

IONOSPHERIC DATA IN JAPAN

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« Real Time Ionograms on the Webhttp://wdc.nict.go.jp/index_eng.html »



NATIONAL INSTITUTE OF INFORMATION
AND COMMUNICATIONS TECHNOLOGY
TOKYO, JAPAN

INTRODUCTION

This Series contains data on ionosphere (I) and solar radio emission (S) obtained at the following stations under the

National Institute of Information and Communications Technology, Japan.

Stations	Geographic(WGS84)		Geomagnetic (IGRF-10(2005))		Technical Method
	Latitude	Longitude	Latitude	Longitude	
*Wakkanai/Sarobetsu	45°10'N	141°45'E	36.4°N	208.9°	Vertical Sounding (I)
Kokubunji	35°43'N	139°29'E	26.8°N	208.2°	Vertical Sounding (I)
Yamagawa	31°12'N	130°37'E	21.7°N	200.5°	Vertical Sounding (I)
Okinawa	26°41'N	128°09'E	17.0°N	198.6°	Vertical Sounding (I)
Hiraiso	36°22'N	140°37'E	27.6°N	209.1°	Solar Radio Emission (S)

*We moved the observation facilities at Wakkanai to Sarobetsu on February 2009. The new observatory is located at approximately 26km south from the old observatory. The observation at Sarobetsu commenced on March 6, 2009.

IONOSPHERE

Ionospheric observations are carried out at the above four stations in Japan by means of vertical sounding using ionosondes. The ionosonde produces ionograms, which are recorded digitally on a computer storage medium. The digitally-recorded ionograms are collected from each station by the central computer and reduced to numerical values and Summary Plots by the automatic processing system. The ionograms obtained at Kokubunji are manually scaled by experienced specialists to supplement automatically-scaled parameters.

A1. Automatic Scaling

Digital ionograms are automatically scaled by the pattern recognition method. The following five characteristics of the ionospheric are listed below. The reliability of these factors has been ascertained by comparison of the automatically-scaled parameters with the manually-scaled values of large amounts of test ionograms.

The published data consist of tabulations of hourly values of three factors (f_oF2 , fEs , $fmin$) and monthly medians of two factors ($h'Es$, $h'F$), daily Summary Plots and monthly medians plot of f_oF2 .

a. Characteristics of Ionosphere

f_oF2	Ordinary wave critical frequency for the $F2$ layer
fEs	Highest frequency of the Es layer whether it may be ordinary or extraordinary
$fmin$	Lowest frequency which shows vertical ionospheric reflections
$h'Es$ $h'F$	Minimum virtual height on the ordinary wave for the Es and F layers, respectively

b. Descriptive Letters

The following descriptive letters are used in the tables.

A Impossible measurement because of the presence of a lower thin layer, for example Es (for f_oF2).

C Impossible measurement because of any failure in observation.

G Impossible automatic scaling because of very small ionization density of the layer (for fEs).

N Impossible automatic scaling because of complex echoes.

Blank No digital record because of problems occurring in the automatic data processing system, but existence of film record.

c. Definitions of CNT, MED, UQ, and LQ

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

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

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

If CNT is less than 10, there are blank spaces left.

d. Reliability of Automatic Scaling

The results of the comparison between automatically-scaled values and manually-scaled ones showed that hourly values of f_oF2 , fEs and $fmin$ were scaled within a difference of 1 MHz from about 90, 90 and 99%, respectively of the test ionograms.

e. Summary Plot

Daily Summary Plots which are made from quarter-hourly digital ionograms are published to present general ionosphere conditions. The upper and middle parts of a Summary Plot show the diurnal variation of the frequency range of the echoes reflected from the F and E regions, respectively. The two solid arcing lines indicate the predicted values of f_xE and f_oE calculated by the method described in the CCIR report 340. The lower part shows the diurnal variation of the virtual height where the echo traces become horizontal.

A2. Manual Scaling

The published data consist of tabulations of hourly values of the ionospheric characteristics and figures of daily f -plot.

All symbols and terminology in the tables or figures of ionospheric data are used in accordance with the "URSI Hand-book of Ionogram Interpretation and Reduction (Second Edition) 1972 " and its revision of chapters I-4, published in July 1978.

a. Characteristics of Ionosphere

fxl	Top frequency of spread F trace
f_oF2 f_oF1 f_oE f_oEs	Ordinary wave critical frequency for the $F2$, $F1$, E , and Es (including particle type E) layers, respectively
$fbEs$	Blanketing frequency of the Es layer, e.g. the lowest ordinary wave frequency visible through Es
$fmin$	Lowest frequency that shows vertical ionospheric reflections
$M(3000)F2$ $M(3000)F1$	Maximum usable frequency factor for a path of 3000 km for transmission by the $F2$ and $F1$ layers, respectively
$h'F2$ $h'F$ $h'E$ $h'Es$	Minimum virtual height on the ordinary wave for the $F2$, whole F , E and Es layers, respectively
Types of Es	See below b. (iii)

b. Symbols

(i) Descriptive Letters

The following letters are entered after, or used to replace a numerical value on the monthly tabulation sheets, if necessary.

- 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 in use.
- E** Measurement influenced by, or impossible because of, the lower limit of the normal frequency range in use.
- F** Measurement influenced by, or impossible because of, the presence of spread echoes.
- G** Measurement influenced by, 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 a 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 the 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** Man-made perturbations of the observed parameter; or spur type spread *F* present.
- Q** Range spread present.
- R** Measurement influenced by, or impossible because of, attenuation in the vicinity of a critical frequency.
- S** Measurement influenced by, or impossible because of, interference or atmospheric.
- T** Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
- V** Forked trace which may influence the measurement.
- W** Measurement influenced or impossible because the echo lies outside the height range recorded.
- 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 a numerical value on the monthly tabulation sheets, if necessary.

- A** Less than. Used only when *fbEs* is deduced from *foEs* because total blanketing of higher layer is present.
- D** Greater than.
- E** Less than.
- I** Missing value has been replaced by an interpolated value.
- 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) Description of Types of *Es*

When more than one type of *Es* trace are present on the ionogram, the type for the trace used to determine *foEs* must be written first. The number of multiple trace is indicated after the type letter.

The types are:

- f** An *Es* trace which shows no appreciable increase of height with frequency.
- l** A flat *Es* trace at or below the normal *E* layer minimum virtual height or below the part *E* layer minimum virtual height.
- c** An *Es* trace showing a relatively symmetrical cusp at or below *foE*. (Usually a daytime type.)
- h** An *Es* trace showing a discontinuity in height with the normal *E* layer trace at or above *foE*. The cusp is not symmetrical, the low frequency end of the *Es* trace lying clearly above the high frequency end of the normal *E* trace. (Usually a daytime type.)
- q** An *Es* trace which is diffuse and non-blanketing over a wide frequency range.
- r** An *Es* trace showing an increase in virtual height at the high frequency end similar to group retardation.
- a** An *Es* trace having a well-defined flat or gradually rising lower edge with stratified and diffuse traces present above it.
- s** A diffuse *Es* trace which rises steadily with frequency and usually emerges from another type *Es* trace.
- d** A weak diffuse trace at heights below 95 km as-associated with high absorption and large *fmin*.
- n** The designation 'n' is used to denote an *Es* trace which cannot be classified into one of the standard types.
- k** The designation 'k' is used to show the presence of particle *E*. When *foEs* > *foE* (particle *E*) the *Es* type precedes k.

c. Definitions of the CNT, MED, UQ and LQ

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

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

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

HOURLY VALUES OF foF2 AT Wakkanai

DEC. 2015

LAT. 45°10.0'N LON. 141°45.0'E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC 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	34	34	32	43	29	48	70	66	72	92	69	80	82	71	67	36	30	31	A	A	A	36
2	35	34	36	37	34	38	38	54	59	65	78	85	67	67	71	67	60	37	37	34	34	32	30	A
3	31	34	29	34	29	34	31	52	N	67	90	80	63	73	70	62	60	32	32	34	38	34	37	34
4	36	38	34	34	32	37	32	52	67	67	74	90	69	67	67	67	64	42		32	32	31	37	32
5	42	43	42	42	40	45	29	51	62	64	72	86	71	69	64	71	47	31	31	40	42	31	37	42
6	40	38	42	37	38	37	29	54	70	70	69	92	91	59	70	68	66	48	31	28	32	32	28	36
7	42	44	43	32	35	35	34	54	71	86	75	82	82	74	85	70	61	34	43	47	34	31	34	33
8	37	42	38	42	37	42	36	52	64	67	N	80	74	90	63	60	57	37	32	36	34	34	35	
9	34	32	28	31	36	35	36	52	70	68	76	68	76	74	68	64	55	42	34	A	A	28	32	34
10	35	31	37	38	A	36	29	51	67	64	76	84	67	69	C	64	61	34	34	29	A	A	29	32
11	37	41	34	42	37	42	42	52		68	68	68	71	74	65	61	64	46	A	38	32	42	46	47
12	51	45	47	34	47	47	31	47	57	67	83	65	85	69	68	71	62	31	38	38	A	31	44	34
13	44	47	34	41	43	47	40	45	60	67	71	64	65		73	62	56	38	29	34		28	34	29
14	37	37	37	37	34	34	31	47	58	66	81	49	66	70	63	68	54	32	32	34	34	29	24	34
15	34	34	34	37	32	38	48	46	65	87	80	69	93	71	N	68	61	42	34	32	42	43	46	33
16	44	46	48	43	45	45	34	32	66	83	87	65	59		68	64	48	32	42	42	31	A	36	40
17	47	48	45	46	47	45	43	58	65	63	70	N		65	66	68	56	29	34	34	32	35	34	32
18	32	34	32	34	30	32		38	63	63	71	64	69	79	70	61	57	46	31	34	34	29	31	34
19	N	34	32	42	38	45	40	38	56	61	66	65	65	69	66	65	47	34	32	36	34	29	34	38
20	42	42	42	37	34	38	42	34	66	61	84	71	66	72	67	77	66	67	58	41	34	34	37	32
21	28	34	31	34	34	34	40	22	38	68	59	66	94	84	90	72	67	54	34	46	37	36	34	43
22	46	44	35	28		N	N	40	64	68	79	72	68	62	64	65	54	41	34	34	31	35	A	A
23	A	A	A	A	31	24		41	55	70	66	68	68	70	65	60	52	51	26	A	A	A	A	29
24	31	27	32	33	32	34	25	34	70	64	72	94	70	67	70	68	53	44	37	48	N	34	36	36
25	40	37	34	43	49	46	36	47	66	67	68	74	70	70	68	66	57	89	34	38	36	32	34	34
26	38	41	41	42	38	40	29	38	56	67	68	68	65	56	62	56	55	28	28	31	37	29		
27	32	28	31	38	38	29	39	43	55	64	86	68	70	68	68	61	53	43	34	36		31	32	34
28	34	34	34	32	32	36	36	42	61	66	68	72	67	62	64	68	54	37	30	32	31	32	34	38
29	34	40	38	38	34	43	36	50	66	60	74	66	67	67	66	66	A	39	31	34	42	40	38	34
30	37	38	37	40	37	A	36	32	55		68	71	64	69	68	66	48	34	34	A	A	A	A	32
31	38	31	34	42	47	42	31	41	56	70	70	71	70	59	80	59	63	46	A	29		32	34	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	28	29	30	30	29	29	28	31	29	30	30	30	30	29	29	31	30	31	28	28	22	26	26	27
MED	37	38	34	37	36	38	36	47	64	67	72	71	69	69	68	66	57	38	34	34	34	32	34	34
U Q	42	42	41	42	39	44	39	52	66	68	79	82	71	73	70	68	62	46	34	38	37	34	37	36
L Q	34	34	34	34	32	34	31	38	56	64	68	66	66	67	65	62	54	34	31	32	32	31	32	32

HOURLY VALUES OF fEs AT Wakkanai

DEC. 2015

LAT. 45°10.0'N LON. 141°45.0'E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC 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	35	32	25	25	G	G	G	G	G	49	42	G	G	G	G	G	G	G	G	33	34	57	29	
2	G	G	26	25	G	G	G	G	35	36	38	36	49	G	G	48	G	G	27	G	24	26	25	32
3	G	27	28	29	26	G	G	G	G	41	54	G	49	G	G	G	G	30	28	23	G	G	G	G
4	G	G	G	32	31	G	G	G	G	G	G	G	G	G	G	G	19	G	G	G	G	G	G	G
5	G	G	26	G	G	G	G	G	G	35	G	G	G	G	G	G	20	G	G	G	G	G	G	G
6	30	G	G	G	G	25	G	27	44	44	61	G	G	G	G	G	26	G	G	G	G	G	24	25
7	28	G	G	25	25	G	G	G	48	38	38	36	G	G	G	G	G	G	27	G	G	G	G	G
8	G	G	G	G	G	G	G	G	30	36	39	36	36	34	G	40	G	27	24	G	G	G	G	
9	G	G	G	G	G	G	G	G	G	35	38	38	35	G	35	44	40	58	30	34	27	G	G	29
10	26	G	27	26	32	G	G	G	30	57	40	50	36	G	C	48	11	G	G	32	33	35	29	38
11	39	26	G	G	G	G	32	33	G	G	G	G	40	G	34	G	19	G	36	36	G	38	32	40
12	32	27	G	G	24	11	G	28	G	38	34	G	G	G	G	28	G	G	G	32	68	35	29	24
13	G	G	G	G	G	G	G	59	58	G	G	G	G	G	G	48	G	35	29	G	32	38	27	G
14	29	26	G	G	G	G	G	G	G	40	35	36	G	G	G	G	G	G	G	G	G	G	27	G
15	G	G	G	28	G	G	G	G	G	G	G	G	G	G	G	G	G	32	G	30	33	34	G	G
16	G	G	G	G	G	G	G	G	G	G	G	35	G	G	G	G	G	G	G	G	G	39	33	28
17	G	G	G	G	G	29	50	34	29	43	G	G	G	G	G	G	G	G	G	G	G	G	G	G
18	G	G	G	G	G	G	G	G	G	32	38	G	G	G	G	G	G	G	G	G	G	G	G	G
19	G	G	G	G	G	G	33	G	48	G	G	G	G	G	G	G	31	G	G	G	34	38	G	G
20	27	29	G	G	G	G	G	G	44	37	39	G	G	G	G	G	G	G	G	G	G	G	G	G
21	G	G	33	G	28	28	34	27	G	34	G	G	G	G	G	G	G	G	G	G	G	G	G	G
22	G	G	G	G	G	G	G	29	42	G	G	G	G	G	G	G	G	G	G	G	G	G	34	28
23	40	33	34	40	32	29	G	G	33	G	G	G	G	40	32	50	36	32	G	41	33	23	34	G
24	G	26	G	30	G	G	G	G	48	36	G	G	G	34	G	G	34	39	G	G	G	31	30	27
25	G	G	34	G	G	G	G	G	48	48	G	G	G	G	G	37	28	G	G	G	G	27	33	G
26	G	G	26	24	24	G	G	G	G	G	G	G	G	G	34	34	33	G	G	G	G	G	G	G
27	G	G	G	G	G	G	G	G	44	41	35	37	36	35	G	G	G	30	G	G	G	G	G	G
28	G	G	G	G	G	26	G	G	G	G	G	G	G	G	34	G	G	28	26	G	G	G	G	G
29	29	24	G	33	G	G	G	G	G	48	G	G	G	G	G	G	67	29	G	35	33	34	39	57
30	34	G	G	33	25	40	27	28	28	G	G	G	G	G	G	G	G	G	30	34	39	36	34	29
31	G	G	G	G	G	G	G	G	48	G	G	G	39	38	42	G	G	32	59	G	G	G	G	G
	00	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	31	29	31	30	30	31	31	30	29	30	31	31	31	30	31	29	31	30	29
MED	G	G	G	G	G	G	G	G	28	36	G	G	G	G	G	G	G	G	G	G	G	G	12	G
U Q	29	26	26	26	24	G	G	27	44	41	38	36	35	G	G	34	26	30	27	30	33	34	32	28
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

HOURLY VALUES OF fmin AT Wakkanai

DEC. 2015

LAT. 45°10.0' N LON. 141°45.0' E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

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

HOURLY VALUES OF fof2 AT Kokubunji

DEC. 2015

LAT. 35°43.0'N LON. 139°29.0'E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC 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	28	A	A	31	32	38	N	64	66	80	85	99	79	74	81	75	44		28	31	36	26	31
2	A	A	32	34	37	36	28	52	71	72	85	90	84	65	75	73	70	47	36	43	37	34	34	28
3	30	31	32	31	A	A	28	50	76	81	84	81	86	68	80	67	63	45	43	31	34	36	26	32
4	34	37	39	39	39	24	32	49	75	74	76	75	90	76	72	68	68	42	37	34	31	23	N	27
5	31	A		34	38	N	27	51	68	72	72	75	76	85	69	64	60	45	39	28	36	36	37	32
6	31	34	36	34	34	N	27	53	73	74	80	85	88	94	91	80	69	59	45	36	A	A	A	32
7	37	30	41	31			28	59	81	75	96	100	82	82	76	69	69	44	39	43	37		34	32
8	34	36	37	37	39	N	28	64	69	84	93	80	84	72	78	76	65	52	36	32	34	30	32	27
9	30	28	32	28	34	28	28	64	71	74	74	81	71	72	80	72	64	46	35	32	28	32	32	25
10	27	27	34	34	38	N		54	74	76	83	77	86	90	87	75	58	A		36	28	27	32	33
11	27	32	34	N	A	34	34	58	71	68	90	66	90	81	68	74	69	51	44	44	N	34	37	37
12	42	42	44	44	44	42	26	54	76	80	97	106	76	87	90	77	65	47	30	36	32	30	30	A
13	A	36	A	37	42	39	28	52	65	72	72	85	86	87	69	77	63	51	A	A	A	27	26	N
14				28	31	34	30	52	67	77	80	82	67	66	76	74	68	51	36	34		30	31	28
15	N	32	32	31	34	36	N	49	56	81	93	98	84	76	80	86	71	49	39	39	38	36	41	38
16	39		39	42	36		27	52	67	80	100	84	77	85	74	67	58	43	44	38	32		26	A
17	30	31	32	34	37	32	27	52	71	86	67	75	90	77	69	72	51	45	34	27	32	25	27	25
18	32	34	34	36	37		26	47	62	76	71	91	84	94	91	75	62	47	48	42	31			
19		23	31	31	36	34	N	54	61	59	76	86	75	68	74	82	67	49	A	36				A
20	A	31	32	27	34	35	28	52	60	69	80	91	78	80	76	77	88	86	65	42	39		34	34
21	36	36	36	32	36	27		63	80	86	101	90	101	115	121	106	97	87	67	52	52	43	42	44
22	38	39	31	28	26			51	67	84	91	77	71	72	70	65	61	49	42	34	31	27	28	25
23	23	A	27	28	58		A	52	69	61	75	80	72	77	74	71	65	49	53	42	34	28		
24	27	28	28	36			26	54	59	61	95	93	90	78	75	65	66	47	42	38	32	N	68	28
25	30	32	36	32	28	N	28	48	66	68	90	88	82	72	74	67	55	47	47	32	36		28	32
26	32	36	37	39	44		28	54	61	61	72	82	75	66	63	62	59	46	30	32	N	N	27	26
27	28	31	31	36	39		26	49	68	65	66	96	80	71	71	72	58	55	46	31		27	27	32
28	32	34	34	34	34	28	28	54	71	67	72	81	84	80	65	67	58	45	A	A	32	A	26	28
29		31	32	34	31	30	A	58	39	64	82	74	86	65	72	63	58	46	A	30	35	37	A	A
30		31	N	34	24	A	A	54	74	58	86	82	81	67	67	66	57	48	32	A	28	34	A	A
31	A	A	30	36	44	28	31	54	59	55	77	100	77	74	69	78	64	49	48	34	34	34	35	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	22	25	26	29	27	16	23	30	31	31	31	31	31	31	31	31	31	30	26	28	24	21	24	22
MED	32	32	33	34	36	33	28	52	68	72	80	84	84	77	74	72	64	47	40	34	33	32	32	32
U Q	36	36	36	36	39	35	28	54	73	80	91	91	86	85	80	77	69	51	46	40	36	36	34	32
L Q	30	30	32	31	34	28	27	51	62	65	74	80	76	71	69	67	58	45	36	31	31	27	27	27

HOURLY VALUES OF fEs AT Kokubunji

DEC. 2015

LAT. 35°43.0' N LON. 139°29.0' E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	G	G	28	30	G	G	G	G	33	G	G	G	53	42	G	33	G	36		G	G	22	29	33	
2	34	45	23	27	23	G	G	29	33	G	G	G	G	G	G	35	46	28	G	26	G	G	G	24	
3	23	G	22	23	29	25	G	29	G	G	G	50	68	61	51	65	35	35	30	G	G	32	G	G	
4	G	G	G	30	G	G	G	27	G	52	G	54	G	G	G	G	G	G	G	30	G	G	G	G	
5	G	29		G	G	G	G	34	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	
6	G	G	G	G	22	29	G	26	36	G	44	75	50	G	G	G	G		35	24	29	29	32	66	G
7	G	G	G	G			G	G	32	43	49	41	71	G	G	48	51	34	G	G	G		G	G	
8	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	30	28	G	G	G	27	G	G	
9	G	23	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	11	G	G	G	G	G	G	
10	G	G	G	G	G	G		G	G	G	47	G	60	50	45	50	58	49	30	G	G	G	G		
11	G	G	G	G	31	27	28	G	G	G	45	92	50	62	49	52	G	G	G	G	G	G	G	49	
12	28	29	G	G	G	11	25	G	G	G	43	44	G	G	G	G	G	G	G	G	G	G	G	43	
13	50	49	49	25	23	G	G	G	G	54	G	43	G	G	46	34	46	46	49	34	26	G	G	G	
14				G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		G	G	G	
15	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	
16	G		G	G	G		G	G	47	G	48	47	G	G	G	G	30	G	G	G	G		G	24	
17	27	G	G	G	G	G	G	G	G	G	49	G	44	40	G	G	G	G	G	G	G	G	G	G	
18	G	G	G	G	G		G	G	G	G	43	G	G	G	G	G	G	27	G	G	G				
19		G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	11	23	G				34	
20	47	G	G	G	G	G	G	G	G	G	56	49	G	G	G	51	62	39	26	G	G	G	G	G	
21	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	27	26	26	G	G	G	G	G	
22	G	G	G	G	G		G	G	G	G	G	G	G	G	G	G	G	27	30		G	G	G	G	
23	G	34	G	25	G		G	G	G	G	G	G	G	67	G	47	33	29	31	45	24	G			
24	G	G	G	G			G	G	G	G	45	52	G	G	G	34	G	G	G	25	G	G	G	G	
25	G	G	G	G	G	G	G	G	G	N	G	G	G	G	G	G	30	26	24	G	G		G	G	
26	G	G	G	G	G		G	G	G	G	G	G	G	G	G	47	29	G	G	G	G	G	G	G	
27	G	G	G	G	G		G	G	G	G	G	G	G	G	37	47	G	49	34	G		G	G	G	
28	G	G	28	24	G	G	G	G	G	G	G	G	G	G	41	50	78	33	34	32	27	26	G	G	
29		G	27	38	30		33	G	G	G	G	G	G	G	50	38	51	77	35	27	G	23	31	28	
30		G	G	25	23	34	34	G	G	G	G	G	G	G	45	44	50	39	43	36	25	29	34	44	
31	43	34	33	29	33	G	G	45	52	37	44	G	G	G	G	33	42	38	G	G	G	G	G	G	
	00	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	29	31	29	23	28	31	31	30	31	31	31	31	31	31	31	31	30	31	28	25	28	28	
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	33	27	27	G	G	G	G	G	G	
U Q	23	12	22	25	22	G	G	G	G	G	44	44	G	G	37	47	46	36	30	26	G	22	G	24	
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	

HOURLY VALUES OF fmin AT Kokubunji

DEC. 2015

LAT. 35°43.0' N LON. 139°29.0' E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

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

HOURLY VALUES OF fof2 AT Yamagawa

DEC. 2015

LAT. 31°12.0'N LON. 130°37.0'E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC 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	28	28	A	49	A	A	30	51	67	64	78	92	92	90	77	86	92	77	38	36	40	50	30	28
2	31	30	29	30	34	B	B	44	60	68	76	81	87	84	81	85	75	78	47	43	46	35	29	59
3	28		35	29	B	26	N	42	74	82	70	76	84	86	82	74	68	66	40	37	36	A	30	B
4	29	30	34	30	37	29	B	42	64	69	75	71	81	92	85	76	76	62	47	34	43	40	32	
5	B		28	34	37	N	B	38	54	68	75	76	84	88	68	73	63	64	42	36	34	36	28	28
6	28	28	32	36	32	29	B	44	72	71	71	76	81	78	93	76	67	60	53	A		A	32	A
7	A	A	40	B	N	B	B	38	77	74	82	85	91	88	73	70	81	75	54	43	47	44	44	47
8	43	38	43	40	38	B	B	46	70	77	82	84	87	77	75	84	73	73	54	46	41	38	34	30
9	A	30	31	31	34	32	29	45	72	72	82	78	72	72	85	86	87	66	47	A	38	34	32	
10	25	A	A	36	37	31	A	41	72	78	74	84	89	100	95	86	81	71	50	45	A	N	40	N
11	N	B	32	34	28	59	28	45	72	75	80	95	77	84	74	77	81	66	44	37	37	B	31	A
12	A	36	38	37	37	34	B	42	71	72	114	81	77	81	94	96	77	67	46	38	42	37	30	31
13	28	A	34	34	40	40	B	41	67	77	70	81	97	84	70	80	81	66	54	40	47	A	A	28
14		A	29	29	34	32	N	63	61	70	85	76	84	67	76	88	77	63	42	42	34	32	29	29
15		28	28	28	28	29	B	46	68	72	96	83	78	82	82	77	78	67	47	40	34	43	42	37
16	41	34	34	37	37	A	A	38	67	81	96	86	80	86	72	62	64	60	53	45	59	40	36	32
17	B		28	28	27	34	29	38	62	70	85	66	87	95	82	76	72	64	48	45	42	34	37	34
18	28	29	34	59	34		N	37	62	76	65	82	87	92	98	80	75	63	52	54	A	40	34	28
19	B	B	29	30	34	31	28	40	57	67	78	86	75	72	76	82	86	68	47	37		B	30	B
20	B	B	N	26	29	34	29	41	66	77	75	90	88	78	82	96	107	103	85	52	52	43	38	40
21	37	45	N	28	30	43	45	52	52	127	86	74	91	115	107	88	88	96	86	54	40	43	48	47
22	29	59	34	37	45	N	B	36	67	83	83	94	86	76	76	75	65	71	53	42	37	34	32	34
23	N	26	29	A	32	26	N	36	72	72	70	94	90	86	86	87	86	90	79	49	46	44	A	B
24	N	N	28	37	34	B		38	67	71	72	101	90	84	85	76	72	45	48	A	41	38	28	28
25	28	31	36	34	B	B	B	34	71	71	76	78	86	84	84	72	62	62	54	37	36	37	B	B
26	B	29	30	28	36	29	B	34	78	62	62	84	82	90	74	58	74	67	51	34		28	28	N
27	26	28	28	34	N	B	B	36	63	71	68	75	86	78	72	77	70	64	52		B	34	B	28
28	28	26	28	33	40	28	B	40	58	66	66	80	92	78	78	71	72	58	51	37	59	29	B	A
29	A	A	32	29	29	31	34	42	48	66	72	80	72	72	77	68	62	70	A	40	A	34	26	26
30	26	30	A	34	28		26	36	65	66	65	113	80	76	74	76	67	62	48	34	37	34	49	B
31	N	A	A	A	44	B	B	34	54	61	61	90	78	93	75	76	70	66	55	54	38	35	41	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	16	18	24	28	26	18	9	31	31	31	31	31	31	31	31	31	31	31	30	27	24	25	26	19
MED	28	30	32	34	34	31	29	41	67	71	75	82	86	84	78	77	75	66	50	40	40	37	32	31
U Q	30	34	34	36	37	34	32	44	72	77	82	90	89	90	85	86	81	71	54	45	46	41	38	37
L Q	28	28	29	29	30	29	28	37	61	68	70	76	80	78	74	74	68	63	47	37	37	34	30	28

HOURLY VALUES OF fEs AT Yamagawa

DEC. 2015

LAT. 31°12.0'N LON. 130°37.0'E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	G	G					G	G		G	G						G			G	G	G	G	G		
2	G		G	G		B	B	G		G	G									G		G	G	G		
3	G	G	G	G	B	G	G	G		G	G												G	B		
4	G	G	G			G	B			G	G									G		G	G	G		
5	B	G	G	G	G	G	B	G		G	G									G	G	G	G	G		
6	G	G	G	G	G		B			G	G											G	G	40		
7	68	44		G	B	G	B	G		G												G	G	G		
8	G	G	G	G	G	B	B	G	G	G	G											G	G	G		
9		G	G	G			G	G	G	G													G	G	G	
10	G	34	47	26	34	34	28			G	G											G	G	G		
11	G	B	G	G	G	G	G			G	G											G	B	G	70	
12	51	G	G	G	G	G	B	G	G		G											G	G	G	G	
13	G	36	34	24	26		B	G	G	G	G												G	G	G	
14	G	30	G	G	G	G		G	G														G	G	G	
15	G	G	G	G	G	G	B			G	G												G	G	G	
16	G	G	G	G	G			G	G	G	G												G	G	G	
17	B	G	G	G	G	G	G	G		G	G												G	G	G	
18	G	G	G	G	G	G	G			G	G												G	G	G	
19	B	B	G	G	G	G	G	G		G	G												G	B	G	B
20	B	B	G	G	G	G	G	G	G	G	G												G	G	G	G
21	G	G	G	G	G	G				G	G												G	G	G	
22	G	G	G	G	G	G	B	G		G	G												G	G	G	G
23	G						G	G		G	G												G	G	B	
24	G	23	25	34	28	24		G	G	G	G												G	G	G	G
25	G	G	G	G	B	B	B	G		G	G												G	G	B	B
26	B	G	G	G	G	G	B	G	G														G	G	G	G
27	G	G	G	G	G	B	B	G	G	G	G												B	G	B	G
28	G	G	G	G	G	G	B	G		G	G												G	G	B	G
29	36	40																					G	G	G	G
30	G	G																					G	G	B	G
31	G																						G	G	G	G
	00	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	28	31	30	29	24	16	31	31	31	31	31	31	31	31	31	31	31	31	30	30	29	28	26		
MED	G	G	G	G	G	G	G	G	G	G	G	G	43	G	G	G	G	28	24	G	G	G	G	G		
U Q	G	25	G	G	25	12	23	G	48	34	G	46	45	50	50	40	40	36	32	27	26	G	G	G		
L Q	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		

HOURLY VALUES OF fmin AT Yamagawa

DEC. 2015

LAT. 31°12.0'N LON. 130°37.0'E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	16	17	14	15	14	15	15	17	14	14	14	16	16	15	17	15	14	14	15	18	15	15	14	14
2	15	15	15	18	15	B	B	16	14	16	15	18	16	20	20	15	14	14	15	16	15	15	16	15
3	17	24	15	17	B	16	17	17	14	14	17	17	18	17	17	15	14	14	15	15	15	15	16	B
4	20	14	14	15	15	16	B	15	14	14	14	16	18	14	18	14	14	18	15	18	17	17	15	71
5	B	66	16	15	15	20	B	17	14	16	34	18	18	17	16	15	14	17	14	15	15	15	16	17
6	14	15	16	15	14	15	B	17	18	15	16	17	16	17	17	17	15	14	14	15	66	15	14	15
7	14	14	15	B	15	B	B	16	14	14	15	16	18	18	20	14	14	14	15	14	18	14	16	14
8	15	16	15	15	15	B	B	15	24	14	14	16	18	18	17	16	16	14	15	16	15	15	15	16
9	14	15	15	15	15	15	15	17	15	16	17	18	20	20	18	16	14	14	16	15	17	15	15	27
10	15	14	14	17	15	14	15	15	14	15	21	18	24	21	17	17	14	15	15	15	14	17	14	15
11	66	B	18	15	14	15	18	15	15	16	17	17	17	18	18	17	18	18	18	23	18	B	18	15
12	14	15	15	15	15	16	B	15	16	15	18	18	22	21	20	20	16	20	14	17	14	15	17	15
13	15	14	14	15	16	15	B	16	22	17	18	35	17	18	20	21	24	20	15	14	15	14	14	15
14	66	14	15	15	14	15	15	16	14	17	17	20	17	16	17	18	17	14	16	15	16	15	15	16
15	66	18	66	17	14	17	B	18	26	16	20	18	24	20	21	17	14	14	15	15	15	28	15	15
16	15	16	15	17	15	15	15	15	24	17	17	17	20	18	18	14	14	20	14	15	16	14	15	17
17	B	66	17	21	17	16	17	15	16	15	17	18	18	18	14	16	14	21	17	15	15	15	15	15
18	16	15	16	17	16	66	17	15	26	17	18	20	20	20	18	29	15	21	15	14	15	16	15	20
19	B	B	16	17	15	15	15	15	26	21	18	18	21	21	20	20	20	15	14	16	66	B	15	B
20	B	B	18	18	14	16	15	15	23	17	21	22	20	22	22	17	17	17	17	16	17	15	14	15
21	17	15	14	18	16	16	14	16	23	20	40	26	29	21	20	15	14	14	14	15	16	15	16	15
22	17	17	14	15	15	15	B	15	15	15	18	21	20	36	20	17	18	20	15	15	15	16	15	15
23	15	15	15	15	14	15	16	17	22	18	35	21	20	20	21	15	16	14	15	15	16	17	15	B
24	18	16	16	15	14	B	66	15	15	18	20	32	30	26	21	22	15	14	15	15	15	15	15	17
25	66	14	15	17	B	B	B	15	23	15	18	21	20	21	17	15	14	14	14	15	14	15	B	B
26	B	15	15	16	15	15	B	17	16	16	18	23	20	22	18	16	15	20	15	15	26	17	15	66
27	18	16	16	15	15	B	B	15	18	17	17	20	21	24	17	15	16	14	15		B	18	B	16
28	15	16	18	17	15	15	B	15	22	15	18	18	20	17	18	15	14	14	16	15	15	20	B	15
29	17	15	15	14	16	15	18	15	14	15	16	18	20	18	16	17	17	15	15	17	15	16	16	15
30	66	14	15	17	18	71	17	15	22	17	17	18	22	20	18	15	16	15	15	18	15	15	15	B
31	20	18	15	15	16	B	B	15	22	18	15	18	17	17	15	15	16	21	15	15	15	15	16	17
	00	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	28	31	30	29	24	16	31	31	31	31	31	31	31	31	31	31	31	31	30	30	29	28	26
MED	16	15	15	15	15	15	16	15	16	16	17	18	20	20	18	16	15	15	15	15	15	15	15	15
U Q	20	16	16	17	15	16	17	17	23	17	18	21	21	21	20	17	16	20	15	16	17	16	16	17
L Q	15	14	15	15	14	15	15	15	14	15	16	17	18	17	17	15	14	14	15	15	15	15	15	15

HOURLY VALUES OF fof2 AT Okinawa

DEC. 2015

LAT. 26°41.0'N LON. 128°09.0'E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC 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	28	28	89	41	A	A	50	71	78	81	87	87	111	106	108	97	103	76	52	58	67	47	N
2	34	37	34	29	40	N	29	45	66	72	86	78	96	94	94	95	85	97	84	54	54	54	46	34
3	B	28	28	32	N	N	N	44	66	88	90	80	81	110	100	92	75	72	60	45	48	43	37	B
4	N	B	B	34	37	B	N	41	64	76	82	75	80	88	103	106	91	81	67	51	51	50	41	B
5	N	30	32	40	38	B		39	58	71	77	77	85	92	86	80	78	66	62	52	43	43	36	28
6	A	28		36	41	34	A	42	77	87	72	74	76	90	100	91	71	78	60	48	41	46	A	A
7	A	48	A	A	A	B	B	38	72	85	78	92	105	98	93	84	96	101	84	60	61	50	52	56
8	44	40	41	45	37	B	B	44	65	81	92	82	81	91	85	85	91	90	89	71	61	52	47	42
9	32	A	A	59	34	N	B	44	72	84	78	84	85	84	96	104	101	81	71	55	50	47	48	54
10	41	30	30	30	40	A	B	41	78	90	84	85	98	125	122	118	120	106	81	60	52	52	54	44
11	34	34	N	44	41	27	B	46	78	82	90	92	95	91	93	78	84	76	58	43	47	47	45	45
12	A	A	42	44	44	N	B	41	81	90	92	91	99	102	125	118	92	90	74	53	41	48	42	41
13	34	29	31	36	40	27	B	40	68	88	101	94	98	112	108	131	128	108	88	80	67	51	52	43
14	37	35	40	34	40	40		41	64	81	86	86	77	86	89	104	108	88	67	56	58	44	47	38
15	31	A	N	36	38	44	46	54	80	80	108	90	59	94	102	91	80	78	77	48	54	67	63	54
16	42	44	37	44	36	B	B	37	70	102	111	85	82	83	116	100	86	76	67	54	52	54	54	31
17	B	B	28	28	29	30	28	38	60	81	88	66	78	115	111	111	101	86	72	58	62	50	50	42
18	30	30	32	34	32	N		40	61	72	76	80	97	97	A	111	110	108	89	88	77	61	54	51
19	43	34	28	30	34	32	28	41	63	84	85	78	92	86	85	97	105	93	75	51	54	65	48	40
20	B	B	28	N	29	34	N	40	58	82	84	91	86	93	N	132	146	148	144	101	87	86	54	61
21	52	66	38	36		61	51	54	60	131	81	72	90	124	114	87	90	102	103	67	51	54	51	50
22	34	32	30	37	45	29	B	37	67	93	105	95	85	82	92	90	91	71	72	60	52	47	42	34
23	34	B	A	A	31	A	B		82	81	86	97	106	124	137	130	128	138	138	97	73	72	51	40
24	31	28	26	44	34	B	B	38	75	87	82	98	100	95	90	87	85	81	63	47	54	54	38	28
25	26	40	48	49	B	B	B	31	75	70	86	82	98	98	98	91	95	80	67	55	52	42	45	
26	B	31	34	36	34	28	28	34	67	114	88	70	96	101	92	75	86	100	89	52	50	41	A	N
27	28	30	32	47	34	B	B	36	64	80	82	70	86	97	97	102	90	75	67	46	45	40	30	30
28	28	28	32	42	34	N	B	32	67	74	82	85	96	84	86	86	87	87	77	54	48	45	A	A
29	29	N	A	29	32	30	A	36	68	72	86	72	88	86	86	86	86	80	80	45	46	50	36	30
30	26	28		34	34	A	A	40	72	75	82	91	101	96	102	101	97	86	71	53	54	52	45	41
31	34	32	32	40	54	N	B	34	60	75	78	76	92	111	106	127	108	102	107	80	67	54	67	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	21	23	22	28	27	12	6	30	31	31	31	31	31	31	29	31	31	31	31	31	31	31	28	24
MED	34	31	32	36	37	31	28	40	67	81	85	84	90	95	98	97	91	87	75	54	52	50	47	41
U Q	39	37	37	44	40	37	46	44	75	88	90	91	98	110	107	111	105	102	88	60	61	54	52	47
L Q	29	28	28	34	34	28	28	37	64	75	81	76	82	88	91	87	86	78	67	51	48	46	42	32

HOURLY VALUES OF fEs AT Okinawa

DEC. 2015

LAT. 26°41.0'N LON. 128°09.0'E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC 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	G	G	G	33	32	44	32	G	G	G	49	67	53	50	G	38	30	30	G	G	27	G	G	
2	G	G	G	G	G	G	G	25	G	37	G	48	48	43	40	40	36	28	29	27	G	26	G	G	
3	B	G	G	G	G	G	G	23	31	38	46	42	41	69	G	40	43	36	35	34	29	G	30	B	
4	G	B	B	G	G	B	G	25	36	38	G	45	47	G	G	G	34	G	24	24	25	G	G	B	
5	G	G	G	G	G	B	G	24	48	34	47	44	G	G	G	G	33	29	26	27	25	G	G	G	
6	38	26	G	G	G	11	23	26	38	G	37	46	46	48	G	38	37	50	47	30	G	35	40	49	
7	46	29	37	37	26	B	B	G	36	40	47	58	50	66	75	G	34	37	29	G	G	G	28	28	
8	G	G	G	G	G	B	B	G	G	G	41	44	48	46	42	38	50	29	G	28	G	G	G	G	
9	24	54	28	G	G	G	B	G	G	G	45	66	70	53	54	57	G	60	45	G	G	G	G	G	
10	G	G	G	G	G	31	B	G	G	G	35	G	G	N	52	62	58	58	59	73	49	28	G	G	G
11	G	G	G	G	G	G	B	G	G	G	G	G	G	G	G	G	34	G	28	28	28	G	G	G	G
12	54	53	26	24	G	G	B	23	32	G	45	50	59	46	G	43	G	G	11	G	G	G	G	G	
13	G	G	G	G	G	G	B	G	34	39	G	G	G	G	G	G	35	G	27	29	38	30	26	G	
14	G	G	G	G	G	G	G	G	G	36	46	G	48	45	47	41	52	32	31	45	G	G	G	G	
15	G	25	G	G	G	G	26	24	45	G	37	44	49	46	43	38	49	36	35	G	G	G	G	G	
16	G	G	G	G	G	B	B	G	G	40	42	46	41	44	44	G	G	36	55	21	G	G	G	G	
17	B	B	G	G	G	G	G	G	48	35	48	45	46	44	49	42	G	34	21	G	G	G	G	G	
18	G	G	G	G	G	G	G	G	G	G	38	46	75	50	124	114	60	50	33	39	38	26	25	24	
19	G	G	G	G	G	G	G	G	G	35	38	40	46	G	G	G	G	G	G	40	G	G	G	G	
20	B	B	G	G	G	G	G	G	G	G	G	G	44	44	50	46	55	57	52	39	31	30	G	G	
21	G	G	G	G	B	G	G	26	34	G	G	57	55	54	42	42	36	50	50	26	G	G	G	G	
22	G	G	G	G	G	G	B	G	G	G	G	G	G	44	G	G	46	G	G	G	G	G	G	25	
23	G	B	30	41	26	28	B	G	G	G	G	G	45	G	44	39	41	49	51	48	26	G	G	22	
24	G	G	G	G	11	B	B	G	G	G	G	55	50	81	76	G	G	45	29	25	G	G	G	G	
25	G	G	G	G	B	B	B	G	G	G	G	50	46	47	40	42	G	G	26	28	26	G	G	G	
26	B	G	G	G	G	G	23	G	30	35	G	44	46	43	54	68	G	31	20	35	26	G	34	G	
27	G	G	G	23	G	B	B	G	G	34	38	51	50	58	73	48	36	G	34	25	25	G	G	G	
28	G	24	G	G	G	G	B	G	G	34	38	44	45	40	48	G	46	60	42	32	34	33	34	29	
29	G	G	43	G	G	24	32	G	48	G	G	42	G	G	48	46	64	32	28	11	G	G	G	G	
30	G	G	28	27	G	29	28	24	G	G	G	G	G	G	65	50	41	54	39	18	11	G	G	G	G
31	G	G	27	28	24	G	B	G	G	36	42	63	67	52	57	46	52	55	46	36	23	43	40	G	
00	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	27	30	31	29	23	16	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	29	
MED	G	G	G	G	G	G	G	G	G	G	G	44	46	46	44	40	37	32	29	28	G	G	G	G	
U Q	G	G	G	G	G	11	24	24	34	36	42	49	50	53	53	46	52	49	46	36	26	26	25	G	
L Q	G	G	G	G	G	G	G	G	G	G	G	41	40	G	G	33	G	24	11	G	G	G	G	G	

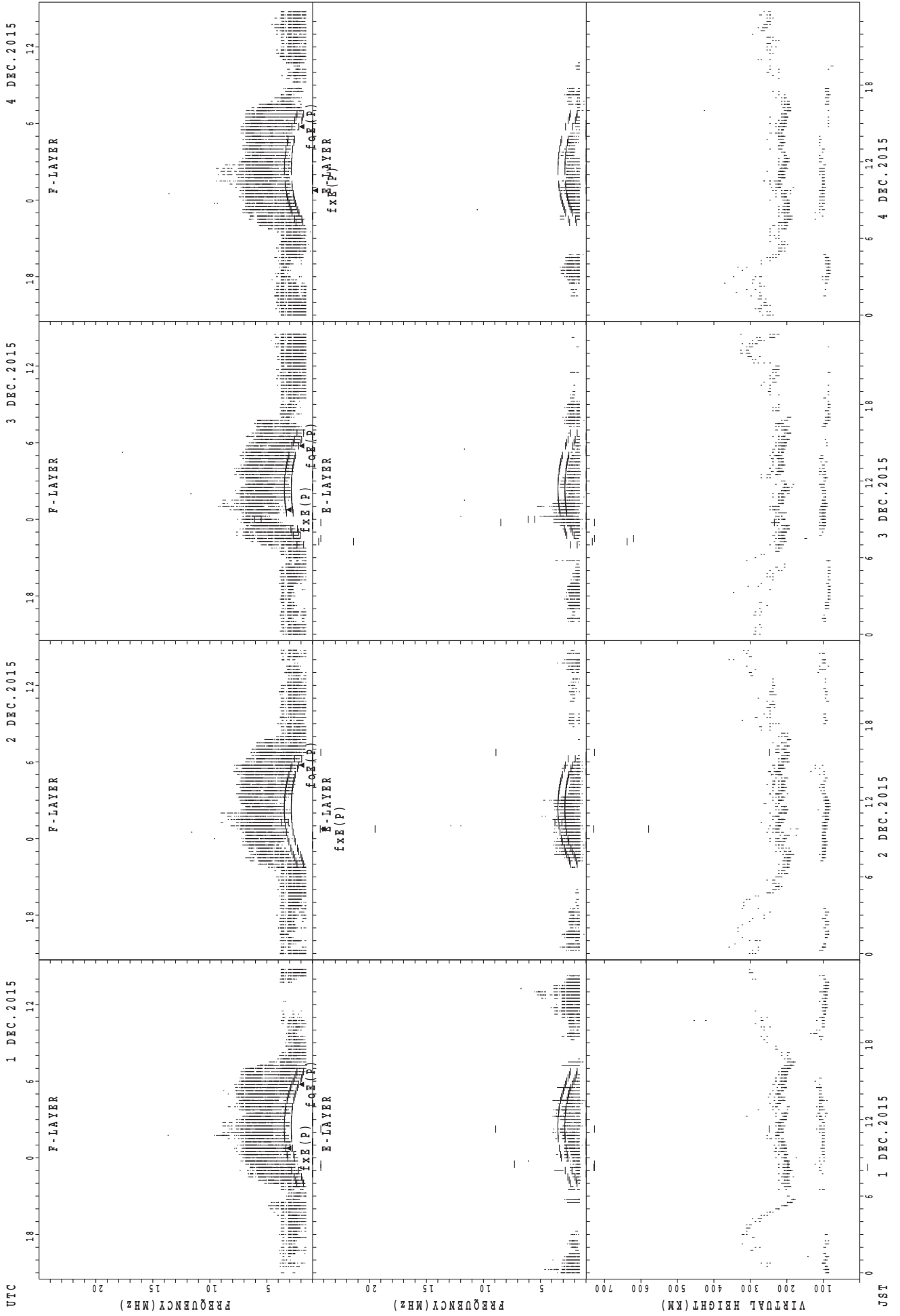
HOURLY VALUES OF fmin AT Okinawa

DEC. 2015

LAT. 26°41.0' N LON. 128°09.0' E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

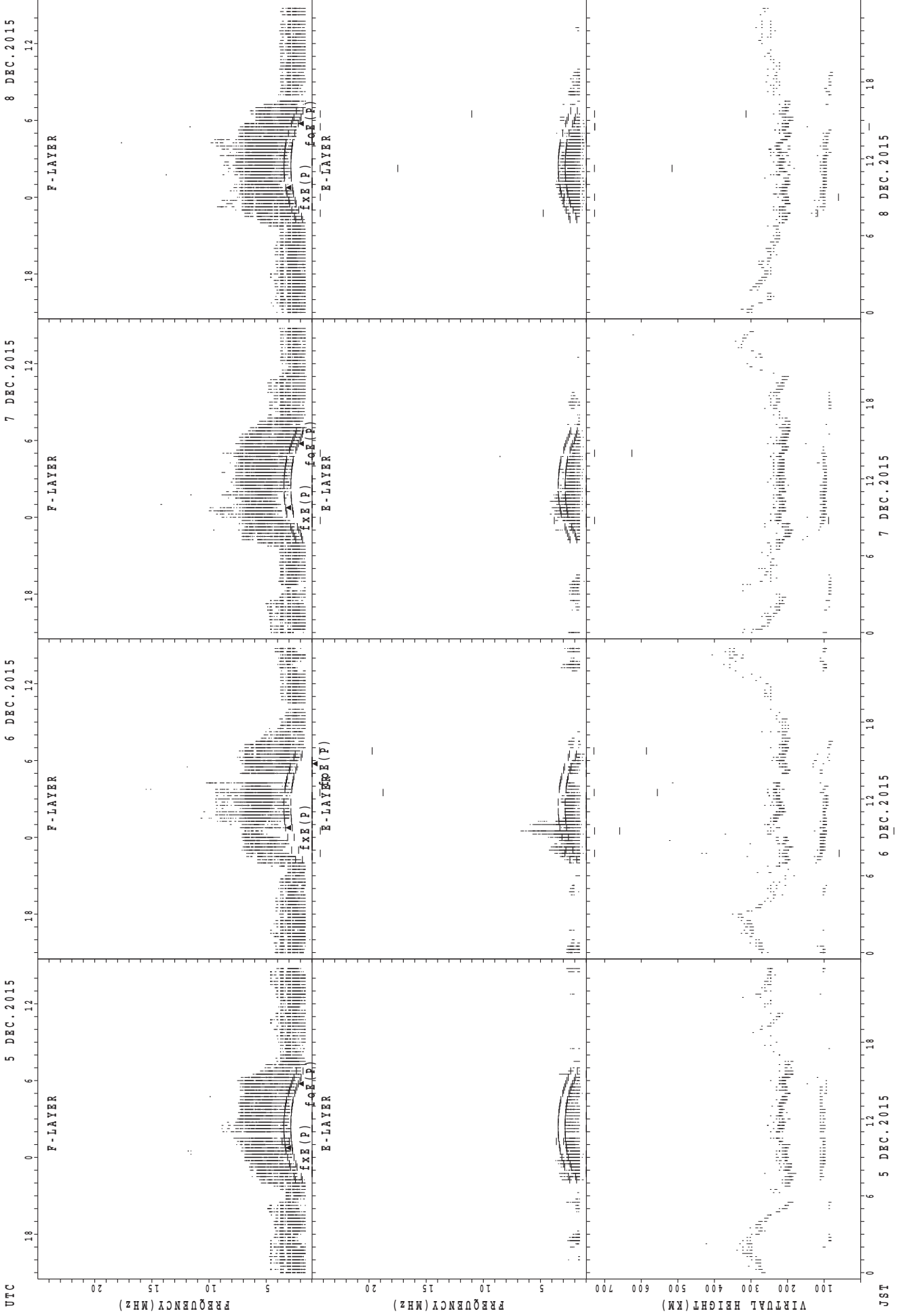
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	15	15	15	14	14	14	14	14	14	15	15	15	17	21	18	14	14	14	14	15	15	14	18
2	15	15	16	15	15	15	15	16	14	14	15	18	18	26	21	14	14	14	14	14	17	15	15	14
3	B	15	15	14	14	15	16	15	14	14	17	18	20	20	20	16	14	14	14	14	14	15	14	B
4	66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

SUMMARY PLOTS AT Wakkanai



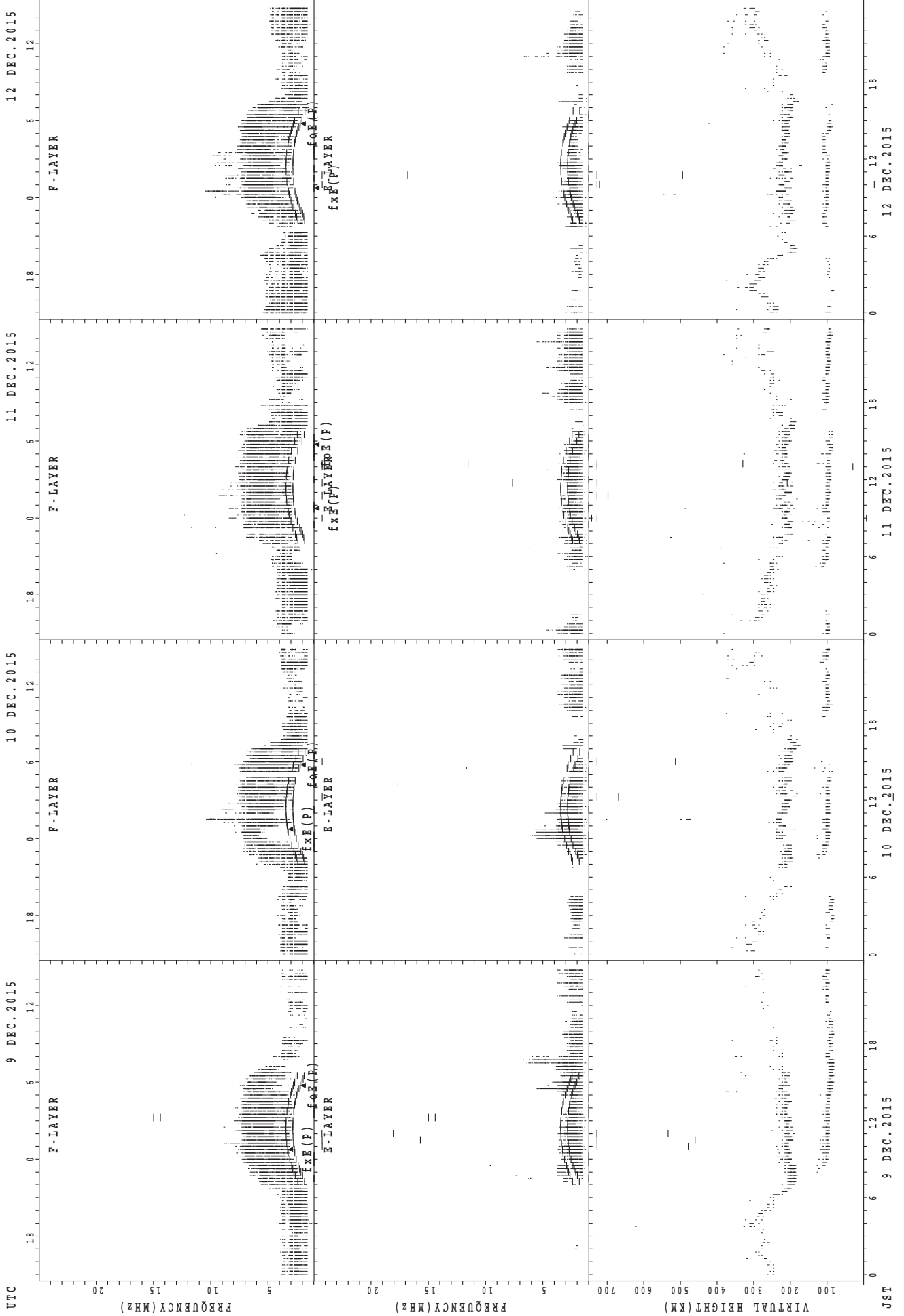
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



fxe(P); PREDICTED VALUE FOR fxe
foe(P); PREDICTED VALUE FOR foe

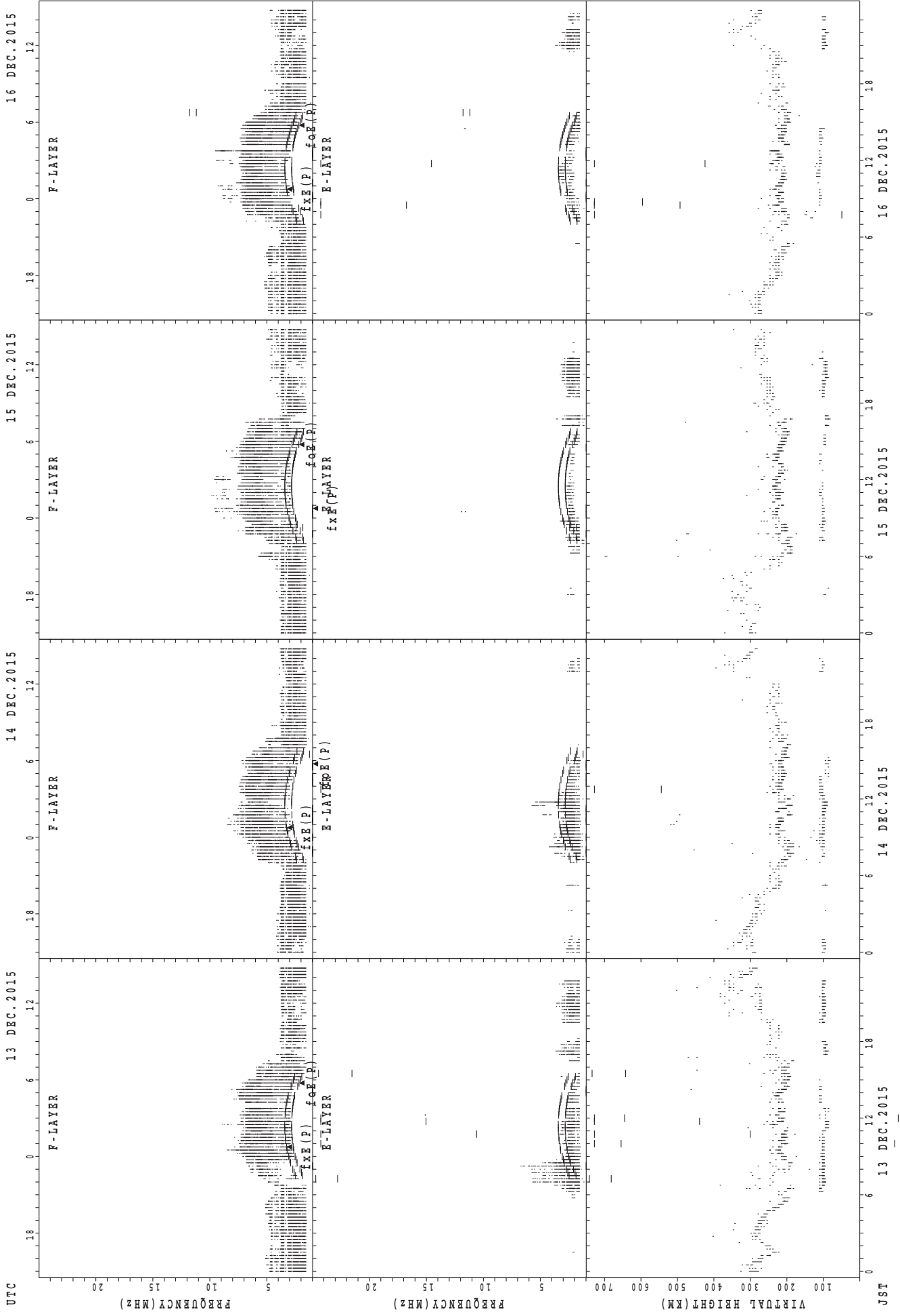
SUMMARY PLOTS AT Wakkanai



f_xE(P); PREDICTED VALUE FOR f_xE
foE(P); PREDICTED VALUE FOR foE

JST

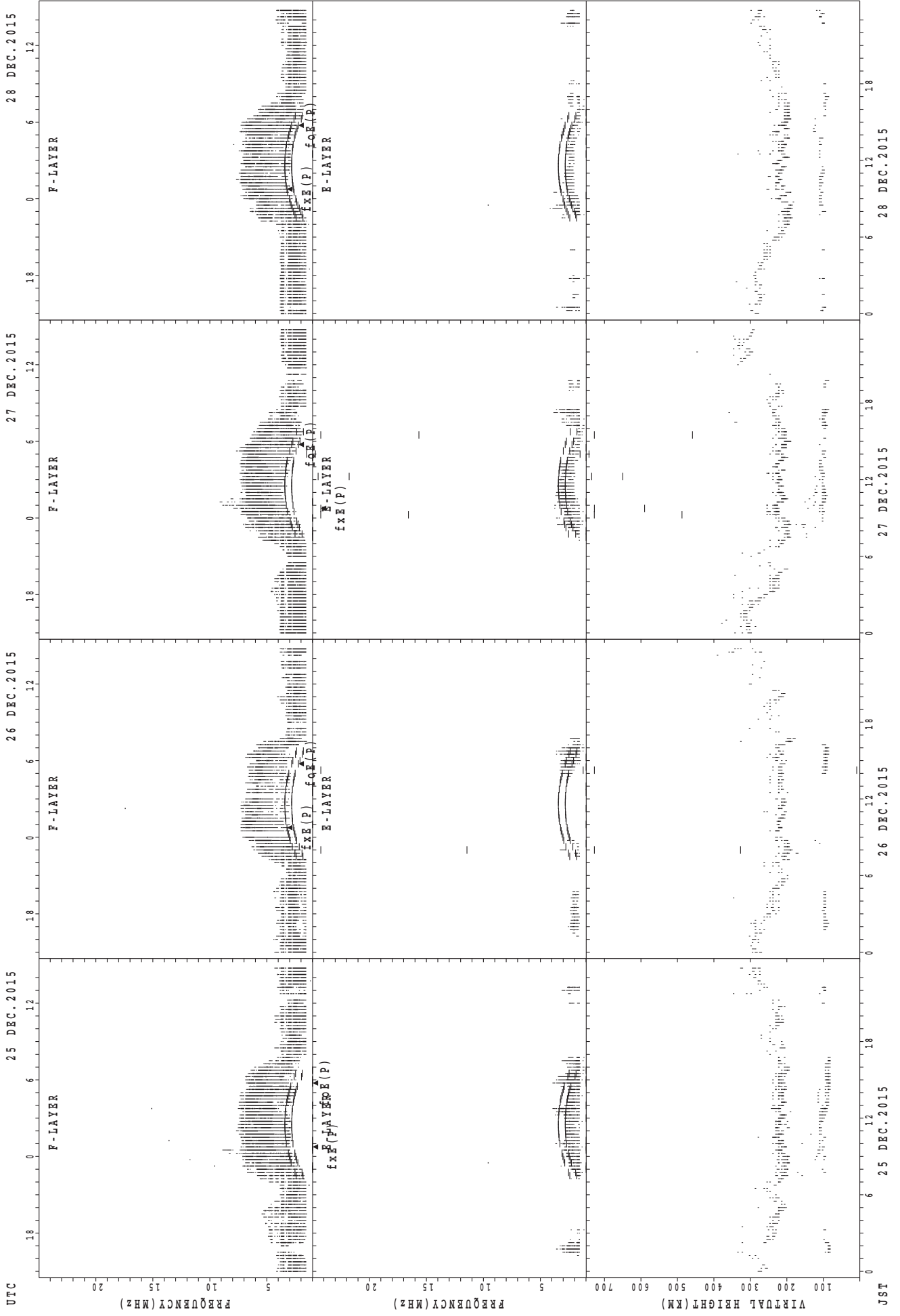
SUMMARY PLOTS AT Wakkanai



fxE(P); PREDICTED VALUE FOR fxE
 foE(P); PREDICTED VALUE FOR foE

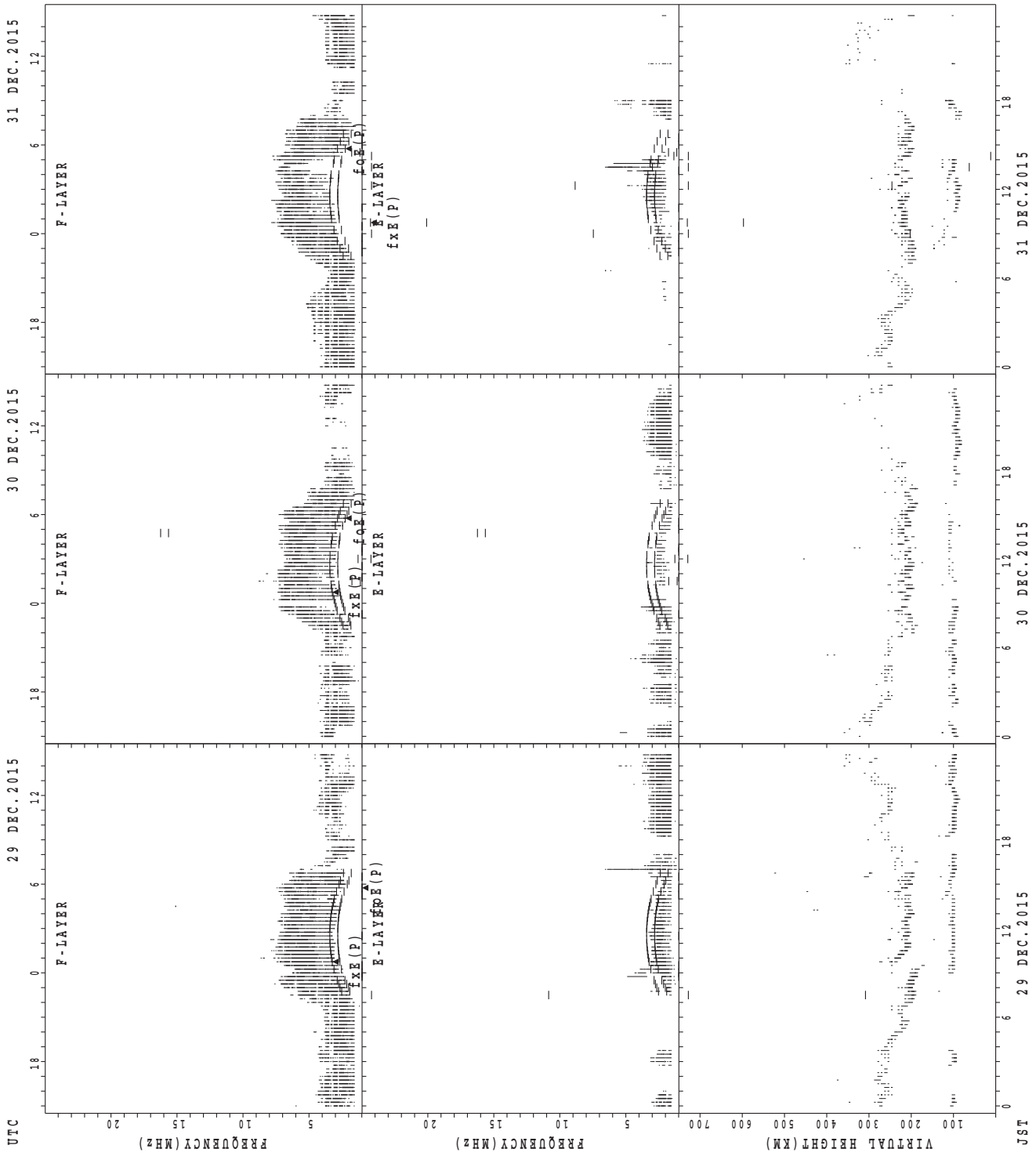
UTC 13 DEC. 2015 14 DEC. 2015 15 DEC. 2015 16 DEC. 2015
 JST 13 DEC. 2015 14 DEC. 2015 15 DEC. 2015 16 DEC. 2015

SUMMARY PLOTS AT Wakkanai



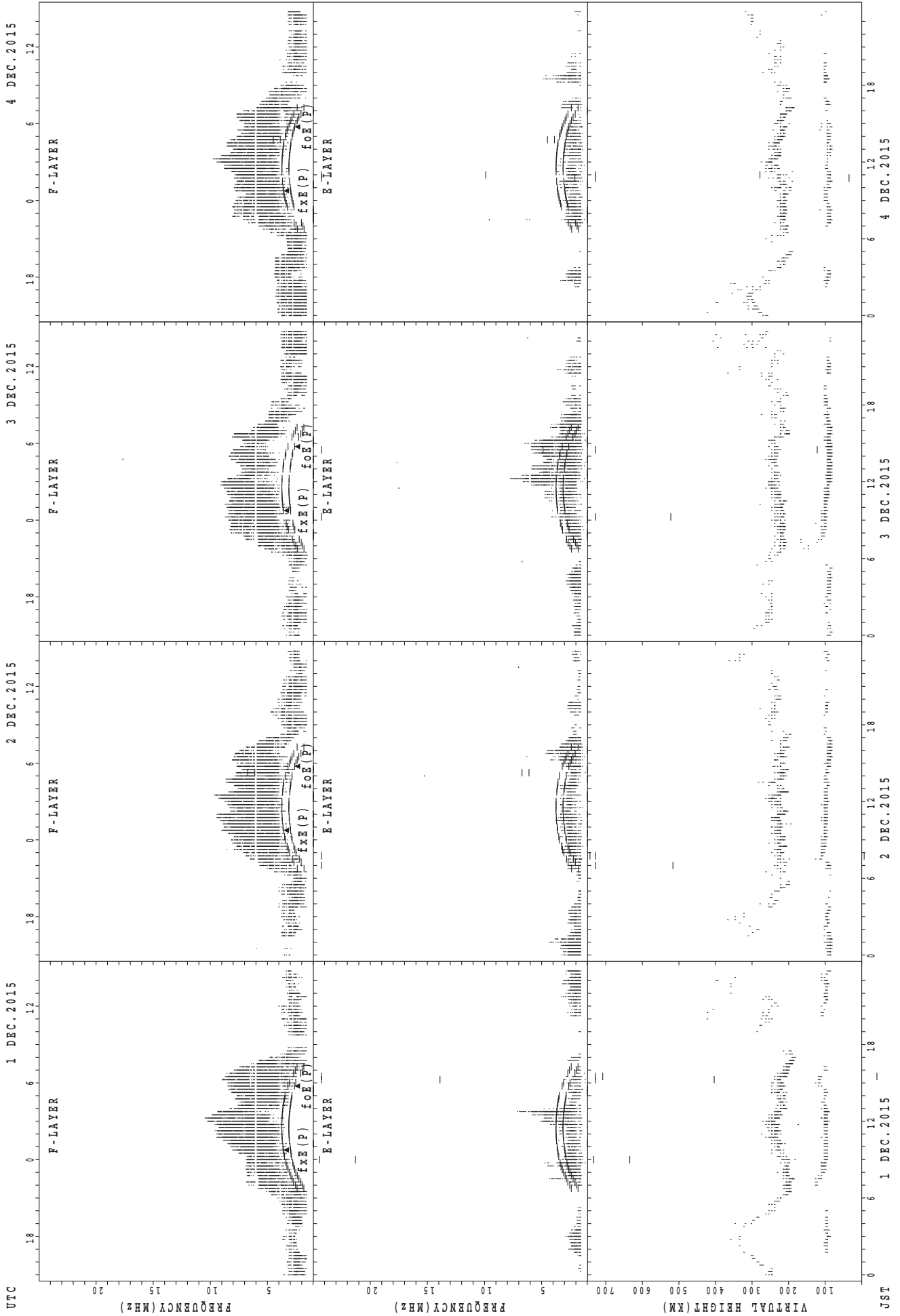
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Wakkanai



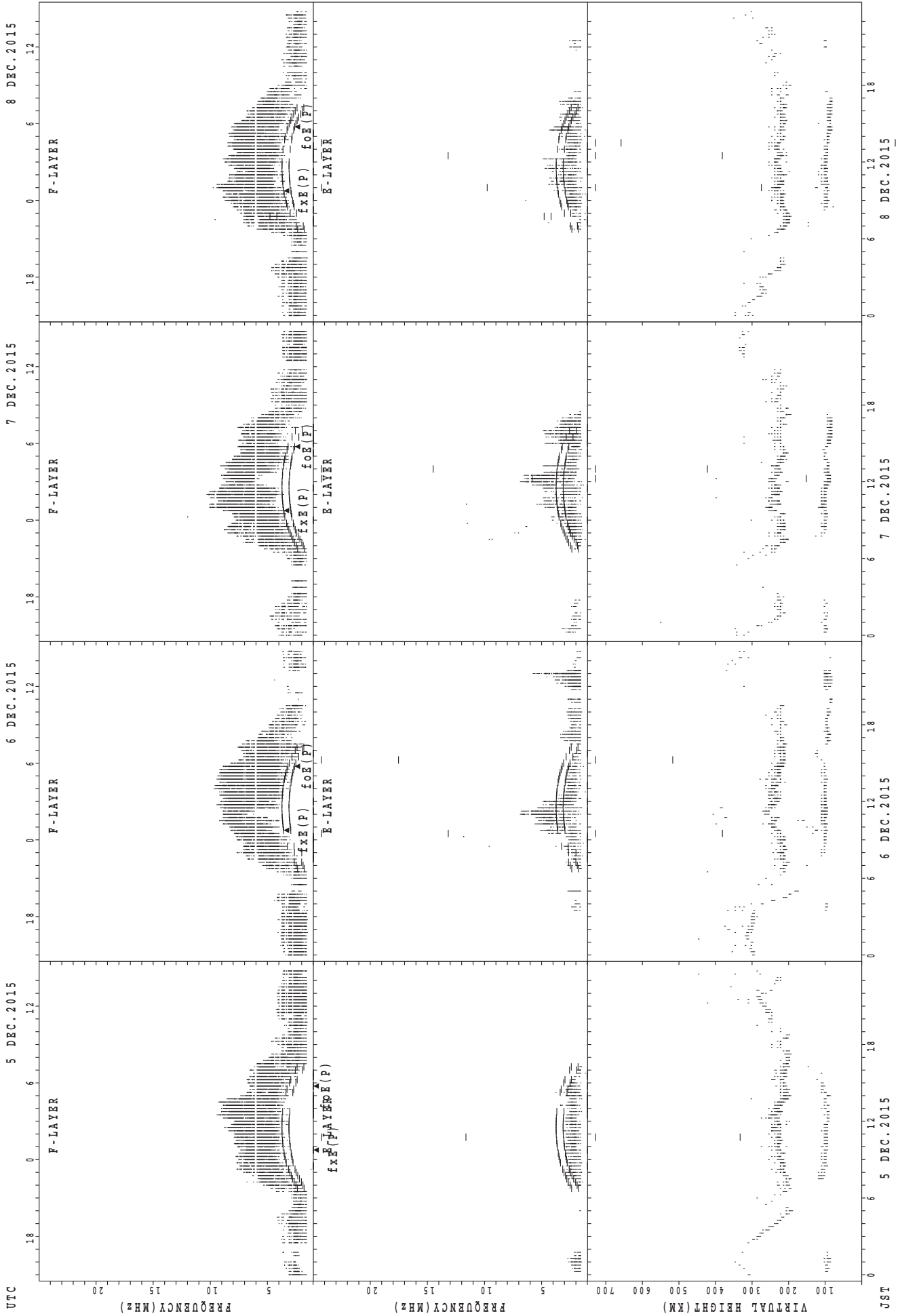
foF2(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



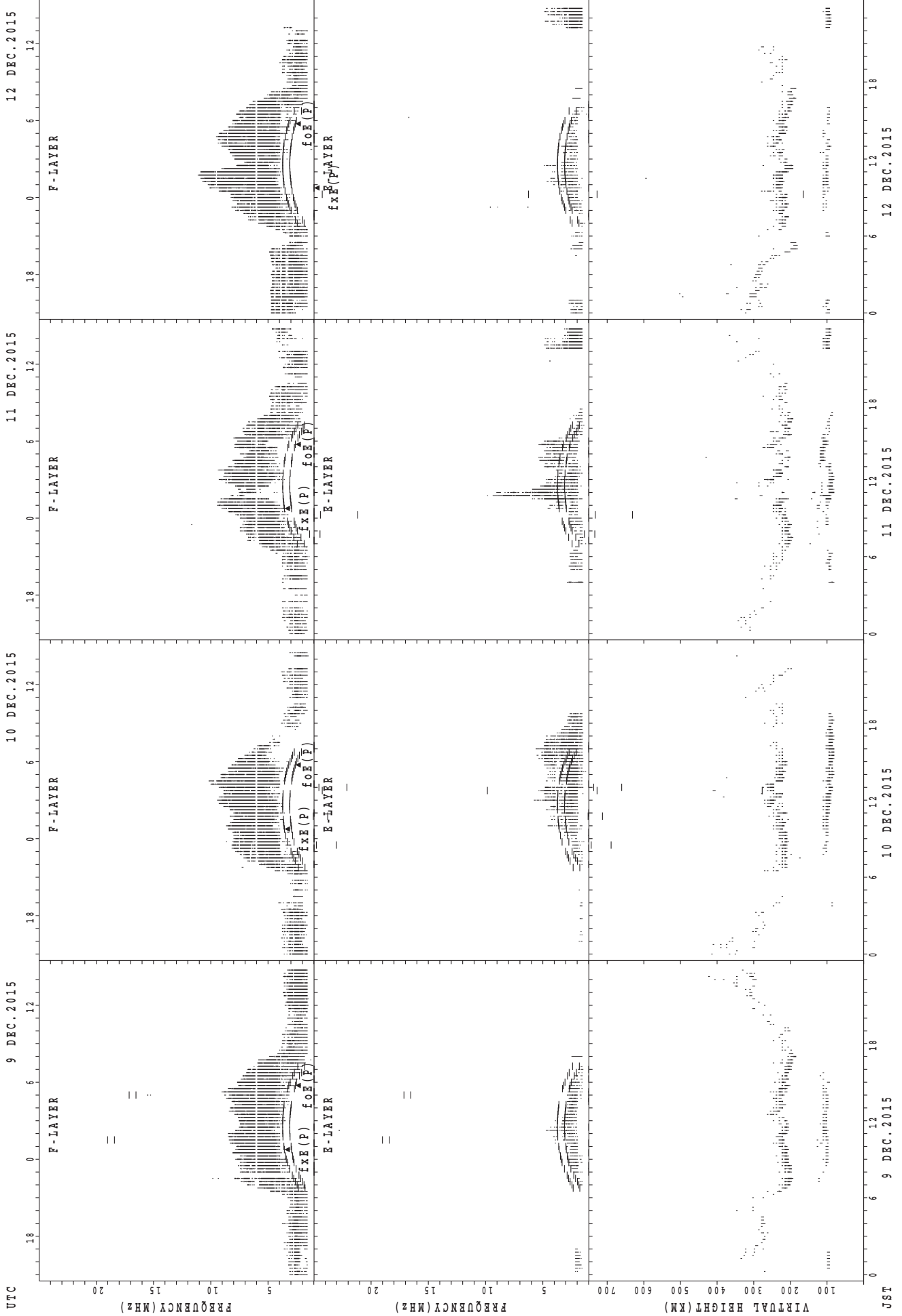
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Kokubunji



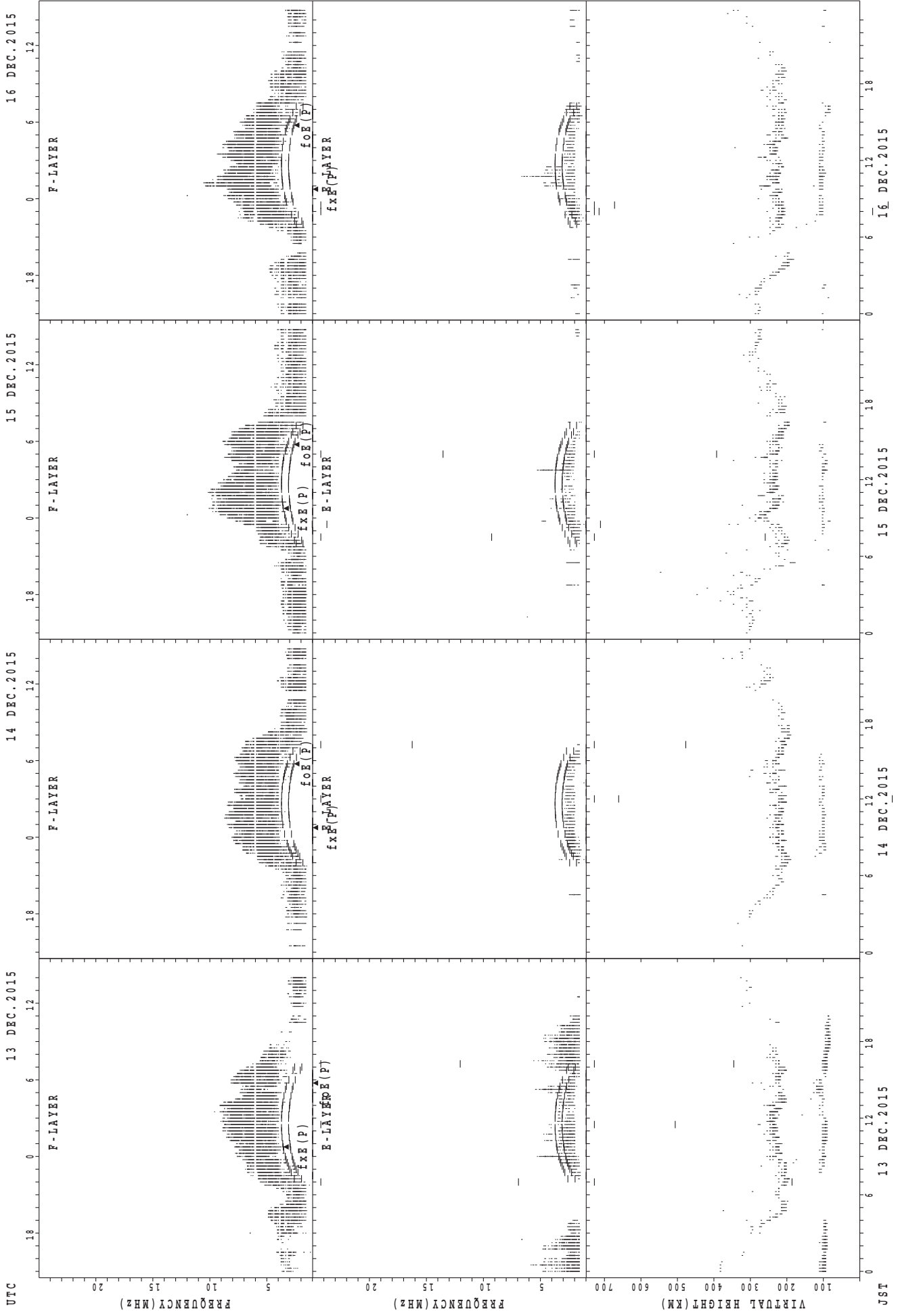
f_oF₂(P); PREDICTED VALUE FOR f_oF₂
 f_oE(P); PREDICTED VALUE FOR f_oE
 h'pF₂(P); PREDICTED VALUE FOR h'pF₂

SUMMARY PLOTS AT Kokubunji



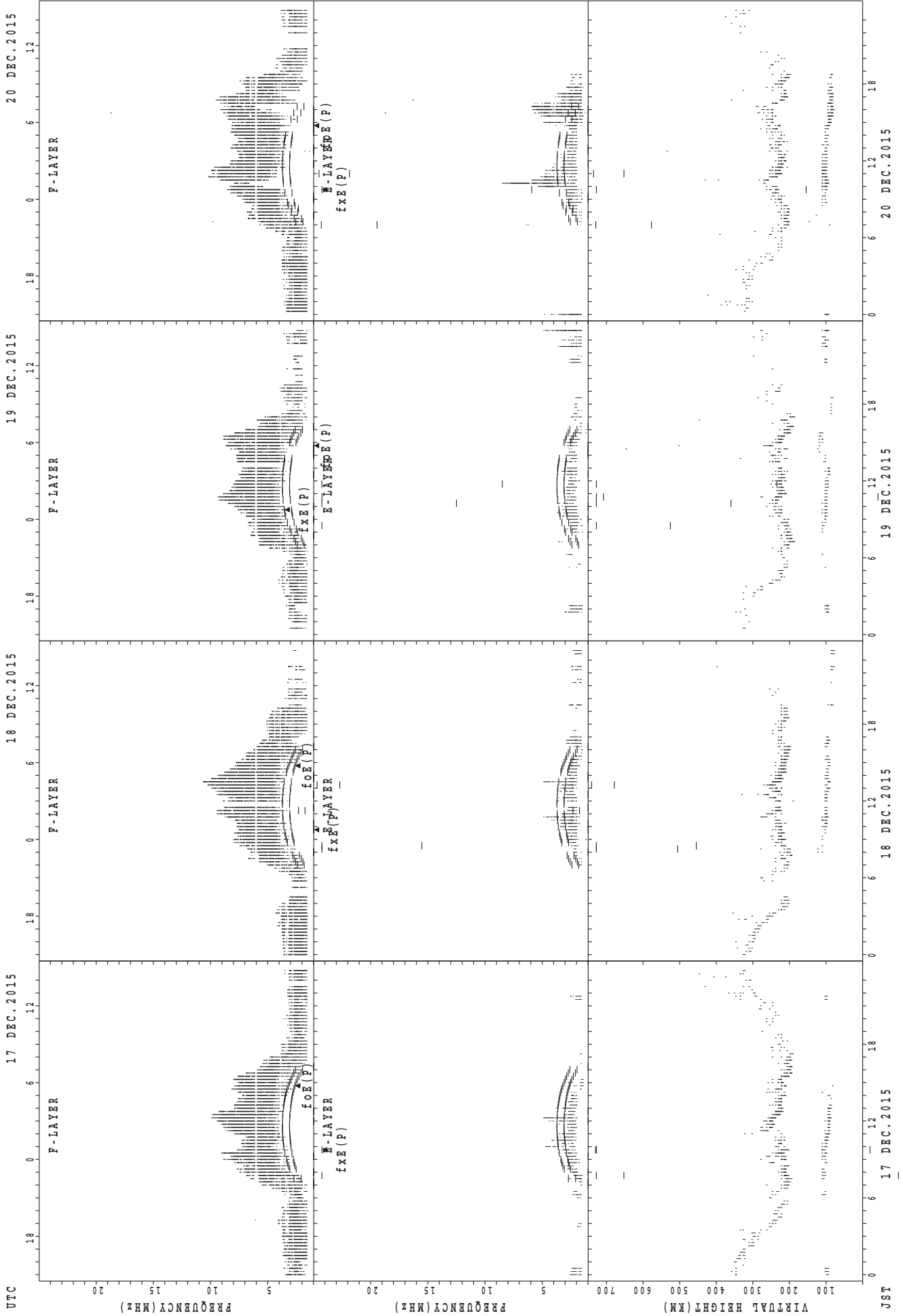
f_xE(P); PREDICTED VALUE FOR f_xE
f_xE(P); PREDICTED VALUE FOR f_xE

SUMMARY PLOTS AT Kokubunji



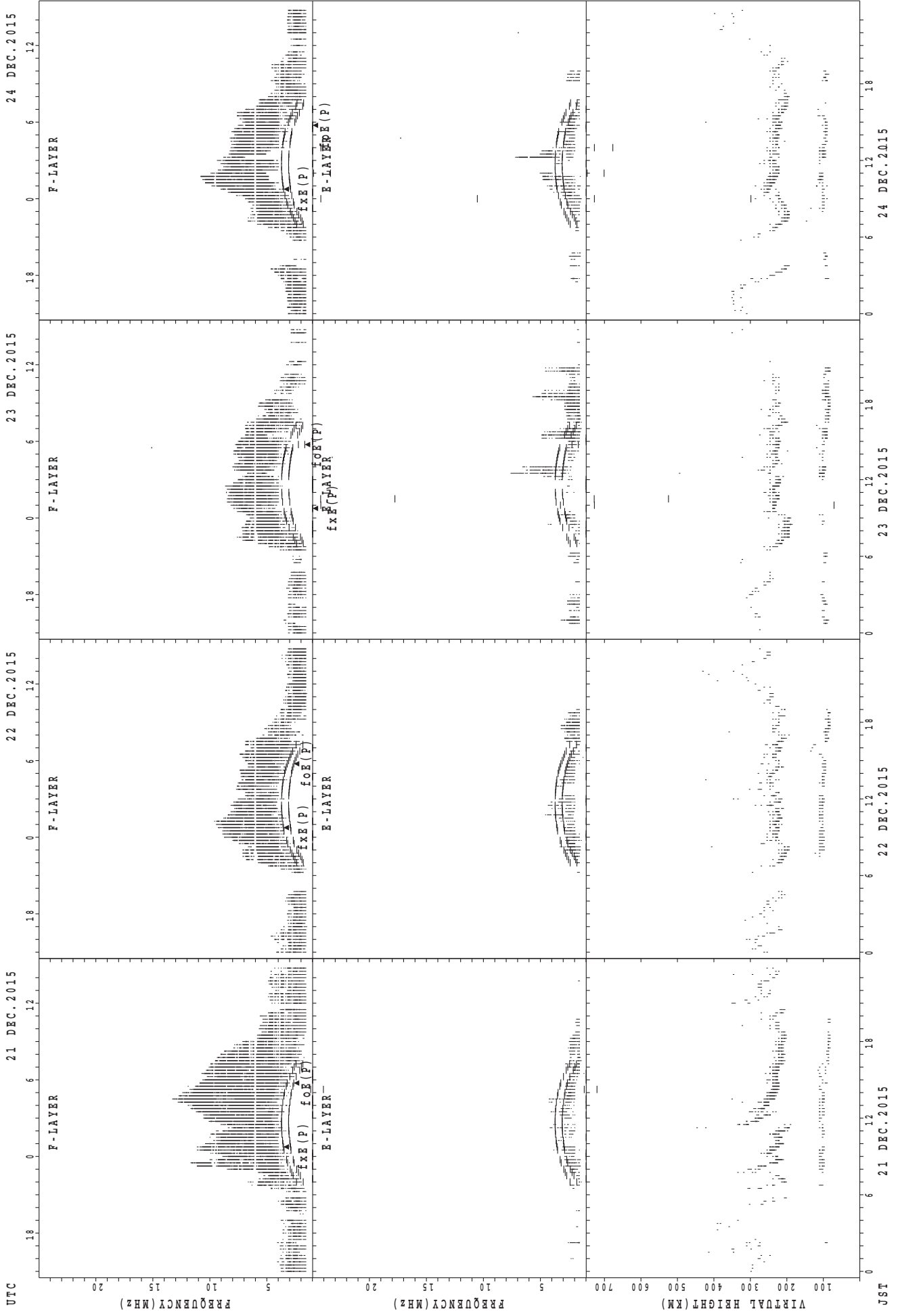
foF2(P); PREDICTED VALUE FOR F2E
foE(P); PREDICTED VALUE FOR E

SUMMARY PLOTS AT Kokubunji



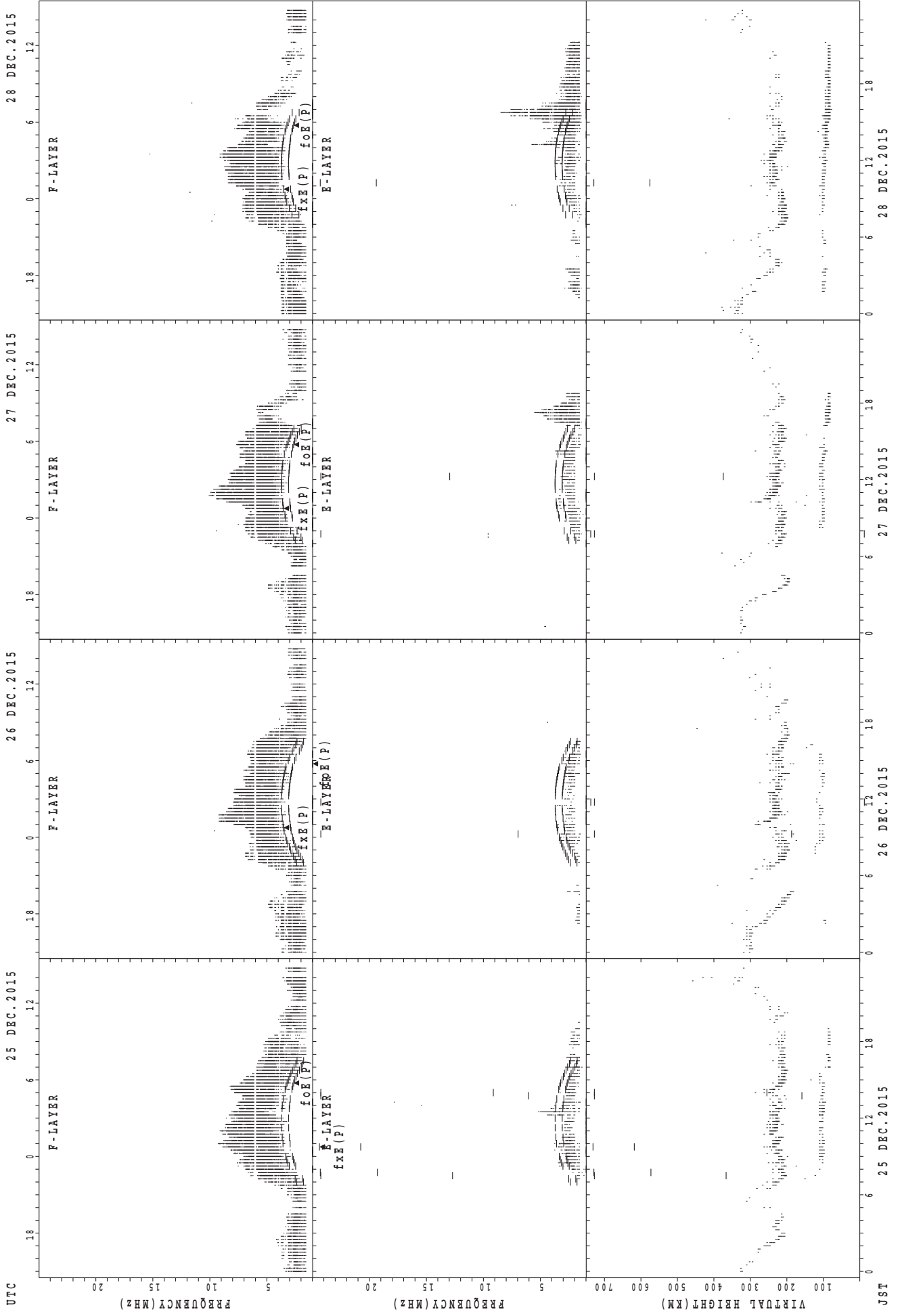
foE(P); PREDICTED VALUE FOR foE
 fxE(P); PREDICTED VALUE FOR fxE
 foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



fxe(P); PREDICTED VALUE FOR fxe
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji

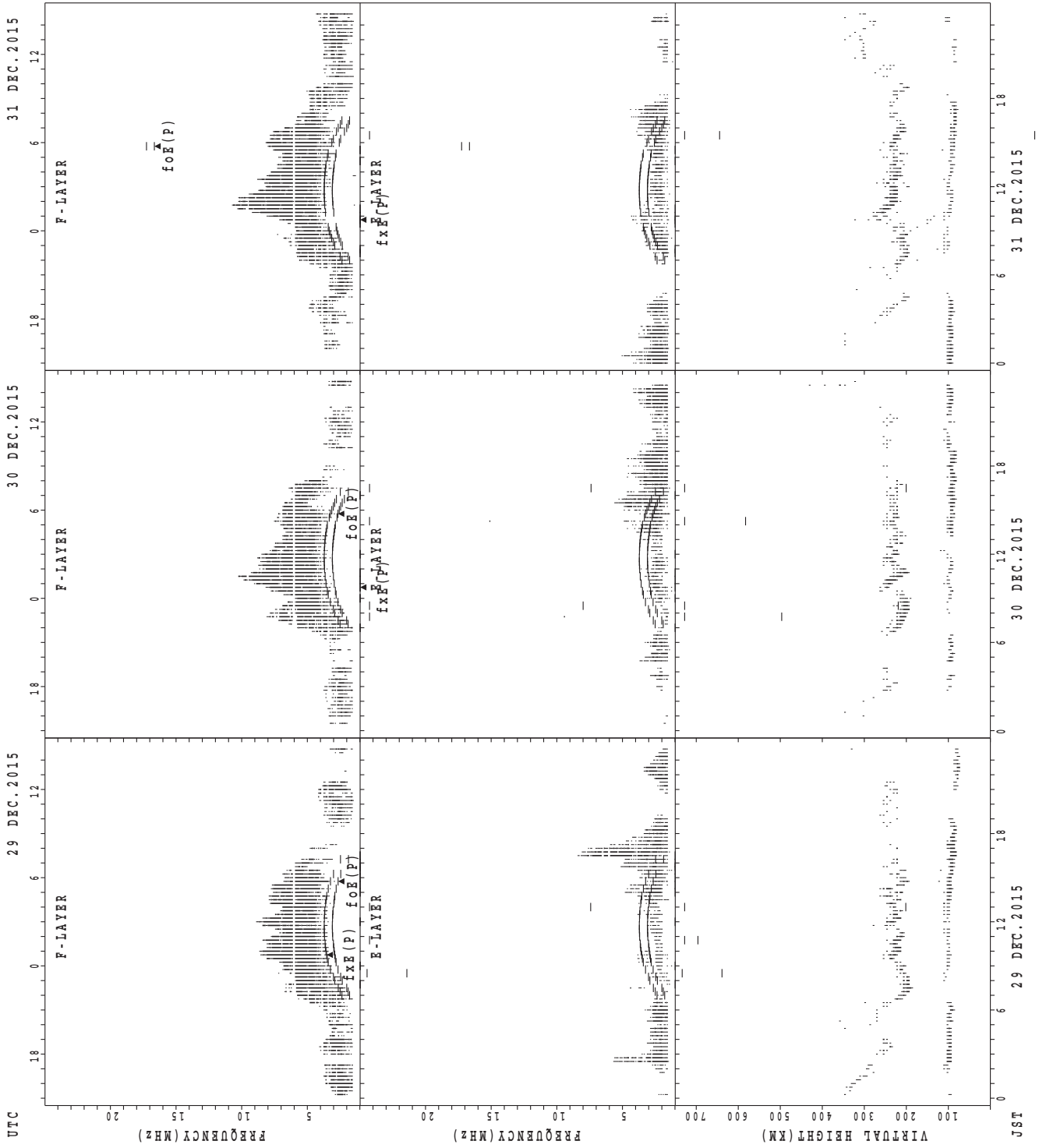


UTC
 25 DEC. 2015
 26 DEC. 2015
 27 DEC. 2015
 28 DEC. 2015

JST
 25 DEC. 2015
 26 DEC. 2015
 27 DEC. 2015
 28 DEC. 2015

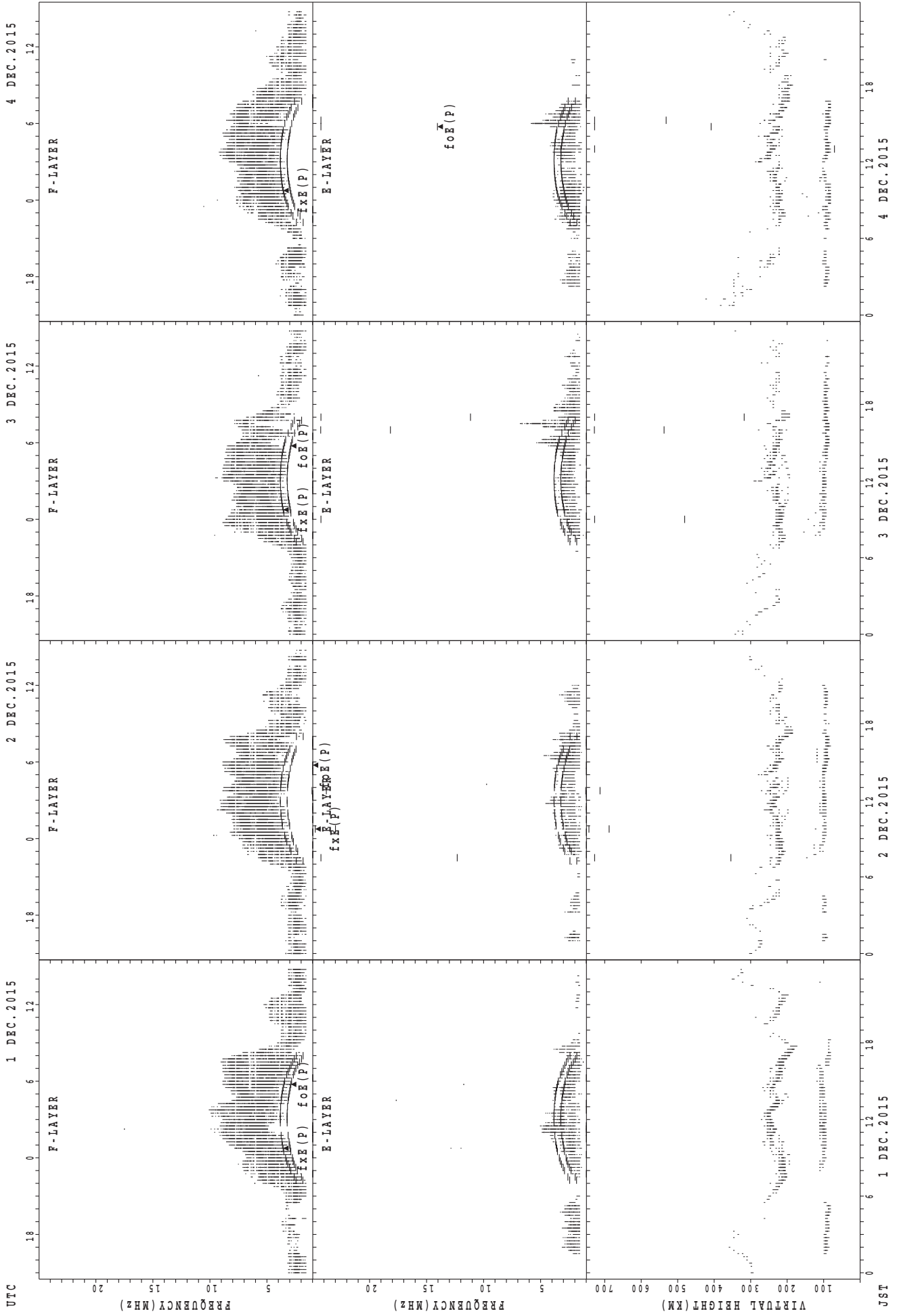
fxe(P); PREDICTED VALUE FOR fxe
 foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



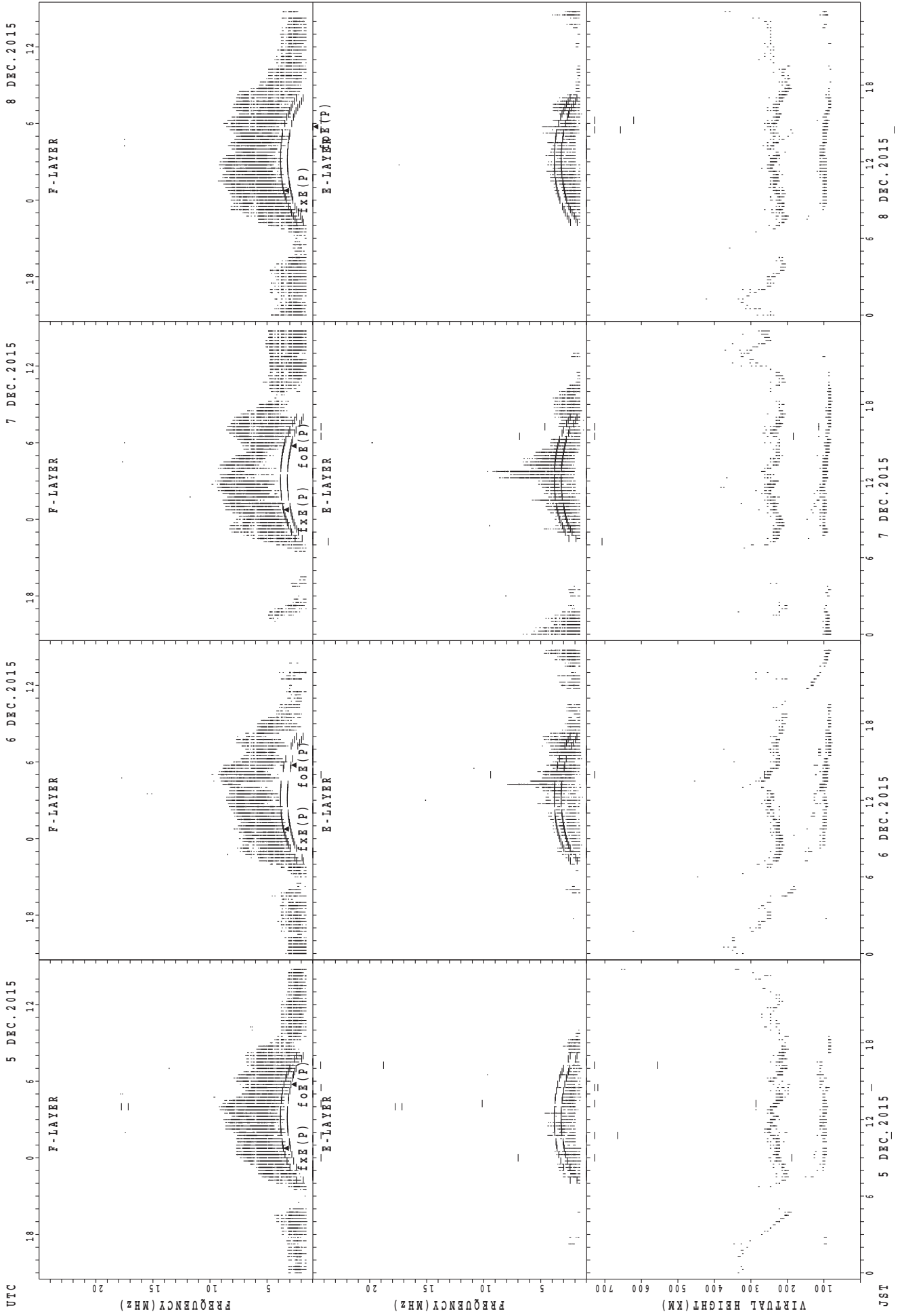
f_oE(P); PREDICTED VALUE FOR f_xE
 f_oE(P); PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Yamagawa



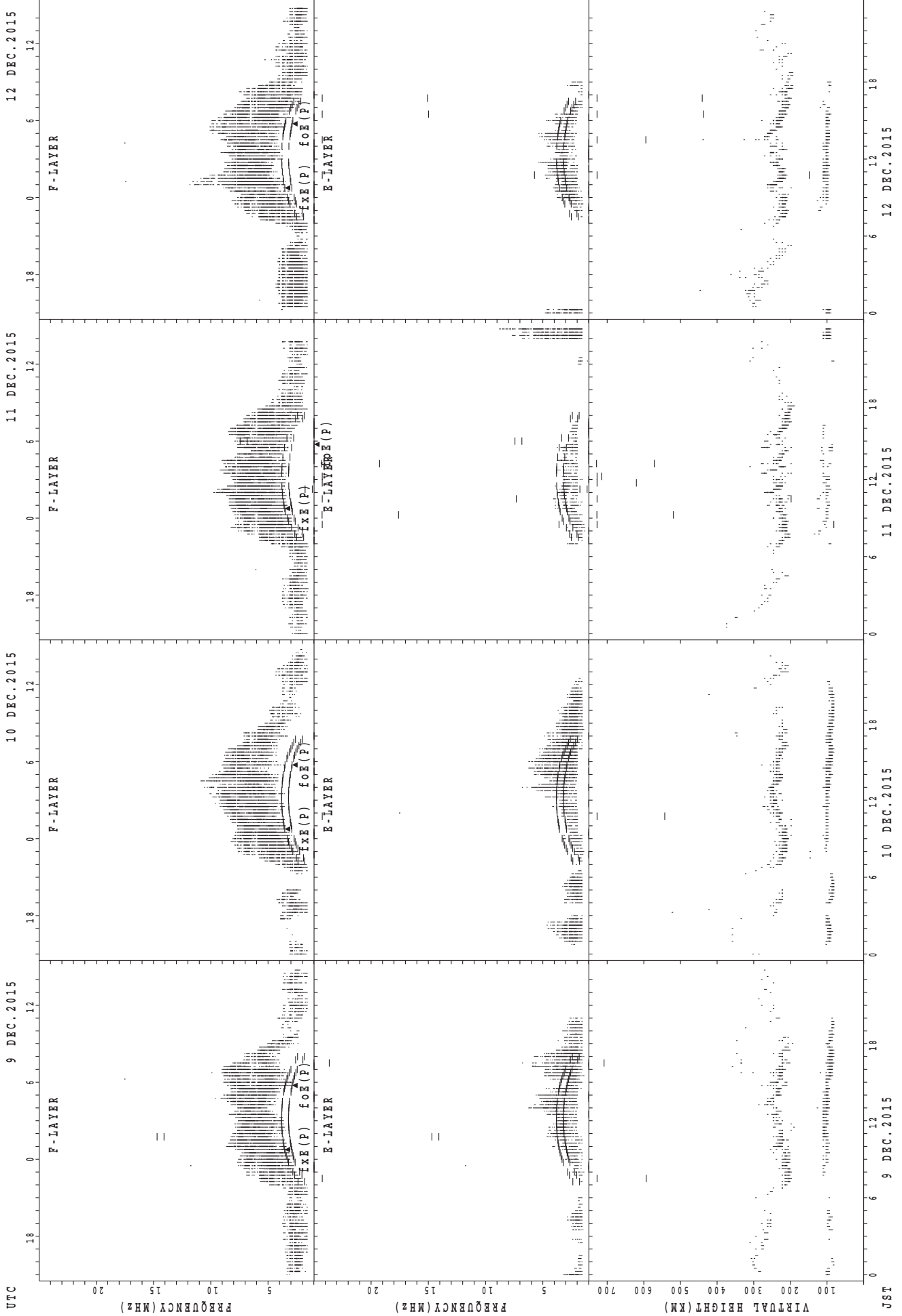
foE(P); PREDICTED VALUE FOR foE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



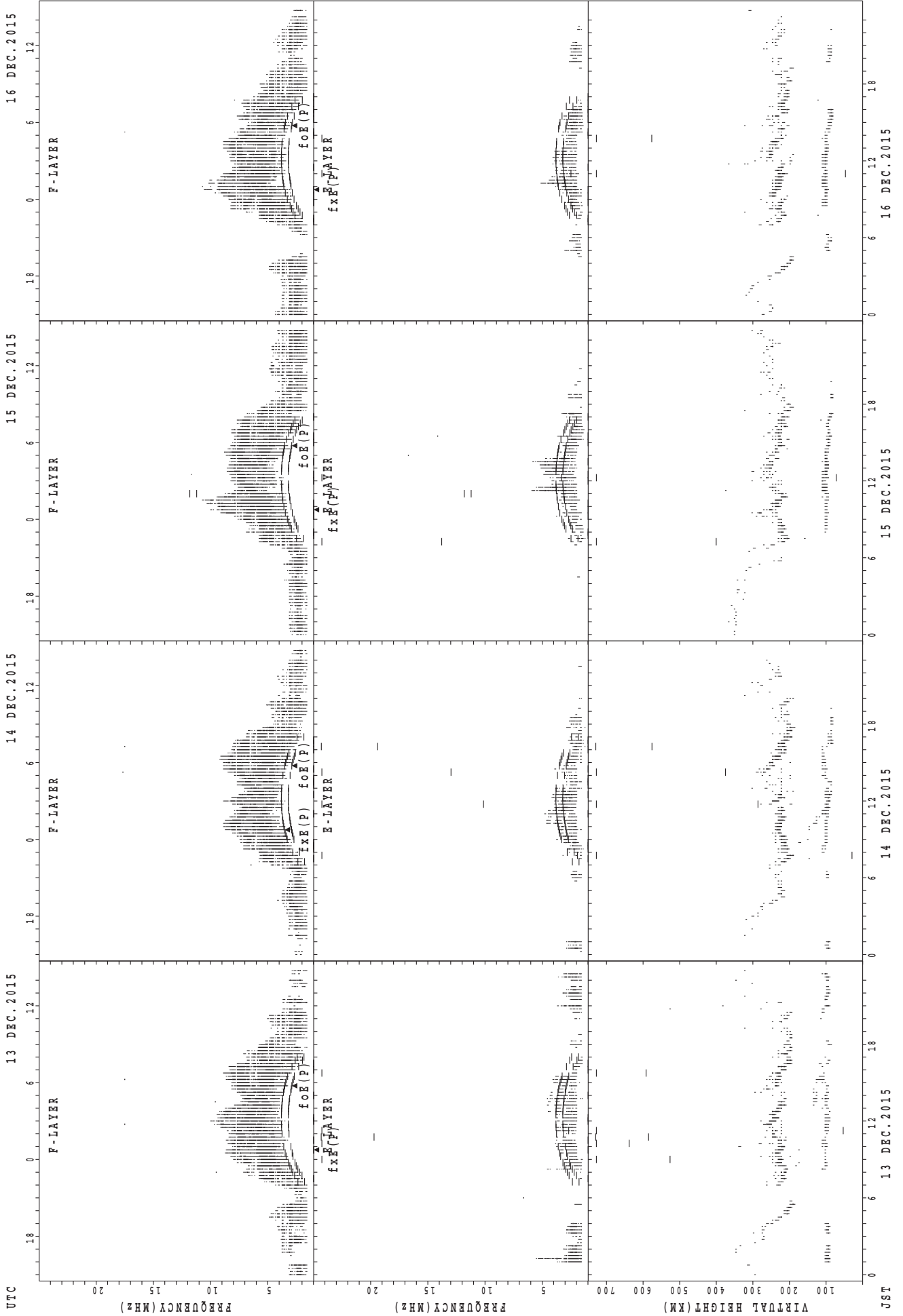
f_{xe}(P); PREDICTED VALUE FOR f_{xe}
f_{oE}(P); PREDICTED VALUE FOR f_{oE}

SUMMARY PLOTS AT Yamagawa



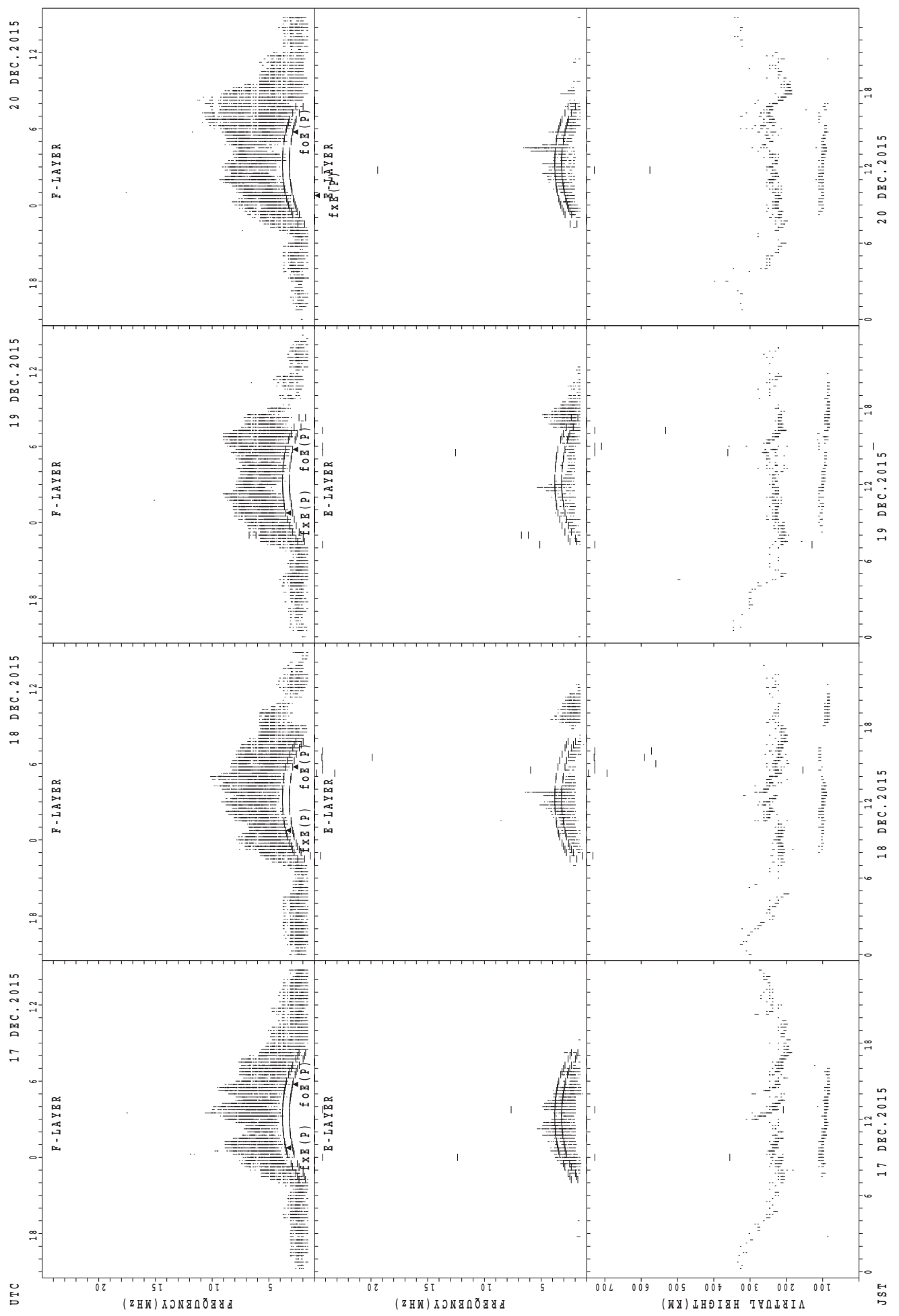
UTC
 9 DEC.2015 12 DEC.2015
 18 12 6 0 6 12 18 0 6 12 18 0 6 12 18
 F-LAYER F-LAYER F-LAYER F-LAYER
 fxe(P) foe(P) fxe(P) foe(P) fxe(P) foe(P) fxe(P) foe(P)
 E-LAYER E-LAYER E-LAYER E-LAYER
 Virtual Height (KM)
 100 80 60 40 20 0
 Frequency (MHz)
 700 600 500 400 300 200 100 0
 Frequency (MHz)
 20 15 10 5 0
 18 12 6 0 6 12 18 0 6 12 18 0 6 12 18
 JST
 9 DEC.2015 10 DEC.2015 11 DEC.2015 12 DEC.2015
 fxe(P); PREDICTED VALUE FOR fxe
 foe(P); PREDICTED VALUE FOR foe

SUMMARY PLOTS AT Yamagawa



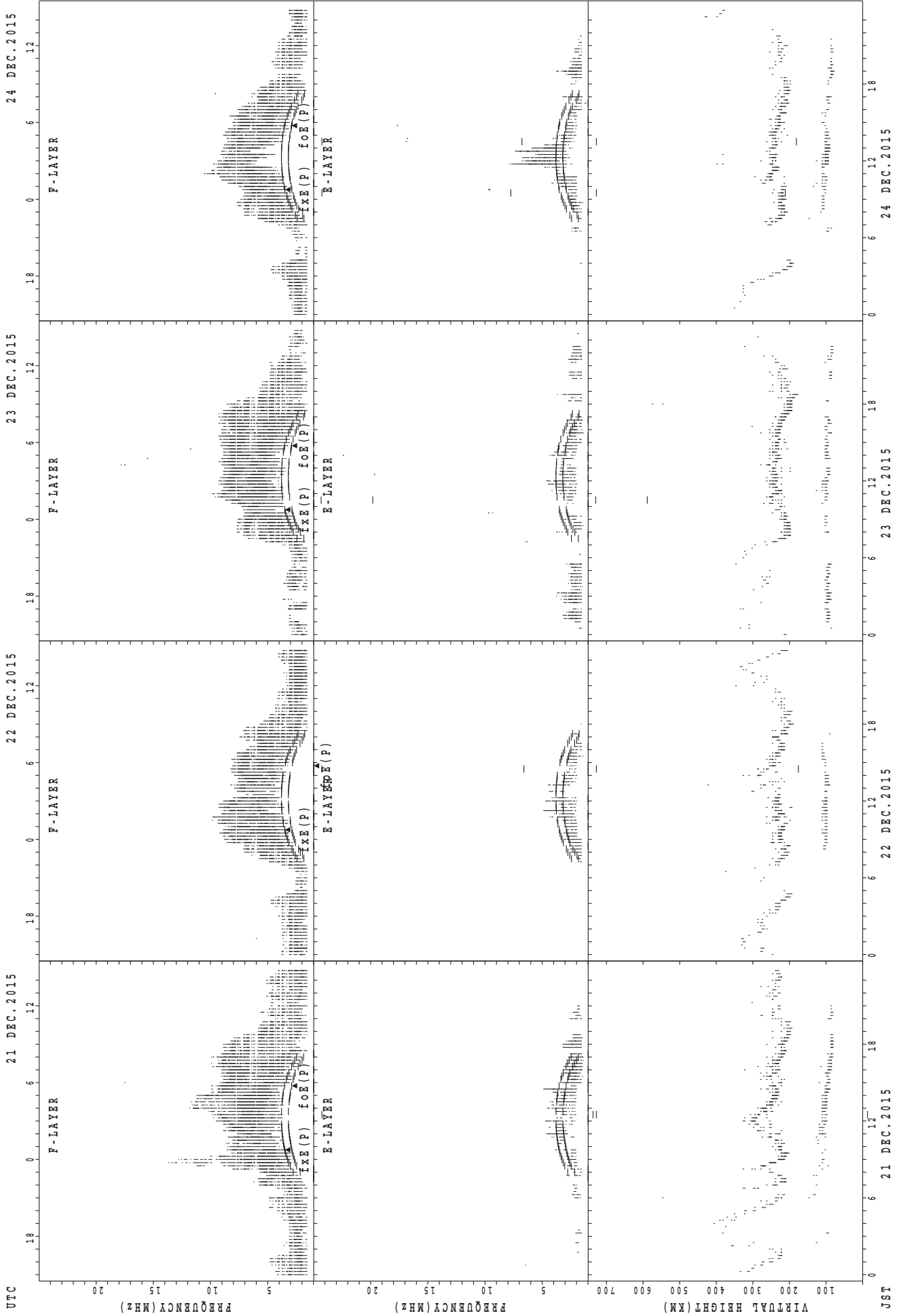
fxe(P); PREDICTED VALUE FOR fxe
foe(P); PREDICTED VALUE FOR foe

SUMMARY PLOTS AT Yamagawa



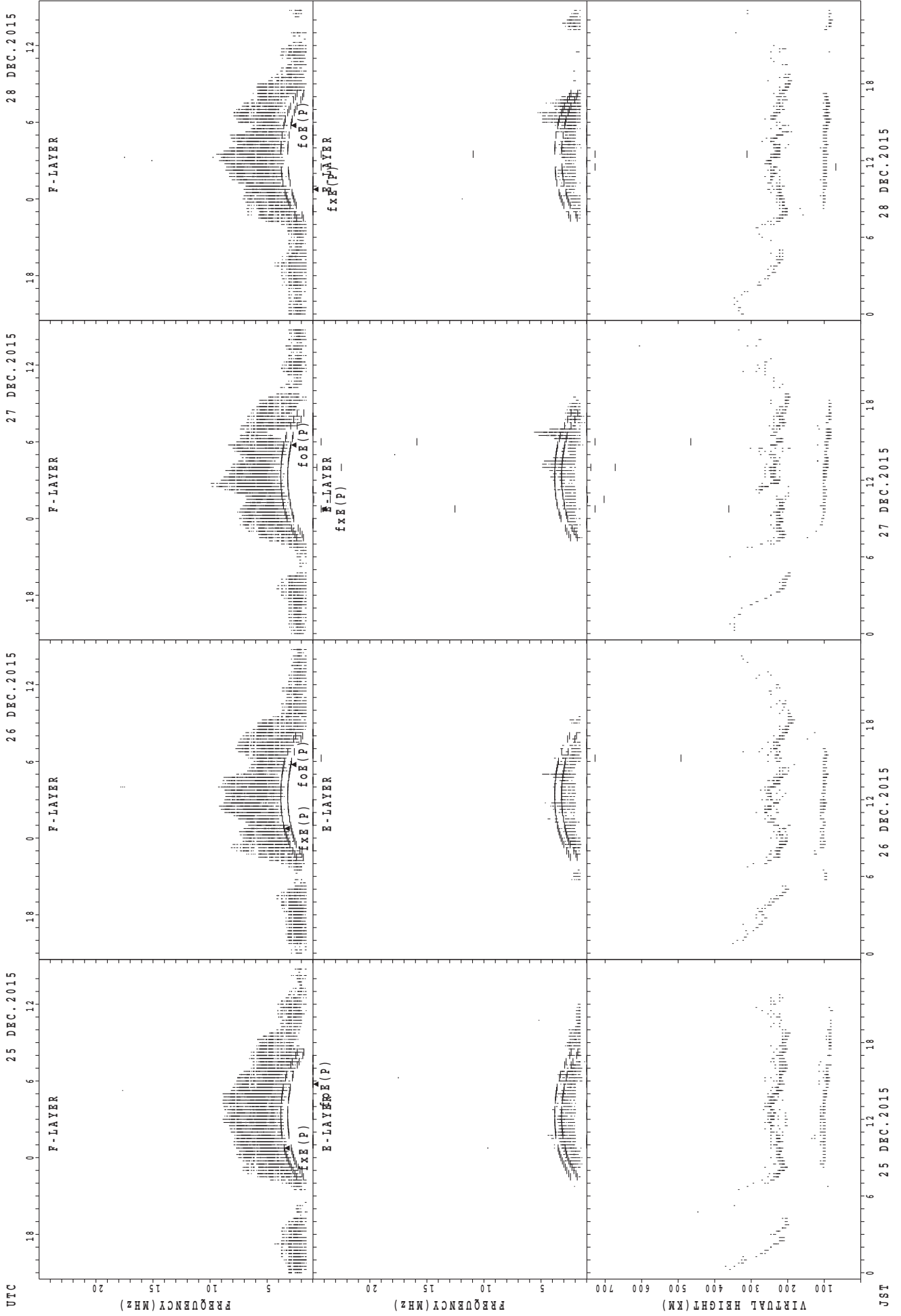
f_xE(P); PREDICTED VALUE FOR f_xE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



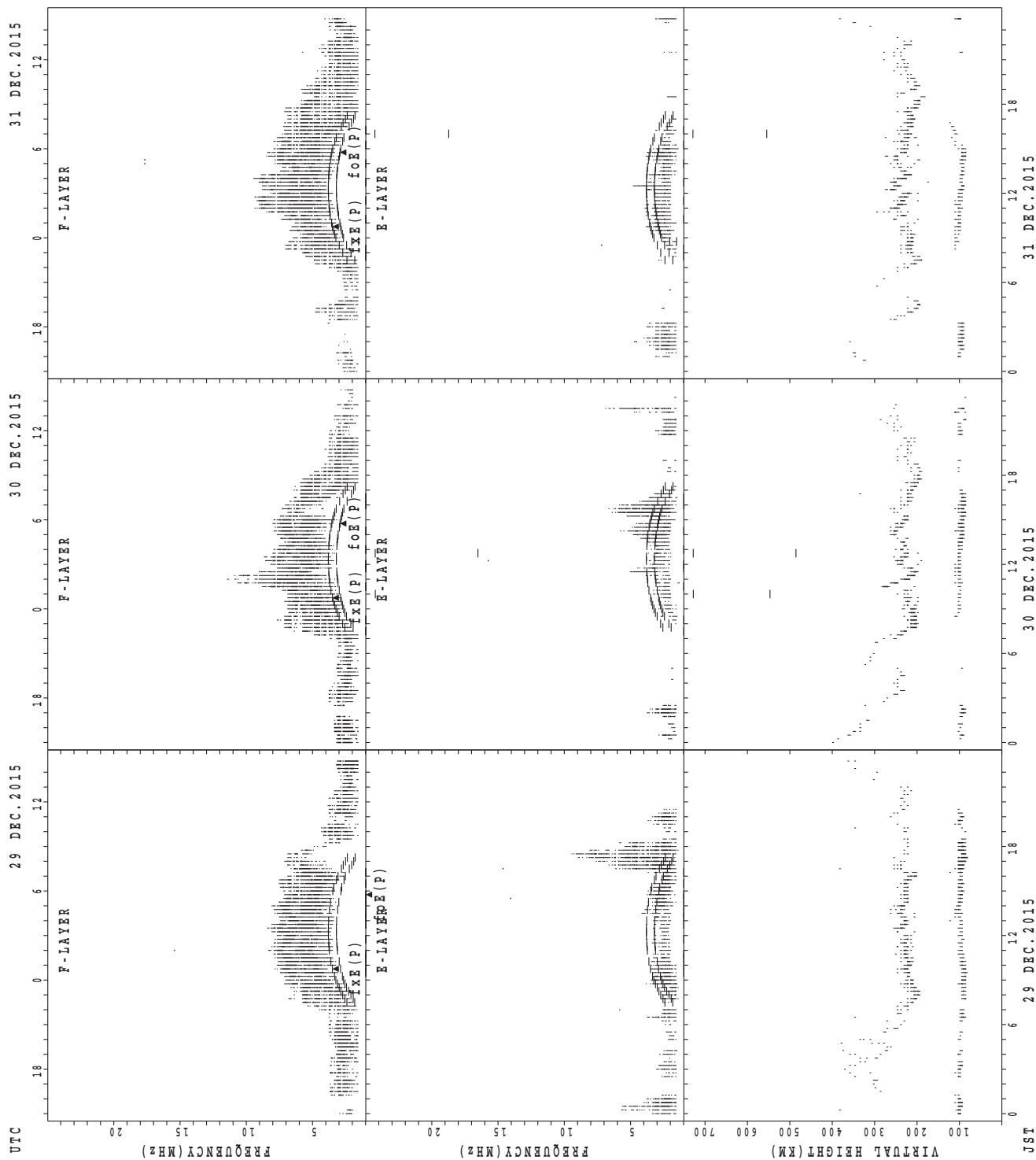
fxe(P); PREDICTED VALUE FOR fxe
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



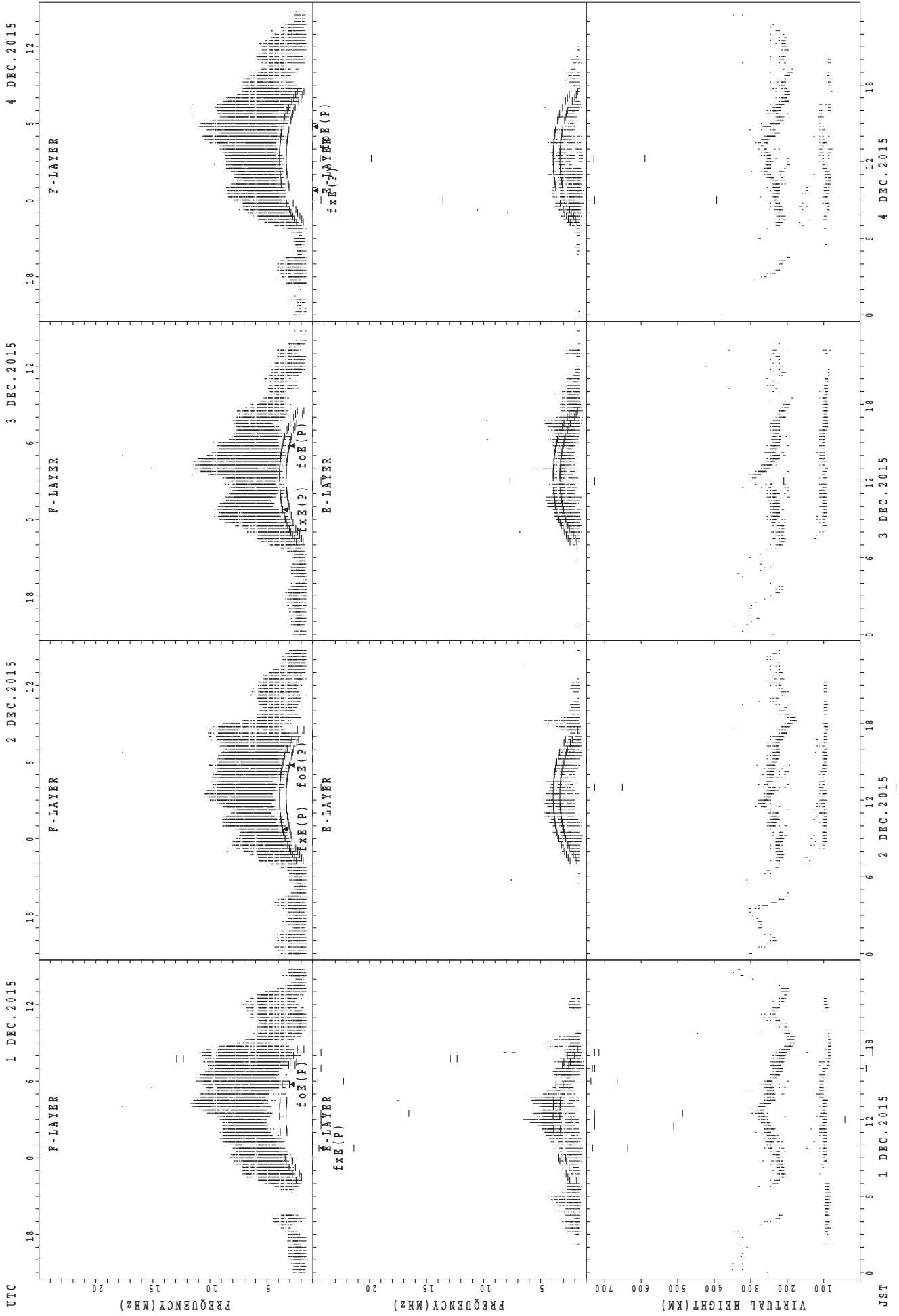
UTC
25 DEC. 2015
26 DEC. 2015
27 DEC. 2015
28 DEC. 2015
JST
fxe(P); PREDICTED VALUE FOR fxe
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



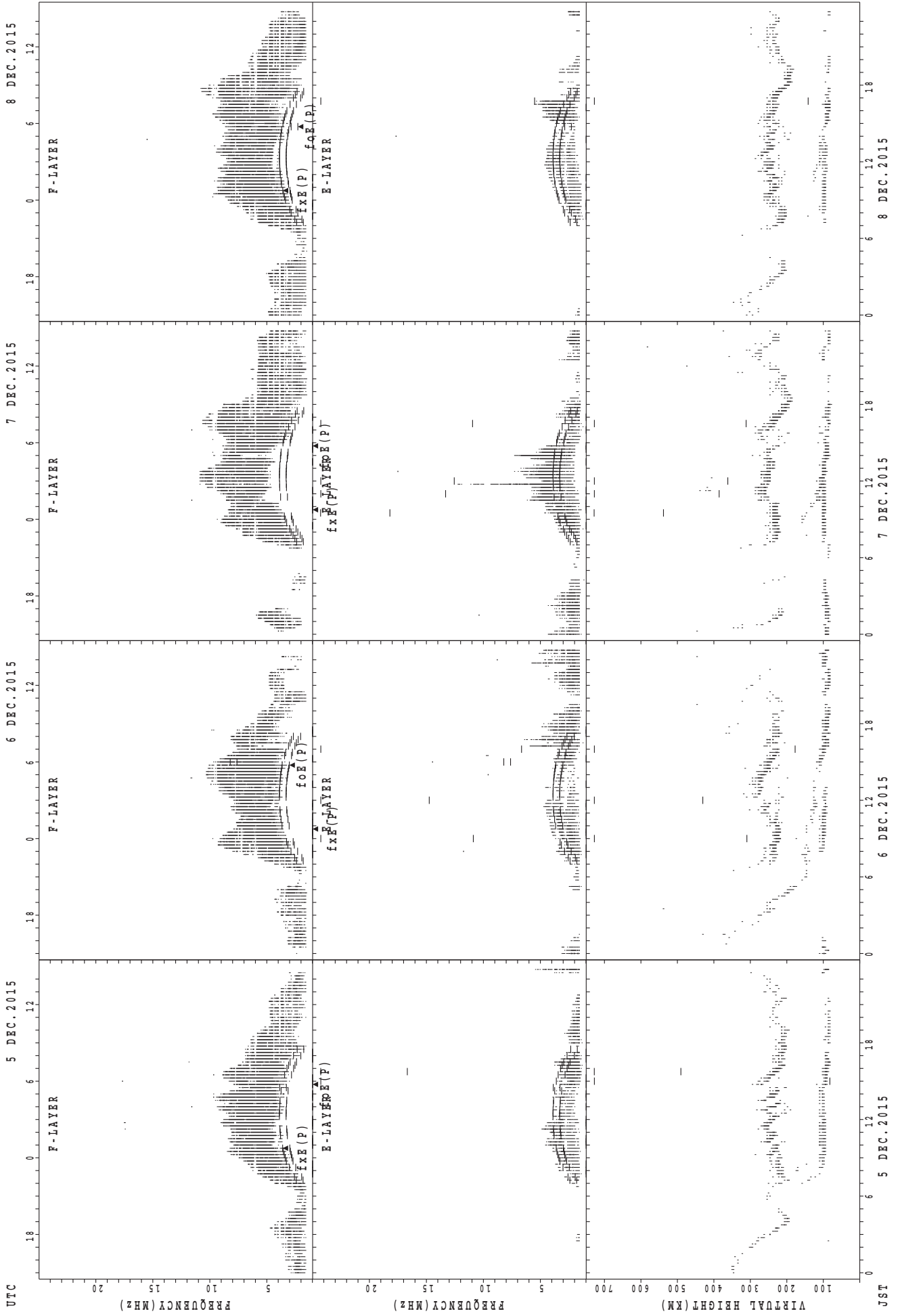
fxe(P); PREDICTED VALUE FOR fxe
fof(P); PREDICTED VALUE FOR fof

SUMMARY PLOTS AT Okinawa



fxe(P); PREDICTED VALUE FOR fxe
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



foF2(P); PREDICTED VALUE FOR foF2
foE(P); PREDICTED VALUE FOR foE

5 DEC.2015

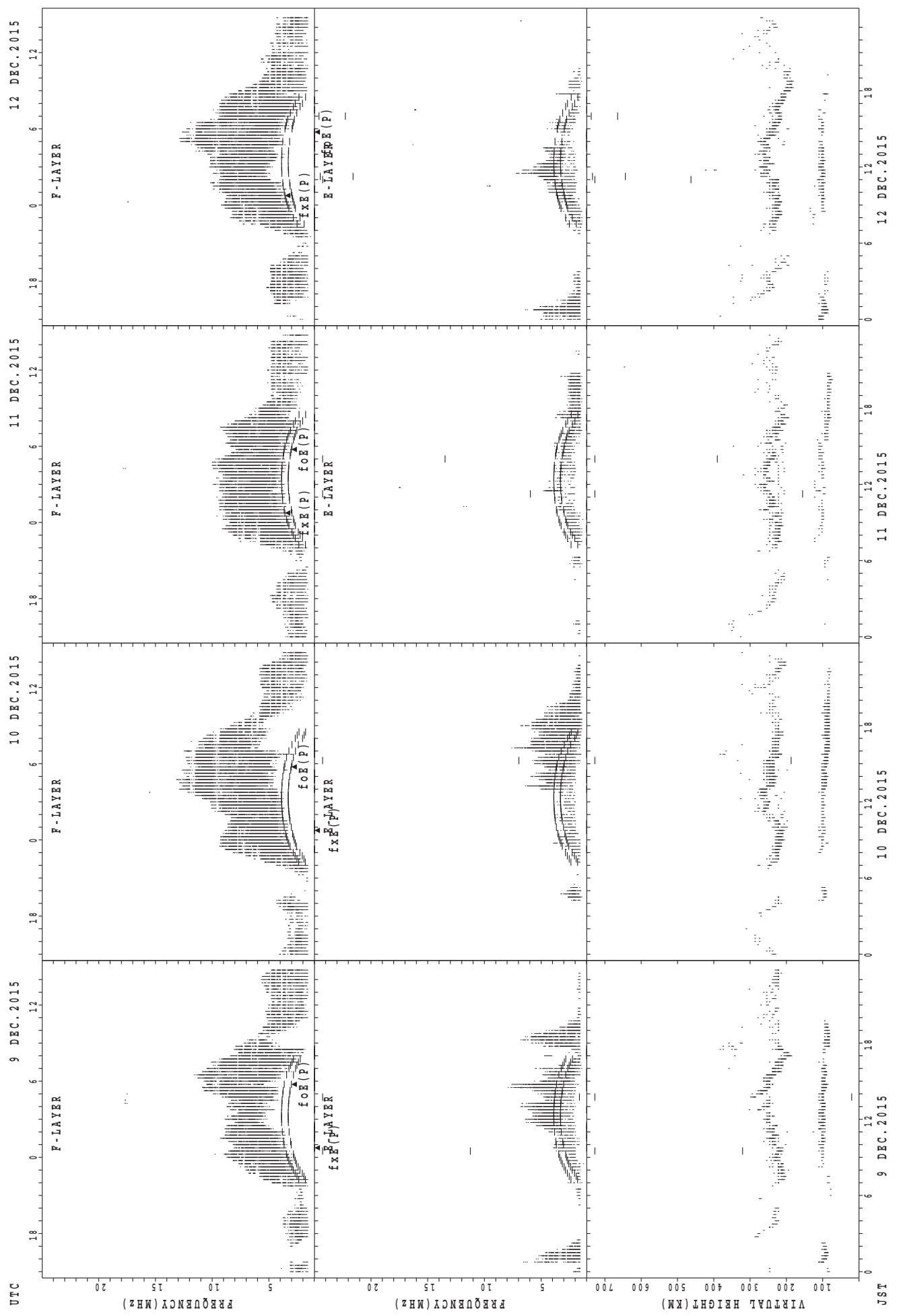
6 DEC.2015

7 DEC.2015

8 DEC.2015

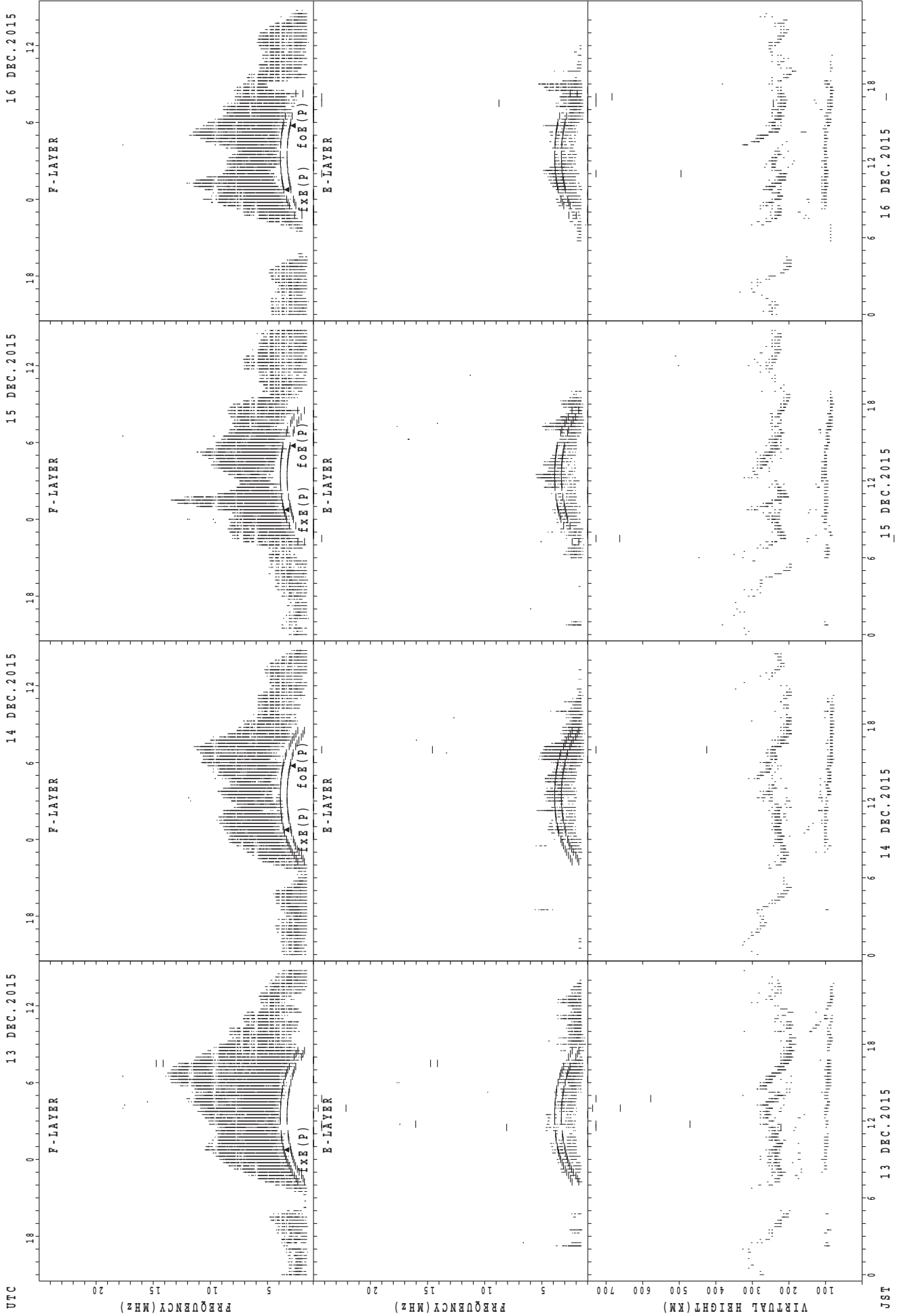
JST

SUMMARY PLOTS AT Okinawa



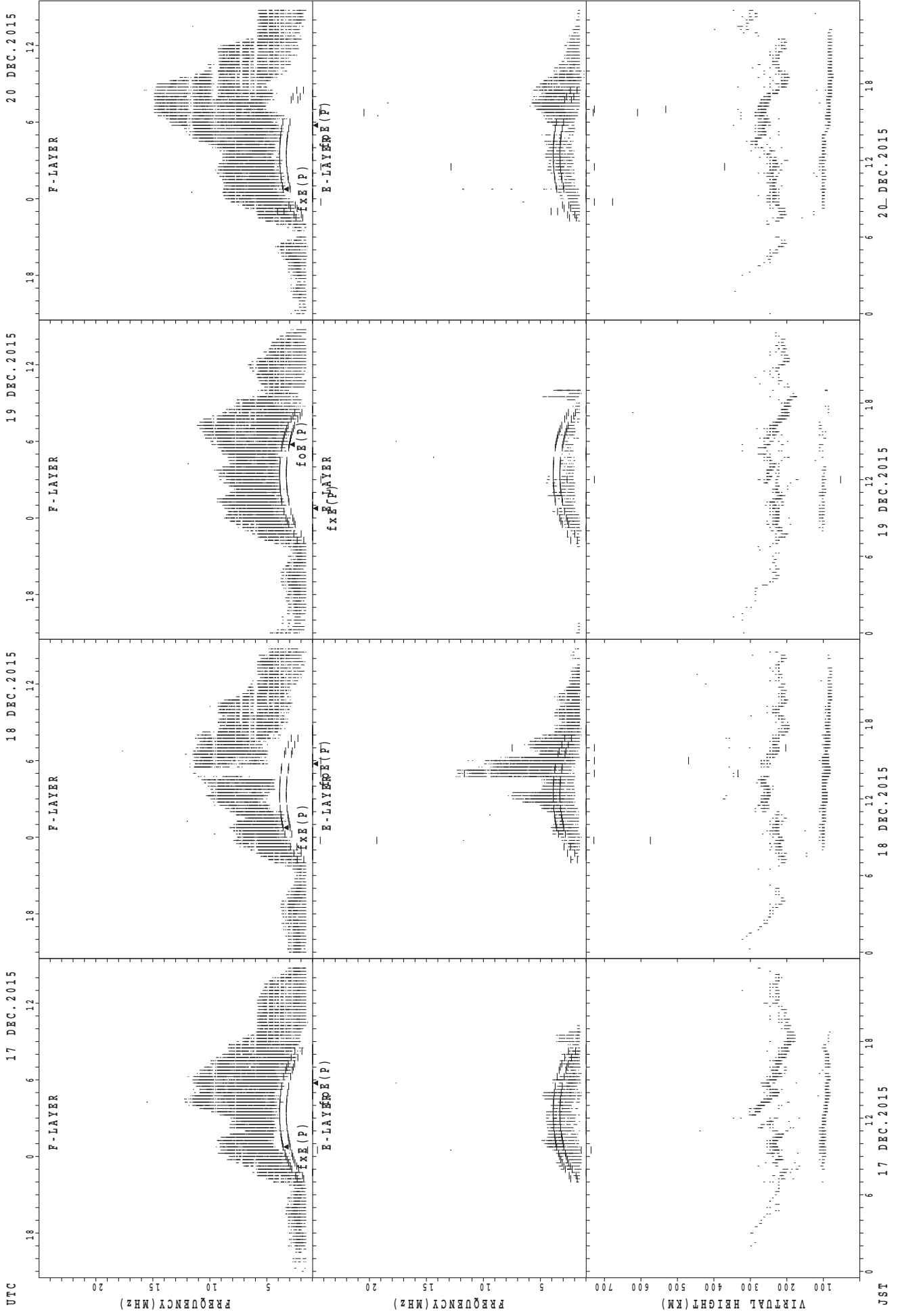
foE(P); PREDICTED VALUE FOR foE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



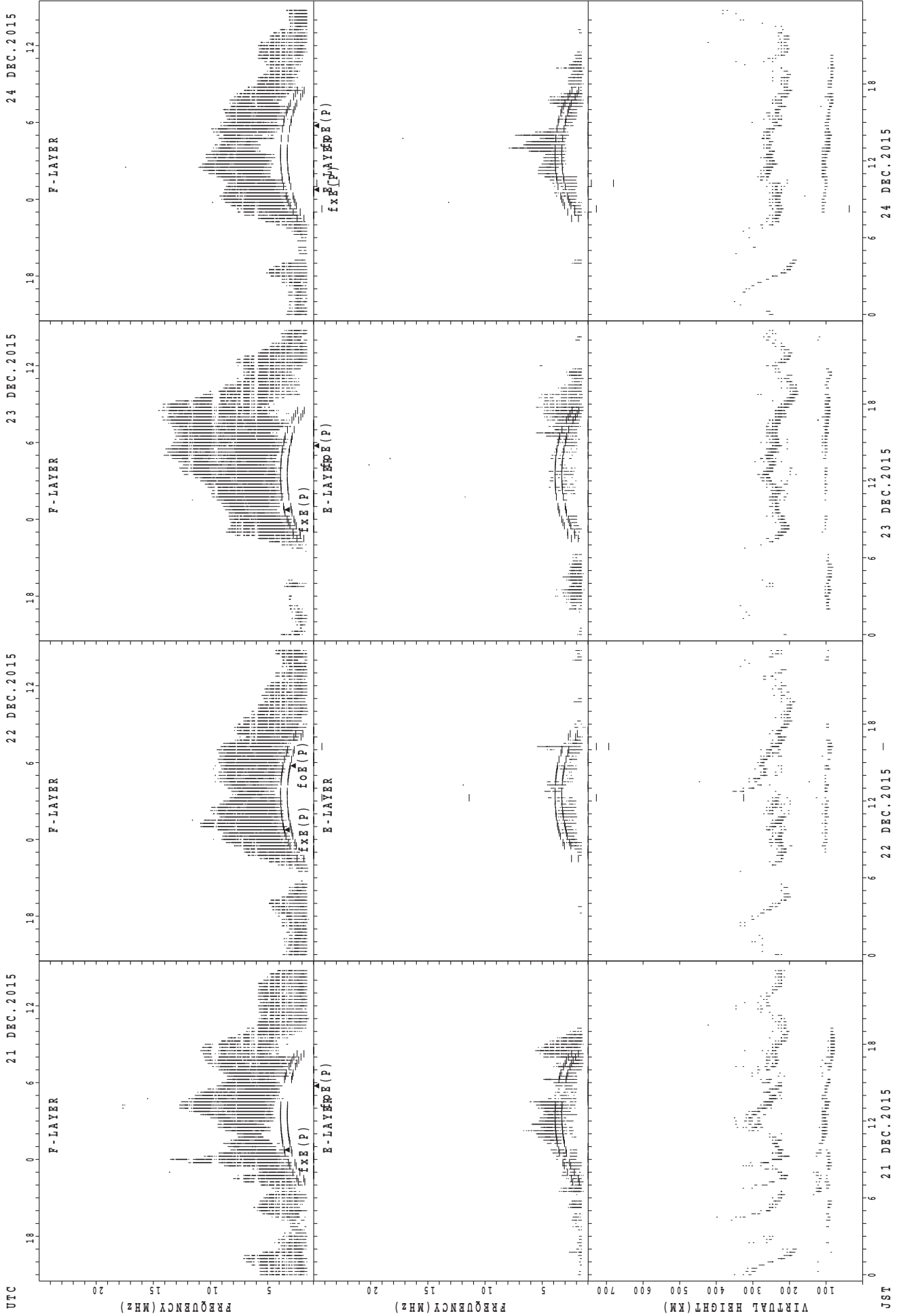
fxE(P); PREDICTED VALUE FOR fxe
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



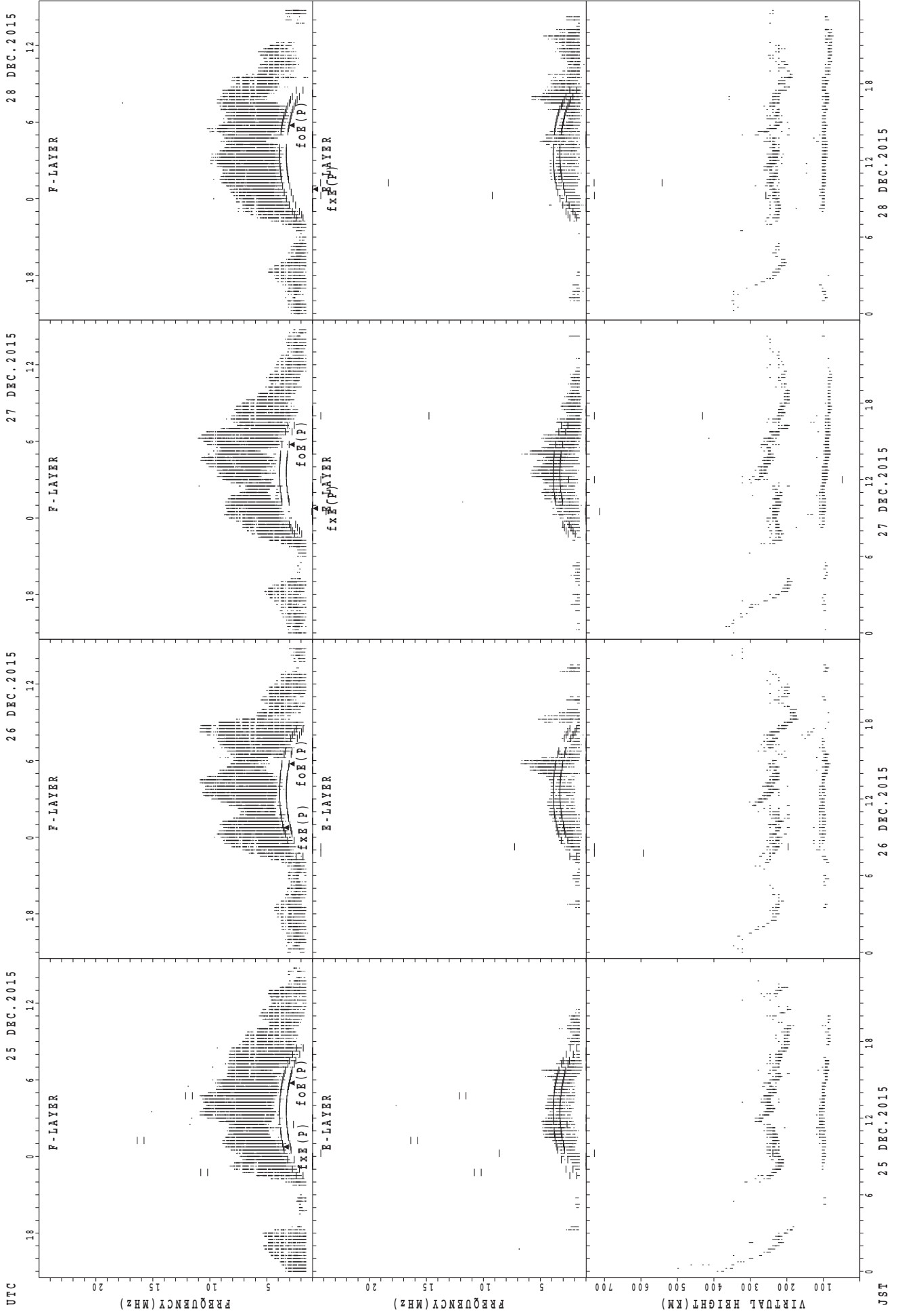
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



JST 21 DEC.2015 22 DEC.2015 23 DEC.2015 24 DEC.2015
fxe(P); PREDICTED VALUE FOR fxe
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



UTC

25 DEC. 2015

26 DEC. 2015

27 DEC. 2015

28 DEC. 2015

F2-LAYER

F1-LAYER

E-LAYER

VIRTUAL HEIGHT (KM)

fxe(P); PREDICTED VALUE FOR fxe

fyo(P); PREDICTED VALUE FOR fyo

UTC

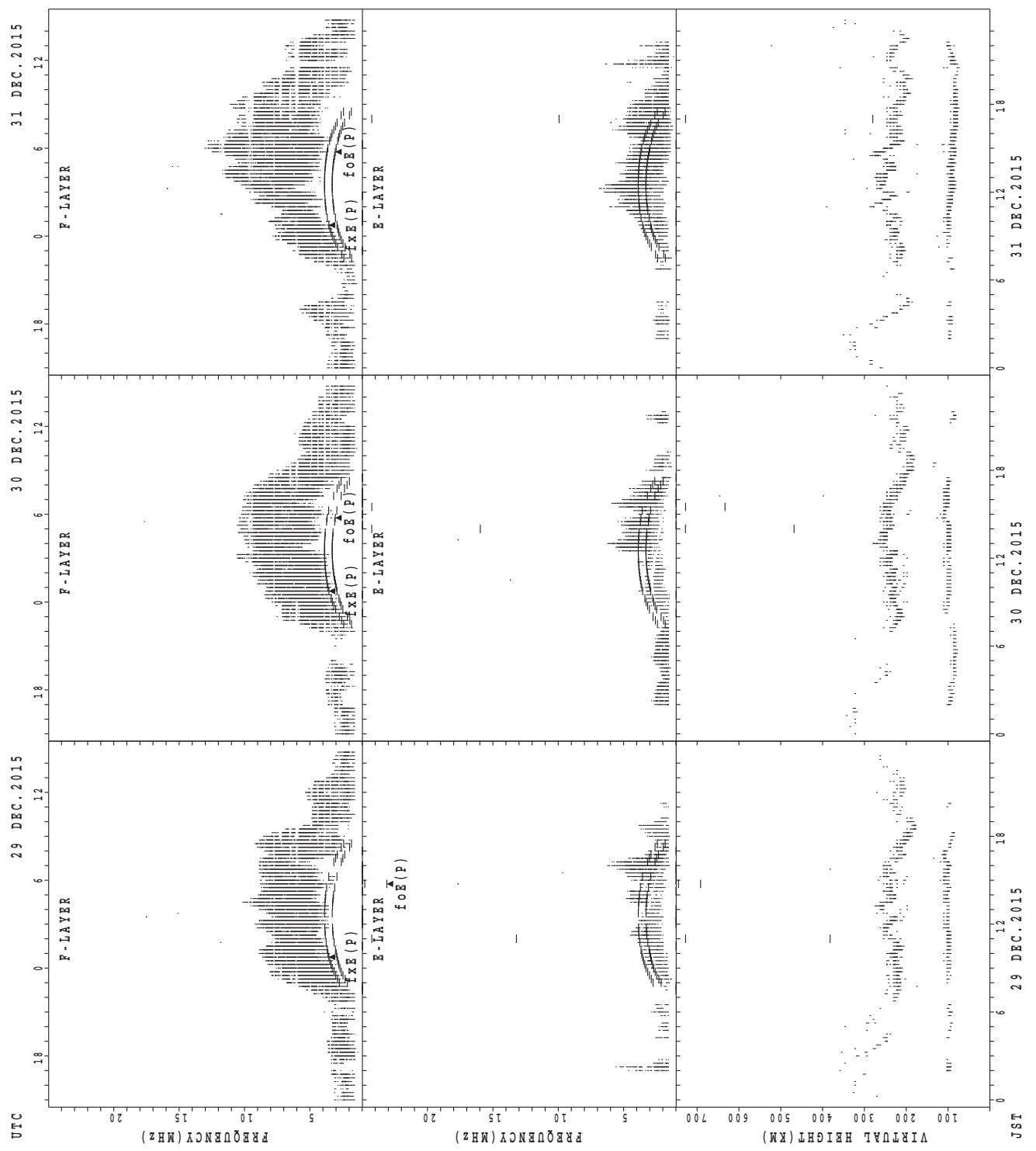
25 DEC. 2015

26 DEC. 2015

27 DEC. 2015

28 DEC. 2015

SUMMARY PLOTS AT Okinawa



$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

MONTHLY MEDIANS OF h'F AND h'Es
 DEC. 2015 135E MEAN TIME (UTC+9H) AUTOMATIC SCALING

h'F STATION Wakkanai LAT. 45°10.0'N LON. 141°45.0'E

	00	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	22	29	30	29	28	27	23	9	1							
MED									220	225	228	222	224	232	232	230	232	274							
U Q									230	246	232	226	232	240	240	238	245	137							
L Q									214	220	220	214	219	222	222	220	228	137							

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	11	9	9	12	9	6	5	8	16	19	12	11	8	5	6	9	11	11	10	9	11	14	15	12
MED	99	97	95	95	95	103	103	106	125	111	103	103	99	105	101	97	91	95	95	99	97	98	101	101
U Q	105	106	99	97	110	105	106	117	158	155	107	113	103	108	105	161	99	97	97	105	105	101	105	104
L Q	95	96	92	90	89	99	103	104	106	103	101	101	92	103	97	93	89	89	87	91	93	95	93	96

h'F STATION Kokubunji LAT. 35°43.0'N LON. 139°29.0'E

	00	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	22	24	30	29	30	29	25	22	15	2	1					
MED									232	225	224	233	224	234	238	234	230	226	231	240					
U Q									116	232	239	242	234	246	251	248	234	240	240	120					
L Q									116	220	221	224	214	230	229	227	224	224	222	120					

h'Es

	00	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	7	8	10	8	4	5	6	7	4	11	10	7	6	8	16	16	19	14	9	5	7	4	8
MED	97	97	97	97	97	95	95	149	113	157	111	109	97	96	96	95	89	91	89	95	89	91	99	98
U Q	99	101	100	101	98	137	98	155	161	188	121	113	103	99	106	108	95	95	91	98	99	103	137	104
L Q	93	93	95	95	93	92	95	95	107	115	107	105	91	91	91	92	88	89	87	89	87	89	98	95

h'F STATION Yamagawa LAT. 31°12.0'N LON. 130°37.0'E

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT									13	28	27	30	31	30	29	25	24	17	3						
MED									234	231	232	238	242	243	244	238	236	234	232						
U Q									244	242	238	246	250	250	261	257	245	246	240						
L Q									223	224	230	224	234	230	230	229	224	228	232						

h'Es

	00	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	8	6	7	8	6	5	6	13	9	5	15	20	15	14	15	14	19	17	11	11	5	3	4
MED	98	98	95	97	97	94	97	113	161	107	109	107	104	101	99	95	91	91	91	89	93	99	91	97
U Q	100	103	99	103	98	97	124	155	167	136	130	111	106	105	103	97	95	95	95	91	95	117	95	103
L Q	94	95	93	95	96	89	91	95	110	97	104	103	102	95	95	91	89	89	87	87	91	93	87	91

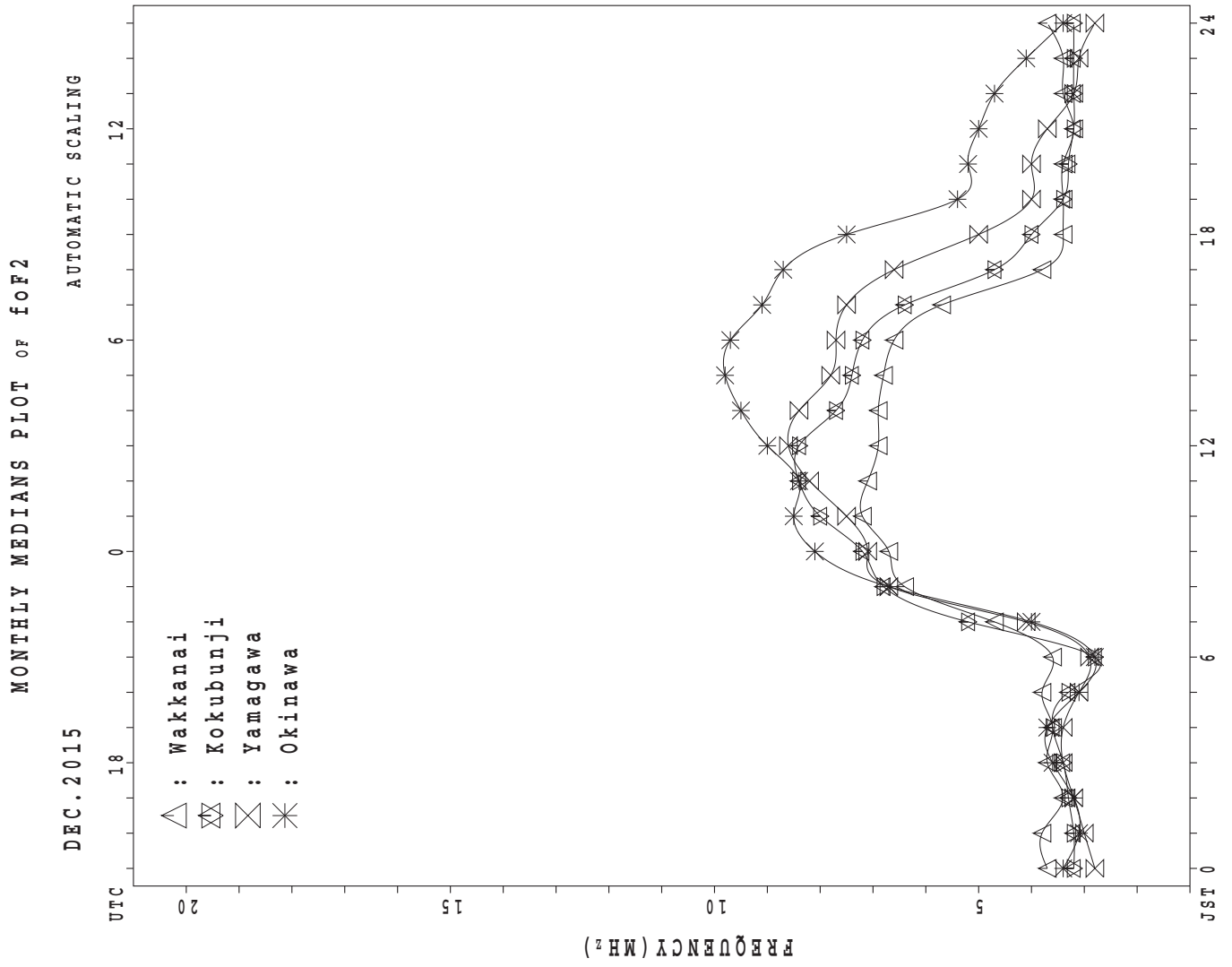
MONTHLY MEDIANS OF h'F AND h'Es
 DEC. 2015 135E MEAN TIME (UTC+9H) AUTOMATIC SCALING

h'F STATION Okinawa LAT. 26°41.0'N LON. 128°09.0'E

	00	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	31	31	30	1	13	30	30	31	29	21	5	3	2		
MED									236	236	234	238	246	254	242	239	238	224	216	236	240	239		
U Q									244	238	238	246	123	274	262	256	250	238	224	241	242	248		
L Q									232	226	230	230	123	241	230	232	224	219	206	218	234	230		

h'Es

	00	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	6	7	6	4	5	6	10	12	15	15	23	24	24	22	20	24	22	27	23	14	8	8	6
MED	96	98	97	94	95	93	95	147	128	119	105	107	106	102	103	96	98	91	89	89	88	89	91	98
U Q	103	101	101	97	98	99	99	161	172	149	125	113	111	104	105	103	102	97	95	95	95	94	94	127
L Q	89	95	95	93	93	91	89	95	113	105	101	103	102	97	93	95	90	87	87	87	85	83	86	91



IONOSPHERIC DATA STATION Wakkanai

DEC.2015 f_{XI} (0.1MHz)

135°E MEAN TIME (G.M.T. + 9 H)

LAT.45°10.0'N LON.141°45.0'E SWEEP 1.0MHz TO 30.0MHz 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	X	X	X	X	X	X													X	X	X	X	X	X	
	44	37	40	41	42	49														36	37	39	39	40	42	
2	X	X	X	X	X	X	X														X	X	X	X	X	X
	40	40	40	43	41	44														43	40	42	39	37	38	
3	X	X	X	X	X	X	X														X	X	X	X	X	X
	40	41	41	41	41	41														40	40	44	41	44	50	
4	X	X	X	X	X	X	X														X	X	X	X	X	X
	43	44	46	42	45	43														38	37	38	43	44	46	
5	X	X	X	X	X	X	X														X	X	X	X	X	X
	46	48	49	47	47	50														42	45	47	44	44	47	
6	X	X	X	X	X	X	X														X	X	X	X	X	X
	44	46	47	44	47	42														44	35	40	40	40	44	
7	X	X	X	X	X	X	X														X	X	X	X	X	X
	48	49	50	39	41	41														50	52	41	39	41	43	
8	X	X	X	X	X	X	X														X	X	X	X	X	X
	43	47	47	47	47	47														42	43	41	41	43	43	
9	X	X	X	X	X	X	X														X	X	X	X	X	X
	43	42	43	43	43	42														39	34	33	36	38	39	
10	X	X	X	X	X	X	X														X	X	X	X	X	X
	41	43	43	45	43	43														41	33	36	36	40	44	
11	X	X	X	X	X	X	X														X	X	X	X	X	X
	43	47	47	45	43	47														58	46	46	48	53	56	
12	X	X	X	X	X	X	X														X	X	X	X	X	X
	58	54	53	56	56	55														45	45	44	46	50	53	
13	X	X	X	X	X	X	X														X	X	X	X	X	X
	50	53	49	48	50	53														40	40	41	40	39	43	
14	X	X	X	X	X	X	X														X	X	X	X	X	X
	43	45	44	41	40	41														46	40	40	38	37	39	
15	X	X	X	X	X	X	X														X	X	X	X	X	X
	40	40	41	45	45	45														45	47	49	46	52	52	
16	X	X	X	X	X	X	X														X	X	X	X	X	X
	54	53	54	54	50	49														46	47	43	44	45	48	
17	X	X	X	X	X	X	X														X	X	X	X	X	X
	52	55	50	52	52	50														41	41	41	41	41	40	
18	X	X	X	X	X	X	X														X	X	X	X	X	X
	36	39	39	39	36	37														41	42	43	36	39	43	
19	X	X	X	X	X	X	X														X	X	X	X	X	X
	44	41	45	47	46	50														38	42	39	41	41	44	
20	X	X	X	X	X	X	X														X	X	X	X	X	X
	47	47	47	47	46	45														65	47	39	41	44	44	
21	X	X	X	X	X	X	X														X	X	X	X	X	X
	44	46	41	41	41	40														47	50	43	47	44	47	
22	X	X	X	X	X	X	X														X	X	X	X	X	X
	49	50	42	35	34	31														40	40	37	37	37	36	
23	X	X	X	A	X	X	X														X	X	X	X	X	X
	37	36	37	37	37	36														38	40	37	31	34	35	
24	X	X	X	X	X	X	X														X	X	X	X	X	X
	36	36	38	41	41	43														49	55	45	42	44	45	
25	X	X	X	X	X	X	X														X	X	X	X	X	X
	46	44	47	49	54	51														41	44	45	41	43	43	
26	X	X	X	X	X	X	X														X	X	X	X	X	X
	45	45	46	47	45	47														33	37	43	37	38	41	
27	X	X	X	X	X	X	X														X	X	X	X	X	X
	42	42	44	47	47	37														41	41	33	36	39	39	
28	X	X	X	X	X	X	X														X	X	X	X	X	X
	40	42	41	41	41	41	42													37	39	38	39	40	45	
29	X	X	X	X	X	X	X														X	X	X	X	X	X
	46	47	47	44	44	47														38	38	46	44	45	45	
30	X	X	X	X	X	X	X														X	X	X	X	X	X
	49	45	46	45	46	45														39	36	39	40	39	44	
31	X	X	X	X	X	X	X														X	X	X	X	X	X
	44	45	48	47	53	45														38	35	35	38	40	39	
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT		31	31	31	30	31	31	1													31	31	31	31	31	31
MED		X	X	X	X	X	X	X													X	X	X	X	X	X
U Q		47	47	47	47	47	49														45	45	44	43	44	46
L Q		X	X	X	X	X	X														X	X	X	X	X	X
		41	41	41	41	41	41														38	37	38	38	39	40

DEC.2015 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

DEC. 2015 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'E {SWEEP 1.0MHz TO 30.0MHz 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	37	31	33	34	35	42	27	47	62	70	72	J R	90	75	79	84	74	66	35	29	30	32	32	33	35
2	34	34	34	36	34	37	37	52	59	68	84	Y	87	72	72	74	66	58	38	36	33	35	32	30	31
3	33	34	34	34	V	34	34	30	50	75	J R	88	80	64	75	69	62	58	40	33	33	37	34	F	F
4	36	37	39	F	38	36	32	50	68	69	76	91	74	67	67	66	64	39	31	30	32	36	37	39	
5	39	41	42	40	40	43	27	49	61	63	74	86	75	Y	65	70	48	37	36	38	40	37	37	40	
6	37	39	40	37	40	35	28	55	68	71	J R	88	98	R	90	R	95	76	72	67	48	37	28	33	33
7	41	42	43	32	34	34	33	53	66	R	86	Y	87	81	81	81	86	70	60	43	43	45	34	33	34
8	36	40	40	40	40	40	35	49	81	R	74	74	82	82	96	70	V	58	55	37	35	36	34	34	36
9	36	35	36	36	36	35	35	50	60	70	78	72	77	77	67	61	54	39	32	27	26	29	31	33	
10	34	36	36	38	36	36	28	48	J R	68	78	77	82	Y	R	C	68	60	33	34	26	29	29	33	F
11	36	40	F	35	38	36	40	40	49	Y	R	74	84	Y	J R	75	81	66	64	45	50	39	31	41	46
12	51	47	46	49	49	48	32	44	57	J R	74	R	83	76	93	83	71	R	72	61	31	38	38	Z	F
13	43	46	42	41	43	46	39	44	58	70	73	68	72	72	78	62	54	38	33	33	34	Z	27	32	F
14	36	38	37	34	33	34	29	45	59	70	87	78	64	72	62	67	53	40	39	33	33	31	30	32	
15	33	33	34	38	38	38	50	50	72	85	87	88	90	Y	76	83	72	61	40	38	40	42	39	45	45
16	47	46	47	47	43	43	J R	31	44	64	J R	83	88	67	90	U R	86	67	64	48	41	39	40	36	F
17	F	42	48	43	45	45	43	42	57	63	63	73	87	87	62	65	69	55	29	34	34	34	34	34	33
18	29	32	32	32	29	30	22	40	61	62	76	70	90	83	69	66	55	46	34	35	36	29	32	36	
19	37	34	38	40	F	37	43	40	40	56	59	69	70	J R	80	77	59	46	38	31	35	32	34	34	37
20	40	40	40	40	39	38	39	40	63	61	J R	83	77	71	J R	79	68	77	65	68	58	40	32	34	37
21	37	39	34	34	34	33	39	33	Y	74	Y	J R	85	74	95	89	88	91	U R	79	52	40	43	36	40
22	42	43	35	28	V	27	V	24	25	J S	42	J R	63	71	J R	U R	79	67	67	66	66	55	41	33	33
23	30	29	30	A	30	29	22	41	57	69	71	69	72	75	64	59	51	50	31	33	30	24	27	28	
24	29	29	31	34	34	36	32	40	64	70	78	99	R	Y	75	73	72	68	52	45	42	48	38	35	38
25	39	37	40	42	47	44	36	44	61	72	75	76	76	74	68	65	54	39	34	37	38	34	36	36	
26	38	38	39	40	38	40	26	39	57	72	72	74	65	62	61	62	V	55	32	26	30	36	30	31	
27	35	35	37	40	F	40	26	24	40	56	62	84	72	73	72	69	58	54	42	34	34	26	29	32	
28	33	35	34	34	34	34	35	40	60	67	69	80	74	66	62	67	53	38	30	32	31	32	33	38	
29	39	40	40	37	37	40	36	48	69	J R	58	83	72	70	68	66	65	50	30	31	32	39	37	Z	
30	Z	42	38	39	F	38	33	39	57	75	Y	74	76	66	70	70	74	48	35	32	29	32	33	32	37
31	37	38	41	40	46	38	28	38	54	75	74	76	80	J R	78	78	63	61	47	31	28	28	31	33	32
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	30	31	31	31	31	31	31	31	31	30	30	30	31	31	31	31	31	31	31	31	31	31
MED	37	38	38	38	37	38	32	44	62	70	77	78	74	75	69	66	55	39	34	33	34	33	34	33	36
U Q	40	40	40	40	40	42	37	50	68	74	84	86	82	80	R	76	70	61	45	38	38	36	36	37	38
L Q	34	34	34	34	34	34	28	40	58	67	74	72	71	72	66	62	53	37	31	30	31	30	32	33	

DEC. 2015 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

DEC.2015 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.45°10.0'N LON.141°45.0'E KSWEPT 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1							208		L			L		L	L										
2										276	344	L	L	L	L	296									
3												L	L	L	272										
4										L	L	L	L	L											
5												L	L	L											
6												L	L	L	L	L									
7											L	L	L												
8											L	L	L	L											
9													L												
10											A	L		L	L	C									
11											L		L	L			L								
12											L	L	L												
13													L												
14											L	L	L												
15											L	L	L												
16											L	L	L	L	L										
17											L	L	L	L			L								
18													L	L	L	L									
19											L		340	364											
20												L	L	L											
21												L	L	L	L	L									
22										L			L	L	L										
23											L	L		L									A		
24											L														
25												L	L	L	L										
26													L												
27													L		L										
28												L	L		L	L									
29										A	L	L	L	L	L	L	A								
30											L	L	L	L	A	A	A								
31											L	L	L	A	U	R	A	A							
																908									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT							1		2	1	2	2	1	1	2	1									
MED							208		252	344	334	352	360	364	284	908									
U Q																									
L Q																									

DEC.2015 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

DEC.2015 foE (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.45°10.0'N LON.141°45.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							B	176	204	236	268	272	264	264	248	250	B	B						
2							184	B	A	252	264	U A	A	260	232	192	164	B						
3							B	172	188	188	284	284	260	232	200		B	200						
4							B	168	224	216	276	280	272	272	260	216	A	196						
5							184	164	224	260	292	276	304	276	264	232	B	B						
6							B	172	220	248	252	284	284	256	252	224	164	184						
7							B	B	220	228	228	228	276	276	240	216	B	A						
8							B	168	220	232	232	276	280	268	228	208	164	A						
9							B	R	168	220	260	276	280	276	288	248	A	A	A					
10							B	B	220	224	244	256	288	276		C	216	B	A					
11							A	136	228	256	284	284	284	284	256	216	A	B						
12							B	172	220	256	276	280	304	284	256	212	A	B						
13							A	A	244	256	268	268	296	280	248	192	B	A						
14							B	A	216	260	288	308	308	292	256	224	A	A						
15							B	168	192	252	272	288	300	284	260	208	A	A						
16							B	B	212	260	272	280	280	280	240	224	156	B						
17							A	216	216	252	284	284	304	272		B U R	B	B						
18							B	228	208	272	268	U R	280	296	284	236	216	164	A					
19							A	144	220	256	288	292	264	304	256	220	220	B	B					
20							B	A	220	232	264	300	296	268	260	188	A	B						
21							A	200	208	208	280	292	280	280	256	208	B	B						
22							B	172	200	244	276	264	256	288	244	220	A	A						
23							B	B	A	244		B	B	A	A	A	A	A						
24							B	A	212	224	260	276	U A	U A	264	196	228	A	A					
25							B	152	208	248	280	292	260	244	256		A	180	A					
26							B	B	208	248		B	B	288	308		A	A	A	A				
27							B	B	176	240	264	U A	296	296	272	252	196	A	A					
28							A	204	268	280	288	276	260	240	196	164	A	A						
29							B	B	168	228	268	284	284	264	244	208	A	A						
30							200	212	A	272	268	284	272	268	240	180	168	140						
31							B	A	164	244	268	R	312	A	264	A	208	164	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							3	17	28	31	29	29	27	30	26	27	10	4						
MED							184	172	214	248	272	284	284	274	248	216	164	190						
U Q							200	188	220	256	280	290	296	284	256	220	168	198						
L Q							184	166	204	232	264	276	276	264	240	200	164	162						

DEC.2015 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

DEC. 2015 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	35	32	25	25	14	E B	E B	J A	G		31	31	34	34	32	26	G E	B E	B	J A		J A	J A	J A	25	
2	25	25	26	28	23	20	24	25	35	36	37	37	J A	G	26	22	G E	B	15	29	24	26	24	27	J A	27
3	E B	J A	J A	J A					G	G	J A	G	G	G		26	22	18	31	31	24	22	22	22	22	
4	E B	21	24	32	32	24	E B	G	G		28	31	31	20	G	19	22	19	27	26	21	J A	E B	14	21	
5	J A	J A	J A	J A	24	23	23	26	J A	G		30	21	30	26	26	J A	J A	J A		E B	E B	E B	E B	E B	
6	30	26	21	23	22	26	E B	J A	J A	J A	J A	J A	G	21	34	28	26	G J	A	22	21	E B	19	22	24	26
7	30	20	24	26	26	E B	E B	E B	J A	J A	J A	J A		J A	J A	J A	E B	J A	J A	J A		E B	E B	E B	E B	
8	E B	E B	E B	E B	E B	E B	E B	J A	J A	J A	J A	J A		J A	J A	J A	J A	J A	J A	J A		20	28	18	23	23
9	E B	E B	J A	J A	J A	E B	J A	J A	J A	J A	J A	J A		J A	J A	J A	J A	J A	J A	J A		J A	J A	J A	J A	
10	J A	24	29	27	33	J A	E B	E B	E B	J A	J A	J A	J A	J A		C	G E	B J	A	J A		J A	J A	J A	58	
11	J A	42	26	14	14	14	22	29	26	27	30	37	31	39	32	34	26	23	14	46	33	28	41	34	48	
12	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A		G	G	J A	J A	E B	J A	J A	J A	J A	J A	J A	J A	
13	J A	E B	E B	E B	J A	E B	E B	J A	J A	J A	J A	J A		G	G	J A	J A	J A	E B	J A	J A	J A	J A	J A	J A	
14	30	J A	E B	E B	E B	E B	J A	J A	J A	J A	J A	J A		G	G	J A	J A	J A	E B	J A	J A	J A	J A	J A	J A	
15	28	21	J A	63	31	25	21	23	25	24	27	27		G	G	25	16	J A	E B	14	32	34	37	24	23	
16	E B	14	21	25	21	E B	E B	E B	E B	J A	J A	J A		G	G	26	22	G E	B E	B E	B E	B E	J A	E B	29	
17	E B	E B	E B	E B	E B	J A	J A	J A	J A	J A	J A	J A		G	G	E B	28	G E	B E	B E	B E	B E	B E	B E	B E	
18	E B	E B	E B	E B	E B	E B	E B	E B	G	G	J A	G		G	G	27	G J	A	J A	J A		E B	E B	E B	J A	
19	26	28	28	E B	14	21	25	32	24	23	G	33	37	31	31	22	J A	E B	E B	J A	J A	J A	E B	E B		
20	J A	J A	J A	E B	E B		E B	J A	G		29	32	27	G	G	G	22	26	14	17	14	14	14	24	14	
21	E B	14	24	34	14	31	28	34	26	20	26	25	27	31	26	G	G J	A	E B	14	25	24	E B	E B	E B	
22	23	26	26	26	23	23	E B	J A	J A	J A	J A	J A		G	G	24	J A	E B		E B	E B	J A	J A	J A	21	
23	J A	J A	J A	J A	J A	J A	E B	J A	J A	J A	J A	J A		G	G	50	J A	30	33	45	34	33	23	27	26	
24	E B	J A	34	30	24	E B	E B	J A	J A	J A	J A	J A		G	G	20	26	41	19	14	22	28	30	30	30	
25	20	30	J A	31	31	23	E B	E B	J A	J A	J A	J A		G	G	J A	J A	J A	J A	E B	E B	J A	J A	J A	24	
26	E B	14	20	26	26	25	E B	E B	E B	G	E B	E B		G	G	34	34	J A	27	25	25	14	23	26	23	
27	E B	E B	E B	E B	E B	E B	E B	E B	E B	G	28	35	38	35	35	28	23	J A	J A	J A	J A	J A	J A	J A	14	
28	E B	15	19	22	26	22	25	24	23	25	31	27	31	24	29	26	22	J A	20	27	27	22	E B	E B	23	
29	31	25	E B	J A	26	23	E B	E B	18	22	26	32	32	32	30	29	25	J A	59	30	27	43	34	34	51	
30	36	28	26	34	26	38	28	29	J A	J A	J A	30	32	32	29	29	24	G J	A	J A	J A	J A	J A	J A	30	
31	22	E B	E B	E B	E B	E B	E B	J A	J A	J A	J A	J A		G	G	J A	40	24	22	26	56	14	22	22	21	26
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	
MED	22	21	24	24	23	22	E B	15	23	24	29	32	32	32	29	26	24	J A	20	20	24	22	23	24	24	24
U Q	30	26	27	28	26	25	23	J A	26	26	34	35	37	34	32	30	26	J A	J A	J A	J A	J A	32	31	30	27
L Q	E B	E B	E B	E B	E B	E B	E B	G	G	G	G	G	G	G	G	G	G		E B	E B	E B	E B	E B	E B	E B	E B

DEC. 2015 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

DEC.2015 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.45°10.0'N LON.141°45.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

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

DEC.2015 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

DEC. 2015 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'E #SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

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

DEC. 2015 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

DEC. 2015 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'E SWEEP 1.0MHz TO 30.0MHz 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		325	302	310	293	301	334	345	350	390	375	359		R		R	347	370	371	350	323	323	322	295	284	293		
2		294	295	295	312	284	335	349	361	374	365		Y	380	362	343	342	371	360	336	336	322	308	331	299	284		
3		300	296	314	294	315	334	306	344	370	376		R	369	335	351	354	360	352	355	349	315	320	318	266	F	F	
4		279	290	294	292	297	351	309	348	381	328	357	363	383	354	354	361	359	373	316	317	290	322	293	303			
5		298	279	274	287	287	353	336	371	373	374	335	362	347		Y	349	372	346	327	316	299	341	292	293	321		
6		286	265	283	268	282	318	373	379	373	385		R	376	R	R	366	338	351	330	347	311	322	298	277	262		
7		283	317	345	300	320	306	311	337	379	364		Y	383	344	364	352	348	351	326	324	351	365	281	278	281		
8		281	332	294	308	302	327	331	353	339	372	379	367	343	345	365	337	357	305	314	330	322	313	315	278			
9		313	295	305	311	290	305	326	374	376	368	365	341	362	363	352	353	365	376	327	302	307	320	302	302	F		
10		291	279	279	304	310	344	326	349	363		R	353	347		Y	R	C	372	367	335	344	306	297	298	285	F	
11		280	276	297	290	298	310	353	353		Y	R		Y			Y	V	354	322	361	311	314	272	266	274		
12		307	284	263	283	295	354	306	363	362	346		R	R	346	338	352	359	364	R	359	370	307	361	314	Z	F	
13		268	289	295	287	276	329	347	369	363	346	366	356	364	338	379	375	343	341	316	355	279	285	260	261	F		
14		283	274	280	300	287	333	321	346	375	332	369		Y			Y	358	367	351	337	345	324	350	312	263	273	
15		282	281	292	271	271	305	345	344	375	334	348	349		Y			356	362	338	325	326	312	321	327	286	303	
16		286	284	291	330	313	333	294		R	362		R	377	342		U	R	366	368	362	336	316	328	308	316	F	
17		F	303	280	283	298	327	333	356	381	343	352		Y			371	330	366	364	358	360	313	330	326	290	285	271
18		302	273	282	297	280	333	378	335	372	365	350	326	322	373	360	354	341	327	359	328	364	283	279	276			
19		289	298	293	304	309	328	349	342	381	355	347	311	341		R		371	367	357	320	326	342	301	309	297	287	
20		301	301	291	282	291	311	345	342	373	344		R	336	364		361	329	302	324	357	339		274	261	290		
21		268	257	290	253	270	284	335	328				Y	322			322	327	U	R	321	310	291	317	270	286	249	269
22		320	321	337	313	223	281	300	333		343		U	R	335	358	282	332	347	V	328	333	322	361	295	290	300	294
23		310	287	293		A	301	341	301	348	344	357	381	352	351		Y	362	342	328	342	325	241	325	299	262	267	
24		287	287	296	318	319	319	360	334	364	345	326	350		Y	363	353	352	351	342	346	350	335	277	275	276		
25		306	284	292	333	315	352	316	334	370	341	356	336	357	365	369	361	358	319	314	330	333	316	308	283			
26		291	298	293	317	319	326	351	340	352	341	367	348	367	313	355	288	323	329	310	308	361	288	273	296			
27		273	274	273	311	312	337	302	360	332	335	366	372	364	361	353	370	345	340	308	371	326	273	280	281			
28		274	280	286	286	311	311	357	345	371	374	354	362	363	353	342	375	354	333	312	345	320	298	320	273	Z		
29		300	295	292	302	302	334	334	329	353	388		R	379	339	376	361	366	391	291	320	320	322	328	288	304		
30		Z	285	298	317	298	324	334	350	349	385		Y	374	370	372	356	363	346	321	337	306	329	316	278	285		
31		314	295	305	293	337	344	311	350	376	373	355	369	332		R	364	348	357	360	314	327	276	281	274	282		
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT		31	31	31	30	31	31	31	30	28	28	20	26	27	23	30	31	31	31	31	31	30	31	31	31			
MED		291	287	293	298	298	329	334	348	372	360	356	354	358	355	357	361	351	333	324	323	322	297	280	281			
U Q		302	298	297	311	312	337	349	356	376	374	366	369	365	364	364	367	358	342	344	342	329	316	293	293			
L Q		281	279	283	287	287	311	311	340	362	343	351	342	341	345	352	347	341	322	314	311	307	285	268	273			

DEC. 2015 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

DEC.2015 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.45°10.0'N LON.141°45.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							379		L			L		L	L									
2									411	411		L	L	L	L									
3													L	L	L									
4											L	L	L	L	L									
5													L	L	L									
6													L		L	L								
7												L	L	L										
8											L		L	L										
9														393										
10											A	L		L	L	C								
11											L		L	L			L							
12											L	L	L											
13													L											
14												L	L	L										
15											L	L	L											
16											L	L	L	L	L									
17											L		L	L	L		L							
18													L	L	L	L								
19											L													
20													418	387										
21												L	L	L	L	L								
22											366		L	L	L									
23										L	L			L								A		
24											L													
25												L	L	L	L									
26													L											
27													L		L									
28												L	L		L	L								
29										A	L	L	L	L	L	L	A							
30												L	L	L	L	A	A	A						
31												L	L	L	A	U	R	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1		2	1	1	2	1	1	2									
MED							379		421	411	366	406	410	387	418									
U Q																								
L Q																								

DEC.2015 M(3000)F1 (0.01)

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DEC.2015 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT.45°10.0'N LON.141°45.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							260		218			238		252	246									
2									214	230	234	226	236	240	248									
3												236	230	250	260									
4										232	246	238	224	242										
5												246	238	240										
6												238	250	246	230									
7											236	232	250											
8											222	230	238	252										
9													222											
10											236	246		230	240	C								
11											226		224	230			240							
12											240	240	230											
13												230												
14												246	242	220										
15											262	240	246											
16												238	238	246	234	238								
17											234	242	250	242	248		236							
18													270	230	236	230								
19										218		228		238		222								
20												264	228	258										
21												282	244	288	270	278	282							
22										298			232	238	240									
23											216	232		246					232					
24											216													
25												242	222	222	222									
26													234											
27										208			236		244									
28												218	238		224	238								
29												222	216	250	222	242	222	240	216					
30												220	232	222	236	A	232	206						
31												230	238	268	240	228	230	210						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1	1	5	11	15	24	24	20	12	8	2	1						
MED							260	298	216	232	240	238	237	240	239	231	208	232						
U Q									220	236	246	242	246	249	247	238								
L Q									211	218	230	230	229	235	233	226								

DEC.2015 h'F2 (KM)

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DEC. 2015 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'E SWEEP 1.0MHz TO 30.0MHz 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		248	248	270	304	292	238	200	232	184	224	238	218	226	200	212	220	220	210	252	264	256	268	302	264	Q	
2		292	288	312	270	322	250	240	220	196	184	174	206	200	202	198	220	236	226	246	260	268	244	298	312	Q	
3		292	292	272	272	256	232	244	248	228	224	246	198	182	210	196	234	228	200	224	248	258	232	292	268	Q	
4		234	260	286	286	278	224	228	228	224	188	188	208	196	190	234	236	210	222	254	250	266	252	262	262	Q	
5		264	286	304	282	272	214	236	232	218	226	212	196	196	200	216	230	220	244	250	276	236	260	266	256	Q	
6		280	290	316	332	260	260	206	226	218	226	262	202	196	196	206	242	222	240	230	230	268	268	334	334	Q	
7		308	268	242	242	268	272	262	246	218	242	212	206	206	238	238	232	226	250	248	230	208	300	288	326	Q	
8		308	254	292	264	264	256	238	238	240	222	202	202	198	198	220	216	240	234	254	254	254	268	258	292	Q	
9		264	264	282	274	314	274	270	220	208	222	232	222	200	234	230	224	220	224	258	266	234	282	294	276	Q	
10		292	296	296	274	270	228	258	246	228		200	234	206	190		216	216	226	244	280	266	226	288	298	Q	
11		318	302	268	274	264	258	226	226	234	220	238	192	202	238	234	214	226	242	250	264	250	300	256	306	Q	
12		260	266	312	290	278	202	234	230	220	194	214	206	226	226	226	234	222	206	262	224	238	262	300	298	Q	
13		290	270	262	298	272	242	224	212	222	256	224	190	236	224	238	214	226	234	254	242	296	266	286	300	Q	
14		292	304	310	288	288	246	246	238	220	246	220	200	184	250	230	236	228	224	224	246	246	246	326	326	Q	
15		298	304	304	326	348	268	262	222	222	210	210	210	240	248	250	232	238	232	278	246	268	282	296	294	Q	
16		294	304	280	240	240	240	230	230	238	288	222	200	210	214	214	216	232	248	236	248	236	268	108	288	Q	
17		280	250	272	278	262	244	238	226	212	188		232	218	204	234	210	224	198	234	234	260	270	314	324	Q	
18		308	296	274	266	268	246	226	278	208	224	232	222	204	204	204	186	232	236	216	266	226	278	288	304	Q	
19		284	296	296	272	264	244	222	222	212	192	234	198	234	210	230	206	220	226	234	242	268	242	282	282	Q	
20		276	282	296	310	268	246	242	222	214	228	236	208	208	214	234	264	282	246	228	232	212	306	332	306	Q	
21		326	344	306	342	298	278	278	246	250	248	234	212	240	230	230	252	248	242	300	264	250	272	272	272	Q	
22		248	248	254	250	230	302	242	228	214	224	248	208	208	206	242	236	236	230	242	216	258	310		290	Q	
23		268	284	320		256	236	236	258	186	186	230	248	214	232	228	266	220		236		236	236	314	292	Q	
24		292	310	280	270	226	236	220	220	208	198	222	244	222	224	226	214	204	222	230	222	232	268	302	288	Q	
25		266	282	282	236	230	210	226	222	216	208	222	208	200	192	212	222	202	212	212	228	218	218	282	282	Q	
26		262	292	268	234	224	224	198	226	202	232	230	208	192	218	220	210	206	224	264	236	220	266	266	266	Q	
27		292	282	288	246	224	196	252	222	162	218	236	224	214	238	200	202	226	226	226	216	216	288	280	296	Q	
28		268	276	278	278	248	236	220	210	200	224	210	212	234	202	190	212	206	218	224	224	228	244	244	276	Q	
29		258	258	272	270	266	236	228	228		178	232	210	206	208	208		212	214	264	236	238	238	280	290	Q	
30		294	304	286	252	260	260	242	208	216	214	202	202	202	216				206	254	232	254	266	290	318	Q	
31		250	278	264	264	234	208	228	218	206	206	206	214	196		212				220	222	222	302	284	300	300	Q
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Q	
CNT		31	31	31	30	31	31	31	31	30	30	30	31	31	30	29	28	29	30	31	30	31	31	30	31	31	Q
MED		282	283	282	272	264	241	235	226	216	222	223	208	206	212	226	221	224	226	244	242	250	267	288	292	Q	
U Q		294	296	304	288	278	258	244	238	222	226	234	218	222	230	234	235	232	236	254	260	266	282	300	306	Q	
L Q		264	266	272	264	248	228	226	222	208	198	210	202	198	202	210	214	218	218	228	230	232	244	272	276	Q	

DEC. 2015 h'F (KM)

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DEC.2015 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT.45°10.0'N LON.141°45.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							B										B	B						
2							112	B				A					B	B						
3							B ^E B	B									B							
4							B	B								A	A							
5							106	134	134	130	130	114	114	114	114	104		B	B					
6							B	116	116	116	116	126	112	112	122	122	100	94						
7							B	B									B	A						
8							B ^E B	B									B	A						
9							B	B								A	A	A						
10							B	B							C		B	A						
11							A	B									A	B						
12							B	118	124	124	124	124	124	124	124	124		A	B					
13							A	A									B	A						
14							B	A									A	A						
15							B	112	124	124	116	118	116	116	124	124	124	A						
16							B	B										B						
17							A	134	134	120	120	120	120	120		B	B	B						
18							B	162	122	122	110	120	120	120	116	126		B	A					
19							A	116	124	118	122	112	112	112	116	102	100		B					
20							B	A									B	B						
21							A	120	120	120	112	120	120	120	120	116		A	B					
22							B	136	118	118	118	112	112	112	116	120		B	B					
23							B	B	A		B	A	B	A	A	A	A	A						
24							B	A									A	A						
25							B ^E B	B									A	A						
26							B	B								A	A	A	A					
27							B	B									A	A						
28							A	114	124		A	124	110	110	110	112	112		A					
29							B	B									A	A						
30							104	104																
31							B	A																
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							3	15	29	31	28	27	28	30	26	26	9	4						
MED							106	126	122	120	118	118	116	116	116	118	108	95						
U Q							112	160	126	124	122	124	120	120	120	124	134	98						
L Q							104	116	118	116	116	114	112	114	114	112	102	94						

DEC.2015 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

DEC.2015 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT.45°10.0'N LON.141°45.0'E KSWEPT 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
1	102	102	102	102	102		B	B	120	188	166	152	122	116	114	140	G	B	B	120	122	116	114	114	114			
2	110	104	104	104	104	96	104	104	104	106	106	96	104	100	146	168	G	B	100	100	100	100	118	110				
3	B	104	104	98	98	94	100		G	100	100	108	104	102	G	166	164	98	98	98	92	92	98	98	106			
4	B	102	98	102	102	102		B	G	G	112	112	160	104	108	104	92	94	94	94	96	92	126	B	100			
5	100	124	108	94	94	94	94	94	128	112		G	126	106	156	98	98	98	98	98	98		B	B	B			
6	112	112	112	100	100	108		B	B	B	130	116	112	108	108	106	126	114	92	92	86	98		B	98	102	108	116
7	114	104	98	98	98		B	B	B	164	110	110	110	106	118	118	98		B	98	98	98		B	B	B	B	
8	B	B	B	B	B		98		B	92	114	114	110	110	176	112	118	98	98	98	94	94	104	92	92	92		
9	B	B		102	104	96		B	94	100	152	128	122	118	118	116	104	100	100	104	102	102	108	108	118	114		
10	116	130	108	98	98	104		B	B	116	110	116	106	106	124	C	126		B	98	132	110	110	110	110	110		
11	110	110		B		138	112	112	166	146	110	148	102	110	126	108	150		B	114	114	114	114	106	106			
12	104	104	98	98	104	104	120	112	112	112	112	110		G	G	110	104	104		104	118	110	110	110	110			
13	106		B	98			98	112	112	116	170	136	98	144		G	96	100	108	106		104	108	108	96			
14	106	106		B		110	110	116	128	136	114	106	114	114	96	G	96	96	96		B	112	98	98	116	116		
15	92	92	96	102	102	94	94	112	136	108	108		G	G	G	102	102	102		B	116	104	104	116	118			
16	B	100	100	108		B	B	B		146	148	146	122	114	114	134	152		G	B	B	B	B	B	108	108		
17	B	B	B	B	114	114	104	114	118	152		G	162	G	G	B	90		B	B	B	B	B	B	B	B		
18	B	B	B	B	B	B	B	B	G	G	116	114	108	108	140		G	116	98	98	98		B	B	B	154		
19	130	130	146		B	110	108	108	106	172		G	122	108	116	156	104	92	92		B	B	92	118	118	B		
20	108	108	118		B	112		B	112	118	118	110	110		G	110	G	172	100		B	100		B	B	154	B	
21	B	112	108		B	124	112	112	118	110	104	104	100	136	110		G	G	98		B	110	92		B	B	B	
22	124	114	104	104	88	106		B	130	138	138	126	110	110	110	164	150	136		B	100			96	114	106		
23	106	106	106	106	110	116		B	104	104	130	122	228	112	106	112	106	106	106	142	104	104	94	98	104			
24	B	110	138	100	116		B	B	102	162	122	116	114	110	110	114	112	106	106	106		B	106	96	96	96		
25	96	110	100	110	104		B	B	104	158	124	130	118	118	104	98	98	98	98	94		B	104	104	104			
26	B	104	102	100	100	100		B	B	114	198		B	B	G	G	104	104	104	100	100		B	100	100	92		
27	B	B	B	B	B	B	B	B	G		172	136	126	124	118	144	146	98	104	122	102	102	102		B	B	B	
28	B	114	114	118	110	110	94	98	102	188	118	134	104	126	134	144	98	98	98	98		B	B	B	116			
29	112	112		108	118		B	B	102	138	120	166	152	126	142	130	112	110	110	144	118	104	104	116	144			
30	108	118	106	110	122	108	114	114	106	106	134	158	142	140	160	128		G	100	100	100	98	110	104	104			
31	106		B	B	B	B		B	106	106	106	134	148	100	100	110	110	186	96	100	122		96	96	96	106		
	00	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	24	22	21	22	20	15	23	28	30	28	29	26	25	25	28	24	21	26	21	20	24	21	24				
MED	108	109	104	102	103	107	104	112	118	119	116	114	110	114	118	105	99	98	100	100	104	104	108	107				
U Q	112	113	108	107	110	111	112	114	149	138	132	135	118	126	140	145	105	104	114	113	109	110	116	115				
L Q	104	104	100	98	98	99	94	102	111	112	110	108	104	110	104	98	98	98	98	97	98	98	99	104				

DEC.2015 h'Es (KM)

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DEC.2015 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

LAT.45°10.0'N LON.141°45.0'E KSWEPT 1.0MHZ TO 30.0MHZ IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F3	F3	F2	F2	F1			L1	L1	C1	CL11	C2	C2	C1	CL21				F1	F1	FF11	FQ21	FQ31	FQ11
2	FF11	F2	FF11	FF21	F1	F1	C1	LC11	LL21	C2	L2	L2	L2	L1	CL21	C2			FF21	F1	F1	F2	FF11	F2
3		F1	FF21	F2	F2	FF11	L1		CL21	C4	C2	L2	CL11		CL11	HL11	L1	L3	F2	F1	F1	F1	F1	F1
4		F1	F1	F2	F3	F1				C1	L1	HL11	L1	L1	L1	L1	L2	L2	F1	F1	F1	F1		F1
5	F1	FF11	F2	F1	F1	F1	L1	L1	C2	CL21		C2	L1	C1	L1	L1	L1	L1	FF11	F1				
6	F2	F1	F1	F1	F1	F1		C1	C2	C6	C2	L1	L1	CL11	LC11	LC11	L1	L1	F1		F1	F1	F1	F2
7	F1	F1	F1	F2	F2			C2	C2	C2	C2	C2	CL21	CL21	CL21	LC12		L1	F2	F1				
8					F1		L1	LC12	C2	C2	LC22	CL21	CL21	C2	CL21	LC12	L1	L2	F2	F2	F1	F1	F1	F1
9			F1	F1	F1		L1	L1	C2	C2	C2	C2	C2	CL22	CL32	C2	L4	L2	F4	F2	F1	F1	F1	F3
10	FF11	FF11	F1	FQ21	FQ11	F1			L2	C3	C2	C2	L2	CL21		C1		L1	F1	F1	F2	F2	F2	F2
11	F3	F1			F1	L1	L1	L1	C22	CL21	CL21	CL21	LC21	LC11	C3	L1	C3		F2	F2	FF11	F3	F1	F3
12	F2	F2	F1	F2	FF11	F1	L1	C3	C1	C1	C1	C2			C1	L1	L1		F1	F1	F2	F2	F1	F1
13	F1			F1			C1	LL32	LC12	LC11	LC11	CL21	CL11	CL11		LC11	L1	L3	F3		F2	F2	FF11	F1
14	F1	F1			F1	L1	L1	C2	C2	CL11	L1	L1	LC11	L1	L1	L1	L1	L1		F1	F1	FF11	F1	F1
15	F1	F1	F1	F1	F2	F1	L1	C1	CL11	L1	L1					L1	L1	L3		F1	F2	F3	F1	F1
16		F1	F1	F1				C1	CL21	C1	C1	C1	L1	C2	C2							FF21		F1
17					F1	F3	L2	L3	C1	H1		H1				L1								
18									L1	L1	L1	L1			C2		LC11	L2	L1	F1				F1
19	F1	F1	F1		F1	FF11	L1	C2	C2		C1	CL11	CL11	CL11	LC11	LC21	L3			F1	F3	F3		
20	F1	F3	F1			F1	L1	L1	C2	C2	C1			LC11		H1	L2		F3				F1	
21		F1	F4		F1	F2	L4	C3	L2	C2	L1	C2	CL11	LL11			L2		F1	F1				
22	F1	F1	F1	F1	F2	F1		C2	C2	C2	CL31	C2	C2	C2	HL21	H1	LL11		F1			F1	F4	F1
23	F3	FQ31	FQ31	F5	F1	FF21		L1	L2	CL11	C1	C1	C1	L1	L1	L2	L3	FF13	F5	F5	F5	F2	F2	F1
24		F1	FF11	F2	F2			L1	C1	C1	C1	C1	C1	C1	L1	L1	L3	L2	F1		F1	F2	F2	F2
25	F1	F1	F3	F1	F1			L1	H2	CL21	C2	C2	C2	CL22	L1	L2	L2	L1	L1			F1	F2	F1
26		F1	F2	FQ11	FQ11	F1			L1	C1					L1	L1	L2	L1	F1			F1	FF11	F1
27									C1	CL21	CL22	C1	C2	C2	CL11	CL11	L1	L1	F1	F2	F2	F1		
28		F1	F1	FF11	F1	F1	L1	L1	C2	HL11	L1	CL11	LC11	CL11	CL11	CL11	HL11	L2	L2	F1	F1			F1
29	FF21	F1		F2	F1			L1	C1	CL11	CL11	CL11	CL11	CL11	C1	C1	L2	L2	FF11	F2	F1	FQ21	F3	FF12
30	F3	F1	F2	F3	F1	F3	C3	C4	L2	L1	CL11	C1	C1	C2	C2	C2		C3	F2	F3	FQ21	FQ21	FQ21	FQ21
31	F1						L1	L1	C1	C1	C1	LC11	L1	C2	L1	C1	L1	L2	F2		F1	F1	F1	F1
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

DEC.2015 TYPES OF Es

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DEC.2015 f_{XI} (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E ;SWEEP 1.0MHz TO 30.0MHz 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	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	40	38	38	39	39	40	43												50	33	36	39	42	33	36
2	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	38	39	40	40	42	42	34												53	42	49	44	40	35	35
3	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	37	40	40	37	37	31	35												51	50	38	40	40	40	39
4	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	41	42	46	44	45	36	37												54	43	38	38	38	35	35
5	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	37	38	39	40	43	35	32												52	44	38	40	43	42	42
6	X	X	X	X	X	X	X	X											X	X	X	X	X	A	X
	37	40	41	42	40	31	33												66	50	43	35	40		39
7	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	42	46	48	37	31	31	34												67	46	49	44	34	40	39
8	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	41	40	42	44	45	33	33												58	43	40	40	37	38	34
9	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	37	37	38	40	39	38	36												52	41	39	35	36	38	41
10	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	42	40	40	40	42	35	32												48	43	38	34	38	42	33
11	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	36	38	41	40	41	41	41												56	48	49	40	39	43	44
12	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	48	48	48	47	47	48	33												53	38	40	37	36	35	36
13	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	39	41	42	42	46	46	35												57	47		32	34	34	34
14	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	35	36	36	36	38	39	36													42	40	33	40	37	35
15	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	38	38	39	38	39	40	31												56	46	48	44	42	45	44
16	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	44	43	45	47	48	28	34												50	49	45	39	36	36	35
17	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	36	37	38	39	42	38	33												50	40	35	38	36	36	36
18	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	37	38	40	41	42	30	30												52	54	49	38	35	34	35
19	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	36	37	38	38	43	40	33												56	38	41	39	34	37	36
20	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	37	38	38	38	40	40	35												95	76	48	46	38	41	41
21	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	43	43	43	40	42	40	30												92	74	60	58	49	50	52
22	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	43	45	39	36	38	24	27												55	48	38	36	33	34	40
23	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	35	37	35	36	36	32	31												56	59	48	41	36	30	31
24	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	33	34	35	41	34	27	32												53	48	46	39	34	34	36
25	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	39	39	41	39	36	32	34												55	55	39	42	35	33	34
26	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	39	40	47	45	48	28	35												52	35	38	31	32	34	33
27	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	36	37	37	42	48	29	30												61	51	36	33	34	35	40
28	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	39	39	40	40	40	34	34												50	38	34	37	29	34	36
29	X	X	X	X	X	X	X	X											X	X	X	X	X	A	X
	35	37	38	40	37	35	38												52	37	38	40	43		35
30	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	37	37	38	42	36	36	38												55	40	35	34	40	35	35
31	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	38	38	41	41	50	33	36												58	49	40	40	40	40	44
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	31	31												30	31	30	31	31	29	31
MED	X	X	X	X	X	X	X												X	X	X	X	X	X	X
	38	38	40	40	41	35	34												54	46	40	39	37	36	36
U Q	X	X	X	X	X	X	X												X	X	X	X	X	X	X
	41	40	42	42	45	40	36												57	50	48	40	40	40	40
L Q	X	X	X	X	X	X	X												X	X	X	X	X	X	X
	36	37	38	38	38	31	32												52	40	38	35	34	34	35

DEC.2015 f_{XI} (0.1MHz)

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DEC.2015 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

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

DEC.2015 foF2 (0.1MHz)

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DEC.2015 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E KSWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L	L		L											
2											L	L												
3											L		A	A	A									
4											L	L	L											
5											L	L	L	L		L								
6											A	A	L	L	L									
7											L		A	L										
8											L		L	L										
9																								
10												L		L										
11													U L 4 6 4											
12													L	L	L									
13										L	L			L										
14										L		L			L	L								
15										L		L			L									
16												A	L	L										
17												L	L											
18										L	L	L	L	L	L	L								
19														L	L									
20												A	L	L										
21														L										
22											L													
23														A	L									
24											L													
25												L	L	L	L									
26											L	L	L	L										
27													L	L										
28											L	L	U L 4 5 6				A							
29													L											
30											L		L		L									
31											L	A	L	L	L									
	00	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											
MED													U L 4 6 0											
U Q																								
L Q																								

DEC.2015 foF1 (0.01MHz)

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DEC.2015 foE (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1								172	A	R	308	320	A	A	R	A	A									
2								B	U	R	U	R	A	A	U	R	U	R	A							
3								B	240	R	A	A	A	A	A	A	A									
4								B	244	284	A	U	R	R	U	A	R	A								
5								B	248	300	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U
6								184	256	R	A	A	A	A	R	A	A									
7								U	R	188	252	296	A	A	A	U	R	A	A							
8								U	R	200	252	R	A	A	A	U	R	U	R	U	R	U	R	U	R	U
9								U	R	192	264	R	A	A	U	R	U	R	U	R	U	R	U	R	U	R
10								B	U	R	244	A	A	A	A	A	A	A								
11								U	R	184	252	300	A	A	A	A	A	A	A							
12								B	U	R	244	A	A	U	R	A	U	R	U	R	A					
13								B	R	A	R	A	A	316	A	A	A	A								
14								B	U	R	244	U	R	R	A	R	R	U	R	B						
15								B	240	R	A	A	R	R	R	R	U	R	U	R	188					
16								U	R	192	260	296	A	A	A	R	R	A	A							
17								U	R	168	R	R	A	A	A	A	R	U	R	U	R	200				
18								B	U	R	244	R	A	A	R	A	R	A	U	R	172					
19								B	U	R	252	300	U	R	R	A	R	A	B							
20								B	U	R	260	R	A	A	U	R	U	R	A	A	A					
21								B	A	A	A	A	A	A	U	R	U	R	A							
22								B	U	R	244	R	R	A	A	A	U	R	U	R	U	A				
23								B	U	R	232	288	A	A	A	U	R	U	R	U	R					
24								B	R	A	A	A	A	A	U	R	U	R	U	R	204					
25								B	U	R	236	296	316	U	R	R	A	R	A	A						
26								B	U	R	236	R	A	R	U	R	U	R	U	R	U	R	180			
27								B	U	R	240	276	304	A	A	R	U	R	U	R	164					
28								B	U	R	220	288	A	R	A	A	U	R	U	R	A					
29								B	208	R	304	R	R	A	A	A	A	A	A							
30								B	U	R	236	268	324	A	R	A	A	A	A							
31								B	228	272	312	A	U	R	U	R	A	A								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT								8	26	13	8	3	5	4	11	12	11									
MED								U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U
U Q								192	252	298	324	336	344	328	312	264	200									
L Q								U	R	178	236	280	306	320	322	314	292	244	180							

DEC.2015 foE (0.01MHz)

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DEC.2015 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	19	19	J A	J A	21	21	J A	20	29	G	36	36	J A	J A	G	28	J A	E B	J A	20	J A	J A	J A	J A		
2	J A	J A	J A	J A	22	22	20	20	J A	G	G	J A	37	38	34	G	J A	J A	J A	J A	21	22	21	19	22	
3	J A	J A	J A	J A	J A	J A	J A	19	23	28	32	32	44	63	55	46	69	32	30	24	15	20	27	16	20	
4	20	E B	E B	J A	J A	20	E B	J A	30	33	J A	G	G	G	G	G	24	J A	J A	J A	J A	E B	E B	E B		
5	J A	J A	J A	E B	E B	E B	E B	19	22	28	G	G	G	G	G	G	G	E B	E B	E B	E B	E B	E B	E B		
6	E B	E B	E B	E B	E B	E B	E B	21	14	15	21	29	G	J A	J A	G	28	21	J A	J A	J A	J A	J A	J A	J A	
7	20	22	21	21	E B	E B	E B	G	29	36	44	36	67	38	G	J A	J A	J A	E B	E B	E B	E B	E B	E B	E B	
8	E B	E B	E B	E B	E B	E B	E B	G	G	G	24	34	37	38	33	36	28	32	24	15	15	14	24	20	20	
9	J A	J A	J A	J A	E B	E B	E B	G	G	G	34	41	37	G	G	G	G	E B	E B	E B	E B	E B	E B	E B	E B	
10	21	J A	J A	J A	J A	E B	E B	G	G	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	E B	E B	E B	
11	E B	J A	E B	E B	E B	J A	J A	G	G	G	J A	J A	J A	J A	J A	J A	J A	J A	E B	E B	E B	E B	E B	J A	J A	
12	J A	J A	E B	E B	E B	J A	J A	G	G	G	J A	J A	J A	J A	J A	J A	J A	J A	E B	E B	E B	E B	E B	E B	J A	
13	J A	J A	J A	J A	J A	E B	E B	G	G	G	50	28	43	38	38	42	35	44	42	45	38	20	20	22	E B	
14	J A	J A	E B	E B	E B	J A	E B	G	G	G	G	G	G	G	G	G	G	E B	E B	E B	E B	E B	E B	E B	E B	
15	E B	E B	E B	E B	E B	E B	E B	G	G	G	36	38	G	G	G	G	G	E B	E B	E B	E B	E B	E B	E B	E B	
16	20	E B	J A	E B	E B	E B	E B	G	G	G	34	41	44	35	G	G	28	J A	J A	E B	19	20	15	19	20	
17	J A	E B	E B	E B	E B	E B	E B	G	G	G	J A	J A	J A	J A	J A	J A	J A	J A	E B	E B	E B	E B	E B	E B	E B	
18	E B	E B	E B	E B	E B	E B	E B	G	G	G	37	36	29	40	G	G	G	G	J A	J A	J A	E B	E B	J A	J A	
19	J A	J A	J A	J A	E B	E B	J A	G	G	G	36	38	G	G	G	G	30	21	J A	J A	E B	E B	E B	J A	J A	
20	J A	E B	E B	E B	E B	E B	E B	G	G	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	E B	E B	J A	E B	E B	E B	
21	E B	J A	E B	E B	E B	E B	E B	G	G	G	31	34	39	35	40	36	G	G	J A	J A	J A	21	20	E B	20	19
22	E B	E B	E B	E B	E B	E B	J A	G	G	G	G	37	36	39	28	24	22	27	29	21	14	14	15	15	15	
23	E B	J A	J A	J A	E B	J A	J A	G	G	G	38	38	37	62	G	G	J A	J A	J A	J A	J A	J A	21	21	20	
24	21	E B	E B	J A	J A	J A	E B	G	G	G	34	40	48	40	36	27	38	G	E B	J A	J A	20	14	15	16	
25	E B	E B	E B	E B	E B	E B	E B	G	G	G	36	G	G	G	G	G	30	J A	J A	J A	J A	E B	E B	E B	E B	
26	E B	J A	E B	E B	J A	E B	E B	G	G	G	34	G	G	G	G	G	G	25	E B	E B	E B	20	E B	E B	E B	
27	20	E B	E B	E B	E B	E B	E B	G	G	G	39	37	36	G	J A	35	30	24	J A	J A	E B	E B	E B	E B	E B	
28	E B	E B	J A	J A	E B	J A	E B	G	G	G	37	29	35	J A	J A	J A	J A	J A	J A	J A	J A	J A	24	26	20	E B
29	J A	E B	J A	J A	J A	J A	J A	G	G	G	36	G	G	G	J A	J A	J A	J A	J A	J A	J A	21	22	29	25	
30	J A	20	18	J A	J A	J A	J A	G	G	G	G	35	G	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	
31	J A	J A	J A	J A	J A	E B	E B	G	G	G	39	36	28	29	28	31	37	39	22	15	14	21	18	26	26	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	
MED	20	18	20	18	18	18	E B	15	19	G	G	37	37	36	36	G	J A	J A	J A	J A	E B	E B	E B	E B	19	
U Q	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
L Q	E B	E B	E B	E B	E B	E B	E B	E B	E B	G	G	G	G	G	G	G	G	E B	E B	E B	E B	E B	E B	E B	E B	E B

DEC.2015 foEs (0.1MHz)

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IONOSPHERIC DATA STATION Kokubunji

DEC.2015 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

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

DEC.2015 fbEs (0.1MHz)

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IONOSPHERIC DATA STATION Kokubunji

DEC.2015 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E #SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

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

DEC.2015 fmin (0.1MHz)

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IONOSPHERIC DATA STATION Kokubunji

DEC.2015 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E [SWEEP 1.0MHz TO 30.0MHz 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	337	292	285	288	293	326	365	385	383	379	356	353	350	382	346	348	366	358	312	323	320	350	284	287	
2	300	297	295	297	332	346	311	359	358	369	358	371	348	332	353	353	365	388	331	344	356	322	321	270	
3	305	312	320	308	335	304	317	366	365	367	358	357	357	347	347	364	374	341	335	327	324	339	324	282	
4	297	298	265	317	355	340	326	371	371	378	370	348	335	334	362	337	388	356	355	335	328	345	321	298	
5	296	278	295	306	332	378	336	367	373	359	367	343	341	365	386	344	366	352	339	313	308	297	290	332	
6	289	297	291	296	318	417	343	348	360	364	347	347	351	327	346	360	340	355	355	365	296	298	A	267	
7	290	332	357	341	324	313	302	341	362	356	345	366	353	334	359	329	343	368	319	329	316	308	285	280	
8	288	305	314	303	365	288	310	360	370	358	374	370	354	339	332	355	358	354	365	336	333	313	325	295	
9	312	311	305	308	313	298	310	362	371	386	348	378	349	357	353	362	371	366	337	360	315	304	287	F	
10	F	298	306	298	360	341	299	364	364	364	372	356	352	346	357	371	368	338	341	315	287	325	368	283	
11	282	287	314	305	313	318	341	369	376	372	370	401	355	359	373	353	348	353	328	335	333	283	288	290	
12	292	285	298	288	308	367	294	345	362	360	354	380	329	335	358	362	370	352	315	333	A	328	295	287	265
13	280	308	300	296	337	354	327	376	373	369	351	344	356	361	332	351	353	337	352		306	306	295	284	
14	280	290	287	299	315	329	342	379	379	376	377	369	365	302	365	358	355	345	332	332	299	313	316	293	
15	285	305	292	271	298	329	379	361	345	333	326	360	344	351	341	360	364	321	314	296	308	295	294	300	
16	297	291	296	330	369	299	303	336	355	349	346	359	336	332	349	368	350	323	334	352	311	307	300	300	
17	278	280	282	300	326	334	330	355	340	340	339	310	347	348	355	354	373	357	343	317	322	334	299	293	
18	288	288	296	313	368	290	337	363	366	370	360	351	331	327	367	363	366	334	340	356	326	306	309	284	
19	281	292	294	285	331	353	362	373	379	348	349	361	368	347	339	355	371	377	320	337	332	345	287	299	
20	321	274	295	283	299	330	351	359	370	352	346	353	368	349	320	317	332	348	342	294	312	266	266	270	
21	291	293	309	267	295	290	335	327	307	340	353	342	328	320	344	333	335	327	354	307	333	275	289	319	
22	293	305	305	318	337	357	305	361	385	358	358	360	324	332	347	326	345	326	350	349	318	296	271	F	
23	312	307	296	299	313	282	307	359	374	378	354	361	371	356	344	348	341	331	361	341	341	331	285	289	
24	289	274	291	345	392	277	319	359	371	334	344	356	356	330	358	348	362	342	319	339	353	332	266	285	
25	272	295	327	358	355	300	304	340	356	335	369	371	358	352	352	385	358	346	346	318	355	295	294	300	
26	288	286	F	336	385	327	319	371	389	343	323	355	354	370	307	344	352	374	360	336	326	339	317	281	
27	276	284	276	323	369	296	286	344	365	381	314	352	357	367	349	365	369	338	388	326	288	317	301	280	
28	277	277	298	316	359	324	312	379	374	381	339	367	331	387	368	365	381	335	320	356	330	330	279	283	
29	291	296	305	330	337	298	320	364	394	368	371	383	364	337	391	339	363	373	345	339	320	331	A	292	
30	289	294	307	333	328	292	298	344	381	396	355	310	382	355	343	362	356	340	365	334	315	334	312	301	
31	295	289	282	321	373	303	335	371	373	359	323	359	357	363	355	354	371	350	337	333	326	299	283	314	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	29	29	
MED	290	293	296	306	332	324	319	361	371	364	354	359	353	347	352	354	363	348	340	334	322	313	294	289	
U Q	297	305	306	323	360	341	337	371	376	376	367	369	357	359	359	362	370	357	354	341	332	332	314	300	
L Q	282	286	291	296	313	298	305	348	362	349	345	351	341	332	344	344	350	337	328	323	311	297	285	282	

DEC.2015 M(3000)F2 (0.01)

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IONOSPHERIC DATA STATION Kokubunji

DEC.2015 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

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

DEC.2015 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC.2015 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										228	242		248											
2											234	222												
3											230		238	236	238									
4											230	240	252											
5											240	240	242	240		232								
6											242	236	244	254	254									
7											258		238	244										
8											246		244	232										
9																								
10												240		264										
11													256											
12													280	258	236									
13										244	228			244										
14										244		230			244	244								
15										280		242			246									
16												222	256	248										
17												276	264											
18										234	240	248	240	258	222									
19														242	256									
20												234	232	258										
21														272										
22											248													
23														246	254									
24											258													
25												234	242	242	252									
26											284	234	248	230										
27													240	240										
28											266	246	258				222							
29													244											
30											246		228		252									
31											280	238	238	226	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										5	16	15	20	18	11	2	1							
MED										244	244	238	244	244	246	238	222							
U Q										262	258	242	254	258	254									
L Q										231	237	234	239	240	238									

DEC.2015 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC. 2015 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT. 35°43.0'N LON. 139°29.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E 242	E 254	E 298	E 298	E 292	E 238	E 218	200	204	190	196	226	220	212	208	216	206	186	196	E 258	E 238	226	E 288	E 322
2	E 302	E 318	E 272	E 298	E 236	220	206	204	H 188	216	190	180	208	210	206	212	210	200	E 250	230	218	230	224	E 310
3	E 280	E 252	E 234	E 234	E 246	250	222	218	218	216	188	202	A	A	A	216	206	206	218	202	220	E 244	212	E 256
4	E 246	E 276	E 276	E 258	212	194	E 230	206	218	212	192	184	184	214	220	204	202	200	202	226	210	212	E 248	E 280
5	E 292	E 296	E 286	E 272	E 228	198	E 240	202	210	214	198	196	202	196	206	194	212	206	E 210	E 210	236	246	264	218
6	E 268	E 282	E 296	E 278	E 266	184	E 228	208	214	216	A	A	208	210	204	218	216	208	204	210	E 268	E 288	A	E 334
7	E 302	E 242	208	208	244	232	E 274	236	222	216	226	230	A	202	210	208	218	210	202	212	220	216	E 304	E 296
8	E 296	E 292	E 260	E 260	214	262	E 270	214	208	218	218	210	202	192	216	214	220	208	204	222	232	E 256	234	E 256
9	E 272	E 272	E 276	E 264	E 264	276	E 260	210	202	210	214	214	206	220	226	220	206	194	204	208	244	260	286	284
10	E 300	E 280	E 268	E 260	228	206	E 242	214	216	214	222	198	E 242	222	224	216	214	E 250	222	214	E 268	246	214	E 284
11	E 316	E 314	E 260	E 250	276	238	212	212	210	212	232	208	182	208	220	228	206	204	214	212	224	222	276	E 254
12	E 294	E 274	E 270	E 284	E 258	186	E 242	218	222	220	228	220	196	204	202	220	206	202	226	214	208	E 250	248	E 314
13	E 316	E 292	E 318	E 268	242	208	216	202	208	202	178	228	232	214	218	222	200	206	232	A	258	E 258	270	E 292
14	E 312	E 312	E 306	E 282	E 258	218	210	198	216	216	218	208	210	210	198	192	218	196	204	E 210	214	262	230	E 288
15	E 296	E 274	E 272	E 308	E 268	242	198	202	212	230	226	206	236	208	206	228	212	200	E 204	E 228	228	248	276	E 268
16	E 262	E 278	E 272	E 228	200	E 286	E 262	216	216	216	E 256	A	192	214	218	212	212	218	218	206	E 242	226	246	E 276
17	E 320	E 294	E 314	E 274	246	224	232	210	212	216	208	192	222	218	218	218	200	202	E 206	E 228	236	E 250	280	E 300
18	E 312	E 286	E 278	E 246	208	E 262	E 236	202	200	204	208	198	186	216	202	216	206	202	216	206	236	232	242	E 314
19	E 304	E 294	E 290	E 288	246	218	202	212	200	206	216	218	212	200	204	226	204	198	E 240	E 228	E 230	226	284	E 270
20	E 262	E 300	E 298	E 302	E 258	228	214	206	212	224	230	A	198	206	218	242	248	210	218	198	214	312	326	E 326
21	E 298	E 252	E 270	E 330	E 320	E 302	244	206	E 272	224	214	208	E 270	224	230	224	224	210	208	212	232	298	240	E 334
22	E 232	E 278	E 212	E 248	226	208	E 280	220	204	226	212	220	214	218	230	220	222	206	212	212	226	244	308	E 258
23	E 264	E 296	E 274	E 286	244	234	E 284	218	202	196	234	224	224	A	198	222	222	204	218	212	222	240	306	E 306
24	E 306	E 322	E 318	E 234	198	E 346	E 274	218	200	216	224	228	E 236	224	226	222	210	202	210	224	200	220	350	E 326
25	E 292	E 284	E 244	210	220	230	E 266	226	214	214	230	202	208	204	200	210	210	210	210	208	216	218	252	E 302
26	E 294	E 288	E 274	E 230	204	192	E 250	224	196	184	194	196	216	202	194	216	216	196	200	220	226	234	240	E 310
27	E 300	E 298	E 314	E 254	196	212	E 274	220	220	210	206	220	218	206	224	212	212	E 246	202	202	208	248	252	E 260
28	E 318	E 318	E 278	E 260	212	232	E 256	214	210	210	200	206	184	220	196	214	A	200	E 258	228	E 236	248	298	E 284
29	E 310	E 318	E 278	E 252	234	264	E 234	216	198	204	216	212	202	220	214	206	204	198	E 278	E 224	224	226	A	E 328
30	E 306	E 300	E 284	E 242	246	308	E 284	222	206	202	206	204	188	220	190	220	218	206	224	E 246	208	234	250	E 306
31	E 316	E 320	E 304	E 254	212	204	E 222	210	202	200	232	A	194	190	198	230	208	224	220	202	234	276	276	E 270
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	30	27	29	29	30	31	30	31	31	30	31	31	29	31
MED	E 298	E 292	E 276	E 260	242	E 211	E 240	212	210	214	214	208	205	210	209	216	210	203	210	211	217	E 244	264	E 288
U Q	E 310	E 300	E 298	E 284	E 258	262	E 266	218	216	216	226	220	221	219	220	222	218	210	222	226	E 236	256	287	E 310
L Q	E 272	E 276	E 270	E 246	212	208	218	206	202	204	200	198	195	204	202	212	206	200	204	208	216	226	241	E 268

DEC. 2015 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC.2015 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1								114	116	112	112	112	A	A	118	118	A								
2								B	116	114	114	A	A	A	118	118	A								
3								B	116	116	A	A	A	A	A	A	A								
4								B	116	114	110	112	116	110	110	114	A								
5								B	112	112	112	114	116	110	108	116	118								
6								118	120	114	110	A	A	A	116	116	116								
7								128	114	110	110	A	A	A	114	A	A								
8								136	110	116	118	A	A	116	114	114	A								
9								120	116	114	112	112	A	112	110	120	120								
10								B	116	112	A	A	A	A	A	A	A								
11								128	114	120	116	A	A	116	116	A	A								
12								B	118	114	112	A	112	A	114	116	A								
13								B	116	A	110	A	110	110	112	112	A								
14								B	116	116	116	114	114	118	114	116	122	B							
15								B	114	110	116	A	116	110	110	114	114								
16								120	122	110	118	A	A	112	112	118	A								
17								130	116	116	A	A	A	A	110	106	116								
18								B	116	118	112	A	124	A	118	A	118								
19								B	118	116	116	114	114	114	114	118	B								
20								B	122	114	A	A	112	114	A	A	A								
21								B	A	A	A	A	A	A	114	116	112								
22								B	118	118	116	A	A	A	114	114	114								
23								B	116	116	A	118	114	A	114	116	116								
24								B	116	112	112	A	A	A	116	A	116								
25								B	112	116	116	116	116	A	116	116	A								
26								B	120	110	118	118	118	114	114	114	110								
27								B	116	116	114	114	A	116	A	110	110								
28								B	110	112	A	116	112	A	A	114	A								
29								B	116	120	114	112	110	A	A	A	A								
30								B	120	120	110	110	110	112	A	A	A								
31								B	112	116	118	118	118	116	112	A	A								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								8	30	29	24	14	16	15	24	21	13								
MED								124	116	114	114	114	114	114	114	116	116								
U Q								129	118	116	116	116	116	116	116	117	118								
L Q								119	114	112	112	112	112	110	112	114	113								

DEC.2015 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC.2015 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E +SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	102	118	104	98	96	98	98	160	120	G	134	160	102	100	102	124	106	B	102	90	122	112	102	102
2	98	96	96	94	94	94	100	102	G	G	G	104	104	104	G	100	94	96	100	100	100	100	100	100
3	96	92	94	94	94	92	102	152	150	114	104	102	102	96	96	96	96	96	98	B	102	94	B	94
4	98	B	B	100	98	98	B	98	160	170	114	96	96	94	124	96	96	100	106	100	102	B	B	B
5	110	100	96	B	B	B	96	148	156	G	G	102	102	G	96	G	G	B	B	B	B	B	B	B
6	B	B	B	B	100	B	B	134	146	G	128	106	102	106	G	132	126	94	94	94	90	94	94	92
7	90	112	104	100	B	B	B	G	156	142	114	104	98	98	G	96	94	92	B	B	B	B	B	B
8	B	B	B	B	B	B	B	G	G	100	116	104	104	102	96	96	92	90	B	B	B	108	112	104
9	104	96	94	90	B	B	B	G	G	G	120	116	108	G	G	102	G	B	B	B	B	B	B	B
10	112	92	94	96	96	96	B	148	G	124	106	104	106	96	96	96	96	96	96	100	104	94	B	B
11	B	96	B	B	96	96	98	G	G	102	120	94	94	114	122	104	100	94	96	B	B	B	118	104
12	98	100	B	B	B	100	100	160	166	120	118	106	G	104	G	98	96	B	B	B	B	B	B	100
13	106	100	100	100	96	102	B	B	G	104	104	104	148	118	124	116	94	98	88	90	90	92	96	B
14	88	88	B	B	106	B	B	92	G	G	G	G	120	104	G	G	G	B	B	B	B	B	B	B
15	B	B	B	B	B	B	B	B	G	G	118	106	G	G	G	G	G	B	B	B	B	B	B	124
16	110	B	104	B	B	B	B	162	G	134	128	108	108	G	G	130	94	96	96	B	90	90	B	110
17	102	B	106	B	104	110	G	G	G	106	102	102	96	96	140	G	B	B	B	B	B	B	B	B
18	B	B	B	B	B	92	B	B	G	G	118	106	106	102	G	100	G	104	94	94	B	86	88	100
19	88	98	98	100	B	102	94	98	G	146	152	G	102	100	G	122	116	94	88	B	B	B	110	106
20	102	B	B	B	B	B	B	B	G	G	108	106	G	G	102	98	92	92	92	92	B	92	B	B
21	B	112	98	B	96	102	B	108	108	108	104	104	102	102	G	G	110	94	88	86	86	B	90	90
22	B	B	B	B	B	B	94	152	120	G	G	108	104	104	102	102	134	94	92	94	B	B	B	B
23	B	96	106	104	100	B	100	150	G	G	108	116	116	106	G	104	100	94	92	96	98	92	92	92
24	92	B	B	92	92	96	B	102	G	122	118	104	106	106	98	98	G	B	98	98	98	B	B	B
25	B	B	B	B	B	B	B	B	G	G	156	G	G	108	G	124	84	88	94	94	B	B	B	B
26	B	120	B	100	100	B	B	154	G	G	114	G	G	G	G	G	148	B	B	B	96	B	B	B
27	122	B	B	B	B	B	B	B	100	G	144	136	108	G	104	138	136	96	90	B	B	B	B	B
28	B	B	106	106	102	104	B	G	G	106	106	110	96	96	96	96	90	90	88	88	88	88	94	B
29	98	B	110	102	102	108	100	112	140	G	154	G	G	106	104	104	96	92	96	90	96	92	86	86
30	90	90	106	106	96	98	98	104	G	G	120	G	G	116	102	100	94	94	94	92	104	98	98	98
31	102	96	96	98	98	B	B	B	150	138	138	128	102	104	96	94	90	90	92	B	B	90	90	92
	00	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	17	17	16	16	16	13	17	13	13	26	26	24	24	17	26	24	22	22	16	15	15	14	16
MED	100	96	100	100	96	98	100	148	146	122	118	106	104	104	102	101	96	94	94	94	98	92	95	100
U Q	105	106	106	101	100	102	101	153	156	140	128	108	108	106	104	122	108	96	96	97	102	98	102	104
L Q	94	94	96	95	96	96	97	103	114	106	108	104	102	99	96	96	94	92	92	90	90	90	90	92

DEC.2015 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC.2015 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

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

DEC.2015 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

DEC.2015 f_{XI} (0.1MHz)

135°E MEAN TIME (G.M.T. + 9 H)

LAT.31°12.0'N LON.130°37.0'E #SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	X 35	X 34	X 36	X 38	X 38	X 37	X 38												X 44	X 42	X 51	X 56	X 35	X 34
2	X 36	X 37	X 36	X 36	X 40	X 36	X 31												X 52	X 49	X 52	X 43	X 34	X 34
3	X 33	X 34	X 40	X 33	X 32	X 32	X 31												X 45	X 43	X 42	X 39	X 38	X 32
4	X 34	X 36	X 38	X 38	X 46	X 36	X 29												X 55	X 41	X 52	X 45	X 39	X 33
5	X 35	X 34	X 36	X 39	X 44	X 30	X 26												X 50	X 42	X 40	X 42	X 35	X 36
6	X 35	X 37	X 40	X 42	X 42	X 34	X 29												X 60	X 45	X 36	X 38	X 38	X 36
7	A	X 46	X 45	X 30	X 32	X 25	X 26												X 59	X 50	X 54	X 49	X 50	X 53
8	X 48	X 44	X 48	X 46	X 43	X 30	X 30												X 59	X 51	X 47	X 45	X 42	X 38
9	X 37	X 37	X 38	X 38	X 40	X 37	X 36												X 52	X 40	X 44	X 39	X 38	X 38
10	X 36	X 36	X 40	X 41	X 43	X 36	X 29												X 56	X 51	X 40	X 42	X 46	X 34
11	X 32	X 35	X 38	X 40	X 40	X 34	X 34												X 49	X 44	X 42	X 36	X 36	A
12	A	X 42	X 44	X 42	X 42	X 40	X 27												X 52	X 46	X 48	X 42	X 36	X 37
13	X 35	X 36	X 40	X 39	X 45	X 45	X 29												X 60	X 47	X 54	X 42	X 35	X 32
14	X 32	X 34	X 36	X 37	X 41	X 38	X 33												X 50	X 47	X 41	X 41	X 43	X 34
15	X 33	X 34	X 34	X 35	X 37	X 38	X 36												X 55	X 47	X 46	X 48	X 46	X 42
16	X 45	X 40	X 41	X 45	X 48	A	X 28												X 58	X 52	X 39	X 44	X 43	X 37
17	X 32	X 34	X 34	X 35	X 38	X 39	X 34												X 55	X 51	X 48	X 48	X 43	X 38
18	X 35	X 37	X 39	X 38	X 41	X 32	X 32												X 63	X 62	X 44	X 46	X 41	X 37
19	X 34	X 36	X 37	X 38	X 40	X 37	X 34												X 52	X 44	X 48	X 38	X 37	X 32
20	X 32	X 33	X 35	X 36	X 40	X 41	X 35												X 98	X 66	X 59	X 51	X 44	X 46
21	X 46	X 51	X 32	X 36	X 38	X 48	X 51												X 94	X 65	X 55	X 49	X 52	X 54
22	X 41	X 39	X 44	X 44	X 50	X 28	X 29												X 59	X 48	X 43	X 39	X 37	X 40
23	X 30	X 35	X 35	X 36	X 38	X 34	X 31												X 86	X 60	X 53	X 51	X 36	X 33
24	X 32	X 33	X 34	X 42	X 39	X 28	X 29												X 55	X 43	X 47	X 44	X 32	X 33
25	X 34	X 37	X 43	X 39	X 33	X 26	X 26												X 63	X 45	X 42	X 42	X 32	X 32
26	X 32	X 34	X 36	X 37	X 42	X 35	X 28												X 63	X 40	X 39	X 34	X 32	X 32
27	X 32	X 34	X 35	X 40	X 41	X 26	X 27												X 60	X 42	X 33	X 39	X 34	X 33
28	X 34	X 34	X 35	X 42	X 45	X 34	X 32												X 63	X 43	X 39	X 34	X 32	X 34
29	X 35	X 36	X 38	X 38	X 37	X 37	X 39												X 52	X 46	X 40	X 39	X 32	X 32
30	X 33	X 36	X 36	X 39	X 38	X 33	X 33												X 55	X 42	X 42	X 39	X 37	X 32
31	X 33	X 34	X 34	X 38	X 51	X 28	X 30												X 66	X 61	X 50	X 45	X 47	X 39
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	31	31	31	31	30	31												31	31	31	31	31	30
MED	X	X	X	X	X	X	X												X	X	X	X	X	X
U Q	36	37	40	41	43	37	34												63	51	51	46	43	38
L Q	X	X	X	X	X	X	X												X	X	X	X	X	X
	32	34	35	36	38	30	29												52	43	40	39	35	33

DEC.2015 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

DEC.2015 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.31°12.0'N LON.130°37.0'E ;SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	29	28	30	32	32	31	32	51	66	64	79	92	89	96 ^R	76	87	86	77	38	36	45	50	29	28 ^V
2	30	31	30	30	34	30	25	43	64	71	76	83	87	84	80	84	74	78	46	43	46	37	28	28 ^V
3	27	28	34	27	26	26	25	42	68	82	73	75	84	86	82	73	68	65	39	37	36	33	32	26
4	28	30 ^V	32	32	40	30	23	42	63	74	74	71	81	87	84	77	76	62	49	35	46	39	33	27
5	29	28	30	33	38	24	20	37	54	70	73	76	84	88	68	73	62	65	44	36 ^R	34	36	29	30
6	29	31 ^V	34	36	36	28	23	43	70	70	71	77	83	83 ^R	94	76	66	72	54	39 ^R	30	32	32	30
7	A	40	39	24	26	19 ^{U R}	20	38	76	74	83	86	91	90	74	70	82	75	53	44	48	43	44 ^V	47
8	42	38	42	40	37	24	24	48	69	77	82	85	87	79	74	84	72	74	53	45	41	39	36	32
9	31	31	32	32	34	31	30	46	66	71	82	78	72	74	84	86	86	66	46	34	38	33	32	32
10	30	30 ^R	34	35	37	30	23	41	72	77	73	84	91	107 ^V	94	86	81	70	50	45	34	36	40	28 ^A
11	26	29	32	34	34	28	28	45	72	75	80	94	77	86	73	76	81	66	43	38	36	30	30	
12	A	36	38	36	36	34	21	42	68	73	117	87	77	82	102	97	76	67	46	40	42	36	30	31
13	29	30	34	33	39	39	23 ^R	40	68	76	74	82	96	83	70	81	81 ^V	65	54	41	48	36	29	26
14	26	28	30	31	35	32	27	43	60	71	84	77	85	67	77	88	76 ^V	66	44	41	35	34	37	28
15	27	28	28	29	31	32	30	46	65	72	100	83	80	83	83	77	78	67	49	41	40	42	40	36
16	39	34	35	39	42	A	22	39	67	82	102	86	81	86	72	66	66	61	52	46	33	38	37	31
17	26	28 ^R	28	29	32	33	28	38	64	70	85	66	88	94	82	76	72	63	49	45	42	42	37	32
18	29	31	33	32	35	26	26	37	62	75	65	83	89	90	99	81	74	64	57	56	38	40	35	31
19	28	30	31	32	34	31	28	40	62	68	78	87	75	72	75	82	87	70	46	38	42	32	31	26
20	26	27	29	30	34	35	29	39	61	77	75	92	88	80	84	96	111	116	92	60	53	45	38	40
21	40	45	26	30	32	42	45	55	56	127	83	76	92	118	107	91	91	97	88	59	49	43	46	48
22	35	33	38	38	44	22	23	36	66	83	84	96	86	77	77	75	66	70	53	42	37	33	31	34
23	24	29	29 ^V	30	32	28	25	37	72	72	70	94	90	86	88	88	87	94	80	54	47	45	30	27
24	26	27	28	36	33	22	23	39	66	70	72	102	91	88	85	77	73	62	49	37	41	38	26	27
25	28	31	37	33	27	20	20	33	69	72	76	78	85	84	84	72	62	61	57	39	36	36	26	26
26	26	28	30	31	36	29 ^V	22	34	74	68	63	84	83	90	74	60	74	68	57	34	33	28	26	26
27	26	28	29	34	35	20	21	36	62	70	67	78	87	78	70	73	70	64	54	36	27	33	28	27
28	28	28	31	36	39	28	26 ^V	38	63	67	66	80	92	80	78	71	73	60 ^R	57	37	33	28	26	28
29	29	30	32	32 ^V	31	31	33	40	62	66	72	79	72	71	76	69	65	69	46	40	34	33	26	26
30	27	30	30	33	32	27	27	36	70	65	66	112 ^R	80	77	73	75	66	61	49	36	36	33	31	26
31	27	28	28	32	45	22	24	36	60	61	60	92	80	92	74	76	69	66	60	55	43	39	41	33
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30
MED	28	30	31	32	34	28	25	40	66	72	75	83	85	84	78	77	74	66	50	40	38	36	31	28
U Q	30	31	34	35	37	31	28	43	69	76	83	92	89	90	84	86	81	72	57	45	45	40	37	32
L Q	26	28	29	30	32	24	23	37	62	70	71	78	80	79	74	73	68	64	46	37	34	33	29	27

DEC.2015 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

DEC.2015 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.31°12.0'N LON.130°37.0'E {SWEEP 1.0MHz TO 30.0MHz 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										244	L	L	L	L	L	L	L																
2									172	260	U L	L	L	U L	424	U L	L																
3										248		L	L	U L	476	L	L																
4												U L	436	U L	508	L	L																
5									176	272	L	L	L	U L	408	448	L	L	248	204													
6									172		312	L	L	U L	492	L	L	L	A														
7												L	L	U L	464	L	L	L	L														
8										240	292	L	L	L	L	408	L	L	292														
9										248	L	L	L	L	L	L	L	L															
10										256	L	U L	L	L	L	L	L	L	L														
11										248	L	U L	L	L	L	L	L	L	L														
12										256		L	L	U L	468	464	L	L	268														
13										276	316	L	L	L	L	L	L	L															
14										U L	L	L	L	U L	464	L	L	L															
15										252	L	L	L	L	L	L	L	L	280														
16										244	U L	L	U L	L	L	L	U L	376		196													
17										L	312	L	L	U L	476	464	516	L															
18										260	308	336	L	U L	480	468	L	U L	L	208													
19										256	312	372	L	L	L	L	L	L															
20										268	296	L	U L	L	L	L	L	L	L														
21									172			L	A	L	L	L	L	L															
22										260	304	L	U L	U L	L	L	L	L		196													
23										252	L	L	L	L	L	L	L	L															
24										232			L	A	A	L	L	L	L														
25										240	300	L	L	L	L	L	L	L	252	216													
26										L	U L	U L	L	L	U L	448	L	U L	372	276	208												
27										240	L	L	L	L	U L	376	L	L	A														
28										U L	296	L	L	L	456	L	L	L															
29										232	296	L	L	L	L	L	L	L	L														
30										220	268	L	U L	392	464	L	U L	U L	A														
31										U L	308	L	U L	U L	L	L	L	L	L														
										244	308	L	U L	444	448	L	L	L	L	212													
										00	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	26	18	4	7	9	10	5	5	6	7													
MED										172	250	308	396	444	464	464	440	372	272	208													
U Q										174	260	316	426	468	478	468	486	394	280	212													
L Q										172	240	296	354	392	444	448	392	342	252	196													

DEC.2015 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

DEC.2015 f_oE (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.31°12.0'N LON.130°37.0'E SWEEP 1.0MHz TO 30.0MHz 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	U	A	U	A	U	A						
2									A	200	260	308	312	320	304	288	252	252		A						
3									A	216	284	292	296	288	288	284		A	A	A						
4									A	228	280	300	308	320	324	312		A	A	A						
5									B	240	268	312	324	332	328	316	292	260		A						
6									B	228	268	300	320	328		320		A	A	A						
7									A	A	U	A	A	A	A	A		A	A							
8									B	188	264	308	320	324	316	320	300		A	A						
9								U	R	224	288	304	320	332	324	312	296		A	A						
10										208	204	276	308	320	316		A	A	A							
11									A	228	280	316	336	332	332	332	284	256		B						
12									B	A	U	A	U	A	A	A	A		260	224						
13									B	212	272	316	328	324					260	224						
14									B	212	272	308	308	348	328	316	288	248	188							
15									B	228	280	320	312	324	336	320	300	248								
16									B	180	284	308	332	328		A	A	236		A						
17									B	216	272	312	316	324		308	288	252		B						
18									B	216	280	324		A	A	A	288	248		A						
19									B	200	280	304	324	324	324	316	292	252	176		A					
20									A	208	284	308	328		A		304	260		A						
21									B	212	264	312	328	332		328	300	260		A						
22									B	200	264	320	324	320	320	308	296	276		A						
23									A	U	A		A		A	A										
24									A	188	260		328	332	320		296	268	196							
25									A	216	268	316	336		A	328	304	280		R	A					
26									A	204	264	316	328	328	340	320	300	236		A	U	A				
27									B	220	272	296	332	332		332	296	240	168							
28									B	200	260	296	308	300		296	272		A	A						
29									B	U	A		A						A							
30									A	204	252			312	316	304	276	264		A						
31									A	176	272	308	316	328	316	316	292	260		A						
									B	184	240	292	312	328	332		292		A	A						
									B	192	276	280	308	324	324	304	284	260	192							
		00	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	30	31	29	29	27	19	24	23	23	7							
MED								208	210	272	308	320	328	324	316	292	256	188								
U Q									220	280	316	328	332	328	320	300	260	196								
L Q									200	264	302	312	320	316	308	288	248	176								

DEC.2015 f_oE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

DEC.2015 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.31°12.0'N LON.130°37.0'E +SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

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

DEC.2015 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

DEC.2015 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.31°12.0'N LON.130°37.0'E {SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E 16	E 16	E 16	E 16	20	20	E 16	E 16	22	27	32	41	35	33	32	29	G	20	E 16	E 16	E 16	E 16	E 16	E 16
2	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	23	29	32	34	36	32	32	29	G	24	21	E 16	E 16	21	E 16	E 16
3	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	31	32	32	33	G	G	31	36	28	26	23	20	16	E 16	E 16
4	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	26	31	33	34	35	37	34	47	30	18	E 16	E 16	16	E 16	E 16	E 16
5	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	25	29	33	33	35	34	28	28	G	G	E 16	E 16	E 16	E 16	E 16	E 16
6	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	29	30	34	36	39	46	35	32	35	38	21	20	E 16	16	28	E 16
7	A 67	A 32	E 16	E 16	E 16	E 16	E 16	E 16	27	31	37	38	38	38	40	34	G	26	23	29	20	E 16	E 16	E 16
8	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	21	28	32	34	37	34	G	G	29	28	24	18	E 16	E 16	E 16	E 16
9	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	34	36	35	40	34	G	29	30	30	E 16	16	21	20	E 16	E 16
10	E 16	20	23	E 16	E 16	19	18	E 16	23	30	33	33	37	35	35	31	37	21	22	21	19	16	E 16	E 16
11	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	24	29	33	34	34	35	U 34	U 29	G	26	18	E 16	E 16	E 16	E 16	E 16
12	A 52	A 16	E 16	E 16	E 16	E 16	E 16	E 16	23	29	35	36	35	35	36	30	G	G	E 16	E 16	E 16	E 16	E 16	E 16
13	E 16	21	E 16	E 16	E 16	E 16	19	E 16	23	29	34	25	37	38	37	34	G	19	20	E 16	E 16	16	28	E 16
14	E 16	22	E 16	E 16	E 16	E 16	E 16	E 16	28	30	35	38	35	26	34	19	G	24	19	20	E 16	E 16	E 16	E 16
15	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	20	30	33	G	37	45	33	29	24	20	E 16	E 16	E 16	E 16	E 16	E 16
16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	34	34	34	34	34	34	30	G	25	18	E 16	E 16	E 16	E 16	E 16
17	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	23	29	34	37	34	40	35	31	G	24	19	E 16	E 16	E 16	E 16	E 16
18	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	22	30	31	36	36	36	U 34	G	G	19	E 16	24	21	17	E 16	E 16
19	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	21	30	33	36	36	U 33	G	G	27	19	20	20	22	16	E 16	E 16
20	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	22	28	32	37	36	35	G 31	G 30	G	24	E 16	E 16	17	E 16	E 16	E 16
21	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	23	29	36	40	40	39	35	G 29	G 26	20	24	E 16	16	E 16	E 16	E 16
22	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	23	28	32	36	36	U 32	U 33	31	26	G	E 16	E 16	E 16	E 16	E 16	E 16
23	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	19	25	27	35	40	34	37	31	G	27	G	E 16	E 16	E 16	E 16	E 16
24	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	22	28	33	37	58	50	G 33	G 35	G	21	E 16	20	E 16	E 16	E 16	E 16
25	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	28	32	35	35	G 32	G 29	G 24	G	18	19	E 16	E 16	E 16	E 16	E 16
26	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	36	36	33	34	24	G	26	20	E 16	E 16	E 16	E 16	E 16	E 16
27	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	23	28	32	U 32	35	44	30	30	G	31	19	E 16	E 16	E 16	E 16	E 16
28	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	22	27	32	U 32	32	33	32	30	G	25	21	E 16	E 16	E 16	E 16	E 16
29	E 16	19	E 16	E 16	E 16	E 16	E 16	E 16	20	28	32	32	35	34	32	29	G	G	26	32	32	16	E 16	E 16
30	E 16	E 16	20	E 16	E 16	E 16	E 16	E 16	20	26	30	33	34	34	37	30	G	37	E 16	E 16	19	E 16	E 16	E 16
31	E 16	E 16	20	20	E 16	E 16	E 16	E 16	20	28	31	33	35	33	32	32	G	G	E 16	E 16	E 16	E 16	E 16	E 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	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	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	23	29	33	35	35	34	34	30	G	20	E 16	E 16	E 16	E 16	E 16	E 16
U Q	E 16	16	16	E 16	E 16	E 16	E 16	E 16	23	30	34	36	37	38	35	31	28	23	20	20	17	16	E 16	E 16
L Q	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	21	28	32	33	35	33	32	29	G	G	E 16	E 16	E 16	E 16	E 16	E 16

DEC.2015 fbEs (0.1MHz)

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IONOSPHERIC DATA STATION Yamagawa

DEC.2015 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.31°12.0'N LON.130°37.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

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

DEC.2015 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

DEC.2015 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.31°12.0'N LON.130°37.0'E SWEEP 1.0MHz TO 30.0MHz 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	307	310	289	292	315	308	332	349	370	373	352	359	338	365 ^R	339	352	360	385	355	299	331	348	350	281 ^V
2	304	323	310	294	339	307	309	349	370	363	368	336	363	371	342	375	348	391	340	337	330	363	311	307
3	289	310	324	316	313	320	325	349	355	384	374	364	339	351	353	368	353	386	352	356	345	333	352	317
4	304	279 ^V	308	315	343	339	311	355	370	376	375	364	338	365	346	328	367	362	361	319	349	353	323	306
5	293	298	304	320	362	409	333	356	379	365	371	351	365	367	368	353	366	351	364	343	320	338	322	328
6	286	279 ^V	309	320	327	416	281	334	373	382	373	340	345	324 ^R	348	364	346	365	364	327 ^R	294	303	312	275
7	^A	321	404	339	359	337	287	322	368	367	356	347	369	356	383	331	351	358	370	306	356	296	285 ^V	309
8	327	281	323	339	375	293	299	345	361	366	356	368	367	333	339	353	353	364	360	343	315	320	325	325
9	304	298	312	315	335	325	307	358	389	377	372	381	357	345	359	359	363	370	350	303	340	309	326	331
10	301	298 ^R	300	352	348	389	312	343	374	380	360	367	332	343	353	355	369	352	341	340	293	321	359	322 ^A
11	276	277	317	323	333	341	324	343	361	362	357	359	347	335 ^V	379	348	367	368	337	328	333	316	305	^A
12	^A	300	315 ^F	298	315	364	283	332	354	369	360	385	372	325	331	368	359	345	363	315	345	335 ^H	311	333
13	294	281	312	330	330	388	414 ^R	331	375	363	371	348	362	374	330	340	368	383	381	329	343	325	337	292
14	298	290	303	311	332	366	343	337	365	378	376	364	370	348	319	345	356	367	363	332	372	309	332	324
15	284	284	288	295	297	288	303	332	368	325	353	370	327	343	334	344	356	361	342	337	295	310	305	308
16	312	299	293	331	387	^A	284	324	325	327	367	379	341	334	343	332	329 ^H	364	362	364	331	328	334	343
17	312	291 ^R	291	308	321	349	351	350	337	346	372	384	329	364	329	366	345	387	355	350	290	315	334	333
18	299	297	300	325	354	296	336	340	362	386	348	354	358	351	369	351	351 ^H	356	347	361	310	332	345	310
19	286	290	301	298	316	381	362	343	381	356	367	354	357	346	335	328 ^H	367	359	388	330	328	330	335	335
20	325	297	295	283	337	341	387	326	364	357	353	362	360	340	327	309	316	336	351	320	306	301	271	274
21	273	312	350	280	262	295	366	352	295	394	371	342	317	331	343	326	307	331	341	350	299	301	316	351
22	321	290	311	319	353	387	331	312	358	354	350	377	353	326	324	329	351	360	366	337	311	307	304	311
23	373	312	296 ^V	324	326	336	303	323	376	381	338	367	353	338	330	337	339	352	360	319	336	310	322	318
24	284	293	306	332	415	308	302	325	377	377	323	348	354	358	349	341	350	353	351	317	345	344	351	286
25	274	294	345	347	371	287	296	336	369	356	365	349	356	350	372	356	363	353	364	355	333	347	322	297
26	286	293	320	321	353	395 ^V	313	333	359	356	364	340	343	370	394	357	362	358	383	334	293	344	347	301
27	285	284	301	344	381	278	297	329	363	379	382	308	363	361	344	382	341	359	363	346	346	323	311	312
28	293	292	323	341	370	354	324 ^V	335	389	374	355	358	359	376	382	333	348	356 ^R	387	361	319	341	317	307
29	283	310	312	289	300	299	344	341	395	376	377	372	357	362	362	354	368	360	378	353	334	334	359	314
30	269	290	298	330	335	306	316	329	374	372	335	382 ^R	361	361	351	362	367	367	364	349	349	350	338	323
31	300	292	295	305	382	368	327	349	360	383	352	364	361	378	346	344	358	351	333	362	315	328	352	280
	00	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	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30
MED	294	293	308	320	337	338	316	337	368	372	364	362	357	351	346	351	356	360	361	337	331	328	325	312
U Q	306	300	317	331	362	368	336	349	375	379	372	370	362	365	362	359	366	367	364	350	345	341	345	325
L Q	284	290	298	298	321	306	302	329	360	357	353	348	341	338	334	333	348	353	350	320	310	310	311	301

DEC.2015 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

DEC.2015 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.31°12.0'N LON.130°37.0'E SWEEP 1.0MHz TO 30.0MHz 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										492	L	L	L	L	L	L	L								
2									485	488	U	L	L	U	L	L	U	L	L						
3									447			L	L	L	U	L	L	L							
4												L	U	L	U	L	L	L							
5									520	501	L	L	L	U	L	L	L	395	406						
6									540		448	L	L	L	U	L	L	L	A						
7												L	L	L	U	L	L	L	L						
8										479	511	L	L	L	L	L	L	L	435						
9									482		L	L	L	L	L	L	L	L							
10									463		L	U	L	L	L	L	L	L	L						
11									444		L	L	U	L	L	L	L	L	L						
12									457			L	L	U	L	U	L	L	L	A					
13									444	475	L	L	L	L	L	L	L	L							
14									A	L	L	L	U	L	L	L	L	L							
15									509		L	L	L	L	L	L	L	L	L						
16									439	426	U	L	L	U	L	L	L	U	L			460			
17									450	461	L	L	L	U	L	U	L	U	L						
18									478	512	431	L	L	L	U	L	U	L	L	L		462			
19									453	466	429	L	L	L	L	L	L	L							
20									431	421	L	U	L	L	L	L	L	L	L						
21								401			L	A	L	L	L	L	L	L							
22									476	479	L	L	L	U	L	L	L	L				416			
23									420		L	L	L	L	L	L	L	L							
24									471			L	A	A	L	L	L	L							
25									455	509	L	L	L	L	L	L	L	L	A			453			
26									L	U	L	U	L	L	L	U	L	L	U	L					
27									479		L	L	L	L	L	U	L	L	L	A					
28									482	421	U	L	L	L	L	L	L	L							
29									457	451	L	L	L	L	L	L	L	L	L						
30									441	496	L	L	U	L	L	U	L	U	L	A					
31									433	A	L	U	L	U	L	L	L	L	L						
												377	404									408			
CNT									4	25	17	4	7	9	10	5	5	4	7						
MED									502	457	460	428	408	395	392	387	410	430	453						
U Q									530	480	488	430	417	405	403	426	426	439	462						
L Q									443	444	432	421	387	378	384	376	400	410	408						

DEC.2015 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

DEC.2015 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT.31°12.0'N LON.130°37.0'E SWEEP 1.0MHz TO 30.0MHz 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									210	208	242	240	250	230	248	232	220							
2								220	210	218	224	240	236	232	260	220	224							
3									216		216	228	272	246	232	218								
4											228	232	276	238	252	252								
5								222	202	226	226	250	234	234	218	244	204	210						
6								242		216	226	252	250	256 ^H	246	224	226							
7											238	248	230	244	216	222	238							
8									214	220	240	228	234	246	220	238	228							
9									202	216	230	220	230	234	230	238								
10									212	210	216	230	242	246	228	226	214							
11									214	224	234	250	240	218		264	216							
12									210		240	222	222	242	258	226	208							
13									210	216	218	244	242	222	236	236								
14									204	214 ^H	226	224	232	264	282	246								
15									220	284	232	222	274	254	254	226	224							
16									218	212	230	216	266	242	222	216		206						
17									206 ^H	214	230	214	282	232	290	220								
18									210	222	206 ^H	248	250	250	230	228	220	206						
19									204	206 ^H	226 ^H	240	236	228	252	228 ^H								
20									218	224	234	238	242	240	242	270	252							
21								236			224	228	296	268	234	224								
22									206	220	216	216	232	286	284	248		232						
23									204	212	226	232	238	242	232	234								
24									212			246	234	242	246	230	222							
25									214	218	232	238	240	250	230	222	206	216						
26									220	204	226	262	246	238	208	224	232	216						
27									216	220	218	288	226	236	238	220	218							
28									202	214	216	236	244	226	216	274								
29									196	212	218	230	226	226	232	228	206							
30									202	208	230	220	240	238	254	222	216							
31									212	212	218	246	220	230	244	232	216	208						
	00	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	27	25	30	31	31	31	30	31	19	7						
MED								229	210	216	226	236	240	240	237	228	220	210						
U Q								239	214	220	232	246	250	246	252	238	226	216						
L Q								221	204	212	218	224	232	232	230	222	214	206						

DEC.2015 h'F2 (KM)

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DEC. 2015 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT. 31°12.0'N LON. 130°37.0'E [SWEEP 1.0MHz TO 30.0MHz 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		270	292	320	310	288	262	234	218	168	186	206	236	212	222	202	212	208	196	178	234	228	214	210	322				
2		292	256	268	296	246	220	264	162	168	212	202	200	218	202	200	192	204	200	200	220	228	200	244	274				
3		312	284	248	220	278	252	246	220	188	216	206	198	194	200	208		A	214	198	218	214	214	236	214	228			
4		296	338	286	280	234	214	264	208	210	216	178	196	186	214	198	238	214	196	188	224	214	214	232	276				
5		324	306	294	264	220	192	280	148	168	190	218	204	182	196	196	190		A	198	192	212	240	216	222	248			
6		298	330	268	240	244	178	320	140	218	198	220	216	222	242	240	218		A	222	208	218	252	356	254	382			
7		A	316	200	258	228	284	352	256	226	218	230	226	224	220	220	212		A	232	212	208	242	208	258	300	240		
8		236	306	258	232	206	308	300	224	154	158	210	214	220	200	200	194		H	216	214	192	212	234	234	232	244		
9		292	284	266	260	250	250	266	212	180	204	204	204	184	224	218	212		A	216	206	188	230	230	240	240	240		
10		264	312	326	238	224	212	310	226	162	202	202	194	216	216	216	220		A		210	202	218	250	244	208	246		
11		336	338	274	254	238	226	248	224	208	214	218	194	202		218	186		H	216	206	192	220	224	236	280	A		
12		A	276	274	282	244	208	318	234	192	216	220	218	198	210	200	208		A		210	192	234	210	210	266	240		
13		286	328	278	260	244	204	200	228	194	172	182	204	208		194	216		H	210	200	190	196	208	286	278	306		
14		312	350	276	280	244	210	214	226		182	224	212	186	184	198	188		H	210	194	190	196	188	246	222	248		
15		310	332	324	310	296	296	204	240	148	214	226	210	216		204	204		A	204	204	202	222	242	236	256	228		
16		264	264	292	244	198		A	324	246	206	206	226	206	196	196	208	190		H	204	182	214	204	204	226	214	220	
17		276	300	298	276	252	234	210	212	174	190	224	210	176	232		206		A	218	212	196	202	200	212	214	234	246	
18		282	300	274	226	220	194	196	214	180	160	202	226	182	228	214	196		H	204	184	202	220	224	232	220	240		
19		320	320	286	282	262	202	208	218	188	186	200	208	204	212	202	198			220	204	202	242	240	216	226	226		
20		262	288	300	308	250	238	202	222	204	222	210	210	210	202	202	210			240	230	188	196	230	228	316	314		
21		322	246	218	308	360	292	222	E B	244	246	216		A	A	252	230			220	218	230	218	218	198	216	220	226	226
22		232	290	262	262	226	204	244	230	174	176	212	216	194	226	204	228			218	220	192	192	216	278	272	272		
23		204	290	292	314	258	234	296	258	178	180	214	214	220	196	206	210		A	226	214	198	198	210	206	232	256		
24		312	318	304	244	190	284	314	252	188	214	210	218		A	202	214			220	214	200	246	212	206	230	320		
25		362	304	238	224	198	354	334	252	168	148	214	214	202	198	194	212		H		A	170	204	192	208	232	250	296	
26		324	314	268	258	232	196	280	258	224	204	196	206	204	186	210	182		H	206	158	190	192	198	204	230	280		
27		338	330	302	240	204	200	316	240	174	174	212	198	220		186	222		A		216	196	192	210	226	260	258		
28		312	328	282	244	216	212	254	236	172	212	214	206	204	206	202	186		H	210	206	196	204	238	206	280	308		
29		304	312	274	308	276	284	228	220	164	188	212	176	204	204	206	198		A		222	202	220	244	208	214	268		
30		358	324	324	256	242	236	276	250	192	150	178	188	200	200	204	210		A		212	192	214	210	224	232	236		
31		286	312	326	296	214	210	254	220	204		A	198	192	192	164	204	216		A	E	A	216	194	204	210	226	216	312
		00	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	31	31	31	31	30	31	31	30	30	30	30	30	26	31	30	22	31	31	31	31	31	31	31	30			
MED		298	312	278	260	242	223	264	225	184	200	211	207	204	205	204	210	214	206	196	214	216	226	232	252				
U Q		321	328	300	296	252	262	310	244	204	214	218	214	216	222	210	216	220	214	202	222	234	236	260	296				
L Q		273	290	268	244	220	204	222	218	168	180	202	198	194	198	200	194	208	196	192	198	210	214	222	240				

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DEC.2015 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT.31°12.0'N LON.130°37.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1								B										A							
									106	98	98	98	96	96	100	104	106								
2								A								A	A	A							
									106	102	100	100	100	100	100										
3								A								A	A	A							
									100	116	100	100	110	96	110										
4								A		A				A		A	A	A							
									110		104	116	104		110										
5								B										A							
									102	108	110	110	106	106	106	108	112								
6								B					A			A		A							
									102	104	98	98	108	108	124		108								
7								A	A	A			A	A	A	A	A	A							
											118	100													
8								B										A	A						
									100	106	114	94	100	100	98	102									
9								A										A	A						
									106	102	98	94	98	98	98	100									
10								104	104	102	102	98	98		A	A	A	A	A						
								A																	
11									120	100	100	98	98	108	110	106	112								B
								B							A	A									
12									114	102	100	98	98	102			108	102							
								B																	
13									106	98	98	104	102	102	116	106	112	168							
								B											A						
14									104	102	114	98	104	104	104	104	108								
								B						A	A	A									
15									102	114	118	110	102				112								
								B							A										
16									102	102	100	100	100		98	102	102								
								B		A	A	A	A	A	A										
17									116							106	100								
								B							A										
18									106	104	96	96	96		96	106	110	164							
								B					A						E	B					
19									106	108	104	102		114	112	106	112								
								A						A											
20									114	102	102	96	96		112	110	108								
								B																	
21									112	110	108	102	100	100	100	110	110								
								B						A											
22									104	102	98	100	100		100	106	110	128							
								A			A				A										
23									110	110		108	108	108		110	110	146							
								A						A	A										
24									108	108	102	102			112	100	106								
								A																	
25									106	100	100	100	100	100	104	104	102								
								A				A		A	A										
26									112	100	100		100			106	106								
								B							A										
27									106	106	102	102	100		100	98									
								B			A	A													
28									146	102			112	110	110	110	112								
								A					A												
29									114		110	110		96	96	112	116								
								A					A		A		A								
30									104	104	100	100		112		112									
								B					A												
31									112	106	100	98		108	108	110	110	110							
	00	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	30	27	28	28	24	19	23	23	22	6							
MED								104	106	102	100	100	100	102	104	106	110	128							
U Q									112	108	106	102	104	108	110	110	112	164							
L Q									104	102	100	98	98	100	100	104	106	110							

DEC.2015 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

DEC.2015 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT.31°12.0'N LON.130°37.0'E KSWEPT 1.0MHz TO 30.0MHz 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	108	92	92	90	90	96		B	144	138	160	104	108	106	106	114	G	88	88	104	B	100	98	136	
2	94	100	B	B	94	98	92	98	92	150	138	106	100	102	102	96	94	92	96	98	94	98	B	B	B	
3	B	B	B	B	152	98	152	98	156	98	154	124	98		G	96	92	92	92	92	92	90	90	92	92	
4	92	98	B	92	96	92	92	114	146	84	170	152	164	164	172	86	86	86		B	B	94	B	B	B	
5	B	B	98	96	B	92		B	B	156	124	172	108	172	154	92	94	90	90	88	88	B	94	B	B	
6	B	B	134	B	B	B		B	B	154	140	150	134	122	120	110	96	96	116	86	110	124	108	132	112	94
7	88	92	92	90	90	92	92	92	92	96	144	122	120	98	116	94	90	90	90	86	86	108	94	100	B	
8	B	B	B	96						138	158	130	110	108	104		G	96	90	84	86	84	84	86	86	100
9	100	82	94	92	94	92	90	90	178		G	114	108	110	102	102	122	90	90	94	90	88	90	90	86	
10	B	96	92	98	92	86	88	92	140	178	162	108	106	98	92	92	88	92	90	86	86	86	90	90	92	
11	B	B	90	102	B	B	B		B	92	186	186	116	114	140	140	186	134	90		B	94	90	90	102	94
12	96	B	B	B	B	B	B	B	B	114	108	116	112	108	112	98	98	96	96	90	92	B	112	B	B	
13	B	144	96	116	96	B	B	B	B	90	174	162	96	164	134	120	120	98	98	92	92	114	98	92	128	
14	86	94	88	B	B	104	96	106	B	182	148	136	106	104	92	172	88	88	88	86	86	94	B	82	88	
15	B	84	84	100	B	B	86		B	120	164	146	118	108	98	98	92	144	90	104	88	88	86	86	B	
16	B	B	B	B	96	96	96	96	158		G	114	108	106	100	174	156	88	160		B	B	88	100	B	
17	88	98	B	B	108	108	B	B	B	122	106	102	98	94	90	86	148	86	86		B	B	B	B	B	
18	B	B	B	B	B	B	B	B	B	154	180	152	112	100	168	166		G	G	174	94	88	86	86	96	84
19	82	B	B	B	B	B	100	B	B	140	174	164	114	98	122	94		G	94	90	86	96	86	84	84	
20	B	B	B	B	B	B	B	B	90	188	116	116	106	102	98	100	94		G	92	96	92	90	86	86	84
21	86	122	94	96	94	B	142	128	B	128	120	126	106	104	102	102	94	92	88	102	86	88	88	B	B	
22	B	B	B	B	B	B	B	B	B	154	132	148	112	104	102	118	180	156		G	94	124	90	94	108	
23	B	96	96	94	94	96	118	92	96	100	104	122	104	110	100	100	200	98	106	104	90	100	84	104	B	
24	B	B	B	B	B	B	B	B	94	160	146	122	110	98	98	98	214	96	92	92	84	88	86	86	90	
25	88	B	B	B	B	B	B	B	94	G	160	136	110	110		G	98	138	122	88	86	86	82	82	90	
26	B	B	B	B	B	B	B	B	94	98	140	G	152	188	100	94	98	164	144	96	90	84	102	B	B	
27	B	B	B	B	B	B	B	B	B	148	156	140	142	100	96	98	164	88	88	88	86		90	88	88	
28	B	B	B	B	B	B	B	B	B	160	188	100	98	98	122	98	92	94	92	98	94	94	92	122	84	
29	100	100	102	100	100	98	98	94	90	100	94	158	168	116	108	96	96	92	116	88	94	B	B	B	B	
30	100	100	90	92	96	90	98	98	152	134	182	140	100	100	112	94	92	92		B	98	98	102	86	B	
31	B	100	100	96	98	B	98	B	118	188	104	104	100	98	94	98		G	G	B	86	86	94	B	B	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	12	15	15	16	15	14	18	17	30	28	30	31	31	29	30	29	27	28	26	27	25	26	22	17		
MED	90	98	94	96	96	94	96	94	142	147	135	110	104	102	99	96	92	91	93	90	90	90	91	92		
U Q	98	100	98	99	98	98	100	98	156	169	154	122	110	119	112	128	98	92	96	94	94	98	98	102		
L Q	87	94	90	92	94	92	92	92	120	118	116	106	100	98	96	93	90	88	88	86	86	86	86	86	86	

DEC.2015 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

DEC.2015 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

LAT.31°12.0'N LON.130°37.0'E SWEEP 1.0MHz TO 30.0MHz 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		F1	F4	F3	F4	F5	F1		H1	H1	H1	C2	C1	C1	C2	C1		LQ21	F1	FF11		F1	F2	FF12	
2		FF11	FF21		FF21	FQ11	FQ21	L1	LH12	H1	HC11	C1	C1	CH21	C2	CH31	L4	L7	FF12	FF11	F4	F1			
3					F1	F1	FF11	LH11	H1	LH12	H1	C1	L1		L1	L3	L5	L4	F3	F5	F3	F2	F2	F1	
4		F1	F1		F2	F1	F1	CL12	HL22	LH31	HL13	HC11	HCL11	HL12	HL12	L3	L3	L1				F1			
5			F1	F1		F1			HC21	CCL11	HCL11	CL11	HL11	HL11	L1	L1	L1	L1	FF31	F2		F1			
6			F1				F1		HHL22	H1	H1	C1	CL21	CL21	LC21	L2	CL12	L5	FF14	FFF12	FFF11	FF3	F3	FF31	
7		FQ41	F4	F1	F2	F1	F1	L1	L2	HL11	CL21	C1	L2	CL12	L3	L4	L2	L3	F4	F4	12	1	FF11	FF11	
8				F1					H1	HL11	CL11	C1	CL11	C1		L1	L2	L2	FF11	F2	F1	FF11	F2	FF11	
9		F5	FF21	F1	F2	FQ11	FQ11	FQ11	L1	H1		C2	C1	C1	C2	C1	L3	L3	F1	F2	F1	F1	F1	F1	
10			F3	F5	F1	F2	F3	F3	L1	H1	H1	H1	C1	C1	L1	LC11	L1	LC21	FQ3	F2	F2	FF21	F1	F1	
11			F1	F1				L1	H1	H1	C1	C1	H1	HL11	HL11	HL11	LC11		F1	F1	F1	FQ21	FF11	FQ31	
12		FQ41							C1	C1	CH11	C1	C1	C1	L2	L1	L1	L1	F1	F1		F1			
13			FFQ12	F2	FF11	F2			LH11	H1	H1	L1	HL11	HL11	CL11	CL11	L1	LH11	F1	F2	FF11	FF32	F5	FF12	
14		F1	FF21	F1		F1	F2	C1	H1	HC11	HL11	C1	CL12	L1	HL11	L1	L1	L2	FF21	F1	F1		F1	F1	
15			F1	F1	FF11		F1		C1	HL11	HL11	CL11	C1	L3	L1	L2	HL11	L3	F1	F1	F1	FF22	FF11		
16					F1	F4	FF21	LC11	H1		C2	C2	C1	L2	H1	HL12	L2	H1			F2	FFQ12			
17		F1	F1		F1	F1			CL11	CH21	CH21	LC21	L2	L3	L2	HL11	L2	L1							
18									H1	H1	H1	C2	C2	HL11	H1			H1	F2	FF41	FQ21	F2	F1	F1	
19		F1				F1			H1	H1	H1	C1	L1	CL11	L1		L1	L3	F3	FF12	F1	FF11	F1		
20				F1				L1	H1	C1	C1	C1	C1	L2	L1	L1		L1	F1	F1	F2	F1	F1	F1	
21		F1	F1	FF11	F1	FFF11		FF11	C1	C1	C1	C1	C1	C1	C1	L2	L2	L2	FF45	F1	F1	F1			
22									H2	H1	H1	C1	C1	C1	C1	H1	HL11		F1		F1	F1	F1	F1	
23		F2	F1	F5	FQ21	FQ11	F1	L1	L1	L1	C1	CL11	CL11	CL12	LL11	LL11	HL11	LH11	FF11	F1	F2	FF21	FF21	FF11	
24								L1	HL11	HL11	C1	C1	L2	L3	L1	HL11	L1	L2	F1	F3	FF21	FF21	F1	F1	
25		F1						L1	H1	H1	H1	C1	C1		L2	HL12	CL12	L3	F2	FF21	FF21	FF21	F1		
26						F2	L1		H1			HC11	HC11	L2	L2	L1	HL11	HL11	F1	F1	F1	F1			
27									H2	H1	H1	H1	C1	L2	L1	HL11	L3	LC21	F1	F1		F1	F1	F1	
28									HC22	H1	L1	L1	L1	CL11	L1	L1	L2	LQ11	FF11	FF11	F1	F1	F1	F2	
29		FFF11	FQ21	F1	F2	F2	F2	L2	L2	LLH2	LH21	HL11	HC11	C1	C1	L1	L1	L4	FF14	FF21	F2				
30		F1	FF11	FQ21	FF11	F2	F1	L1	H1	H1	H1	H1	L1	L1	CL12	LC21	L3	L2		F2		FF21	FF11	FF11	
31			F2	FF22	F2	F1		F1	C1	H1	C1	C1	L1	L1	L1	LLH12				F1	F1		F1		
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																									
MED																									
U Q																									
L Q																									

IONOSPHERIC DATA STATION Okinawa

DEC.2015 f_{XI} (0.1MHz)

135°E MEAN TIME (G.M.T. + 9 H)

LAT.26°41.0'N LON.128°09.0'E SWEEP 1.0MHz TO 30.0MHz 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	32	34	37	37	46	32	32													64	65	73	54	37
2	X	40	44	40	36	46	32	34													60	66	62	51	40
3	X	30	33	36	40	32	34	30													50	54	48	43	30
4	X	30	32	33	38	42	29	28													63	62	59	46	36
5	X	34	37	40	46	43	28	26													58	49	50	41	35
6	X	33	34	36	42	44	40	25													57	49	51	49	39
7	X	41	55	43	A	30	22	A													65	67	62	60	62
8	X	49	46	47	50	42	29	27													74	66	57	51	48
9	X	37	35	35	38	39	34	32													58	56	53	53	60
10	X	45	37	35	36	45	28	27													66	58	57	60	49
11	X	42	40	45	51	46	36	31													48	53	53	51	54
12	X	40	44	50	50	51	35	29													59	57	54	48	46
13	X	40	35	37	43	46	36	27													85	74	58	59	50
14	X	43	43	48	40	44	44	28													64	64	52	55	48
15	X	38	38	38	42	44	50	54													54	60	73	70	59
16	X	49	50	43	49	42	23	24													62	58	60	59	37
17	X	30	32	34	34	36	36	34													66	68	62	56	47
18	X	37	36	38	39	39	32	30													100	86	64	61	57
19	X	52	42	35	37	40	38	33													57	61	69	54	44
20	X	33	31	33	33	36	41	29													110	98	92	66	67
21	X	63	72	48	42	41	66	57													73	64	62	64	56
22	X	40	38	39	44	51	35	25	X												66	58	53	48	44
23	X	40	30	33	34	37	31	30													107	79	80	65	44
24	X	40	34	36	49	40	27	29													53	61	61	46	34
25	X	38	46	56	53	18	24	25													63	59	49	50	34
26	X	36	37	41	42	42	34	33													59	56	46	39	32
27	X	34	38	42	52	40	26	26													52	53	45	38	37
28	X	34	36	38	47	42	33	28													63	56	50	A	36
29	X	35	34	36	36	38	36	34													50	51	55	41	35
30	X	34	34	37	40	41	37	34													59	62	58	51	45
31	X	40	38	38	45	58	32	30													88	75	61	74	39
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT		31	31	31	30	31	31	30	1												31	31	31	30	31
MED		X	X	X	X	X	X	X	X												X	X	X	X	X
U Q		X	X	X	X	X	X	X	X												X	X	X	X	X
L Q		X	X	X	X	X	X	X	X												X	X	X	X	X
		34	34	36	37	39	29	27													57	56	52	48	36

DEC.2015 f_{XI} (0.1MHz)

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IONOSPHERIC DATA STATION Okinawa

DEC.2015 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.26°41.0'N LON.128°09.0'E SWEEP 1.0MHz TO 30.0MHz 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	28	30	31	40	26	26	49	70	79	81	88	88	112	107 ^R	108	97	102	77	58	59	67	48	31
2	34	38	34	30	40	26	28	45	66	73	86	78	96	94	96	94	84	97	85	54	60	56	45	34
3	24	27	30	34	26	28 ^V	24	43	66	89	88	80	80	110	100	89	73	73	60	44	48	42	37	24
4	24	26	27	32	36	23	22	40	63	75	82	75	81	88	102	105	92	80	70	57	56	53	40	30
5	28	31	34	40	37	22	20	39	58	72	76	76	84	90	85	79	78	66	61	52	43	44	35	29
6	27	28	30	36	38	34	19	40	76	87	72	74	76	90	99	92	72	77	61	51	43	45	43	33
7	35	46 ^F	37	A	24	16	A	36	71	86	78	86	104	98	85	84	96	101	85	59	61	56	54	56
8	43	40	41	44	36	23	21	46	64	80	89	82	82	91	85	85	91	92	98	68	60	51	45	42
9	31	29	29	32	33	28	26	43	67	82	78	84	84	83	95	102 ^V	101	81	70	52	50	47	47	54
10	39	31	29	30	39	22	21	41	78	89	83	85	98	124	122	118	121	105	81	60	52	51	54	43
11	36	34	39	45	40	30	25	46	78	82	91	88	95	91	93	81	84	76	59	42	47	47	45	48
12	34	38	42 ^F	42 ^F	45	29	23	41	81	88	91	91	99	102	126	118	92	93	74	53	51	48	42	40
13	34	29	31	37	40	30	21	40	70	88	101	94	98	106	115	131	130	109	91	79	68	52	53	44
14	37	37	42	34	38	38	22	41	64	80	86	86	79	85	93	104 ^H	108	91	70	58	58	46	49	42
15	32	32	32	36	38	44	48	54	80	79	110	91	71	93	103	91 ^H	79	79	76	48	54	67	64	53
16	43	44	37	43	36	17	19	37	70	103	112	84	82	84	116	98	86	76	69	56 ^H	52	54	53	31
17	24	26	28	28	30	30	28	39	60 ^H	82	88	72 ^H	79	114	112	111	101	86	72	60	62	56	50	41
18	31	30	32	33	33	26	24	38	60	72	74	80	96	97	110	112	109	108	108	94	80	58	55	51
19	46	36	29	31	34	32	27	39	63	83	85	78	83	84	84	96	105	91	75	51	55	63	48	38
20	27	25	27	27	30	35	23	38	58	82	83	90	85	92	115	136 ^R	152	160	160	104	92	86	60	61
21	57	66	42	36	35	60	51	53	58	132	82	75	90	124	110	88	92	102	103	67	58	56	58	50
22	35	32	33	38	45	29	19	38	68	87	104	95	85	81	92 ^H	90	92	71	73	60	52	47	42	32 ^F
23	30 ^F	24	27	28	31	25	24	37	82	80	85	96	105	123	138	130	129	142	139	101	73	74	59	38
24	34	28	30	43	34	21	23	39	72	86	83	98	99	94	92	86	85	76	62	47	55	55	40	28
25	29	35 ^F	46 ^F	47 ^J	12 ^B	18	19	32	74	70	85	81	98	100	99	91	80	80	69	57	53	43	44	28
26	30	31	35	36	36	28	27	35	71	87	89	68	95	100	89	77 ^H	85	99	98	53	50	40	33	26
27	28	32	36	46	34	20	20	35	64	80	82	70	87	97	98	103 ^{J R}	88	77	70	46	47	39	32	31
28	28	30	32	41	36	27	22	33	66	73	82	85	96	84	87	85	86	86	77	57	50	44	A	30
29	29	28	30	30	32	30	28	37	64	73	85	72	88	86	86	82	84	81	82	44	45	49	35	29
30	28	28	31	34	35	31	28	38	71	74	83	94	101	96	102 ^{J R}	100	100	92	71	53	56	52	45	39
31	34	32	32	39	52	26	24	34	59	74	77	77	93	111	104 ^R	127	112	103 ^R	108	82	69	55	68	33
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31
MED	31	31	32	36	36	28	24	39	67	82	85	84	88	94	99	96	92	91	75	57	55	52	46	38
U Q	35	36	37	41	39	30	27	43	72	87	89	90	98	106	110	111	105	102	91	60	60	56	54	44
L Q	28	28	30	31	33	23	21	37	63	74	82	76	82	88	92	86	84	77	70	51	50	46	42	30

DEC.2015 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

DEC.2015 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.26°41.0'N LON.128°09.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L	L	L	L	L	L	L	L							
2										L	L	L	L	L	L	U L	L							
3										L	L	L	L	L	L	L	L							
4											L	U L	L	L	L	L	L							
5											L	4 6 4	4 6 8	4 5 2	4 6 0									
6										L		L	L	L	U L	L	L							
7											L	L	L	L	L	L	L							
8										L	L	L	U L	L	L	L	L	A						
9										L	L	L	L	L	U L	L	L							
10									L		U L	L	L	U L	L	L	L							
11										L	L	L	L	L	L	L	L							
12										L	L	L	U L	U L	U L	U L	L							
13										L	L	L	L	L	L	L	L							
14									U L		L	L	L	L	L	L	L	L						
15										L	L	L	L	L	L	L	L							
16											L	L	L	L	L	L	L	L						
17											L	L	L	U L	L	L	L	L						
18											L	L	A	L	A	L	A	L	A					
19										L	L	L	L	L	L	L	L	L						
20										L	L	L	L	U L	L	L	L	L						
21													U L	L	L	L	L	L						
22											U L	L	L	L	L	L	L	L						
23									2 6 4	L	L	L	U L	U L	L	L	L	L						
24									2 6 4	3 2 4	L	L	L	L	A	L	L	L						
25										L	L	L	U L	L	L	L	L	L						
26											L	L	L	L	L	L	L	L						
27										L	L	L	U L	U L	L	L	L	L						
28									2 4 8		L	L	L	L	L	L	L	L						
29									2 5 2		L	L	U L	L	L	L	L	L						
30											L	L	U L	L	L	L	L	L						
31											L	U L	U L	L	L	L	U L	L						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									5	1	5	7	16	17	12	5								
MED									2 6 4	3 2 4	4 4 8	4 5 6	4 7 0	4 8 0	4 6 6	4 2 4								
U Q									L		U L	U L	U L	U L	L	L	L							
L Q									2 9 2		L	L	L	L	L	L	U L	L						
									2 5 0		4 3 6	4 4 8	4 6 6	4 7 0	4 6 0	4 0 4								

DEC.2015 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

DEC.2015 foE (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.26°41.0'N LON.128°09.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1								A	204	264	292	312	U A	A	A	A	A	A							
2								A	236	260	308	320	320		A	A	A	A	A						
3								B	212	268		A	A	332	320	296		A	A	A					
4								188	228	272	304	328	U A	A		324	316	268	176						
5								164	248	288	U A	U A	U A		348	336	324	296	268						
6								188	224	272	296	324	332	332	324		A	A	A	A					
7								B	236		304	328		A	A	A		296	268	212				A	
8								B	232	272	312	328	336		A	A	A	A	A	A					
9								B	240	284	324	332						272	184					A	
10								B	212	284	316	324	344		A	A	A	A	A	A					
11								B	240	276	316	332	336	344	336	316	272		A	A					
12								B	244	284	328	336		A	A	A		272	200						A
13								B	216	280	316	336	352	344	336	316	272	184							A
14								B	192	264	324	336		A	A	A		316		A	A	A			
15								172	192	280	308	336		A	A	A	304		A	A	A				
16								148	212	284	U A	A	A		340	328		268		A	A				
17								152	212	284		A	A	A	A	A		268		A	B				
18								B	196	276	312	328		A	A	A	A	A	A	A					
19								B	196	276	320	348	352	332	332	308	280	200			A				
20								B	240	276	308				A	A		A	A	A					
21								A	U A		B				A	A	A		A	A					
22									208	284	316	332	340		B	340	312	276	220						A
23								B	200	268		340	328		A	A	A	A	A	A					
24								B	212	284	316		U A	A	A		324	276		A	A				
25								B	200	280	296		A	A	A	A		268	192						
26								B	224	284	316	344	356	344		A	A	260	180						A
27								B	200	268	308	320		A	A	A		256	212						
28								B	200	272	312	324	332	332		A	300	276		A	A				
29								B	192	256	300		A	344	328	300		A	A	A	A				
30								B	208	264	304	324	324		A	A	A	A	A	A					
31								B	216	256	U A	A	A	A	A	A	A	A	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								6	31	30	27	23	19	9	12	12	17	10							
MED								168	212	276	312	328	340	332	330	310	272	196							
U Q								188	232	284	316	336	348	344	336	316	276	212							
L Q								152	200	268	304	324	332	332	324	298	268	184							

DEC.2015 foE (0.01MHz)

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IONOSPHERIC DATA STATION Okinawa

DEC.2015 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.26°41.0'N LON.128°09.0'E #SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E 13	B 13	E 13	B 20	J 32	A 29	J 45	A 26					J 60	A 48	J 47	A 32	J 32	A 25	J 27	A 21	J 21	A 23	J 22	E 13
2		21	18	20	E 13	B 18	E 13	B 13	18	26	30	35	40	40	37	34	J 33	A 29	J 21	A 26	J 22	A 20	J 21	E 13
3		17	18	13	E 13	B 13	E 13	B 18	16	25	31	40	37	40	68		J 36	A 40	J 43	A 33	J 41	A 23	J 17	A 25
4	J 22	A 16	J 18	A 18	J 21	A 19	J 18	A 16	28	34	34	38	36	36	20	G	34	24	21	25	24	19	15	E 13
5	E 13	B 13	B 18	J 18	E 13	B 13	B 44	J 44	G	28	31	40	41			G	J 28	A 27	J 25	A 21	J 22	A 24	J 20	A 19
6	J 44	A 19	J 18	A 18	E 13	B 16	J 20	A 14	31	32	37	40	38	40		G	36	J 30	A 48	J 44	A 29	J 21	J 33	A 45
7	J 46	A 27	J 35	A 39	J 21	A 12	J 16	A 86	31	33	40	57	52	64	72	29	28	41	26	21	J 18	A 15	J 28	A 30
8	J 22	A 18	E 13	B 20	E 13	B 17	E 13	B 16	20	25	34	38	41	40	36	J 32	A 45	J 46	A 21	J 22	A 19	E 18	B 13	
9	J 20	A 60	J 30	A 19	J 18	A 20	J 20	A 70	27		G	38	60	63	49	55	52	21	98	48	22	15	21	17
10	J 16	A 16	J 18	A 18	J 20	A 29	J 18	A 14	24	31		G	38	46	58	54	57	55	70	44	33	21	19	17
11	J 16	A 19	J 17	A 18	J 20	A 21	J 38	A 16		30	34	37	37		G	34	26	25	23	28	30	20	20	18
12	J 52	A 52	J 22	A 22	J 21	A 13	E 13	B 16		G	38	43	59	39		G	J 42		18	19	19	16	21	17
13	18	13	21	19	J 19	A 18	E 18	B 14	28	33	36	39	40	38	27	38	J 34	A 20	J 21	A 24	J 34	A 25	J 23	18
14	18	18	13	13	J 18	A 13	E 13	B 14	24	34	39	37	44	41	41	40	J 50	A 29	J 32	A 46	J 21	17	18	19
15	19	J 27	17	E 13	B 13	E 13	B 20	A 48	53	68	31	35	37	J 45	A 40	40	J 32	A 46	J 28	A 32	J 21	13	13	20
16	18	E 13	B 13	B 13	J 17	A 17	J 24	A 15	25	32	37	45	29	39	38	33	J 25	A 31	J 52	A 20	J 16	19	E 13	18
17	J 20	A 13	B 16	E 13	B 13	E 13	B 16	J 14	28	31	41	39	36	40	44	37	J 24	A 32	J 17	A 16	J 13	E 13	B 13	13
18	E 13	B 13	B 36	E 13	B 13	E 19	B 17	J 50	26	32	34	39	70	43	124	126	J 59	A 46	J 29	A 44	J 45	A 37	J 31	21
19	J 20	A 20	J 16	E 13	B 13	E 13	B 44	J 15	24		G	J 48	39	27		G	J 22	A 31	J 22	A 34	J 13	A 16	E 13	13
20	E 13	B 18	J 13	E 13	B 13	E 19	B 15	J 16		G	G	37	36	38	48	40	J 50	A 54	J 48	A 36	J 27	A 24	J 20	19
21	20	18	J 19	A 20	J 20	A 20	J 21	J 21	28	33	41	51	49	49	36	38	J 21	A 43	J 46	A 21	J 13	E 13	B 13	13
22	18	E 13	B 13	18	20	E 13	B 14	A 41		G	31	34	36	38	42	36	J 48	A 19	J 18	A 19	J 18	18	18	21
23	J 20	A 20	J 24	A 41	J 22	A 25	J 31	A 48		G	E 37	B 36	38	37	37	33	J 34	A 47	J 49	A 20	J 28	A 20	J 13	16
24	E 13	B 13	B 13	B 13	E 18	B 13	E 13	B 14	25		G	35	49	44	74	68	J 26	A 42	J 24	A 21	J 17	A 19	J 20	18
25	18	E 13	B 13	B 13	E 16	B 17	J 15	A 14	23		G	34	52	42	42	40	J 36	A 26	J 20	A 25	J 39	A 18	J 19	19
26	E 13	B 13	B 13	E 13	B 20	J 20	A 20	A 16	38		G	34	37	39	36	48	J 71		24	J 20	J 19	A 20	J 16	18
27	E 13	18	17	J 20	A 15	J 20	18	13	25	31	34	47	44	59	70	43	J 36	A 24	J 34	A 21	J 21	A 18	J 18	18
28	19	J 27	J 18	J 17	18	18	19	14	23	30		G	37	37	36	J 41	A 33	J 42	A 62	J 44	A 32	J 28	A 40	44
29	18	18	45	20	20	22	34	16		30	33	37		36	43	42	J 58	A 26	J 23	A 20	J 20	A 18	J 17	19
30	E 13	B 16	A 45	E 25	A 21	J 38	A 42	A 22		33	32	26	26	68	45	37	J 51	A 38	J 17	A 13	E 13	B 13	J 18	19
31	J 20	A 13	B 25	J 29	A 25	J 19	J 19	A 18	18	30	35	58	64	45	53	42	J 49	A 52	J 44	A 39	J 20	A 52	J 36	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	18	18	18	18	J 18	A 18	J 18	A 16	25	31	34	39	40	40	40	36	J 34	A 29	J 26	A 22	J 20	A 18	J 19	18
UQ	J 20	A 19	J 22	A 20	J 20	A 20	J 31	A 22	28	32	37	45	45	48	48	42	J 49	A 46	J 44	A 34	J 27	A 21	J 23	19
LQ	E 13	B 13	B 13	E 13	B 13	E 13	B 15	G	G	G	34	37	37	37		G	32		J 22	A 21	E 20	B 17	A 16	B 13

DEC.2015 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

DEC.2015 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.26°41.0'N LON.128°09.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

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

DEC.2015 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

DEC.2015 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.26°41.0'N LON.128°09.0'E KSWEPT 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

$\frac{H}{D}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	13	13	13	13	13	13	13	13	14	14	14	15	14	15	17	20	13	13	13	13	13	13	13	13
2	13	13	13	13	13	13	13	14	14	15	14	18	16	20	20	14	14	13	13	13	13	13	13	13
3	13	13	13	13	13	13	13	14	14	15	15	16	19	18	18	17	14	14	13	13	13	13	13	13
4	13	13	13	13	13	13	13	13	14	14	14	14	14	14	14	20	16	14	14	13	13	13	13	13
5	13	13	13	13	13	13	13	13	14	15	15	16	17	18	15	15	14	14	13	13	13	13	13	13
6	13	13	13	13	13	13	13	14	14	14	15	15	17	17	14	21	16	14	14	13	13	13	13	13
7	13	13	13	13	13	13	13	14	16	15	16	16	16	18	20	16	14	14	14	13	13	13	13	13
8	13	13	13	13	13	13	13	14	14	14	14	14	16	18	17	17	16	14	14	13	13	13	13	13
9	13	13	13	13	13	13	13	14	14	15	14	18	18	17	18	17	15	14	14	13	13	13	13	13
10	13	13	13	13	13	13	13	14	14	15	18	20	20	20	18	16	14	14	14	13	13	13	13	13
11	13	13	13	13	13	13	13	14	14	14	20	18	18	19	21	16	14	14	14	13	13	13	13	13
12	13	12	13	13	13	13	13	14	14	16	18	20	18	18	20	21	18	14	14	13	13	13	13	13
13	13	13	13	13	13	13	13	14	14	17	16	14	18	17	16	14	13	13	13	13	13	13	13	13
14	13	13	13	13	13	13	13	14	14	16	19	20	20	18	18	15	13	13	13	13	13	13	13	13
15	13	13	13	13	13	13	13	14	14	15	16	18	15	19	19	18	14	14	14	13	13	13	13	13
16	13	13	13	13	13	14	14	14	16	15	16	18	18	18	19	16	14	14	13	13	13	13	13	13
17	13	13	13	13	13	13	13	14	14	13	14	14	16	15	14	15	15	14	13	13	13	13	13	13
18	13	13	13	13	13	13	13	13	14	14	17	14	18	20	20	18	15	14	13	13	13	13	13	13
19	13	13	13	13	13	13	13	13	14	15	19	18	20	20	20	17	16	14	13	13	13	13	13	13
20	13	13	13	13	13	13	13	14	14	16	17	20	21	20	20	16	16	15	14	13	13	13	13	13
21	13	13	13	13	14	14	13	14	14	18	41	24	21	21	20	19	15	14	14	14	13	13	13	13
22	13	13	13	13	13	13	14	14	14	18	22	20	20	31	23	18	14	14	13	13	13	13	13	13
23	13	13	13	13	13	13	13	14	14	19	37	21	20	20	22	17	15	15	14	13	13	13	13	13
24	13	13	13	13	13	13	13	14	14	18	20	36	24	24	25	21	16	14	13	13	13	13	13	13
25	13	13	13	13	13	13	13	14	14	14	16	16	18	20	18	19	14	14	13	13	13	13	13	13
26	13	13	13	13	13	13	13	13	14	14	14	16	17	20	15	15	15	14	14	13	13	13	13	13
27	13	13	13	13	13	13	13	13	14	14	16	18	17	18	16	14	14	14	14	14	13	13	13	13
28	13	14	14	13	13	13	13	14	14	15	17	14	16	14	14	14	14	14	14	13	13	13	13	13
29	13	13	13	13	13	13	13	13	14	14	17	21	20	20	18	16	15	14	14	14	13	13	13	13
30	13	13	13	13	13	13	13	13	14	16	17	17	20	20	21	17	17	15	14	13	13	13	13	13
31	13	13	13	13	13	13	13	14	14	16	16	19	17	14	15	14	13	13	13	13	13	13	14	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	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	13	13	13	13	13	13	13	14	14	15	16	18	18	18	18	17	14	14	14	13	13	13	13	13
U Q	13	13	13	13	13	13	13	14	14	16	18	20	20	20	20	18	16	14	14	13	13	13	13	13
L Q	13	13	13	13	13	13	13	13	14	14	15	15	16	17	16	15	14	14	13	13	13	13	13	13

DEC.2015 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

DEC.2015 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.26°41.0'N LON.128°09.0'E KSWEPT 1.0MHz TO 30.0MHz 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	262	283	281	281	320	329	320	337	368	364	349	346	321	333	317 ^R	340	334	347	357	302	304	344	354	275
2	289	344	302	292	339	315 ^V	332	337	350	370	359	354	343	330	323	351	335	357	371	348	318	324	333	320
3	311	306	297	329	343	316	326	357	355	355	373	361	318	337	336	348	346	366	367	327	337	324	345	334
4	289	273	282	324	361	319	321	351	360	359	374	346	348	329	352	363	348	359	345	336	324	330	329	296
5	276	284	299	320	377	363	351	354	356	337	358	358	360	357	360	332	369	352	356	353	329	328	340	320
6	291	265 ^F	291	317 ^A	330	386	276	317	350	370	360	337	323	315	327	351	342	353	352	350	293	305	323	273
7	260	336 ^F	410		350	392		322 ^A	359	371	358	330	342	352	327	294	312	336	347	309	315	301	294	338
8	291	281	308	344	382	288	297	347	353	352	368	343	348	354	337	321	337	336	364	367	303	313	318	361
9	337	278	303	310	355	349	340	340	363	363	359	358	351	353	323	330	353	346	364	326	296	312	320	336
10	314	304	312	322	361	354	299	332	359	378	367	328	313	333	332	311 ^V	319	341	358	312	324	302	334	358
11	260	265	298	323 ^F	338 ^F	357	303	325	359	348	348	344	340	318	349	321	339	366	352	314	312	300	304	330
12	285	280	313 ^F	326 ^F	346	381	296	327	369	382	354	373	339	306	316	339	330	343	373	326	306	303	290	331
13	299	288	291	331	351	387	291	323	339	349	365	343	329	322	309	320	339	333	343	339	326	310	314	292
14	285	257	264	286	343	370	354	351	355	366	360	360	327	342	310	329	345	347	355	340	330	286	328	330
15	283	270	274	287	312	311	250	316	356	349	324	373	277	319	328	328 ^H	338	332	353	304	284	299	318	321
16	307	295	284	337	375	264	278	306	358	357	356	372	349	286	335	337 ^H	340	339	322	332 ^H	290	324	343	367
17	292	276	301	297	309	336	338	341	330 ^H	332	360	334 ^H	290	328	339	355	332	352	374	327	305	319	320	353
18	291	289	330	340	359	337	326	350	348	361	371	338	344	337	337	337	329	326	285	335	333	322	326	358
19	274	244	300	306	335	360	341	340	363	365	351	367	348	356	331	319	340	357	356	325	310	349	346	327
20	323	291	305	290	319	357	366	318	356	352	353	350	345	313	317	301 ^R	313	321	339	315	317	338	266	266
21	259	304	307	313	256	323	346	315	349	369	358	307	299	325	327	318	302	312	338	322	304	289	303	342 ^F
22	323	298	270	304	347	346	298	327	354	348	348	333	336	317	316 ^H	318	325	327	344	355	296	324	326	289
23	363 ^F	289	300	310	342	305	275	295	375	360	352	349	323	329	325	318	320	325	357	330	336	312	310	306
24	294	276	292	346	409	312	298	318	358	354	343	328	336	336	322	337	357	368	348	340	317	345	349	275
25	231	298 ^F	342 ^F	390 ⁹	147	272	294	304	365	357	363	351	327	332	347	361	331	344	354	379	324	304	362	295
26	276	273	314	345	353	325	315	309	342	347	373	348	334	332	362	315 ^H	315	321	375	317	354	308	339	283
27	277	274	294	357	397	315	319	327	350	357	378	373	313	333	324	315 ^{J R}	376	351	366	335	337	322	320	322
28	282	274	299	352	376	355	307	320	356	358	348	357	355	348	317	325	314	345	345	319	298	346		298 ^A
29	318	289	290	293	332	301	325	336	353	363	367	352	361	329	355	326	335	333	369	374	323	343	344	318
30	287	292	281	310	322	319	308	342	373	358	335	347	345	332	326 ^{J R}	322	301	331	350	337	334	318	347	345
31	295	282	283	290	361	369	316	343	373	375	373	324	322	335	321 ^R	349	315	320 ^R	346	339	325	340	347	314
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31
MED	289	283	299	318	346	336	316	327	356	358	359	348	336	332	327	328	335	343	354	332	317	319	327	321
U Q	307	295	307	337	361	360	332	342	363	366	367	358	348	337	337	340	342	352	364	340	329	330	344	338
L Q	276	274	284	297	330	315	297	318	350	352	351	337	322	322	321	318	319	331	345	319	304	304	318	295

DEC.2015 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

DEC.2015 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.26°41.0'N LON.128°09.0'E #SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L	L	L	L	L	L	L	L							
2										L	L	L	L	L	L	U L	L							
3										L	L	L	L	L	L	L	L							
4											L	U L	L	L	L	L	L							
5											L	387	386	400	368									
6											L	395	387	374	387									
7											L	L	L	L	L	L	L							
8											L	L	L	L	L	L	L	A						
9											L	L	L	L	L	L	L	L						
10									L		U L	L	L	L	L	L	L	L						
11										L	L	L	L	L	L	L	L	L						
12										L	L	L	L	L	L	L	L	L						
13										L	L	L	L	L	L	L	L	L						
14									U L		L	L	L	L	L	L	L	L						
15										L	L	L	L	L	L	L	L	L						
16											L	L	L	L	L	L	L	L						
17											L	L	L	L	L	L	L	L						
18											L	L	L	L	L	L	L	L	A					
19										L	L	L	L	L	L	L	L	L						
20										L	L	L	L	L	L	L	L	L						
21													L	L	L	L	L	L						
22											U L	L	L	L	L	L	L	L						
23									415		L	L	L	L	L	L	L	L						
24									L	L	L	L	L	L	L	L	L	L						
25										L	L	L	L	L	L	L	L	L						
26											L	L	L	L	L	L	L	L						
27										L	L	L	L	L	L	L	L	L						
28									447		L	L	L	L	L	L	L	L						
29									442		L	L	L	L	L	L	L	L						
30											L	L	L	L	L	L	L	L						
31											L	L	L	L	L	L	L	L						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									5	1	5	7	16	17	12	5								
MED									416	430	387	395	386	378	386	396								
U Q									444		402	405	390	389	388	404								
L Q									412		383	387	371	374	368	396								

DEC.2015 M(3000)F1 (0.01)

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IONOSPHERIC DATA STATION Okinawa

DEC.2015 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT.26°41.0'N LON.128°09.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1										232	254	248	L 274	268	246	252	222								
2										218	244	232	258	240	248	240	232								
3										242	228	236	252	260	230	230	224								
4											232	252	246	264	242	234	240								
5											230	242	240	238	234	258									
6										226		L 260	L 266	278	268	250	234								
7											236	264	252	244	254	L 258	258								
8										244	232	242	244	244	256	234	238								
9										236	238	244	252	252	272	248	220								
10									232		226	246	252	258	236	242	230								
11										236	260	240	260	260	242	L 262									
12										226	244	230	264	266	266	238									
13										244	232	236	252	254	228	256									
14									218		234	234	252	246	278	260	246								
15										248	266	216	L 388	280	260	238									
16											248	214	242	L 334	264	246	238								
17											234	232	L 316	268	234	238	226								
18											228	268	256	256	E A 320	256	226								
19										234	238	230	254	240	268	242	242								
20										244	240	246	236	272	268	264	270								
21													290	272	246	262	262								
22									220		246	252	242	302	270	278	258								
23									216	220	240	236	260	254	254	238	238								
24										242	238	264	248	254	258	242	236								
25										226	236	240	270	248	238	230	228								
26											238	234	262	246	226	220	248								
27										238	224	222	284	264	248	244									
28										228	248	234	236	238	L 282	218									
29									220		236	234	240	264	234	226	234								
30											232	230	242	260	240	246									
31											238	286	236	254	234	244	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									6	16	29	30	31	31	31	31	23								
MED									220	236	238	238	252	258	248	244	236								
U Q									228	243	244	248	264	268	268	256	246								
L Q									218	226	232	232	242	246	236	238	226								

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DEC. 2015 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT. 26°41.0'N LON. 128°09.0'E {SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	280	310	304	302	242	220	278 ^A	236	214	220	212	228	206	248 ^A	212	206	216	214	190	198	228	222	202	266
2	290	230	258	276	236	244	242	222	220	216	208	212	218	210	208	190	216	224	192	206	226	212	214	232
3	230	266	280	234	230	258	262	222	218	208	208	200	206	188	212	202	214	214	196	194	212	214	226 ^A	228
4	310	332	320	262	214	214	244	226	220	234	222	210	178	190	190	226	216	210	210	190	212	206	204	256
5	336	314	286	244	198	210	228	216	216	216	218	212	224	192	198	202	226	220	210	194	226	214	230	230
6	280	336	298	260	240	184	390	248	236	222	230	220	210	202	188	226	218	228	210	206	222	258	246	348
7	^E 380 ^A	244	192	^A 228		^B	^A	262	228	230	228	248	214	224	228	192	196	228	202	198	206	222	268	226
8	268	288	262	226	206	292	302	232	208	204	224	208	208	216	198	202	^A	236	200	192	214	222	226	218
9	228	292	282	262	218	222	248	222	212	214	206	196		^A	194	210	216	196	204	200	236	240	236	222
10	228	258	270	242	216	212	304	246	210	216	204	186 ^H	204	216	210	208	218	216	206	200	216	256	232	206
11	280	328	264	234	228	198	278	234	224	218	214	216	204	206	212	212	226	214	204	208	230	228	232	224
12	264 ^E	334 ^A	258	242	214	196	280	238	230	222	216	228	210	194	210	196	222	214	196	186	200	224	250	226
13	254	300	292	248	222	196	298	250	220	228	228	216	210	210	212	244	220	200	184	220	212	222	222	222
14	272	296	274	264	240	204	200	230	206	226	220	210	200	198	186	238	234	210	200	222	204	200	240	214
15	280	328	302	288	268	202	284 ^A	248	222	234	228	218	212	216	216	200	224	230	210	204	226	238	226	226
16	232	228	290	238	198		^B 368	268	230	232	216	208	190	180 ^H	242	228	220	220	234 ^A	182	200	242	206	206
17	268	310	290	282	260	230	224	230	202	218	216	198	170 ^H	176 ^H	198	228	206	206	188	190	196	230	224	216
18	260	298	260	234	206	216	242	208	218	218	212	212		226	^A	^A	^A	214	190	222	206	202	220	206
19	256	308	286	276	236	224	224	232	218	192	212	188	232	222	204	206	234	206	202	240 ^A	204	212	208	206
20	230	290	286	304	246	226	216	252	212	220	218	214	204	204	218	242	^A	248	202	208	220	210	268	294
21	302	246	186	244	362	258	226	268	224	232	234	224	254 ^E	260 ^A	222	210	232	240	226	204	218	254	240	220
22	222	266	306	276	230	216	344 ^E	248 ^B	216	224	216	204	200	258	238	210	228	220	208	202	182	210	220	280 ^Q
23	210 ^Q	312	286	272	240	262	326	272	184	186	224	208	208	194 ^H	224	212	230	220	202	178	198	240	196	238
24	238	318	298	232	190	284	286	252	232	232	220	250 ^E	220 ^A	^A	250	222	230	216	210	202	234	210	210	302
25	364 ^Q	286 ^Q	226 ^Q	204	^B	^B	334	272	228	204	220	214	206	206	194	220	206	224	196	190	234	206	218	264
26	304	320	258	226	204	234	250	258	232	216	204 ^H	222	214	202	226	196	184	246	196	178	208	192	234	302
27	326	322	286	216	192	270	276	240	220	232	220	208	194	196	220	218	206	220	202	186	206	208	212	240
28	304	326	296	234	204	218	^E 258 ^B	242	192	230	206	216	214	210	200	200	210	218	200	186	212	214	^A 276 ^E	
29	248	302	298	286	240	266	254	224	174	220	222	198	206	202	204	208	224	218	196	186	204	208	204	256
30	304	302	300	268	238	246	^E 288 ^A	240	216	232	210	190	178	194	224	194 ^H	222	210	192	190	204	196	220	216
31	248	308	314	270	214	204	246	216	210	230	214	186	208	192	198	188	214	228	212	194	192	228 ^A	210	210
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	30	28	30	31	31	31	31	31	29	29	30	30	28	31	31	31	31	31	30	31
MED	268	302	286	254	228	221	262	240	218	220	216	211	207	204	210	209	219	218	202	198	212	214	223	226
U Q	304	320	298	276	240	252	298	252	224	230	222	218	214	216	222	222	226	228	210	206	226	230	234	264
L Q	238	286	262	234	206	207	242	226	210	216	212	200	202	194	198	200	214	214	196	190	204	208	210	216

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NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

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DEC.2015 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT.26°41.0'N LON.128°09.0'E SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1								A	114	106	106	106	106		A	A	A	A	A						
2								A	110	106	106	114	106		A	A	A	A	A						
3								B	110	110		A	A		110	110	110		A	A	A				
4								160	142	118	110	106	108		A	112	110	112	116						
5								148	114	110	110	106	106	106	106	108	110		A	A					
6								144	136	108	108	134	122	112	110		A	A	A	A					
7								B	126		120	116		A	A	A	116	116	138						
8								B	134	134	124	112	112		A	A	A	A	A	A					
9								B	110	104	106	106		A	A	A		112	112						
10								B	110	106	110	106	106		A	A	A	A	A	A					
11								B	112	110	110	106	108	106	110	110	108		A	A					
12								B	110	110	110		A	A	A		A		116	116					
13								B	108	108	108	108	108	108	112	112	112	124							
14								B	106	106	108	108		A	A	A	112		A	A	A				
15								144	110		106	106		A	A	A	A	A	A	A					
16								158	112	110	110		112		A	A	A	A	A	A					
17								188	110	110		A	A	A	A	A	108		A	B					
18								B	110	110	110	106		A	A	A	A	A	A	A					
19								B	108	110	110	110	108	110	110	110	114	114							
20								B	110	110	106		A	A	A		A	A	A	A					
21								A	120		A	B	108	108	106	108		110		A	A				
22								B	110	108	108	106	104		A	A	A	A	A	A					
23								B	112	110		108	112		A	A			A	A					
24								B	112	112	112		112		A	A	108	110		A	A				
25								B	110	108	108		A	A	A	A		108	108						
26								B	116	110	110	110	110	110		A	A		110	112					
27								B	112	108	106	106		A	A	A		116	120		A	A			
28								B	A	110	108	114	114		A	A	114	118		A	A				
29								B	106	106	106		112	108	108		A	A	A	A					
30								B	112	110	108	110	114		A	A	A	A	A	A					
31								B	128	108	108		A	A	A	A	A	A	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								6	30	28	27	22	19	9	13	11	17	10							
MED								153	111	110	108	108	108	108	110	110	112	116							
U Q								160	114	110	110	110	112	110	112	112	115	120							
L Q								144	110	108	106	106	106	106	108	108	110	112							

DEC.2015 h'E (KM)

IONOSPHERIC DATA STATION Okinawa

DEC.2015 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT.26°41.0'N LON.128°09.0'E KSWEPT 1.0MHz TO 30.0MHz 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	B	102	98	98	98	96	166	186	144	112	110	108	118	118	106	92	92	90	102	100	100	B
2		100	92	92	B	108	B	B	138	164	130	116	112	110	110	108	102	102	102	102	100	104	104	B	B
3		104	96	B	B	B	B	98	156	124	118	108	114	114	94	G	106	106	106	102	114	100	96	102	102
4		94	100	86	94	98	98	98	98	154	188	142	122	110	108	96	186	94	136	92	94	92	90	90	B
5		B	B	90	92	B	B	92	G	178	160	118	116	G	G	G	102	100	98	94	96	96	96	90	94
6		116	104	104	104	B	104	110	B	140	158	134	124	124	124	G	118	106	102	102	94	96	96	96	102
7		98	94	92	100	100	100	92	120	102	148	132	124	124	100	100	96	96	98	92	92	92	94	96	94
8		92	92	B	92	B	92	B	102	104	104	128	120	116	110	106	98	96	96	94	92	92	114	B	B
9		92	102	102	102	100	92	86	102	198	G	G	120	106	106	106	104	104	142	112	96	96	96	92	90
10		88	88	88	88	130	102	102	B	146	186	G	G	158	104	102	100	96	96	96	96	92	92	88	94
11		94	102	94	88	104	100	94	98	G	134	136	124	122	G	G	126	98	94	94	94	92	96	94	94
12		108	106	116	98	96	B	B	144	G	G	118	114	114	110	G	110	G	102	98	94	94	94	94	B
13		94	B	98	98	98	106	96	B	168	180	168	186	166	174	100	192	100	174	96	148	108	98	92	90
14		92	86	B	B	90	B	B	B	130	178	136	126	114	114	110	96	96	114	92	108	B	B	88	88
15		88	104	90	B	B	98	106	88	90	154	154	126	114	108	108	102	122	96	94	90	B	B	92	92
16		92	B	B	B	96	96	96	96	166	144	132	110	104	104	166	98	96	96	106	96	94	88	B	90
17		92	B	94	B	B	94	106	176	182	108	108	104	100	98	96	96	96	98	98	94	B	B	B	B
18		B	B	108	B	B	96	104	96	192	160	138	112	100	104	100	104	98	98	96	94	90	90	90	90
19		90	88	88	B	B	132	100	182	G	G	162	98	170	102	G	100	190	146	94	100	B	B	B	B
20		B	90	B	B	B	96	100	96	G	G	G	112	110	104	104	94	94	92	90	88	88	90	90	130
21		130	122	98	100	100	100	98	126	122	124	B	110	110	106	108	102	100	94	92	92	B	B	B	B
22		96	B	B	162	102	B	B	118	G	176	158	148	124	162	162	G	100	100	96	116	96	96	96	104
23		104	100	100	104	102	98	98	98	G	G	B	140	118	110	108	106	106	106	100	104	100	98	B	128
24		B	B	B	B	134	B	B	B	178	G	130	110	110	102	102	G	98	98	98	92	92	94	90	94
25		114	B	B	B	108	100	100	B	172	G	144	114	114	108	108	100	100	G	94	94	94	94	90	90
26		B	B	B	B	102	102	100	96	98	G	180	176	152	164	104	102	G	142	90	88	104	94	102	102
27		B	106	120	104	106	100	94	B	156	154	148	116	104	100	100	98	96	96	94	94	92	92	94	110
28		108	108	108	92	106	106	108	B	178	172	G	144	140	148	112	148	102	100	102	96	92	92	92	96
29		90	92	104	114	118	106	100	100	G	176	178	104	G	132	110	116	104	112	96	110	110	94	94	94
30		B	92	104	100	96	96	94	94	G	192	174	100	104	128	104	118	110	106	140	B	B	102	94	94
31		124	B	100	98	100	94	100	98	108	178	112	104	98	100	96	94	96	94	90	90	90	100	106	96
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT		23	20	21	19	22	22	25	22	24	23	25	30	29	29	25	29	29	30	31	30	26	28	24	23
MED		94	98	98	100	101	99	98	99	160	160	136	115	114	108	106	102	100	99	96	94	94	94	93	94
U Q		108	104	104	104	106	102	101	118	177	180	156	124	124	119	109	117	105	106	100	100	100	97	96	102
L Q		92	92	91	92	98	96	94	96	123	144	123	110	108	103	100	98	96	96	92	92	92	92	90	90

DEC.2015 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

DEC.2015 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

LAT.26°41.0'N LON.128°09.0'E {SWEEP 1.0MHZ TO 30.0MHZ 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				F2	F3	F4	F5	L3	H2	H1	H1	C1	C1	C2	C1	C1	C2	L2	L3	FQ11	FF11	F3	F1		
2		F1	F1	F1	F1			H1	H1	H1	C1	C1	C1	C1	C1	L1	L3	L2	L4	F3	F1	F2			
3		F1	F1				F1	H1	C1	C1	C2	C1	C1	L1		L1	L2	L3	LQ31	FF11	F9	F1	F3	F1	
4		F2	F1	F1	F1	F1	F1	L1	HL21	HL21	HL11	CL11	CL11	CL11	CL11	H1	L1	H1	L2	F2	F1	F1	F1		
5				F2	F2		F1	H1	H1	C1	C1					L1	L1	LC11	L2	F3	FQ21	FQ11	F1	F1	
6		FF12	F2	FF12	F1	F1	FF12	C1	HC11	H11	H11	C11	CL11	CL11	CL11	C1	C1	L1	L3	F4	F1	F4	FQ31	F4	
7		F5	F4	FQ21	FQ51	F3	F1	F1	CL11	LH21	HL12	HL11	CL21	CL11	LC21	L4	L1	L2	L2	L3	F1	F1	F1	F1	FQ31
8		FQ11	F1		F1		F1	L1	L1	L1	CL11	CL11	CL11	CL11	CL11	L1	L1	L3	L1	L1	F3	F2	F1		
9		F3	FQ31	FQ21	F1	F1	F1	F1	L1	HL11			C1	C2	C3	C2	L1	L1	H1	CL15	FQ31	FQ11	FQ11	F2	F1
10		F1	F1	F1	F1	F2	F1		H1	H1			H1	L1	L1	L3	L1	L3	L3	LQ41	FQ61	FQ31	FQ21	FQ21	F1
11		F1	F1	F1	F1	F1	FQ11	L1		H1	H1	C1	CL11	CL11			C1	L1	L2	L2	LQ21	FQ31	FQ11	FQ11	F1
12		F2	FQ31	FQ11	FQ11	F1			HL11			C1	C1	C1	C1		C1	L1	L1	L1	F1	F1	F1	F1	
13		F1		F1	F1	F1	F1		H1	H1	H1	HL11	HL11	HL11	L1	HL11	L1	HL11	L1	FF22	FF63	FF5	FF4	FF2	
14		F1	F2		F1			H1	HCL11	H1	C1	C1	CL11	CL11	CL12	LH21	L2	L13	L3	FF34	F2	F2	F1	F1	
15		F1	FQ11	F1		F1	F3	L1	LHC11	H11	H1	C1	C1	C1	C1	L1	CL22	L4	L3	F1			F1	F1	
16		F1			F1	F1	F2	L1	H1	H1	H1	CQ11	L1	L1	HL11	L2	L2	L4	L9	F1	F1	F1		F1	
17		F1		F1			F1	L1	H1	H1	C1	C1	C1	L2	L2	LH21	L21	L11	LQHL11	F1					
18				F1		F1	F1	L1	H1	H1	H1	C1	L3	L2	L3	LQ31	LQ41	L3	LQ41	LQ41	FQ61	FQ31	F3	F1	
19		F2	F1	F1			FF11	L1	HC11		HL11	L1	H1	L1		L1	HL11	HL11	L2	FF42		F1			
20			F1			F1	F1	L1				C1	C1	L1	L1	L2	LQ21	L3	L7	F4	F3	F3	F1	F1	
21		F2	F1	FF11	FQ11	FQ11	F1	CL43	CL11	CL12		C2	C2	C2	C1	L2	L1	L3	L5	F2					
22		F1		F1	FF11			C1		H1	H1	H1	C1	HL11	H1		L1	L1	L1	FF11	F1	F1	F1	FQ21	
23		FQ11	F1	F2	F2	FQ31	FQ21	FQ11	L1			H1	CL11	CL11	CL11	C1	C2	CQ31	L5	F3	F3	F1		FF21	
24					F1				H1		H1	C1	C1	L3	L3		L1	L3	L2	FQ31	FQ21	F1	FF31	F1	
25		F1			F1	F1	F1	L1	HC11		H1	CH11	C1	C1	C1	L1	L1		L1	FQ31	F1	F1	F1	F1	
26					F1	F1	F2	L2	L1		H1	H1	H1	H1	L2	L2		HL21	L1	F1	F1	FF11	F2	F1	
27			F1	F2	F1	F2	F1		H1	H1	H1	C1	L2	L2	L3	L2	LH21	LH21	LQ31	FF11	F3	F1	F1	F1	
28		F1	F1	F1	F1	F1	F1		HL11	H1		HL11	H1	HC11	C1	HL11	L1	LQ21	LQ11	LQ31	FQ41	FQ41	FQ31	FQ31	
29		F1	F1	FQ21	FQ11	FQ11	FQ21	L1		H1	H1	LC11		H1	C1	C1	LQ31	C2	L2	F1	F1	F1	F1	F1	
30			F1	FQ21	FQ11	FQ31	FQ41	LQ11		H1	H1	L1	L1	CL11	LC21	CL11	CQ11	C2	H1			F1	F2	F1	
31		FF11		FQ21	FQ31	FQ11	F1	L1	L1	HC11	C1	L2	L3	L3	L2	LQ21	LQ21	LQ31	LQ41	FQ51	F3	FQ31	FQ21	F1	
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																									
MED																									
U Q																									
L Q																									

f - PLOTS OF IONOSPHERIC DATA

KEY OF f - PLOT	
	SPREAD
◊	f _o F ₂ , f _o F ₁ , f _o E
×	f _x F ₂
*	DOUBTFUL f _o F ₂ , f _o F ₁ , f _o E
⊗	f _b E _s
└	ESTIMATED f _o F ₁
†, ‡	f _{min}
^	GREATER THAN
∨	LESS THAN

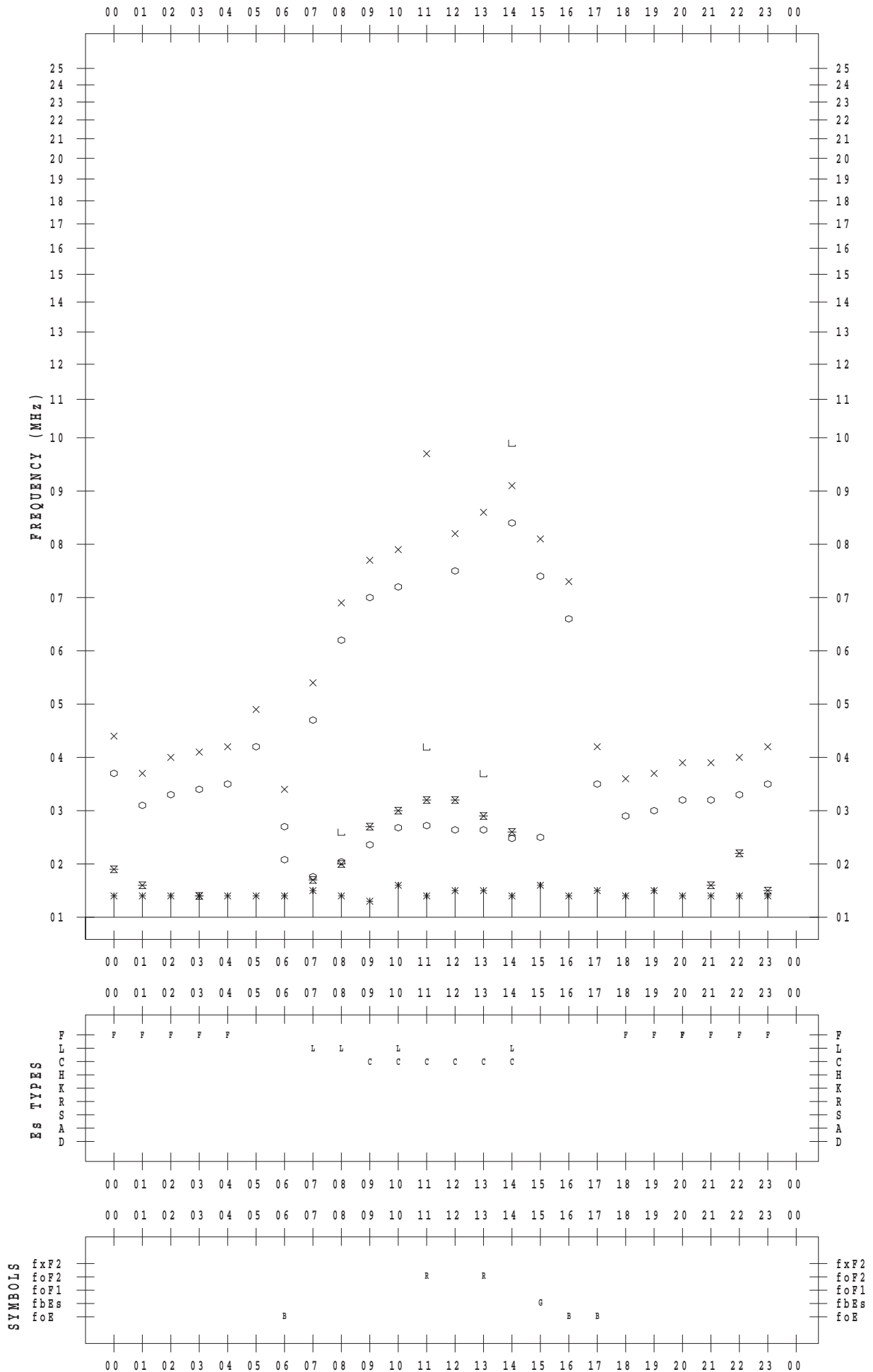
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/ 1

135 ° E MEAN TIME



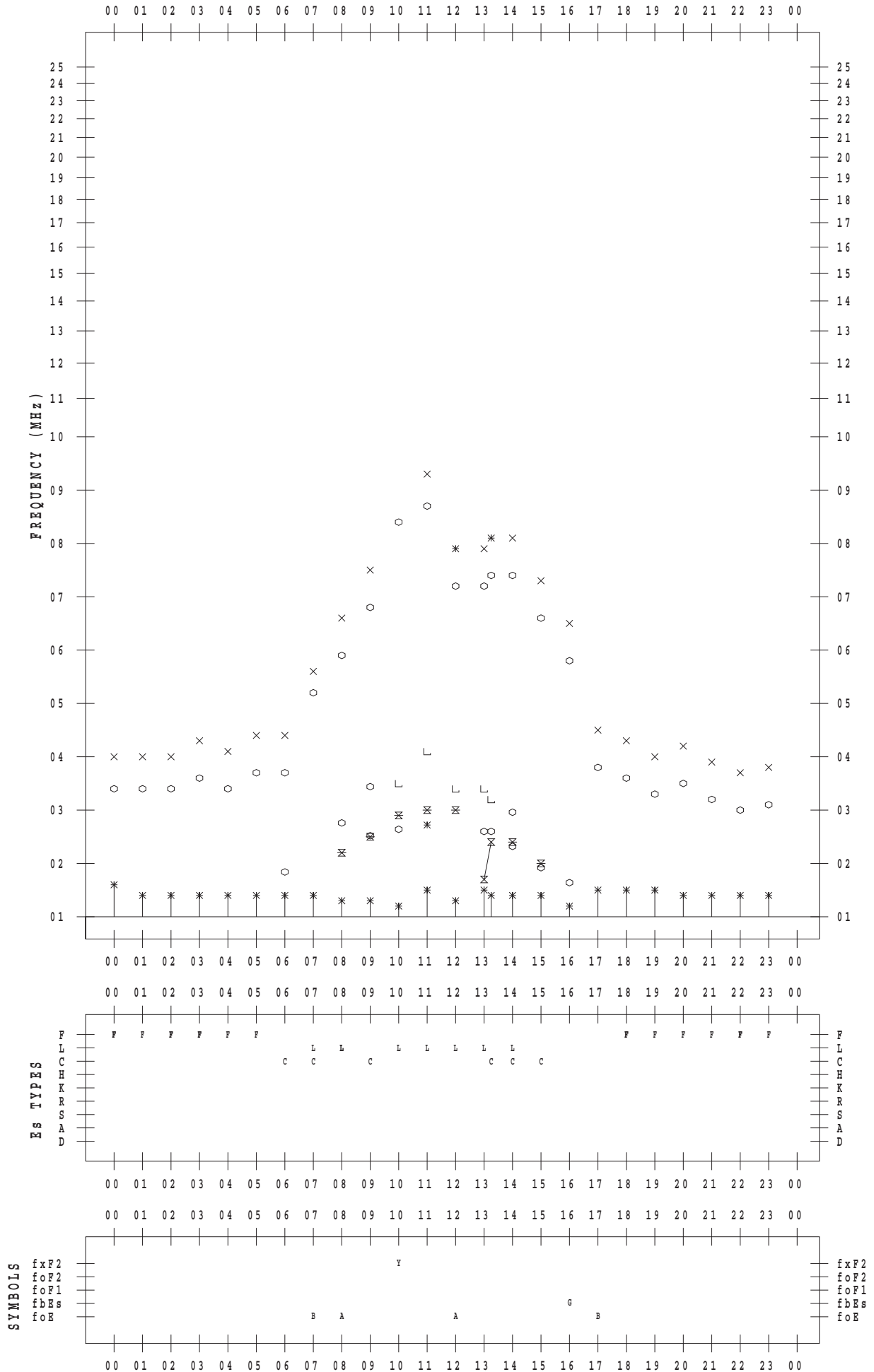
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/ 2

135 ° E MEAN TIME



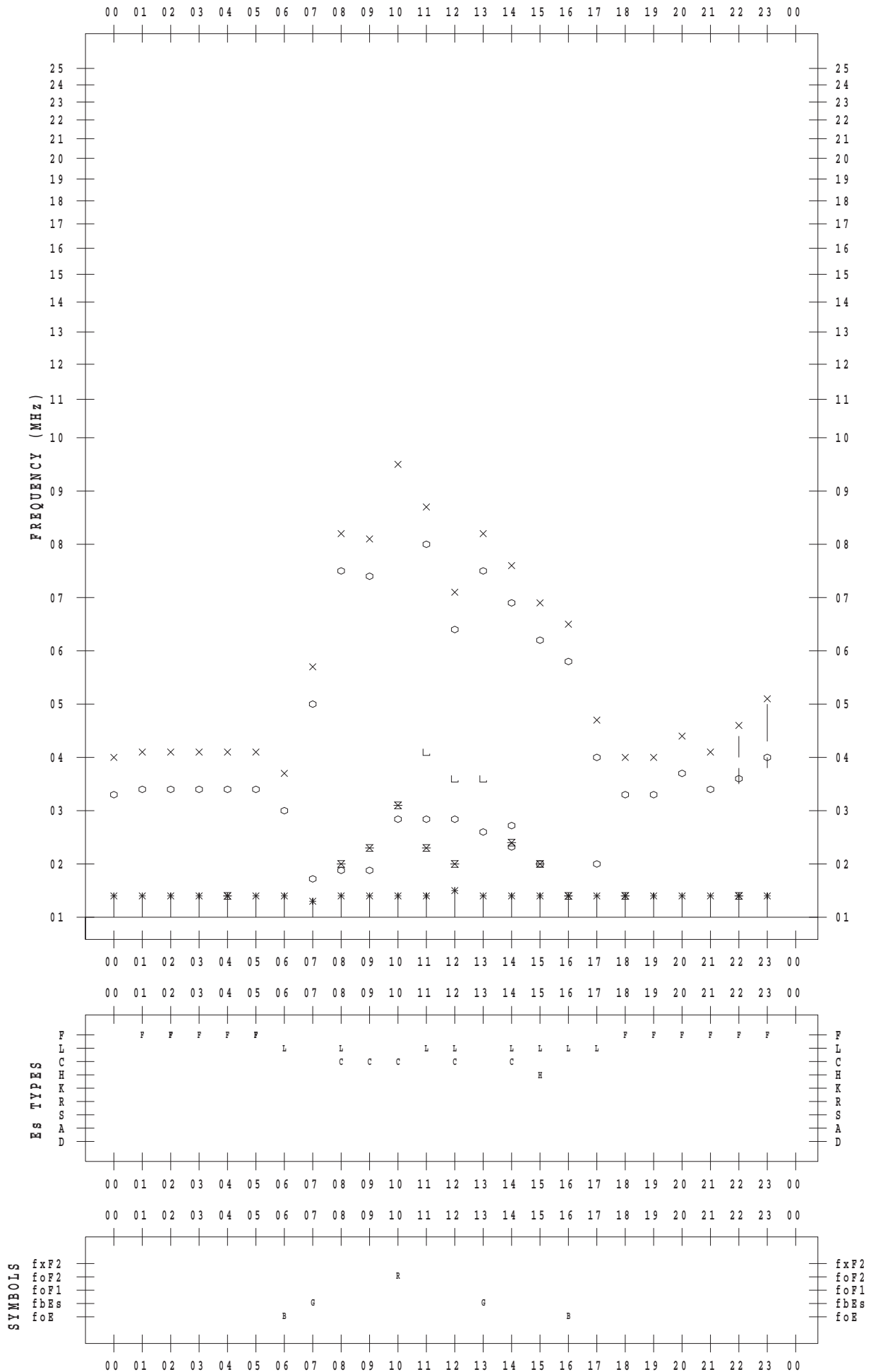
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/ 3

135 ° E MEAN TIME



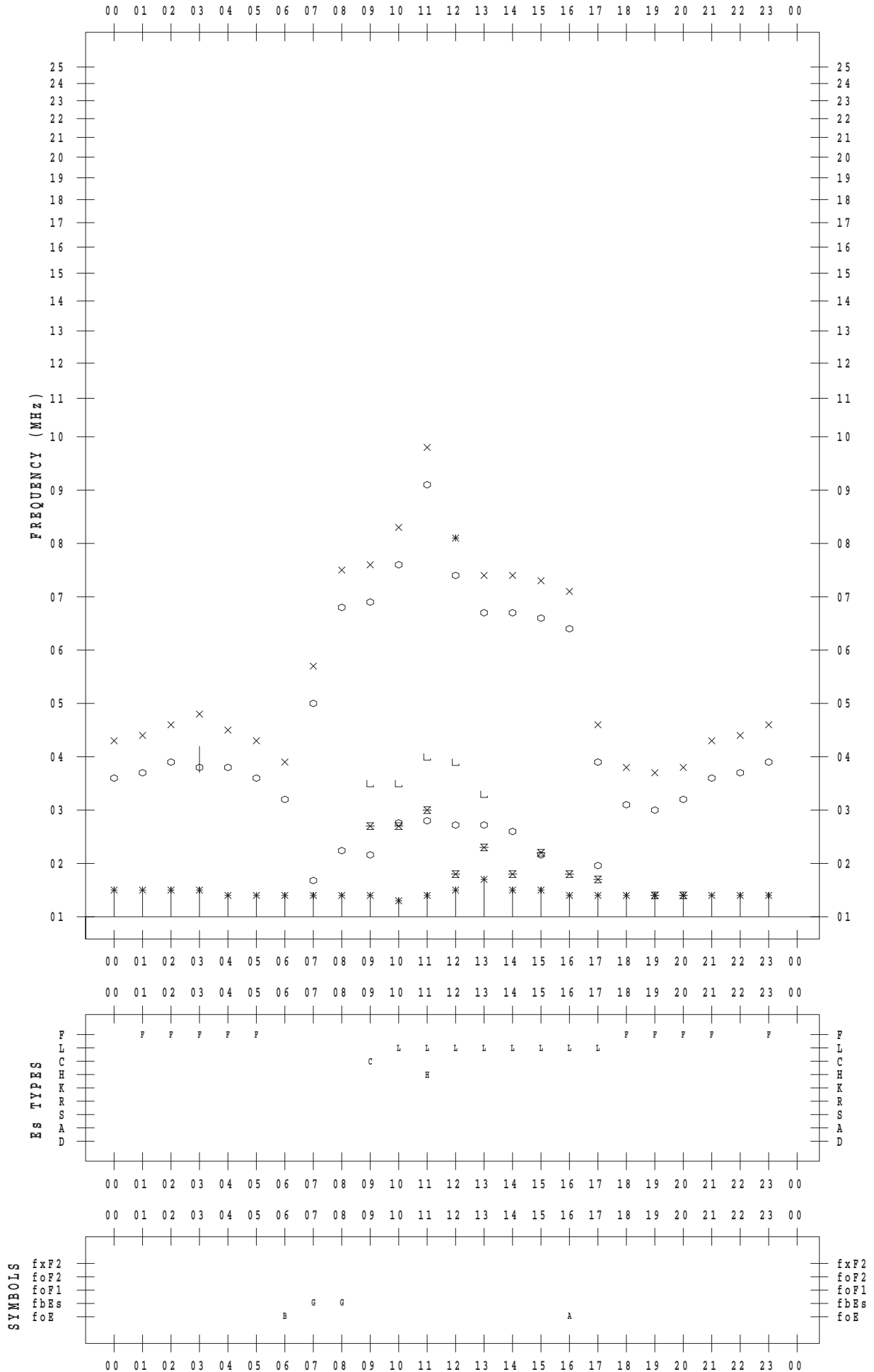
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/ 4

135 ° E MEAN TIME



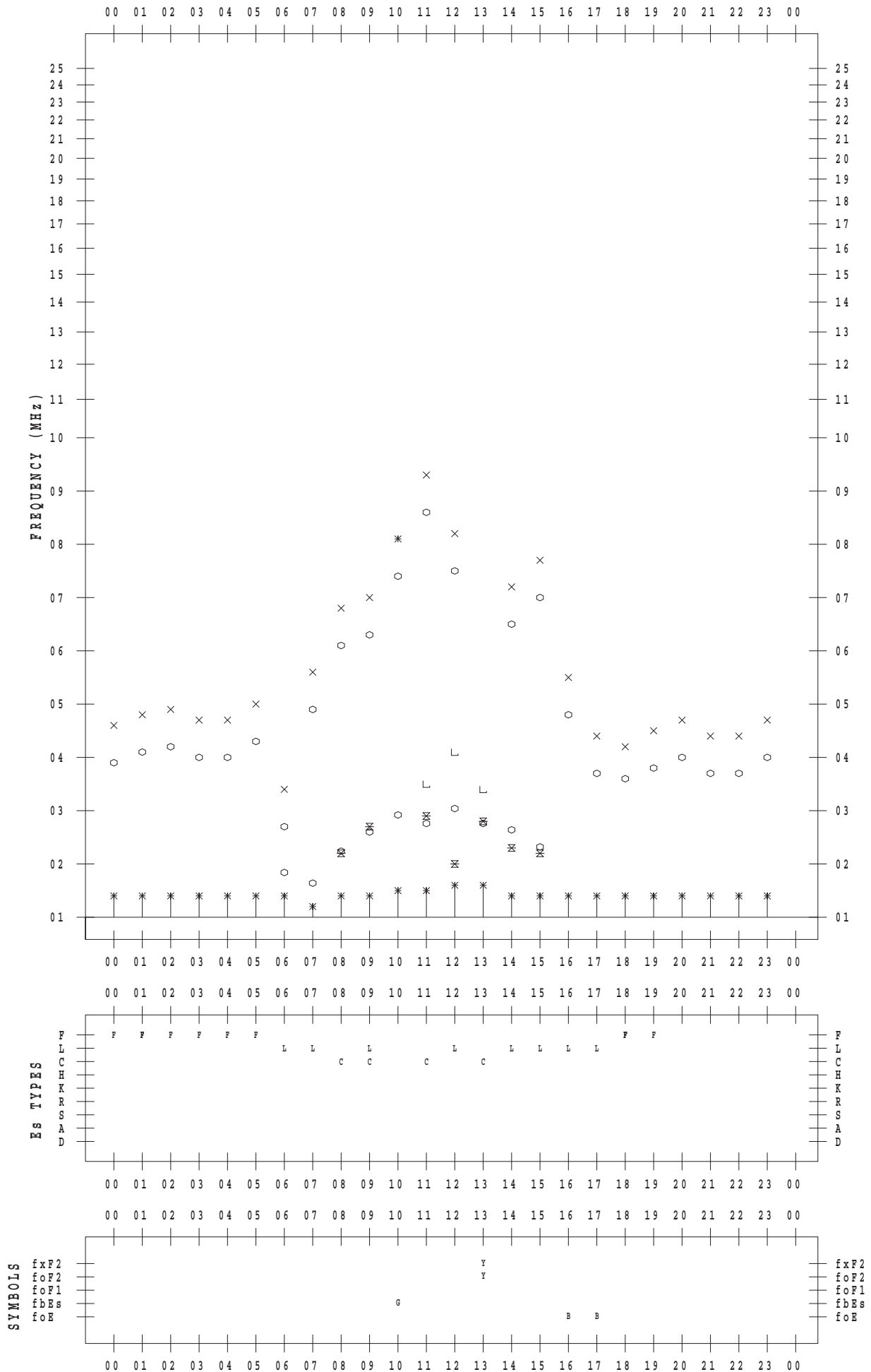
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/ 5

135 ° E MEAN TIME



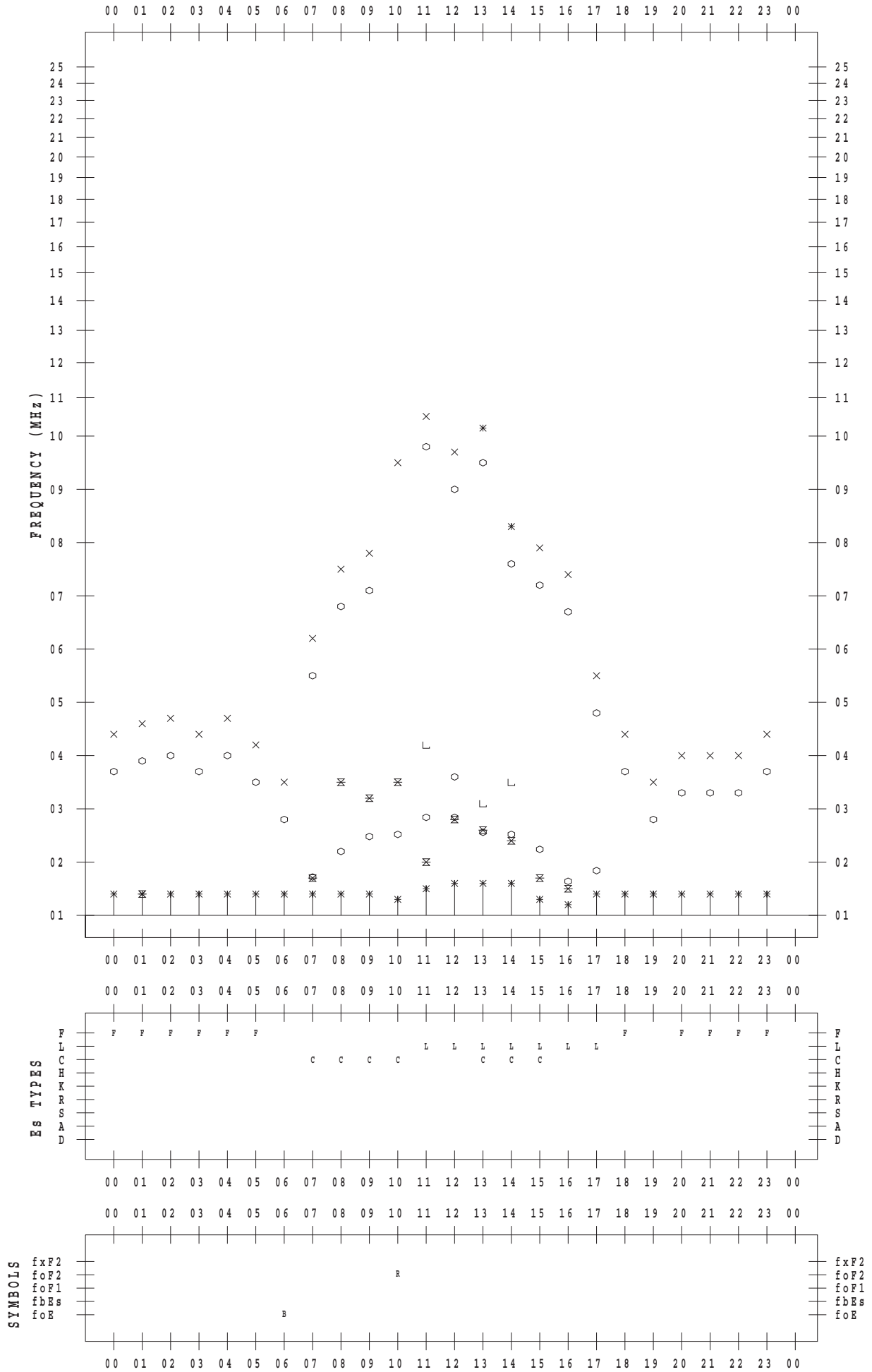
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/ 6

135 ° E MEAN TIME



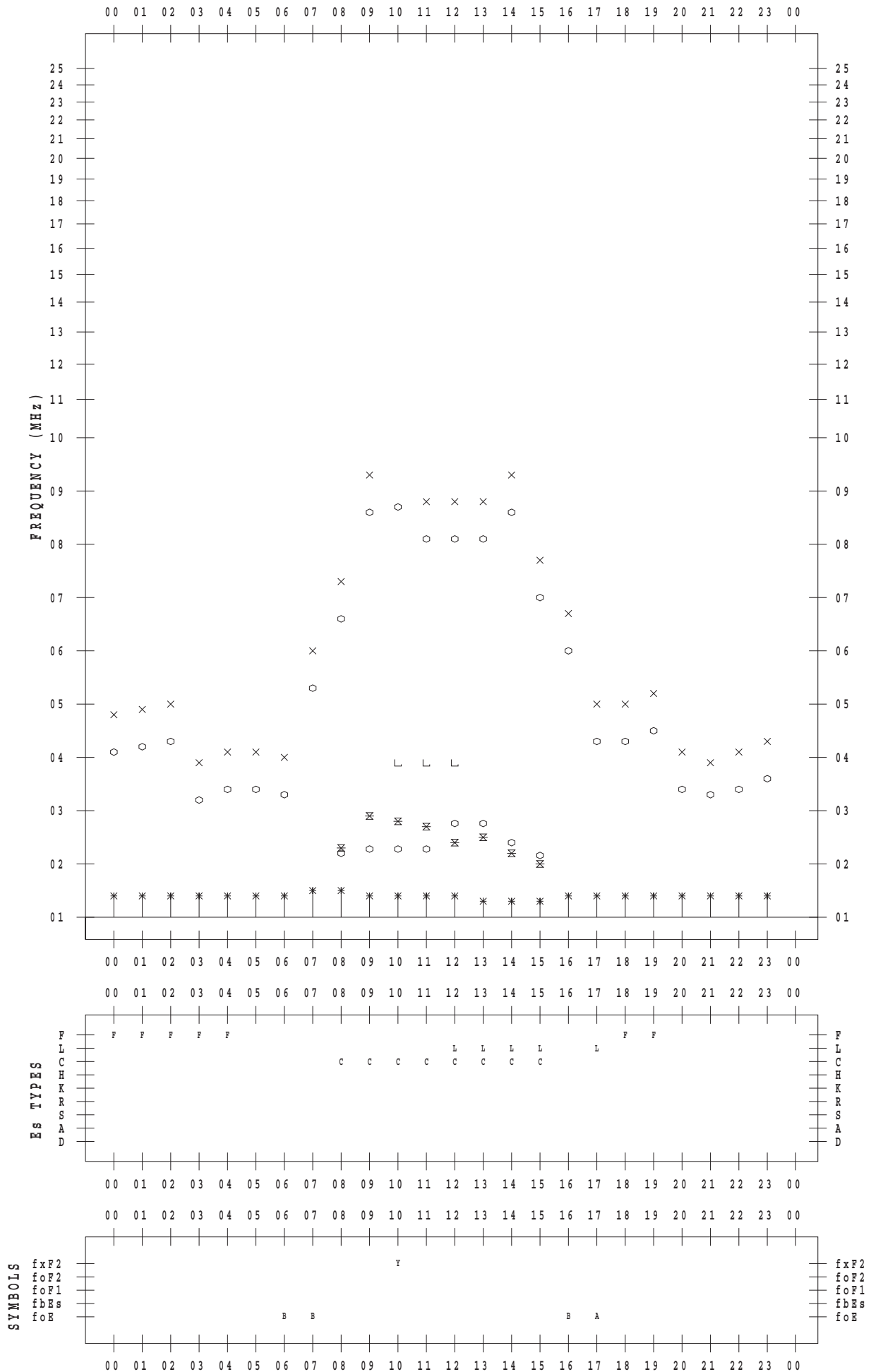
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/7

135 ° E MEAN TIME



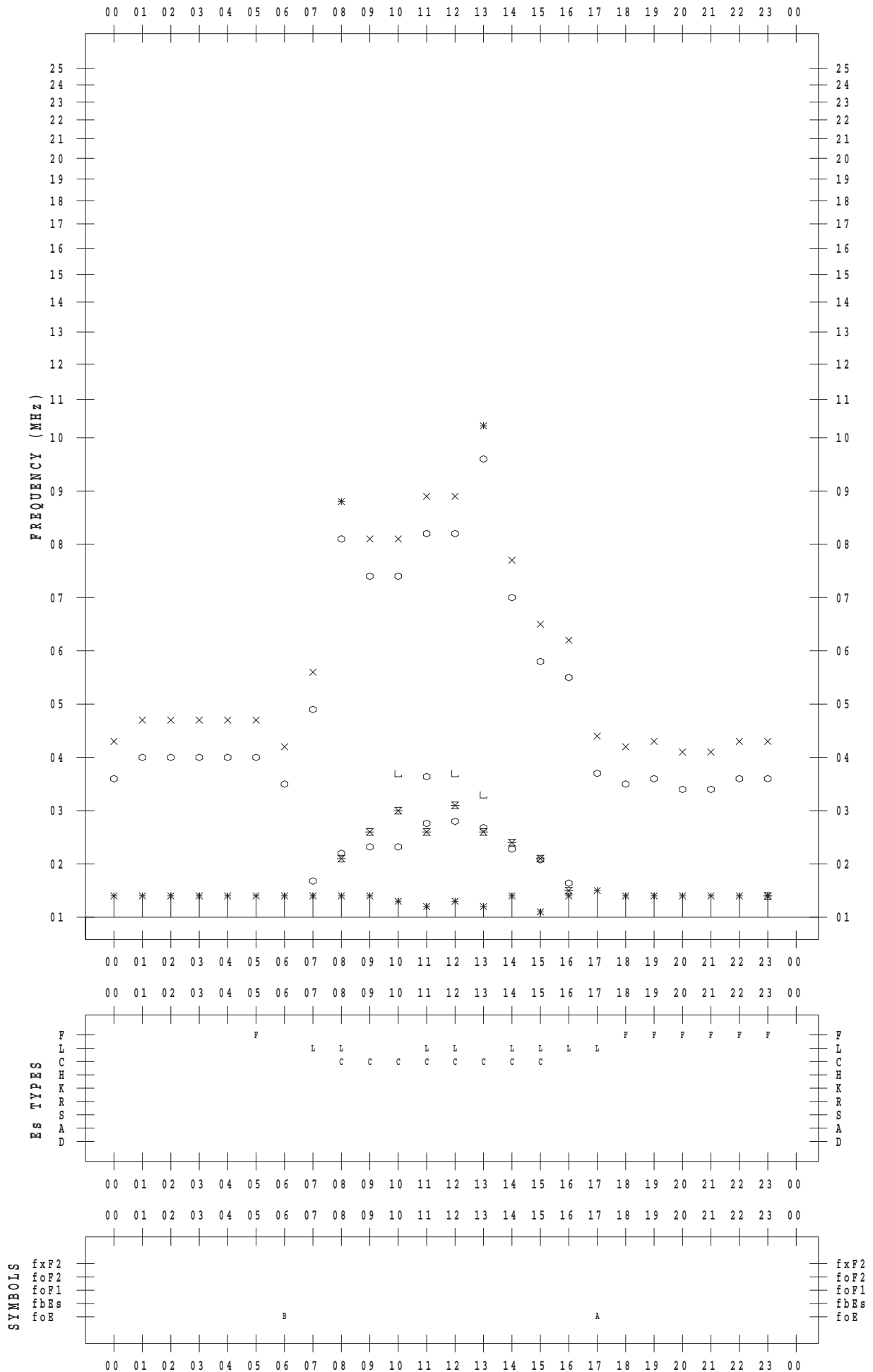
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/ 8

135 ° E MEAN TIME



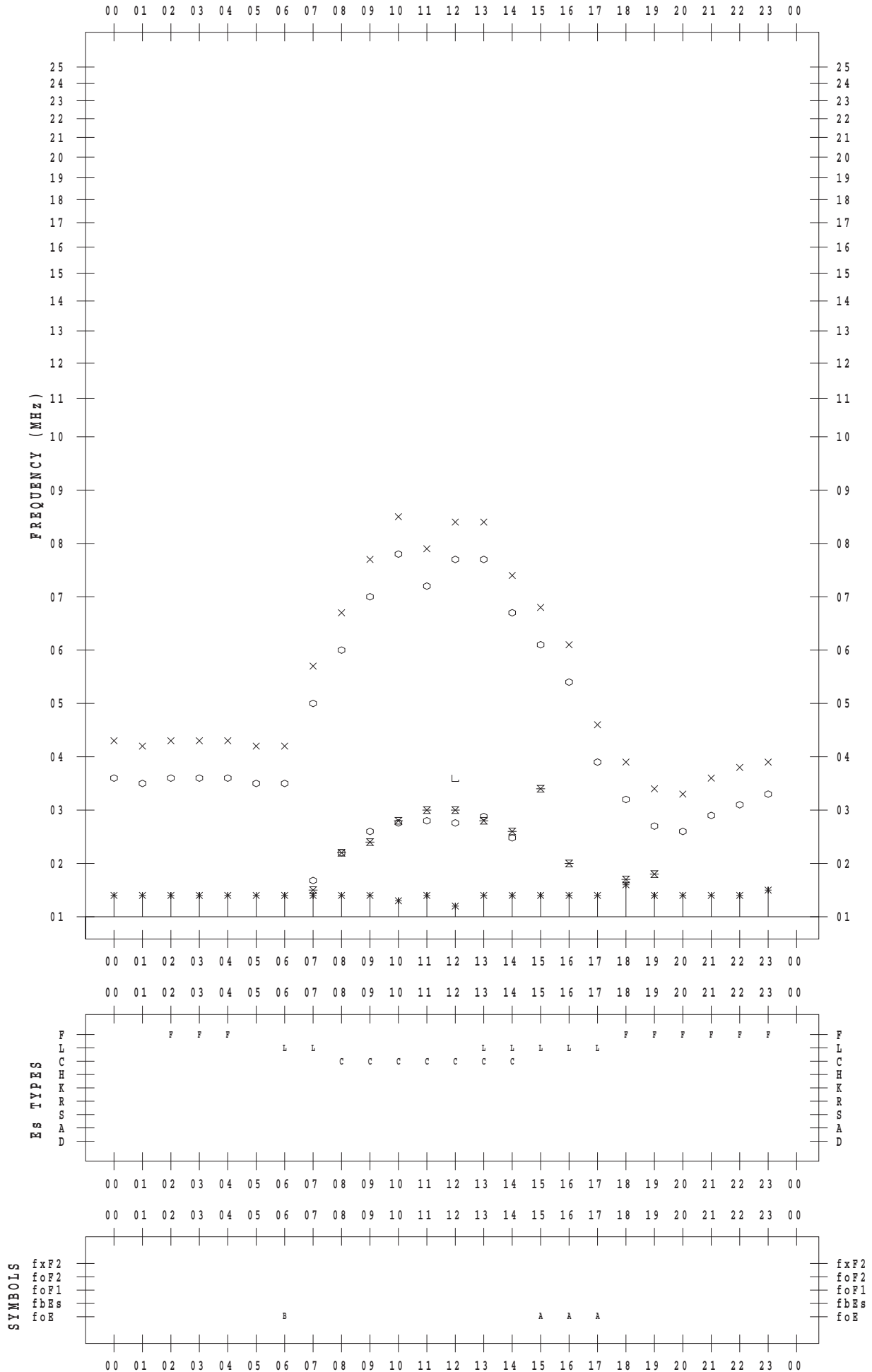
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/ 9

135 ° E MEAN TIME



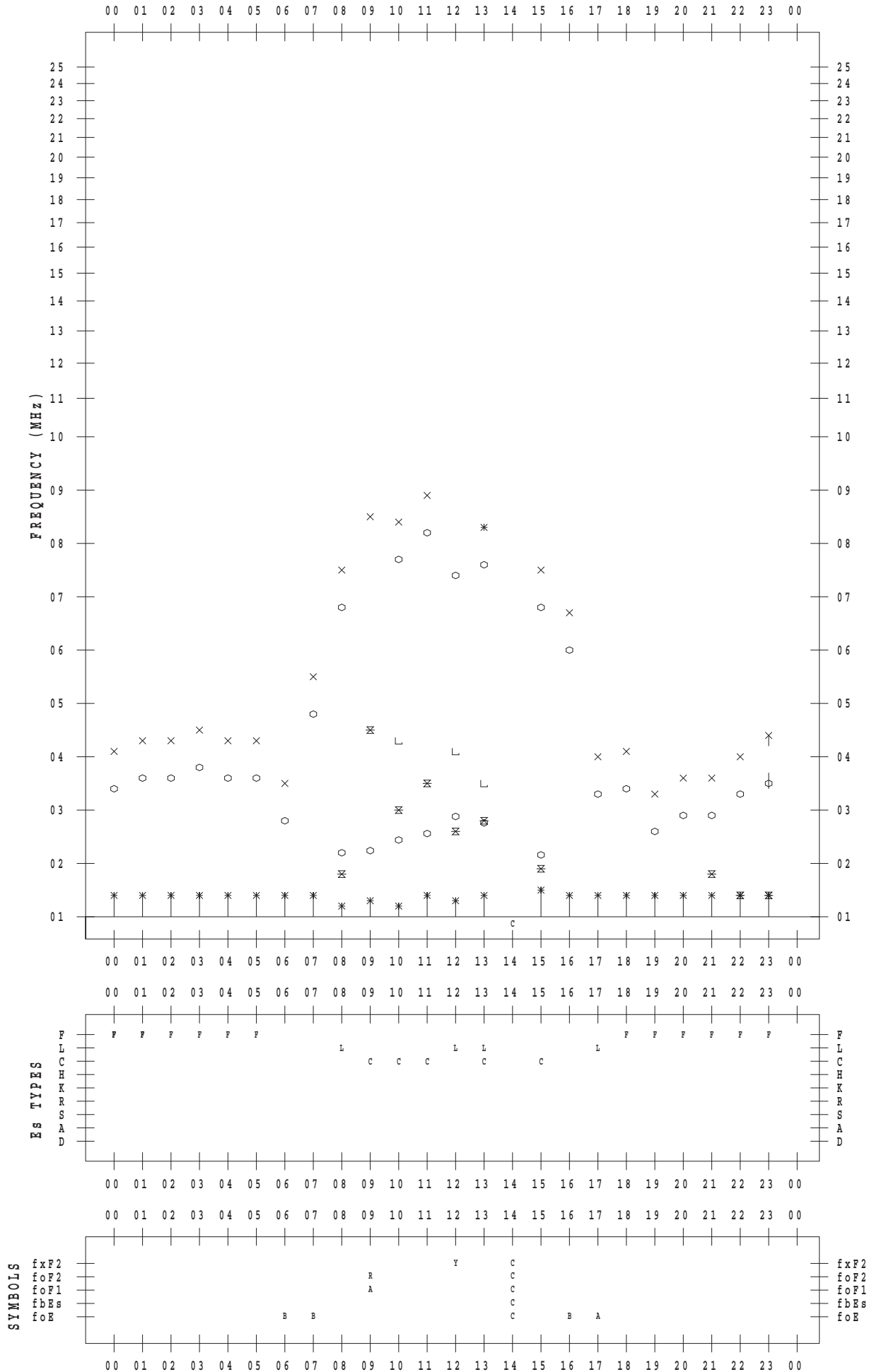
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/10

135 ° E MEAN TIME



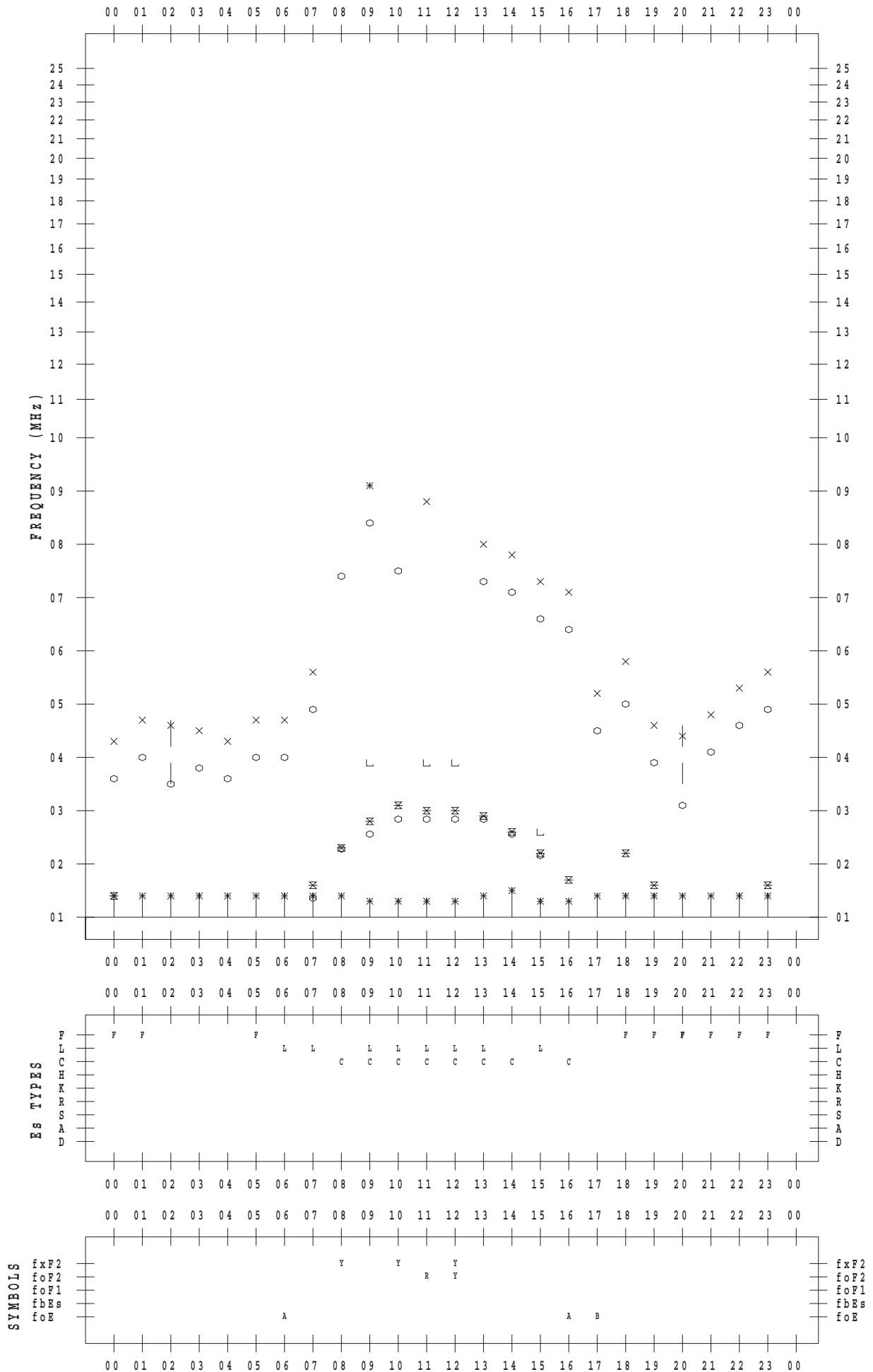
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/11

135 ° E MEAN TIME



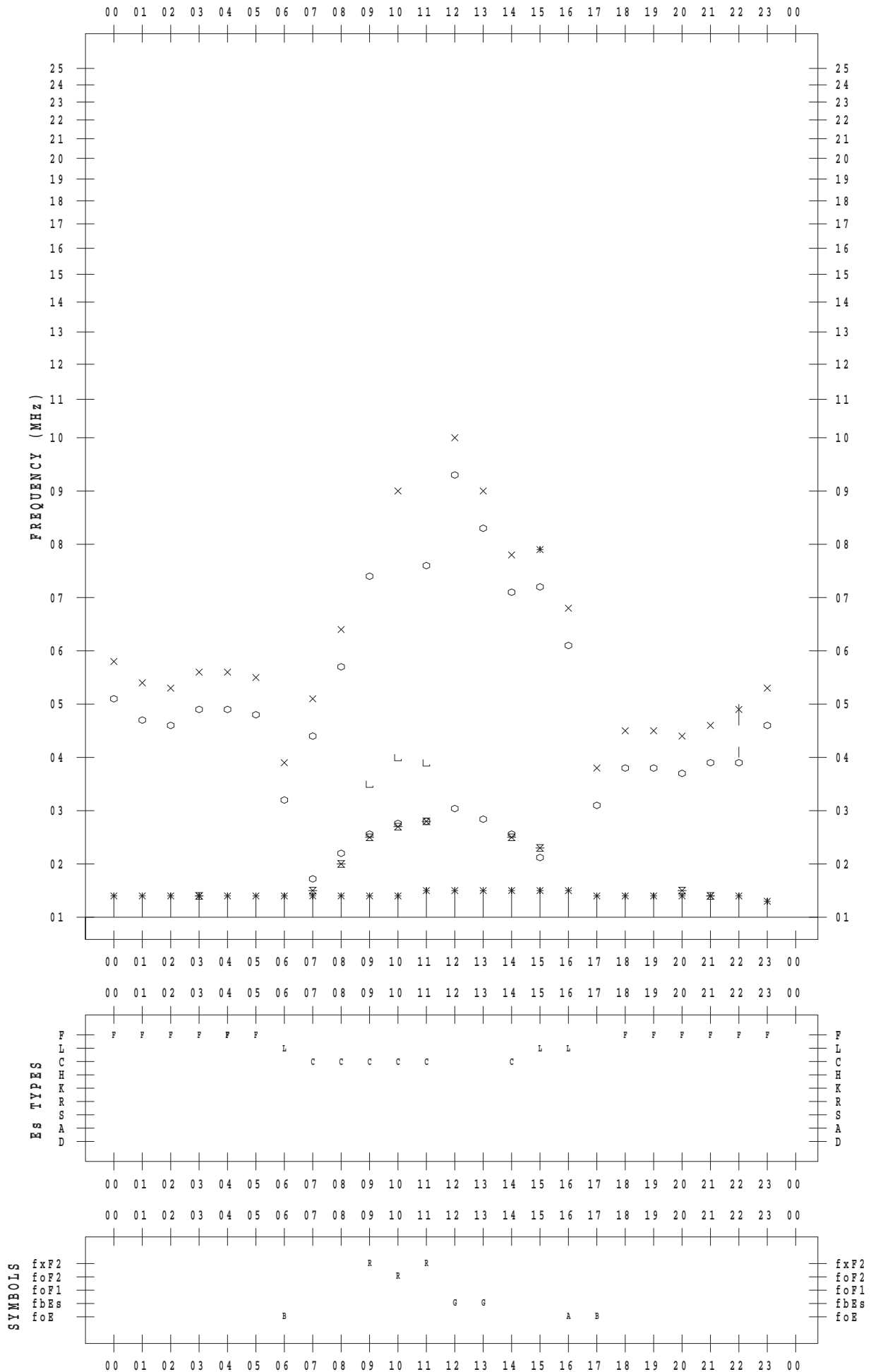
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/12

135 ° E MEAN TIME



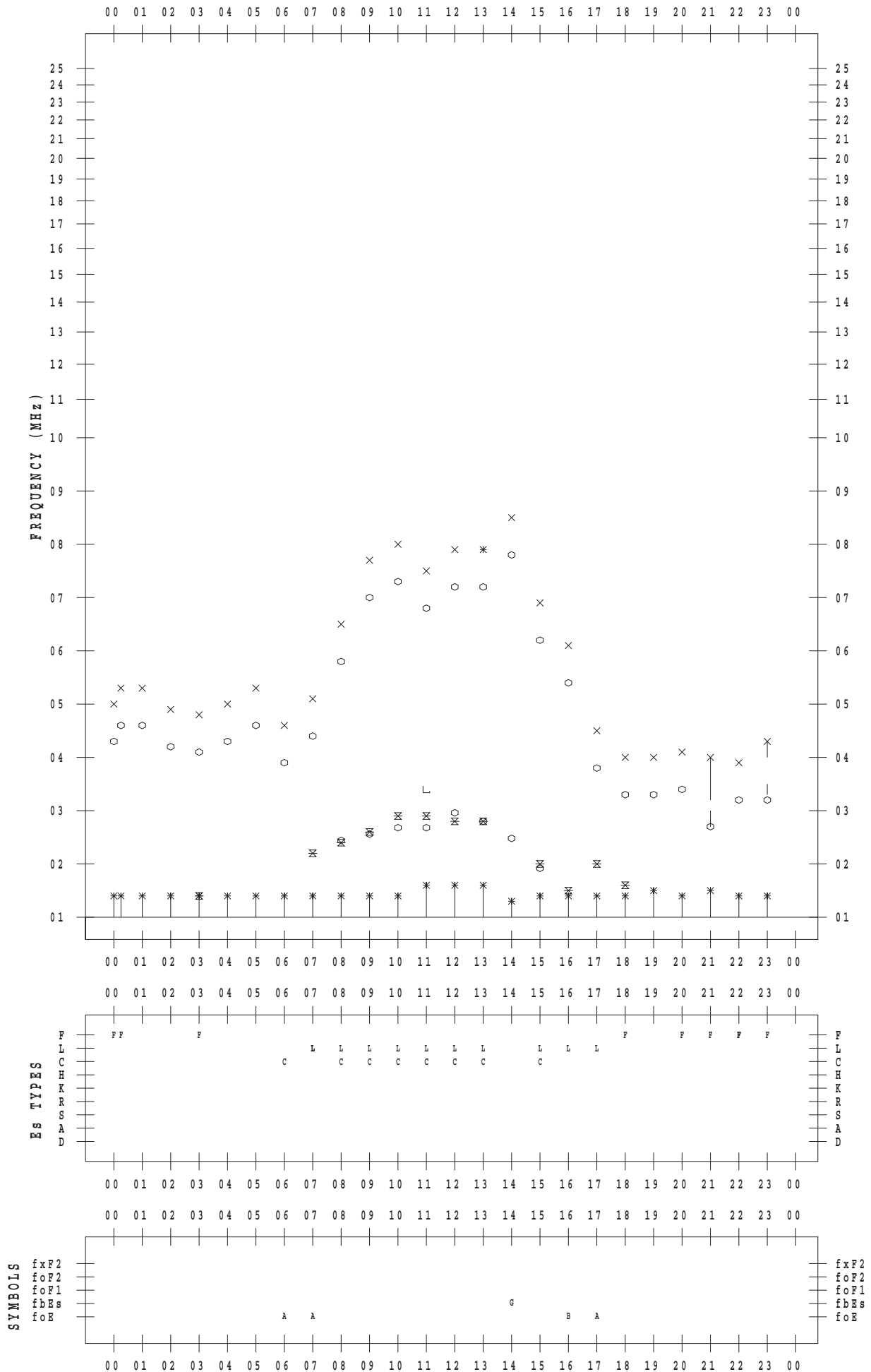
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/13

135 ° E MEAN TIME



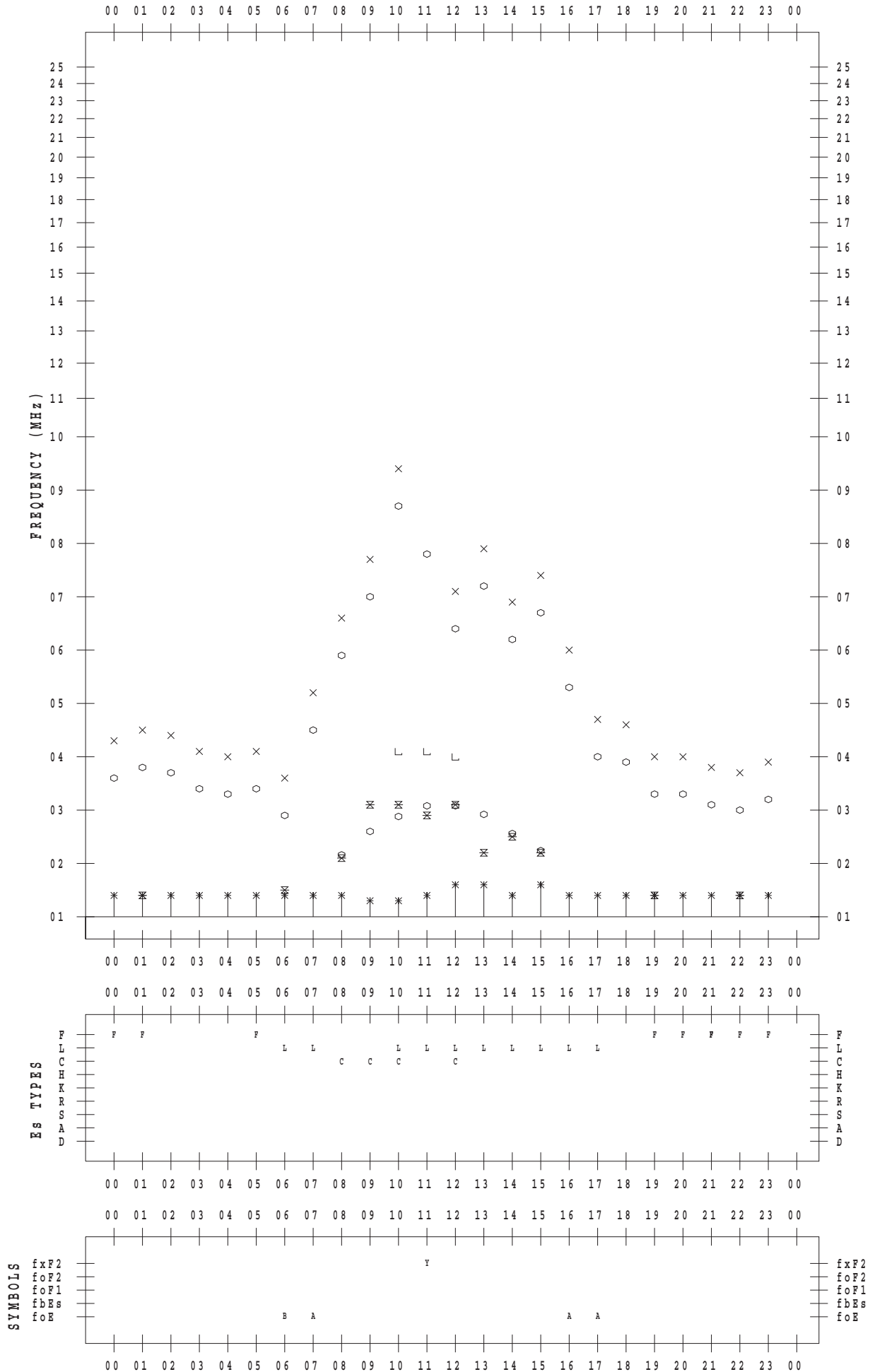
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/14

135 ° E MEAN TIME



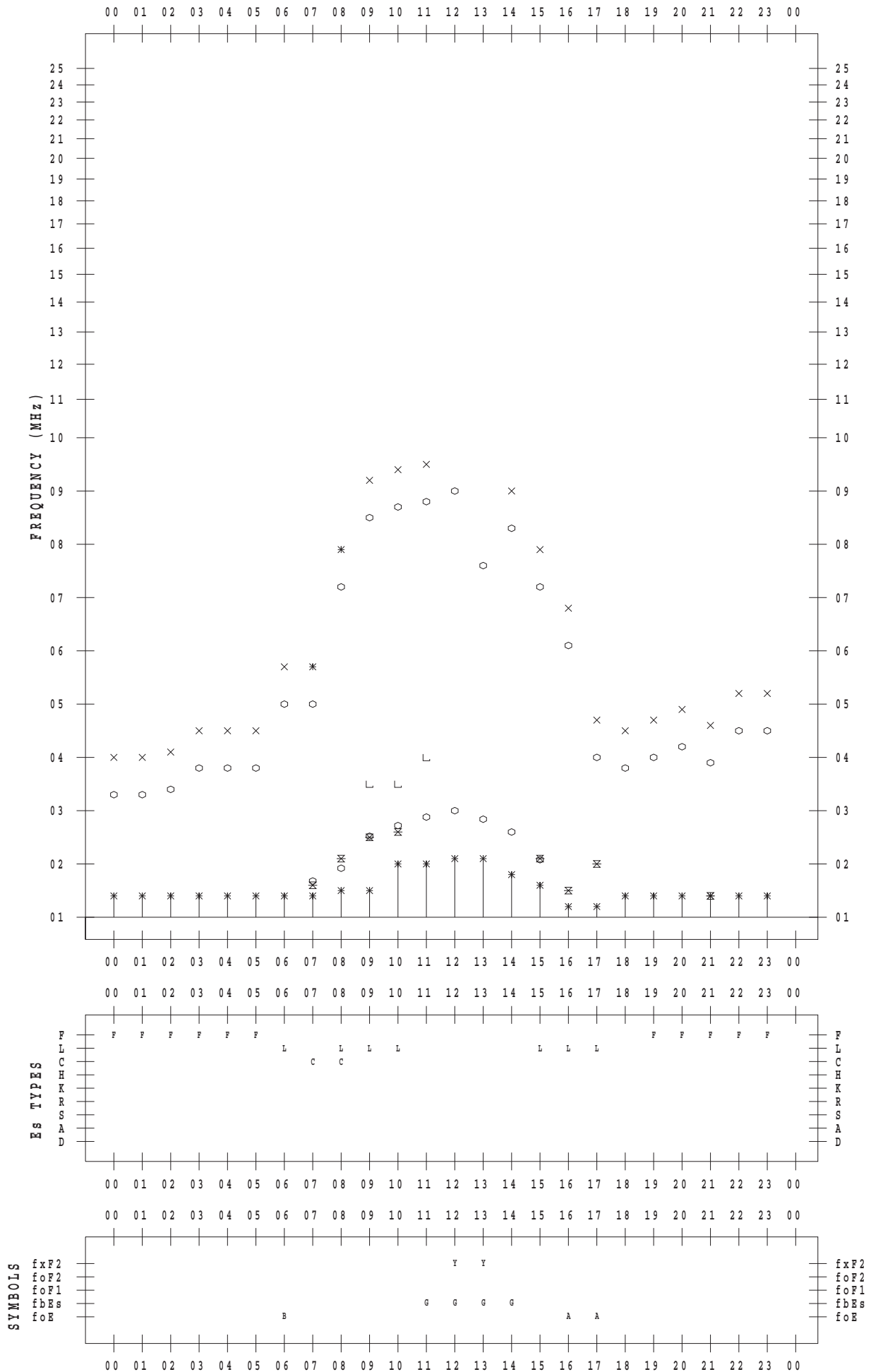
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/15

135 ° E MEAN TIME



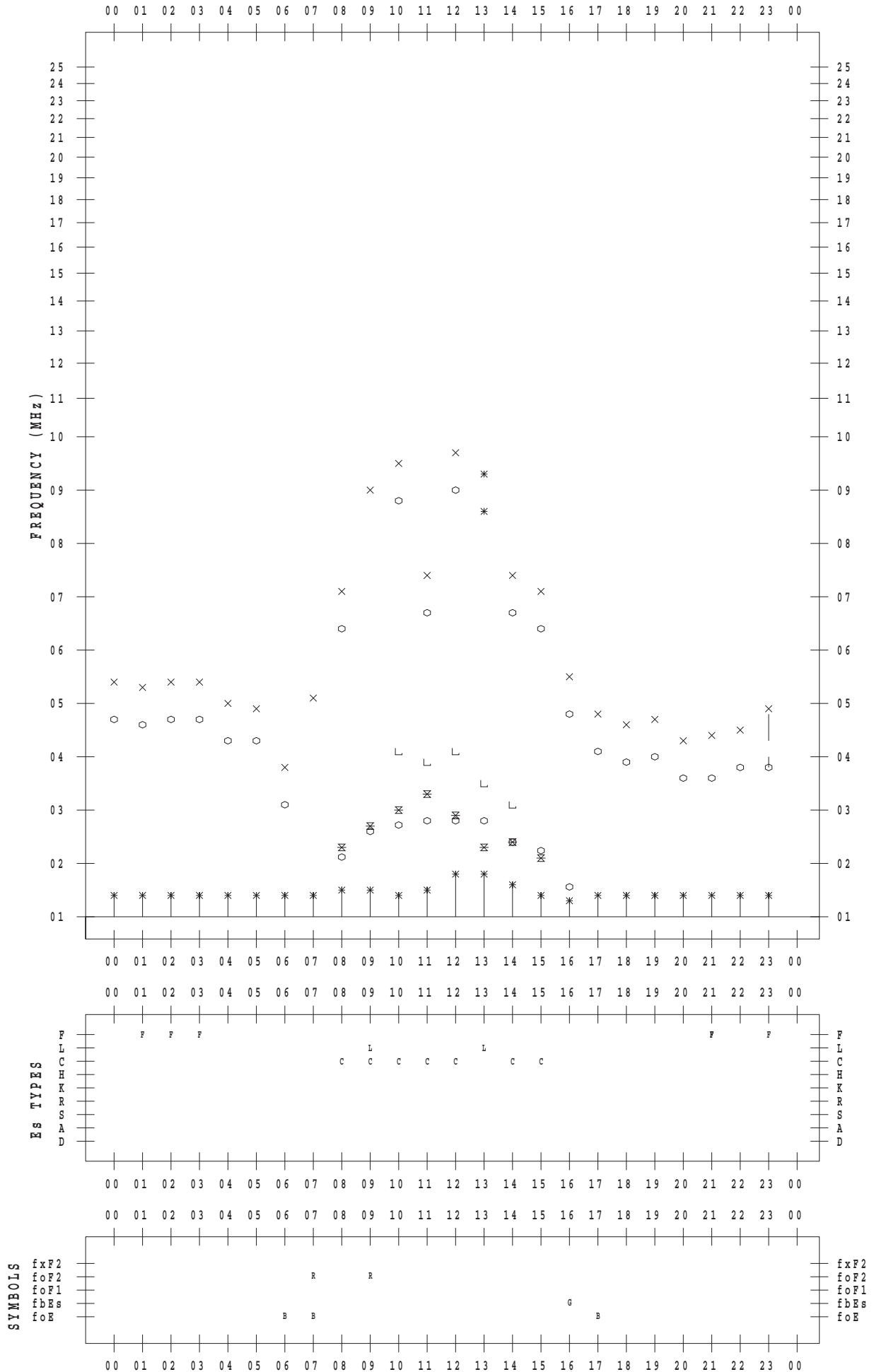
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/16

135 ° E MEAN TIME



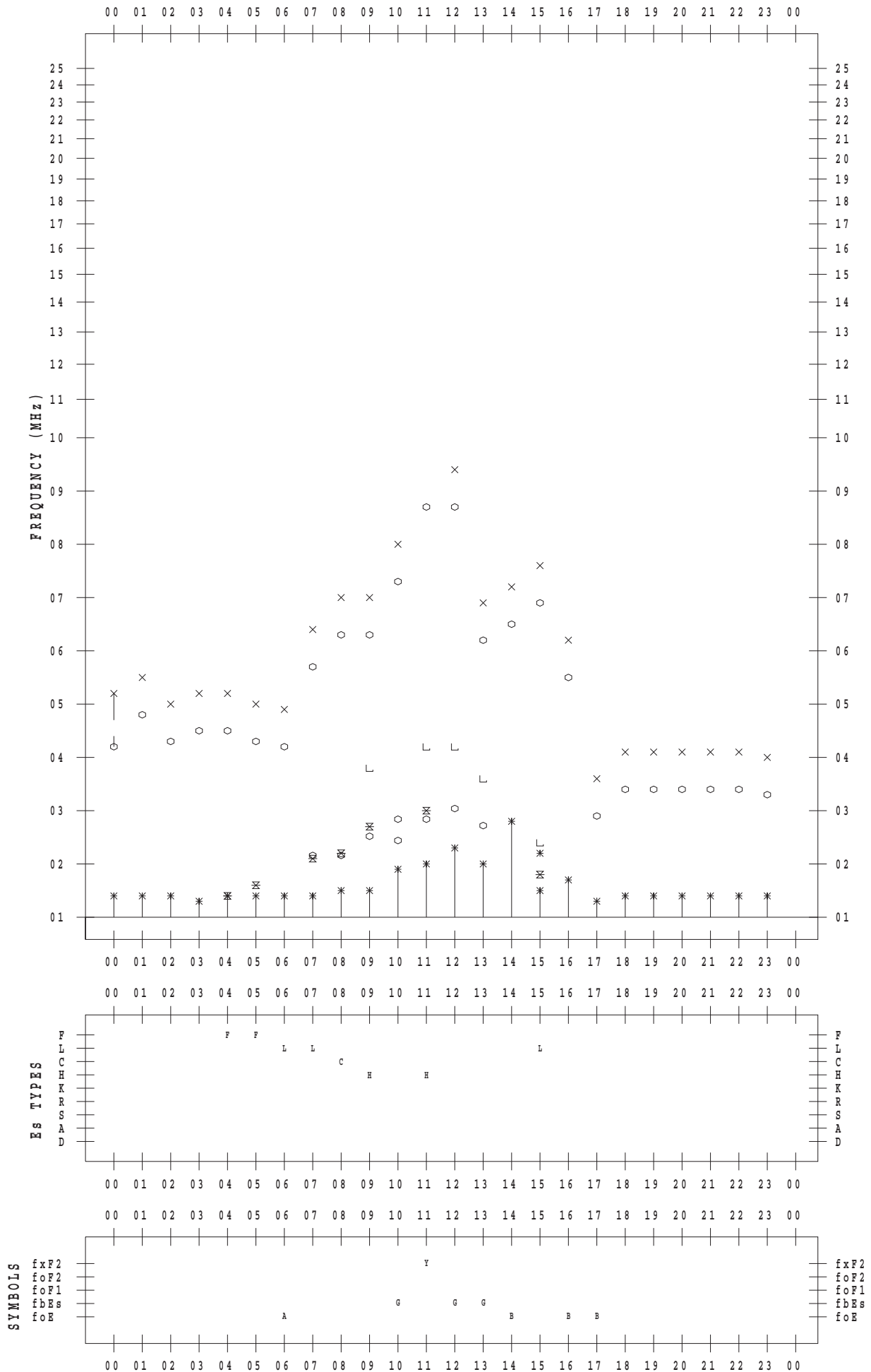
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/17

135 ° E MEAN TIME



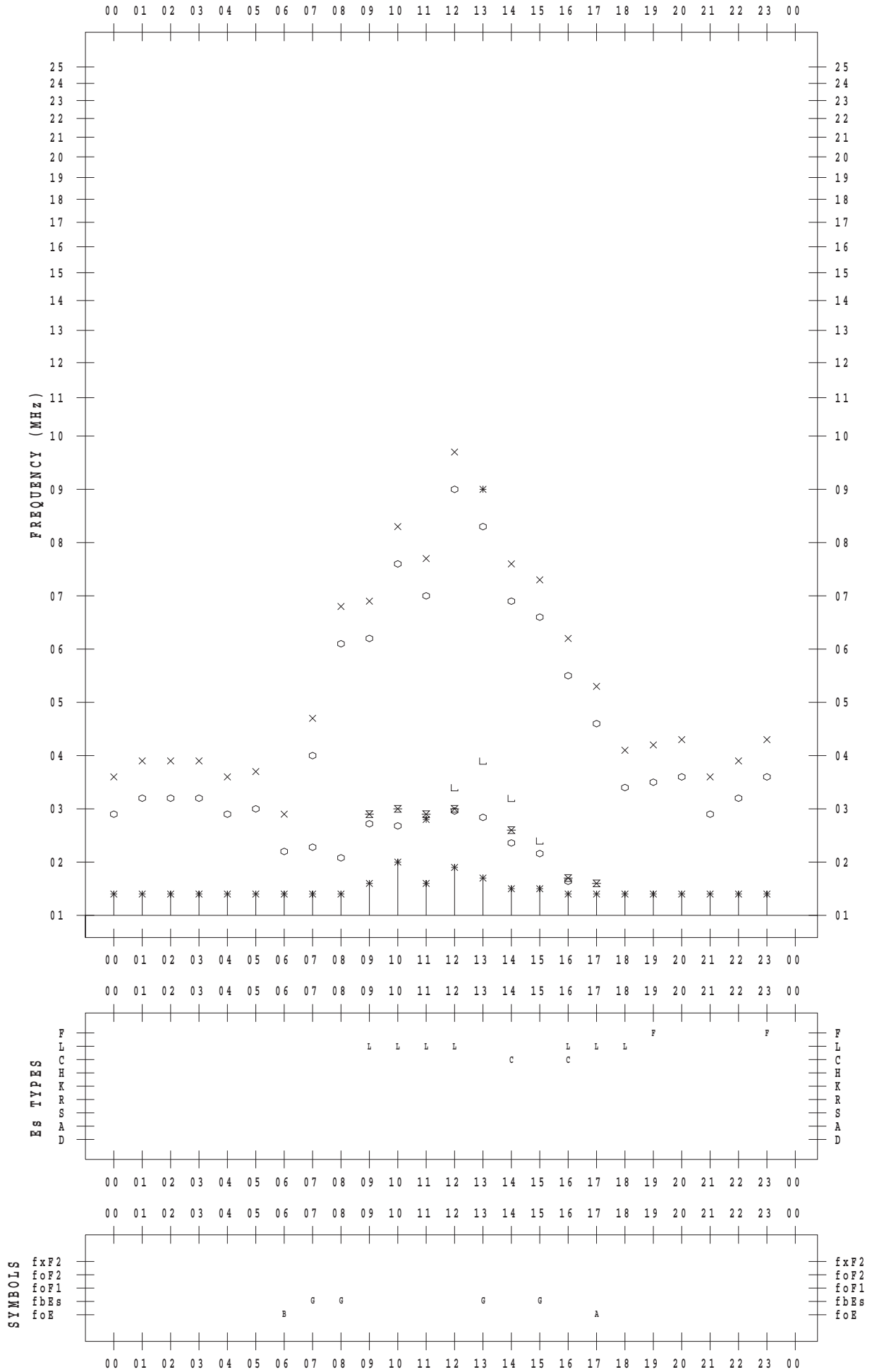
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/18

135 ° E MEAN TIME



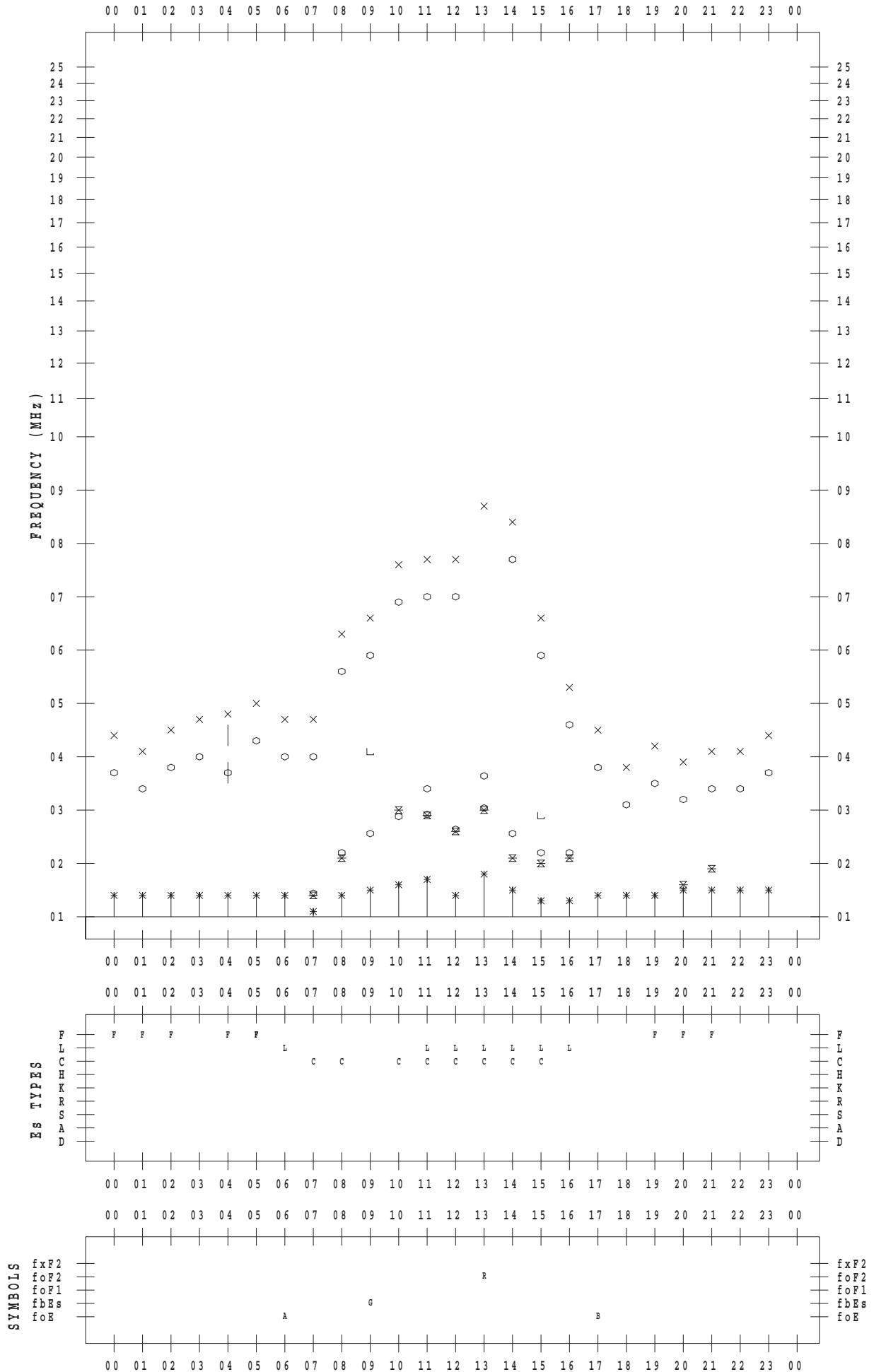
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/19

135 ° E MEAN TIME



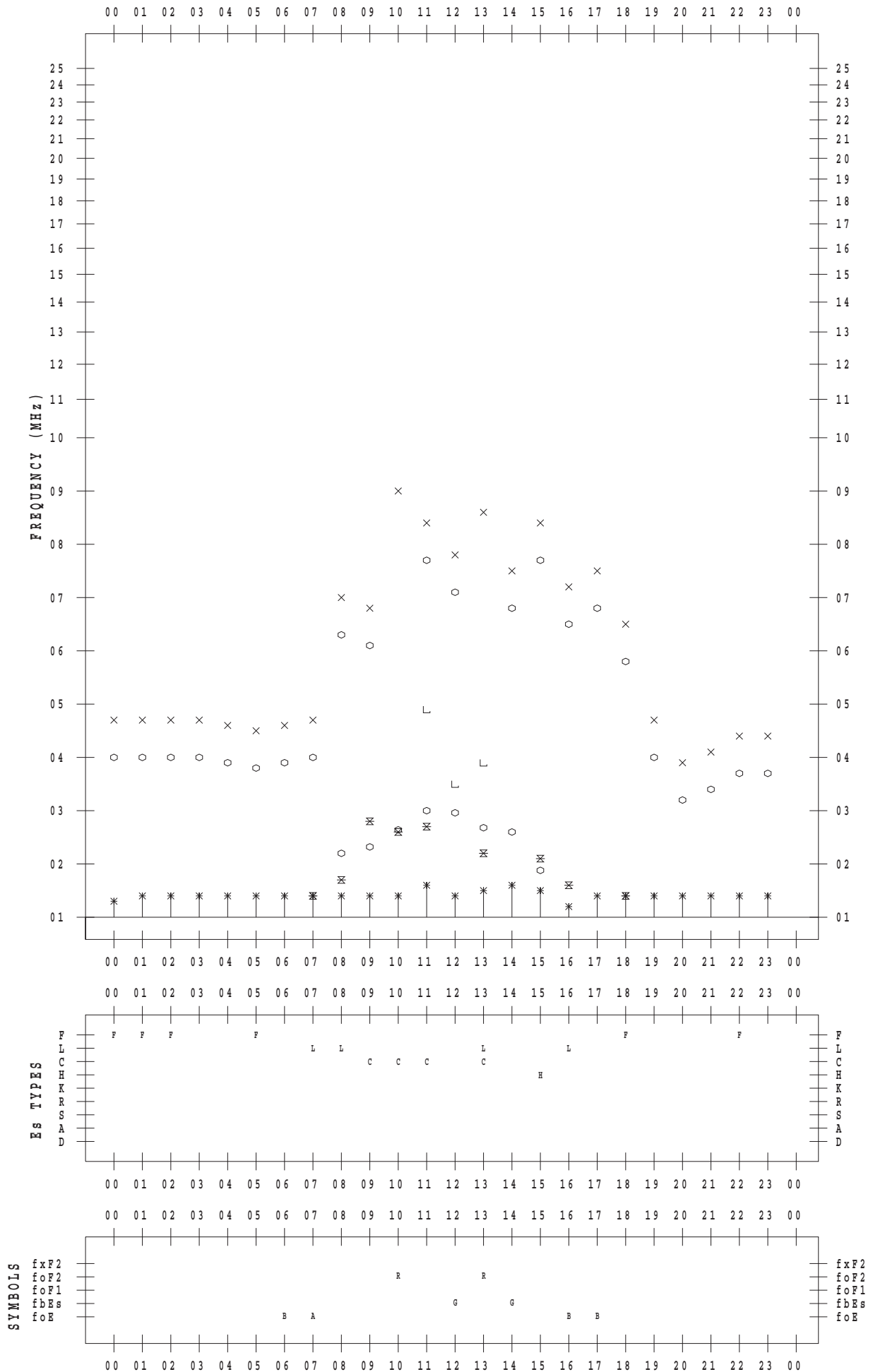
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/20

135 ° E MEAN TIME



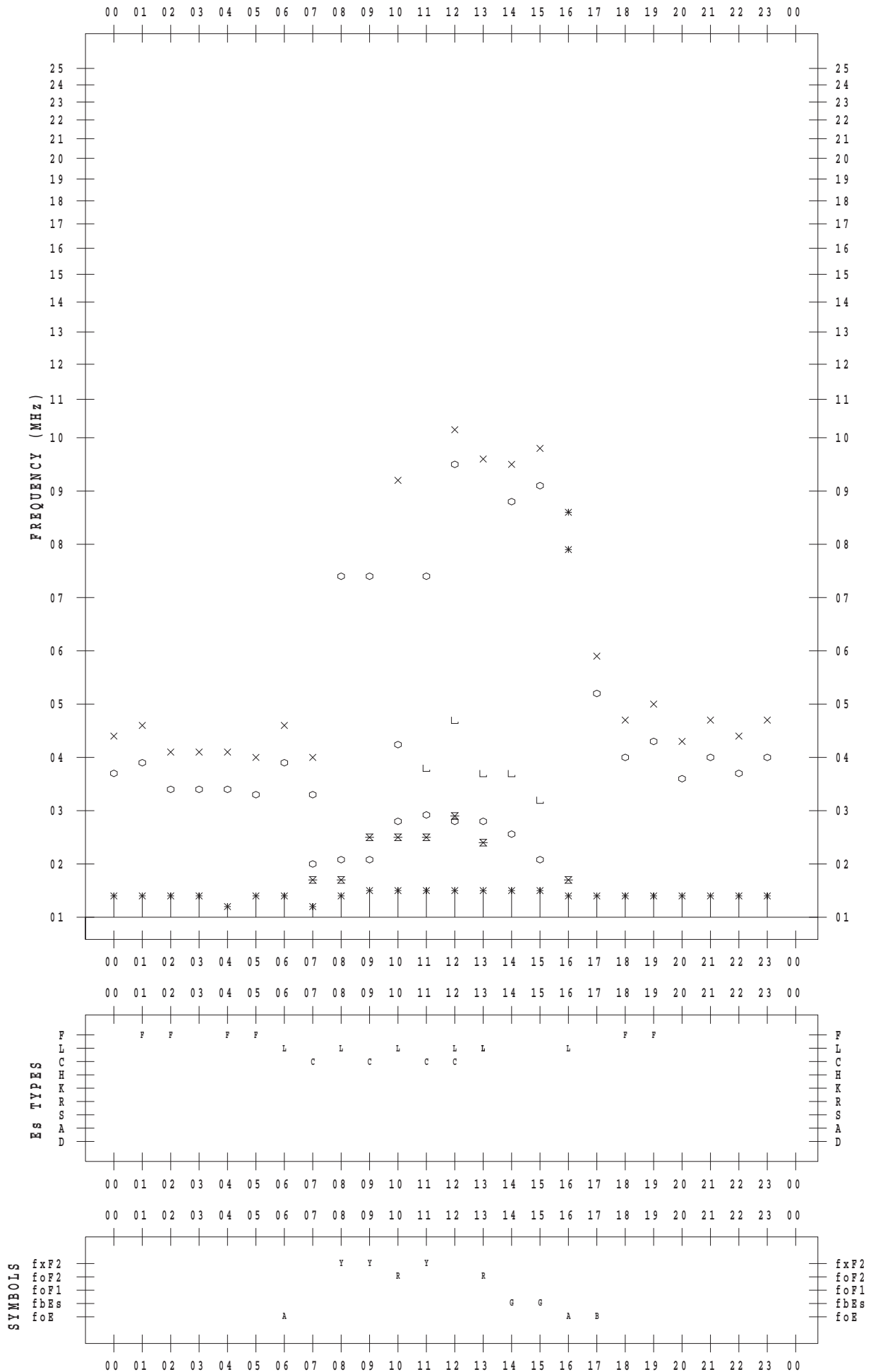
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/21

135 ° E MEAN TIME



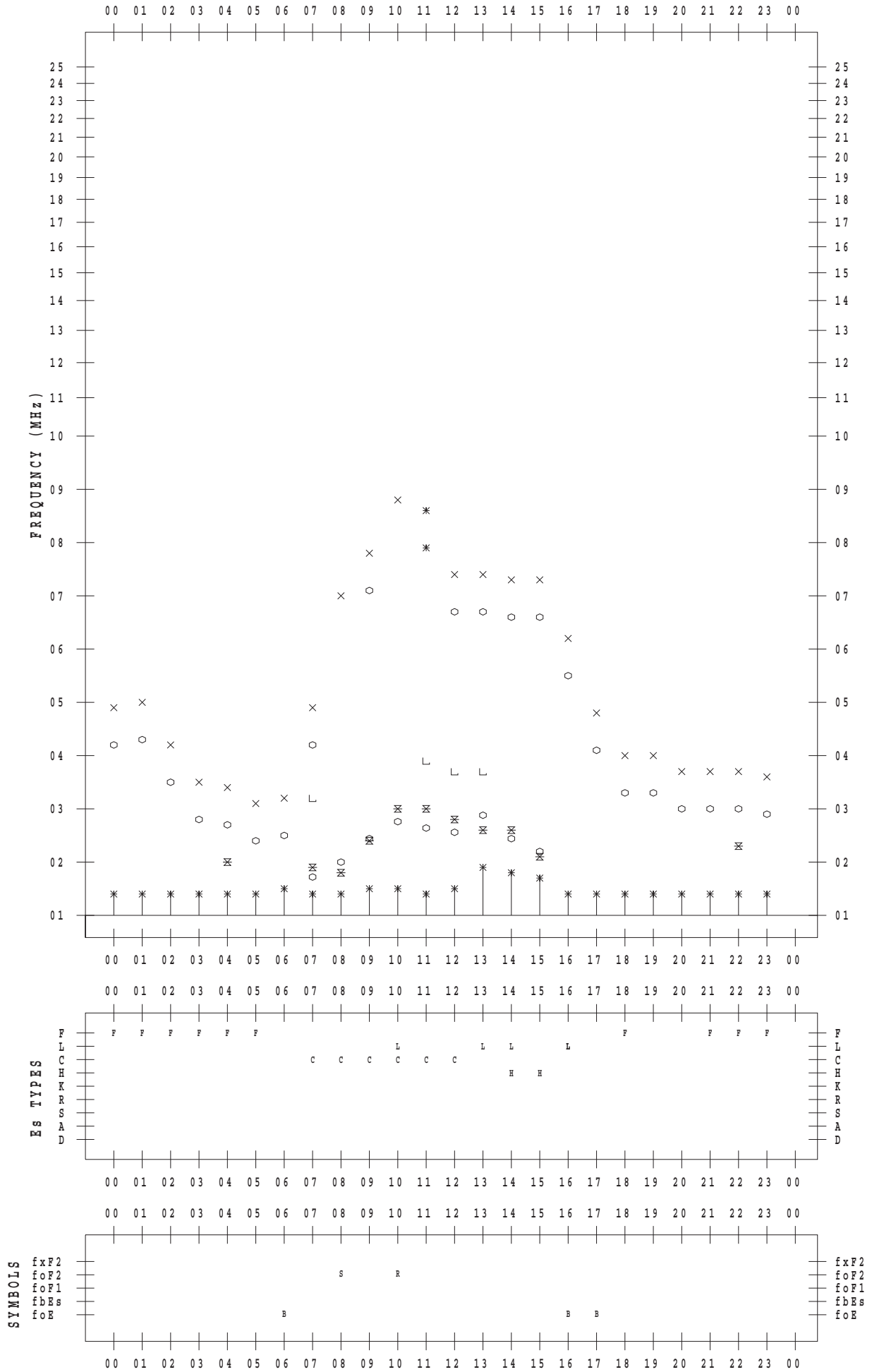
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/22

135 ° E MEAN TIME



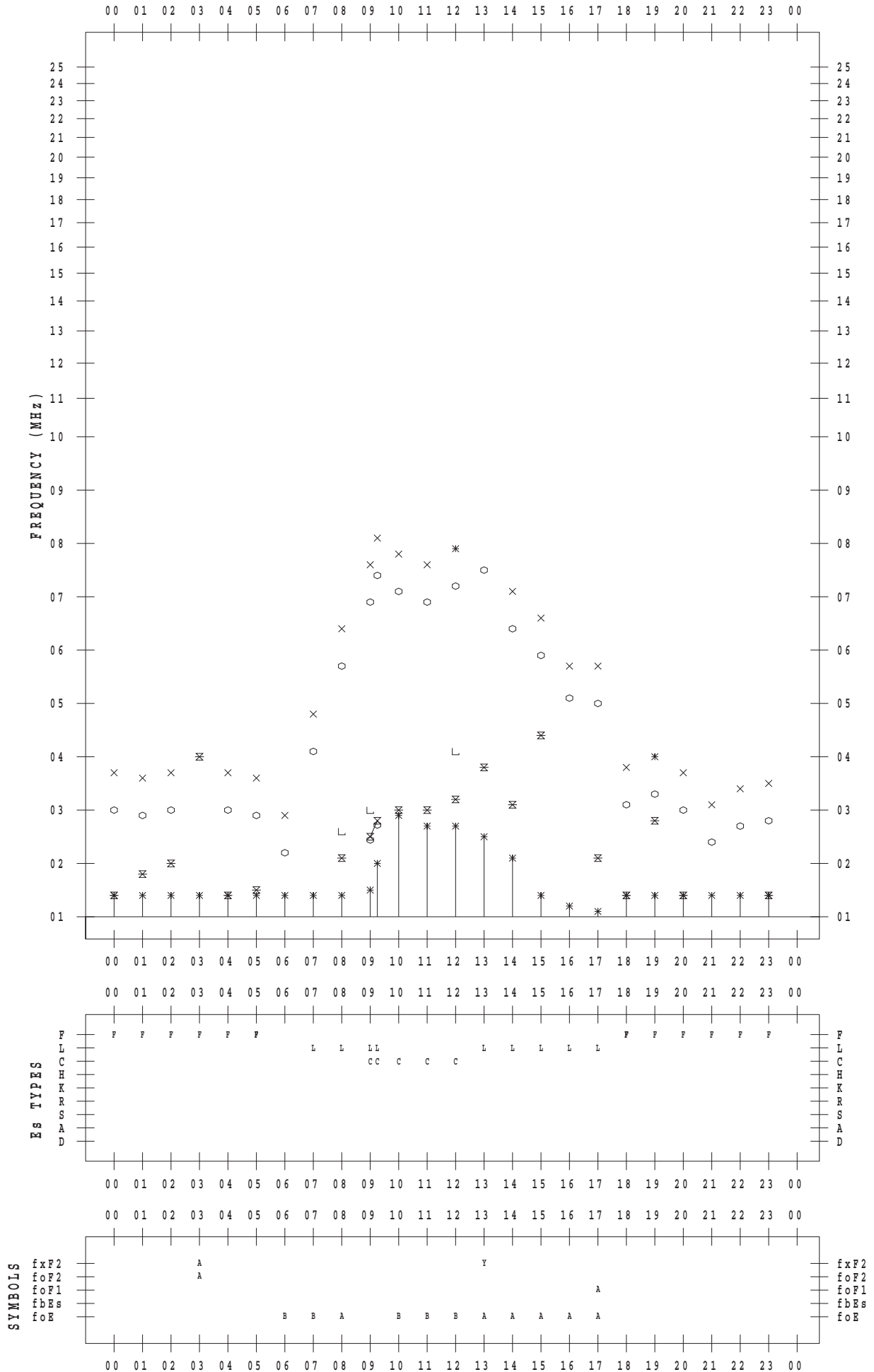
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/23

135 ° E MEAN TIME



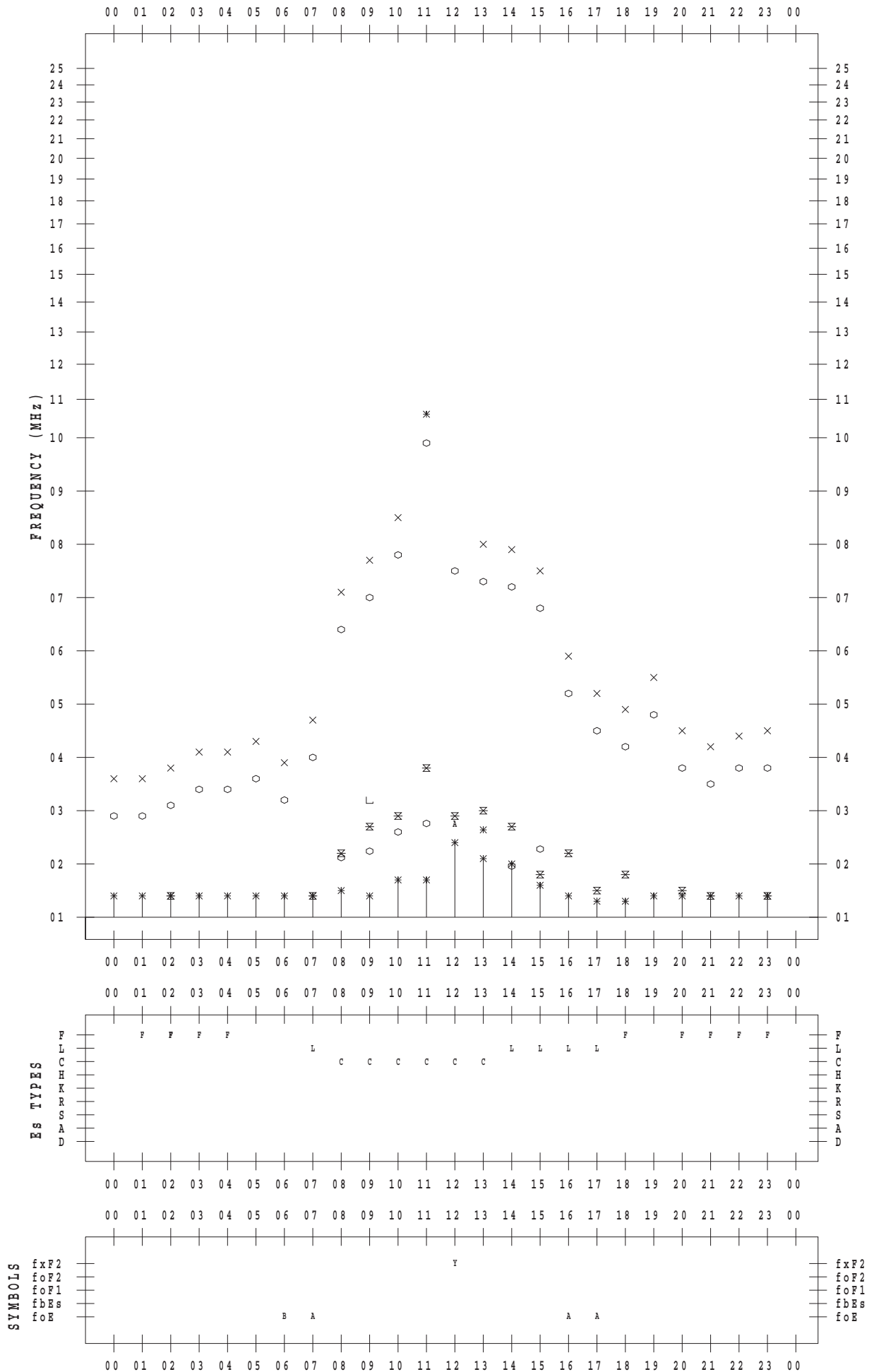
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/24

135 ° E MEAN TIME



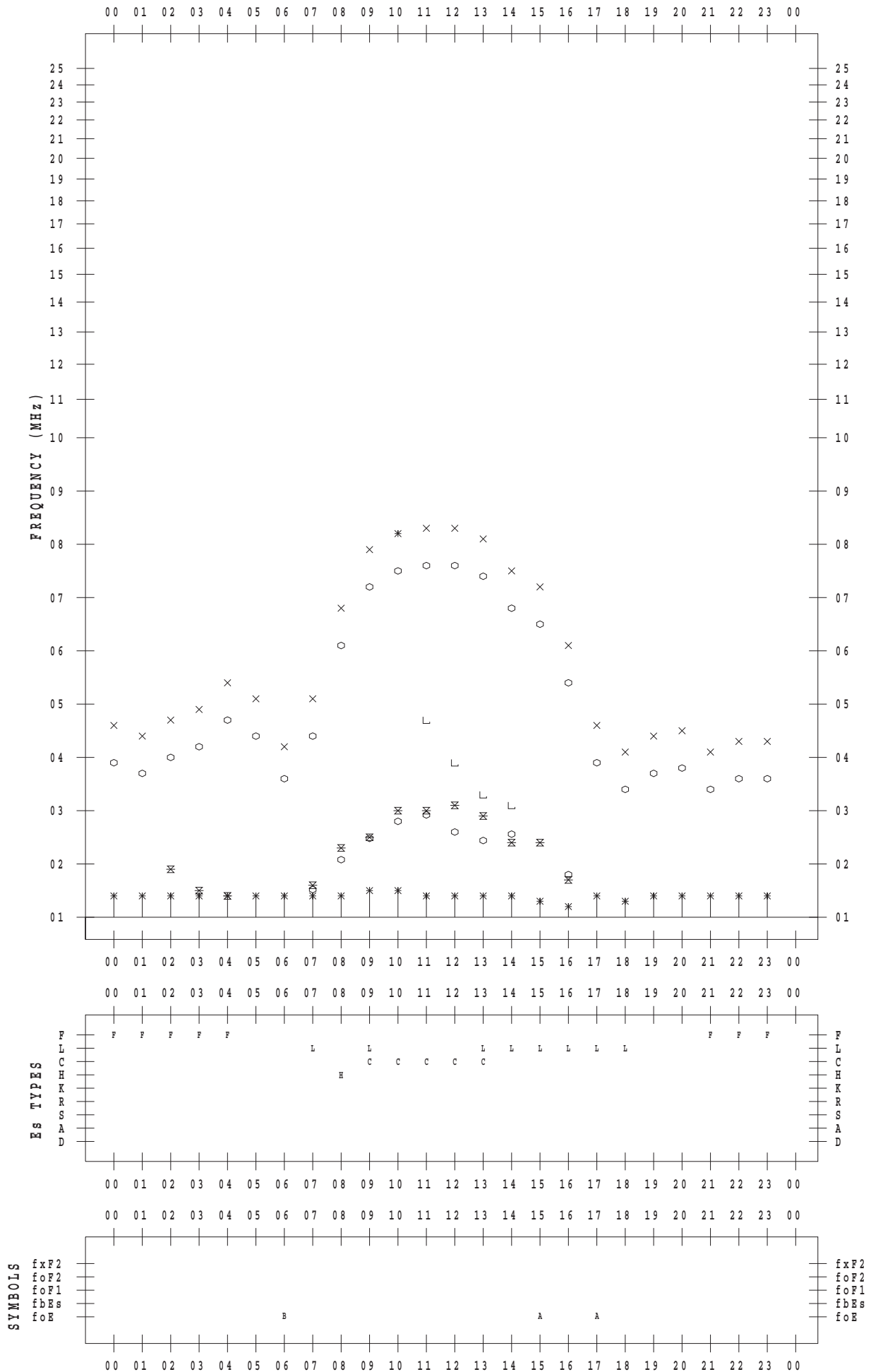
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/25

135 ° E MEAN TIME



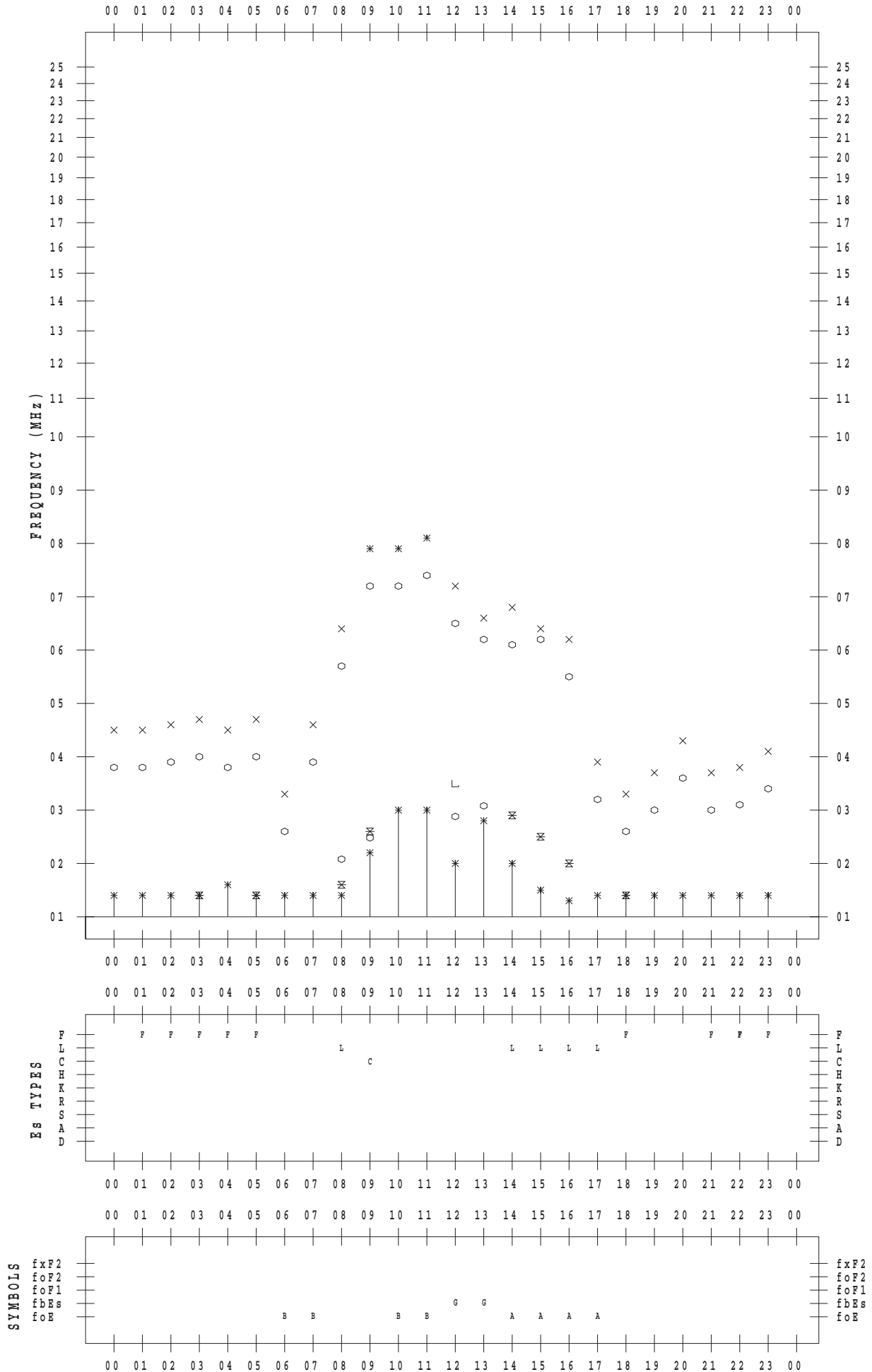
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/26

135 ° E MEAN TIME



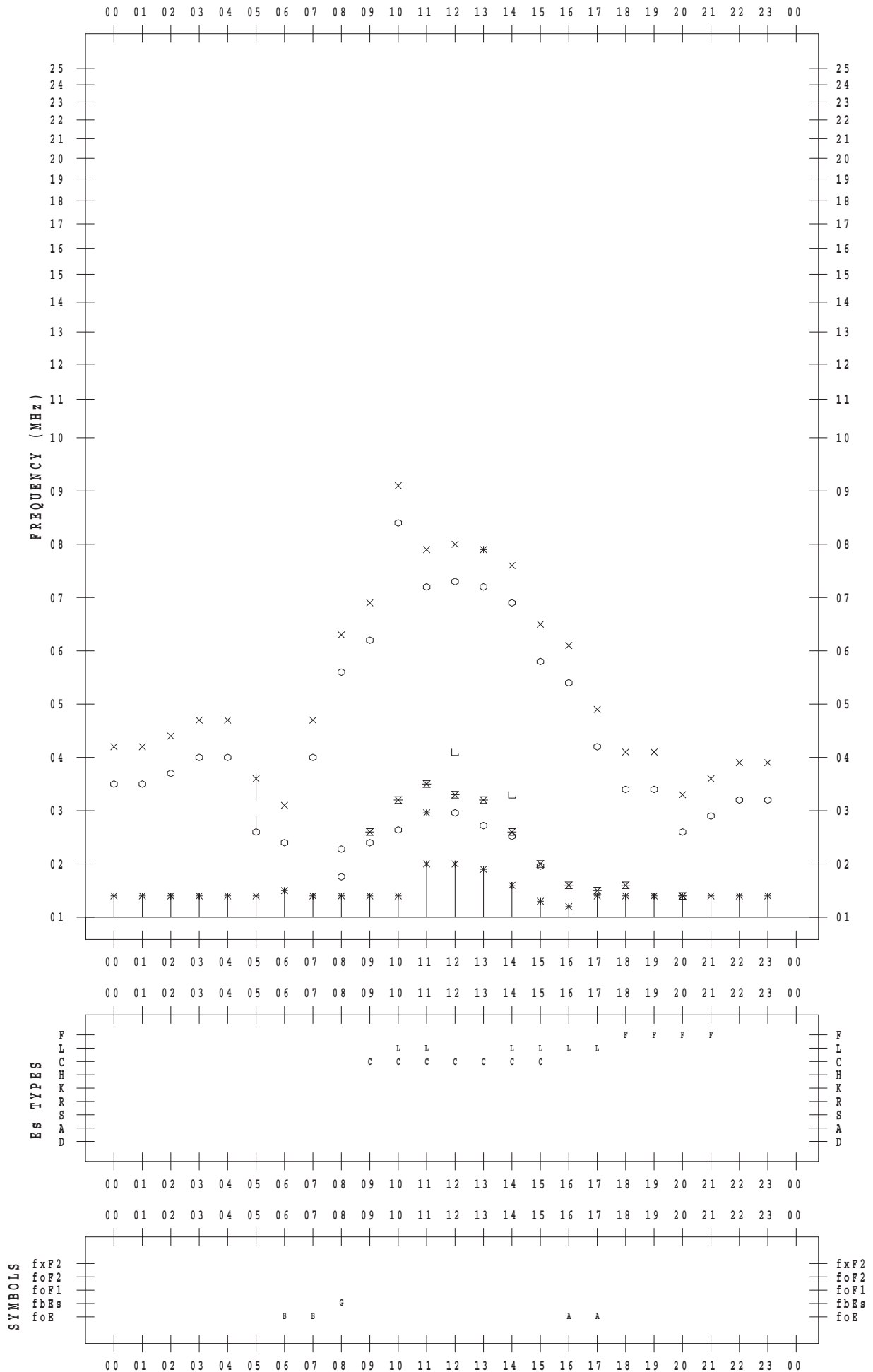
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/27

135 ° E MEAN TIME



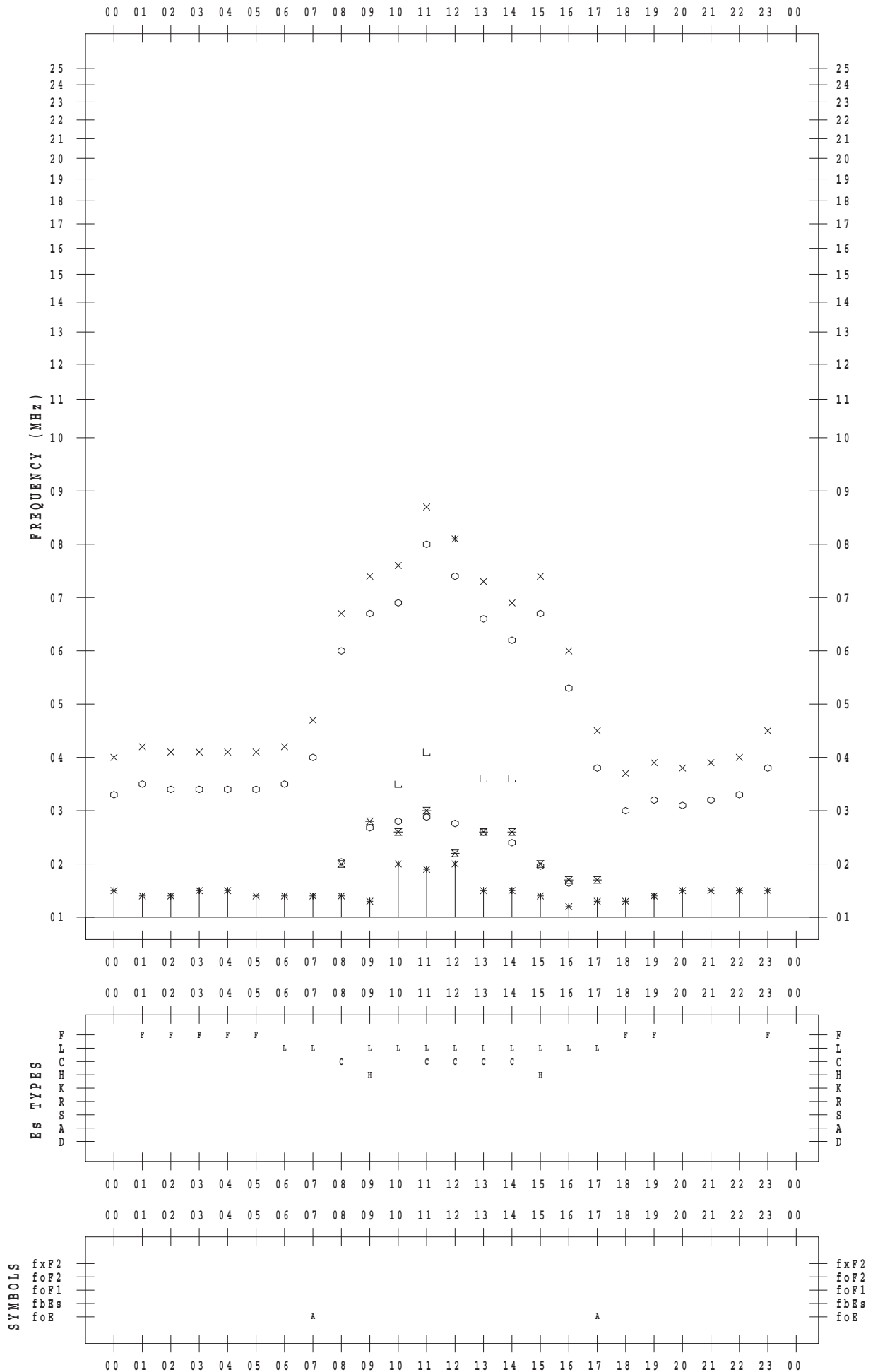
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/28

135 ° E MEAN TIME



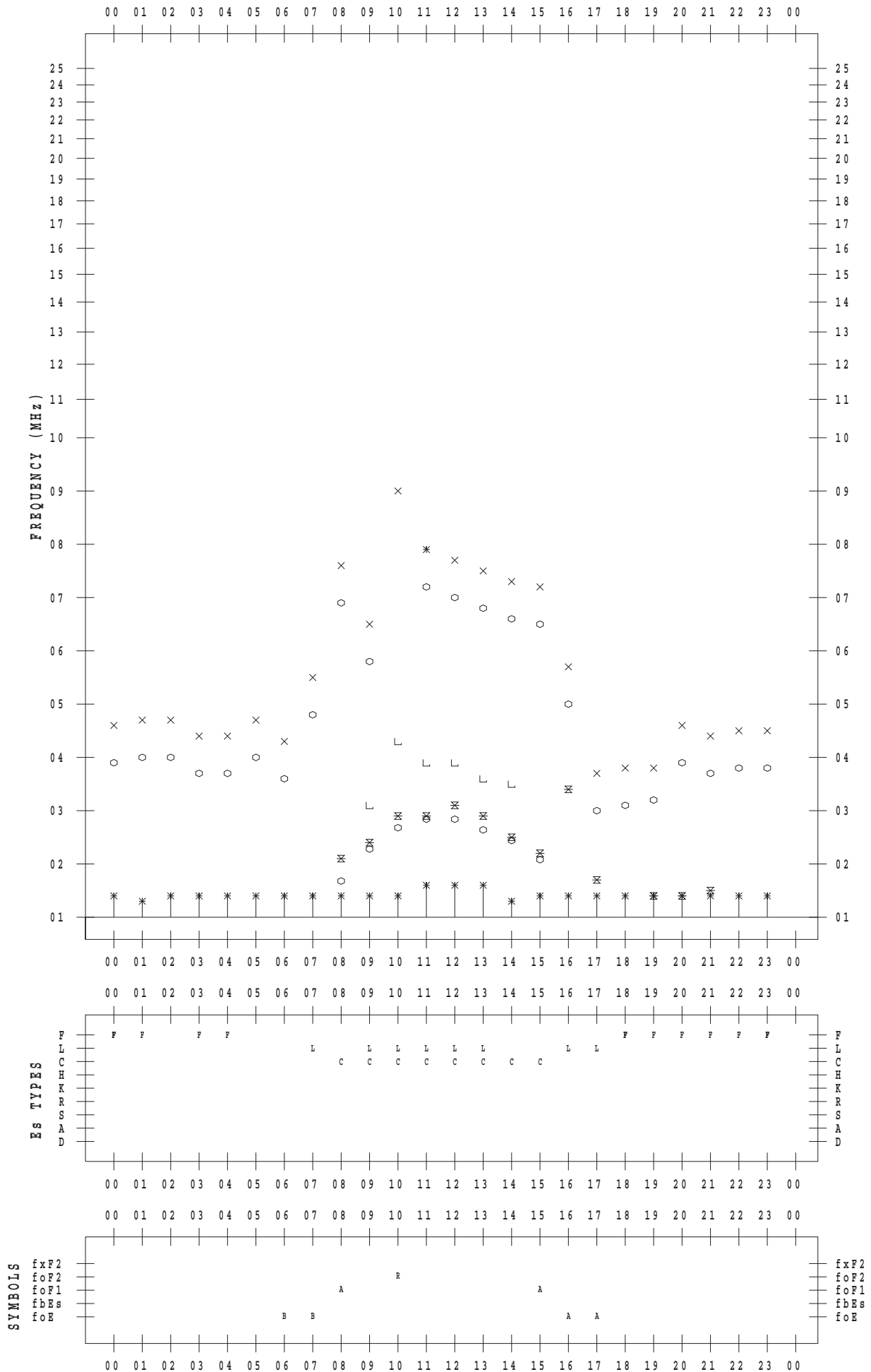
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/29

135 ° E MEAN TIME



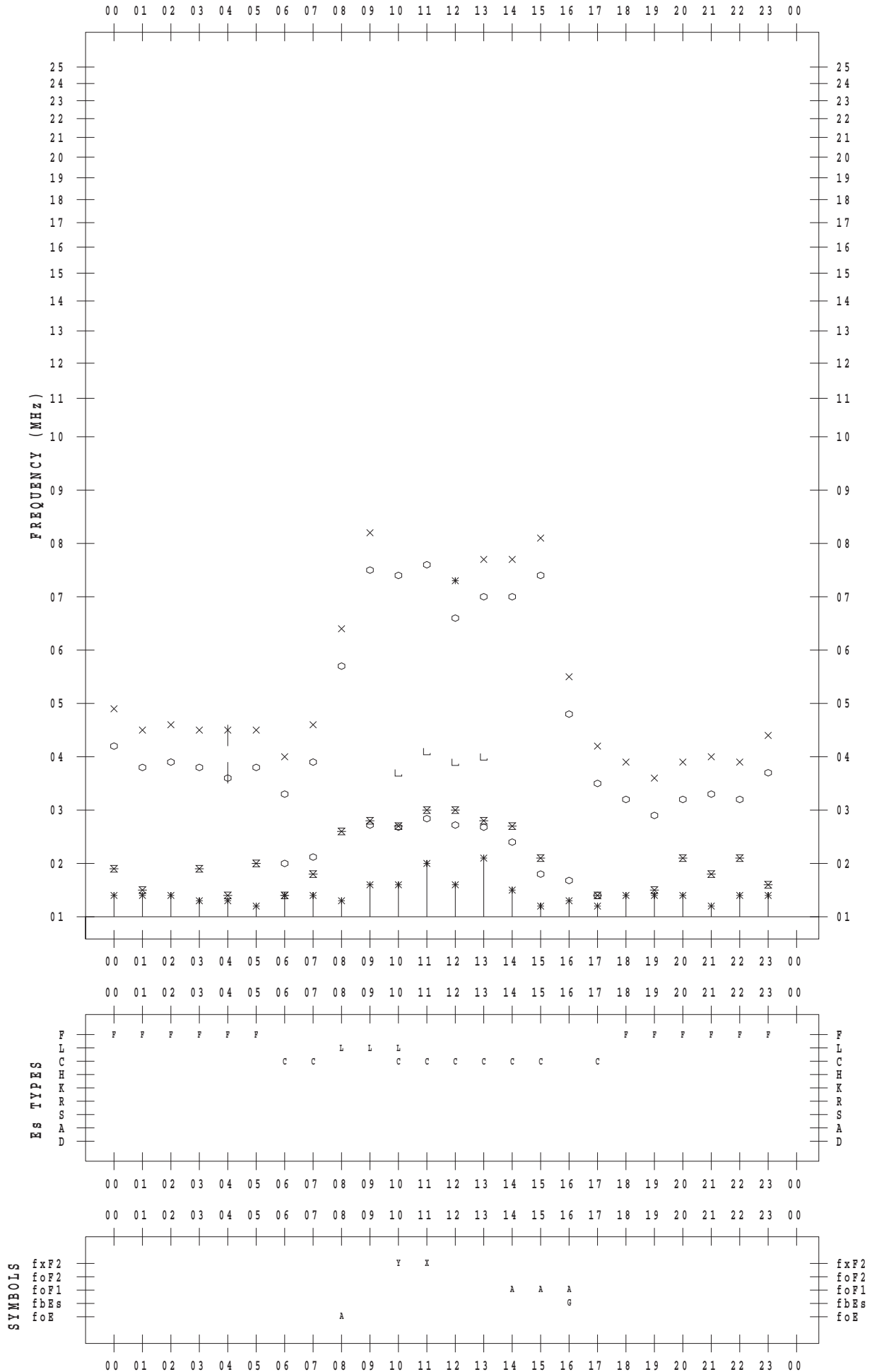
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2015/12/30

135 ° E MEAN TIME



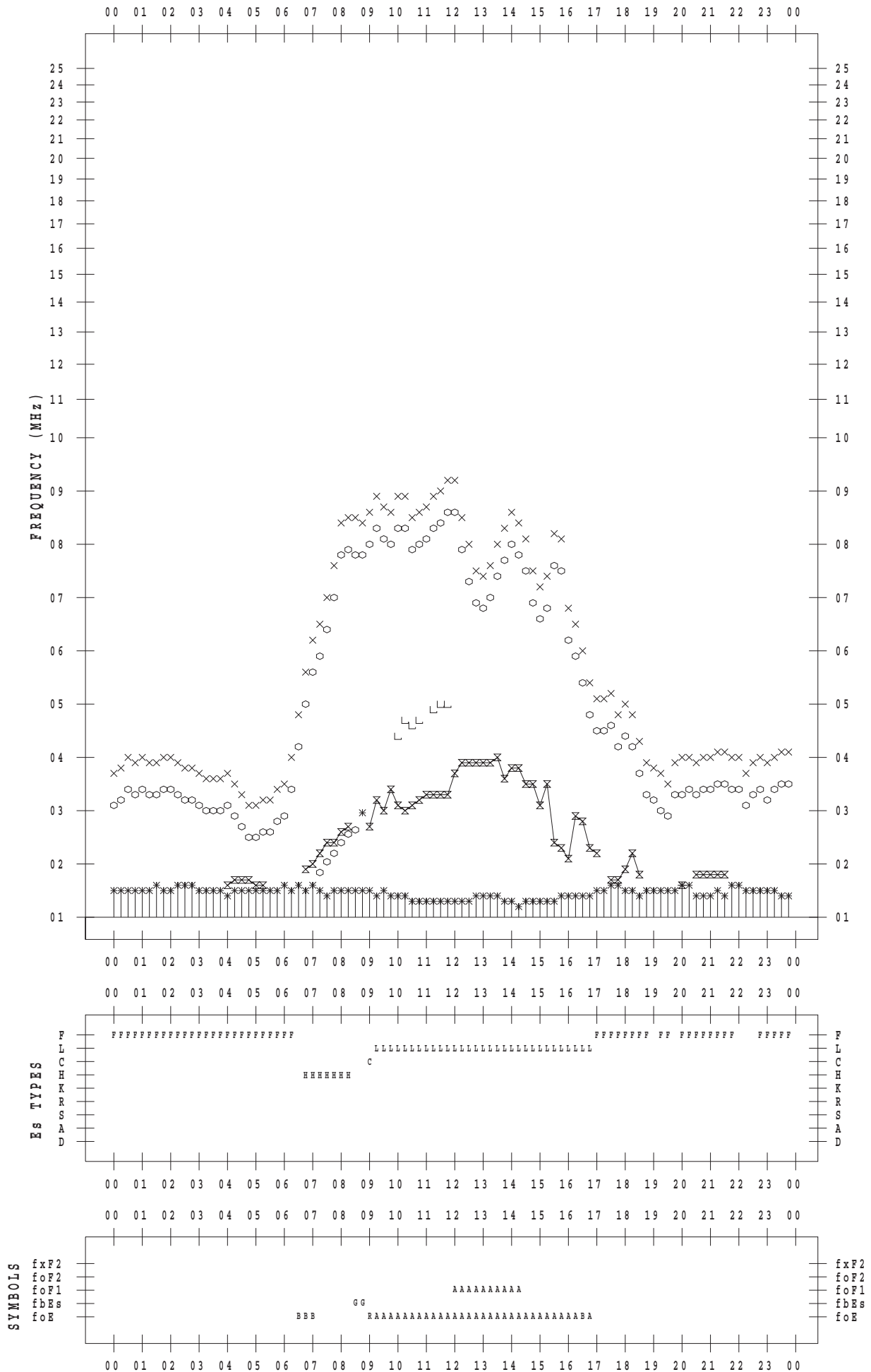
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/ 3

135 ° E MEAN TIME



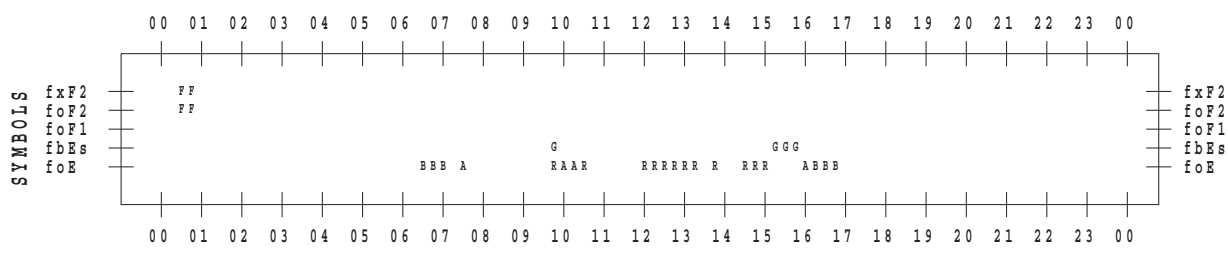
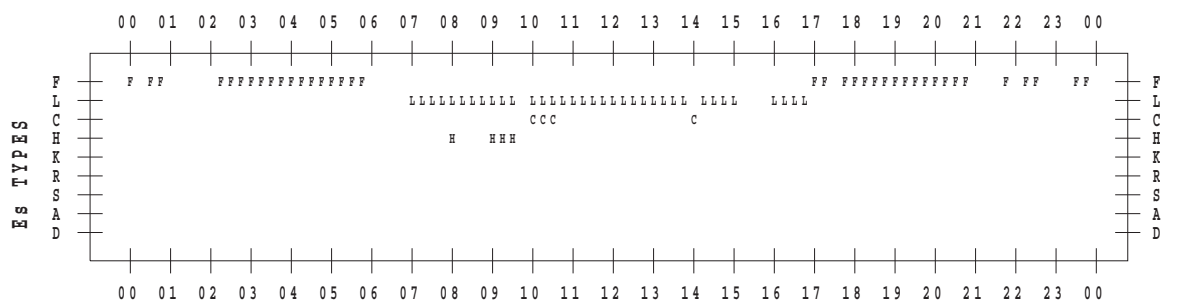
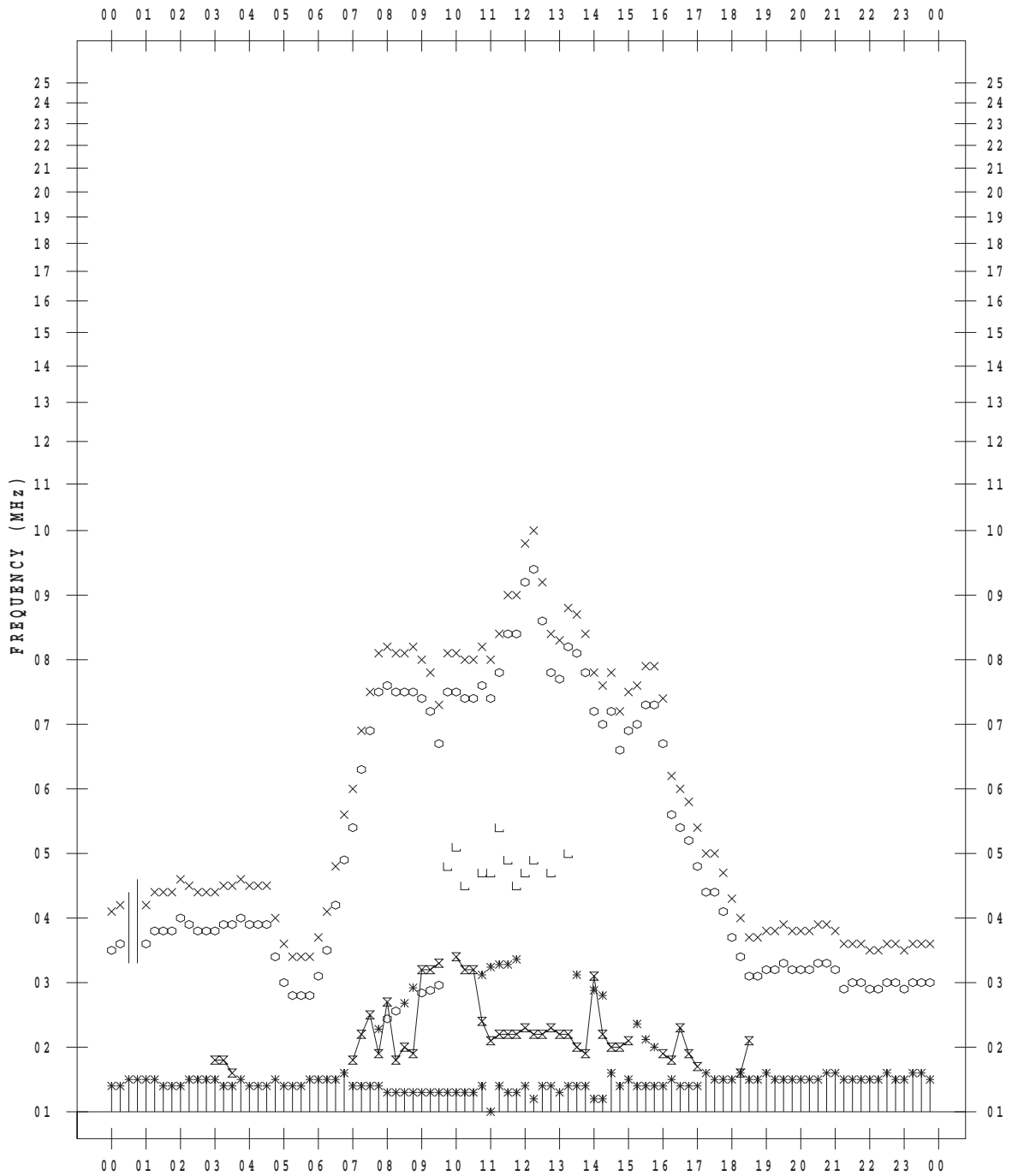
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/ 4

135 ° E MEAN TIME



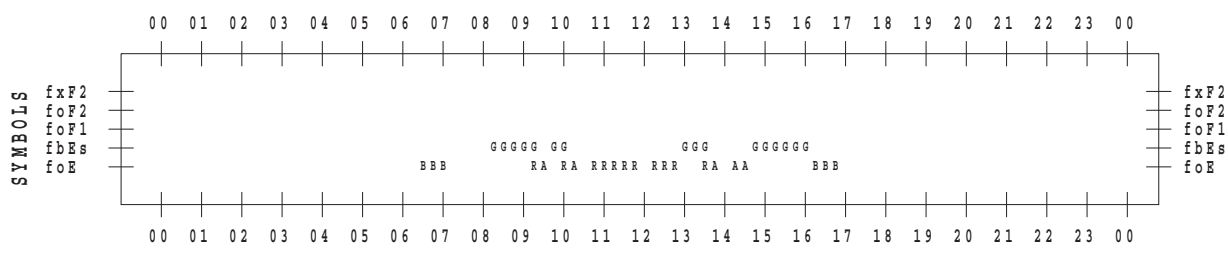
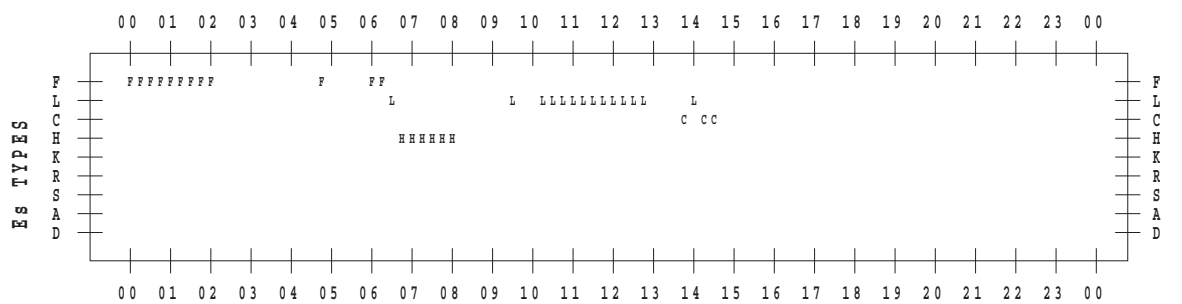
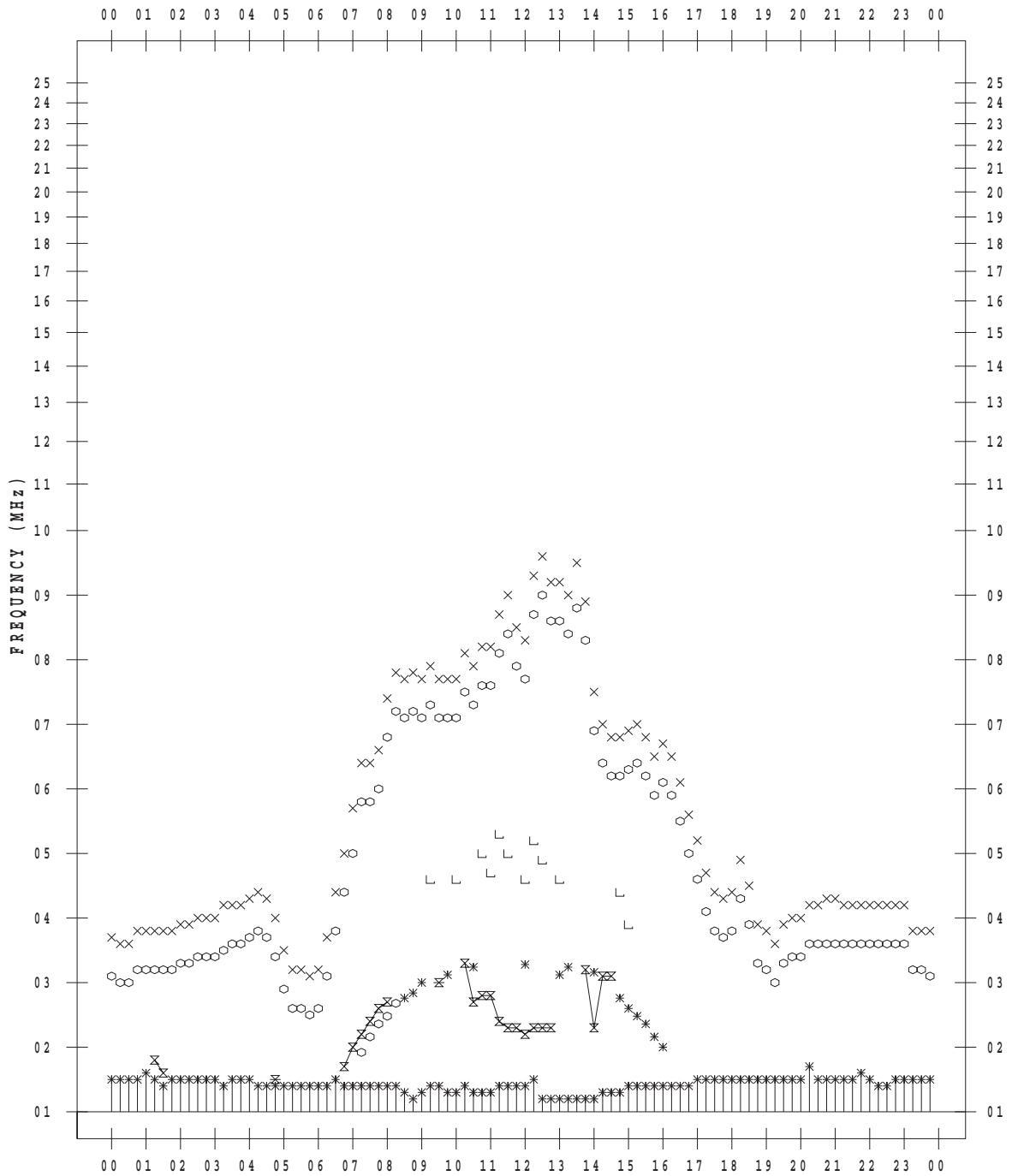
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/ 5

135 ° E MEAN TIME



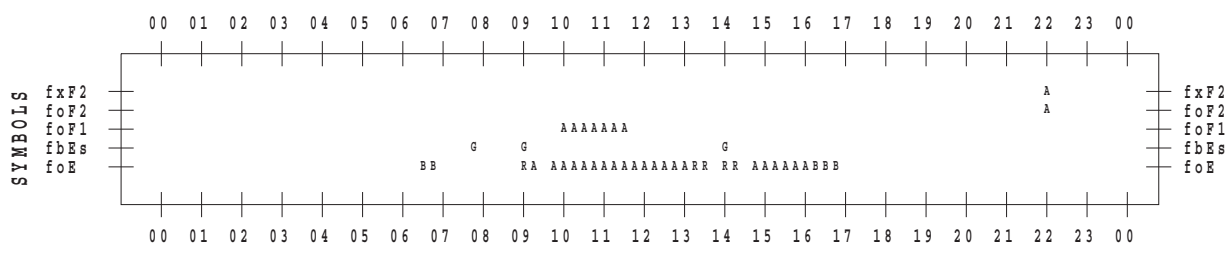
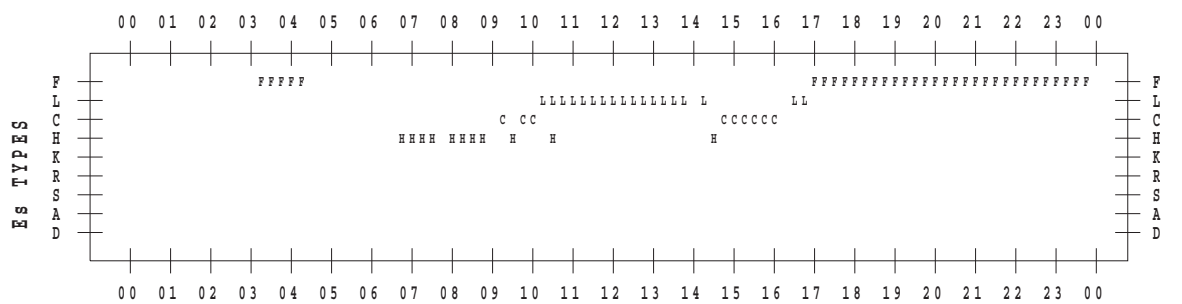
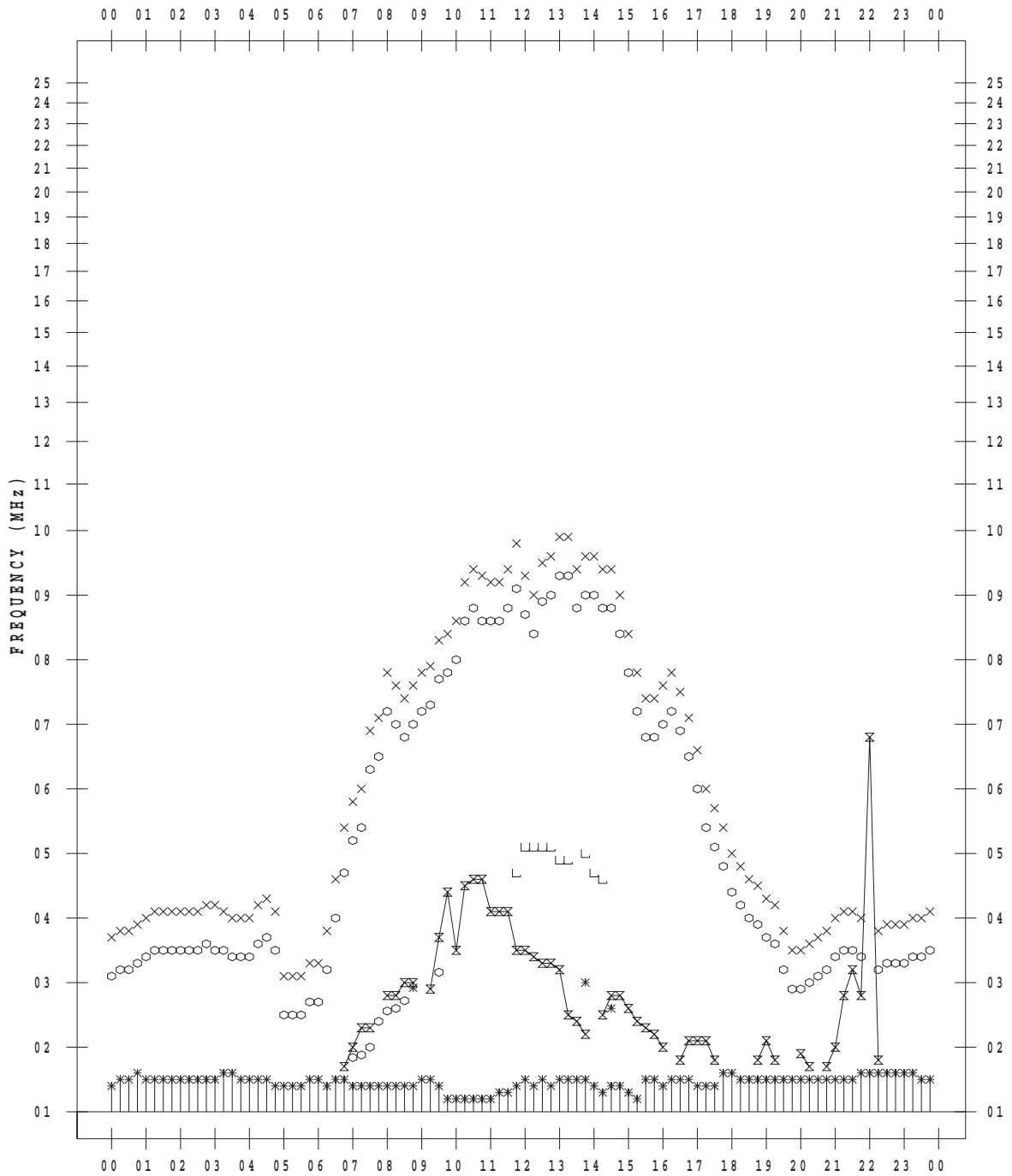
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/ 6

135 ° E MEAN TIME



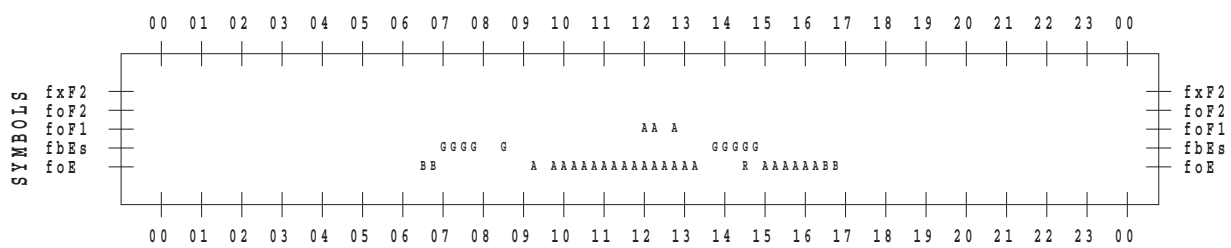
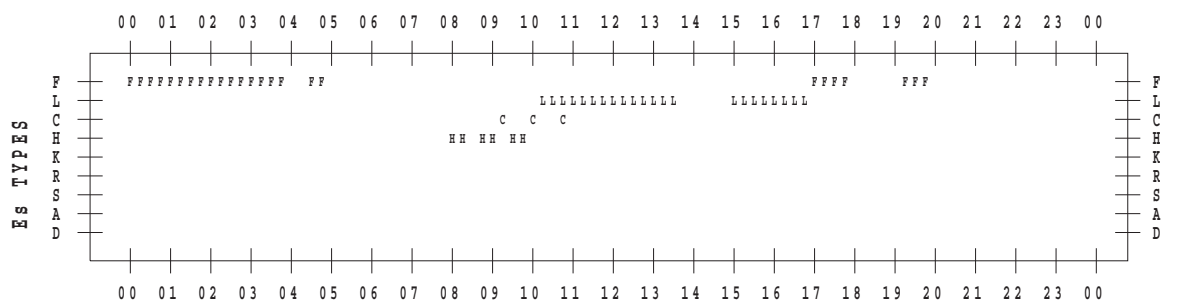
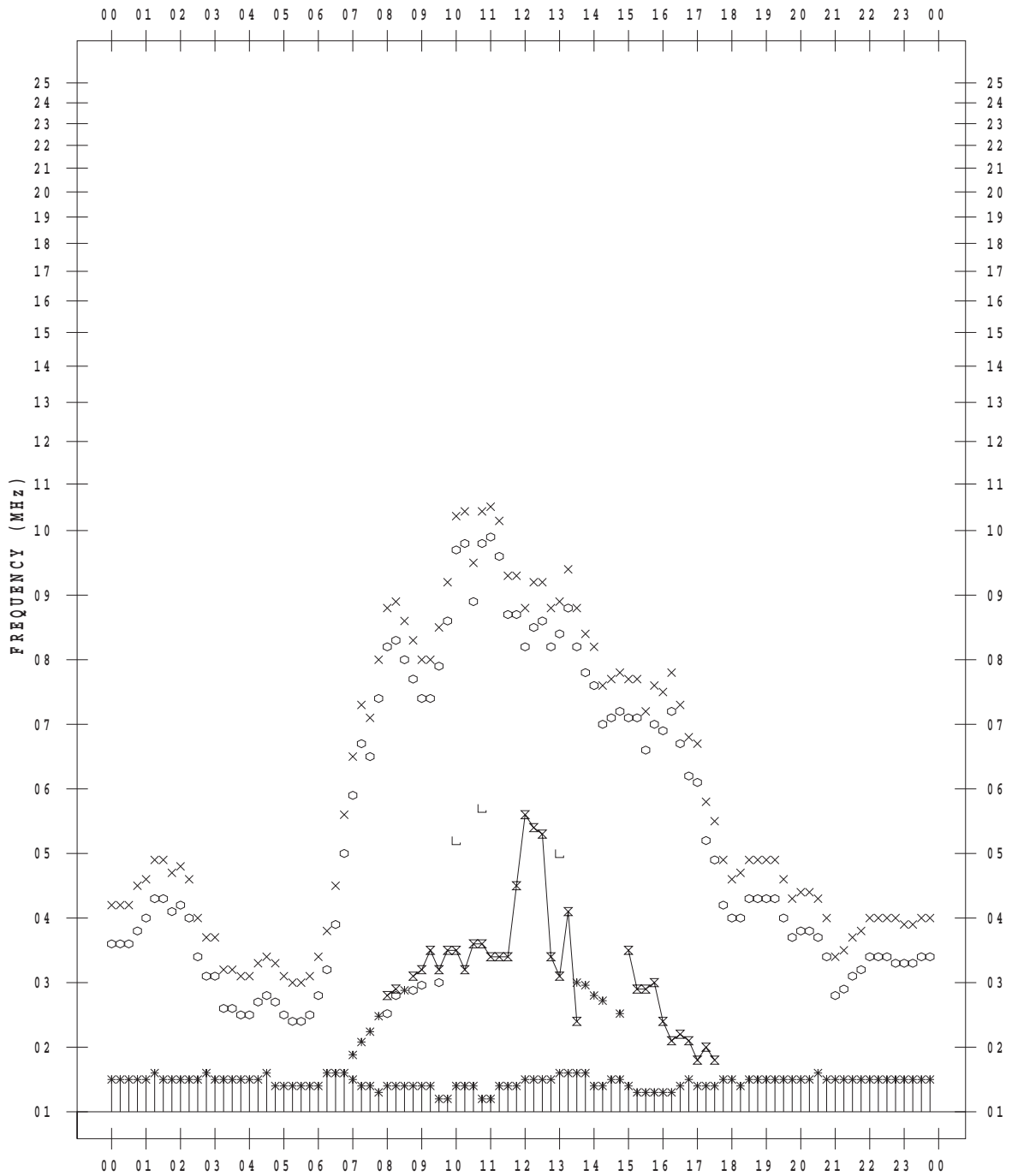
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/ 7

135 ° E MEAN TIME



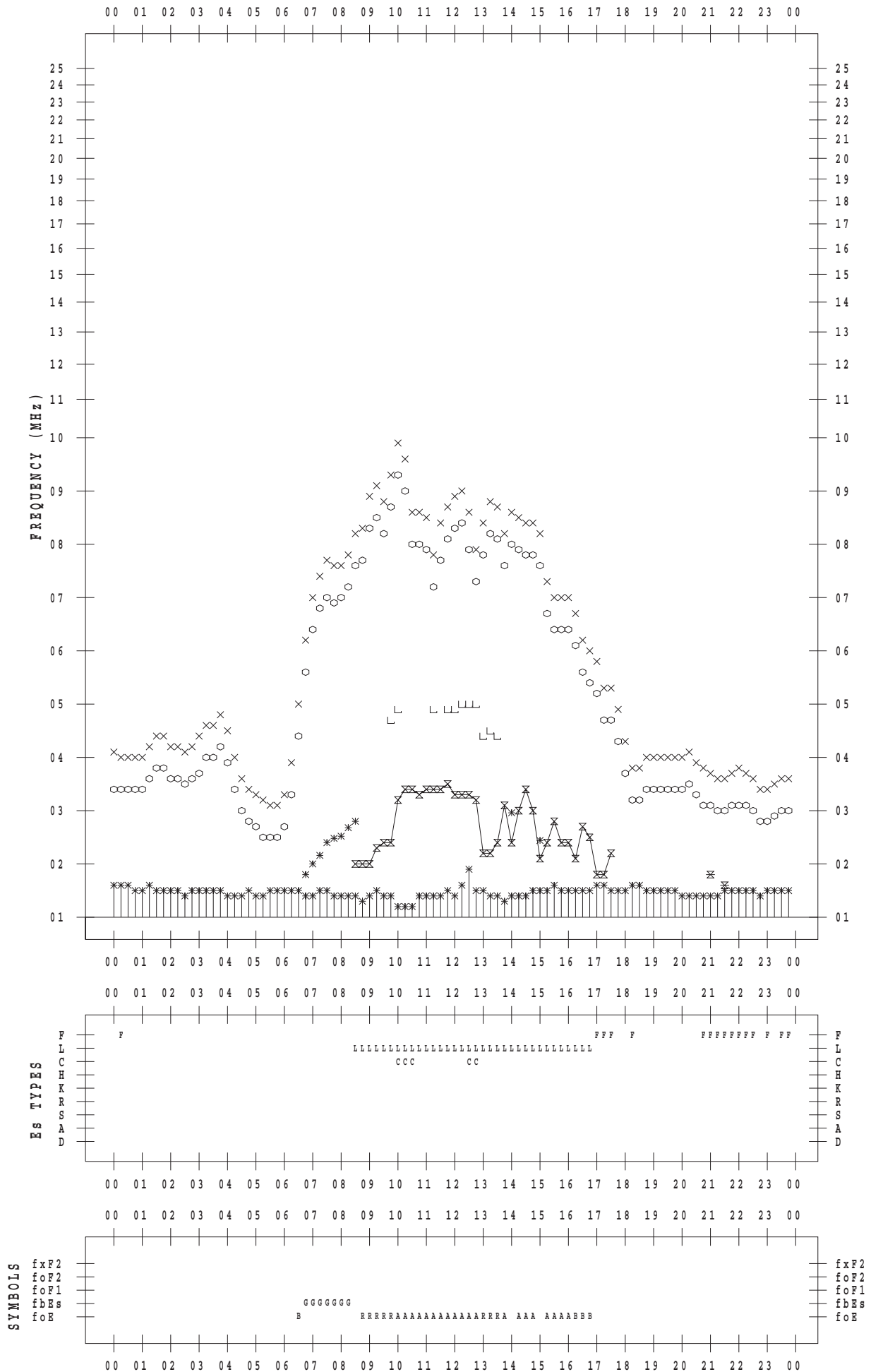
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/ 8

135 ° E MEAN TIME



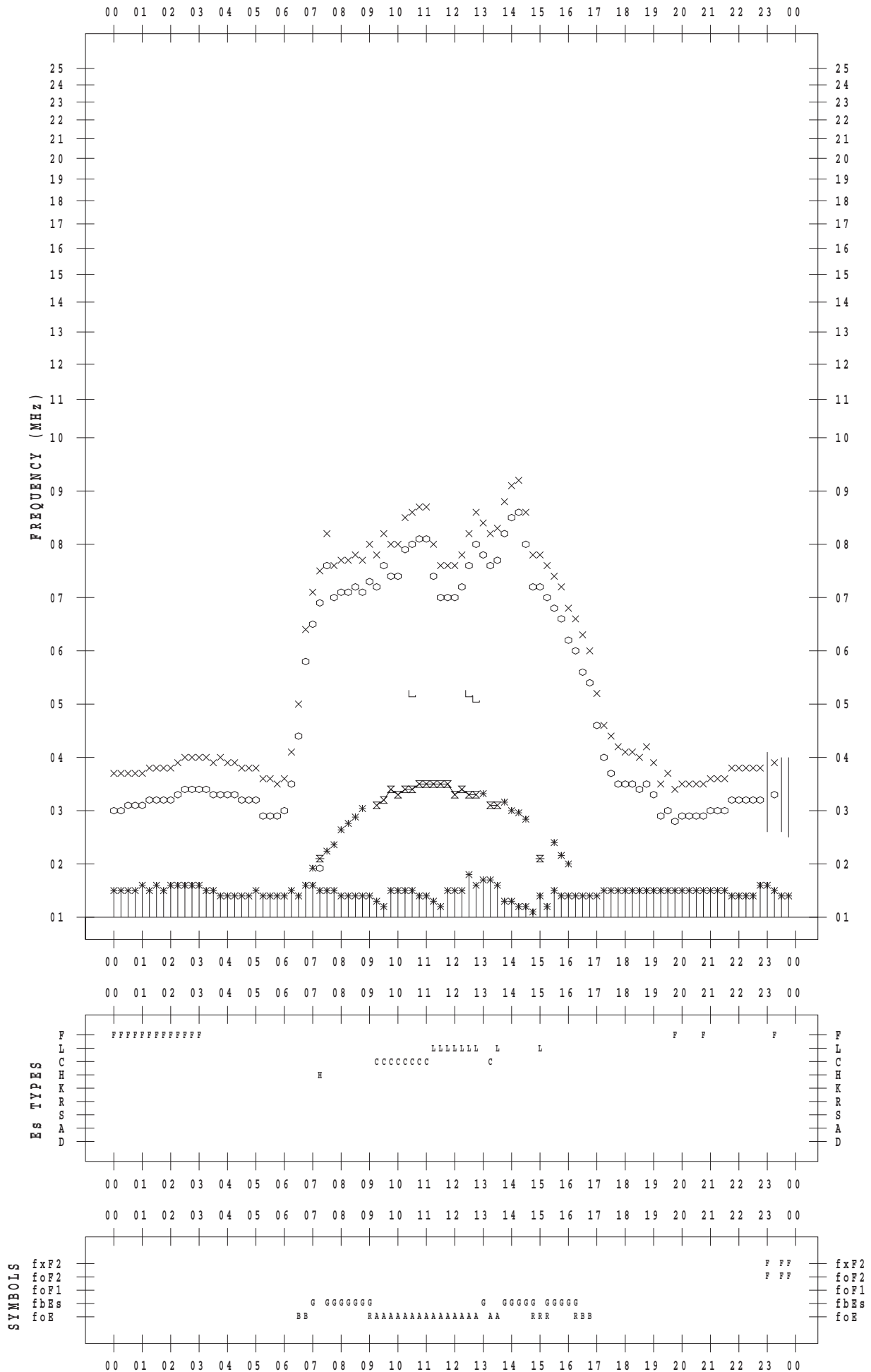
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/ 9

135 ° E MEAN TIME



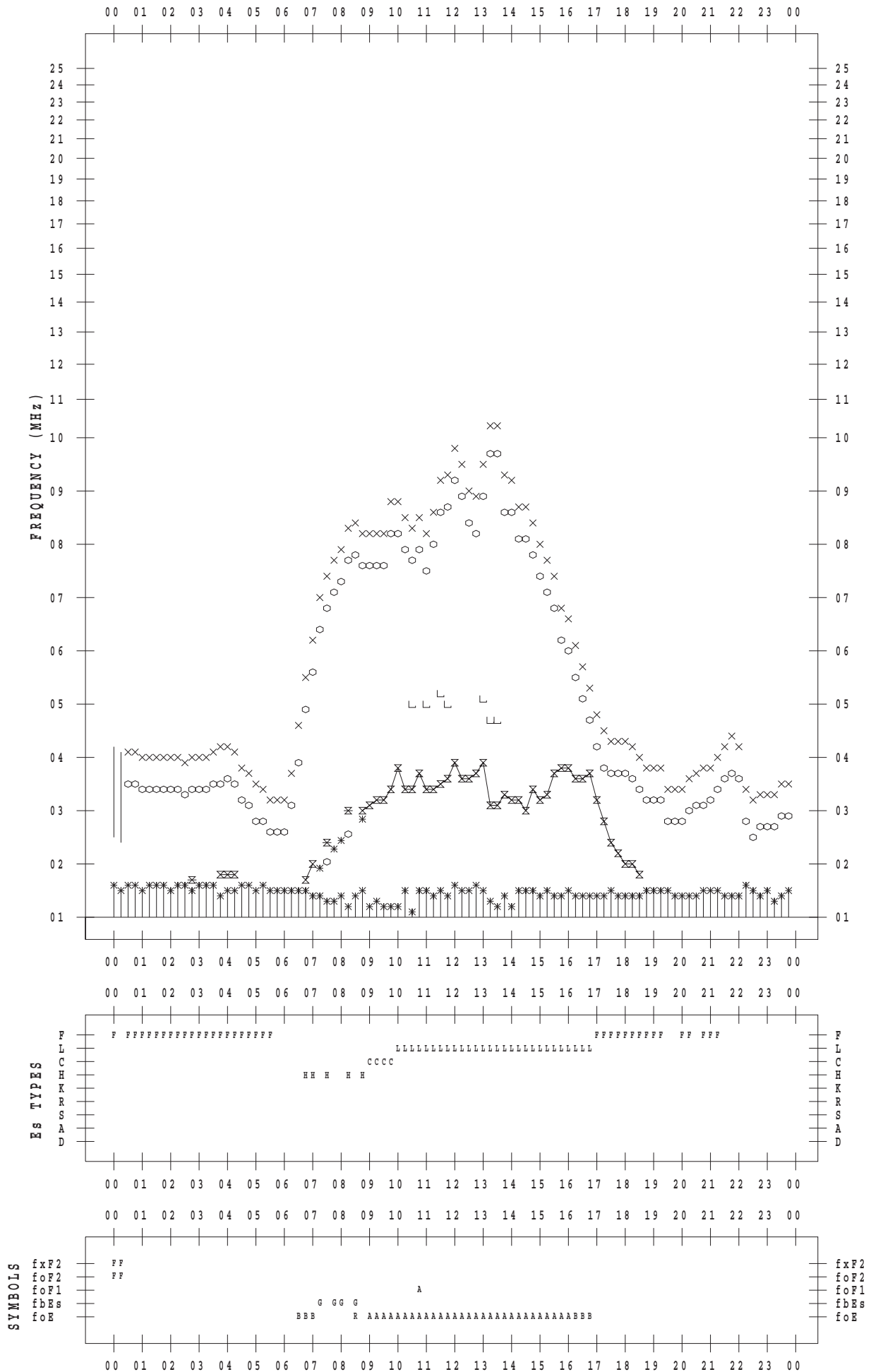
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/10

135 ° E MEAN TIME



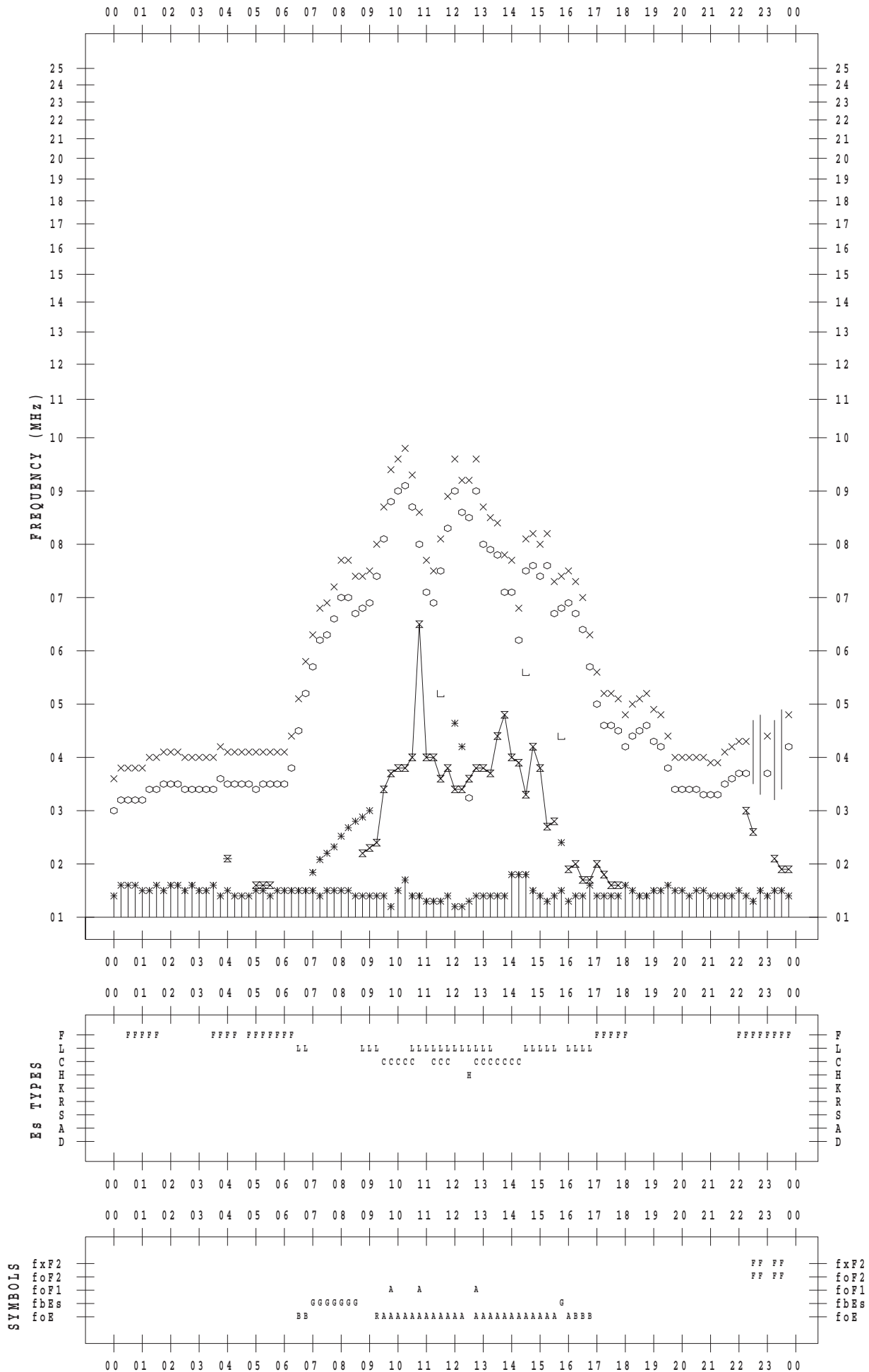
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/11

135 ° E MEAN TIME



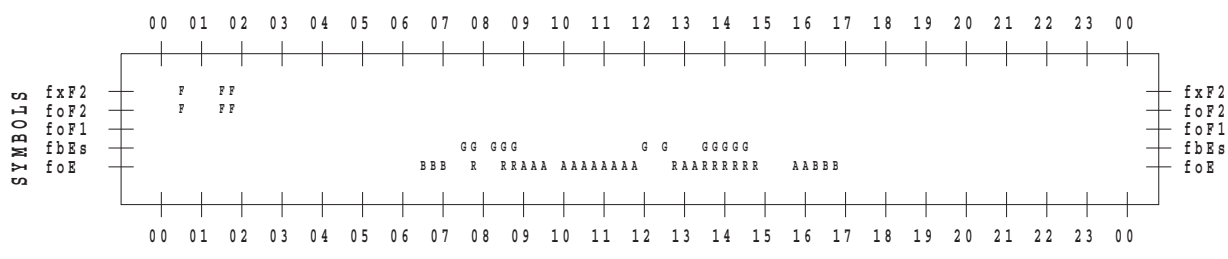
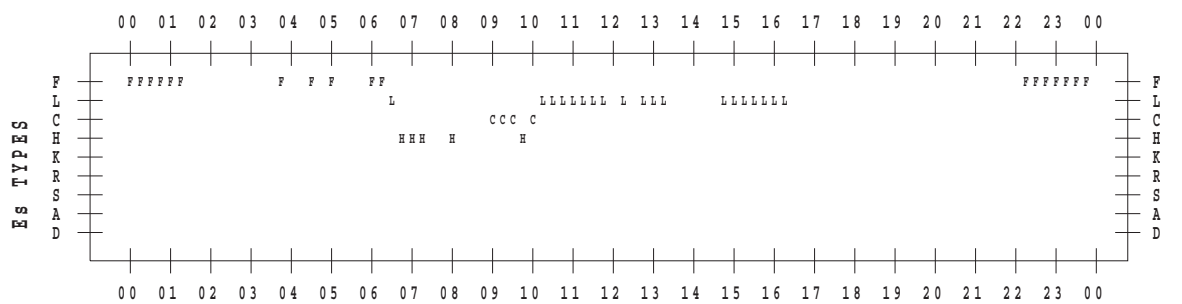
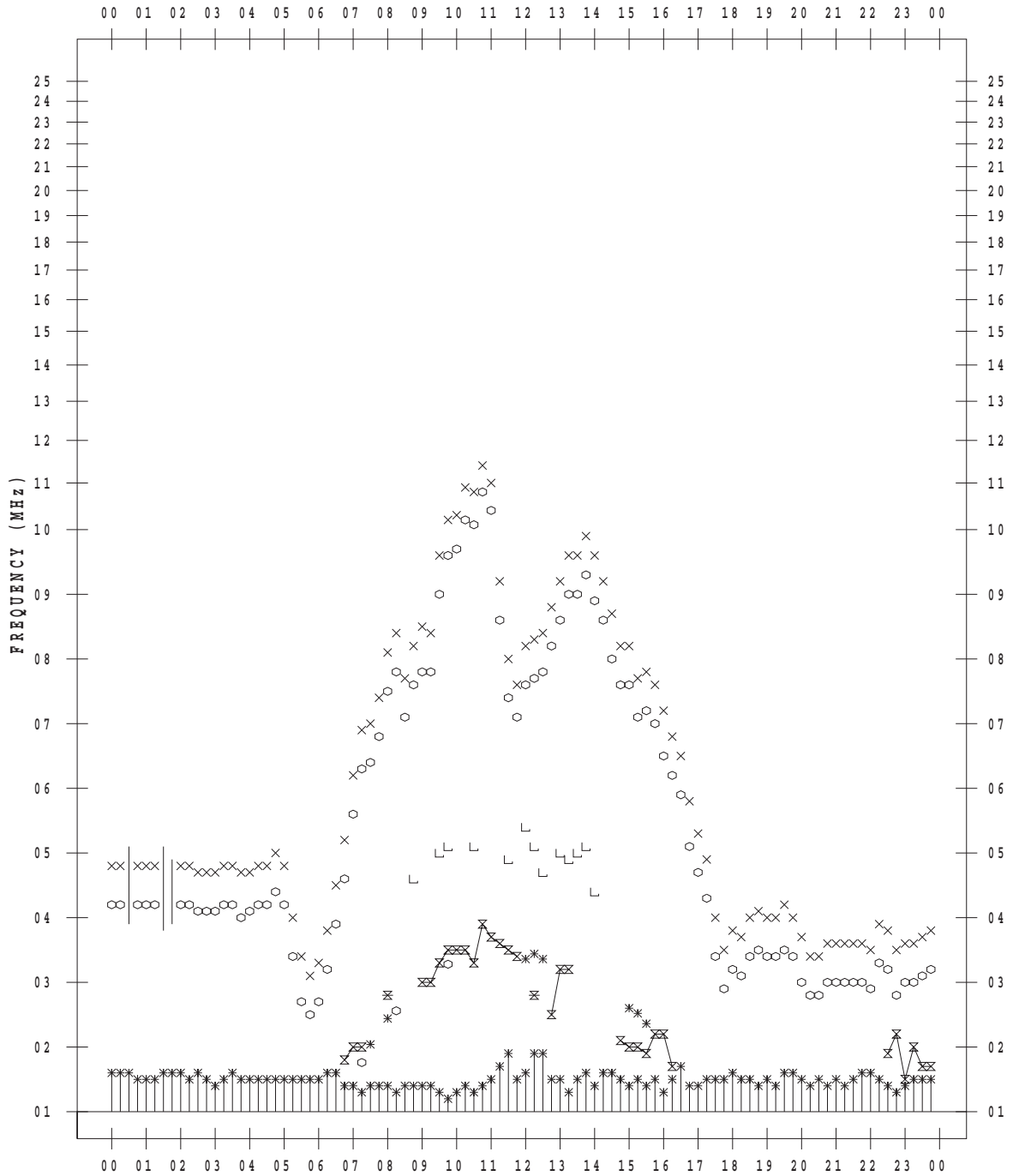
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/12

135 ° E MEAN TIME



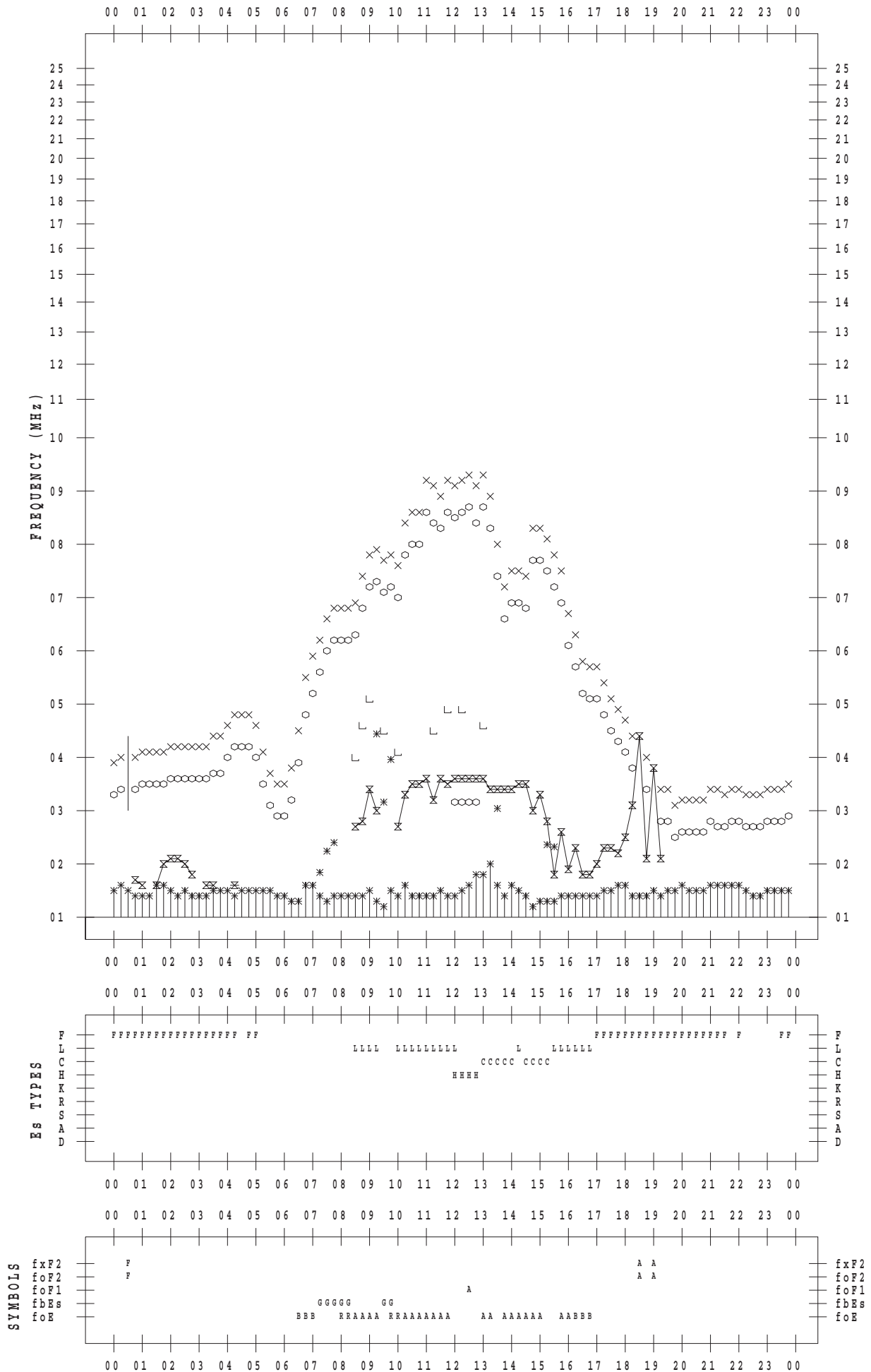
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/13

135 ° E MEAN TIME



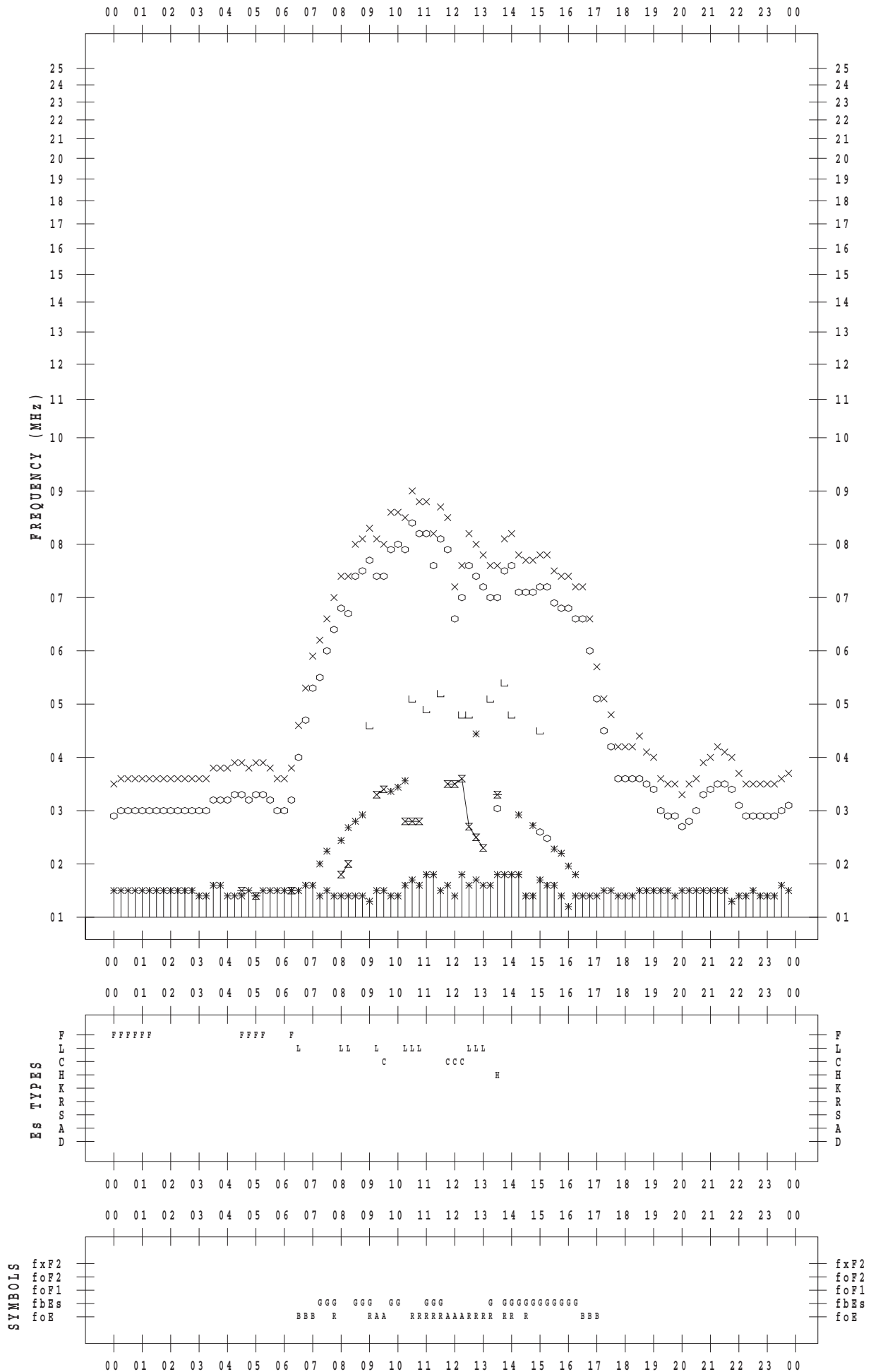
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/14

135 ° E MEAN TIME



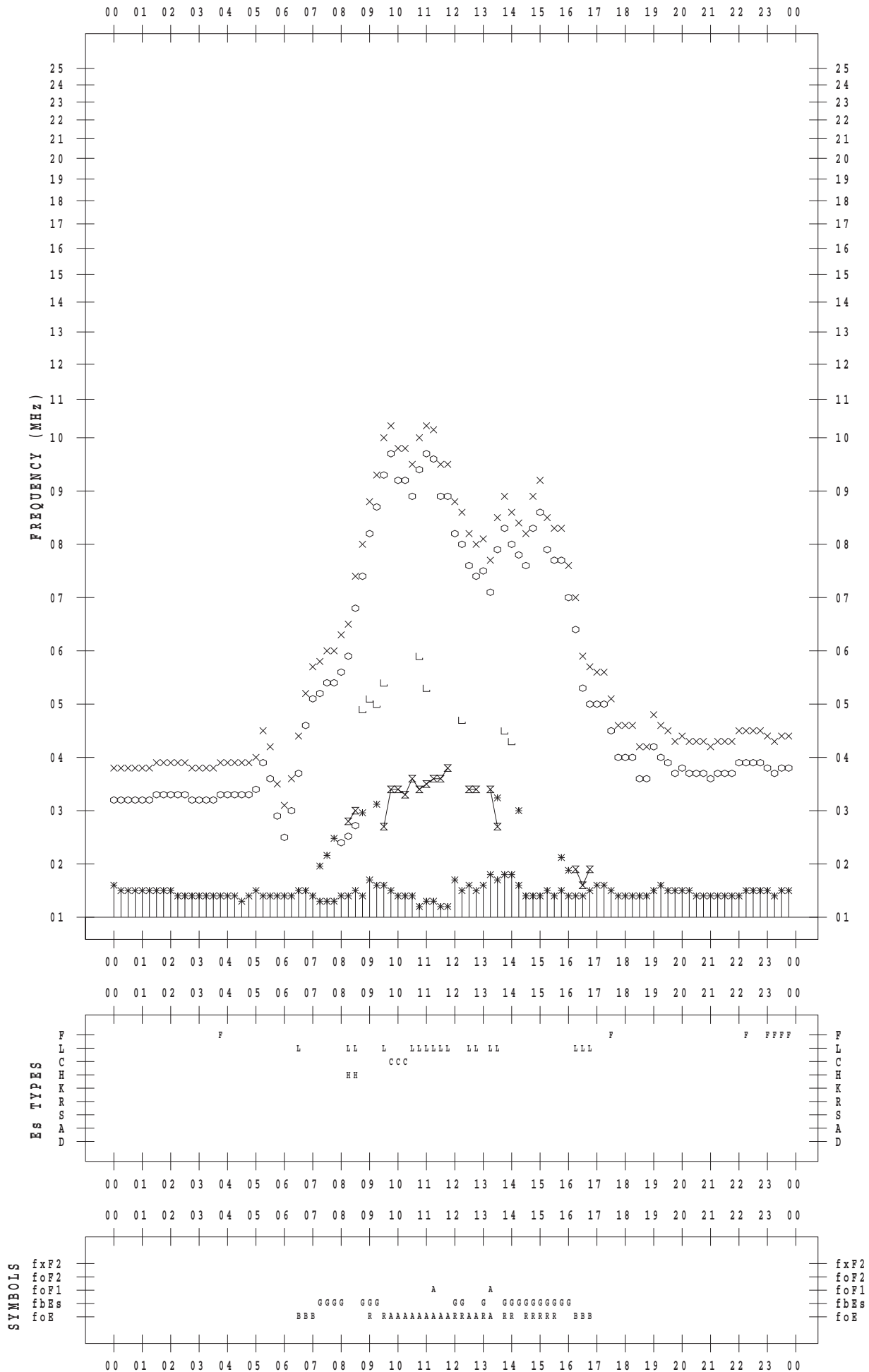
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/15

135 ° E MEAN TIME



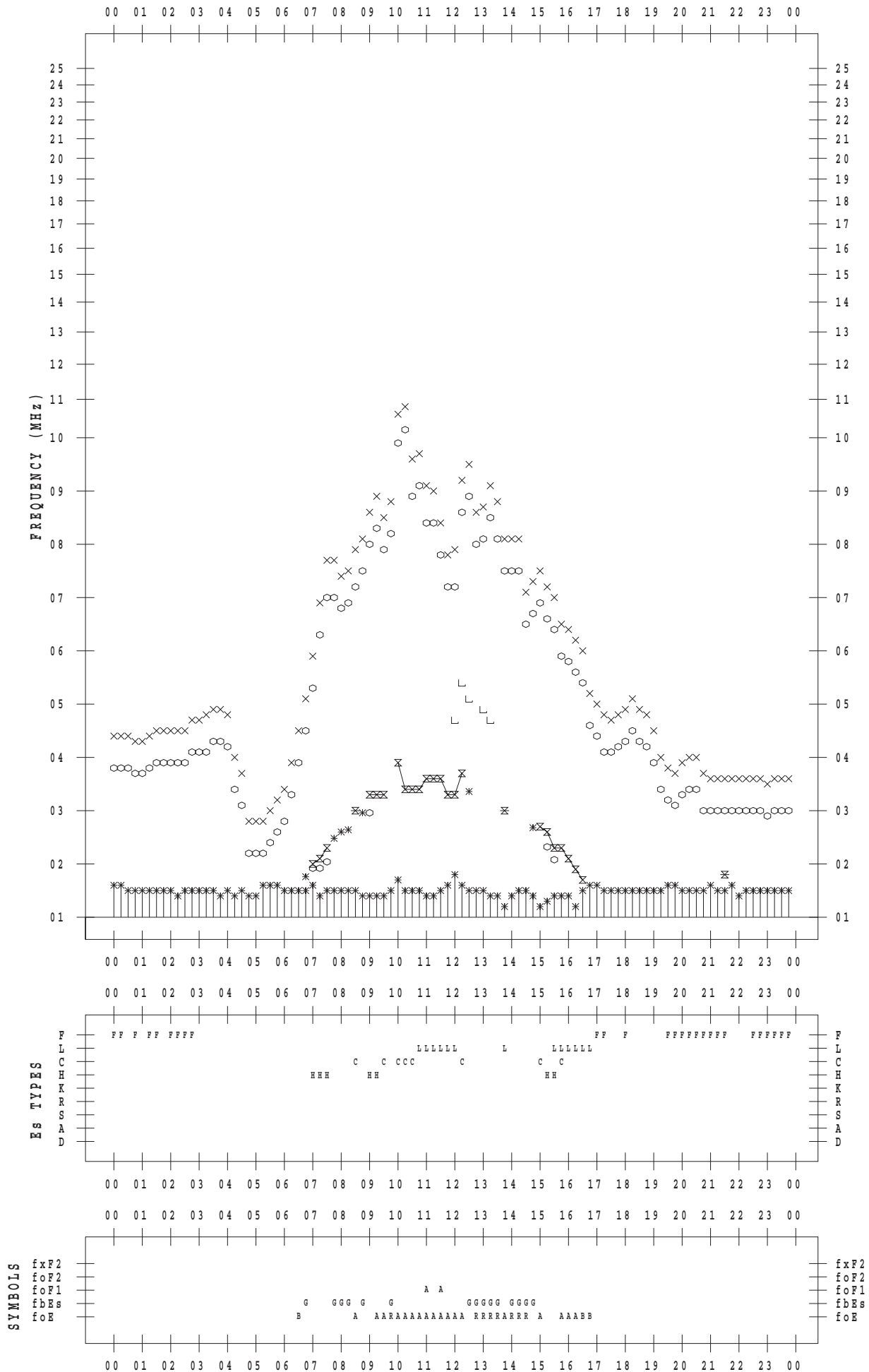
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/16

135 ° E MEAN TIME



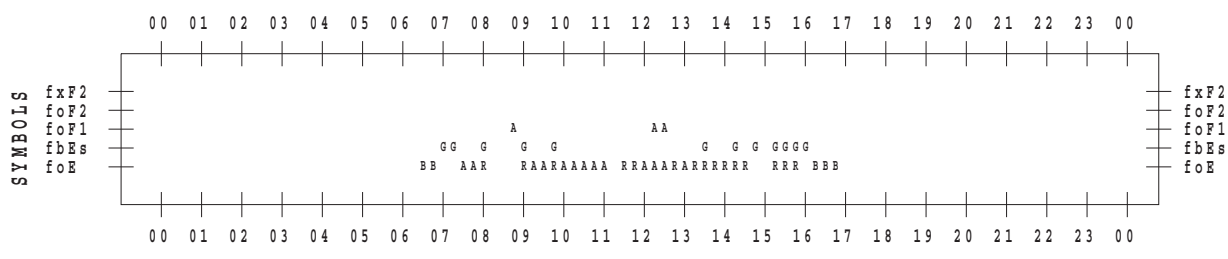
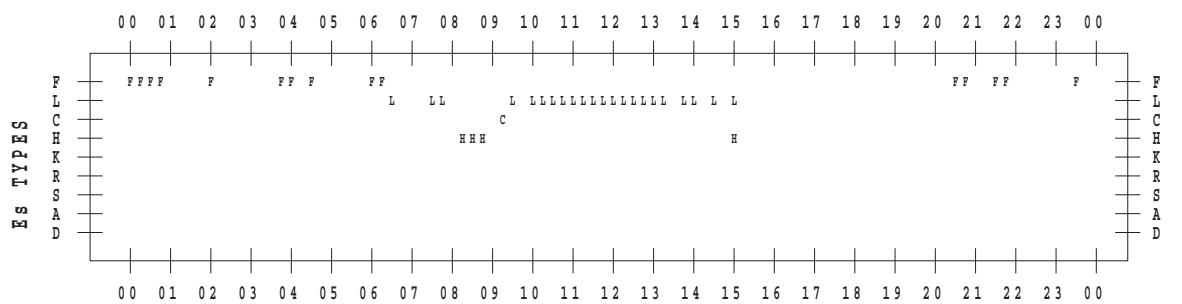
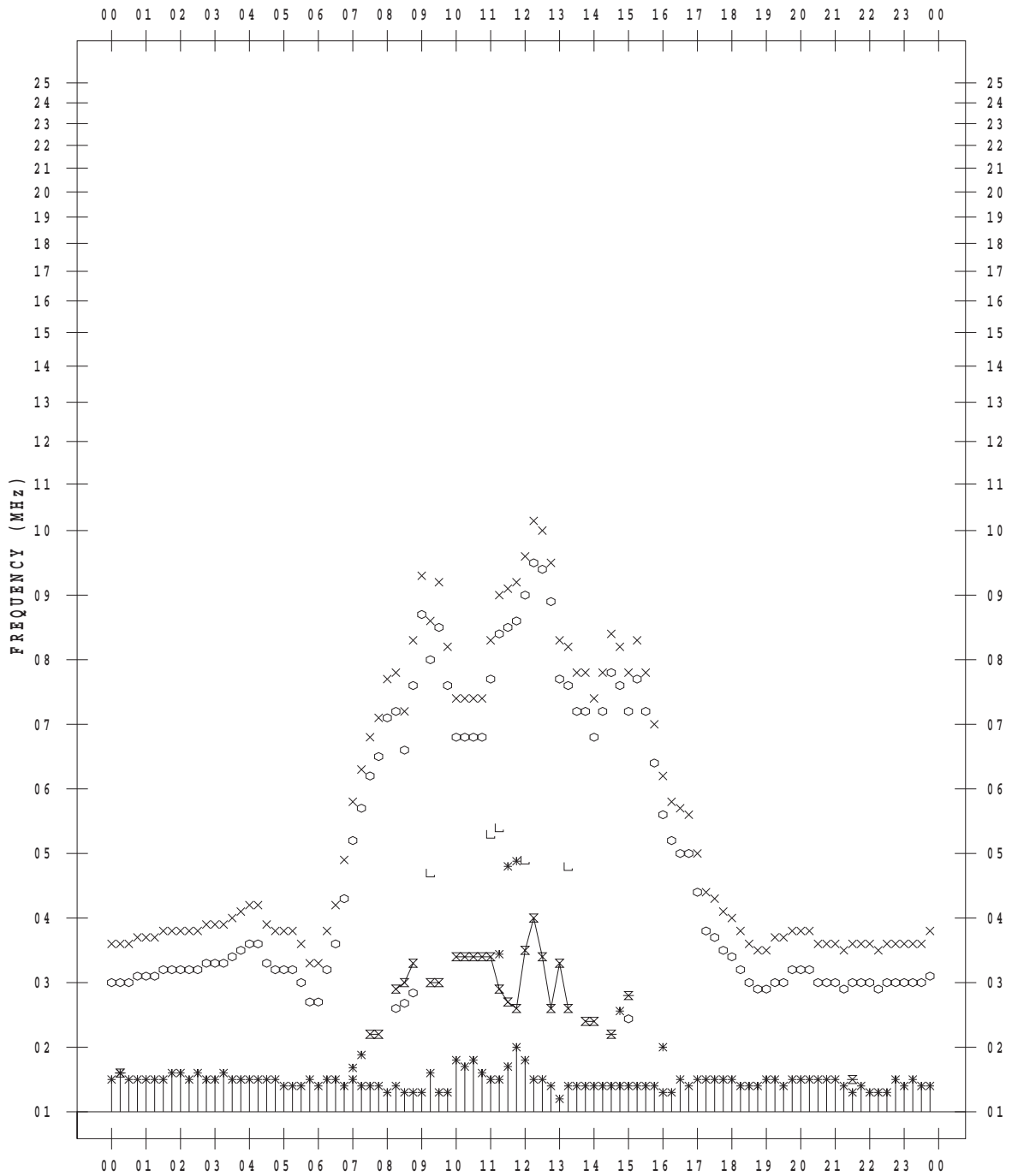
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/17

135 ° E MEAN TIME



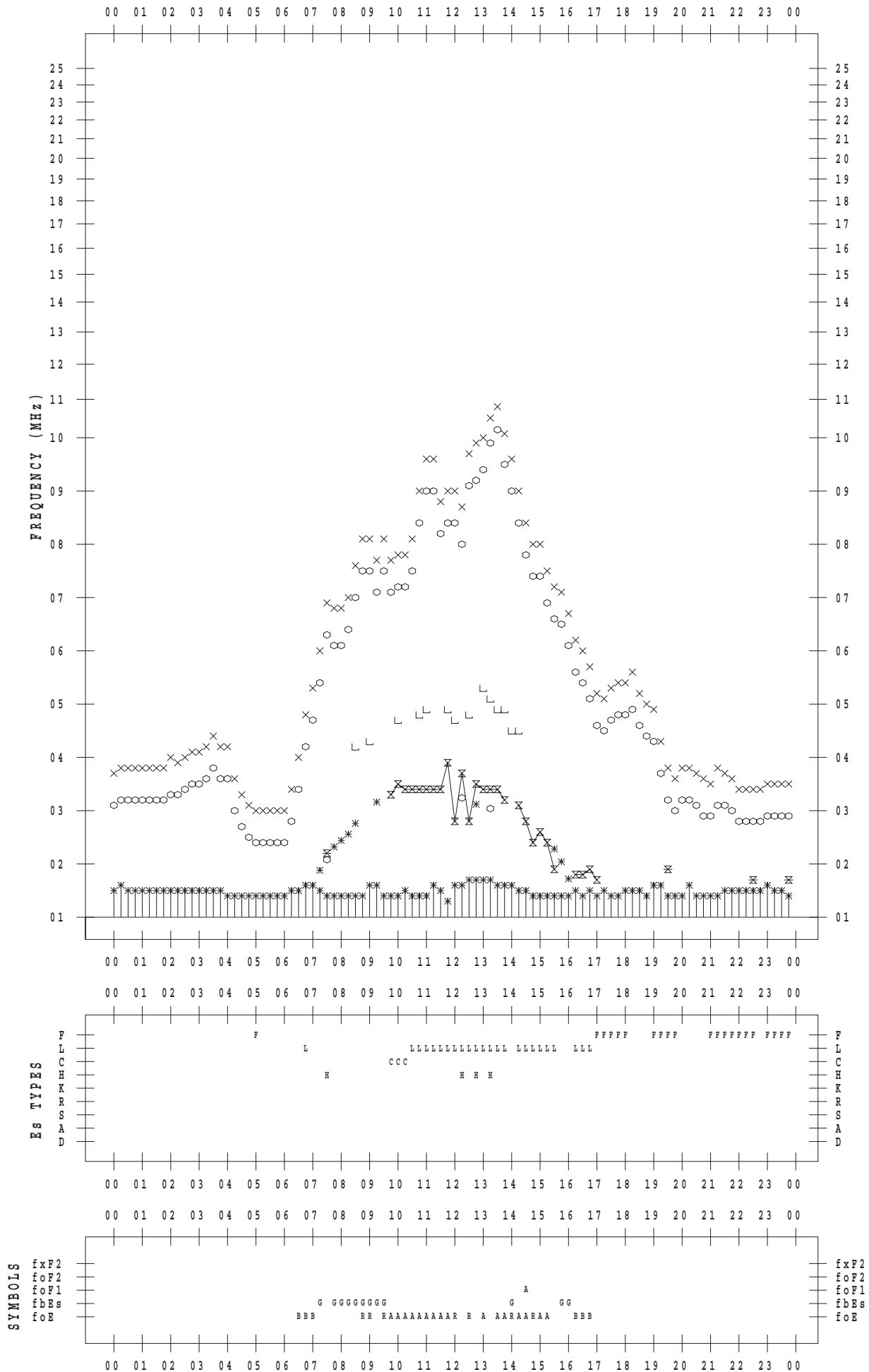
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/18

135 ° E MEAN TIME



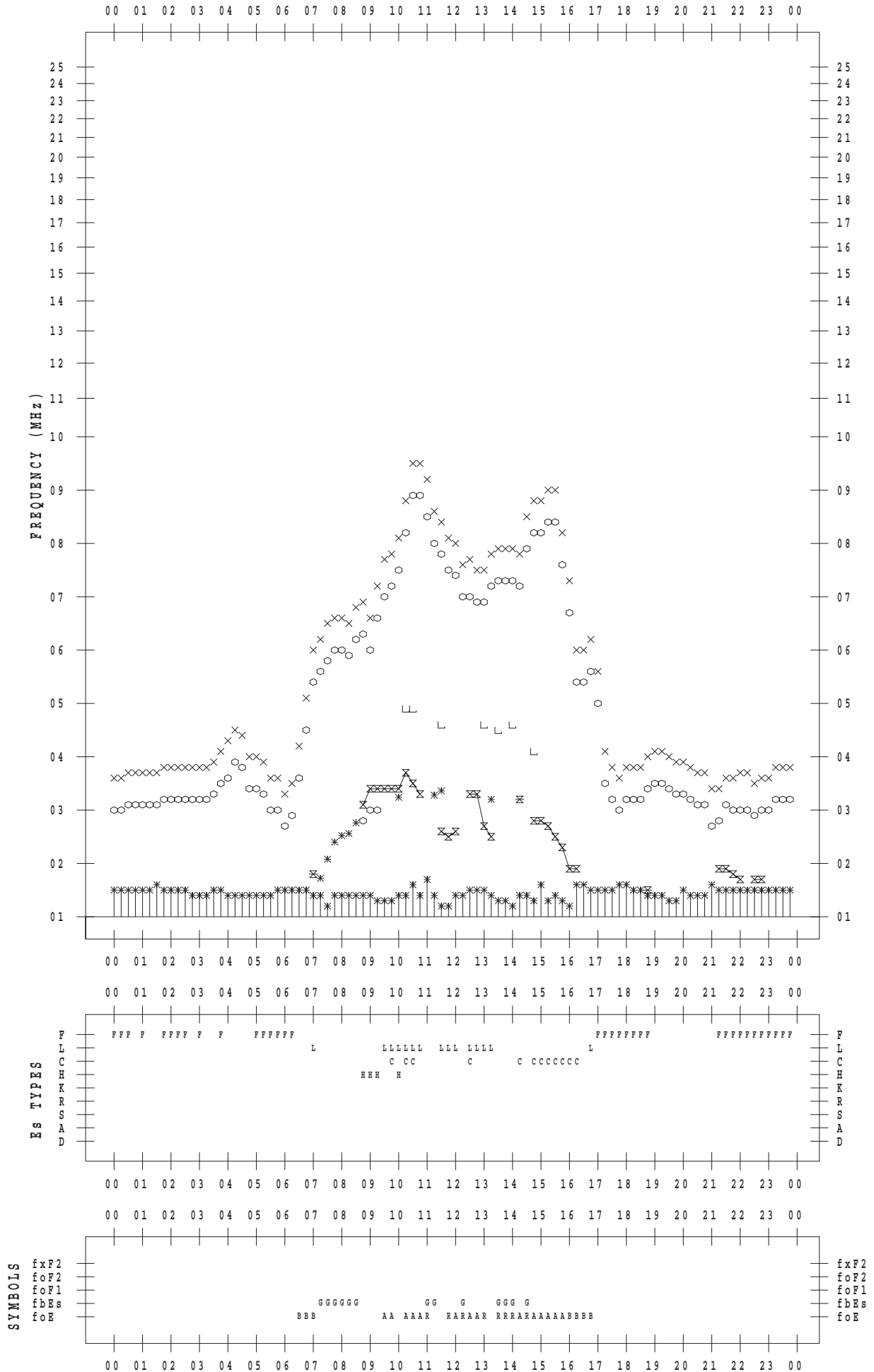
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/19

135 ° E MEAN TIME



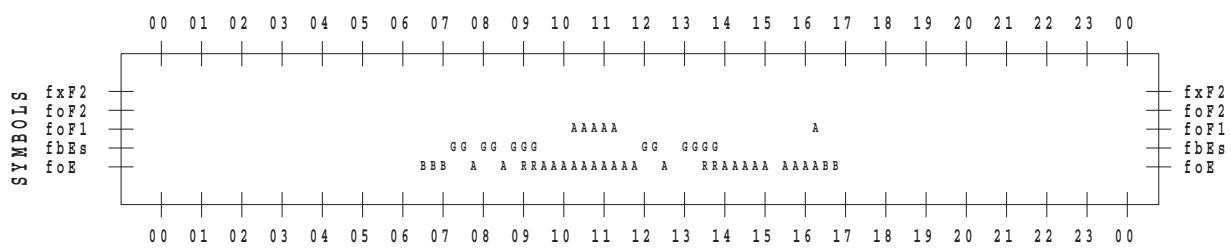
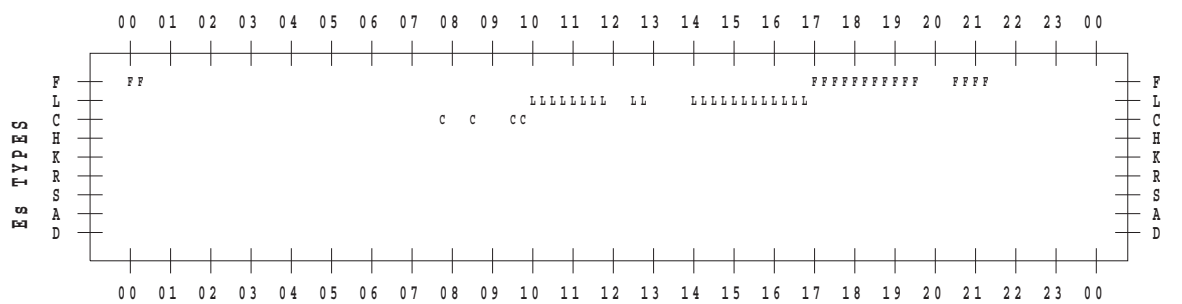
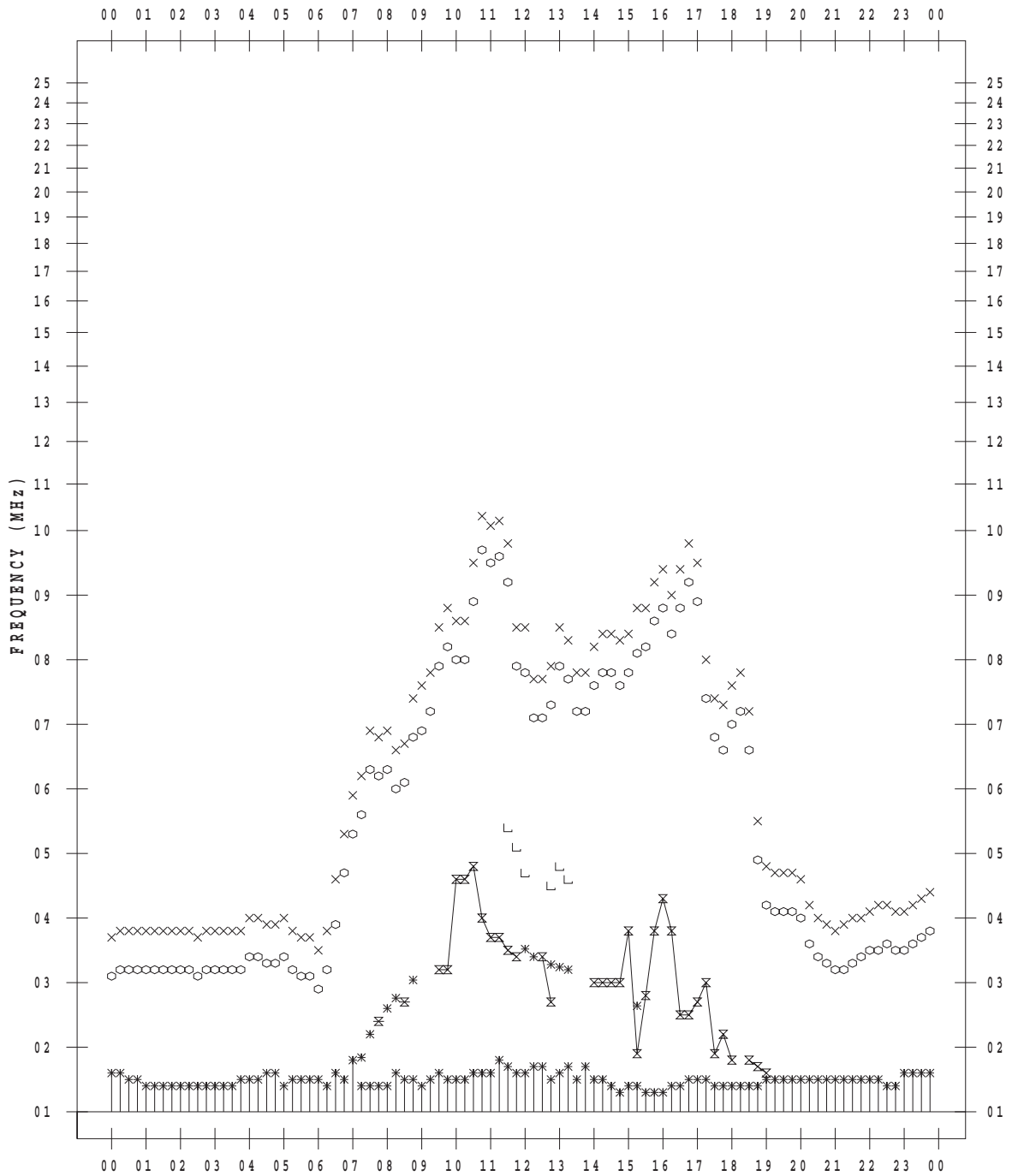
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/20

135 ° E MEAN TIME



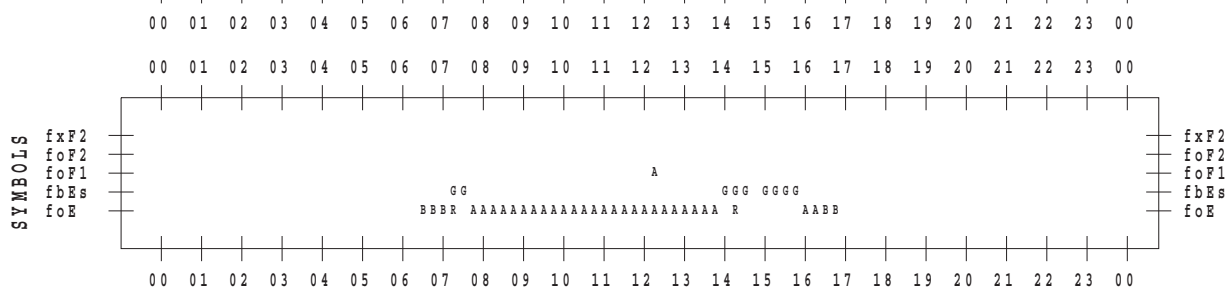
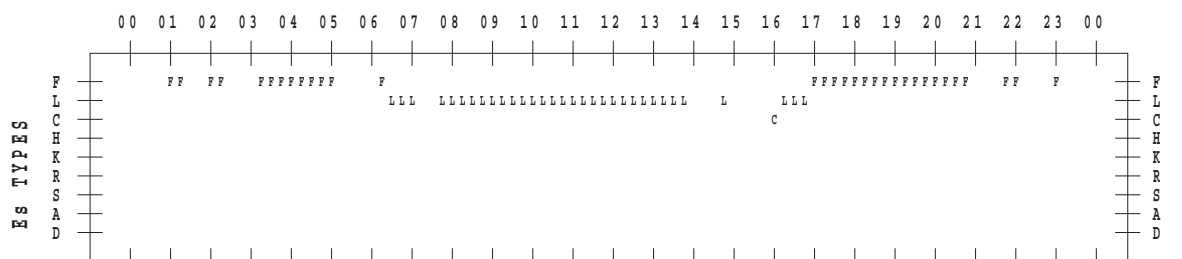
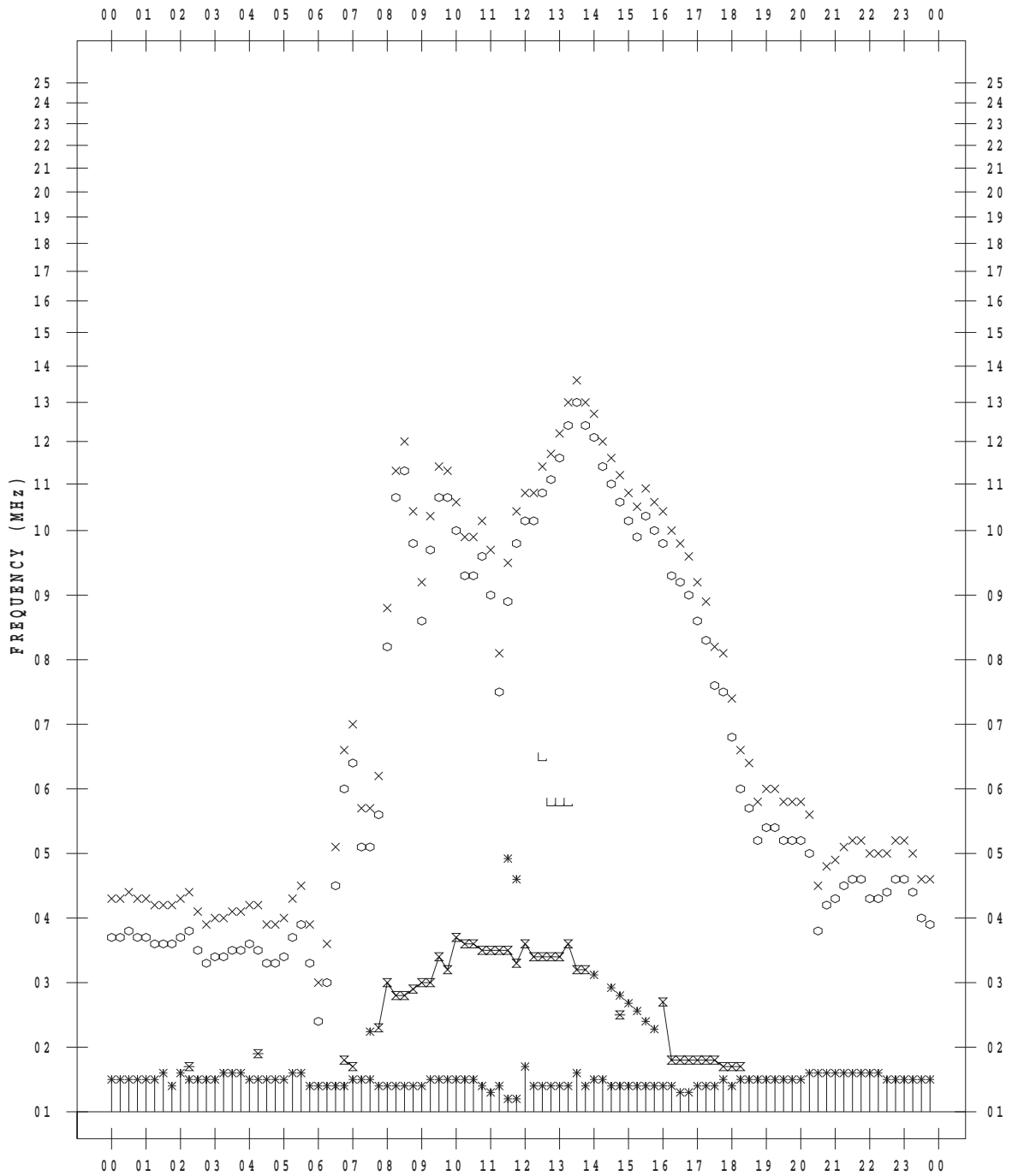
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/21

135 ° E MEAN TIME



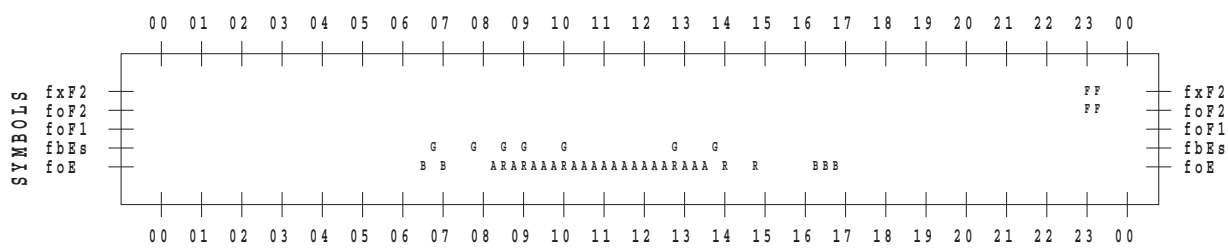
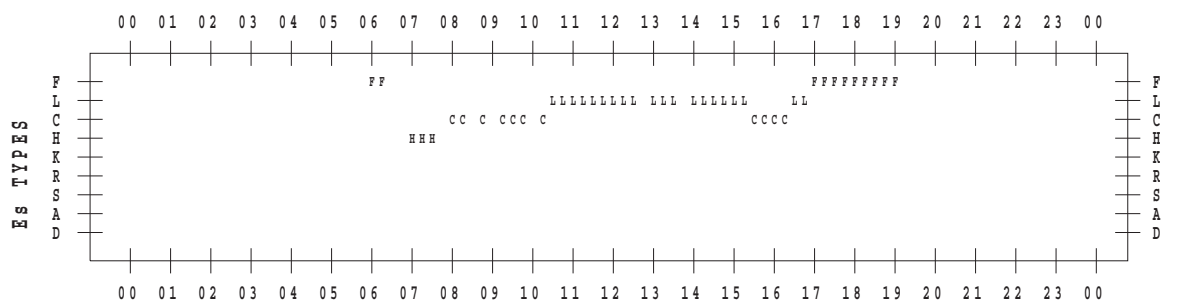
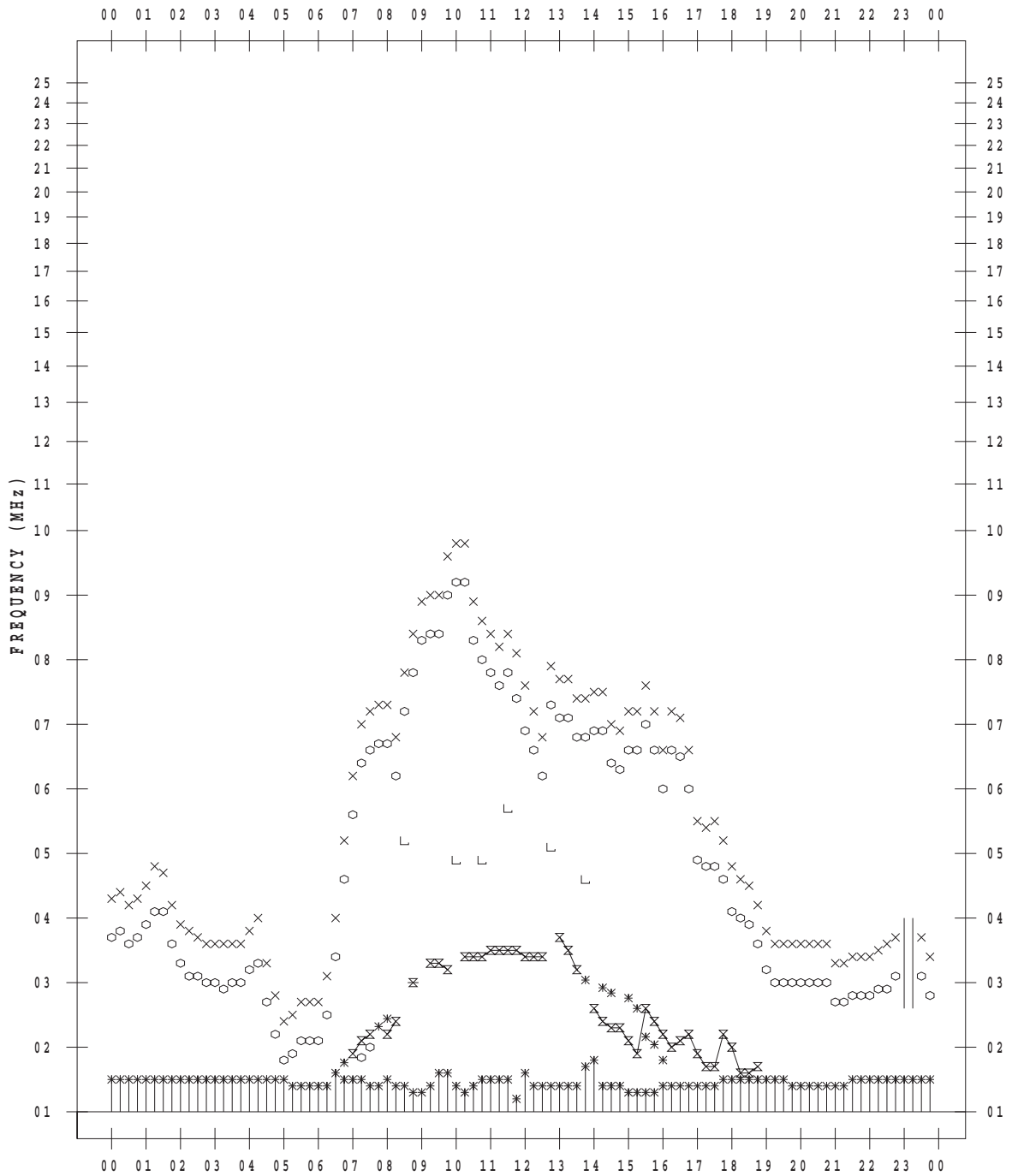
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/22

135 ° E MEAN TIME



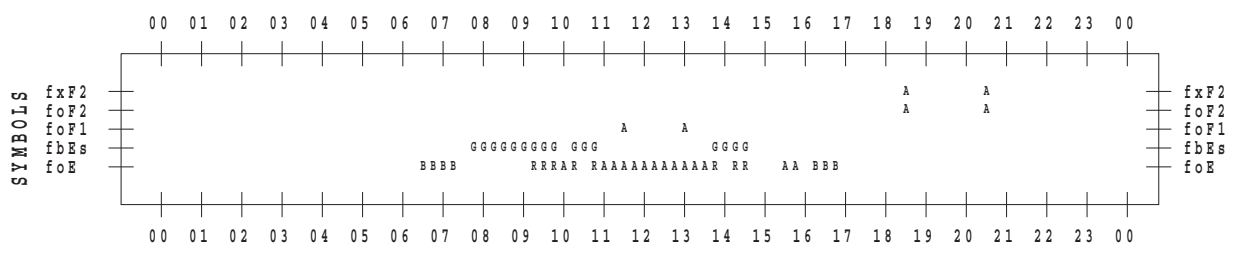
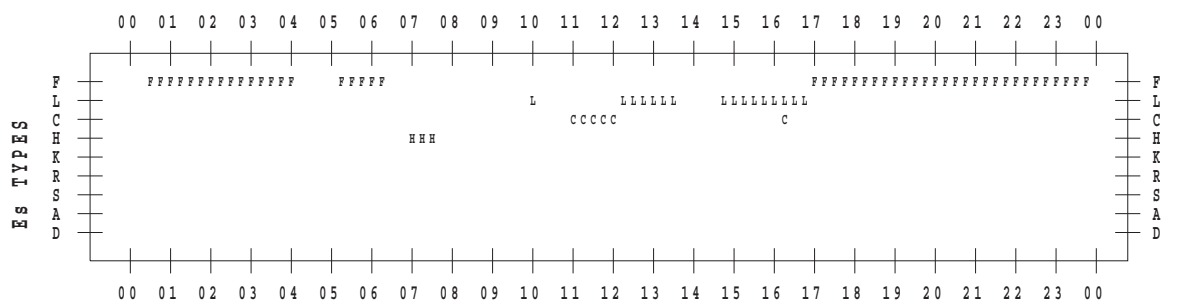
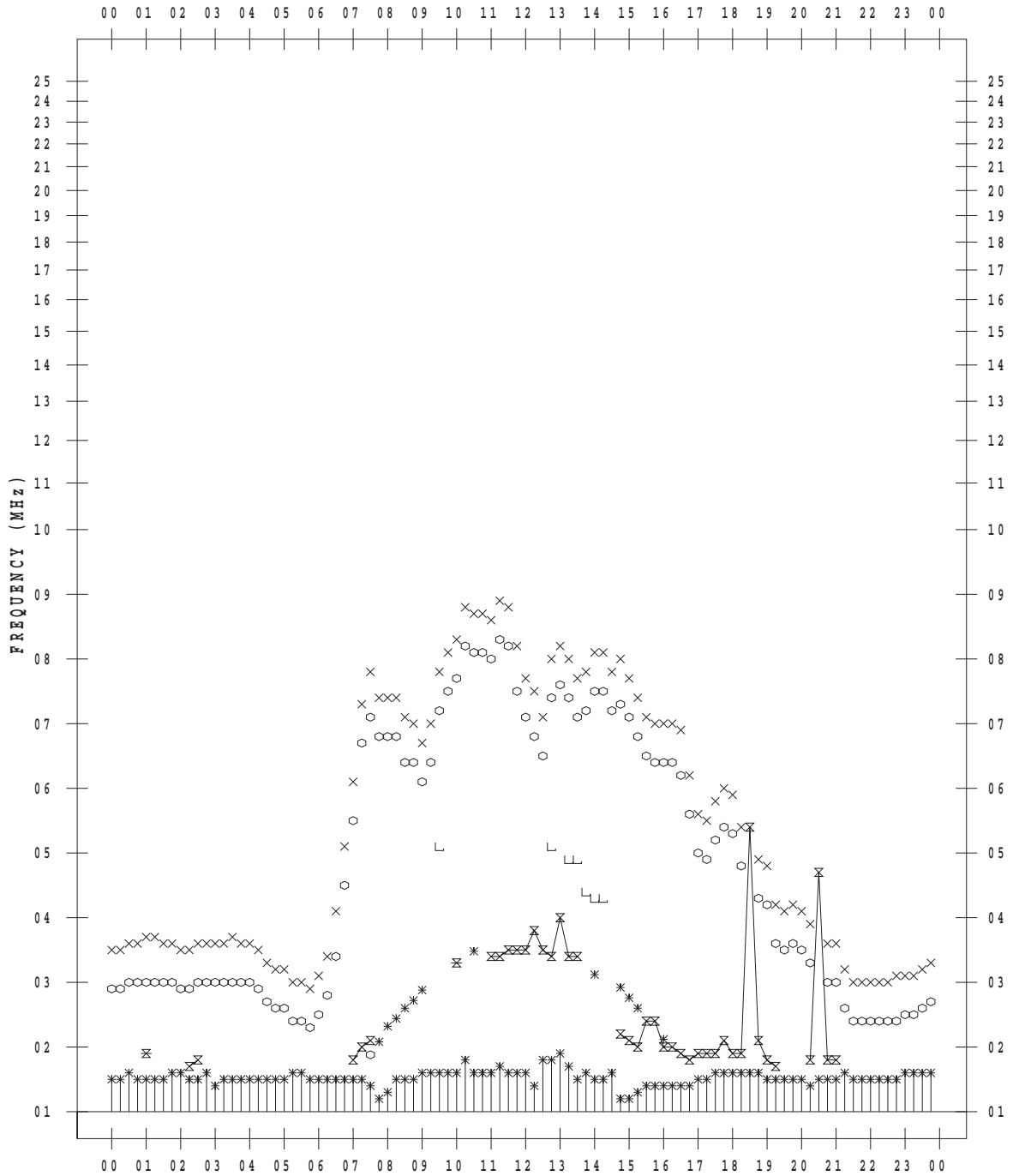
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/23

135 ° E MEAN TIME



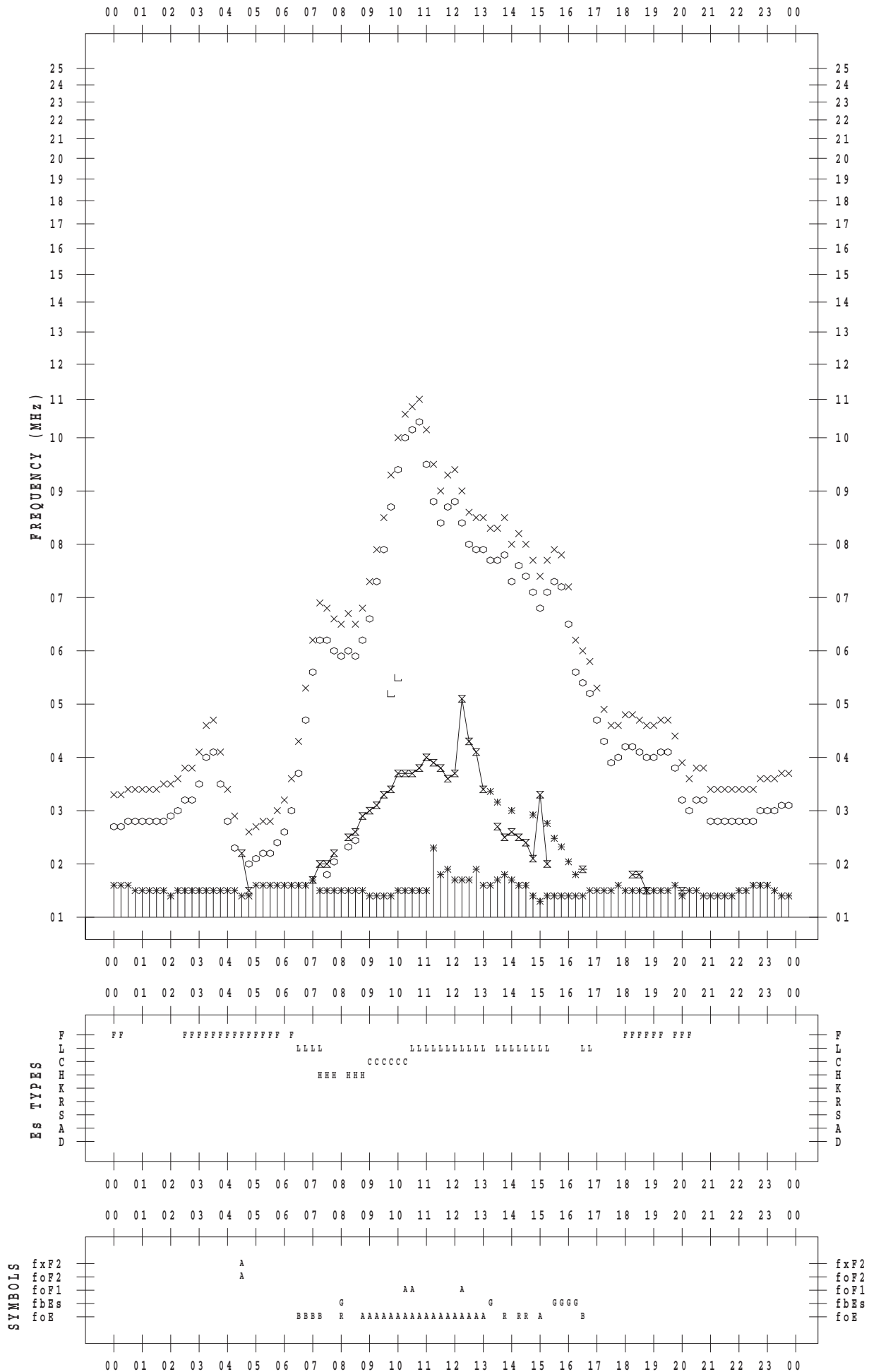
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/24

135 ° E MEAN TIME



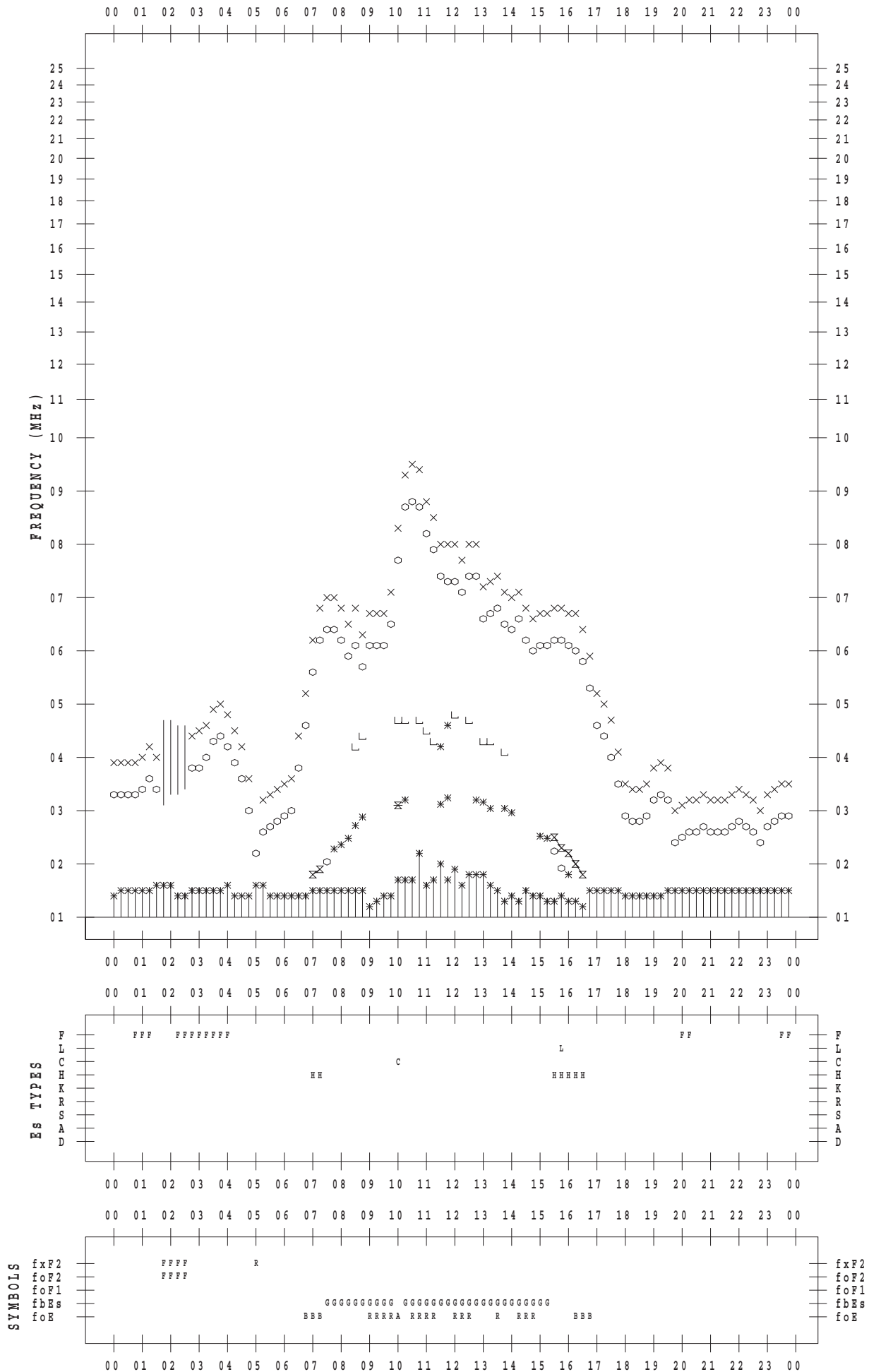
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/26

135 ° E MEAN TIME



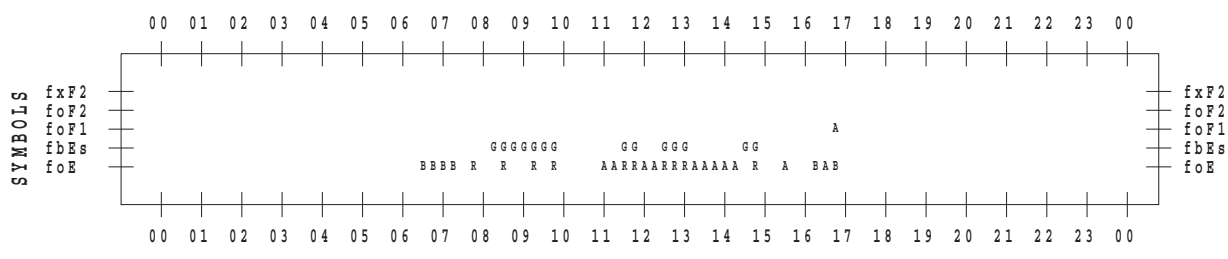
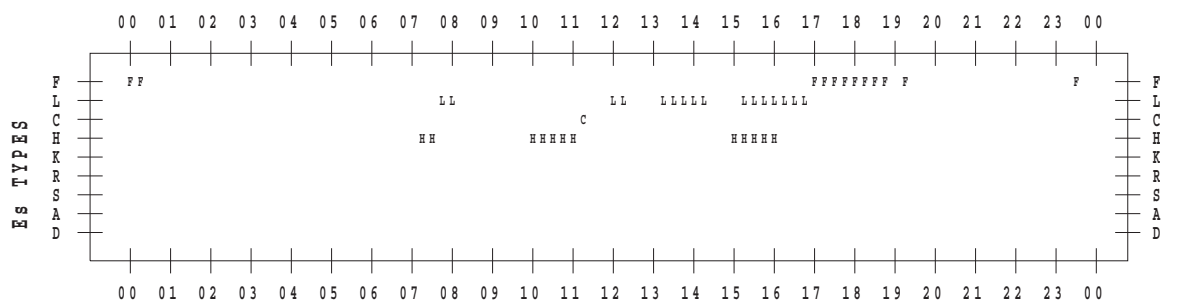
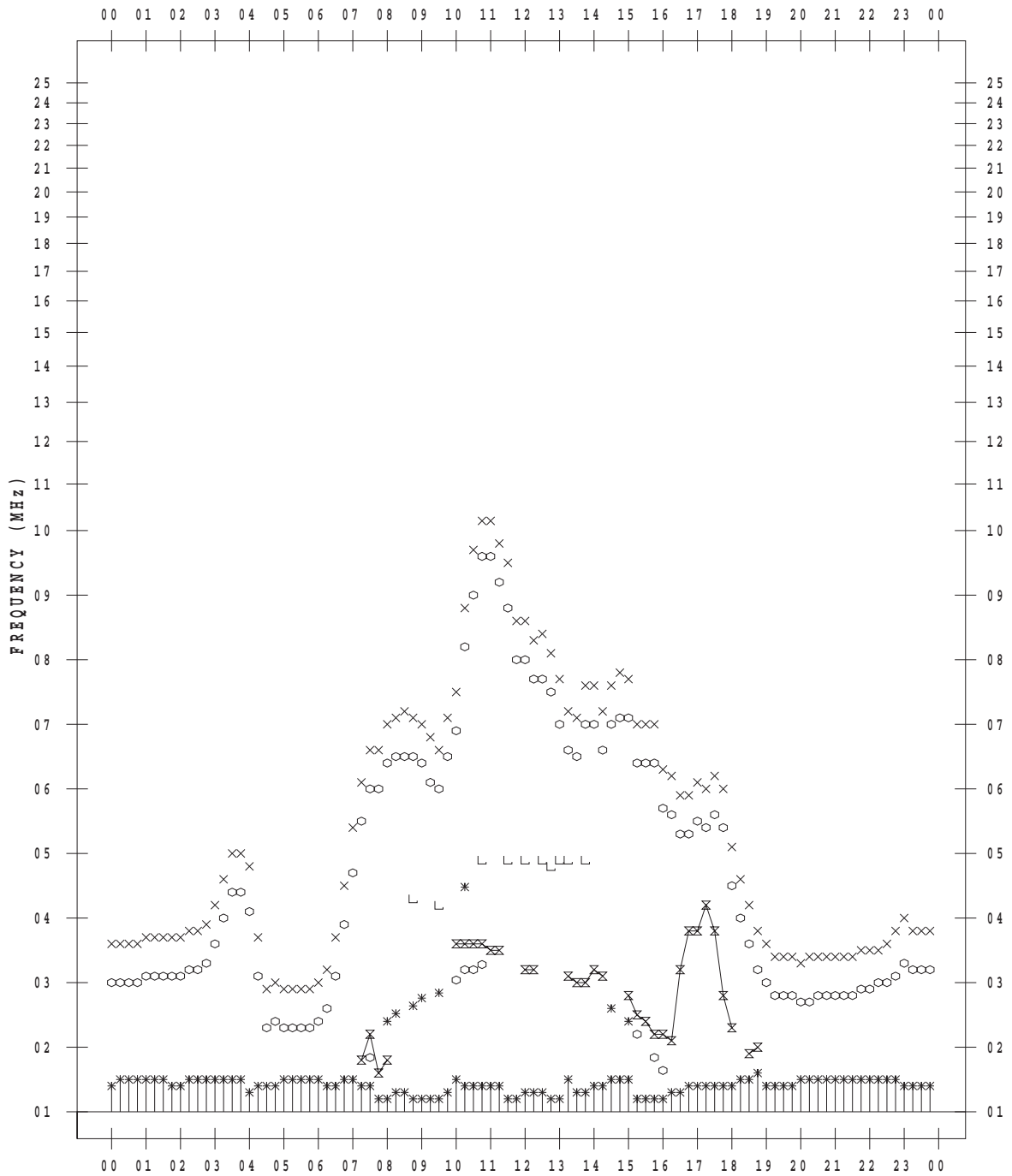
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/27

135 ° E MEAN TIME



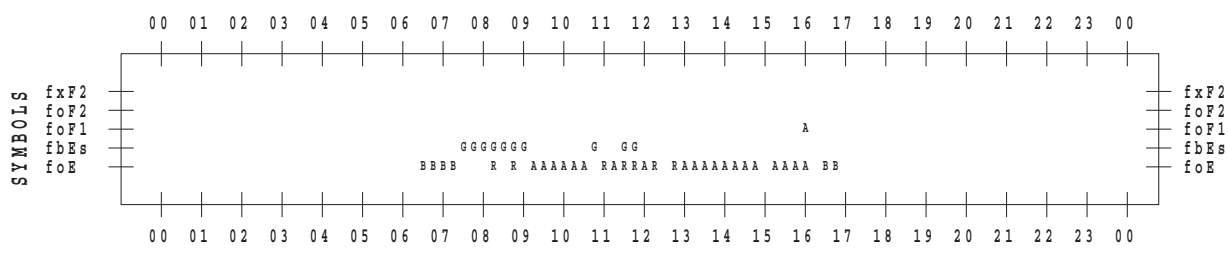
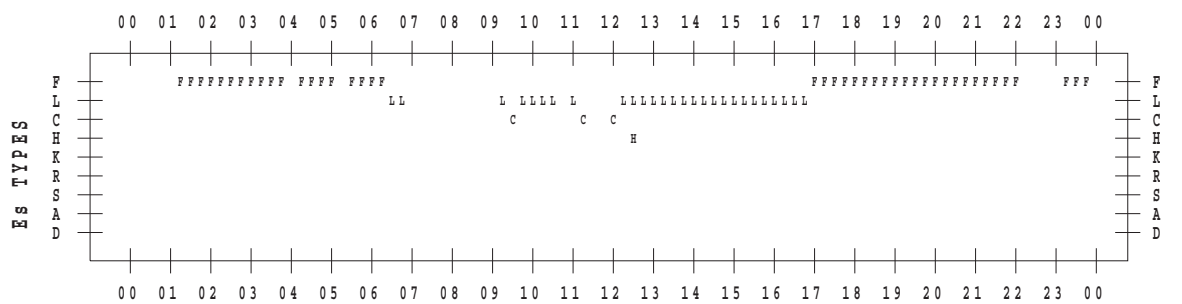
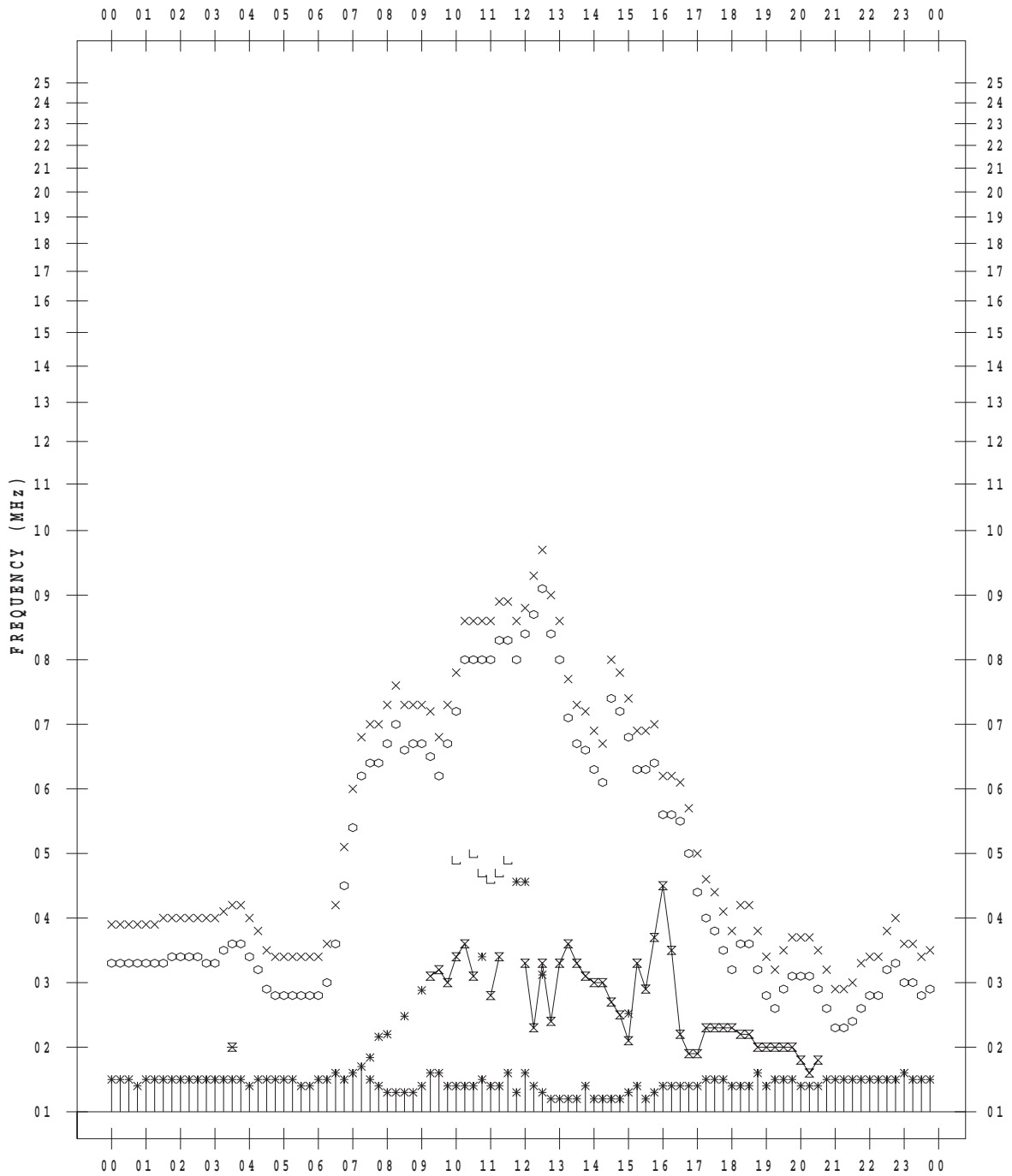
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/28

135 ° E MEAN TIME



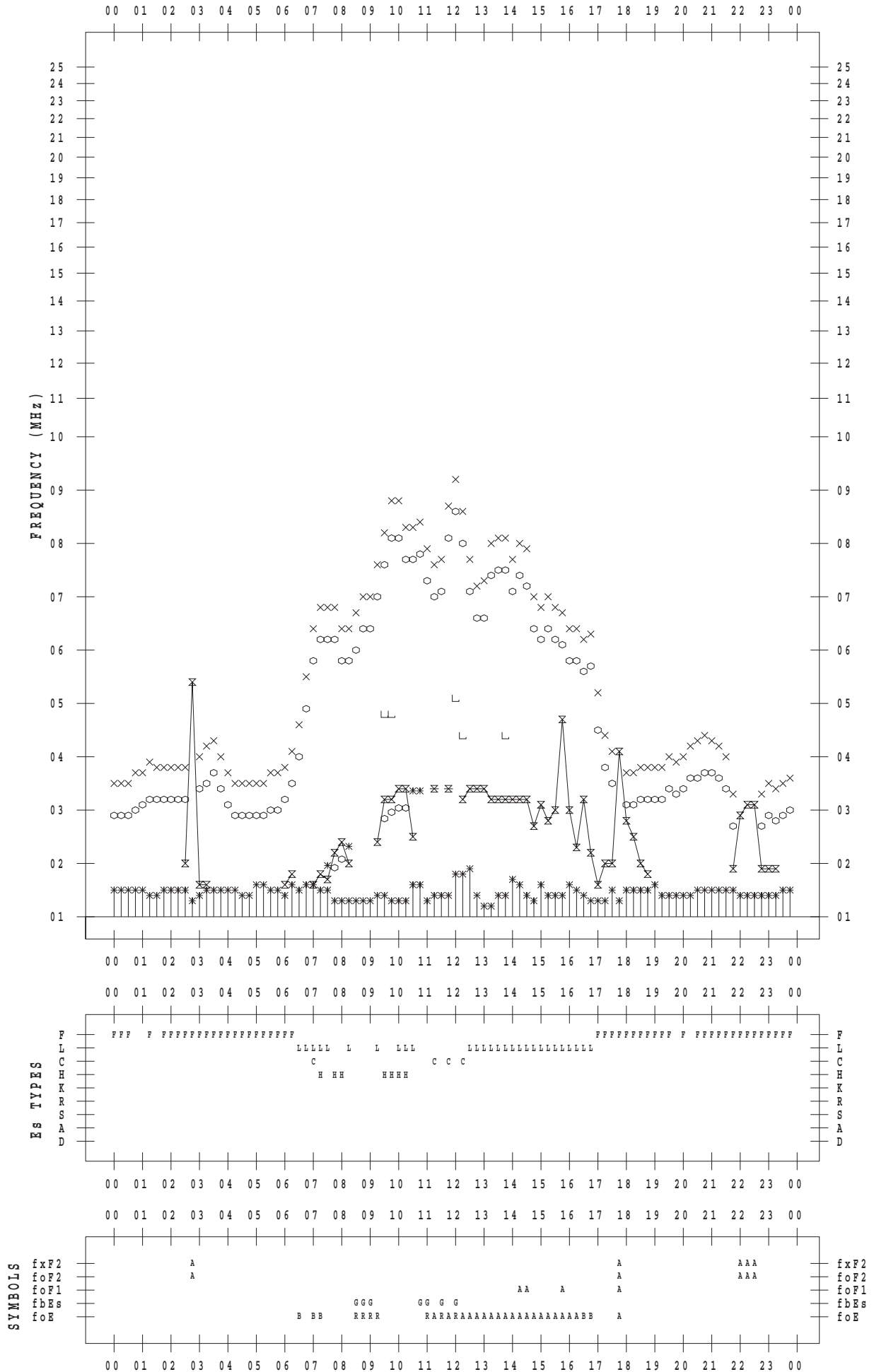
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/29

135 ° E MEAN TIME



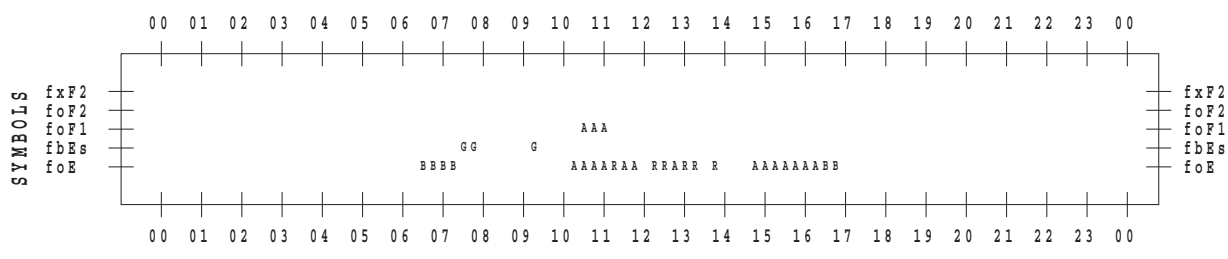
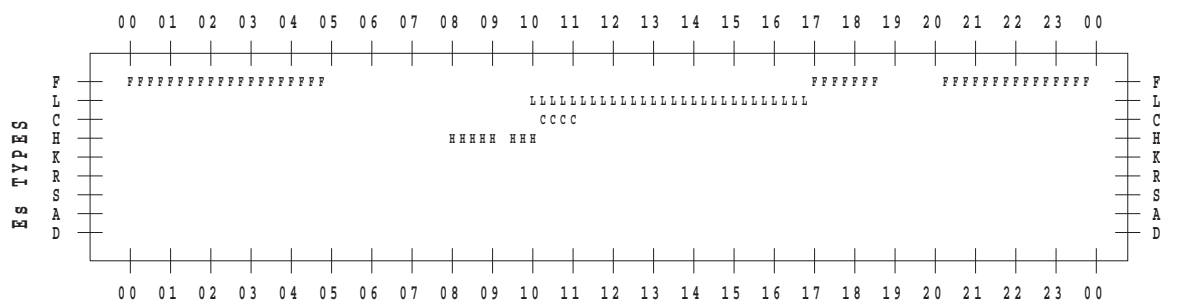
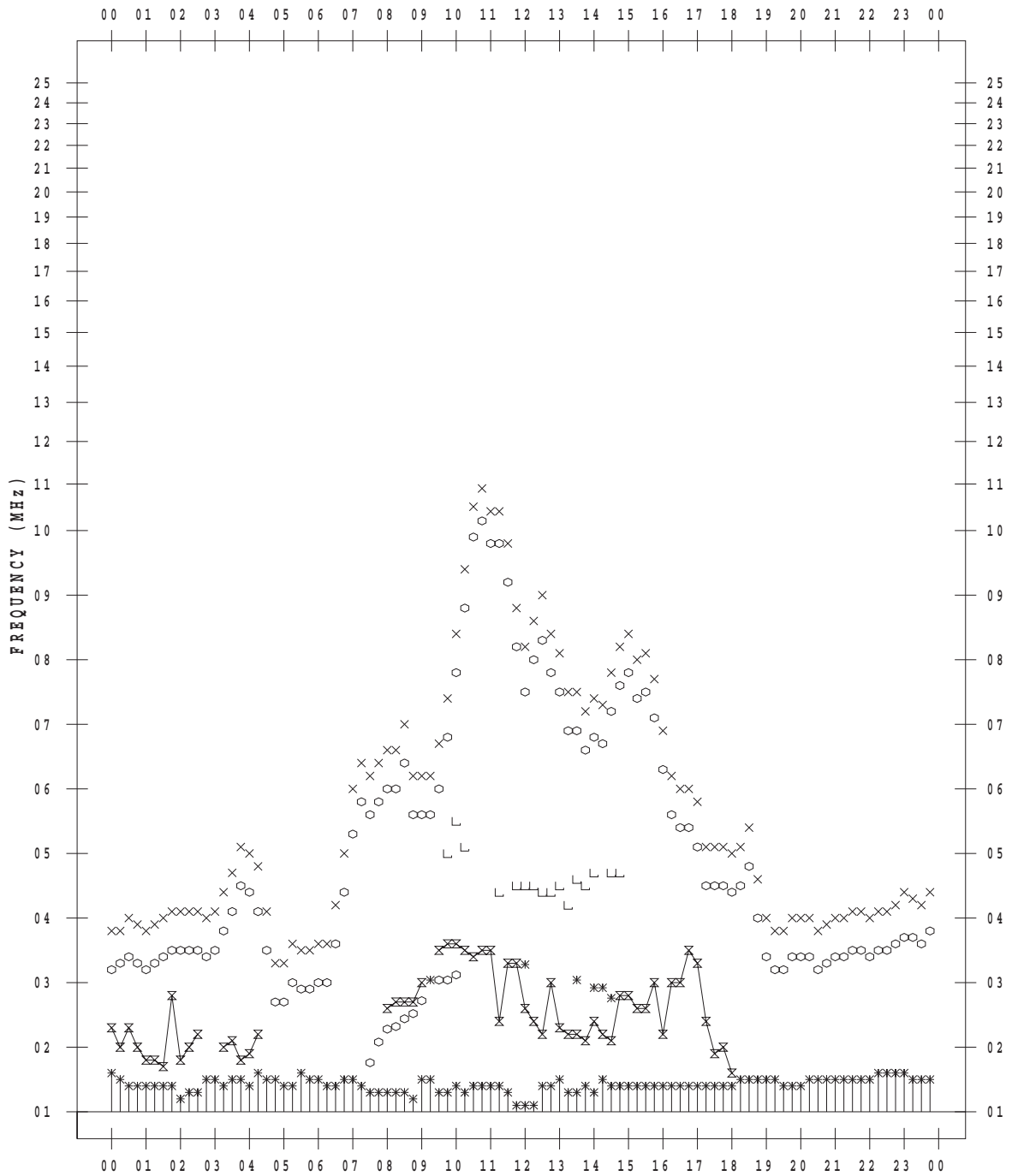
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2015/12/31

135 ° E MEAN TIME



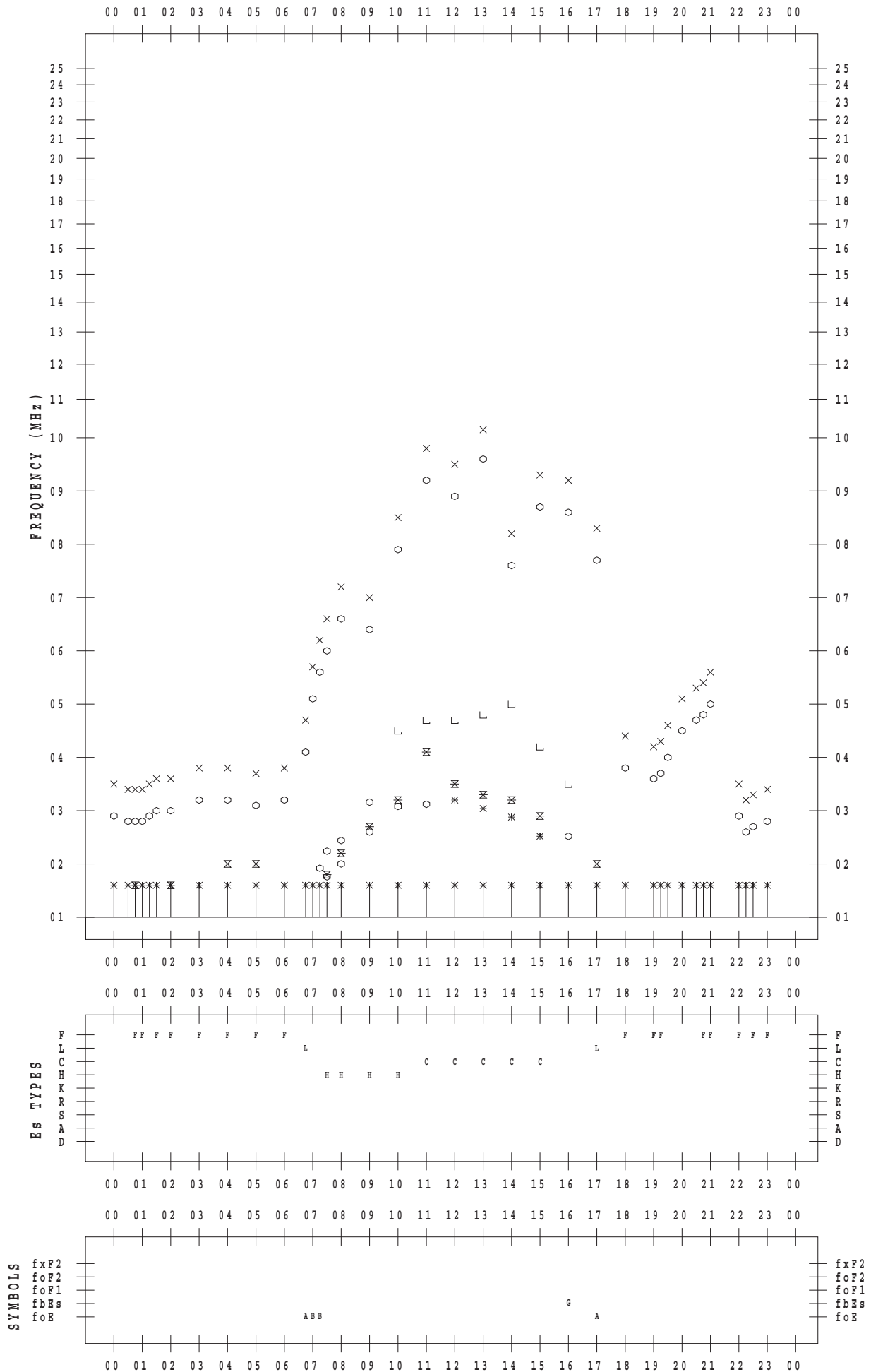
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/ 1

135 ° E MEAN TIME



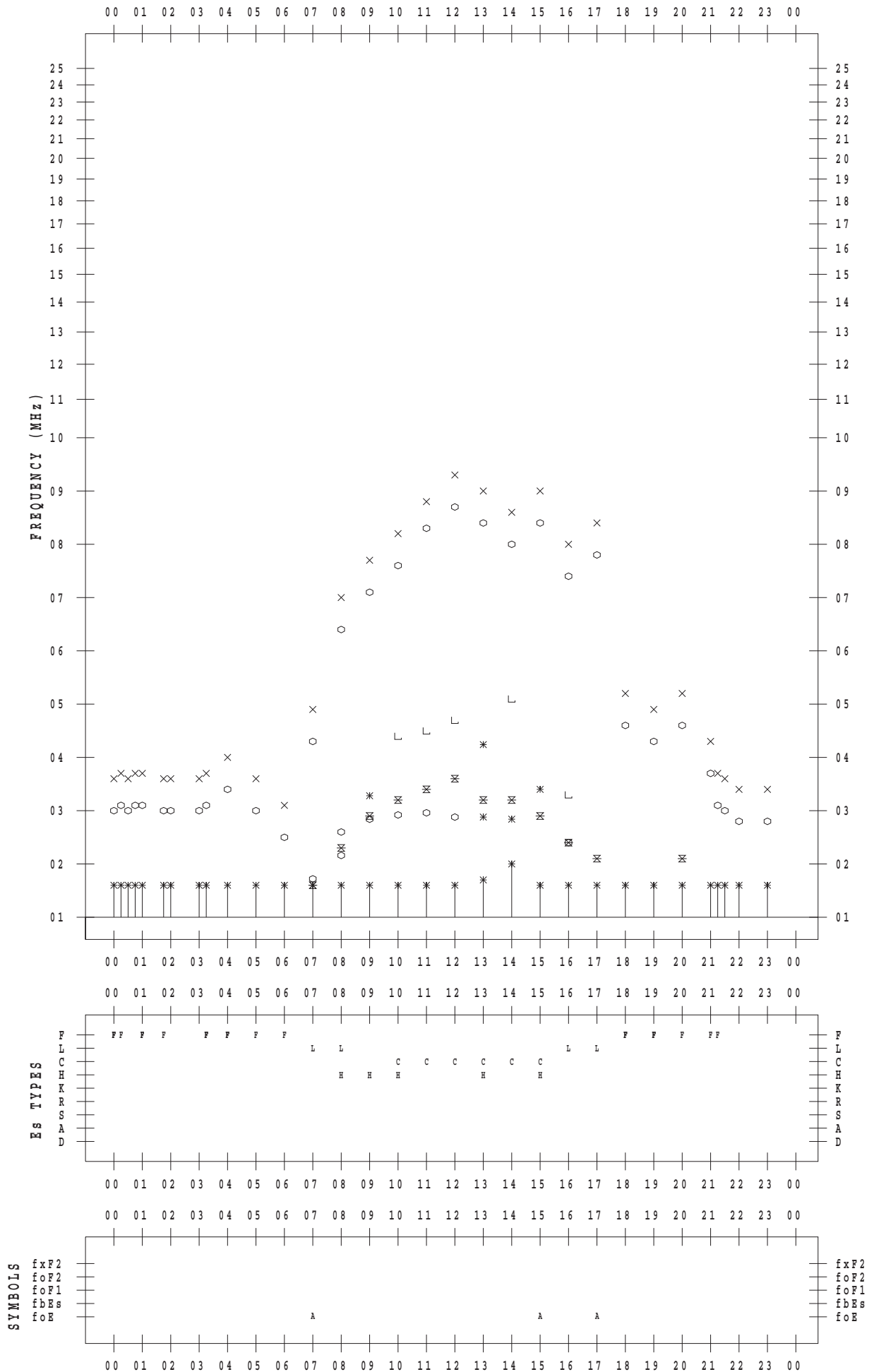
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/ 2

135 ° E MEAN TIME



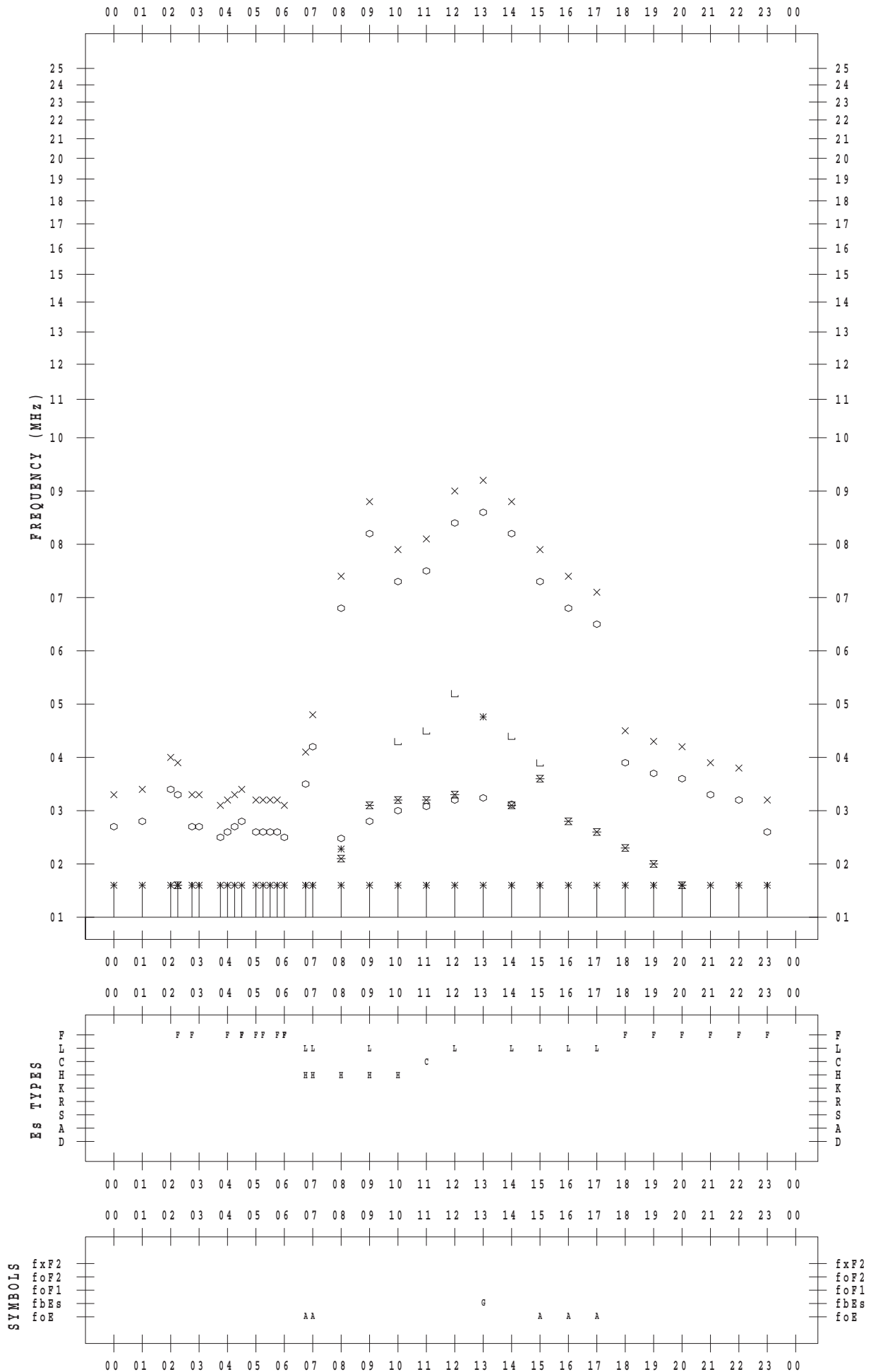
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/ 3

135 ° E MEAN TIME



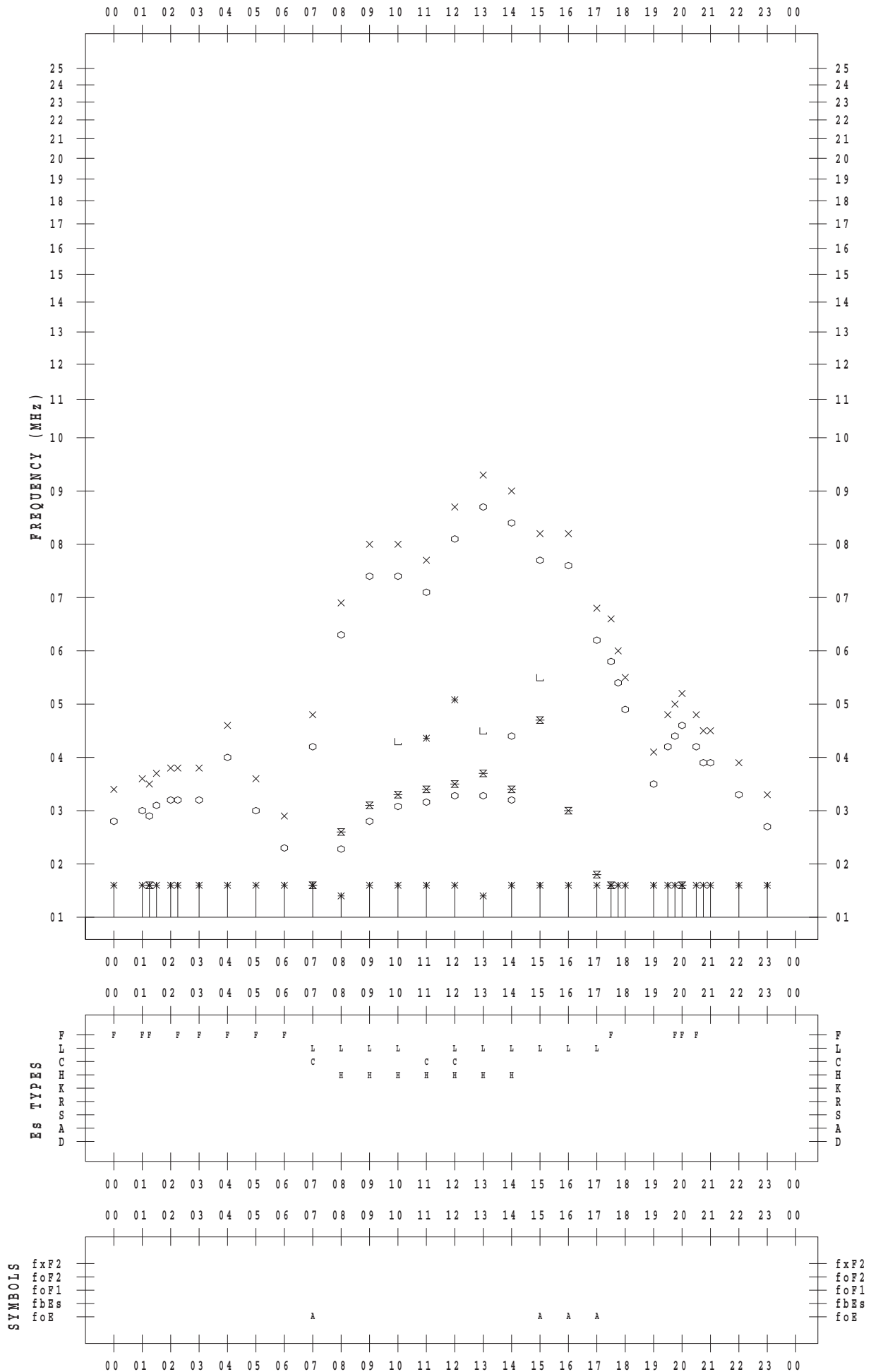
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/ 4

135 ° E MEAN TIME



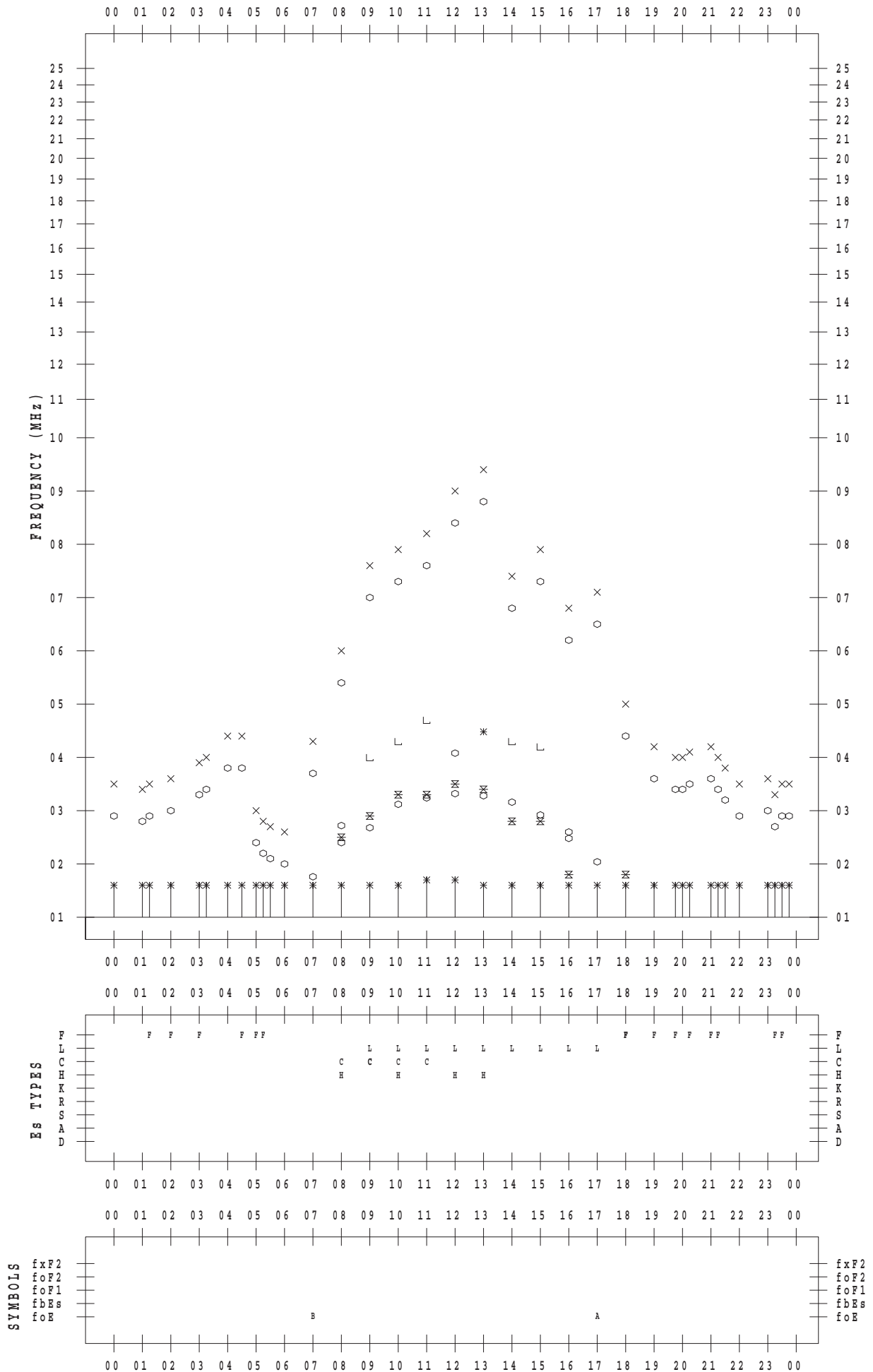
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/ 5

135 ° E MEAN TIME



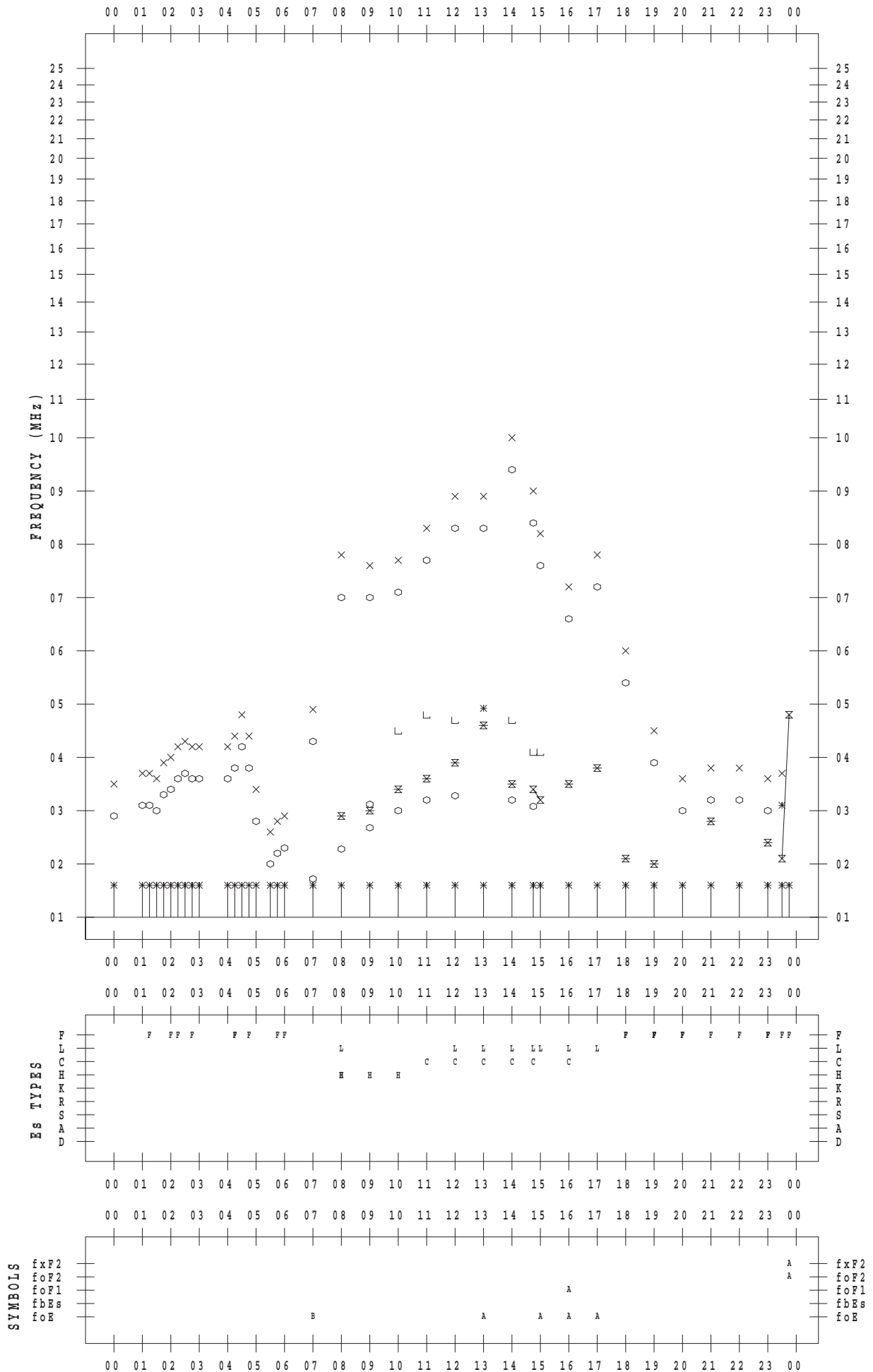
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/ 6

135 ° E MEAN TIME



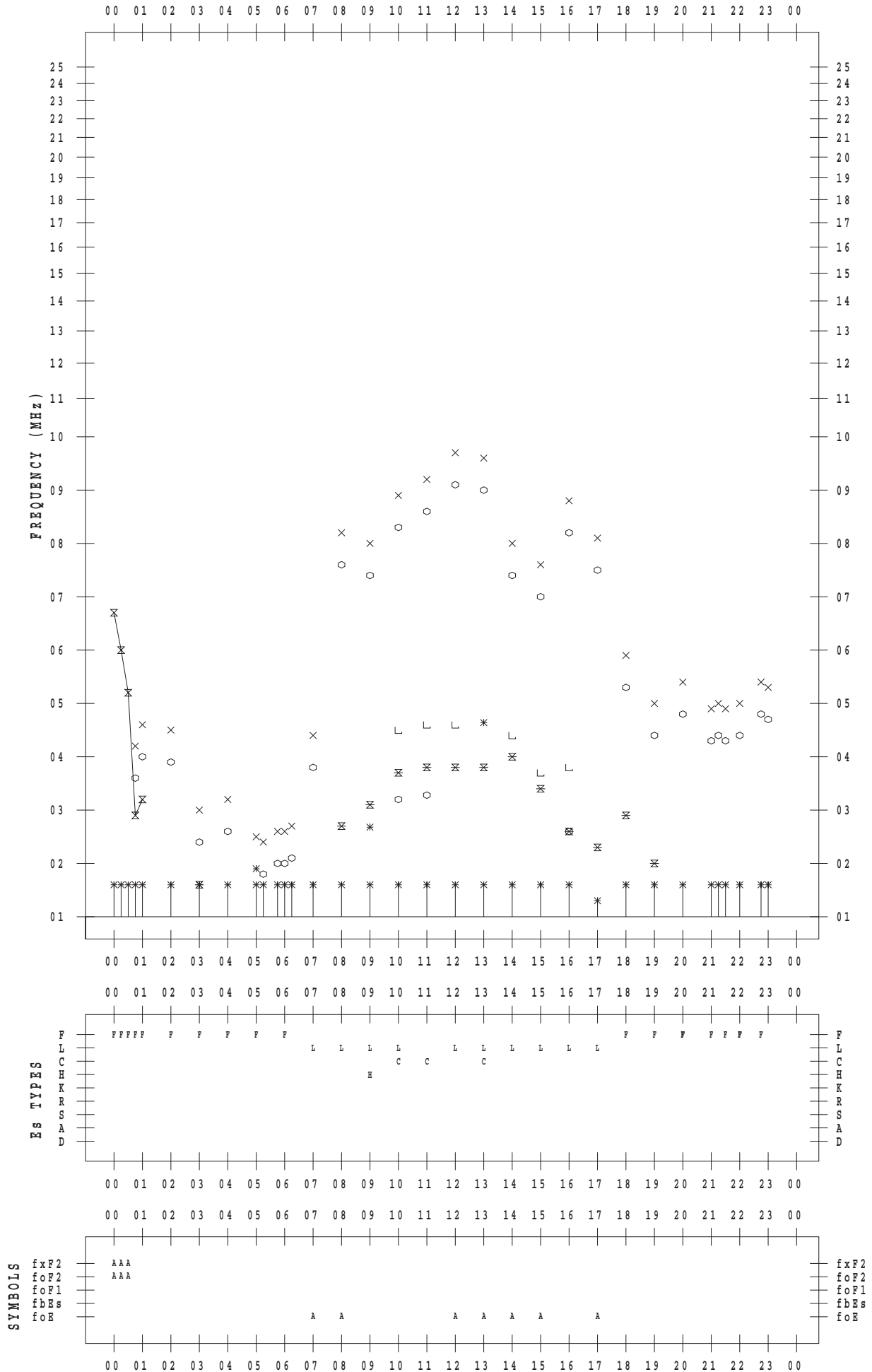
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/ 7

135 ° E MEAN TIME



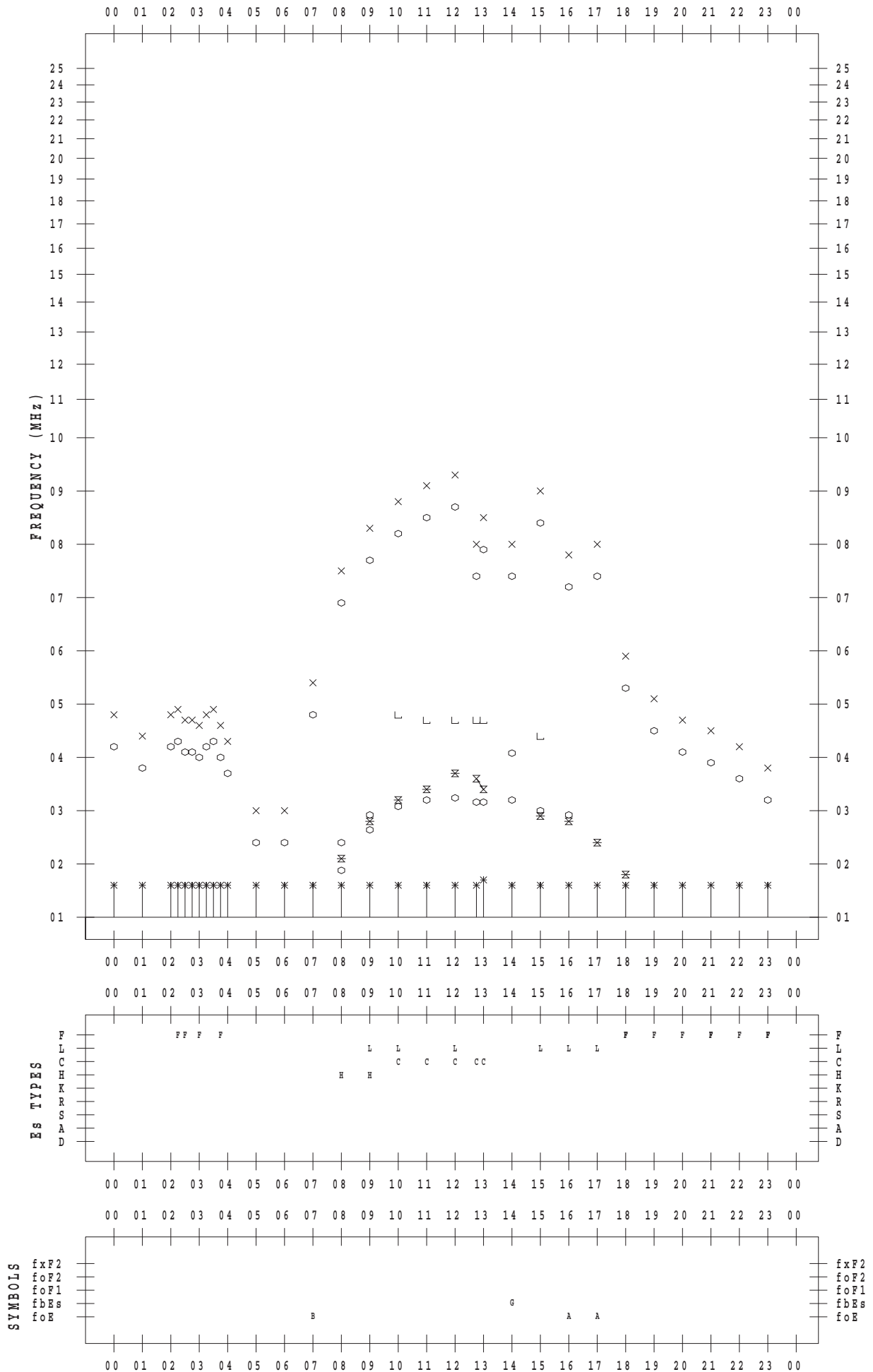
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/ 8

135 ° E MEAN TIME



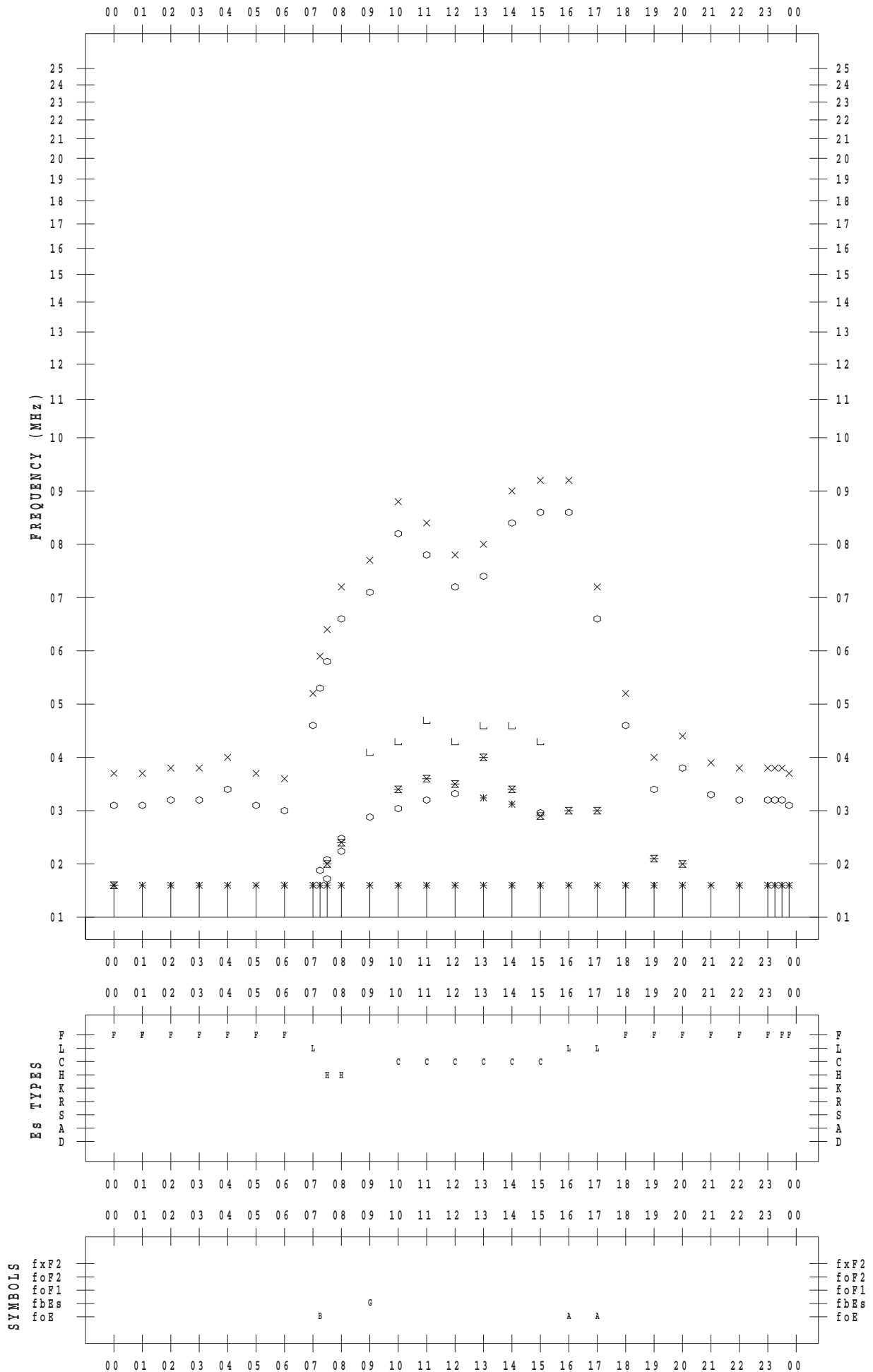
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/ 9

135 ° E MEAN TIME



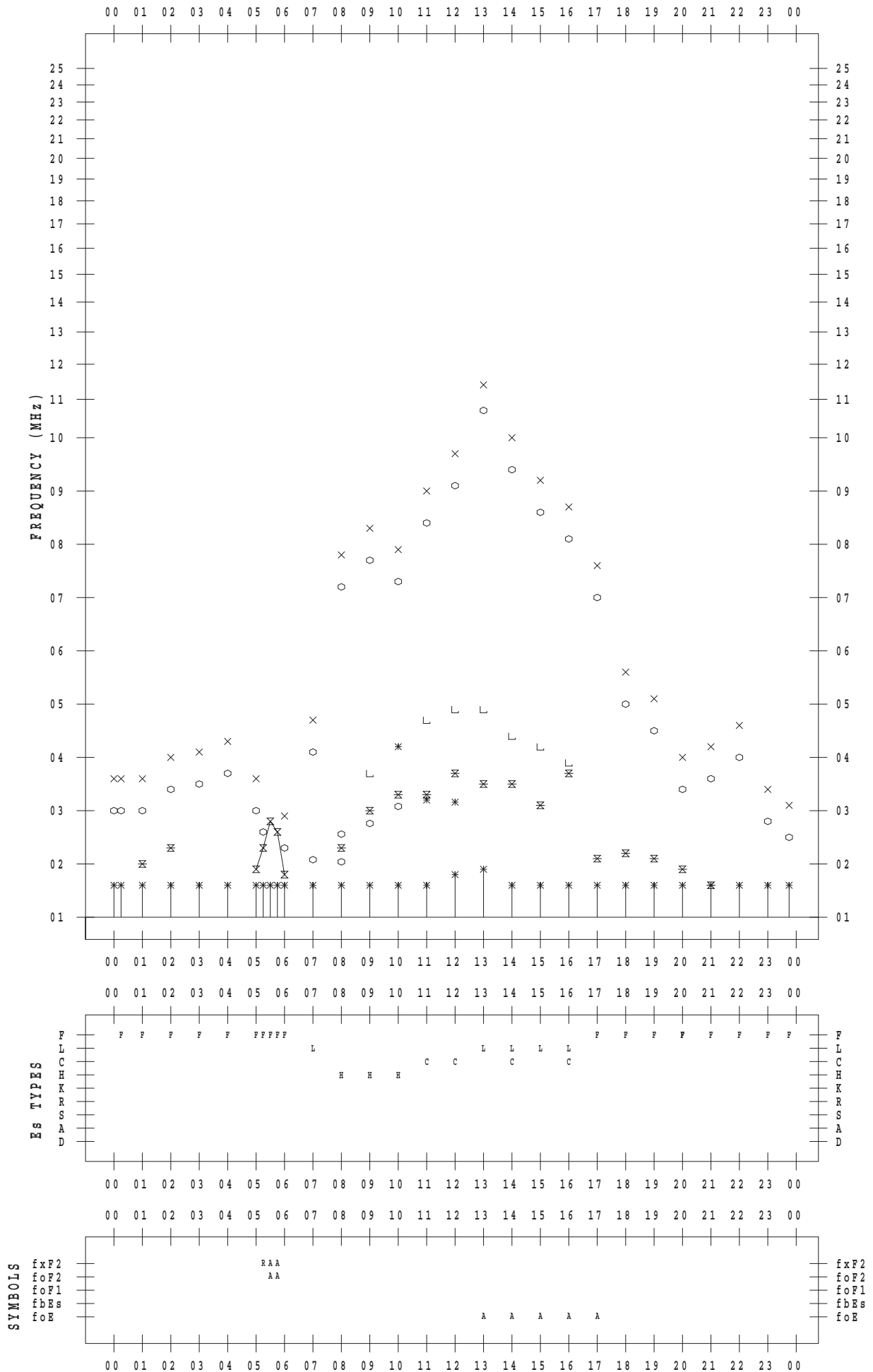
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/10

135 ° E MEAN TIME



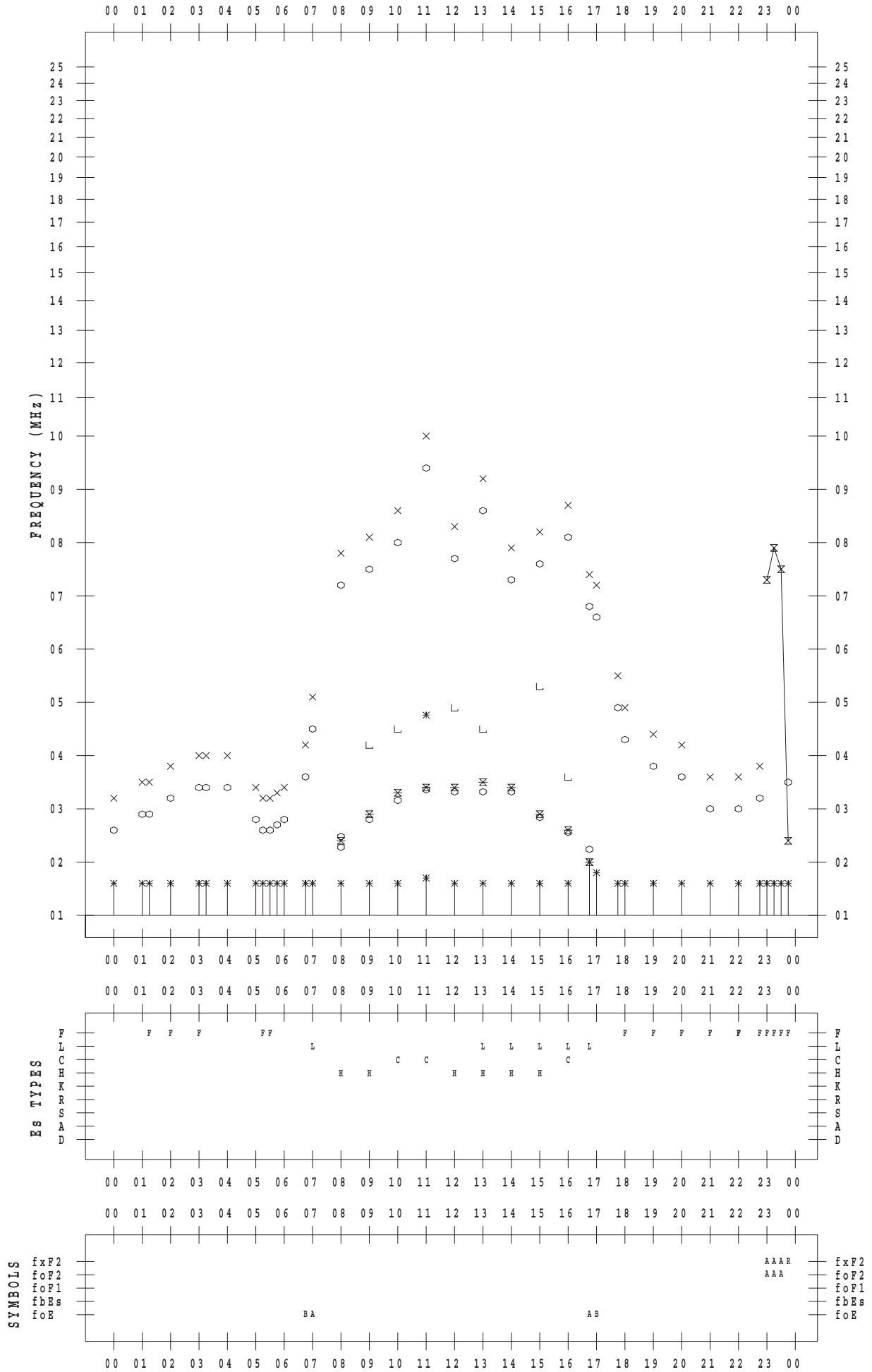
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/11

135 ° E MEAN TIME



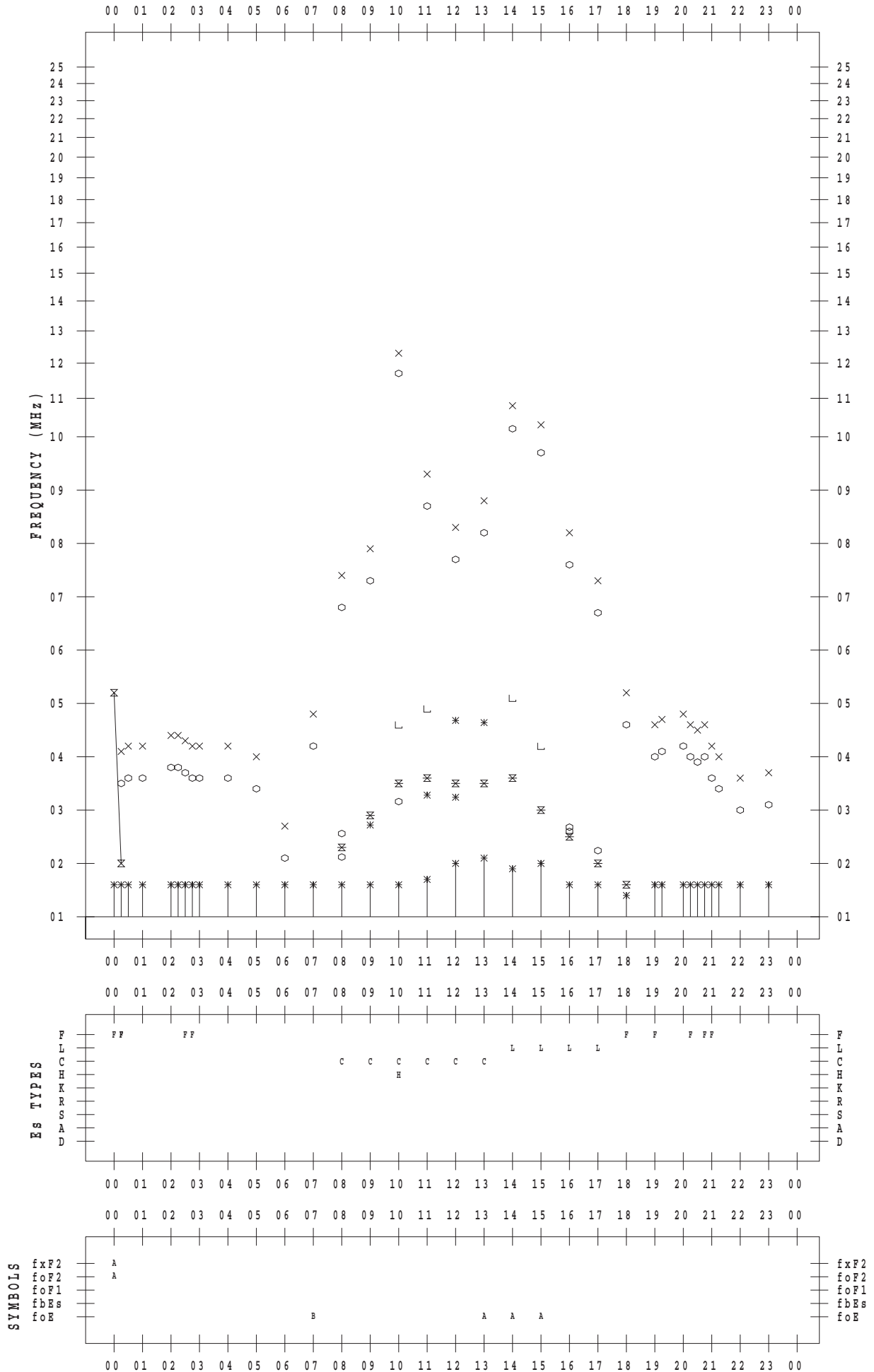
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/12

135 ° E MEAN TIME



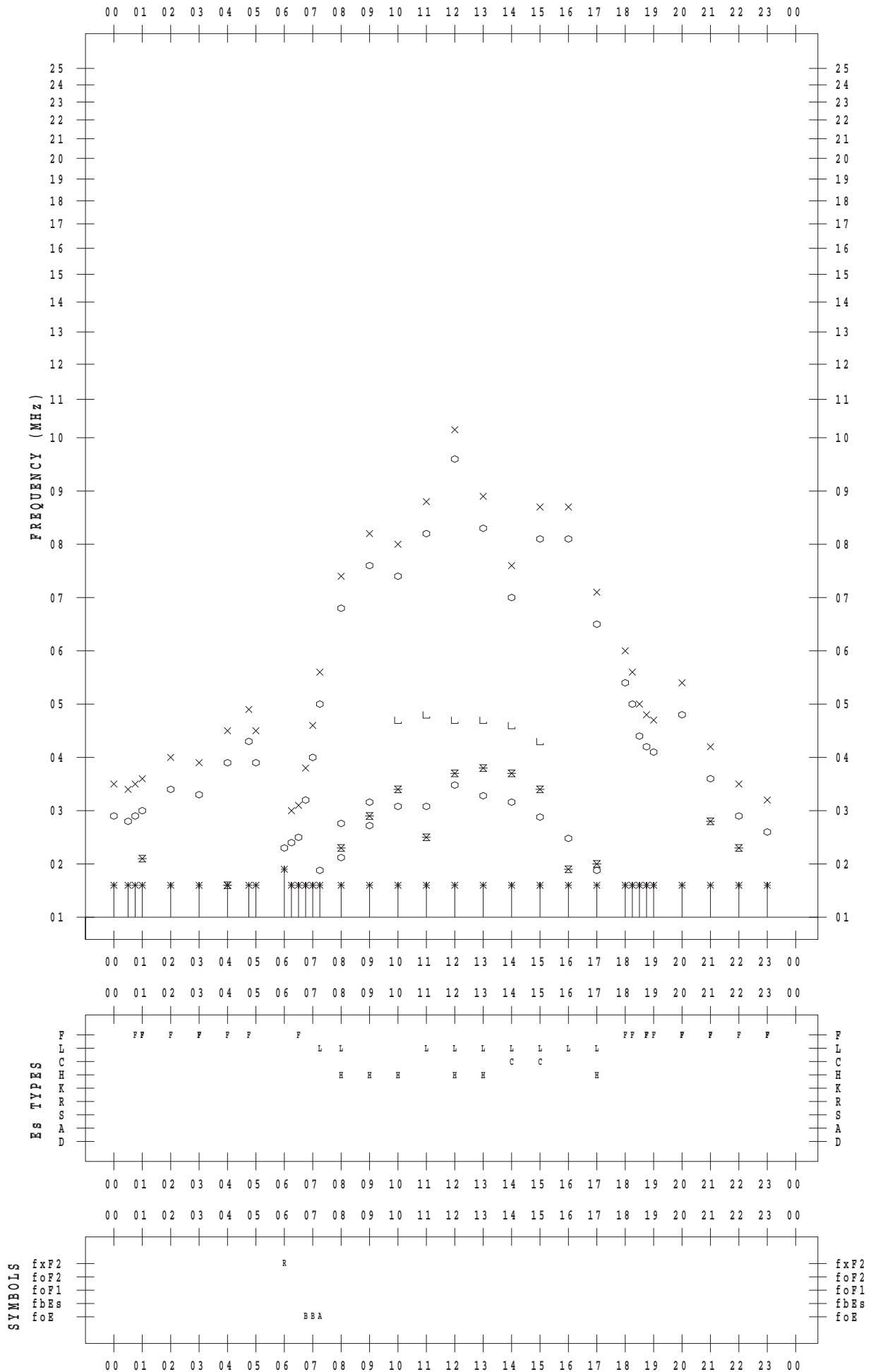
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/13

135 ° E MEAN TIME



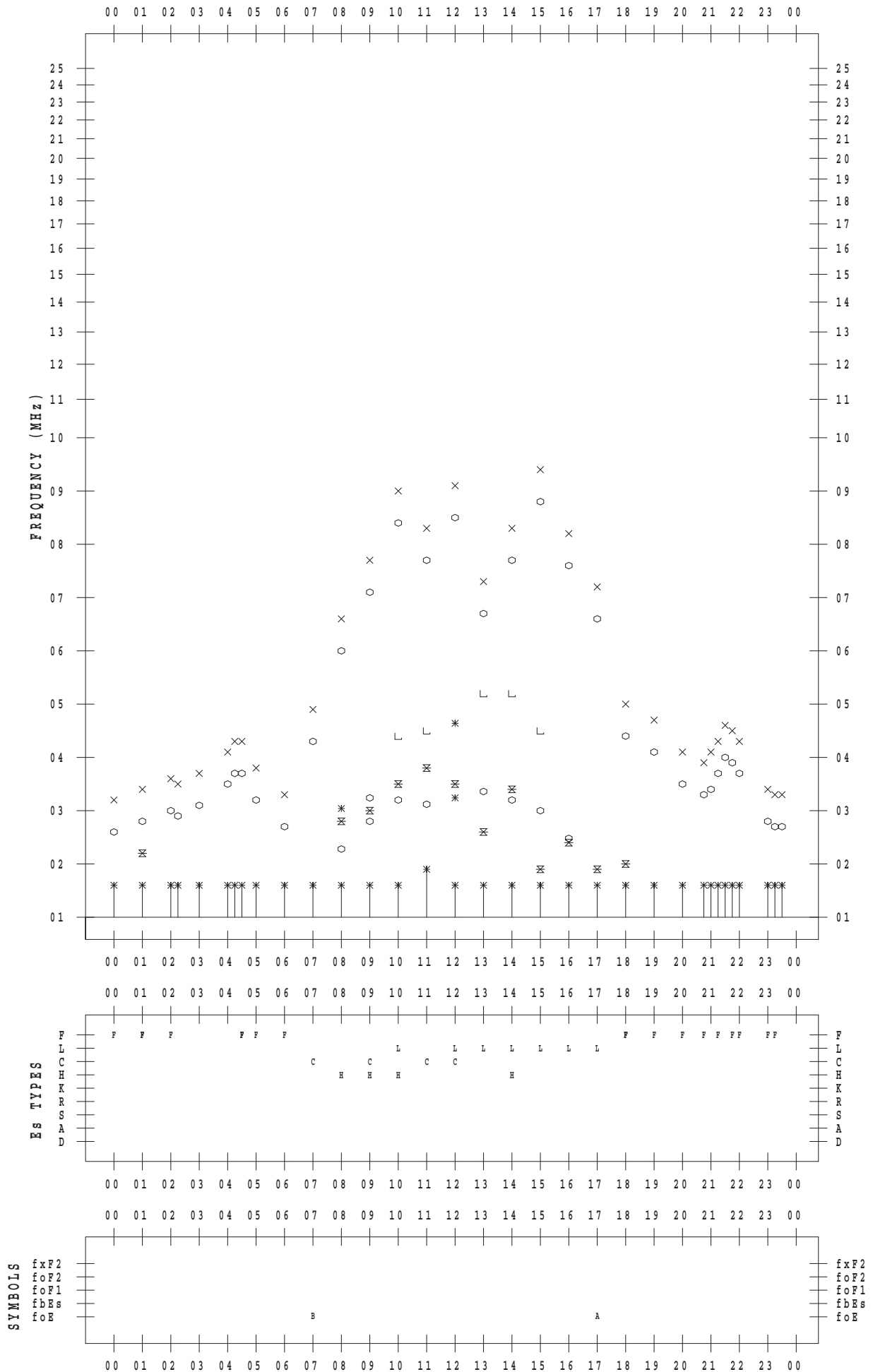
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/14

135 ° E MEAN TIME



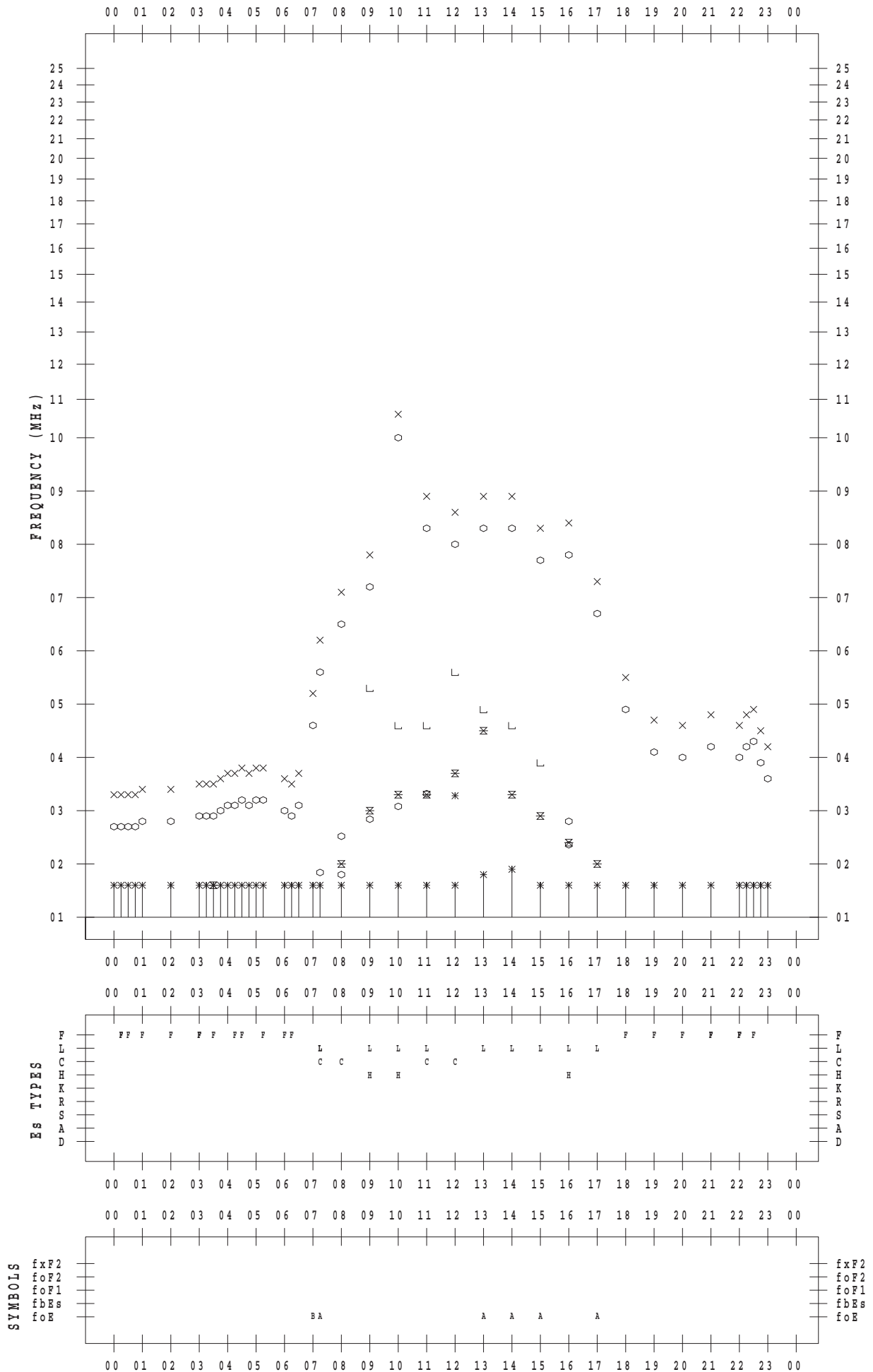
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/15

135 ° E MEAN TIME



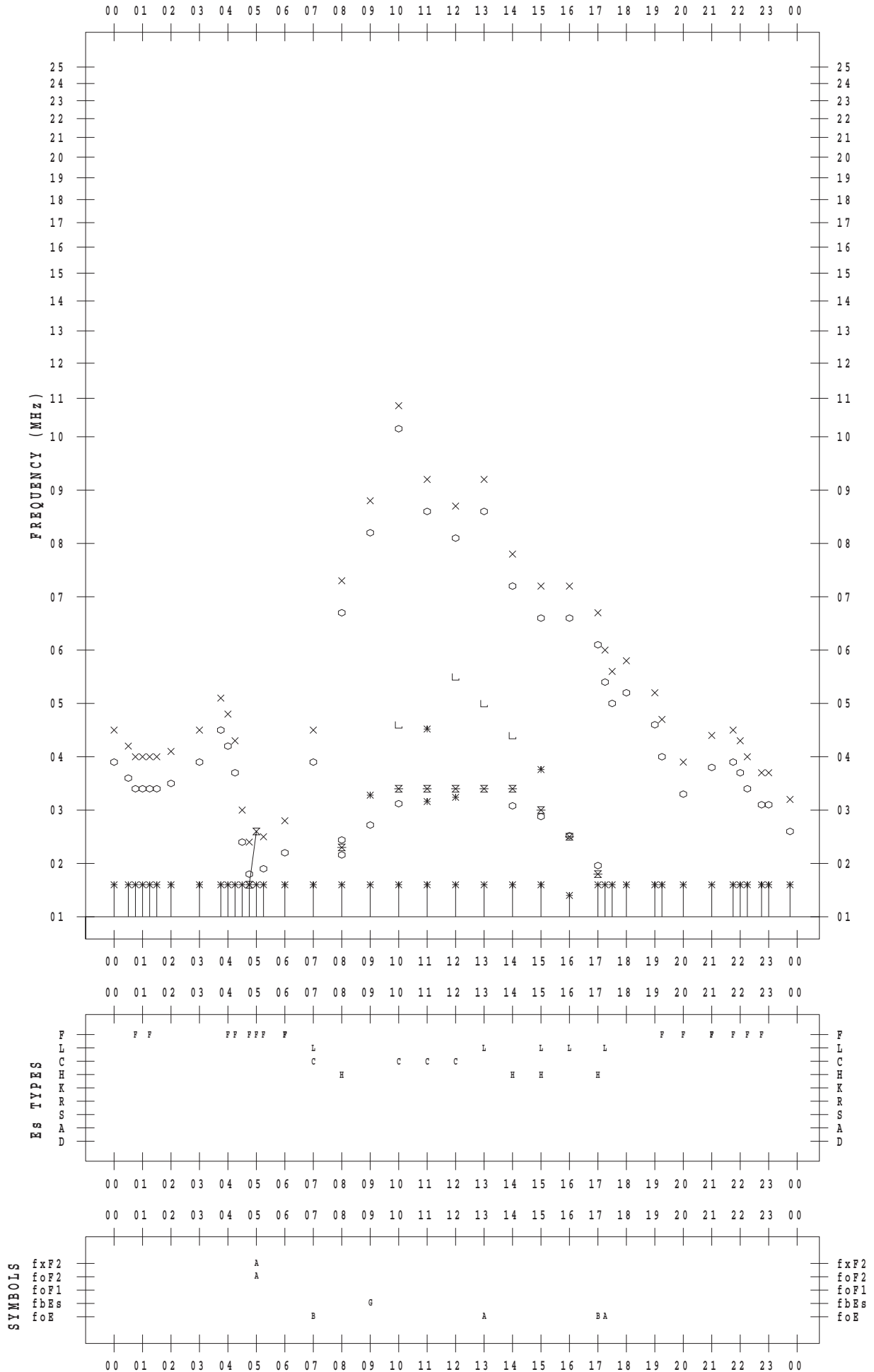
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/16

135 ° E MEAN TIME



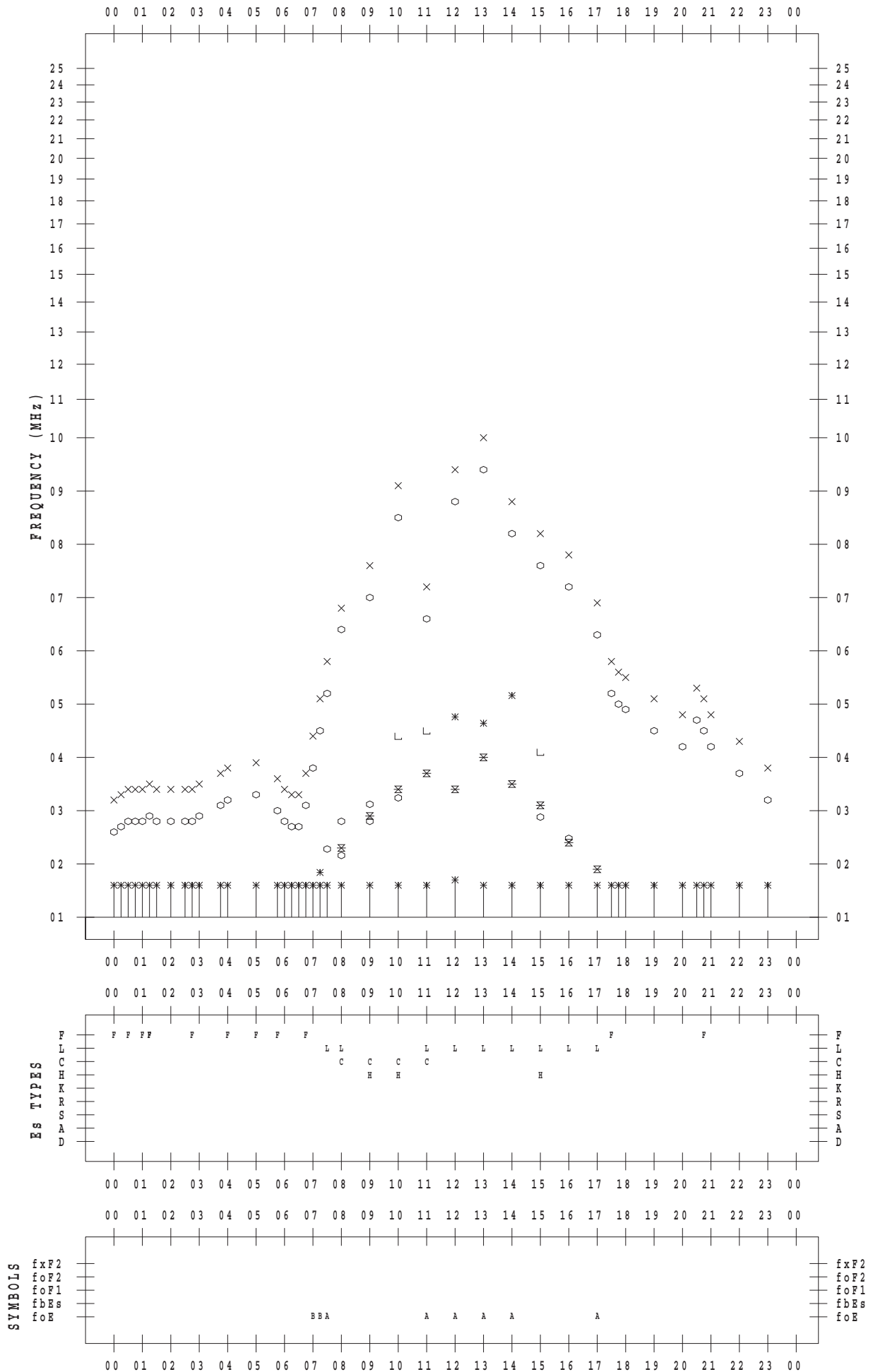
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/17

135 ° E MEAN TIME



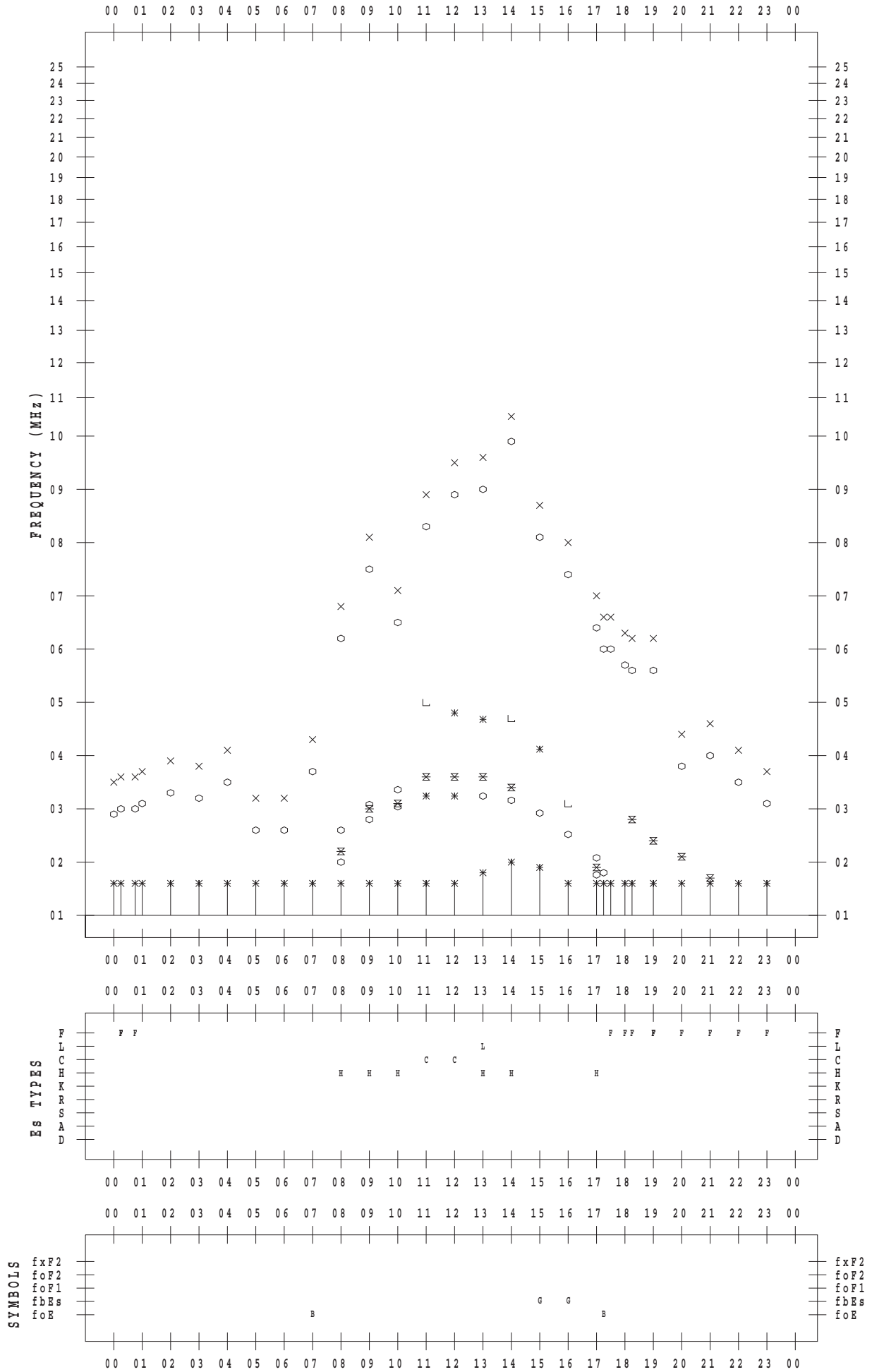
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/18

135 ° E MEAN TIME



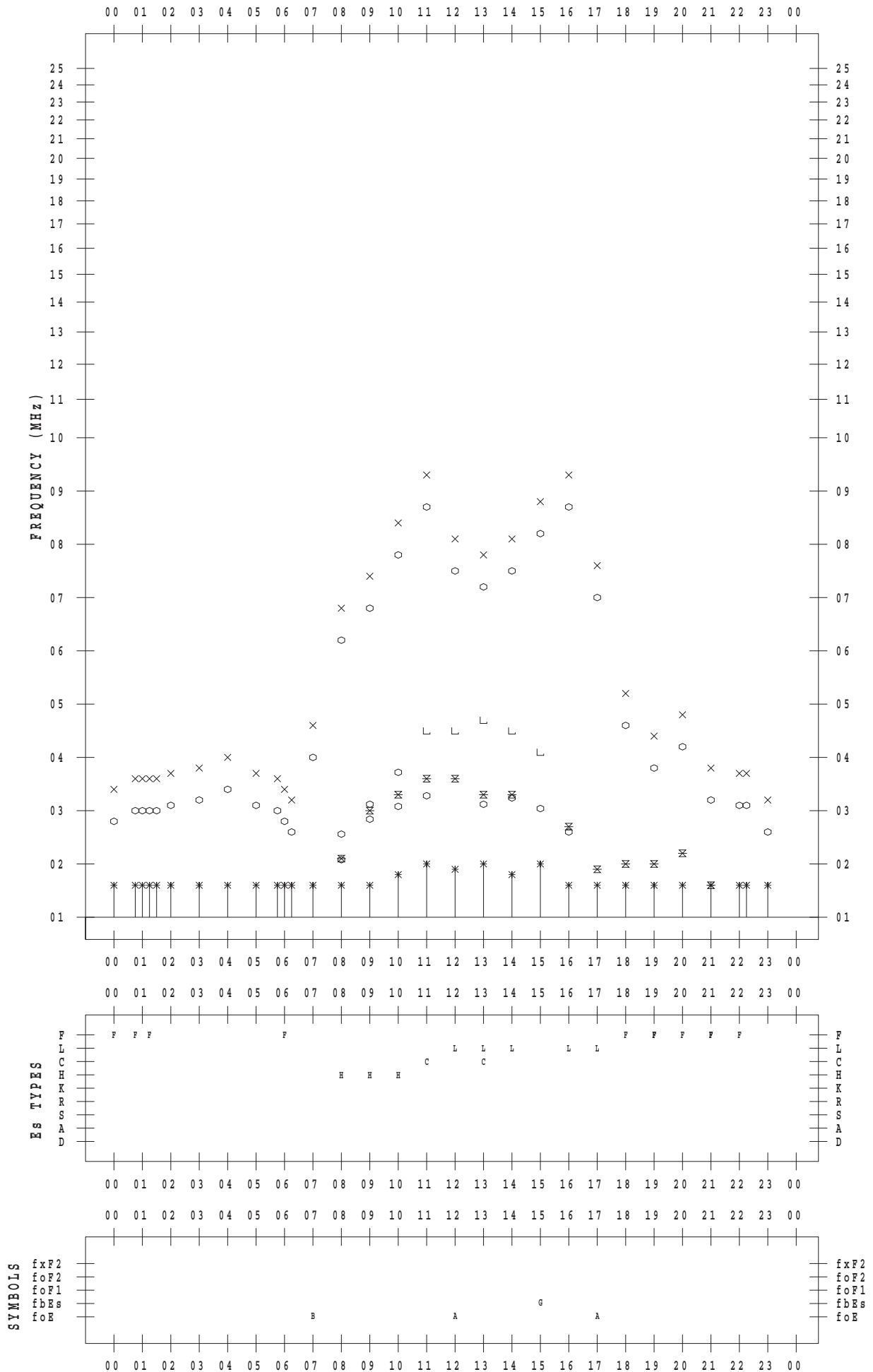
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/19

135 ° E MEAN TIME



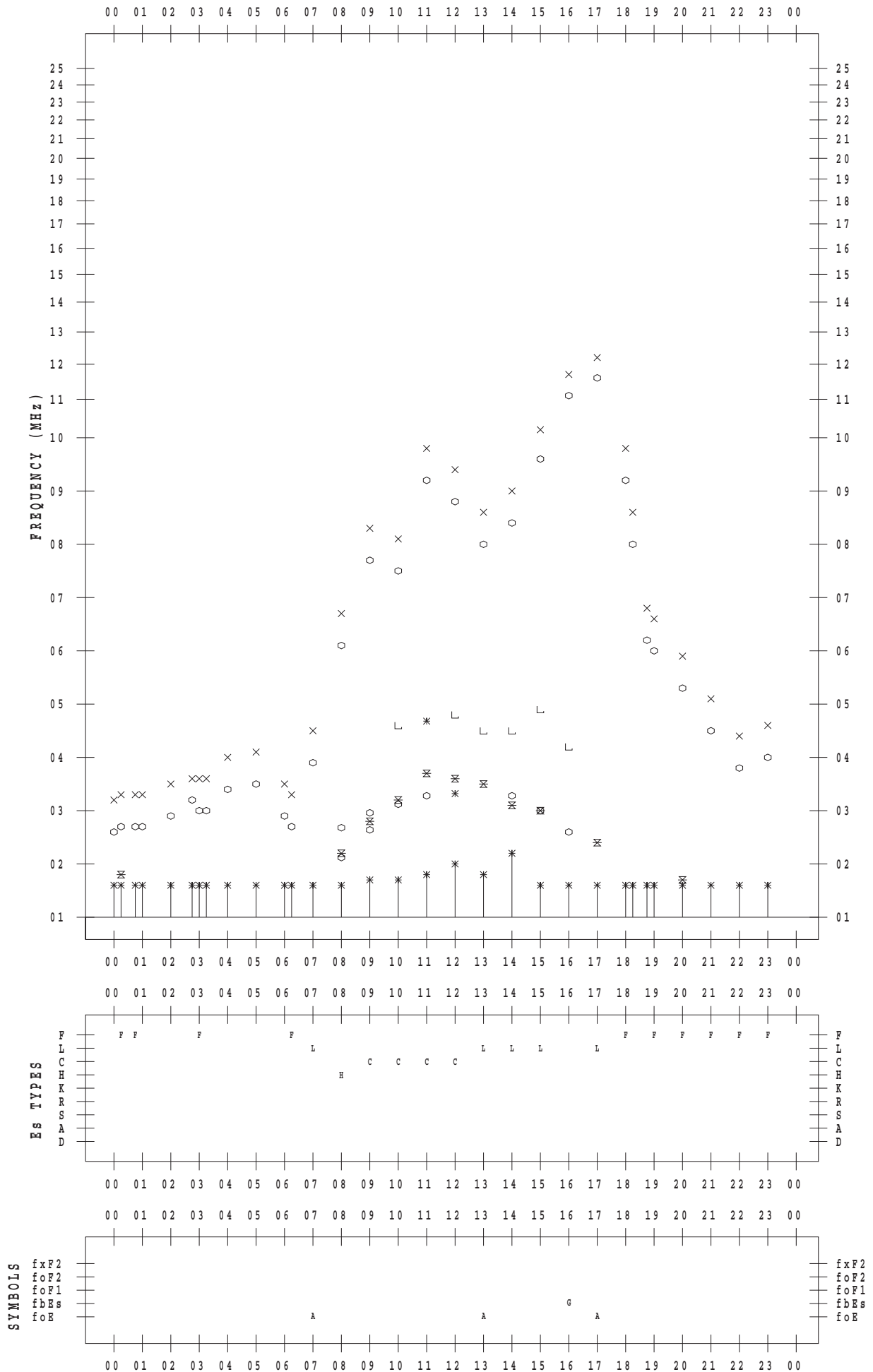
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/20

135 ° E MEAN TIME



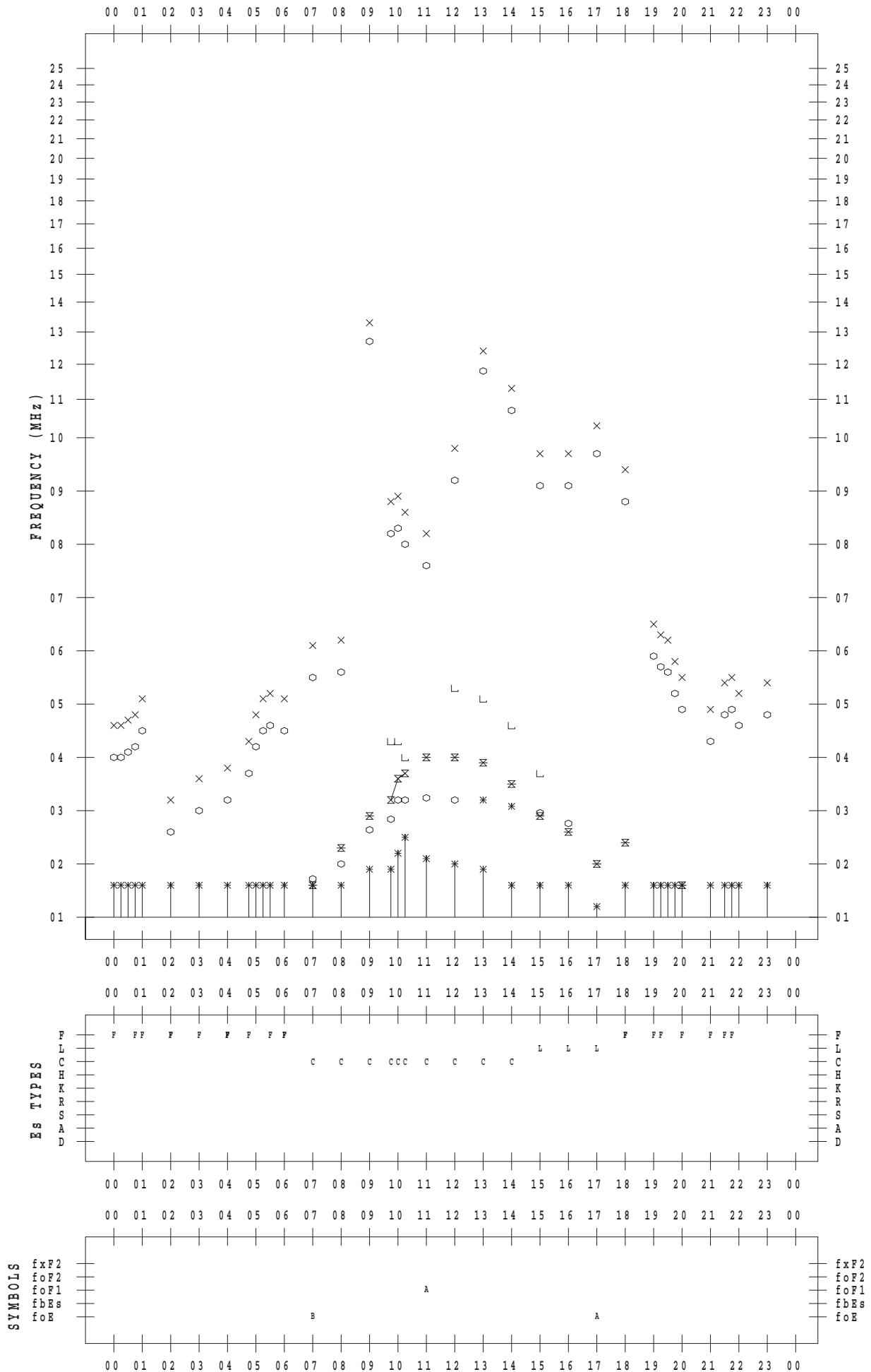
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/21

135 ° E MEAN TIME



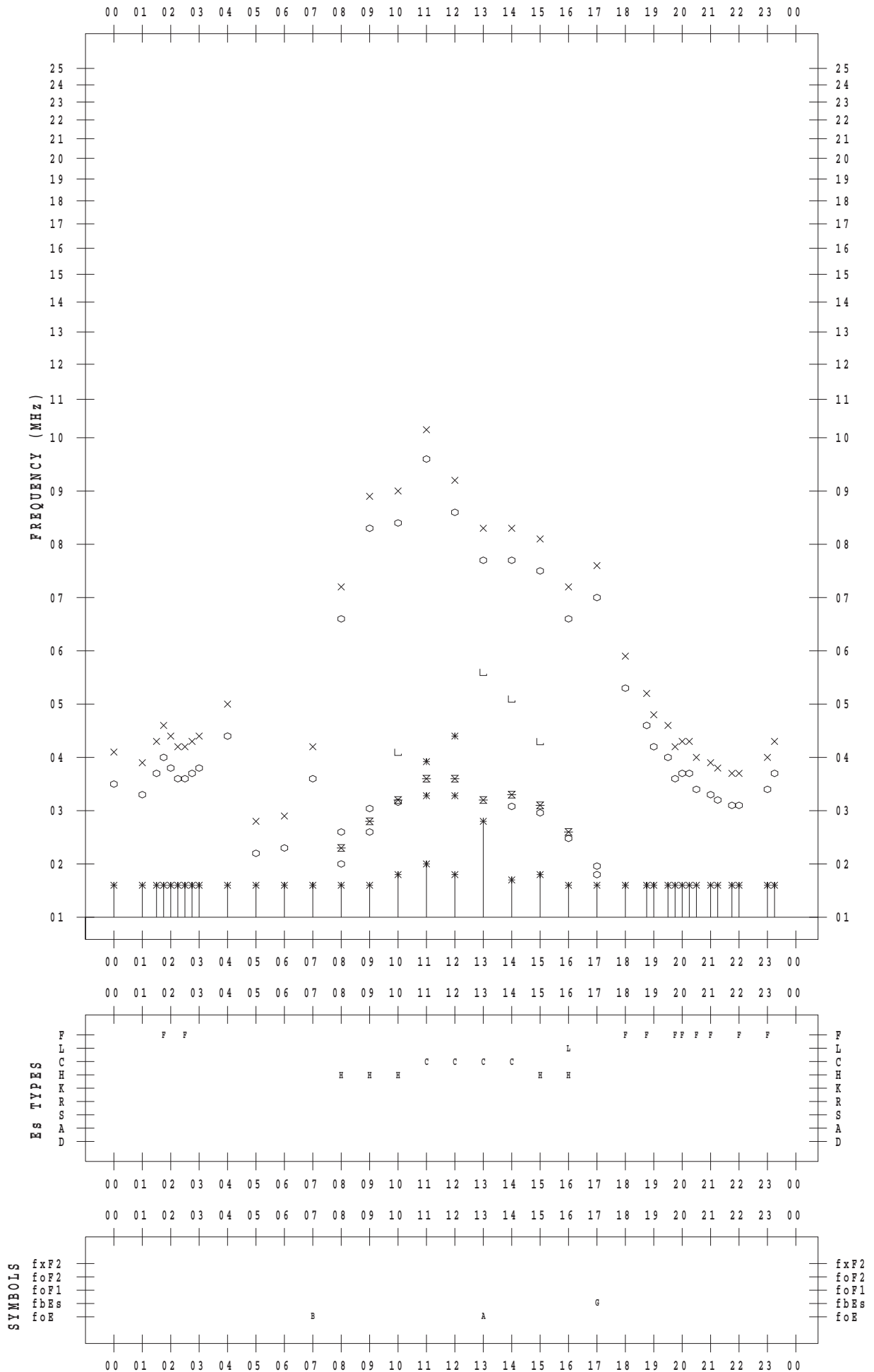
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/22

135 ° E MEAN TIME



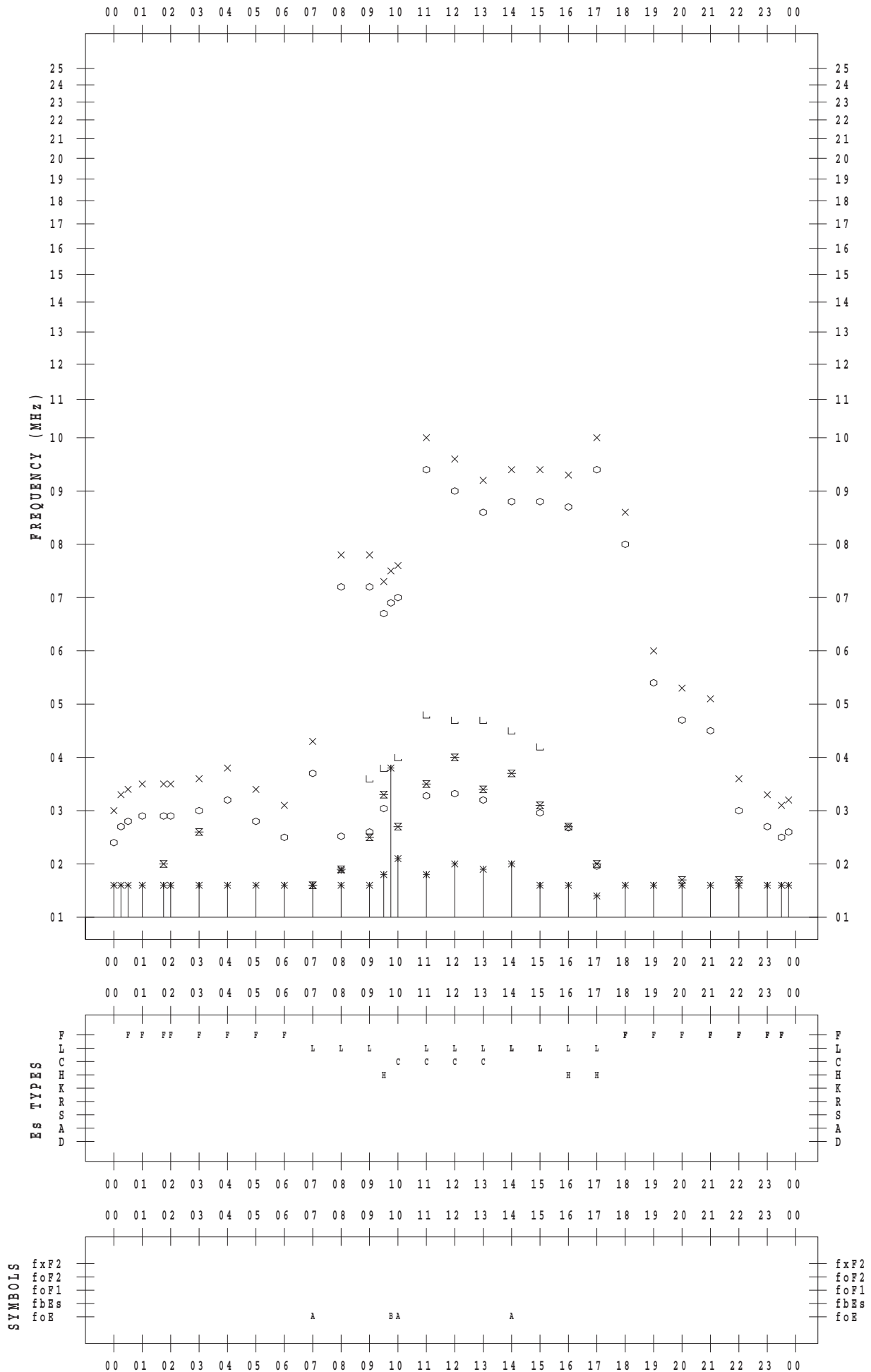
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/23

135 ° E MEAN TIME



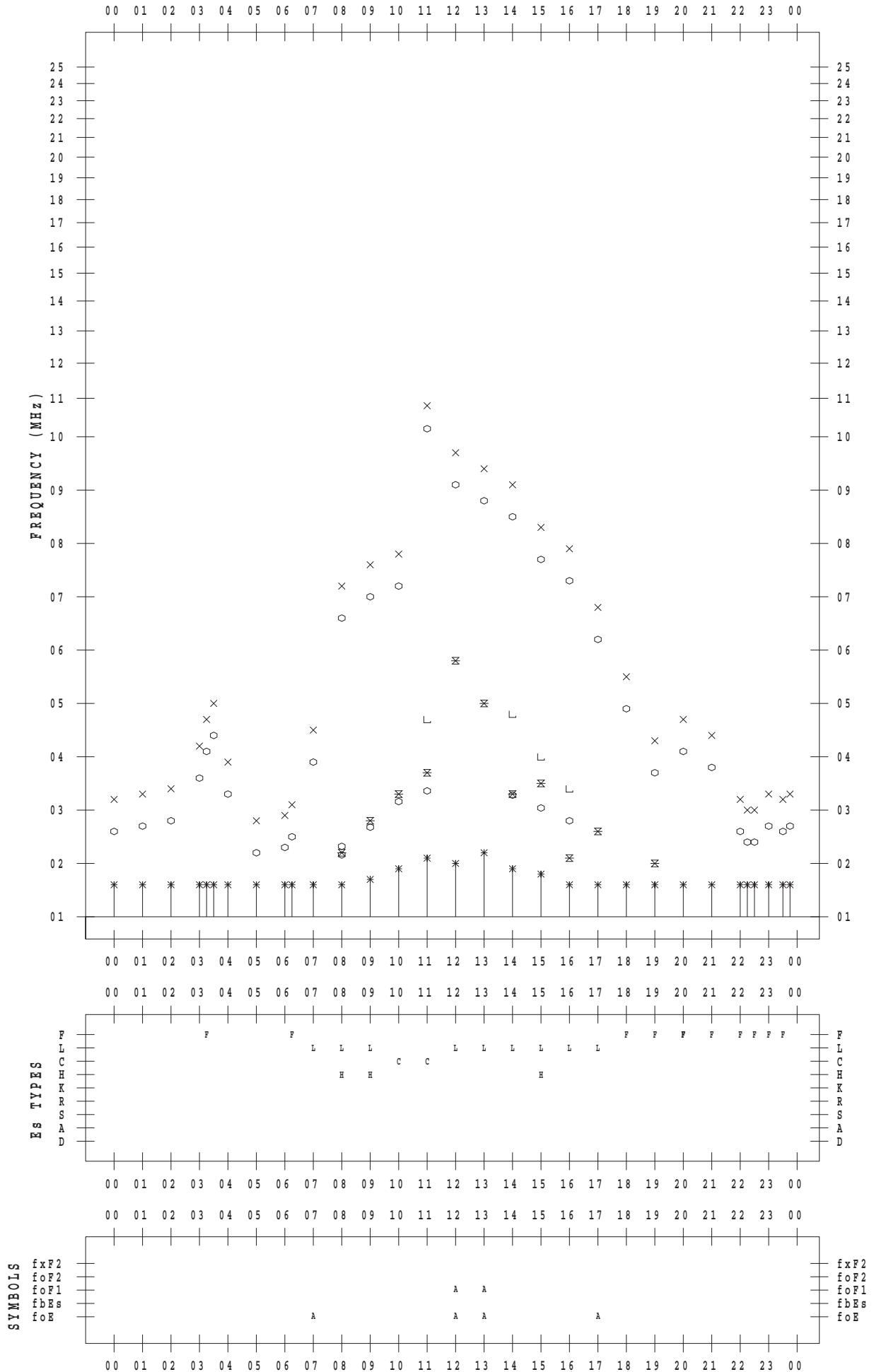
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/24

135 ° E MEAN TIME



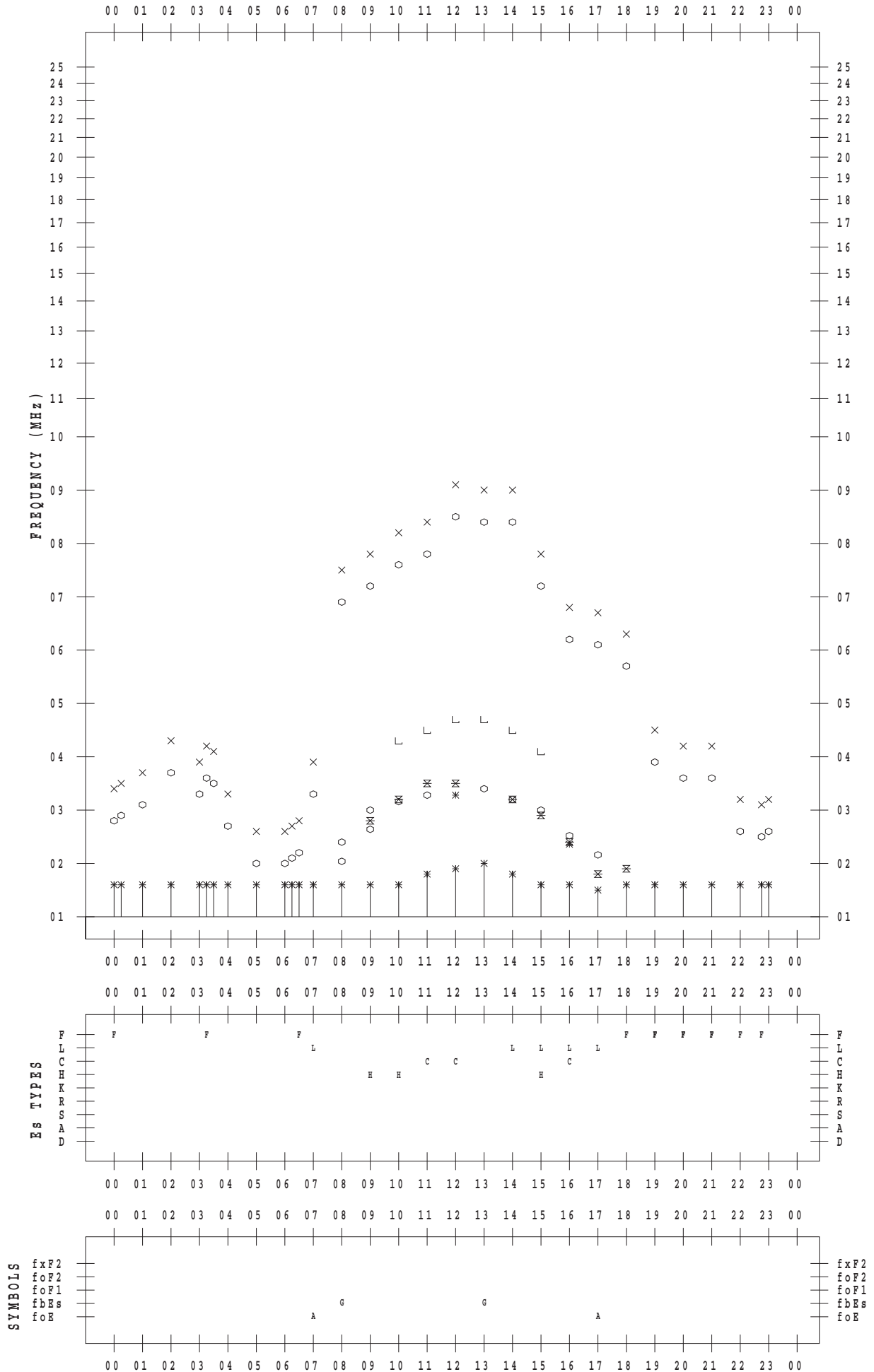
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/25

135 ° E MEAN TIME



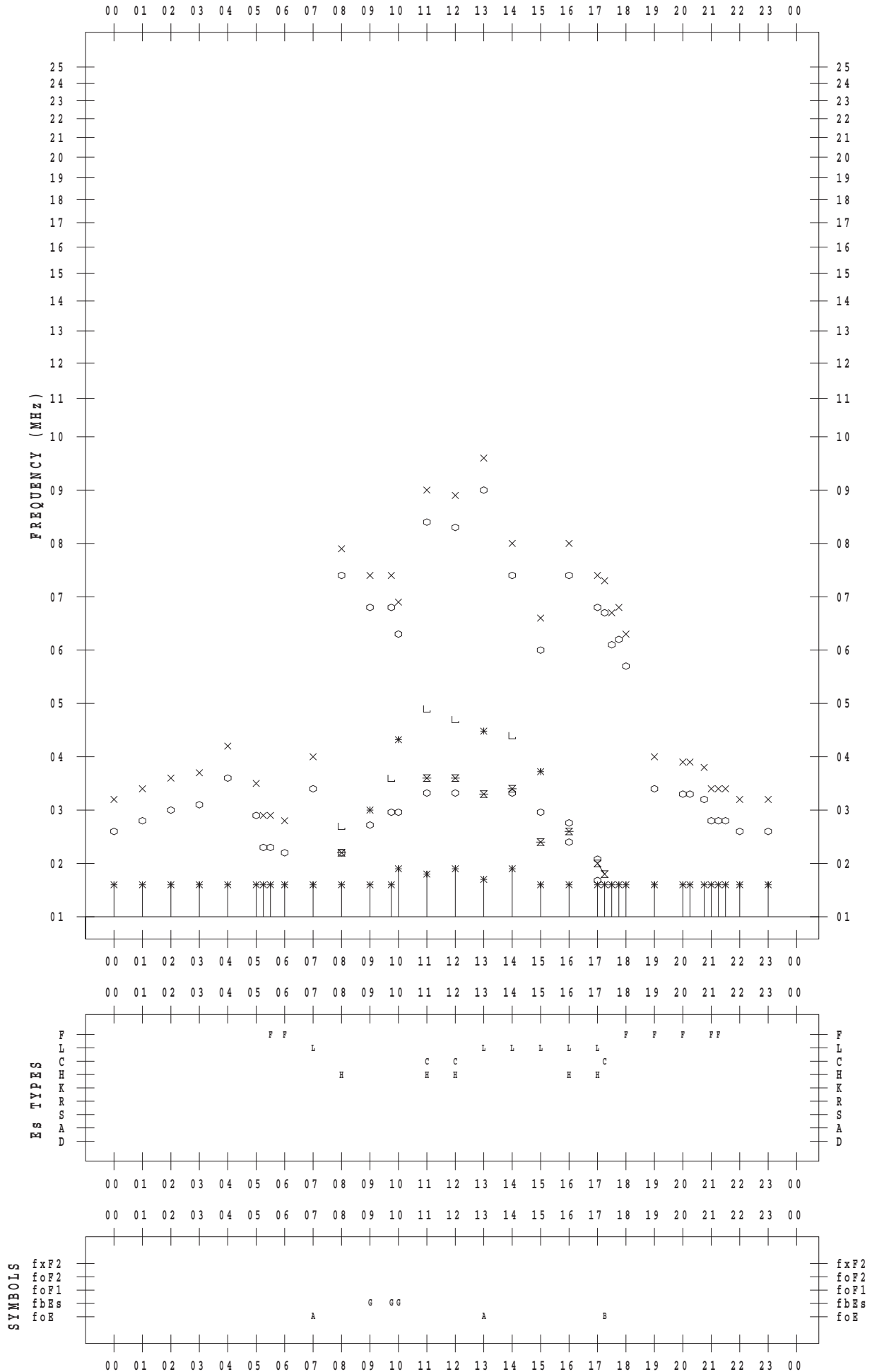
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/26

135 ° E MEAN TIME



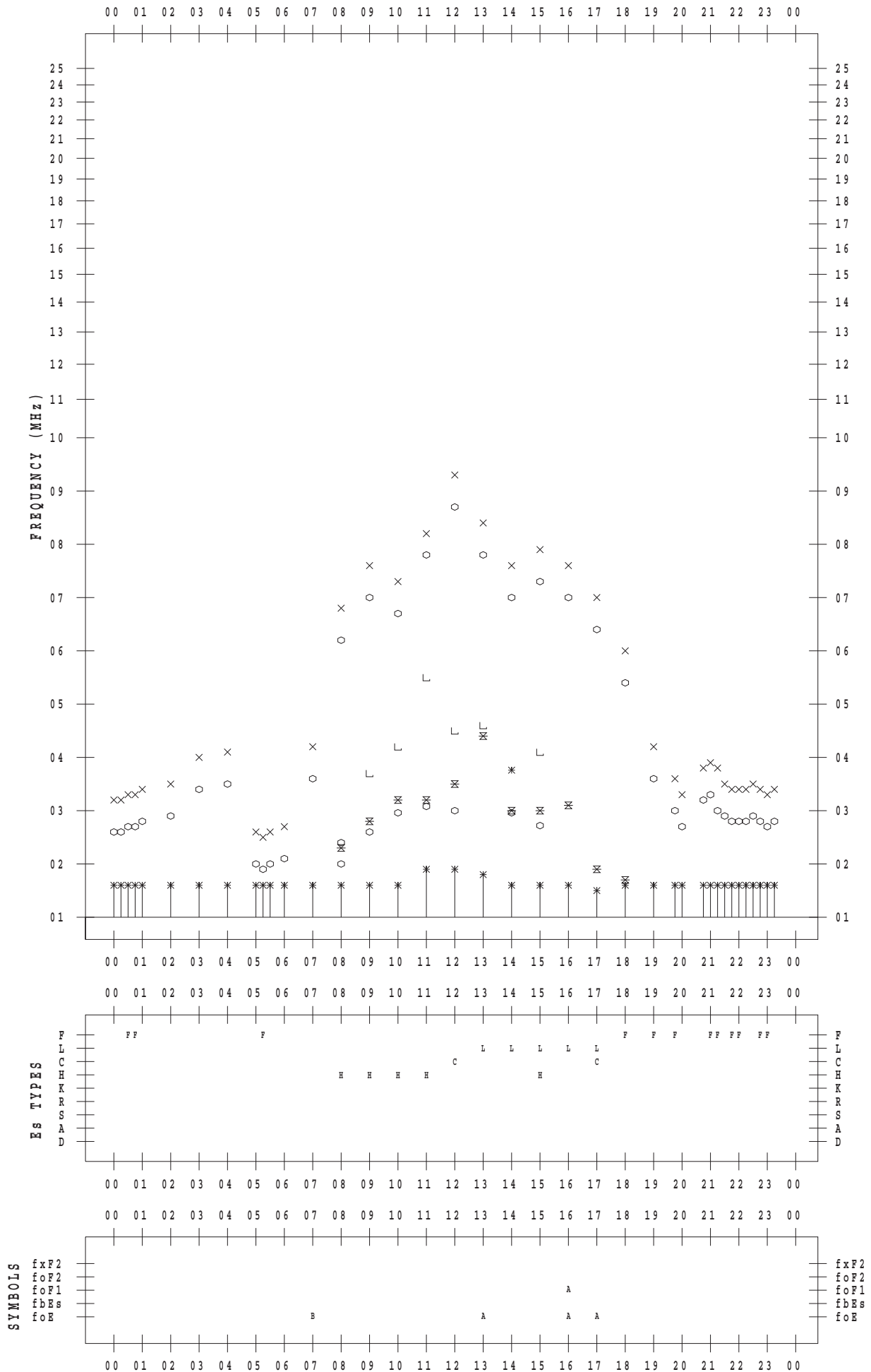
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/27

135 ° E MEAN TIME



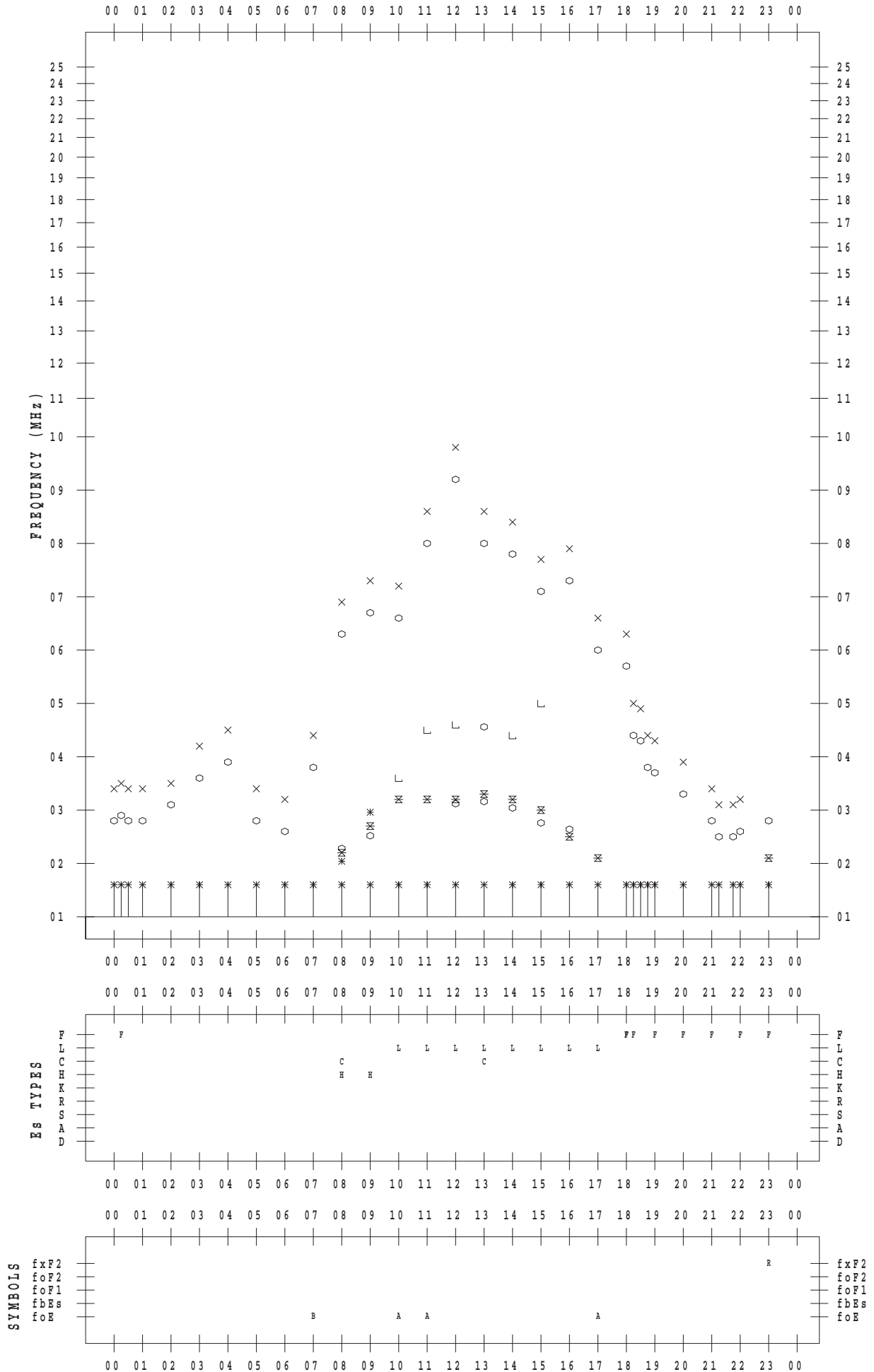
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/28

135 ° E MEAN TIME



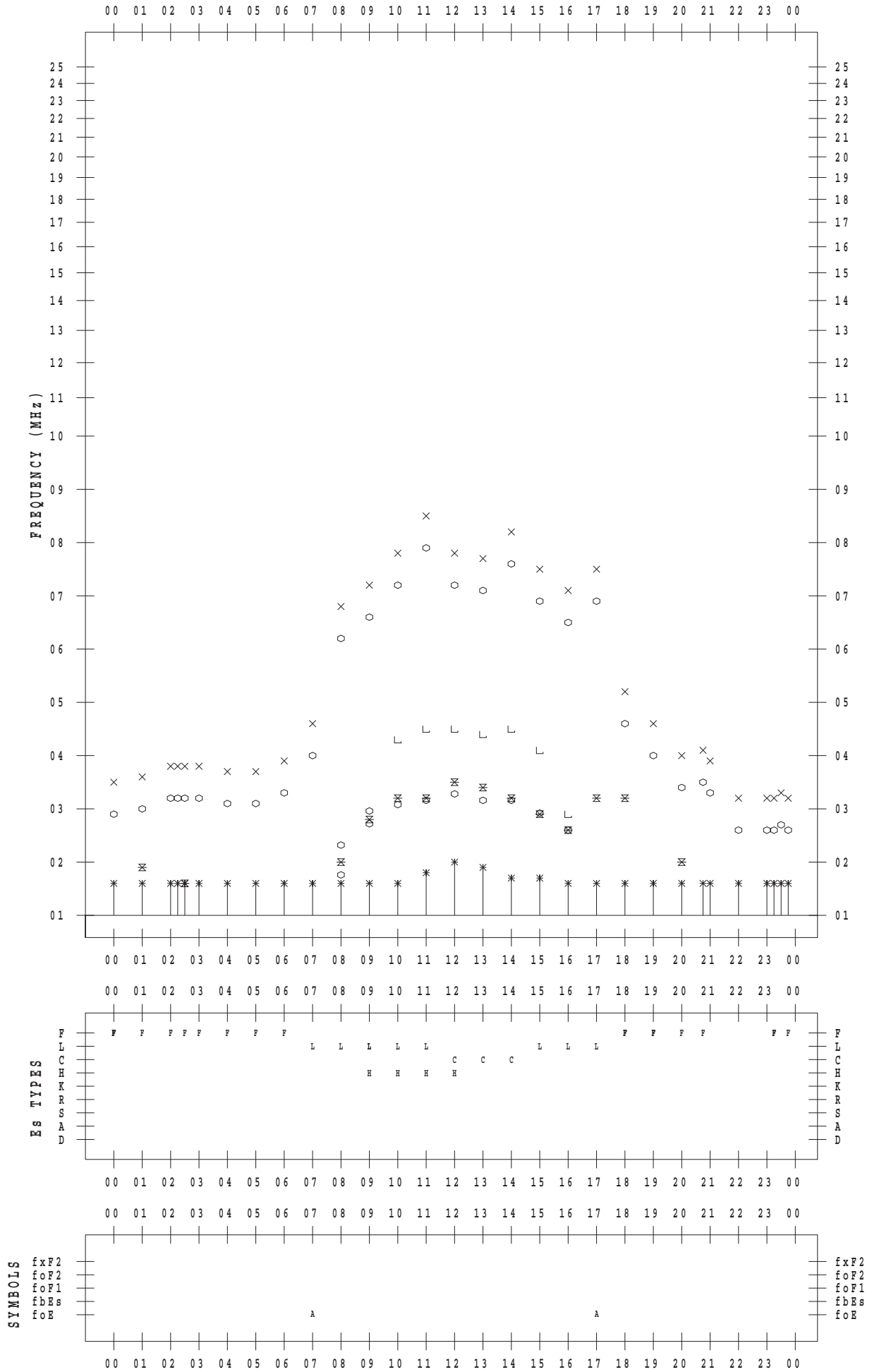
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/29

135 ° E MEAN TIME



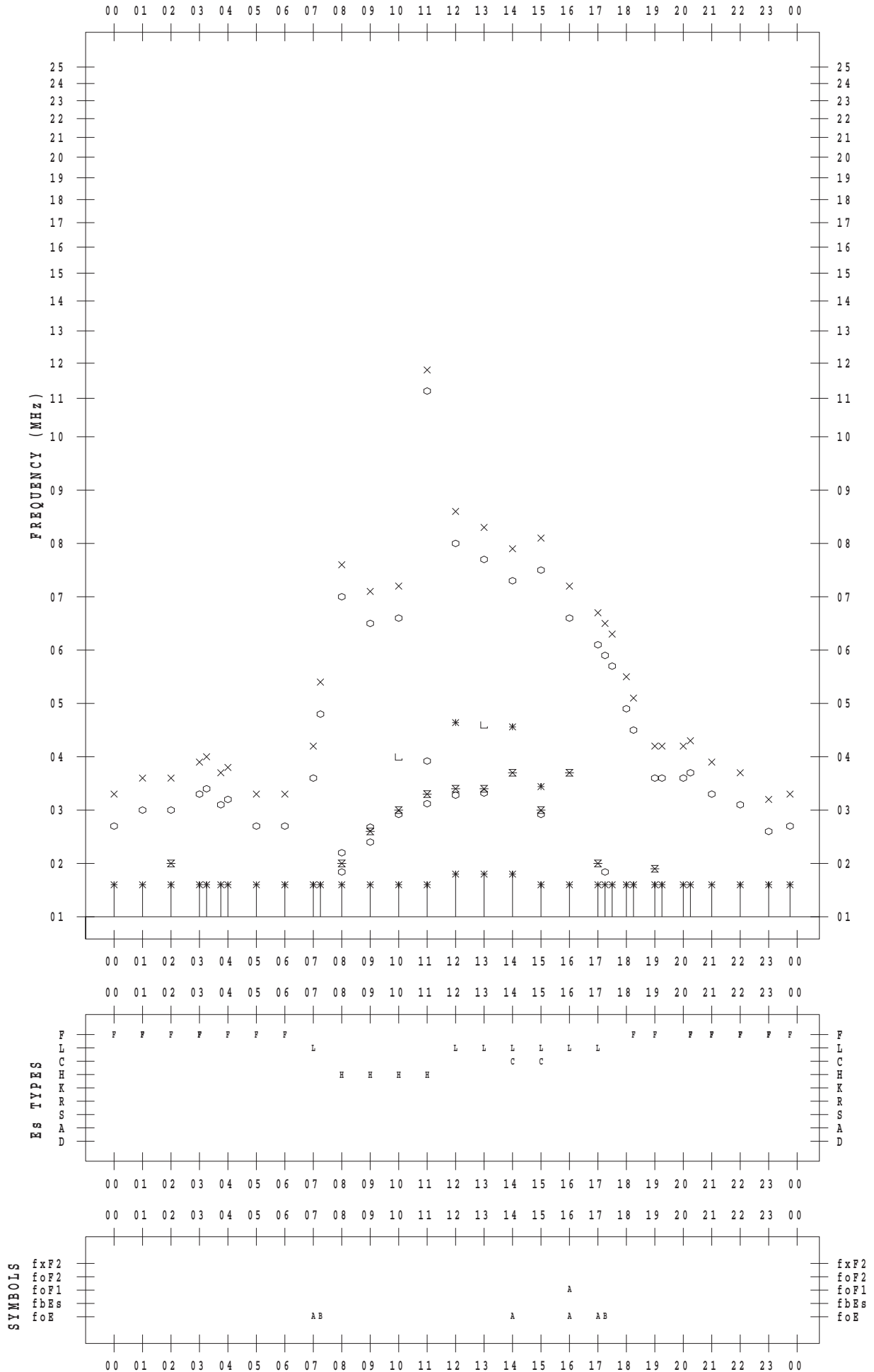
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/30

135 ° E MEAN TIME



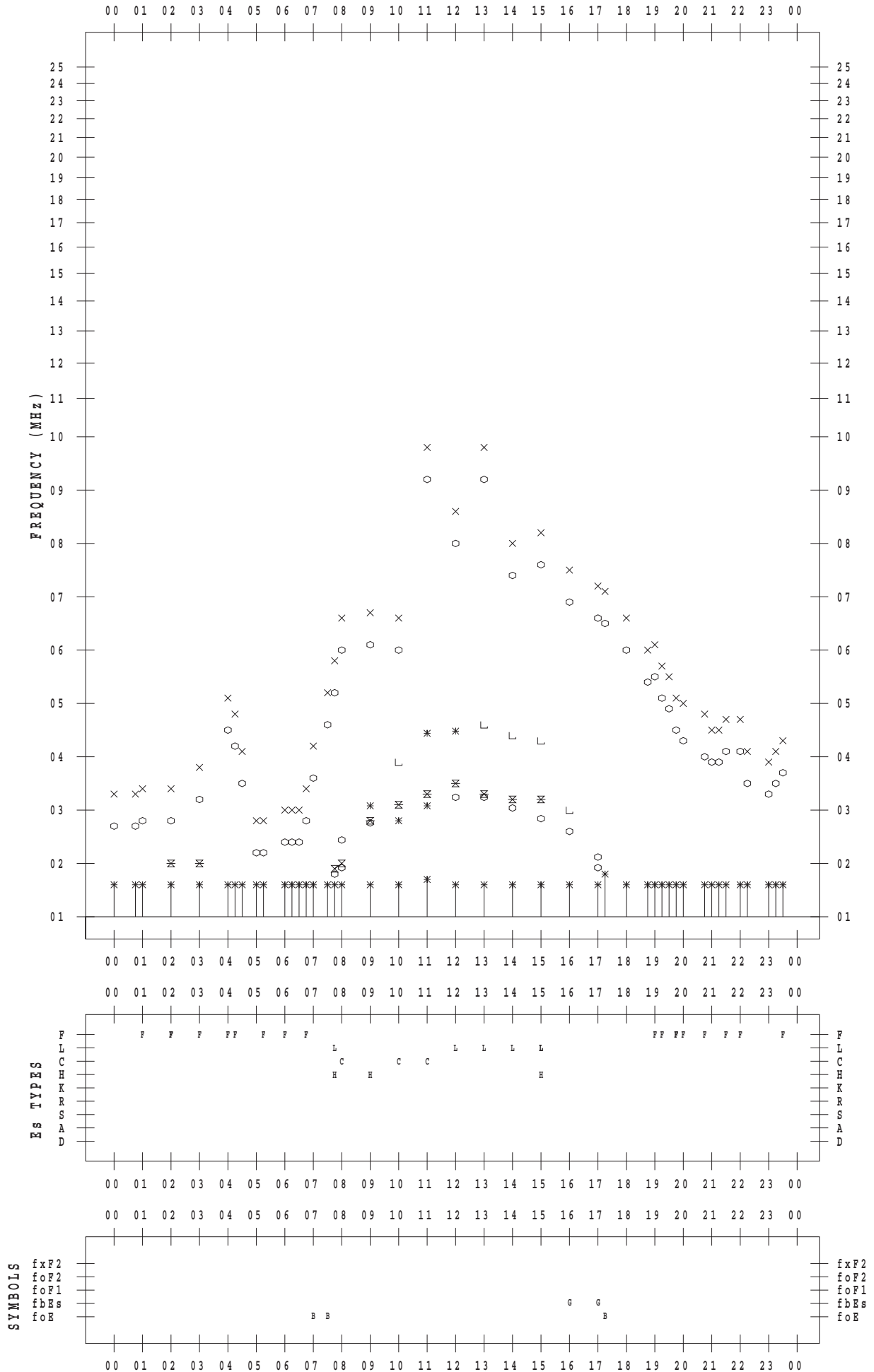
f - PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2015/12/31

135 ° E MEAN TIME



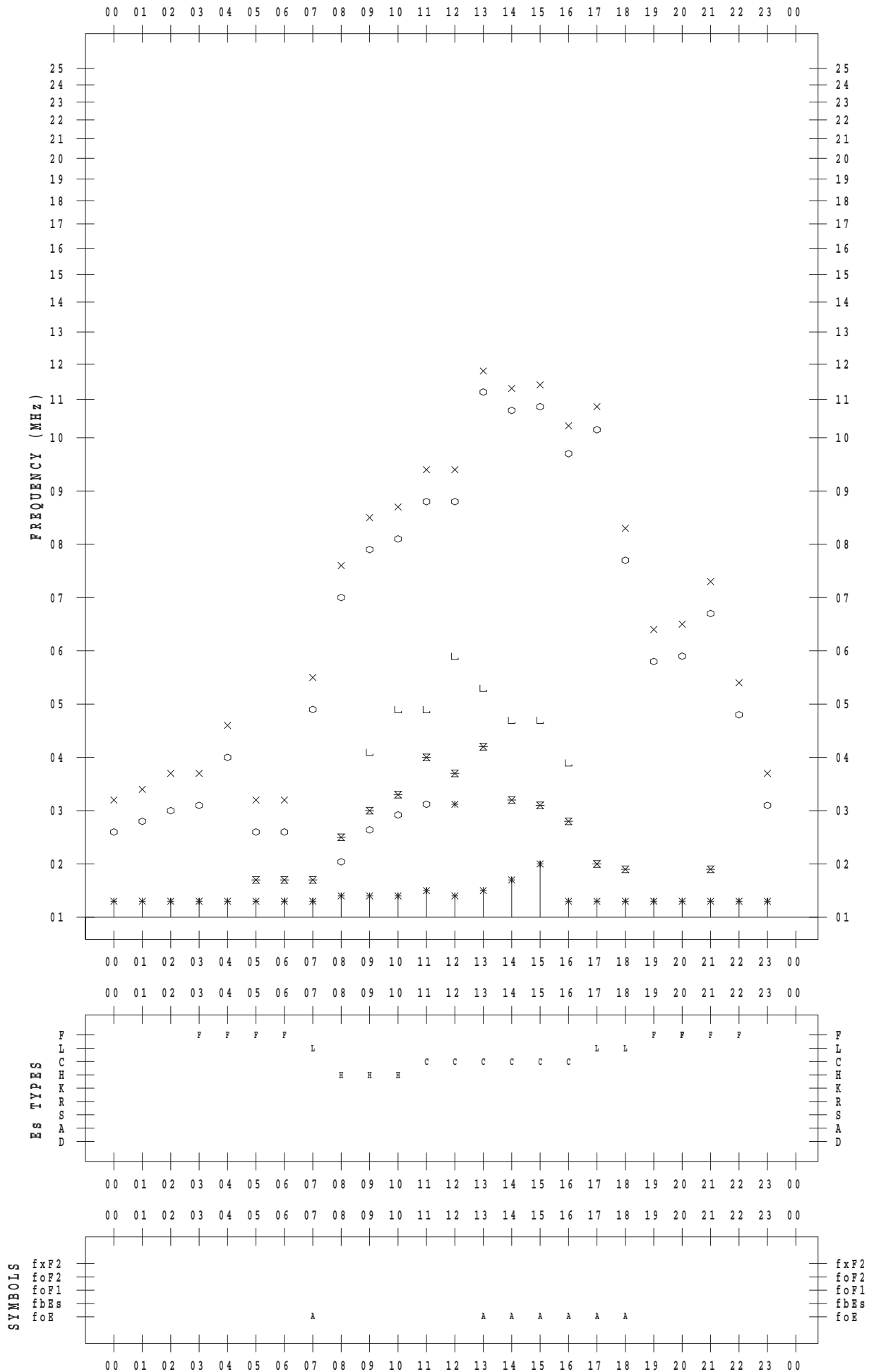
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/ 1

135 ° E MEAN TIME



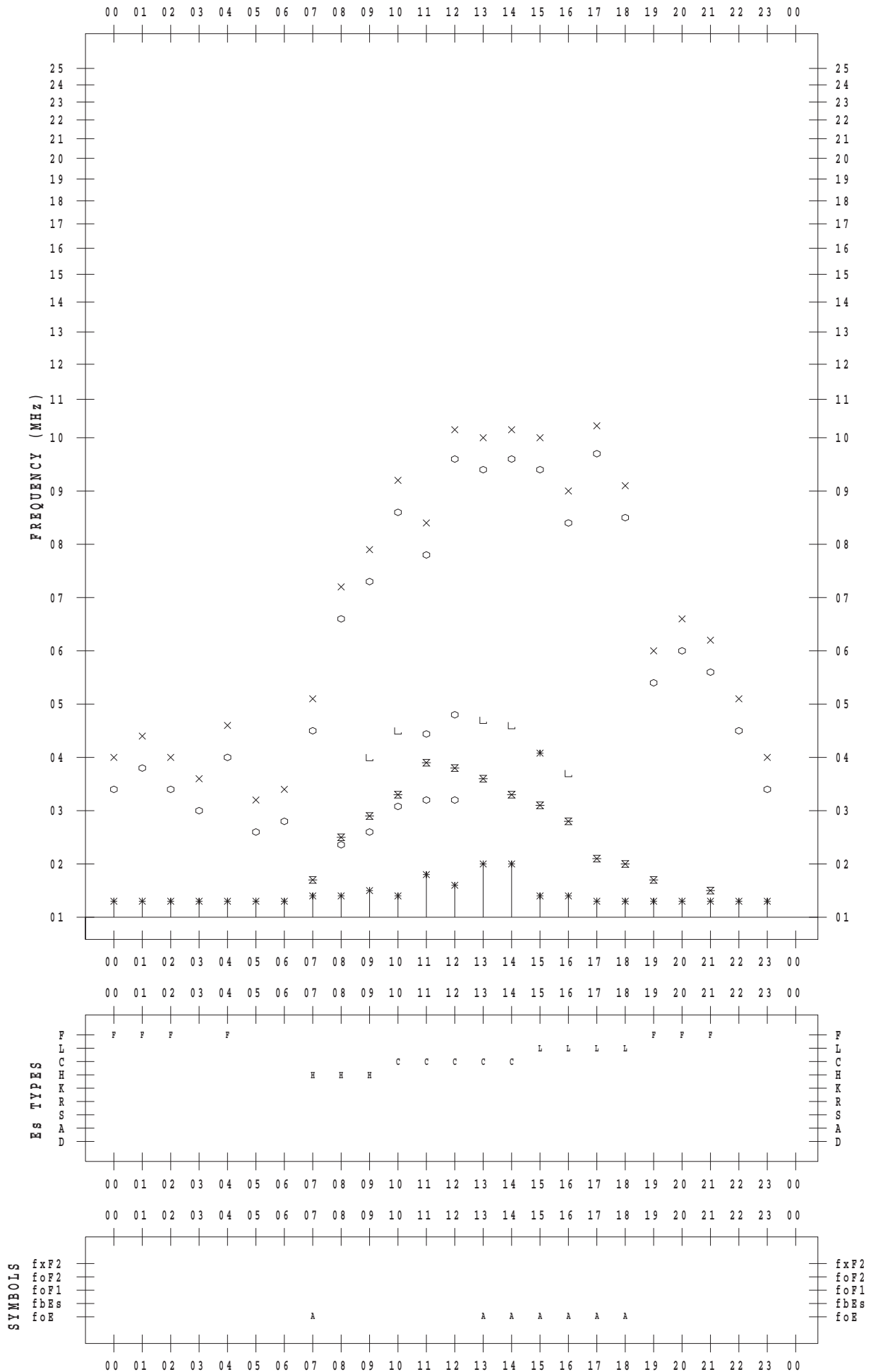
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/ 2

135 ° E MEAN TIME



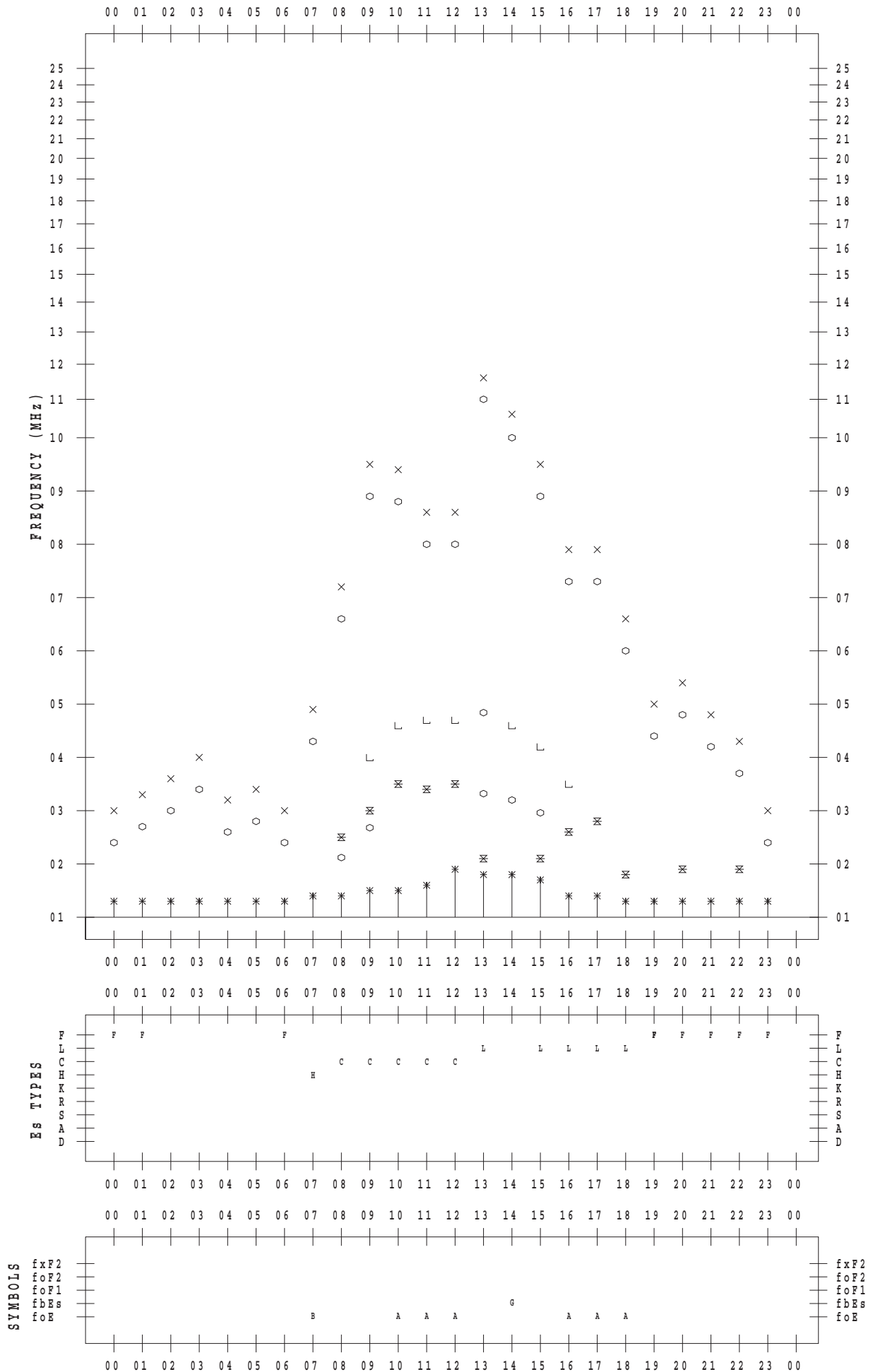
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/ 3

135 ° E MEAN TIME



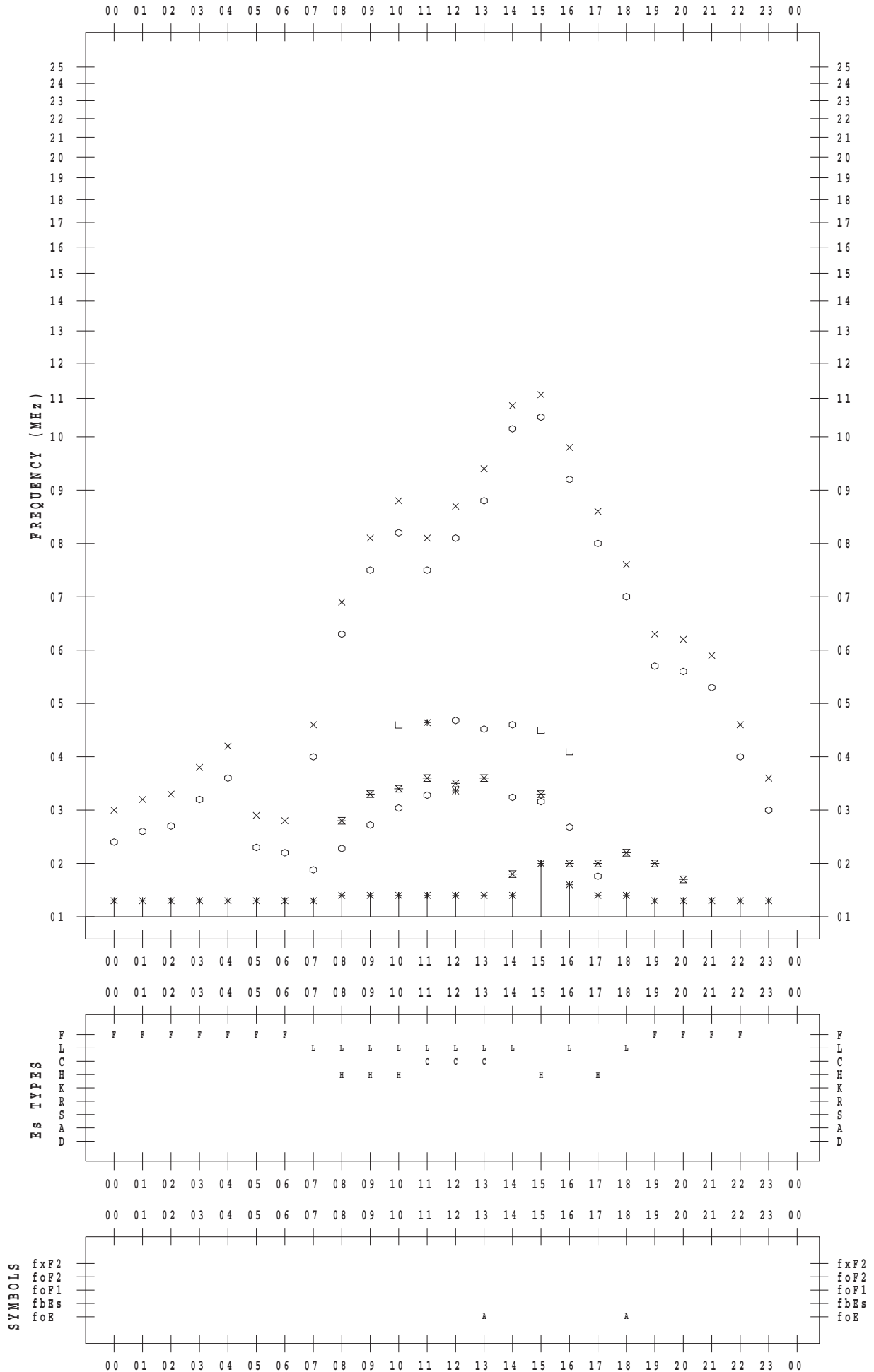
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/ 4

135 ° E MEAN TIME



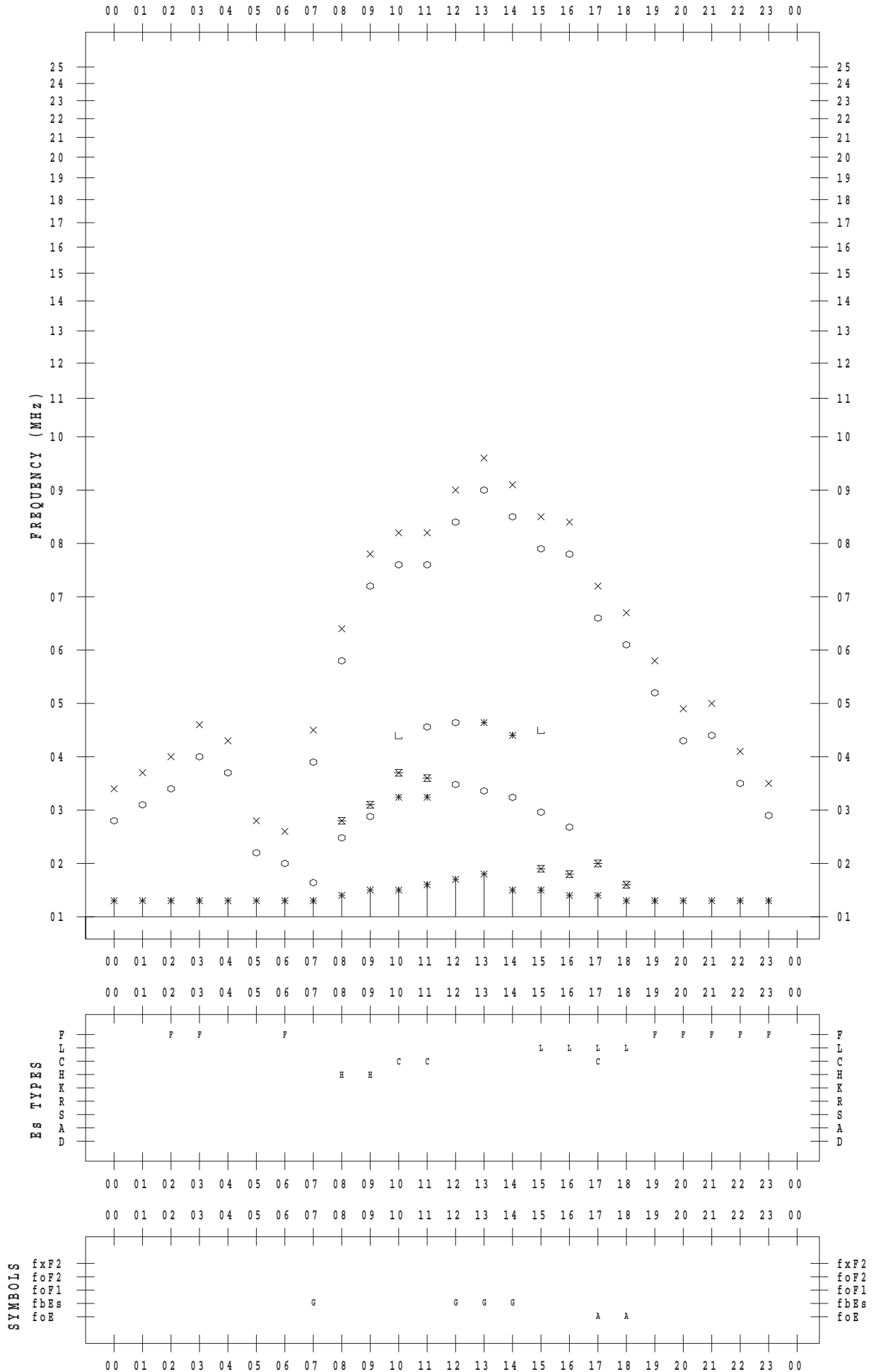
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/ 5

135 ° E MEAN TIME



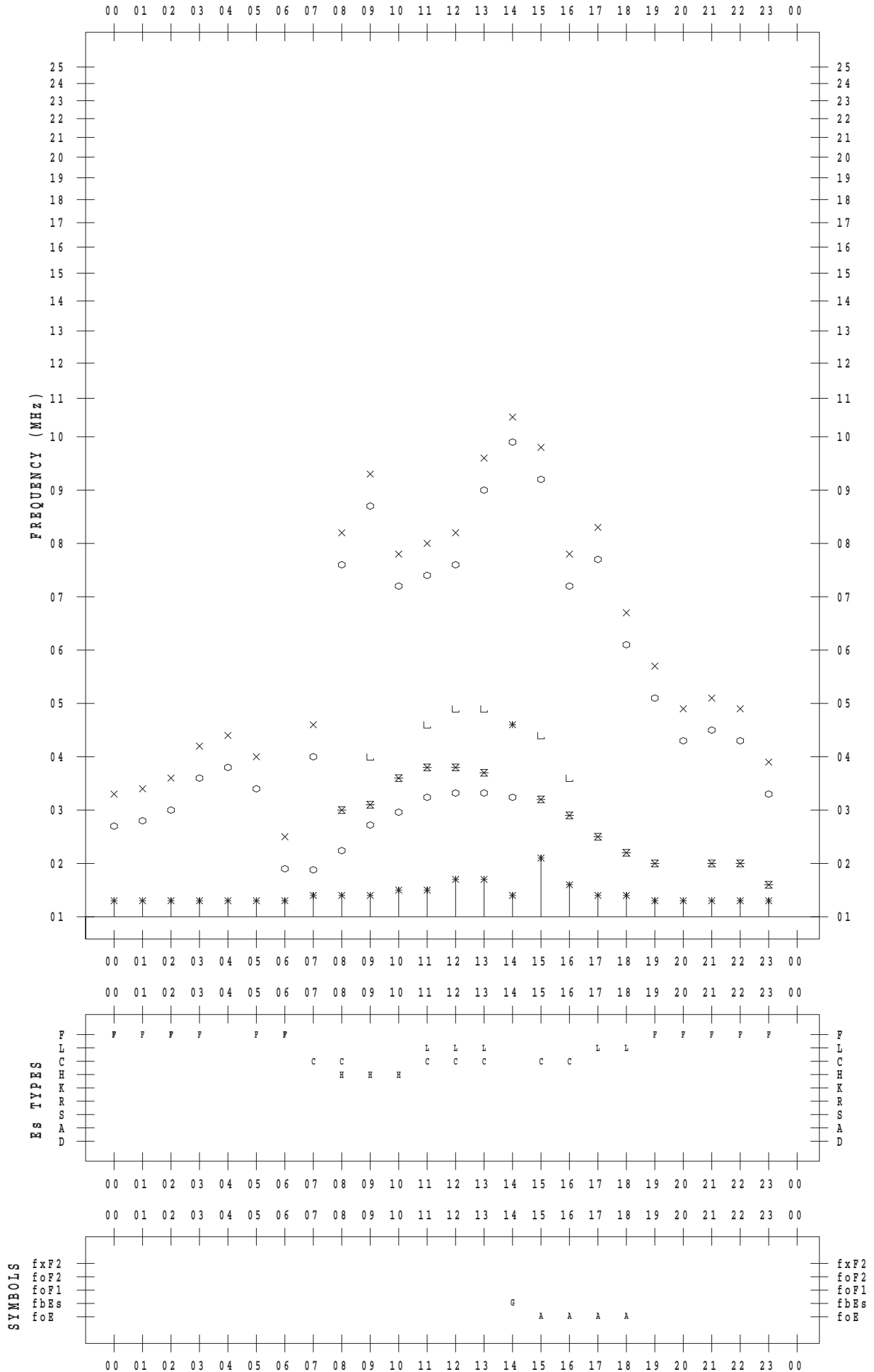
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/ 6

135 ° E MEAN TIME



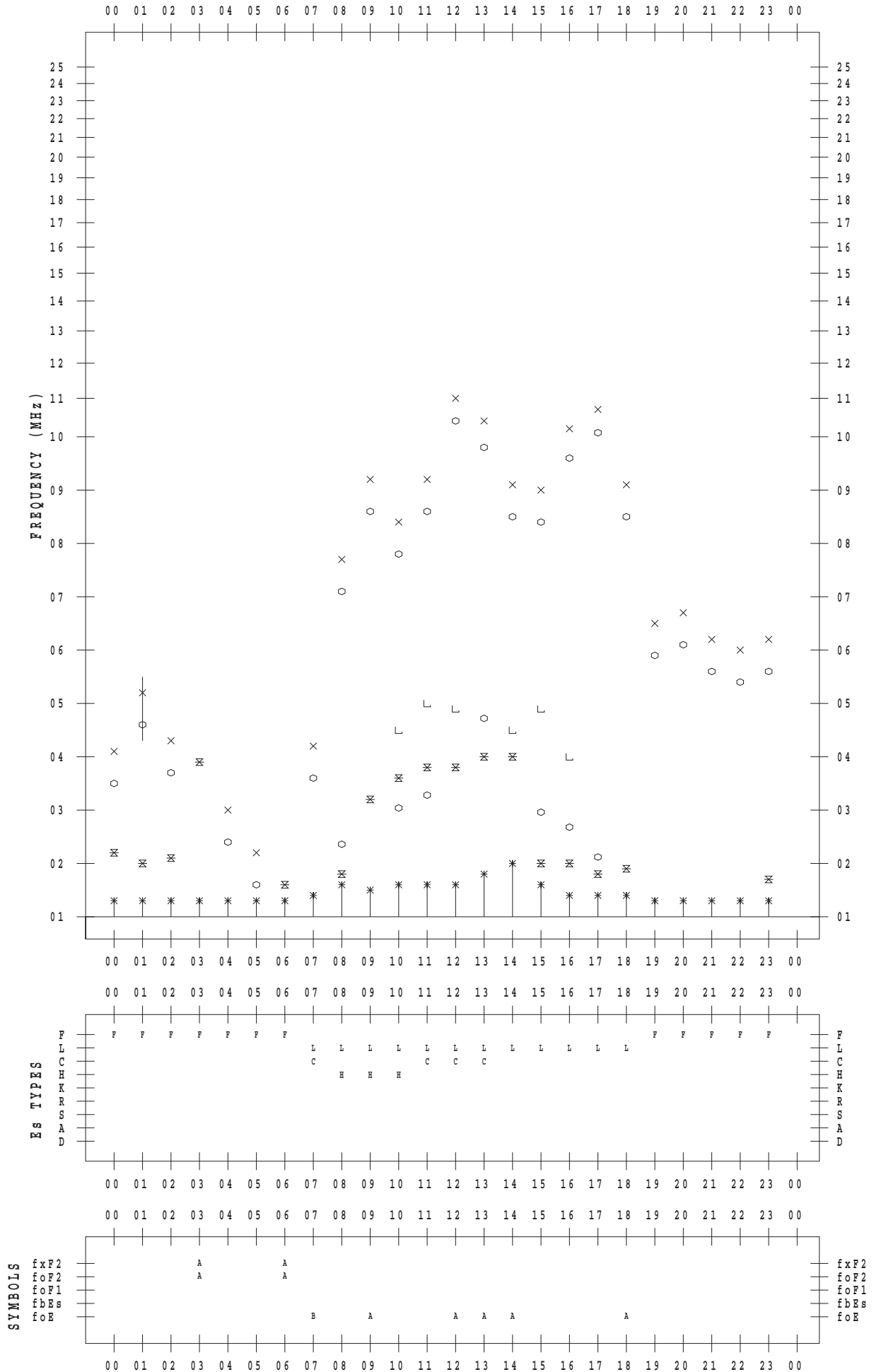
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/ 7

135 ° E MEAN TIME



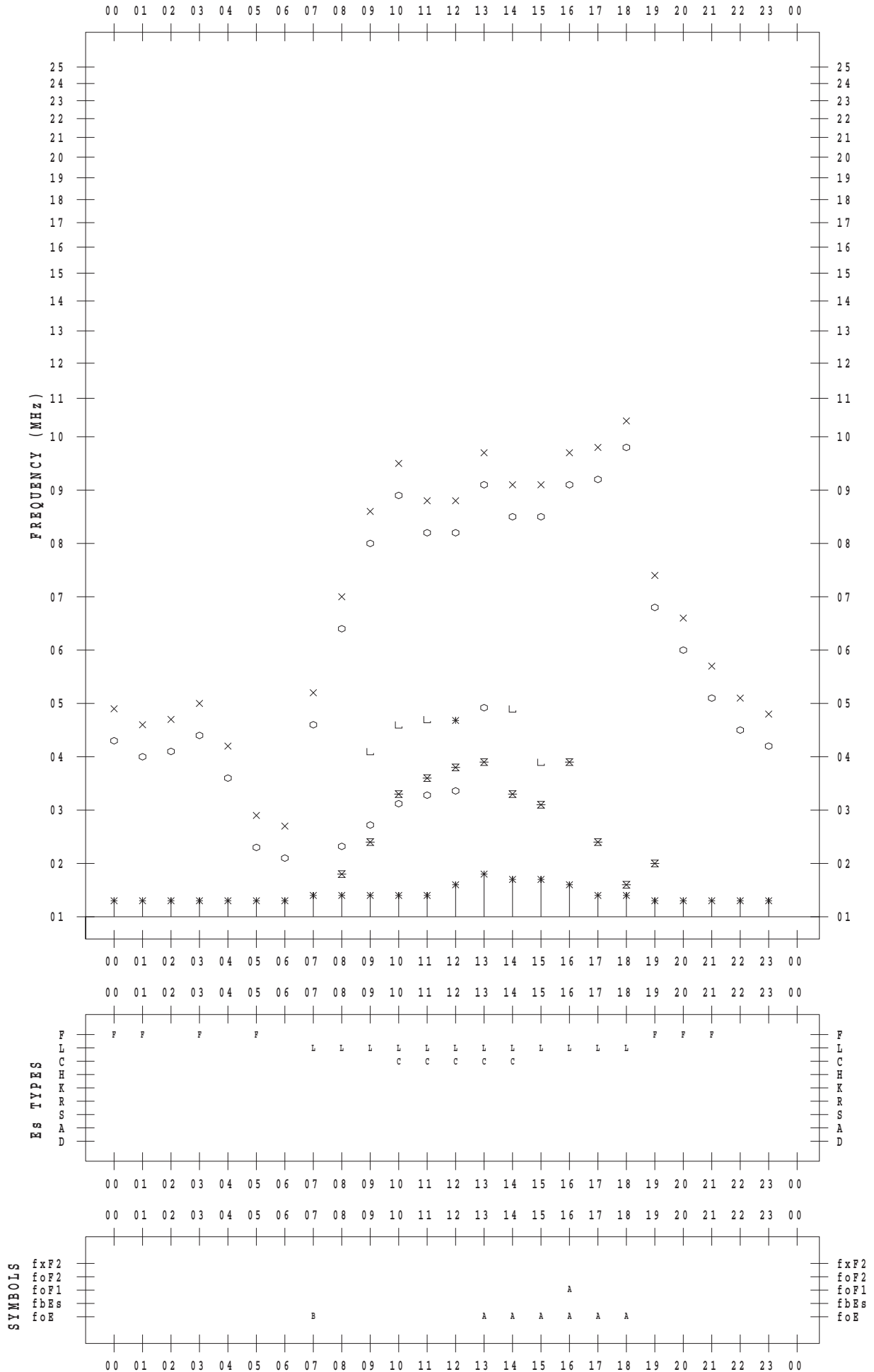
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/ 8

135 ° E MEAN TIME



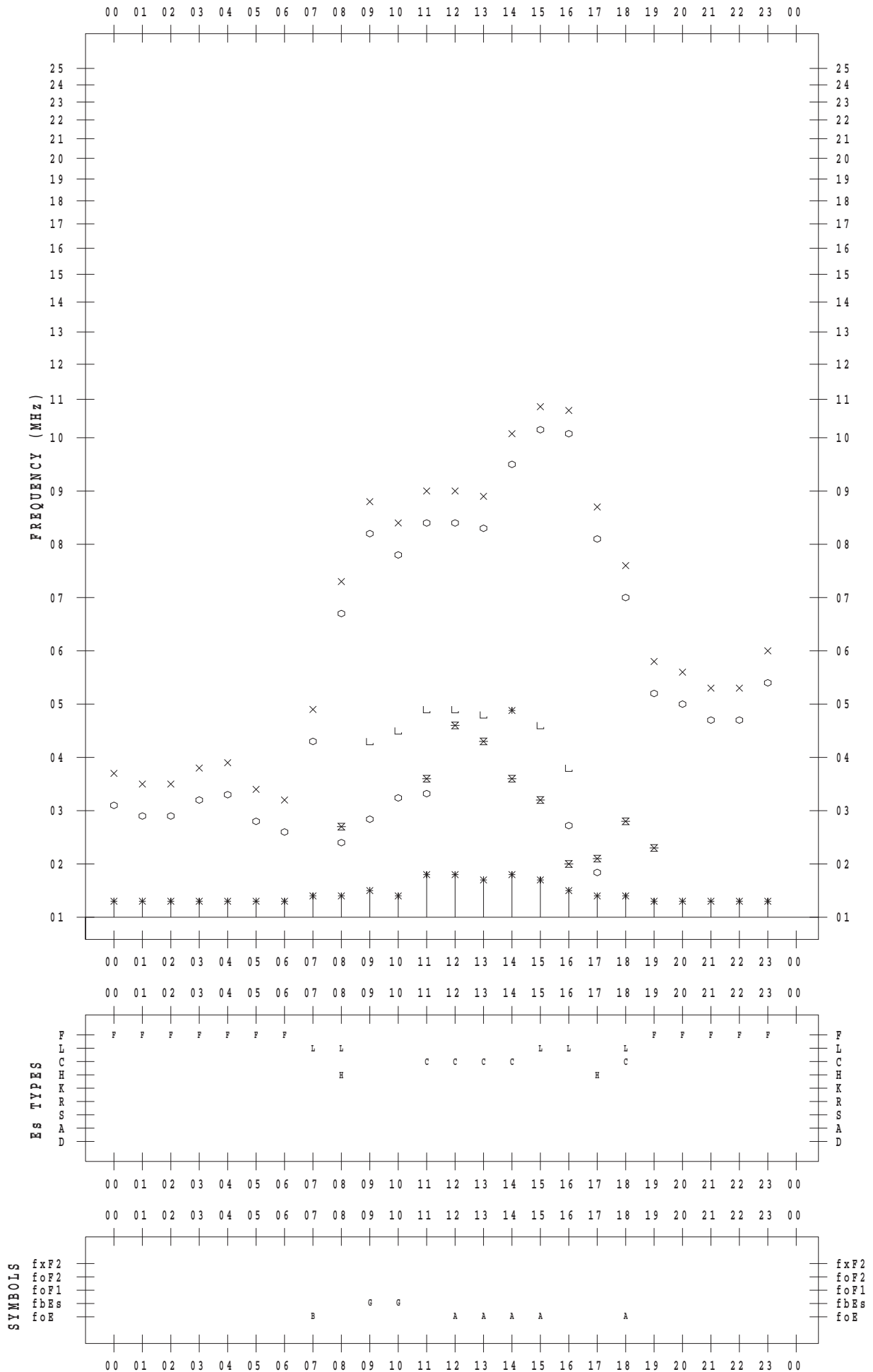
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/ 9

135 ° E MEAN TIME



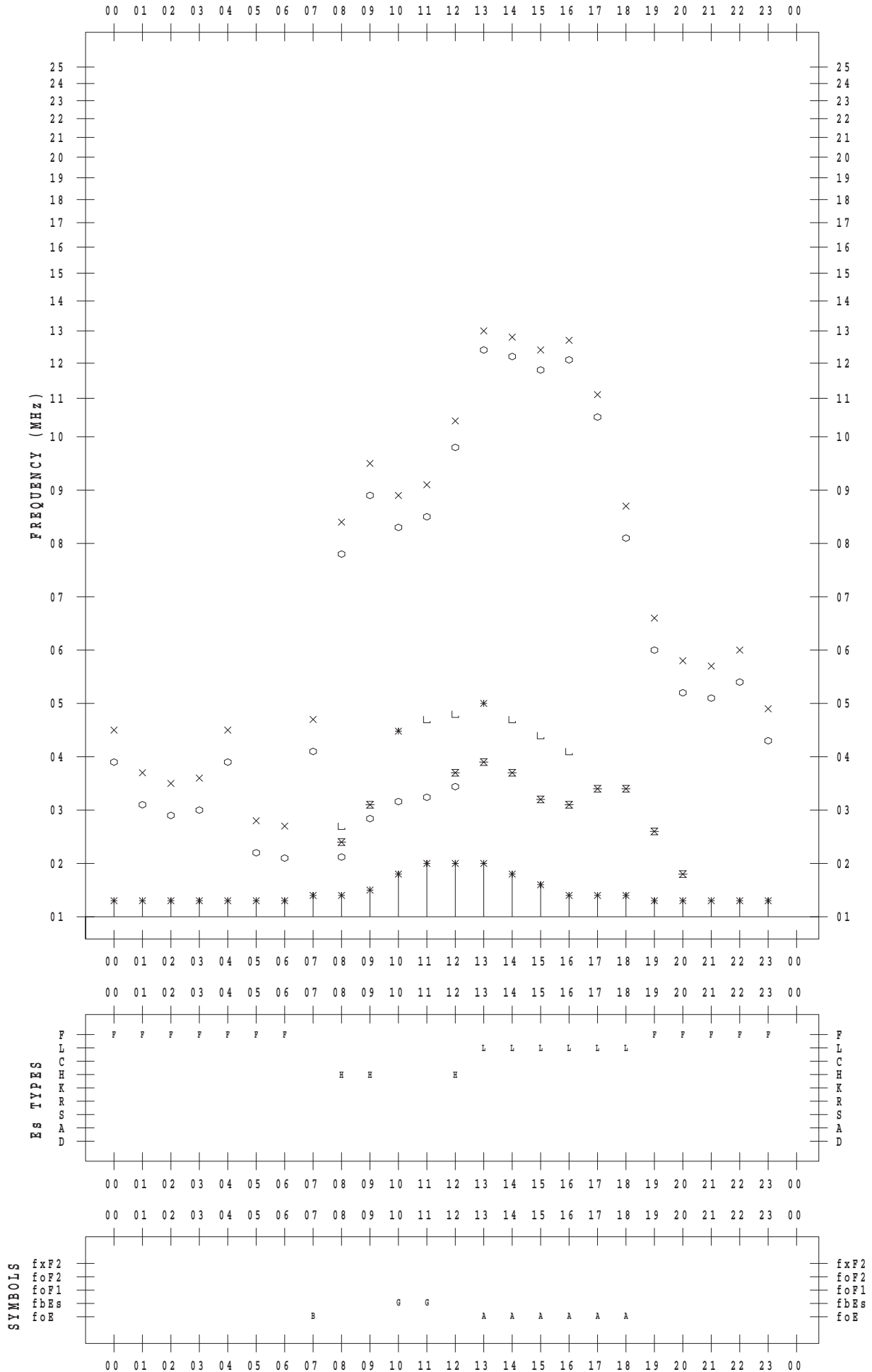
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/10

135 ° E MEAN TIME



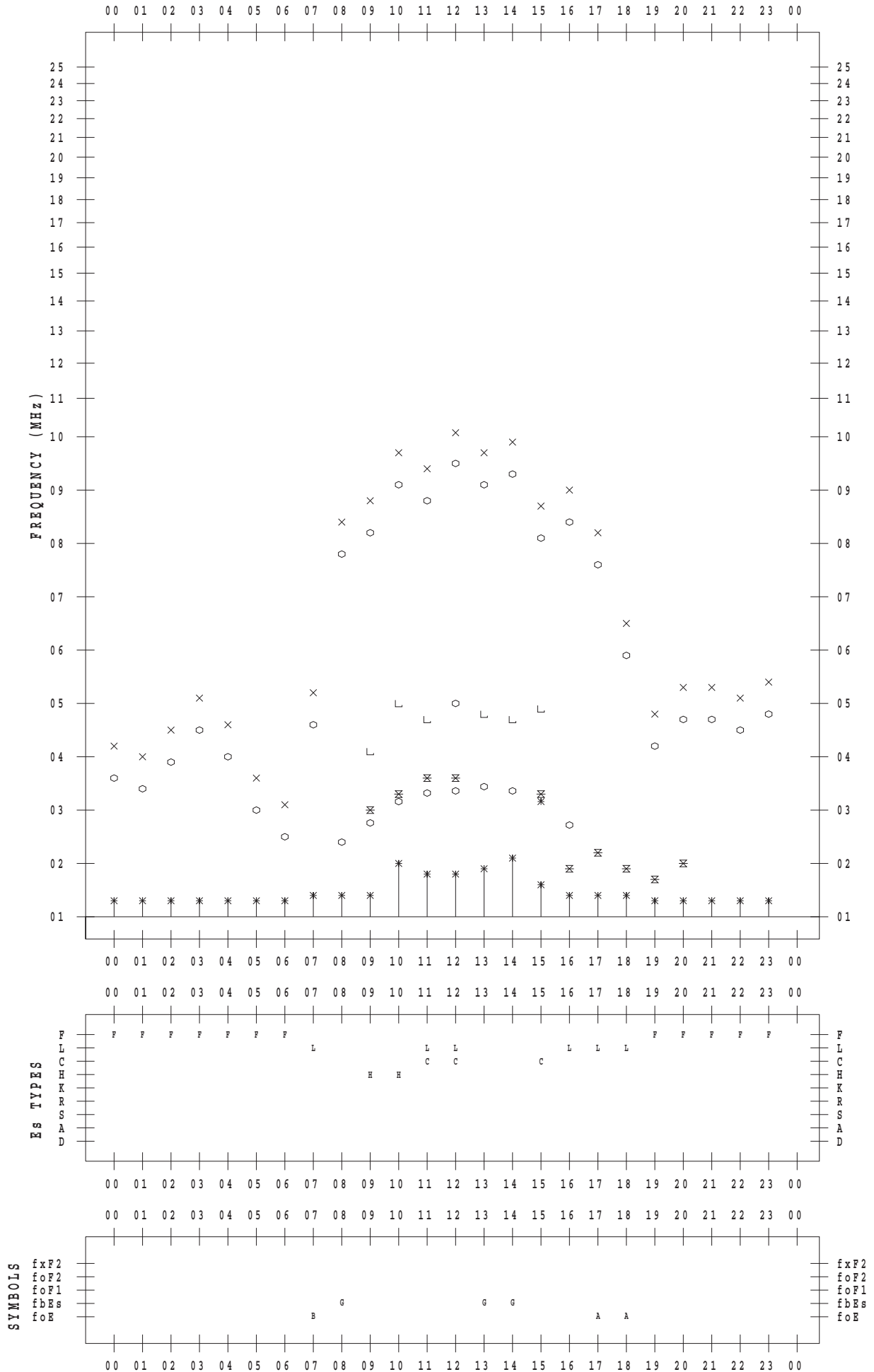
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/11

135 ° E MEAN TIME



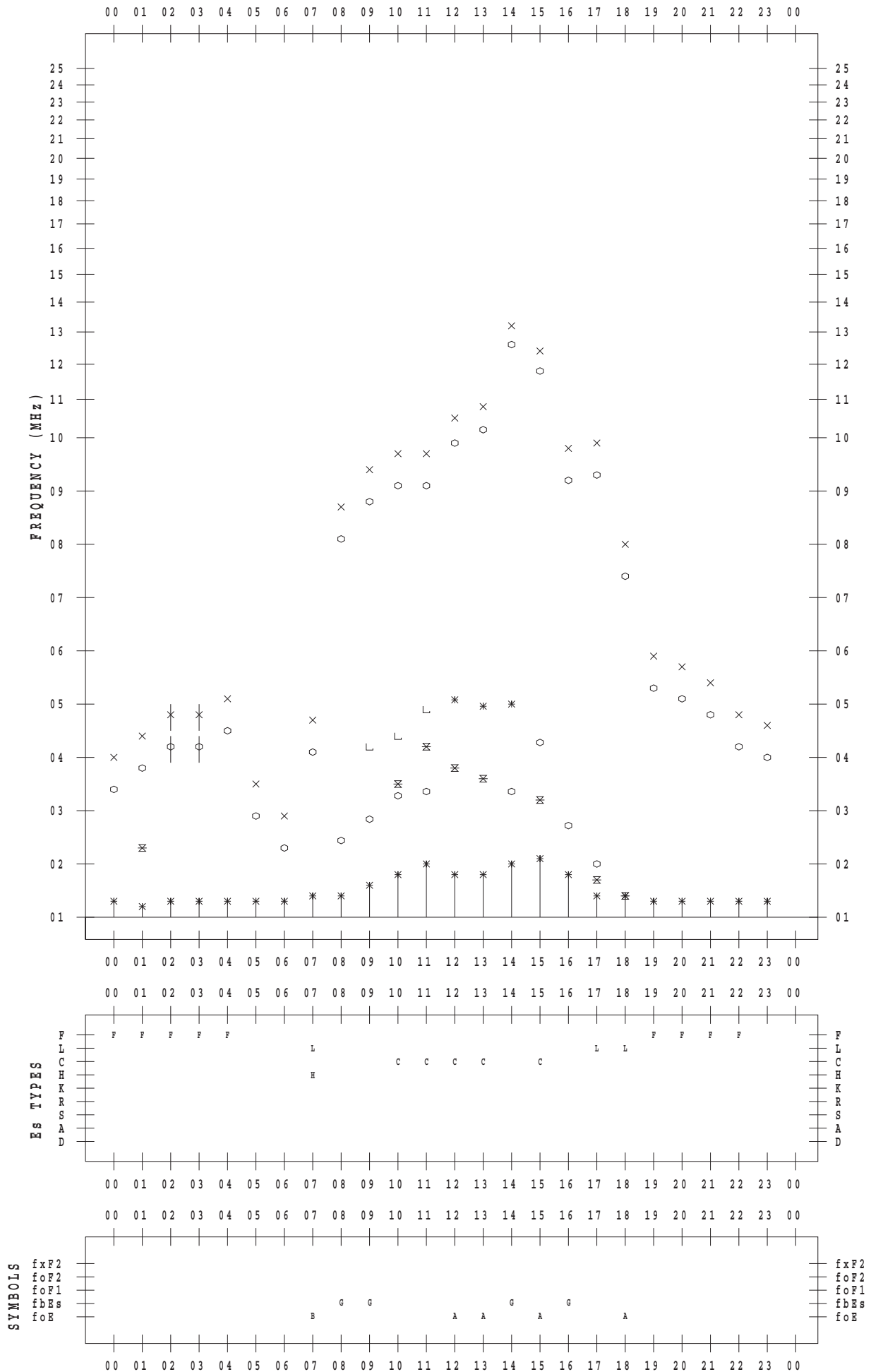
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/12

135 ° E MEAN TIME



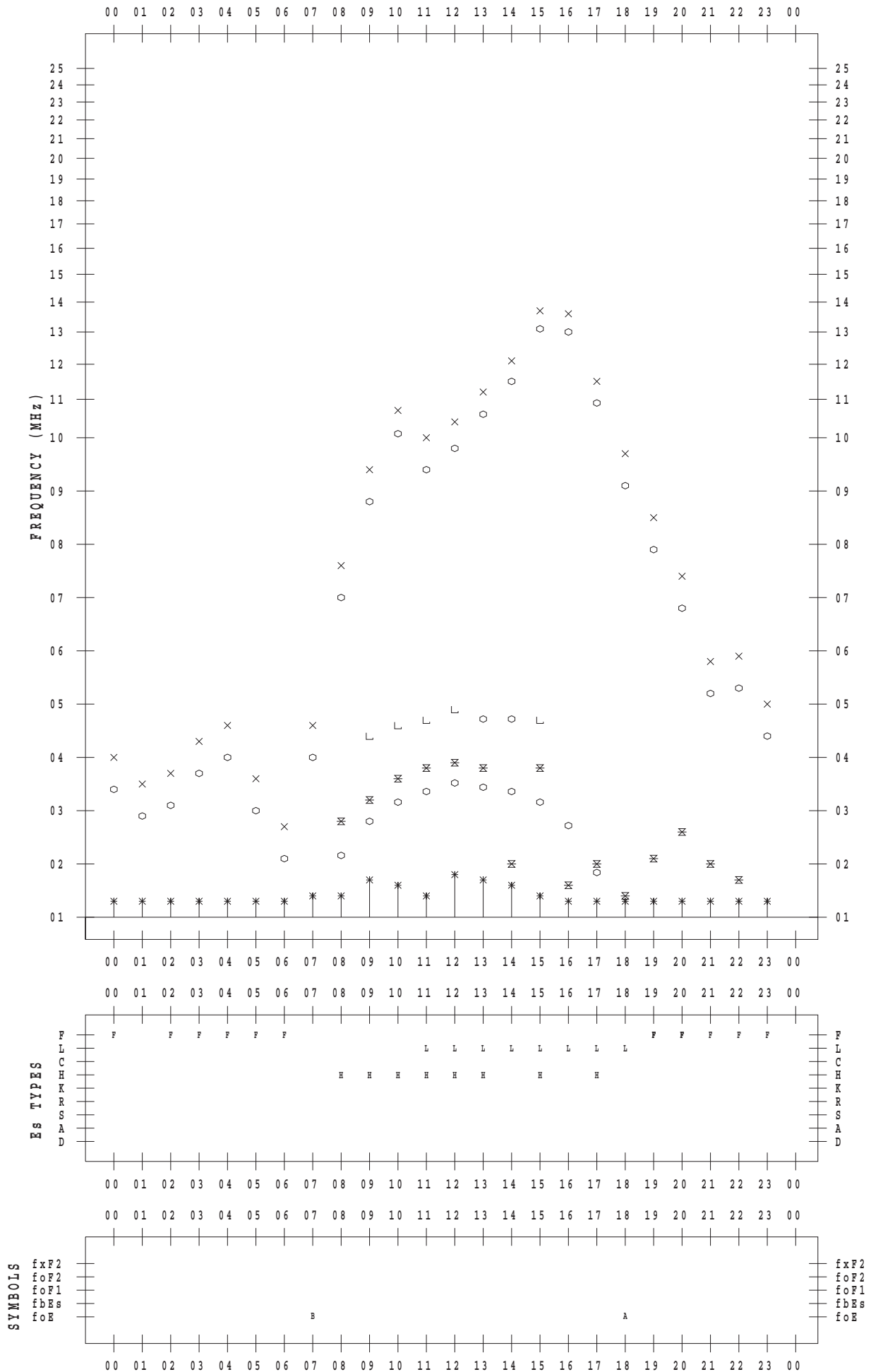
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/13

135 ° E MEAN TIME



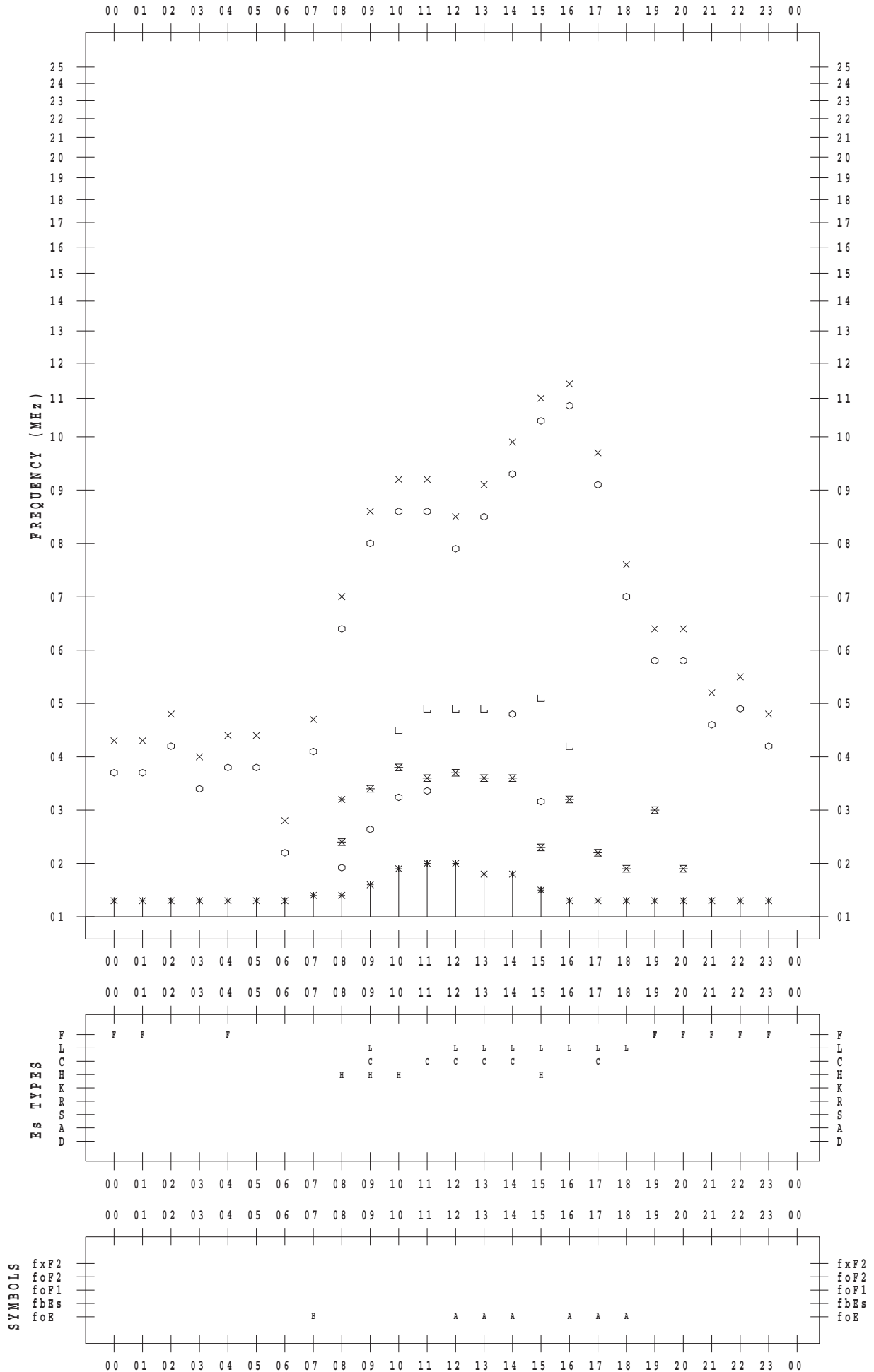
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/14

135 ° E MEAN TIME



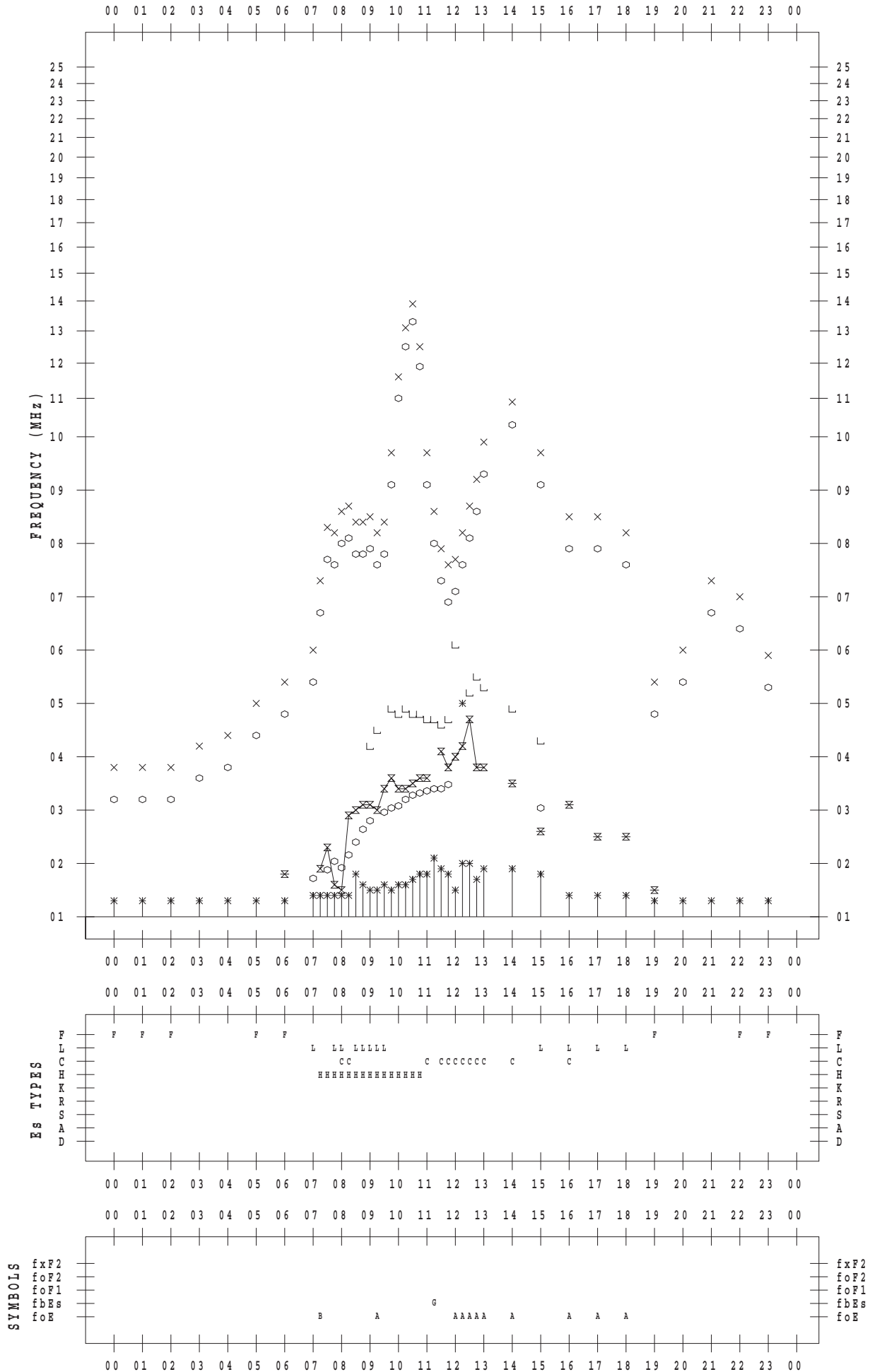
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/15

135 ° E MEAN TIME



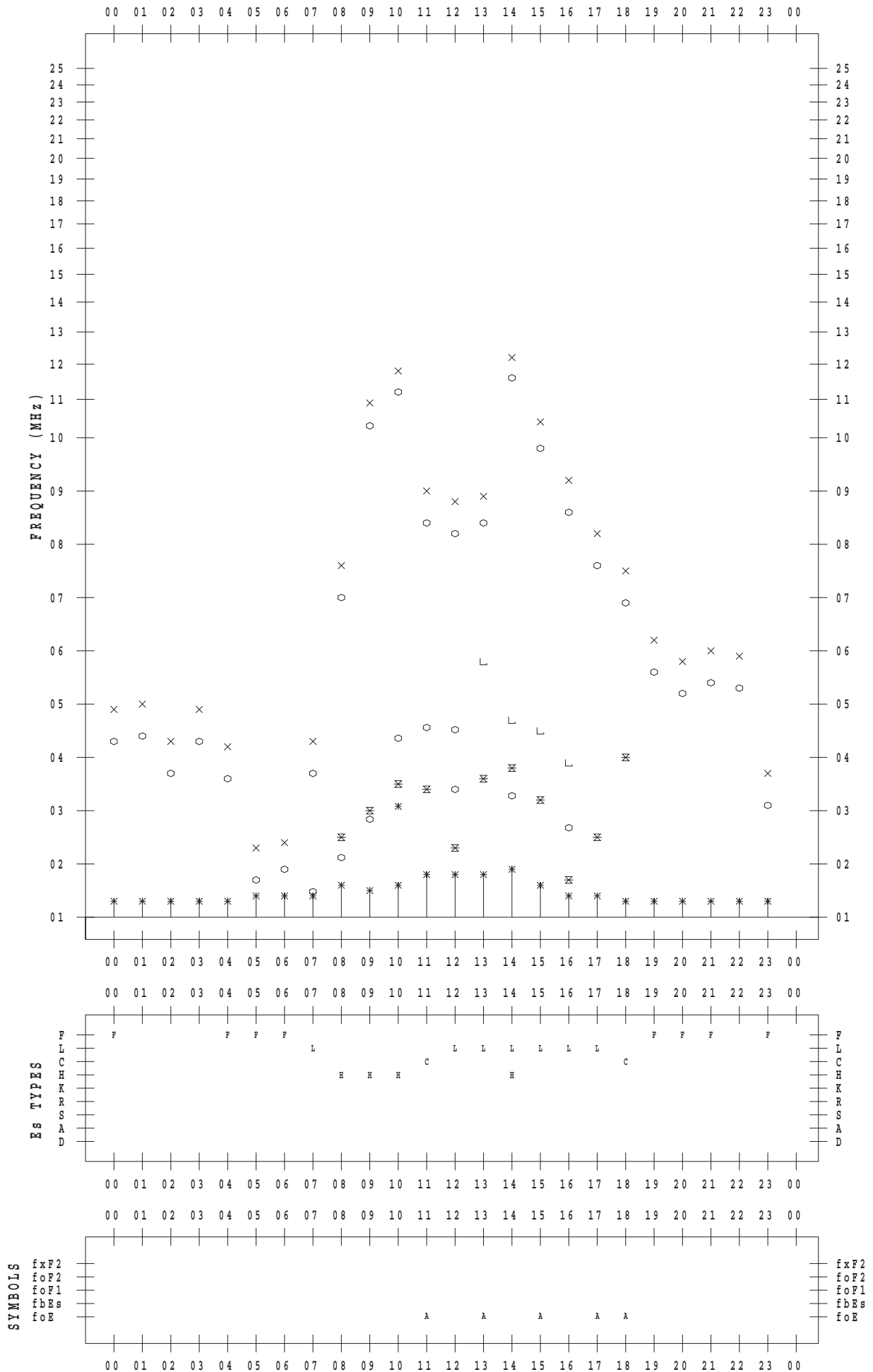
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/16

135 ° E MEAN TIME



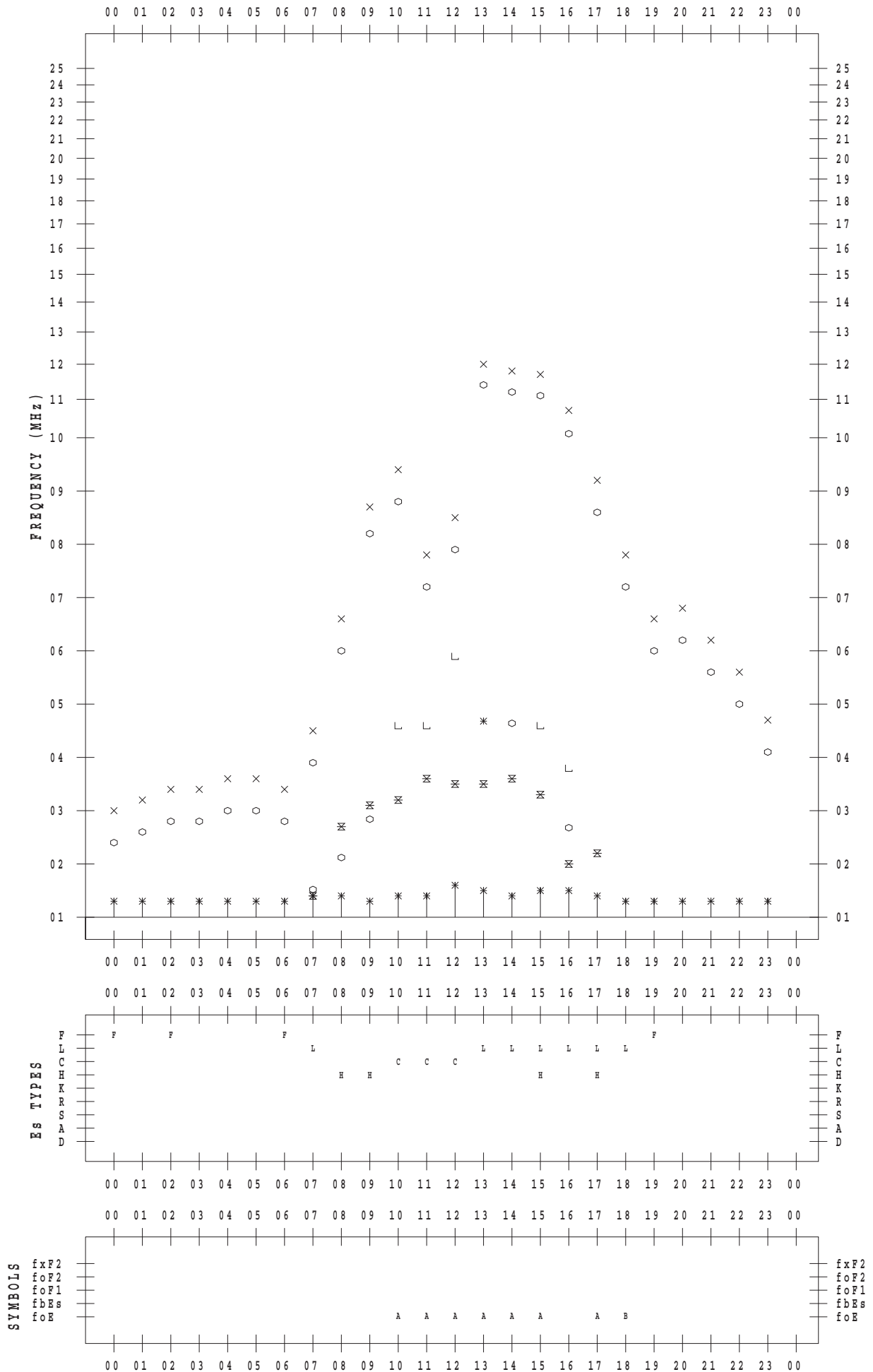
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/17

135 ° E MEAN TIME



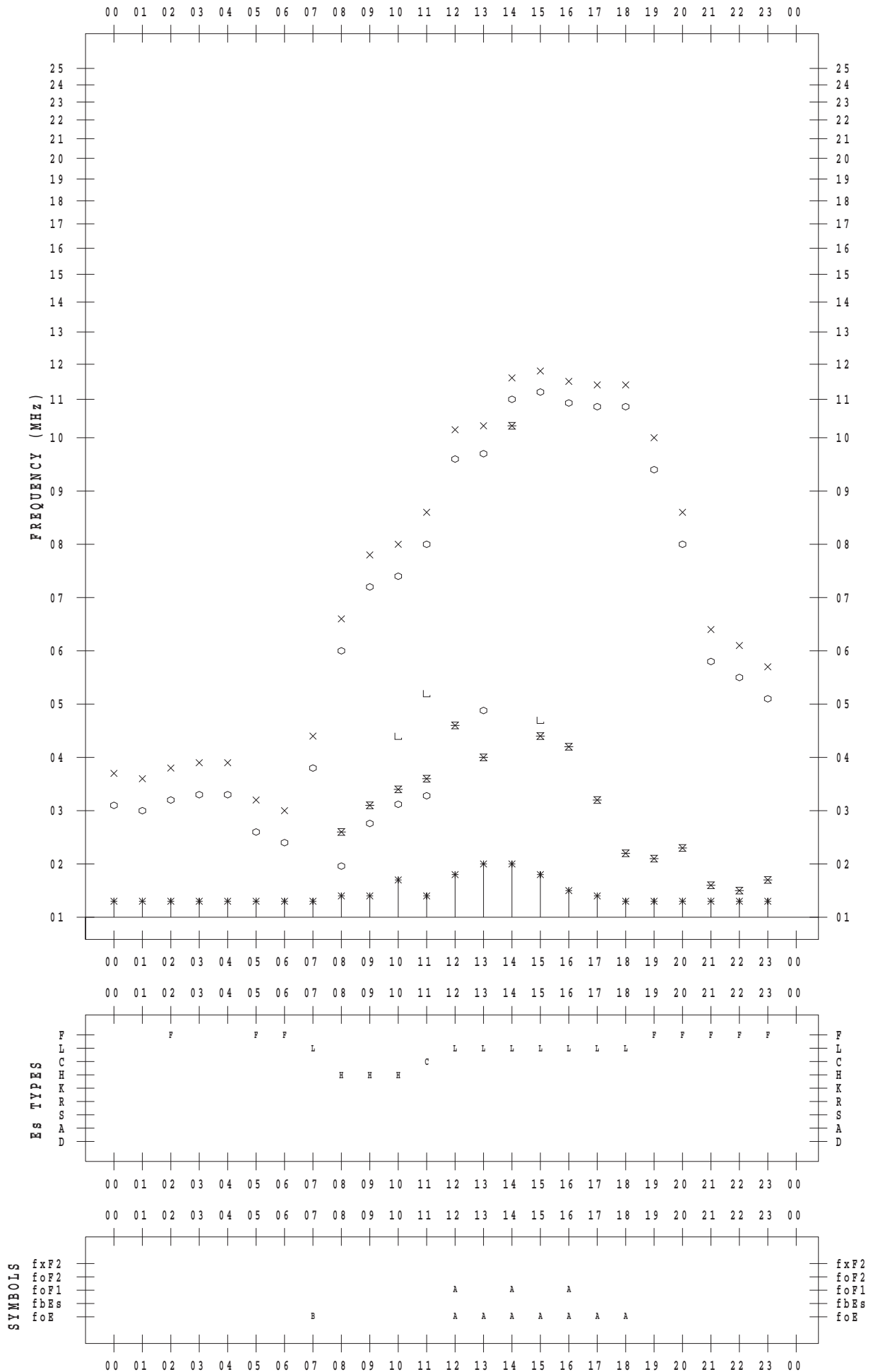
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/18

135 ° E MEAN TIME



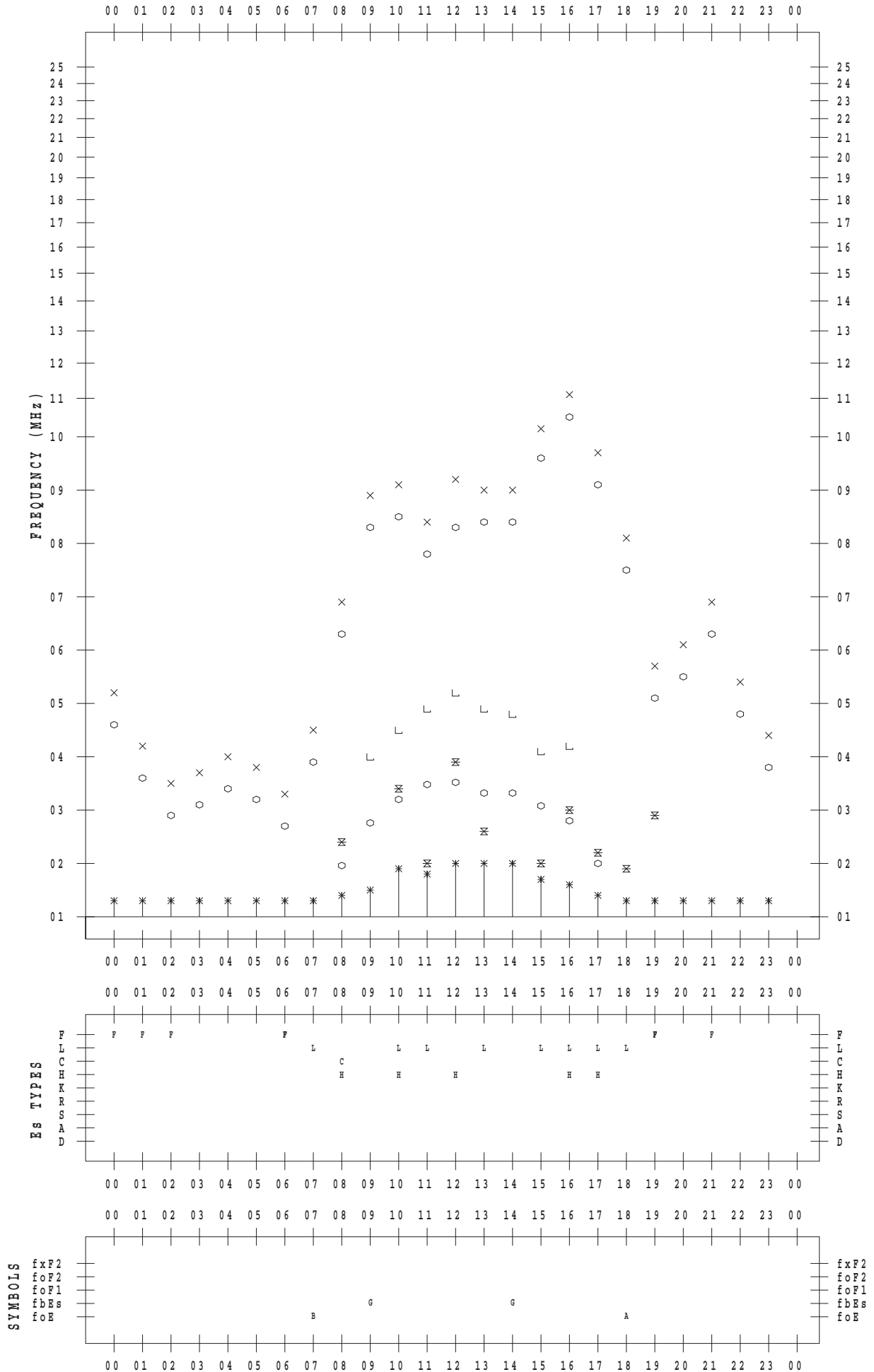
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/19

135 ° E MEAN TIME



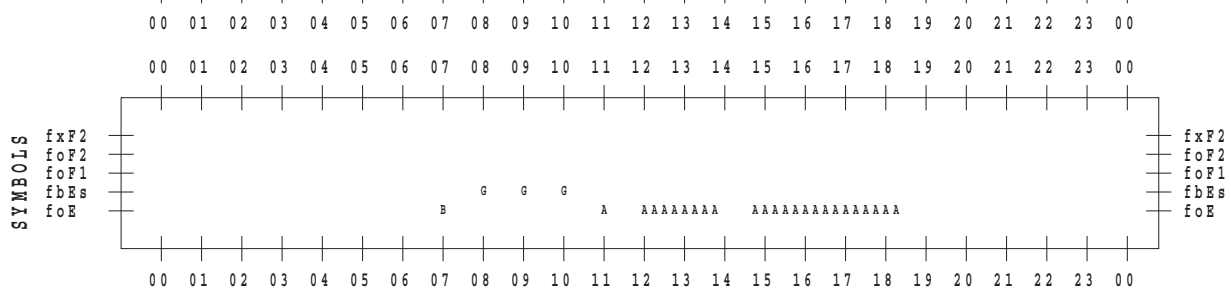
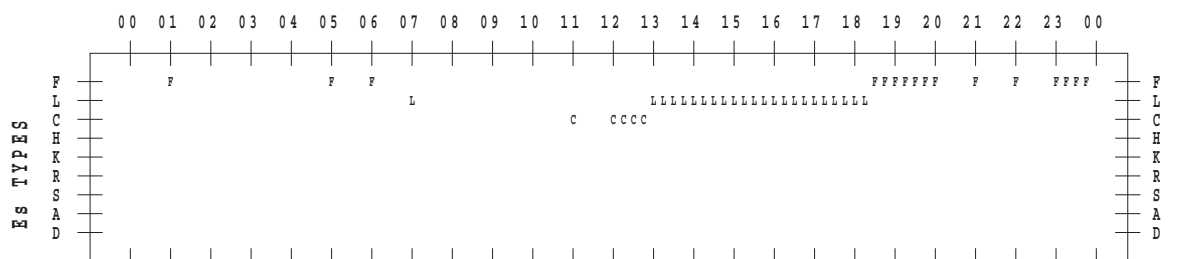
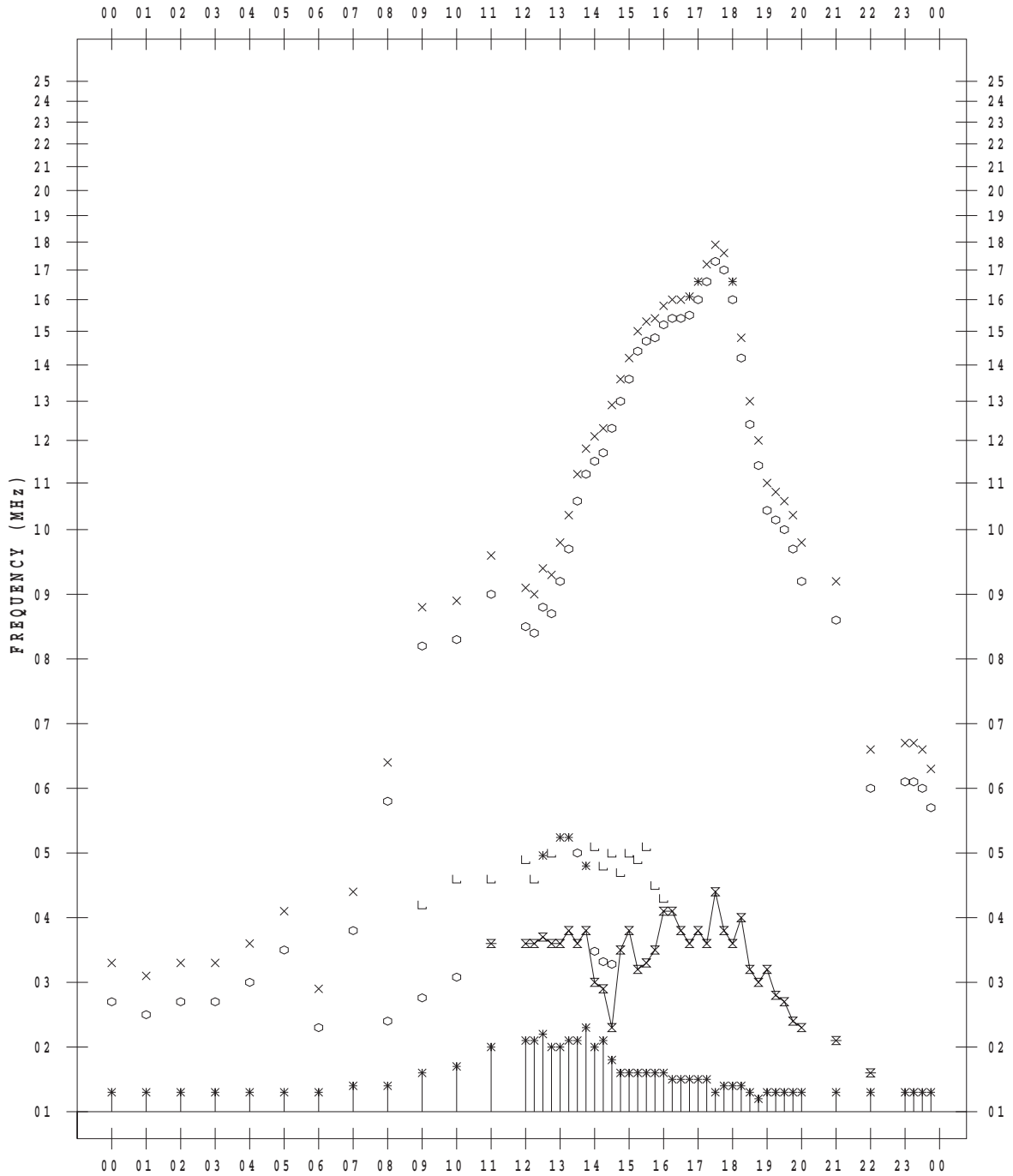
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/20

135 ° E MEAN TIME



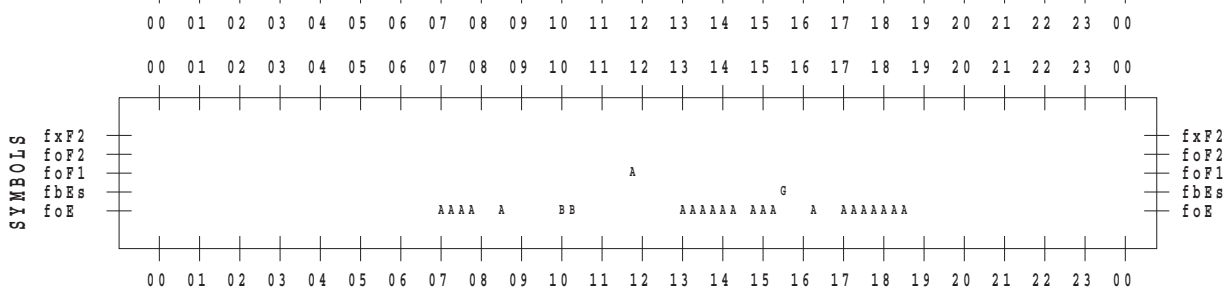
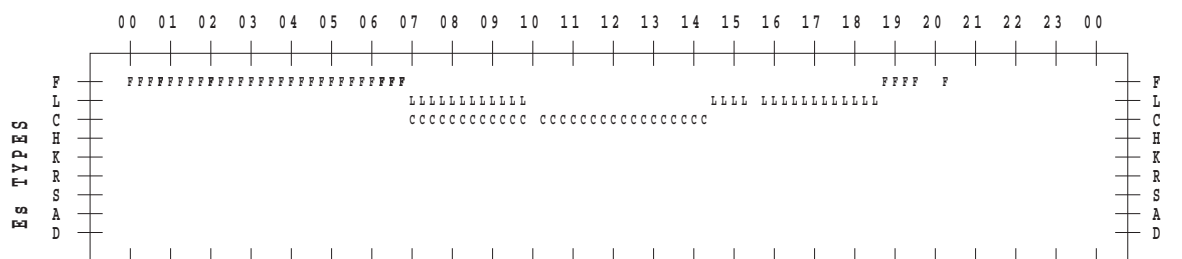
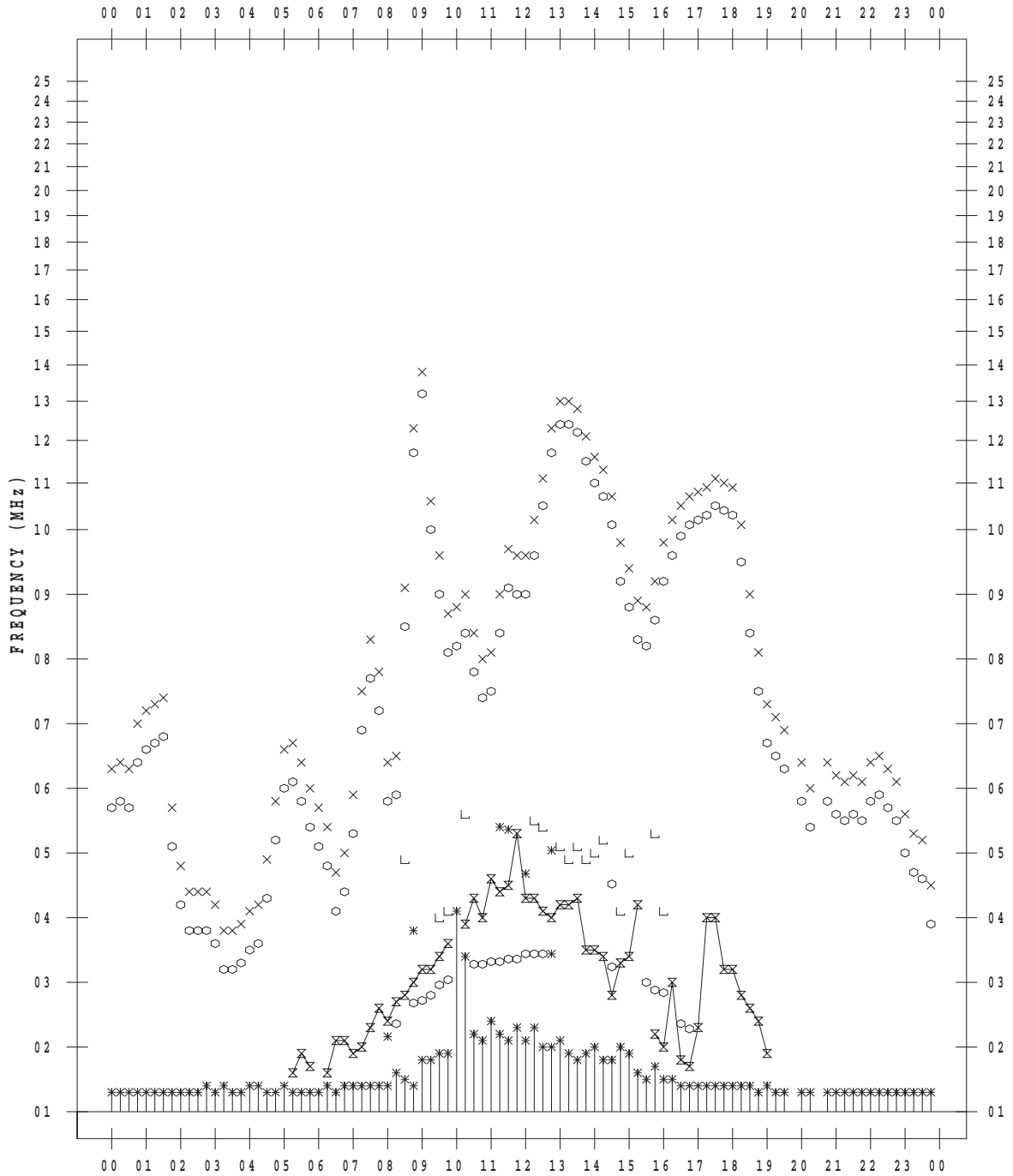
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/21

135 ° E MEAN TIME



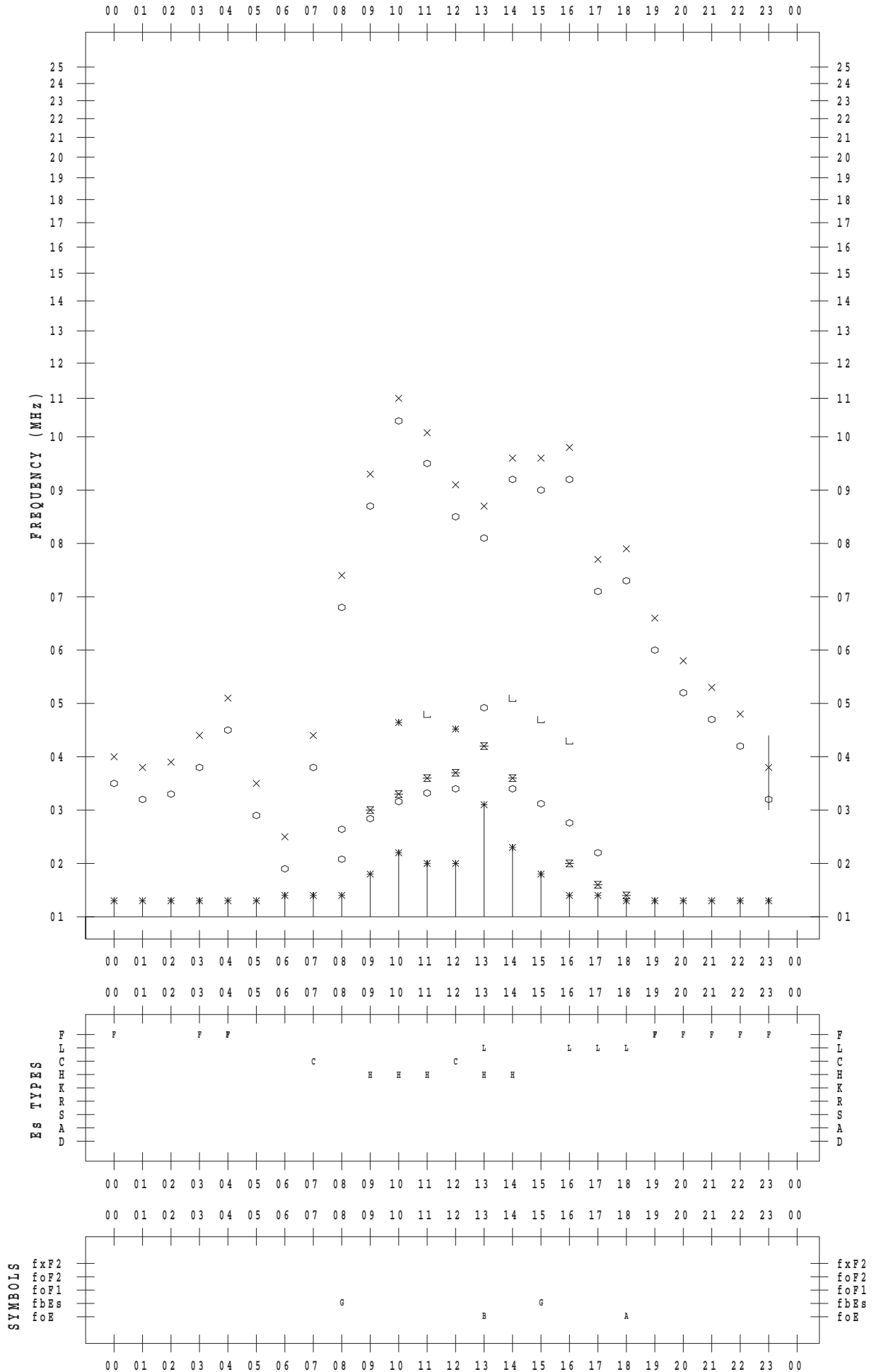
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/22

135 ° E MEAN TIME



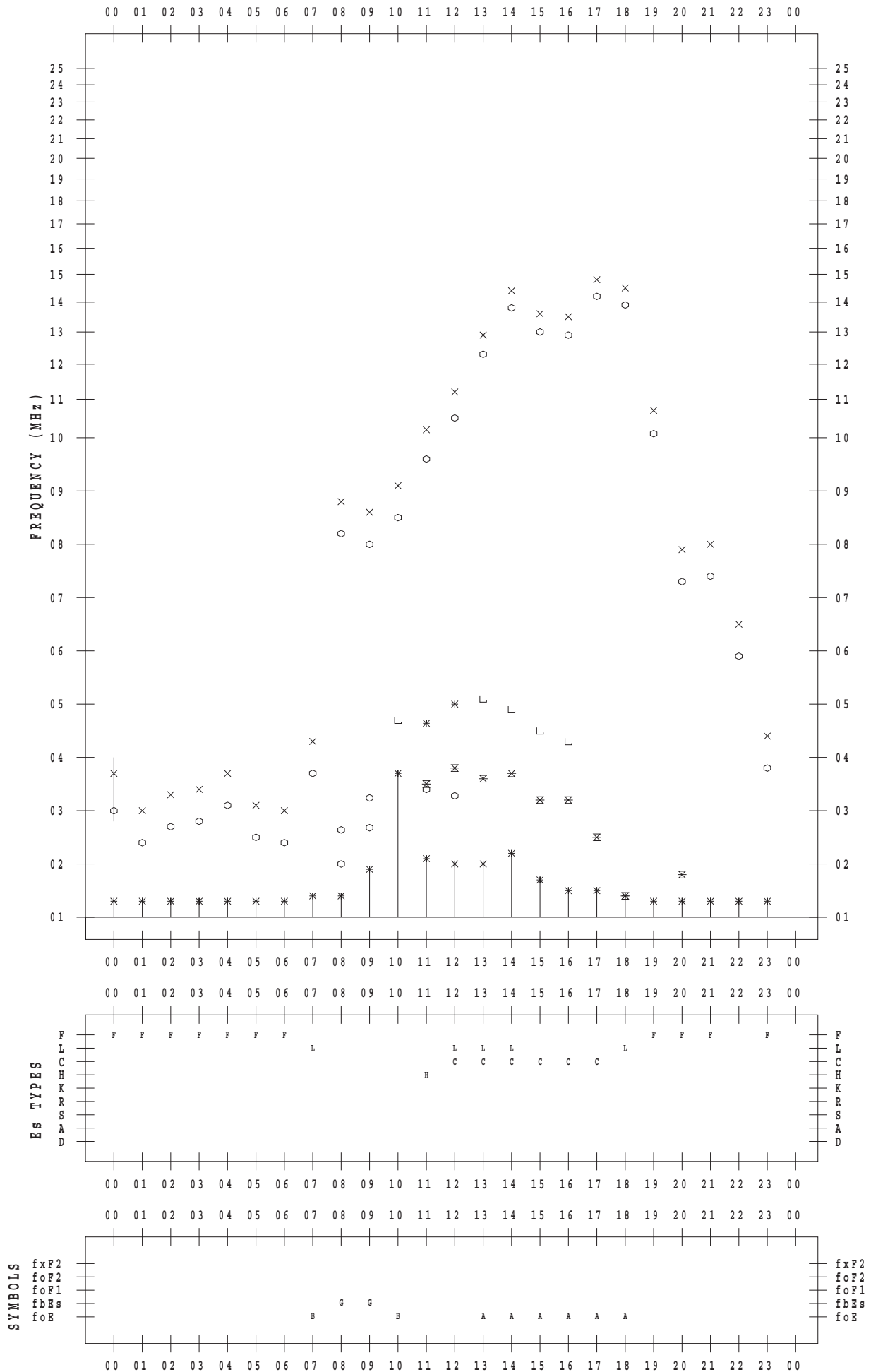
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/23

135 ° E MEAN TIME



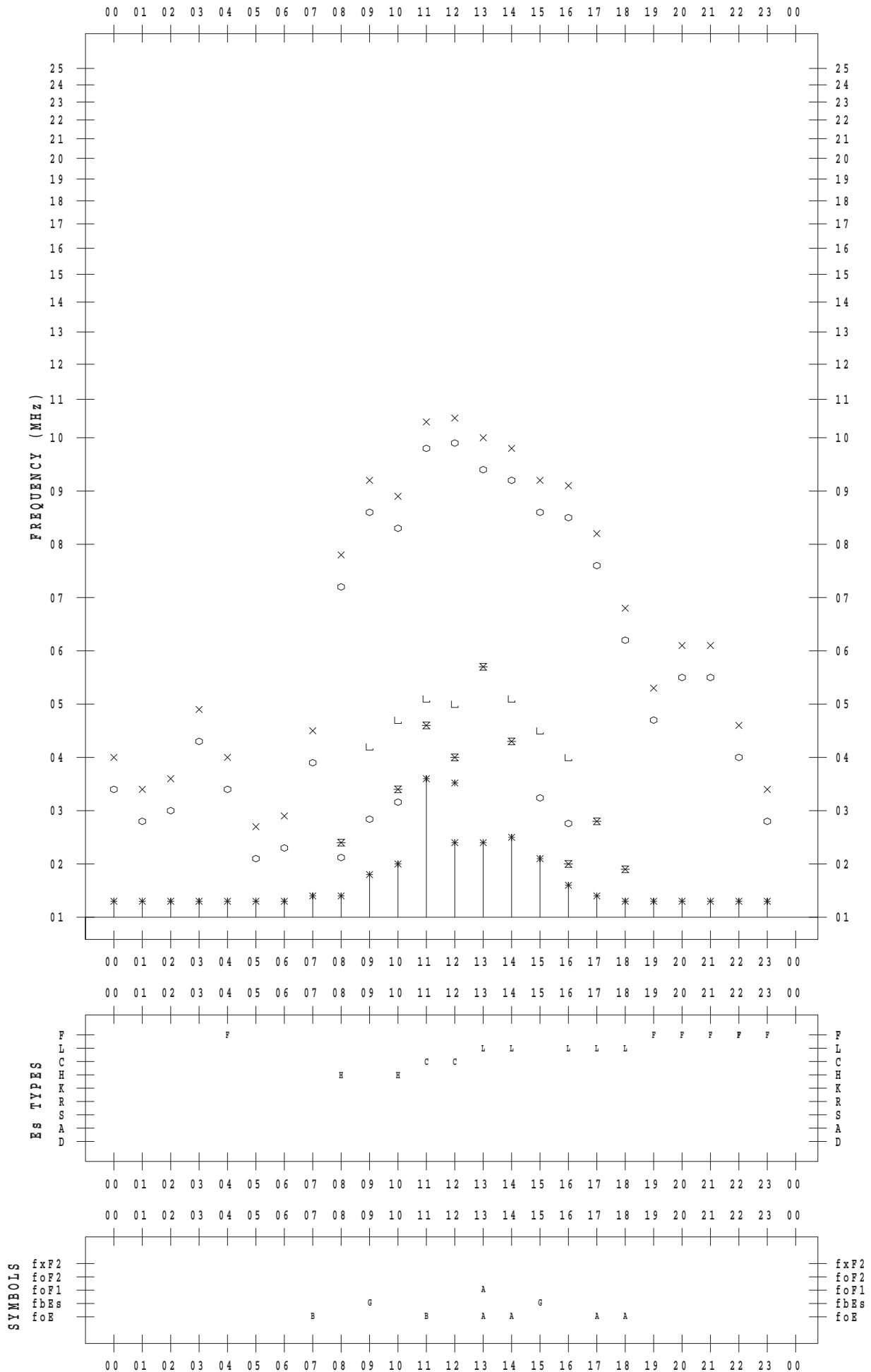
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/24

135 ° E MEAN TIME



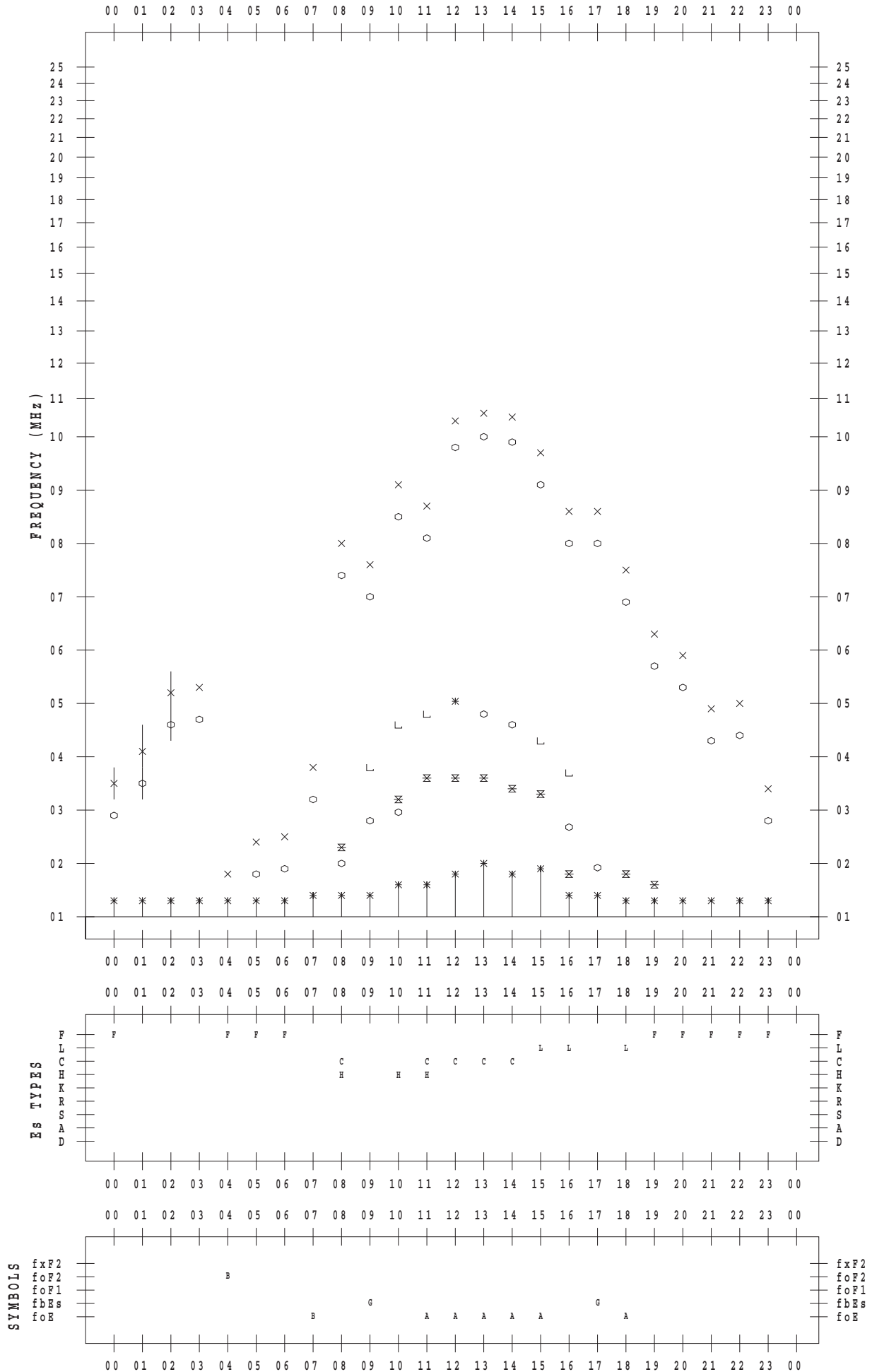
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/25

135 ° E MEAN TIME



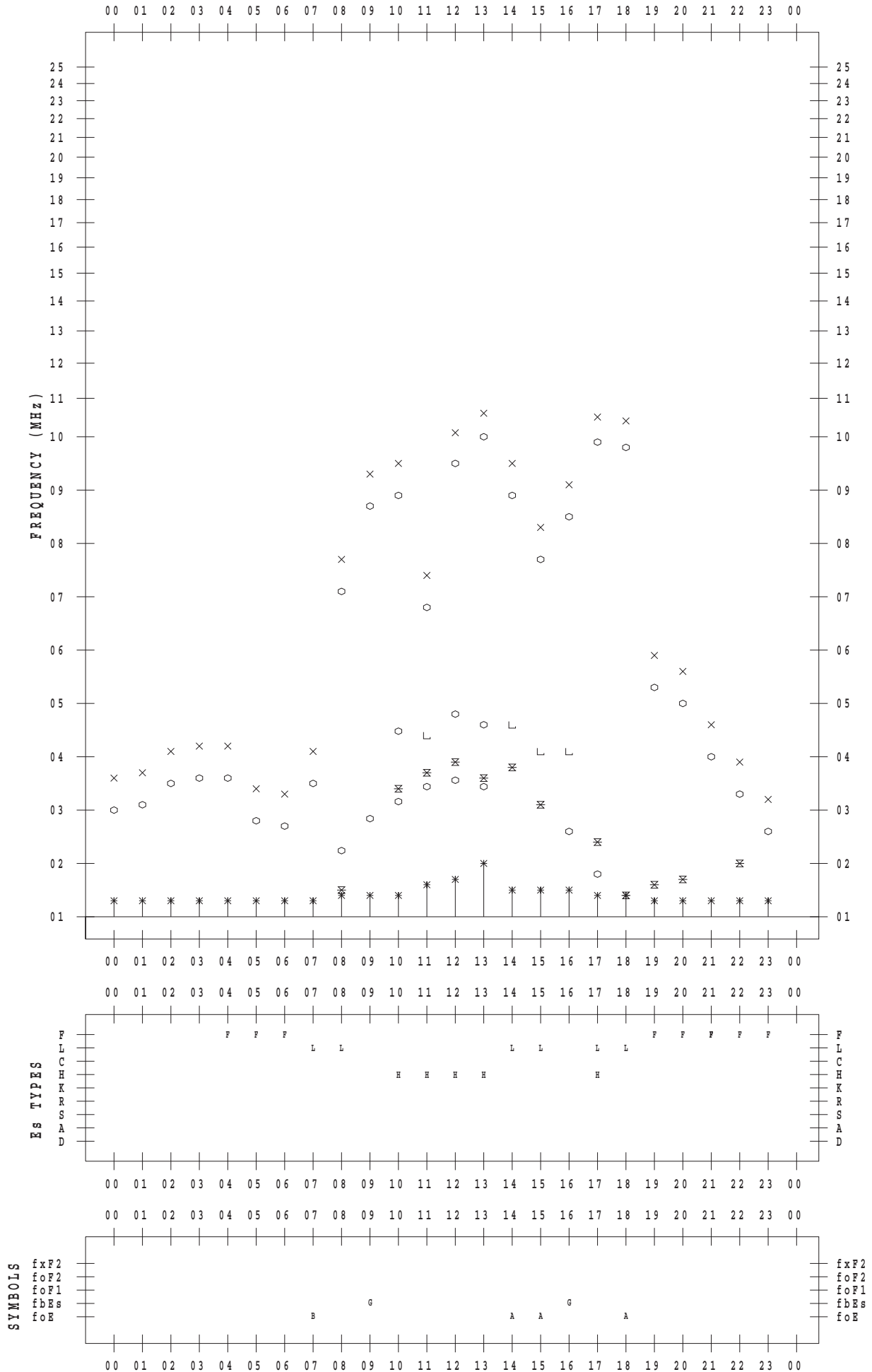
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/26

135 ° E MEAN TIME



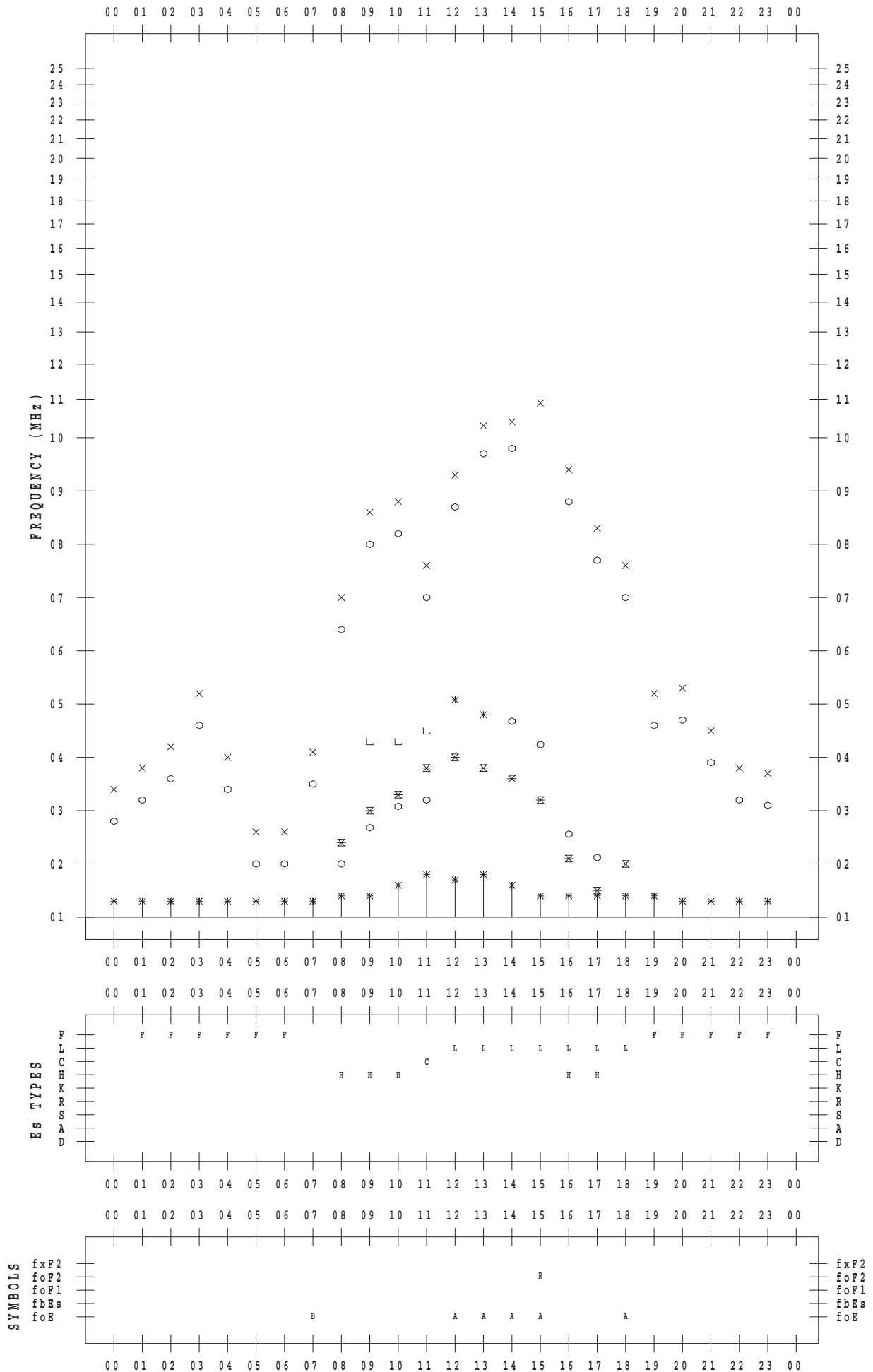
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/27

135 ° E MEAN TIME



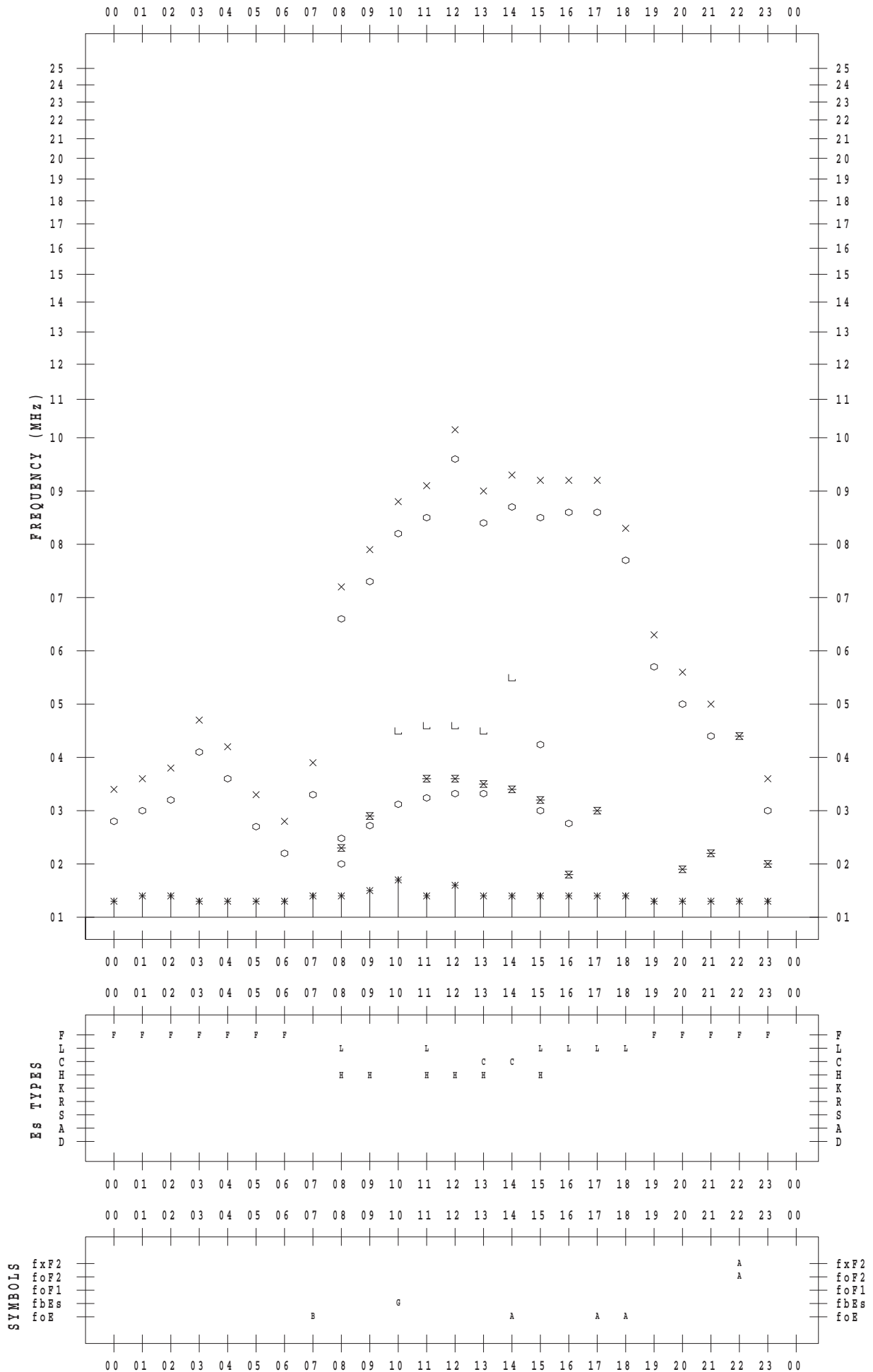
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/28

135 ° E MEAN TIME



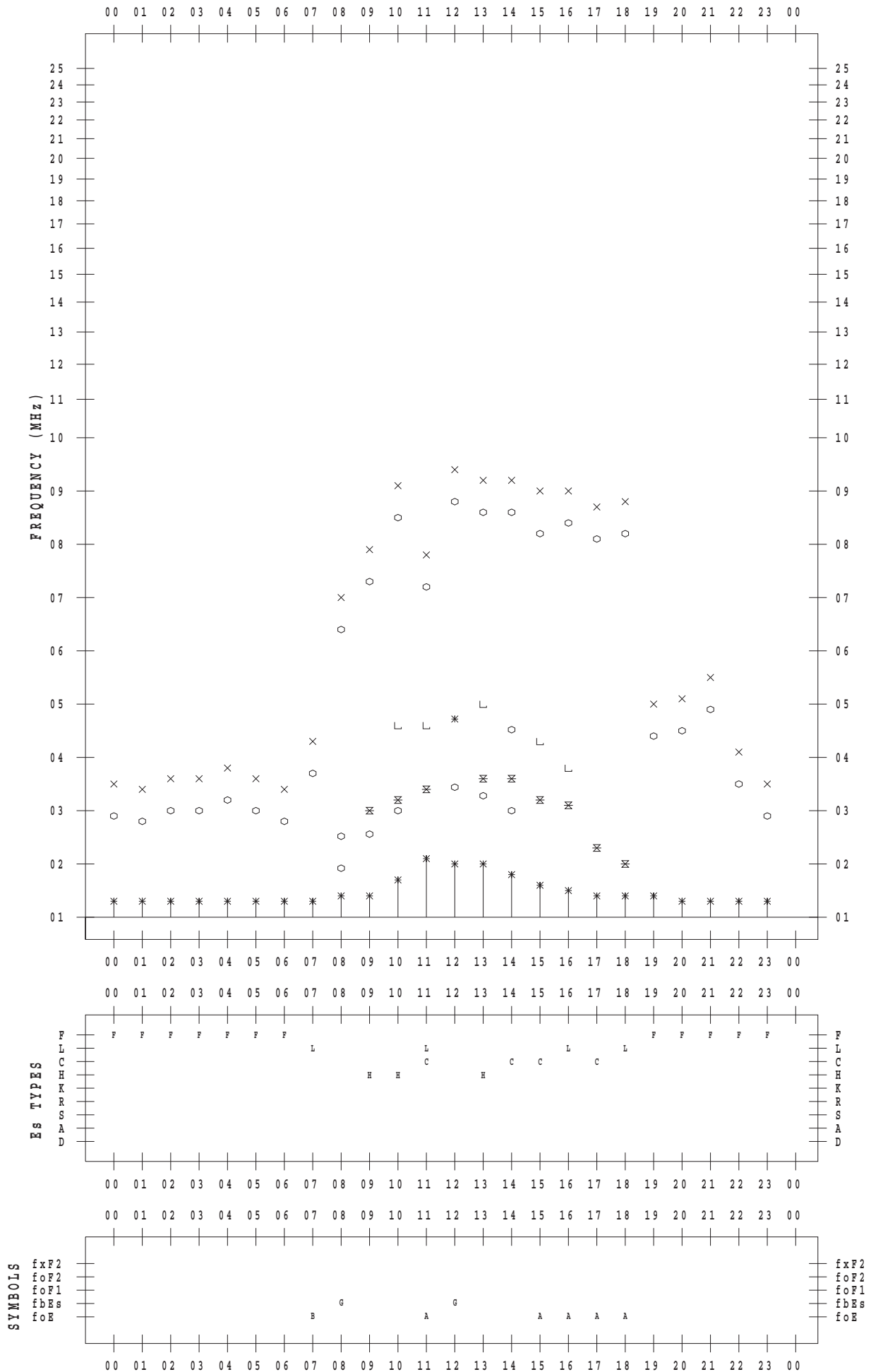
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/29

135 ° E MEAN TIME



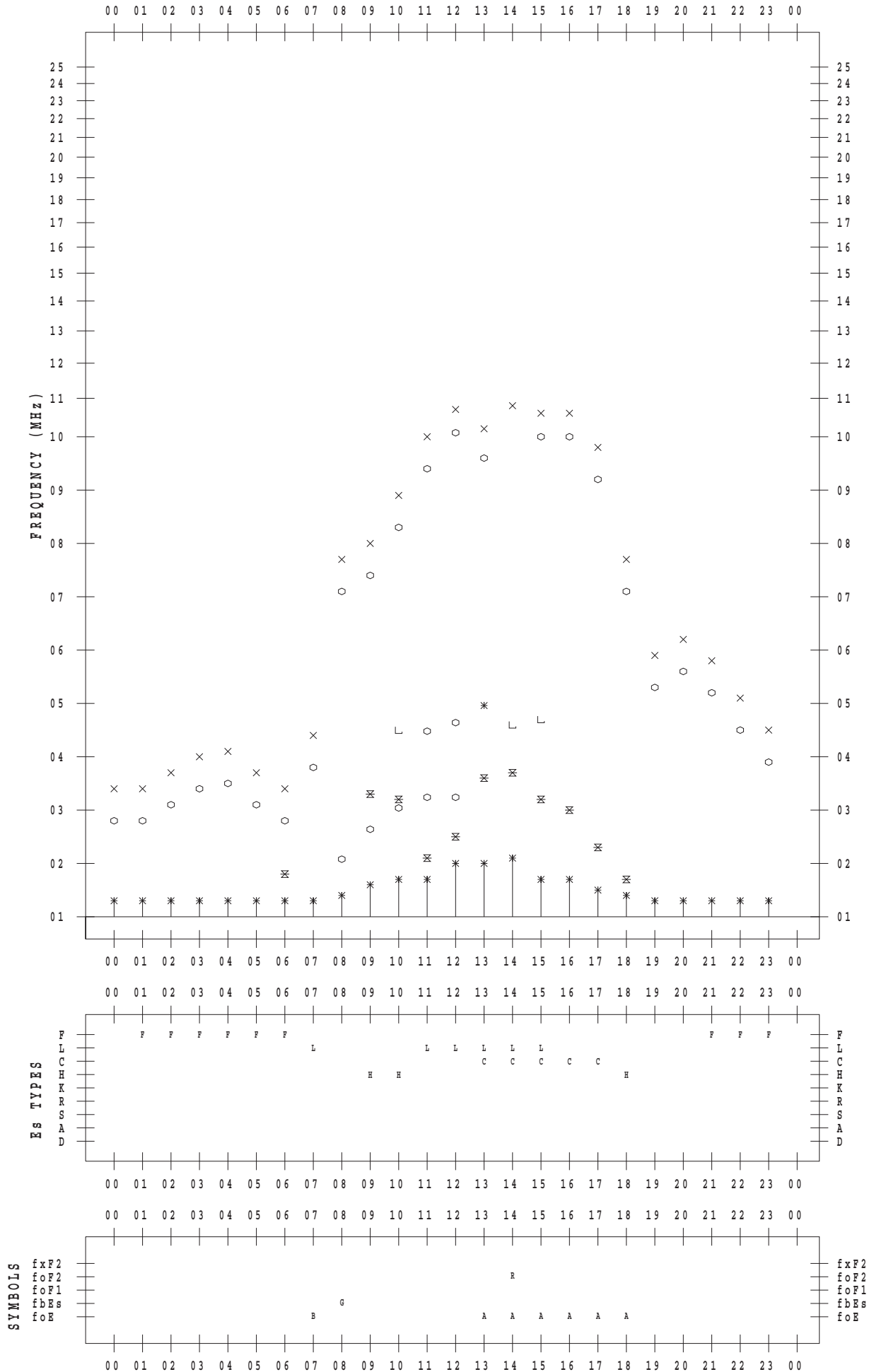
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/30

135 ° E MEAN TIME



f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2015/12/31

135 ° E MEAN TIME

