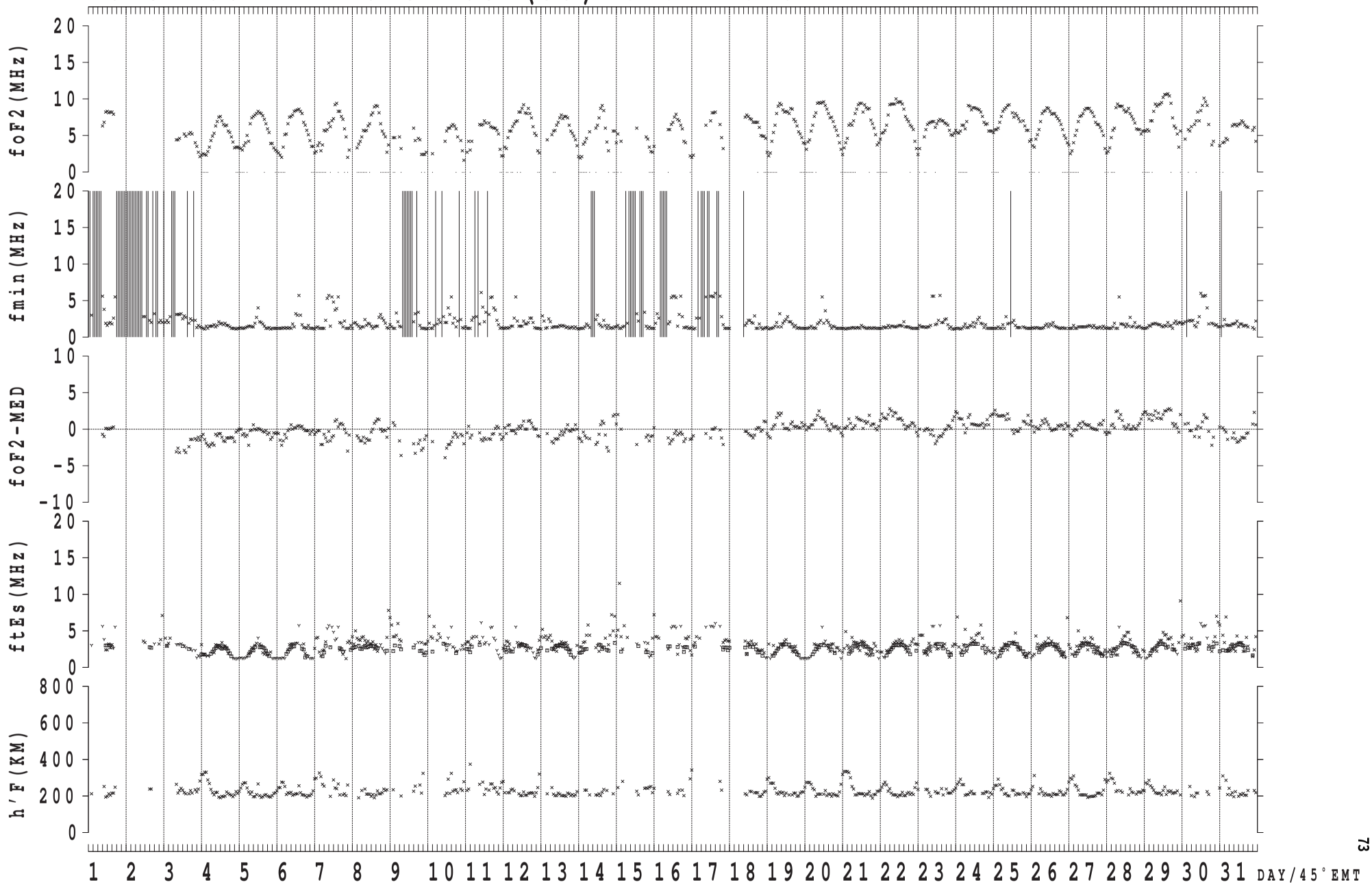

2013 0501 -> 2013 0531(99) SYOWA-ST.
foF2(MHz)
fmin(MHz)
foF2-MED
ftEs(MHz)
h'F(KM)
DAY/45°EMT

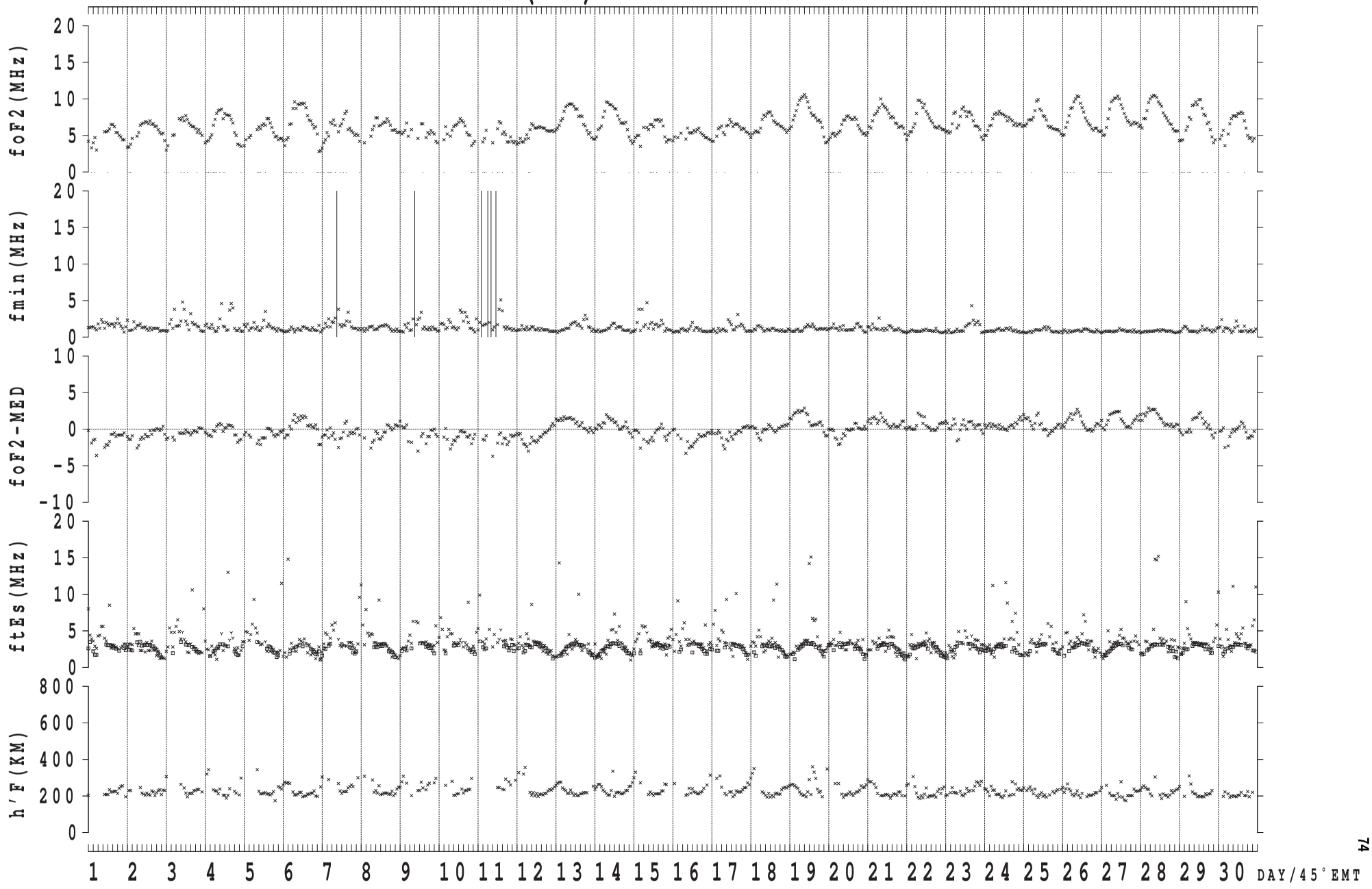

2013 0601 -> 2013 0630(99) SYOWA-ST.
foF2(MHz)
fmin(MHz)
foF2-MED
ftEs(MHz)
h'F(KM)
DAY/45°EMT

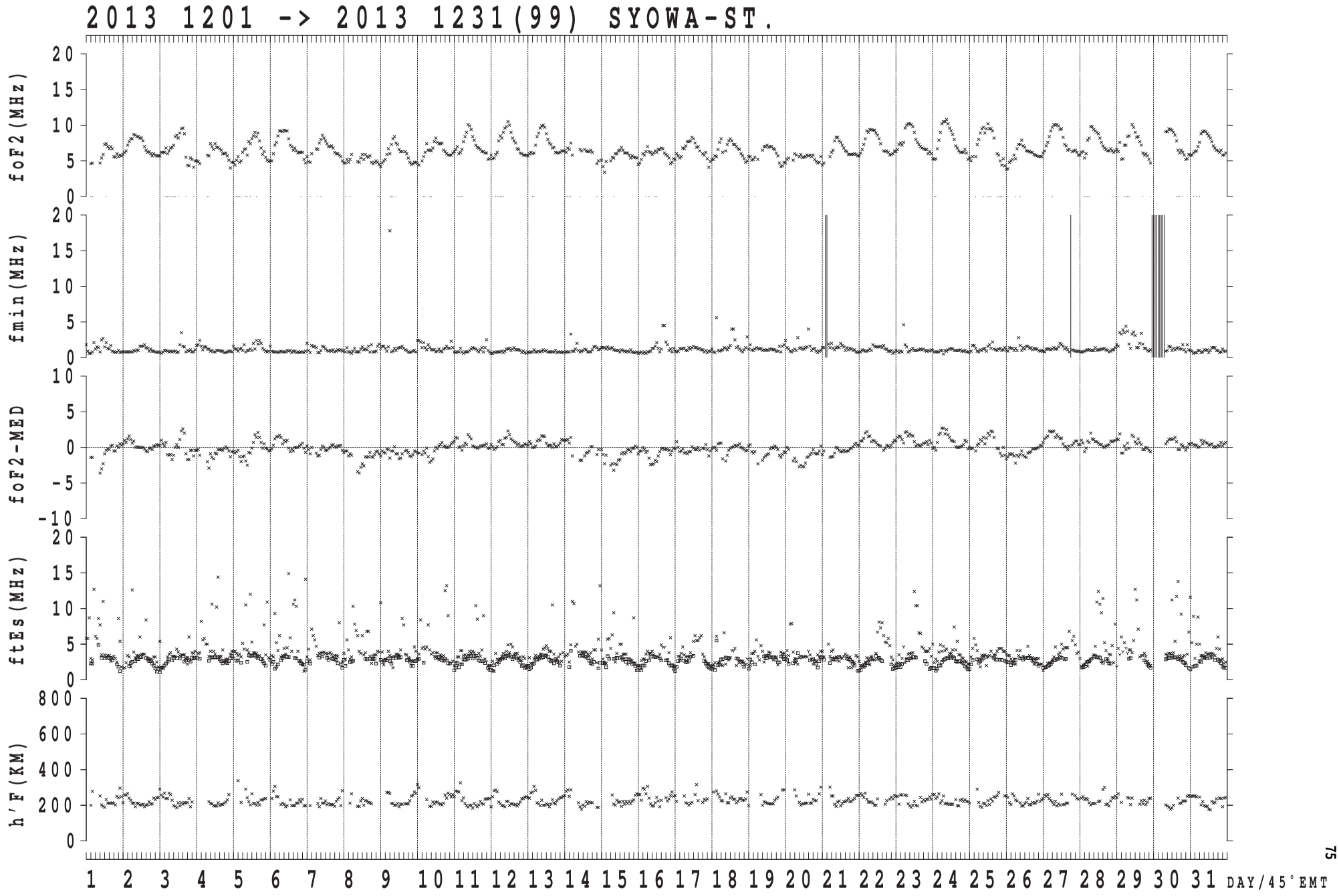

2013 0701 -> 2013 0731(99) SYOWA-ST.
foF2(MHz)
fmin(MHz)
foF2-MED
ftEs(MHz)
h'F(KM)
DAY/45°EMT


2013 0801 -> 2013 0831(99) SYOWA-ST.
foF2(MHz)
fmin(MHz)
foF2-MED
ftEs(MHz)
h'F(KM)
DAY/45°EMT


2013 0901 -> 2013 0930(99) SYOWA-ST.
foF2(MHz)
fmin(MHz)
foF2-MED
ftEs(MHz)
h'F(KM)
DAY/45°EMT

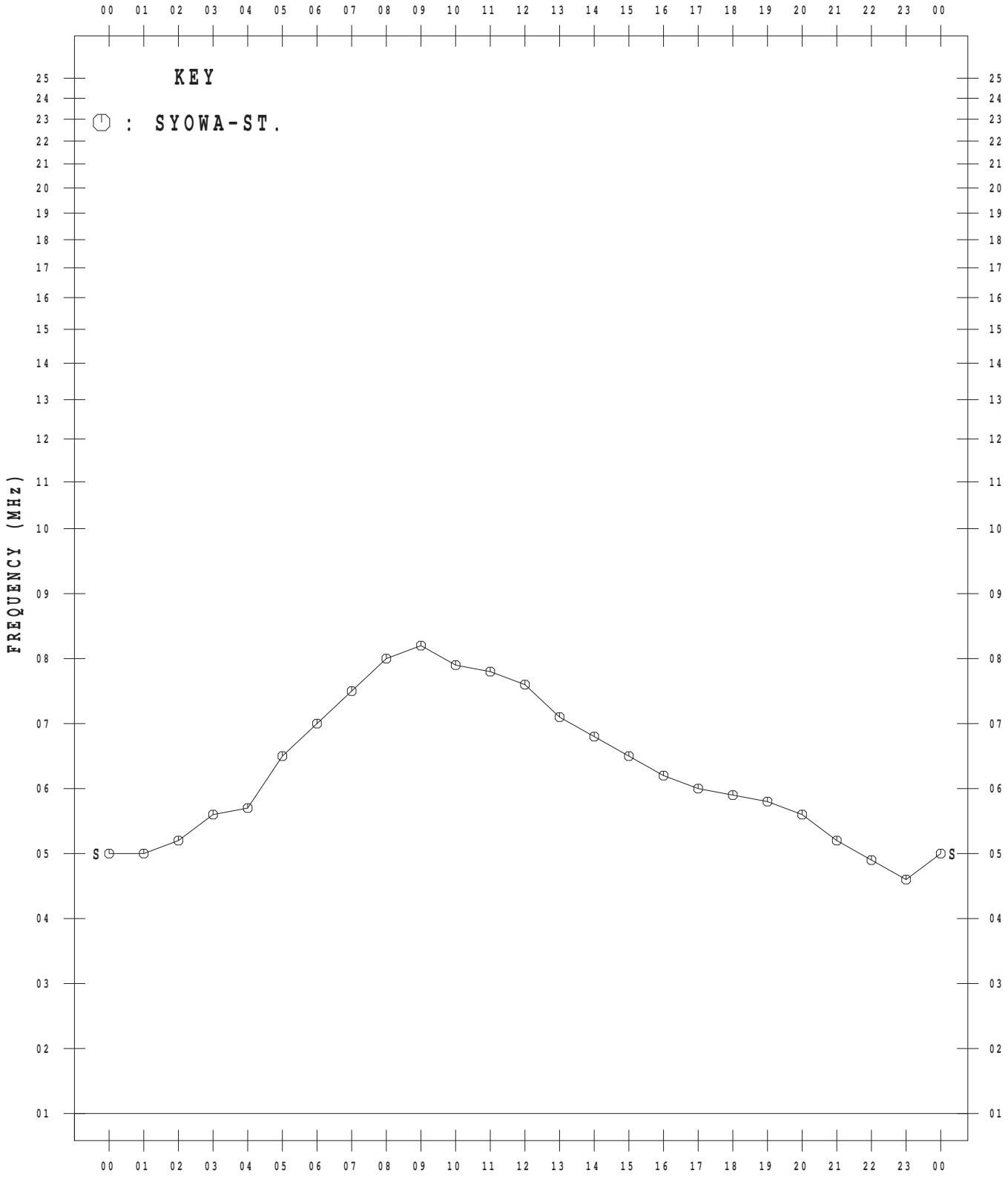

2013 1001 -> 2013 1031(99) SYOWA-ST.
foF2(MHz)
fmin(MHz)
foF2-MED
ftEs(MHz)
h'F(KM)
DAY/45°EMT


2013 1101 -> 2013 1130(99) SYOWA-ST.
foF2(MHz)
fmin(MHz)
foF2-MED
ftEs(MHz)
h'F(KM)
DAY/45°EMT


2013 1201 -> 2013 1231(99) SYOWA-ST.
foF2(MHz)
fmin(MHz)
foF2-MED
ftEs(MHz)
h'F(KM)
DAY/45°EMT

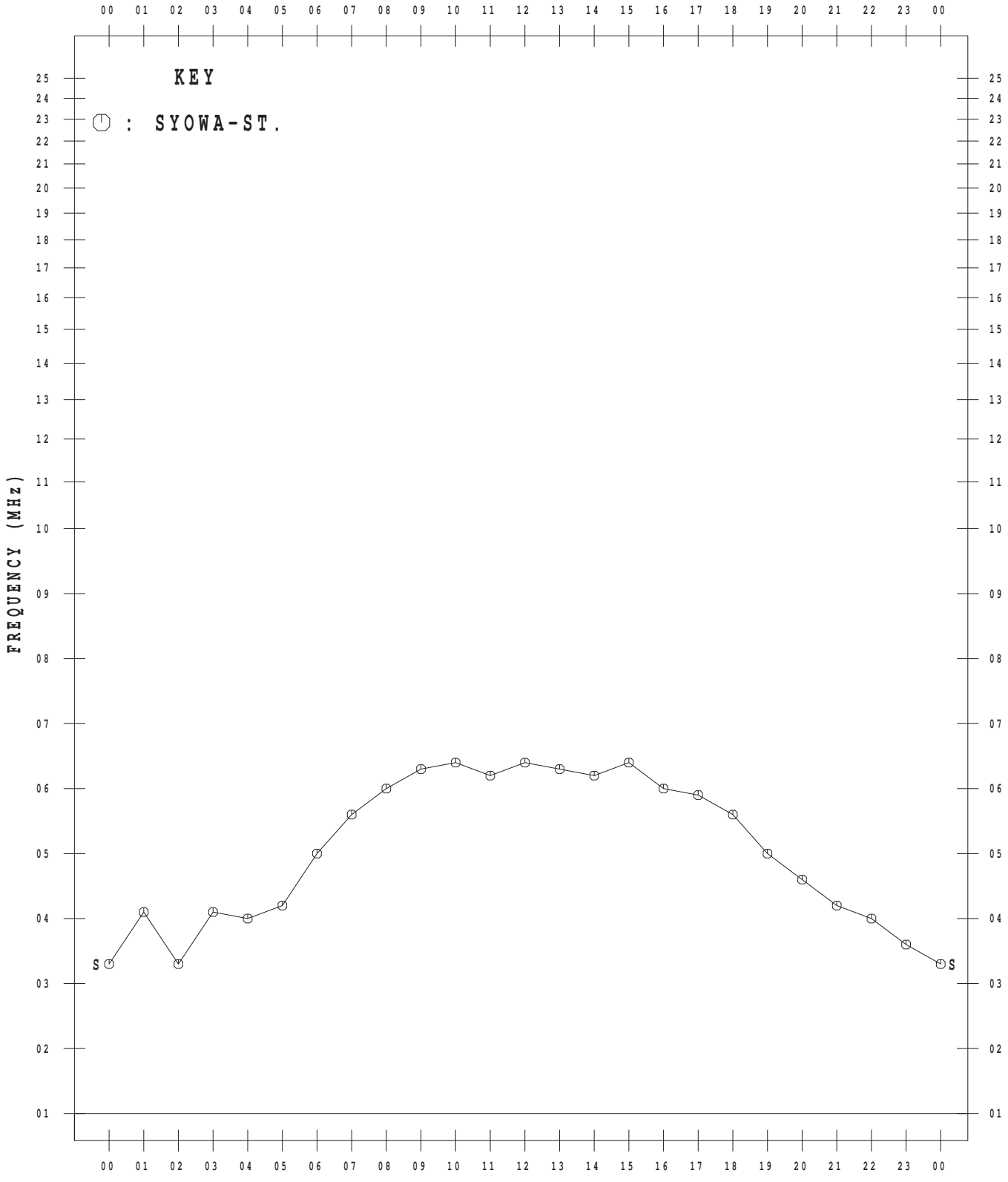
# MONTHLY MEDIAN VALUES OF foF2

45°E MEAN TIME JAN. 2013



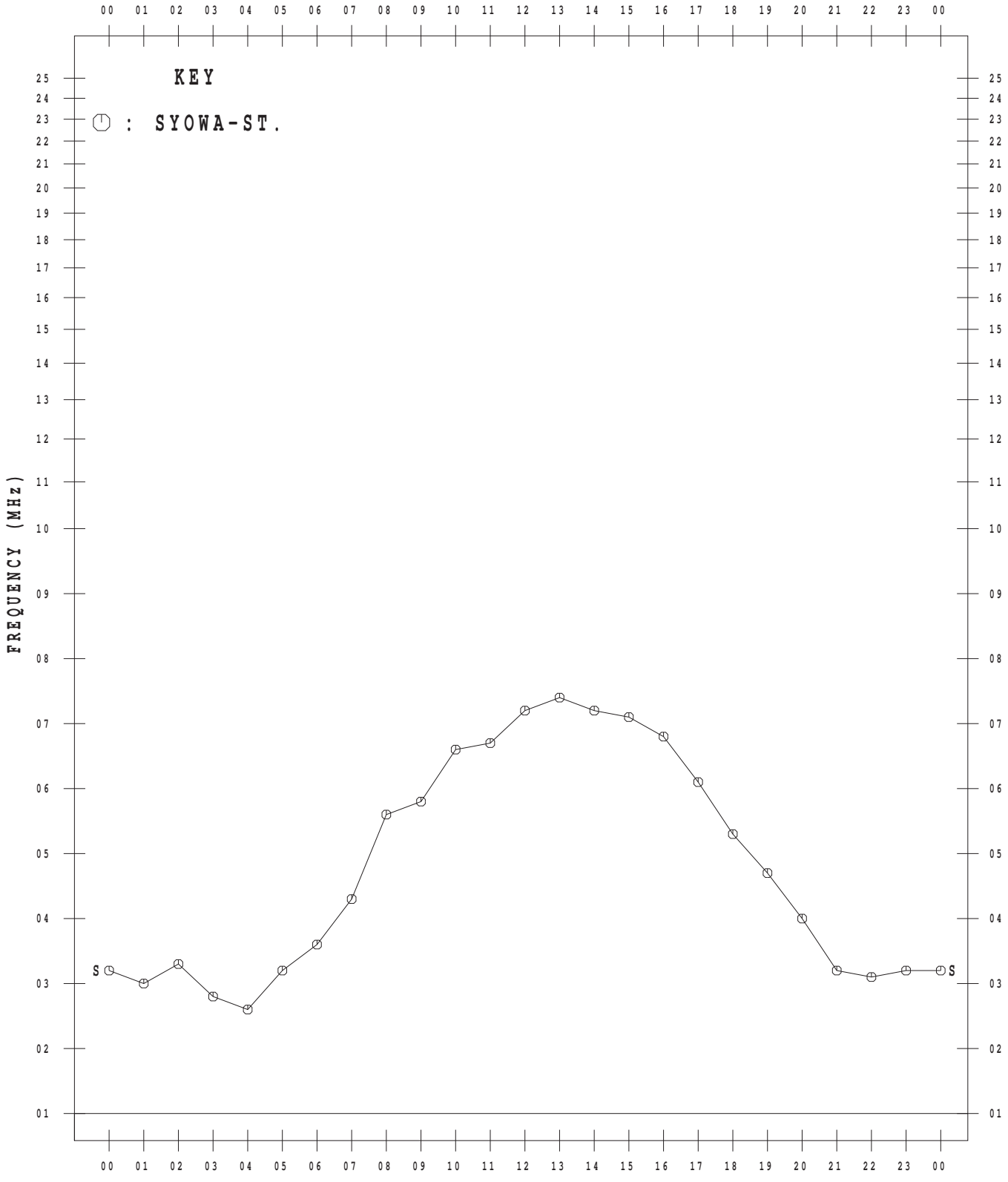
# MONTHLY MEDIAN VALUES OF foF2

45°E MEAN TIME FEB. 2013



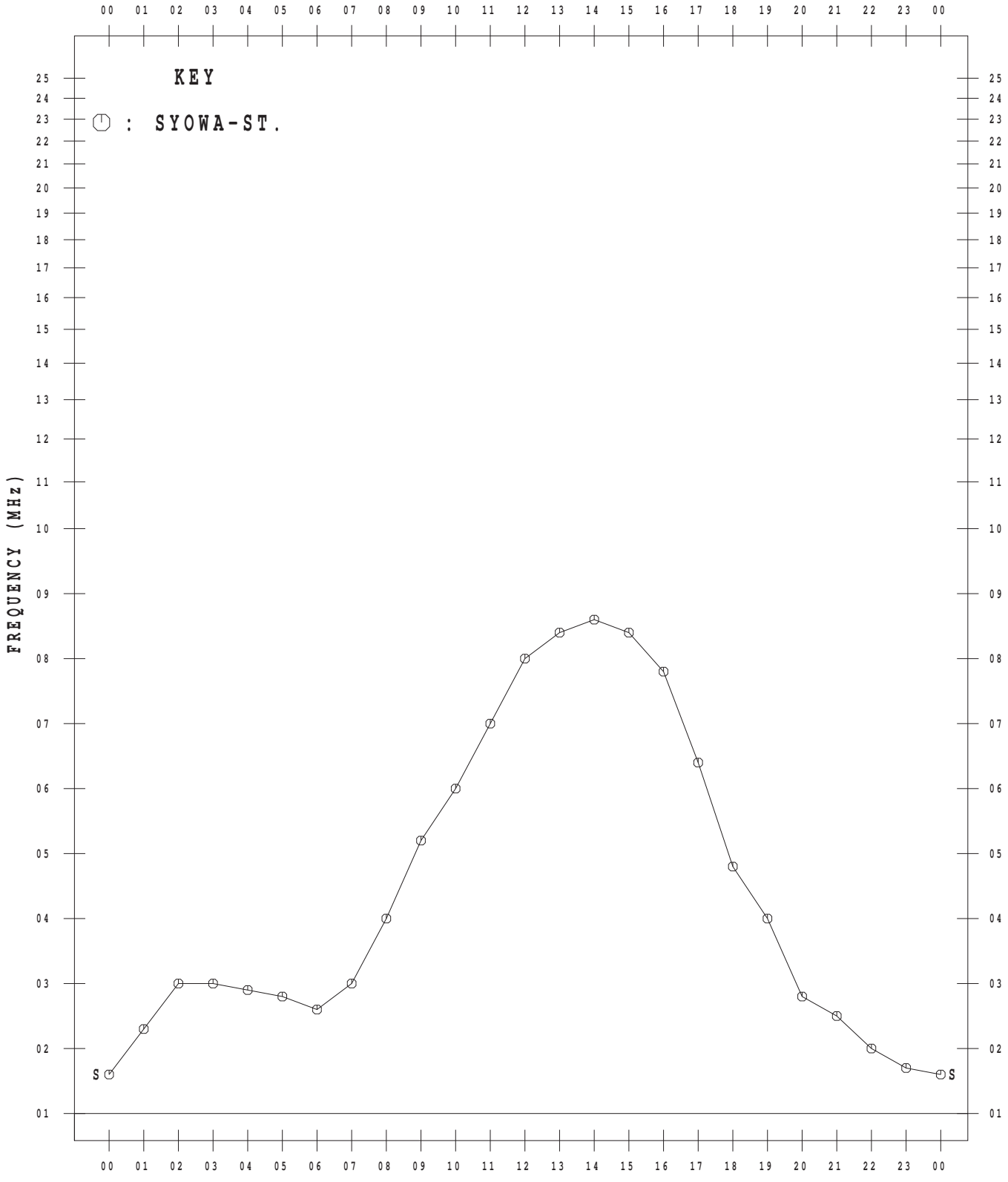
# MONTHLY MEDIAN VALUES OF foF2

45°E MEAN TIME MAR. 2013



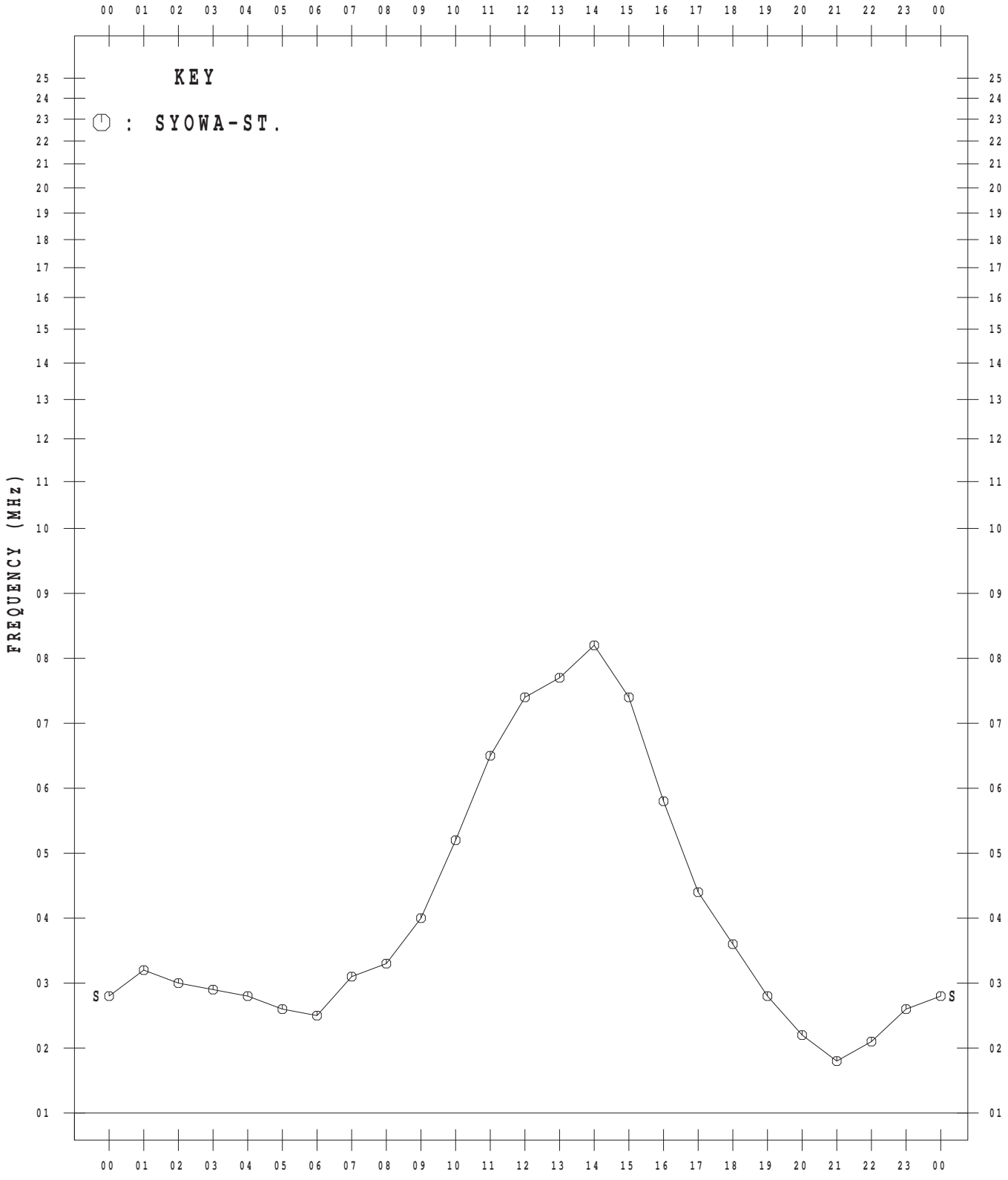
# MONTHLY MEDIAN VALUES OF foF2

45°E MEAN TIME APR. 2013



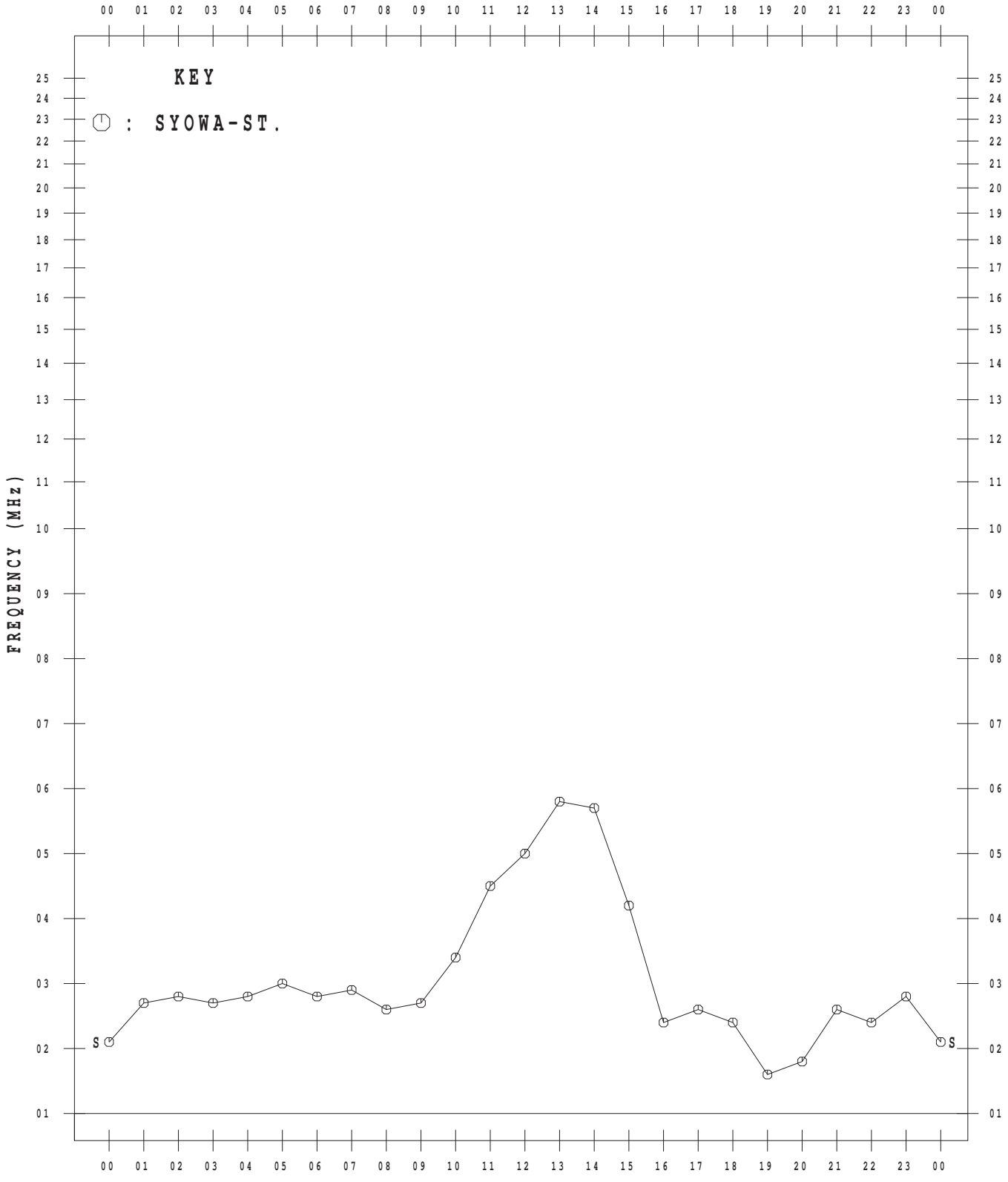
# MONTHLY MEDIAN VALUES OF foF2

45°E MEAN TIME MAY 2013



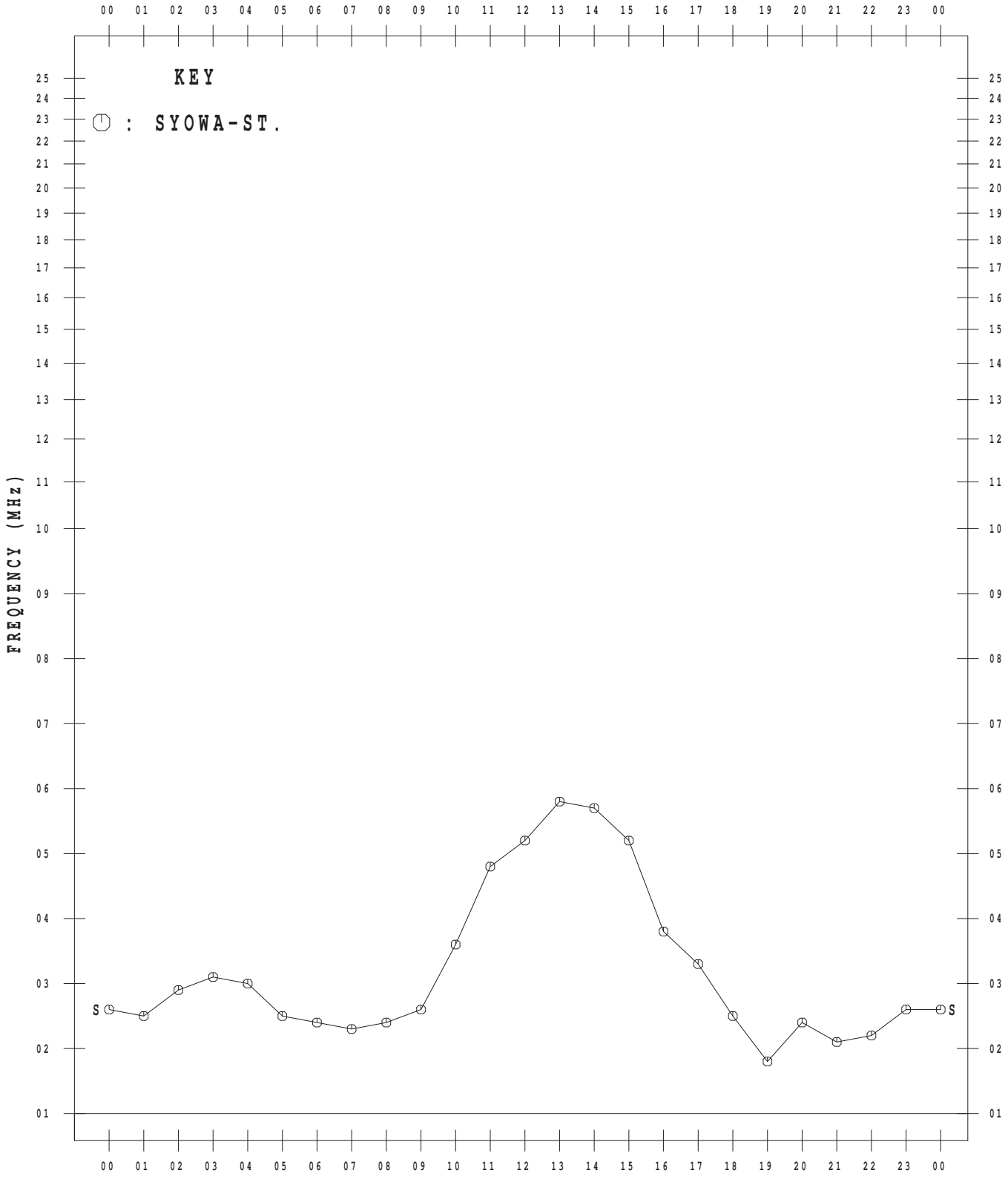
# MONTHLY MEDIAN VALUES OF foF2

45°E MEAN TIME JUN. 2013



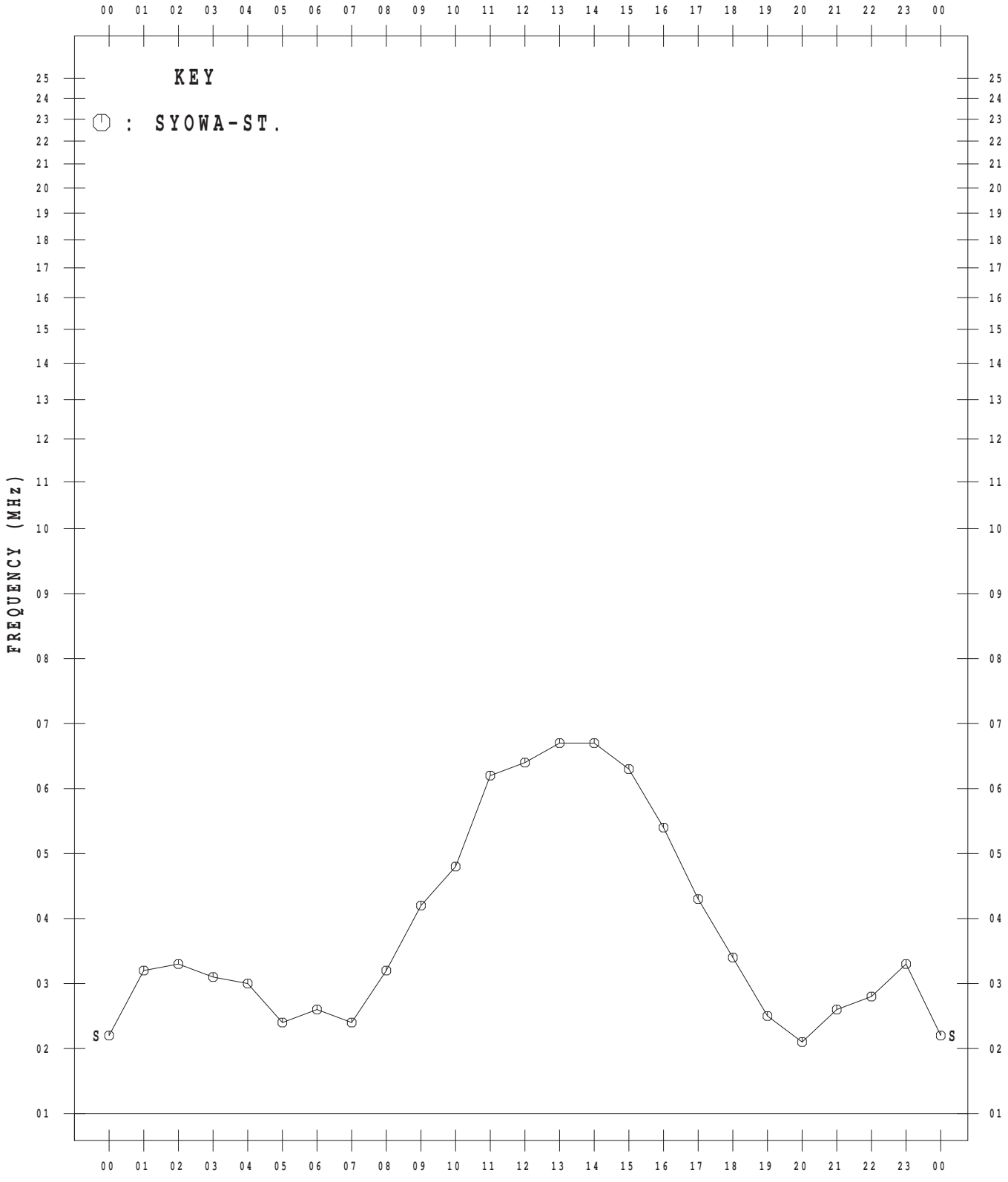
# MONTHLY MEDIAN VALUES OF foF2

45°E MEAN TIME JUL. 2013



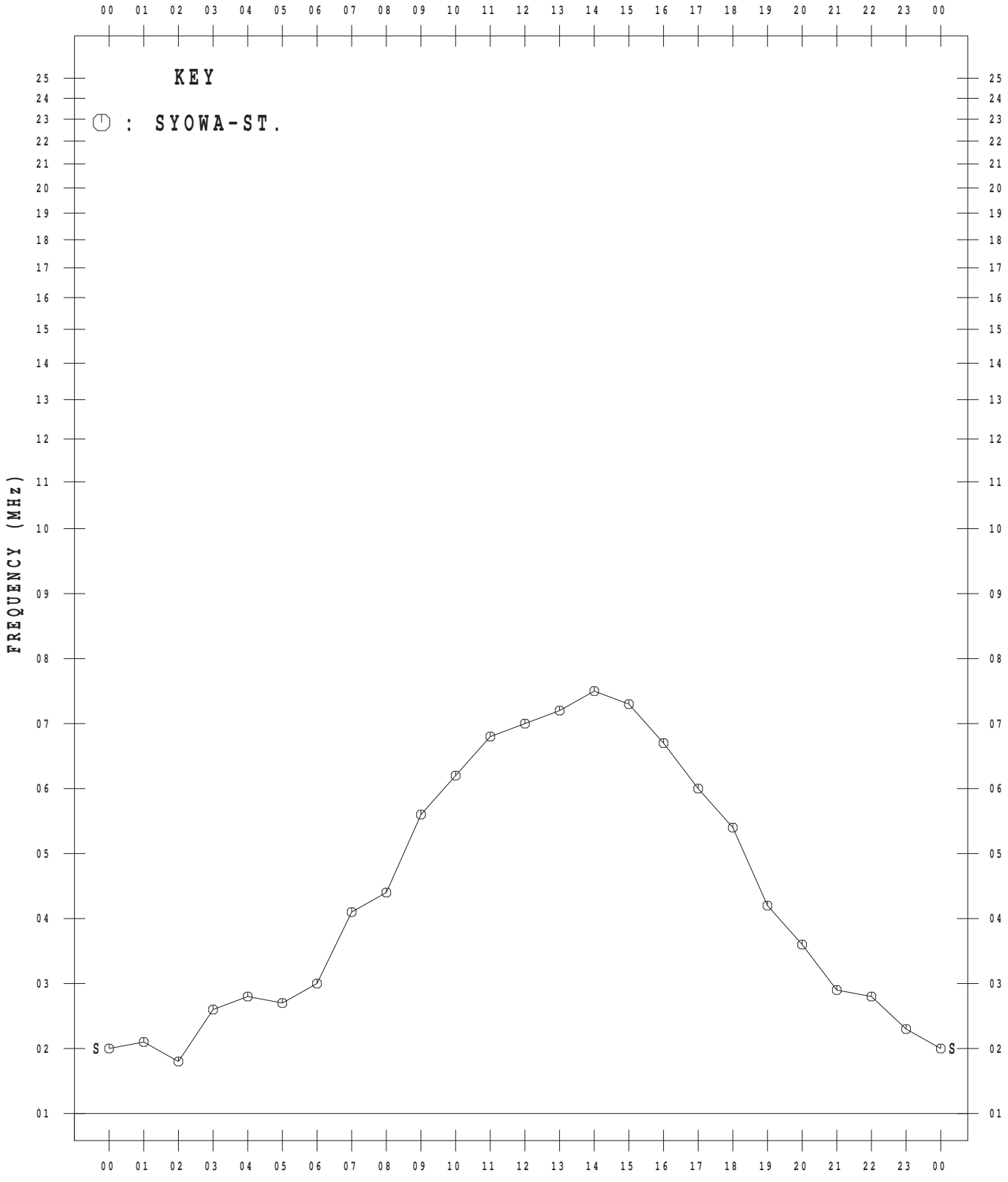
# MONTHLY MEDIAN VALUES OF foF2

45°E MEAN TIME AUG. 2013



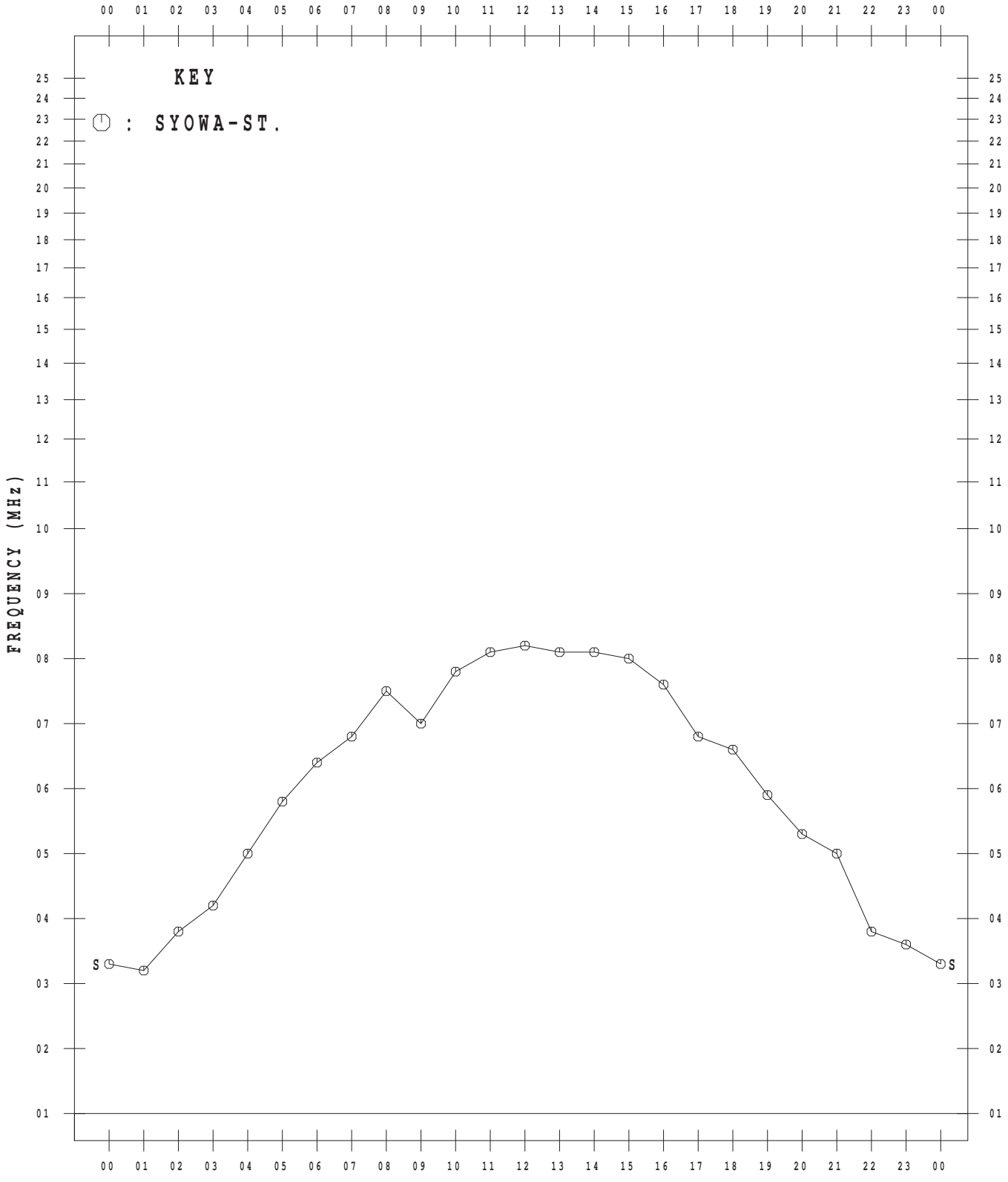
# MONTHLY MEDIAN VALUES OF foF2

45°E MEAN TIME SEP. 2013



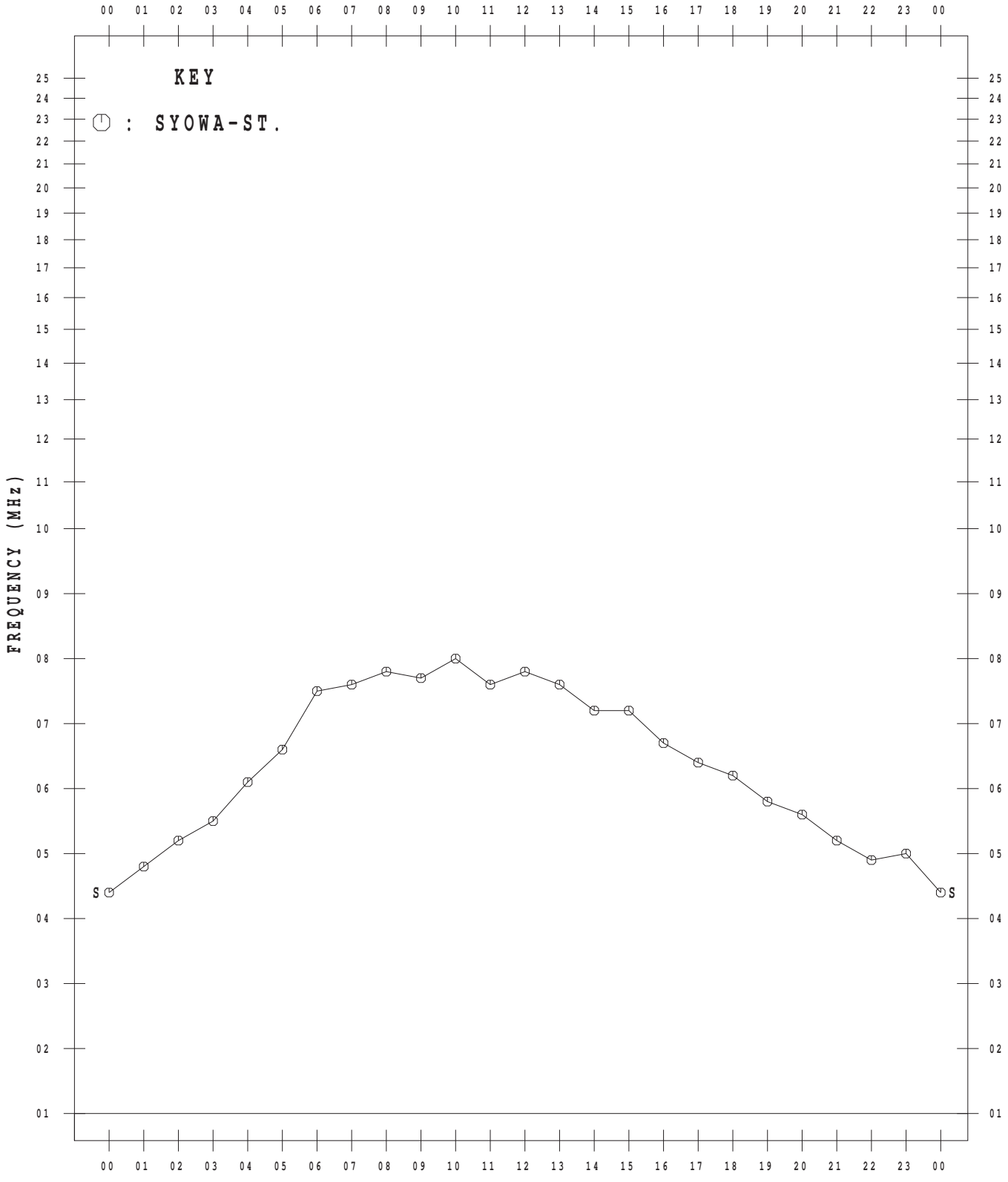
# MONTHLY MEDIAN VALUES OF foF2

45°E MEAN TIME OCT. 2013



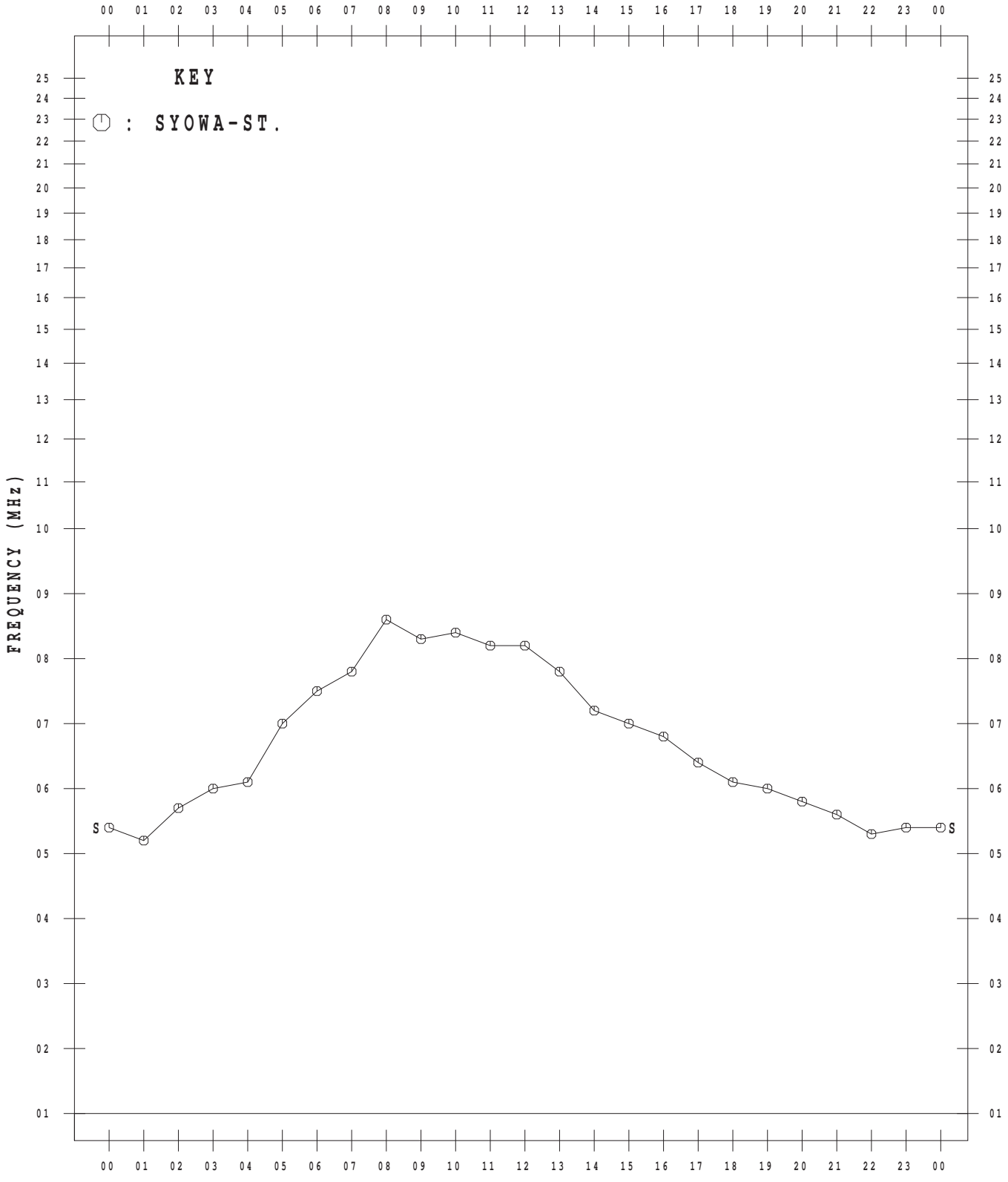
# MONTHLY MEDIAN VALUES OF foF2

45°E MEAN TIME NOV. 2013



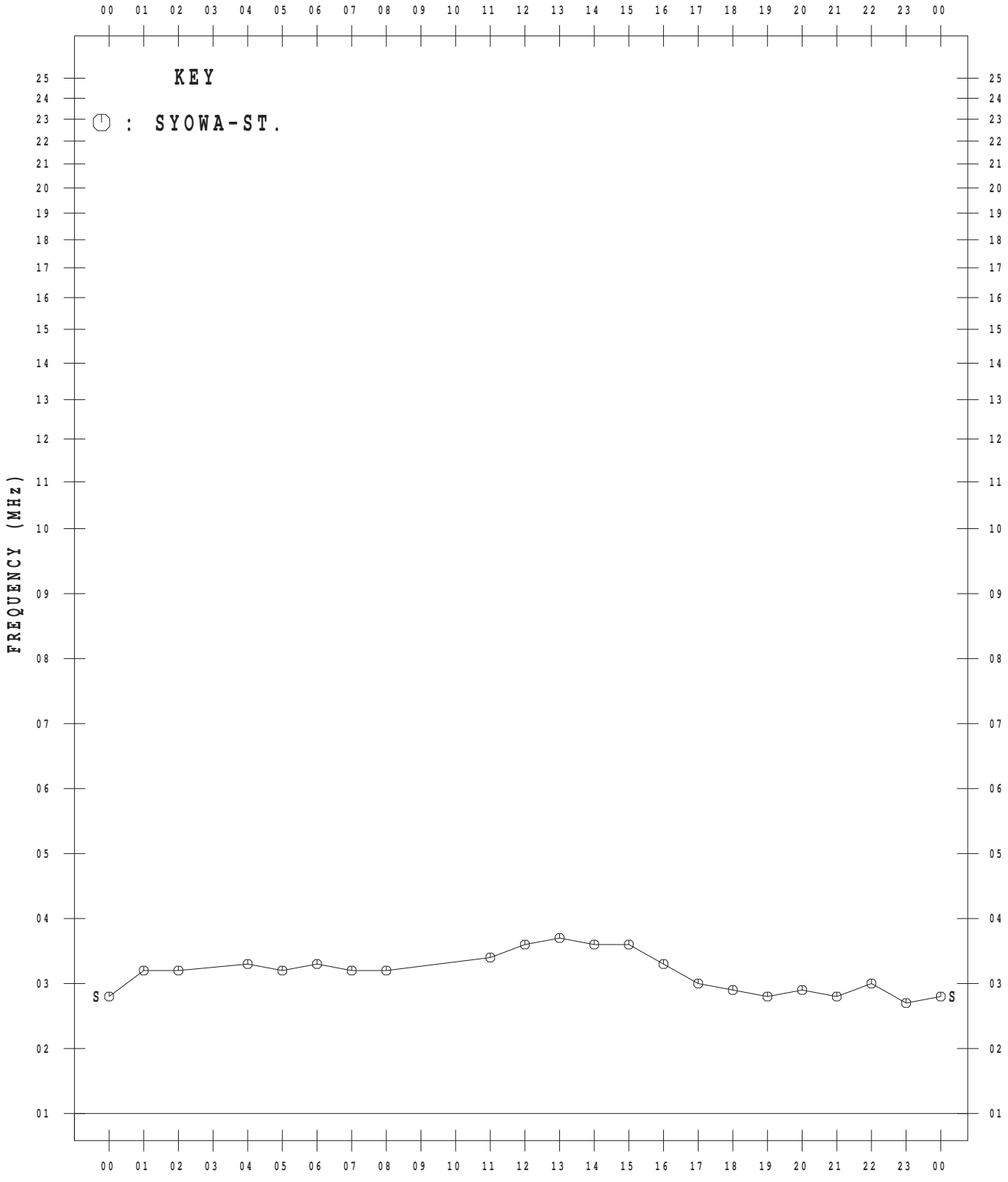
# MONTHLY MEDIAN VALUES OF foF2

45°E MEAN TIME DEC. 2013



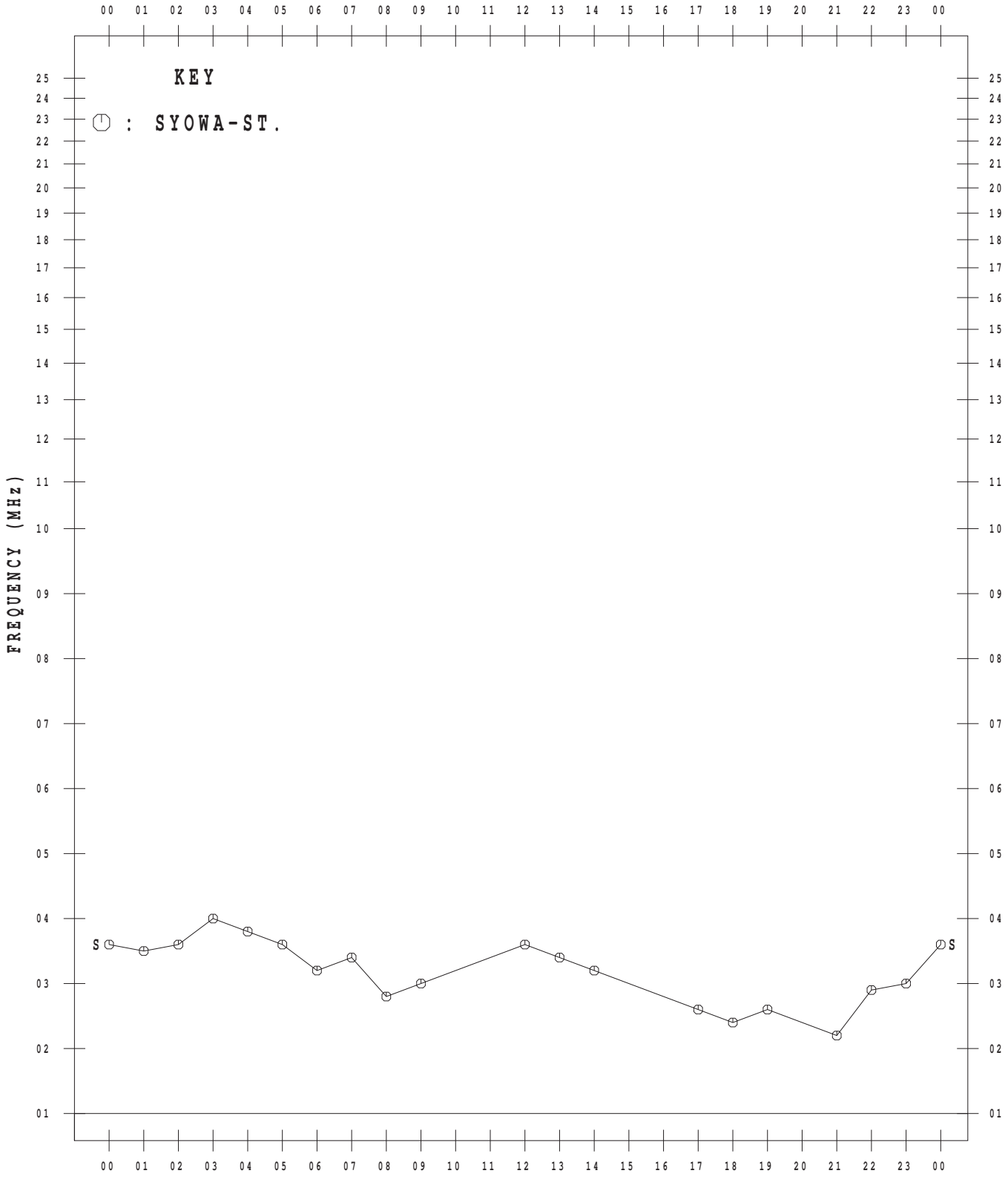
# MONTHLY MEDIAN VALUES OF ftEs

45°E MEAN TIME JAN. 2013



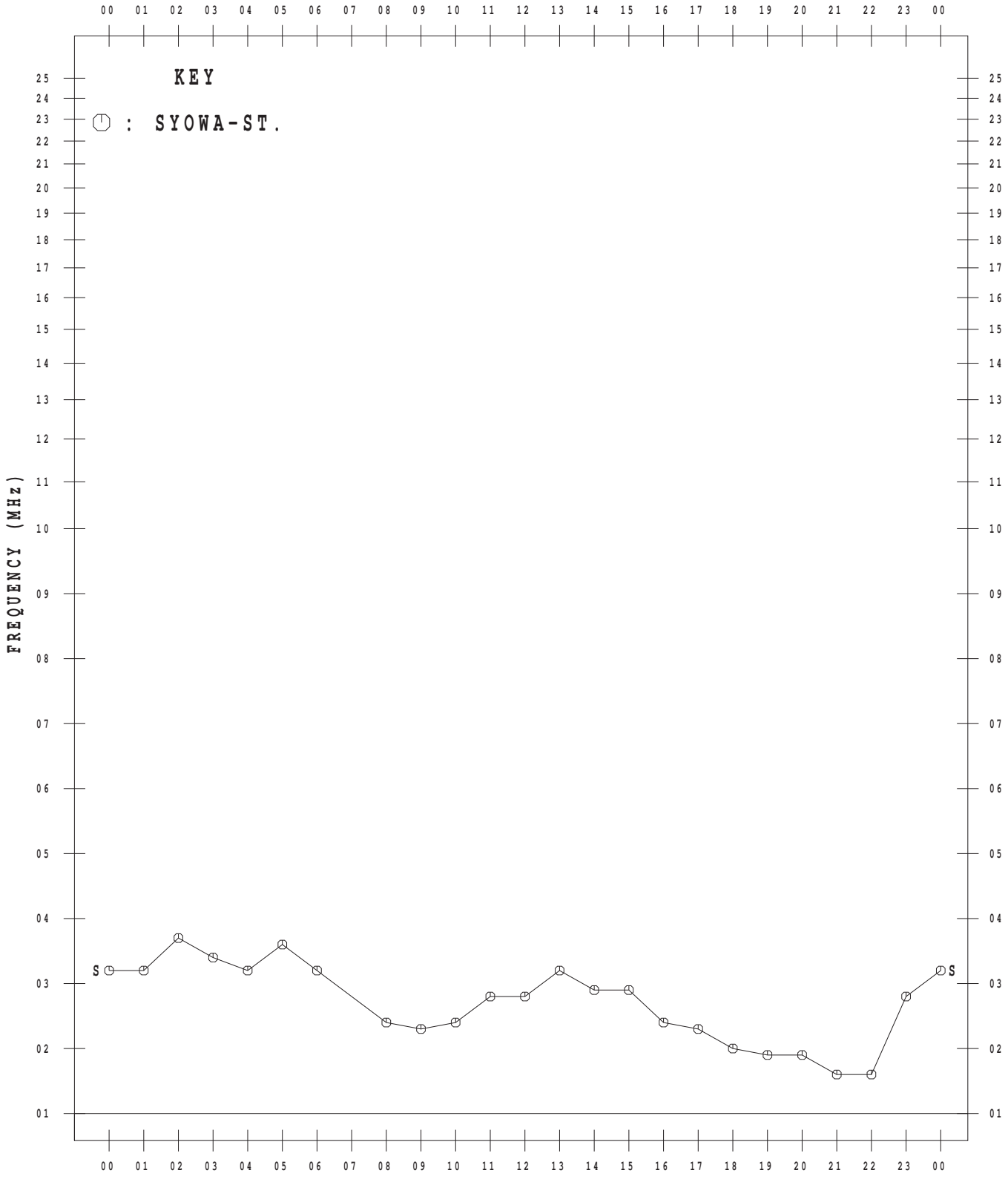
# MONTHLY MEDIAN VALUES OF ftEs

45°E MEAN TIME FEB. 2013



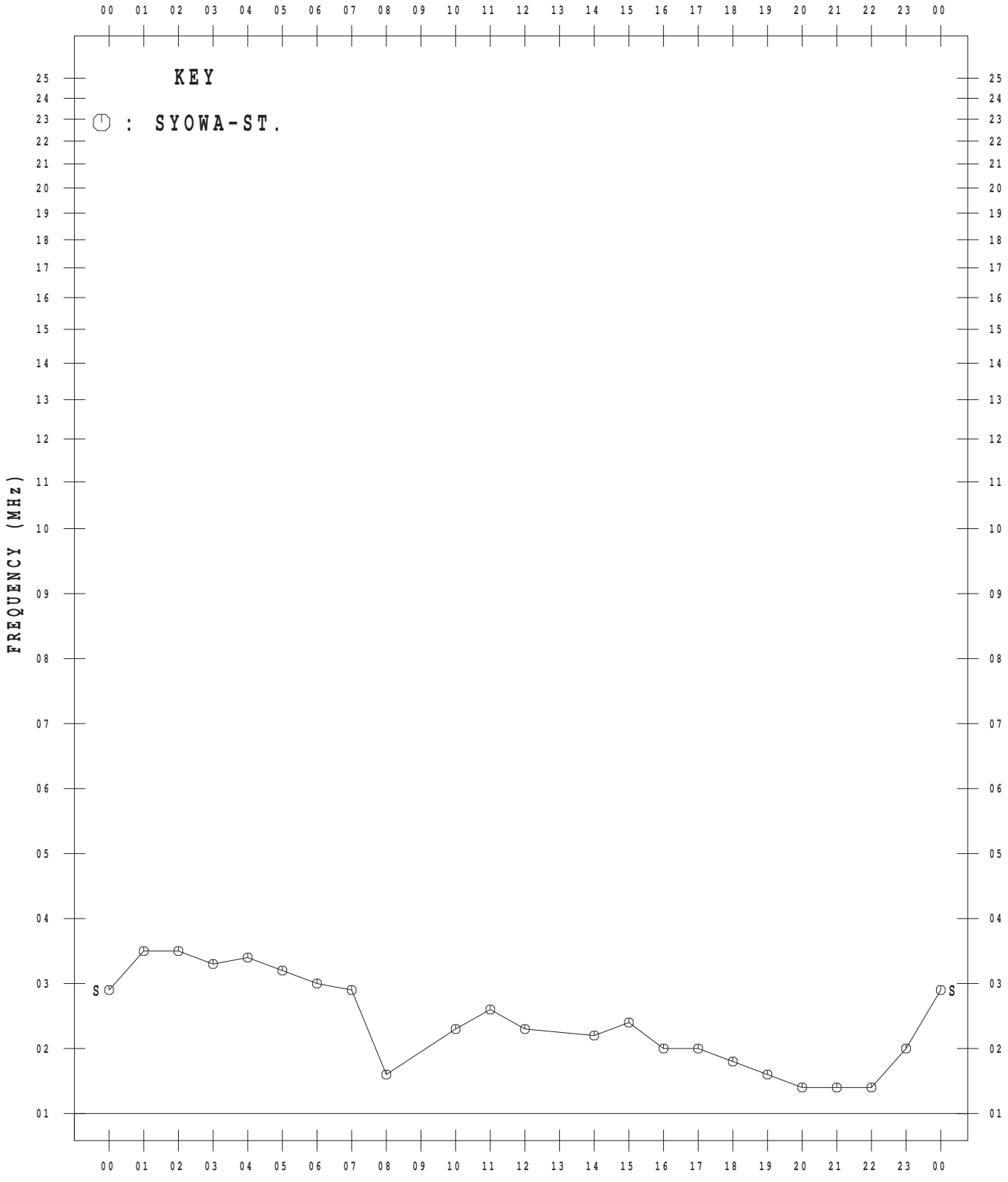
# MONTHLY MEDIAN VALUES OF ftEs

45°E MEAN TIME MAR. 2013



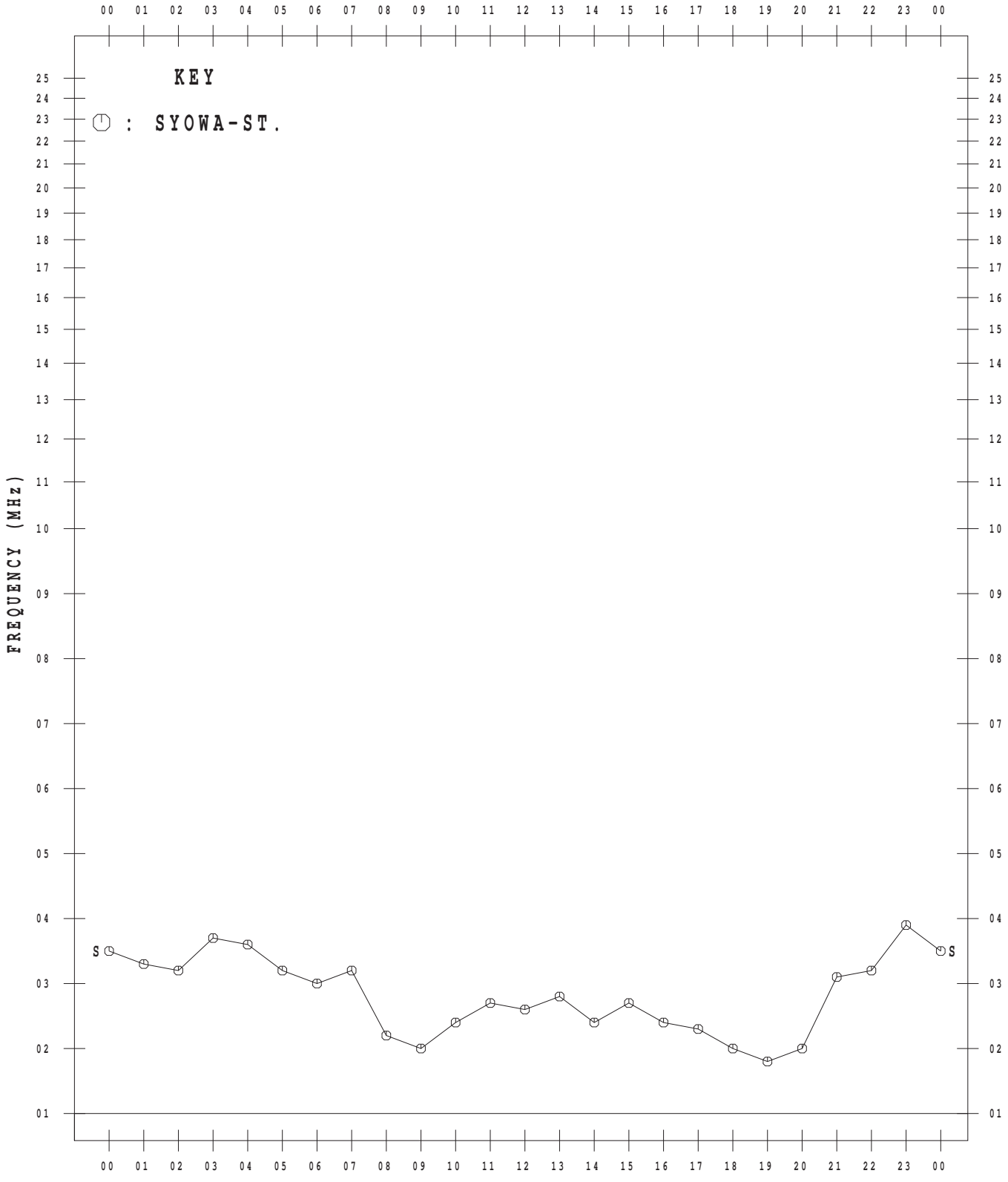
# MONTHLY MEDIAN VALUES OF ftEs

45°E MEAN TIME APR. 2013



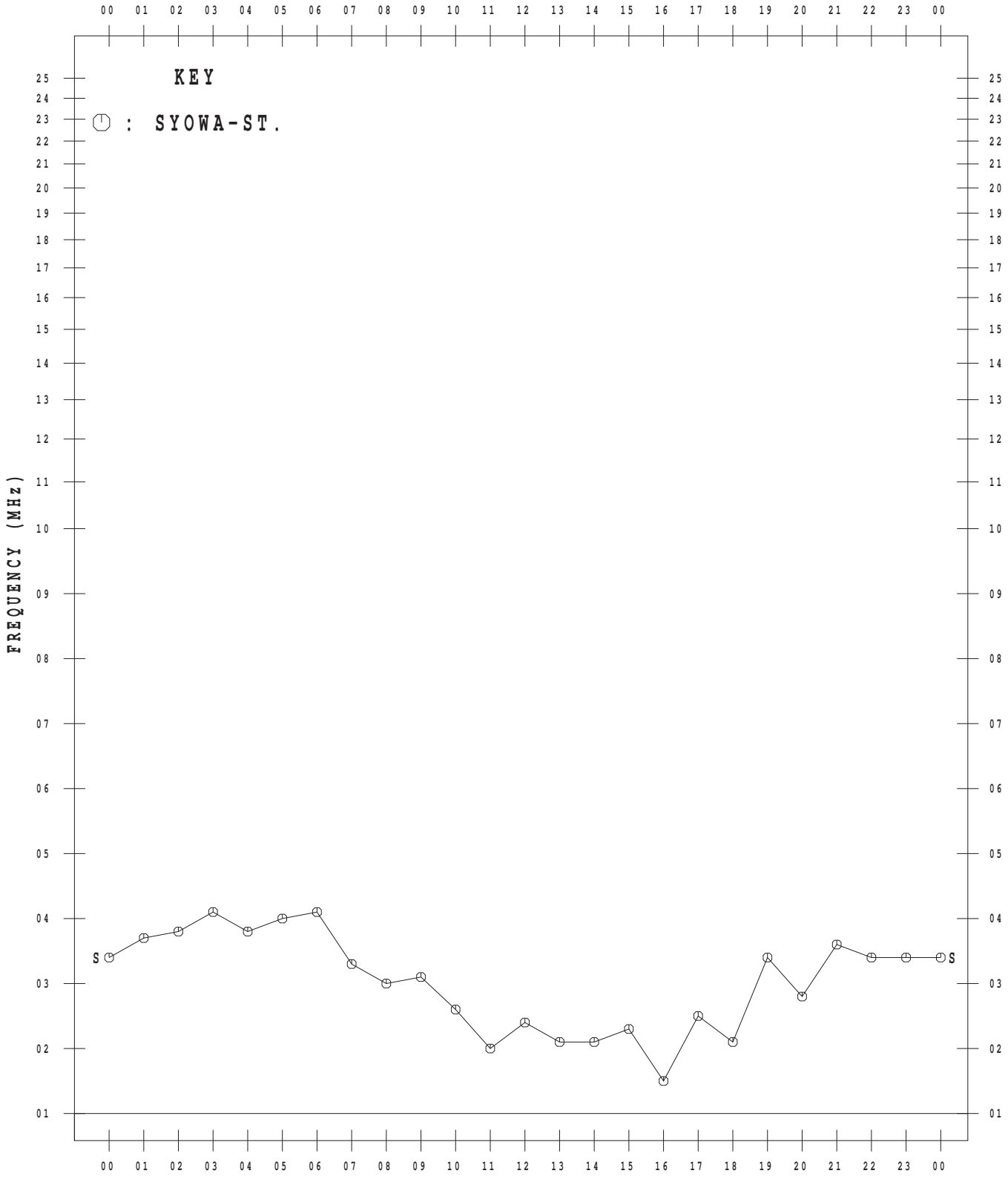
# MONTHLY MEDIAN VALUES OF ftEs

45°E MEAN TIME MAY 2013



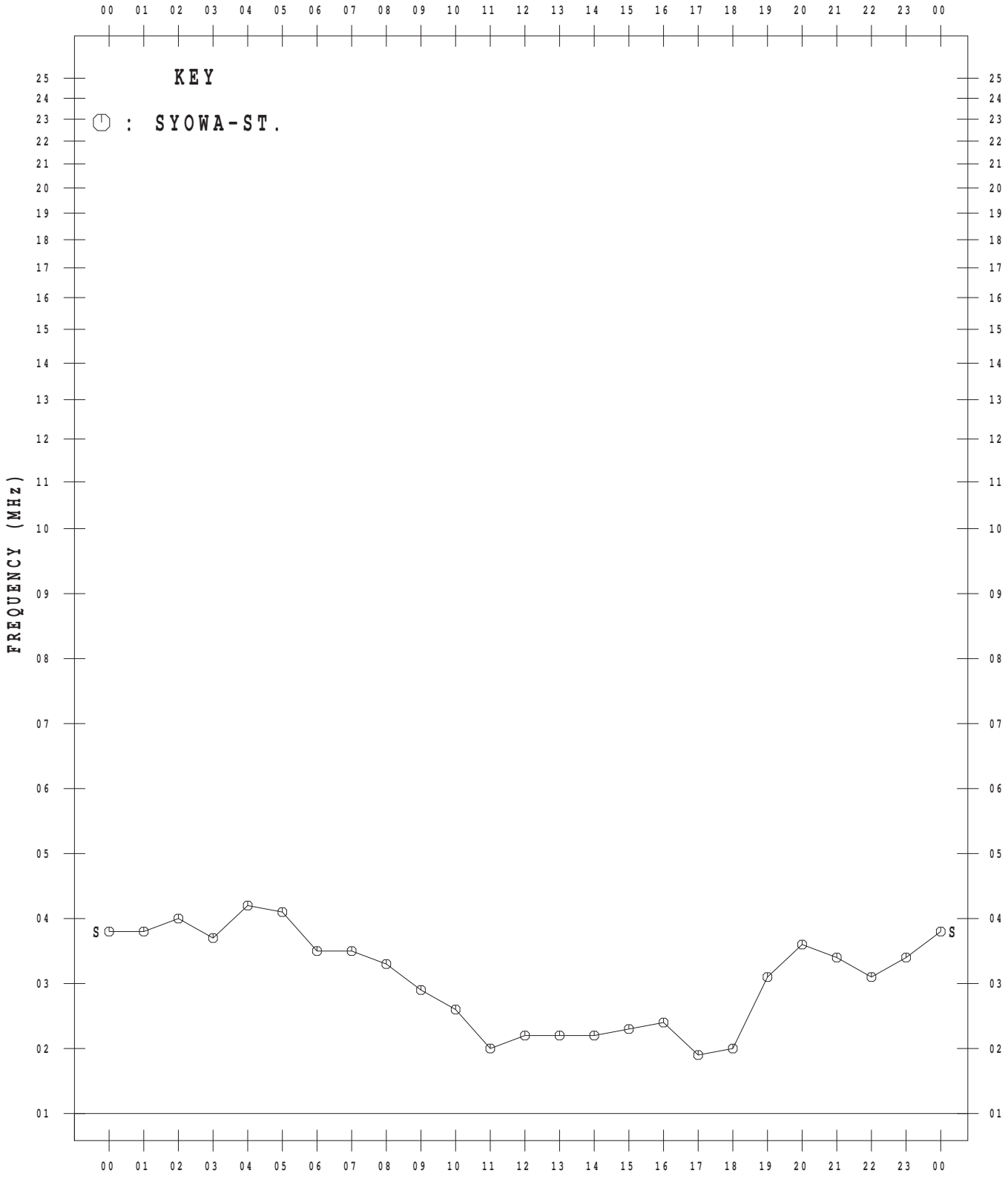
# MONTHLY MEDIAN VALUES OF ftEs

45°E MEAN TIME JUN. 2013



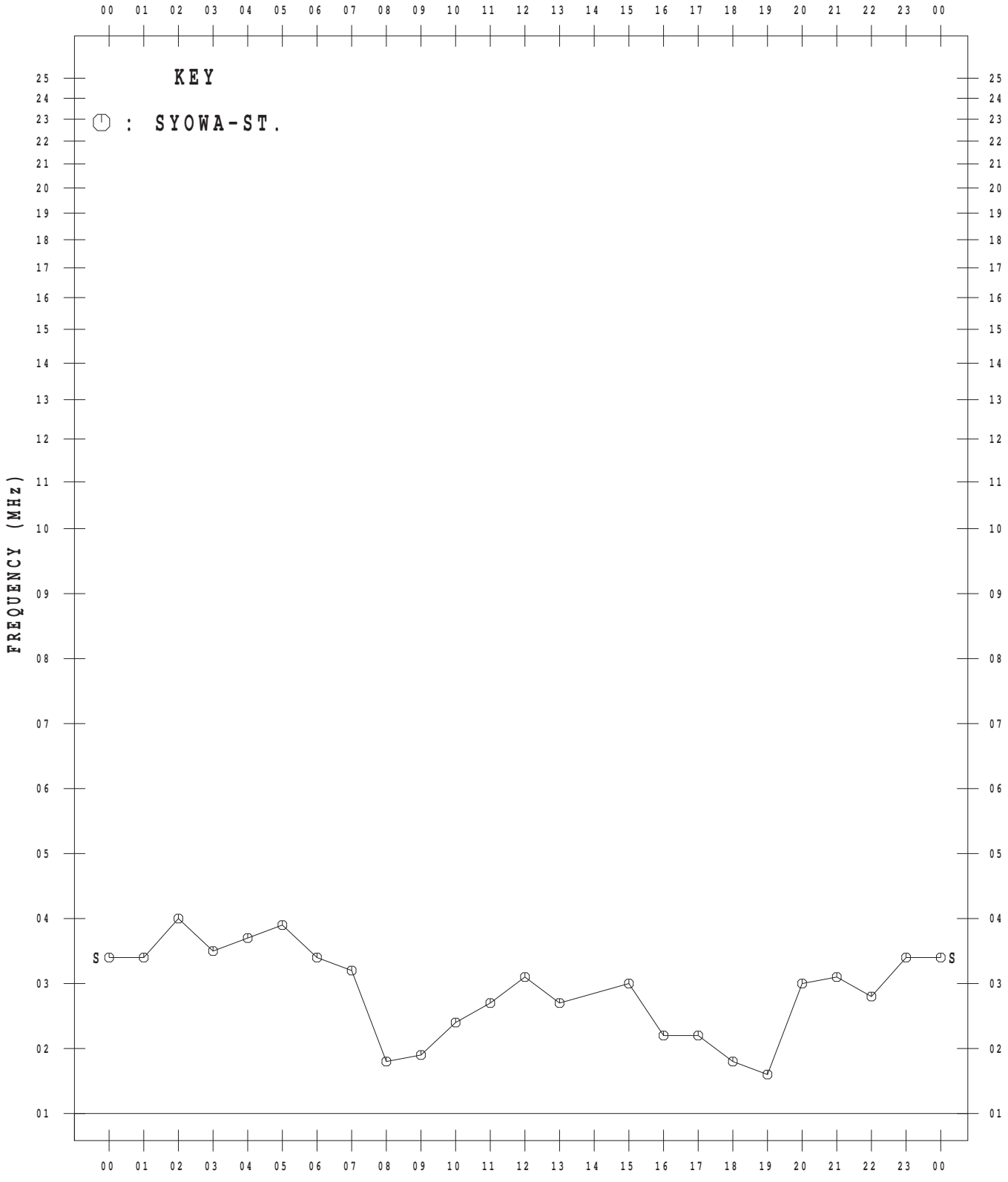
# MONTHLY MEDIAN VALUES OF ftEs

45°E MEAN TIME JUL. 2013



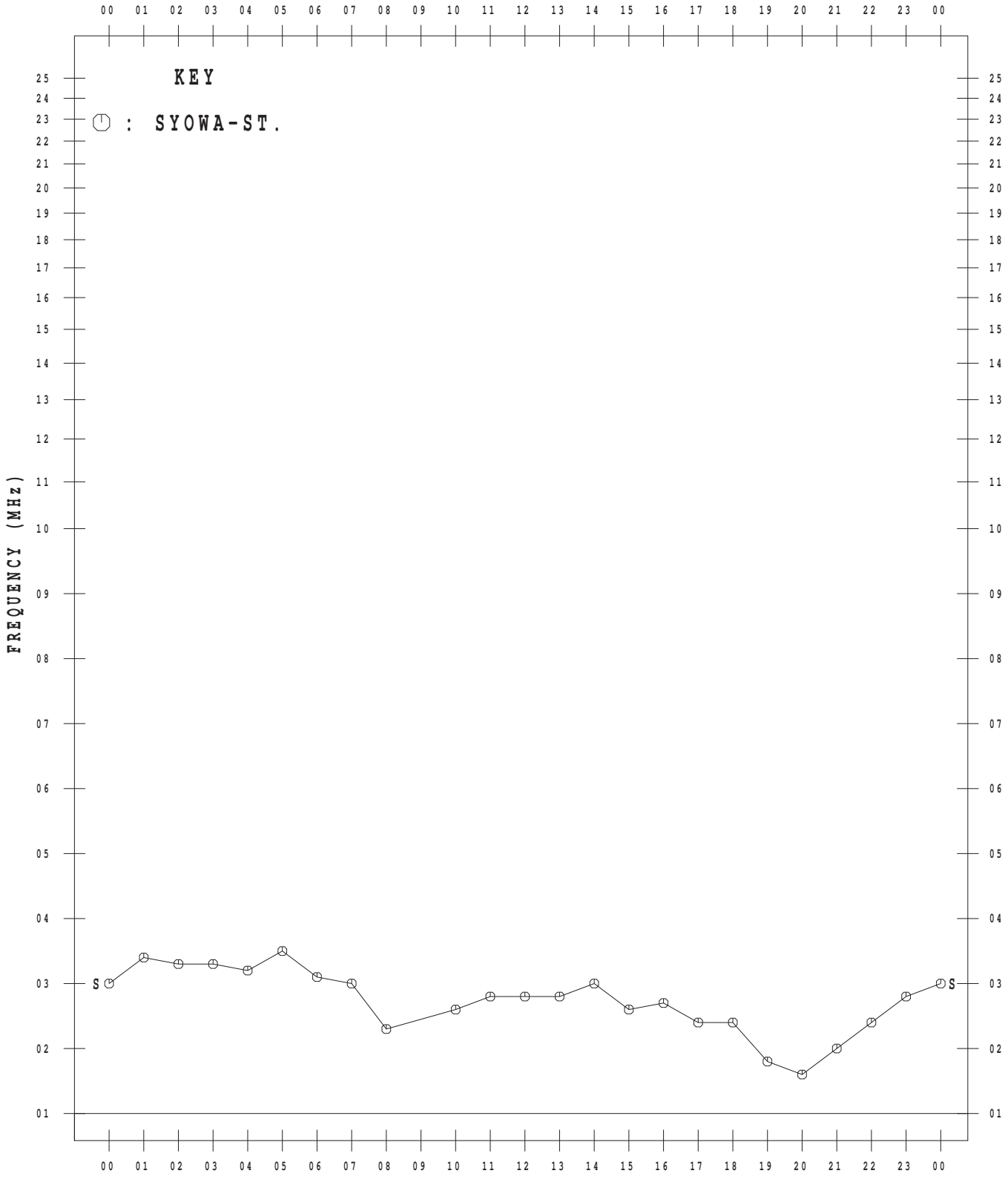
# MONTHLY MEDIAN VALUES OF ftEs

45°E MEAN TIME AUG. 2013



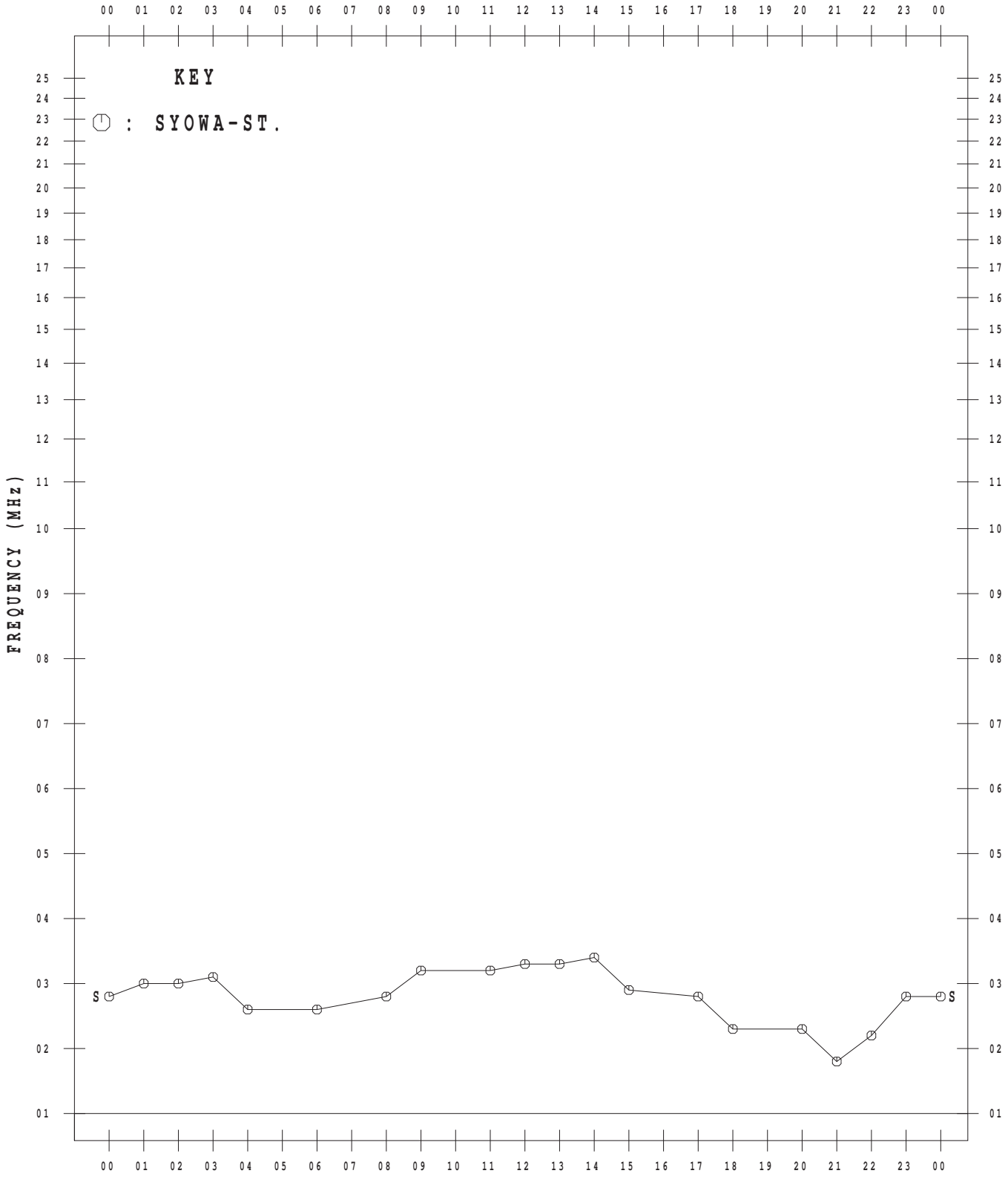
# MONTHLY MEDIAN VALUES OF ftEs

45°E MEAN TIME SEP. 2013



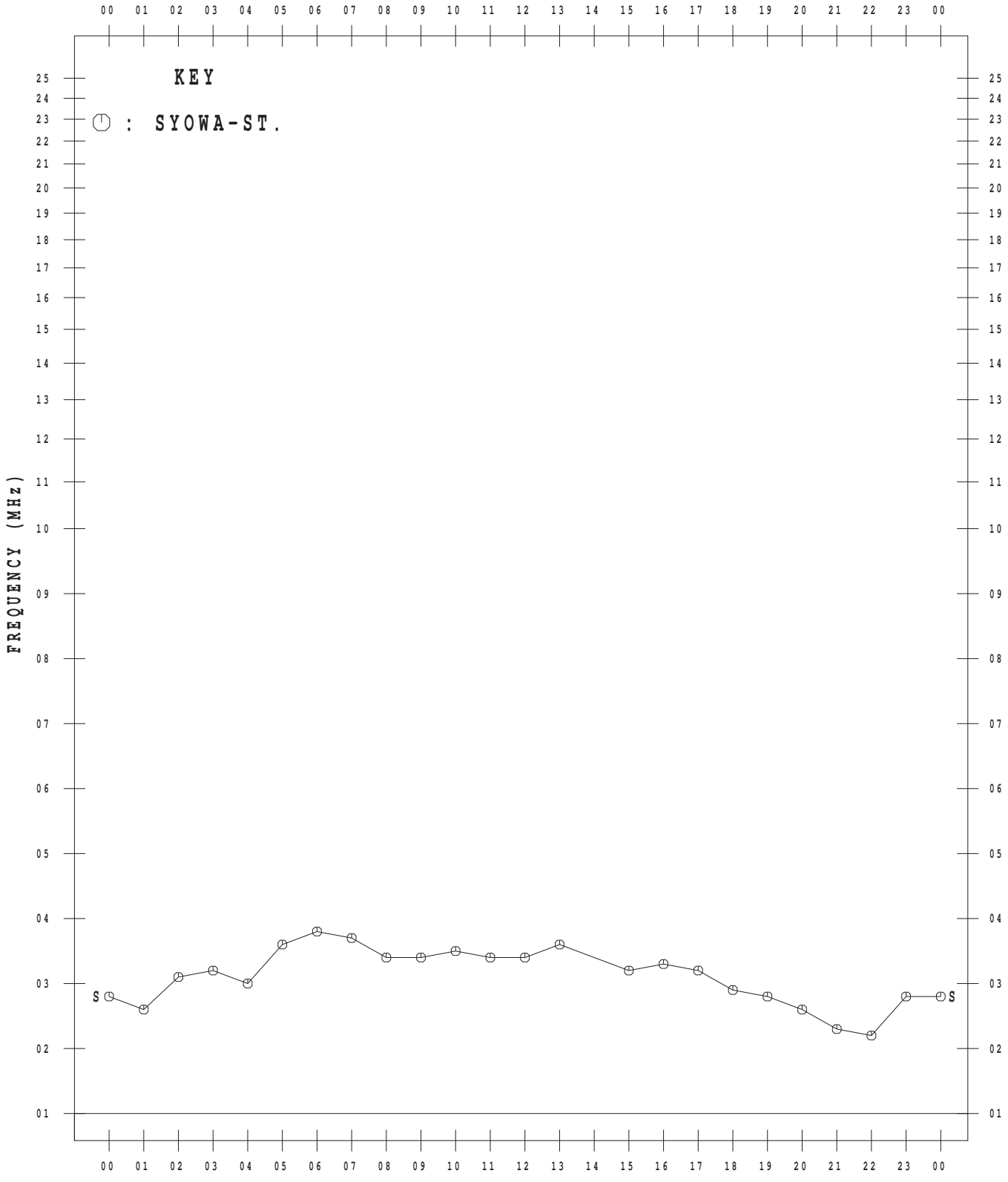
# MONTHLY MEDIAN VALUES OF ftEs

45°E MEAN TIME OCT. 2013



# MONTHLY MEDIAN VALUES OF ftEs

45°E MEAN TIME NOV. 2013



# MONTHLY MEDIAN VALUES OF ftEs

45°E MEAN TIME DEC. 2013