

# IONOSPHERIC DATA IN JAPAN

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« Real Time Ionograms on the Web .....[http://wdc.nict.go.jp/index\\_eng.html](http://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

<b><math>f_oF2</math></b>	Ordinary wave critical frequency for the <b><math>F2</math></b> layer
<b><math>fEs</math></b>	Highest frequency of the <b><math>Es</math></b> layer whether it may be ordinary or extraordinary
<b><math>fmin</math></b>	Lowest frequency which shows vertical iono-spheric reflections
<b><math>h'Es</math></b> <b><math>h'F</math></b>	Minimum virtual height on the ordinary wave for the <b><math>Es</math></b> and <b><math>F</math></b> 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 auto matic 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

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

NOV. 2013

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	34	A	A	37	31	34	42	67	60		69	59	59		82	69	66	65	62	34	34	37	43	46	
2	34	38	34	35	34	32	51	74	67	59	N	69	69	92	59	69	66	64	65	52	37	36	37	34	
3	32	35	36	37	37	50	53	67	62		69	69	59			68	64	61	42	34	34	A	A		
4	A	A	A	32	42	32	44	61	59	59	59	59	71	68	67	59	67	53	54	54	34		A	32	
5	36	35	32	34	35	43	40	60	88	59		N	59	70	71	69	67	63	62	53	61	62	64	62	
6	65	63	62	67	66	53	48	67	N	99	66	62	59	67	92	73	N	60	50	42	34	A	34	34	
7	46	52	35	N	51	34	53	67	69	59	59	69		70	59	C	C	C	C	C	C	C	C	C	
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		52	36	42	39	37	34
9	42	46	38	34	51	43	52		107		C	112	116		C	94	71	67	69	67	51	A	A	28	34
10	36	34	34	30	A	32	A	67	89	66	117	106	69	107		N	69	75	48	30	38	A	A	34	31
11	35	A	34	34	32	32	37	66	61	96	69	59		90	89	92	69	66	64	50	45	34	34	34	
12	34	43	34	34	43	42	52	67	99	106	112	112	94	91		82	67	54	52	31	34	37	34	34	
13	A	34	32	34	34	34	32	66	N	89	86		86	92	88	72	67	64	33	34	35	35	30	34	
14	36	37	34	37	38	32	46	67	72	68	96	96	97	94	70	92	59	48	37	36	36	34	34	34	
15	34	38	38	38	38	32	35	67	87	85	99	102	97	93	89	92	68	64	58	52	38	38	34	37	
16	34	34	36	37	43	34	N	63	59	69	130	92	95	93	92	96	69	65	54	54	53	54	A	34	
17	42	46	36	47	37	44	51	69	89	107	120	109	92	99	67	92	71	61	50	37	34	32	A	A	
18	A	31	32	34	36	32	38	62	67	106	59	59	91	94	95	75	67	61	53	34	36	34	34	32	
19	34	34	34	34	32	34	32	65		59	85	96	96	67	85	68	66	54	34	32	34	32	32	34	
20	34	32	30	35	37	38	47	67	88	92	119	91	96	96	94		76	54	51	38	29	34	34	34	
21	36	32	34	32	32	38	44	65	N	59	92	96	97	87	68	92	67	26	37	37	43	38	34	36	
22	32	38	37	40	34	32	40	66	70	62	70	94	70	70	89	70	62	43	38	34	36	38	34	34	
23	32	31	34	38	32	34	36	61	66	59	72	96	59	68	68	75	63	58	52	32	34	37	34	34	
24	A	37	32	31	32	32	31	67	74	86	70	N	91	71	69	69	61	44	40	35	32	34	32	32	
25	32	42	42	34	37	34	32	60	66	69	59	64	93	71	84	70	61	48	34	29	32	34	34	34	
26	34	32	37	34	37	30	28	54	67	66	67	66	86	82	N	67	58	48		32	29	30	28	32	
27	32	34	34	34	34	32	29	53	68	65	65	80	70	70	69	59	64	32	30	26	29	28	31	32	
28	34	32	32	34	32	30	29	49	66	67	59	70	59	67	64	65	58	A	A	30	A	A	30	32	
29	32	34	34	34	34	32	32	54	67	68	67	71	68	65	62	64	N	34	31	30	32	34	34	34	
30	34	34	32	34	34	35	34	26		69	86	67	N	68	62	66	58	46	32	A	A	34	34	37	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	25	26	27	28	28	29	27	28	24	26	25	26	26	27	25	26	26	27	27	28	25	24	26	27	
MED	34	34	34	34	36	34	40	66	68	68	70	76	86	71	71	70	67	54	51	36	34	34	34	34	
U Q	36	38	36	37	38	38	48	67	87	89	97	96	95	93	89	82	68	64	58	46	37	37	34	34	
L Q	33	34	32	34	33	32	32	60	66	59	65	66	69	68	67	68	62	48	34	32	33	34	32	32	

HOURLY VALUES OF fEs AT Wakkanai

NOV. 2013

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	39	39	39	G	G	G	G	G	35		39	50	57		40	39	32	G	G		G	G		25
2	G	27	26	28	G	G	G	23	34	39	32	32	31	29	27	33	25	34	G	G	G	G	G	G
3	G	G	G	G	G	G	G	G	33			30	40	41			32	33	G	G	G	G		40 52
4	46	40	41	G	G	G	G	G	36	33	29	31	33	34	28	34	G	39	32	G	G		34 29	
5	33	G	G	G	G	G	G	24	39	35		31	34	40	40	37	40	G	34	32	28	58	56 33	
6	39	G	34	36	33	G	G	44	36	60	47	35	37	33	29	27	G	G	G		38	34	33	33
7	35	32	G	G	G	G	G	G	32	30	29	32		30	34	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	G		28	G	G	G
9	24	G	24	G	G	G	G		35	C	C			C			G	G	G	G		28	40	33 26
10	G	25	G	G	26	28	33	G	32	103	80	73	58	36	32	30	46	36	25	39	59	34	32 26	
11	G	28	25	G	G	G	G	28	68	29	58	40		31	29	34	G	G	G	G	28	28	G	33
12	33	28	26	G	G	G	G	32	37	36	40	34	32	32		24	G	G	G	G		29	33	30 28
13	25	G	G	25	G	G	G	G	33	34	34		32	31	28	25	35	30	G	G	G	G	G	G
14	G	G	G	G	G	G	G	G	36	30	31	30	31	30	27	24	G	G	G	G	G	G	G	G
15	G	26	27	24	G	G	G	G	34	29	32	32	39	31	29	24	11	G	G	G	G	G	G	G
16	G	G	G	G	G	G	G	G	26	28	35	33	33	32	29		G	G	G	G	G		26	29 24
17	26	G	G	G	G	G	G	36	35	33	31	33	34	32	29	24	G	G	G		G	27	35 33	
18	35	G	G	G	27	27	24	48	28	33	32	34	32	31	30	26	G	G	G	G		26	G	G
19	G	G	G	G	G	G	G	G		30	32	32	G	G	G		26	34	32	G	G	G	G	G
20	G	G	G	G	G	G	G	G	27	31	32	33	32	30	26		G	26	G	G	G	G	G	G
21	G	G	G	28	G	G	G	G	34	35	38	32	38	29		23	G	33	G	G	G	G	G	G
22	26	G	G	G	G	G	G	G	48	35	54	33	32	29	26	25	G	G	G	G	G	G	G	G
23	G	G	G	G	G	G	G	29	28	28	34	34	33	29	28	27	11	G	G	G	G	G	G	30
24	35	G	G	G	G	G	G	G	27	32	34	30	30	52	38	36	30	25	G	G	G		25	24
25	G	G	G	G	G	G	G	36	33	37	32	30	29	30	32	36	G	G		24	G	G	G	G
26	G	G	G	G	G	G	G	32	48	34	35	34	39	32	33	33	G	G		24	G	25	24 22	
27	G	G	G	24	G	G	G	34	38	48	43	45	38	39	44	36	G	G	G	G	G	G	G	G
28	G	G	G	G	G	G	G	39	33	35	39	39	40	33	52	48	40	32	60	27	33	26	G	27
29	30	G	G	G	G	G	G	G	38	48	32	38	31	29	26	48	28	26	G	G	G	G	G	G
30	G	G	28	23	G	G	G	20		51	38	41	37	36	42	32	32	34	G		32	40	28	32
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	29	29	29	29	28	27	26	26	28	27	27	27	26	28	28	28	29	29	28	29	29
MED	G	G	G	G	G	G	G	G	34	34	34	33	33	31	29	28	G	G	G	G	G	G	G	G
U Q	33	25	25	12	G	G	G	32	37	37	39	38	38	34	34	36	32	32	G	27	28	27	32	27
L Q	G	G	G	G	G	G	G	G	32	30	32	32	32	30	27	24	G	G	G	G	G	G	G	G

HOURLY VALUES OF fmin AT Wakkanai

NOV. 2013

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	15	14	14	21	16	15	14	14	14		17	18	15		14	14	14	14	15	14	14	15	15	15
2	15	17	15	14	14	15	15	22	14	15	17	17	15	14	15	14	15	14	15	15	15	14	15	14
3	20	14	14	16	14	15	15	23	15			17	20	16			14	14	17	15	15	15	14	14
4	14	14	14	17	14	14	15	14	15	16	17	17	17	15	14	14	14	15	15	15	15		14	15
5	14	15	15	15	15	16	15	23	14	14		15	16	15	15	14	14	14	15	15	14	15	14	14
6	14	15	15	14	15	14	15	14	14	14	15	15	16	14	14	14	20	15	15	14	14	15	15	15
7	14	14	15	15	14	15	14	15	14	21	14	18		14	14	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C						
9	14	15	15	14	14	15	14		14	C	C		16	14	C	14	14	18	14	14	14	15	14	17
10	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	15	14
11	15	14	14	15	15	14	14	14	14	14	15	15		14	14	14	21	14	17	15	15	14	15	14
12	14	14	15	15	14	14	14	14	14	14	15	15	15	15		14	18	14	15	14	14	14	14	14
13	16	14	15	14	15	14	14	21	15	14	15		14	16	14	14	14	14	14	15	14	14	14	15
14	14	15	14	14	18	15	14	20	14	15	15	15	18	15	15	14	18	14	15	14	14	14	15	15
15	14	14	14	14	15	14	15	18	14	14	15	15	15	17	14	15	18	15	14	15	14	15	14	14
16	15	15	14	14	14	15	15	21	18	17	21	33	23	22	20	15	17	14	15	14	15	16	15	15
17	15	16	14	14	15	14	15	14	14	15	16	15	15	17	14	14	18	15	15	14	15	15	14	14
18	14	15	14	15	14	14	15	14	16	15	16	15	15	15	14	14	16	15	16	14	14	14	14	14
19	15	15	15	15	15	14	15	21		20	22	35	34	35	28	24	14	14	15	15	15	14	14	14
20	14	15	14	16	15	15	14	18	14	14	15	15	14	15	14		17	16	15	15	20	15	15	14
21	15	15	14	14	14	15	15	14	14	14	14	14	15	15	14	14	16	14	14	14	14	14	15	15
22	14	15	14	14	18	17	15	14	14	14	14	14	15	14	15	14	16	14	15	15	14	14	14	15
23	14	18	15	14	15	14	15	15	14	15	15	18	18	18	16	17	14	14	14	14	15	14	15	14
24	14	14	15	17	16	15	15	14	16	16	15	17	16	15	14	14	14	14	14	15	15	15	15	14
25	14	15	14	14	15	15	14	14	14	14	14	14	14	14	14	14	14	15	15	18	15	14	15	15
26	15	15	15	15	16	14	17	14	14	14	14	14	14	14	14	14	16	14		15	14	17	15	15
27	15	15	14	15	15	14	15	14	14	14	14	14	14	14	14	14	14	18	14	15	15	15	14	15
28	15	15	15	15	15	15	17	14	14	14	14	14	14	14	14	14	14	15	14	15	15	15	15	14
29	14	14	14	15	15	15	15	17	14	17	16	17	16	17	14	21	14	15	15	15	16	15	14	15
30	15	14	14	14	14	15	14	16		14	14	14	14	14	14	14	14	14	18	14	14	14	15	15
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	29	29	29	29	28	27	26	26	28	27	27	27	26	28	28	28	29	29	28	29	29
MED	14	15	14	15	15	15	15	14	14	14	15	15	15	15	14	14	14	14	15	15	15	14	15	14
U Q	15	15	15	15	15	15	15	19	14	15	16	17	16	16	15	14	17	15	15	15	15	15	15	15
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

NOV. 2013

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



HOURLY VALUES OF fEs AT Kokubunji

NOV. 2013

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	33			G	G	G	G	G	29	51	G	G	G	G	59	53	50	G		G	G	G			
2	G		G	G	G		G	G	47	G	G	G	51	71	38	37	33	28	G	G	G		G	G	
3	G	G		G			G	G	G	G	G	G	G	G	G	26	23	G	G		G		G		
4					G		G	G	G	G	G	G	G	G	G	G	39	35	G		44	28	24	G	G
5	G	G	G			G	G	G		G	G		G	G	G	G	56	45	40	36	33	G			
6	G	G	G	26			G	G	28	G	G	G	G	G	G	G	27	G	G	32		35	24	G	
7			G	G	G		G		G	G	G	G	G	G	G	40	G	G	G	G	G	G		58	
8	26	G		G			G		24	27	G	G	G	G	G	29	G	G	G	G	G	G	G	27	
9	G	G			G	G	G	G	29		G	G	C	C	C	C	C	C	C	C	C	C	C	C	
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
11	C	C	C	C	C	C	C	C	C	C	G	G	G	48		31	24	G	G	G	G	G	G	32	
12	27	G	G			G	G	G	28	29	G	G	G	G	G	G	G	G	G	G	G	G			
13					G	G	G	G	28	G	G	G	G	G	G	26	G	G	G	G	G	G			
14	32	27	G		G	G	G	G	27	29	G	G	G	G	G	26	G	G	G			28	24	28	
15	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	G	G	G	G	G	G	G	G	G	G	G	G		26	G	G	G	
17		G	G			G	G	G	G	G	G	G	G	55		G	G	G	11	G	G	G			
18							G		26	28	G	G	G	G	G	G	G	G	G			31			
19	G		G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G			
20				G			G	G	29	29	G	G	G	G	G	G	G	G	G	G	G			G	
21	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	26	G	G	G	G	G	G	G		
22		G			G		G	G	26	G	G	G	G	G	28	G	G	26	32			G	G		
23				G	G		G	G	27	G	G	G	G	G	G	26	G	G		G	G				
24	G	G	G				G	G	27	G	G	G	G	G	G	28	G	G	G	G	G	G	G		
25			G	G	G	G	G	G	G	G	G	G	G	G	G	27	G	G	G	G	G			33	
26	G	G	G	G	G			24	G	29	G	G	G	G	G	G	G	G	G	G	G		G	G	
27		G			G		G	G	26	28	G	G		59	52	G	41	38	G	G	G		G	G	
28	27				G		G	G	G	G	G	G	G	50	51	41	24	30		G	G				
29	27	G				G		G	G	G		53	47	G	G	28	35	G	G	G		G	G	G	
30	G	G	G		G	G	G	G	27	28	54	50		G	G	28	29	G	G	G		G	G		
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	18	17	16	14	17	13	25	28	28	28	29	28	28	28	28	28	28	28	25	23	23	22	13	11	
MED	G	G	G	G	G	G	G	G	26	G	G	G	G	G	G	26	G	G	G	G	G	G	G	G	
U Q	27	G	G	G	G	G	G	G	28	28	G	G	G	G	G	30	24	G	G	G	G	G	12	27	
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

NOV. 2013

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

HOURLY VALUES OF foF2 AT Yamagawa

NOV. 2013

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	42	42	42		52	26	36	67	88	114	N	97	97	100	89	92	99	89	64	54	54	53	52	46	
2	42	42	42	42	29		32	72	88	96	102	N	102	N	95	111	100	93	74	54	52	51	43	43	
3	37	42	40	37	40	34	29	55	88	96	95	98	98	79	N	109	98	88	72	52	54	51	48	42	
4	43	41	40	46	47	B	B	67	86	92	89	87	90	N	113	97	97	71	67	48	52	42	37	A	
5	A	34	38	37	36	31	34	62	88	96	96	N	96	92	79	110	90	89	72	52	A	46	37	32	
6	37	37	37	32	34	29	31	62	88	96	108	N	97	94	69	96	93	74	55	51	50	47	34	36	
7		28	59	34	38	30	59	63	85	82	91	94	114	100	92	111	N	95	92	86	53	53	48	A	
8	42	46	59	32	32	34	37	74	86	91	89	93	94	96	102	N	87	80	70	49	53	50	38	41	
9		40	36	28	38	28	59	66	88	89	95	111	96		92	102	95	88	78	70	54	47	34	40	
10	34	A	A	41	B	34	38	76	91	79	N	69	108	97	99	110	96	85	67	50	53	51	38	32	
11	34	A		38	43	40	32	41	62	78	99	79	98	97	88	101	110	107	75	80	76	54	43	53	47
12	42	36		42	41	37	43	81	88	40	101	96	N	92	90	97	96	85	55	54	44	44	47	32	
13	N	N			36	32	38	77	81	87	90	96	93	94	98	97	94	81	67	53	52	43	59	29	
14	32	37	41	41	40	34		72	87	88	98	96	96	100	94	91	88	78	58	53	54	54	44	34	
15		34	37	42	34	B	36	72	91	91	87	96	110	91	94	117	96	88	78	54	54	53	48	42	
16	34	36	34	37	B	37	36	70	73	94	69	113	88	96	97	95	91	91	77	66	64	52	52	40	
17	42	42	43	43	B	41	59	63	90	91	109	100	92	79	114	90	110	86	74	76	72	52	34	B	
18		32	32	B	32	N	28	53	72	88	91	85	96	79	86	97	98	87	77	80	58	29	42	34	
19		32	B	34	38	59	28	54	87	93	96	94	93	88	84	101	91	81	46	53	52	42	52	37	
20	34	34		59	59	32	29	59	80	87	91	96	90	92	79	96	85	86	80	74	49	52	52	31	
21	29	32	34	B	38	31	26	52	86	91	94	101	89	96	89	94	90	87	58	53	53	47	48	34	
22	36	30	B	28	29	B	29	53	88	91	94	98	92	96	N	94	96	88	57	54	53	40	37	42	
23	B	28	34	28	31	B	30	53	85	90	101	96	88	112	88	93	81	78	67	N	53	51	53	41	
24	38	50	41	30	N	B	N	52	77	88	94	97	94	103	89	92	84	72	60	53	53	43	42	43	
25	42	42	40	B	32	N	B	54	71	87	96	77	88	98	N	95	93	67	53	42	52	52	37	34	
26	36	29		42	34	B	B	46	72	80	87	81	81	86	94	N	78	69	60	45	53	50	39	40	
27	49	32	32	29	32	25		44	80	86	87	88	76	73	91	78	81	72	52	53	N	36	29	30	
28	26	32	26	34	32	28	28	48	67	76	86	87	82	72	79	82	90	77	48	48	34	43	B	N	
29	A	28	B	30	29	N	29	53	68	77	66	85	A	86	78	N	91	76	N	46	54	53	43	34	
30	34	37	34		34	28		42	70	78	87	84	86	N	86	76	78	72	52	43	43	53	37	32	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	21	27	22	24	26	20	23	30	30	30	28	27	28	26	27	27	30	30	29	29	28	30	28	27	
MED	37	36	38	37	35	32	34	62	86	90	92	96	94	93	91	96	93	83	67	53	53	49	42	37	
U Q	42	42	41	42	40	34	38	70	88	93	96	98	97	97	97	109	96	88	75	54	54	52	50	42	
L Q	34	32	34	31	32	28	29	53	77	86	87	87	88	86	86	92	88	75	56	49	52	43	37	32	

HOURLY VALUES OF fEs AT Yamagawa

NOV. 2013

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

HOURLY VALUES OF fmin AT Yamagawa

NOV. 2013

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	15	15	17	29	15	18	15	22	15	18	21	51	44	27	23	34	17	21	15	17	17	15	15	15		
2	18	15	14	14	14	66	16	15	15	18	21	40	28	22	24	18	16	17	14	16	15	15	15	16		
3	18	17	21	15	16	B	18	23	18	17	21	42	42	23	27	20	17	14	15	16	16	15	15	17		
4	16	15	16	15	15			22	17	18	18	37	42	44	24	22	18	17	14	15	16	15	15	14		
5	15	16	16	16	15	16	15	15	16	17	17	35	38	35	36	18	16	22	15	14	15	15	15	18		
6	16	15	15	17	16	18	15	15	16	17	18	35	35	24	23	18	17	15	15	15	16	15	16	15		
7	71	17	17	16	14	15	15	22	16	42	24	29	24	26	20	18	14	16	15	15	15	15	15	18		
8	15	15	16	17	16	17	16	21	15	16	18	27	30	27	26	17	16	15	14	14	15	17	18	15		
9	66	18	15	18	18	17	16	20	14	15	18	39	36		20	22	17	21	15	15	15	18	21	15		
10	16	17	15	15	B		21	15	20	18	17	23	52	20	42	22	20	17	14	15	15	15	17	16		
11	18	17	15	16	17	16	16	27	15	18	23	33	26	21	21	18	16	21	15	15	15	15	15	16		
12	15	17	71	16	15	17	15	22	14	16	20	20	42	42	38	39	17	22	15	15	15	15	15	16		
13	21	17	18	71	16	15	15	21	14	20	18	20	20	43	18	15	18	21	15	18	18	18	15	20		
14	17	16	17	15	15	18	28	20	15	17	17	20	40	40	37	22	17	22	14	16	15	15	16	16		
15	66	17	18	15	15	B		18	21	16	18	18	28	27	21	20	17	23	15	15	16	15	17	20		
16	17	17	20	15	B		16	18	21	21	18	35	29	54	26	28	20	16	14	15	14	15	22	22		
17	16	16	16	17	B		15	17	21	18	18	22	22	36	17	22	20	17	21	18	15	15	16	B		
18	20	15	18	B		15	17	15	21	15	18	21	24	38	42	23	20	17	15	15	15	18	16	20	17	
19	18	18	B		17	17	15	15	20	16	18	22	38	28	30	21	22	18	23	18	17	17	20	15	17	
20	20	15	66	15	15	66	18	15	28	17	26	28	20	41	20	20	16	17	15	15	16	15	15	18		
21	18	15	17	B		16	18	16	21	18	17	16	20	41	38	15	18	17	15	15	16	16	15	17	16	
22	17	20	B		17	15	B		16	27	15	15	27	24	22	27	24	22	15	21	17	15	15	16	15	
23	B		17	16	15	17	B		20	18	15	18	22	26	38	28	20	18	15	21	15	16	16	16	15	15
24	16	15	16	16	16	B		16	18	15	15	20	43	32	22	20	18	16	15	15	16	16	15	15	16	
25	17	16	16	B		16	66		18	18	17	18	27	30	30	14	14	15	22	18	24	15	15	15	15	
26	17	17	66	16	15	B	B		18	16	17	20	22	22	20	17	18	18	21	16	17	16	15	18	15	
27	16	16	16	17	17	15	66	17	28	34	18	23	18	18	20	21	14	22	18	15	16	15	17	16		
28	16	17	16	17	17	16	15	17	14	17	28	39	40	20	18	16	28	20	15	14	16	16	B	66		
29	15	15	B		17	17	16	18	18	15	18	18	21	24	21	20	14	15	15	14	16	17	17	15	15	
30	18	15	17	16	16	18	66	16	16	17	18	26	27	27	26	18	15	18	15	20	15	26	15	16		
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	29	30	27	27	27	24	27	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	29	29		
MED	17	16	16	16	16	17	16	20	16	17	20	28	31	27	22	19	17	20	15	15	16	15	15	16		
U Q	18	17	18	17	17	18	18	21	18	18	22	38	40	39	24	21	17	21	15	16	16	17	17	17		
L Q	16	15	16	15	15	15	15	18	15	17	18	23	24	22	20	18	16	15	15	15	15	15	15	15		

## HOURLY VALUES OF foF2 AT Okinawa

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	52	31	46	A	B	B	B	66	90	107	127	N	122	109	130	130	130	120	90	78	54	N	77	53		
2	52	52	52	50	B	B	B	67	88	103	119	99	119	110	115	127	130	117	88	66	70	74	54	66		
3	67	52	51		B	B	B	61	86	105	115	121	123	129	129	130	129	110	88	81		72	67	54		
4	58	53	51	57	40	B	B	54	87	98	108	110	132	129	119	N	130	120	104	67	66	79	54	52		
5	46						B	52	88	104	94	99	110		132	123	118	106	88			73	B	49		
6		B		47	B	B	B	61	86	104	108	110	82	121	128	116	101	87	55	B		72	71	52	43	
7		B				B		34	67	78	82	97	106	108	114	111	126	119	109	106	52	71	84	66		
8	B		B	B	B			67	83	102	114	107	76	108	110	107	114	89	88	54	59	70		B		
9	B	B	B	B	B	B	B	60	93	106	109	109	118	107	N		135	129	110	107	74	84		B		
10		B		B	B	B	B	76	108	121	129	118	107	108	110	120	118	110	N		67	64	54		B	
11	B	B	B	B	B	B		54	86	114	128	108	112	132	140	110	N		121	89	81	86		72	54	
12		B	B		B	B		78	97	108	118	N	110	132	109	126	121	107	78	74	80	73		B		
13	B	B	B	B	B	B		30	53	84	97	102	106	107	108	108	127	131	118	87	72	59		B		
14	B				B	B		30	66	88	108	113	108	120	129	N	130	N	115	107	84		81		53	
15			B			B	B	67	88	90	106	84	111	130	136	134	129	124	89	80	104	102	72	48		
16		49	B	B	43	B	B	67	101	109	104	108	108	107	129	115	118	109	107	79	87	73	78			
17	B			B	52		B	66	88	110	127	128	133	136	110	132	N	N	109	58	54	88	63		B	
18	52	66	52	63	47	B	B	52	81	114	105	113	107	109	116	118	127	N		92	86		88	54	51	
19			39	B		B	B	52	87	110	108	117	108	118	128	118	N		109	88	55	76		66	64	
20	52	B		53	52	58		66	82	93	107	108	110	108	109	N	N		108	89	88	88	83	74		
21	B	B		B	34		B	53	84	104	114	120	123	133	118	132	128	N		88	87	78				
22			B	B		B	B	53	86	88	117	120	128	129	109	104	N		133	79	82	N	67	64	67	
23					29	29	B	53	86	89	107	104	102	108	107	108	108	89	88	74	79		66	59		
24	B		55	52	46	B	B	58	87	101	111	122	N	120	129	109	131	110	88		82	87	74	54		
25	67	N	58	52	46	B	B	56	81	88	98	76	88	107	113	109	112	102	74	54		64	54		B	
26	48	B				B	B		75	88	87	87	100	88	102	106	89	81	80	66	78	B	67	60		
27	B	B		B		B	B	44	74	104	116	101	106	89	90	88	108	114	73	52	67	52	48		B	
28		B	N	B	B	B	B	47	67	93	87	104	97	88	88	87	115	89	N	51	70	52			B	
29	40	B	B	B		B	B	52	94	83	82	84	107	78	107	120	112	107	87	83	76	76	52			
30		52		B	B		B	51	94	84	102	114	110	110	107	93	100	75	86		63	80	67		B	
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	10	9	10	9	9	2	4	29	30	30	30	28	29	29	28	28	24	28	28	25	25	22	20	15		
MED	52	52	52	50	46	32	30	58	86	104	108	108	110	110	112	119	118	109	88	74	76	73	66	54		
U Q	58	54	52	54	49	34	32	66	88	108	116	115	119	129	128	128	129	116	89	81	83	81	72	60		
L Q	48	50	46	46	37	29	30	52	83	90	102	102	106	107	108	108	112	97	86	56	65	67	54	51		

HOURLY VALUES OF fEs AT Okinawa

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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	G	G	G	29	B	B	B	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
2	G	G	G	G	B	B	B	G	G	G	G	G	G	G	G	G	28	27	G	G	G	G	G	G
3	G	G	G	G	B	B	B	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
4	G	G	G	G	G	B	B	G	G	G	G	G	G	G	G	G	27	G	G	G	G	G	G	G
5	G	G	G	G	G	G	B	27	G	G	G	G	G	G	G	G	35	G	G	G	G	G	B	G
6	G	B	G	G	B	B	B	G	G	G	G	G	G	G	G	G	45	52	24	B	G	G	G	G
7	G	B	G	G	G	B	G	G	G	G	G	G	G	G	49	46	27	26	G	G	G	G	G	G
8	B	G	B	B	B	G	G	G	26	G	47	46	G	G	G	G	28	G	G	G	G	G	G	B
9	B	B	B	B	B	B	B	G	G	G	G	G	G	G	G	G	30	G	G	G	G	G	G	B
10	G	B	G	B	B	B	B	G	G	G	G	G	G	G	G	G	G	G	28	G	G	G	G	B
11	B	B	B	B	B	B	G	G	G	G	G	G	G	G	47	54	48	34	G	G	25	G	G	G
12	G	B	B	G	B	B	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	B	G	
13	B	B	B	B	B	B	G	G	28	G	G	G	G	G	G	G	47	G	G	G	G	G	B	G
14	B	G	G	G	B	B	G	G	26	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
15	G	G	B	G	G	B	B	G	G	G	G	G	G	G	G	G	27	G	G	G	27	49	G	G
16	G	G	B	B	G	B	B	G	G	G	G	G	G	G	G	G	38	G	G	G	G	G	G	G
17	B	G	G	B	G	G	B	G	G	29	G	G	G	G	48	49	27	36	G	G	G	G	G	B
18	G	G	G	G	G	B	B	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
19	G	G	G	B	G	B	B	G	25	G	G	G	G	G	G	G	G	27	G	G	G	G	G	G
20	G	B	G	G	G	B	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
21	B	B	G	B	G	G	B	G	G	G	G	G	G	G	G	G	35	28	G	48	43	24	G	G
22	G	G	B	B	G	B	B	G	25	G	G	G	G	G	G	G	28	G	G	G	G	G	G	G
23	G	G	G	G	G	G	B	G	24	G	G	G	G	G	G	G	27	G	G	G	G	G	G	G
24	B	G	G	G	B	B	B	G	G	G	G	G	G	56	G	43	30	G	G	G	G	G	G	G
25	G	G	G	G	G	B	B	G	25	29	G	G	G	G	G	G	G	G	G	G	G	G	G	B
26	G	B	G	G	G	B	B	G	28	42	G	G	50	49	51	G	27	G	G	11	G	B	G	G
27	B	B	G	B	G	B	B	G	G	G	G	51	54	54	G	G	37	G	G	G	G	G	G	B
28	G	B	G	B	B	B	B	G	24	28	G	G	G	50	50	44	G	34	G	G	G	G	G	B
29	G	B	B	B	G	B	B	G	27	34	G	G	G	50	47	29	27	G	11	G	G	G	G	G
30	G	G	G	B	B	G	B	G	27	44	49	83	57	G	G	G	32	25	G	G	G	G	G	B
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	21	17	21	16	16	6	7	30	30	30	30	30	30	30	30	30	30	30	30	29	30	29	27	22
MED	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	27	G	G	G	G	G	G	G
U Q	G	G	G	G	G	G	G	G	25	G	G	G	G	G	G	29	30	25	G	G	G	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 Okinawa

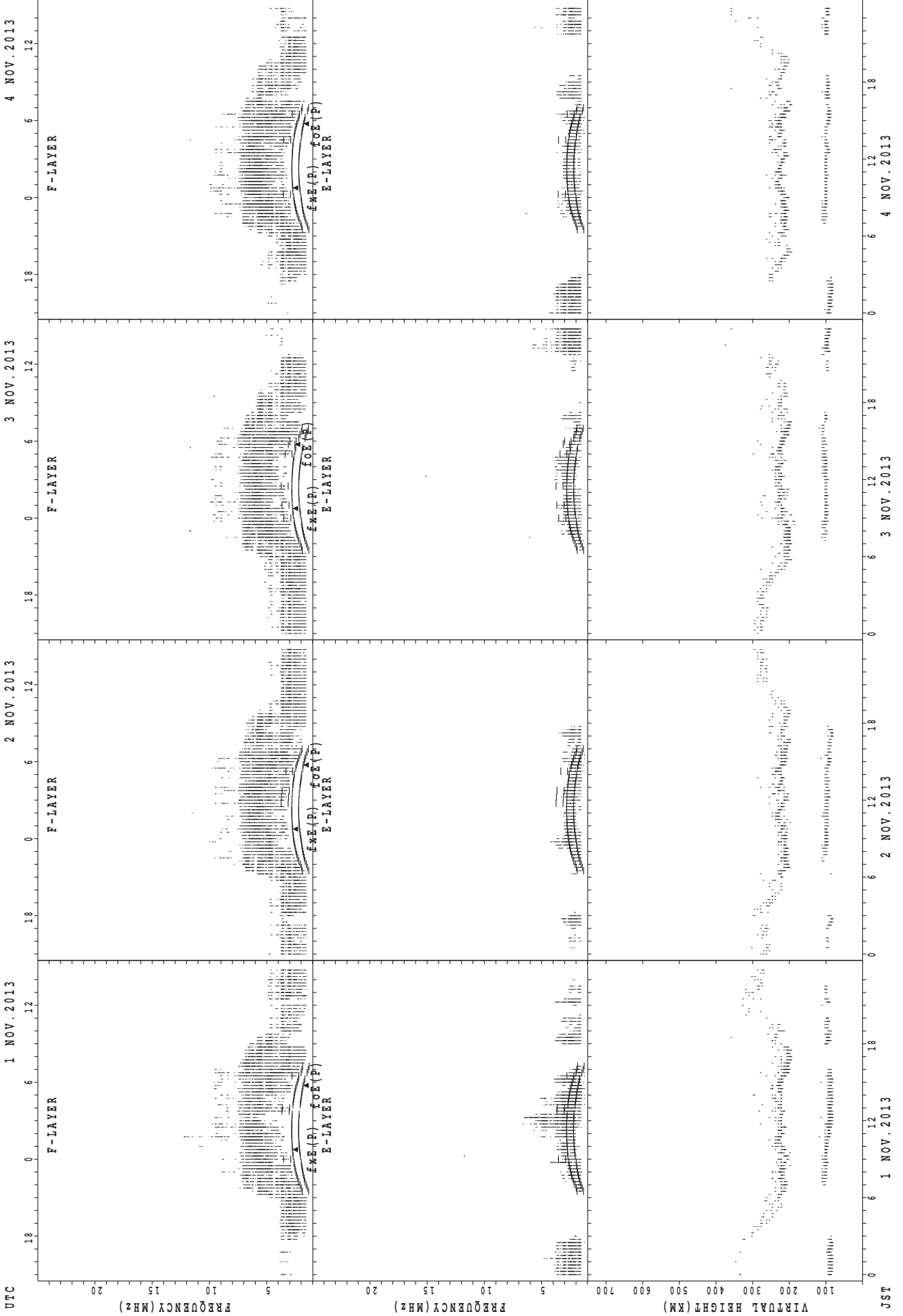
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LAT. 26° 41.0' N LON. 128° 09.0' E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

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	21	20	16	18	B	B	B	36	32	40	42	43	45	68	42	43	40	33	22	24	21	18	17	20
2	71	40	18	26	B	B	B	37	34	41	43	65	54	44	45	43	35	23	20	17	20	45	49	18
3	20	40	20	27	B	B	B	24	30	40	44	53	44	56	53	46	40	28	22	26	44	43	21	20
4	21	20	18	18	21	B	B	36	30	44	47	62	52	48	44	43	38	33	18	20	20	42	20	20
5	21	66	66	71	66	20	B	43	40	42	42	48	68	74	43	42	35	43	21	44	71	52	B	21
6	66	B	20	66	B	B	B	38	41	42	44	49	44	53	40	45	22	21	17	B	20	21	22	21
7	71	B	17	18	20	B	20	24	40	58	44	51	48	51	39	28	41	39	29	38	39	22	21	66
8	B	42	B	B	B	18	18	28	17	43	40	45	50	54	46	44	39	39	38	41	53	42	20	B
9	B	B	B	B	B	B	B	24	29	39	43	54	43	54	45	42	42	26	18	17	42	46	71	B
10	18	B	21	B	B	B	B	27	39	42	42	53	52	59	52	42	40	40	16	28	66	42	20	B
11	B	B	B	B	B	B	22	29	40	42	42	46	43	51	43	35	26	17	21	42	17	42	21	18
12	71	B	B	66	B	B	66	41	29	39	43	43	60	53	42	52	38	38	21	18	20	18	B	71
13	B	B	B	B	B	B	21	38	18	42	42	46	45	60	43	47	40	28	21	20	26	21	B	66
14	B	66	66	71	B	B	18	30	20	39	40	44	47	52	52	42	38	28	20	26	N	24	42	24
15	66	66	B	20	66	B	B	21	32	40	42	46	54	52	42	39	20	29	48	44	17	23	24	18
16	66	20	B	B	28	B	B	30	39	40	43	47	43	45	42	43	22	40	44	40	22	49	22	16
17	B	21	66	B	20	66	B	30	33	20	42	45	52	47	41	32	32	22	16	27	41	40	55	B
18	40	26	21	30	20	B	B	29	29	21	48	60	56	59	46	43	40	38	20	21	65	20	43	27
19	66	18	29	B	66	B	B	21	30	21	42	48	60	45	43	42	34	38	38	20	38	64	45	44
20	43	B	20	21	18	B	71	30	28	38	42	43	47	44	43	41	39	30	21	44	64	18	16	50
21	B	B	20	B	20	20	B	21	33	39	44	40	50	52	46	41	21	23	18	21	15	21	44	71
22	66	66	B	B	23	B	B	41	28	40	40	43	58	43	44	43	20	32	18	20	44	17	23	50
23	18	20	20	81	17	66	B	22	16	39	42	48	52	60	43	42	41	24	18	18	44	81	48	16
24	B	42	18	21	B	B	B	20	29	40	42	42	47	38	43	30	22	26	20	42	20	42	21	16
25	22	45	21	42	42	B	B	20	18	21	40	43	46	43	46	44	39	26	18	40	81	18	18	B
26	20	B	66	66	66	B	B	66	17	40	42	42	43	43	39	43	34	24	22	20	22	B	17	42
27	B	B	66	B	66	B	B	21	15	18	42	40	42	38	58	42	20	29	15	39	18	41	26	B
28	66	B	20	B	B	B	B	18	28	21	42	38	44	40	38	41	38	28	42	40	20	16	66	B
29	21	B	B	B	18	B	B	20	20	22	43	44	45	36	26	20	42	32	21	21	20	21	22	71
30	91	20	66	B	B	66	B	20	18	21	29	23	29	43	48	41	15	16	28	41	44	16	22	B
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	21	17	21	16	16	6	7	30	30	30	30	30	30	30	30	30	30	30	30	29	29	29	27	22
MED	43	40	20	28	22	43	21	28	29	40	42	46	47	51	43	42	38	28	21	26	26	24	22	22
U Q	66	55	66	66	66	66	66	36	33	42	43	49	52	54	46	43	40	38	22	40	44	42	44	50
L Q	21	20	19	20	20	20	18	21	20	22	42	43	44	43	42	41	22	24	18	20	20	19	20	18

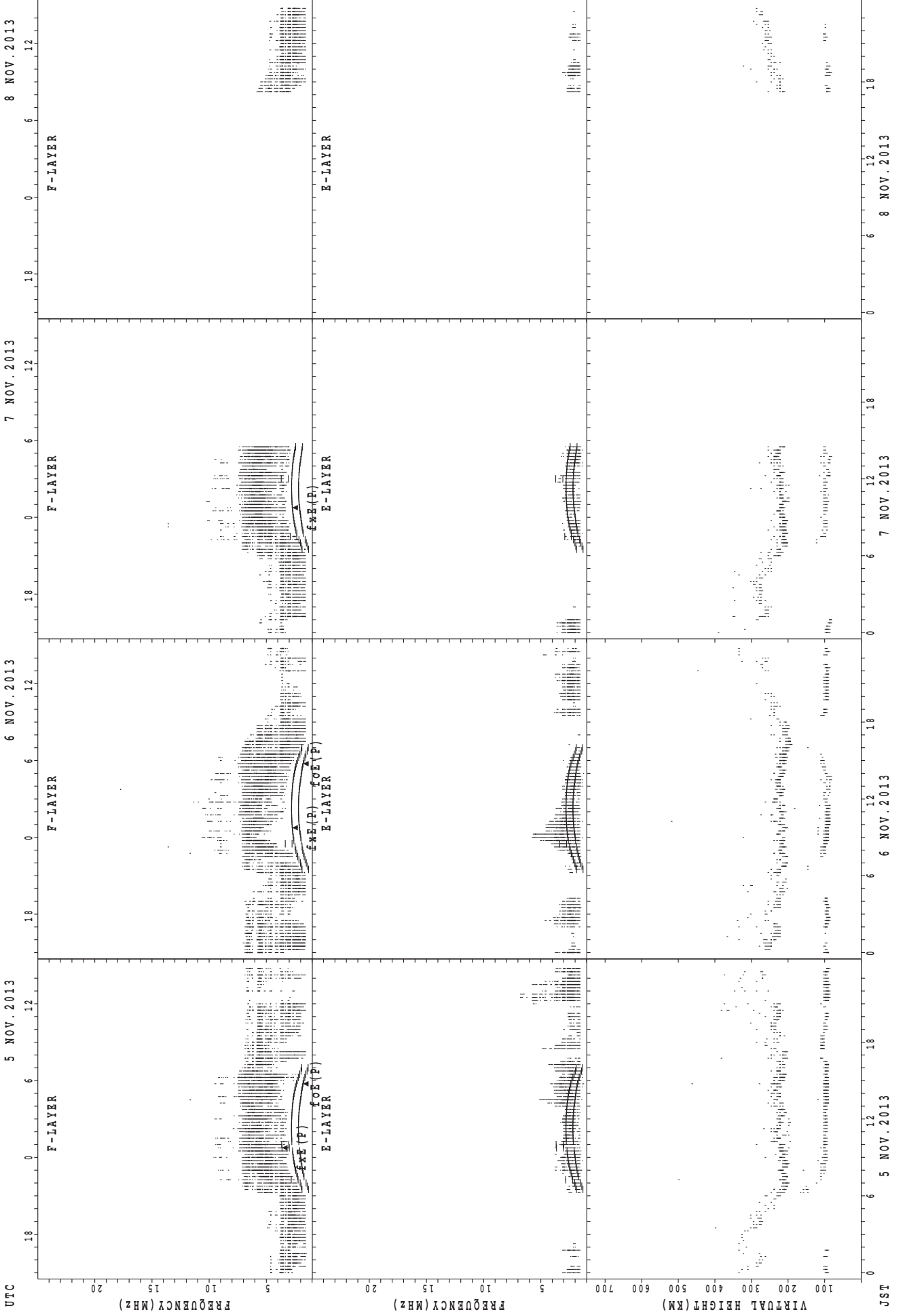


SUMMARY PLOTS AT Wakkanai



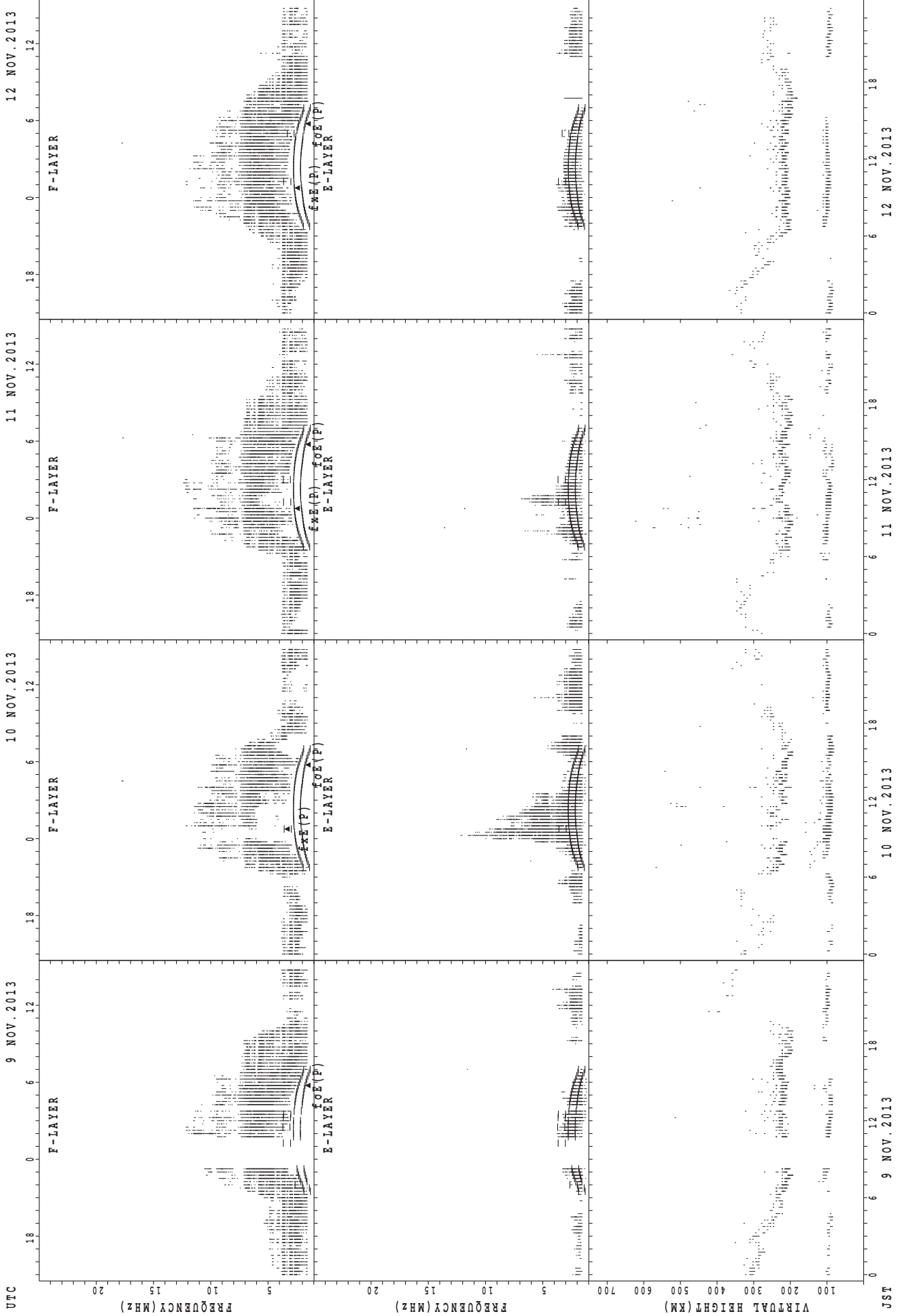
f<sub>x</sub>E(P); PREDICTED VALUE FOR f<sub>x</sub>E  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



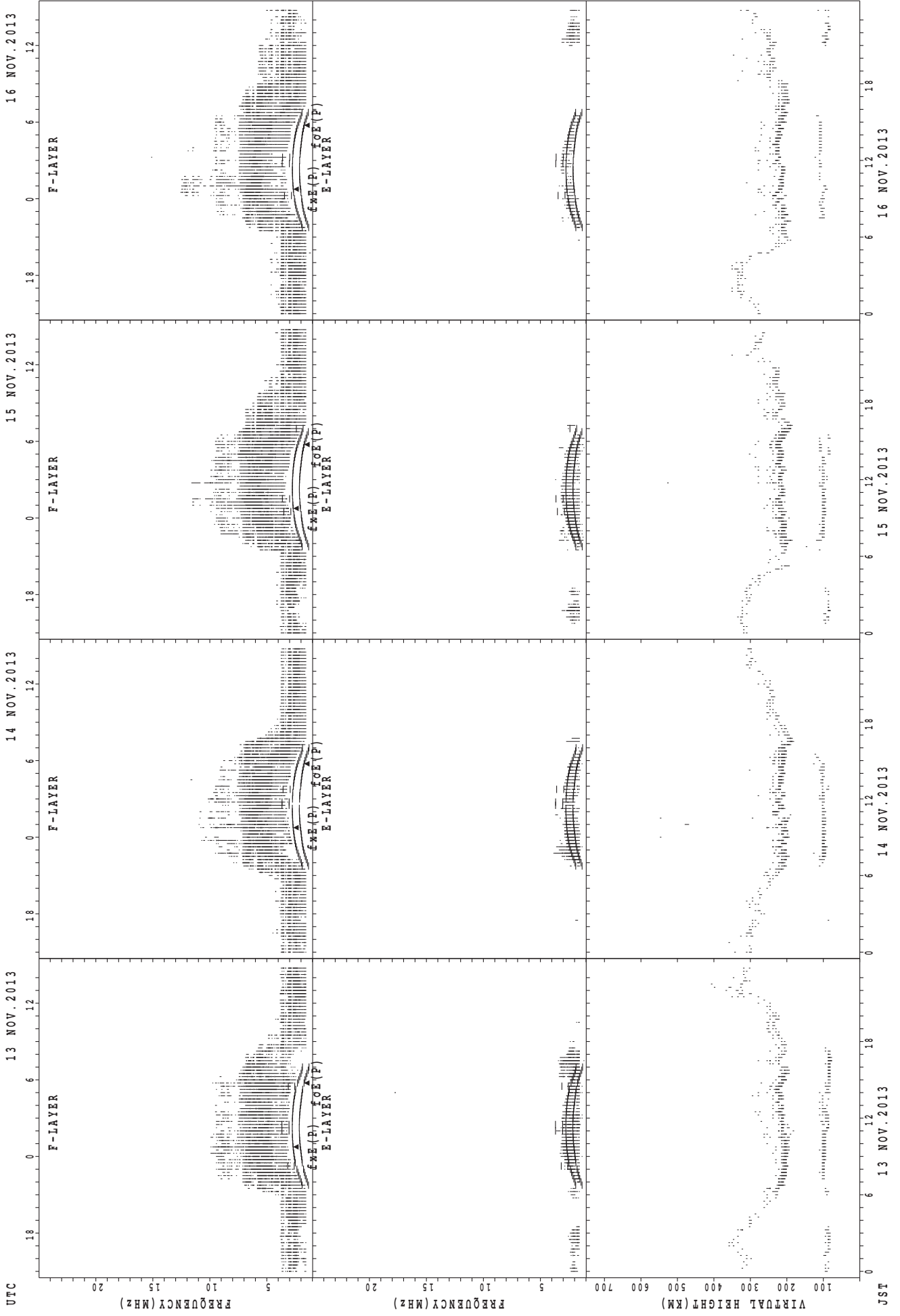
f<sub>xE</sub>(P); PREDICTED VALUE FOR f<sub>xE</sub>  
f<sub>oE</sub>(P); PREDICTED VALUE FOR f<sub>oE</sub>

SUMMARY PLOTS AT Wakkanai



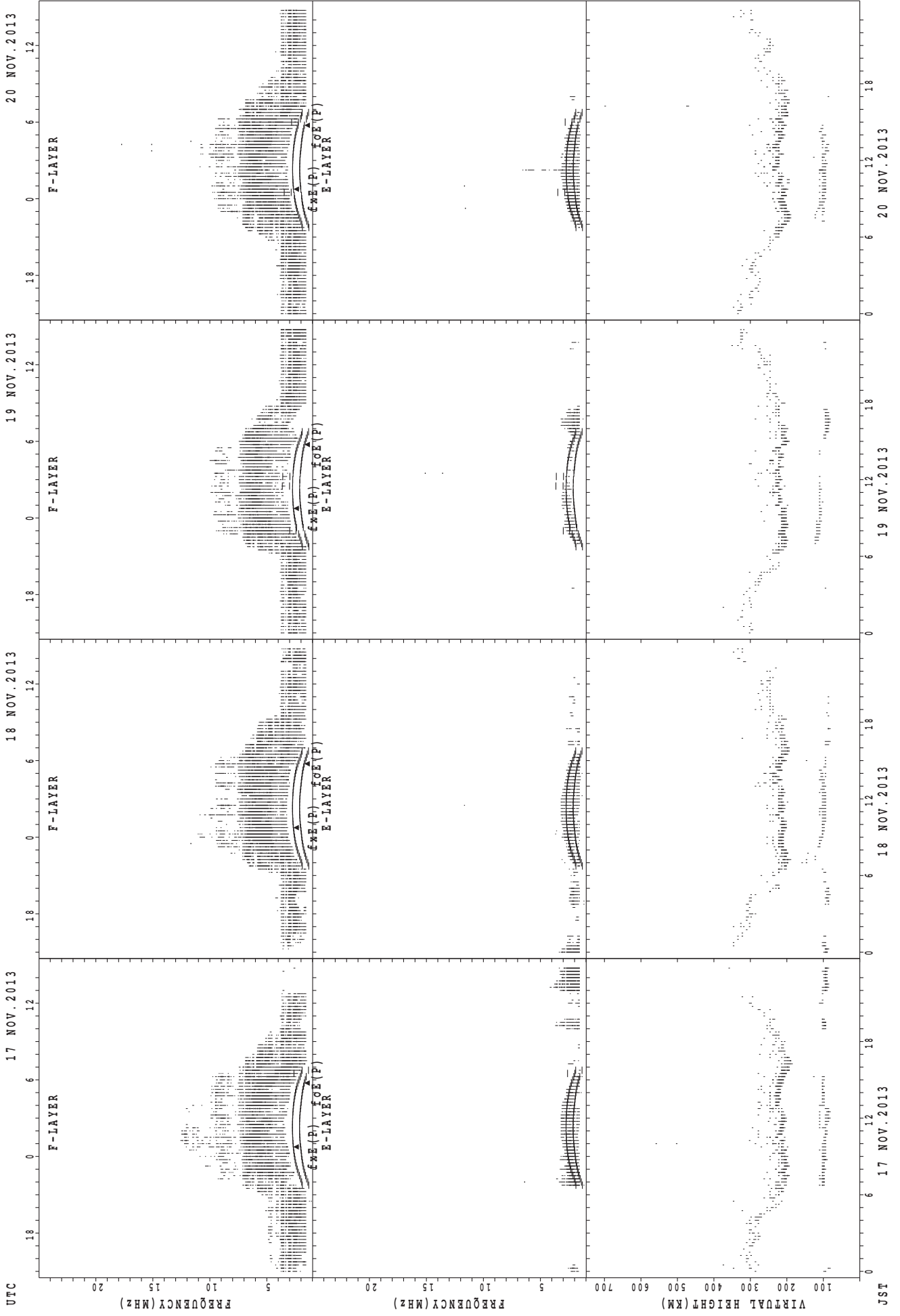
foF2(P); PREDICTED VALUE FOR foF2  
foF2(O); OBSERVED VALUE FOR foF2

SUMMARY PLOTS AT Wakkanai



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

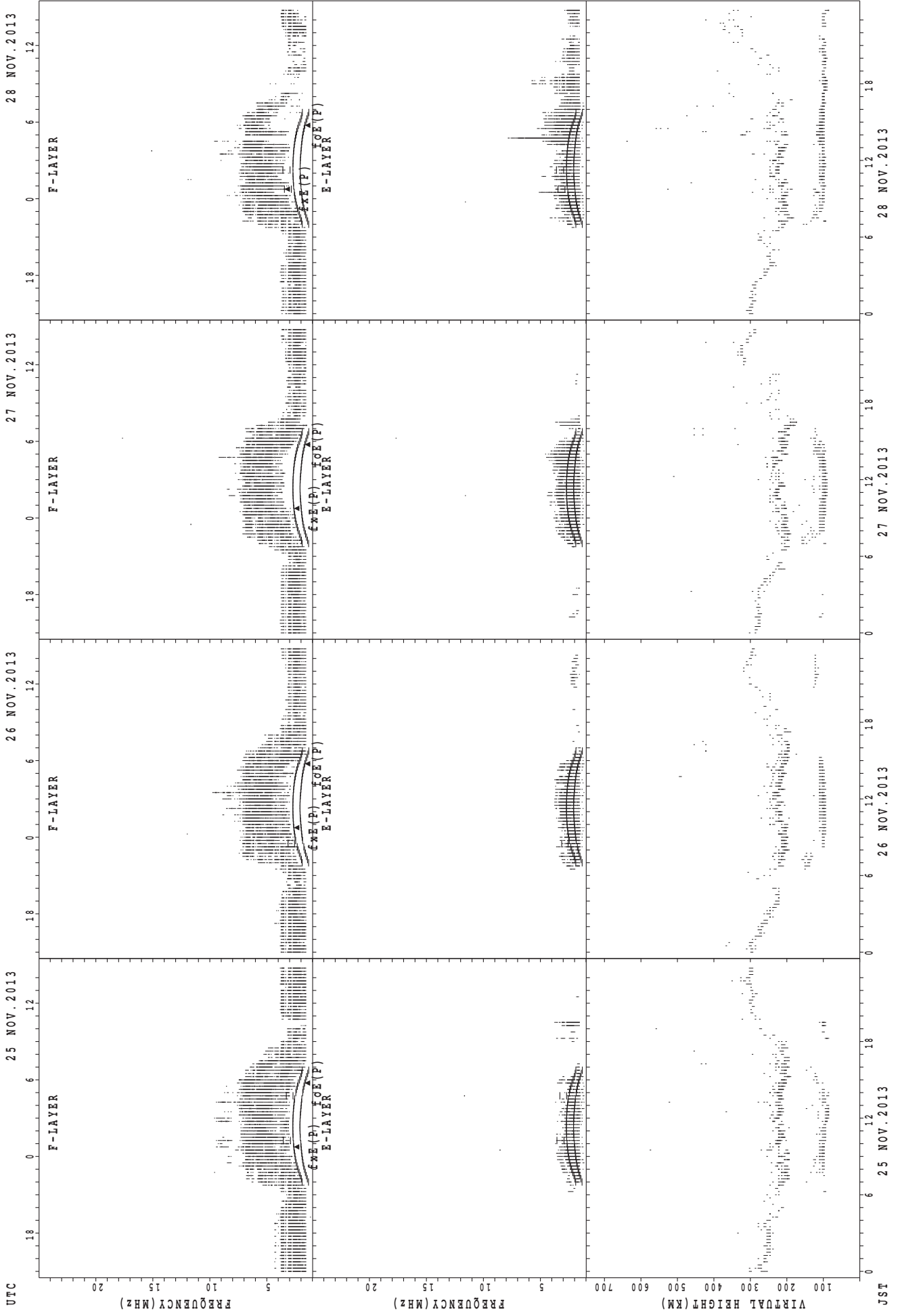
SUMMARY PLOTS AT Wakkanai



$f_{x E}(P)$ ; PREDICTED VALUE FOR  $f_{x E}$   
 $f_{o E}(P)$ ; PREDICTED VALUE FOR  $f_{o E}$

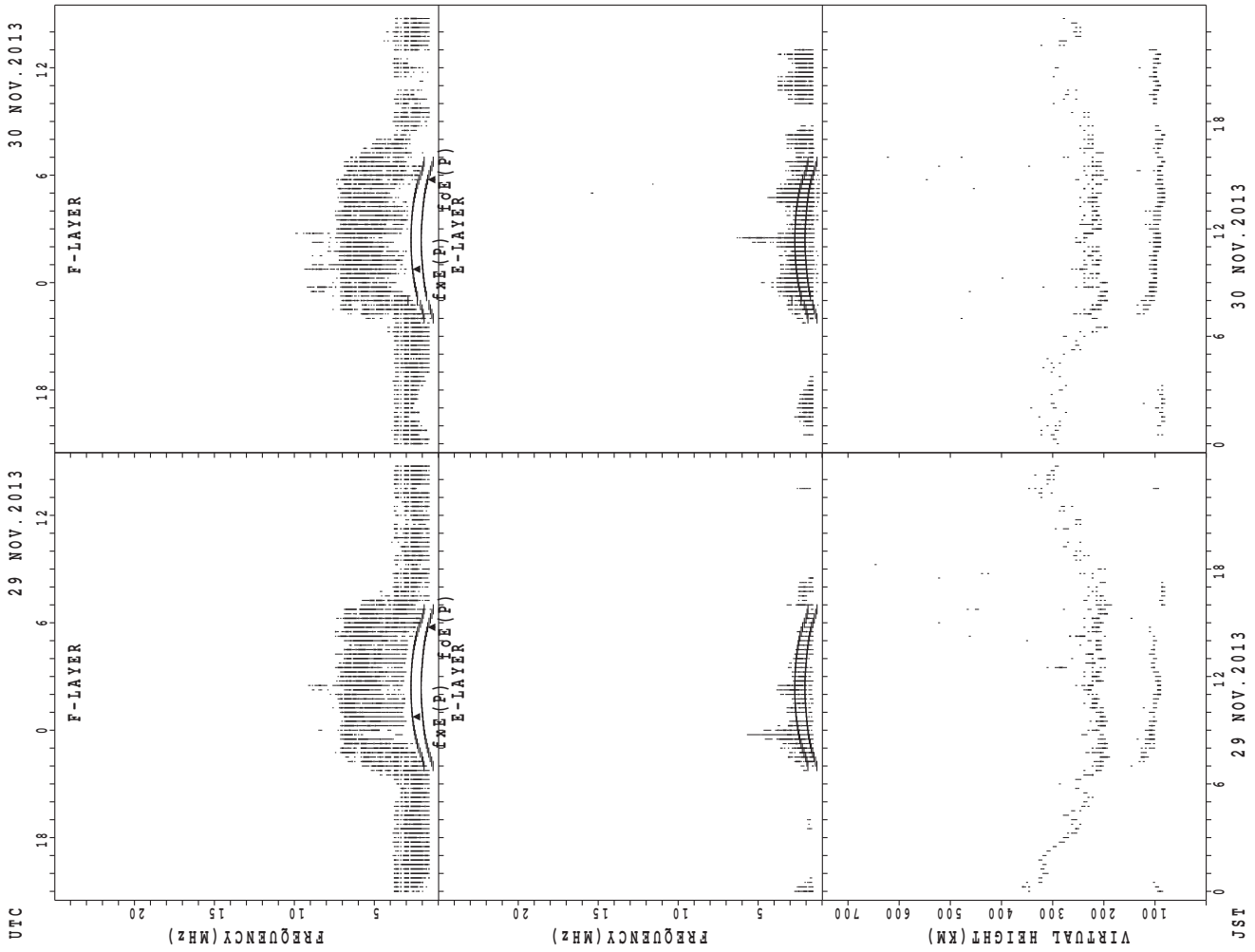


SUMMARY PLOTS AT Wakkanai



f<sub>x</sub>E(P); PREDICTED VALUE FOR f<sub>x</sub>E  
f<sub>o</sub>E(P); PREDICTED VALUE FOR f<sub>o</sub>E

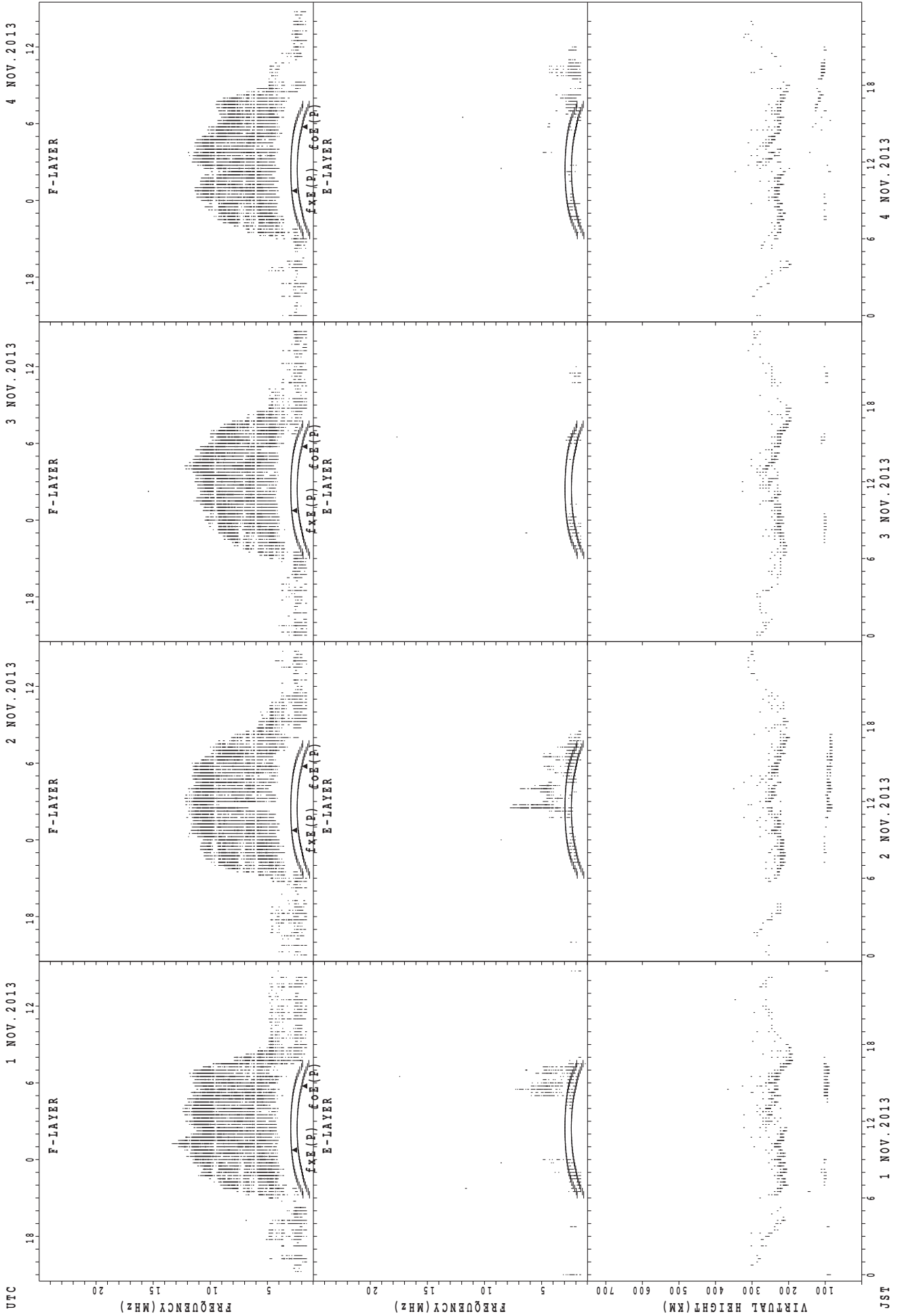
SUMMARY PLOTS AT Wakkanai



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

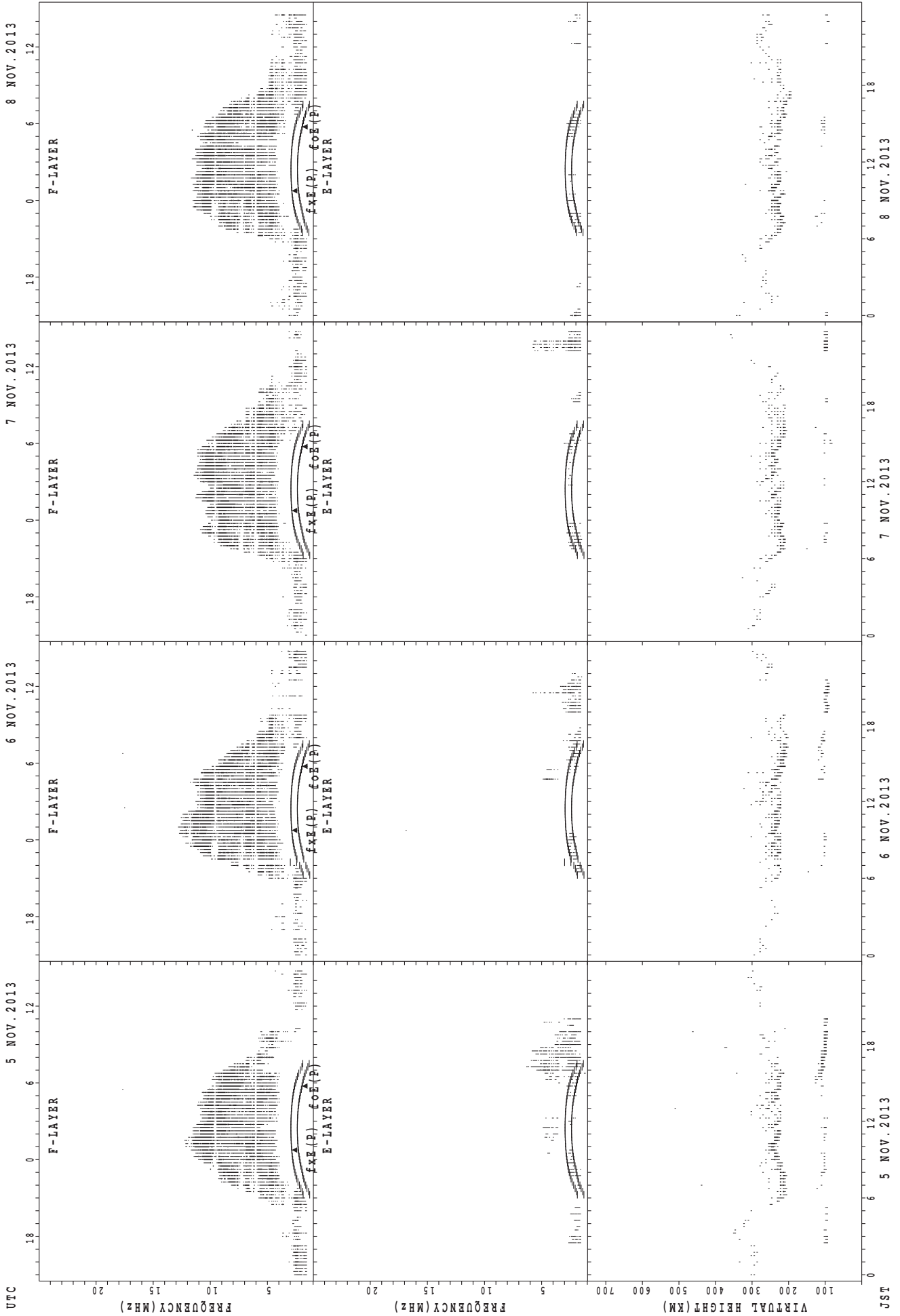


SUMMARY PLOTS AT Kokubunji



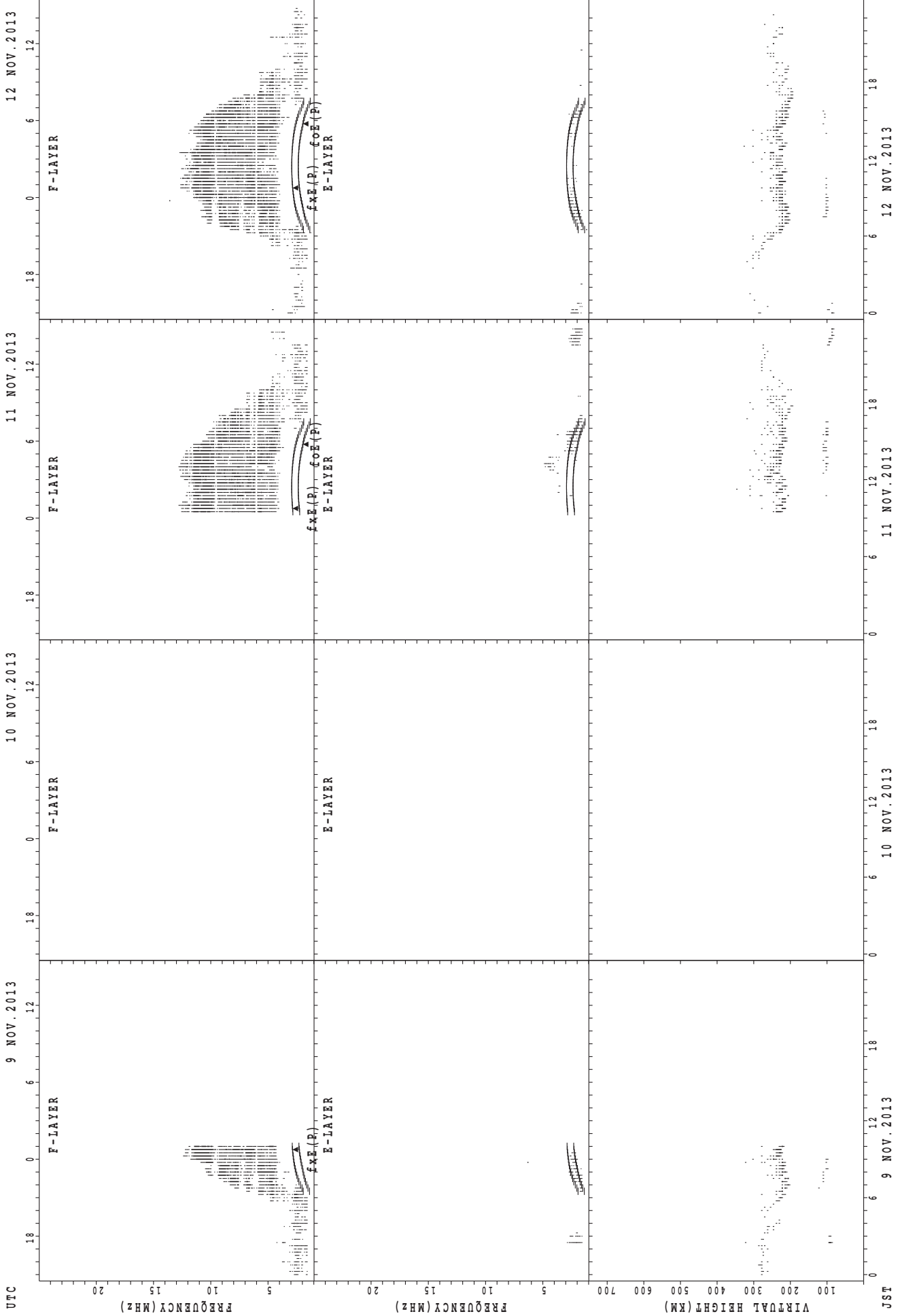
JST 1 NOV. 2013 2 NOV. 2013 3 NOV. 2013 4 NOV. 2013  
fxe(P); PREDICTED VALUE FOR fxe  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



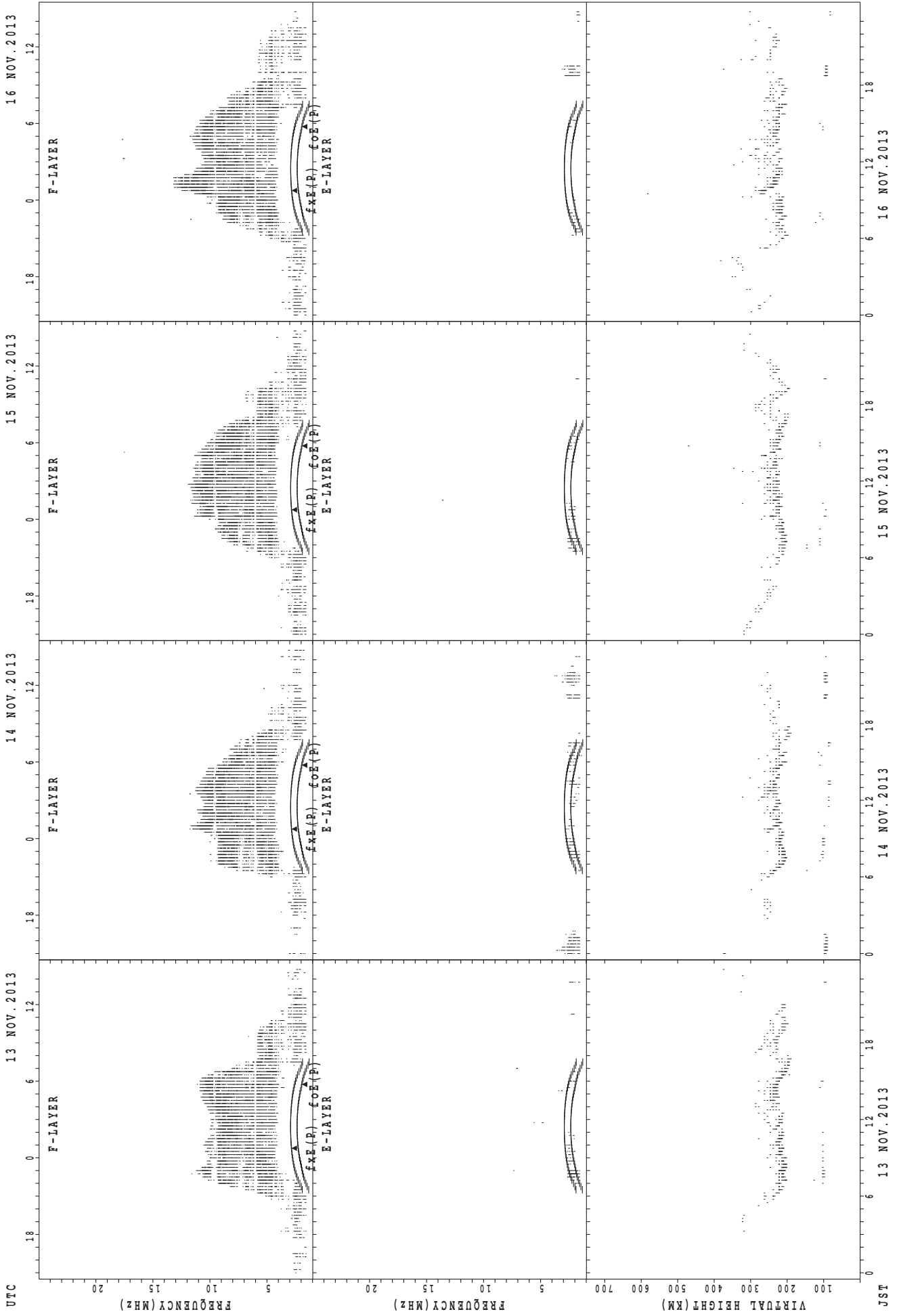
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Kokubunji



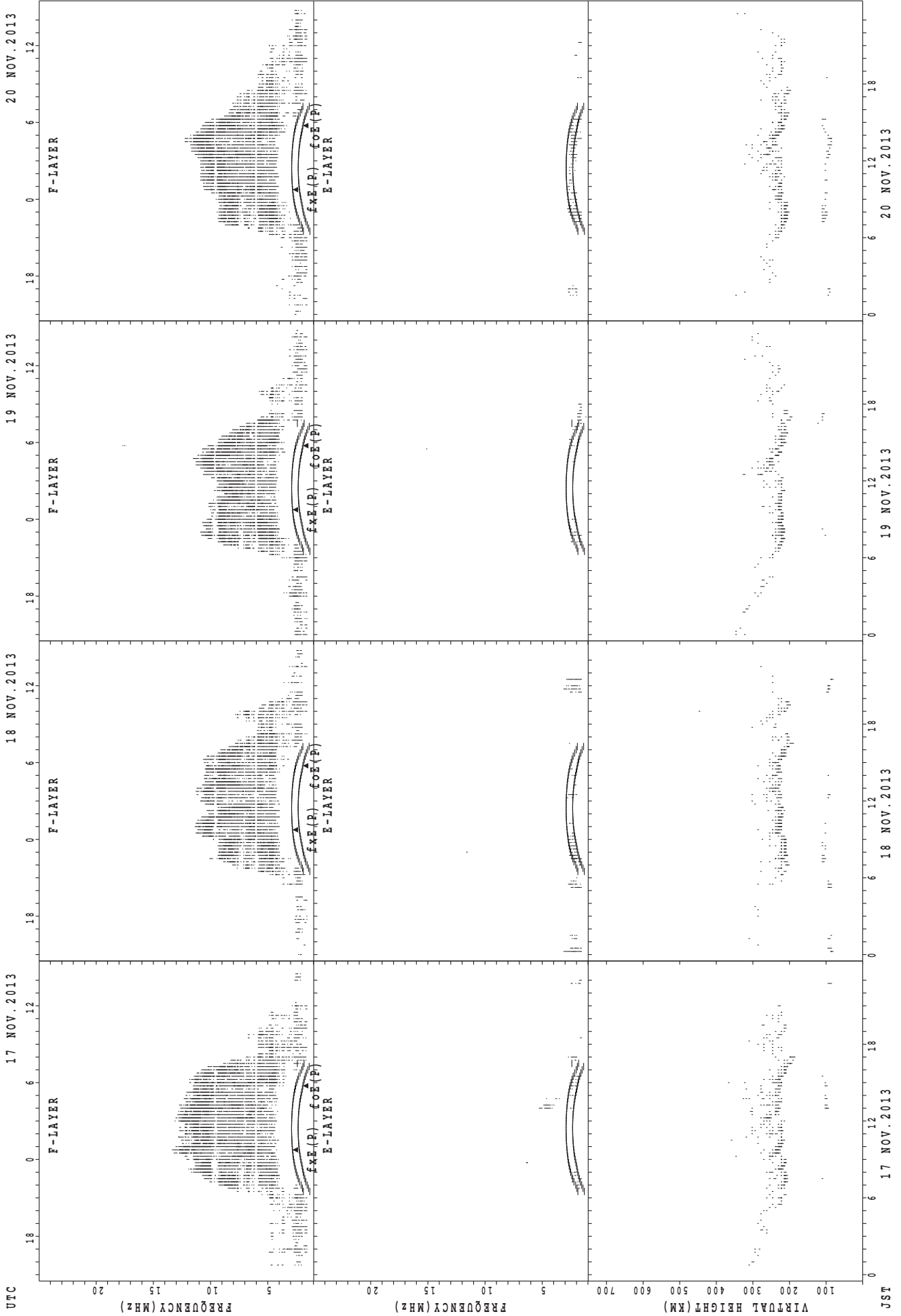
foE(P); PREDICTED VALUE FOR foE  
foF(P); PREDICTED VALUE FOR foF

SUMMARY PLOTS AT Kokubunji



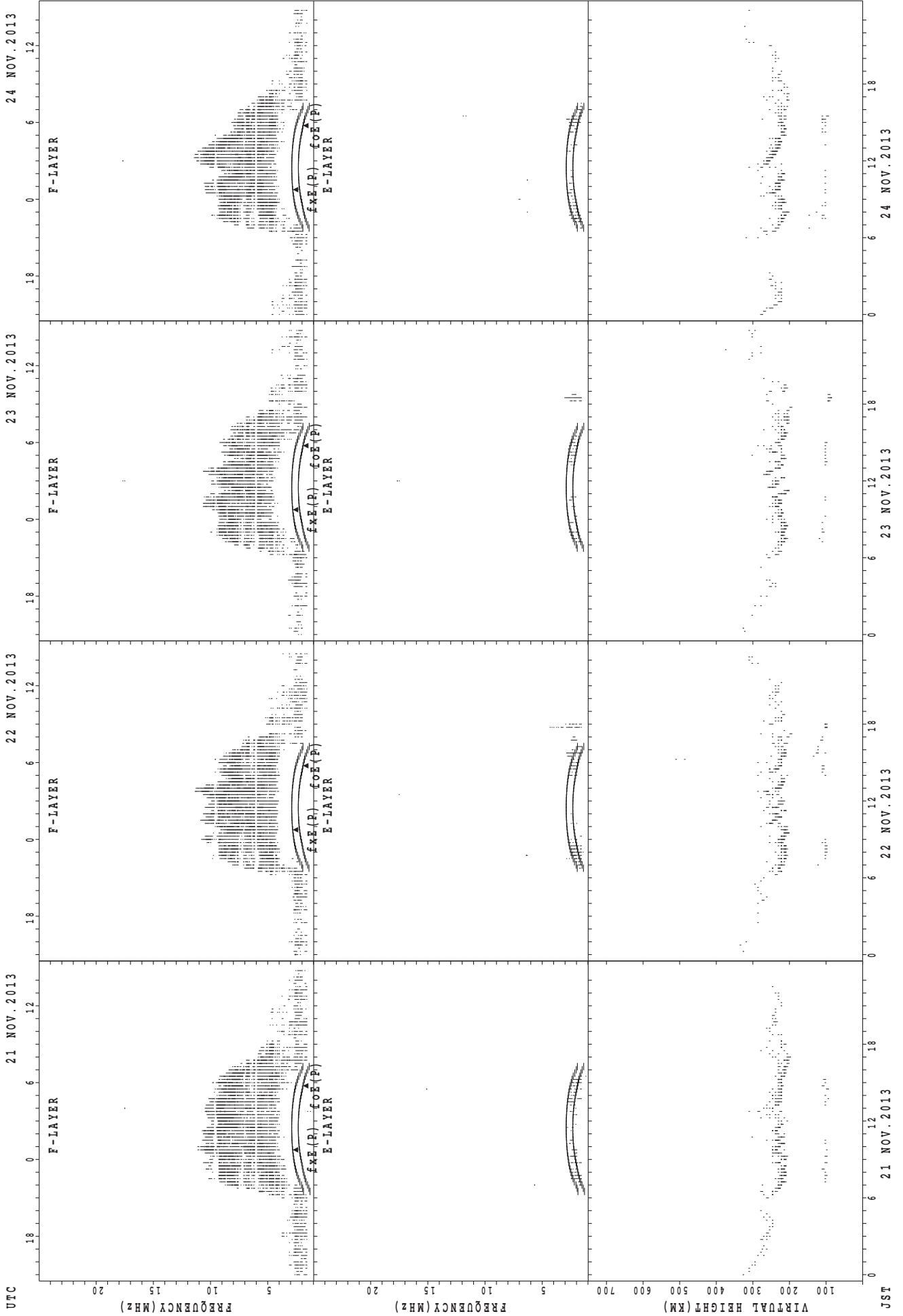
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Kokubunji



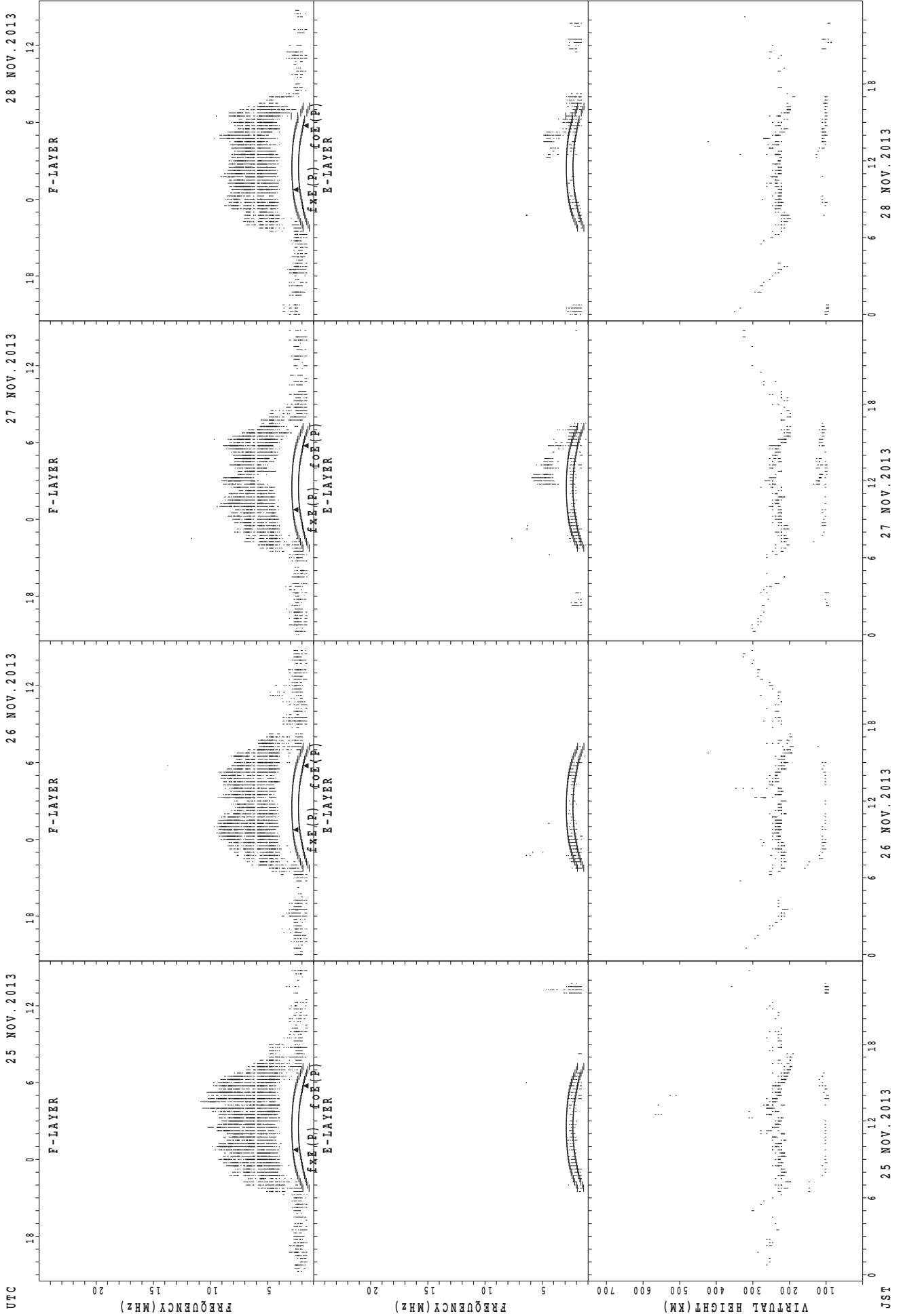
f<sub>x</sub>E(P); PREDICTED VALUE FOR f<sub>x</sub>E  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



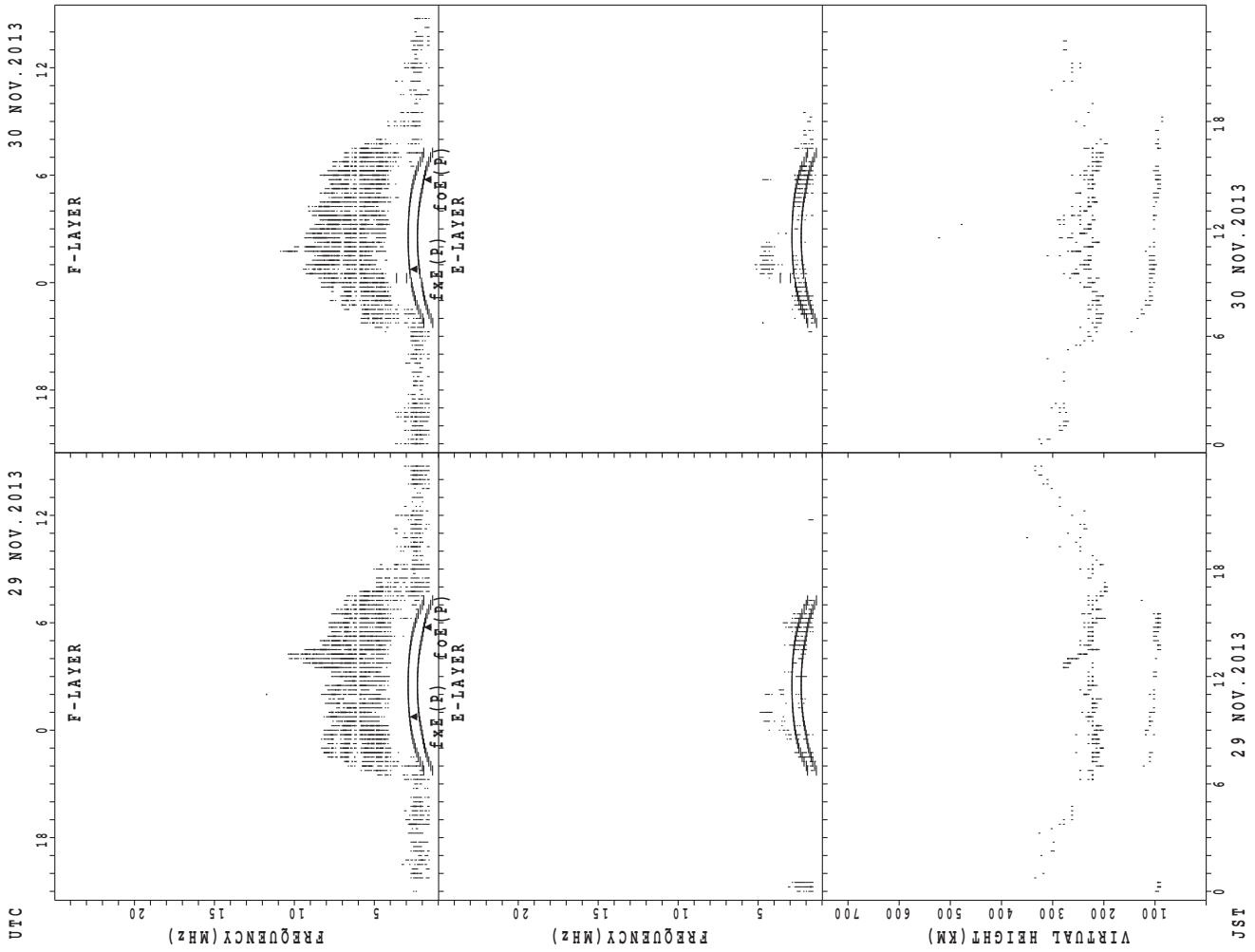
foE(P); PREDICTED VALUE FOR foE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



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

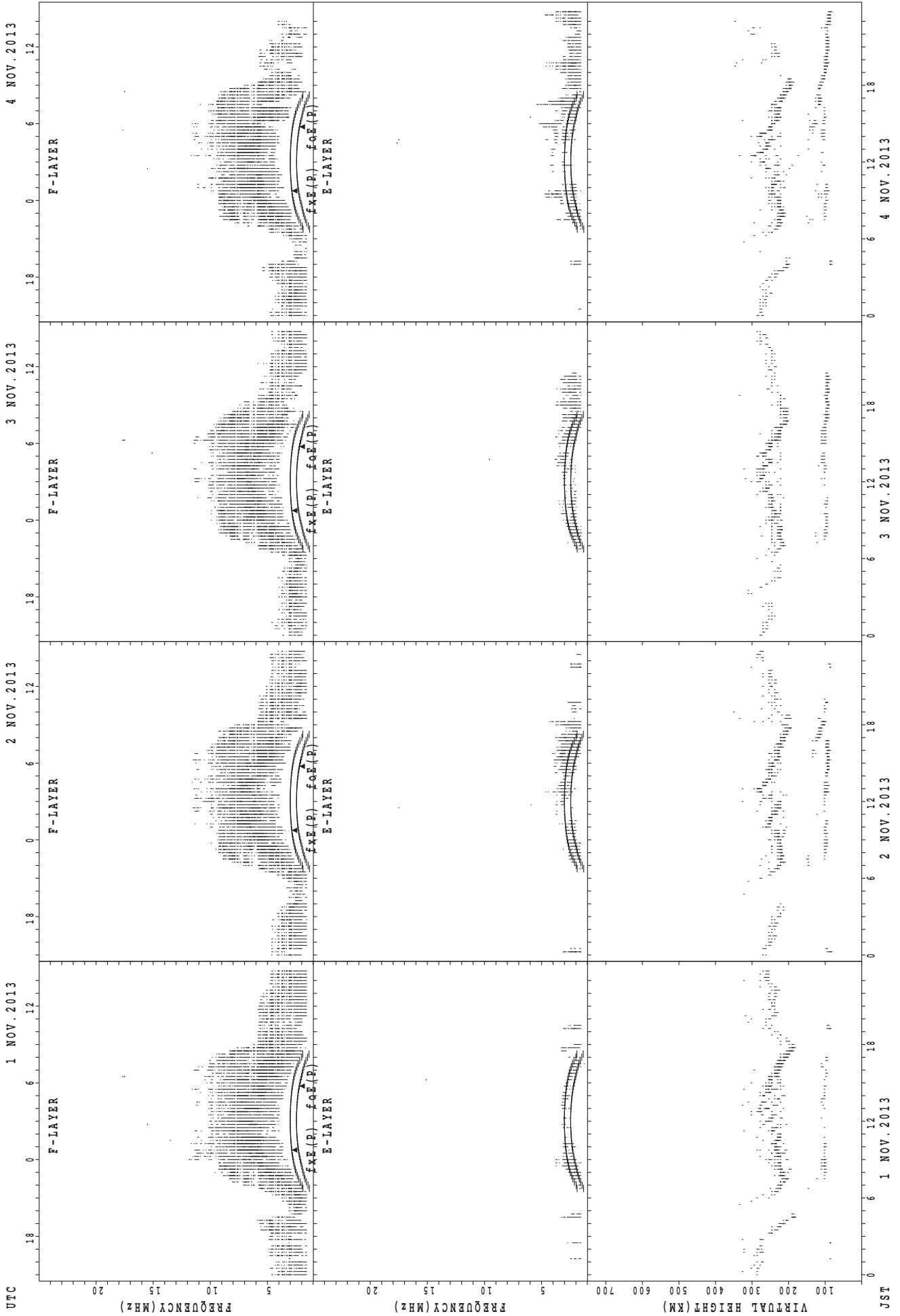
### SUMMARY PLOTS AT Kokubunji



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

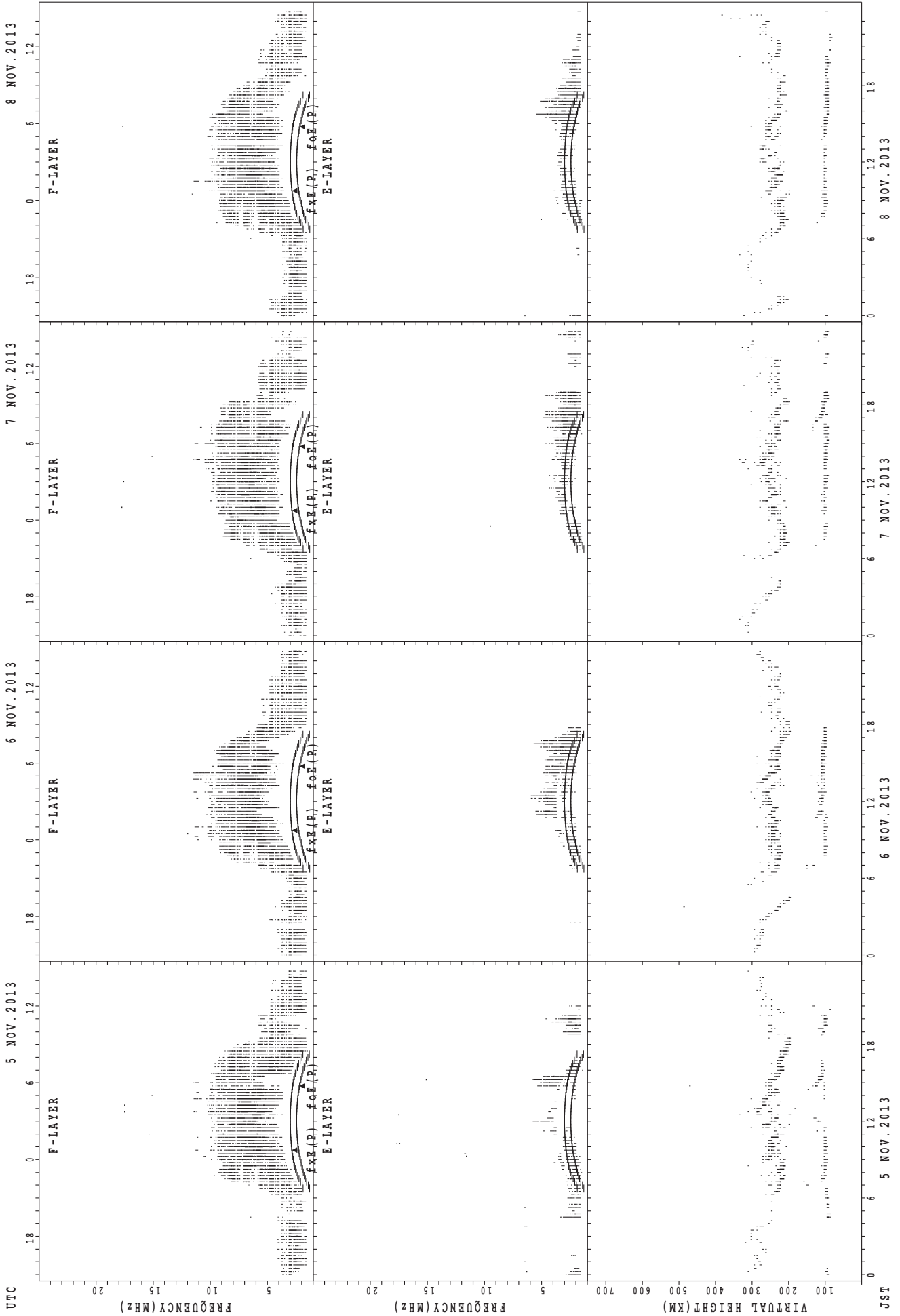


SUMMARY PLOTS AT Yamagawa



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

SUMMARY PLOTS AT Yamagawa



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

5 NOV. 2013

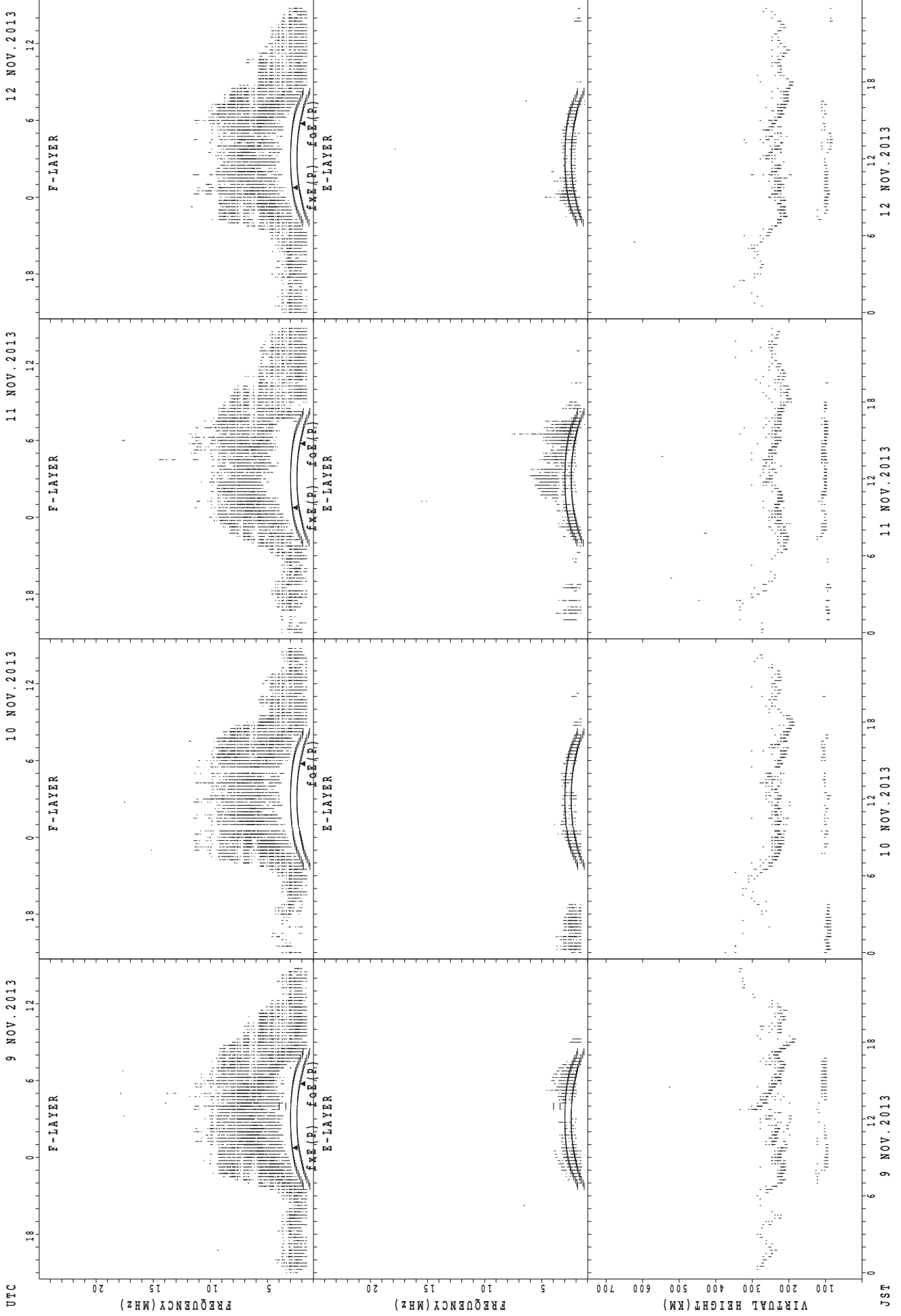
6 NOV. 2013

7 NOV. 2013

8 NOV. 2013

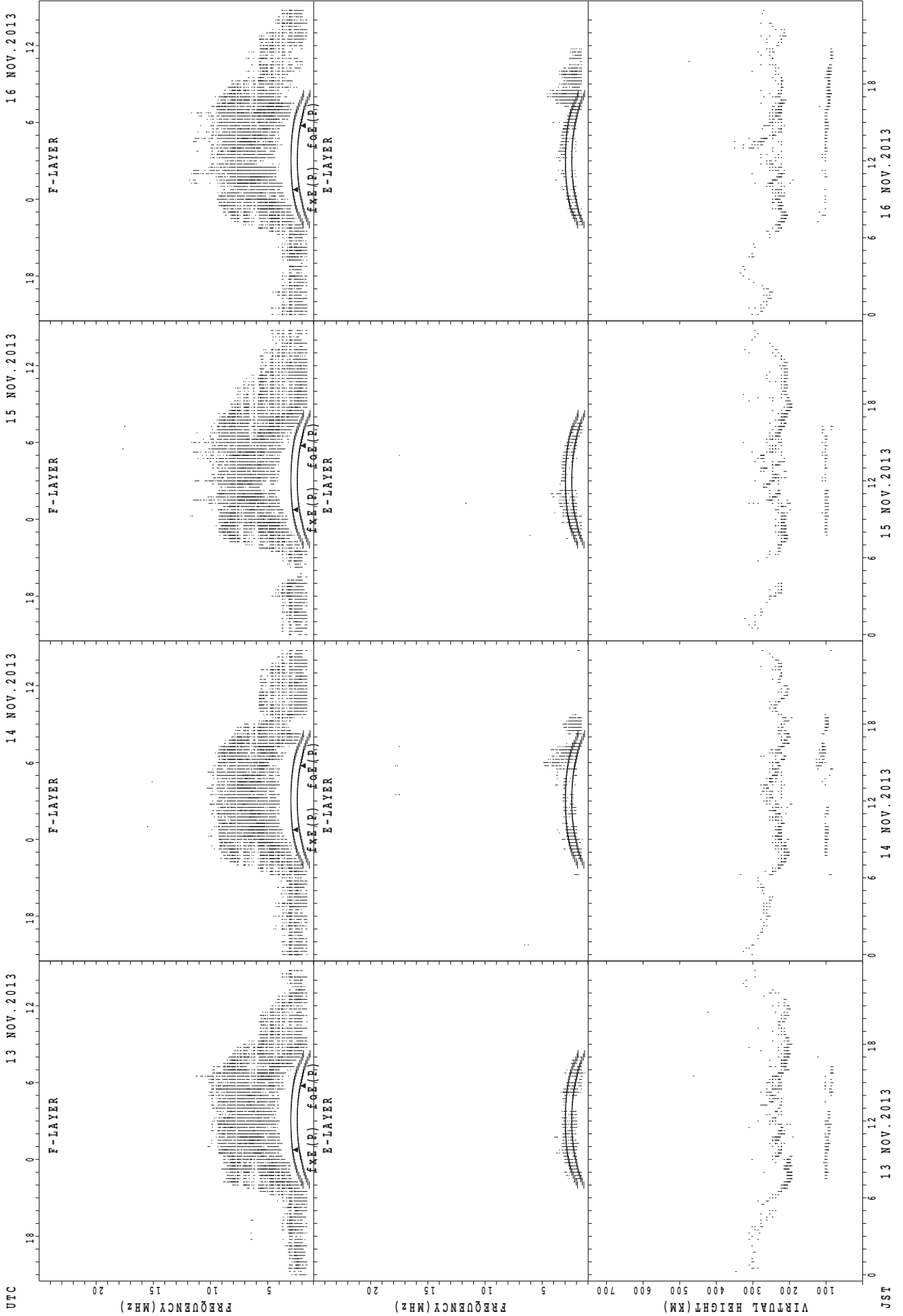
JST

SUMMARY PLOTS AT Yamagawa



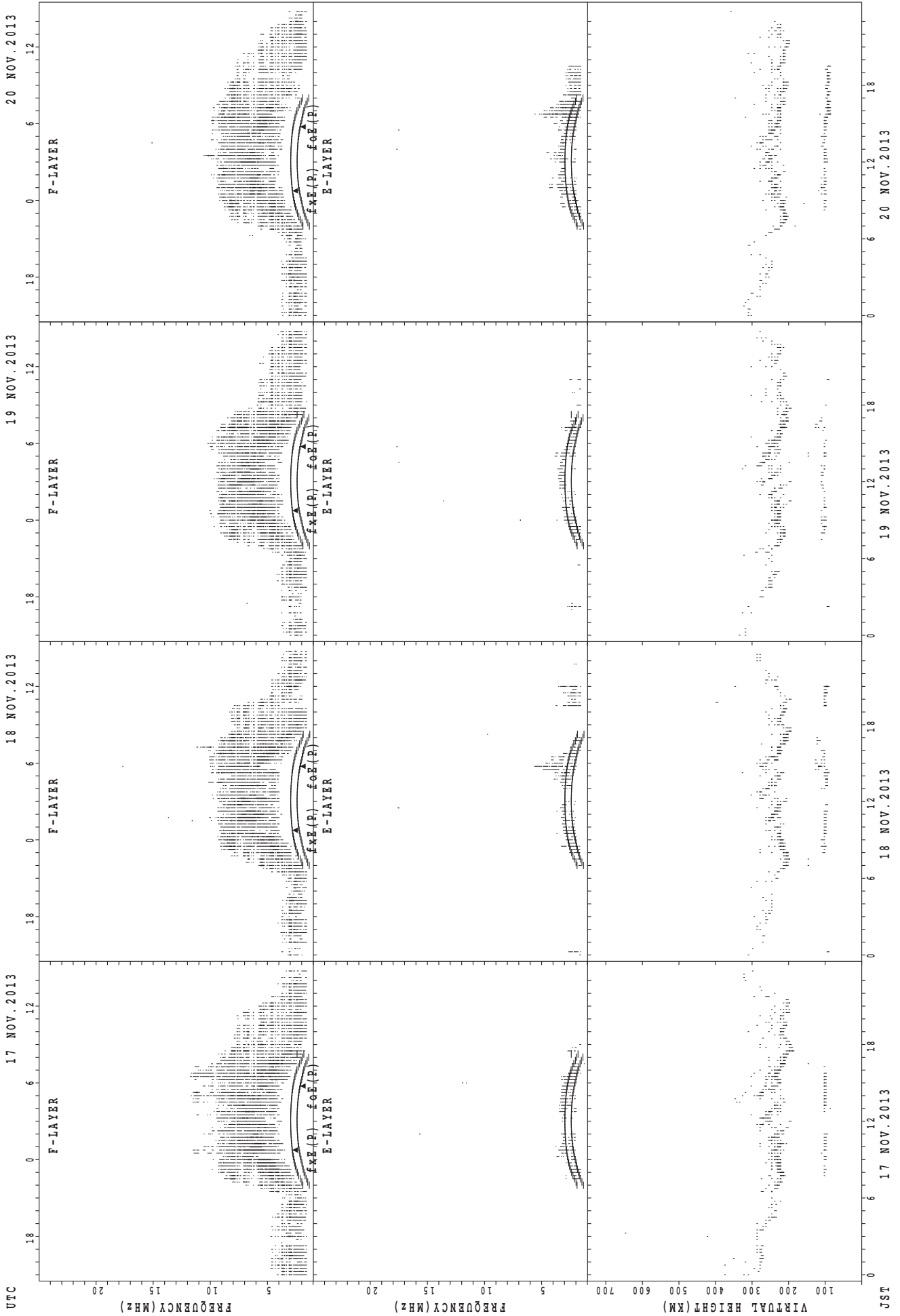
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



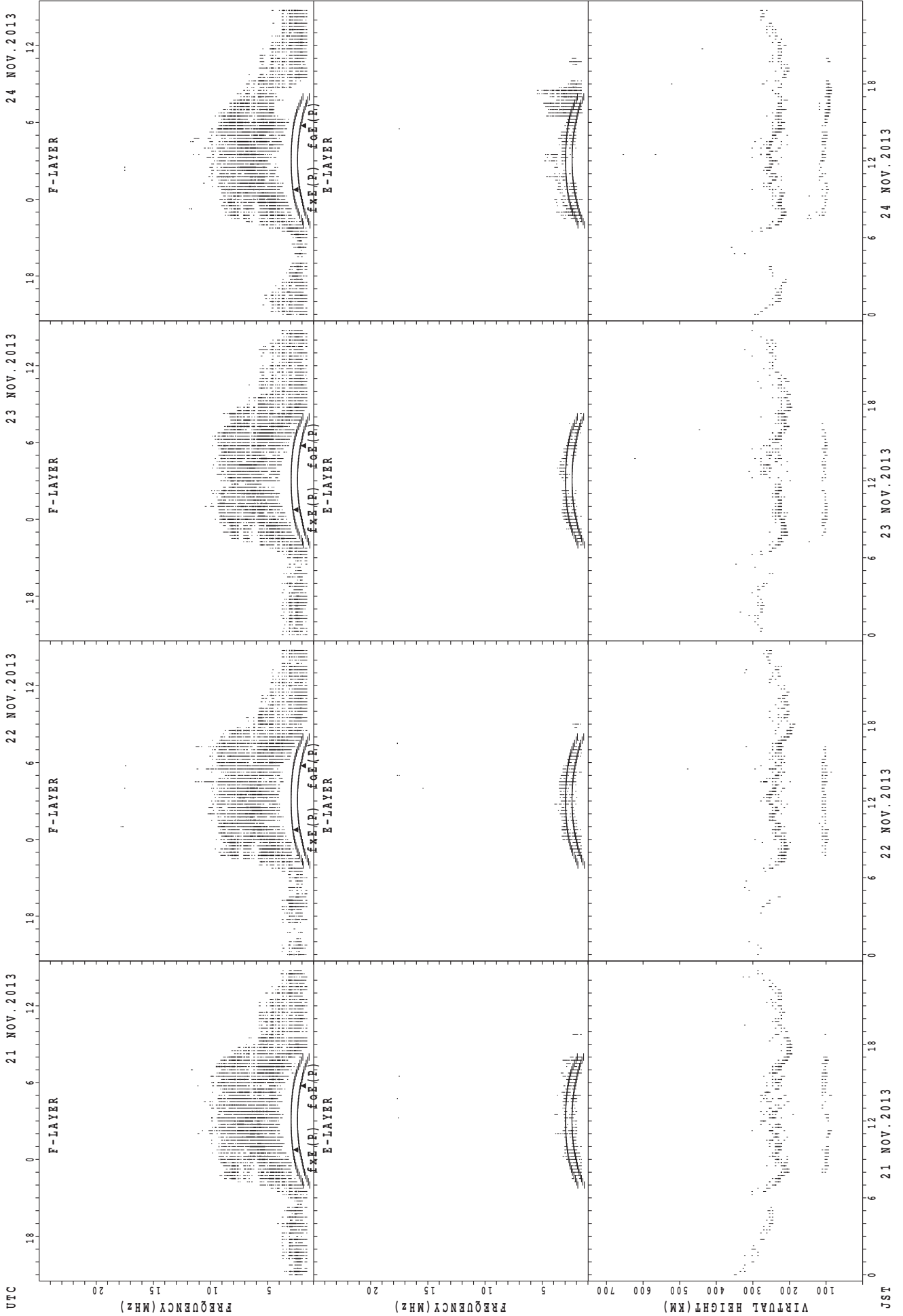
fxE(P) ; PREDICTED VALUE FOR fxe  
foE(P) ; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



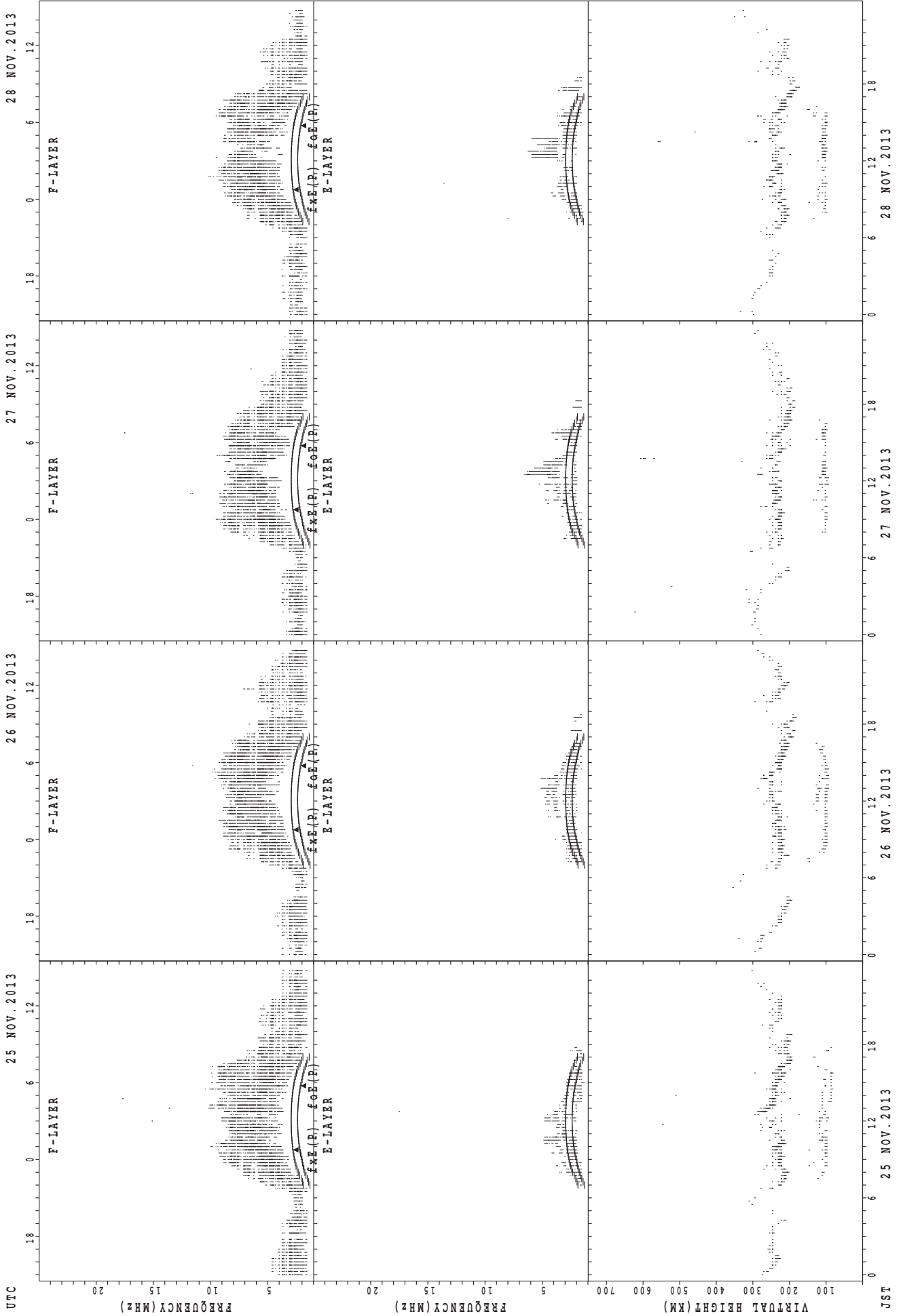
f<sub>x</sub>E(P); PREDICTED VALUE FOR f<sub>x</sub>E  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



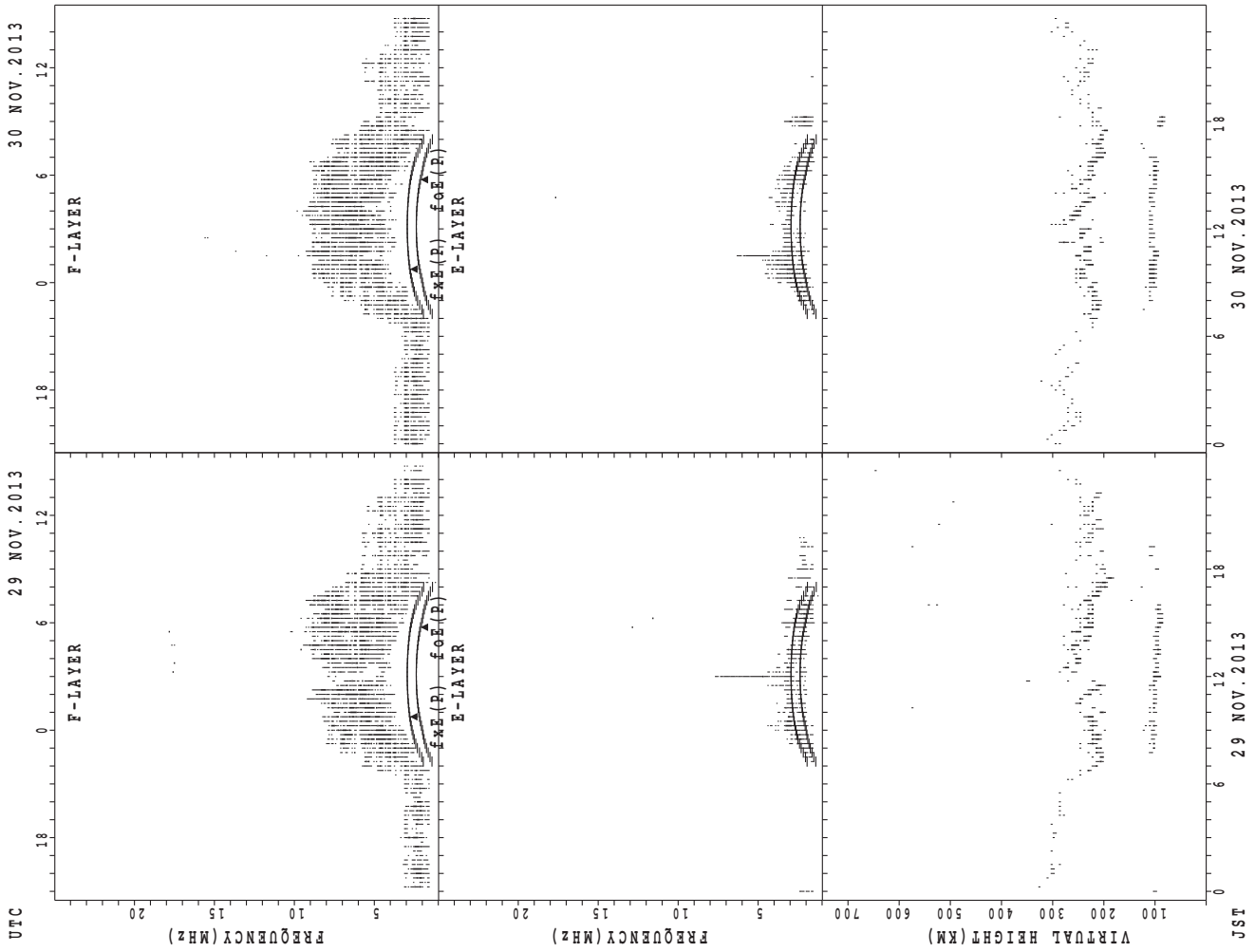
foF2(P); PREDICTED VALUE FOR foF2  
h'pF2(P); PREDICTED VALUE FOR h'pF2

SUMMARY PLOTS AT Yamagawa



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

UTC

JST

29 NOV. 2013

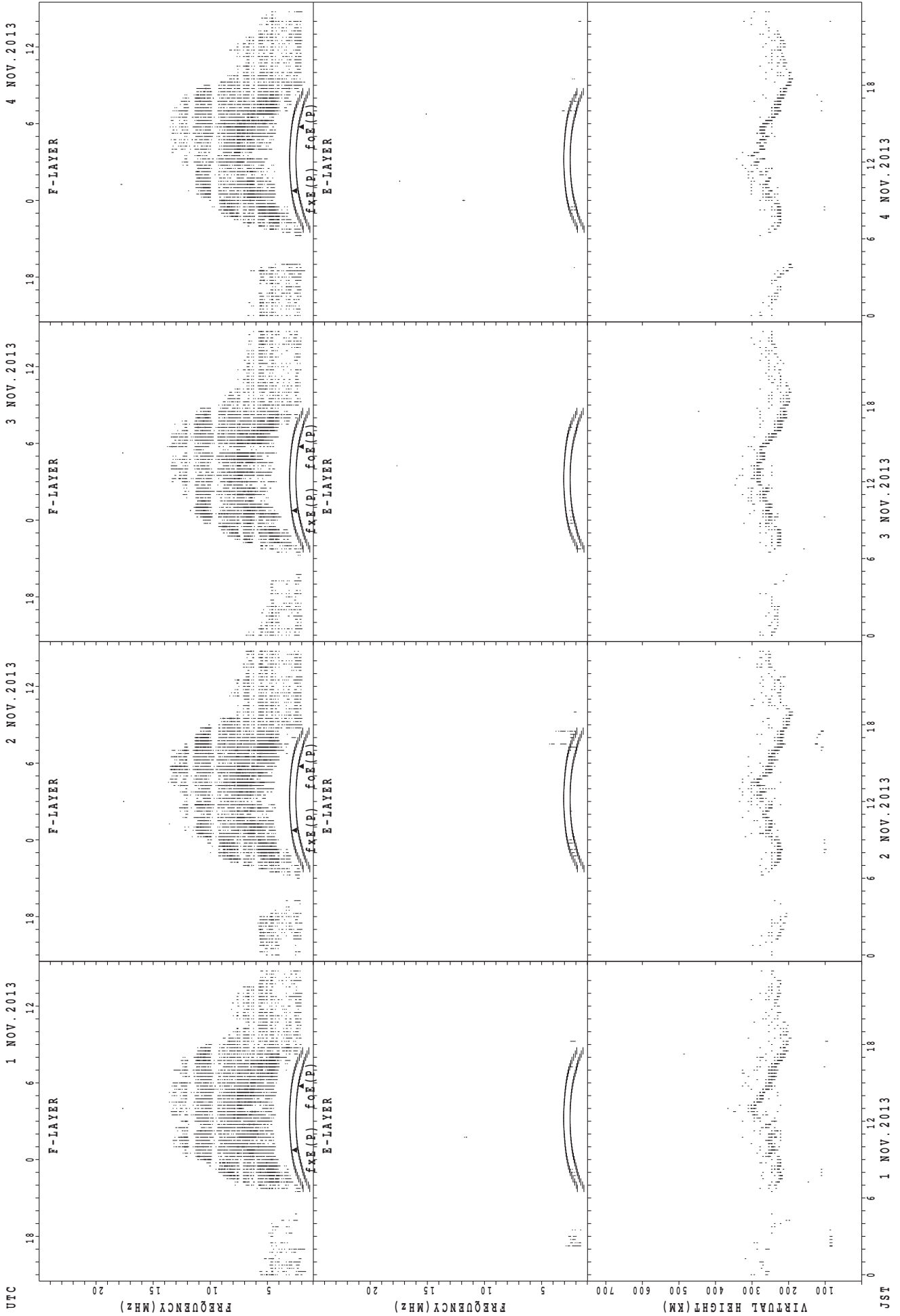
30 NOV. 2013

29 NOV. 2013

30 NOV. 2013

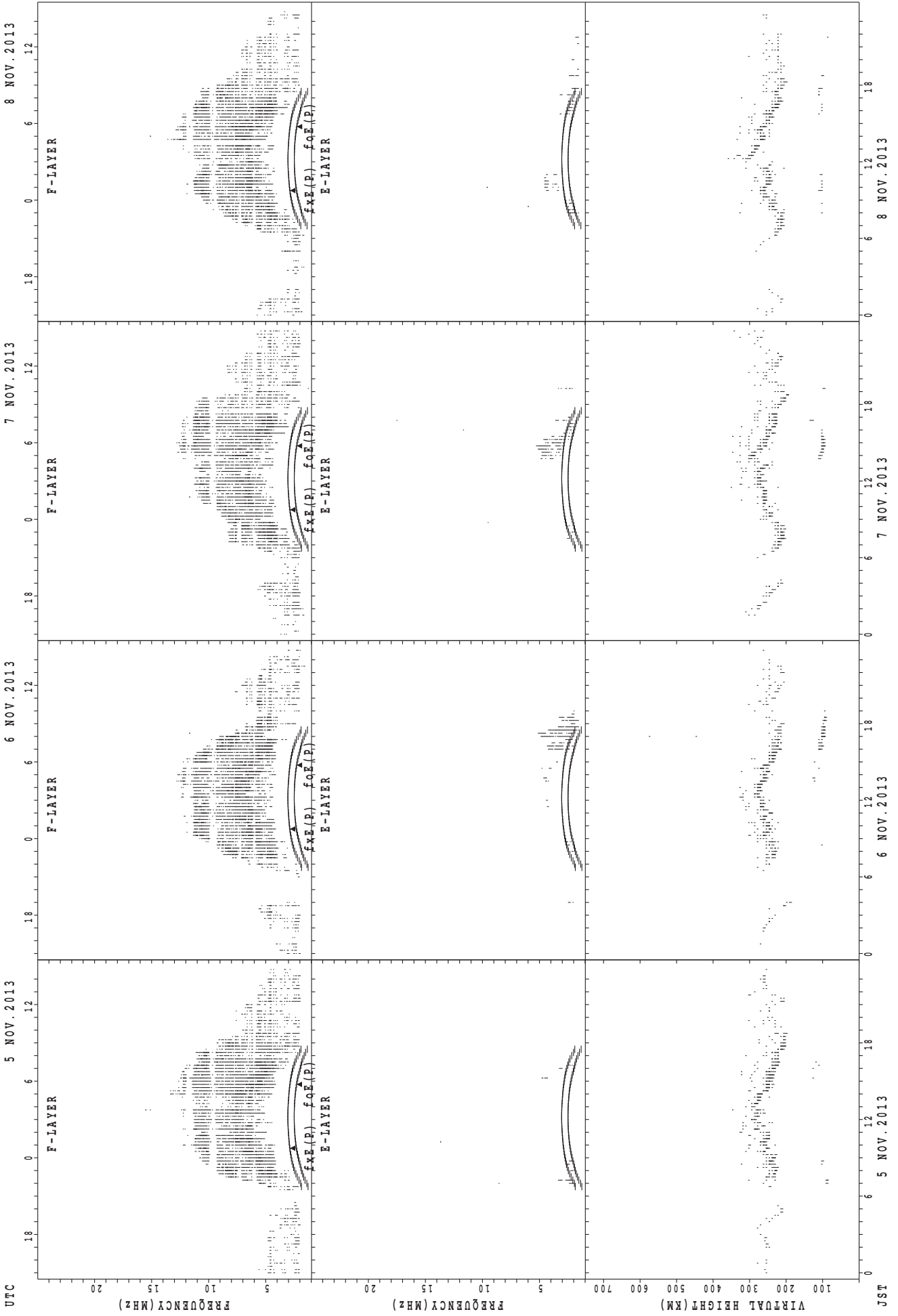


SUMMARY PLOTS AT Okinawa



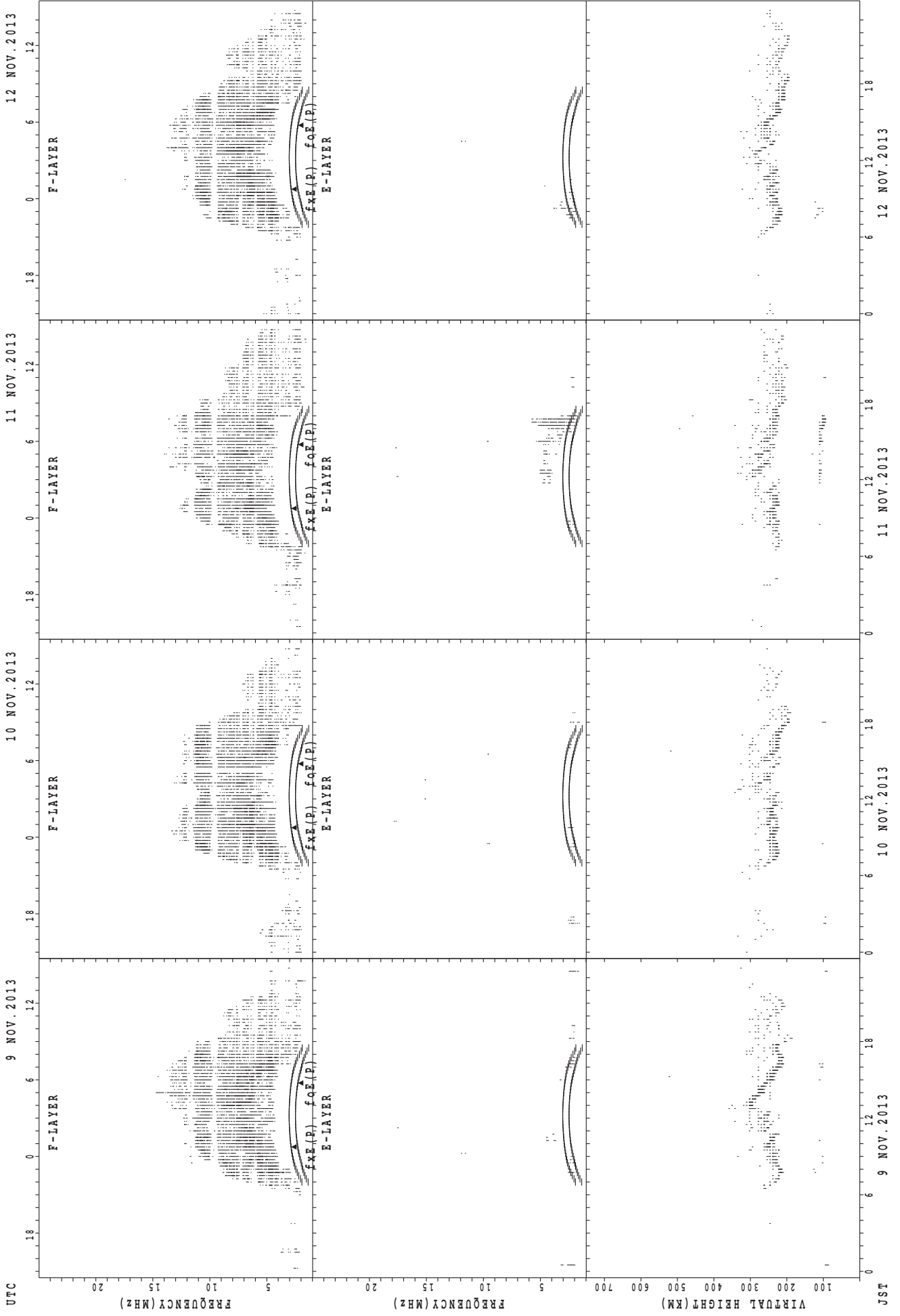
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



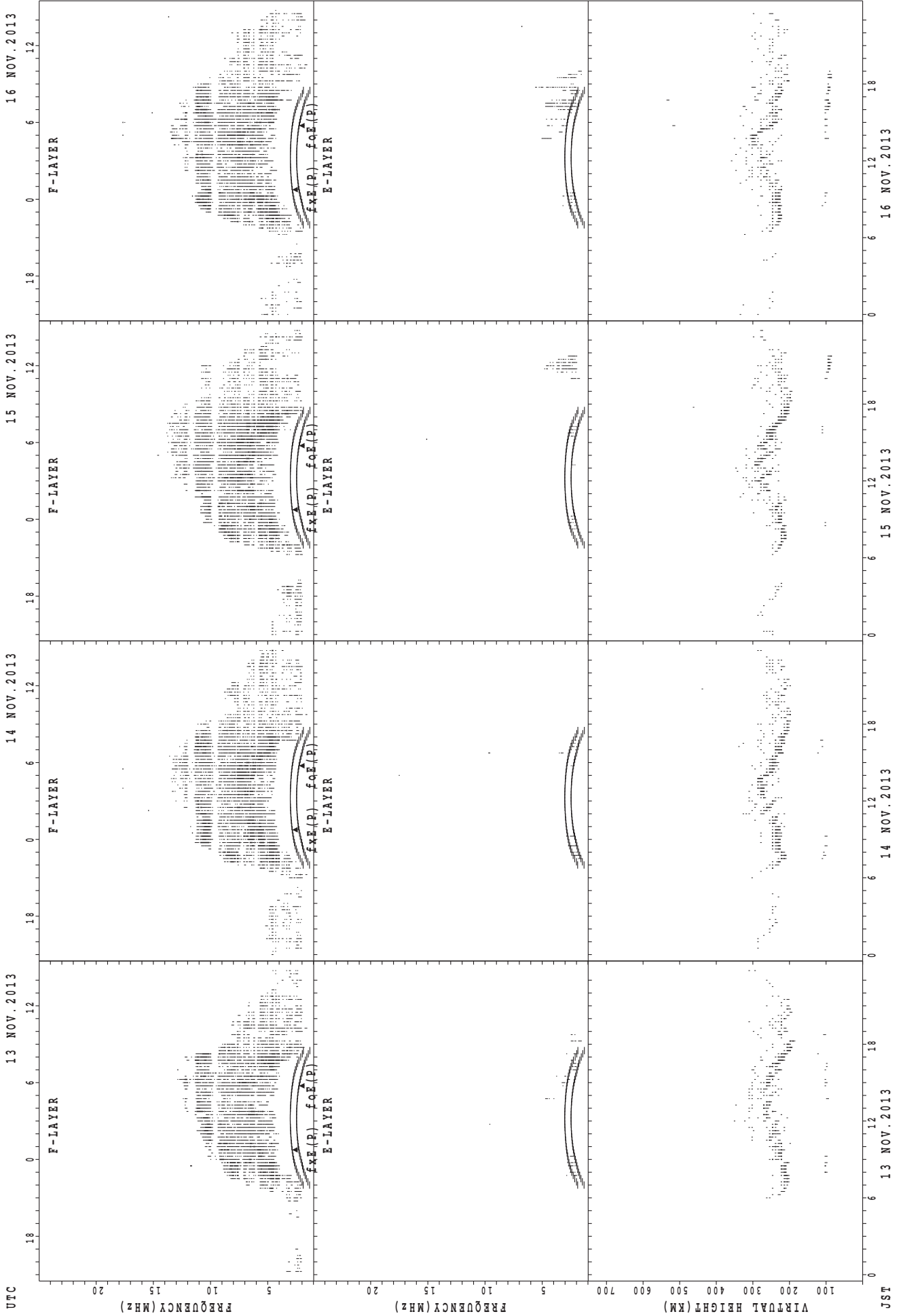
f<sub>x</sub>E(P); PREDICTED VALUE FOR f<sub>x</sub>E  
f<sub>o</sub>E(P); PREDICTED VALUE FOR f<sub>o</sub>E

SUMMARY PLOTS AT Okinawa



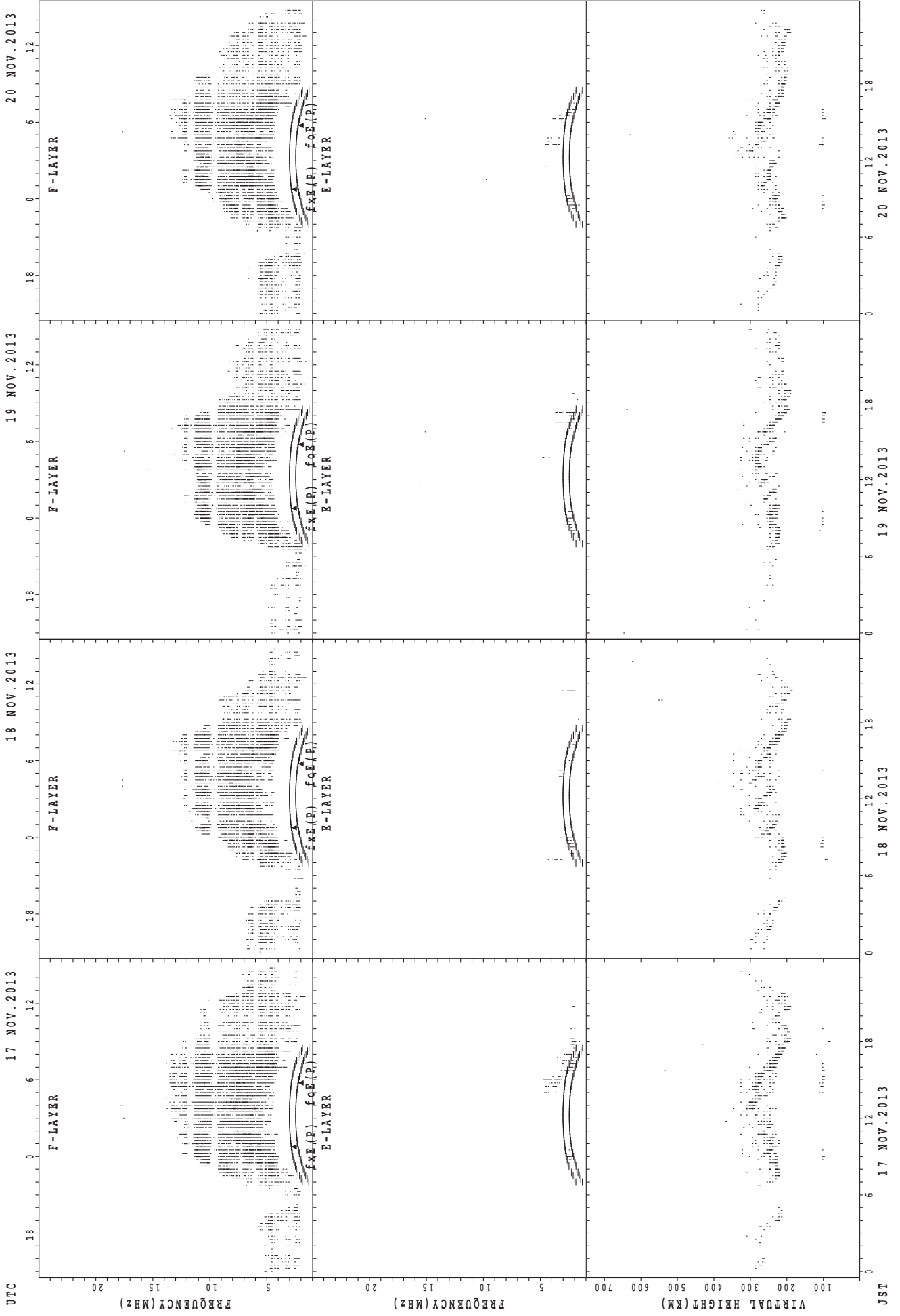
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Okinawa



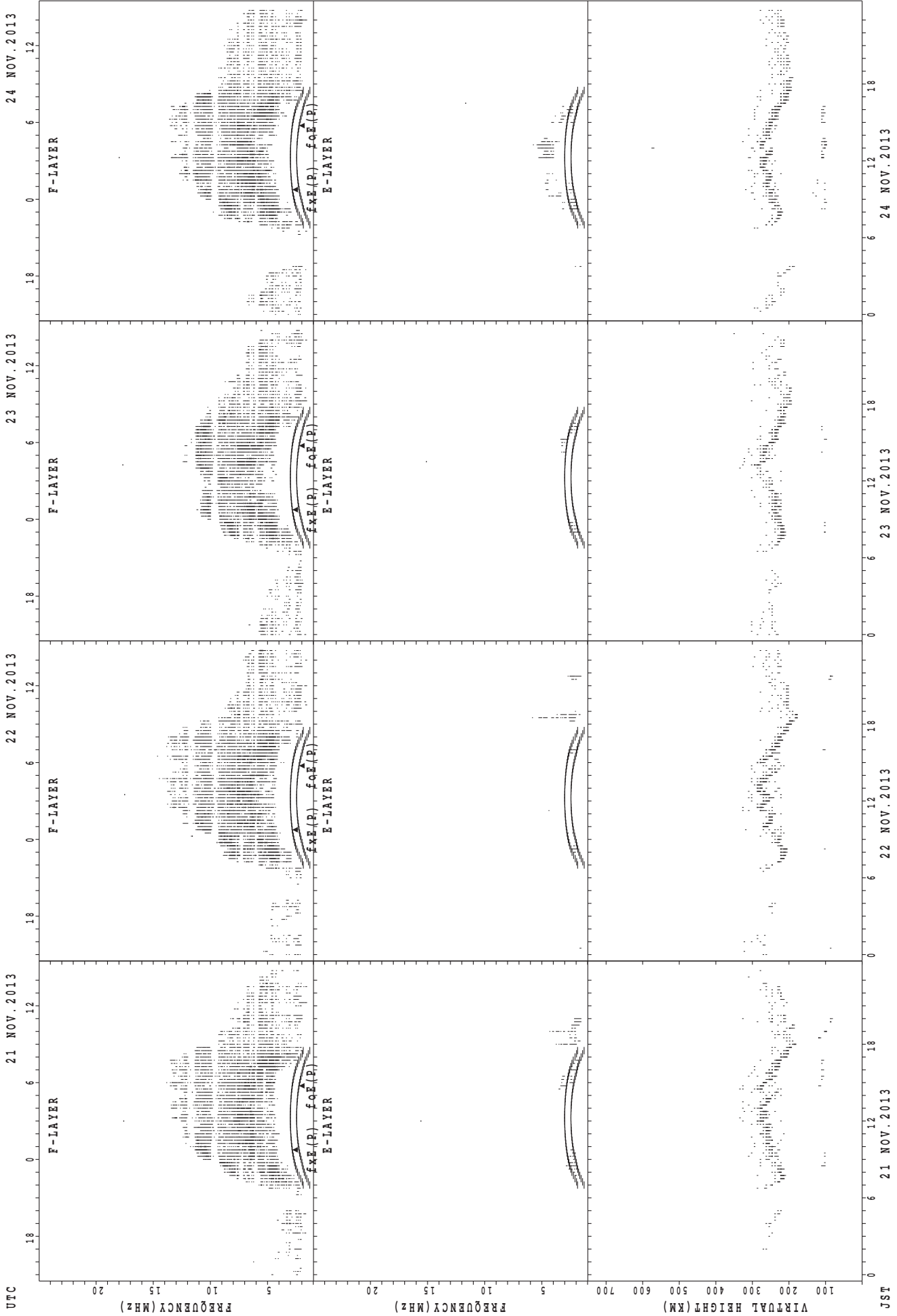
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Okinawa



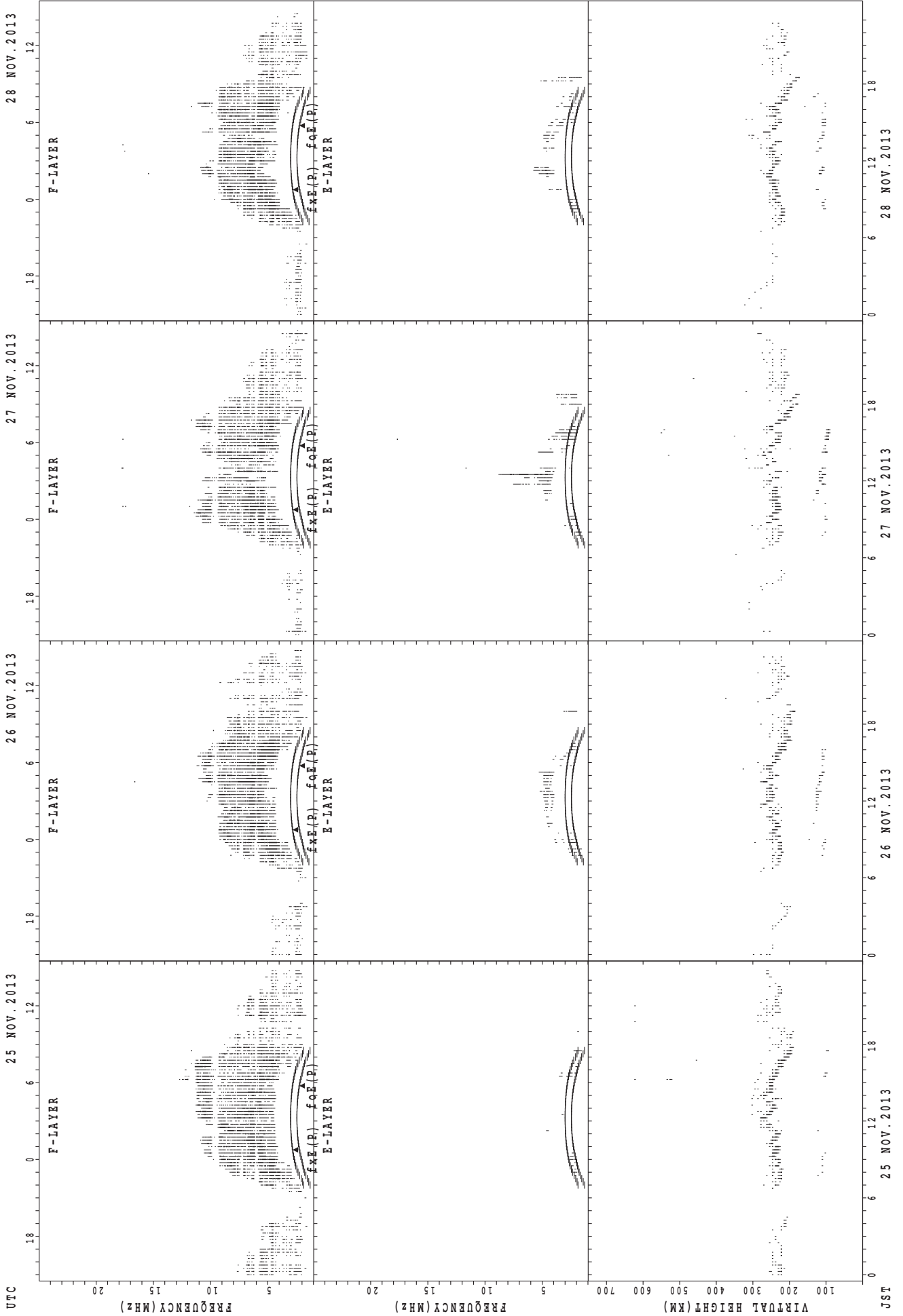
UTC  
17 NOV. 2013  
18 NOV. 2013  
19 NOV. 2013  
20 NOV. 2013  
JST  
f<sub>x</sub>E(P); PREDICTED VALUE FOR f<sub>x</sub>E  
f<sub>o</sub>E(P); PREDICTED VALUE FOR f<sub>o</sub>E

SUMMARY PLOTS AT Okinawa



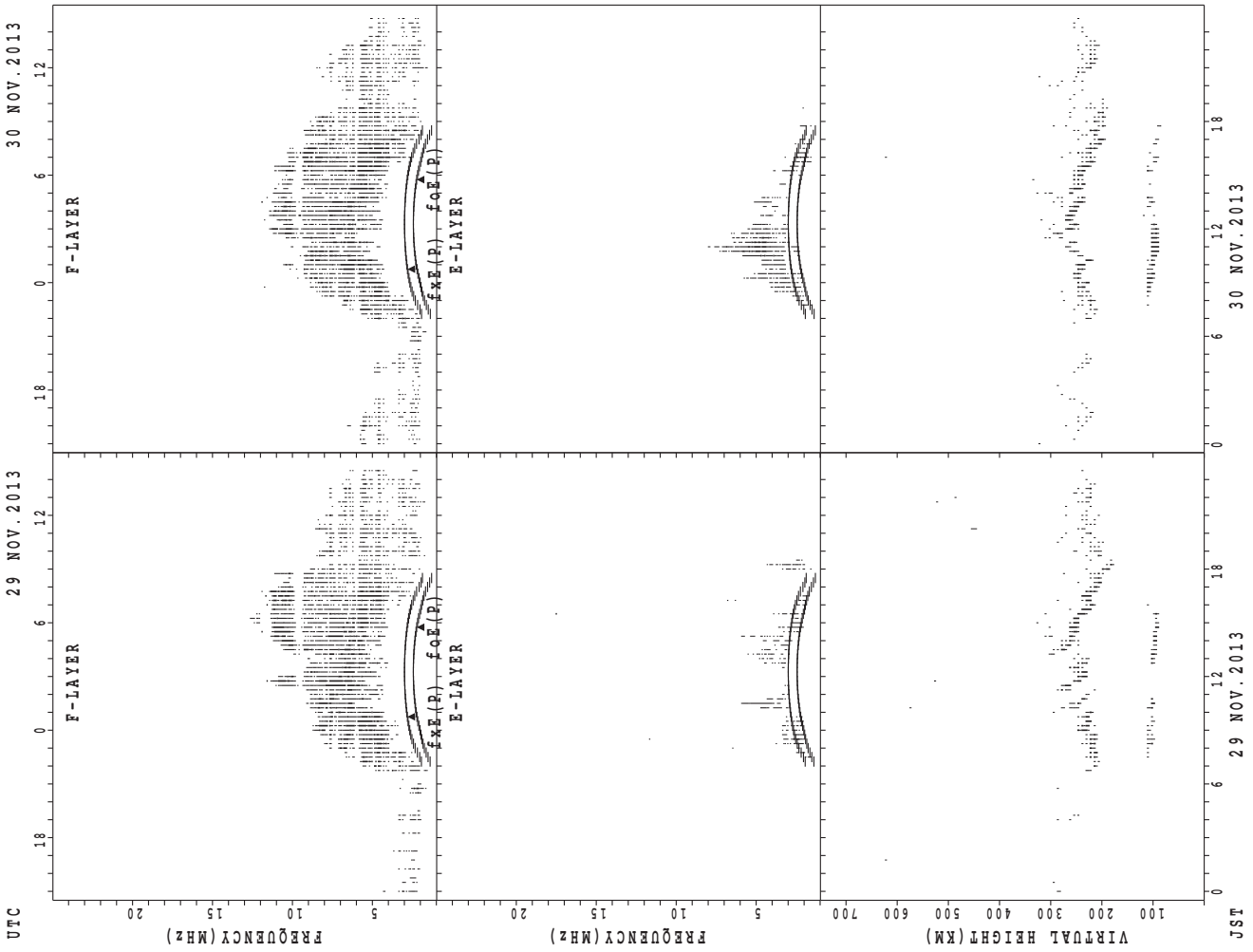
foF2(P); PREDICTED VALUE FOR foF2  
fxF2(P); PREDICTED VALUE FOR fxF2

SUMMARY PLOTS AT Okinawa



f\_xE(P); PREDICTED VALUE FOR f\_xE  
f\_oE(P); PREDICTED VALUE FOR f\_oE

SUMMARY PLOTS AT Okinawa



f<sub>x</sub>E(P); PREDICTED VALUE FOR f<sub>x</sub>E  
f<sub>o</sub>E(P); PREDICTED VALUE FOR f<sub>o</sub>E



MONTHLY MEDIANS OF h'F AND h'Es  
 NOV. 2013 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		1						19	26	25	24	19	21	27	26	25	19	8	3					1
MED		280						226	215	214	222	224	228	232	230	224	228	246	260					322
U Q		140						236	228	222	230	230	233	238	236	230	236	261	266					161
L Q		140						222	214	206	216	214	222	228	226	222	224	239	242					161

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	13	8	9	7	3	2	2	13	27	26	26	27	25	25	25	24	11	12	6	9	9	12	11	14
MED	95	90	91	91	89	90	94	143	109	107	107	101	107	101	103	108	91	91	104	101	97	99	97	101
U Q	97	95	97	101	97	91	95	155	131	113	113	113	110	108	113	125	95	99	105	106	101	105	101	105
L Q	91	89	89	89	89	89	93	119	103	103	101	95	101	99	98	94	89	89	97	100	95	96	95	97

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								24	27	28	11			13	28	28	26	9	1	1				
MED								231	224	230	230			244	241	231	230	236	276	256				
U Q								239	230	238	238			256	254	244	236	254	138	128				
L Q								224	216	222	230			236	232	223	222	226	138	128				

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	6	1		1				3	16	8	2	3	2	5	6	16	9	5	2	4	3	4	3	3
MED	96	95		99				137	107	105	105	105	110	105	101	105	107	109	104	99	99	99	97	95
U Q	99	47		49				155	112	108	105	113	123	117	105	109	112	117	105	104	107	103	103	99
L Q	91	47		49				115	105	105	105	105	97	94	99	97	100	97	103	98	97	96	97	93

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								9	28	28	17				15	30	30	26	6	2	1	1		
MED								246	231	234	230				248	244	230	230	223	264	264	240		
U Q								261	237	240	246				256	248	240	244	246	266	132	120		
L Q								227	219	230	228				240	236	224	222	222	262	132	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	4	2	2	1	1		1	3	27	26	24	23	18	23	27	29	26	12	12	8	8	3	1	1
MED	100	96	95	97	87		95	155	109	103	105	107	107	105	105	105	105	100	96	98	98	95	95	91
U Q	105	97	97	48	43		47	163	119	107	107	109	113	111	109	108	107	115	106	104	106	137	47	45
L Q	95	95	93	48	43		47	137	105	103	100	101	103	103	101	101	99	95	95	94	94	95	47	45

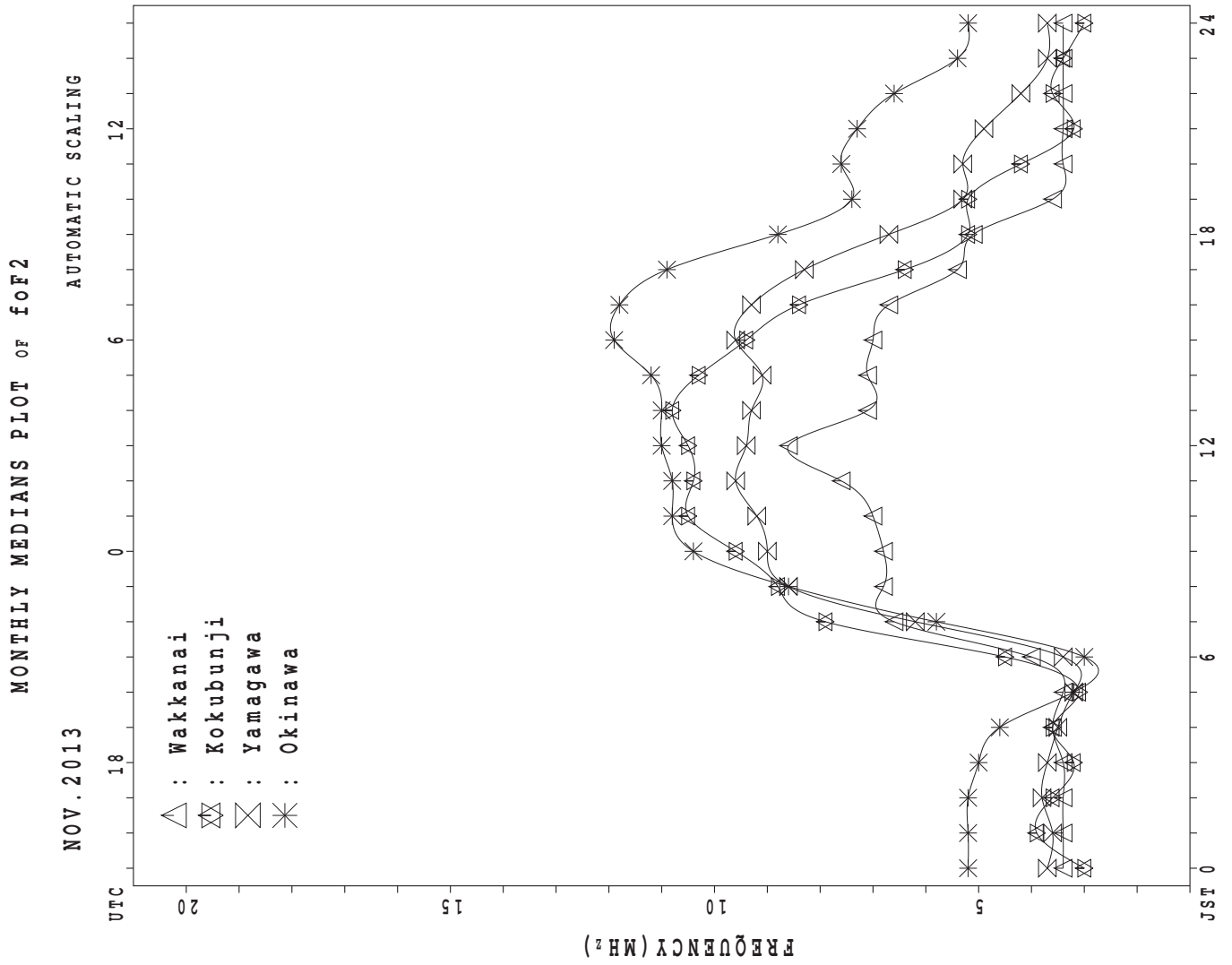
MONTHLY MEDIANS OF h'F AND h'Es  
 NOV. 2013 135E MEAN TIME (UTC+9H) AUTOMATIC SCALING

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								8	29	30	14					30	30	30	28	12	14	9	4	1
MED								254	234	240	237					253	236	222	225	249	258	266	264	270
U Q								262	245	248	246					258	244	232	234	261	272	269	273	135
L Q								241	223	238	232					242	228	216	216	231	248	237	257	135

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				1				1	11	6	2	4	3	5	6	8	19	8	4	1	3	1		
MED				87				93	113	109	105	113	119	111	112	107	109	112	142	105	97	95		
U Q				43				46	115	111	107	123	131	125	115	109	113	127	185	52	105	47		
L Q				43				46	107	107	103	101	97	105	109	102	105	100	101	52	89	47		



## IONOSPHERIC DATA STATION Wakkanai

NOV. 2013 f<sub>XI</sub> (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	X 47	X 47	X 47	X 47	X 48	X 47												X 82	X 69	X 57	X 49	X 51	X 51	X 52
2	X 51	X 51	X 51	X 51	X 52	X 47												X 77	X 73	X 57	X 47	X 49	X 52	X 51
3	X 52	X 53	X 53	X 54	X 54	X 55												X 74	X 69	X 60	X 51	X 50	X 49	X 52
4	X 53	X 53	X 55	X 55	X 57	X 45													X 67	X 62	X 44	X 42	X 47	X 47
5	X 49	X 49	X 47	X 47	X 51	X 49												X 81	X 77	X 73	X 72	X 69	X 69	X 68
6	X 74	X 77	X 75	X 73	X 73	X 62												X 69	X 56	X 51	X 47	X 43	X 53	X 58
7	X 59	X 57	X 57	X 58	X 58	X 56										C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	X 59	X 54	X 51	X 51	X 49
9	X 49	X 51	X 51	X 53	X 55	X 53				C	C			C				X 100	X 83	X 56	X 37	X 39	X 39	X 39
10	X 42	X 43	X 41	X 35	X 38	X 39	X 45											X 55	X 42	X 45	X 37	X 40	X 41	X 44
11	X 43	X 41	X 41	X 41	X 41	X 39												X 88	X 77	X 57	X 48	X 48	X 48	X 49
12	X 49	X 49	X 49	X 51	X 50	X 48												X 72	X 57	X 45	X 46	X 43	X 45	X 41
13	X 40	X 41	X 41	X 42	X 42	X 42	X 46											X 74	X 57	X 49	X 46	X 43	X 41	X 44
14	X 46	X 46	X 46	X 47	X 47	X 46												X 57	X 46	X 43	X 44	X 42	X 40	X 41
15	X 42	X 43	X 43	X 43	X 45	X 45	X 41											X 74	X 67	X 56	X 52	X 47	X 47	X 47
16	X 47	X 47	X 47	X 48	X 49	X 49	X 46											X 80	X 61	X 61	X 59	X 59	X 54	X 51
17	X 51	X 50	X 48	X 50	X 51	X 51												X 68	X 55	X 47	X 41	X 39	X 39	X 41
18	X 42	X 45	X 43	X 43	X 45	X 42	X 46											X 68	X 60	X 45	X 44	X 44	X 41	X 38
19	X 41	X 40	X 39	X 41	X 42	X 42	X 43											X 63	X 51	X 45	X 41	X 41	X 40	X 41
20	X 42	X 42	X 44	X 44	X 44	X 47	X 52											X 61	X 58	X 45	X 46	X 46	X 43	X 42
21	X 45	X 46	X 46	X 46	X 45	X 45	X 49											X 56	X 50	X 47	X 49	X 45	X 43	X 43
22	X 44	X 46	X 45	X 46	X 46	X 46	X 48											X 53	X 46	X 43	X 51	X 47	X 42	X 41
23	X 42	X 45	X 45	X 45	X 45	X 43	X 43											X 64	X 58	X 47	X 43	X 45	X 47	X 47
24	X 51	X 47	X 43	X 37	X 37	X 39	X 45											X 53	X 47	X 42	X 40	X 40	X 43	X 47
25	X 44	X 47	X 47	X 45	X 45	X 39	X 37											X 56	X 41	X 34	X 37	X 39	X 40	X 41
26	X 42	X 43	X 46	X 47	X 43	X 35												X 54	X 39	X 37	X 35	X 36	X 37	X 39
27	X 40	X 41	X 41	X 41	X 40	X 40												X 40	X 37	X 32	X 34	X 35	X 37	X 39
28	X 38	X 38	X 39	X 40	X 39	X 35	X 34											0 46	X 46	X 36	X 34	X 33	X 36	X 39
29	X 39	X 40	X 40	X 42	X 41	X 40	X 37											X 47	X 37	X 36	X 39	X 39	X 39	X 40
30	X 41	X 42	X 41	X 41	X 39	X 41	X 42											X 52	X 45	X 39	X 37	X 41	X 42	X 45
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	29	29	29	15											27	29	29	29	29	29	29
MED	X	X	X	X	X	X	X											X	X	X	X	X	X	X
U Q	50	50	48	50	51	48	46											74	67	56	49	48	48	49
L Q	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	42	42	41	42	42	40	41											54	46	42	38	40	40	41

NOV. 2013 f<sub>XI</sub> (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

NOV. 2013 f<sub>o</sub>F2 (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	40	40	40	40	40	40	46	68	92	U R	J R	J R	J R	J R	J R	J R	92	76	62	50	43	44	44	45							
2	44	44	44	44	45	40	50	75	U Y	97	Y	101	112	J R	92	99	U R	93	J R	90	70	66	50	40	42	45	45				
3	45	46	46	47	47	48	51	75	U R	85	95	103	Y	J R	102	102	102	96	R	83	68	62	53	44	43	42	45				
4	45	46	49	48	50	38	45	77	R J	Y U	78	107	J R	J R	93	76	79	J R	R	80	63	60	55	37	36	40	41				
5	42	42	40	41	44	42	46	76	U R	J R	91	97	102	104	100	Y	J R	94	92	U R	78	74	69	66	65	62	62	61			
6	68	F	64	68	66	66	55	48	R	79	103	104	J Y	96	Y	U R	107	Y	J R	J R	U R	81	62	49	44	40	37	46	51		
7	F	47	50	50	52	51	49	55	R U	Y	76	103	Y	J R	Y	R	J R	U R	C	C	C	C	C	C	C	C	C	C			
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
9	42	44	44	R	46	48	46	50	R	109	C	C	R	117	115	C	J R	96	91	91	93	76	49	30	33	32	33				
10	35	36	34	28	31	32	38	73	U R	97	105	118	R	J R	J R	108	100	R	R	100	100	80	48	35	38	U	A	30	33	34	37
11	36	34	34	34	34	32	38	76	Y	J R	R	J R	R	Y	Y	Y	R	J R	R	98	90	81	70	50	41	41	41	42			
12	42	42	42	44	43	41	50	76	U R	105	108	117	112	111	101	99	98	85	65	50	38	39	36	38	34	34	34	34			
13	33	34	34	35	36	36	39	80	R	100	103	95	103	93	94	J R	J R	69	68	51	42	39	36	34	38	34	38	38	38		
14	39	39	39	40	40	39	43	76	J R	U R	R	J R	J R	110	98	R	R	83	U R	83	50	39	36	37	35	33	34	34	34		
15	35	36	36	36	38	38	34	70	U R	94	101	116	102	104	100	90	92	74	67	60	49	45	40	40	40	41	41	41	41		
16	41	40	40	41	42	42	39	69	J R	93	102	129	110	109	116	114	106	92	73	54	R	54	52	52	48	44	44	44	44		
17	44	44	42	44	44	44	50	78	U R	102	J R	108	123	113	116	111	U R	106	86	62	48	40	34	32	32	34	34	34	34		
18	35	38	36	36	38	35	39	70	J R	J R	U R	97	102	98	97	100	89	72	61	53	38	37	37	34	31	31	31	31	31		
19	34	33	32	34	35	36	36	70	R	93	90	94	109	104	Y	J R	88	74	69	56	44	38	34	34	33	34	34	34	34		
20	35	35	37	37	37	40	45	81	J R	U R	88	104	101	104	102	108	98	90	R	77	54	51	38	39	39	36	35	35	35		
21	38	39	39	39	38	37	42	71	U R	U R	92	98	99	103	102	90	U R	R	82	72	49	44	40	42	38	36	36	36	36		
22	38	39	39	39	39	39	40	67	Y	U R	75	85	95	86	79	90	79	68	46	39	36	44	40	35	34	34	34	34	34		
23	35	38	38	38	38	36	36	63	U R	J R	R	J R	J R	Y	J R	82	77	84	71	57	51	40	36	38	40	40	40	40	40		
24	45	40	36	30	30	32	38	76	U Y	J R	81	94	84	95	92	87	87	76	66	46	40	35	33	33	36	37	37	37	37		
25	37	40	40	38	38	32	30	58	J R	80	92	86	90	79	84	72	V	62	50	34	27	30	33	33	34	34	34	34	34		
26	35	36	38	40	36	28	25	53	U R	69	72	74	74	J R	U R	84	81	74	69	60	47	32	30	28	29	30	32	32	32		
27	33	34	34	34	33	33	29	52	65	71	70	77	76	76	78	66	V	H	64	33	30	25	28	28	30	32	32	32	32		
28	32	32	32	33	32	28	27	56	U R	U Y	75	75	78	86	73	71	68	V	J R	39	39	28	27	26	29	32	32	32	32		
29	32	33	33	35	34	33	30	52	U R	82	74	79	76	83	68	71	V	58	41	30	29	32	32	32	33	33	33	33	33		
30	34	35	34	34	32	34	36	50	U R	R	77	79	87	81	80	76	70	74	61	45	38	32	30	34	35	38	38	38	38		
31																															
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23							
CNT	29	29	29	29	29	29	29	28	28	25	28	26	28	24	28	28	28	28	28	29	29	29	29	29	29	29	29	29	29		
MED	38	39	39	39	38	38	39	72	92	R	100	104	102	93	92	90	76	59	50	40	37	36	36	37	37	37	37	37	37		
U Q	43	43	42	44	44	42	47	76	R	97	104	108	112	106	100	99	94	84	68	60	50	42	40	42	42	42	42	42	42		
L Q	35	35	34	34	34	33	36	65	U R	78	81	86	95	91	80	82	75	67	48	39	36	31	33	33	34	34	34	34	34		

NOV. 2013 f<sub>o</sub>F2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

NOV. 2013 foF1 (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									L	L	L	L			L									
2									U L 332	L		L	L	L										
3										L		L		L										
4										L	L	L												
5										L	L	L	L											
6													L											
7											L	L	L	L		C	C							
8							C	C	C	C	C	C	C	C	C	C	C							
9										C	C		L	C										
10											L		L	L										
11										L														
12													L											
13										L	L	L	L											
14											L	U L 436	L	L										
15										L	L													
16											L					248								
17											L													
18											L		L	L		256								
19											L	L				248								
20															L									
21											L	L	L											
22										324		L	352	L	300									
23											L	L	L	L										
24																								
25										L	L	L	U L 368											
26											L		L			U L 192								
27										320					L									
28									U L 296	356	L	L	L	L										
29										U L 368			L			252								
30												L		L										
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									2	3	1	1	2		1	4	1							
MED									314	324	U L 368	U L 436	U L 360		300	250	U L 192							
U Q										U L 356						254								
L Q										320						248								

NOV. 2013 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

NOV.2013 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			R	R	A	A		A	A	A									
							216	272	296	324			320													
2							B		A	A							A									
							208				320	328	316	300	284	256										
3							B						A	A	A		A									
							228	260	308	316	332					252										
4							B		A	A							A									
							212				316	332	312	308	288	260		200								
5							B							A	A	A	A									
							200	272	292	300	324	320														
6							B		A	A								B								
							208					320	332	316	288	244										
7							B										C									
							208	256	296	308	324	320	312	288				C								
8							C	C	C	C	C	C	C	C	C	C	C	C								
9							B			C	C	A			C											
								260			308	312			284	240	164									
10									A	A							A									
							216	256					324	308	280	224										
11							B				A							A								
							212	268	292			324	328	308	284	216										
12							B		R						R											
							216	244	292	320	320	324	316	280	236	188										
13								188	272	300	320	320	324	308	280	240										
14							B	H																		
							204	264	304	312	320	316	304	284	232	184										
15								184	264	292	308	332	320	304	280	228										
16											A						B									
							180	256	296			332	332	312	288	220										
17							B	A							A		B									
								240	296	324	336	332	328			232										
18								H																		
							212	268	288	316	328	316	300	272	208											
19								A	U	R			R	R												
							188		292	320	316		296	272	220											
20								180	248	284	312	328	308	300	264	228	172									
21																	B									
							176	248	288	312	304	312	296	276	220											
22								192	248	280	300	316	312	300	268	232	U	R								
																	144									
23								196	252	276	296	308	332	304	272	220	160									
24								200	256	296	300	308	320	296	284	236										
25																	A									
							188	260	284	300	304	300	292	256	208											
26							J	R	A								B									
							136		232	268	292	300	312	304	256	220										
27							J	R									A			J	K					
							136	184	208	260	284	296	296	304	256	188			164							
28								176	240	284	312	324		A	296	272	U	A								
																	212									
29								176	224	268	292		A	308	300	260	196									
30																A										
							172	240	264	300	316	292	292			200										
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT							2	26	25	24	24	26	25	26	24	26	6	1	1							
MED							J	R											J	K						
							136	198	256	292	312	320	316	304	280	226	168	200	164							
U Q								212	264	296	318	328	324	308	284	236	184									
L Q								184	242	282	300	308	312	300	270	216	160									

NOV.2013 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN





## IONOSPHERIC DATA STATION Wakkanai

NOV. 2013 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	17	16	20	E B E B E B E B	14 15 15 13	16 16 16	20 30 35	25 25	G	G	G	30 35	25 25	G	25 25	21 13	E B	18 18	18	17	E B E B E B E B	14 14 14		
2	E B E B E B E B	12 12 12	E B E B E B E B	12 12 14 14	12 14 14	21 24 27	25 25	G	G	G	25 25	24 22	G	20 20	18 18	18	E B E B E B E B	14 14 14	14 14	14 14	14 14	12 12		
3	E B E B E B E B	12 12 12	E B E B E B E B	14 14 14 14	14 14 14	28 27	34 25 34	33 32	G	G	G	25 34	33 32	20 20	20 22	14 14	E B E B E B E B	14 14 14	14 14	14 14	16 16	20		
4	18 29 18	E B E B E B E B	15 15 15 15	E B E B E B E B	15 15 15	16 23 33	33 26 25	G	G	G	26 25	23 19	G	19 19	18 18	18	E B	17 14	E B E B E B E B	14 14 14	14 14	14 14		
5	E B E B E B E B	14 15 15	E B E B E B E B	15 15 15 13	22 29 31	30 24 31	31 30	G	G	G	24 31	31 30	26 22	15 14	17 17	13 13	13 13	17 17	E B E B E B E B	14 14 14	14 14	14 14		
6	24 12 12	E B E B	24 21	E B E B	12 12	G	G	G	G	G	21 25 38	34 23	34 22	29 26	18 17	17	E B	12 17	17 17	E B E B E B E B	14 14 14	14 14		
7	18 18	E B E B E B E B	14 14 14 14	14 14 14	G	G	G	G	G	G	19 19 18	33 19	18 18	C	C	C	C	C	C	C	C	C	C	
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
9	E B E B E B E B	14 14 14	E B E B E B E B	14 14 14 14	E B E B E B E B	14 14 14	E B	C	C	G	240	33 20	G	G	G	G	E B E B E B E B	14 14 14	14 14	14 14	16 14	14 14		
10	E B E B E B E B	14 14 14	E B E B E B E B	14 14 14 14	E B E B E B E B	14 14 14	G	28 28	28 35	25 18	18 18	18 18	30 26	19 11	14 13	13 13	13 13	13 13	13 13	13 13	13 13	13 13		
11	E B E B E B E B	12 14 14	E B E B E B E B	13 13 14 14	12 18 33	32 28 18	18 18	30 26	19 11	14 13	13 13	13 13	13 13	13 13	13 13	13 13	13 13	13 13	13 13	13 13	13 13	13 13		
12	E B	14 16 16	E B E B E B E B	15 15 15 15	14 27 24	24 24	23 18	18	18	18	26 20	20 20	20 20	11 12	11 11	11 11	11 11	11 11	11 11	11 11	11 11	11 11		
13	E B E B E B E B	17 14 14	E B E B E B E B	11 11 11 11	15 17 18	17 17	17 17	17 17	17 17	17 17	28 20	20 20	20 20	11 12	11 11	11 11	11 11	11 11	11 11	11 11	11 11	11 11		
14	E B E B E B E B	14 14 13	E B E B E B E B	13 16 14 14	16 20 20	G	G	G	G	G	32 17	G	G	G	G	E B E B E B E B	12 12 12	12 12 12	12 12 12	12 12 12	12 12 12	12 12 12		
15	E B E B E B E B	14 14 14	E B E B E B E B	14 14 14 15	20 18 30	31 17 17	17 28	G	G	G	17 17	28	G	17 17	14 14	14 14	14 14	14 14	14 14	14 14	14 14	14 14		
16	E B E B E B E B	12 14 13	E B E B E B E B	15 14 14 14	20 22 30	30 30	G	G	G	G	23 18	14 14	15 15	15 15	15 15	15 15	15 15	15 15	15 15	15 15	15 15	15 15		
17	E B E B E B E B	14 14 14	E B E B E B E B	14 14 14 14	19 18 18	18 18	18 18	26 20	15 15	12 17	12 12	16 18	18	18	18	26 20	E B E B E B E B	15 15 12	17 12 12	16 18	18			
18	22 12 12	E B E B E B	12 12 16	E B E B	12 12	G	G	G	G	G	31 22	21 33	32 30	23 14	14 14	13 13	13 13	13 13	13 13	13 13	13 13	13 13		
19	E B E B E B E B	15 14 14	E B E B E B E B	14 16 16 13	G	18 20	34 34	G	G	G	28 24	22 22	16 14	14 14	14 14	14 14	14 14	14 14	14 14	14 14	14 14	14 14		
20	E B E B E B E B	14 14 14	E B E B E B E B	14 14 14 14	G	G	G	G	G	G	16 18	32 23	21 19	26 17	16 14	14 14	14 14	14 14	14 14	14 14	14 14	14 14		
21	E B E B E B E B	14 14 14	E B E B E B E B	14 14 14 14	G	G	G	G	G	G	16 16	31 28	G	G	G	G	E B E B E B E B	16 15 14	12 11	11 11	11 11	11 11		
22	E B E B E B E B	14 14 14	E B E B E B E B	14 12 12 12	G	G	G	G	G	G	17 32	32 32	20 18	G	G	G	E B E B E B E B	12 12 12	12 12 12	12 12 12	12 12 12	12 12 12		
23	E B E B E B E B	14 15 15	E B E B E B E B	15 15 15 15	18 26 28	30 32	29 31	29 26	G	G	31 29	26	G	G	G	G	E B E B E B E B	14 13 12	12 12 12	12 12 12	12 12 12	12 12 12		
24	E B E B E B E B	12 12 12	E B E B E B E B	12 12 12 12	G	G	G	G	G	G	12 33	32 20	19 21	19 16	11 12	11 11	11 11	11 11	11 11	11 11	11 11	11 11		
25	E B E B E B E B	13 13 13	E B E B E B E B	13 13 13 12	G	G	G	G	G	G	28 31	30 32	20 19	24 18	14 14	14 14	14 14	14 14	14 14	14 14	14 14	14 14		
26	E B E B E B E B	15 15 15	E B E B E B E B	14 14 14	G	22 23	27 28	30 30	30 30	27 24	E B E B E B E B	13 13	13 13	13 13	15 15	15 15	15 15	15 15	15 15	15 15	15 15	15 15		
27	E B E B E B E B	15 15 15	E B E B E B E B	15 15 15	G	25 30	33 32	33 30	30 30	19 16	12 16	12 12	12 12	12 12	12 12	12 12	12 12	12 12	12 12	12 12	12 12	12 12		
28	E B E B E B E B	15 15 15	E B E B E B E B	15 15 15	G	25 27	33 32	G	G	G	26 31	33 32	22 26	24 13	13 13	13 13	13 13	13 13	13 13	13 13	13 13	13 13		
29	E B E B E B E B	13 13 14	E B E B E B E B	14 14 14 14	G	28 36	31 28	30 23	G	G	21 17	17 14	14 14	14 14	14 14	14 14	14 14	14 14	14 14	14 14	14 14	14 14		
30	E B E B E B E B	12 12 12	E B E B E B E B	12 15 14	18 18	16 16	30 31	21 25	22 17	15 16	16 22	14 14	14 14	14 14	14 14	14 14	14 14	14 14	14 14	14 14	14 14	14 14		
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	29	29	29	29	28	29	28	28	29	29	28	29	28	28	28	29	29	29	29	29	29
MED	E B E B E B E B	14 14 14	E B E B E B E B	14 14 14 14	E B E B E B E B	14 14 14	G	G	G	G	30 30	30 22	G	G	G	G	E B E B E B E B	15 14 14	14 14	14 14	14 14	14 14	14 14	
U Q	15 15 15	E B E B E B E B	15 15 15 14	G	26 30	32 32	G	G	G	G	29 24	18 17	14 15	15 14	14 14	14 14	14 14	14 14	14 14	14 14	14 14	14 14	14 14	
L Q	E B E B E B E B	13 13 13	E B E B E B E B	13 14 14 12	18 18	18 23	24 22	19 23	20 20	14 13	12 12	12 12	12 12	12 12	12 12	12 12	12 12	12 12	12 12	12 12	12 12	12 12	12 12	

NOV. 2013 fbEs (0.1MHz)

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## IONOSPHERIC DATA STATION Wakkanai

NOV. 2013 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

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	14	14	14	15	15	13	14	14	14	14	17	12	12	12	12	12	13	13	13	15	14	14	14
2	12	12	12	12	12	14	14	14	14	14	14	14	14	14	16	16	15	14	14	14	14	14	12	12
3	12	12	12	14	14	14	14	16	11	11	11	14	14	14	14	14	14	14	14	14	14	14	14	14
4	15	15	15	15	15	15	15	15	15	15	14	14	14	14	14	14	14	14	14	14	14	14	14	14
5	14	15	15	15	15	15	13	13	13	13	13	15	15	15	15	16	16	15	14	14	14	13	12	12
6	12	12	12	12	12	12	12	13	11	12	12	12	12	12	12	12	12	12	12	14	14	14	14	14
7	14	14	14	14	14	14	14	14	14	18	16	16	16	16	14		C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C						
9	14	14	14	14	14	14	14		240	C	C			C					14	14	14	14	14	14
10	14	14	14	14	14	14	14	14	13	13	13	13	13	13	13	13	13	13	13	14	11	11	11	11
11	12	14	14	13	13	14	14	14	14	14	14	14	14	14	15	15	11	11	14	13	13	13	13	14
12	14	14	14	15	15	15	15	15	14	14	14	14	14	14	14	14	15	15	15	15	15	15	15	15
13	17	14	14	11	11	11	11	14	14	15	15	15	11	11	11	11	11	11	11	12	11	11	11	11
14	14	14	13	13	16	14	14	14	14	14	13	12	15	13	12	12	12	12	12	12	12	12	12	12
15	14	14	14	14	14	14	15	15	15	15	13	12	12	12	12	12	12	12	14	14	14	14	14	14
16	12	14	13	15	14	14	14	14	16	16	19	20	20	20	19	16	18	14	14	15	15	15	15	15
17	14	14	14	14	14	14	14	14	14	14	14	16	15	15	15	15	15	12	12	12	12	12	12	12
18	13	12	12	12	12	12	12	12	12	12	12	14	14	14	14	14	14	14	14	13	13	13	13	13
19	15	14	14	14	16	16	13	13	15	18	18	18	18	18	20	16	16	16	16	14	14	14	14	14
20	14	14	14	14	14	14	14	14	14	14	14	14	12	12	13	16	16	16	14	14	14	14	14	14
21	14	14	14	14	14	14	14	15	15	15	16	15	15	15	16	16	16	15	14	12	11	11	11	11
22	14	14	14	14	12	12	12	11	11	11	11	10	10	9	8	8	13	12	12	12	12	12	12	12
23	14	15	15	15	15	15	15	15	14	12	11	12	14	15	15	15	15	14	13	12	12	12	12	12
24	12	12	12	12	12	12	12	12	13	14	13	12	12	14	13	13	11	11	12	11	11	11	11	11
25	13	13	13	13	13	13	12	12	14	13	13	11	11	11	11	11	11	14	14	14	14	14	14	14
26	15	15	15	14	14	14	14	13	13	10	10	10	10	10	13	13	13	13	13	13	15	15	15	15
27	15	15	15	15	15	15	15	15	15	13	12	12	12	13	12	12	12	12	12	12	12	12	12	12
28	15	15	15	15	15	15	15	15	15	12	16	16	13	12	12	12	11	13	13	13	13	13	13	13
29	13	13	14	14	14	14	14	13	13	13	12	15	15	15	15	15	14	14	14	14	14	14	14	14
30	12	12	12	12	12	15	14	12	13	13	13	13	11	11	11	13	12	15	16	16	15	14	14	14
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	29	29	29	29	28	29	28	28	29	29	28	29	28	28	28	29	29	29	29	29	29
MED	14	14	14	14	14	14	14	14	14	14	13	14	14	14	14	14	14	14	14	14	14	14	14	14
U Q	14	14	14	14	15	15	14	15	15	14	14	15	15	15	15	15	15	14	14	14	14	14	14	14
L Q	12	13	13	13	12	14	13	13	13	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12

NOV. 2013 fmin (0.1MHz)

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## IONOSPHERIC DATA STATION Wakkanai

NOV. 2013 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

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	288	286	285	286	292	315	327	348	344	U R	J R	R	R	R	U R	R	R	334	339	335	329	287	288	286	281		
2	307	295	292	292	320	325	319	364	353	U Y	R	R	R	347	354	335	R	337	329	329	316	302	300	300			
3	301	305	303	293	298	334	336	384	379	U R	U R	R	R	Y	U R	U R	R	R	330	319	328	297	302	309	Z		
4	272	302	305	308	325	340	332	357	R	U R	U R	R	R	R	358	348	R	342	322	329	360	358	298	289	V		
5	274	304	290	287	300	309	317	383	U R	R	U R	R	R	Y	R	U R	U R	349	362	331	338	321	323	321	319	292	
6	284	313	F	309	317	316	304	318	360	R	359	330	Y	U R	Y	R	R	361	323	346	320	313	313	308	294	R	
7	268	F	299	296	284	287	293	330	369	U R	Y	Y	Y	Y	R	U R	R	C	C	C	C	C	C	C	C	C	
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
9	292	286	292	281	R	298	306	316	356	R	C	C	R	C	R	R	322	351	330	362	289	251	260	258	A		
10	279	276	288	314	282	270	285	356	357	U R	342	341	323	R	326	350	352	342	340	352	326	291	284	276	R		
11	295	303	271	271	281	298	300	350	Y	R	R	R	R	Y	Y	R	R	314	334	311	324	299	289	282	R		
12	282	282	274	284	289	295	337	359	363	U R	355	330	326	R	J R	R	346	335	339	330	316	330	314	313	R		
13	285	282	275	287	280	310	320	365	379	U R	372	358	368	R	321	R	341	342	320	327	336	308	273	264	R		
14	288	283	294	298	298	295	328	364	R	R	R	R	R	338	346	334	334	351	328	315	316	318	320	277	277	R	
15	288	280	285	300	293	329	327	365	359	U R	380	341	337	347	332	327	353	349	304	322	322	332	305	291	294	R	
16	294	297	280	274	272	292	346	369	R	334	339	343	323	R	R	R	330	326	327	323	308	302	317	304	286	R	
17	307	285	287	277	294	321	315	354	U R	367	R	329	344	R	323	328	344	339	318	320	335	318	303	291	271	R	
18	282	276	272	283	294	321	314	348	R	U R	358	350	333	319	338	332	332	330	316	301	304	307	329	271	R		
19	288	294	297	290	294	330	331	360	R	361	366	358	R	326	Y	R	343	325	337	343	319	327	336	319	282	R	
20	269	280	292	293	293	294	326	R	349	U R	360	347	338	R	342	332	320	336	328	344	339	303	296	311	295	293	R
21	291	288	288	291	301	303	330	344	U R	382	371	340	348	339	328	U R	338	349	337	317	306	337	321	335	297	297	R
22	282	278	292	292	292	313	339	388	Y	U R	342	R	R	Y	345	346	363	367	358	313	318	301	326	314	302	R	
23	296	282	294	295	299	291	317	369	U R	360	R	R	R	Y	R	365	332	344	338	337	331	304	285	273	270	F	
24	295	327	328	301	294	279	308	345	359	U Y	362	349	R	354	R	331	343	376	365	335	330	310	299	282	280	R	
25	296	307	302	318	321	352	347	357	335	R	354	R	354	333	364	353	351	323	354	309	284	292	293	305	R		
26	296	294	302	308	346	336	318	335	374	U R	361	364	367	R	358	366	365	341	360	307	350	330	303	294	294	R	
27	296	296	305	305	308	346	340	353	357	U R	362	332	364	337	358	371	371	363	327	321	362	321	283	273	290	R	
28	281	287	300	313	324	333	324	355	343	U R	365	387	369	R	341	366	347	366	312	R	366	315	309	295	269	V	
29	289	287	287	311	316	321	314	359	371	U R	363	355	342	356	R	348	341	361	356	367	320	297	293	285	284	R	
30	299	294	300	300	298	307	306	335	376	U R	389	358	303	370	R	357	339	352	332	352	311	309	A	307	297	309	R
31																											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	29	29	29	29	29	29	29	27	23	19	23	16	18	18	23	22	26	28	28	29	27	29	29	29			
MED	288	288	292	293	298	309	320	357	360	U R	362	348	344	340	336	339	345	342	333	329	326	315	303	294	286		
U Q	296	300	301	306	312	330	330	365	374	U R	372	358	357	353	347	355	352	361	343	338	333	323	315	306	294		
L Q	282	282	286	285	292	294	314	348	356	355	339	332	333	328	333	335	334	323	320	317	301	295	284	276			

NOV. 2013 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

NOV. 2013 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									L	L	L	L			L										
2									U L 409	L		L	L	L											
3										L		L		L											
4										L	L	L													
5										L	L	L	L												
6													L												
7											L	L	L	L		C	C								
8							C	C	C	C	C	C	C	C	C	C	C								
9									C	C			L	C											
10											L		L	L											
11										L															
12													L												
13										L	L	L	L												
14											L	U L 403	L												
15										L	L														
16											L					466									
17											L														
18											L		L	L		466									
19											L	L				508									
20															L										
21											L	L	L												
22										431		L	417	422											
23											L	L	L	L											
24																									
25										L	L	L	U L 413												
26											L		L			U L 461									
27														L											
28									411 U L 419 405	L	L	L	L												
29									U L 410			L				421									
30											L		L												
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT									2	3	1	1	2		1	4	1								
MED									414	411	410	403	415		422	466	461								
U Q									431							487									
L Q									U L 405							444									

NOV. 2013 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

NOV. 2013 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									234	234	234	230			L 260										
2									218	216		224	224	226											
3										226		226		230											
4										222	222	222													
5										222	222	222	222												
6													238												
7											220	220	250	254			C	C							
8							C	C	C	C	C	C	C	C	C	C	C	C							
9										C	C				C										
10											250		234	242											
11										232															
12												224													
13										214	214	214	214												
14										220	226	228													
15										230	230														
16											230						224								
17											254														
18											224		224	280			216								
19											244	244					218								
20																218									
21											218	218	222												
22											210		210	210		224									
23											218	222	216	216											
24																									
25										220	236	234	234												
26											236		238				212								
27											212			228											
28										222	222	222	226	230	224										
29											222		222			222									
30												232		232											
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT										3	12	18	16	16	9	3	4	1							
MED										222	222	223	224	226	230	224	220	212							
U Q										234	228	236	228	236	248	L 260	223								
L Q										218	215	220	221	222	225	218	217								

NOV. 2013 h'F2 (KM)

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## IONOSPHERIC DATA STATION Wakkanai

NOV. 2013 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		302	302	316	308	272	248	242	224	224	222	198 <sup>H</sup>	198	212	212	218	218	218	216	216	216	250	280	296	296
2		258	258	258	258	258	232	232	230	208	208	214	214	214	214	224	224	224	218	218	216	216	250	252	262
3		266	266	266	266	266	228	226	220	212	200	216	216	224	224	224	224	212	212	216	216	216	222	262	344
4		304	332 <sup>A</sup>	250	250	238	210	212	210	210	210	210	210	210	210	224	224	224	224	224	224	224	254	266	284
5		290	284	290	306	296	244	240	212	214	214	214	214	214	214	214	214	214	214	214	230	234	234	246	258
6		274	242 <sup>O</sup>	242	260	238	228	216	212	222	214	214	214	176 <sup>H</sup>	218	178 <sup>H</sup>	206	206	206	206	234	234	252	254	254
7		310	296	276	276	276	258	252	214	214	214	214	214	196 <sup>H</sup>	216	224									
8		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9		276	276	276	276	270	258	256		200 <sup>H</sup>															
10		332	320	256	256	280	280	280	224	224	224	224	236	216	216	216	216	216	216	216	236		282	300	300
11		264	280	296	304	304	226	226	226	220	200	206	208	214	214	220	222	222	218	218	230	230	252	266	266
12		278	294	310	298	272	272	236	228	228	214	214	214	214	214	214	214	208	208	208	208	242	242	242	242
13		294	294	320	320	286	284	252	214	214	214	214	192	192	208	210	210	210	210	222	222	240	332	322	
14		292	294	292	262	286	254	230	214	214	202	202	208	216	216	216	216	216	214	216	228	228	242	258	270
15		290	292	292	292	290	238	226	226	226	218 <sup>H</sup>	218	218	218	218	218	218	208	224	224	224	224	246	280	276
16		276	276	310	310	310	236	214	212	212	222	220	220	224	224	224	190	216	212	212	244	244	244	244	252
17		284	284	300	298	292	262	238	218	216	216	216	216	216	224	224	224	220	220	220	234	234	268	268	334
18		344	302	302	302	294	212	232	216	216	216	216	216	216	216	228 <sup>H</sup>	188	194	212	212	234	246	246	246	300
19		292	292	292	292	292	254	236	220	220	220	220	220	220	220	220	166	196	216	216	232	232	236	238	302
20		302	302	288	288	288	256	246	216	216	216	216	216	216	216	188 <sup>H</sup>	216	216	216	216	240	248	248	272	292
21		292	282	276	276	276	274	244	212	210	210	210	210	210	210	216	216	216	208	208	208	232	232	258	268
22		296	296	296	296	294	278	240	230	208	204	204	204	204	204	204	204	204	204	234	250	250	240	242	252
23		286	290	290	282	280	244	234	226	226	222	216	220	220	218	218	218	202	226	226	226	262	300	300	300
24		286	258	244	270	270	270	270	230	210	210	210	212	212	212	212	212	202	202	210	220	248	266	276	292
25		268 <sup>O</sup>	266	264	256	256	212	216	216	216	198 <sup>H</sup>	198 <sup>H</sup>	202	202	212	212	212	212	212	212	234	260	278	278	290
26		272	284	282	260	224	224	242	232	206	206	206	214	214	220	220	220	174	214	214	224	232	258	294	294
27		292	276	276	276	266	204	246	218	214	214	214	222	222	222	216	216	202	188	270	210	222	294	312	310
28		286	286	286	278	242	240	238	222	218	218	218	188 <sup>H</sup>	222	218	214	212	206	324 <sup>E A</sup>	244	232	254	270	296	304 <sup>O</sup>
29		320 <sup>O</sup>	314	314	276	268	234	260	206	206	208	180	198	208	208	208	204	200	210	206	234	258	272	288	288
30		280	278	278	278	278	278	266	230	204	202	208	206	206	206	206	206	204	204	226	242		270	276	262
31																									
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT		29	29	29	29	29	29	29	28	29	28	28	29	29	28	29	28	28	28	29	29	27	29	29	29
MED		290	286	288	278	276	244	238	219	214	214	214	214	214	216	216	216	211	214	216	228	234	252	268	290
U Q		299	296	298	298	291	266	249	226	220	217	216	216	217	218	222	219	216	218	224	234	248	271	295	301
L Q		276	276	271	264	266	228	228	214	210	207	207	204	207	212	212	208	203	209	212	221	228	241	249	262

NOV. 2013 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

NOV. 2013 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	136	132	128	130			124										
2							B	118	A	A	118	118	114	114	114	114								
3							B	114	114	124	124	122		A	A	130								
4							B	E	A	A		124	124	124	122	122	A	122						
5							B	170						A			A							
6							B	122	122	122	122	122	120					B						
7							B	120	A	A	A	120	110	110	110	110		C	C					
8							B	116	116	116	112	112	112	106	106		C	C	C					
9							C	C	C	C	C	C	C	C	C	C								
10							B			C	C			C			E	B						
11								150			A	136	120		118	118	166	A						
12								E	A	A	A	A												
13								142	140				132	116	116	116								
14							B	A	A		A						A							
15								144	144	130		130	120	120	120	120		E	B					
16							B	142	126	126	126	114	114	112	112	126	174							
17								132	126	126	122	118	118	118	118	152		E	A					
18							B	148	126	128	116	110	110	110	110	110	150							
19								134	124	124	122	110	110	110	110	110		B						
20								110	118	118	A	118	118	118	118	118		B						
21							B	A		130	130	130	120	120	120	130		B						
22								136	126	126	124	116	116	112	112	112		B						
23								142	A	118	118	118	118	118	118	120		A						
24								132	132	120	120	118	114	114	114	114	186		H					
25								150	126	122	122	122	116	116	118	118		B						
26								158	132	106	114	114	114	114	114	128	136							
27								144	136	128	122	120	120	120	120	120	158		E	B				
28								128	128	128	128	128	118	118	118	118		A						
29								132	118	118	118	116	114	112	112	112								
30							B	A		114	114	120	122	124	124	124		B						
31							B	142	126	120	114	114	112	112	112	112		A		B				
								140	140	126	126	124	A	114	114	114								
								134	122	122	118	A	114	114	114	114		B						
								138	144	122	122	122	120	120	A	120		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								26	25	24	24	26	26	26	24	26	6	1						
MED								136	126	123	122	119	117	115	114	118	152	122						
U Q								142	134	127	124	122	120	120	118	122	174							
L Q								128	122	119	118	116	114	112	112	114	150							

NOV. 2013 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

NOV. 2013 h'Es (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	100	100	98	98	B	B	B	104	104	104	102	102	110	102	102	102	98	B	98	98	98	102	102	102	
2	100	100	100	100	B	B	B	166	116	114	114	114	106	106	106	106	106	102	102	B	B	B	B	B	
3	B	B	B	B	B	B	B	G	134	110	184	110	110	110	110	110	110	110	B	B	106	106	106	106	
4	94	94	94	94	B	B	B	94	108	108	108	182	106	106	106	106	100	100	100	100	B	100	100	102	
5	102	102	102	B	B	B	B	160	160	126	126	100	188	98	98	98	98	122	118	118	110	110	108	108	
6	108	B	106	98	98	B	158	158	112	102	102	102	168	104	148	144	144	112	B	112	108	108	108	108	
7	102	102	98	B	98	B	B	G	98	98	94	94	188	100	100	C	C	C	C	C	C	C	C	C	
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
9	122	116	108	100	100	100	100	174	C	C	174	104	C	104	102	G	B	114	114	114	114	128	152		
10	110	106	106	B	102	102	102	G	136	118	118	96	96	96	96	96	96	96	102	102	102	102	102	102	
11	108	108	108	B	108	B	108	108	108	180	100	100	100	100	202	138	134	126	118	118	118	104	118	116	
12	110	106	106	B	106	B	106	106	106	106	106	106	106	G	G	106	G	B	B	B	106	106	106	106	
13	92	94	94	94	B	120	96	104	104	104	104	104	96	96	172	92	92	92	92	140	140	114	B	B	
14	92	94	B	96	B	B	B	104	102	102	G	G	212	96	G	G	G	B	B	B	B	B	B	96	
15	B	104	104	102	122	B	92	166	120	186	196	G	106	106	136	G	98	98	B	B	B	B	B	B	
16	B	B	98	B	B	B	B	166	216	170	102	G	102	G	G	156	B	B	B	B	B	96	96	96	
17	96	96	B	B	B	B	B	104	104	104	104	104	100	100	102	102	B	B	B	106	106	142	120	108	
18	96	102	B	102	100	100	100	G	G	132	108	108	198	198	174	162	102	102	102	B	100	96	B	96	
19	B	100	B	100	100	B	B	120	120	120	194	178	G	G	162	146	98	98	B	B	B	B	98	110	
20	110	104	B	B	B	B	B	G	104	104	206	100	100	100	164	G	92	92	92	B	B	B	B	B	
21	B	B	B	92	92	B	B	G	G	98	98	200	G	G	202	G	B	B	B	B	B	B	B	106	
22	104	B	B	B	B	B	B	G	G	104	174	170	184	110	G	110	G	B	B	B	B	B	B	B	
23	B	B	B	B	B	B	B	126	136	152	146	146	112	178	150	132	G	B	B	B	B	B	100	100	
24	96	96	B	B	B	B	B	G	G	110	168	142	110	102	96	96	96	96	94	94	112	112	B	110	
25	B	B	B	B	B	B	B	G	G	158	168	168	168	98	98	124	126	B	B	B	116	116	116	B	
26	B	B	B	B	B	B	B	G	146	160	158	158	158	158	148	148	B	B	B	146	146	132	128	128	
27	126	118	B	108	108	B	G	96	132	148	148	138	136	136	128	128	122	B	B	B	134	120	B	B	
28	B	B	B	B	B	B	B	G	174	144	162	170	104	144	134	128	124	112	110	134	108	108	B	104	
29	98	120	B	B	118	114	B	G	124	124	124	98	144	112	G	176	94	90	B	B	B	B	B	B	
30	B	92	92	92	92	B	B	176	120	112	112	110	202	108	98	146	104	96	96	96	96	96	118	B	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	19	20	14	13	13	6	8	17	24	28	27	26	27	24	24	24	19	18	16	15	18	19	16	20	
MED	102	102	101	98	100	101	100	120	120	113	124	109	110	105	119	117	100	101	102	112	110	108	107	106	
U Q	110	106	106	101	108	114	105	163	136	146	168	158	168	111	156	145	122	110	112	118	118	114	114	110	
L Q	96	96	98	94	98	100	95	104	105	104	104	102	104	100	101	102	96	96	97	100	106	102	101	102	

NOV. 2013 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Wakkanai

NOV. 2013 TYPES OF Es 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	F	F	FQ	F					L	L	L	L	L	CL	L	L	L	LQ		F	F	F	F	F	F
2	F	F	F	F					H	L	L	L	L	L	L	L	L	L	L	F	F				
3										CL	L	HL	L	L	L	L	L	L	F	F		F	F	F	F
4	F	F	FQ	F				L	L	L	L	HL	L	L	L	L	L	L	L	F	F		F	F	F
5	F	F	F					H	H	CL	CL	L	HL	L	L	L	L	L	F	F	F	F	F	FQ	FQ
6	FF		F	F	F	H	H	C	L	L	L	L	HL	L	HL	HL	H	F		F	F	F	FQ	F	F
7	F	F	F		F				L	L	L	L	HL	L	L							F	F	F	F
8																			F	F	F	F	F	F	F
9	F	F	F	F	F	F	L		HL			HL	L		L	L			F	F	F	F	F	F	F
10	FF	F	F		F	F	F		HL	L	LQ	LQ	LQ	L	L	L	L	L	F	F	F	FQ	F	F	F
11	F	FQ	FQ		F	C	L	L	HL	L	L	L	L	L	HL	H	C	F	F	FQ	F	F	FF	F	F
12	F	F	F		F		L	CL	L	L	L	L	L				L					F	F	F	F
13	F	F	F		F	F	L	L	L	L	L	L	L	L	H	L	LQ	FQ	F	F	F	F	F	F	F
14	F	F		F			L	L	L				H	L											F
15		F	F	F	F		HL	L	HL	HL		L	L	L	HL		L	F							
16			F				H	L	HL	L		L				H							F	F	F
17	FQ	F					L	LC	L	L	L	L	L	L	L	L	L	F		F	FF	FF	FQ	FQ	
18	FQ	F		F	F	F			CL	L	L	HL	HL	HL	HL	HL	L	F	F		F	F		F	F
19		F		F	F		L	L	L	HL	HL			H	HL	L	F	F					F	F	F
20	F	F					L	L	HL	L	L	L	L	L	HL		L	F	F						
21				F	F				L	L	HL				HL			F							F
22	CL								L	HL	HL	HL	HL	L		L									
23							L	HL	HL	HL	HL	L	H	H	C									F	F
24	F	F							L	HL	HL	L	LC	L	L	L	L	F	F	F	F	F	F		F
25					F		H	H	H	HL	L	L	L	C	C	C	C		F	F	F	F			
26						C	HL	HL	HL	HL	HL	HL	HL	C	HL	C	HL		F	F	F	F	F	F	F
27	F	F		F	F		L	CL	CL	HL	HL	CL	CL	CL	CL	CL	C		K		F	F			
28							H	CL	CL	CL	C	HL	C	C	C	C	C	F	F	FF	FF	F	F		F
29	F	F		F	F		CL	C	C	L	HL	L		H	L	L	F								
30		F	FQ	FQ	F		HL	L	L	L	L	HL	L	L	HL	L	F	F	F	F	F	F	F	FF	FF
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT																									
MED																									
U Q																									
L Q																									

NOV. 2013 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

NOV. 2013 f<sub>XI</sub> (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	X 51	X 51	X 52	X 54	X 54	X 43												X 82	X 58	X 56	X 54	X 52	X 51	X 52	
2	X 51	X 51	X 50	X 53	X 46	X 42												X 90	X 64	X 60	X 49	X 46	X 44	X 47	
3	X 47	X 48	X 47	X 46	X 48	X 42												X 75	X 57	X 56	X 50	X 46	X 46	X 46	
4	X 45	X 45	X 46	X 51	X 51	X 34												X 94	X 58	X 58	X 48	X 40	X 40	X 42	
5	X 41	X 42	X 43	X 41	X 42	X 42												X 71	X 64	X 61	X 47	X 47	X 48	X 46	
6	X 47	X 46	X 48	X 48	X 43	X 39												X 68	X 58	X 53	X 47	X 48	X 50	X 48	
7	X 45	X 46	X 48	X 50	X 44	X 45												X 78	X 67	X 67	X 50	X 42	X 39	X A	
8	X 45	X 51	X 42	X 43	X 40	X 41												X 78	X 59	X 56	X 51	X 48	X 50	X 48	
9	X 46	X 48	X 46	X 46	X 47	X 44						C	C	C	C	C	C	C	C	C	C	C	C	C	
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
11	C	C	C	C	C	C	C	C	C	C								X 95	X 78	X 65	X 51	X 48	X 50	X 49	
12	X 48	X 47	X 47	X 48	X 49	X 51												X 75	X 63	X 55	X 47	X 50	X 46	X 41	
13	X 41	X 41	X 42	X 44	X 43	X 44												X 64	X 67	X 65	X 49	X 39	X 40	X 42	
14	X 42	X 50	X 44	X 48	X 43	X 43												X 69	X 46	X 52	X 46	X 50	X 42	X 42	
15	X 43	X 44	X 45	X 48	X 45	X 42												X 73	X 70	X 72	X 50	X 45	X 42	X 43	
16	X 47	X 48	X 44	X 43	X 43	X 44												X 87	X 71	X 60	X 63	X 62	X 52	X 45	
17	X 51	X 52	X 52	X 53	X 52	X 54												X 78	X 66	X 65	X 57	X 38	X 37	X 38	
18	X 41	X 42	X 41	X 40	X 41	X 42												X 72	X 72	X 80	X 47	X 42	X 37	X 35	
19	X 36	X 39	X 40	X 44	X 42	X 40												X 60	X 52	X 60	X 49	X 43	X 42	X 42	
20	X 43	X 44	X 46	X 44	X 45	X 43												X 81	X 64	X 67	X 55	X 54	X 39	X 40	
21	X 42	X 43	X 43	X 44	X 45	X 41												X 68	X 58	X 52	X 52	X 49	X 42	X 36	
22	X 39	X 39	X 42	X 45	X 42	X 40												X 70	X 57	X 51	X 51	X 49	X 47	X 39	
23	X 42	X 44	X 43	X 44	X 40	X 40												X 74	X 51	X 57	X 44	X 45	X 51	X 47	
24	X 50	X 52	X 42	X 38	X 35	X 35												X 63	X 49	X 43	X 45	X 38	X 38	X 40	
25	X 40	X 40	X 40	X 39	X 37	X 36												X 53	X 54	X 51	X 44	X 38	X 36	X 37	
26	X 39	X 40	X 42	X 45	X 35	X 26												X 57	X 46	X 44	X 50	X 47	X 40	X 37	
27	X 38	X 40	X 40	X 38	X 45	X 34												X 56	X 45	X 37	X 37	X 35	X 38	X 39	
28	X 40	X 40	X 42	X 44	X 36	X 36												X 55	X 41	X 46	X 41	X 36	X 34	X 34	
29	X 37	X 38	X 38	X 37	X 40	X 37												X 57	X 53	X 44	X 45	X 42	X 41	X 40	
30	X 40	X 43	X 42	X 40	X 39	X 39												X 58	X 48	X 41	X 50	X 42	X 41	X 42	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	28	28	28	28	28	28												28	28	28	28	28	28	27	
MED	X	X	X	X	X	X												X	X	X	X	X	X	X	
U Q	47	48	46	48	46	43												78	65	63	51	48	48	46	
L Q	X	X	X	X	X	X												X	X	X	X	X	X	X	
	40	40	42	42	40	38												62	52	51	46	41	39	39	

NOV. 2013 f<sub>XI</sub> (0.1MHz)

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## IONOSPHERIC DATA STATION Kokubunji

NOV. 2013 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

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

NOV. 2013 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

NOV. 2013 foF1 (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										L		A	L	L	A	A								
2												L	L	A	A	A								
3											A	L	L	L										
4													L		L									
5											L	L		L										
6											A	L	L		A									
7										L		L	L											
8										L	L	L		L	L									
9										L		C	C	C	C	C	C							
10							C	C	C	C	C	C	C	C	C	C	C							
11							C	C	C	C	A	L		A										
12											A			A										
13														L										
14																								
15																L								
16											A			L										
17													L											
18													L	L										
19														L										
20										L	L			L	A									
21											L	L		L										
22																L								
23												L	A											
24													A	A										
25														A										
26											L	A		A										
27											L		A	A										
28																								
29																								
30											A			L										
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

NOV. 2013 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

NOV. 2013 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							B	A	A	A	R	A	A	A	A									
2							B	R	A	A	A	A	A	A	A	A	A							
3							B	R	R	A	A	R	R	R	R	A	B							
4							B	R	R	A	R	A	A	A	A	A	A							
5							B	R	A	A	A	A	A	A	A	A	A							
6							B	U R	A	A	A	A	R	A	A	A	A							
7							B	224	A	R	A	A	A	A	A	A	U R							
8							B	228	A	R	R	R	A	R	R	R	A	U R						
9							B	A	A	A	A	C	C	C	C	C	C							
10							C	C	C	C	C	C	C	C	C	C	C							
11							C	C	C	C	A	A	A	A	A	A	A	B						
12							B	U R	A	A	A	A	A	A	A	A	A	R						
13							B	224	A	A	A	A	A	R	R	R	R							
14							B	232	R	A	A	A	R	A	R	R	U R							
15							B	216	A	A	A	A	A	A	A	A	R	U R						
16							B	232	A	A	A	A	R	A	A	A	A	U R						
17							B	196	A	A	R	A	R	A	A	U R	R							
18							B	208	A	A	A	A	A	R	A	A	272	R						
19							B	220	A	A	A	R	A	A	R	R	R							
20							B	208	A	A	A	A	A	A	A	A	R	U R						
21							B	216	R	A	R	R	R	R	A	A	U R							
22							B	208	R	A	R	A	A	A	A	A	R	A						
23							B	204	A	A	A	A	A	R	R	R	R							
24							B	224			R	A	R	A	A	A	A	A						
25							B	208	264	R	R	R	A	A	A	R	A	U R						
26							B	212	R	R	R	A	A	A	A	R	A	R						
27							B	200	U R	A	A	A	A	A	A	A	A	A						
28							B	284	R	A	A	A	A	A	A	A	A	A						
29							B	200	R	A	A	A	A	A	R	R	A	B						
30							B	200	A	A	A	A	A	A	A	A	A	U R						
31																	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								19	2								1	9						
MED								208	274								U R	U R	U R					
U Q								U R										U R	U R					
L Q								200										U R	U R					

NOV. 2013 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

NOV. 2013 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	J 28	A E 14	B J 21	E B 15	J A 21	E B 15	B E 14	B	J A 28	J A 42	A 46	A 42	A 46	G 41	J A 56	J A 56	J A 47	J A 30	A E 15	B E 15	B E 15	B E 14	B E 16	B E 16	
2	E 14	B J 24	A 22	E B 20	E B 14	B E 14	B E 15	G J 44	A 39	A 42	A 42	A 42	J A 50	J A 66	A 43	J A 40	J A 36	J A 27	A E 14	B E 15	B E 14	B E 14	B E 14	B E 14	
3	E 14	B E 15	B E 14	B E 15	B E 15	B E 14	B E 14	G 24	A 40	A 42	G	G	G	G	G	36	25	E 16	B E 15	B E 15	J A 24	J A 24	A 20	E B 15	
4	E 15	B J 21	A E 15	B E 15	B E 14	B E 14	B E 14	G	G	39	G	43	40	40	J A 35	40	33	J A 33	J A 21	A J 41	J A 31	J A 24	A 19	E B 14	
5	E 14	B 19	E B 15	J A 28	22	22	15	E B	G	38	42	42	42	43	42	40	40	J A 52	A J 41	A J 49	A J 34	A J 48	A E 15	B E 14	
6	E 15	B E 15	B J 20	A E 15	B E 15	B E 14	B E 14	G	38	37	42	42	G	41	43	39	31	J A 27	A E 15	B J 15	A J 30	A J 33	A J 34	A E 20	
7	21	E B 14	20	20	E B 15	B E 15	B E 14	28	37	G	41	41	39	40	41	38	J A	G E 15	B E 15	B J 21	A E 15	B E 14	B E 15	J A 75	
8	J A 22	A E 15	B 18	E B 15	B E 14	B E 14	B E 14	25	G	G	G	42	G	G	G	34	G E 15	B E 15	B	20	20	21	20	J A 31	
9	E 16	B E 15	B E 15	J A 25	21	20	16	24	37	40	45	C	C	C	C	C	C	C	C	C	C	C	C	C	
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
11	C	C	C	C	C	C	C	C	C	C	42	40	J A 45	J A 48	37	37	25	J A 27	A E 15	B E 16	J A 20	A E 15	B E 15	J A 33	
12	J A 28	A 23	22	J A 22	E B 14	B E 15	B E 14	G 40	J A 40	42	41	43	43	38	37	G	J A 18	A E 21	E B 16	20	E B 16	B E 14	B E 15		
13	E 14	B E 16	B E 14	B E 16	B E 15	B E 14	B E 15	G 20	J A 34	A 40	42	43	43	G	G	G	G E 14	B E 14	B E 15	24	14	15	24	B E 24	
14	J A 40	J A 23	A J 20	A E 16	B 20	E B 15	B E 15	G	G	40	42	41	26	42	G	G	G E 15	B E 14	B E 14	J A 25	25	41	A J 23		
15	E 15	B E 14	B E 14	B E 15	B E 14	B E 15	B E 15	30	40	41	42	42	44	42	41	G	G E 15	B E 15	B E 15	22	E B 15	B E 15	B E 14		
16	E 15	B E 15	B E 15	B E 15	B E 14	B E 15	B E 15	24	39	42	42	42	G	43	42	36	G E 14	B E 14	B J 28	A E 14	B E 15	20	20		
17	21	E B 14	14	14	E B 14	B E 14	B E 14	23	39	40	G	43	G J A 53	42	G	G	G E 14	B 21	E B 15	20	E B 16	B E 14	22		
18	J A 25	J A 30	A J 22	A E 15	B J 22	A J 22	A J 27	G 36	J A 37	39	40	40	G	39	36	G	G	E 19	B E 14	B E 13	J A 14	38	21	E B 15	
19	E 15	B E 15	22	E B 15	B E 14	B E 16	B E 15	G J A 35	A 42	40	G	J A 43	43	G	G	G	22	J A 23	A E 14	B E 14	B E 14	15	15	15	
20	E 14	B E 14	B J 24	A E 15	B E 15	B E 15	B E 15	G J A 34	A 40	36	41	41	39	38	J A	G	G E 16	22	22	19	20	15	14	E B 14	
21	E 15	B E 15	B E 15	B E 15	B E 14	B E 15	B E 15	25	G	37	G	G	G	G	40	38	G	J A 22	A J 20	A E 15	B E 15	15	14	15	
22	E 15	B E 15	B E 15	B E 13	B E 15	B E 16	B E 14	G	G	42	G	42	42	39	40	G	28	J A 29	A E 40	B E 14	15	15	22	E B 14	
23	E 14	B E 16	B E 13	B E 14	B E 15	B E 14	B E 15	G J A 38	A J 44	A J 43	A J 44	A J 45	G	G	G	G	G E 14	B J 20	A E 15	B E 15	14	13	14	B E 14	
24	E 15	B E 16	B E 14	B E 14	B E 14	B E 14	B E 14	G 33	G	40	G	42	44	41	36	24	22	E B 15	B E 14	14	14	14	15	B E 14	
25	E 15	B E 15	B E 15	B E 14	B E 15	B E 15	B E 15	G	G	G	40	39	41	G	35	G	15	15	15	20	14	50	25	B E 25	
26	E 16	B E 15	B E 15	B E 15	B E 13	B E 14	B E 15	25	G	41	40	41	46	44	41	G	G E 15	B E 13	B E 14	14	14	14	15	B E 15	
27	E 15	B E 15	22	22	E B 21	B E 15	B E 15	24	G	40	40	J A 45	J A 54	J A 48	42	36	J A 41	A E 14	B E 14	B E 14	15	15	14	14	
28	J A 23	A 20	20	E B 15	B E 16	B E 16	B E 15	G	G	40	41	40	42	J A 48	A 45	44	26	J A 30	A E 15	B E 14	15	28	23	21	
29	J A 22	A E 15	B E 15	B E 15	B E 14	B E 14	B E 14	G 35	J A 43	A J 47	A J 48	43	G	G J A 36	27	15	15	15	14	16	15	15	15	15	
30	E 15	B E 14	B E 15	B E 15	B E 16	B E 15	B E 15	22	34	J A 39	A J 48	A J 46	42	J A 38	38	39	J A	G J A 24	A J 26	22	15	15	15	14	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	28	28	28	28	28	28	28	28	28	28	29	28	28	28	28	28	28	28	28	28	28	28	28	28	28
MED	E 15	B E 15	B E 15	B E 15	B E 15	B E 15	B E 15	G	34	40	42	42	42	41	40	36	G	17	E 15	B E 15	B E 16	B E 15	B E 15	B E 15	
U Q	J A 22	A 18	20	16	16	E B 15	B E 15	24	38	42	42	43	43	44	42	38	28	J A 27	A J 21	A J 20	A J 21	A J 20	A J 20	A J 22	
L Q	E 15	B E 15	B E 15	B E 15	B E 14	B E 14	B E 14	G	G	38	38	40	G	G	G	G	G	G E 15	B E 14	B E 14	15	14	14	14	

NOV. 2013 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

NOV. 2013 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	22	E B	17	E B	E B	E B	E B	25	35	34	39	40	G	36	36	37	40	18	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	G	30	35	35	37	41	44	38	36	31	21	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	G	G	G	G	G	G	G	G	32	23	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	G	G	37	G	37	38	38	34	38	29	27	17	36	24	E B	E B	E B	E B
5	E B	E B	E B	E B	E B	E B	E B	G	34	38	37	38	40	39	38	38	45	34	42	24	30	E B	E B	E B	E B
6	E B	E B	E B	E B	E B	E B	E B	G	34	34	38	37	G	38	39	36	29	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	26	33	G	37	37	36	37	39	35	G	E B	E B	E B	E B	E B	E B	E B	E B
8	17	E B	E B	E B	E B	E B	E B	22	G	G	G	39	G	G	G	30	G	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	23	30	35	39	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	38	37	39	40	34	32	24	20	E B	E B	E B	E B	E B	E B	E B
12	19	E B	E B	E B	E B	E B	E B	G	32	35	38	39	38	38	36	35	G	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	G	16	30	33	38	37	39	G	G	G	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	G	G	36	40	39	24	40	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	26	36	36	36	40	38	39	37	G	G	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	23	33	37	40	38	G	39	38	35	G	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	22	36	38	G	40	G	46	38	G	G	E B	E B	E B	E B	E B	E B	E B	E B
18	19	E B	E B	E B	E B	E B	E B	G	34	31	38	39	39	G	38	31	G	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	G	29	32	36	G	37	38	G	G	G	20	18	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	G	28	33	32	39	37	35	34	G	G	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	22	G	34	G	G	G	G	33	32	G	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	G	G	41	G	40	39	37	36	G	G	24	18	18	14	15	15	15	14
23	E B	E B	E B	E B	E B	E B	E B	G	36	39	38	33	43	G	G	G	G	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	G	29	G	37	G	40	37	35	32	22	18	15	14	14	14	14	15	14
25	E B	E B	E B	E B	E B	E B	E B	G	G	G	G	35	34	38	G	35	G	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	23	G	36	36	37	37	38	36	G	G	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	22	G	30	38	42	44	41	40	33	29	14	14	14	15	15	14	14	14
28	17	E B	E B	E B	E B	E B	E B	G	G	33	37	38	38	40	43	40	23	17	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	G	33	35	42	41	37	G	G	29	22	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	20	31	35	40	38	38	33	34	34	G	21	19	E B	E B	E B	E B	E B	E B
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	28	28	28	28	28	28	28	28	28	28	29	28	28	28	28	28	28	28	28	28	28	28	28	28	28
MED	E B	E B	E B	E B	E B	E B	E B	G	30	34	37	38	38	38	36	32	G	E B	E B	E B	E B	E B	E B	E B	E B
U Q	16	15	15	15	15	15	15	22	34	36	38	39	39	39	38	35	24	18	15	16	15	15	15	16	16
L Q	E B	E B	E B	E B	E B	E B	E B	G	G	32	G	37	G	G	G	G	G	E B	E B	E B	E B	E B	E B	E B	E B

NOV. 2013 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

NOV. 2013 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

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

NOV. 2013 fmin (0.1MHz)

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## IONOSPHERIC DATA STATION Kokubunji

NOV. 2013 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

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	297	301	305	319	335	313	329	368	364	348	336	333	318	323	314	325	352	354	315	300	303	296	309	312	
2	313	300	301	321	337	309	323	351	350	335	329	326	326	322	323	344	336	360	342	317	323	317	298	289	
3	307	309	306	305	332	322	333	360	349	341	324	322	317	317	330	342	352	341	308	307	311	299	289	289	
4	302	278	312	308	356	316	335	344	346	342	351	333	321	315	332	336	338	356	332	319	318	296	295	286	
5	293	285	288	280	298	299	360	351	339	338	335	327	315	319	322	330	350	335	334	357	276	298	289	282	
6	290	308	302	324	309	305	323	343	336	331	338	331	324	319	345	350	360	341	322	324	301	311	314	301	
7	293	295	295	306	310	294	313	357	353	349	343	335	318	317	321	326	345	330	332	344	311	313	266	A	
8	285	327	298	329	298	303	329	372	344	348	341	330	316	332	334	338	342	344	314	325	322	303	301	305	
9	301	299	310	312	330	300	336	357	357	336	337	C	C	C	C	C	C	C	C	C	C	C	C	C	
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
11	C	C	C	C	C	C	C	C	C	C	C	330	337	314	324	317	326	329	334	314	336	305	295	296	287
12	319	279	292	289	288	298	326	359	356	346	339	312	327	314	325	341	345	342	331	353	320	329	340	318	
13	299	314	305	294	287	300	337	366	375	355	357	336	332	329	327	340	363	307	332	355	337	393	292	310	
14	271	321	309	316	319	295	319	366	363	365	361	322	324	327	326	345	343	349	303	343	310	331	315	274	
15	293	299	314	328	321	313	336	360	358	333	332	324	318	326	330	331	344	333	312	358	307	317	297	294	
16	284	308	287	293	278	284	350	355	348	333	324	336	310	314	318	317	334	328	323	294	316	318	323	312	
17	282	292	280	300	294	306	322	353	335	322	332	314	305	305	314	318	339	321	311	341	328	343	291	271	
18	290	285	308	310	304	299	329	366	362	334	337	329	322	322	321	326	349	338	314	356	357	314	314	299	
19	285	294	295	299	322	297	313	353	359	356	348	326	321	313	329	344	347	334	308	339	324	318	315	301	
20	285	284	303	309	300	294	320	354	355	351	347	333	318	319	334	343	330	334	318	346	320	337	316	278	
21	284	311	317	312	317	296	314	355	352	349	356	330	322	336	343	336	345	347	337	322	317	338	321	287	
22	288	289	297	288	324	306	322	359	362	363	320	354	329	336	325	334	352	349	330	312	311	321	298	301	
23	291	290	296	304	327	313	326	355	363	348	349	351	341	350	314	349	339	350	314	350	300	274	294	289	
24	313	339	342	324	297	287	308	345	356	348	343	336	331	340	347	354	355	343	330	321	342	301	308	291	
25	303	302	320	322	333	303	322	351	362	364	357	329	345	345	335	356	358	364	323	329	326	319	287	300	
26	282	299	307	358	367	353	302	355	364	349	364	350	347	318	346	376	376	347	331	336	326	308	292	296	
27	296	300	308	309	333	323	331	340	356	352	345	356	338	352	333	349	366	363	342	334	337	331	303	289	
28	283	306	318	322	350	310	329	364	345	362	345	349	360	347	366	356	382	376	314	358	339	352	300	306	
29	308	279	289	310	337	317	322	358	368	368	377	359	340	346	341	370	338	350	349	319	329	311	298	279	
30	284	291	298	288	301	304	340	364	359	363	346	370	354	347	350	353	360	343	336	351	268	323	315	307	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	28	28	28	28	28	28	28	28	28	28	29	28	28	28	28	28	28	28	28	28	28	28	28	27	
MED	292	299	304	310	320	304	326	356	356	348	343	333	323	324	330	342	346	343	323	336	319	317	299	294	
U Q	302	308	310	322	333	313	334	362	362	356	350	343	335	338	338	350	356	350	332	350	327	330	314	305	
L Q	284	290	296	300	299	298	321	352	348	337	334	326	318	318	322	330	339	334	314	320	308	302	293	287	

NOV. 2013 M(3000)F2 (0.01)

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## IONOSPHERIC DATA STATION Kokubunji

NOV. 2013 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		A	L	L	A	A								
2												L	L	A	A	A								
3											A	L	L	L										
4													L		L									
5											L	L		L										
6											A	L	L		A									
7										L		L	L											
8										L	L	L		L	L									
9										L		C	C	C	C	C	C							
10							C	C	C	C	C	C	C	C	C	C	C							
11							C	C	C	C	A	L		A										
12											A			A										
13														L										
14																								
15																L								
16											A			L										
17													L											
18													L	L										
19														L										
20										L	L			L	A									
21											L	L		L										
22																L								
23												L	A											
24													A	A										
25														A										
26											L	A		A										
27											L		A	A										
28																								
29																								
30											A			L										
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

NOV. 2013 M(3000)F1 (0.01)

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## IONOSPHERIC DATA STATION Kokubunji

NOV. 2013 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										242		230	276	258	238	254									
2												264	266	248	246	238									
3											240	250	272	280											
4													282		258										
5											250	240		266											
6											240	244	280		232										
7										244		252	278												
8										242	248	246		262	260										
9										266		C	C	C	C	C	C								
10							C	C	C	C	C	C	C	C	C	C	C								
11							C	C	C	C	234	260		250											
12											230			228											
13														246											
14																									
15															268										
16											248			288											
17													278												
18													274	260											
19														276											
20										248	242			264	240										
21											246	250		262											
22															266										
23												226	236												
24													264	242											
25														250											
26											242	220		230											
27											262		246	248											
28																									
29																									
30											240			246											
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT										5	12	11	11	18	8	2									
MED										244	242	246	274	254	252	246									
U Q										257	248	252	278	264	263										
L Q										242	240	230	264	246	239										

NOV. 2013 h'F2 (KM)

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## IONOSPHERIC DATA STATION Kokubunji

NOV. 2013 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							B		A	A	A			A	A	A	A								
							112					116	118												
2							B		A	A	A	A	A	A	A	A	A								
							114																		
3							B			A	A						A	B							
							122	122				122	122	122	120										
4							B			A		A			A										
							114	114		114				114		118	114								
5							B		A	A	A	A			A										
							118							122		122									
6							B		A	A	A	A			A										
							116						126		126	118	118								
7							B				A	A			A										
							110	116	116																
8							B					A													
							120	118	118	118			120	120	120										
9							B			A	A	C	C	C	C	C	C								
							120	114																	
10							C	C	C	C	C	C	C	C	C	C	C								
11							C	C	C	C	A	A	A	A	A	A	A	B							
12							B		A	A	A	A	A	A	A	A									
							112											118							
13							B		A	A	A	A													
							128							128	128	118	120								
14							B			A	A	A			A										
							120	114				110			114	118	120								
15							B				A	A			A										
							118	120	112								112	128							
16							B		A	A	A	A			A	A	A								
							124						120					122							
17							B			A		A			A										
							118	118		120			124				114	116							
18							B			A	A	A				A									
							116	118						118				118							
19							B				A			A											
							118	118	118		118			122	122	122	118								
20							B		A	A	A	A			A										
							116										116	114							
21							B																		
							112	120	124	118	120	120	114	110	114	120									
22							B			A		A			A										
							122	114		122							114	116							
23							B			A	A	A													
							122	122						124	118	118	120								
24							B				A			A	A	A	A								
							122	122	118		124														
25							B					A		A	A										
							126	118	114	114					108		122								
26							B						A	A	A										
							124	124	118	118	118						120	122							
27							B			A	A														
							122	116				116	116	114	116	118									
28							B					A			A										
							124	116	114	122			122												
29							B				A	A													
							126	120	114					114	114										
30							B	B			A	A		A	A										
									118	118															
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								27	20	11	8	7	10	11	11	14	19								
MED								120	118	118	118	118	120	120	118	118	120								
U Q								122	120	118	121	122	122	122	122	118	122								
L Q								116	116	114	116	116	118	114	114	114	118								

NOV. 2013 h'E (KM)

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## IONOSPHERIC DATA STATION Kokubunji

NOV. 2013 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

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	90	B	96	B	98	B	B	146	106	104	104	118	G	100	100	100	94	106	B	B	B	B	B	B
2	B	94	94	92	B	B	B	G	106	102	100	98	94	100	100	92	92	92	B	B	B	B	B	B
3	B	B	B	B	B	B	B	G	102	108	104		G	G	G		110	108	B	B	B	100	100	100
4	B	96	B	B	B	B	B	G	G	102	G	102	100	124	104	126	126	124	116	106	106	106	98	B
5	B	98	B	102	100	102		B	G	108	110	106	106	104	136	106	128	110	108	104	100	100	B	B
6	B	B	106	B	B	B	B	G	102	102	108	104		G	104	118	120	120	110	B	100	100	102	96
7	96	B	96	94	B	B	B	132	122	G	98	106	104	102	104	102		G	B	B	102	B	B	102
8	96	B	98	B	B	B	B	122	G	G	G	100	G	G	G		108	G	B	B	108	102	102	100
9	B	B	B	96	96	94	B	122	116	104	106		C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C		110	106	106	106	104		98	104	B	B	112	B	B
12	92	94	94	100	B	B	B	G	104	106	104	106	106	108	106	108		G	92	92	B	92	B	B
13	B	B	B	B	B	B	B	104	106	106	104	104	106		G	G	G	G	B	B	B	102	B	B
14	98	94	96	B	94	B	B	G	G	104	104	102	94	102		G	G	G	B	B	B	96	98	96
15	B	B	B	B	B	B	B	142	116	118	104	106	104	102	106		G	G	B	B	B	94	B	B
16	B	B	B	B	B	B	B	138	104	106	104	98	G	102	100	104		G	B	B	102		94	94
17	86	B	B	B	B	B	B	172	126	104	G	104	G	100	102		G	G	B	B	B	90	B	96
18	92	96	94	B	94	94	94	G	118	106	108	102	102	G	100	104		G	104	B	B	B	98	92
19	B	B	98	B	B	B	B	G	134	120	102	G	108	118		G	G	G	116	112	B	B	B	B
20	B	B	B	B	B	B	B	G	106	106	106	106	108	100	102		G	G	B	B	B	90	92	B
21	B	B	B	B	B	B	B	164	G	118	G	G	G	G		116	120	G	100	100	B	B	B	B
22	B	B	B	B	B	B	B	G	G	106	G	106	106	106	106		G	120	112	102	B	B	B	B
23	B	B	B	B	B	B	B	G	120	106	108	106	104		G	G	G	G	B	B	B	B	B	B
24	B	B	B	B	B	B	B	G	148	G	108	G	100	110	104	108	108	98	B	B	B	B	B	B
25	B	B	B	B	B	B	B	G	G	G	G	108	94	104		110		G	B	B	B	98	98	102
26	B	B	B	B	B	B	B	160	G	128	116	128	108	106	108		G	G	B	B	B	B	B	B
27	B	B	98	98	98	B	B	156	G	108	108	128	126	128	124	118	108		B	B	B	B	B	B
28	106	102	102	B	B	B	B	G	G	118	122	110	122	112	108	104	102	104	B	B	B	106	102	98
29	98	B	B	B	B	B	B	G	126	116	106	108	102		G	G	100	136	B	B	B	B	B	B
30	B	B	B	B	B	B	B	130	122	122	108	108	108	102	98	98		G	96	96	88	B	B	B
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	9	7	12	6	6	3	1	12	19	24	23	24	21	21	20	19	12	14	10	8	13	8	10	9
MED	96	96	96	97	97	94	94	140	116	106	106	106	104	104	105	108	108	104	99	101	100	101	97	98
U Q	98	98	98	100	98	102		158	122	117	108	108	108	111	107	118	120	110	104	104	102	104	100	101
L Q	91	94	94	94	94	94		126	106	104	104	103	101	102	101	102	100	98	96	96	93	98	94	96

NOV. 2013 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

NOV. 2013 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	F2		F2		F1				H1	L2	L2	L2	C1		L2	L2	L2	L2	F3							
2		F1	F2	F1						L1	L2	L2	L1	L3	L2	L2	L2	L2	F2							
3										L1	L1	L2					L1	L2				F2	F3	F2		
4		F2									L2		L2	L1	C2	L1	C2	C2	F2	F2	F3	F3	F2	F1		
5		F1		F2	F2	F2			L1	L1	L2	L2	L2	C1	L1	C2	L2	L2	F3	F3	F2	F3	F3	F2		
6			F1						L2	L1	L1	L1		L1	C1	C2	C2	F2		F2	F2	F3	F3	F2		
7	F1		F1	F1					H2	C1		L2	L2	L2	L2	L2	L1				F2				F3	
8	F3		F2						C1			L1					L1				F1	F1	F1	F2	F2	
9				F2	F1	F1			C1	C1	L1	L1														
10																										
11												L1	L2	L2	L2	L2	L2	L2	F2			F1			F2	
12	F3	F2	F2	F2					L2	L1	L2	L2	L2	L2	L2	L1	L1		F1	F2		F1				
13								L1	L2	L2	L2	L2	L2									F2			F2	
14	F2	F3	F1		F1					L1	L1	L2	L2	L2	L2	L2						F3	F2	F2	F1	
15									H2	C1	C1	L2	L1	L1	L2	L2						F1				
16									H1	L2	L2	L2	L2		L2	L1	L2				F2			F1	F2	
17	F1								H1	C1	L2		L1		L2	L2				F1		F1			F2	
18	F2	F2	F1		F2	F1	L2		C1	L1	L2	L2	L2	L2	L2	L2	L2		F2				F3	F1		
19			F1						C1	C2	L2	L2	L1	C1					F2	F2						
20			F2						L2	L2	L2	L2	L2	L2	L2	L1					F1	F1	F1	F2		
21									H2		C1					C2	C1		F1	F1						
22										L2		L2	L2	L2	L2	L2		C2	F2	F2				F2		
23										C1	L2	L2	L2								F2					
24									H1		L2			L2	L2	L2	L1	L2	F1							
25												L2	L2	L1			L1					F1		F2	F2	
26									H1		C1	C1	C1	L1	L1	L1										
27			F1	F1	F1				H1		L1	L1	C1	C2	C2	C2	C2	L2								
28	F2	F1	F1							C2	C2	L1	L1	C1	L2	L2	L1	L2	F3				F2	F2	F2	
29	F2									C1	C1	L2	L1	L2			L2	H2								
30									H2	C2	C2	L2	L2	L2	L2	L1	L2		F2	F2	F1					
31																										
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT																										
MED																										
U Q																										
L Q																										

NOV. 2013 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

NOV. 2013 f<sub>XI</sub> (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 50	X 51	X 53	X 56	X 62	X 38	X 43												X 71	X 64	X 66	X 62	X 59	X 53
2	X 49	X 51	X 49	X 48	X 36	X 36	X 41												X 81	X 61	X 59	X 58	X 54	X 51
3	X 49	X 49	X 46	X 43	X 46	X 40	X 35												X 79	X 60	X 59	X 57	X 50	X 50
4	X 50	X 48	X 46	X 53	X 52	X 30	X 34												X 74	X 54	X 62	X 57	X 45	X 45
5	X 45	X 45	X 45	X 44	X 46	X 43	X 43												X 78	X 58	X 60	X 52	X 47	X 48
6	X 46	X 46	X 46	X 51	X 47	X 36	X 39												X 62	X 57	X 58	X 53	X 48	X 43
7	X 40	X 41	X 43	X 46	X 44	X 38	X 40												X 96	X 62	X 63	X 62	X 50	X 49
8	X 49	X 53	X 39	X 39	X 40	X 41	X 42												X 76	X 57	X 61	X 56	X 46	X 46
9	X 44	X 46	X 44	X 43	X 45	X 38	X 40												X 85	X 76	X 70	X 53	X 45	X 46
10	X 45	X 49	X 48	X 47	X 43	X 44	X 46												X 72	X 57	X 60	X 57	X 47	X 43
11	X 44	X 42	X 45	X 48	X 48	X 42	X 47												X 101	X 84	X 76	X 58	X 60	X 57
12	X 48	X 46	X 45	X 49	X 47	X 48	X 51												X 70	X 70	X 70	X 54	X 54	X 42
13	X 37	X 38	X 40	X 41	X 44	X 40	X 48												X 76	X 64	X 67	X 51	X 40	X 42
14	X 43	X 46	X 48	X 46	X 48	X 45	X 47												X 76	X 60	X 72	X 59	X 58	X 49
15	X 44	X 43	X 44	X 48	X 41	X 38	X 43												X 88	X 82	X 76	X 66	X 62	X 51
16	X 51	X 50	X 46	X 45	X 38	X 44	X 45												X 90	X 72	X 72	X 65	X 57	X 48
17	X 48	X 50	X 50	X 50	X 52	X 48	X 44												X 90	X 86	X 82	X 66	X 48	X 43
18	X 43	X 44	X 42	X 43	X 40	X 37	X 38												X 86	X 89	X 68	X 50	X 48	X 43
19	X 40	X 42	X 44	X 48	X 46	X 43	X 39												X 68	X 67	X 66	X 59	X 57	X 48
20	X 45	X 44	X 44	X 43	X 42	X 39	X 40											X 100	X 97	X 84	X 83	X 70	X 59	X 40
21	X 38	X 39	X 41	X 43	X 44	X 39	X 38											X 96	X 72	X 63	X 64	X 59	X 54	X 47
22	X 42	X 41	X 41	X 40	X 42	X 35	X 35												X 71	X 69	X 65	X 52	X 51	X 48
23	X 43	X 42	X 41	X 40	X 43	X 38	X 38												X 77	X 61	X 65	X 61	X 59	X 52
24	X 51	X 57	X 49	X 38	X 32	X 32	X 34												X 72	X 65	X 59	X 57	X 51	X 49
25	X 50	X 50	X 44	X 40	X 40	X 31	X 30												X 68	X 55	X 63	X 58	X 44	X 41
26	X 41	X 39	X 45	X 48	X 39	X 29	X 30												X 69	X 52	X 67	X 74	X 59	X 45
27	X 38	X 38	X 40	X 40	X 42	X 39	X 32												X 66	X 60	X 53	X 46	X 41	X 38
28	X 38	X 38	X 39	X 41	X 40	X 35	X 34												X 56	X 57	X 62	X 52	X 38	X 33
29	X 35	X 37	X 36	X 38	X 37	X 36	X 35												X 67	X 58	X 61	X 59	X 58	X 48
30	X 45	X 46	X 44	X 40	X 42	X 39	X 39												X 59	X 52	X 59	X 63	X 51	X 42
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30											2	30	30	30	30	30	30
MED	X 44	X 46	X 44	X 44	X 43	X 38	X 40											X 98	X 75	X 62	X 64	X 58	X 51	X 46
U Q	X 49	X 49	X 46	X 48	X 46	X 42	X 43												X 85	X 70	X 70	X 62	X 58	X 49
L Q	X 41	X 41	X 41	X 40	X 40	X 36	X 35												X 69	X 57	X 60	X 53	X 47	X 43

NOV. 2013 f<sub>XI</sub> (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Yamagawa

NOV. 2013 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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	44	45	47	50	56	32	37	70	89	115	116	113	114	116	116	118	116	105	65	58	60	56	53	47	
2	43	45	43	42	30	30	35	72	94	101	110	118	110	120	118	115	109	98	75	55	53	52	48	45	
3	43	43	40	37	40	34	29	62	89	98	102	110	116	116	118		110	89	73	54	53	51	44	44	
4	44	42	40	47	46	24	28	66	86	96	108	104	106	120	128	118	108	102	68	48	56	50	39	39	
5	39	39	39	38	40	37	37	68	92	100	110	106	108	116	118	116	93	91	72	52	54	46	41	42	
6	40	40	40	45	41	30	33	62	88	110	115	116	110	110	120	101	93	74	56	51	52	47	42	37	
7	34	35	37	40	38	32	34	68	84	83	94	102	104	106	115	112	107	93	90	56	57	56	44	43	
8	43	47	33	33	34	35	36	75	86	94	109	104	110	110	110	110	93	86	70	51	55	50	40	40	
9	38	40	38	37	39	32	34	66	91	107	109	112	110	130	139	120	104	102	79	70	64	47	39	40	
10	39	43	42	41	37	38	40	76	116	134	133	118	115	110	118	110	104	92	66	51	54	51	41	37	
11	38	36	39	42	42	36	41	62	83	110	129	103	114	118	124	114	112	110	95	78	70	52	54	51	
12	42	40	39	43	41	42	45	83	100	109	112	118	118	110		115	102	87	64	64	64	48	48	36	
13	31	32	34	35	38	34	42	76	82	84	101	101	96	100	108	110	94	82	70	58	61	45	34	36	
14	37	40	42	40	42	39	41	74	88	102	104	104	108	114	110	101	95	80	70	54	66	53	52	43	
15	38	37	38	42	35	32	37	72	98	93	95	104	118	116	128	118	105	102	82	76	70	60	56	45	
16	45	44	40	39	38	38	39	71	89	104	110	115	104	110	116		110	99	84	66	66	59	51	42	
17	42	44	44	44	46	42	38	69	97	103	114	116		129	131	119	118	114	84	80	76	60	42	37	
18	37	38	36	37	34	31	32	60	76	91	98	111	102	113	106	115	109	91	80	83	62	44	42	37	
19	34	36	38	42	40	37	33	64	86	104	101	100	100	100	106	109	97	80	62	61	60	53	51	42	
20	39	38	38	37	36	33	34	63	80	92	102	102	110	105	110	110	100	94	91	78	77	64	53	34	
21	32	33	35	37	38	33	32	60	86	95	102	112	112	110	102	103	103	90	66	57	58	53	48	41	
22	36	35	35	34	36	29	29	59	90	90	102	110	118	116	116	108	110	98	65	63	59	46	45	42	
23	37	36	35	34	37	32	32	59	84	93	102	98	90	101	96	100	88	82	71	55	59	55	53	46	
24	45	51	43	32	26	26	28	58	83	91	101	103	107	118	116	94	86	74	66	59	53	51	45	43	
25	44	44	38	34	34	25	24	51	70	88	104	84	92	108	96	102	96	68	62	49	57	52	38	35	
26	35	33	39	42	33	23	24	47	72	80	87	86	82	87	97	92	78	70	63	46	61	68	53	39	
27	32	32	34	34	36	33	26	46	80	92	90	90	80	78	92	81	86	72	60	54	47	40	35	32	
28	32	32	33	35	34	29	28	50	68	76	86	93	84	71	90	82	90	79	50	51	56	46	32	27	
29	29	31	30	32	31	30	29	53	69	76	74	90	84	87	90	88	87	76	61	52	55	54	52	42	
30	39	40	38	34	36	33	33	48	68	79	89	86	86	100	86	83	76	73	53	46	53	57	45	36	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	30	30	30	30	30	30	30	30	30	30	30	29	30	29	28	30	30	30	30	30	30	30	30	
MED	38	40	38	38	38	32	34	64	86	94	102	104	107	110	115	110	101	90	69	56	58	52	45	40	
U Q	43	43	40	42	40	36	37	71	90	104	110	112	113	116	118	115	109	98	79	64	64	56	52	43	
L Q	35	35	35	34	34	30	29	59	80	90	98	100	94	101	100	100	93	79	63	51	54	47	41	37	

NOV. 2013 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

NOV. 2013 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

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	L							
2									284	L	L	L	L	U	L	L	L							
3									L	L	L	L	L	L	L	L	L							
4										L	L	L	L	U	L	U	L	A	L					
5									L	L	L	L	L	L	L	L	A				208			
6										L	L	L	L	L	L	L	L							
7									320	L	U	L	L	L	L	L	L							
8										L	U	L	L	L	L	L	L							
9									200	L	L	L	L	L	L	L	L	L						
10									U	L	L	L	L	U	L	L	L	L	L					
11									332		L	L	L	A	L	L	L	L	A					
12										L	L	L	L	L	L	L	L	L	L					
13										L	U	L	L	L	L	L	L	L						
14									276	U	L	L	L	L	L	L	L	A	A					
15									288	L	L	L	L	L	L	L	L	L	L					
16									200		L	L	L	L	L	L	L	L	L					
17									208	296	L	L	L	L	L	L	L	L						
18									208	284	L	L	L	L	L	L	L	L	L					
19										U	L	L	L	L	L	L	L	L	L					
20									276	344	L	L	L	L	L	L	L	L	L					
21										L	L	L	L	L	L	L	L	L	L					
22									208		L	L	L	L	L	L	L	L	L					
23									284	336	L	L	L	L	L	L	L	L	L					
24									276		L	L	L	L	L	L	L	L	L					
25										L	L	L	L	L	L	L	L	L	L					
26									208		L	L	L	L	L	L	L	L	L					
27										L	L	L	L	L	L	L	L	L	L					
28									180	L	A	L	L	L	L	L	L	L	L					
29										L	L	L	L	L	L	L	L	L	L					
30									176	292	384	L	L	L	L	L	L	L	L					
31									180	288	308	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								9	13	5	3	2	5	3	4	1	5	9						
MED								200	284	344	436	464	484	572	498	356	280	208						
U Q								208	294	396	444		544	572	564		318	212						
L Q								180	276	322	408		464	512	408		272	202						

NOV. 2013 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

NOV. 2013 foE (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

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								200	272	U A 308	R 328	A U R 352	U A 356	U A 316	312	272									
2								216	256	292	A 340	352	A 364	A 376	R 368	A 340	A U A 292	A U A 216							
3								196	276	308	336	A U R 364	U R 376	368	340		A U A 256								
4								196	272	312	340	348	R 364	376	356	320	272	196							
5								U A 192	260	312	344	360	U A 384	364	U R 336	328	280	184							
6								208	276	320	R 336	360	372	364	364	320	A U A 280								
7								196	264		B U A 324	U A 324		A 352	360		A U A 272	A U A 212							
8								B 260	U A 284	U A 324	U A 340	U A 328	U A 328	U A 324			A 272	A 212							
9								188	256	300	A U A 328	U A 340	A 344	R 356	A 332	U A 316	U A 244								
10								180	264	304	U A 320	R 344	R 348	U A 348	324	U A 300	264								
11								196	272	316	R 348	352	348	U A 360	U A 336	U A 300	U A 200	U A 176							
12								180	276	304	R 328	340	344	R 360	R 348	312	272	188							
13								184	256	304	U A 328	336	344	R 352	R 340	308	U R 276	184							
14								184	260	312	R 332	332	344	U R 364	R 348	316	A 280								
15								196	268	308	A 324	U A 328	U A 324	R 360	R 344	312	264	176							
16								200	252	308	U A 324	U A 328	U A 344	364		A 324	R 264								
17								U A 176	232	304	U A 320	R 344	364	360		A 316	260	196							
18								188	244	280	U A 336		A 344	R 340	R 356	316	U A 264	180							
19								188	272	300	U A 320	U A 332	U A 332	U A 324	U A 368	300	280								
20								208	264	304	U A 320	U A 324	U A 304	U A 328	U A 348										
21								B 256	U A 288	U A 300	U A 340	U A 344	R 360	R 332	312		A								
22								176	244	288	R U 316	U A 332	U A 332	U A 336	U A 324	U A 308	R 256								
23								176	248	304	U R 328	U A 340	U A 372	U A 332	U A 332	R 300	256								
24								176	240	296	336	352	A 364	U A 340	U A 320	U A 296									
25								180	252	316	324	348	352	348	324	U A 292	252								
26								192	236	304	320	348	U R 348	R 344	324	292	U A 240	U A 168							
27								B 256	296	324	344	344	R 332	R 308	292	U A 236	184								
28								168	228	292	R 328	R 328	R 356	R 344	R 340	A 292	252	172							
29								B 252	312	332	R 348		A 332	R 320	R 288	U A 232	188								
30								B 244	U A 276	U A 316	U A 320	U A 320	U A 348	R 320	U A 276	U A 236	192								
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								25	30	29	30	28	26	29	27	25	26	15							
MED								188	256	304	328	340	346	352	336	308	264	184							
U Q								196	268	310	336	348	364	360	348	316	272	196							
L Q								180	248	294	320	332	344	338	324	294	252	176							

NOV. 2013 foE (0.01MHz)

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## IONOSPHERIC DATA STATION Yamagawa

NOV. 2013 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 16	J 20	A 16	E 19	B 16	J 16	A 16	E 16	B 16	B 16	B 16	B 16	B 16	B 16	G 18	G 33	G 31	G 28	G 33	G 33	G 30	G 24	J 22	A 16	B 16	B 16	B 16	B 16
2	J 19	A 16	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	J 40	A 32	J 34	A 34	J 34	A 32	J 28	A 19	J 16	A 16	B 16	B 16	B 16	B 16
3	E 20	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
4	E 19	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
5	J 26	A 16	J 22	A 16	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
6	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
7	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
8	J 22	A 16	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
9	J 23	A 16	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
10	J 45	A 35	J 32	A 26	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
11	E 16	J 26	A 25	B 16	J 18	A 20	B 19	J 21	A 29	B 33	B 38	B 45	B 54	B 40	B 45	B 51	B 48	B 28	B 22	B 18	B 17	B 22	B 18	B 20	B 18	B 20	B 18	B 20
12	E 19	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
13	E 20	B 18	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
14	E 17	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
15	J 16	A 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
16	E 16	B 20	B 18	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
17	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
18	J 26	A 17	A 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
19	E 16	B 16	B 25	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
20	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
21	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
22	E 16	B 16	B 17	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
23	E 18	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
24	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
25	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
26	E 16	B 16	B 18	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
27	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
28	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
29	J 19	A 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
30	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
31																												
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
UQ	J 19	A 17	B 17	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16
LQ	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16

NOV. 2013 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

NOV. 2013 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 19	E 16	E 16	E 16	G 18	G	32	G U Y	G 31	G 28	G U Y	G 33	G 30	G 24	E 21	E 16	E 18	E 16	E 16	E 16	E 16	
2	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	27	U Y	31	36	38	38	38	32	34	30	31	28	E 16	E 16	E 16	E 16	
3	E 16	E 16	E 16	E 16	E 16	E 16	E 16	22	30	32	36	40	40	38	36	36	29	24	29	25	26	16	16	16	
4	E 16	E 16	E 16	E 16	E 16	E 16	E 16	22	29	35	36	G	39	43	40	47	31	29	24	28	28	20	E 16	28	
5	22	E 16	E 16	E 16	E 16	E 16	E 21	22	G 25	35	G	40	46	43	G	39	29	20	E 16	E 23	E 16	20	E 16	E 16	
6	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G 20	G 23	34	U Y 36	44	43	43	43	35	38	28	E 16	E 16	E 16	E 16	E 16	E 16	
7	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	28	E 39	35	37	36	33	37	38	33	40	25	27	E 16	E 16	20	E 16	
8	19	E 16	E 16	E 16	E 16	E 16	E 16	18	28	31	35	35	37	35	35	33	31	41	28	20	22	E 16	E 16	E 16	
9	16	E 16	E 16	E 16	E 16	E 16	E 16	G	27	32	34	36	36	23	36	35	28	18	E 16	E 16	E 16	E 16	E 16	E 16	
10	E 16	21	17	17	E 16	E 16	E 16	G	G	26	32	34	29	27	30	34	32	G	E 22	E 16	E 16	E 16	E 16	E 16	
11	E 16	E 16	E 16	E 16	E 16	E 16	E 16	19	28	33	38	43	52	38	37	36	42	18	E 16	E 16	E 16	E 16	E 16	E 16	
12	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G 18	G 23	32	27	30	26	26	30	G	22	20	E 16	E 16	E 16	E 16	E 16	E 16	
13	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	26	33	35	35	26	G	25	21	29	21	E 16	17	E 16	E 16	E 16	E 16	
14	E 17	E 16	E 16	E 16	E 16	E 16	E 16	G	G 24	G 29	31	G	26	39	39	42	36	19	22	E 16	E 16	E 16	E 16	E 16	
15	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	36	38	39	40	31	G	G	19	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	G	27	G	U Y 34	U Y 35	U Y 37	G 35	G 35	33	28	32	26	21	22	E 16	E 16	E 16	
17	E 16	E 16	E 16	E 16	E 16	E 16	E 16	20	24	32	38	G	G	23	34	22	28	18	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	G	26	U Y 30	33	34	G	27	39	40	28	21	E 16	E 16	E 16	E 16	E 16	E 16	
19	E 16	E 16	E 20	E 16	E 16	E 16	E 16	G	G	32	U Y 33	U Y 34	U Y 37	U Y 36	40	G 27	30	21	E 18	E 16	E 20	E 16	E 16	E 16	
20	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	28	G	37	37	36	35	G	32	28	23	20	21	E 16	E 16	E 16	E 16	
21	E 16	E 16	E 16	E 16	E 16	E 16	E 16	19	28	30	U Y 32	U Y 36	G 24	U Y 38	22	33	U Y 26	E 20	E 16	E 16	E 16	E 16	E 16	E 16	
22	E 16	E 16	E 17	E 16	E 16	E 16	E 16	G	26	33	34	37	35	37	34	20	G	19	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	G	26	32	33	G	G	38	34	28	24	18	E 16	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	G	30	34	37	40	44	36	34	31	37	34	18	E 16	E 16	E 16	E 16	E 16	
25	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	E 17	G 23	37	37	41	37	22	31	27	18	E 16	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	G	25	33	U Y 34	U Y 38	40	43	40	32	27	18	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	U Y 17	27	32	34	38	37	46	33	31	30	G	E 16	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	G	24	34	37	G	38	39	36	33	26	20	E 16	E 16	E 16	E 16	E 16	E 16	
29	18	E 16	E 16	E 16	E 16	E 16	E 16	G	24	32	34	G	44	30	35	31	26	20	E 16	E 16	E 16	E 16	E 16	E 16	
30	E 16	E 16	E 16	E 16	E 16	E 16	E 16	26	29	32	37	36	37	37	32	26	20	26	E 16	E 16	E 16	E 16	E 16	E 16	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	
MED	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	26	32	34	36	37	37	G	32	28	20	E 16	E 16	E 16	E 16	E 16	E 16	
U Q	16	16	16	16	16	16	16	G	28	33	36	38	40	39	37	35	30	24	22	18	16	16	16	16	
L Q	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	G	G	G	G	G	G	G	E 16	E 16	E 16	E 16	E 16	E 16	

NOV. 2013 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

NOV. 2013 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

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

NOV. 2013 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

NOV. 2013 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

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	291	303	303	314	361	287	311	354	345	334	362	342	RU R	RU R	RU R	RU R	R	R			303	313	316	301				
2	314	319	315	343	357	285	310	353	356	351	330	R	349	320	R	R	341	341	348	358	309	313	319	306	301			
3	312	320	312	290	320	349	310	342	351	347	339	U R	319	321	R	R	R	332	341	335	315	304	307	324	305			
4	298	307	298	329	396	330	296	347	359	348	341	U R	331	U R	J R		336	325	355	368	285	318	324	289	299			
5	290	302	310	294	310	310	319	339	364	330	342	U R	336	U R	J R		324	339	348	346	318	321	316	310	299			
6	298	301	304	322	364	293	305	337	338	343	342	U R	336	319	330	U R	341	330	357	362	331	319	327	322	H	319		
7	296	285	307	322	362	284	310	370	376	344	346	R	346	338	309	U R	R	R	332	331	353	300	307	328	280	286		
8	281	345	302	298	293	292	319	364	353	362	346	U R	341	320	317	320	334	330	341	342	301	323	344	312	316			
9	305	317	319	298	335	306	313	357	366	363	336	R	348	319	319	318	331	324	326	322	317	320	313	266	273			
10	264	294	310	306	304	285	293	327	347	345	344	U R	348	321	326	332	334	326	348	350	311	320	319	324	294			
11	313	298	275	303	321	305	331	364	351	339		R	336	311	331	336	333	332	326	347	324	320	321	306	300			
12	302	289	283	293	289	299	305	353	378	348	335	U R	332	330	331		U R	358	347	346	322	311	336	334	357	329		
13	304	303	299	308	313	316	331	382	366	351	349	346	336	318	320	331	331	346	341	326	332	348	329	297				
14	291	294	308	326	310	295	310	358	359	355	347	344	U R	329	330	344	343	339	337	340	312	335	327	334	314			
15	284	295	304	337	356	272	316	345	361	353	332	341	R	340	333	318	311	342	339	325	324	323	332	316	281			
16	289	306	321	273	291	280	312	351	343	356	327	U R	320	330	J R	U R	R	R	323	324	330	305	306	332	328	298		
17	287	299	302	284	311	319	310	338	350	362		R	328		U R	U R	R	R	345	332	315	323	325	340	299	287		
18	282	302	314	325	333	308	344	356	355	348	341	R	345	311		U R	R	R	324	321	333	343	320	338	342	313	307	301
19	303	289	301	317	326	332	311	349	358	363	349	351	330	303	344	323	345	339	332	319	333	309	331	308				
20	287	289	302	308	320	297	311	343	363	340	348	R	343	328	329	334	324	328	330	342	317	323	343	334	305			
21	279	299	299	314	330	331	296	333	380	352	346	330	339	322	340	326	340	356	350	324	325	325	321	306				
22	298	297	300	323	335	297	311	344	370	344	345	342	U R	329	349	342	320	326	355	336	322	339	320	322	299			
23	311	302	311	303	317	298	293	348	378	351	363	358	318	334	341	331	360	331	337	332	317	302	308	310				
24	294	334	344	335	346	280	291	344	368	354	336	332	U R	340	331	343	334	340	331	332	352	324	323	327	300			
25	301	323	327	336	355	331	322	350	372	354	371	354	345	334	353	351	349	339	336	308	331	339	319	297				
26	303	311	329	365	390	286	296	339	361	346	358	337	343	327	350	368	359	364	359	300	318	356	343	308				
27	293	306	309	304	337	386	305	338	347	362	343	357	347	348	347	335	371	350	365	334	360	324	331	307				
28	301	304	325	329	331	345	344	362	367	346	358	381	354	354	355	345	369	373	348	309	R	358	358	311	289			
29	296	301	301	302	308	307	325	369	374	369	364	R	379	338	336	353	U R	342	335	361	359	349	347	325	339	303		
30	284	317	322	316	319	301	324	348	353	336	370	346	344	354	336	352	V	379	347	350	317	304	328	323	309			
31																												
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	30	30	30	30	30	30	30	30	30	30	28	30	29	27	26	28	30	30	30	30	30	30	30	30	30			
MED	296	302	308	314	328	300	311	348	360	350	346	342	329	330	336	R	332	340	344	340	317	323	324	320	301			
U Q	303	311	315	326	355	319	319	357	368	355	354	348	340	334	344	342	347	354	350	324	333	334	329	308				
L Q	287	297	301	302	311	287	305	342	351	344	340	336	320	322	324	R	325	331	332	331	309	318	319	308	297			

NOV. 2013 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

NOV. 2013 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

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	L							
2									493	L	L	L	L	U	L	L	L							
3								470	L	L	L	L	L	L	L	L	L							
4										L	L	L	L	U	L	U	L	A	L					
5									L	L	L	L	L	L	L	L	A				492			
6										L	L	L	L	L	L	L	L							
7									A	L	U	L	L	L	L	L	L							
8								A		L	U	L	L	L	L	L	L							
9										L	L	L	L	U	L	L	L	L						
10									U	L	L	L	L	U	L	L	L	L						
11										L	L	L	L	A	L	L	L	A						
12										L	L	L	U	L	L	L	L	L						
13									A	L	U	L	L	L	L	L	L							
14									421	U	L	L	L	L	L	L	A	A						
15								412		L	L	L	L	L	U	L	L	L						
16								441	A	L	L			L	L	L	L							
17								450	484	L	L	L	L	L	L	L	L							
18									U	L	L	L	L	L	A	L	L							
19									489	457	L	L	L	U	L	L	L							
20									L	L	L	L	L	L	L	L	L							
21								435		L	L	L	L	L	L	L								
22									435	453	L	L	L	L	L	L	U	L						
23									440		L	L	L	L	L	L	L	L						
24										L	L	L	L	L	L	L	L	A						
25										L	L	L	L	L	L	L	U	L						
26									460		L	L	U	L	A	L	U	L						
27								411	L	L	L	L	L	A	L	L	L	L						
28									L	A	L	L	U	L	L	L	L	A						
29									B	L	L	L	L	L	L	U	L							
30									424	414	L	L	L	377	L	U	L							
31									432	407	A	L	L	L	U	L	L	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								7	10	4	3	2	5	3	4	1	3	7						
MED								435	438	437	407	414	388	365	390	425	411	423						
U Q								450	484	455	439		406	372	422		472	462						
L Q								412	421	418	406		372	361	368		392	413						

NOV. 2013 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Yamagawa

NOV. 2013 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

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									220	248	234	222	256	258	270	250	228							
2									220	234	262	238	270	280	244	244	228							
3								212	222	248	248	248	268	272	268	246	224							
4									230	246	232	270	260	278	240	238								
5									228	256	244	234	238	280	252	244		216						
6									242	246	248	248	244	252	222									
7									210	220	238	236	242	246	262	242								
8								212		222	236	222	270	270	256	250								
9										226	242	234	262	278	256	226	218	232						
10									226	234	232	234	224	252	254	228	242							
11										246	230	226	248	268	240	222	226	222						
12										238	220	234	256	232	236	236	210	204						
13									196	210	224	222	246	274	248	248								
14									206	222 <sup>H</sup>	230	228	244	262	238	232	228	198						
15								224		218	224	230	246	266	274	248	224	208						
16								226	212	230	236		302	244	242									
17								228	216	234	232	232	252	236	278	228								
18									204	218	232	244	244	258	228	264	224							
19										234	238	246	268	288	258	240								
20									212	240	238	228	258	248	262	234								
21								238		234	236	236	272	252	270									
22									214	214	234	246	260	242	236		224							
23									210		228	234	224	254	252	242	212	210						
24										226	254	248	242	258	240	222	212							
25										230	232	234	244	258	238	236	224	194						
26									220		232	236	244	240	250	224	210							
27								224	238	232	264	238	228	236	250	226	218	200						
28									210	214	252	222	236	220	242	242	220							
29									214	208	220	204	228	284	252	232		222						
30									216	210	218	224	226	230	246	236	222	204						
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								9	19	28	30	29	29	30	30	27	20	9						
MED								224	212	230	235	234	248	258	251	240	224	208						
U Q								227	220	236	244	238	265	270	262	244	227	219						
L Q								213	210	220	230	228	242	246	240	226	215	199						

NOV. 2013 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

NOV. 2013 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	274	264	264	262	210	252	250	218	206	206	208	208	204	214	210	224	222	204	182	228	246	236	234	252	
2	250	244	234	220	210	294	268	222	164	220	206	210	194	202	222	222	228	212	204	208	212	242	248	264	
3	264	250	238	276	254	218	250	188	204	200	206	216	224	220	216	230	224	206	216	230	238	232	234	260	
4	266	254	244	232	194	248	266	224	214	220	216	206	186	236	222	A	224	214	192	266	262	234	268	318	
5	304	262	252	282	250	242	262	224	220	210	206	216	A	242	228	H	A	216	170	196	228	228	246	252	262
6	276	270	264	250	206	276	254	226	218	230	224	234	230	236	248	A	208	226	202	194	224	224	226	216	246
7	268	298	276	250	218	300	262	208	A	B	200	200	204	200	216	234	228	232	206	224	224	228	264	284	
8	298	214	270	276	284	288	250	A	216	216	190	212	194	226	212	218	208	220	212	226	236	220	248	252	
9	272	256	236	262	236	232	260	218	212	216	208	204	192	204	204	218	216	226	A	188	218	212	218	294	
10	322	284	242	270	252	290	276	244	180	216	206	206	190	200	216	212	A	204	188	222	224	234	210	266	
11	258	274	302	276	242	230	230	208	212	198	210	218	A	212	220	218	A	220	196	198	214	222	242	228	
12	234	268	298	272	270	284	254	222	216	212	214	184	180	226	214	232	218	184	188	214	214	214	220	220	
13	238	272	286	286	260	236	236	208	A	198	188	188	190	220	224	222	206	202	196	208	210	194	226	292	
14	292	284	258	252	250	250	266	218	E	A	210	202	206	210	190	218	222	A	A	E	A	208	206	228	
15	272	272	266	234	214	306	250	234	A	218	214	206	216	228	190	204	218	220	192	194	210	206	210	264	
16	274	250	248	304	294	284	238	206	A	212	206	218	220	202	240	218	222	226	212	222	240	222	210	252	
17	272	270	270	278	252	228	228	192	138	208	214	214	194	216	210	H	222	226	210	200	216	210	198	288	
18	288	262	254	246	236	244	224	204	158	178	212	204	208	198	A	242	220	206	212	210	194	216	228	260	
19	290	290	294	262	238	224	228	228	212	224	214	214	190	206	234	208	222	202	196	220	214	230	220	238	
20	280	294	266	248	238	276	248	216	196	216	220	222	188	202	204	220	220	210	200	216	208	202	218	220	
21	322	286	276	262	238	238	268	212	208	204	180	198	200	224	210	232	226	206	198	202	218	220	216	250	
22	266	282	282	264	250	266	276	232	198	194	212	192	188	216	222	216	226	206	186	200	212	212	224	248	
23	250	272	264	272	256	236	276	230	198	216	210	210	202	198	192	208	220	194	200	202	212	238	244	244	
24	284	224	220	226	226	322	308	230	214	218	214	214	236	228	202	216	A	214	212	202	226	206	238	262	
25	258	232	238	238	224	234	258	226	208	220	224	202	222	198	228	216	194	A	196	218	216	220	230	272	
26	284	268	240	214	198	334	306	228	188	218	216	222	208	A	238	198	210	192	206	222	226	210	218	238	
27	270	282	282	272	234	202	282	A	230	230	226	232	220	A	196	206	A	A	190	198	200	218	218	254	
28	276	286	276	242	234	234	228	220	E	A	216	214	218	204	214	206	216	A	198	194	214	204	202	280	
29	320	290	280	286	276	274	258	B	200	194	194	206	222	210	208	222	170	198	192	202	208	232	212	246	
30	272	252	248	266	254	266	230	E	B	E	A	A	218	212	210	194	H	198	220	A	202	204	212	256	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	30	30	30	30	30	30	27	27	27	30	30	28	28	29	27	24	28	30	30	30	30	30	30	
MED	273	270	264	262	238	251	256	220	209	214	210	211	203	213	216	218	220	206	196	216	214	220	227	255	
U Q	288	284	276	276	254	284	268	228	216	218	214	216	220	222	223	222	225	213	206	224	226	232	244	266	
L Q	266	254	244	246	224	234	238	208	198	202	206	204	190	201	205	216	213	200	192	208	210	210	218	246	

NOV. 2013 h'F (KM)

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## IONOSPHERIC DATA STATION Yamagawa

NOV. 2013 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								130	100	100	102	A	108	110	102	114	114	A							
2								142	98	98	102	102	A	A	112	A	A	A							
3								134	124	120	110	104	104	102	102	A	104	B							
4								124	100	100	102	100	106	106	106	104	114	116							
5								134	120	100	98	98	100	102	100	100	104	110							
6								148	122	98	98	98	98	102	102	102	108	B							
7								128	116	B	98	A	A	108	108	A	118	A							
8								B	100	98	96	100	100	100	100	A	A	A							
9								122	116	108	98	94	104	106	100	102	102	B							
10								132	98	104	98	102	108	110	104	104	104	A							
11								116	104	102	100	100	98	98	98	100	104	B							
12								E B	164	118	110	104	104	104	106	106	104	114	126						
13								E B	146	A	A	A	100	100	96	100	100	100	116						
14								E B	148	110	A	A	98	106	106	106	106	106	B						
15								144	104	100	96	96	98	106	106	104	106	E B	124						
16								148	112	98	108	98	104	104	104	110	112	A							
17								E B	182	100	100	98	98	104	104	A	104	106	122						
18								142	104	100	104	A	102	108	108	104	104	116							
19								E B	164	104	102	102	98	100	98	A	108	116	A						
20								176	98	98	98	96	96	96	102	A	A								
21								B	102	108	96	110	104	100	104	104	A								
22								168	102	104	104	98	102	98	102	104	104	B							
23								142	104	100	110	102	106	102	114	112	112	B							
24								136	104	96	106	112	108	104	104	102	A	A							
25								142	104	108	100	100	106	110	106	104	102	B							
26								136	116	134	102	98	98	98	108	104	106	E B	154						
27								B	104	98	98	98	98	96	94	116	A	E B	134						
28								B	110	102	102	108	102	100	100	100	114	E B	126						
29								B	118	104	102	100	A	108	108	110	108	126							
30								B	108	102	102	102	102	102	102	100	108	106							
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								24	29	27	28	27	27	29	28	25	24	12							
MED								138	104	100	102	100	102	102	104	104	106	118							
U Q								148	116	104	103	102	106	106	106	107	113	126							
L Q								133	101	98	98	98	100	99	101	102	104	116							

NOV. 2013 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION Yamagawa

NOV. 2013 h'Es (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	90	B	88	B	B	B	118	G	104	G	100	98	100	104	104	98	98	B	92	92	B	B	B
2	110	B	B	B	B	B	B	G	152	136	132	116	98	96	98	94	132	118	106	128	102	B	B	92
3	92	B	B	B	B	B	B	180	202	126	122	190	168	172	110	112	102	96	94	94	92	B	B	96
4	92	92	B	B	86	B	B	154	144	122	132	G	184	148	134	124	138	114	112	102	98	94	110	90
5	90	90	88	B	B	92	92	148	104	130	G	124	118	176	G	122	140	158	B	104	98	134	B	B
6	B	B	B	B	94	B	B	132	100	132	122	112	110	110	110	110	106	98	104	B	98	B	B	B
7	B	B	B	B	B	B	B	G	134	B	106	102	96	96	96	96	126	114	104	98	B	104	92	108
8	92	100	B	B	B	92	B	152	196	104	104	108	102	104	104	98	96	92	94	94	94	88	84	B
9	96	B	94	B	B	B	B	G	122	112	114	118	114	98	112	104	102	102	104	B	B	B	104	100
10	106	96	92	92	B	B	94	G	144	114	104	96	92	100	120	118	G	96	B	B	104	B	B	B
11	B	92	94	B	96	94	94	216	110	124	112	104	102	108	104	100	100	106	100	108	100	102	106	92
12	92	B	B	B	B	B	B	116	98	104	96	96	94	92	90	G	100	182	B	B	92	B	B	88
13	86	88	B	B	B	B	B	G	96	104	104	92	92	G	88	86	86	120	B	90	90	B	B	B
14	B	B	B	B	B	B	90	G	100	98	98	G	98	162	130	112	104	118	98	100	B	B	B	B
15	86	B	B	B	B	B	B	G	G	G	104	102	102	168	100	G	84	G	98	B	B	B	B	88
16	B	82	84	B	B	B	B	G	118	G	116	104	106	100	100	98	138	90	92	92	84	88	B	B
17	B	B	B	B	B	B	B	188	118	112	106	G	G	90	100	94	156	98	96	B	B	B	B	B
18	94	94	B	B	B	B	B	G	154	106	98	98	G	98	138	118	162	112	B	B	106	96	102	102
19	B	B	92	B	B	B	92	G	104	106	112	106	104	140	100	122	108	98	98	92	92	B	B	B
20	B	B	B	B	B	B	B	G	192	G	104	104	100	104	G	100	92	92	92	92	92	92	B	B
21	B	B	B	B	B	B	B	194	194	106	108	92	90	184	90	194	102	98	B	104	B	B	B	98
22	B	B	B	B	B	B	B	G	190	178	110	110	110	108	110	88	G	B	B	B	B	B	B	B
23	86	B	B	B	B	B	B	G	194	112	100	G	G	102	154	102	100	194	B	B	88	B	B	B
24	B	B	B	B	B	B	B	G	122	130	124	120	110	122	110	108	94	94	94	B	92	B	B	B
25	B	B	B	B	B	B	B	G	158	98	126	118	116	112	88	110	140	134	90	96	B	B	B	B
26	B	B	94	B	B	B	B	G	150	150	162	138	122	114	112	116	112	154	B	B	B	B	B	B
27	B	B	B	B	B	B	B	218	178	170	176	124	122	106	118	134	106	G	B	B	B	B	B	B
28	B	B	B	B	B	B	B	G	134	120	112	G	124	112	118	106	146	136	B	B	B	B	112	B
29	100	B	B	B	B	96	B	B	102	118	112	G	96	98	172	88	156	128	94	96	100	B	B	B
30	B	B	B	130	B	B	B	B	202	104	104	106	110	112	108	100	148	104	88	92	82	B	B	B
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	13	9	7	3	3	4	5	11	27	26	28	24	27	29	28	28	28	27	18	17	19	8	7	10
MED	92	92	92	92	94	93	92	154	144	113	109	107	106	106	110	104	106	108	97	96	92	95	104	94
U Q	98	95	94	130	96	95	94	194	190	130	122	118	116	118	119	114	139	128	104	103	100	103	110	100
L Q	88	89	88	88	86	92	91	132	110	104	104	101	98	99	100	98	100	98	94	92	92	90	92	90

NOV. 2013 h'Es (KM)

# IONOSPHERIC DATA STATION Yamagawa

NOV. 2013 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		F1				C1		C1		L1	L1	L1	C1	C1	L2	L2		F1	F1				
2	F1								H1	H1	HL11	CL11	L1	L1	L1	L2	HL12	CL22	F5	FF21	F1			F2	
3	F1							H2	HL11	CL11	CL11	HL11	HL11	H1	C1	C1	C1	L2	F3	F3	F5			F1	
4	F1	F1			F4			H1	H1	CL11	HL11		HL11	H1	C1	HL21	C2	F2	F4	F4	F4	F3	FF31	F6	
5	F3	F1	F1		F2	F6		H1	L1	C1		C1	C1	H1		C1	H1	H1		F4	FQ21	FF31			
6					F1			H1	L1	H1	C1	C1	C1	C1	C2	C1	C3	C2	F2		F1				
7									HL11		C1	C1	L1	L1	L1	L2	CL22	C6	FF14	F5		F1	F2	F1	
8	F3	F1			F2			H1	HC11	C1	C1	C1	C1	C1	C1	L1	L3	F5	F5	F4	F7	F1	F1		
9	F1		F1						CL11	CL11	C1	C1	CL11	L1	C1	C2	C3	C1	F1				FF11	F1	
10	FF11	F2	FQ21	FQ21			F1		H1	CL11	C1	L1	L1	L1	C1	C1		L2			F2				
11		F4	F2		F1	F1	F1	H1	C1	C1	C1	C1	C3	C1	C1	C2	CC22	C1	F3	F1	F1	F1	FF11	F1	
12	F1							C1	L1	CL11	L1	L1	L1	L1	L1		L1	H1			F1			FF11	
13	F1	F1							L2	CL21	CL11	L1	L1		L1	L1	L2	CL11		F1	F2				
14						F1			L1	L1	L1		L1	H1	HL11	C1	C2	C1	F3	F1					
15	F1										C1	C1	C1	HL11	L1		L1		F1					F1	
16		F1	F1						CL11		CL11	C1	C1	L1	L1	L1	HL11	L3	F3	F2	F2	F1			
17							H1		C1	C1	C1		L1	L1	L1	L1	HL11	L1	FF31						
18	F2	F1						H1	C1	L1	L1	L1	L1	HL11	C1	H1	C2	C1			F1	F3	F1	F1	
19			F1			F1			C1	C1	C1	C1	C1	HL11	L1	CL11	C1	F2	F1	F1	F2				
20								H1		C1	C1	C2	C1		L1	L2	L3	F3	F3	F3	F1	F1			
21							H1	H1	CL11	C1	L1	L1	L1	H1	L1	H1	C1	L2		F1				F1	
22								H1	HL11	CL11	C1	CL11	C1	C1	L1										
23	F1							H1	CH11	L1			C1	HL11	L1	L1	H1				F1				
24								C2	C2	CL11	CL11	C1	C1	C1	C1	C2	L2	L3	F3		F2				
25								H1	L1	C1	C1	CL11	CL11	L1	CL11	HL11	HL11	F1	F1						
26			F1					HL11	HL11	H1	H1	C1	C1	CL11	CL11	C1	HL11								
27							H1	H1	H1	H1	C1	C1	C1	C1	C1	HL11	CL12								
28								HL11	C2	C1		C1	C1	C1	C1	C1	HL11	H1					F1		
29	F1				F1			L1	C1	C1		L2	L1	HL11	L2	HL11	C1	F1	F1	F1	F1				
30				F1				HC11	C1	C1	C1	C1	C1	C1	C2	HL11	C1	F3	F1	F1	F1				
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT																									
MED																									
U Q																									
L Q																									

## IONOSPHERIC DATA STATION Okinawa

NOV. 2013 f<sub>XI</sub> (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	X 64	X 60	X 54	X 56	X 56	X 35	X 35													X 101	X 96	X 94	X 86	X 72	
2	X 64	X 68	X 72	X 59	X 43	X 34	X 40													X 94	X 98	X 97	X 82	X 78	
3	X 77	X 65	X 57	X 50	X 52	X 31	X 34													X 102	X 99	X 91	X 82	X 74	
4	X 76	X 73	X 63	X 70	X 46	X 27	X 31													X 101	X 94	X 96	X 75	X 65	
5	X 60	X 56	X 53	X 50	X 47	X 43	X 36													X 80	X 79	X 80	X 64	X 58	
6	X 50	X 48	X 53	X 56	X 48	X 30	X 33													X 65	X 79	X 80	X 65	X 51	
7	X 50	X 48	X 51	X 58	X 54	X 42	X 43													X 94		X 103	X 79	X 68	
8	X 65	X 59	X 34	X 37	X 39	X 42	X 45													X 93	X 94	X 80	X 64	X 53	
9	X 48	X 48	X 40	X 42	X 39	X 34	X 34													X 105	X 112	X 88	X 63	X 58	
10	X 53	X 56	X 54	X 46	X 41	X 40	X 43													X 78	X 77	X 80	X 70	X 51	
11	X 46	X 41	X 42	X 46	X 44	X 40	X 38													X 112	X 114	X 92	X 84	X 74	
12	X 61	X 49	X 49	X 48	X 46	X 45	X 48													X 94	X 95	X 86	X 62	X 52	
13	X 45	X 39	X 38	X 38	X 42	X 38	X 43													X 86	X 88	X 76	X 61	X 50	
14	X 53	X 51	X 58	X 55	X 52	X 41	X 44													X 115	X 113	X 101	X 84	X 72	
15	X 59	X 50	X 46	X 47	X 41	X 35	X 38													X 127	X 132	X 122	X 86	X 64	
16	X 62	X 60	X 53	X 46	X 49	X 40	X 41													X 117	X 100	X 86	X 84	X 61	
17	X 57	X 60	X 56	X 60	X 66	X 41	X 39													X 132	X 135	X 119	X 92	X 77	
18	X 77	X 78	X 82	X 74	X 61	X 39	X 40													X 113	X 103	X 77	X 70	X 60	
19	X 56	X 52	X 52	X 48	X 48	X 42	X 35													X 93	X 98	X 99	X 87	X 74	
20	X 70	X 66	X 69	X 69	X 65	X 45	X 42													X 126	X 115	X 114	X 86	X 64	
21	X 51	X 49	X 50	X 48	X 49	X 39	X 32													X 106	X 90	X 92	X 76	X 69	
22	X 62	X 59	X 54	X 50	X 48	X 35	X 36													X 100	X 93	X 84	X 84	X 80	
23	X 72	X 67	X 59	X 57	X 48	X 37	X 36													X 93	X 95	X 88	X 81	X 69	
24	X 64	X 74	X 58	X 56	X 29	X 29	X 31													X 121	X 110	X 110	X 99	X 85	
25	X 85	X 76	X 66	X 61	X 54	X 35	X 34													X 78	X 76	X 81	X 71	X 58	
26	X 56	X 50	X 48	X 49	X 32	X 28	X 30													X 84	X 90	X 97	X 82	X 66	
27	X 47	X 38	X 38	X 38	X 42	X 31	X 30													X 78	X 80	X 72	X 61	X 44	
28	X 43	X 40	X 44	X 38	X 38	X 32	X 31													X 67	X 80	X 75	X 64	X 50	
29	X 46	X 41	X 40	X 36	X 40	X 34	X 36													X 101	X 96	X 88	X 86	X 75	
30	X 68	X 72	X 58	X 47	X 54	X 40	X 38													X 70	X 79	X 92	X 77	X 58	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	30	30	30	30	30	30													30	29	30	30	30	
MED	X 60	X 56	X 53	X 50	X 48	X 38	X 36													X 97	X 95	X 90	X 80	X 64	
U Q	X 65	X 66	X 58	X 57	X 52	X 41	X 41													X 112	X 106	X 97	X 84	X 74	
L Q	X 50	X 48	X 46	X 46	X 41	X 34	X 34													X 84	X 84	X 80	X 65	X 58	

NOV. 2013 f<sub>XI</sub> (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

NOV. 2013 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

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	58	54	48	50	50	29	29	66	91	110	129	131	129	139	RU R 144	138	133	127	110	95	90	88	80	66	
2	58	62	66	53	37	28	34	71	97	102	122	132	127	R 131	U R 147	137	133	119	105	88	92	91	76	72	
3	71	59	51	44	46	25	28	62	86	106	115	126	131	RU RU R 140	144	144	138	122	R 109	96	93	85	76	68	
4	70	67	57	64	40	23	25	64	88	98	112	119	133	RU RU R 144	150	158	RU Y 138	130	111	95	88	90	69	59	
5	54	50	47	44	41	37	30	60	91	104	U R 120	R 118	126	U R 130	RU R 144	R 132	124	111	94	74	73	74	58	52	
6	44	42	47	50	42	24	27	60	86	106	117	115	118	131	134	123	101	87	66	59	73	74	59	45	
7	44	42	R 45	R 52	48	36	37	69	80	83	97	110	118	122	J R 127	R 130	130	123	117	88	94	97	73	62	
8	59	53	28	31	33	36	39	65	84	102	122	113	112	U R 132	132	133	123	106	100	87	U R 88	74	58	47	
9	42	U R 42	R 34	R 36	33	28	28	65	86	106	121	122	R 131	J R 145	RU RU 162	RU Y 158	Y 139	U Y 124	Y 119	99	106	82	57	52	
10	47	50	48	40	35	34	37	75	110	128	R 131	128	116	126	127	124	120	124	107	72	71	74	64	45	
11	40	35	36	40	R 38	34	32	64	85	112	130	115	111	R 136	R 146	140	132	129	124	R 106	108	86	78	68	
12	55	43	43	42	40	39	42	80	97	112	R 121	126	125	R 144	R 138	R 137	R 125	109	105	88	89	80	56	46	
13	39	33	32	32	36	32	37	64	83	97	102	106	110	123	123	128	116	119	98	80	82	70	55	44	
14	47	45	52	49	46	35	38	74	94	112	110	115	128	RU R 136	R 153	R 142	R 133	127	115	U R 109	J R 107	95	78	66	
15	53	44	40	41	35	29	32	68	95	101	107	119	130	R 136	RU RU 149	R 153	J R 147	R 154	R 139	R 121	R 126	116	80	58	
16	56	54	47	40	43	34	35	70	100	116	106	123	127	U R 128	R 144	U R 131	U R 125	U R 127	U R 121	R 111	94	80	78	55	
17	51	54	50	54	60	35	33	68	96	116	126	136	U R 138	U R 151	Y	Y	U R 154	U R 154	U R 142	R 126	129	113	86	71	
18	71	72	76	68	55	33	34	64	80	96	106	115	132	U R 129	U R 126	131	136	129	108	107	97	71	64	54	
19	50	R 46	46	46	42	36	29	58	88	112	115	117	118	R 124	135	128	133	120	107	87	92	93	81	68	
20	64	60	63	63	59	39	36	67	84	96	116	124	112	R 127	R 132	R 138	R 136	R 133	R 141	R 120	R 109	R 108	80	58	
21	45	43	44	42	43	33	26	59	84	104	118	131	136	RU RU 145	R 132	R 146	R 145	R 140	R 121	R 100	84	86	70	63	
22	56	53	48	44	42	29	30	62	85	93	120	126	142	RU RU 154	RU RU 162	156	154	154	141	94	87	78	78	74	
23	66	61	53	51	42	31	30	59	86	99	108	105	103	R 114	123	120	115	102	103	87	89	82	75	63	
24	58	68	52	50	22	23	25	60	88	101	R 117	127	137	R 137	R 145	R 149	R 144	R 123	R 116	R 115	R 104	R 104	93	79	
25	79	70	60	55	48	29	28	54	80	93	99	96	107	R 111	123	123	124	112	91	72	70	75	65	52	
26	50	44	42	43	26	22	24	48	76	91	92	88	100	R 100	100	102	107	99	85	85	78	84	91	76	60
27	41	32	32	32	36	25	24	45	74	104	J R 104	102	107	R 91	R 100	R 107	R 106	R 109	97	72	74	66	55	38	
28	37	34	38	32	32	26	25	47	68	88	93	104	98	96	98	89	98	98	84	61	74	69	58	J R 44	
29	40	35	34	30	R 34	28	30	54	74	85	82	88	110	94	110	125	118	114	R 104	95	90	82	80	69	
30	62	66	52	41	J R 48	34	32	51	72	86	104	98	116	116	112	106	100	81	88	64	73	86	71	52	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	30	30	30	30	30	30	30	30	
MED	54	50	47	44	42	32	30	64	86	102	115	118	122	130	R 134	132	131	122	108	91	90	84	74	58	
U Q	59	60	52	51	46	35	35	68	91	110	121	126	131	R 139	RU RU 146	RU R 143	RU R 138	RU R 129	RU R 119	106	97	91	78	68	
L Q	44	42	40	40	35	28	28	59	80	96	104	106	111	122	123	124	118	109	98	78	82	74	59	52	

NOV. 2013 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

NOV. 2013 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								
2										L	L	L	L	L	L	L								
3										L	L	L	L	L	L	L	L							
4											L	L	L	L	L	L	L							
5											L	L	L	L	L	L								
6										L	L	L	L	L	L	L								
7											L	U	L		L	U	L	L	L					
8											L	L	L	L	L	L								
9										L	L	L	L	L	L	L	L	L						
10										L	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							
13										L	L	L	L	L	L	L	L							
14											L	L	L	L	L	L	L							
15											L	L	L		L	L	L							
16										L	L	L	L	L	L	L	L							
17											L	L	L	L	L	L	L							
18										L	L	L	L	L	L	L	L	L						
19									L	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	L	L	L	L						
22											L	L	L	L	L	L	L	L						
23										L	L	L	L	L	L	L	L	L						
24										L	L	L	L	L	L	L	L	L						
25											L	L	L	U	L	L	L	L						
26										L	L	L	L	L	L		L	L						
27										L	L	L	A	A	U	L	L	L						
28										L	L	L	L	L	L	L	L	L						
29										L	L	U	L	L	L	L	L	L						
30										L	L	L	L	L	L	L	L	L						
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT												3	1	1	3									
MED												U	L	U	L	U	L							
U Q												468	460	492	552									
L Q												U	L			L								
												504			564									
												U	L		U	L								
												456			516									

NOV. 2013 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



# IONOSPHERIC DATA STATION Okinawa

NOV. 2013 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								200	268	304	R	R	B	B	B	B	B	U	R	B				
2								200	256	312	R	R	B	B	B	B	308	B	B					
3								228	260		R	R	B	U	R	B	A	B	B	A				
4								204	280	320	R	B	B	B	B	B	296	216						
5								A	248		R	B	B	B	B	B	304	220						
6								204	264	336	U	R	R	B	B	R	B	A	A	A				
7								200	260		B	B	B	B	B	A	U	A	A	A		B		
8								192	260	300		A	A	B	B	B	U	R	A					
9								188	268	312	U	A	U	R	U	R	A	A	R					
10								B	U	R	R		B	B	B	B	B	268	216					
11								A	U	R	U	A		B	B	B	A	A	A	B				
12								R	A	312	R	B	B	B	B	B	B	U	R					
13								B	R	268	U	R	U	R	B	B	U	R	A					
14								A	U	R	U	R		B	B	B	B	U	R	A	A	B		
15								B	U	R	R		B	B	B	U	R	R						
16								B	264	300	U	A	U	R	B	R	B	A	A	A	R	A		
17								200	252	304	U	R		B	U	R	A	A	U	R				
18								B	268	312	R		B	R	R	R	A	R						
19								184	248	284	U	R	B	U	R	B	B	R	U	R	A	B		
20								184	260	304	U	R	B	B	B	A	U	R	R	B	B			
21								196	260	304	360		U	R	R	B	320	A	A	B				
22								R	184	244	288	320		A	B	B	U	R	B	A				
23								184	248	296	U	R	A	U	R	B	B	A	A					
24								176	260	312	R		B	B	U	A	A							
25								196	248	308	U	R	B	372	364	356								
26								B	240	312	348	360	U	R	U	R	R	A	A					
27								184	244	308	332	368	U	R	B	U	R	B	R	A	R	B		
28								B	256	304	R	B	356	U	R	A	B	A	U	R	A	B		
29								B	U	A	A		A	U	R	A	A	292	268	224				
30								B	U	A	A	U	A	A	U	A	A	U	A	A	B			
31									244	308					344	316	272							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								17	29	24	13	8	5	9	5	8	16	17						
MED								196	260	306	344	360	364	360	356	330	286	216						
U Q								200	266	312	354	366	368	374	364	350	294	222						
L Q								184	248	300	318	350	352	350	336	318	274	210						



IONOSPHERIC DATA STATION Okinawa

NOV. 2013 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	BE	BE	BE	B		E	BE	BE	BE	B	G	G		GE	BE	BE	BE	BE	BE	BE	BE	BE	BE	B					
2	E	BE	BE	BE	BE	BE	BE	BE	B	G	G	GU	GE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	B					
3	E	BE	BE	BE	BE	BE	BE	BE	B	G	GU	GU	GU	GE	B		GE	B		E	B		E	BE	BE	BE	BE	BE	BE	B
4	E	BE	BE	BE	BE	BE	BE	BE	B	G	GU	YE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	B				
5	E	BE	BE	BE	BE	BE	BE	BE	B		GU	YE	B		E	BE	BE	BE	BE	BE	BE	BE	BE	BE	B					
6	E	BE	BE	BE	BE	BE	BE	BE	B	G	G	GE	BE	B		E	B					E	B		E	BE	BE	B		
7	E	BE	BE	BE	BE	BE	BE	BE	B	G		E	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	BE	B					
8	E	BE	BE	BE	BE	BE	BE	BE	B	G					E	BE	BE	BE	BE	BE	BE	BE	BE	B						
9	E	BE	BE	BE	BE	BE	BE	BE	B	G	G									U	GE	BE	BE	BE	BE	BE	B			
10	E	BE	BE	BE	BE	BE	BE	BE	B	G	G											E	BE	BE	BE	BE	B			
11	E	BE	BE	BE	BE	BE	BE	BE	B	G	G				E	B					E	BE	BE	BE	BE	BE	B			
12	E	BE	BE	BE	BE	BE	BE	BE	B	U	G				E	BE	BE	BE	BE	BE	BE	BE	BE	BE	B					
13	E	BE	BE	BE	BE	BE	BE	BE	B		U	G			GE	BE	BE	BE	BE	BE	BE	BE	BE	B						
14	E	BE	BE	BE	BE	BE	BE	BE	B	G	G				GE	BE	BE	BE	BE	BE	BE	BE	BE	B						
15	E	BE	BE	BE	BE	BE	BE	BE	B	G	G				GE	B		E	B		G	G		E	BE	BE	B			
16	E	BE	BE	BE	BE	BE	BE	BE	B	G		U	YE	B		E	B				G		E	BE	BE	BE	BE	B		
17	E	BE	BE	BE	BE	BE	BE	BE	B	G	G				GU	GE	BE	G			G		E	BE	BE	BE	BE	B		
18	E	BE	BE	BE	BE	BE	BE	BE	B	G					GE	B	U	GU	GU	GU	G			GE	BE	BE	BE	BE	B	
19	E	BE	BE	BE	BE	BE	BE	BE	B	G	G				GE	B		GE	BE	BE	BE	BE	BE	BE	B					
20	E	BE	BE	BE	BE	BE	BE	BE	B	G	G				GE	BE	BE	BE	BE	BE	BE	BE	BE	B						
21	E	BE	BE	BE	BE	BE	BE	BE	B	G	G				GU	G		GU	GE	B				E	BE	BE	B			
22	E	BE	BE	BE	BE	BE	BE	BE	B	G	G													E	BE	BE	BE	BE	B	
23	E	BE	BE	BE	BE	BE	BE	BE	B	G					GE	BE	BE	BE	BE	BE	BE	BE	BE	B						
24	E	BE	BE	BE	BE	BE	BE	BE	B	G					E	B		U	Y				E	BE	BE	BE	BE	BE	B	
25	E	BE	BE	BE	BE	BE	BE	BE	B	G					E	B								E	BE	BE	BE	BE	B	
26	E	BE	BE	BE	BE	BE	BE	BE	B	G														E	BE	BE	BE	BE	B	
27	E	BE	BE	BE	BE	BE	BE	BE	B	G					U	Y		E	B	U	G			E	BE	BE	BE	BE	B	
28	E	BE	BE	BE	BE	BE	BE	BE	B	G	G				GE	B								E	BE	BE	BE	BE	B	
29	E	BE	BE	BE	BE	BE	BE	BE	B															E	BE	BE	BE	BE	B	
30	E	BE	BE	BE	BE	BE	BE	BE	B															E	BE	BE	BE	BE	B	
31																														
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23						
CNT	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30	30	30	30	30						
MED	E	BE	BE	BE	BE	BE	BE	BE	B	G	G	GE	GE	GE	BE	BE	B				E	BE	BE	BE	BE	BE	BE	B		
UQ	E	BE	BE	BE	BE	BE	BE	BE	B			E	B		E	B							E	BE	BE	BE	B			
LQ	E	BE	BE	BE	BE	BE	BE	BE	B	G	G	G	GE	B		G	G				GE	BE	BE	BE	BE	BE	BE	B		

## IONOSPHERIC DATA STATION Okinawa

NOV. 2013 fmin (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

$\begin{matrix} H \\ D \end{matrix}$	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	18	16	14	18	16	21	32	43	44	44	41	42	25	17	14	14	14	14	14	14
2	14	14	14	14	14	14	14	17	20	21	20	46	44	43	44	42	22	21	14	14	14	14	14	14
3	14	14	14	14	14	14	14	16	17	21	22	23	42	29	42	24	27	23	14	19	14	14	14	14
4	14	14	14	14	14	14	14	15	21	24	40	44	45	43	40	40	20	17	18	14	14	14	14	14
5	14	14	14	14	14	14	14	14	15	33	42	38	43	43	40	40	21	15	15	14	14	14	14	14
6	14	14	14	14	14	20	14	14	19	24	43	44	42	33	41	26	21	16	14	14	14	14	14	14
7	14	14	14	14	14	14	14	14	20	43	42	42	45	43	24	22	22	20	14	14	20	14	14	14
8	14	14	14	14	14	14	14	14	14	22	33	34	41	43	44	24	18	17	14	14	14	14	14	14
9	14	14	14	17	15	14	14	14	15	18	22	23	26	26	27	20	21	14	14	14	14	14	14	14
10	14	14	14	14	14	14	14	22	20	20	22	46	41	43	43	40	16	20	14	14	14	14	14	14
11	14	14	17	14	14	14	14	14	20	24	29	43	40	44	36	32	20	14	14	14	14	14	14	14
12	14	14	14	14	14	18	14	16	18	21	43	42	44	43	41	42	22	16	14	14	14	14	14	14
13	14	14	14	14	14	14	14	18	18	21	21	22	41	45	24	27	21	17	14	17	14	14	14	14
14	14	14	14	14	14	14	14	14	17	22	24	44	43	44	44	22	16	17	14	14	14	14	14	14
15	14	14	14	14	14	14	14	20	17	17	23	44	42	44	24	20	17	16	14	15	14	14	14	14
16	14	14	22	14	14	22	14	20	21	20	20	44	33	43	36	24	19	15	14	14	20	14	14	14
17	14	14	14	14	14	14	14	15	20	20	24	24	42	24	28	23	19	14	14	14	14	14	20	14
18	14	14	14	14	14	14	14	20	18	20	23	42	32	27	31	24	23	20	14	14	14	14	14	14
19	14	14	14	14	14	14	14	16	20	21	40	23	41	42	41	27	20	17	14	14	19	14	14	14
20	14	14	14	14	14	14	14	14	17	23	21	43	44	44	22	20	20	24	14	14	14	14	14	14
21	14	14	14	14	14	14	14	14	20	18	24	22	20	22	42	17	19	14	14	14	14	14	14	14
22	14	20	14	14	14	14	14	17	16	20	22	24	42	43	22	35	20	19	14	14	14	14	14	14
23	14	14	14	14	14	14	14	14	14	20	32	25	43	45	33	28	20	14	14	14	14	14	14	14
24	14	14	14	14	14	14	14	14	15	20	22	39	44	32	32	20	20	23	14	14	14	14	14	14
25	14	14	14	14	14	14	14	14	15	18	24	40	31	32	22	24	20	16	14	14	14	14	14	14
26	14	14	14	14	14	14	14	18	14	19	27	24	24	24	21	32	20	16	14	14	19	14	14	14
27	14	14	14	14	14	14	14	14	14	20	19	22	40	24	38	24	18	17	14	14	14	14	14	14
28	14	14	14	14	14	14	14	16	18	19	39	23	23	24	35	21	22	18	14	14	14	14	14	14
29	14	14	14	14	14	14	14	16	16	21	21	23	31	29	23	20	16	16	14	14	14	14	14	14
30	14	14	14	14	14	14	14	16	16	15	23	23	24	25	23	20	16	14	14	14	14	14	14	14
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	14	14	14	14	14	14	14	16	17	20	24	38	42	43	36	24	20	17	14	14	14	14	14	14
U Q	14	14	14	14	14	14	14	17	20	22	33	43	43	43	41	32	21	19	14	14	14	14	14	14
L Q	14	14	14	14	14	14	14	14	15	20	22	23	32	27	24	21	19	15	14	14	14	14	14	14

NOV. 2013 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

NOV. 2013 M(3000)F2 (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	307	304	315	338	384	312	314	337	347	319	338	333	305	308	RU R	326	313	313	324	332	316	292	297	320	303			
2	307	315	328	353	324	288	297	346	355	330	337	325	319	R	314	RU R	320	327	332	328	333	311	286	313	313	304		
3	312	329	345	326	346	333	307	330	340	335	329	321	314	RU RU R	314	RU R	320	334	325	333	336	326	291	320	311	313		
4	297	315	313	344	401	317	302	342	356	328	321	320	314	RU RU R	328	RU R	323	329	Y	331	338	300	310	318	314	296		
5	298	314	322	315	323	361	287	327	344	337	326	310	U R	R	U RU R	326	319	332	334	332	318	304	329	286	306			
6	313	320	313	337	399	292	279	357	340	325	335	327	308	R	319	318	331	336	360	344	305	313	343	344	315			
7	311	291	306	R	R	355	295	308	358	377	334	325	322	312	315	J RJ R	310	318	322	346	304	284	318	308	285			
8	297	333	355	300	279	313	327	361	345	330	331	316	295	U R	312	318	310	334	317	331	334	282	327	320	316			
9	297	U R	305	R	302	326	329	335	311	349	361	343	348	R	J RU R	317	317	333	Y	Y	R	311	327	305	315	331	274	275
10	277	291	339	312	304	297	305	342	343	343	342	333	320	R	309	319	316	319	333	342	334	301	308	331	325			
11	323	312	296	309	346	313	324	350	336	333	354	333	297	R	315	318	311	329	317	328	322	312	321	317	326			
12	319	292	290	309	286	291	312	346	361	335	341	334	304	R	323	322	345	332	329	326	313	327	351	325	314			
13	304	333	297	301	330	322	342	364	372	359	345	333	313	R	317	311	319	322	341	345	326	333	327	311	305			
14	295	298	322	327	337	318	298	339	346	351	337	313	308	RU R	315	329	330	319	334	334	321	309	317	318	326			
15	313	297	305	332	371	294	310	345	346	350	337	316	319	R	RU RU R	308	334	337	350	338	317	317	328	322	287			
16	302	314	307	293	308	321	301	341	348	348	323	320	305	RU R	294	313	314	U R	304	311	328	307	316	319	340	304		
17	295	302	291	301	337	352	302	339	336	330	320	318	311	U R	311	Y	Y	U RU R	327	339	343	314	319	326	303	288		
18	296	308	323	331	355	321	341	357	359	333	344	311	321	U R	286	294	306	320	338	318	318	346	299	315	305			
19	292	R	296	321	341	337	288	343	347	337	322	337	323	R	304	308	308	322	336	328	308	309	308	324	325			
20	296	287	321	331	336	316	300	338	354	344	326	329	290	R	304	308	320	323	334	334	332	317	307	324	324			
21	271	285	305	311	325	372	294	344	358	329	323	327	315	RU R	320	R	J RJ RU R	326	329	353	335	348	300	313	315	312		
22	306	289	309	312	352	308	283	345	369	344	332	308	334	RU RU R	332	325	319	338	344	353	325	328	311	307	322			
23	320	316	309	297	327	326	297	339	364	346	343	334	315	R	302	313	332	338	336	325	327	321	302	312	318			
24	278	323	327	346	382	288	276	331	361	325	321	320	331	R	313	323	332	328	325	324	346	314	325	314	321			
25	310	337	334	324	365	289	301	327	354	340	340	362	312	R	327	320	320	340	337	328	334	305	316	322	307			
26	316	308	334	370	364	276	298	335	352	349	360	355	340	R	328	327	343	355	338	340	329	294	327	331	346			
27	313	305	296	309	347	385	289	330	332	354	353	355	353	J R	323	329	315	320	345	332	311	326	331	340	312			
28	315	288	302	332	326	353	322	349	360	357	342	351	359	R	338	312	339	328	348	385	301	319	323	336	J R	311		
29	294	316	308	308	326	320	317	R	373	360	358	346	323	355	294	321	324	333	343	330	328	327	333	342	309			
30	299	314	324	313	J R	348	313	348	348	350	355	331	328	334	331	332	338	353	342	341	302	328	343	309				
31																												
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	28	28	28	30	30	30	30	30	30	30	30			
MED	303	308	311	320	337	318	302	344	353	338	337	326	314	315	R	320	322	328	335	334	320	312	320	319	312			
U Q	313	316	324	332	355	335	313	349	360	349	344	333	323	323	R	326	332	335	343	342	329	319	328	331	321			
L Q	296	292	302	309	325	295	297	338	345	330	326	320	308	308	312	314	321	328	328	311	301	313	312	304				

NOV. 2013 M(3000)F2 (0.01)

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## IONOSPHERIC DATA STATION Okinawa

NOV. 2013 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								
2										L	L	L	L	L	L	L								
3										L	L	L	L	L	L	L	L							
4											L	L	L	L	L	L	L							
5											L	L	L	L	L	L								
6										L	L	L	L	L	L	L								
7											L	U L 382		L	U L 352	L	L							
8											L	L	L	L	L	L								
9										L	L	L	L	L	L	L	L							
10										L	L	L	L	L	L	L	L							
11										L	L	L	L	L	L	L	L							
12										L	L	L	L	L	L	L								
13										L	L	L	L	L	L	L								
14											L	L	L	L	L	L								
15											L	L	L		L	L	L							
16											L	L	L	L	L	L	L							
17											L	L	L	L	L	L								
18										L	L	L	L	L	L	L	L							
19									L	L	L	L	L	L	L	L	L							
20										L	L	L	L	L	L	L	L							
21									L	L	L	L	L	L	L	L	L							
22											L	L	L	L	L	L	L							
23											L	L	L	L	L	L	L							
24											L	L	L	L	L	L	L							
25											L	L	L	U L 380	L	L	L							
26										L	L	L	L	L		L	L							
27										L	L	L	A	A	U L 365	L	L							
28										L	L	L	L	L	L	L	L							
29										L	L	U L 427	L	L	L	L								
30										L	L	L	L	L	L	L	L							
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT												3	1	1	3									
MED												U L 413	U L 420	U L 380	U L 361									
U Q												U L 427			U L 365									
L Q												U L 382			U L 352									

NOV. 2013 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

NOV. 2013 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											250	254	L 292	298	276	260									
2										246	252	272	250	258	272	250									
3										260	256	274	286	284	274	260	232								
4											264	266	292	274	266	264	228								
5											262	L 262	288	294	274	250									
6										264	254	244	268	276	260	240									
7											246	262		264	292	262	250								
8											262	250	L 278	288	268	246									
9										244	250	266	268	302	272	244	224								
10										242	256	246	236	292	250	262	228								
11										242	228	260	292	272	274	264	244								
12										232	246	242	L 280	266	256	260									
13										244	240	236	240	262	264	262									
14											236	276	248	278	268	246									
15											238	288	290		268	272	246								
16										236	248	L 244	286	302	298										
17											252	270	L 258	296	284	276									
18										274	240	L 252	278	L 308	L 240	L 278	260								
19									224	246	236	238	258	278	284	246	252								
20										238	274	252	236	284	292	280	244								
21									232	264	252	272	282	284	252	270									
22											268	246	264	284	264	278	252								
23										244	234	238	272	290	274	248	234								
24										250	264	256	274	280	262	254	234								
25											238	230	272	244	270	254	240								
26										254	232	236	258	258		246	220								
27										236	232	242	254	274	270	230	256								
28										244	246	254	232	254	302	232	238								
29										238	230	238	238	236	266	256									
30										234	242	268	266	258	262	244	226								
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT									2	20	30	30	29	29	29	29	18								
MED									228	244	247	253	268	278	270	256	239								
U Q										252	256	266	284	291	275	264	250								
L Q										238	238	242	252	263	263	246	228								

NOV. 2013 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

NOV. 2013 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

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	250	258	248	254	216	218	240	234	226	226	218	Y B	222	220	B	232	228	218	202	200	226	226	224	218			
2	232	236	214	204	202	280	276	236	226	224	220	Y B	236	222	B	258	240	236	220	204	188	218	212	218	248		
3	244	224	222	232	232	214	268	226	224	238	220	Y Y	234	228	228	228	248	224	214	206	196	216	220	234	236		
4	240	242	220	224	190	266	256	228	226	222	218	Y E B	230	208	H	232	234	236	224	218	202	190	206	204	222	254	
5	248	244	232	246	228	200	256	240	232	234	230	224	212	234	214	H	228	234	226	206	206	232	212	228	246		
6	240	254	248	224	190	E B E B	356	302	238	228	230	Y E B E B	230	232	234	220	B	236	220	210	206	232	228	214	204	236	
7	252	274	266	230	208	266	260	218	212	226	208	220	252	242	198	H	232	224	230	218	194	234	222	208	262		
8	244	206	222	280	308	262	238	210	212	214	228	220	224	228	236	A	232	236	222	210	210	212	214	206	256		
9	248	258	274	254	214	240	272	230	220	214	226	206	216	208	234	234	222	220	208	220	228	204	250	270			
10	292	274	226	260	250	304	280	252	228	222	224	Y E B	232	208	B	232	224	212	226	196	194	238	216	210	224		
11	240	274	304	274	228	270	222	220	228	222	220	214	208	242	240	A	232	220	228	212	212	206	194	226	208		
12	228	236	286	262	224	286	262	230	218	218	228	226	218	244	222	B	232	220	212	204	216	214	202	186	224		
13	238	242	280	284	254	246	238	206	210	222	218	192	196	234	230	B	232	226	220	200	208	206	196	214	242		
14	276	264	236	228	228	226	278	236	220	228	214	212	228	230	236	B	224	226	222	206	196	210	196	222	220		
15	240	266	256	228	212	262	256	226	218	226	210	208	234	232	236	216	222	216	196	198	210	228	208	256			
16	262	240	254	282	262	E B	230	266	232	232	220	220	Y E B	224	218	B	216	238	224	234	212	212	222	222	212	226	
17	250	254	264	252	220	206	278	240	230	228	218	222	214	214	208	H	238	238	218	198	196	214	194	206	236		
18	260	246	240	234	212	246	240	216	218	212	234	Y	212	232	230	H	228	224	222	220	204	208	204	184	230	236	
19	262	272	268	250	226	236	246	224	218	228	216	E Y	234	198	210	236	Y	230	234	216	206	194	218	208	220	212	
20	248	268	236	224	214	226	268	238	218	208	226	Y	226	224	238	B	242	244	212	214	208	196	214	208	190	224	
21	254	284	252	244	240	210	306	246	210	224	224	214	210	226	Y	B	226	226	236	212	186	208	210	216	212	242	
22	252	276	250	256	230	256	296	244	214	220	206	212	218	232	232	Y E	206	216	228	200	186	200	200	218	224		
23	232	234	238	260	214	226	280	234	218	216	224	222	218	230	234	Y	242	222	218	198	198	218	224	226	212		
24	276	234	212	222	212	304	322	246	222	228	224	218	236	214	222	Y	226	228	208	200	204	202	208	212	214		
25	216	212	216	234	208	214	272	232	222	230	226	220	218	202	224	Y	192	234	208	200	186	238	226	216	236		
26	244	238	238	202	202	B	294	230	222	232	228	220	230	234	A	236	E Y E A	248	224	202	196	188	256	220	210	222	
27	244	268	294	282	232	198	324	248	226	228	228	E A	248	A	A	A	H E Y	190	224	220	204	184	190	210	218	214	228
28	262	288	260	230	228	214	270	228	218	226	224	B	230	236	A	246	A	220	194	216	196	188	230	212	202	232	
29	266	266	274	272	254	260	266	214	222	214	210	206	234	222	A	234	A	190	220	212	192	202	224	204	224	218	
30	246	232	218	258	248	220	254	226	220	218	E A	242	240	A	A	Y	A	208	202	196	190	242	222	210	224		
31																											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	30	30	30	30	30	30	30	30	30	30	30	29	29	29	30	29	30	30	30	30	30	30	30	30	30		
MED	248	254	248	248	225	240	268	231	221	224	222	217	220	230	232	231	224	218	202	197	217	212	214	230			
U Q	260	268	266	260	232	266	280	238	226	228	228	E	231	231	234	236	237	228	222	206	208	228	220	224	242		
L Q	240	236	226	228	212	218	256	226	218	218	218	213	213	218	224	224	220	212	196	190	210	204	208	222			

NOV. 2013 h'F (KM)



IONOSPHERIC DATA STATION Okinawa

NOV. 2013 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								146	108	108	116	B	B	B	B	B	B	118	B						
2								144	110	108	A	B	B	B	B	B	112	B	B						
3								166	110		A	A	A	B		B	A	B	B	A					
4								132	114	110		B	B	B	B	B	B	110	112	B					
5								A	110		B	B	B	B	B	B	B	112	114	B					
6								134	110	108		B	B	B		B	114	A	A	A					
7								142	112		B	B	B	B	B	A	A	A	128	A	B				
8								142	108	108		A	A	B	B	B	110	A	120	A					
9								124	124	108	108	104	108	108		A	A	A	A	B					
10								B	108	106	106		B	B	B	B	B	106	134	A					
11								A	114	108	110		B	B	B	A	A	A	A	B					
12								A	A	108		B	B	B	B	B	B	108	114	B					
13								B	114	A	108		A	B	B		A	110	120	A					
14								A	108	108	108		B	B	B	B	108	112	A	B					
15								B	112	110	108		B	B	B	108	108	110	116	B					
16								B	108	108	106		B	R	B	A	A	A	122	A					
17								158	114	106	106		A	B		A	A	114	108	A					
18								B	116	110	110		B	A	A	A	A	110	128	B					
19								172	110	108		B	B	B	B	A	116	A	B						
20								144	110	110	108		B	B	B	B	118	114	B	B					
21								166	114	108	108		A	104	A	B	108	A	A	B					
22								168	110	108	108		A	B	B		B	A	B						
23								150	110	110		A	B	B	A	A	110	116	B						
24								160	112	108	108		B	B		A	112	A	B	B					
25								162	114	110	112		B	112	114	114	A	A	128	B					
26								B	112	112	112	110	106	106	106		A	A	118	B					
27								174	112	106	106	106		B	106		B	A	A	B					
28								B	114	110		B	108	108	108		B	A	A	B					
29								B	112	110		A	112	A	A	A	108	108	122	A					
30								B	116	A	110		A	A		A	112	A	B						
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								17	29	25	18	7	5	10	6	8	16	18							
MED								150	112	108	108	110	108	110	109	109	111	119							
U Q								166	114	110	110	112	110	112	112	113	112	128							
L Q								142	110	108	108	106	105	108	108	108	110	116							

NOV. 2013 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION Okinawa

NOV. 2013 h'Es (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	B	B			B		B	G	G		G	B	B	B	B	B	108		G	B	B	B	B	94	92		
2	B	B	90	88		88		B	G	G			B	B	B	B	136	122		B	B	96		94	B		
3	B	B	B	B	B	B	B	G	G		102	102	102		B	G	B		B	B	B	B	B	B	B		
4	B	B	B	B	B	B	B	G	G		134		B	B	B	B	B	130	122		B	B	B	B	90		
5	B	B	B	B	B	B	B			94	94	148		B	B	B	B	124	124		B	B	B	B	B		
6	B	B	B	B	B	B	B	G	G	G	B	B		116	124		120	108	104	100	98	96	92		B	B	
7	B	B	B	B	B	B	B				B	B	B		B			102	124	116	106		96		B	B	
8	B	B	B	B	B	B	B	G	G					B	B	B	G		106	120	108	102	100	96	90	90	
9	B	B	B	B	B	B	B	G		106	120	116	114	112	112	110	114	106	106		102		98		98	B	
10	98	104	106	104	98	86		B	B		G	G		B	B	B	B	90		102	102	102		96		B	
11	B	B	B	B	100	98	96	120			G	G		B				110	106		B	106	96		B	B	
12	B	B	B	B	B	B	B			124	118	120	114		B	B	B	B	G		B	B	B	B	B	B	
13	B	B	B	B	B	B	B	B			152	104		G			102		G	G		B	B		94	B	
14	B	B	B	B	B	B	B	B			156		G	G	G	B		B	B	B		B	B		92	B	
15	B	B	B	B	B	B	B	B	G	G	G	B		B	B	G	G	G	G		B	96	106	96	96	96	
16	B	B	B	B	B	B	B	B	G			112	112		110		104	104	102	102	98	94		92	88	B	
17	B	B	B	B	B	B	B	G	G	G			G	B		102	108	104	104	118	104	104	104		B	B	
18	B	112		B	B	B	B	B		108	124		G	B		104	104	104	104		G	G	B	B	B	B	
19	B	B	B	B	B	B	B	G	G	G	B			B	B	B		112	106	104		98		B	B	B	
20	B	B	B	B	B	B	B				G	G	G	B	B	B		110	104	100		B	B	B	B	B	
21	B	B	B	B	B	B	B	G	G	G	G			G		B		114	114	94	94	104	102		B	102	
22	92		B	B	100	100	100				B	G	G			B	B	G		B	B	B	B		92	92	
23	B	B	B	B	B	B	B	G			G			B	B		114	106		G	G	B	B	B	B	B	
24	B	B	B	B	B	B	B	G			174		116				114	106			B	B	B	B	B	B	
25	B	B	B	B	B	B	B	G			138	128	116		B		108	112	112	110			B	B	B	B	
26	B	B	B	B	B	B	B	B			170		134		120	122		108	106	128		G	B	B	B	B	
27	B	B	B	B	B	B	B	G			170	138	134	130	124	124	112	118	108			B	B	B	B	B	
28	B	B	B		B	B		G	G	G	B			184		140	122	116	112		104	100	148	96		B	B
29	98	94		B	B	B		G	G	G	B			116	122	118	112	108		G	G		B	B	B	B	
30	B	B	B	B	B	B	B	B			112	112	112		110	104	98	98		G	G	102	102		92	94	
31											116	110	104	98	102	114	112	112	100	96	98	90		B	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	3	3	2	4	3	5	3	6	12	14	15	14	12	13	13	21	23	18	13	15	10	9	10	8			
MED	98	104	98	101	100	98	96	128	130	120	116	109	115	112	110	108	108	119	102	102	99	96	94	94			
U Q	98	112		103	100	102	106	156	170	134	128	116	121	120	112	114	110	124	106	104	102	97	96	97			
L Q	92	94		94	98	87	94	120	110	112	106	102	110	104	106	104	102	104	98	96	96	92	92	91			

NOV. 2013 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

NOV. 2013 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			F1	F2		F1					C1						C1							F1	F1	
2												L1						H1	C1			F1		F1		
3											L1	L1	L1				C1	C1		L1						
4											H1							H1	C1						F1	
5								L1	L1	H1		C1						C1	C1							
6														C1	C1		C1	C1	L1	L2	F2	F1	F1			
7							H1	H1							C1	LH11	LH11	C1	CL11	CL11	F1		F1			
8										C1	C1	C1						C1	CL11	C1	F1	F1	F2	F1	F1	
9								L1	C1	C1	C1	C1	C1	C1	C1	C1	C1	L1	L1		F1		F1		F1	
10	F1	F1	F2	F1	F1	F1											L1		L2	F1	F1		F1			
11				F1	F1	F1	C1				C1		C1	C1	CH11	C1	C1	C1		C1	F1					
12							C1	C1	C1	C1									H1							
13									HC11	L1		L1					L2			CL11	F1			F1		
14							H1									CL11	C1	C1				F1		F1		
15													H1								F1	FF11	F4	F1	F1	
16										C1	C1			C1	L1	L1	L1	L1	L3	F2			F1	F1		
17												L1		L1	C1	L1	L1	C1	CL11	CL13	F1	F1				
18		F1						L1	C1					L1	L1	L1	L1									
19													L1				C1	L1	L1		F1					
20							H1								C1	L1	L1	L1		F1			F1			
21												L1		L1			CL11	C1	L1	L1	FF11	FF11			F2	
22	F1		F1	F1	F1						C1	C1						C1						F3	F1	
23										H1		C1				C1	C1									
24										H1	C1	C1		C1	C1	C1	C1	C1								
25									H1		H1			C1	C1		C1	L1	C1							
26									H1	H1	H1	H1	H1	C1	C1	C1	C1	C1								
27									H1		H1	C1	C1	C1	C1		L1	L1	H1	L1						
28			F1				F1					C1	C1	C1	C1	C1	C1		H1	L1		F1	F1	F1	F2	
29	F1	F1			F1	F1			C1	C1	C1			C1	L1	L2	L1		L1	L1	F1		F1			
30								C1	C1	C1	L2	L1	L1	C1	CL11	CL11	L2	L1	L1	L1	F1					
31																										
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT																										
MED																										
U Q																										
L Q																										

## f-PLOTS OF IONOSPHERIC DATA

KEY OF f-PLOT	
	SPREAD
◊	f <sub>o</sub> F <sub>2</sub> , f <sub>o</sub> F <sub>1</sub> , f <sub>o</sub> E
×	f <sub>x</sub> F <sub>2</sub>
*	DOUBTFUL f <sub>o</sub> F <sub>2</sub> , f <sub>o</sub> F <sub>1</sub> , f <sub>o</sub> E
⊗	f <sub>b</sub> E <sub>s</sub>
└	ESTIMATED f <sub>o</sub> F <sub>1</sub>
†, ‡	f <sub>min</sub>
^	GREATER THAN
∨	LESS THAN

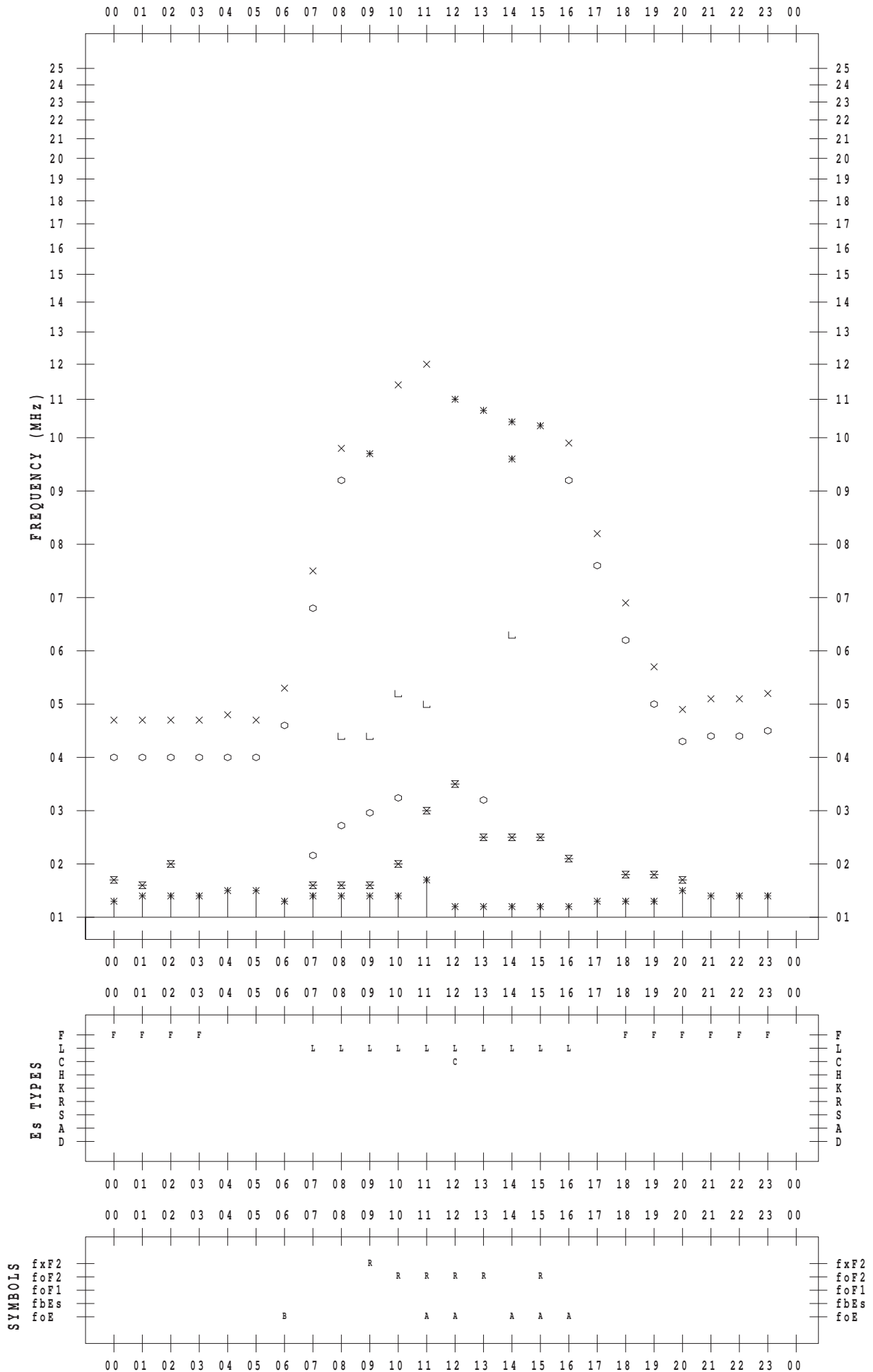
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/ 1

135 ° E MEAN TIME



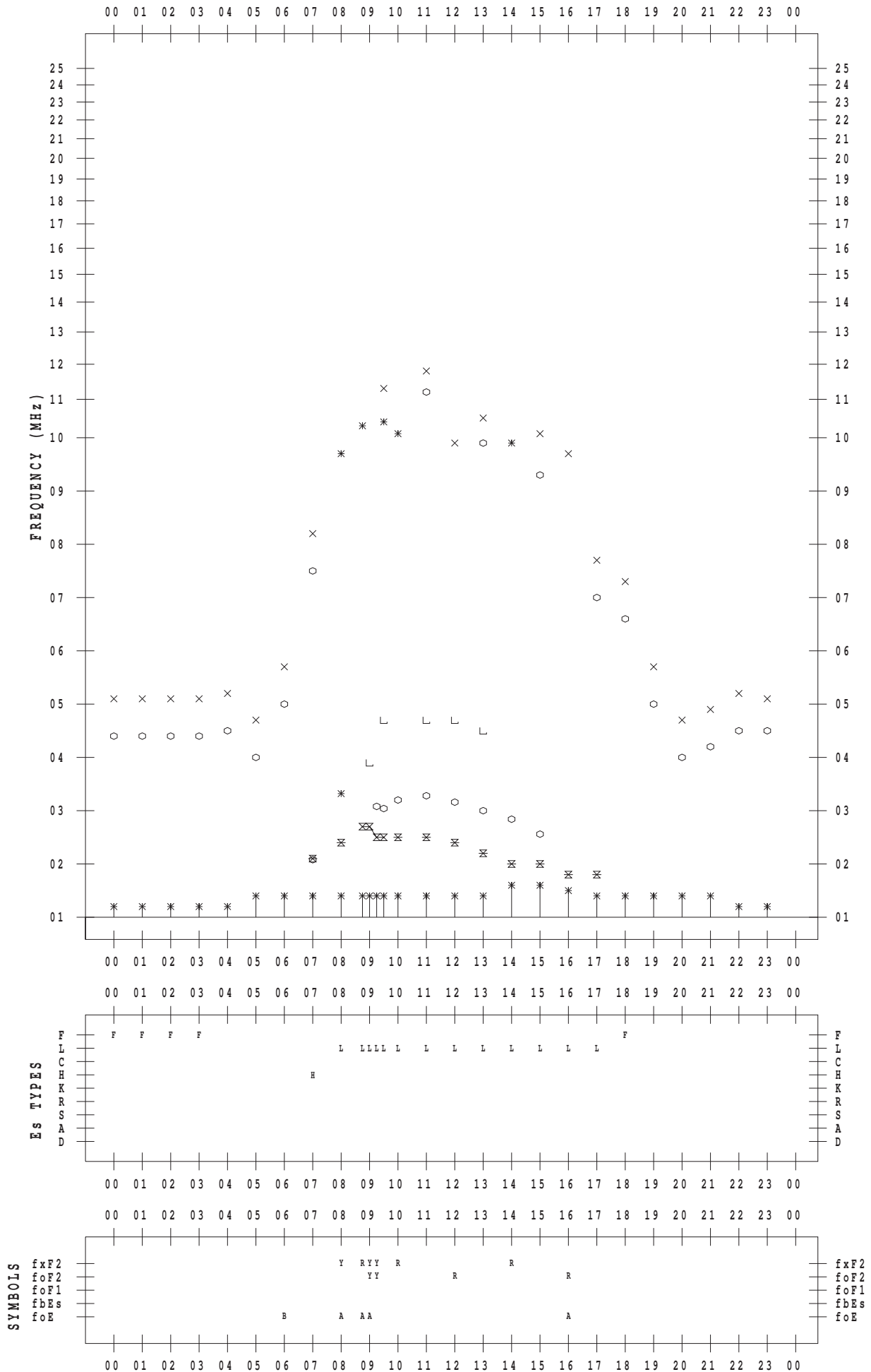
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/ 2

135 ° E MEAN TIME



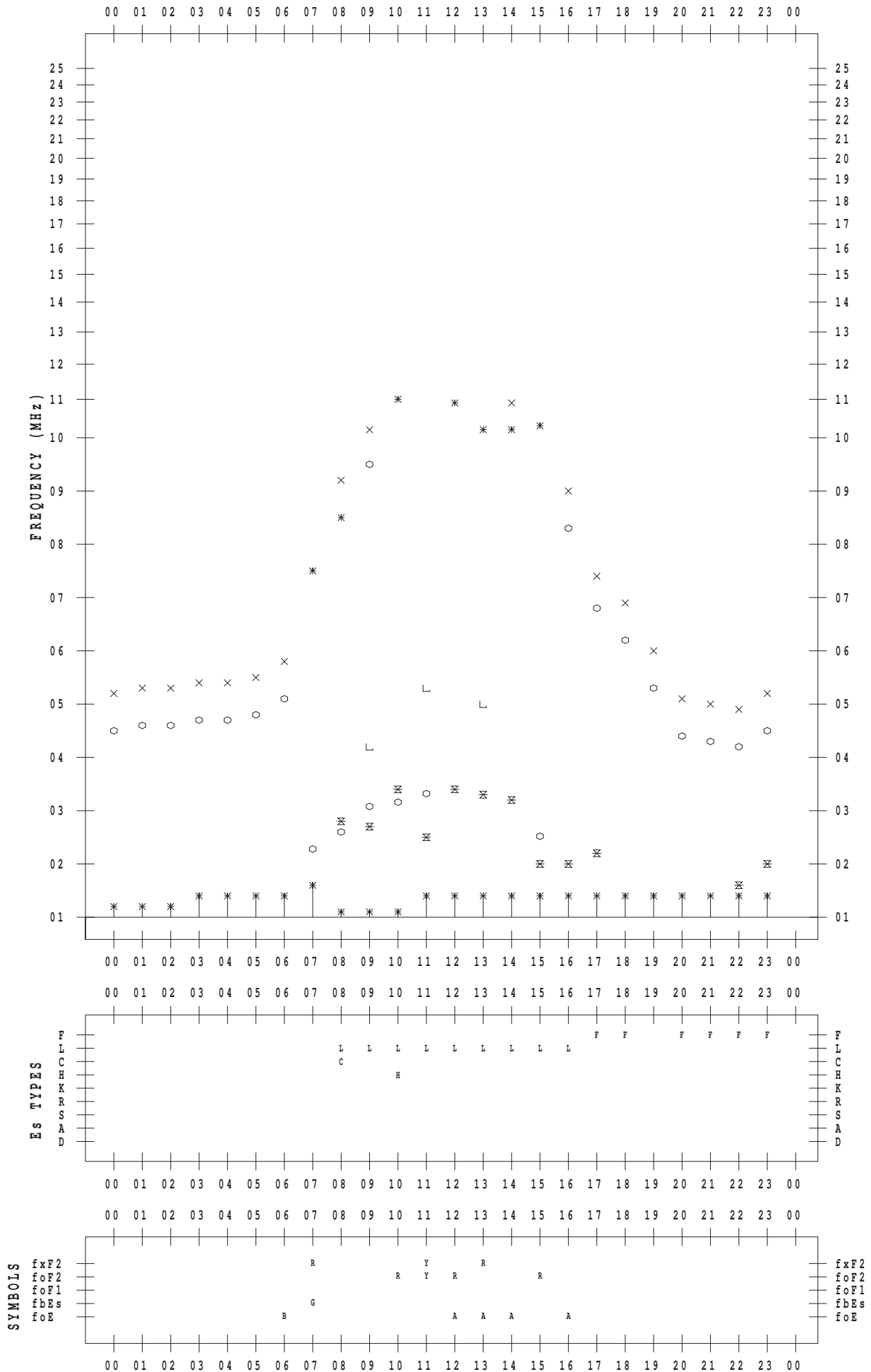
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/ 3

135 ° E MEAN TIME



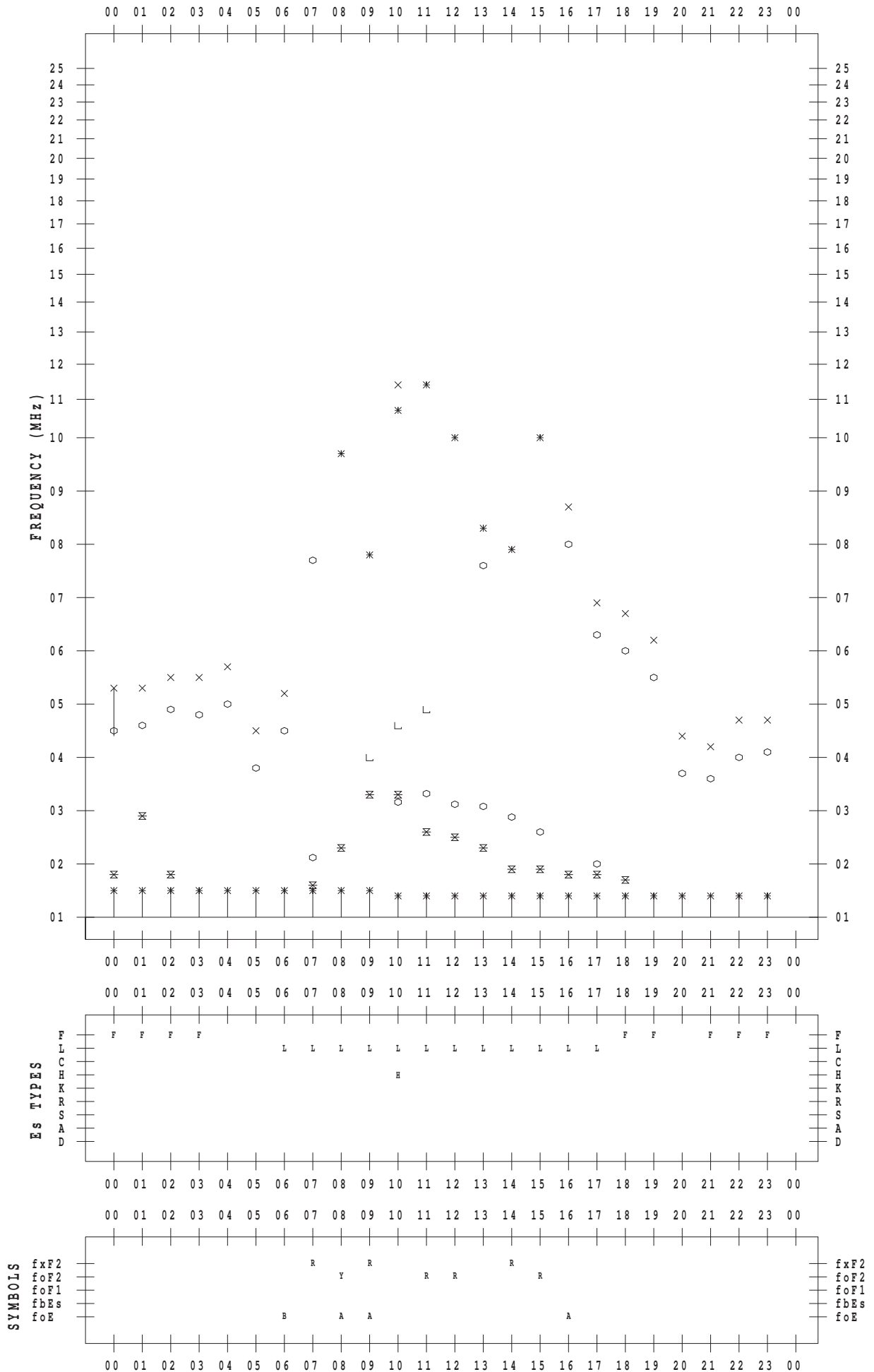
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/ 4

135 ° E MEAN TIME





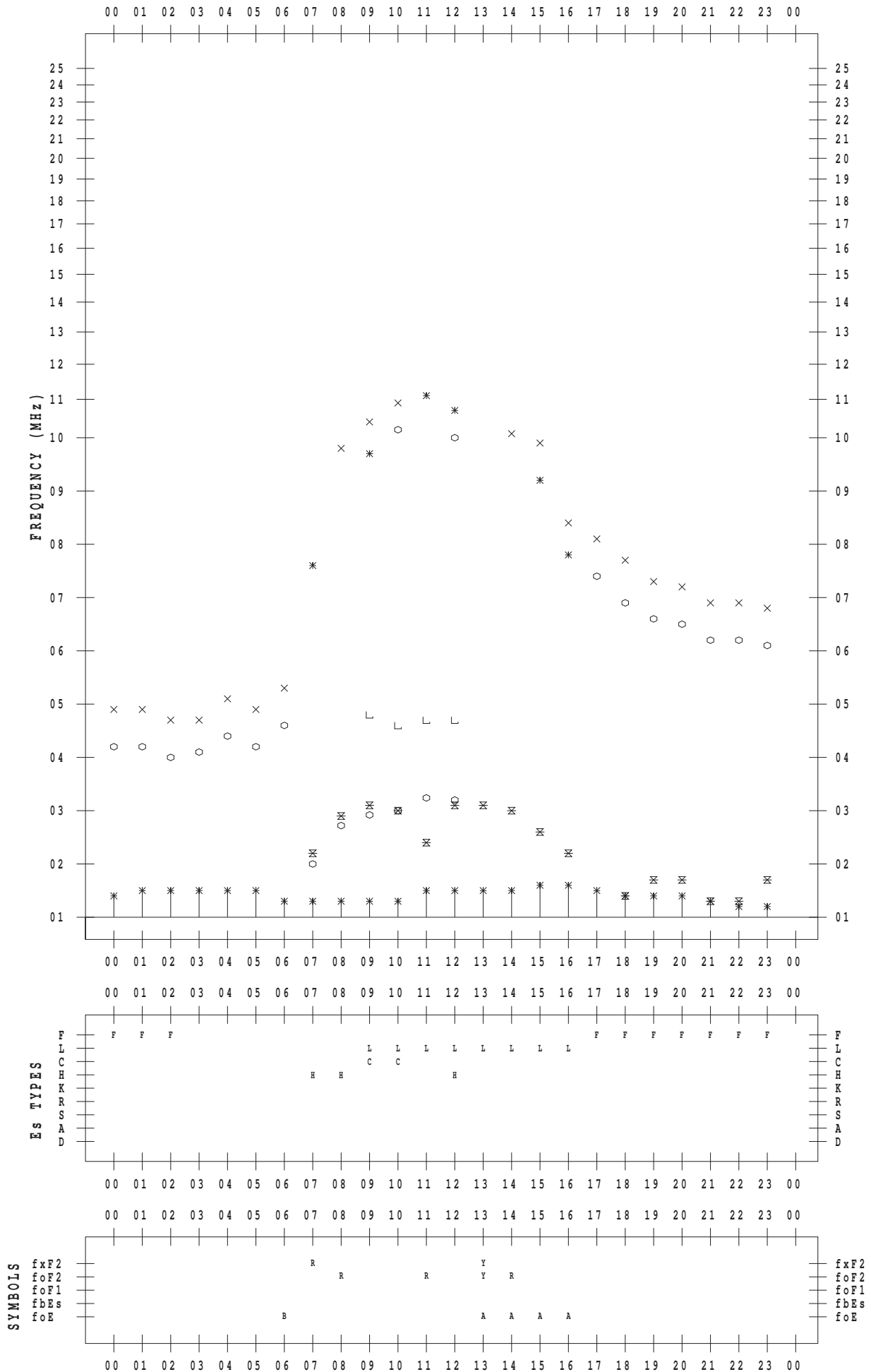
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/ 5

135 ° E MEAN TIME



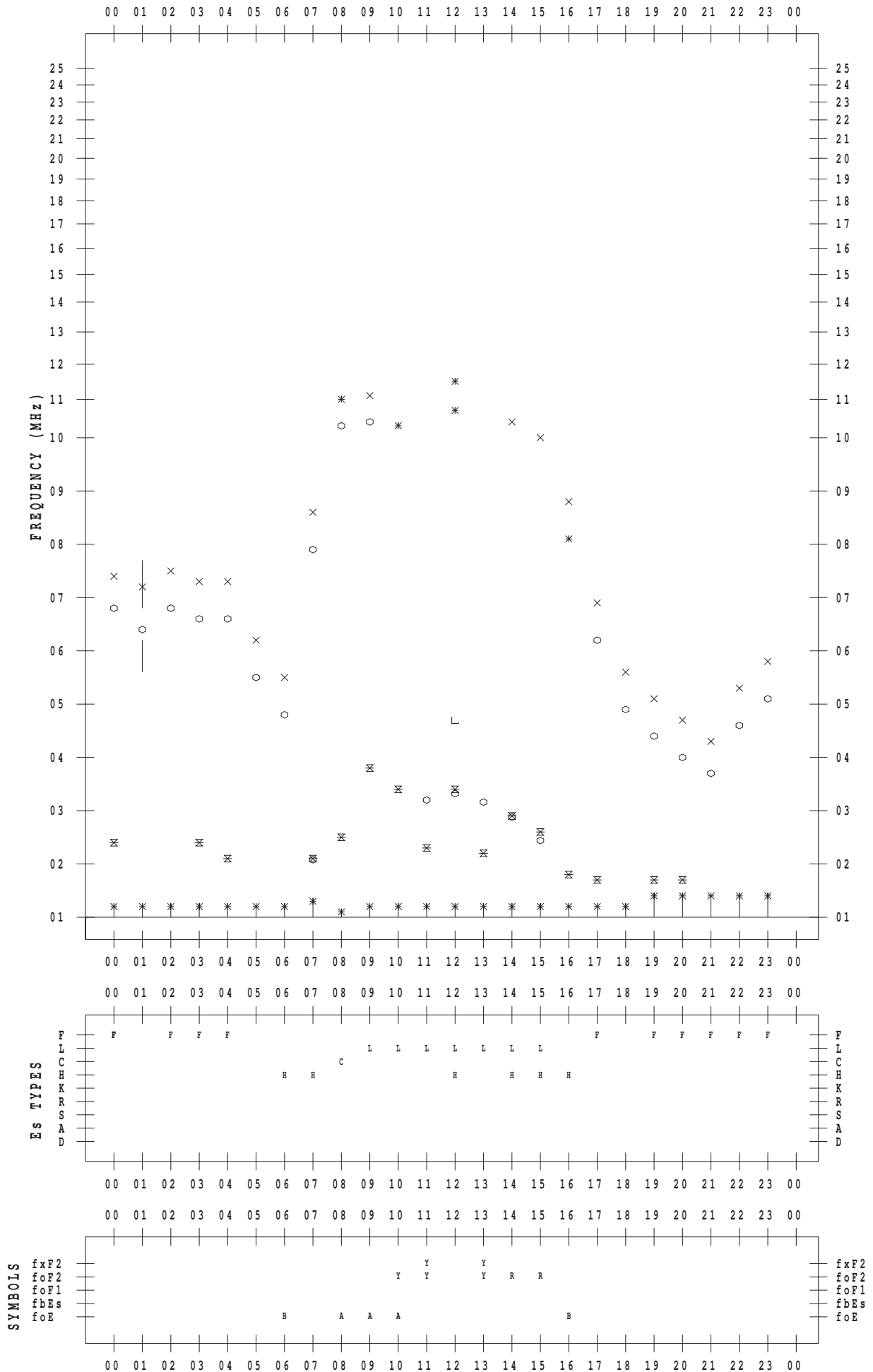
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/ 6

135 ° E MEAN TIME



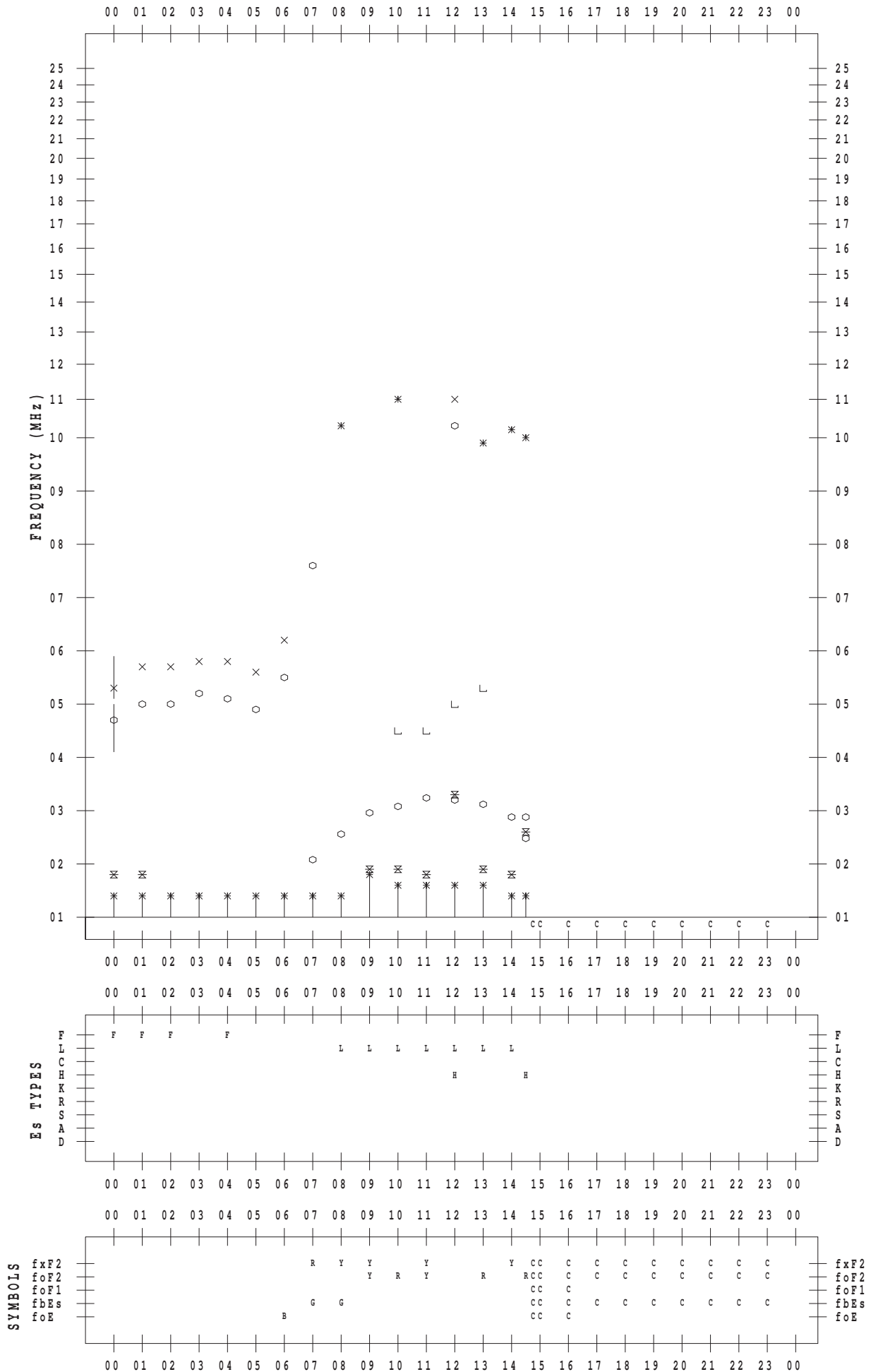
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/ 7

135 ° E MEAN TIME





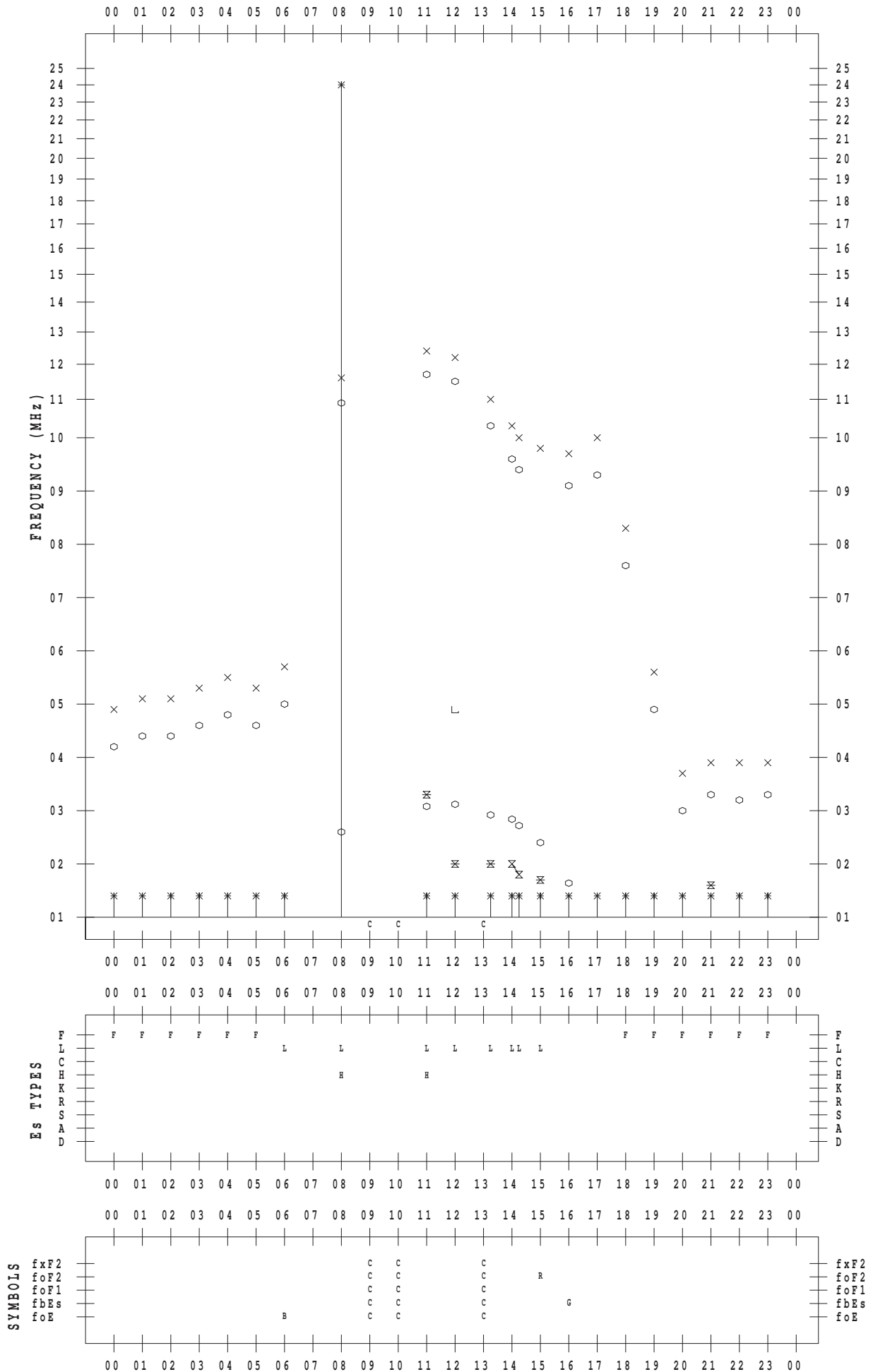
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/ 9

135 ° E MEAN TIME



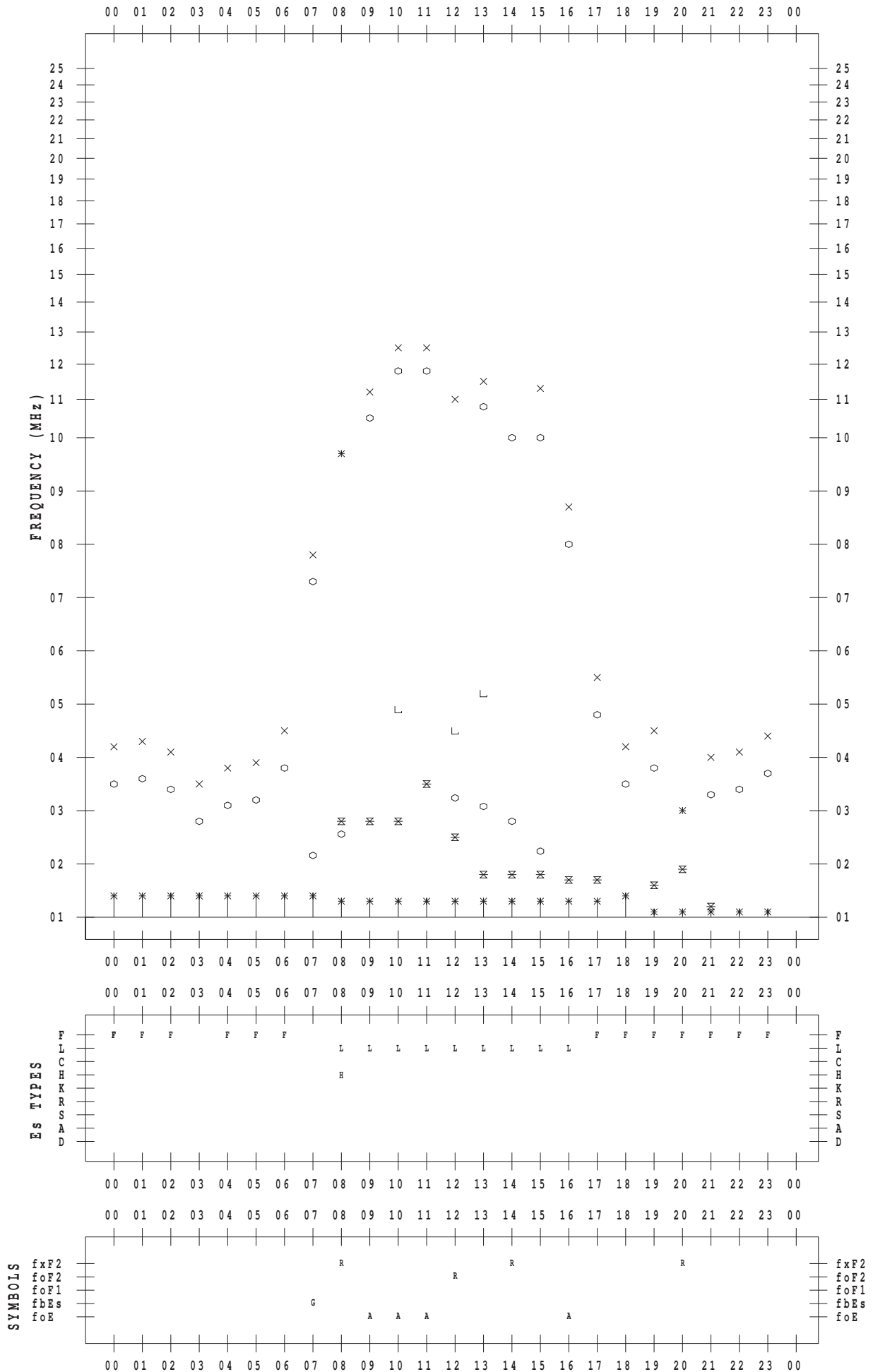
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/10

135 ° E MEAN TIME



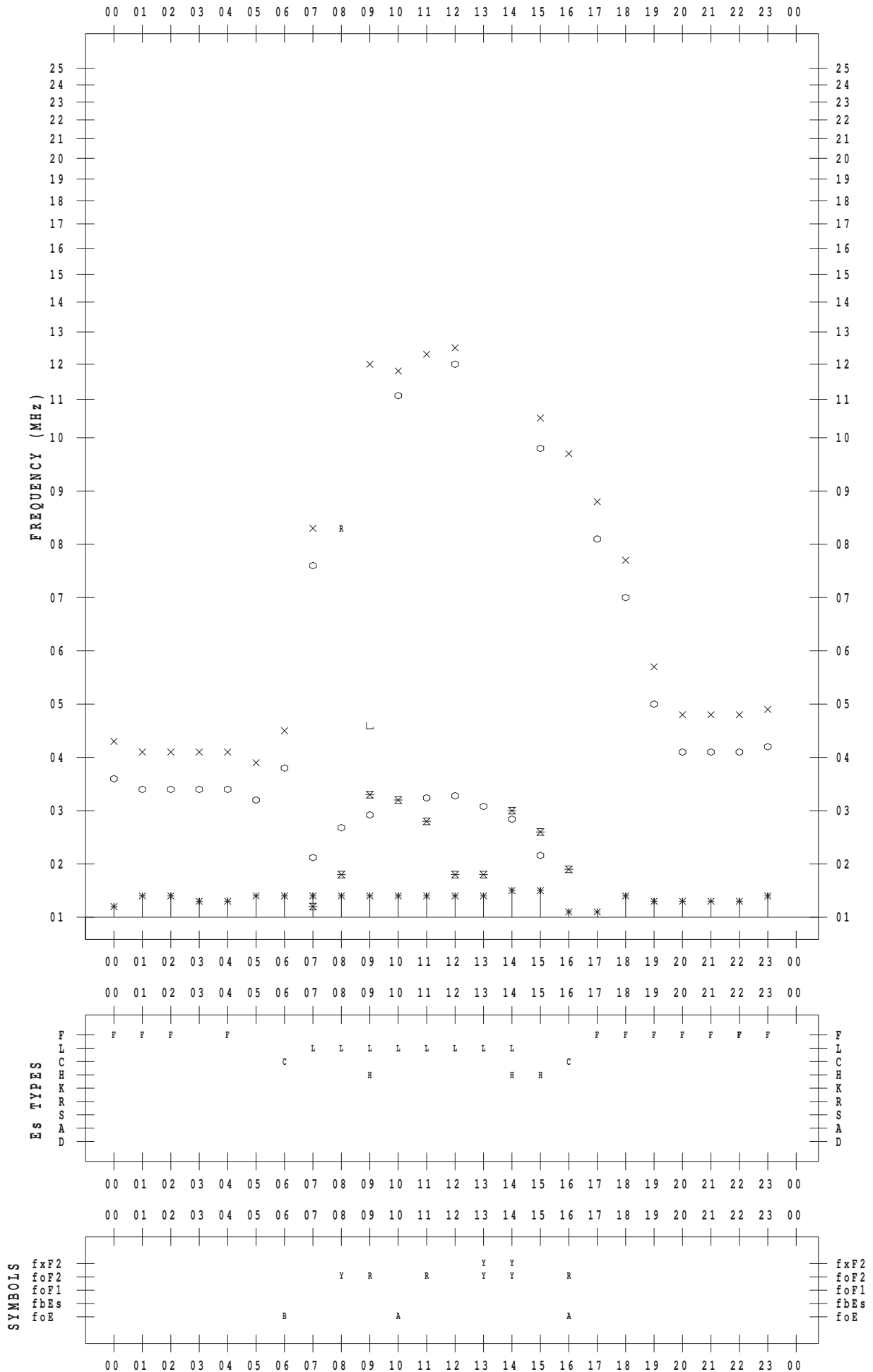
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/11

135 ° E MEAN TIME



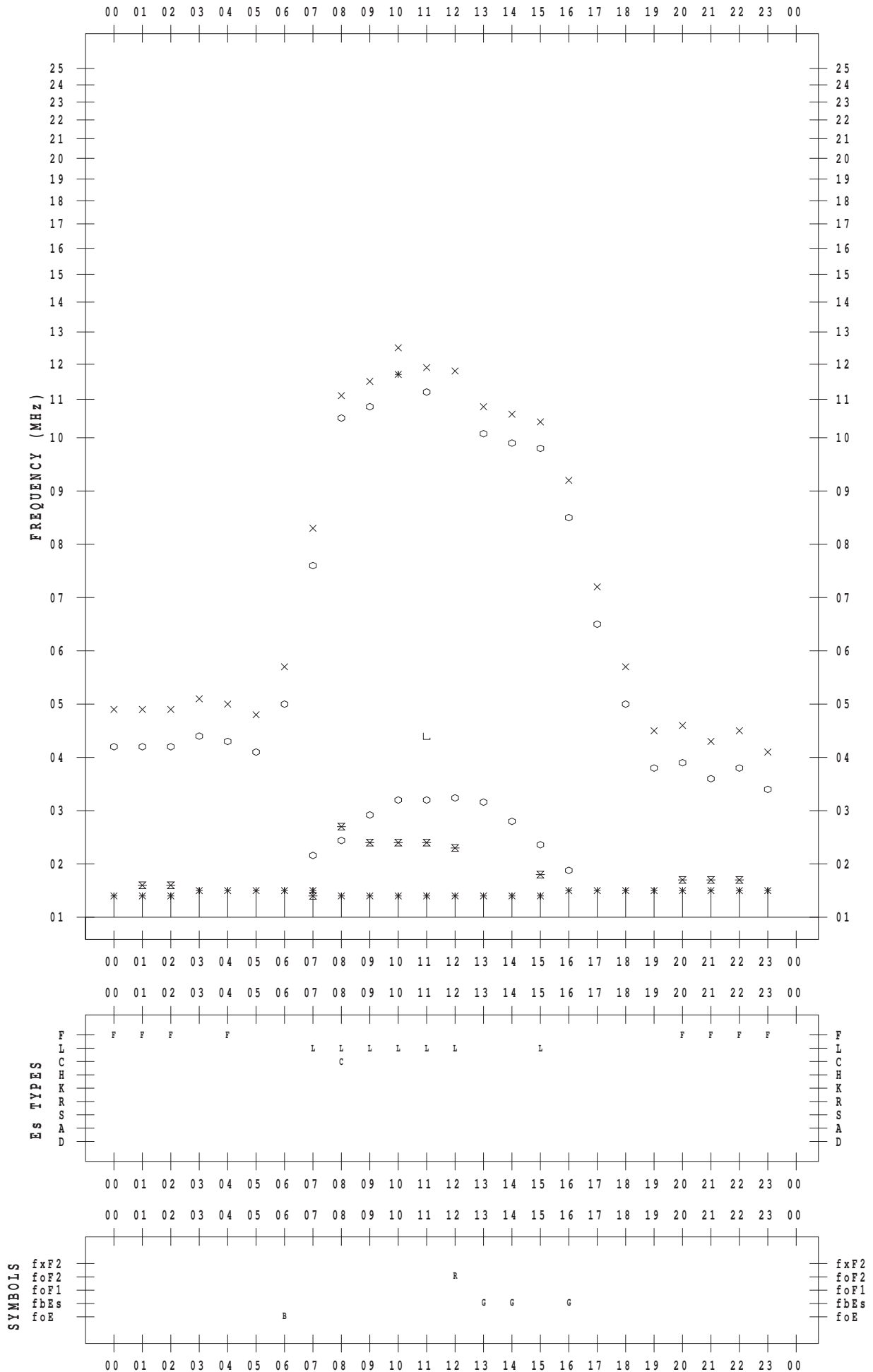
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/12

135 ° E MEAN TIME





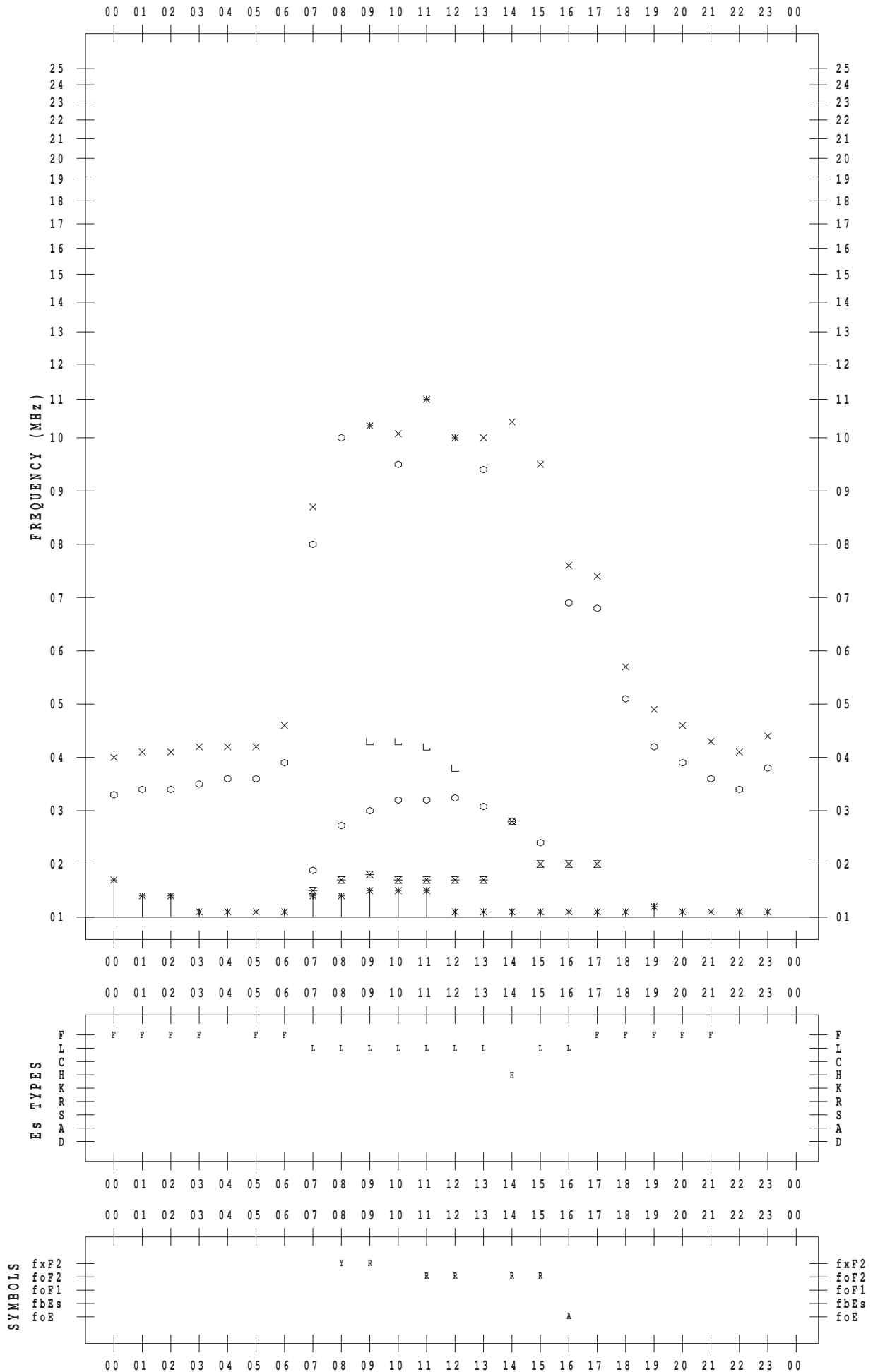
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/13

135 ° E MEAN TIME



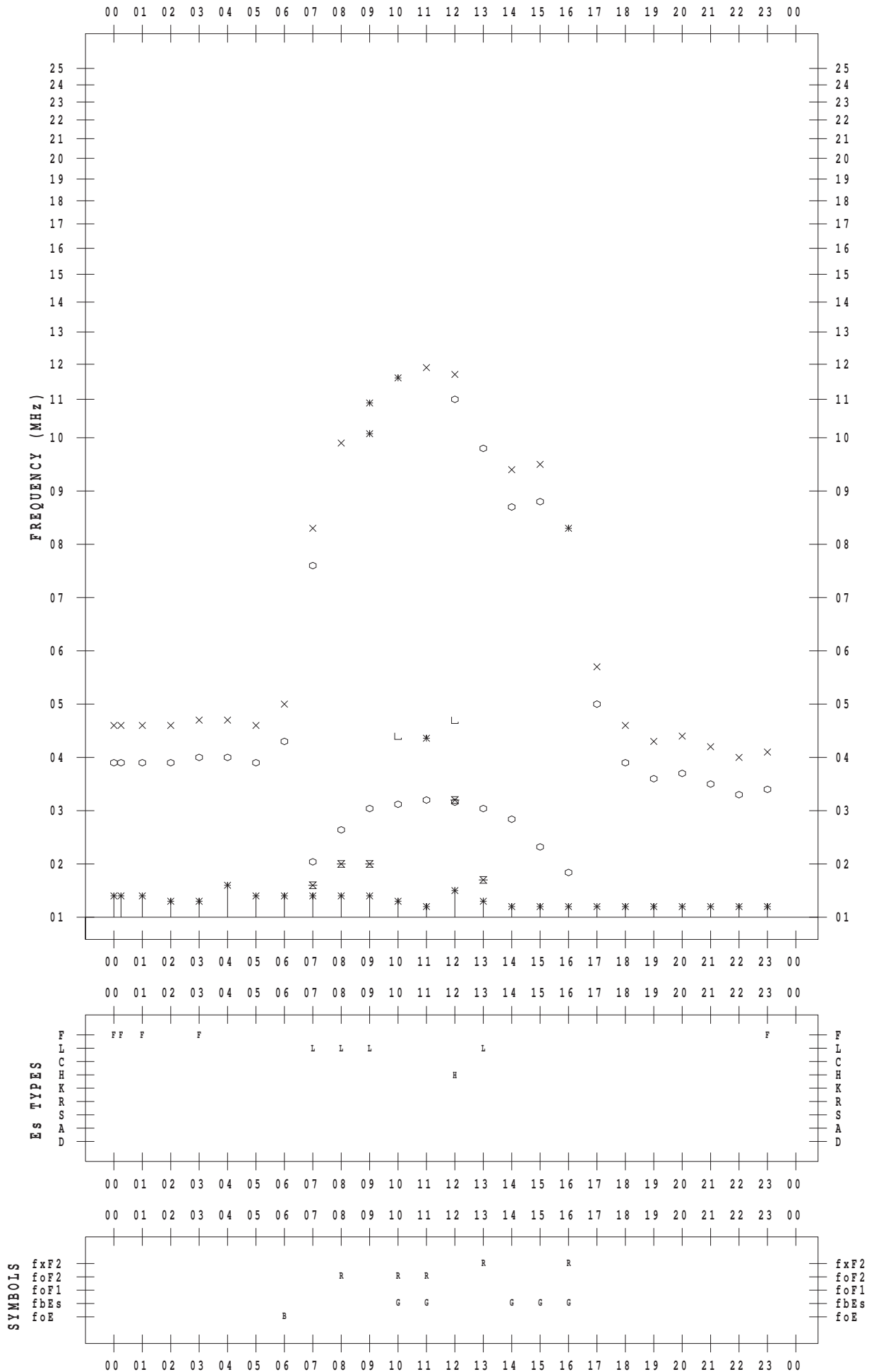
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/14

135 ° E MEAN TIME



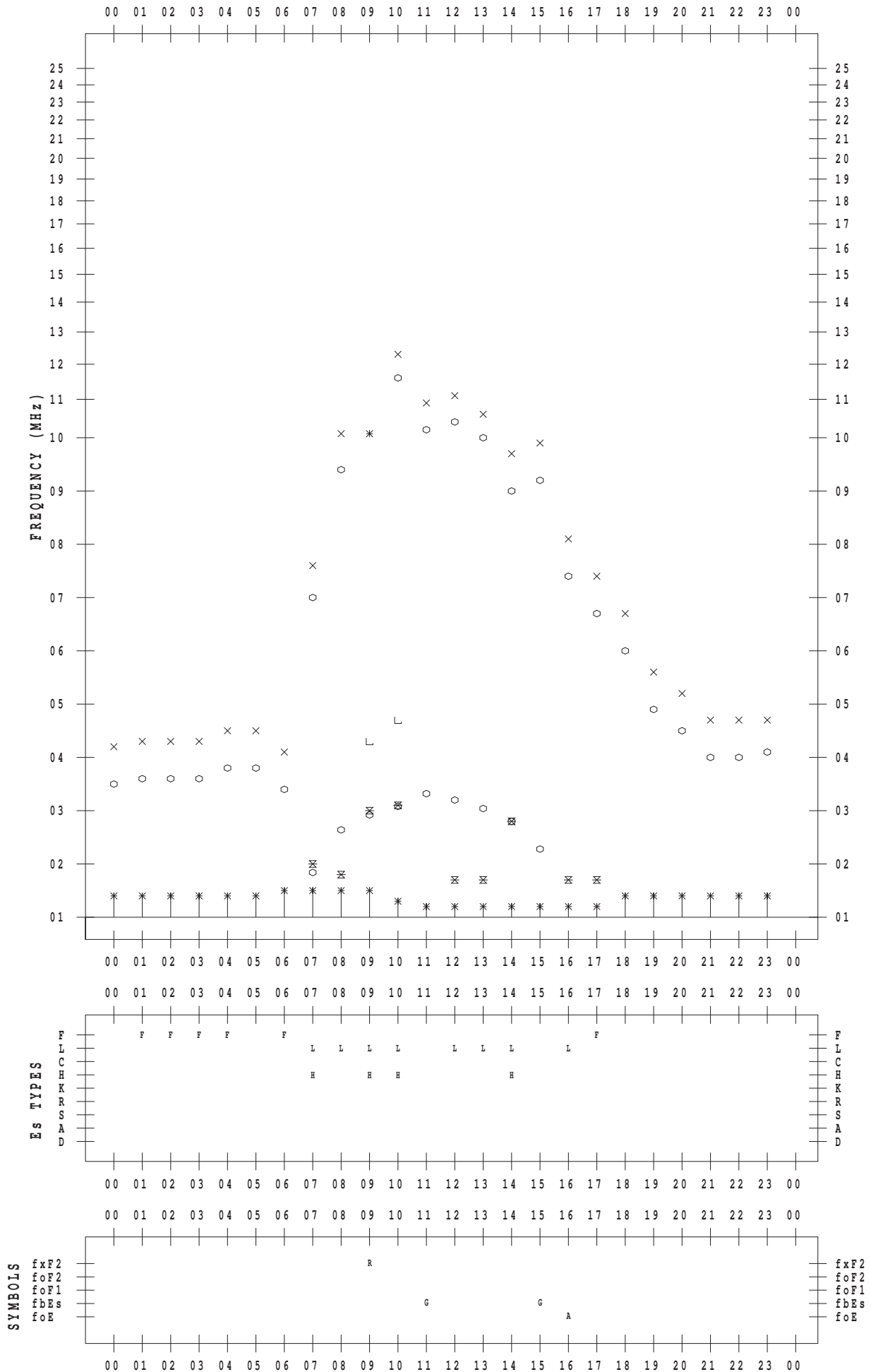
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/15

135 ° E MEAN TIME



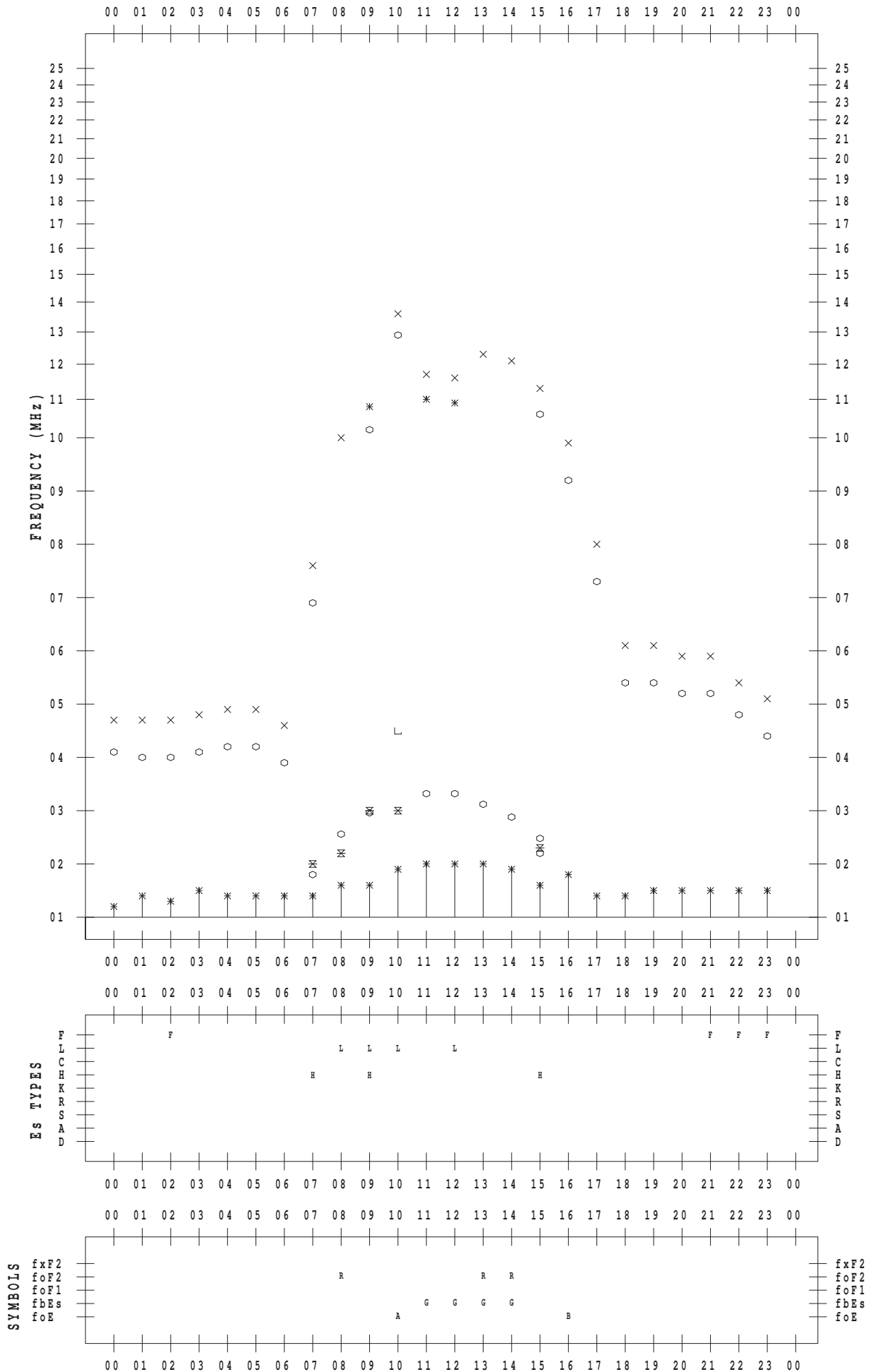
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/16

135 ° E MEAN TIME



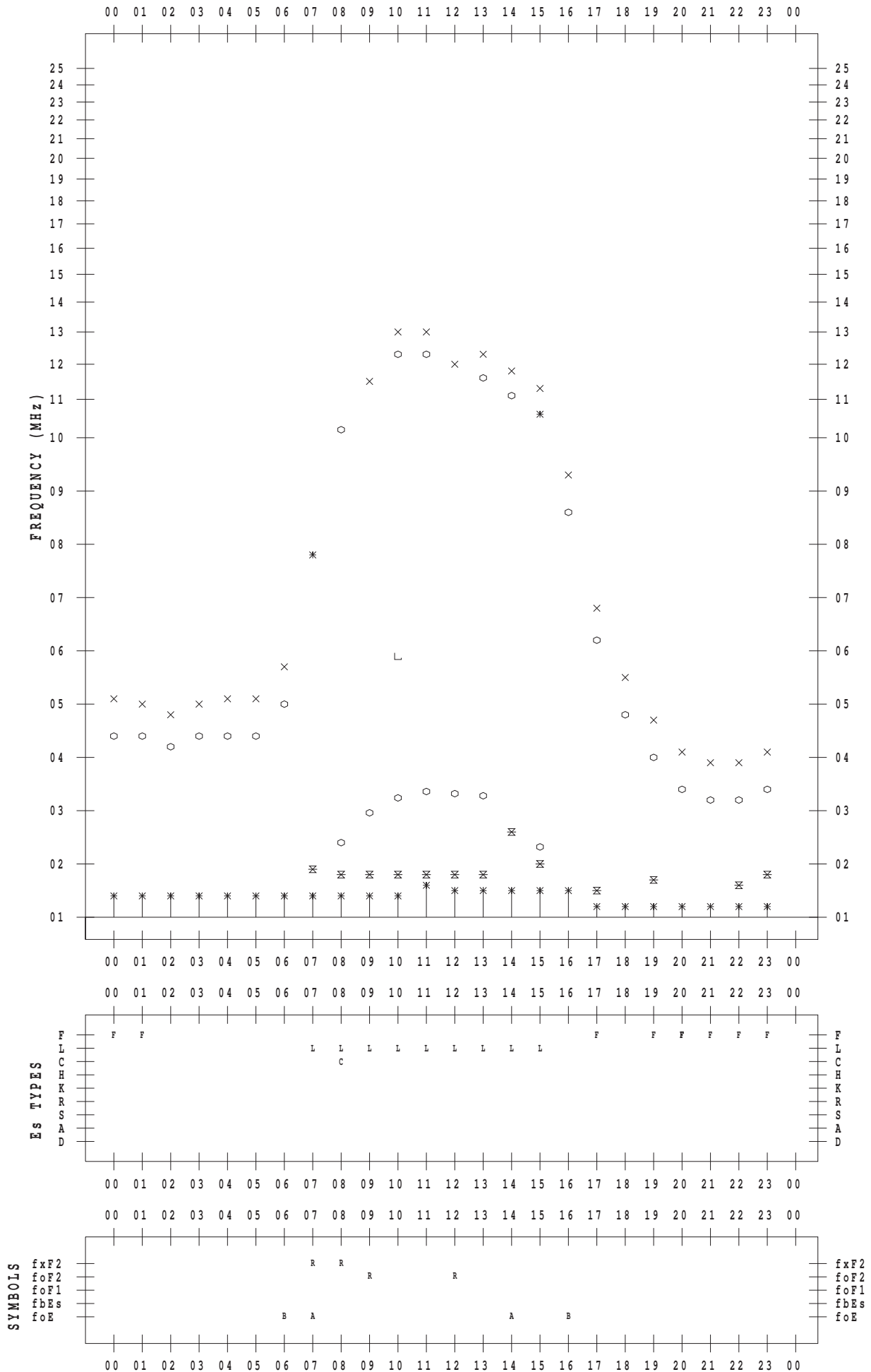
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/17

135 ° E MEAN TIME



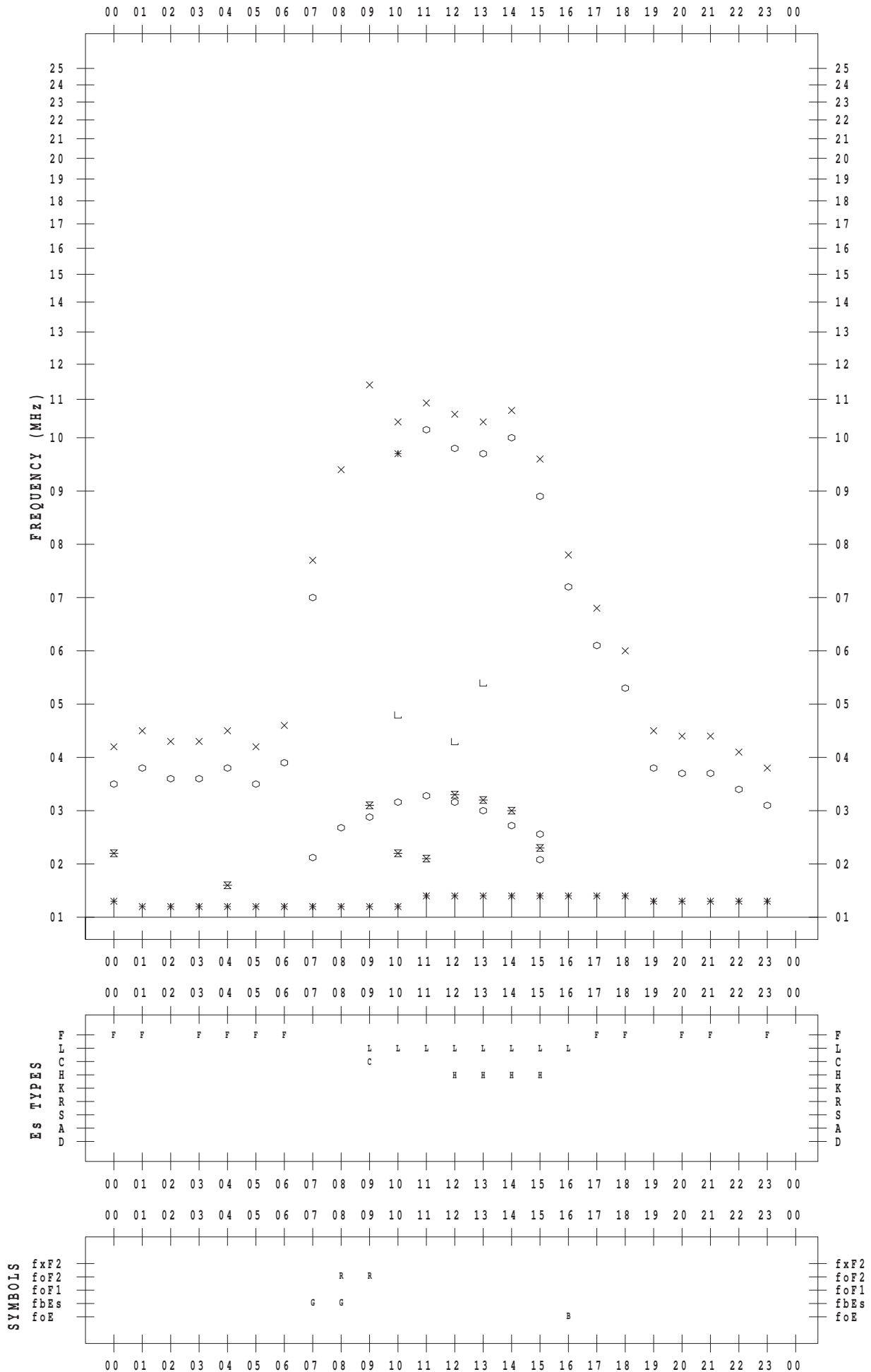
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/18

135 ° E MEAN TIME



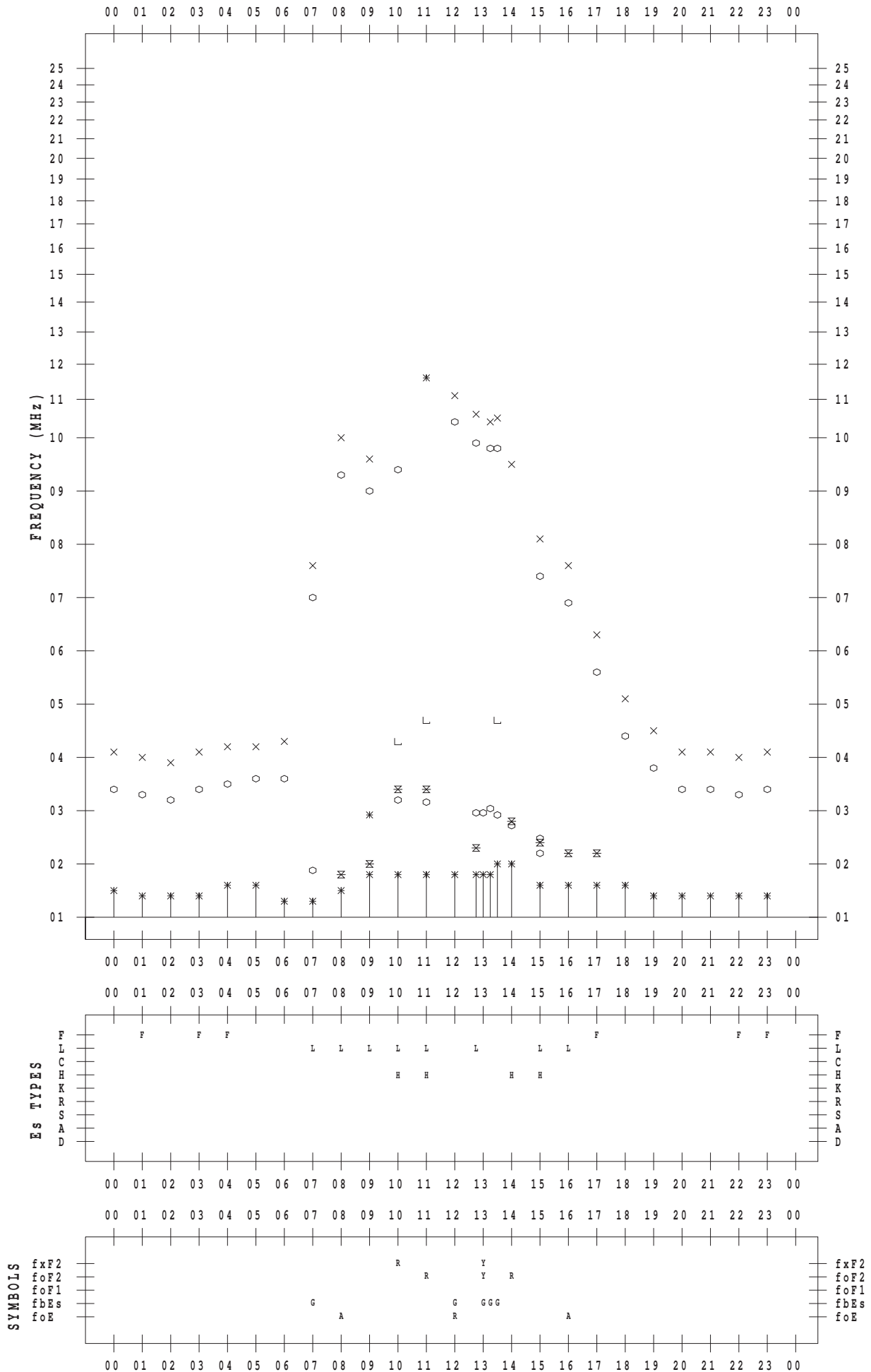
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/19

135 ° E MEAN TIME



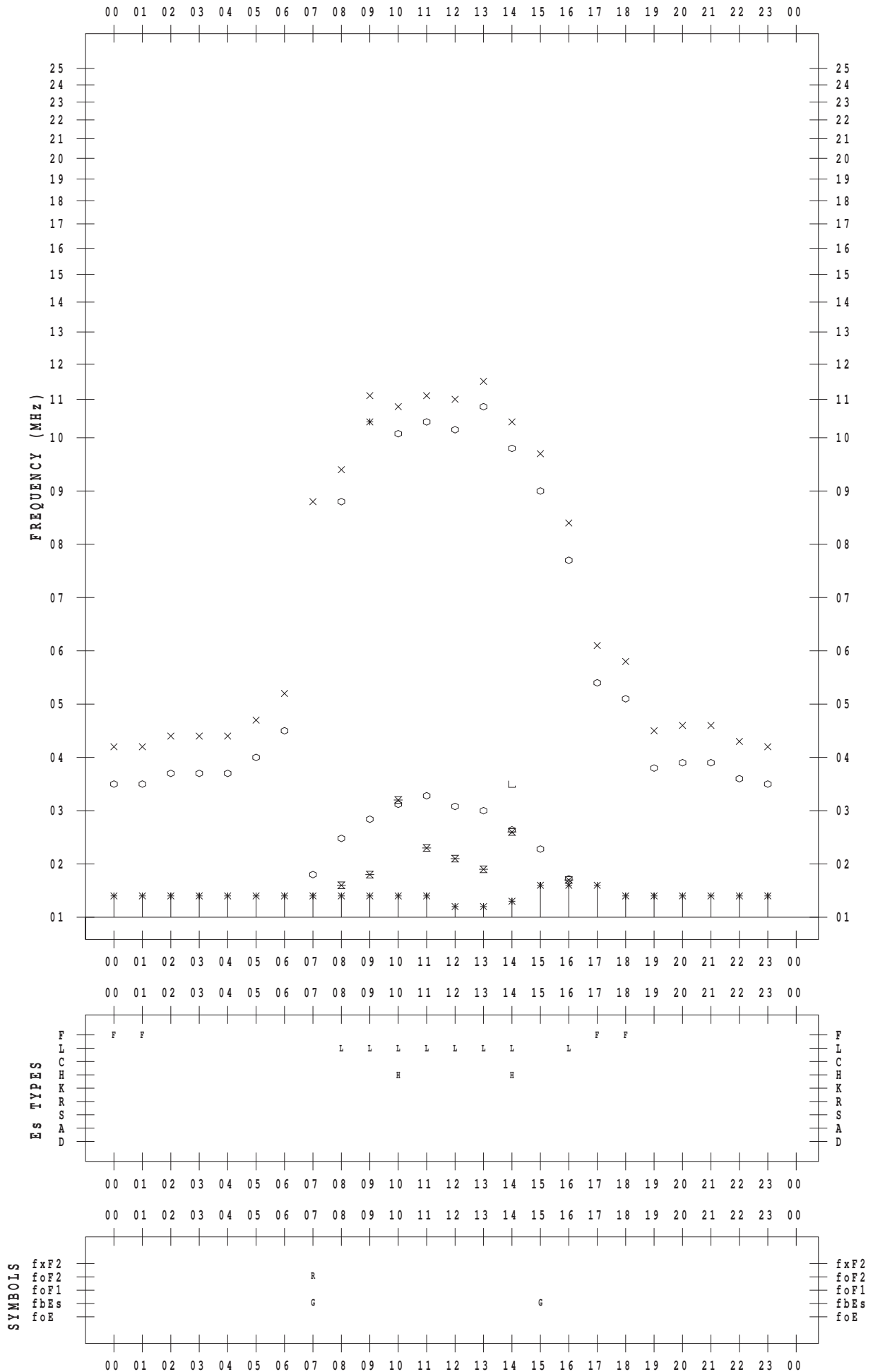
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/20

135 ° E MEAN TIME





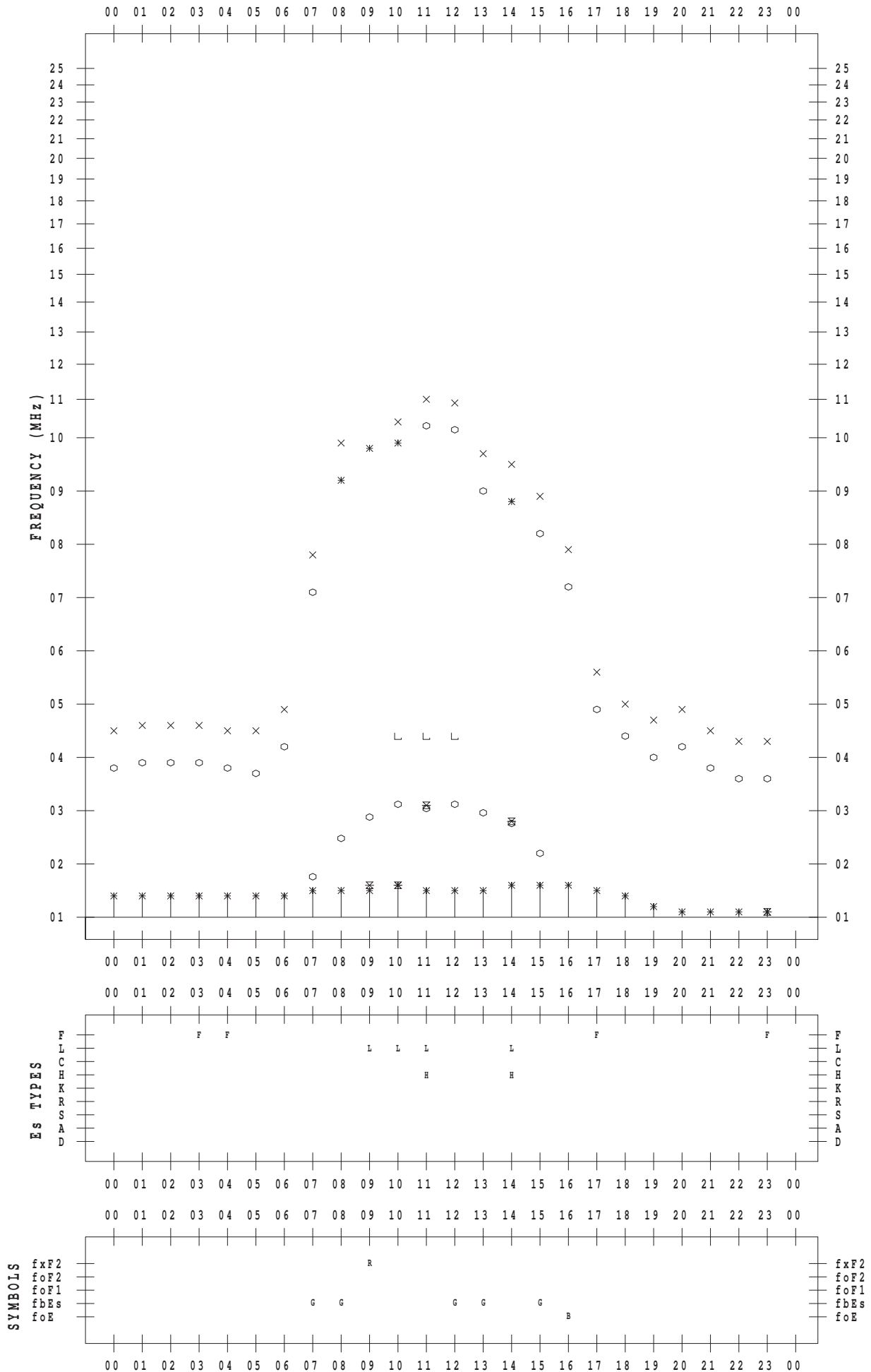
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/21

135 ° E MEAN TIME



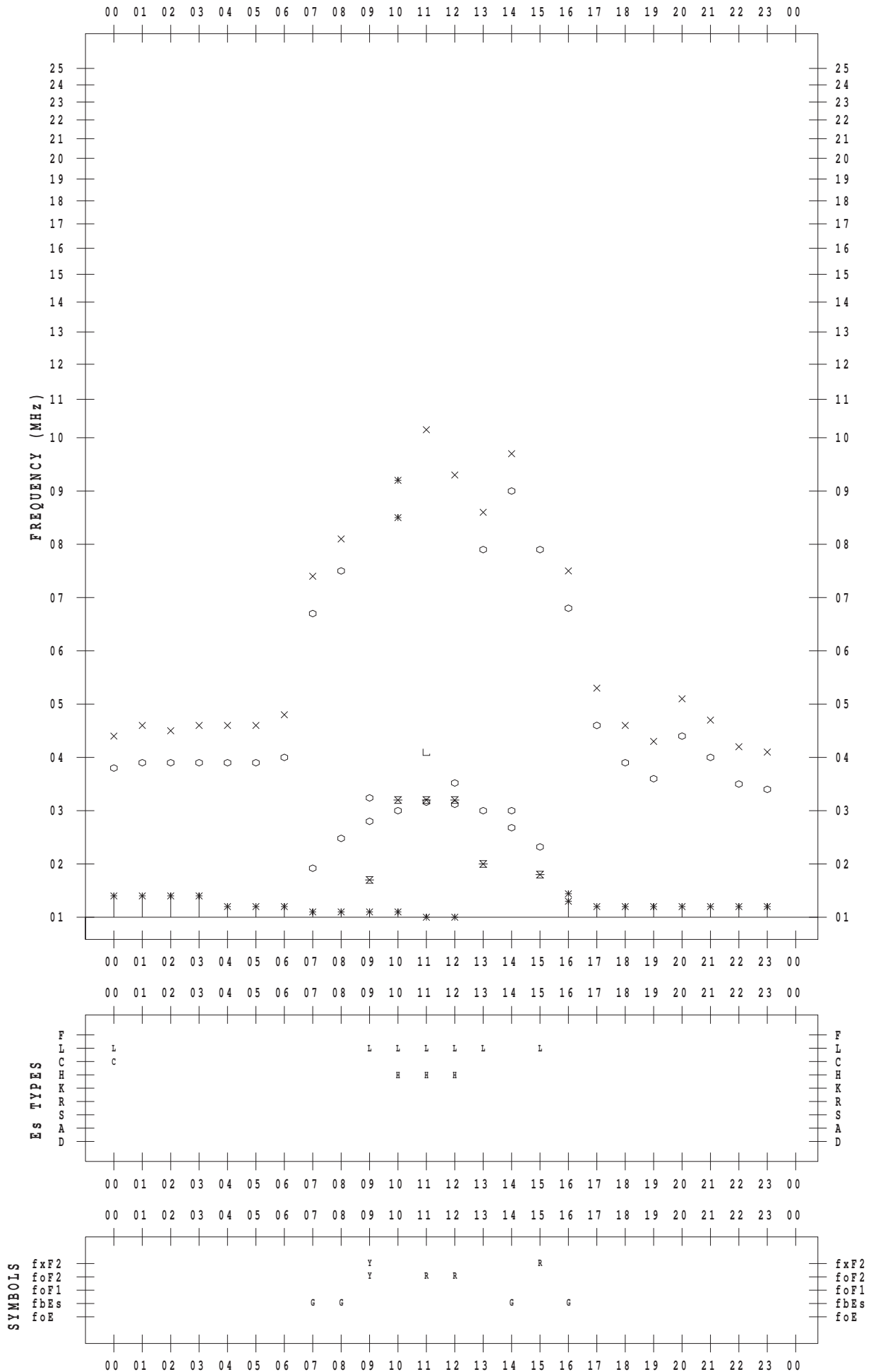
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/22

135 ° E MEAN TIME



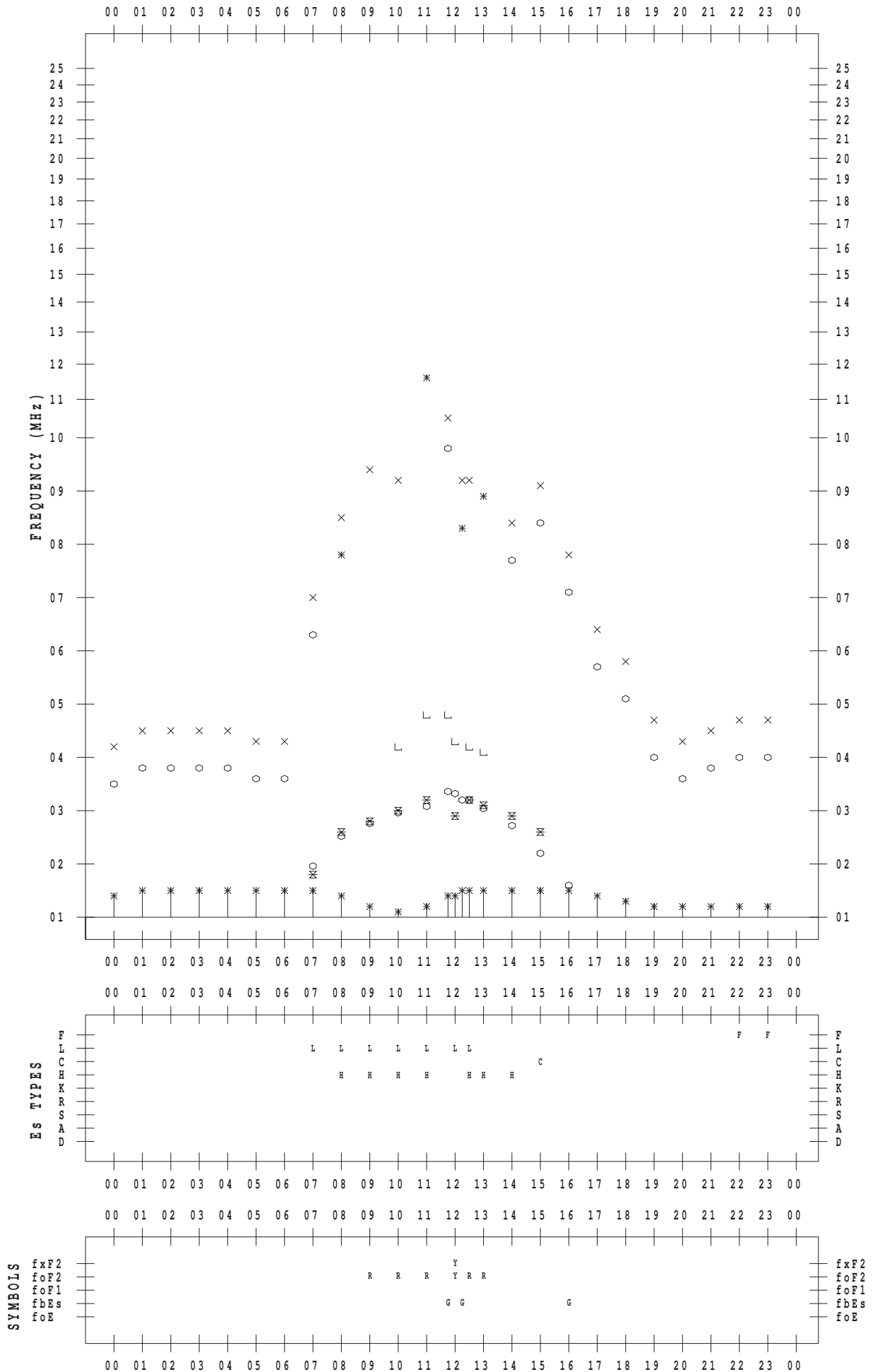
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/23

135 ° E MEAN TIME



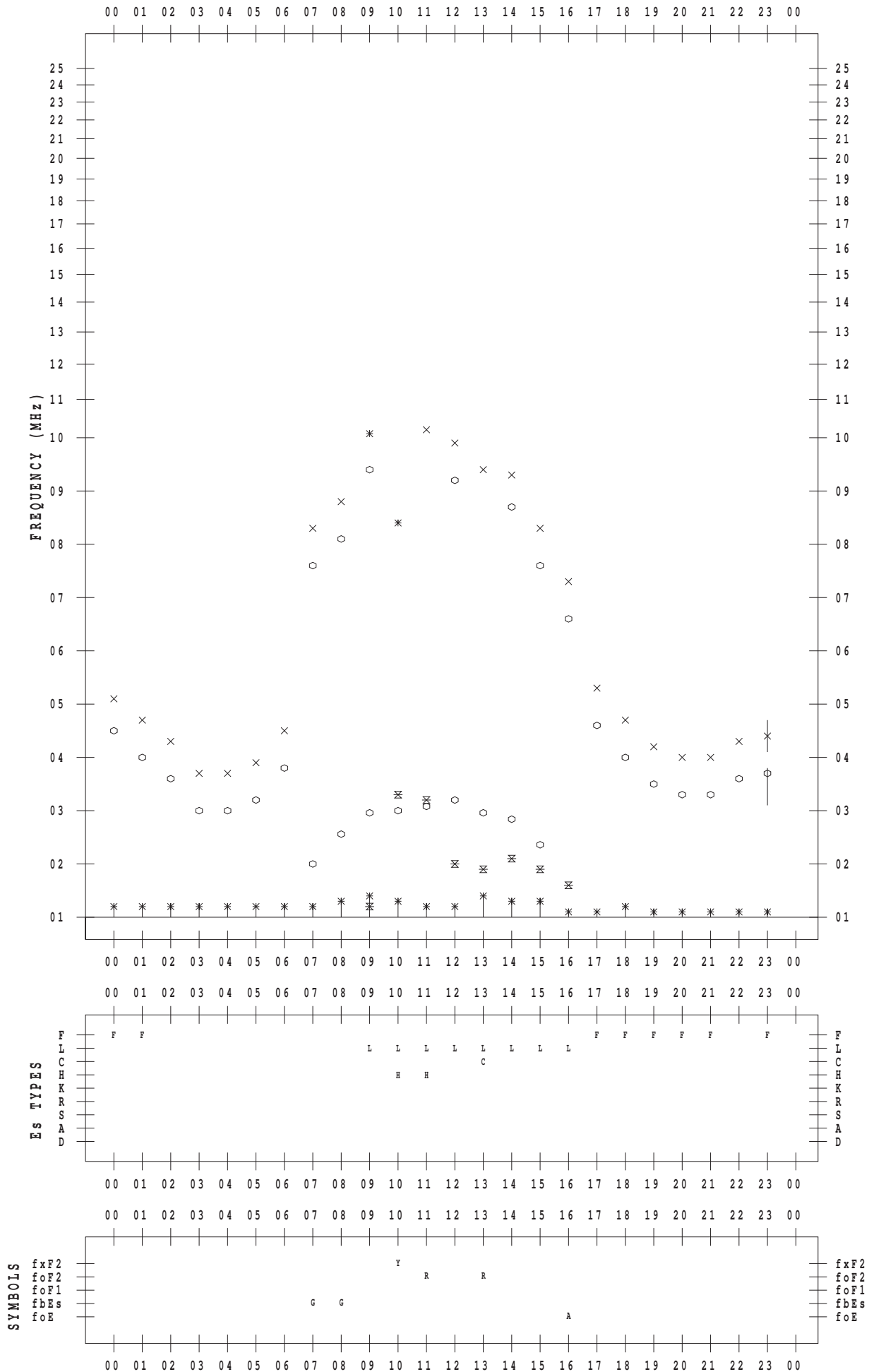
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/24

135 ° E MEAN TIME



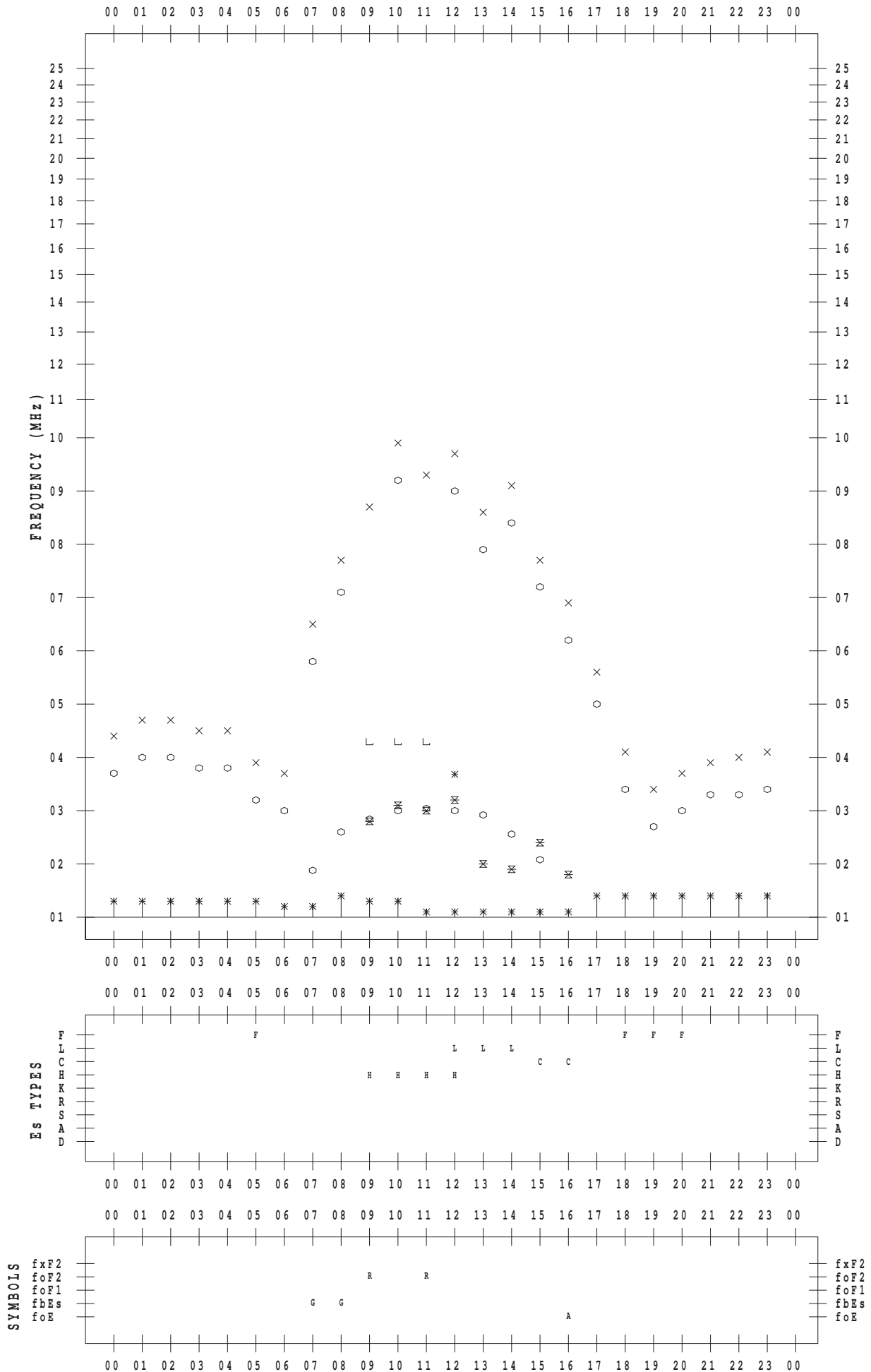
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/25

135 ° E MEAN TIME



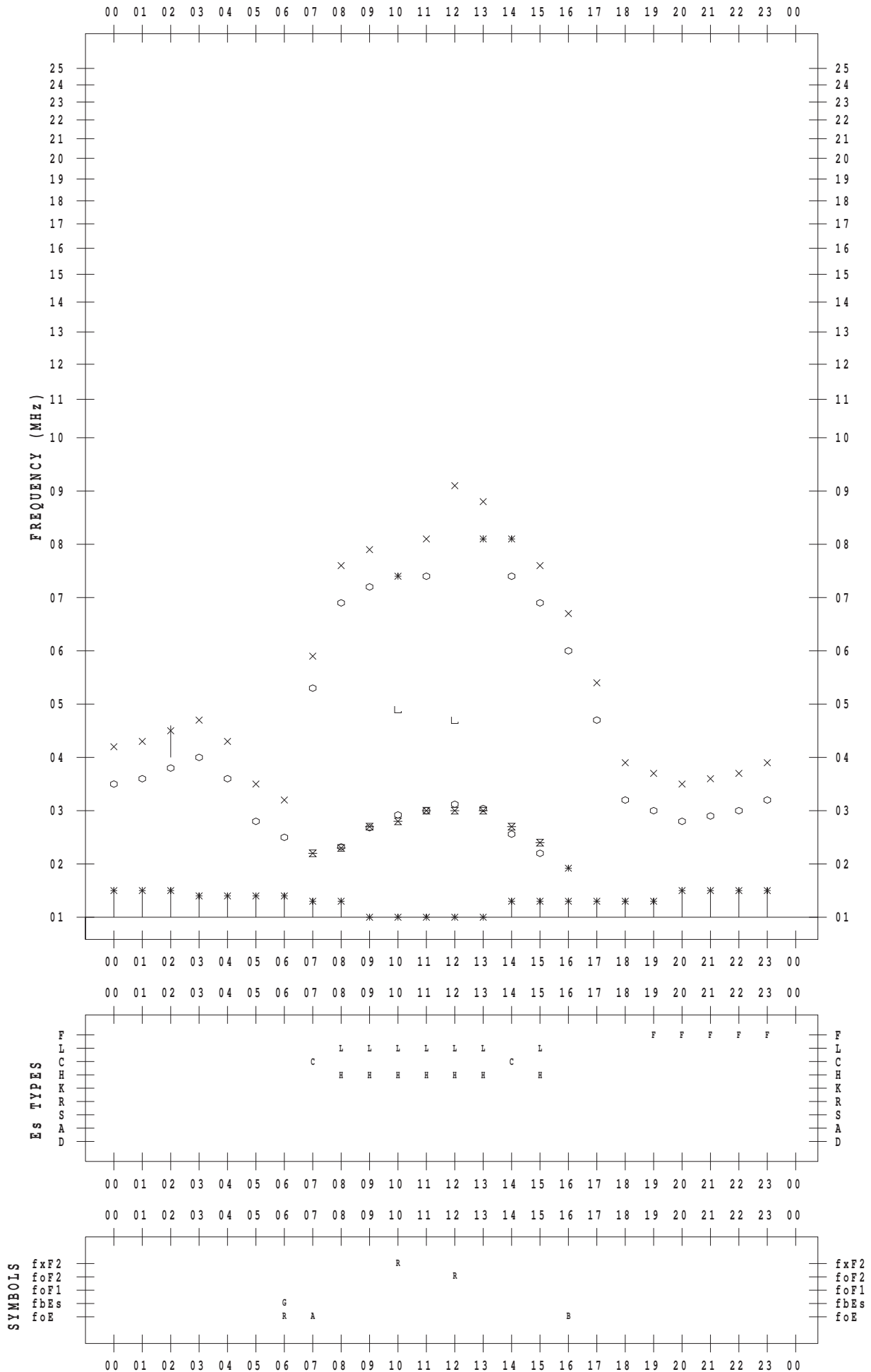
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/26

135 ° E MEAN TIME



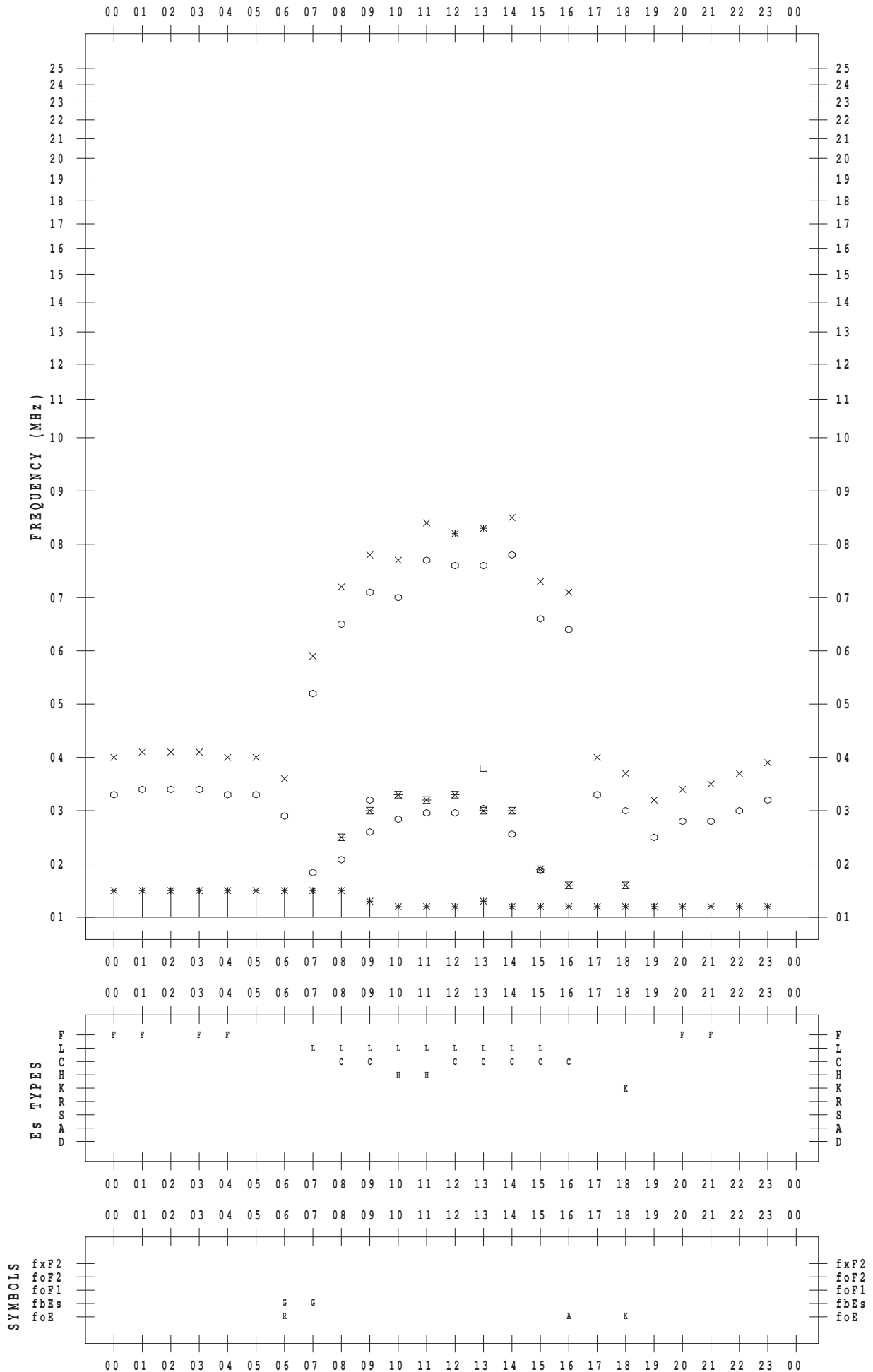
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/27

135 ° E MEAN TIME



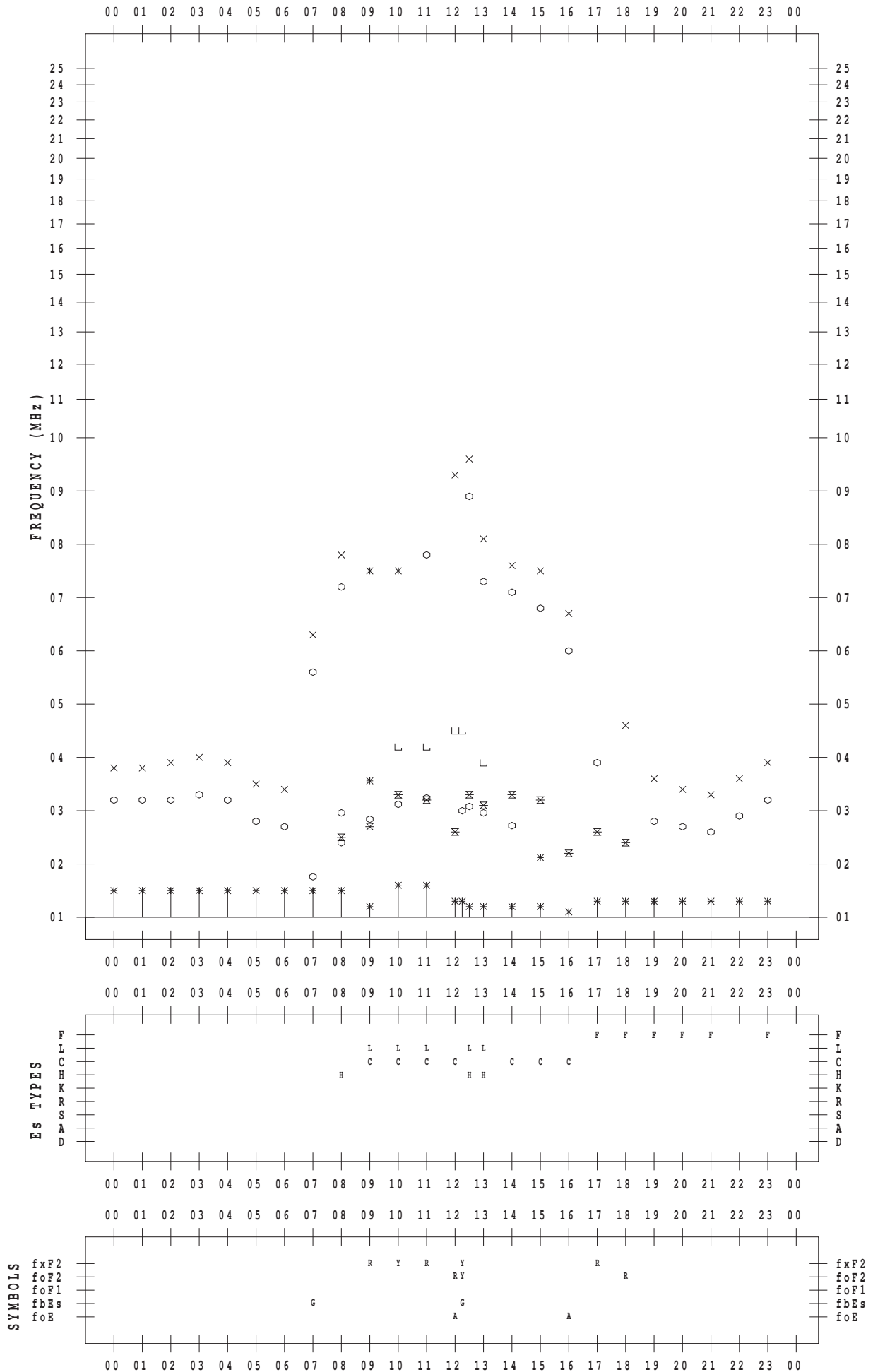
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/28

135 ° E MEAN TIME





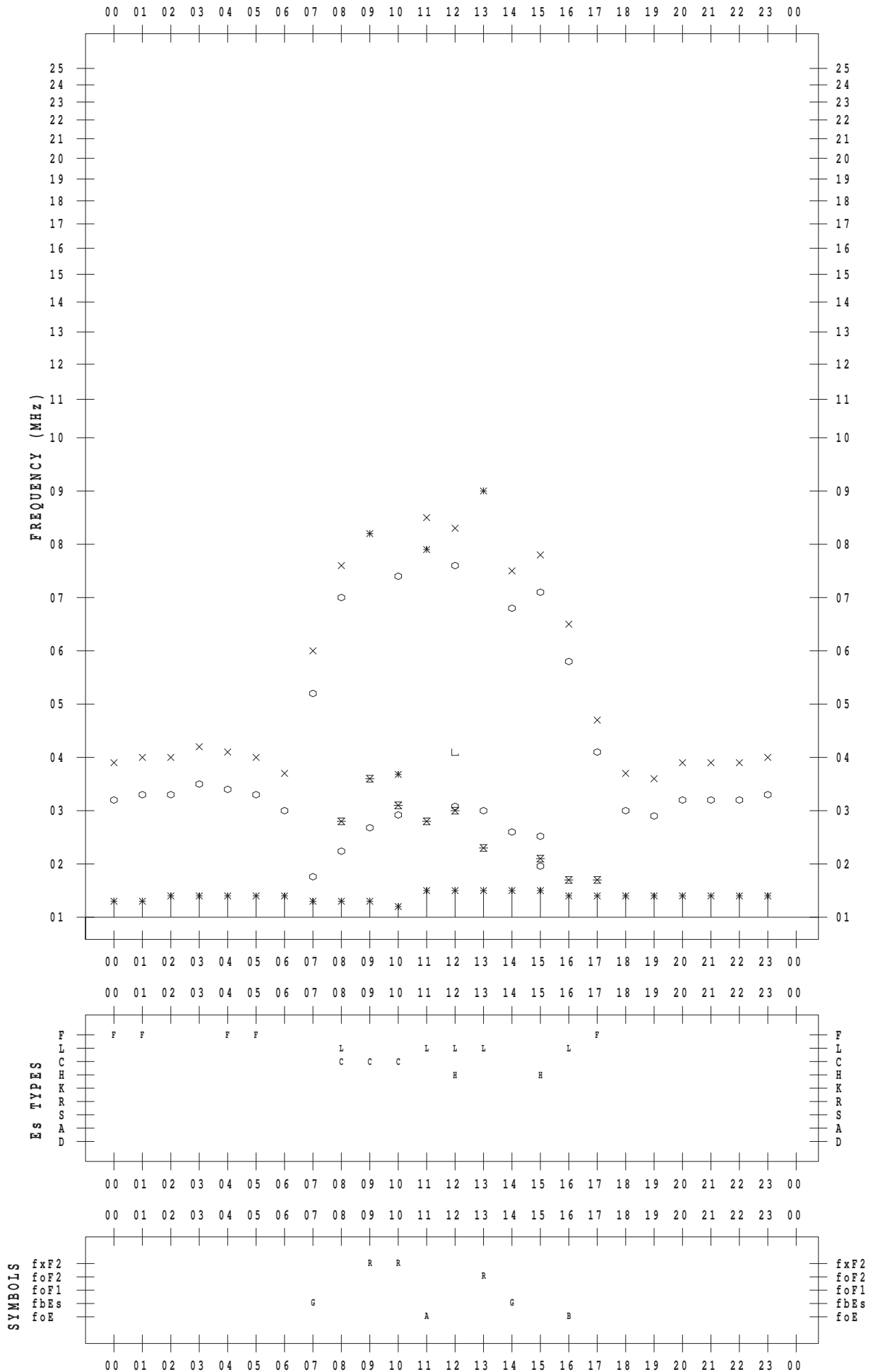
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/29

135 ° E MEAN TIME



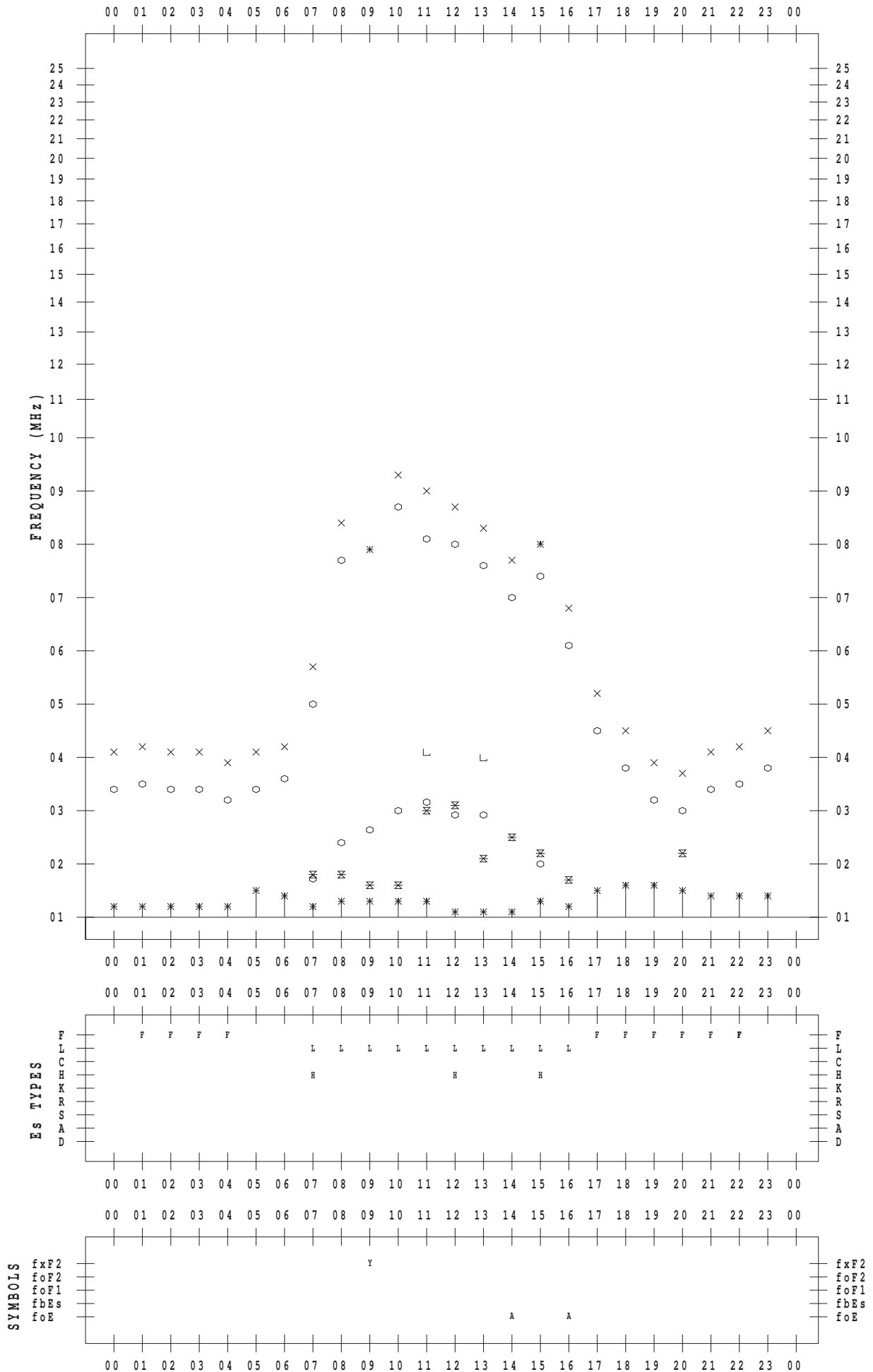
# f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/11/30

135 ° E MEAN TIME



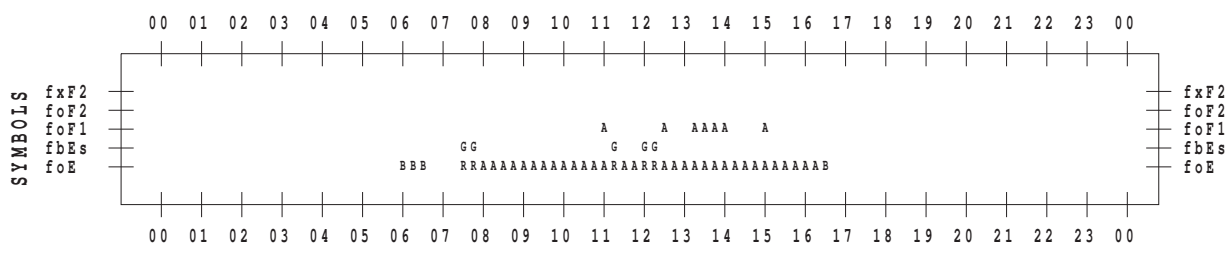
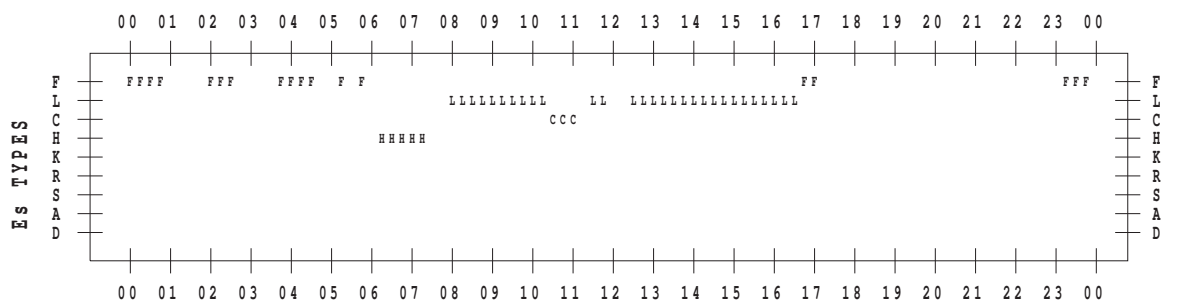
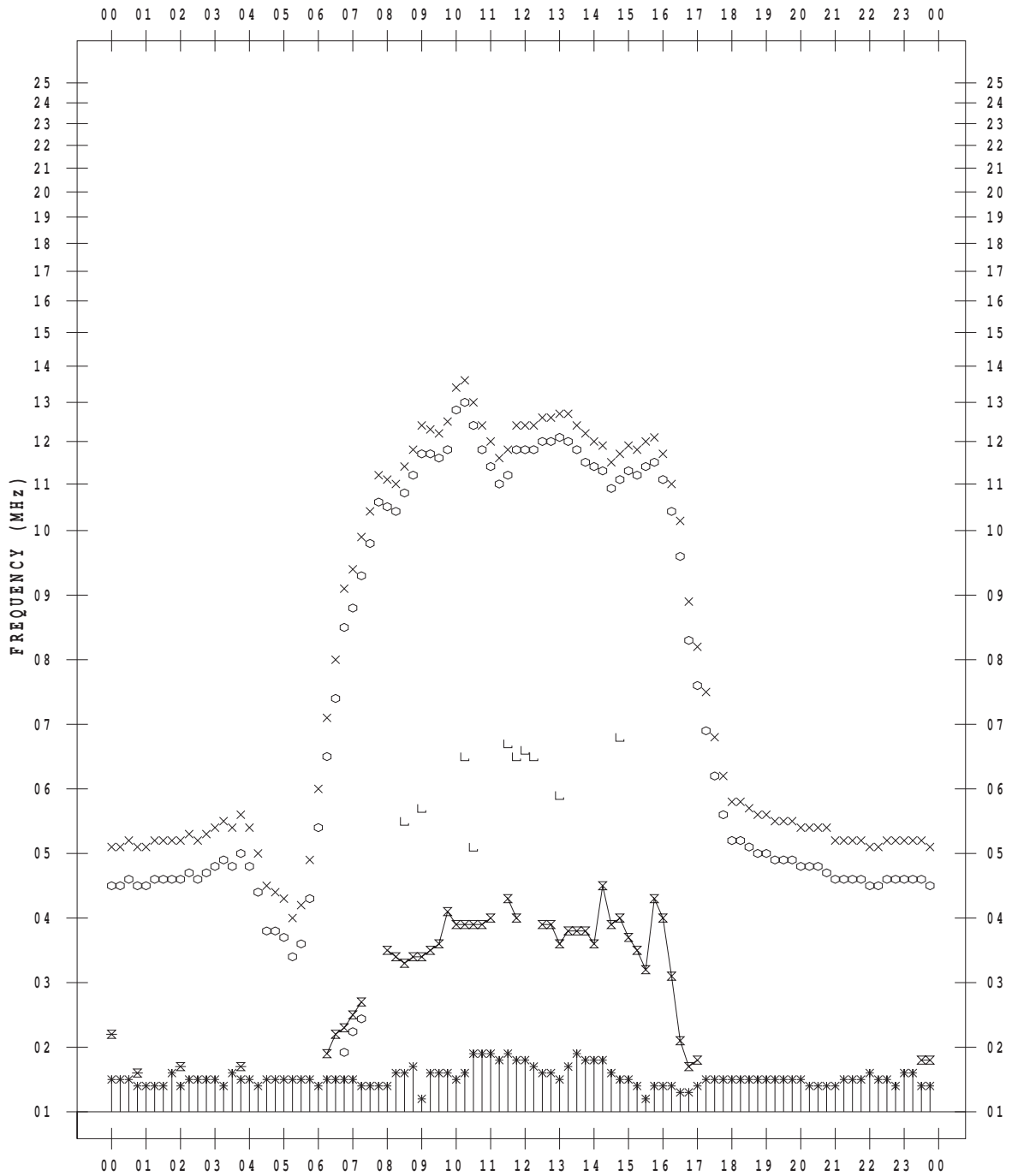
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/ 1

135 ° E MEAN TIME



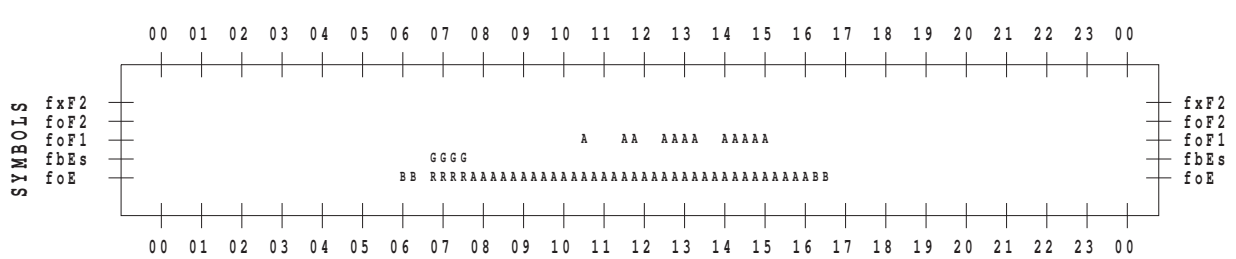
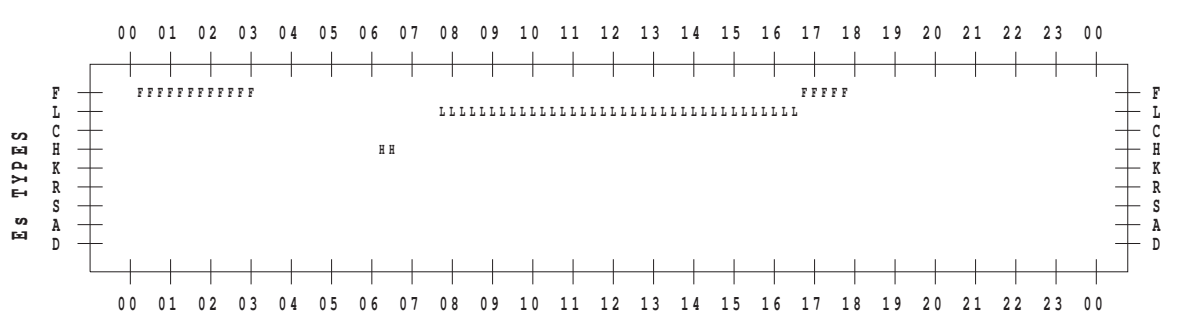
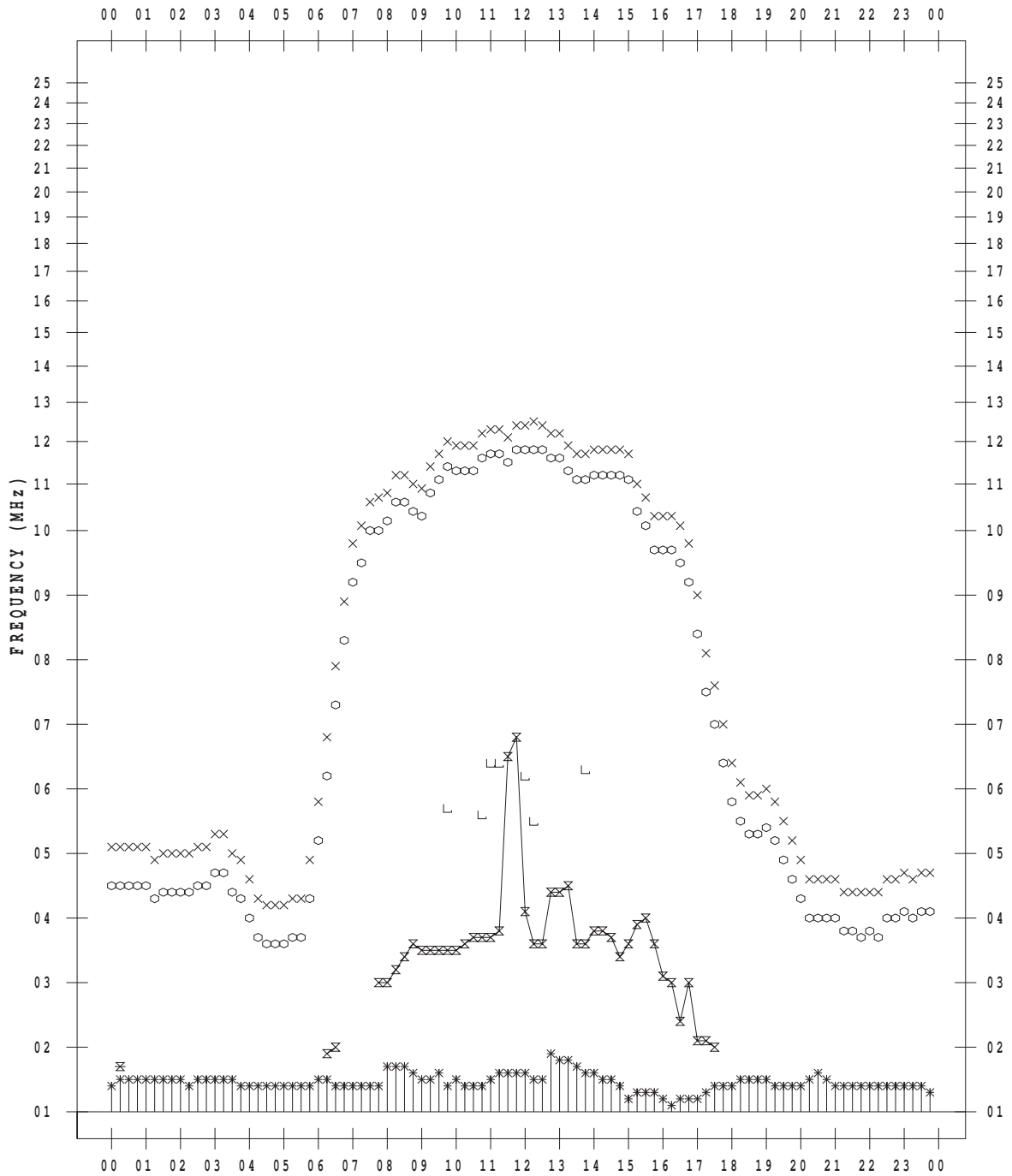
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/ 2

135 ° E MEAN TIME



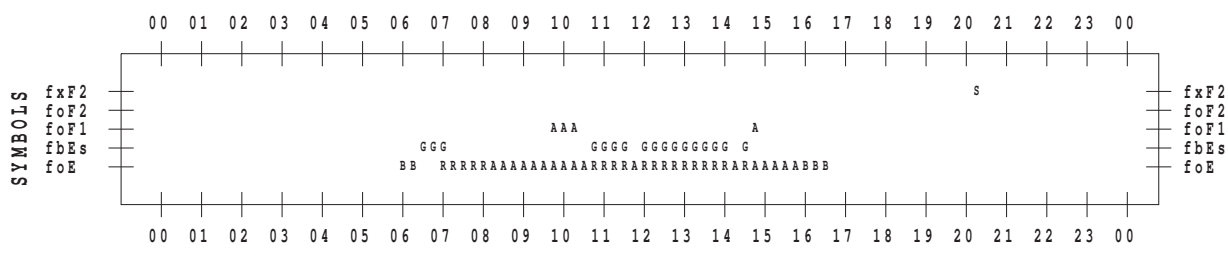
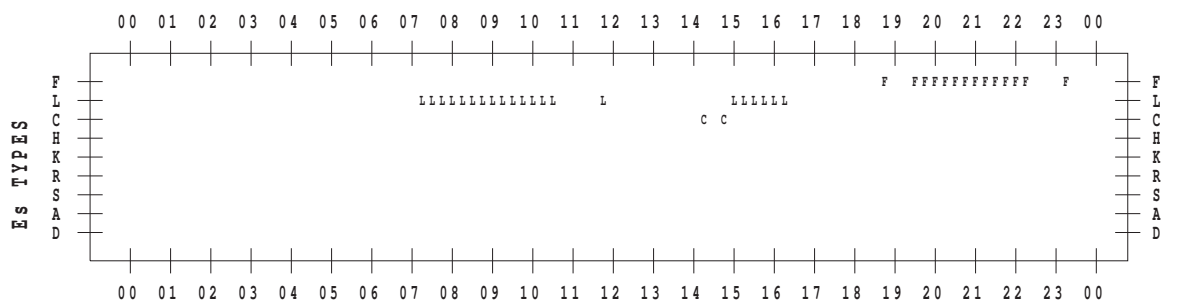
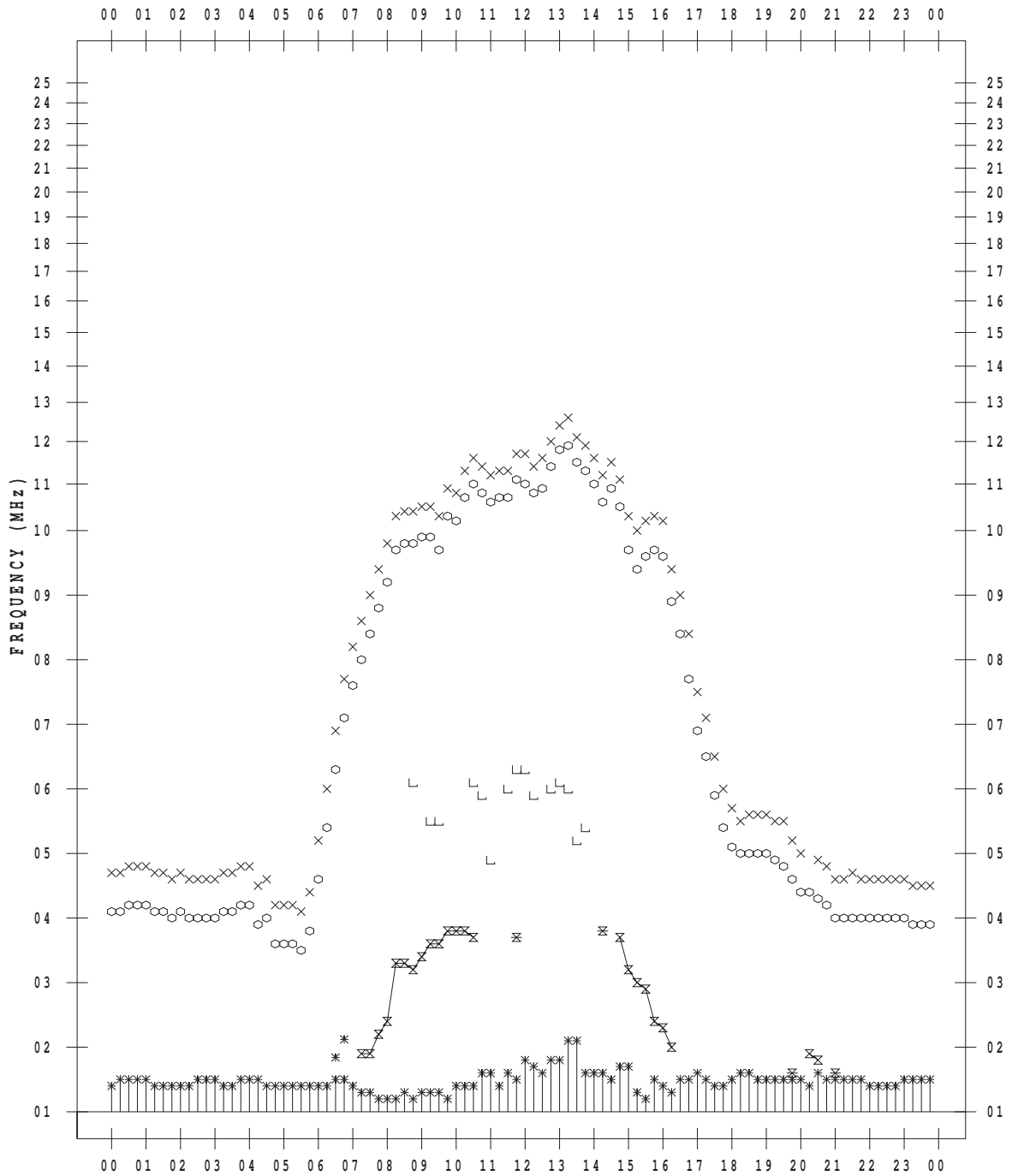
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/ 3

135 ° E MEAN TIME



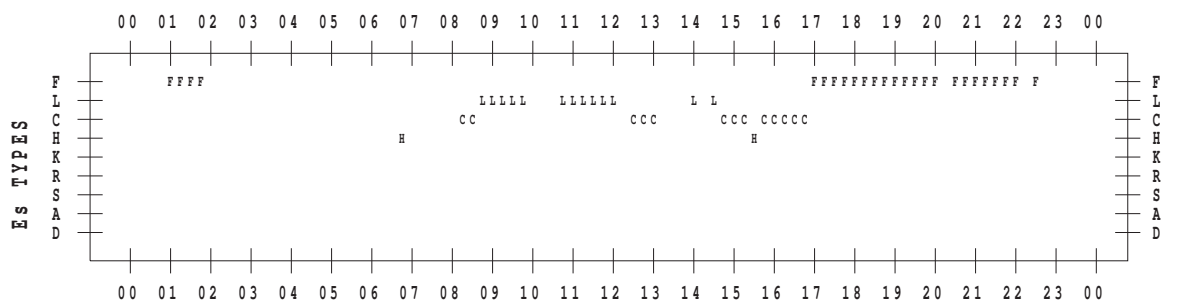
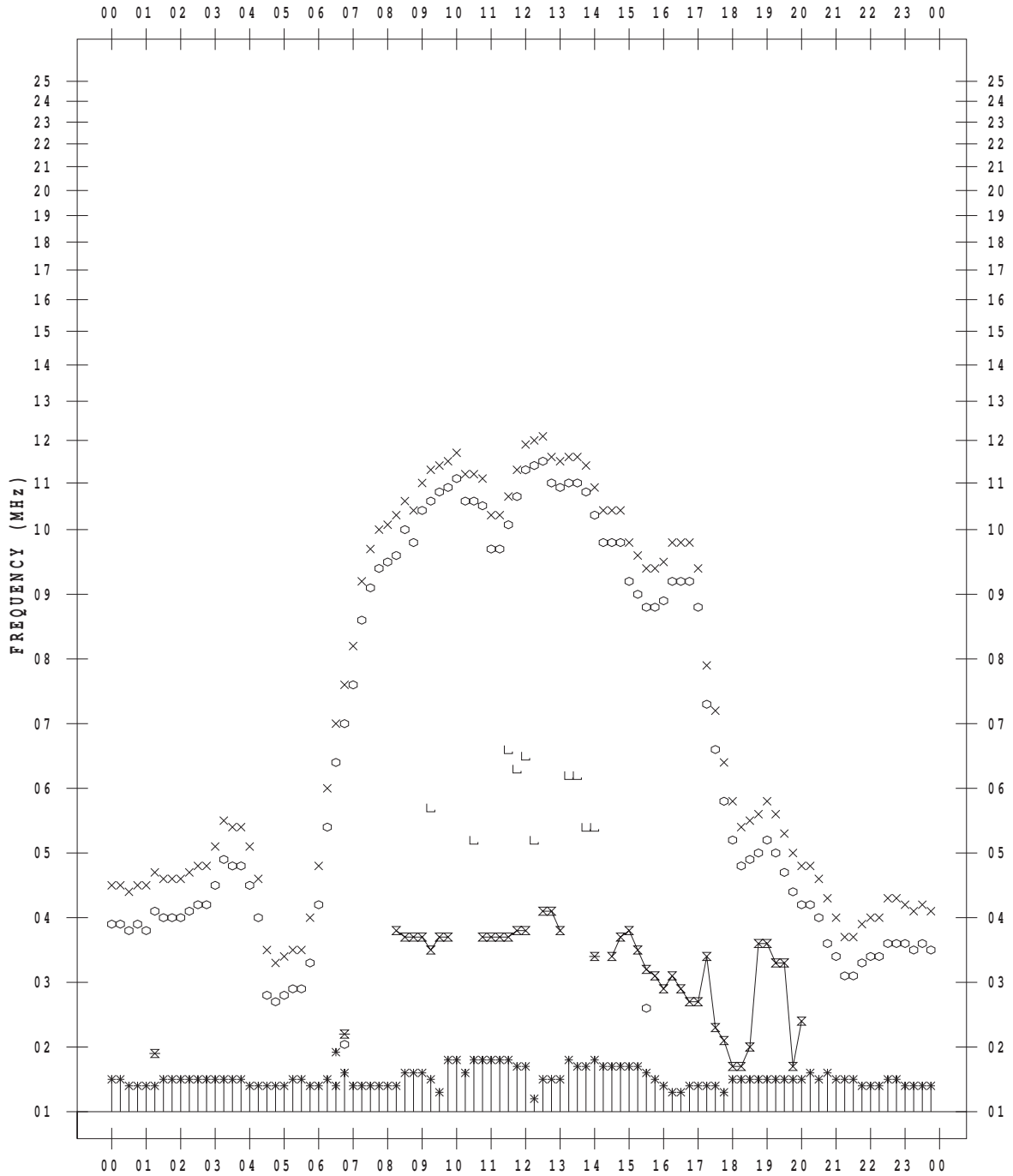
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/ 4

135 ° E MEAN TIME



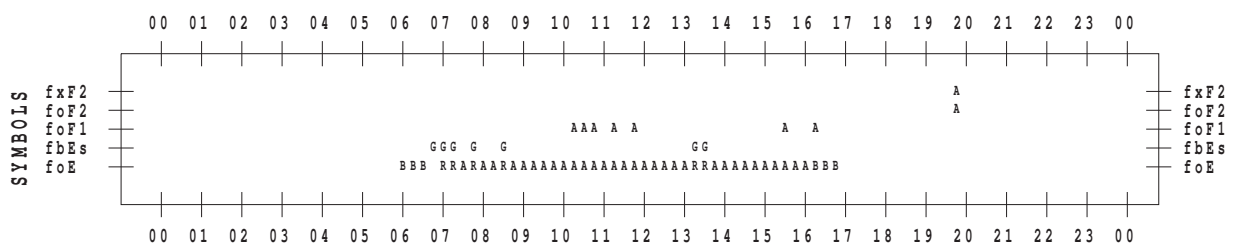
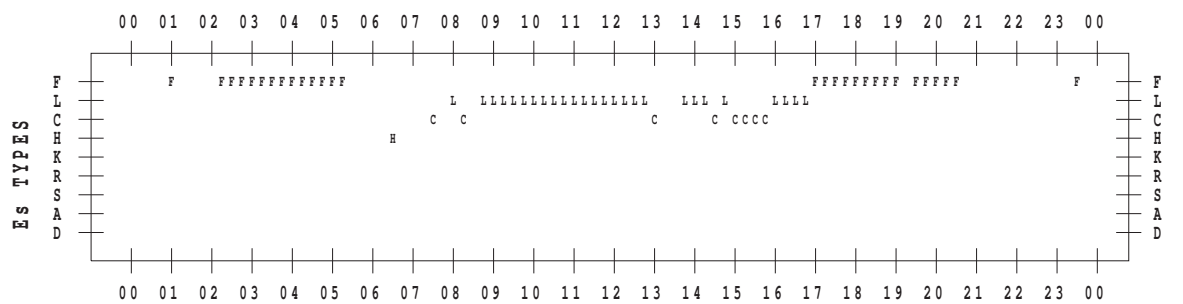
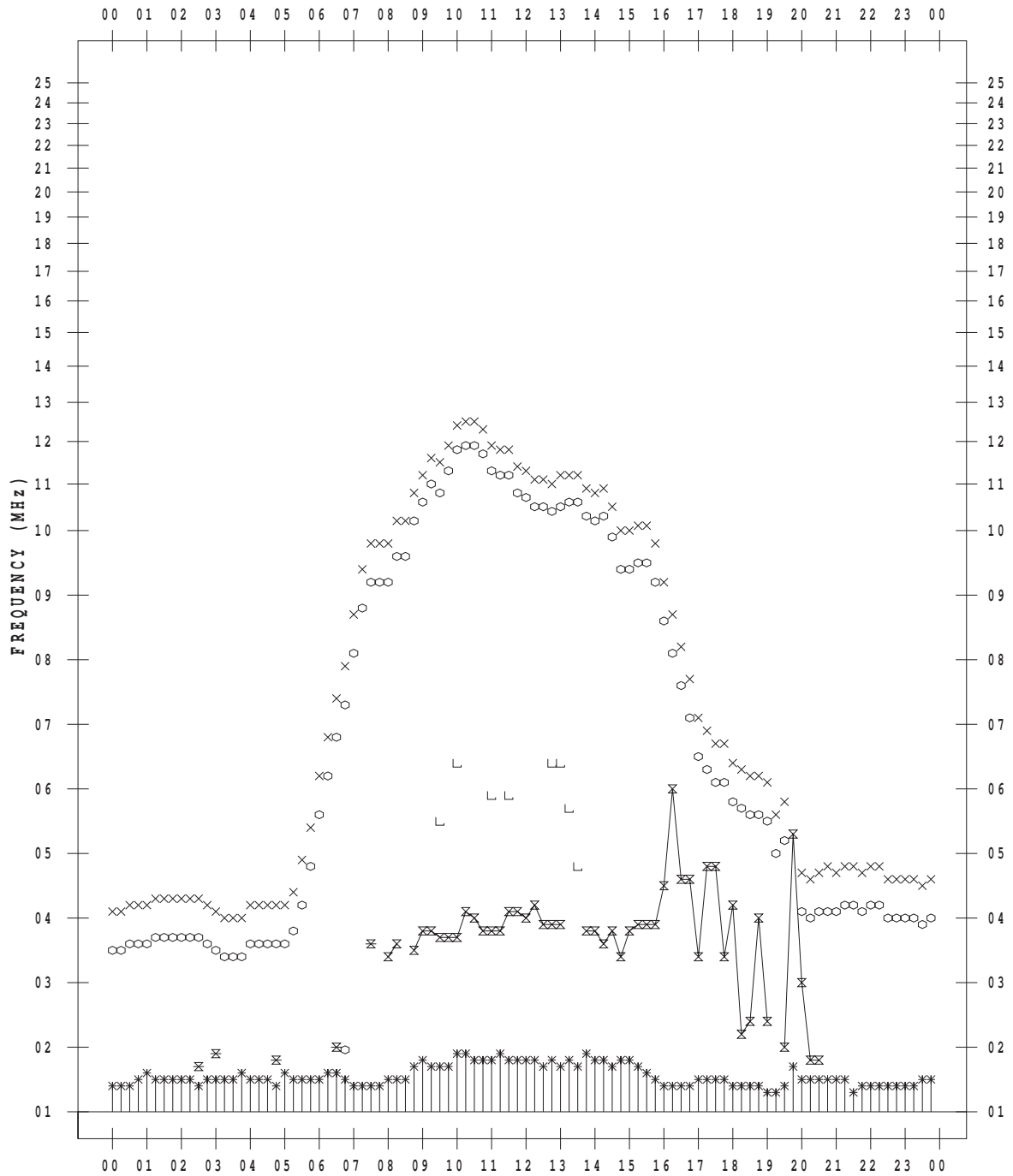
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/ 5

135 ° E MEAN TIME



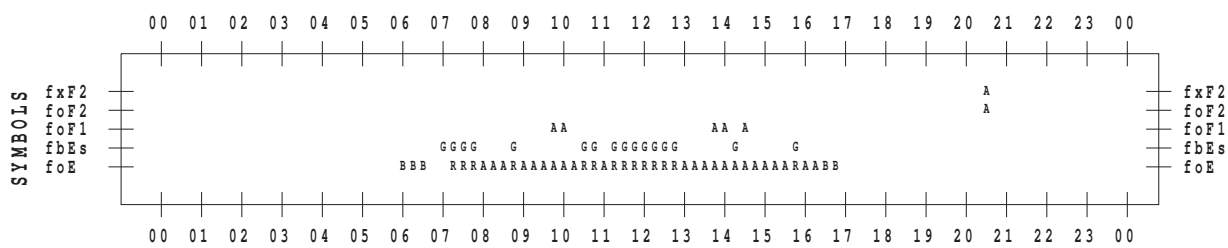
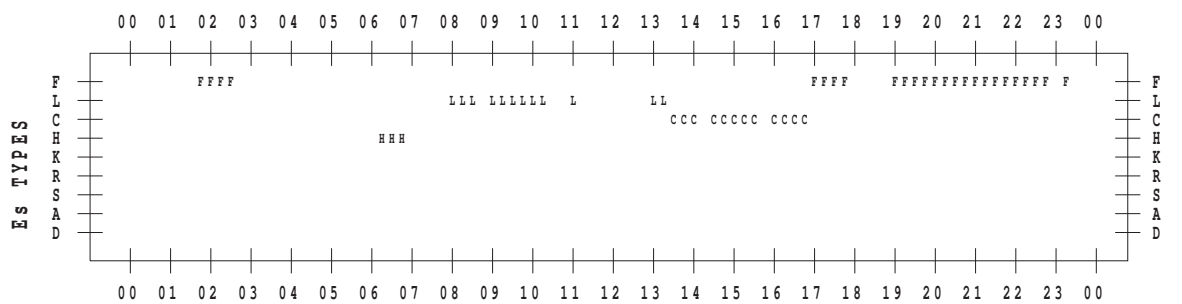
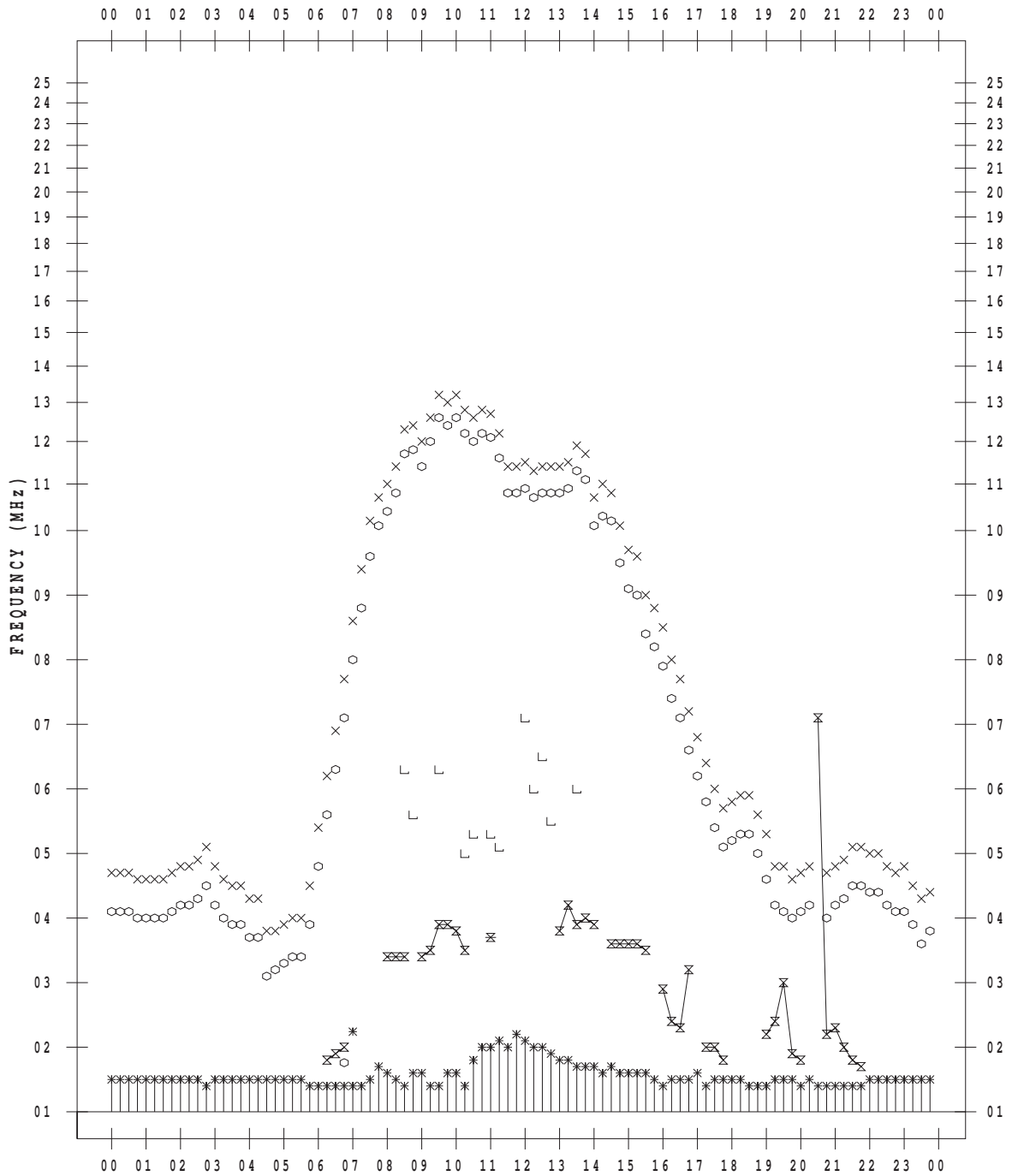
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/ 6

135 ° E MEAN TIME





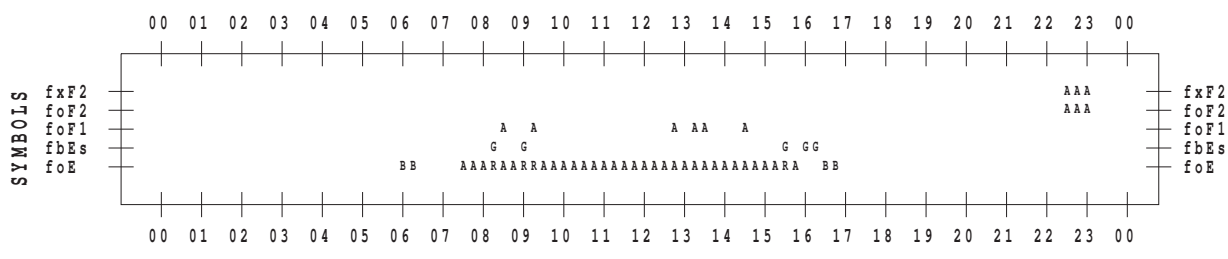
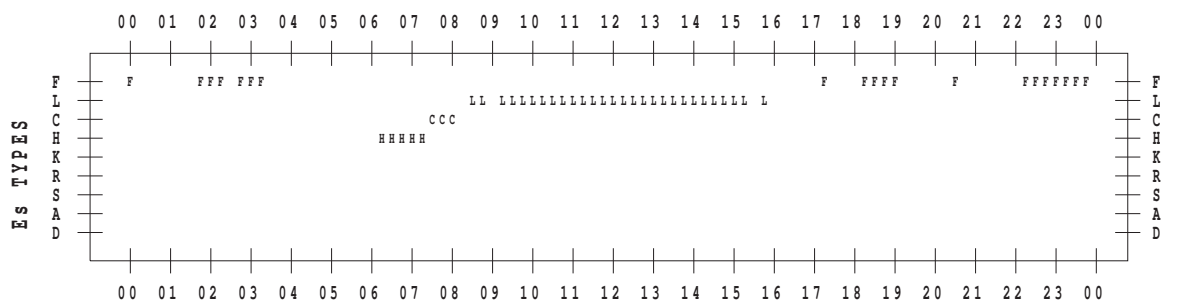
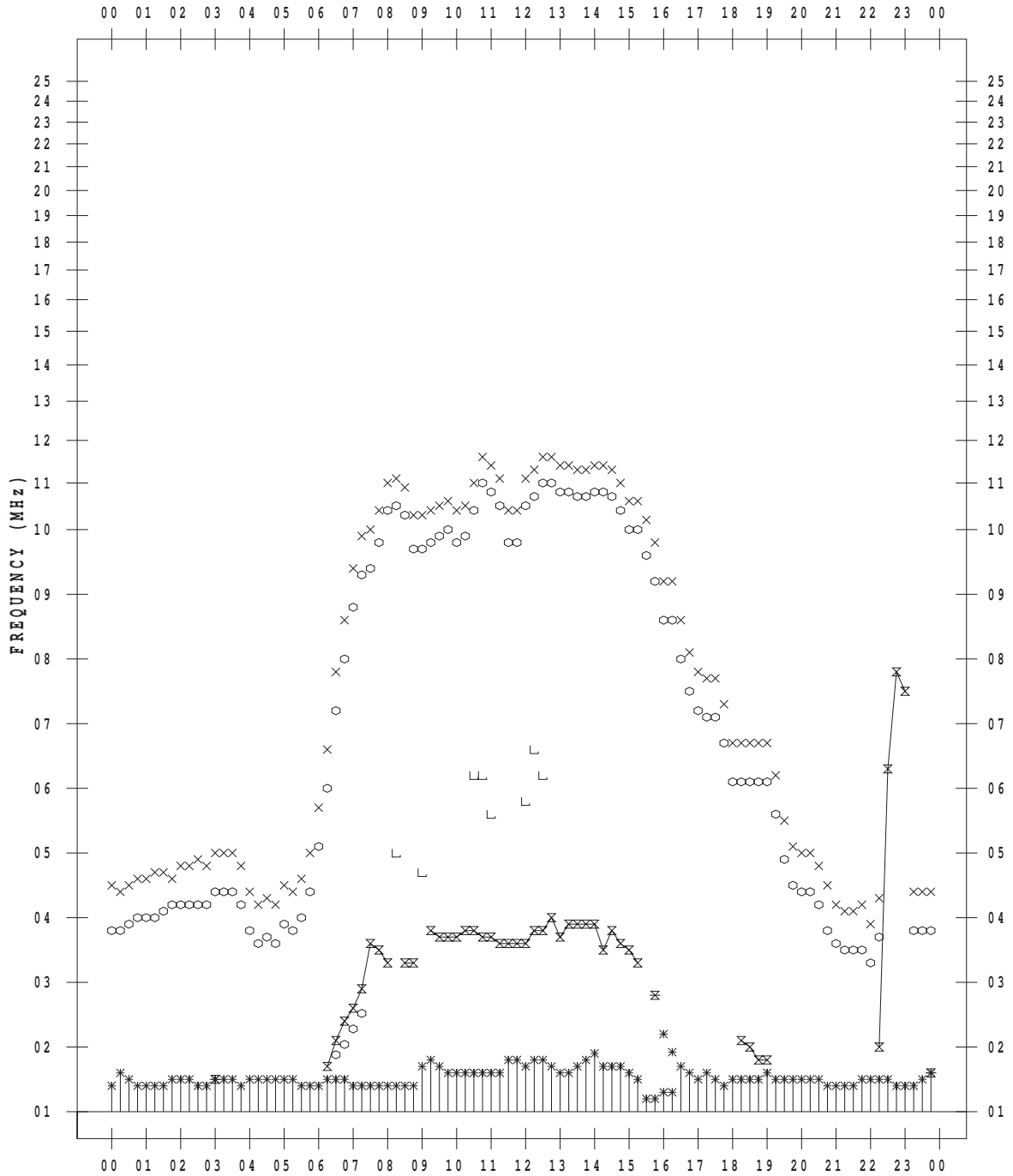
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/ 7

135 ° E MEAN TIME



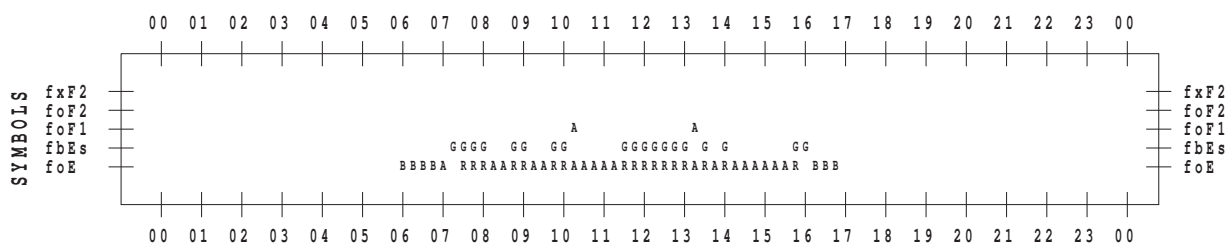
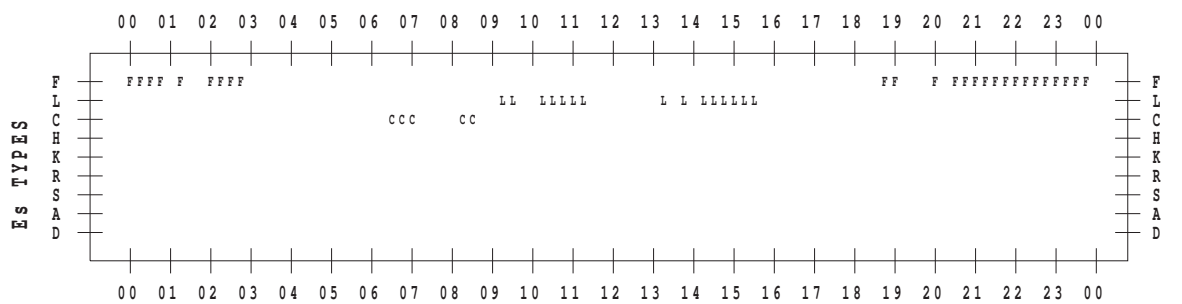
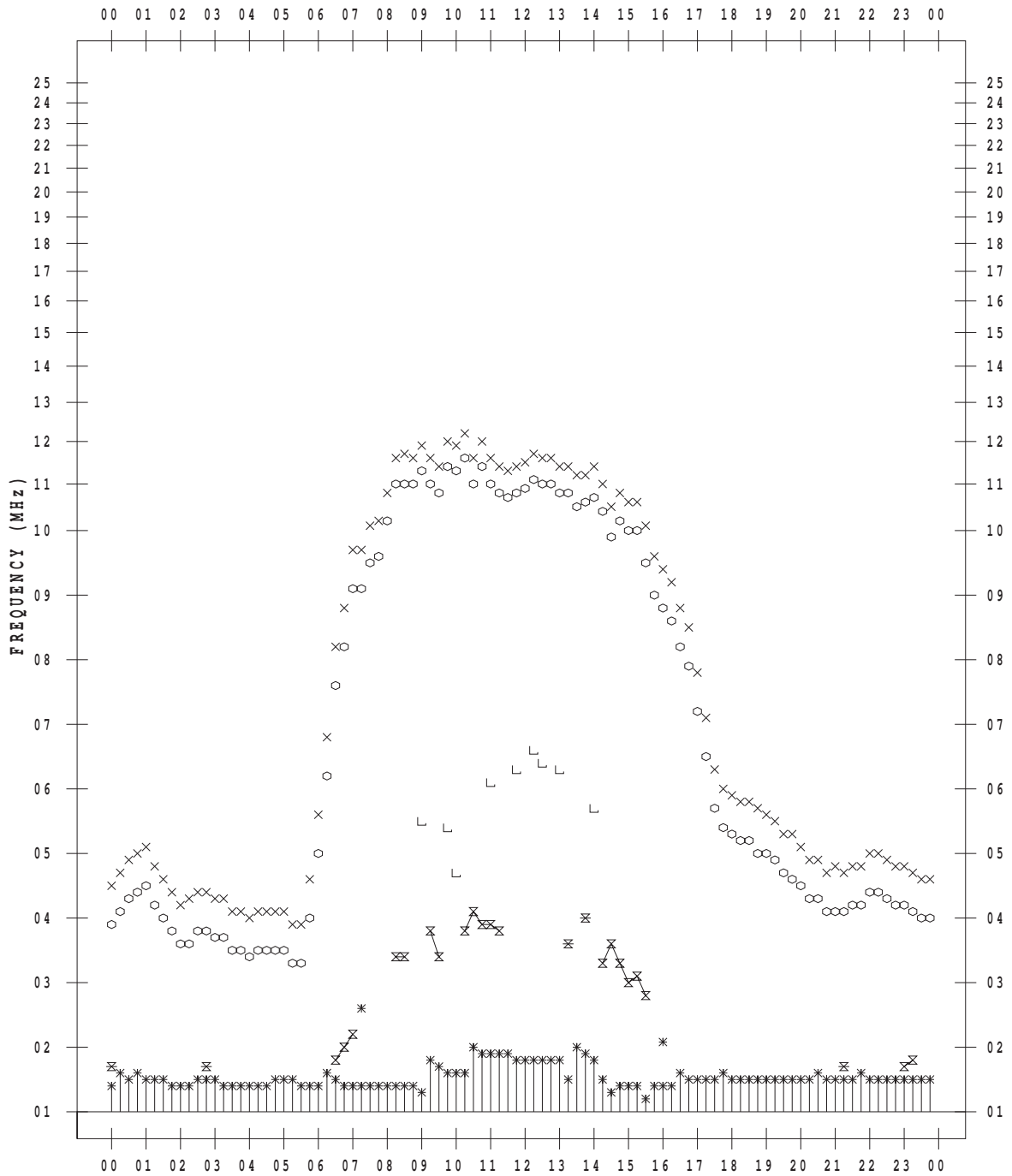
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/ 8

135 ° E MEAN TIME



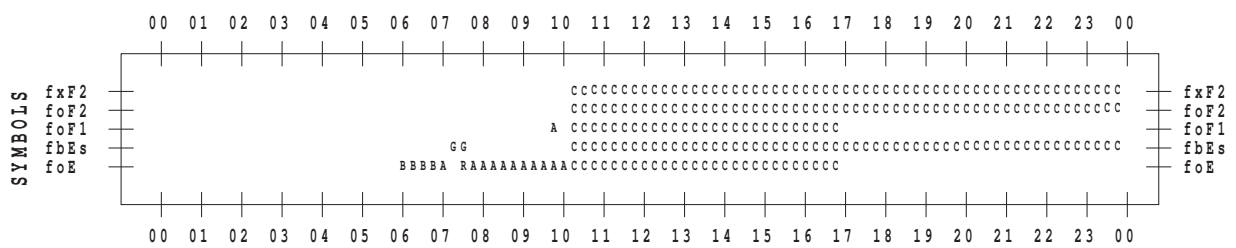
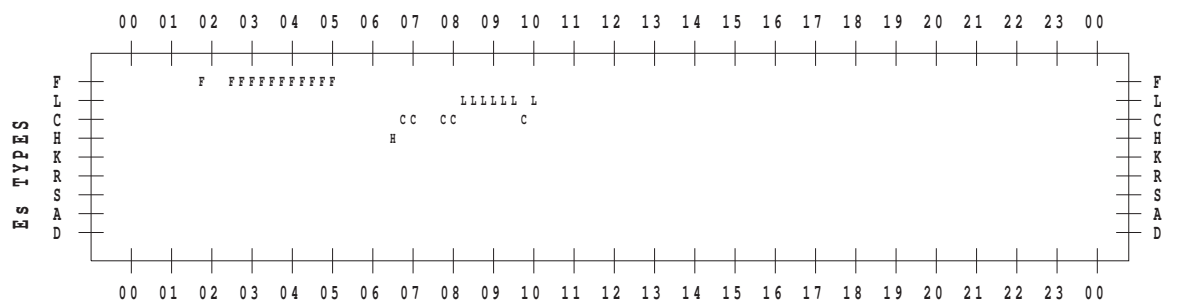
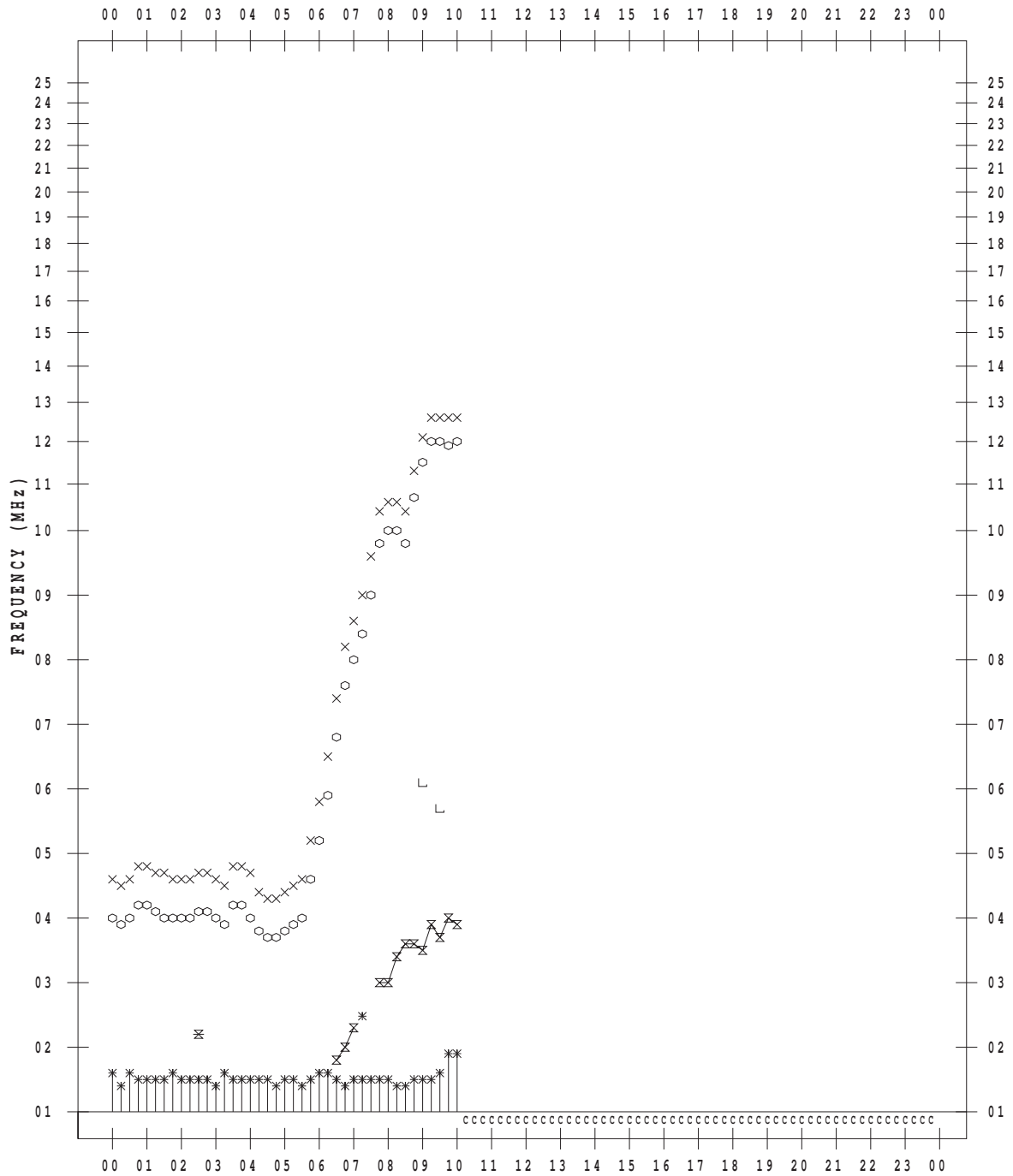
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/ 9

135 ° E MEAN TIME



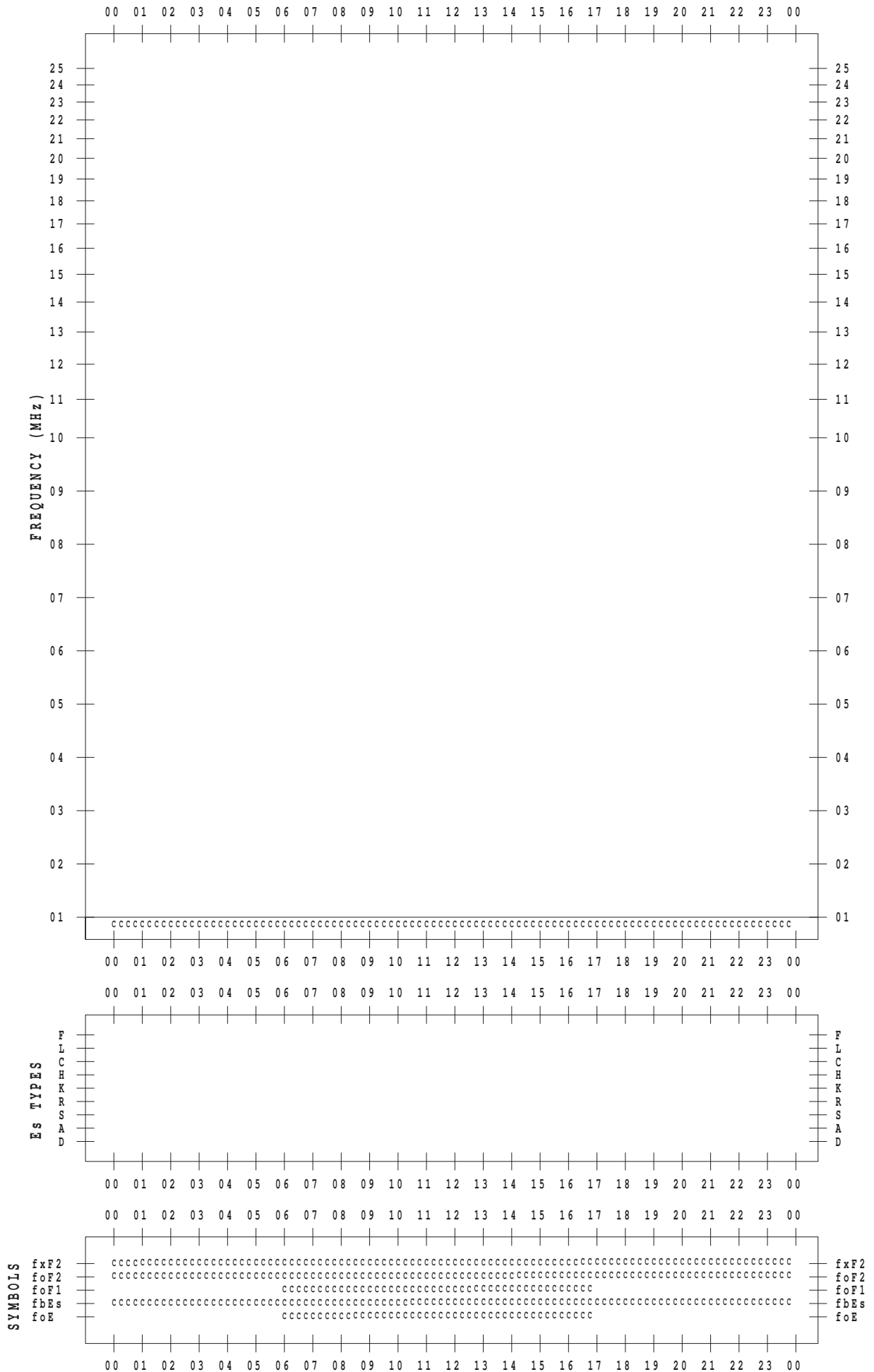
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/10

135 ° E MEAN TIME



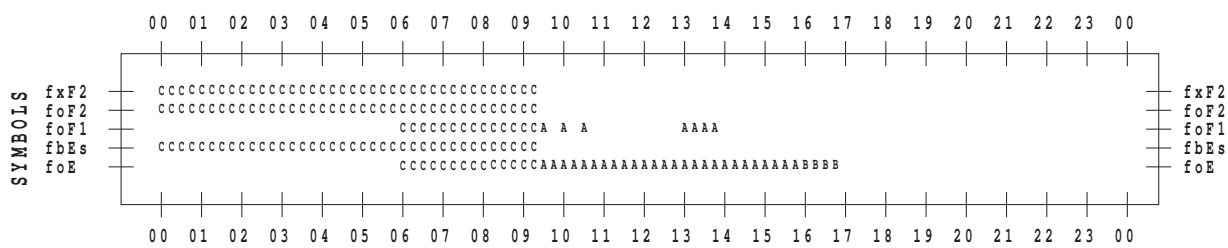
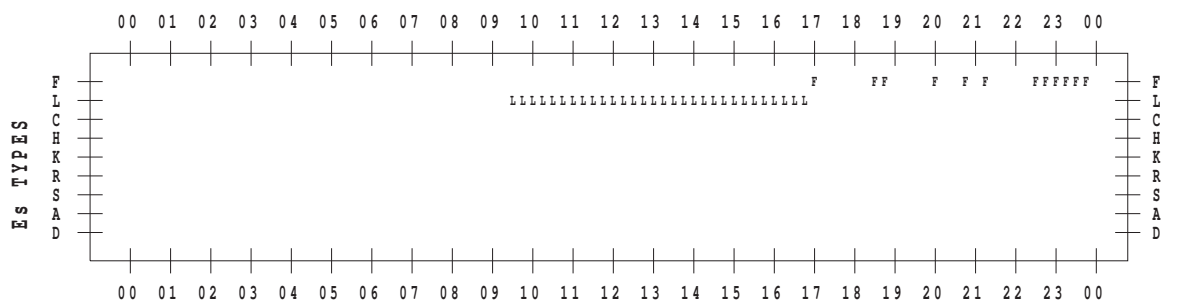
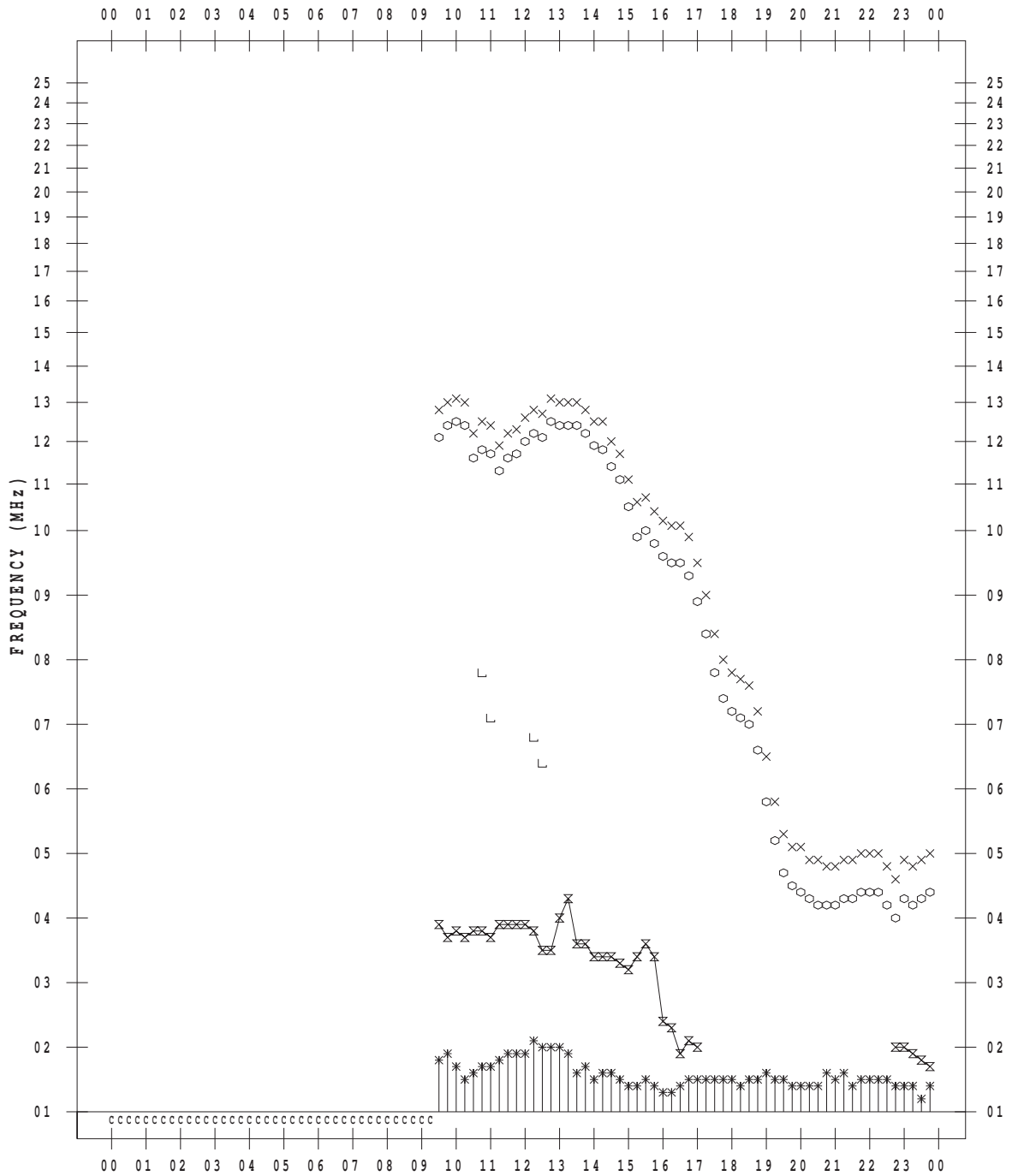
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/11

135 ° E MEAN TIME



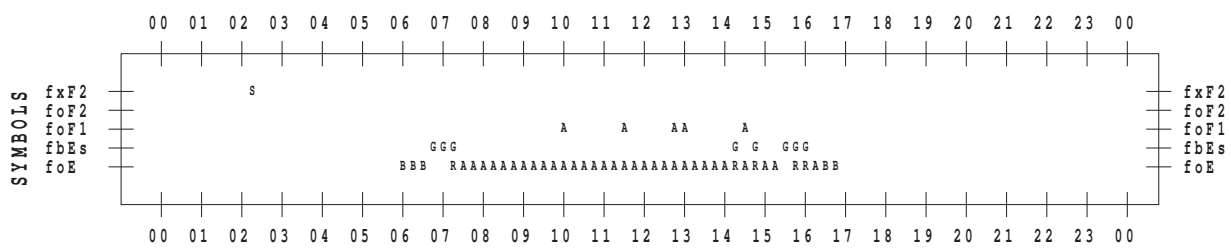
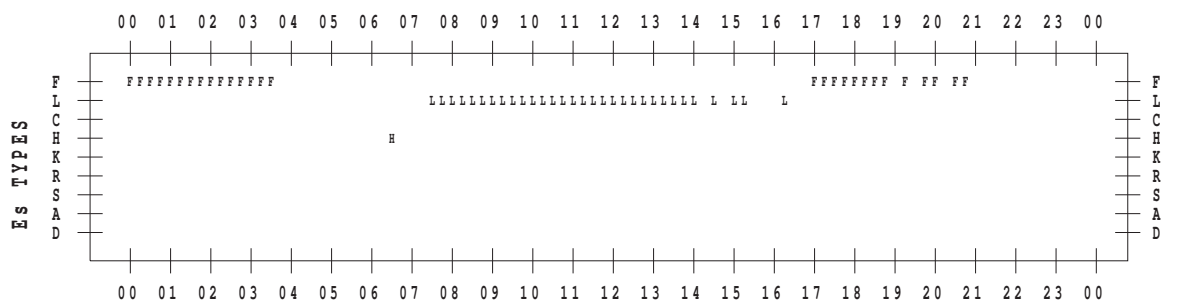
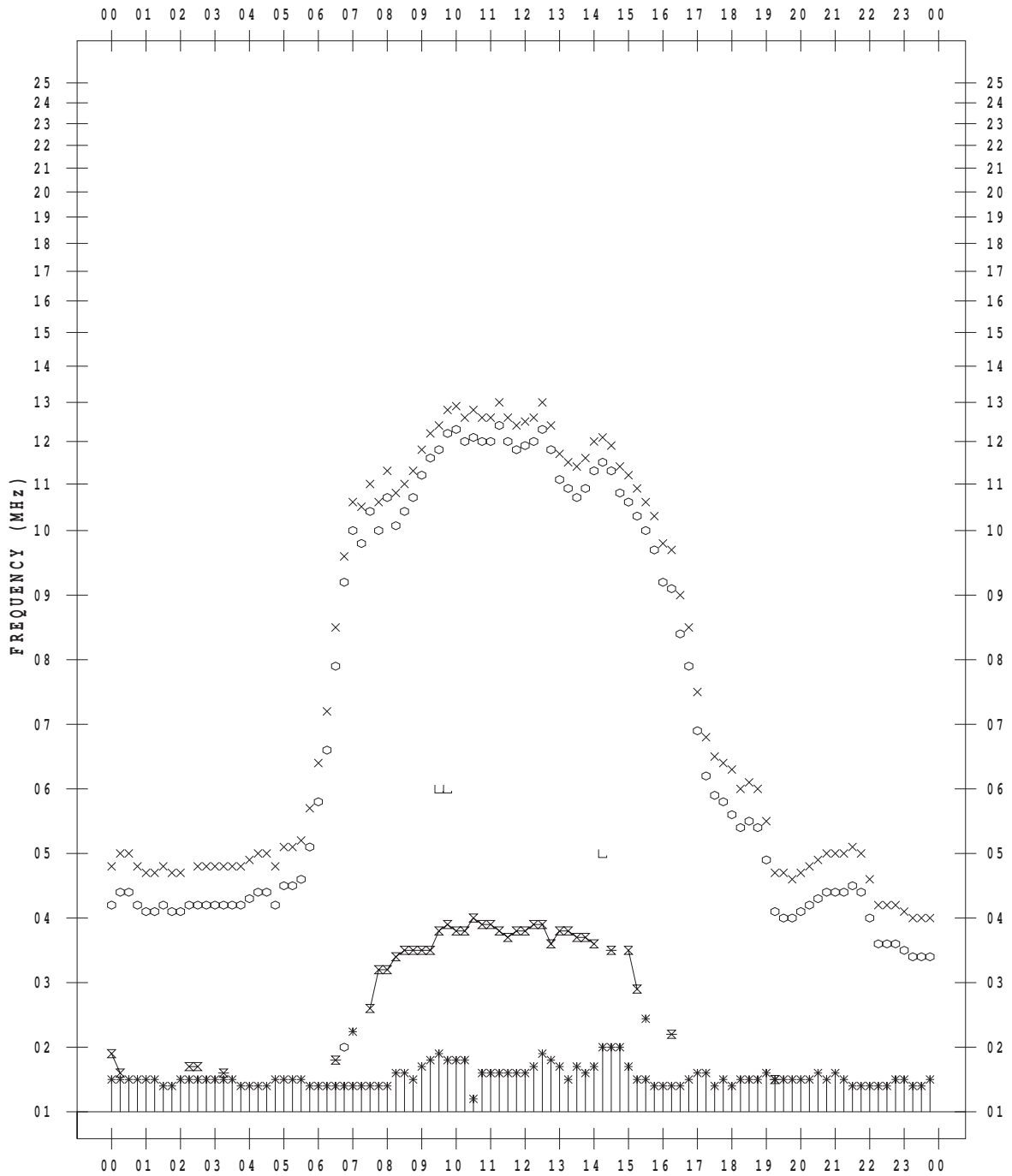
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/12

135 ° E MEAN TIME



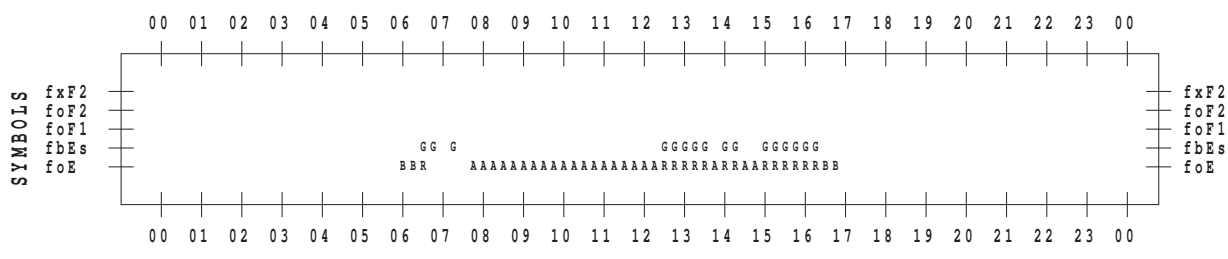
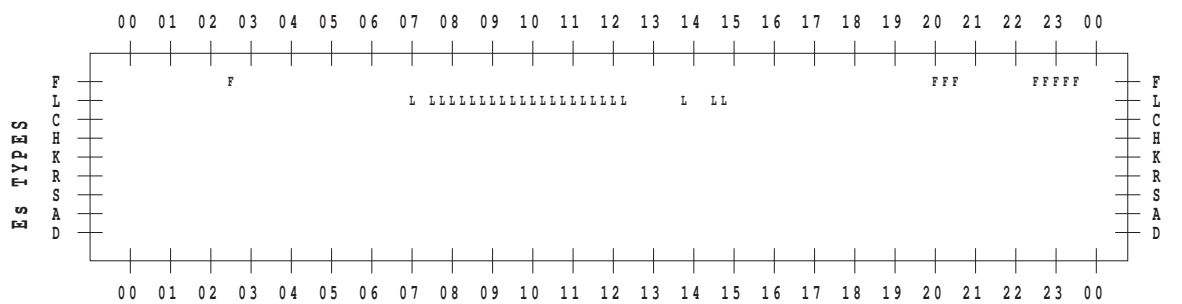
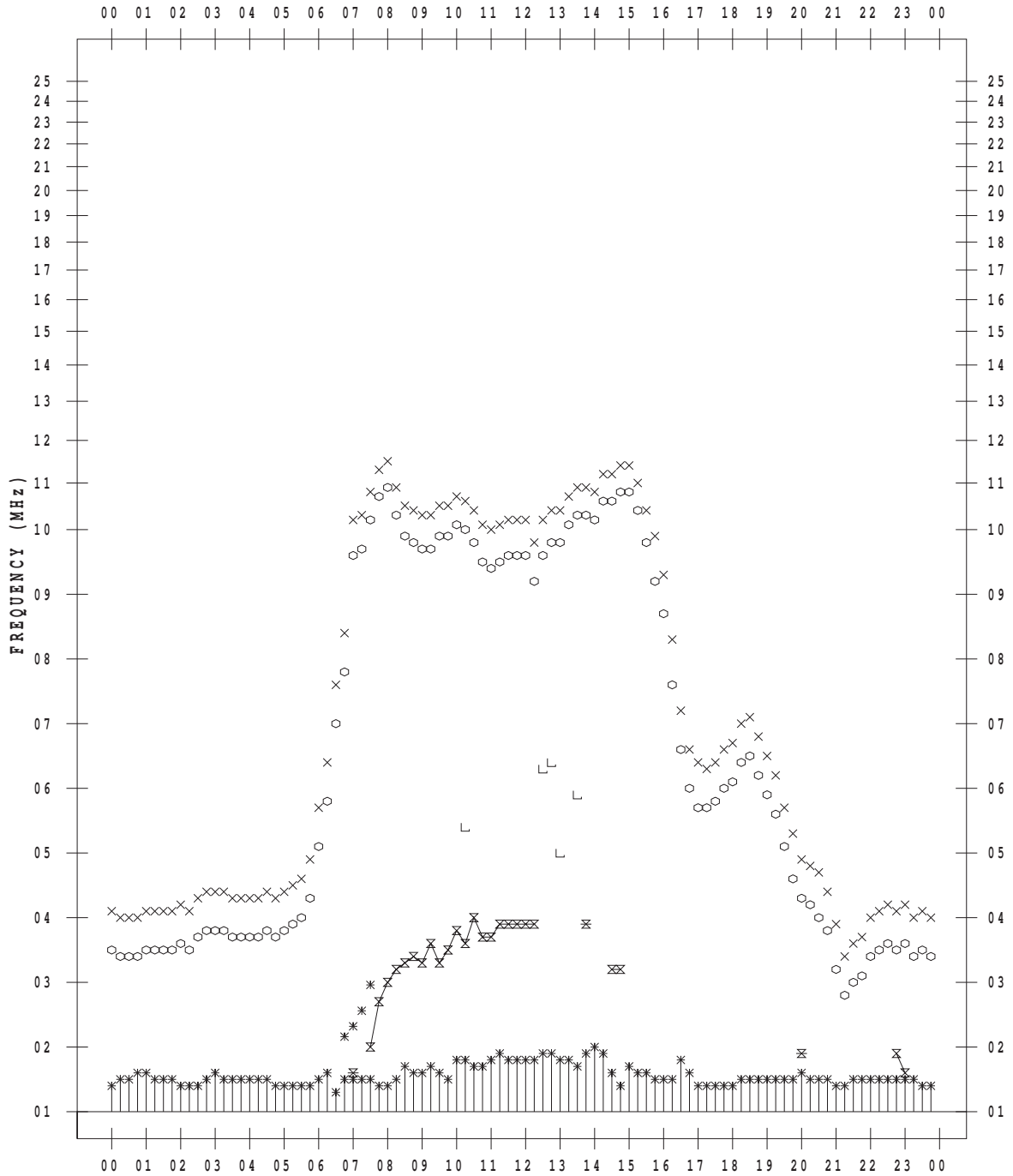
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/13

135 ° E MEAN TIME



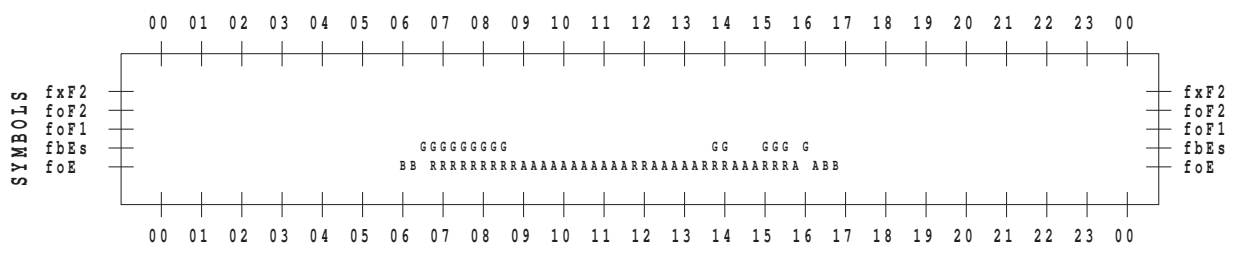
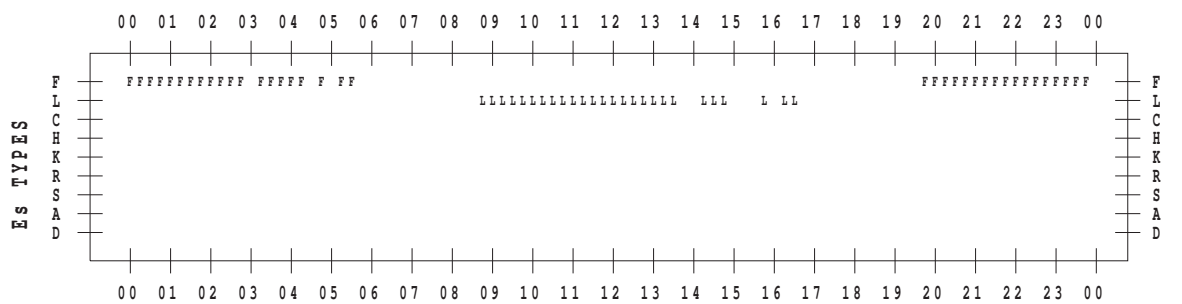
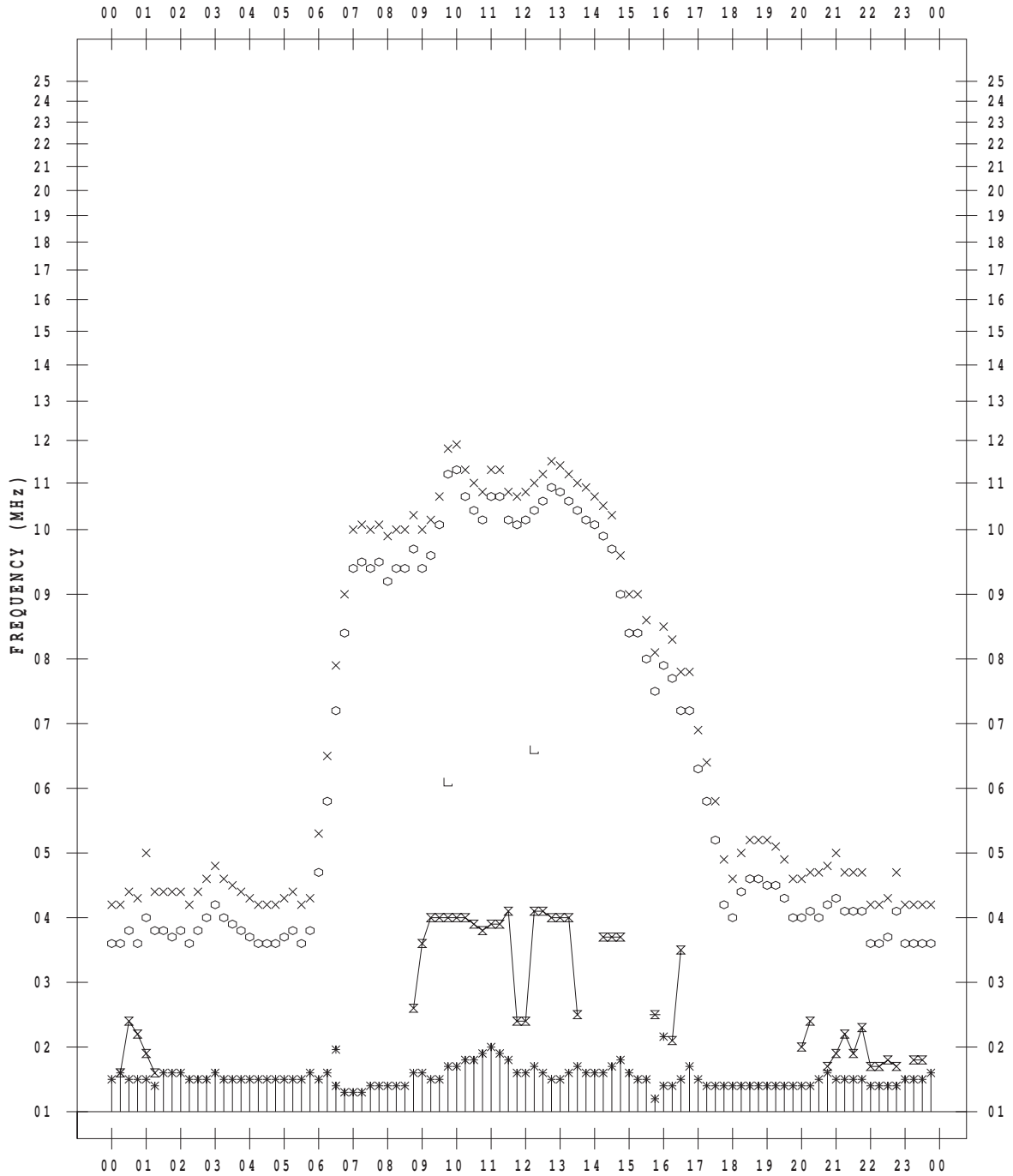
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/14

135 ° E MEAN TIME





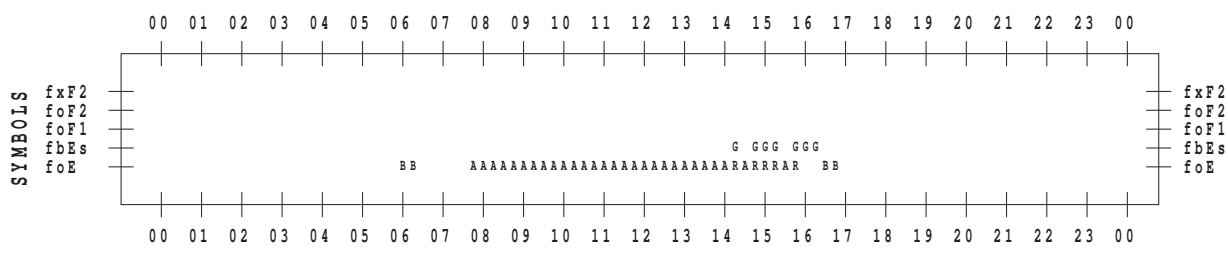
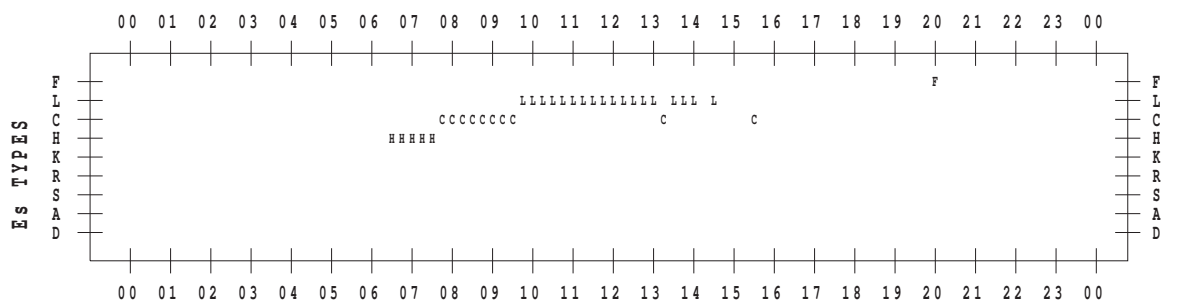
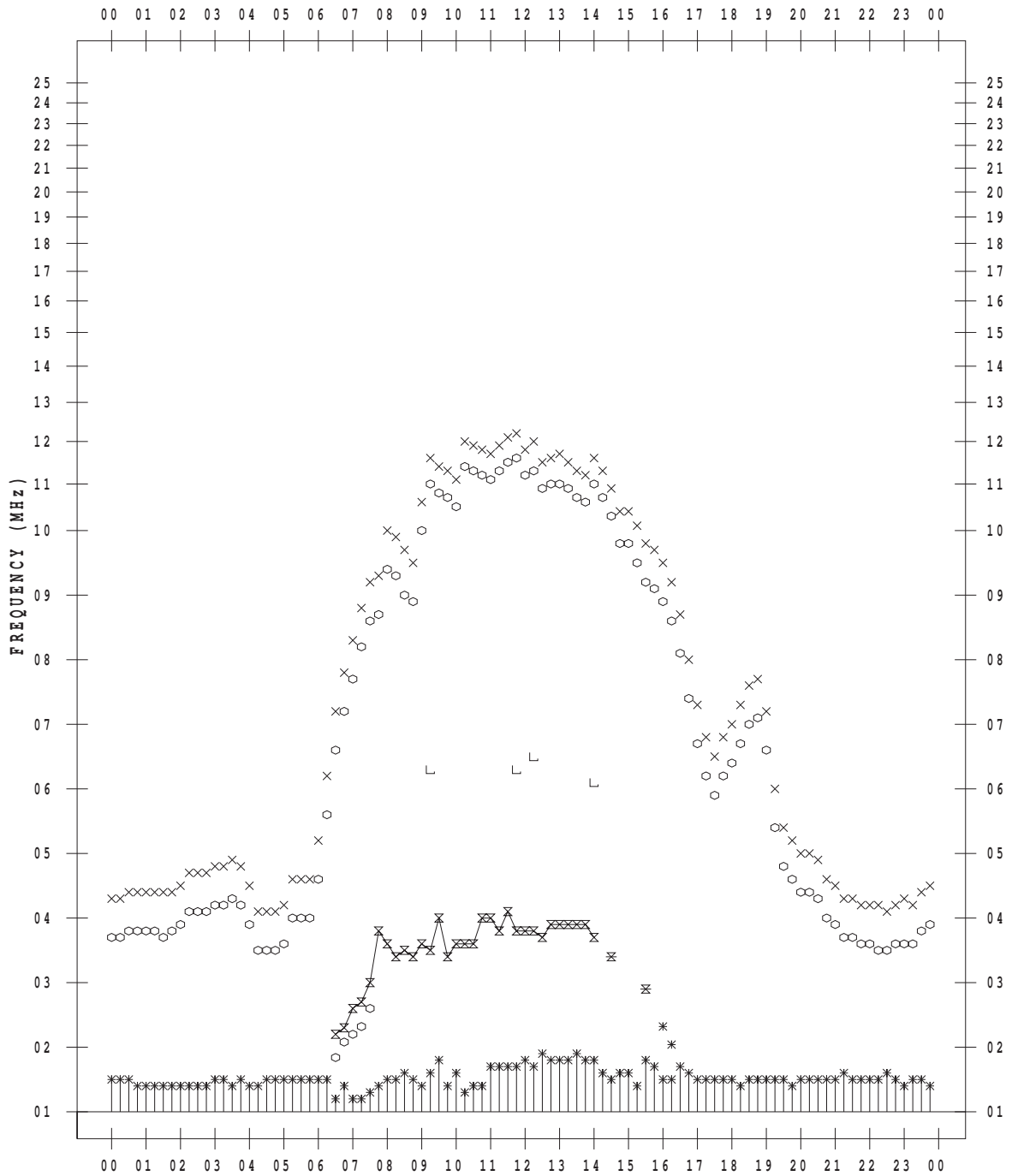
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/15

135 ° E MEAN TIME



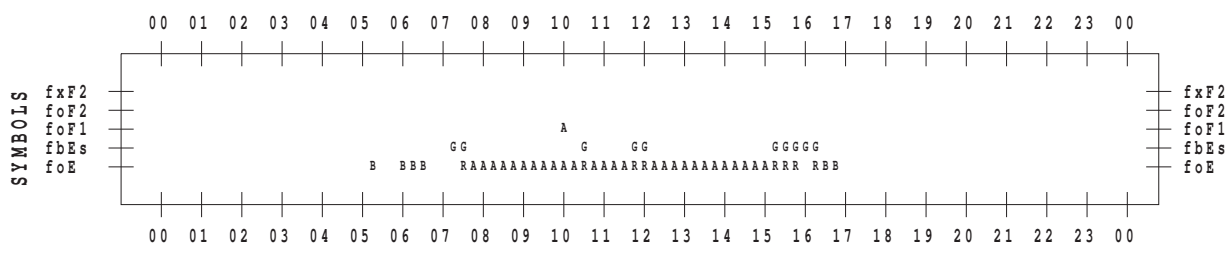
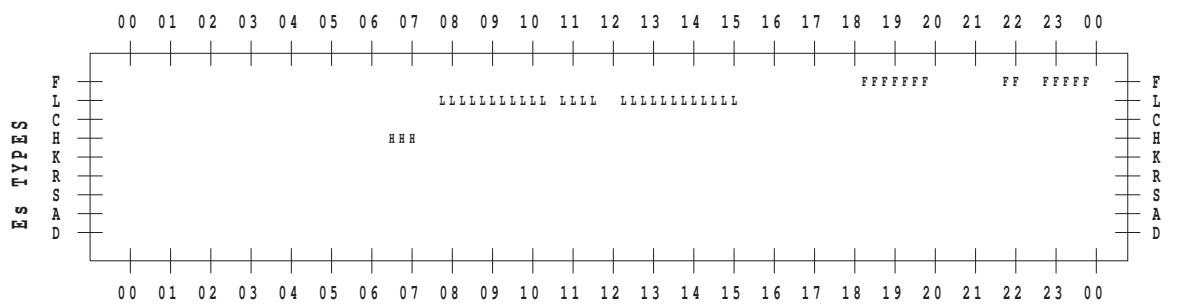
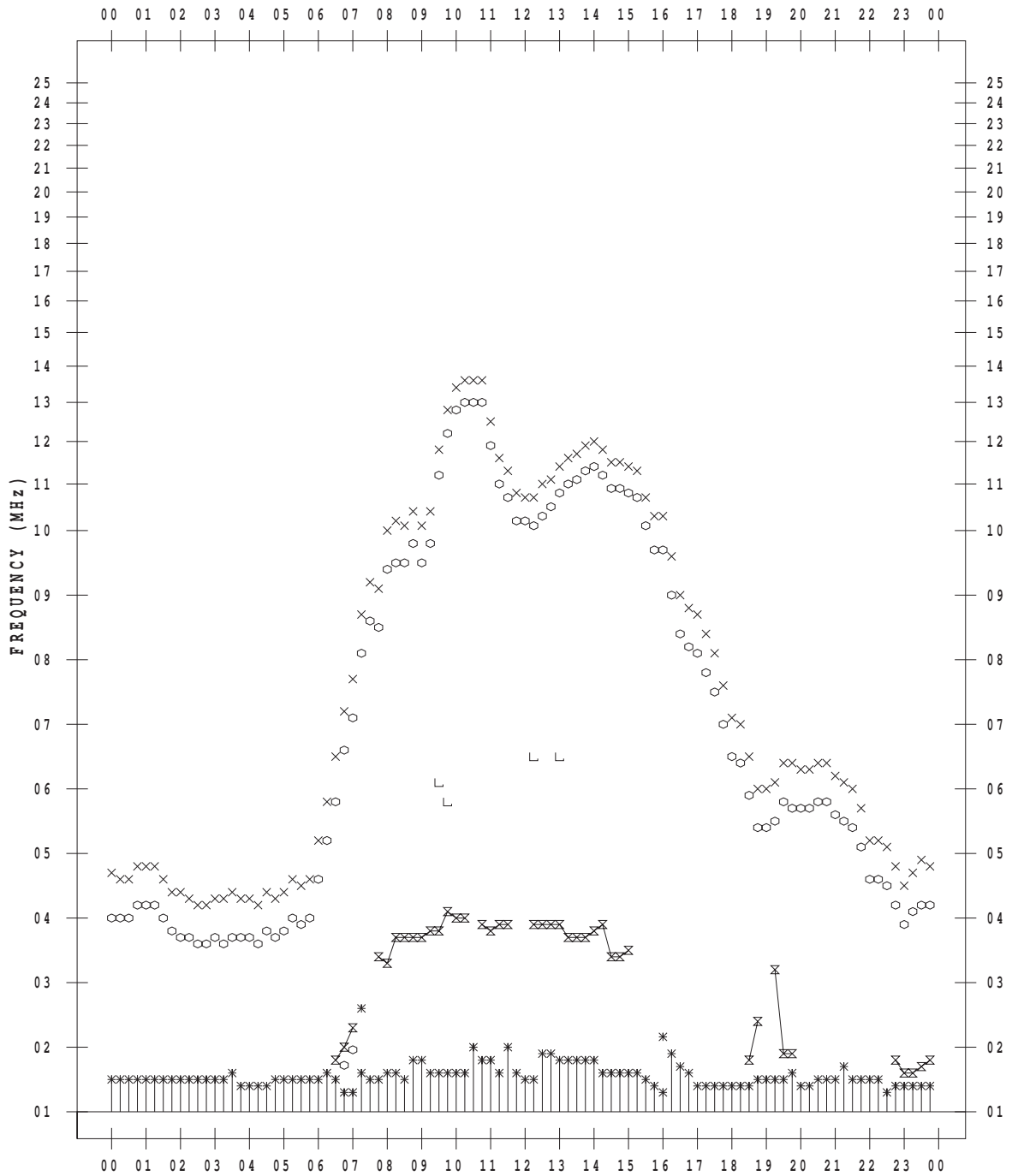
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/16

135 ° E MEAN TIME



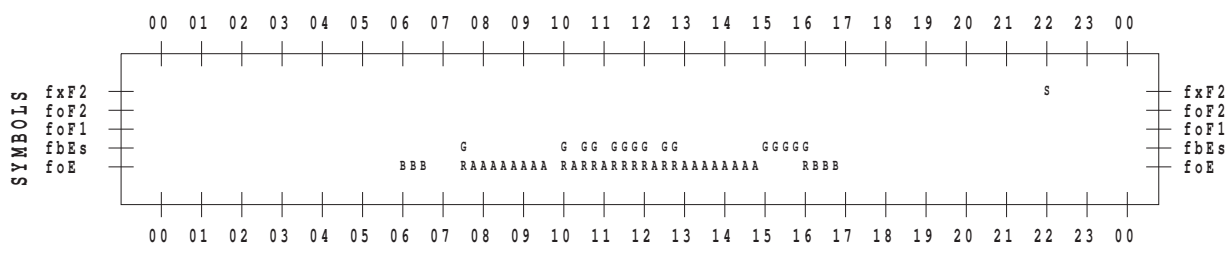
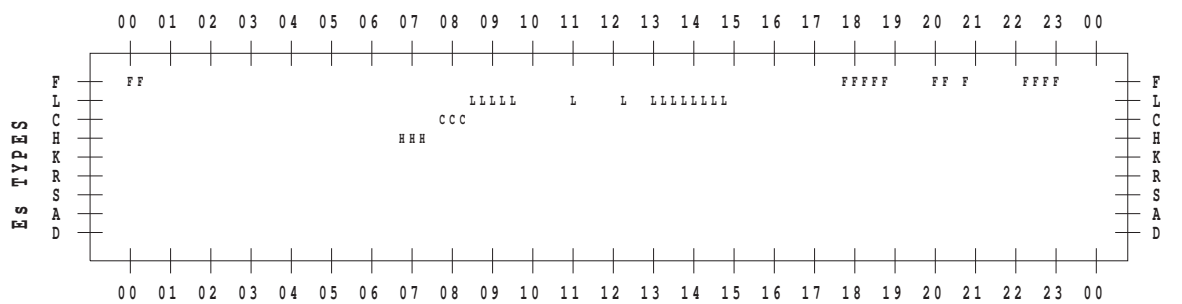
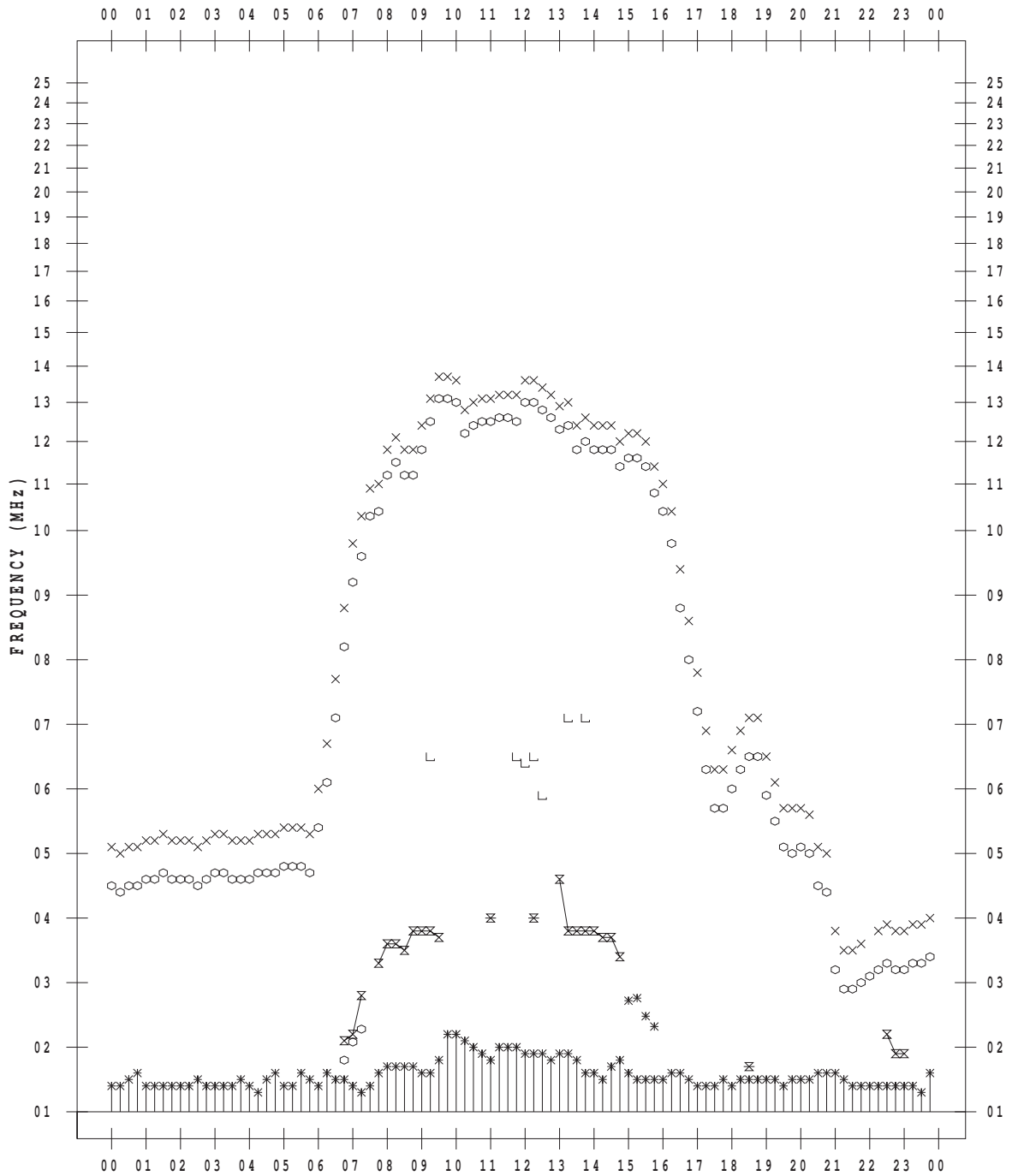
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/17

135 ° E MEAN TIME



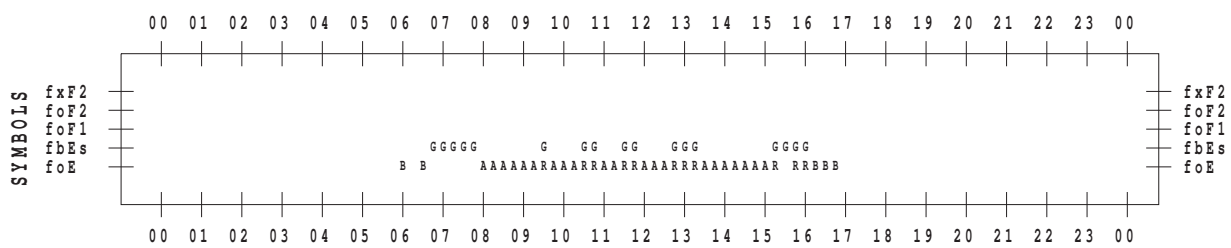
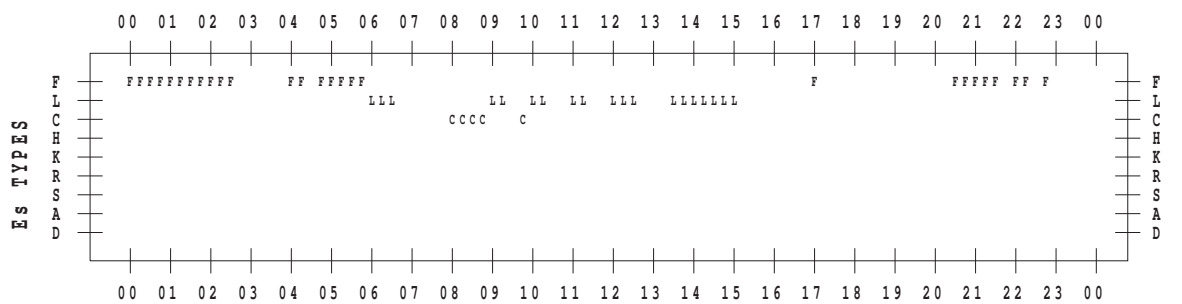
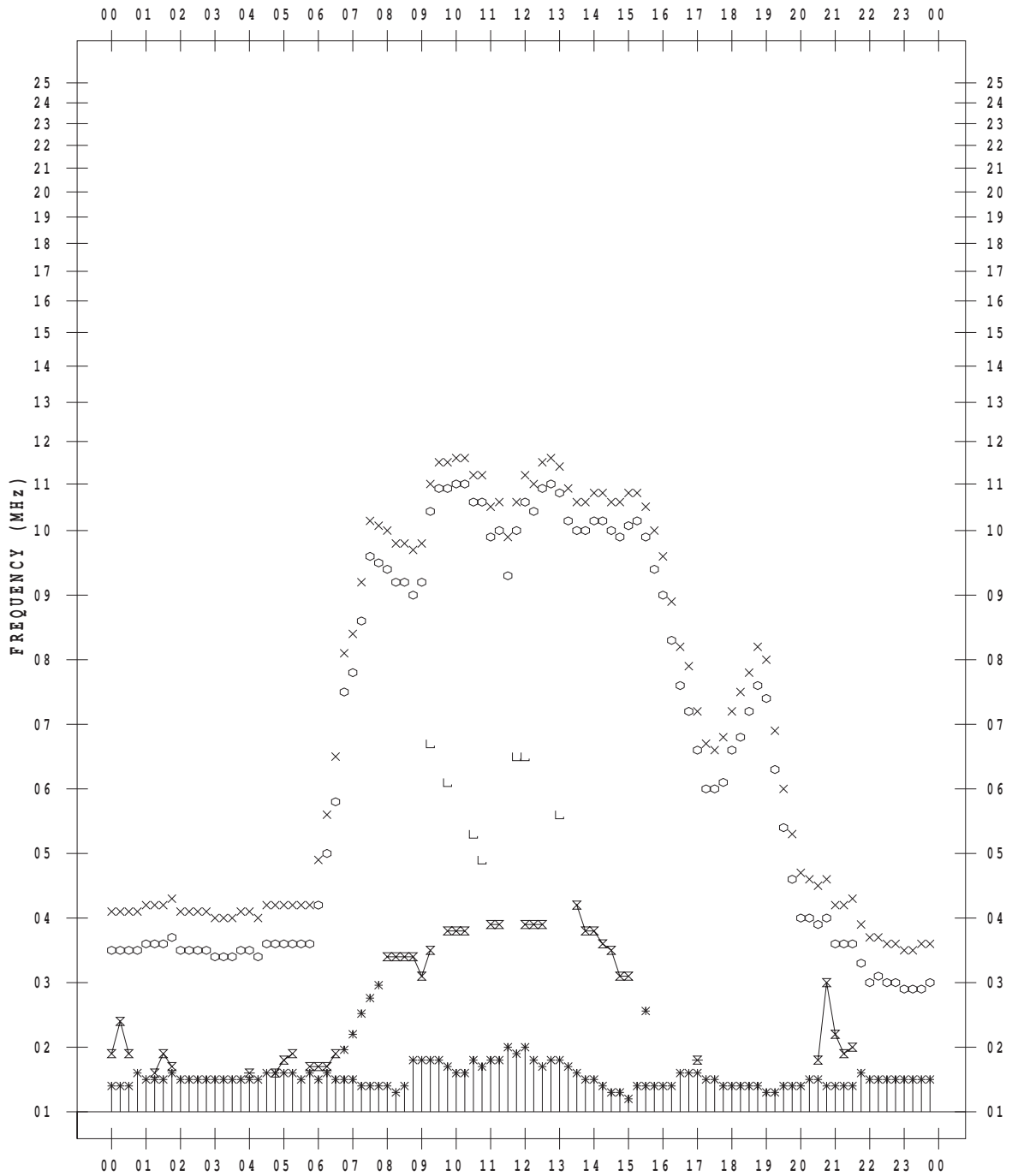
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/18

135 ° E MEAN TIME



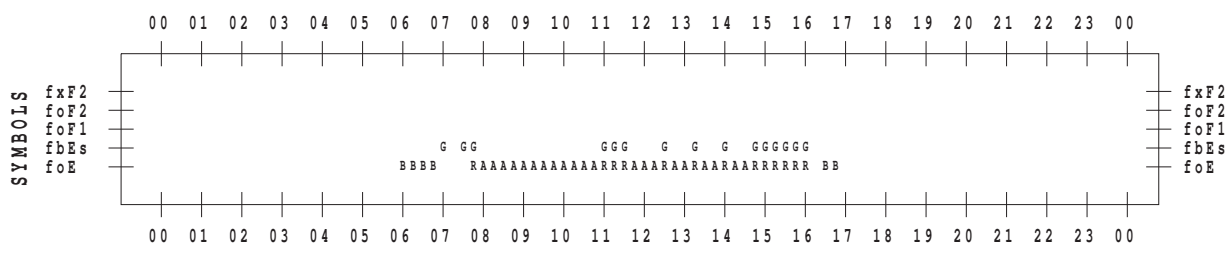
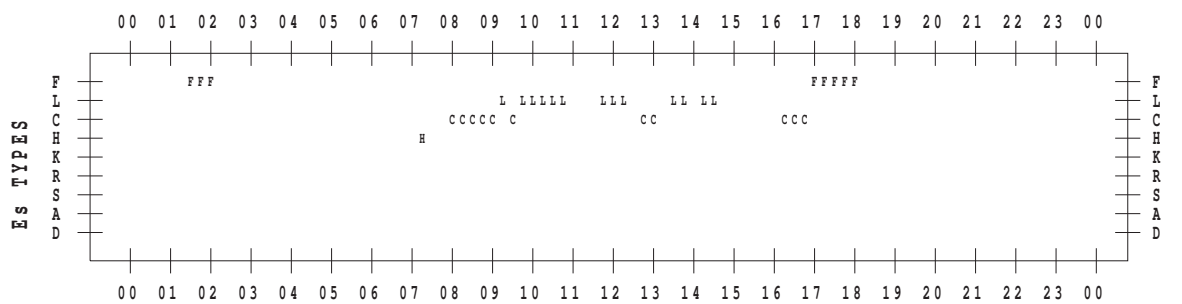
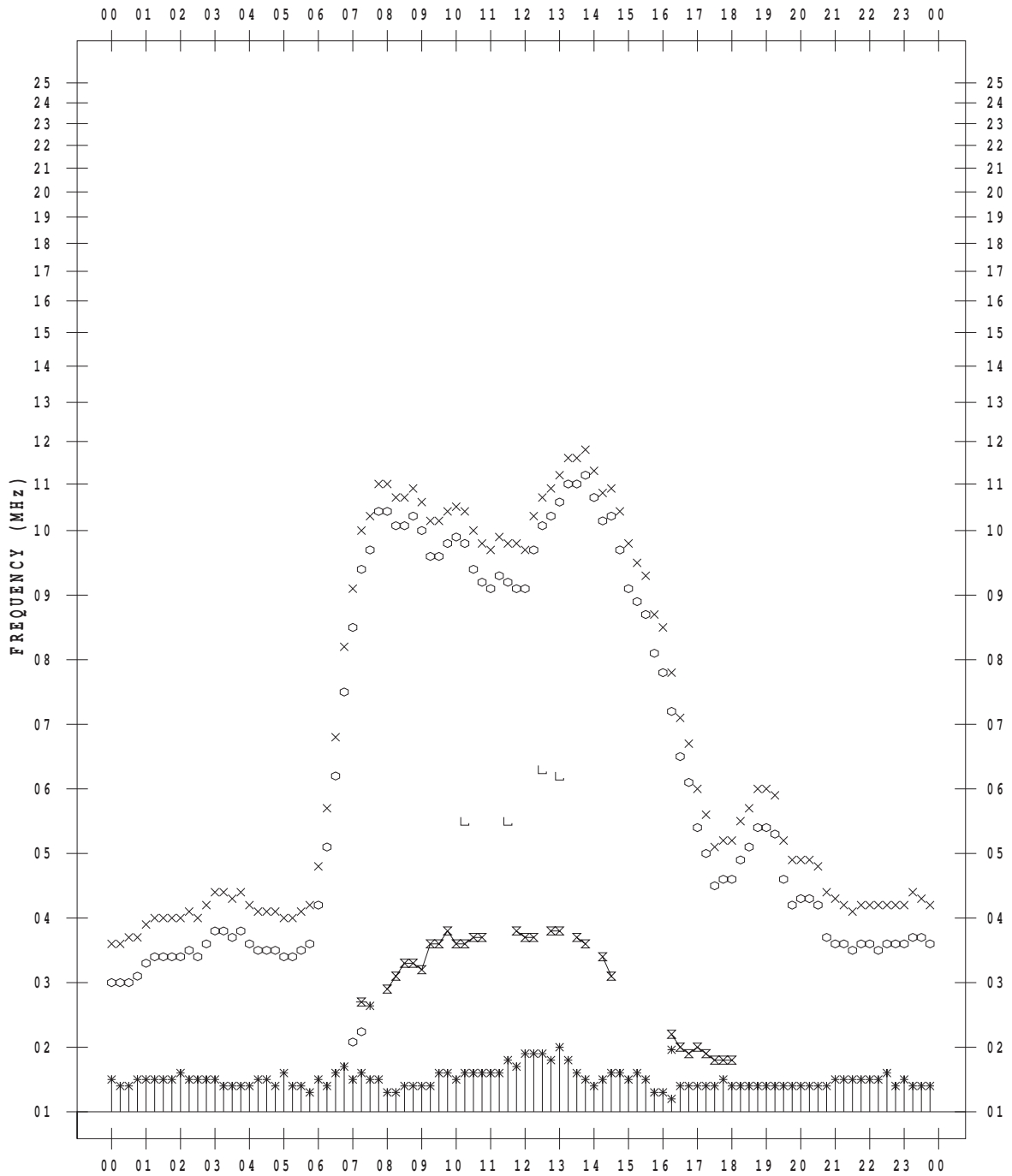
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/19

135 ° E MEAN TIME



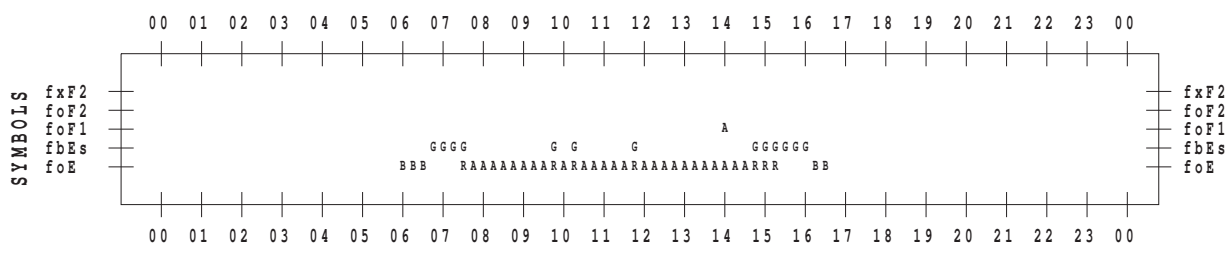
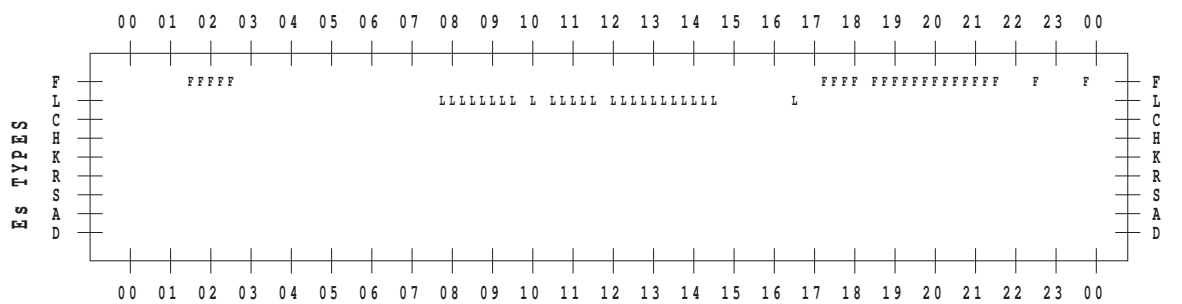
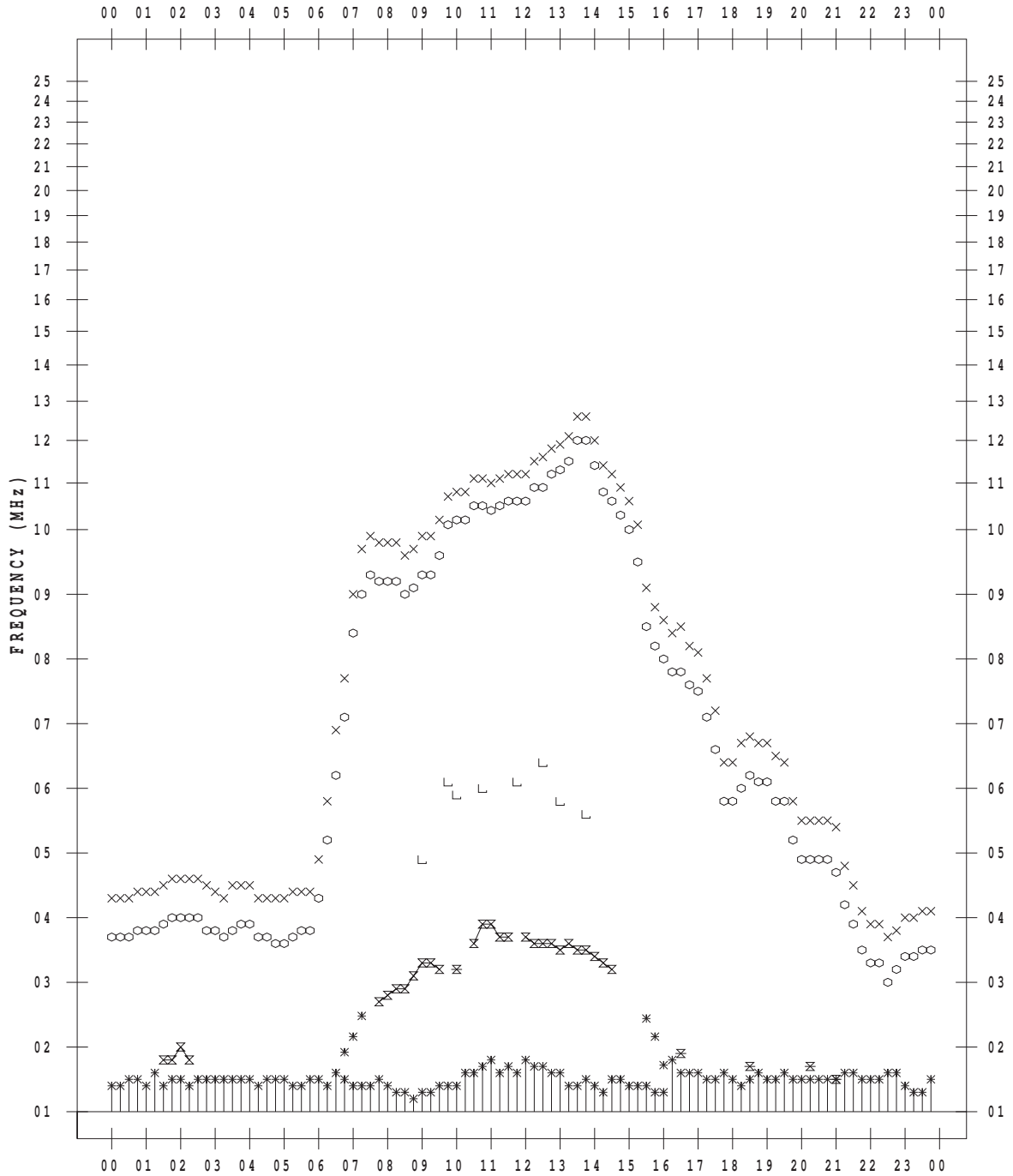
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/20

135 ° E MEAN TIME



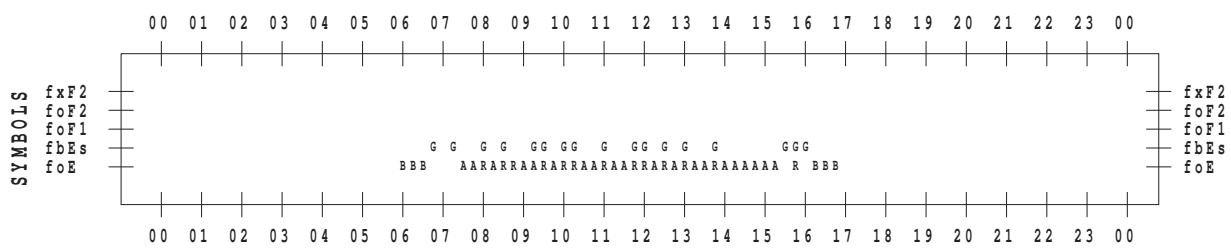
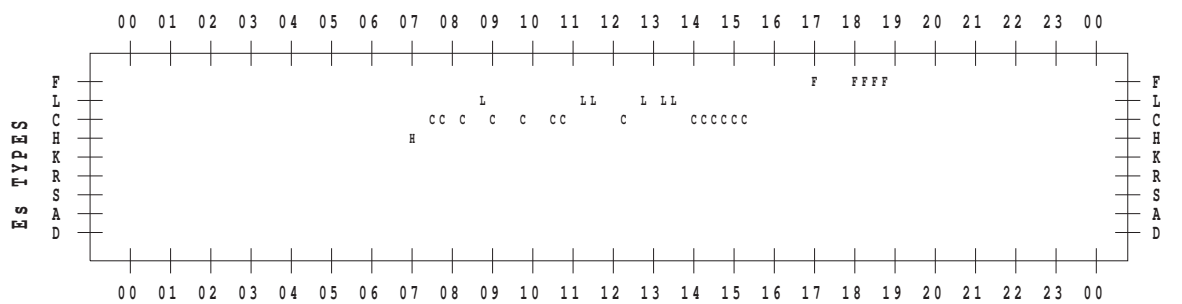
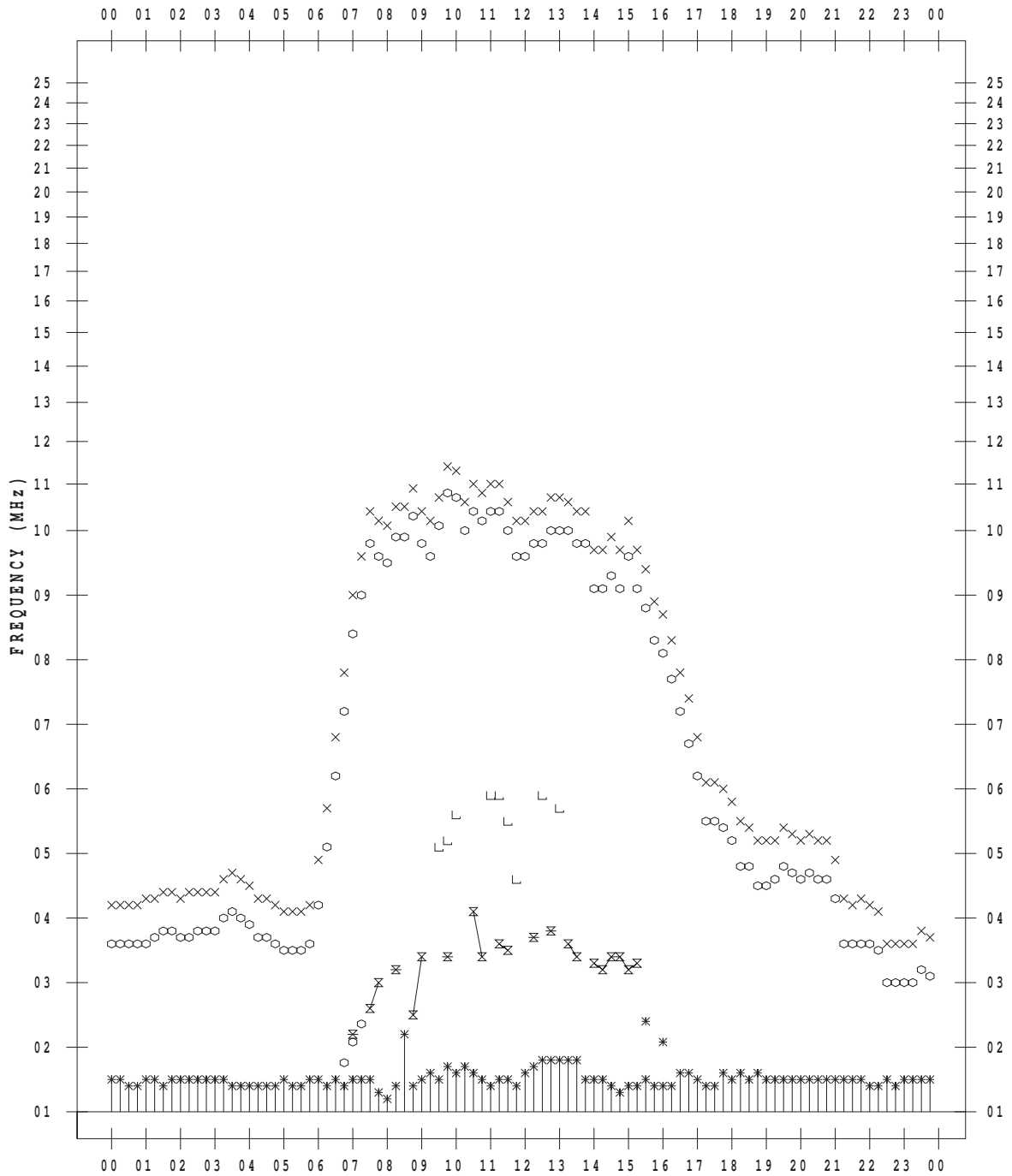
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/21

135 ° E MEAN TIME



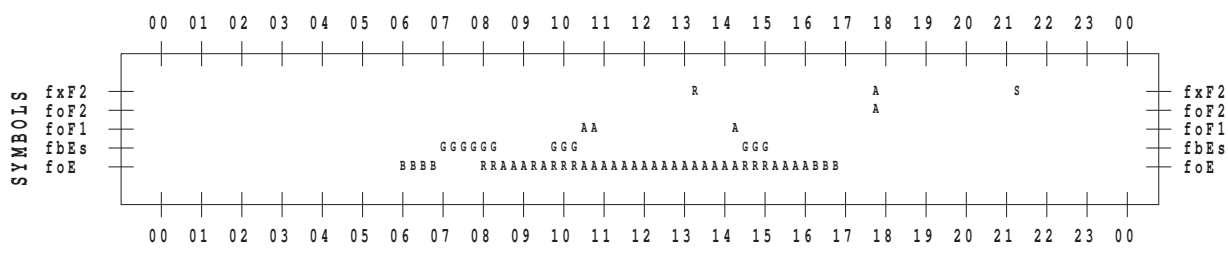
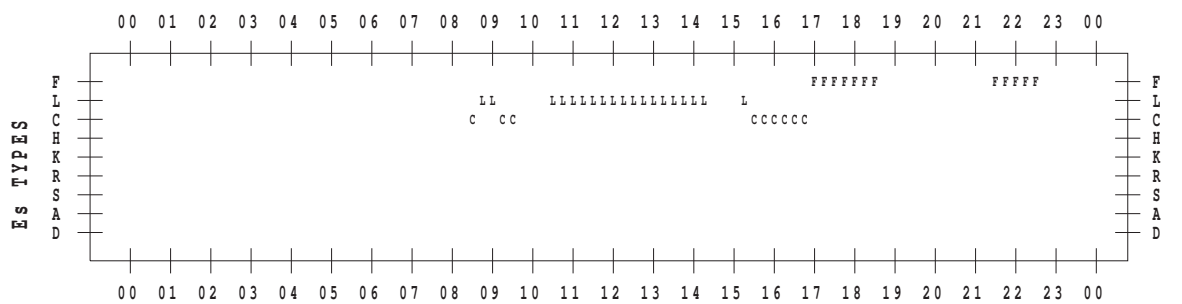
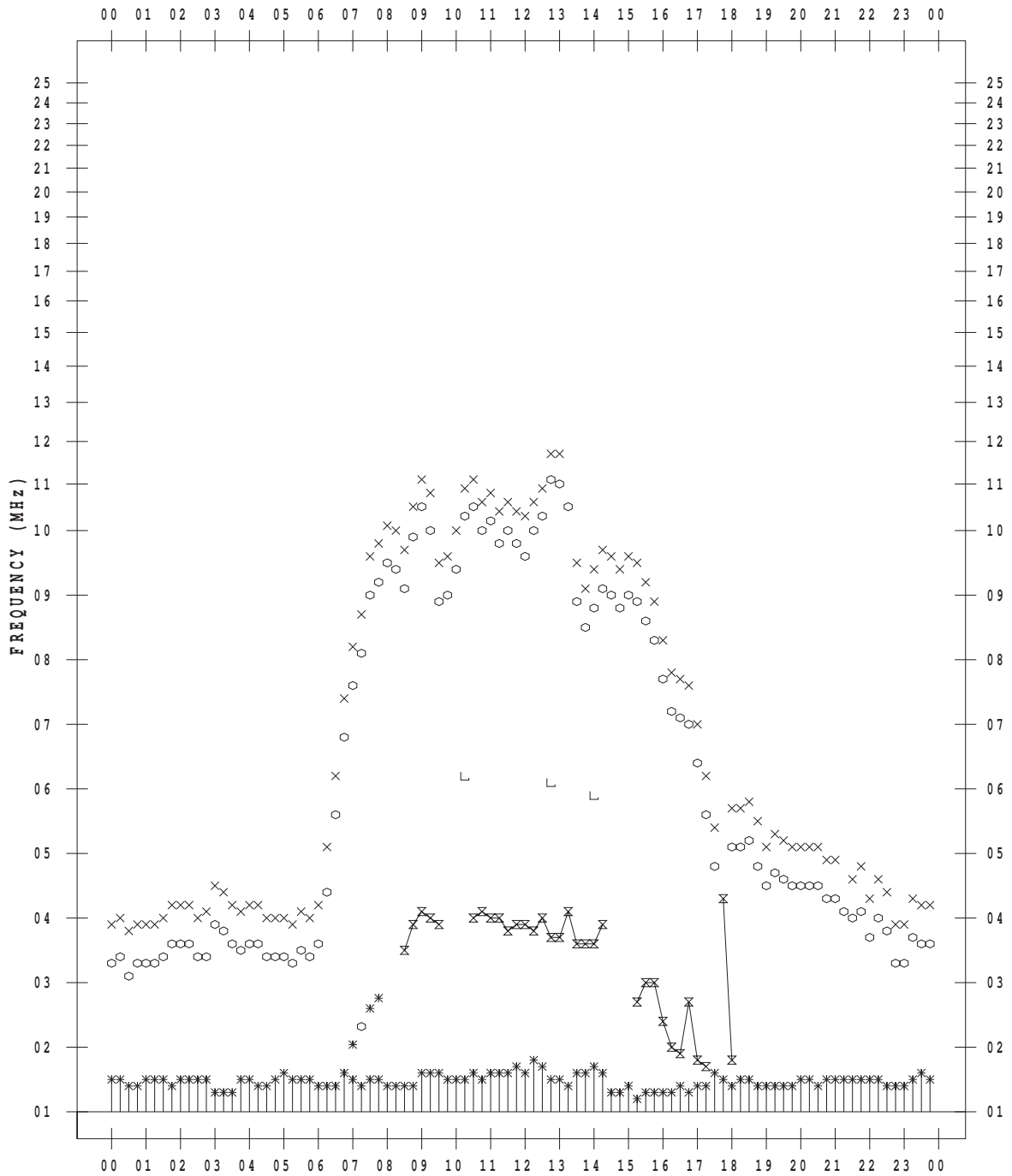
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/22

135 ° E MEAN TIME





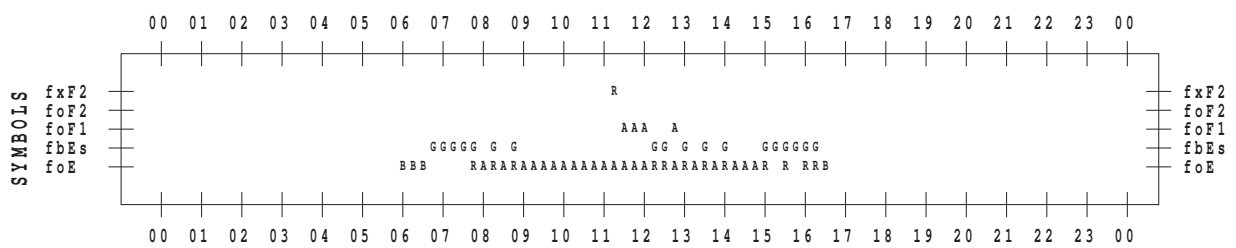
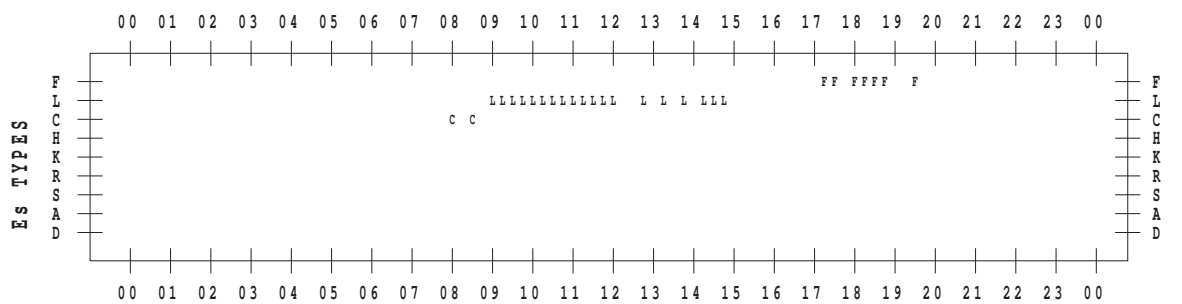
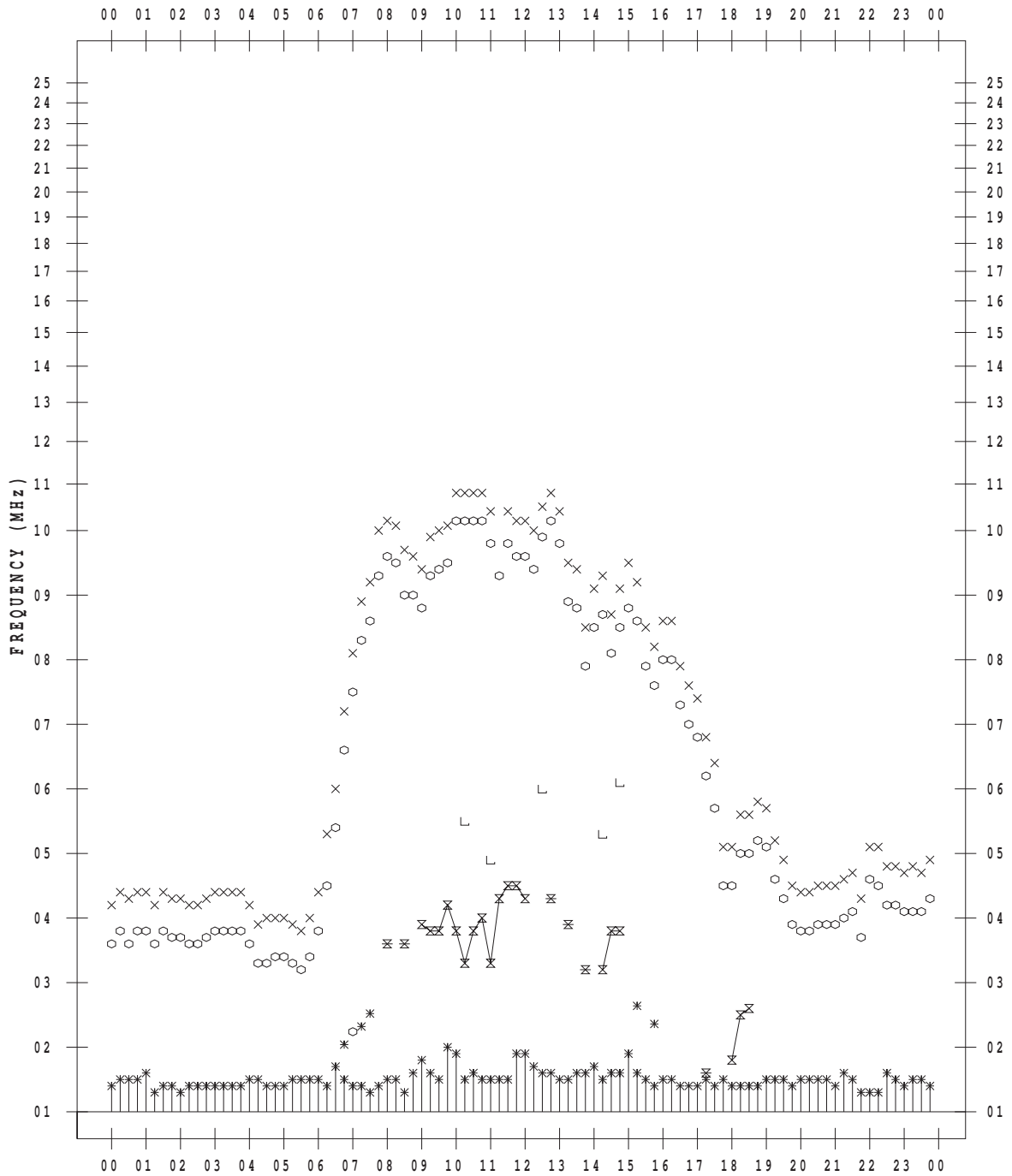
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/23

135 ° E MEAN TIME



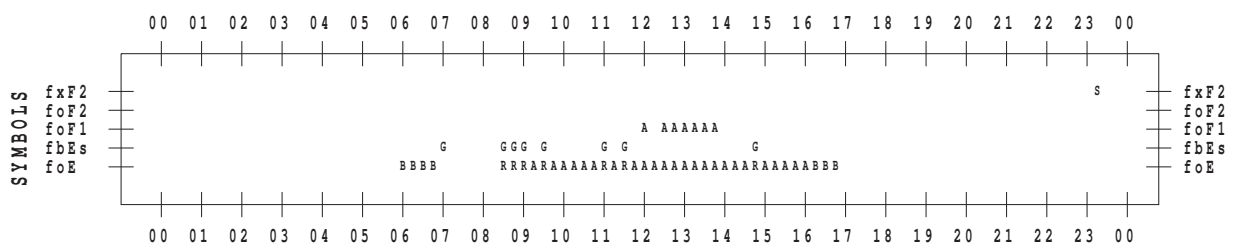
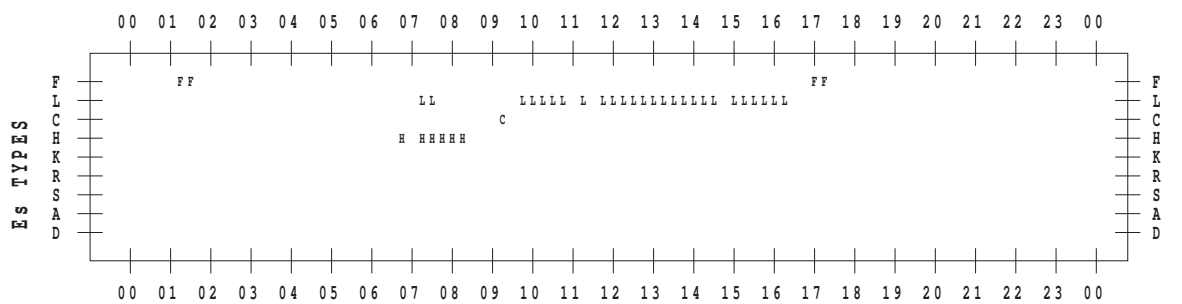
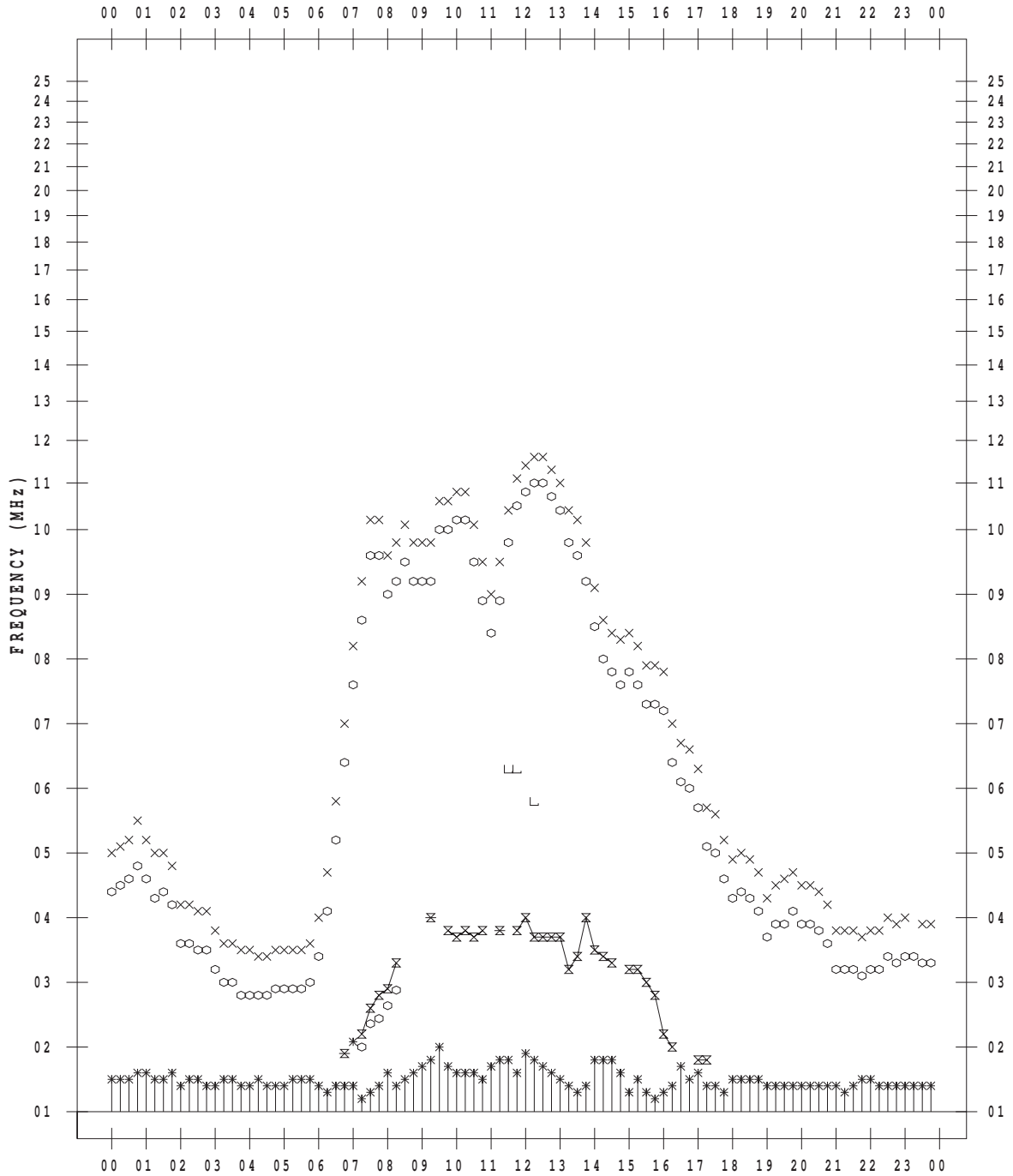
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/24

135 ° E MEAN TIME



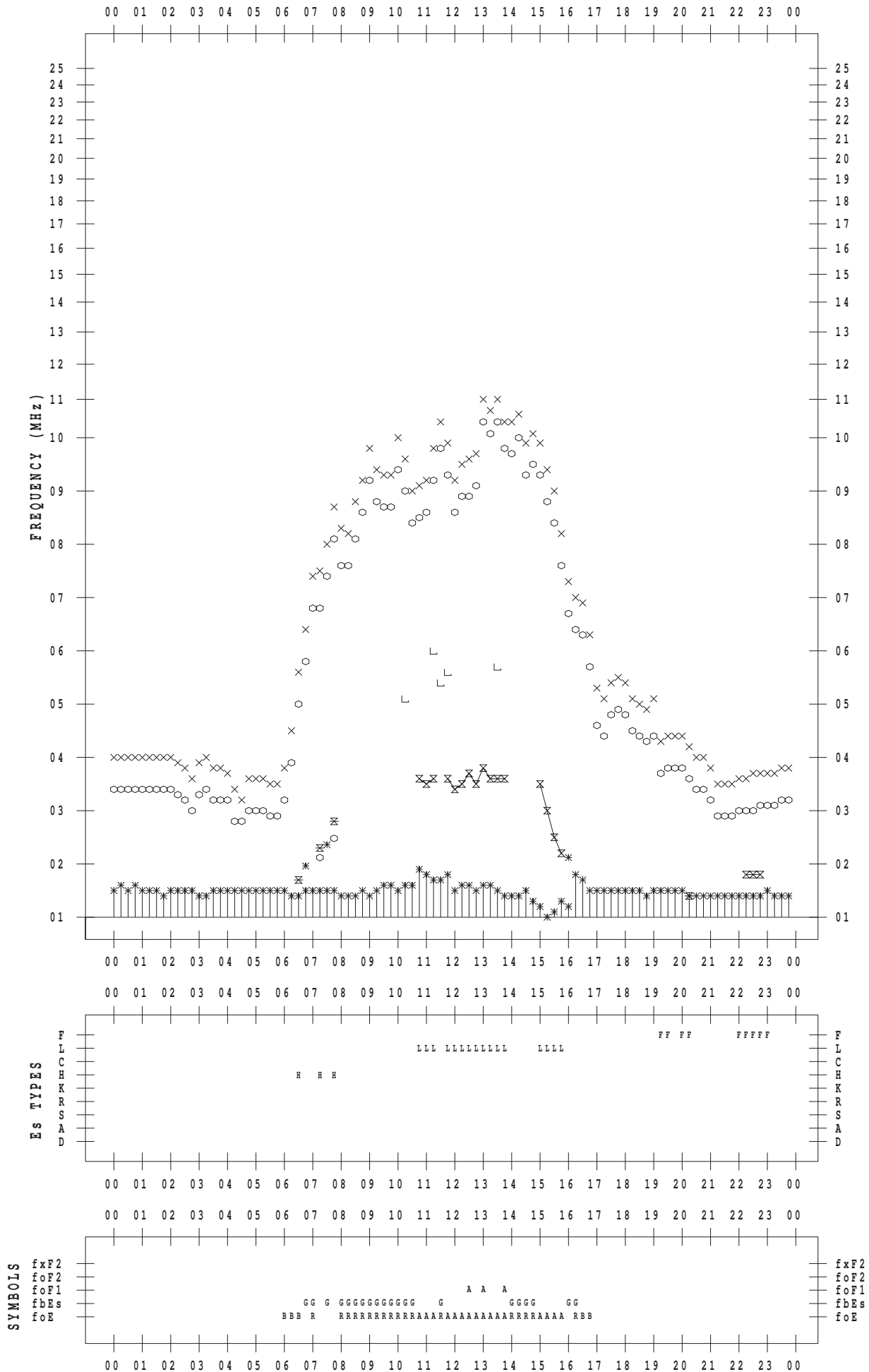
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/25

135 ° E MEAN TIME





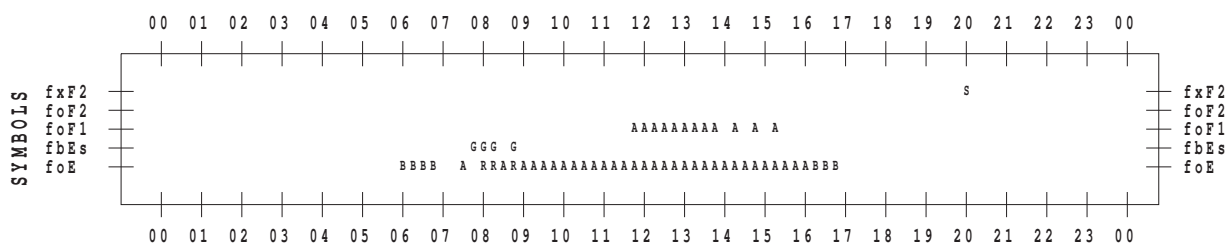
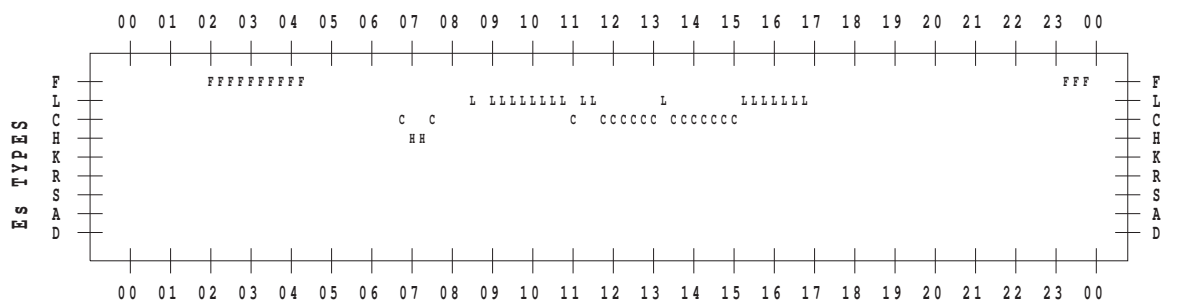
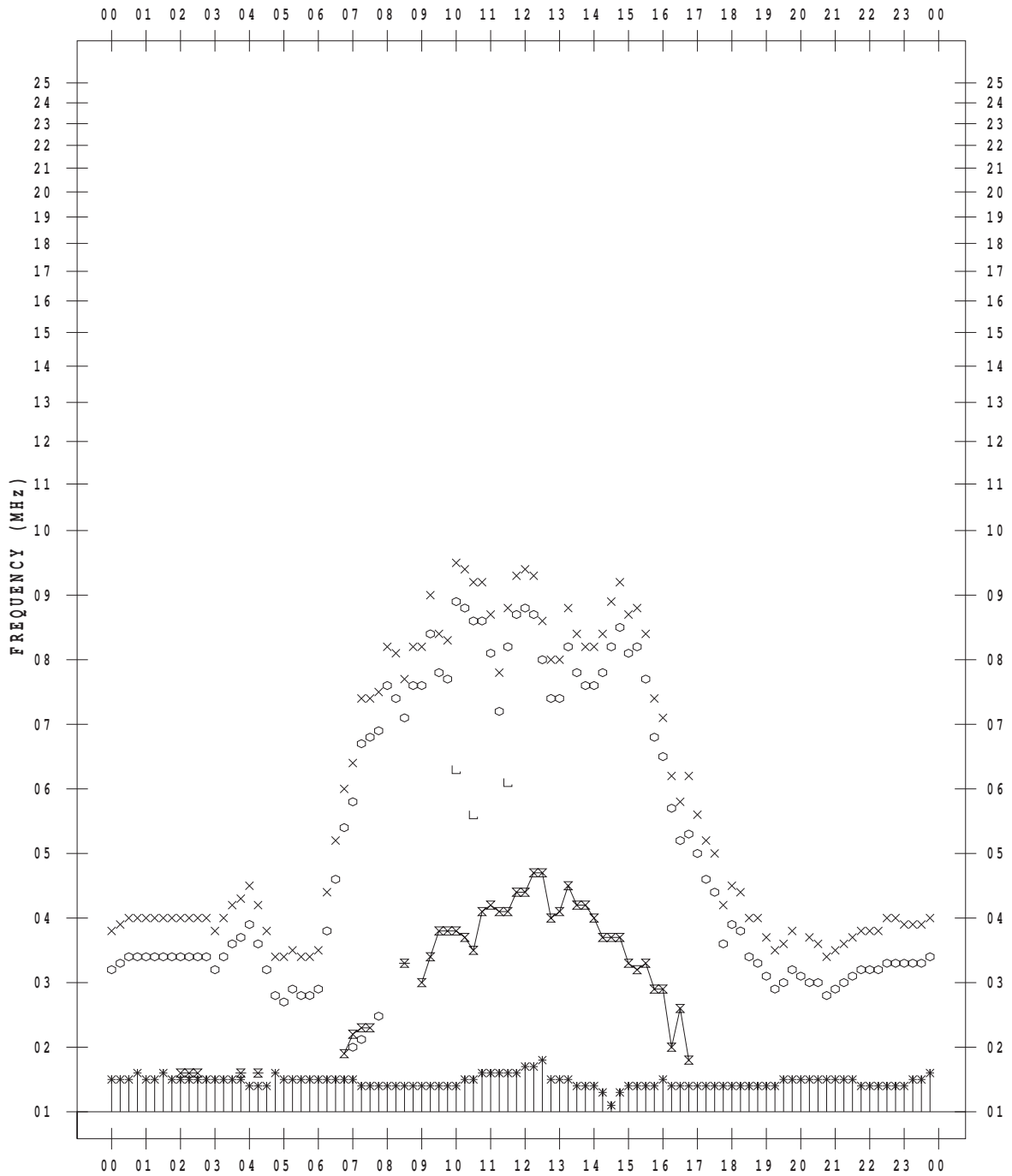
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/27

135 ° E MEAN TIME



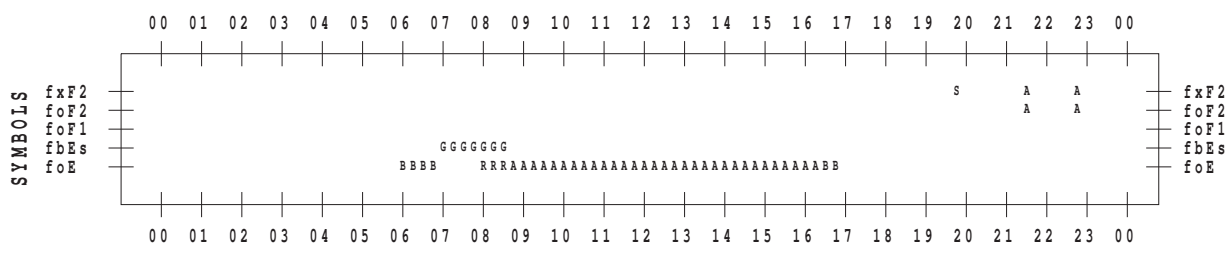
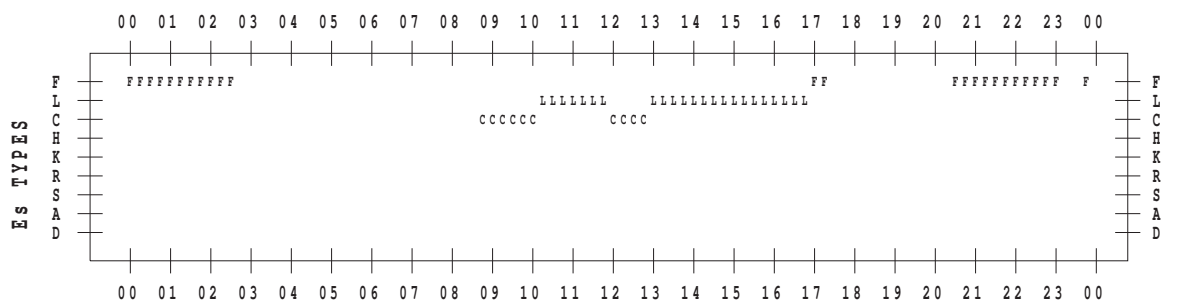
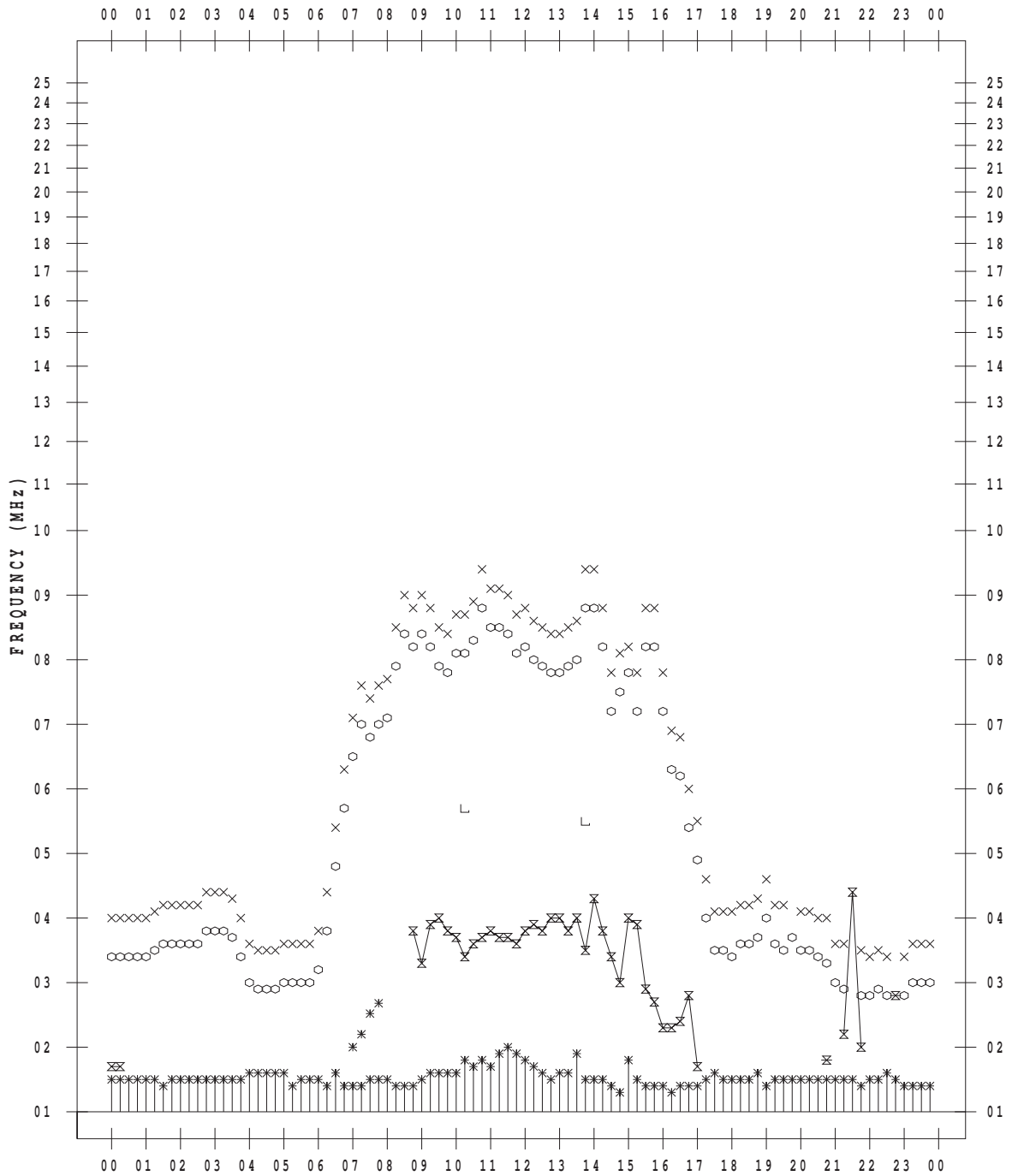
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/28

135 ° E MEAN TIME



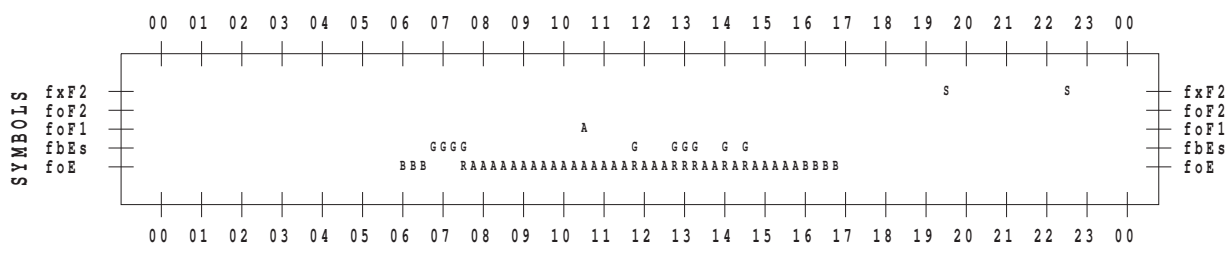
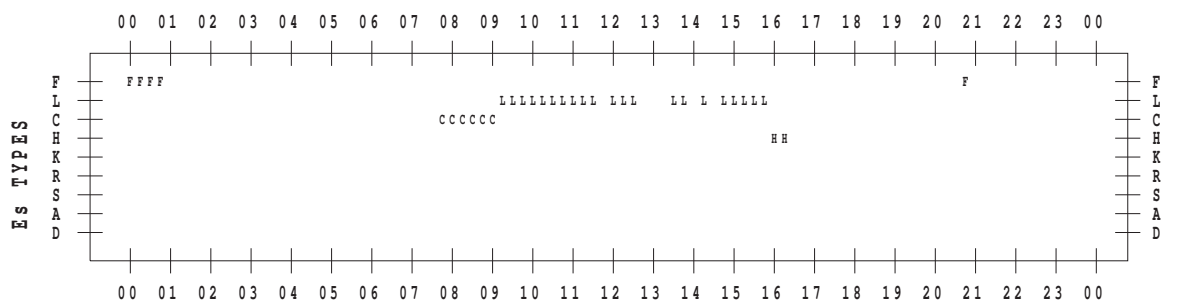
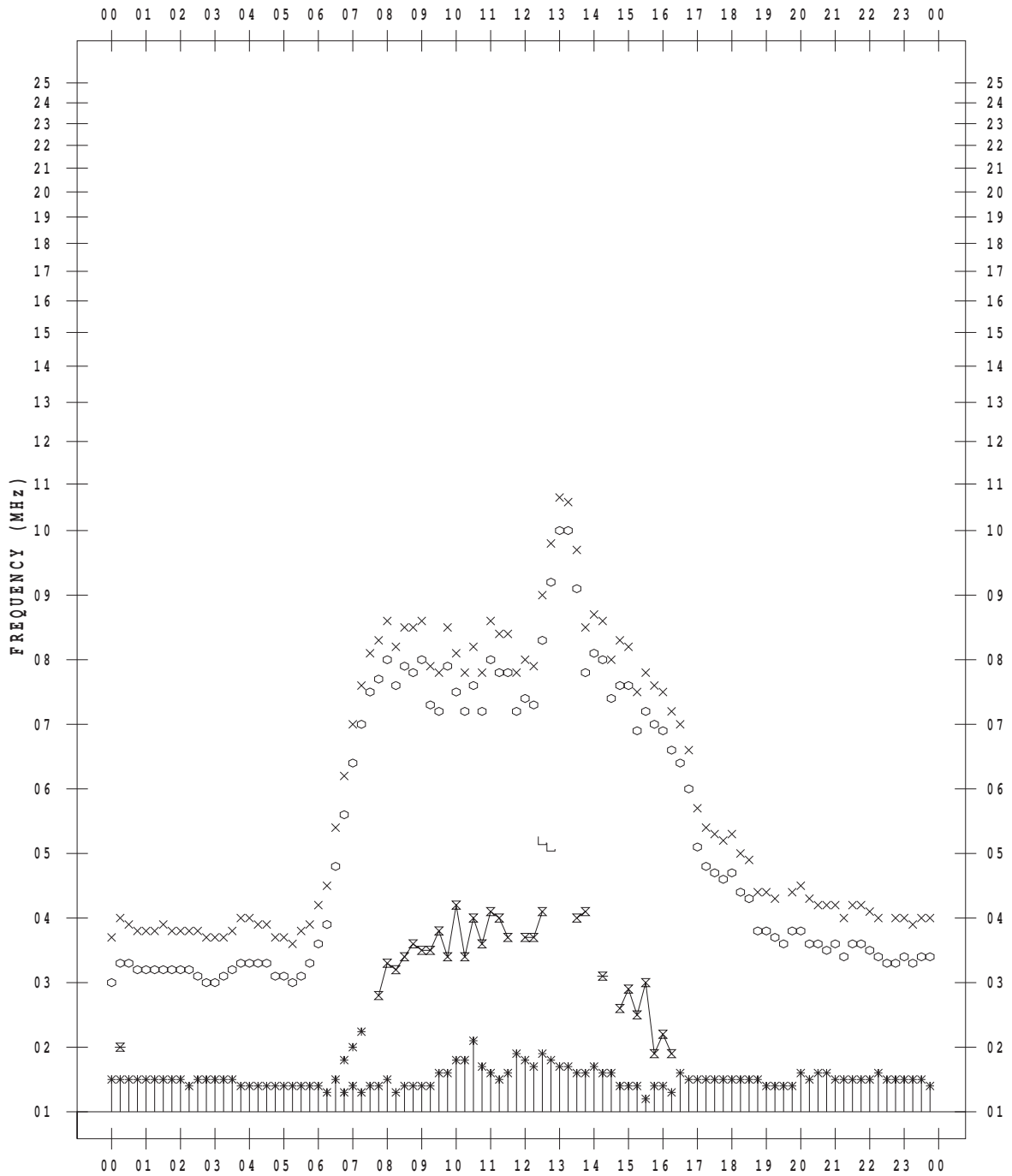
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/29

135 ° E MEAN TIME



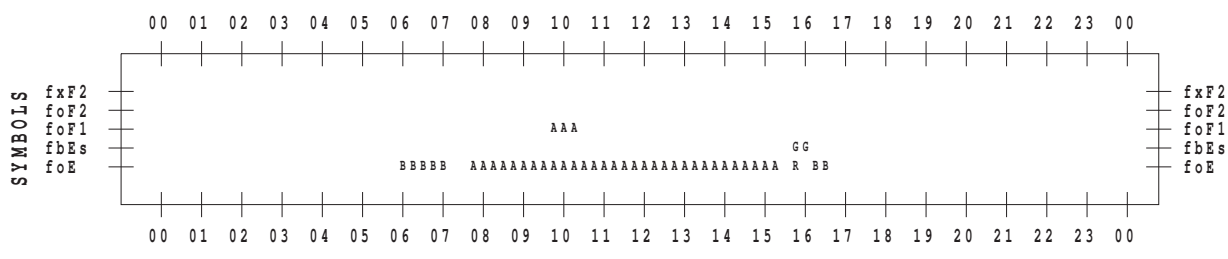
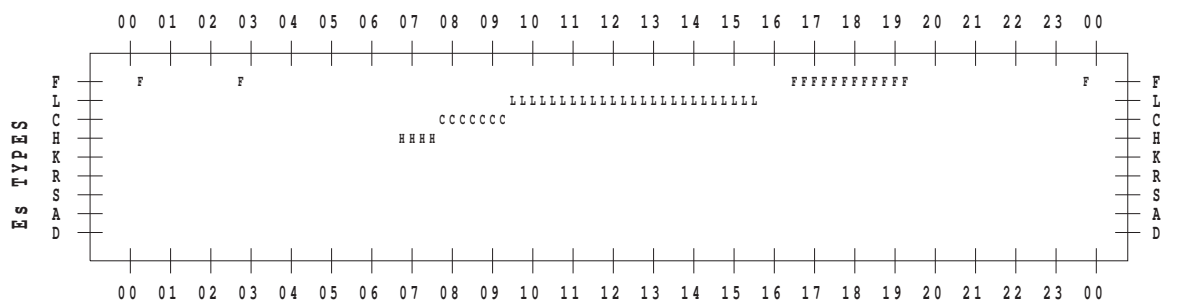
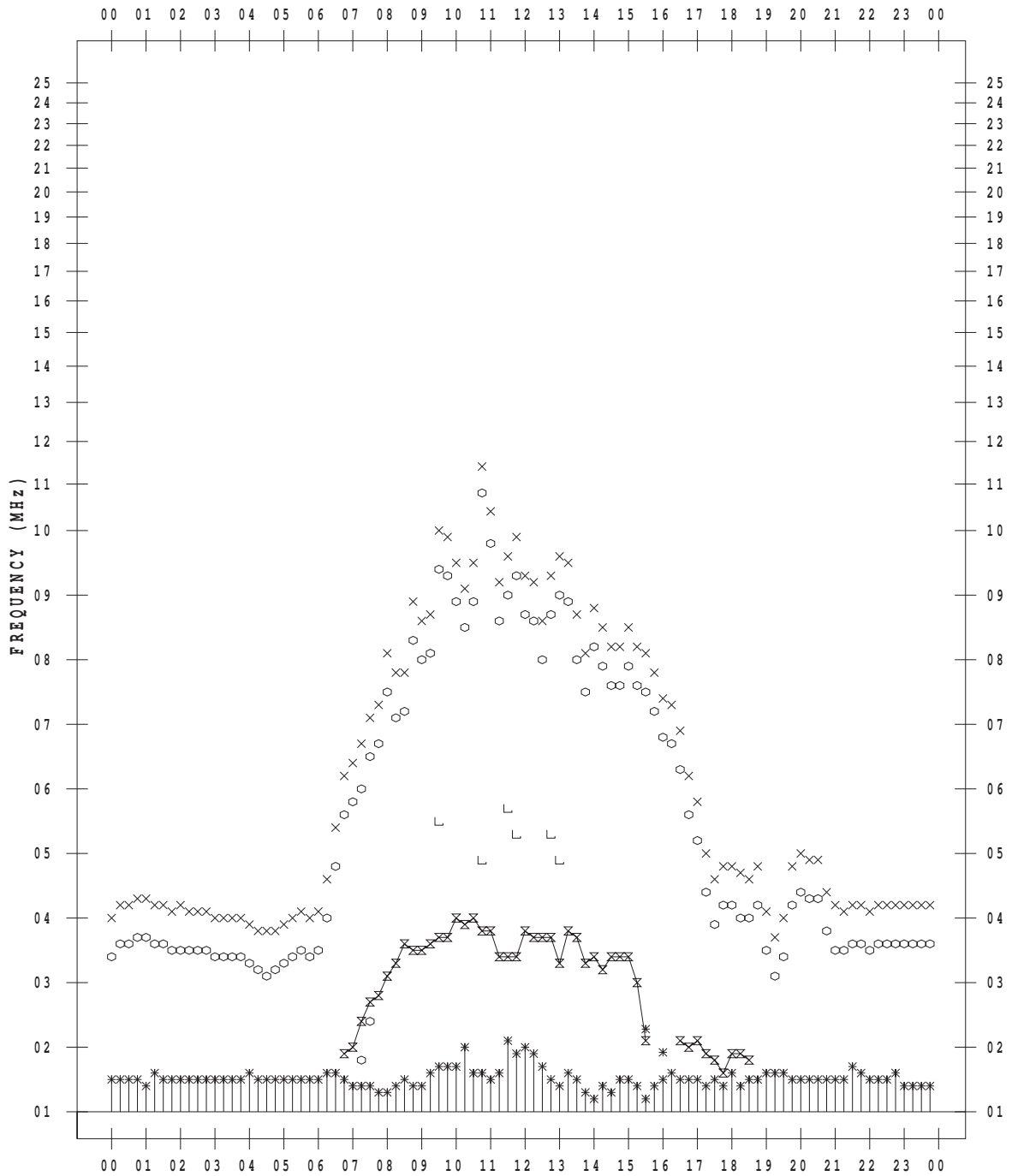
# f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/11/30

135 ° E MEAN TIME





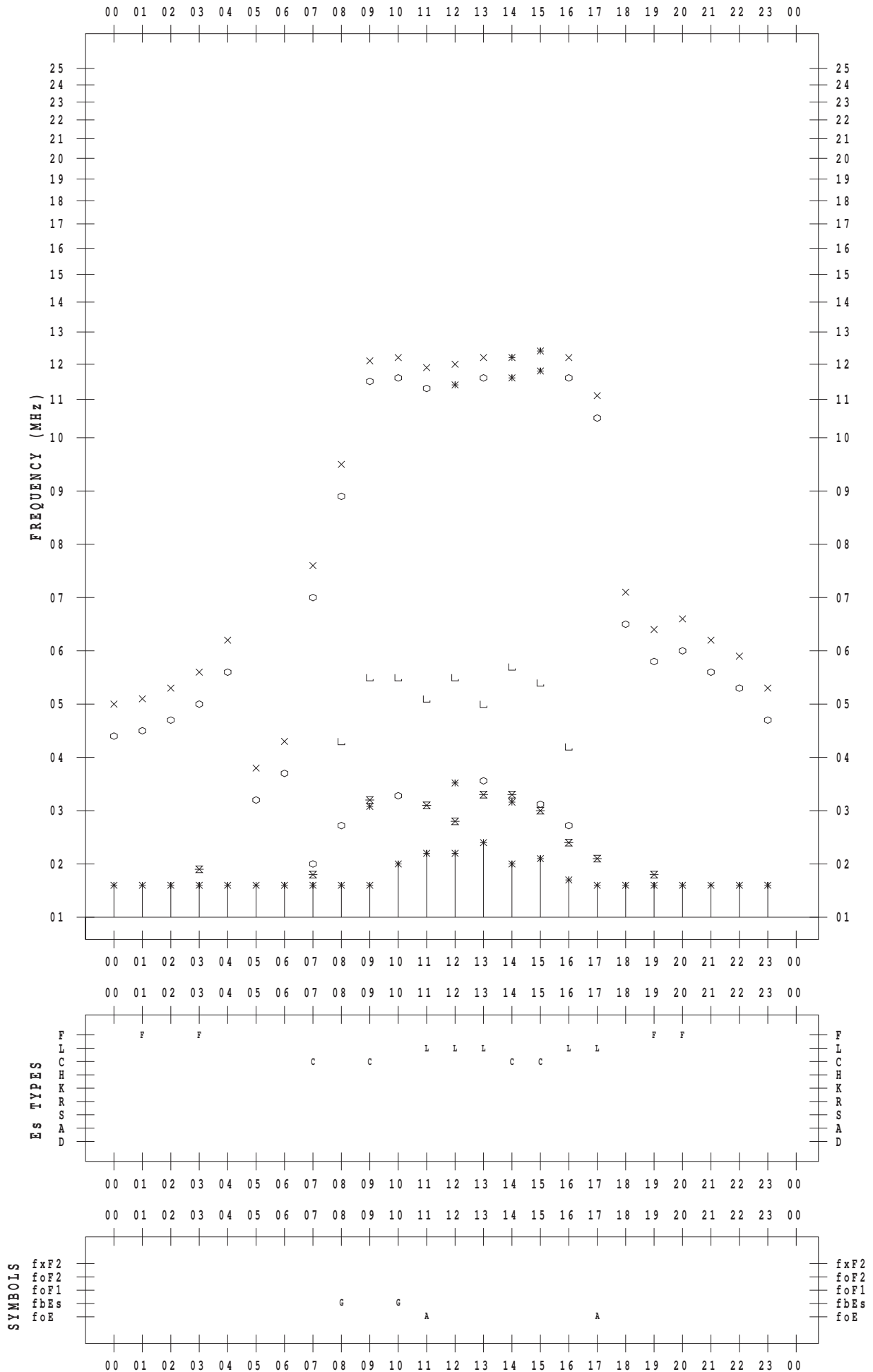
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/ 1

135 ° E MEAN TIME



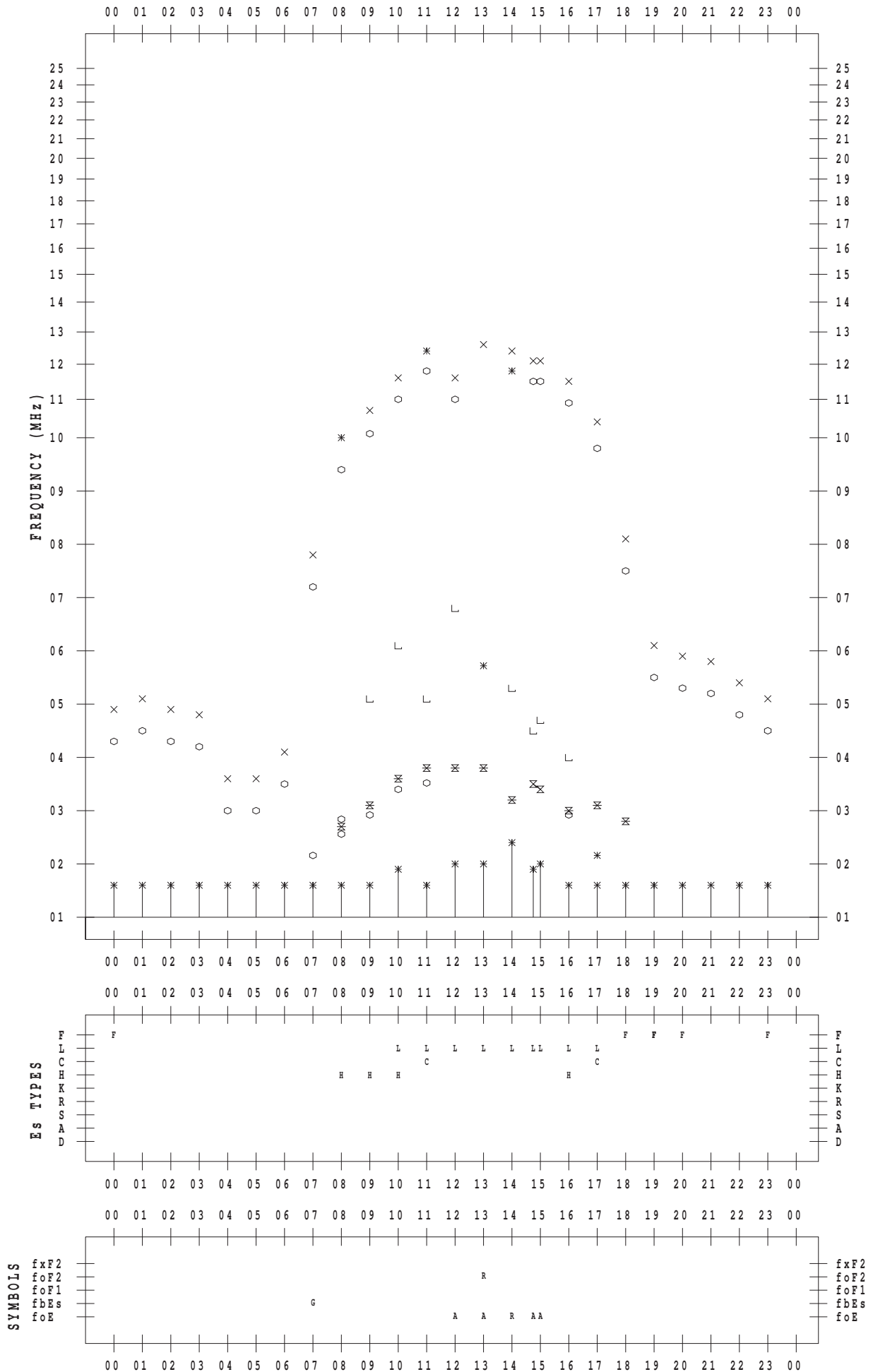
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/ 2

135 ° E MEAN TIME



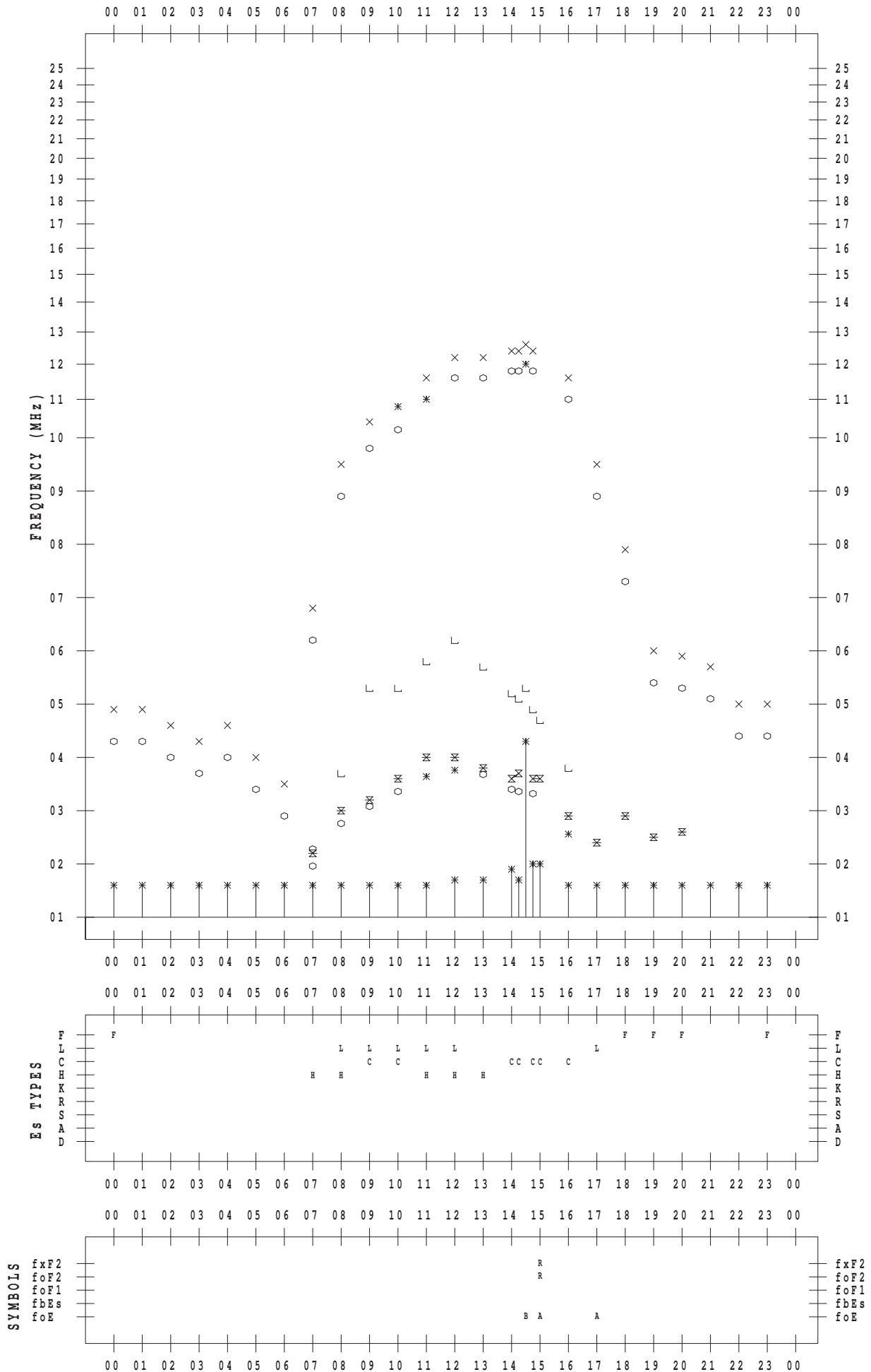
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/ 3

135 ° E MEAN TIME



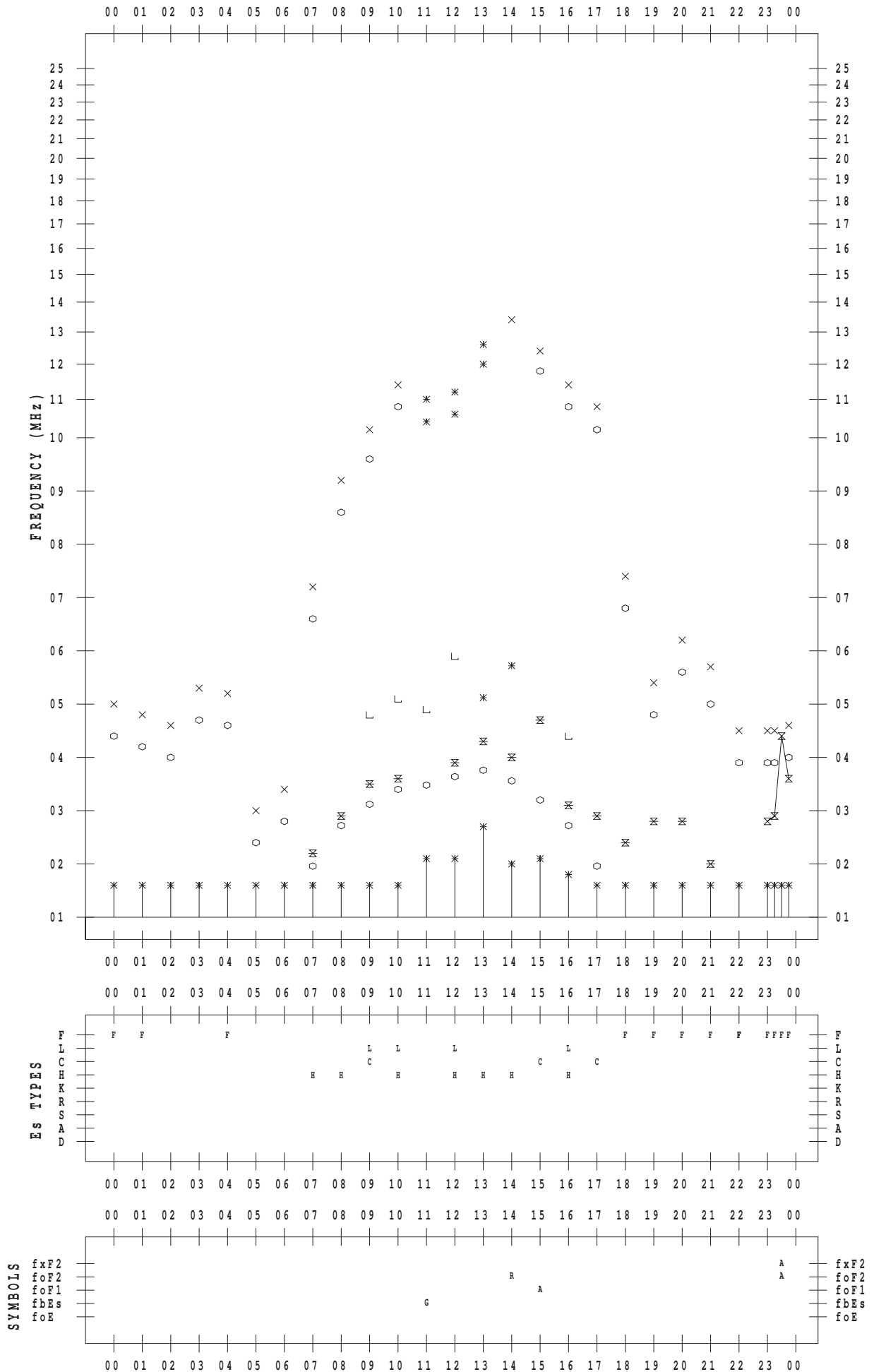
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/ 4

135 ° E MEAN TIME



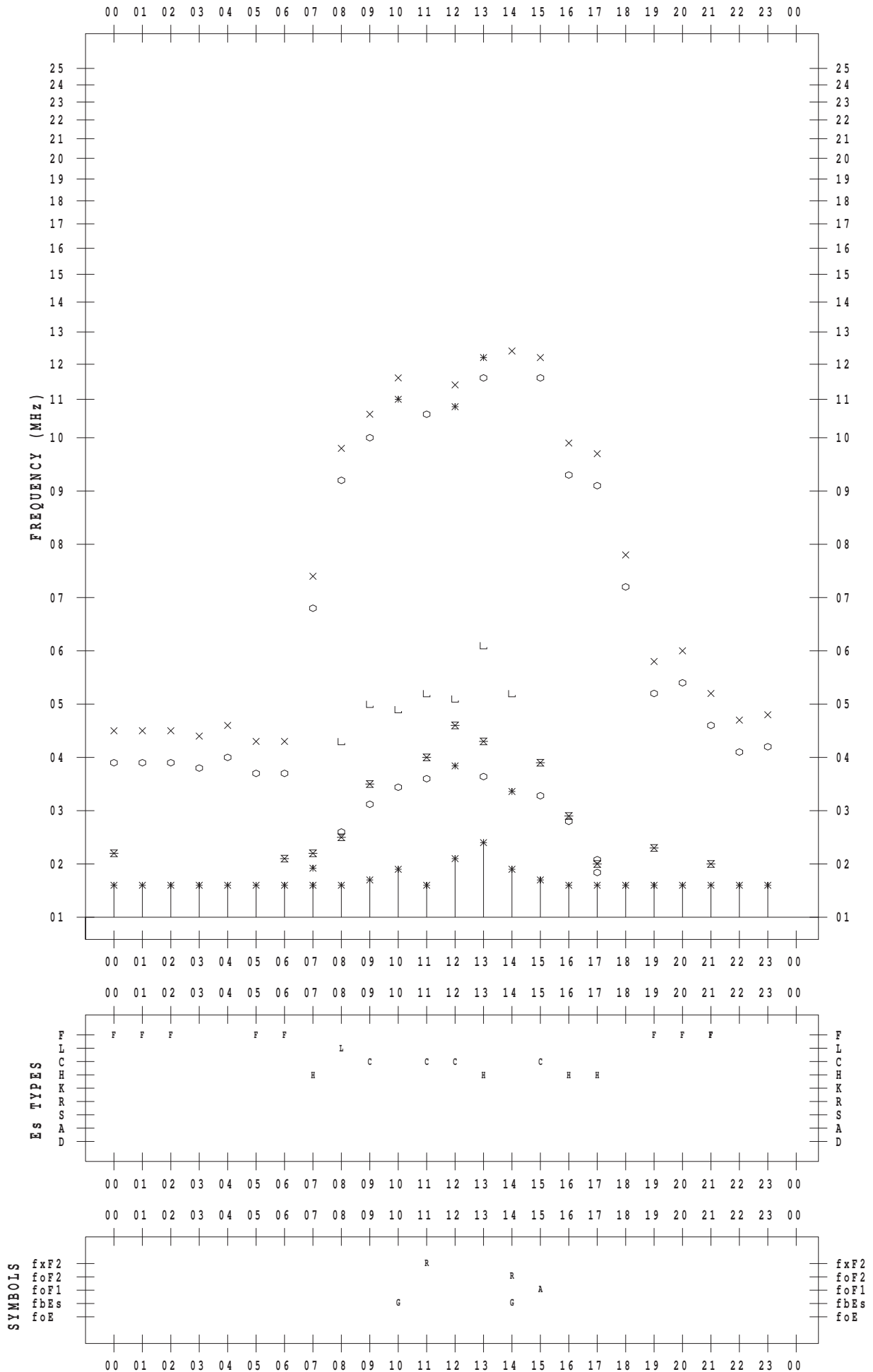
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/ 5

135 ° E MEAN TIME



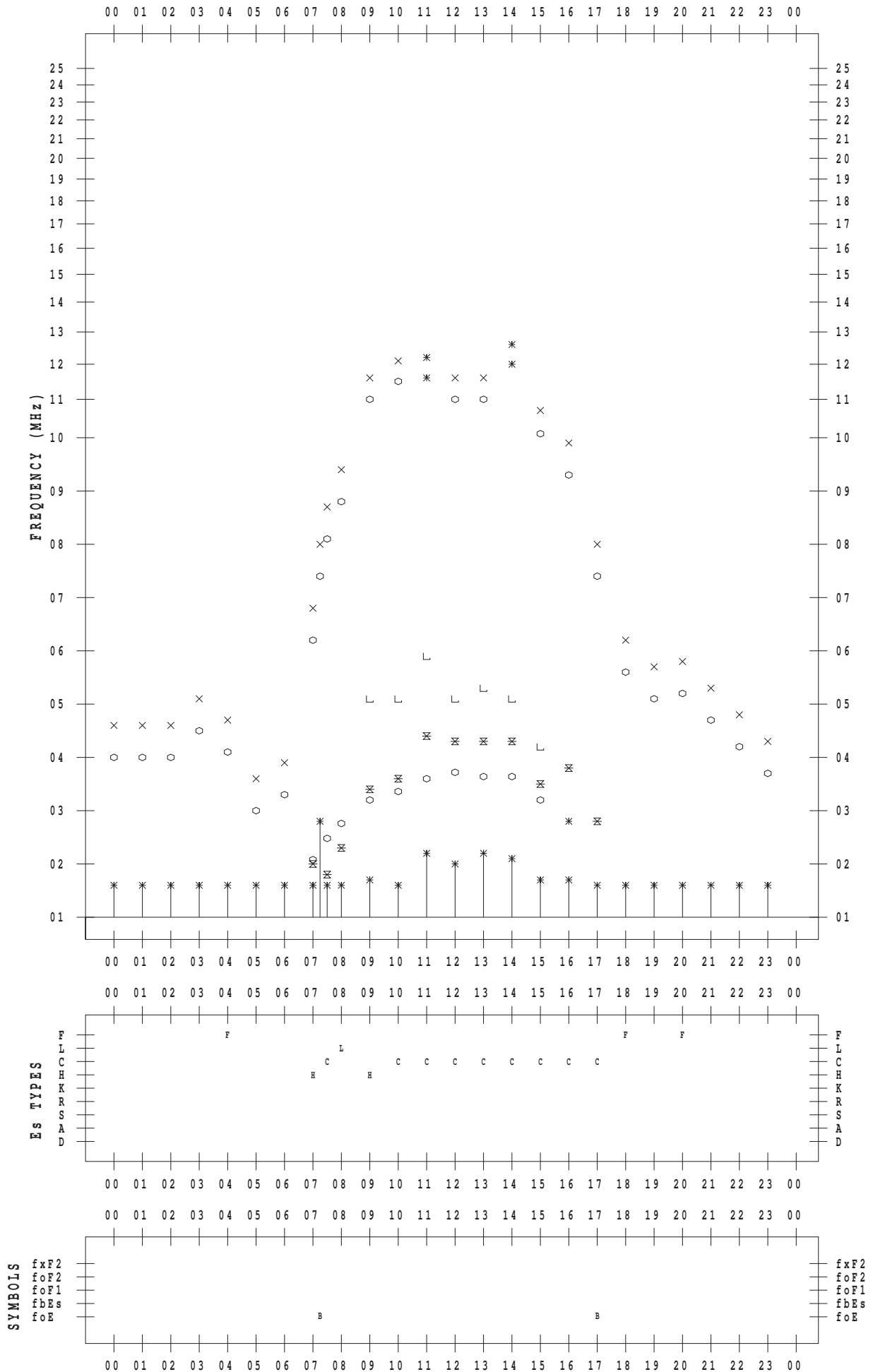
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/ 6

135 ° E MEAN TIME



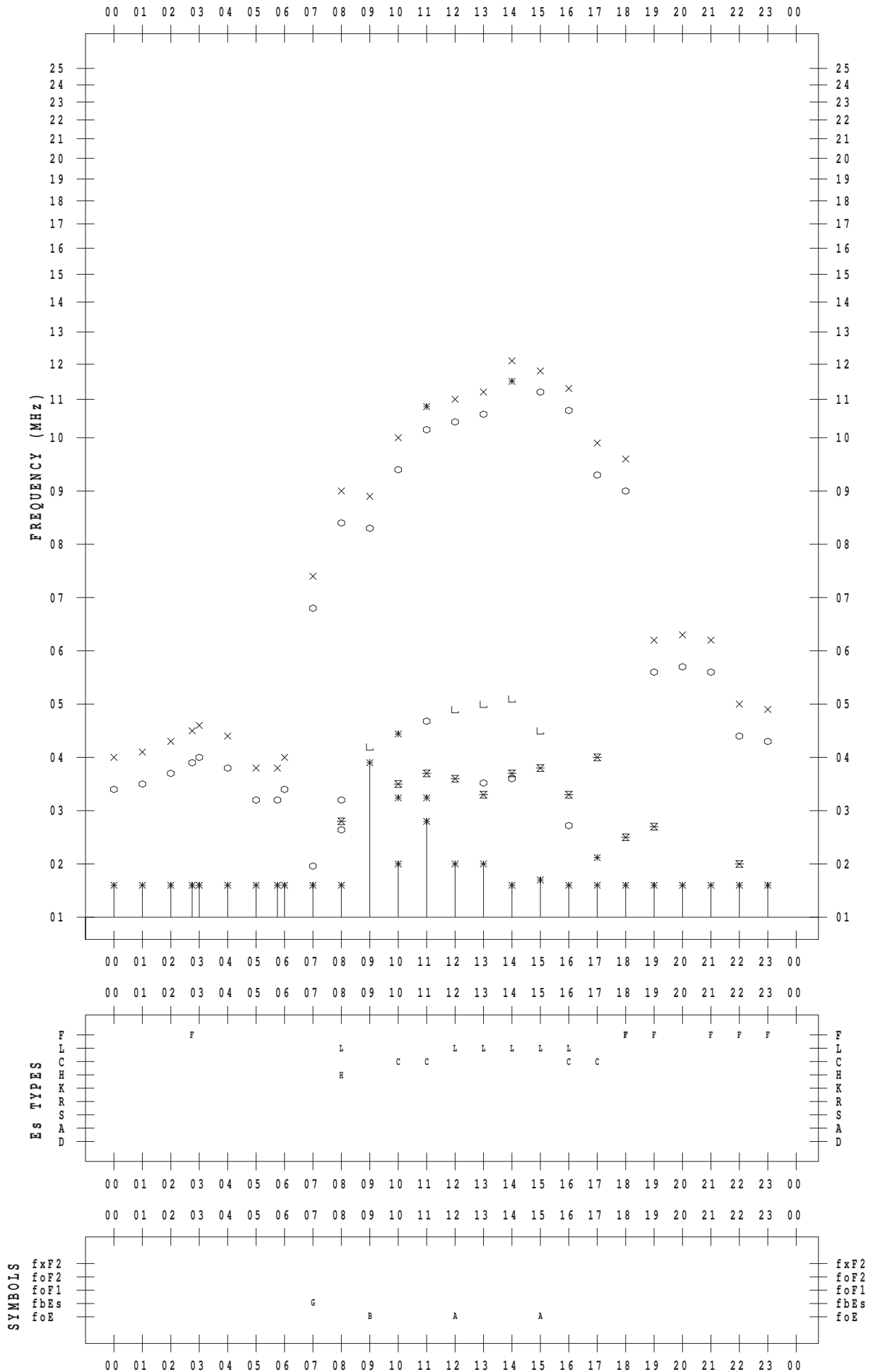
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/ 7

135 ° E MEAN TIME



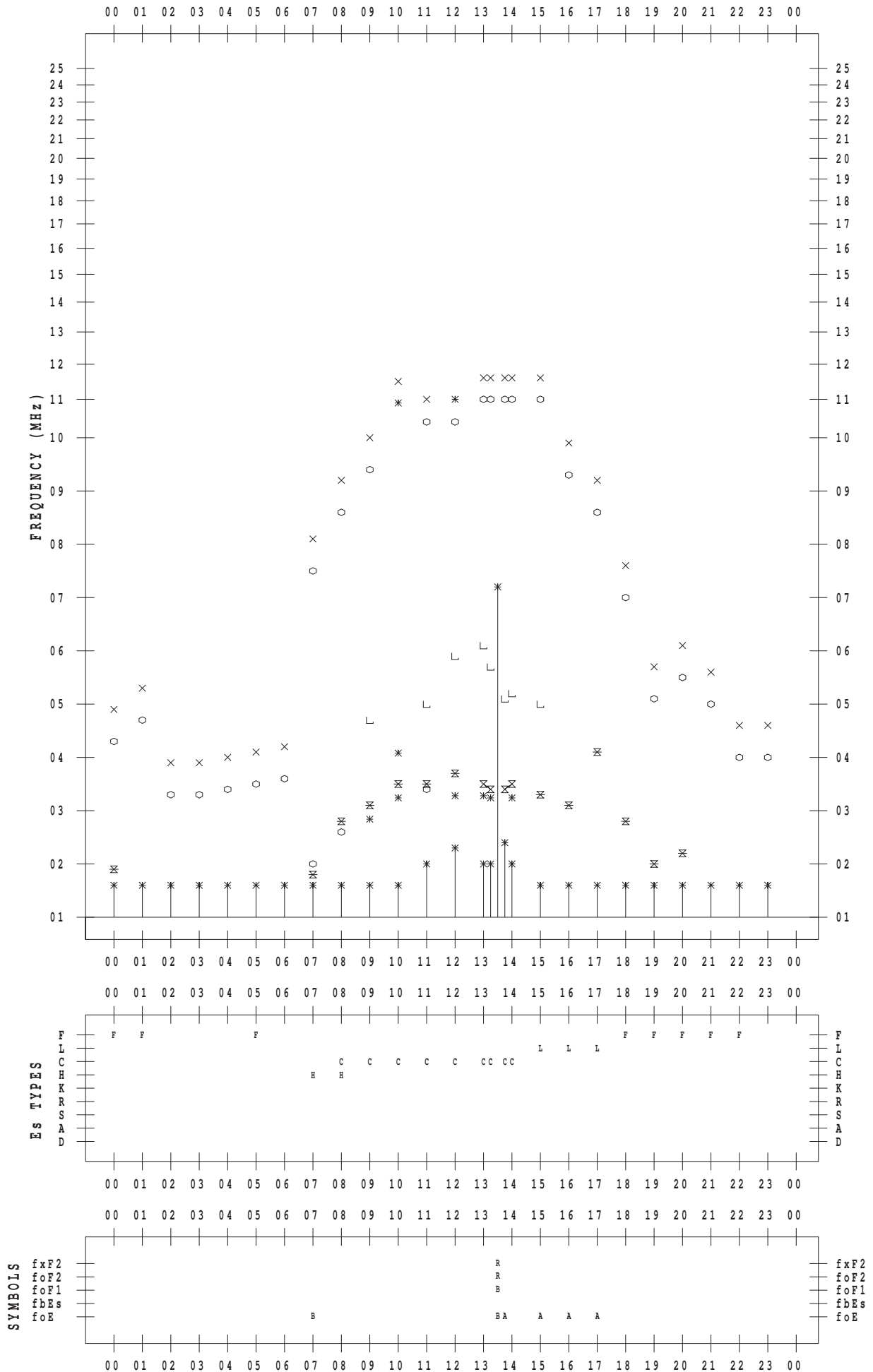
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/ 8

135 ° E MEAN TIME





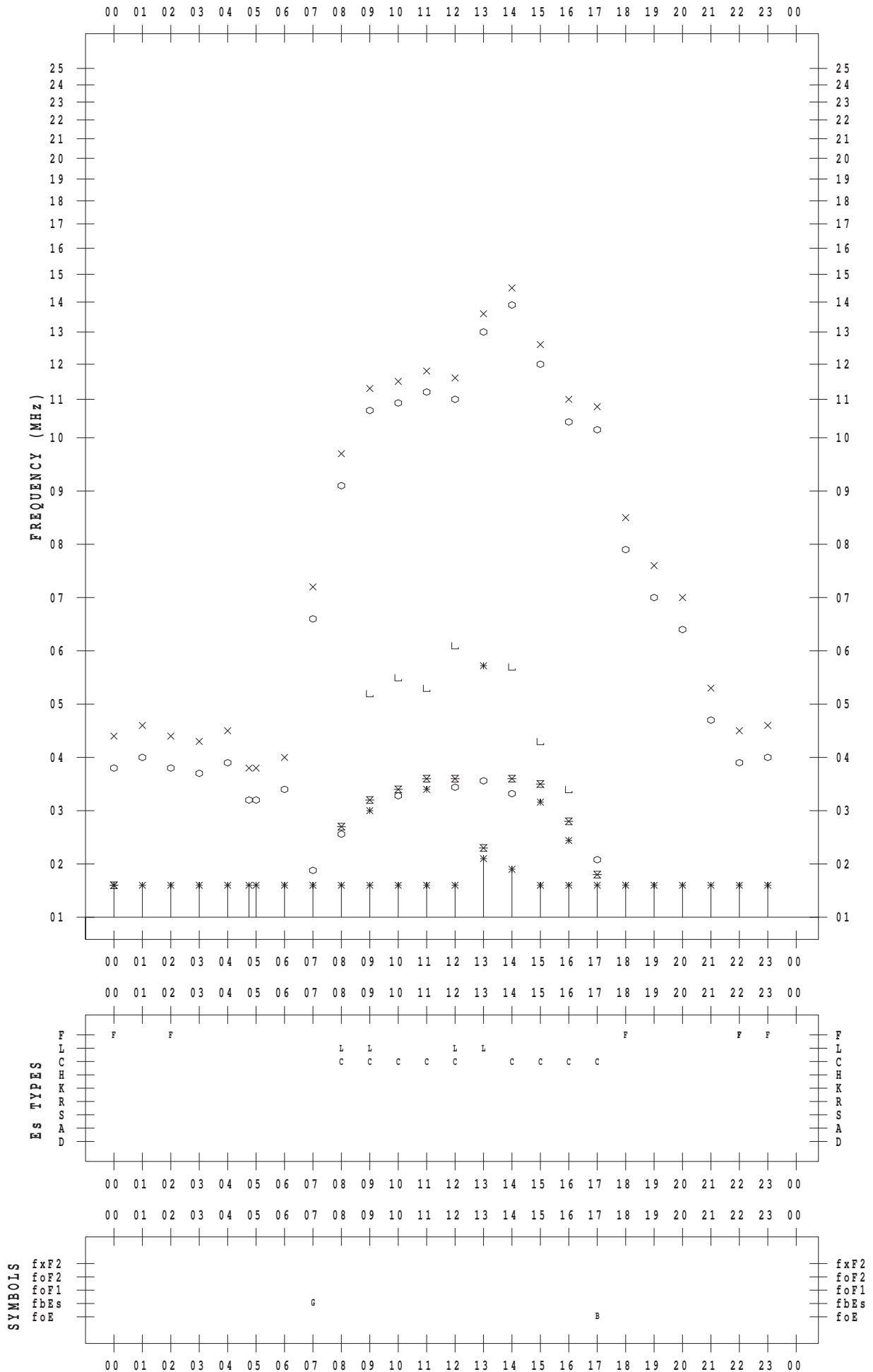
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/ 9

135 ° E MEAN TIME



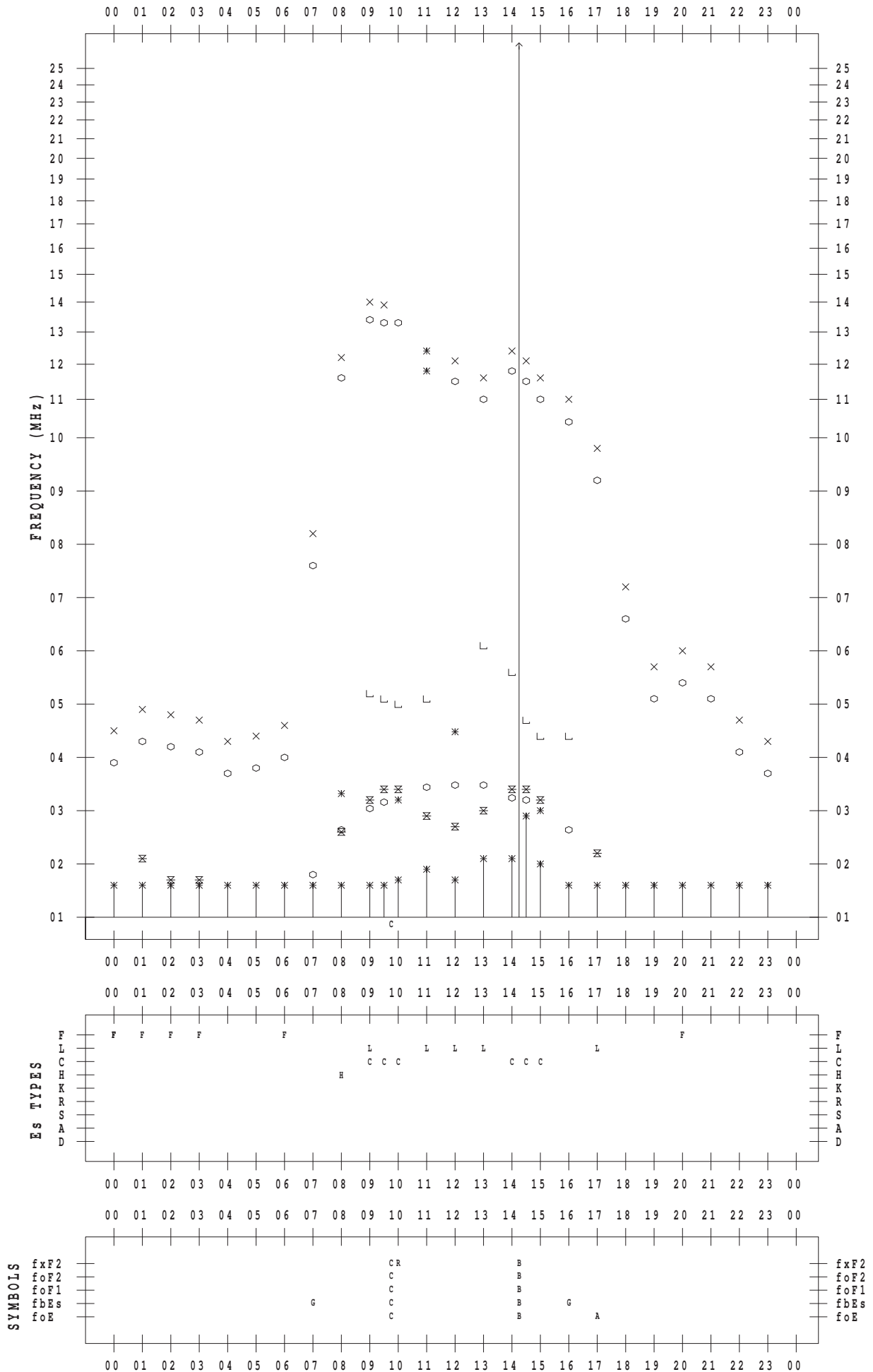
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/10

135 ° E MEAN TIME



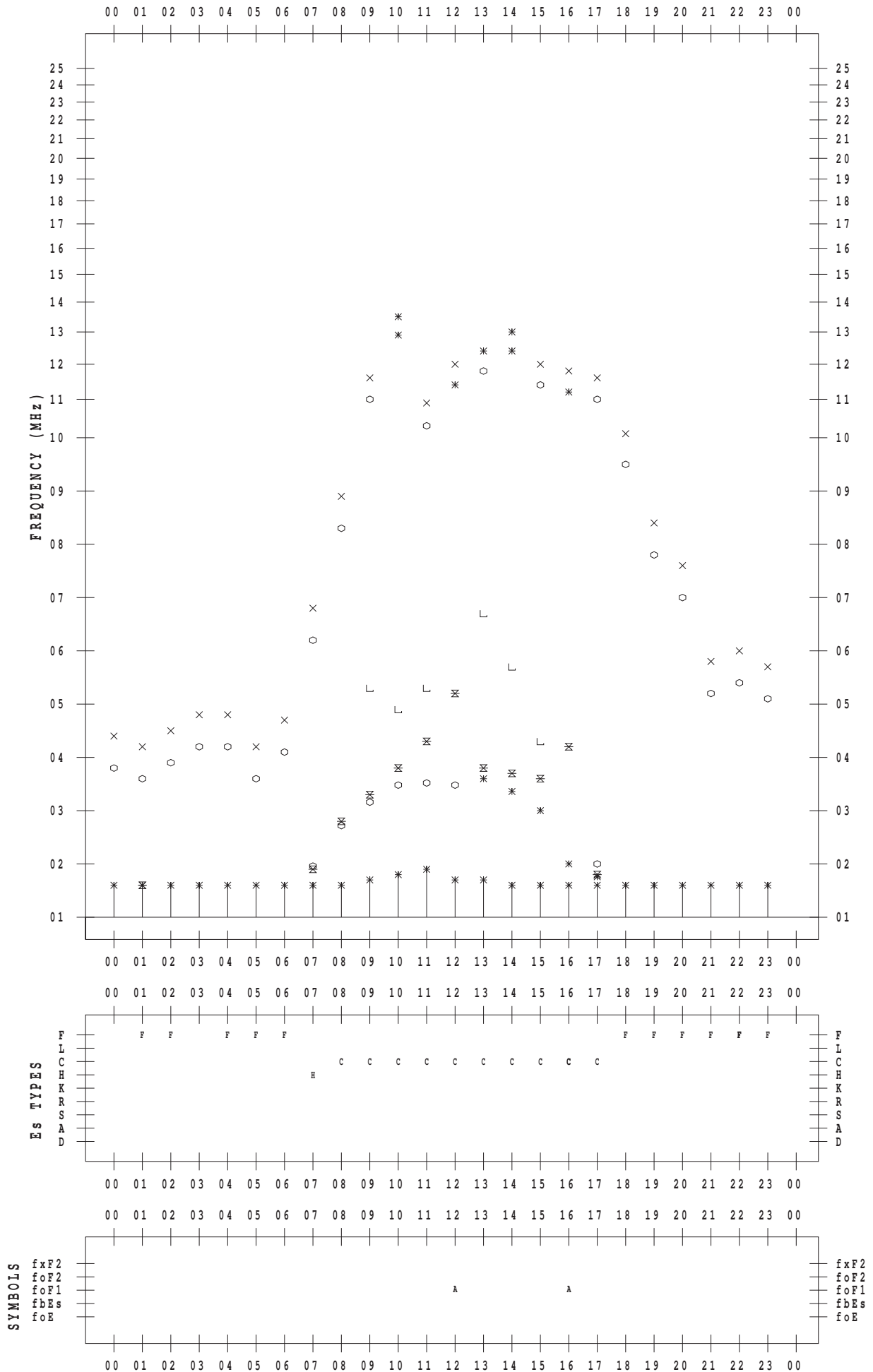
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/11

135 ° E MEAN TIME



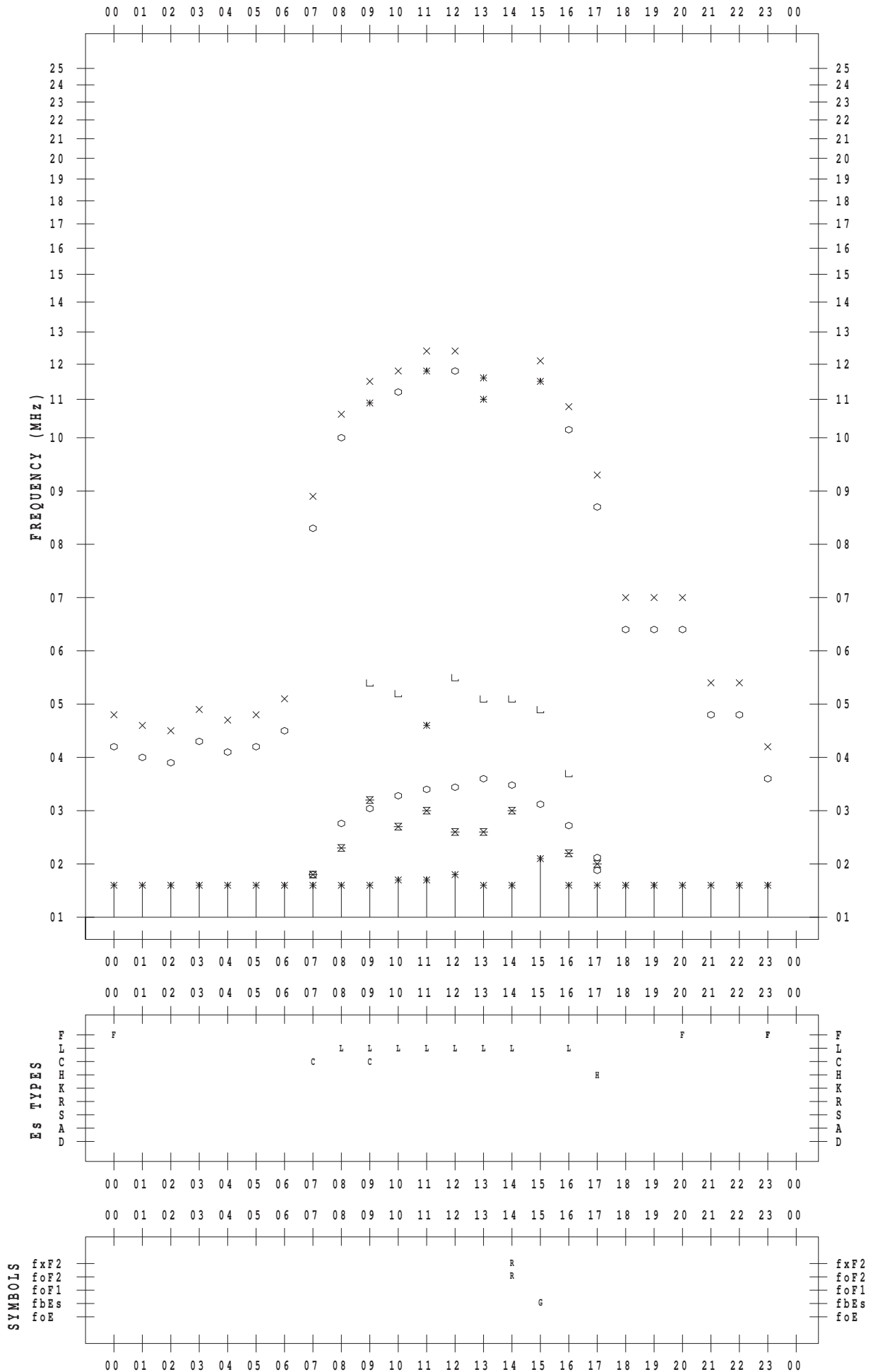
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/12

135 ° E MEAN TIME



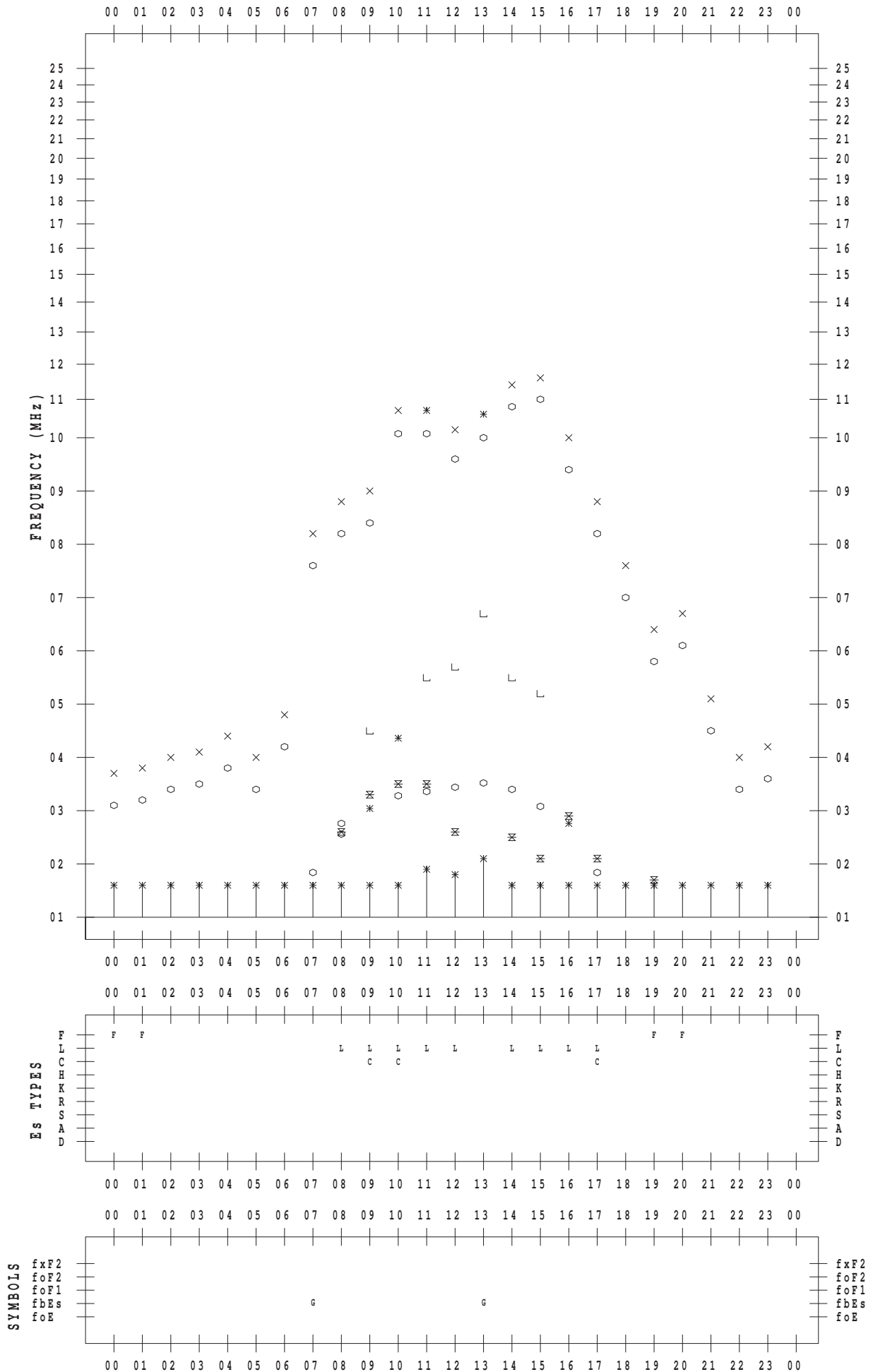
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/13

135 ° E MEAN TIME



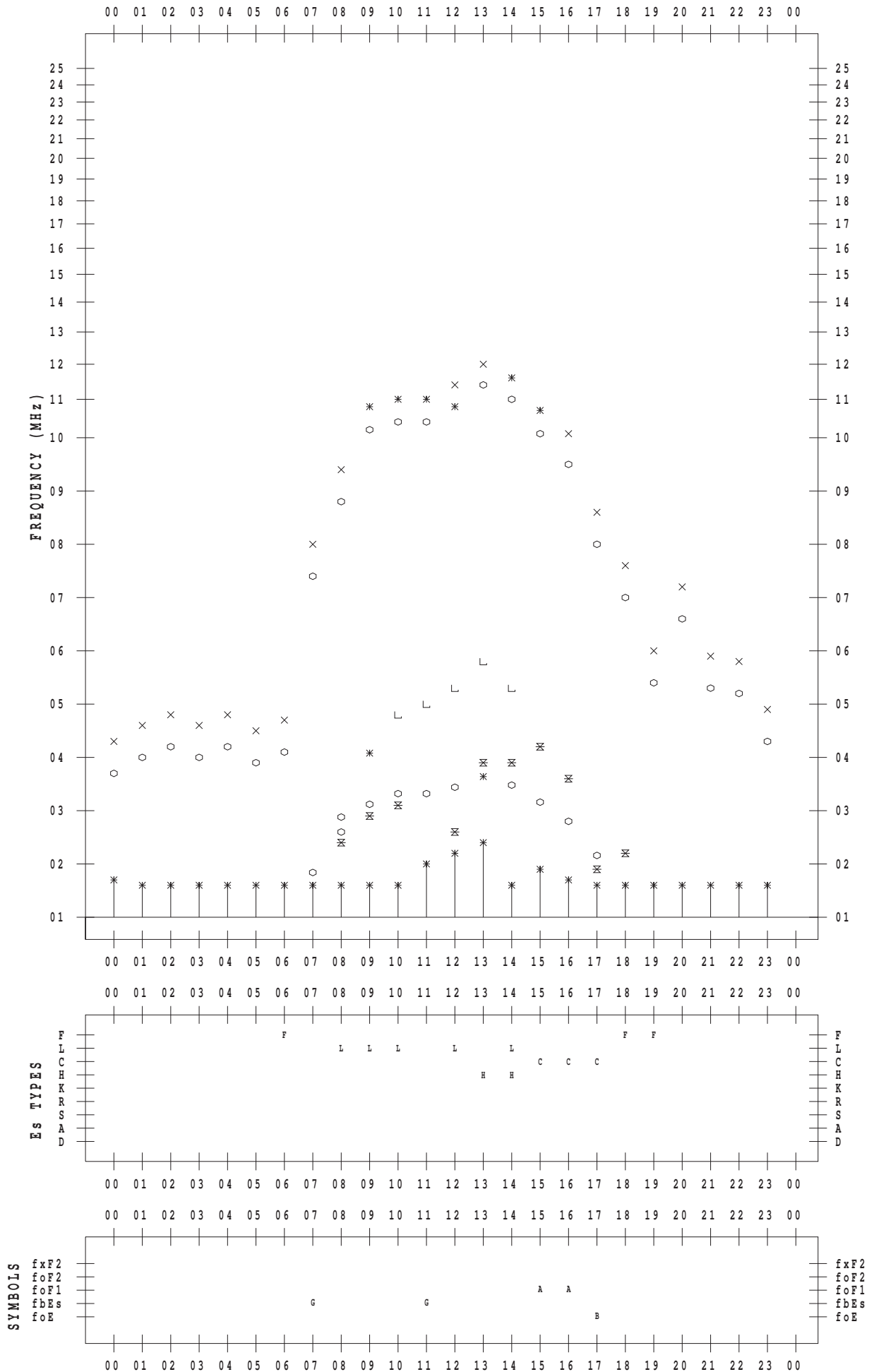
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/14

135 ° E MEAN TIME



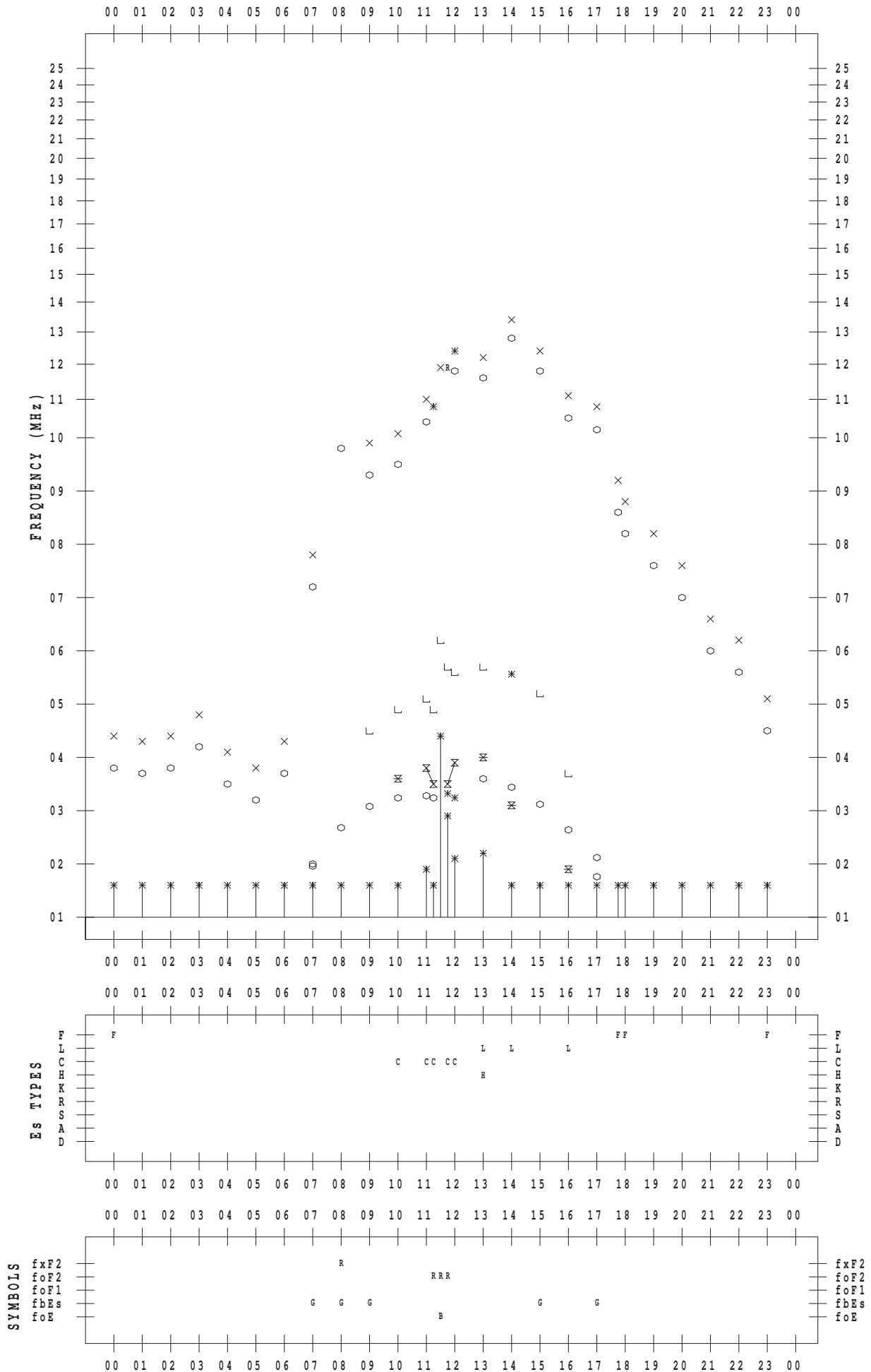
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/15

135 ° E MEAN TIME



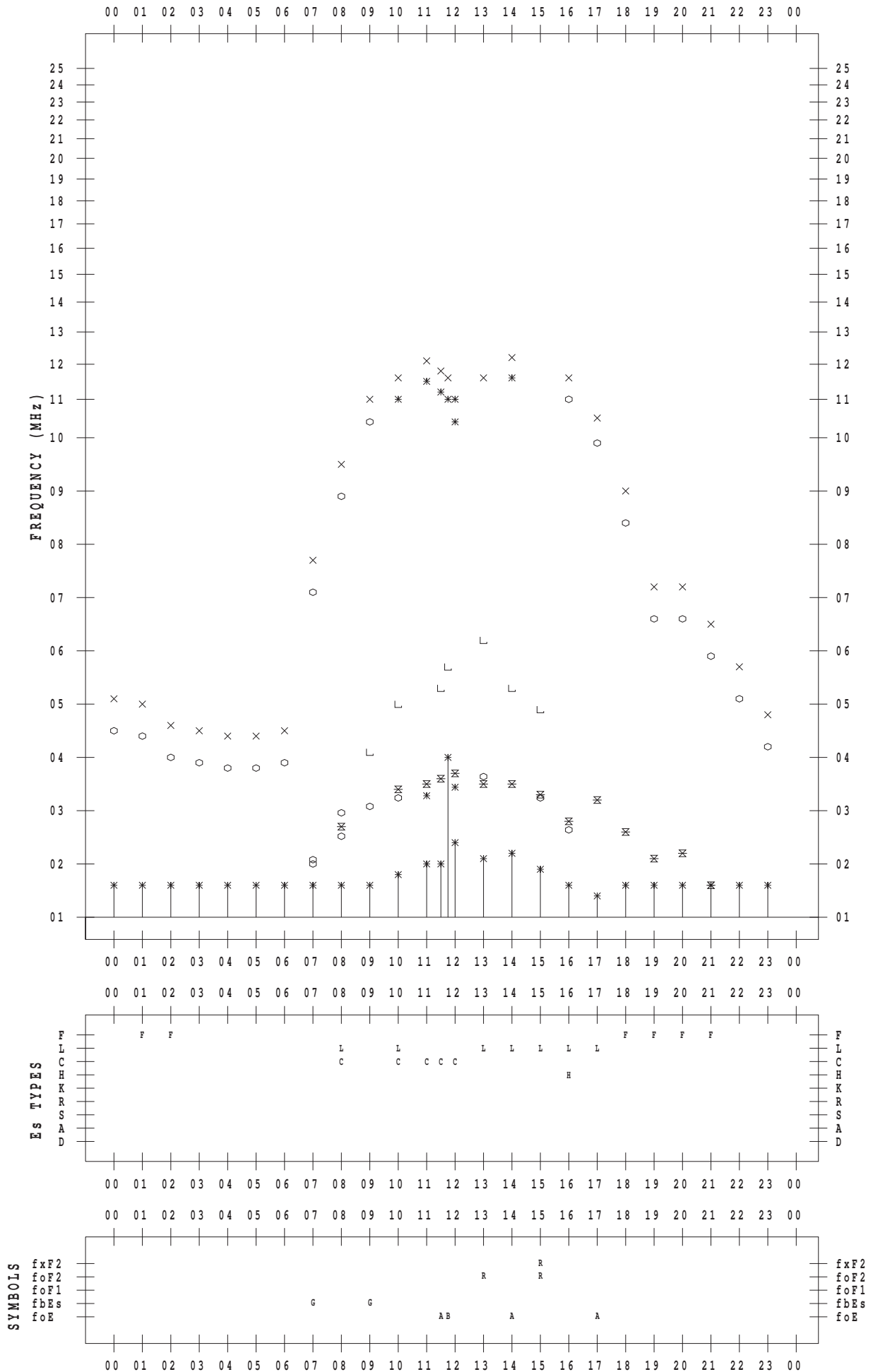
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/16

135 ° E MEAN TIME





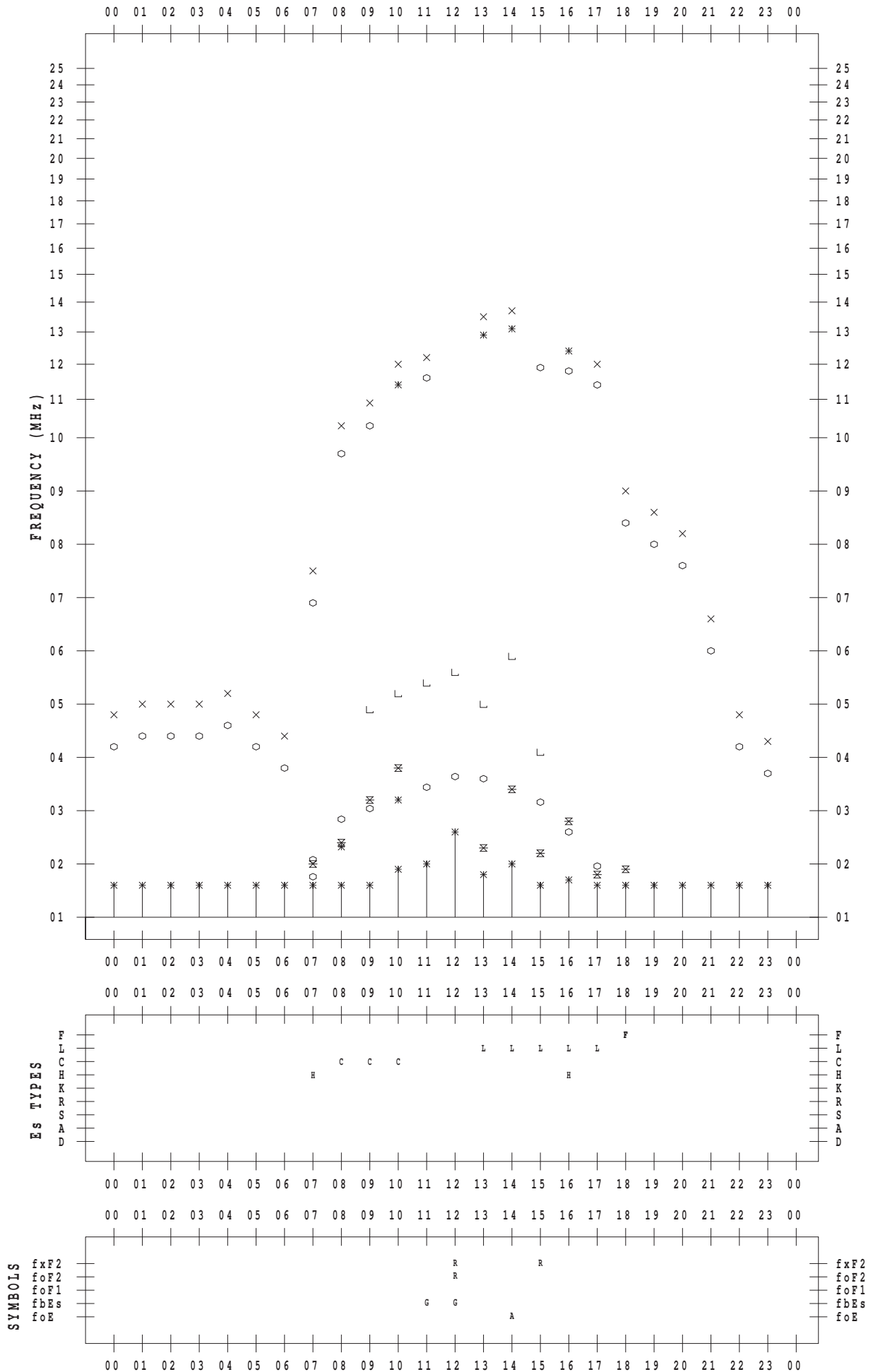
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/17

135 ° E MEAN TIME



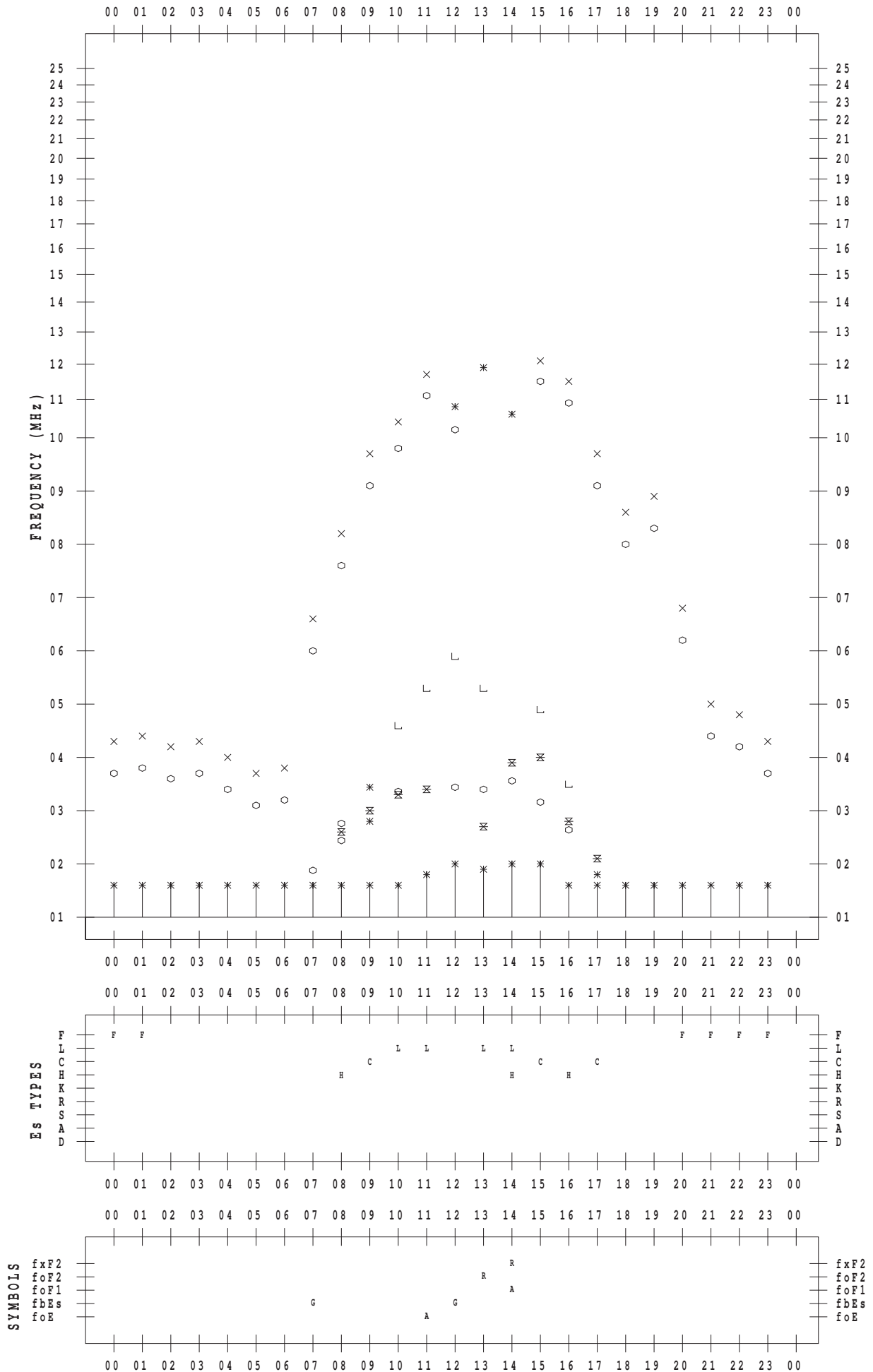
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/18

135 ° E MEAN TIME



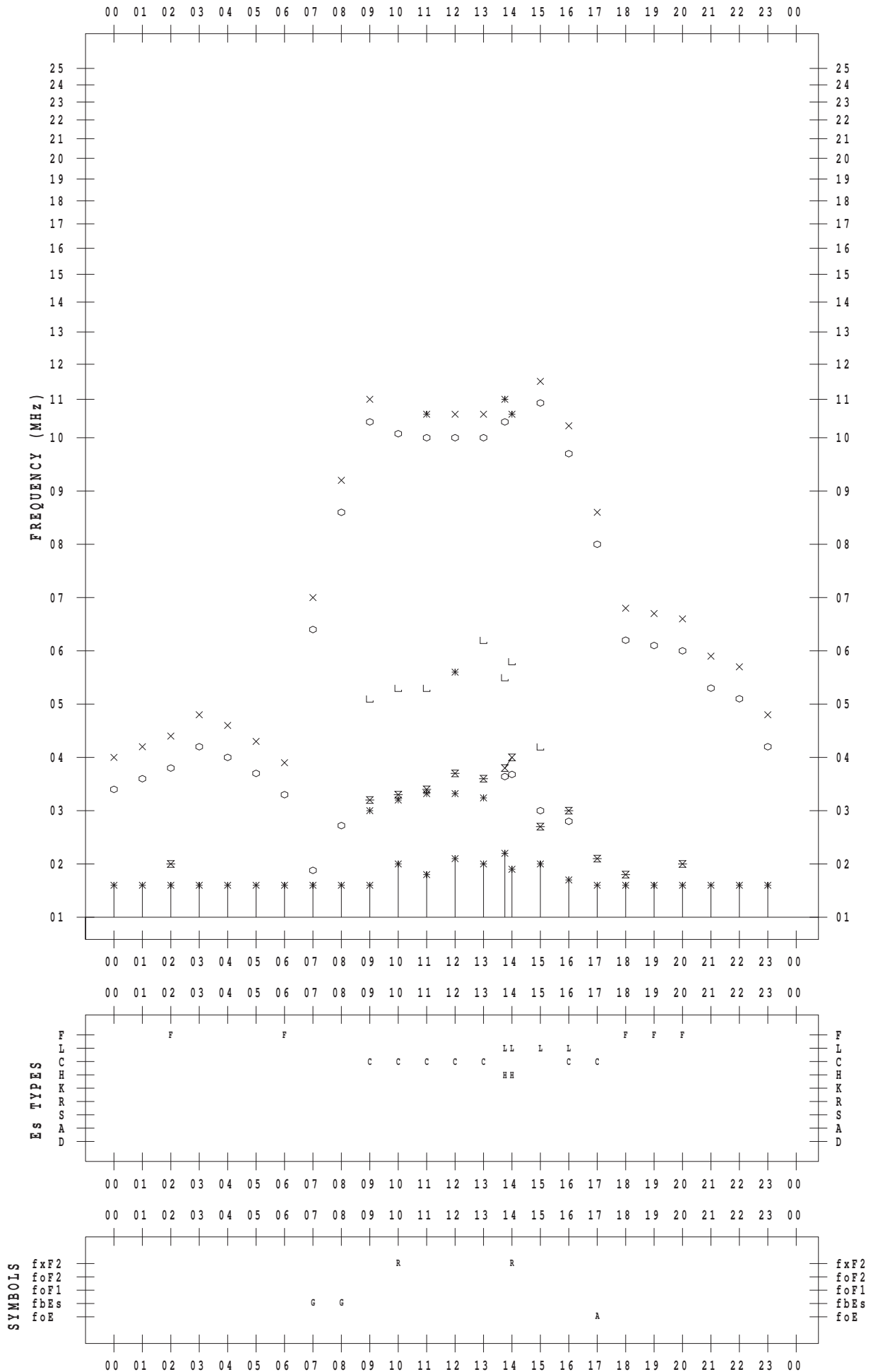
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/19

135 ° E MEAN TIME



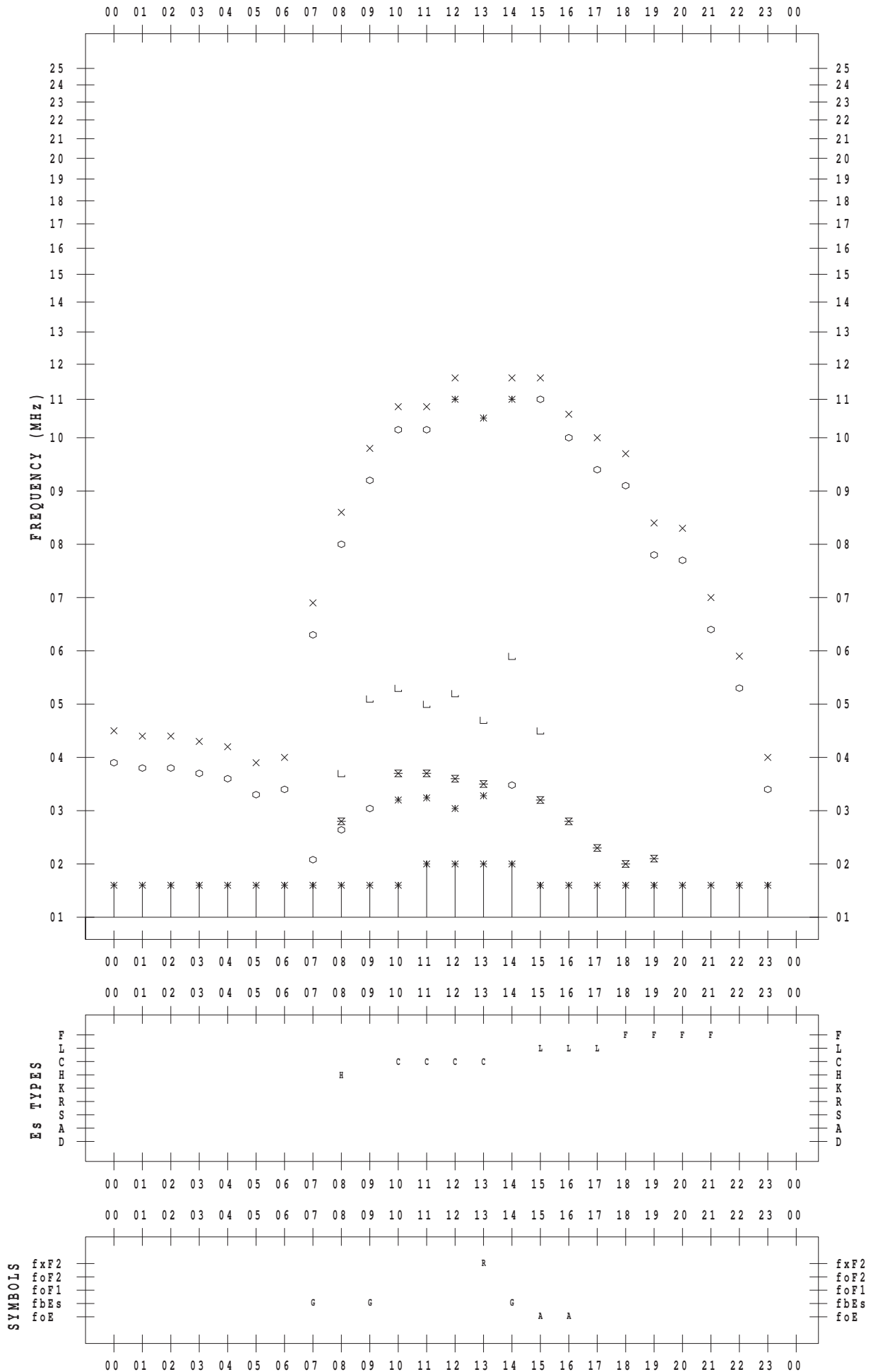
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/20

135 ° E MEAN TIME



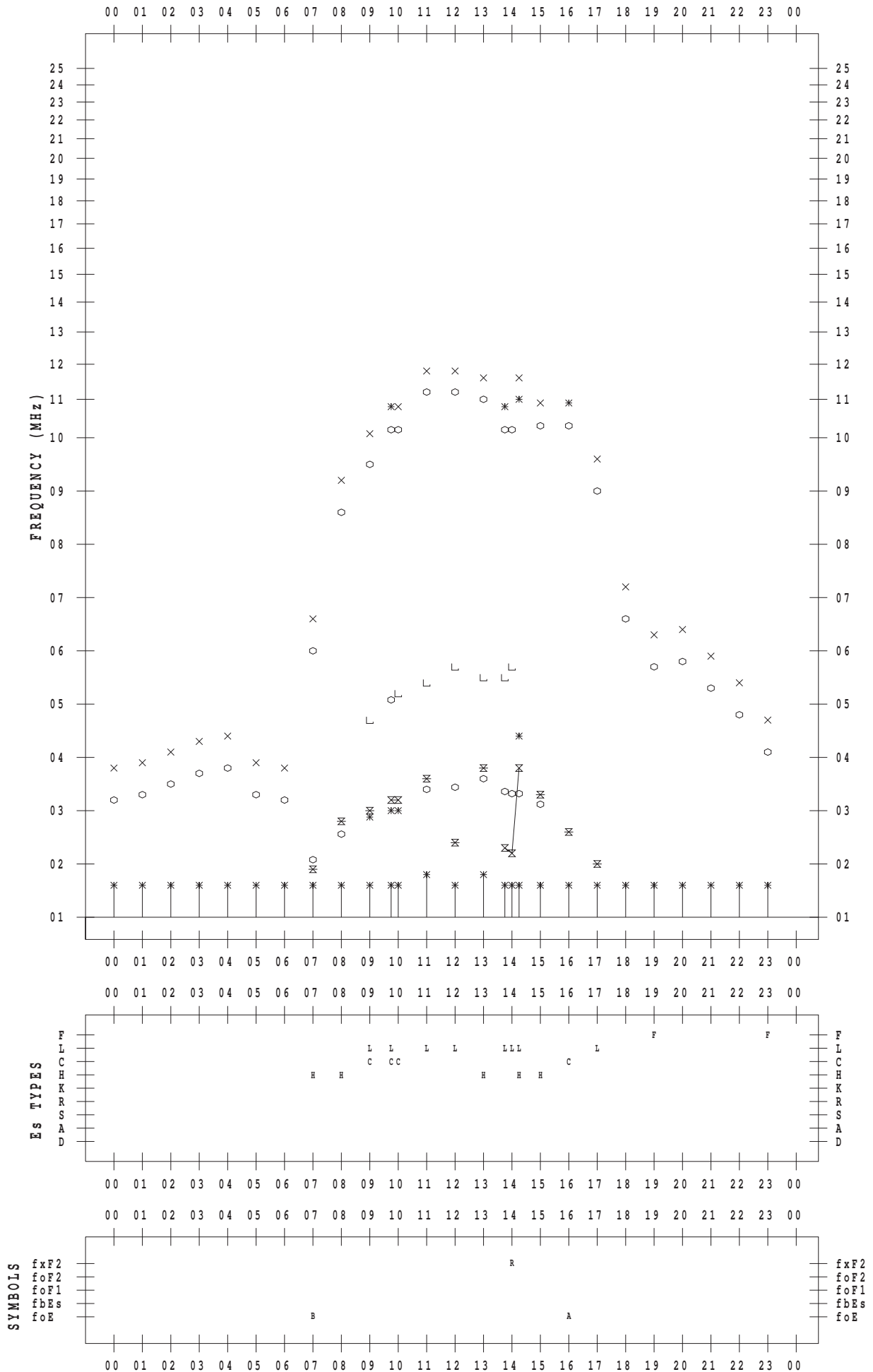
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/21

135 ° E MEAN TIME



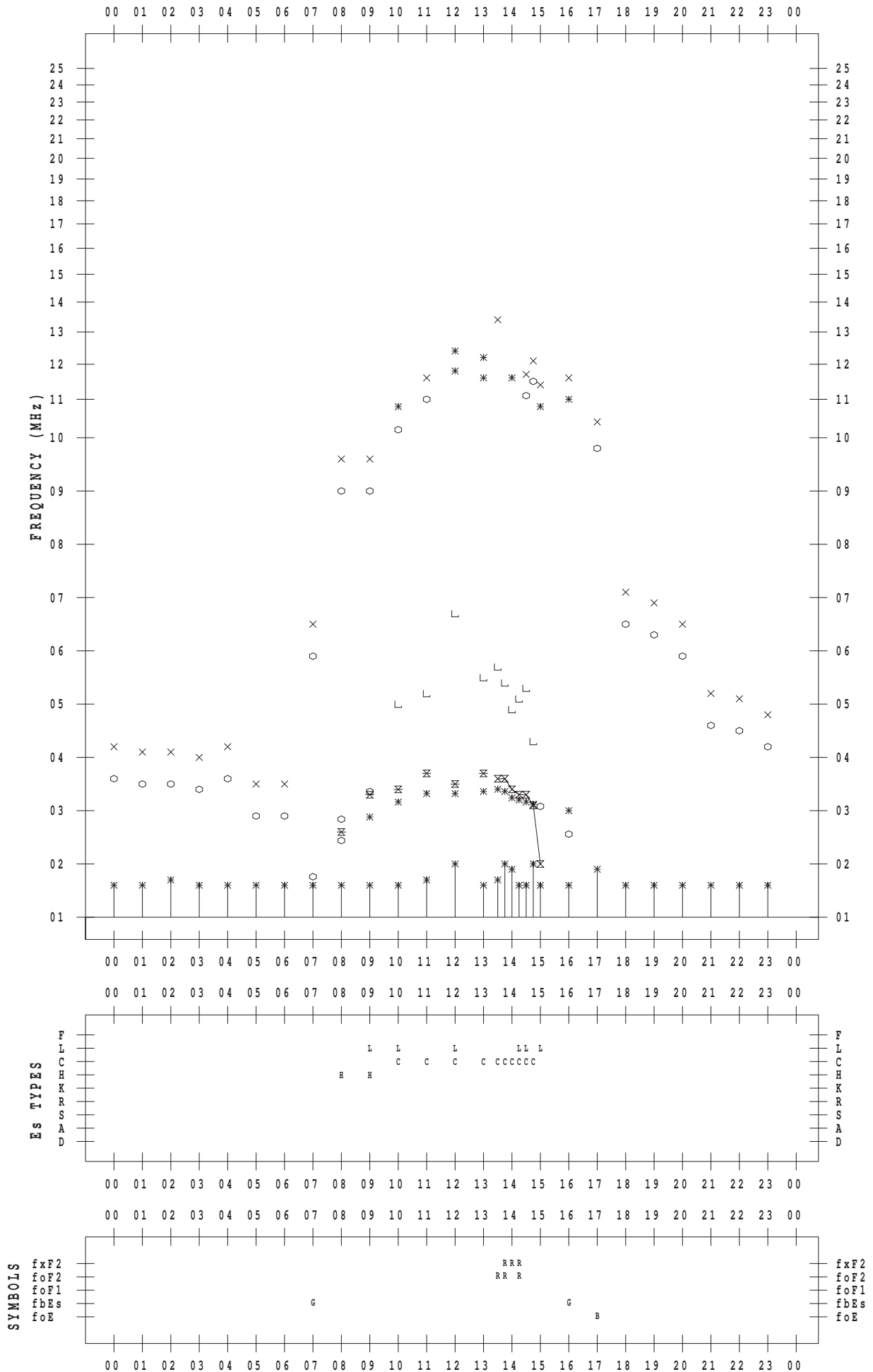
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/22

135 ° E MEAN TIME



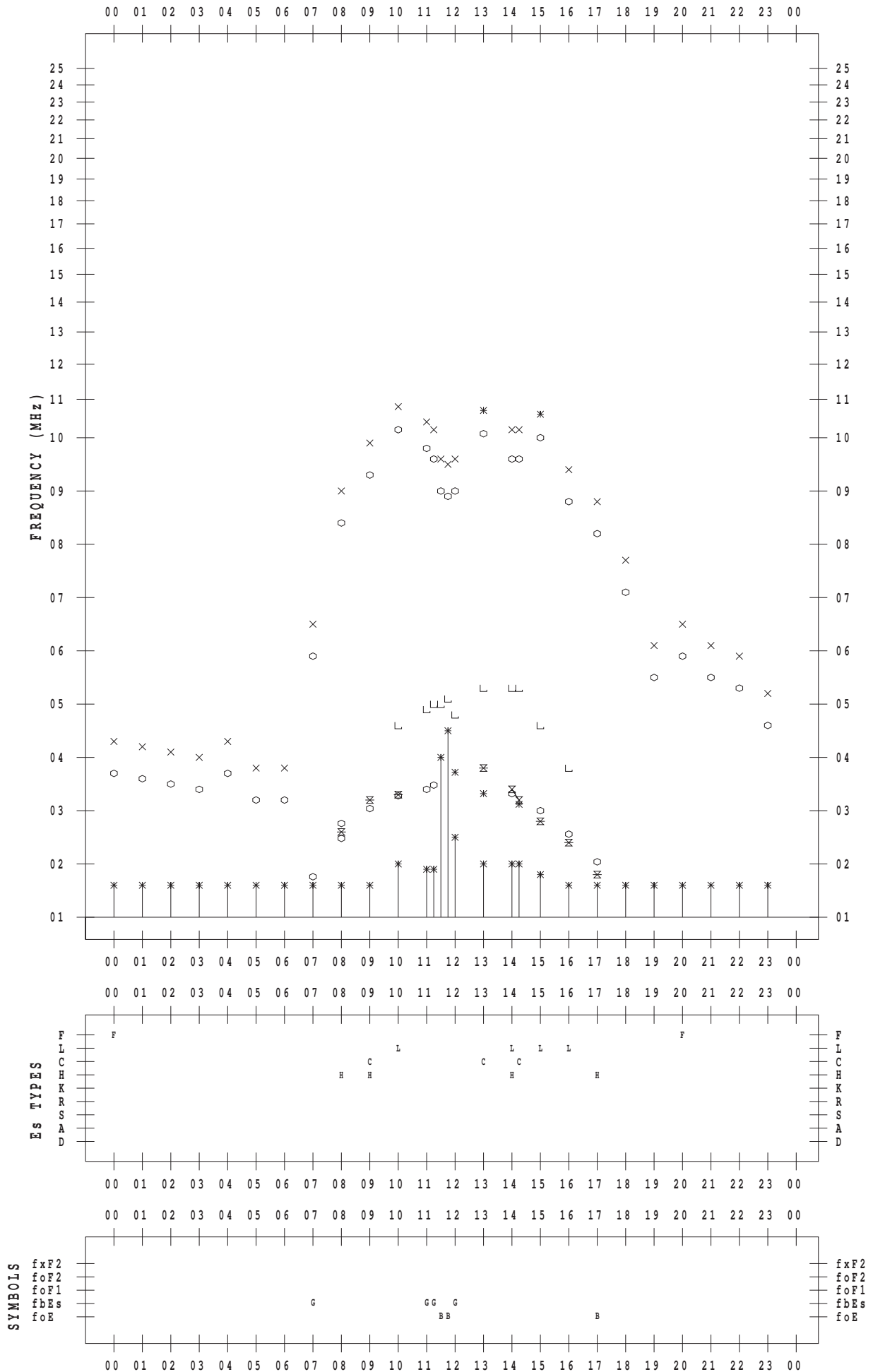
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/23

135 ° E MEAN TIME



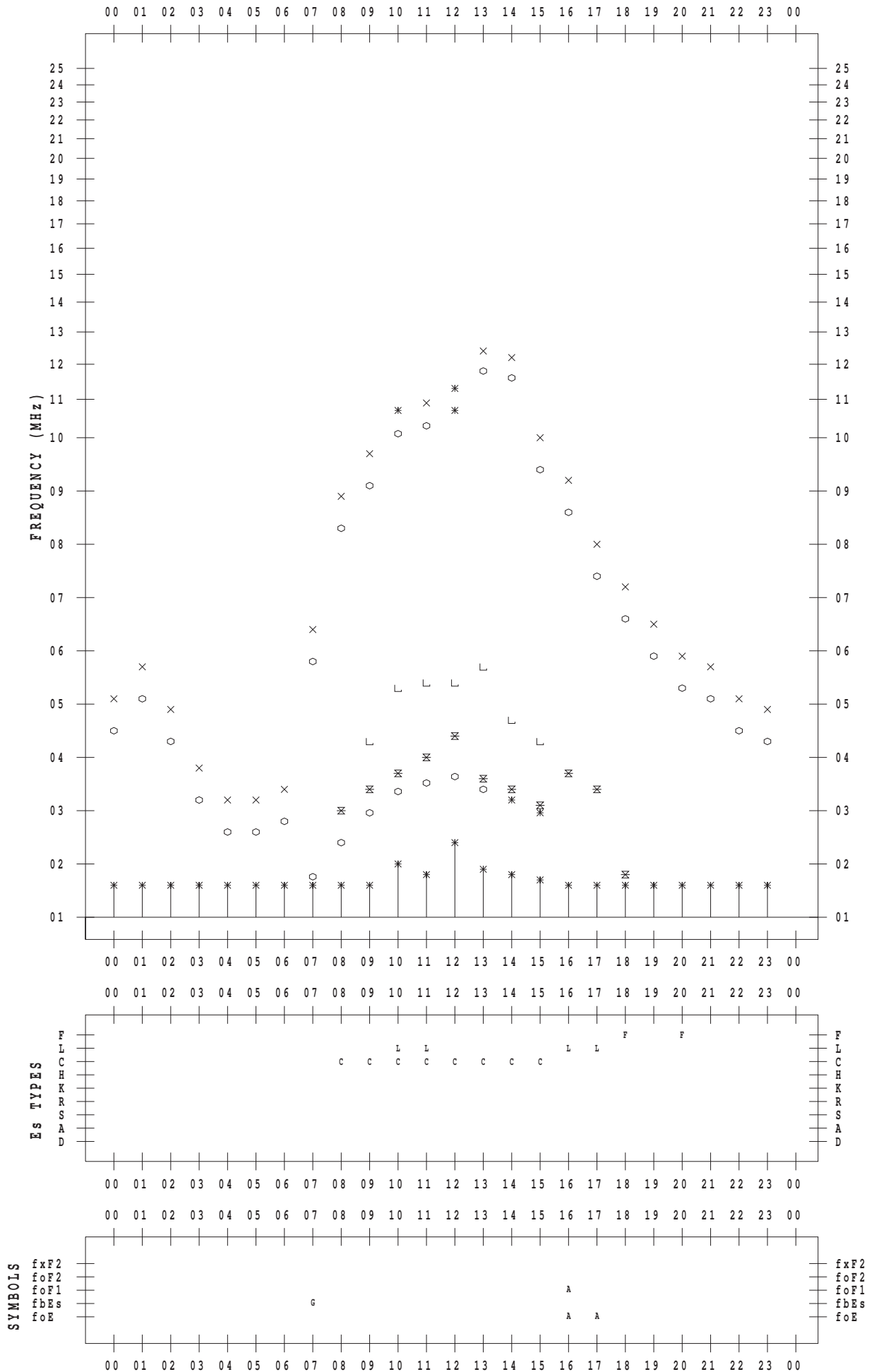
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/24

135 ° E MEAN TIME





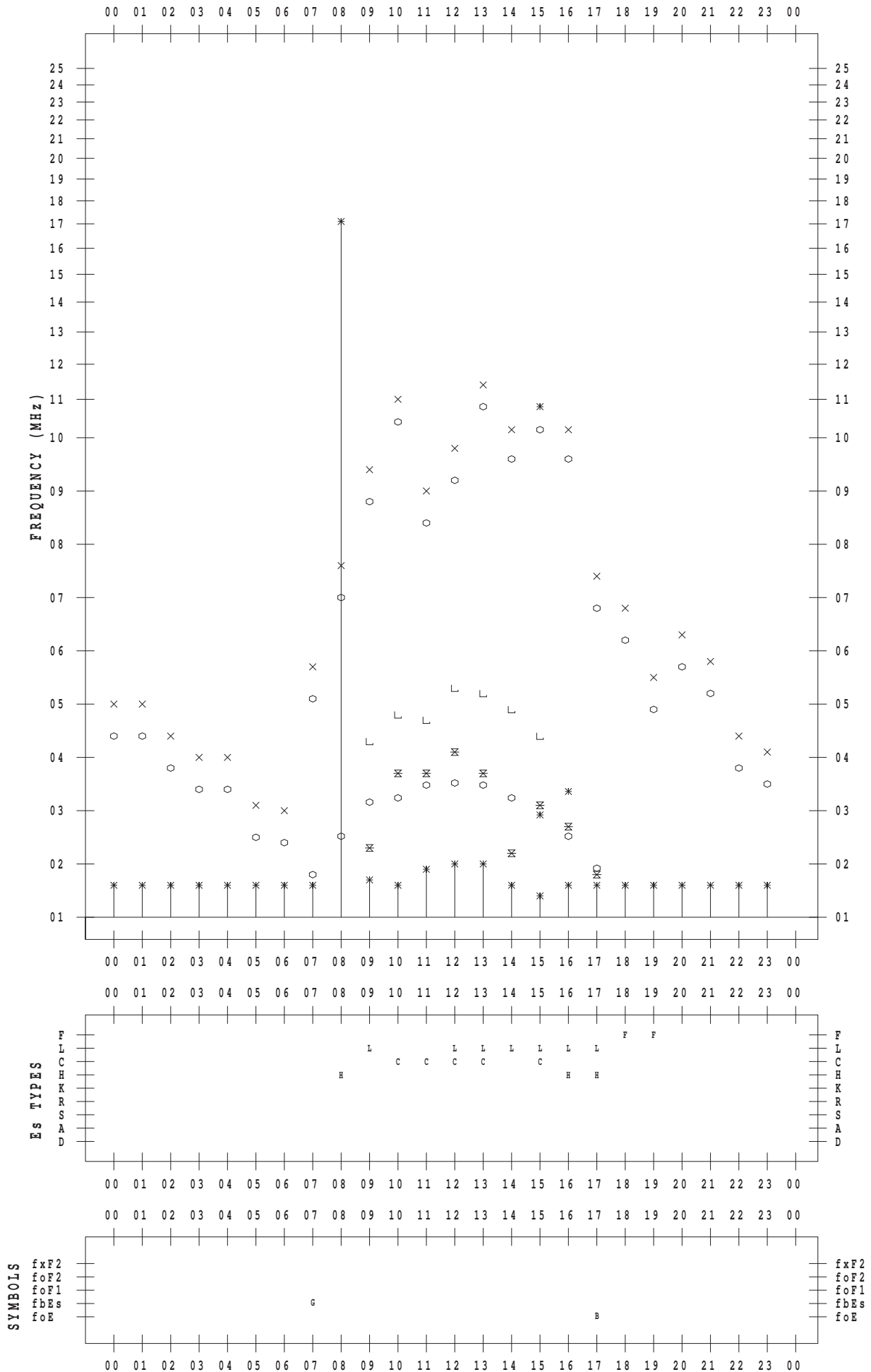
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/25

135 ° E MEAN TIME



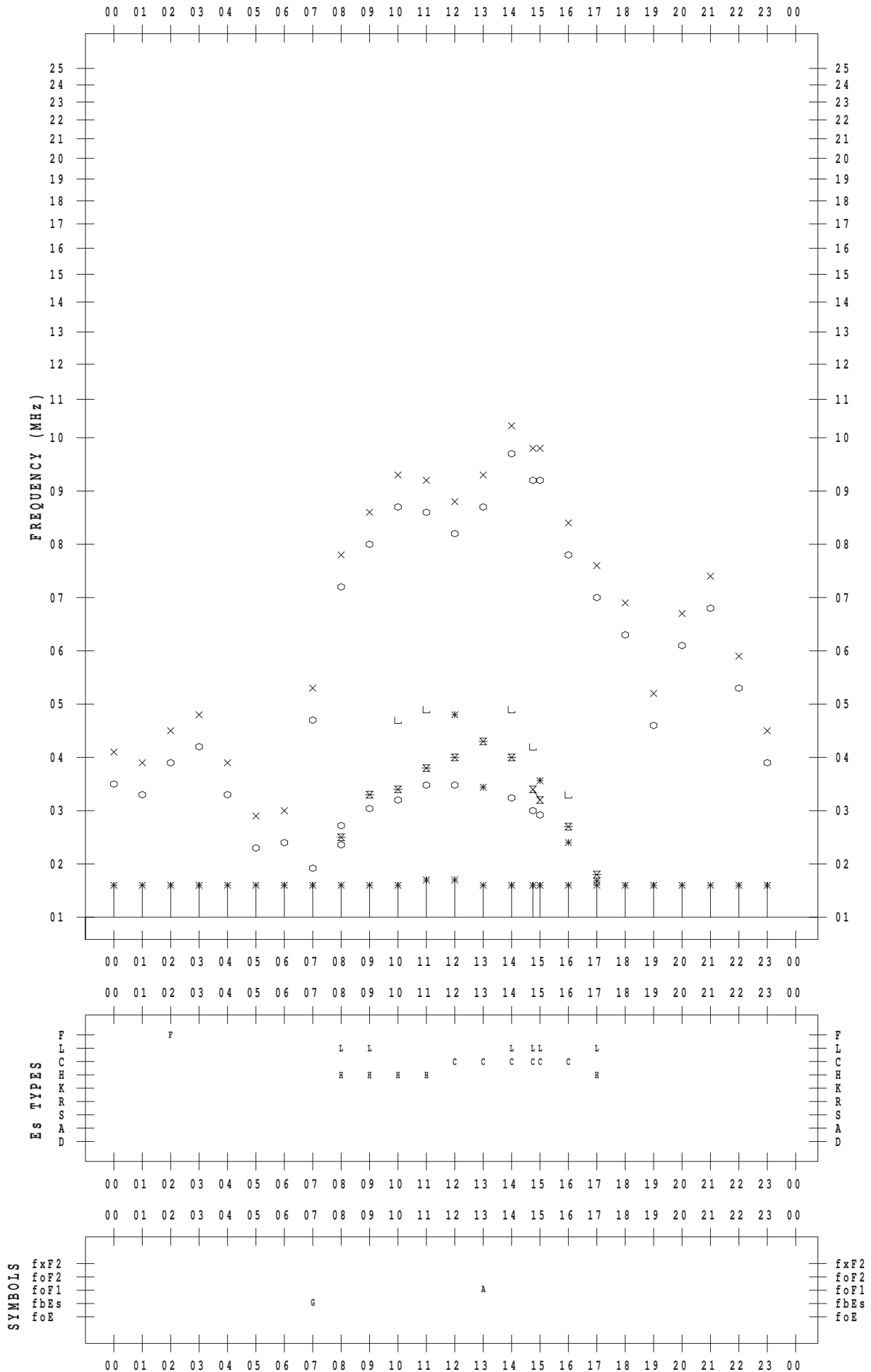
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/26

135 ° E MEAN TIME



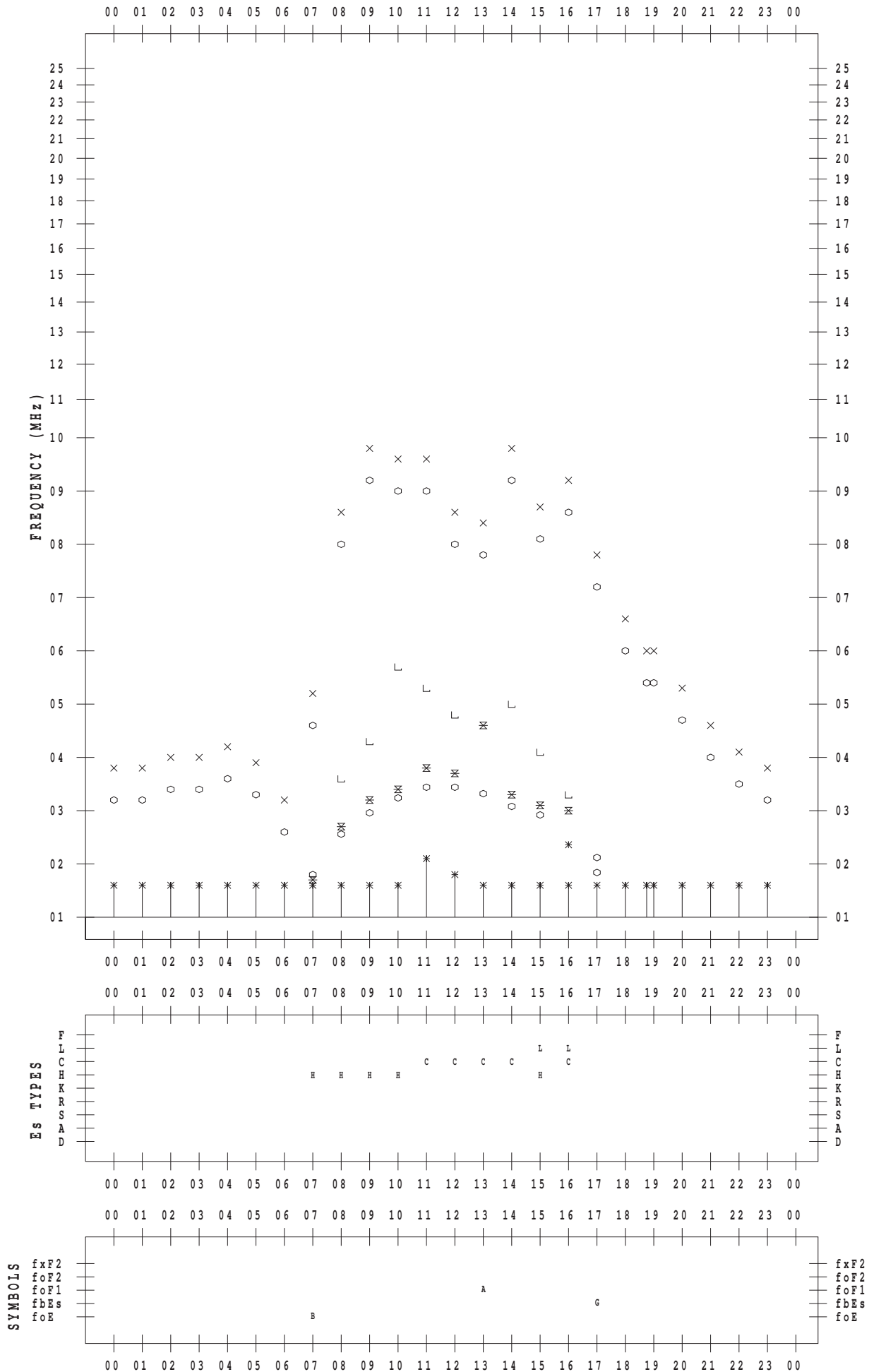
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/27

135 ° E MEAN TIME



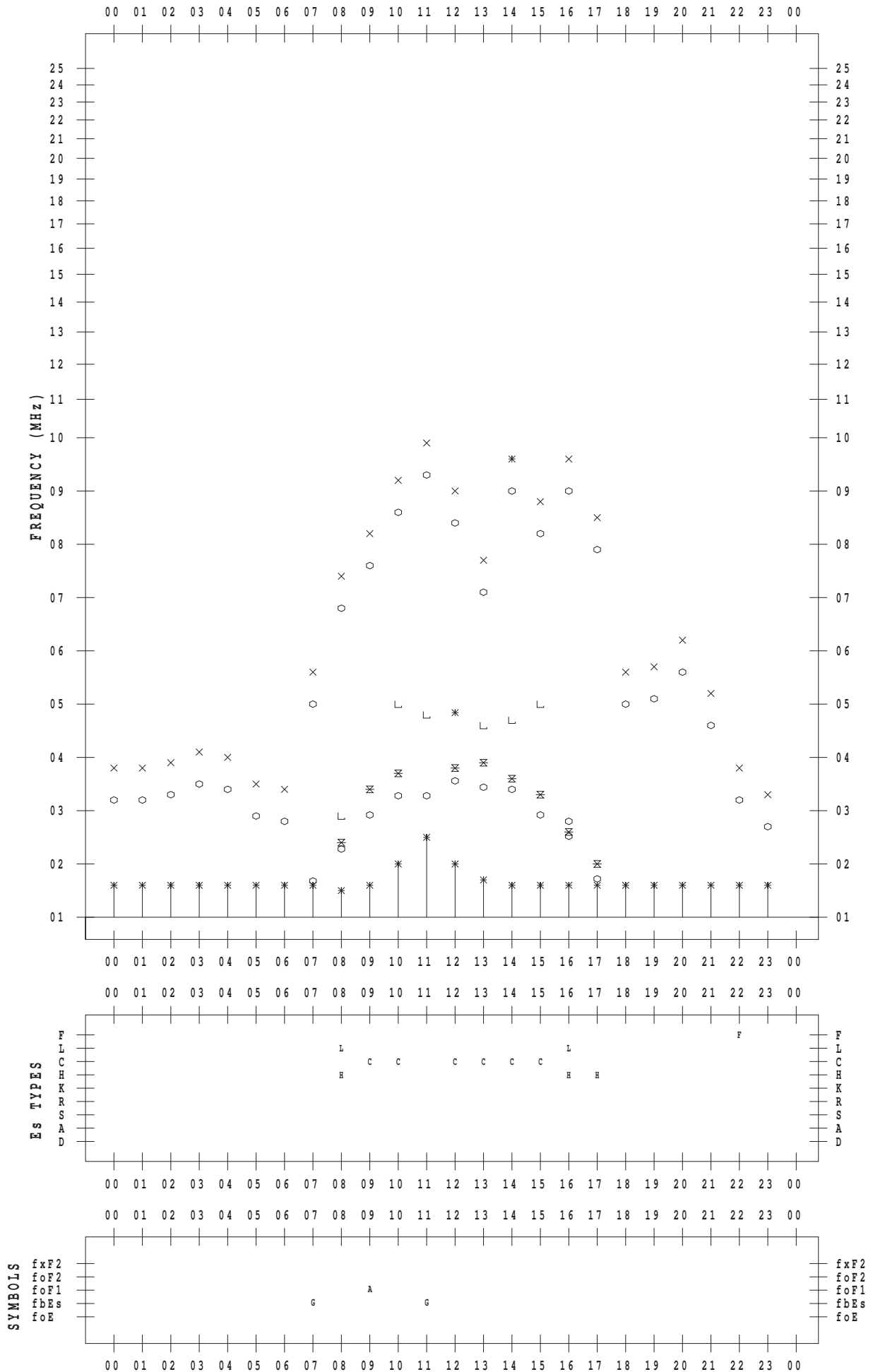
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/28

135 ° E MEAN TIME



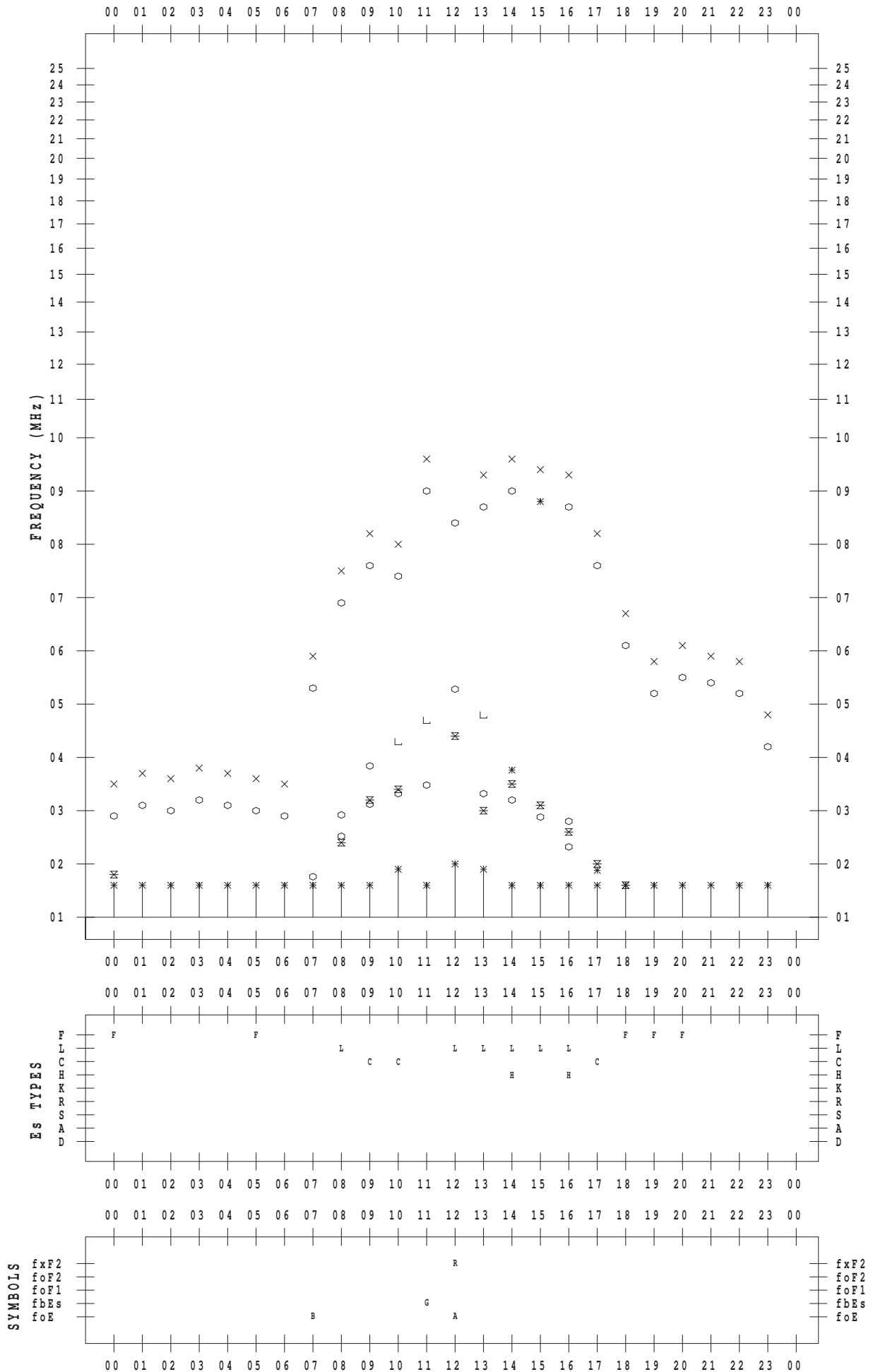
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/29

135 ° E MEAN TIME



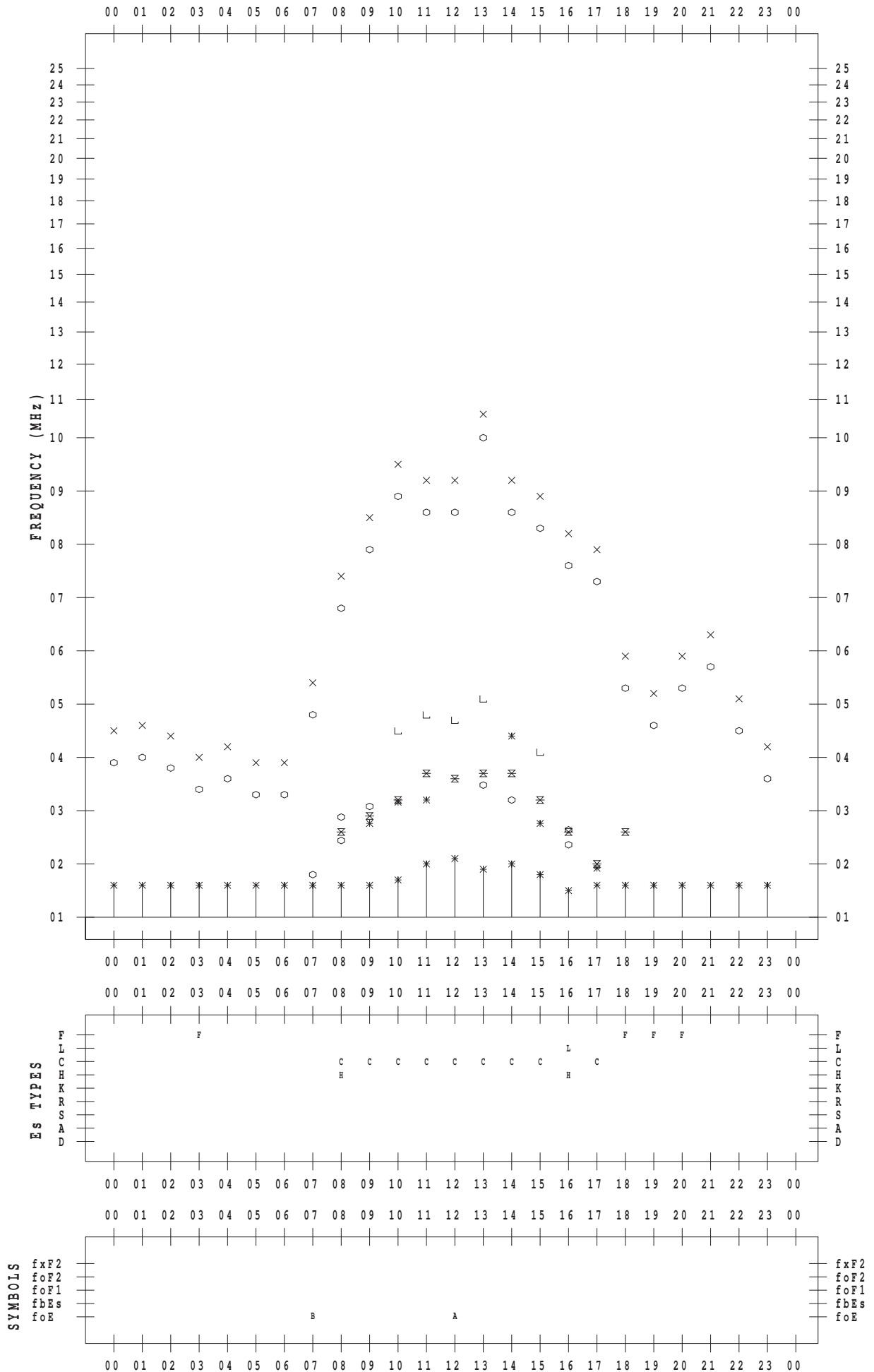
# f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/11/30

135 ° E MEAN TIME



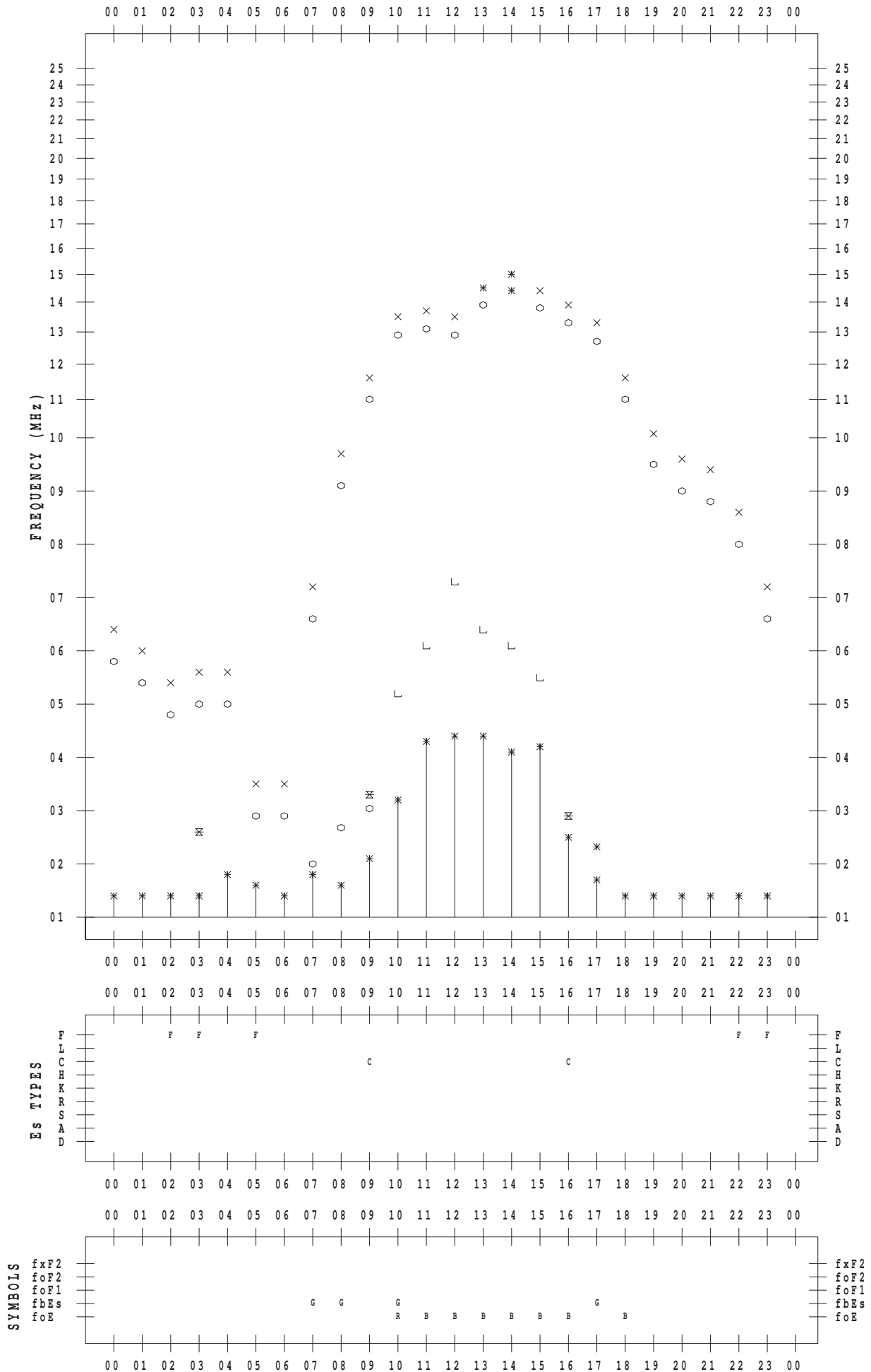
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/ 1

135 ° E MEAN TIME



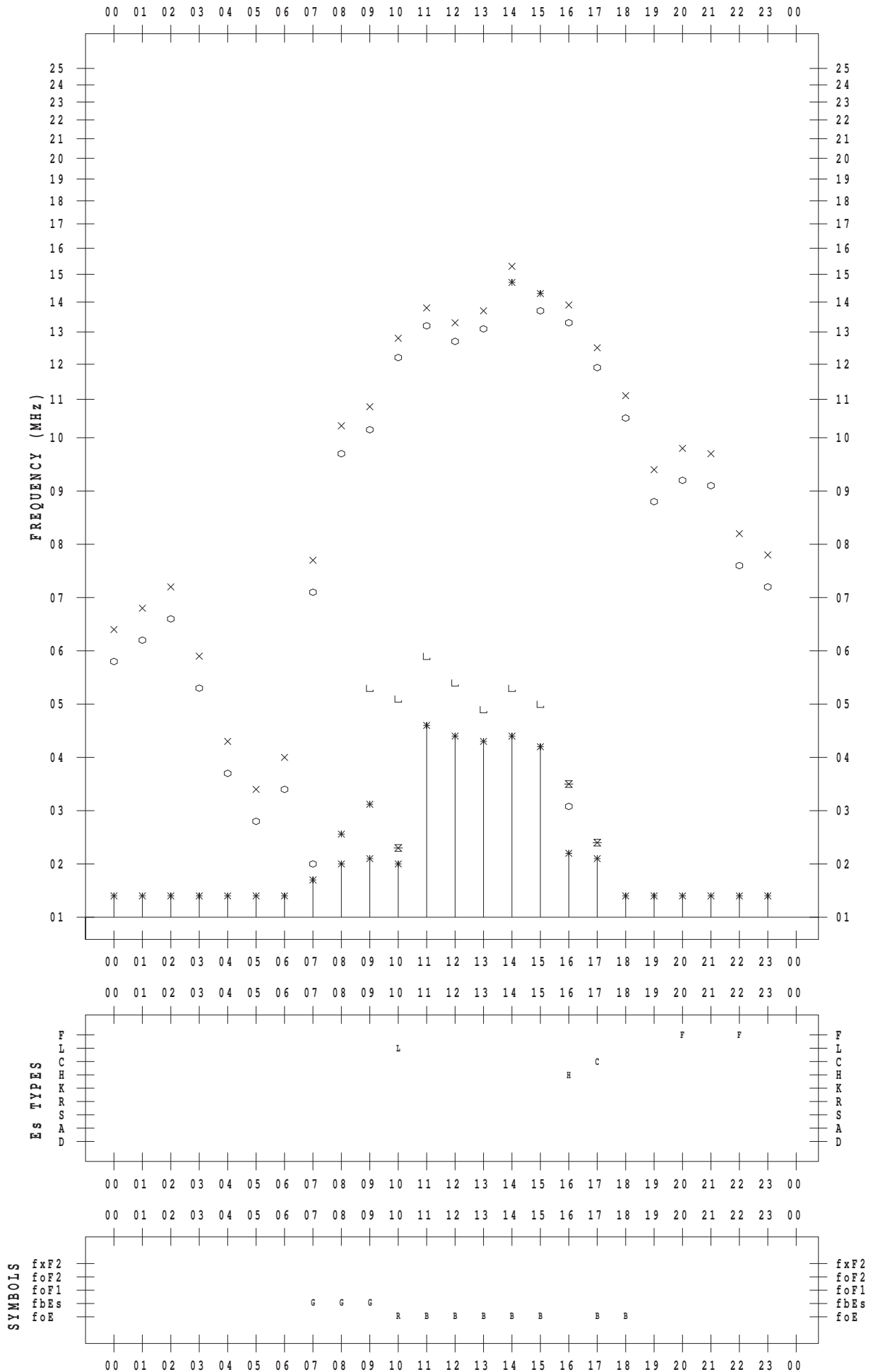
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/ 2

135 ° E MEAN TIME





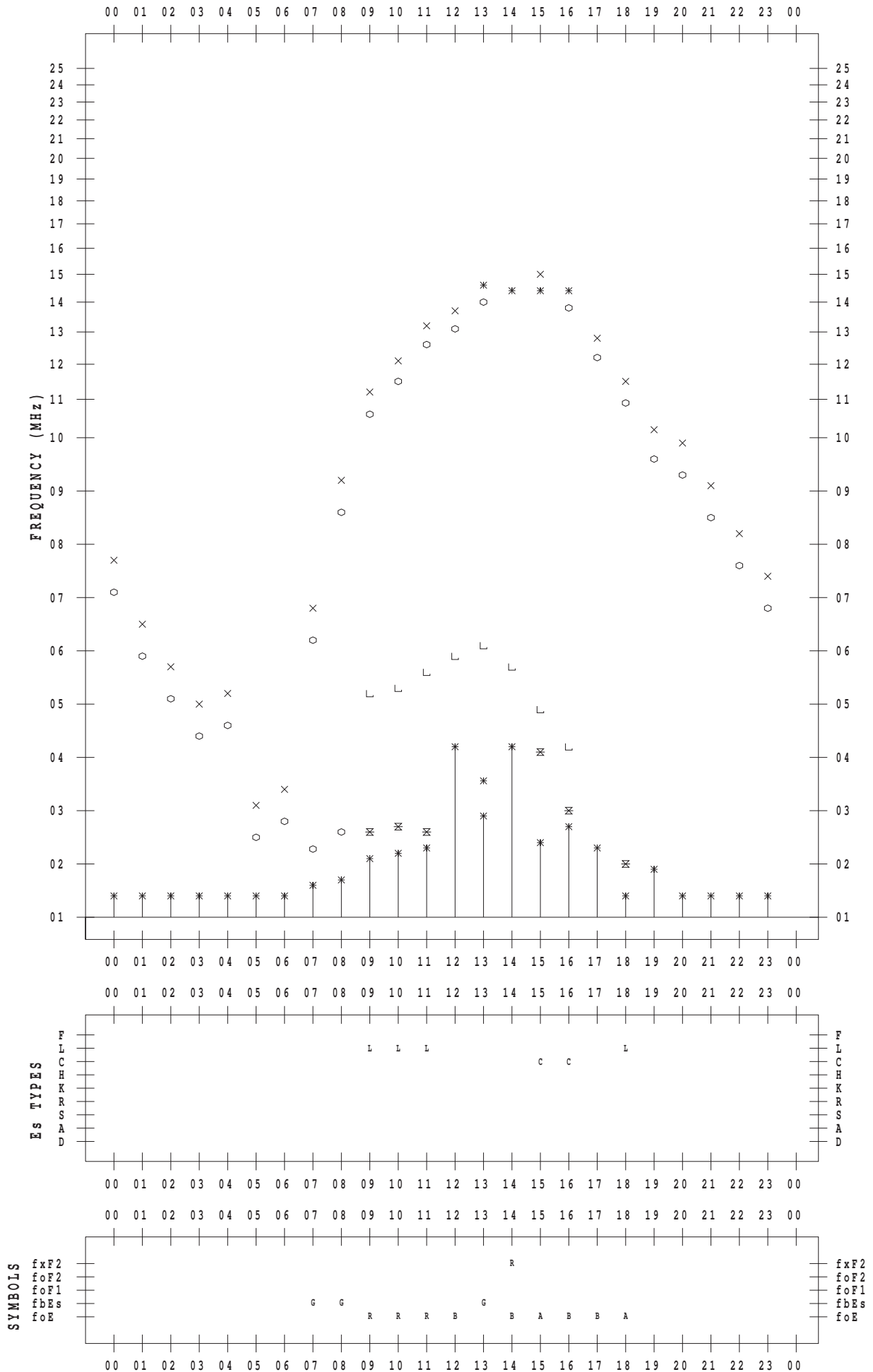
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/ 3

135 ° E MEAN TIME



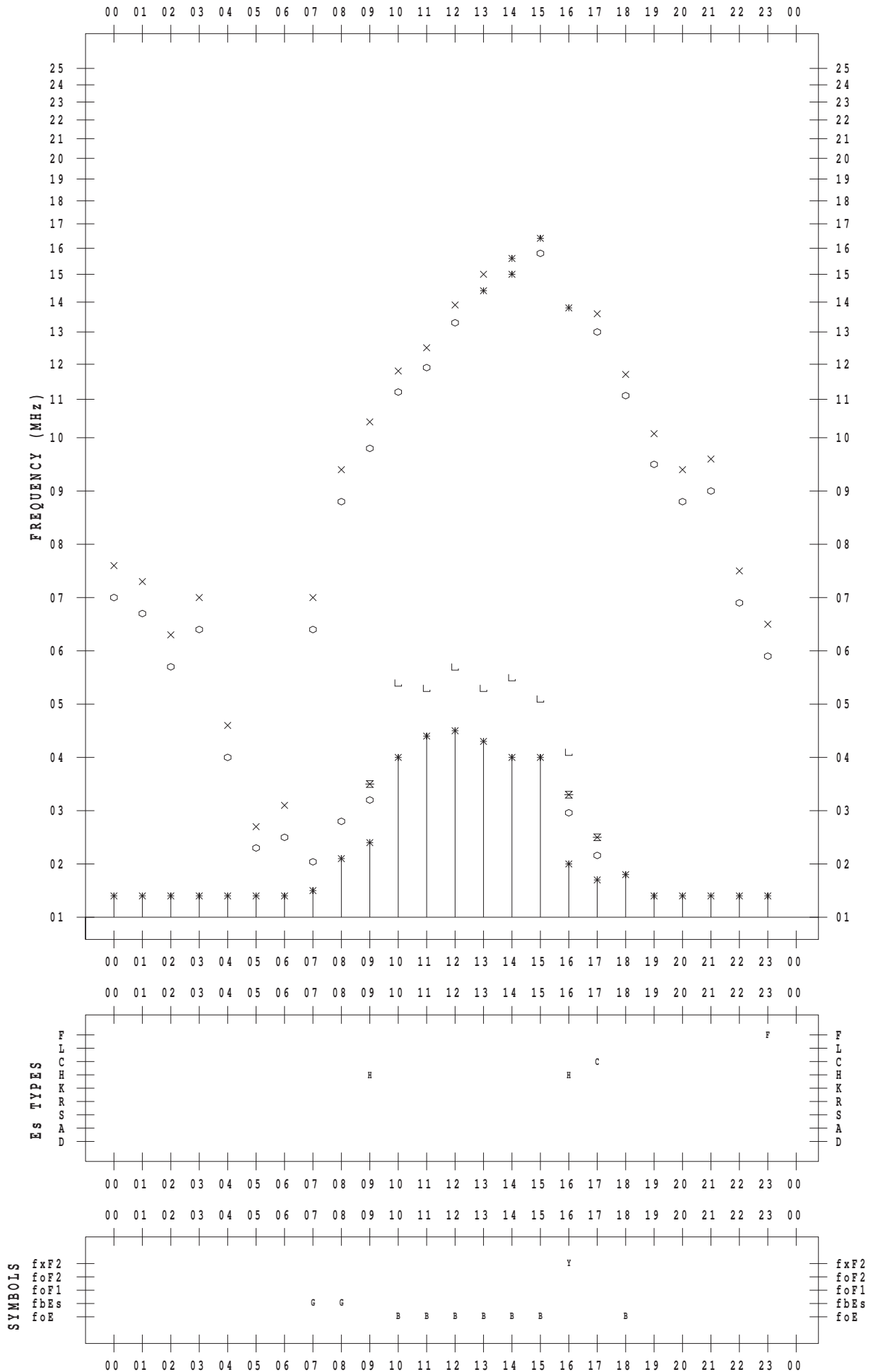
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/ 4

135 ° E MEAN TIME



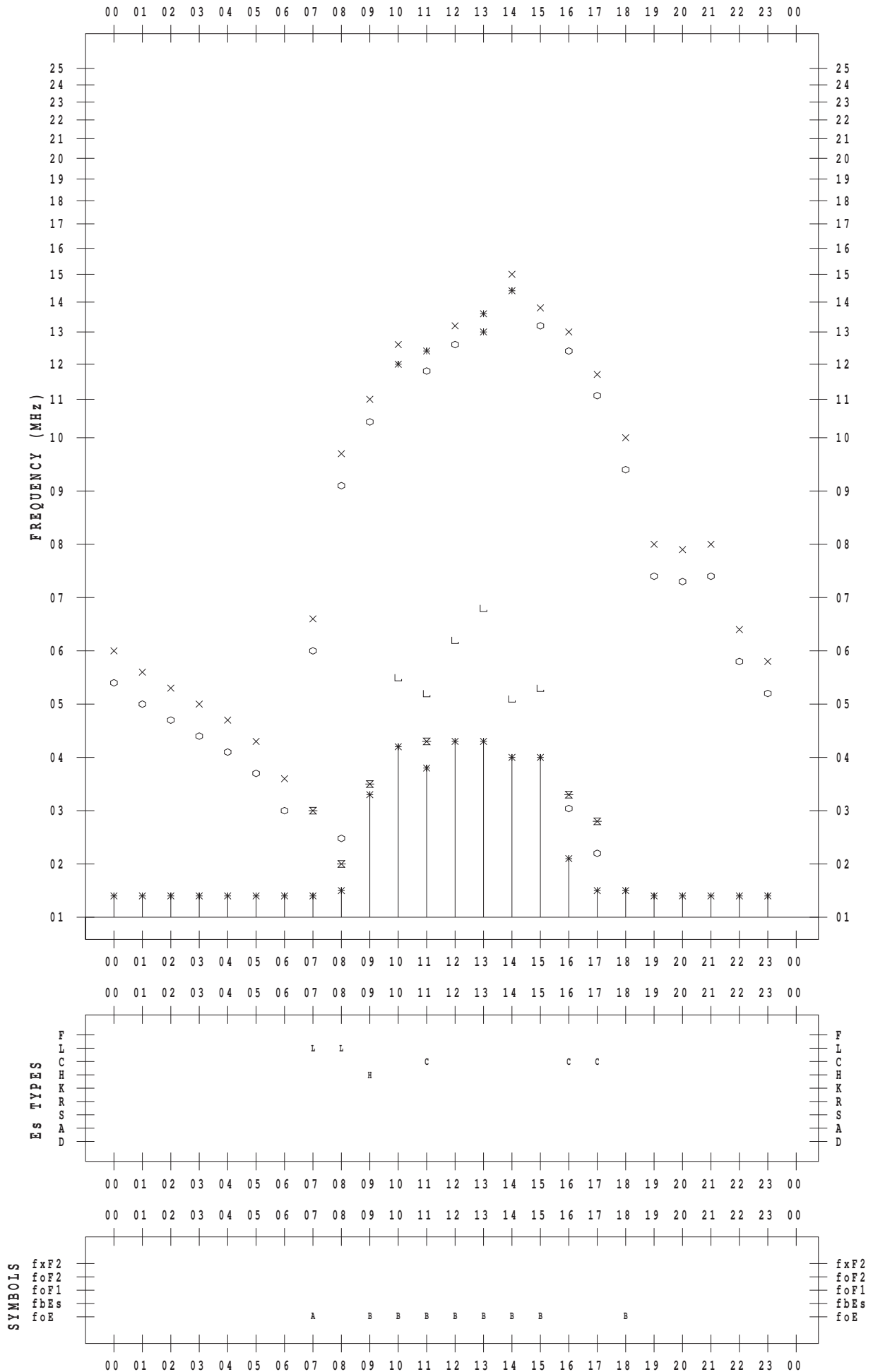
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/ 5

135 ° E MEAN TIME



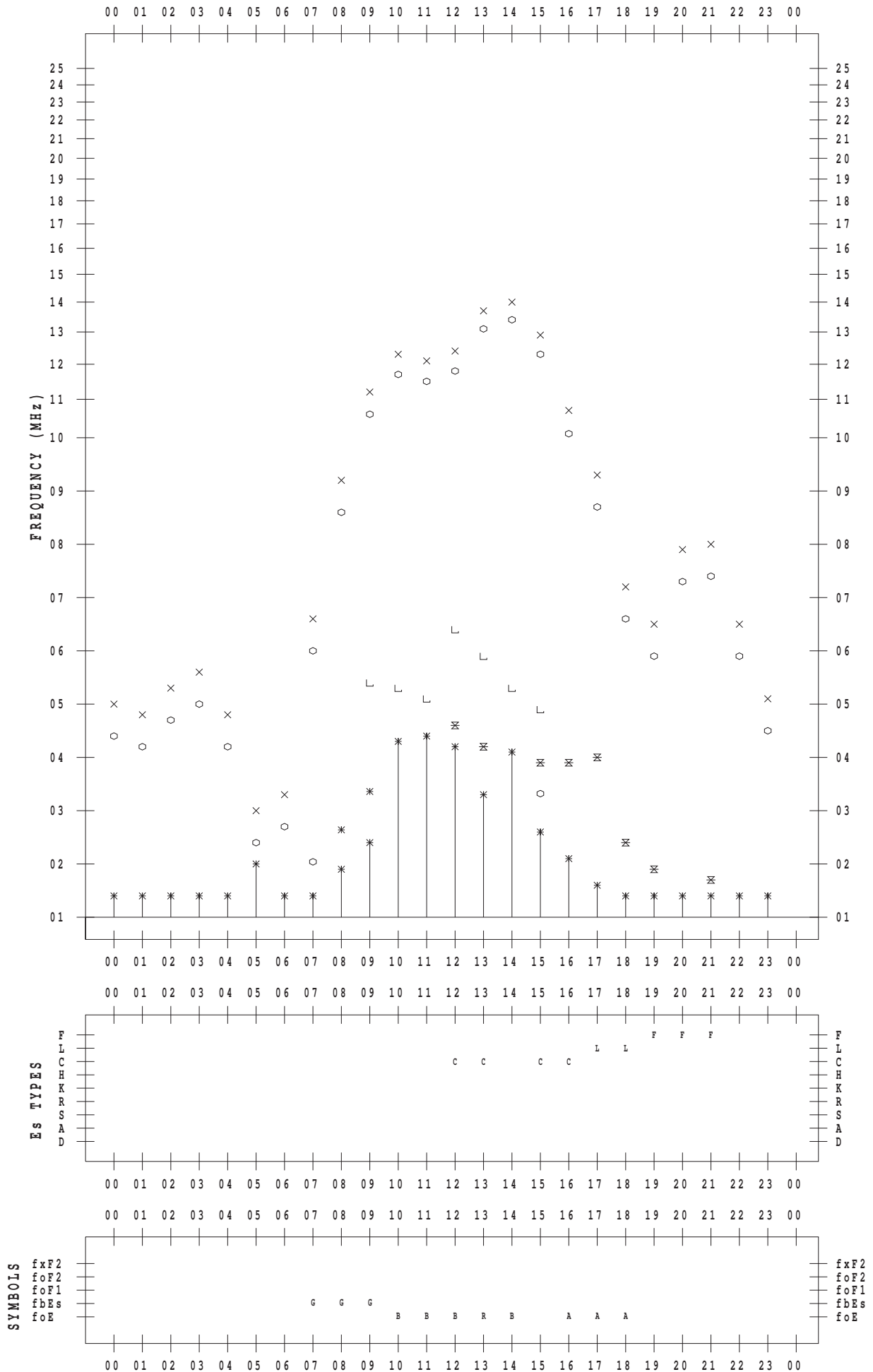
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/ 6

135 ° E MEAN TIME



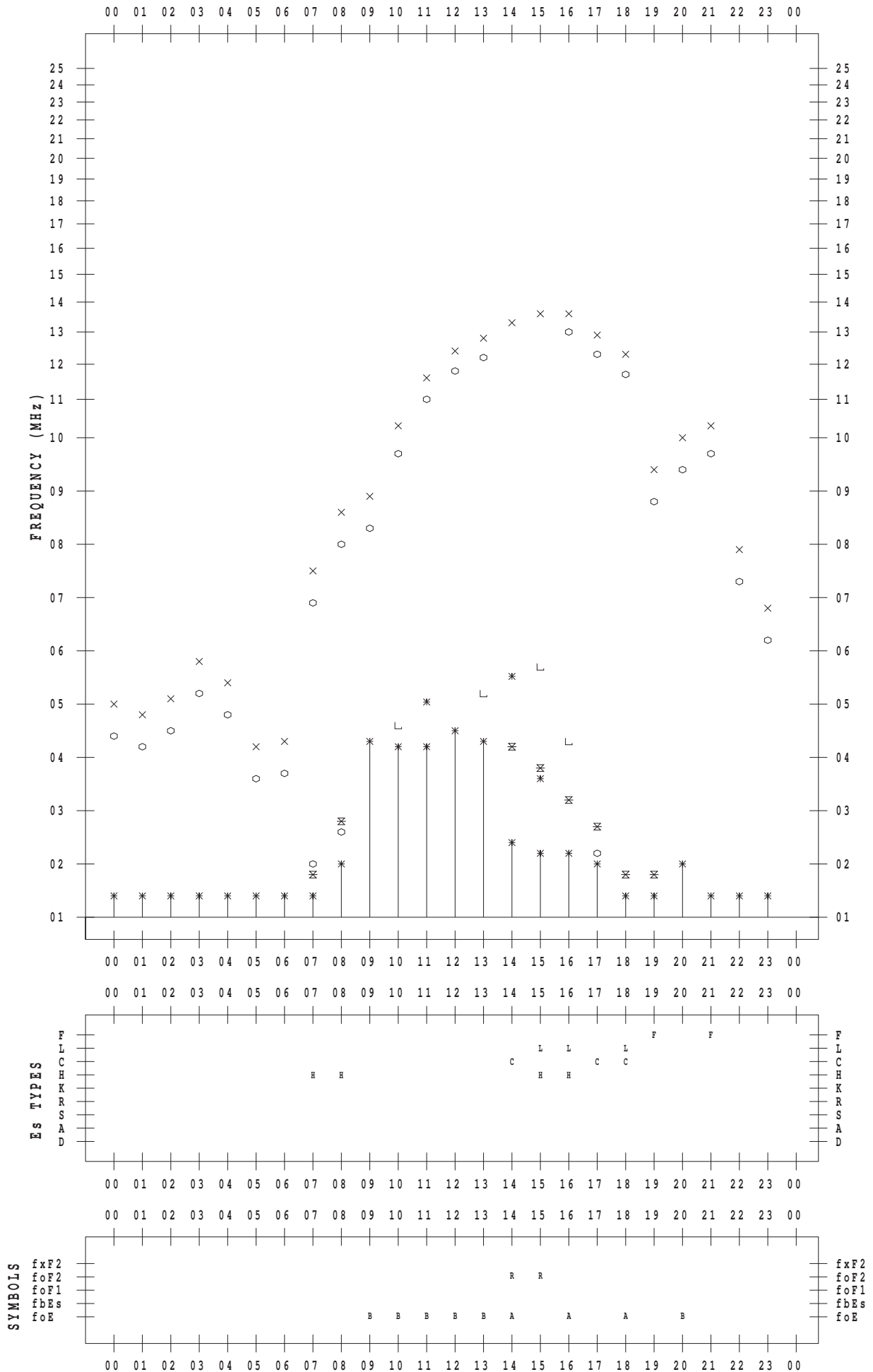
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/ 7

135 ° E MEAN TIME



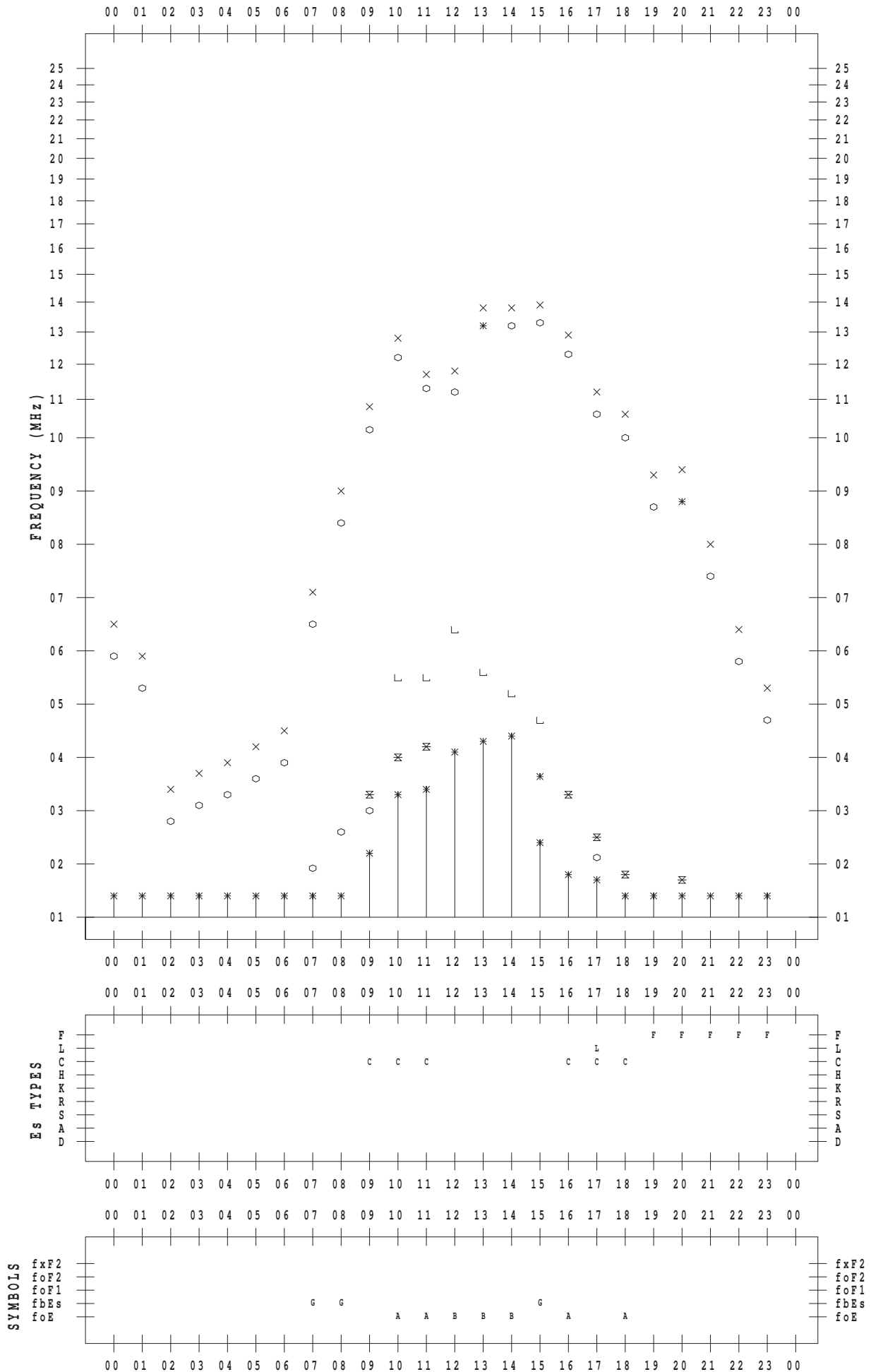
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/ 8

135 ° E MEAN TIME



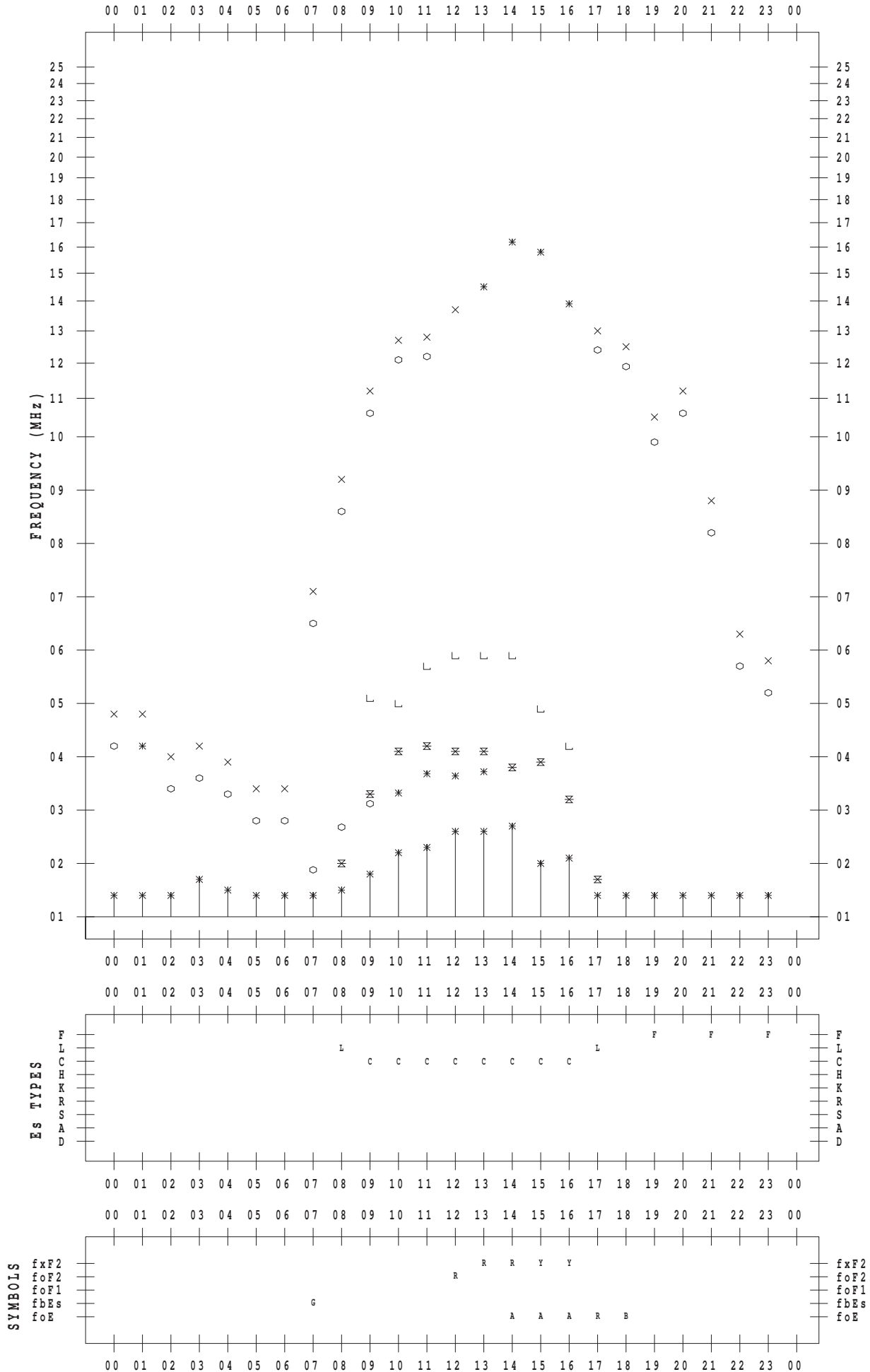
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/ 9

135 ° E MEAN TIME



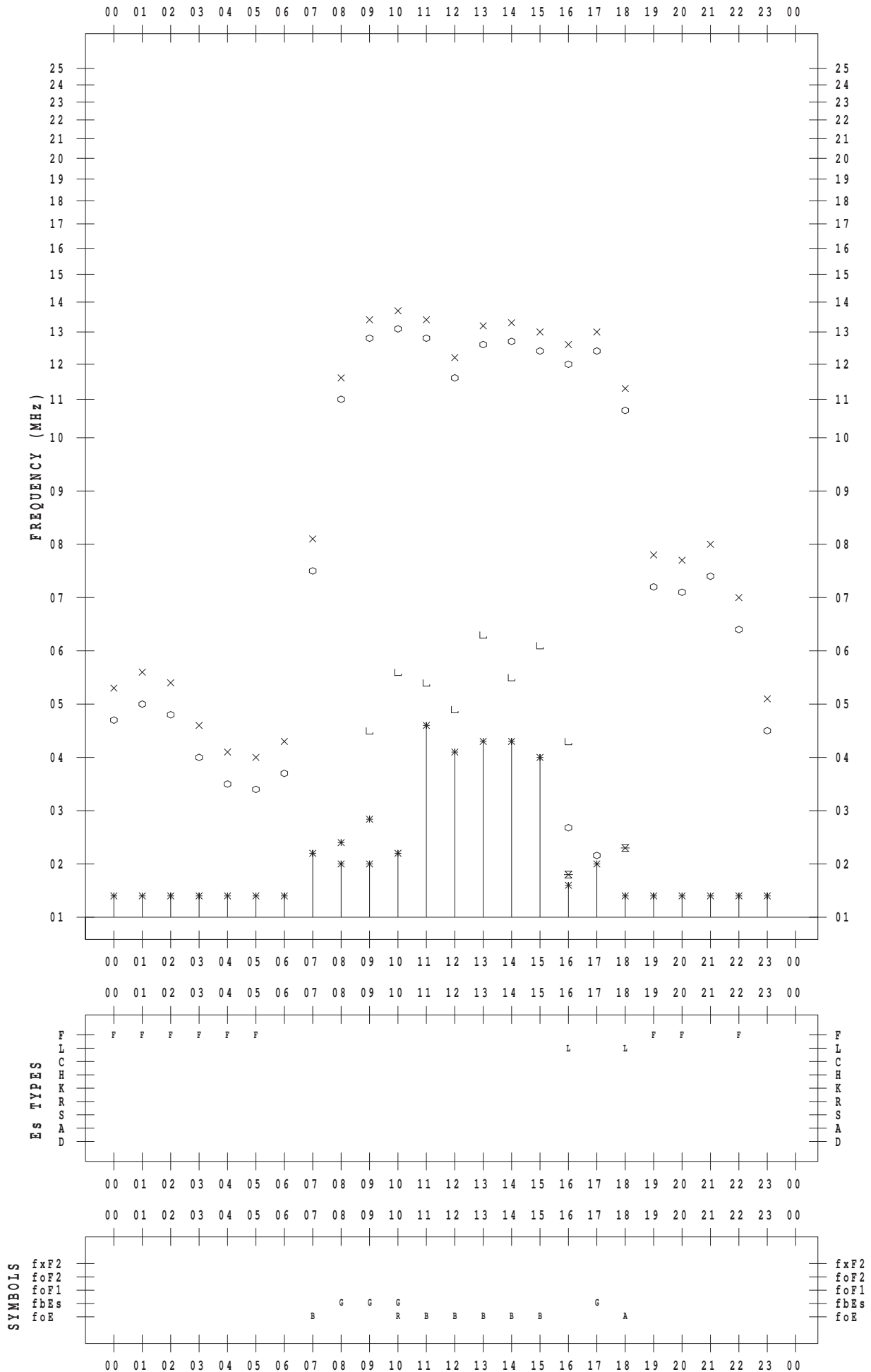
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/10

135 ° E MEAN TIME





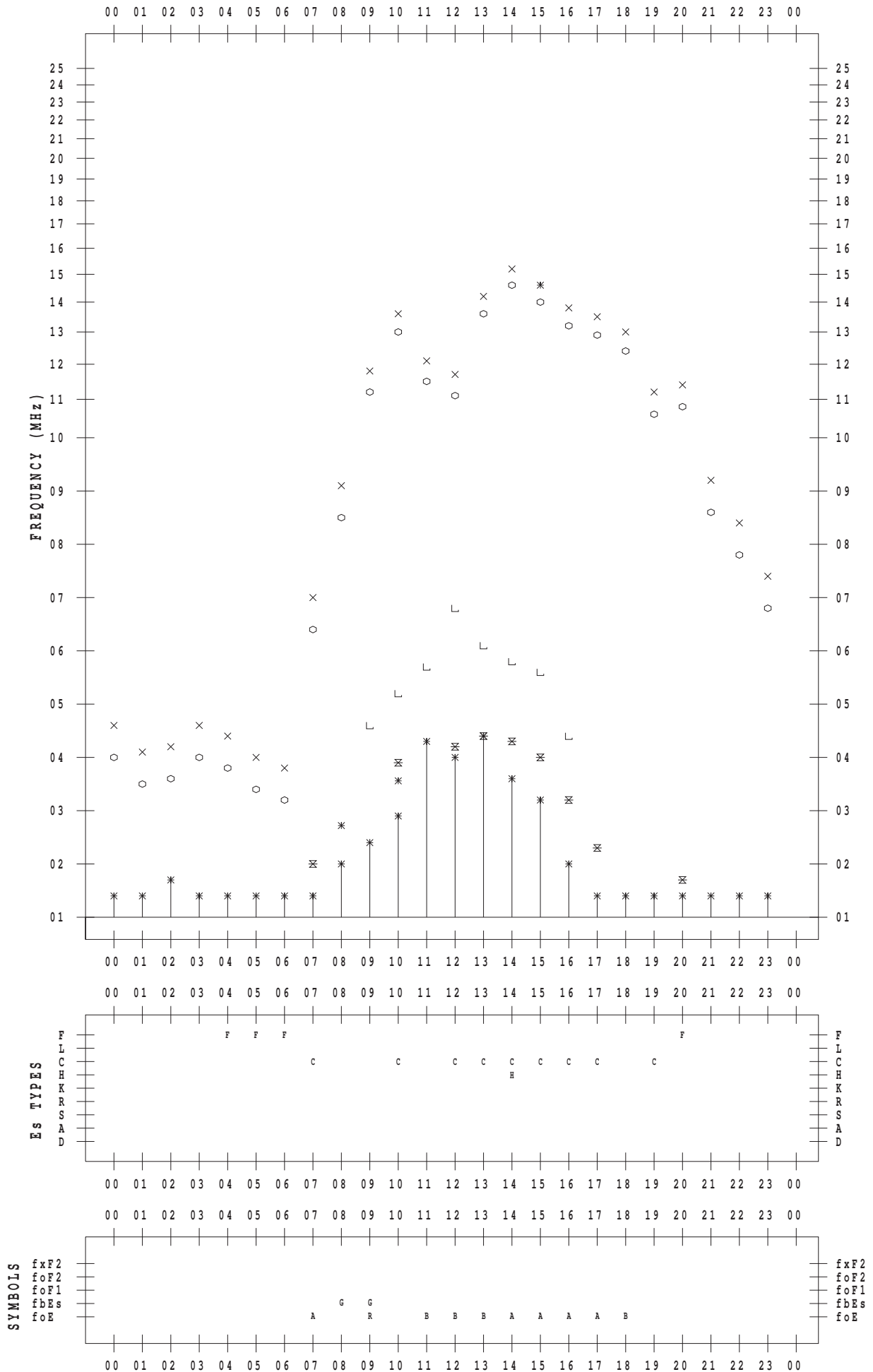
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/11

135 ° E MEAN TIME



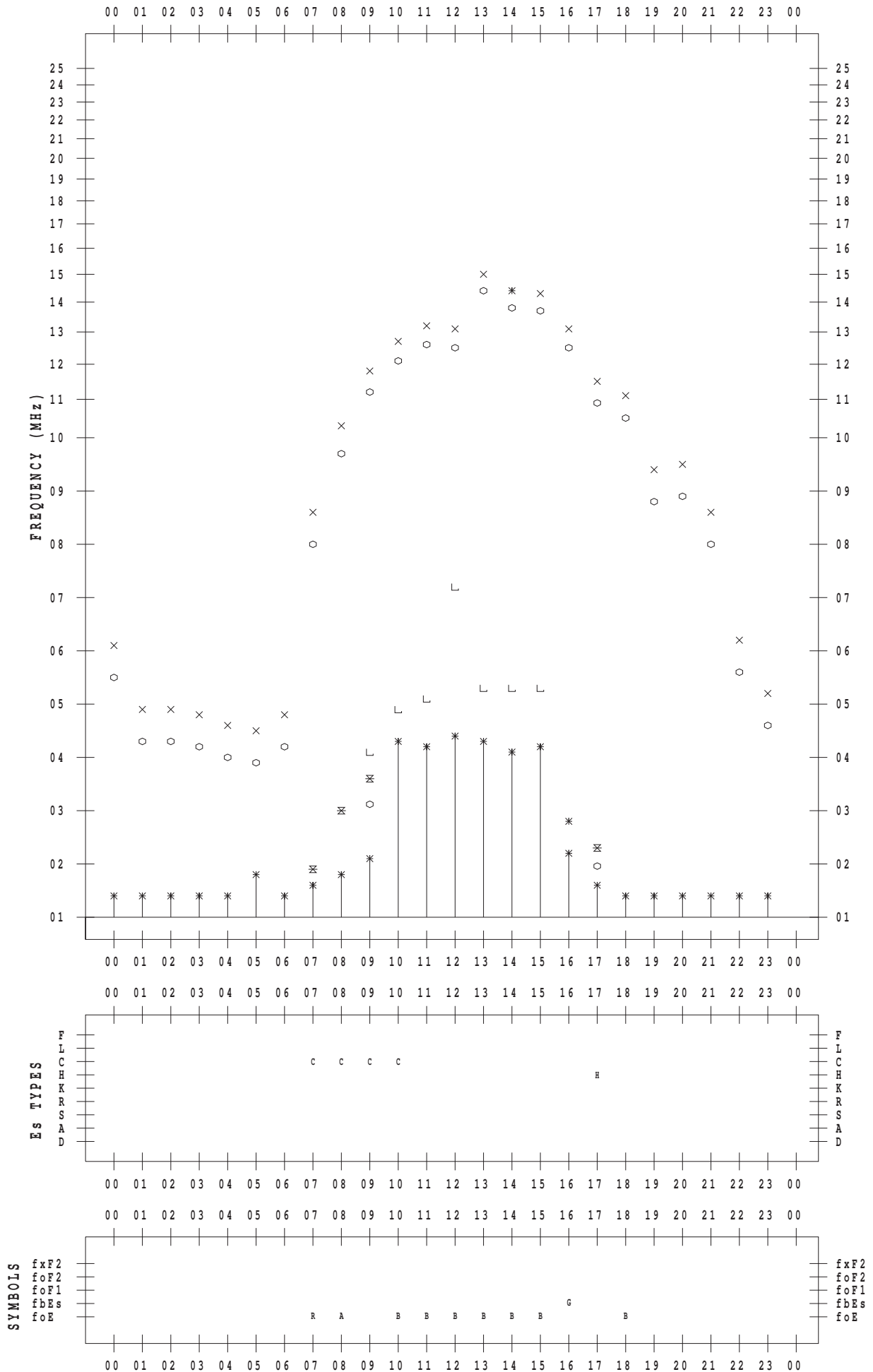
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/12

135 ° E MEAN TIME



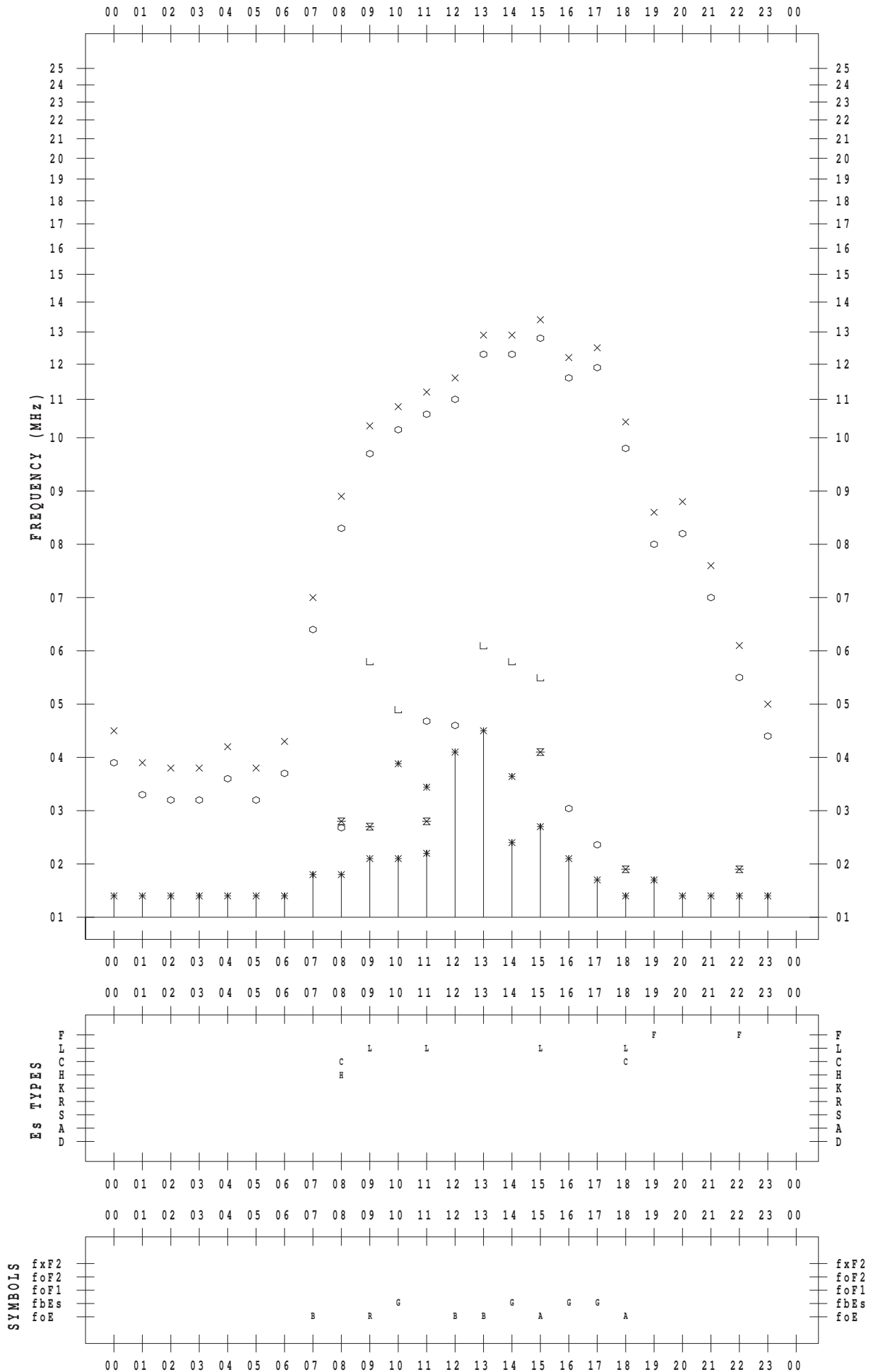
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/13

135 ° E MEAN TIME



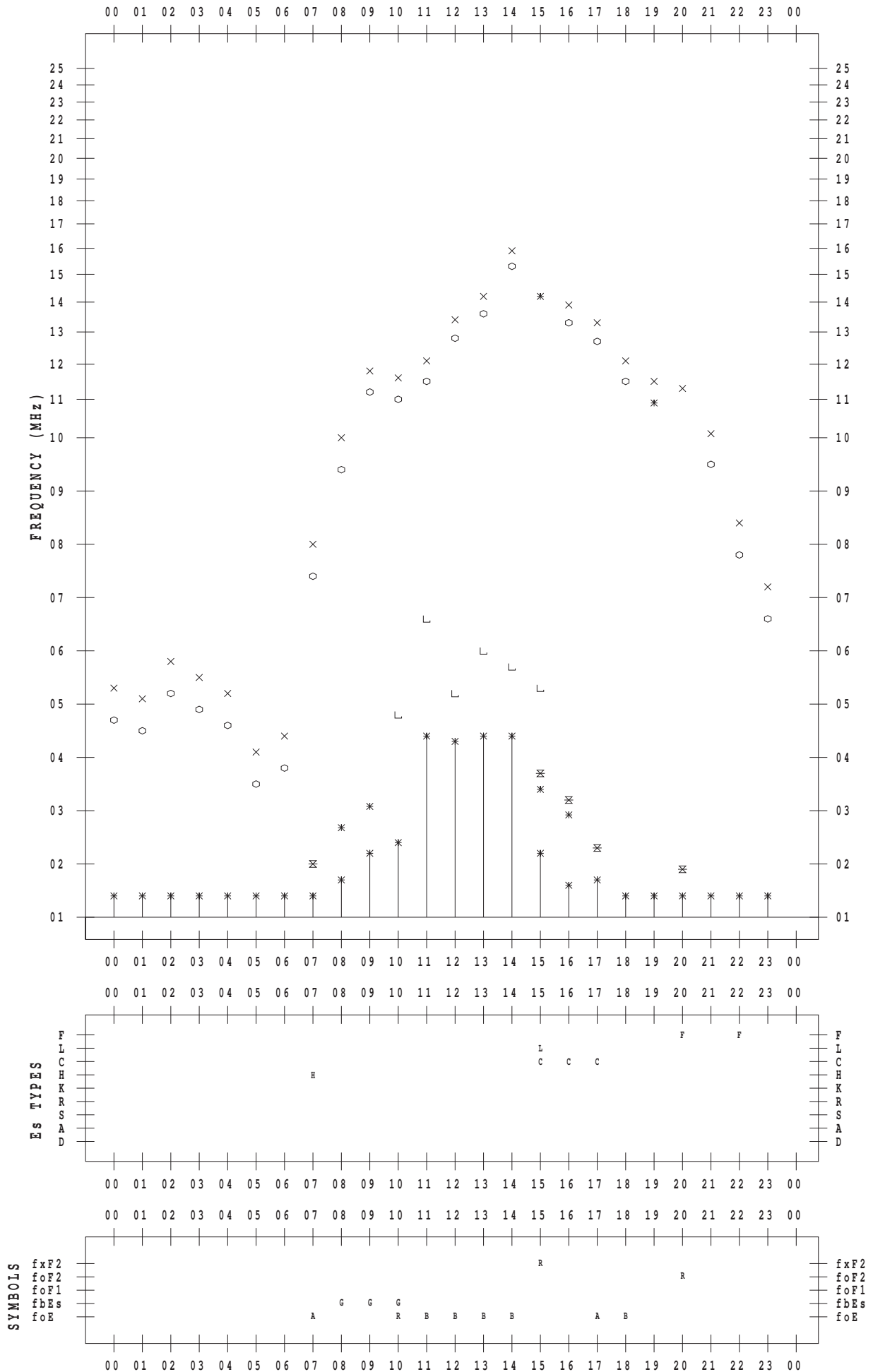
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/14

135 ° E MEAN TIME



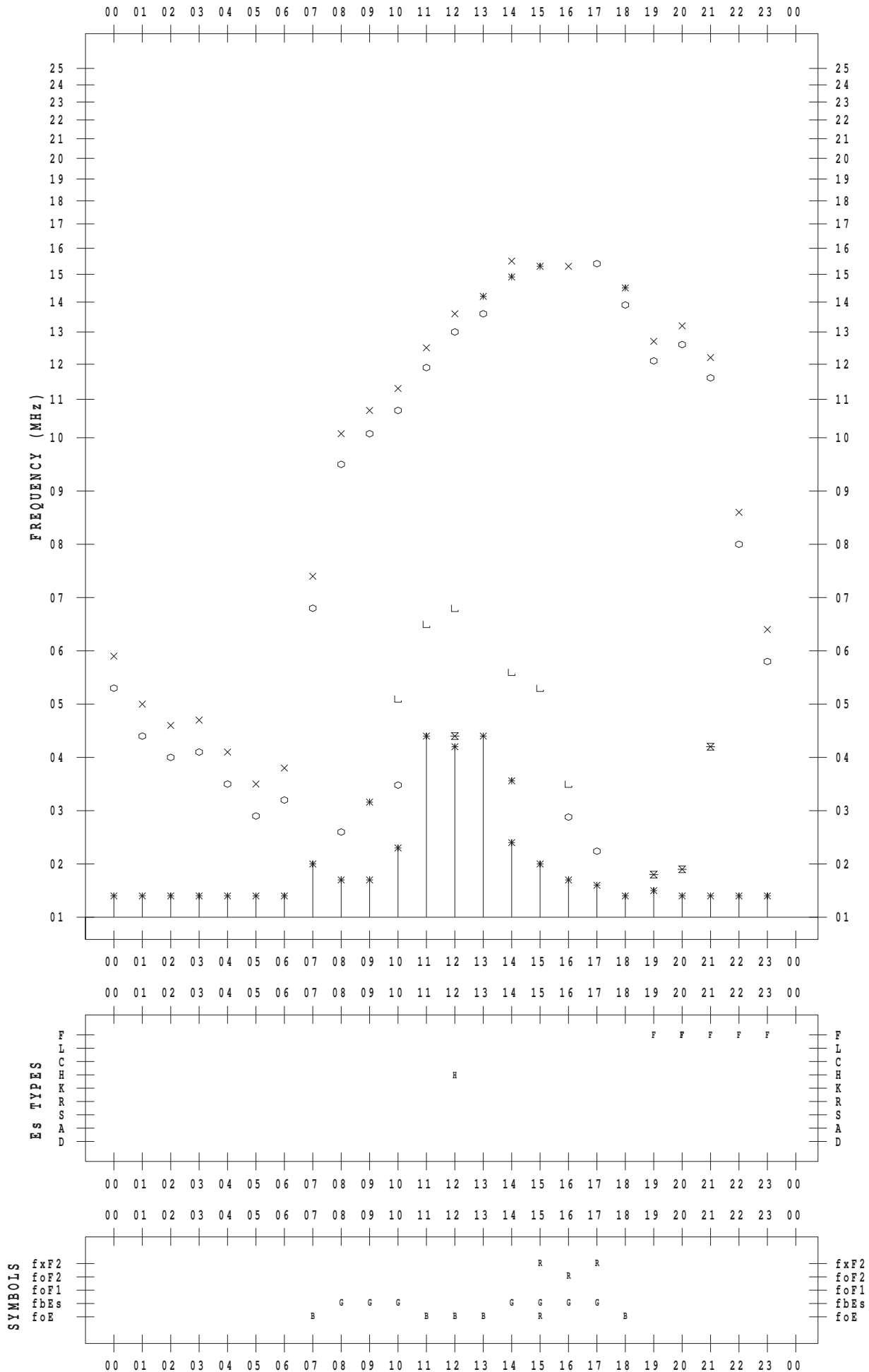
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/15

135 ° E MEAN TIME



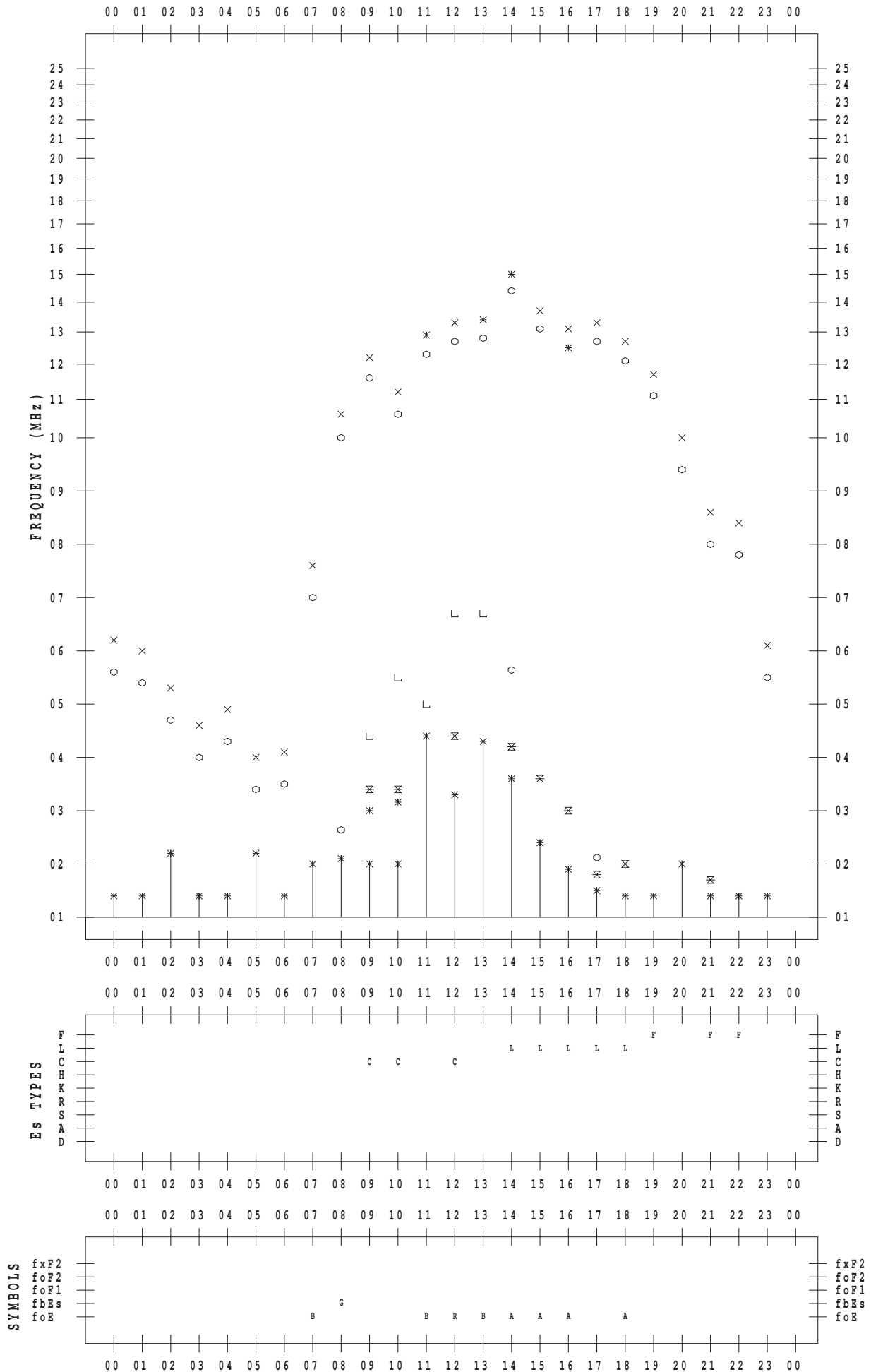
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/16

135 ° E MEAN TIME



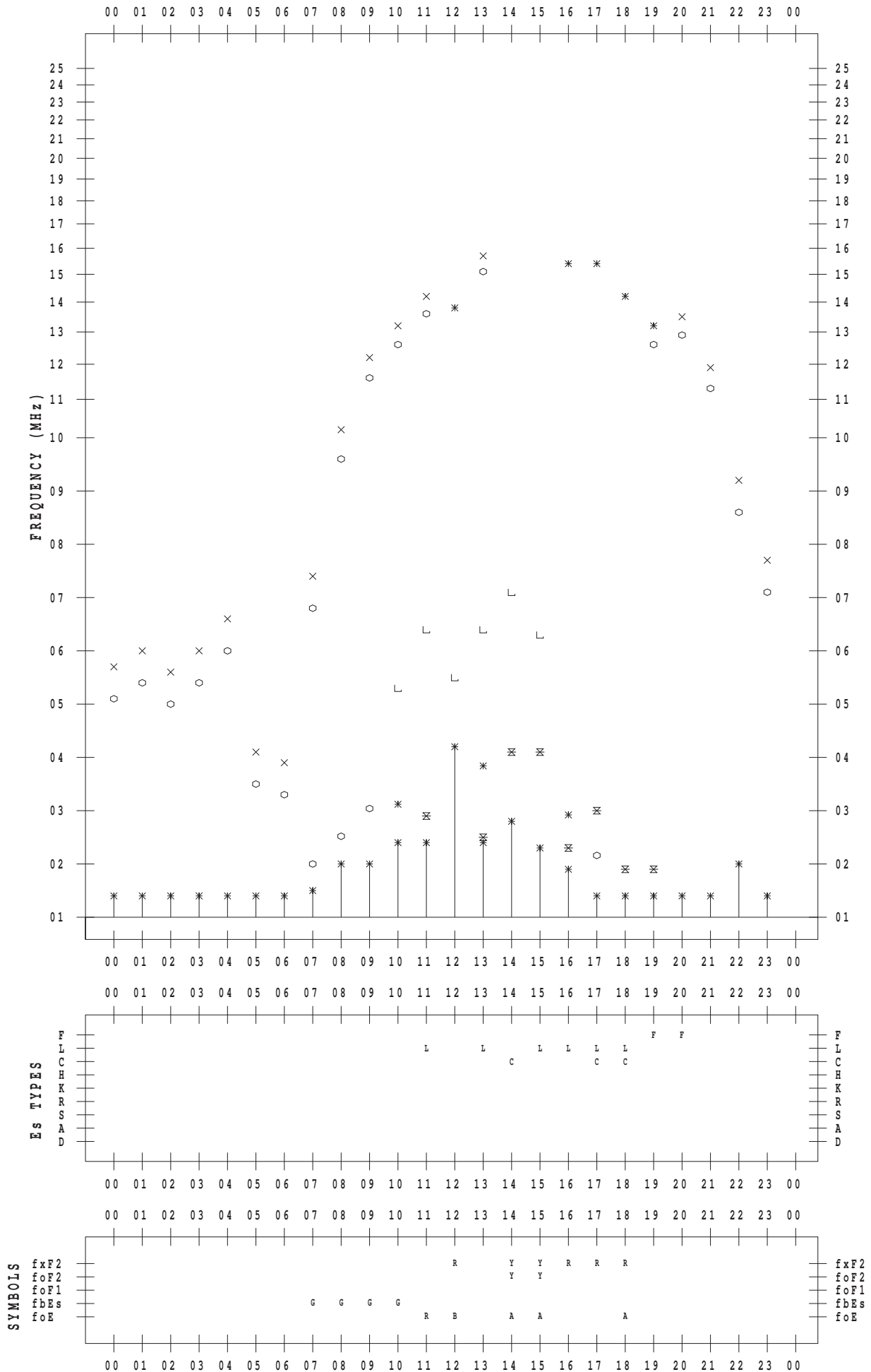
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/17

135 ° E MEAN TIME



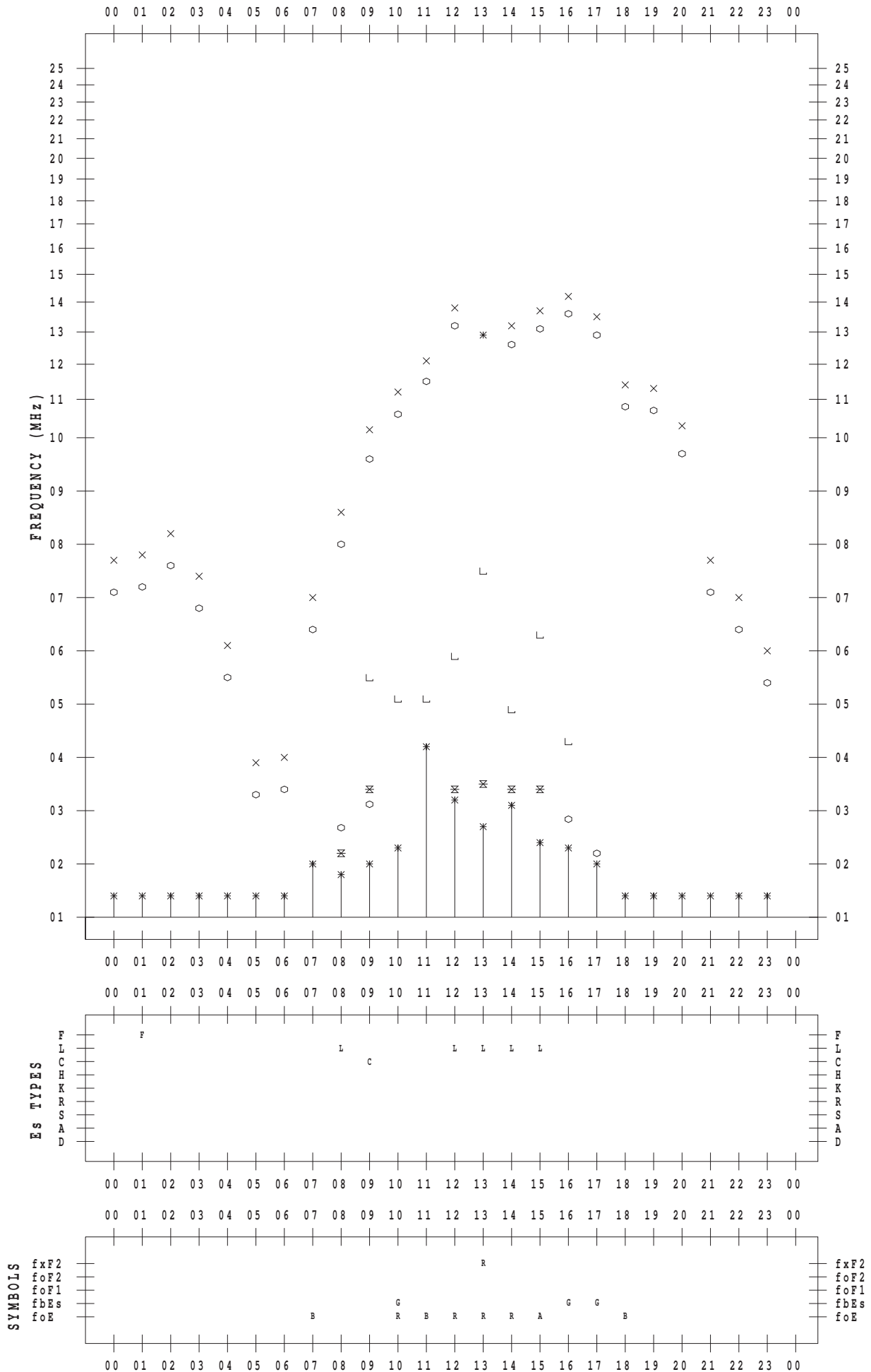
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/18

135 ° E MEAN TIME





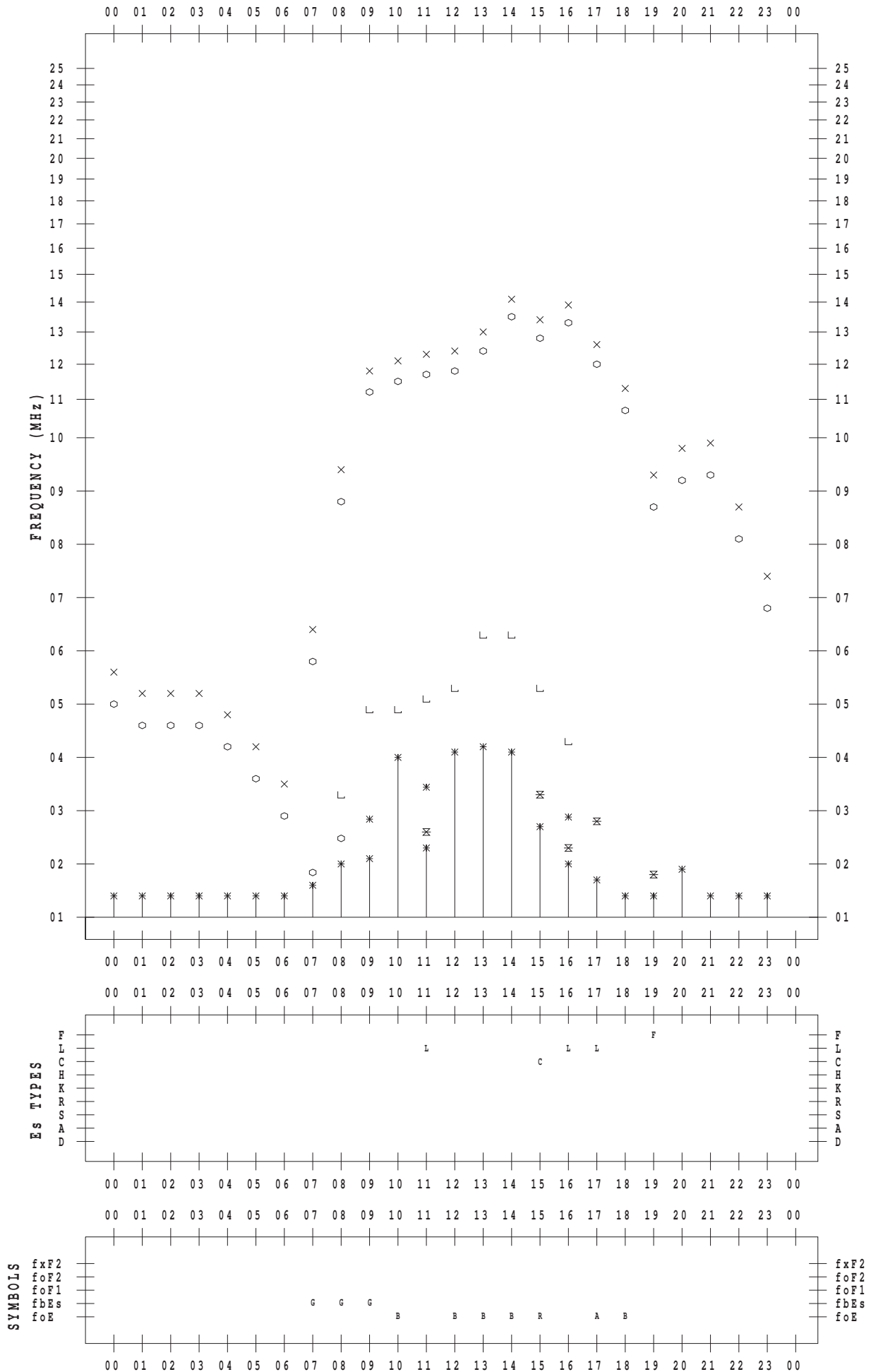
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/19

135 ° E MEAN TIME



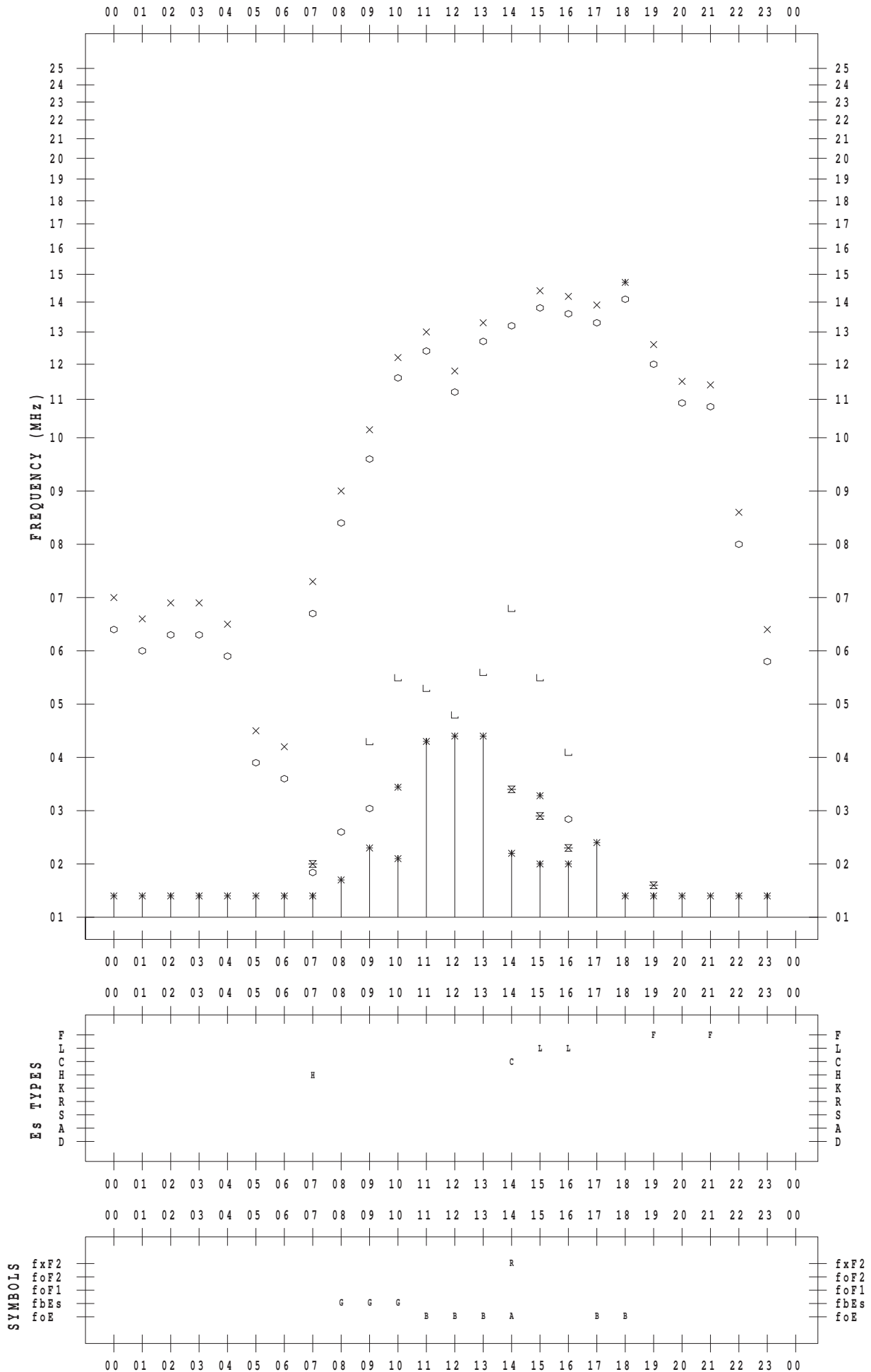
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/20

135 ° E MEAN TIME



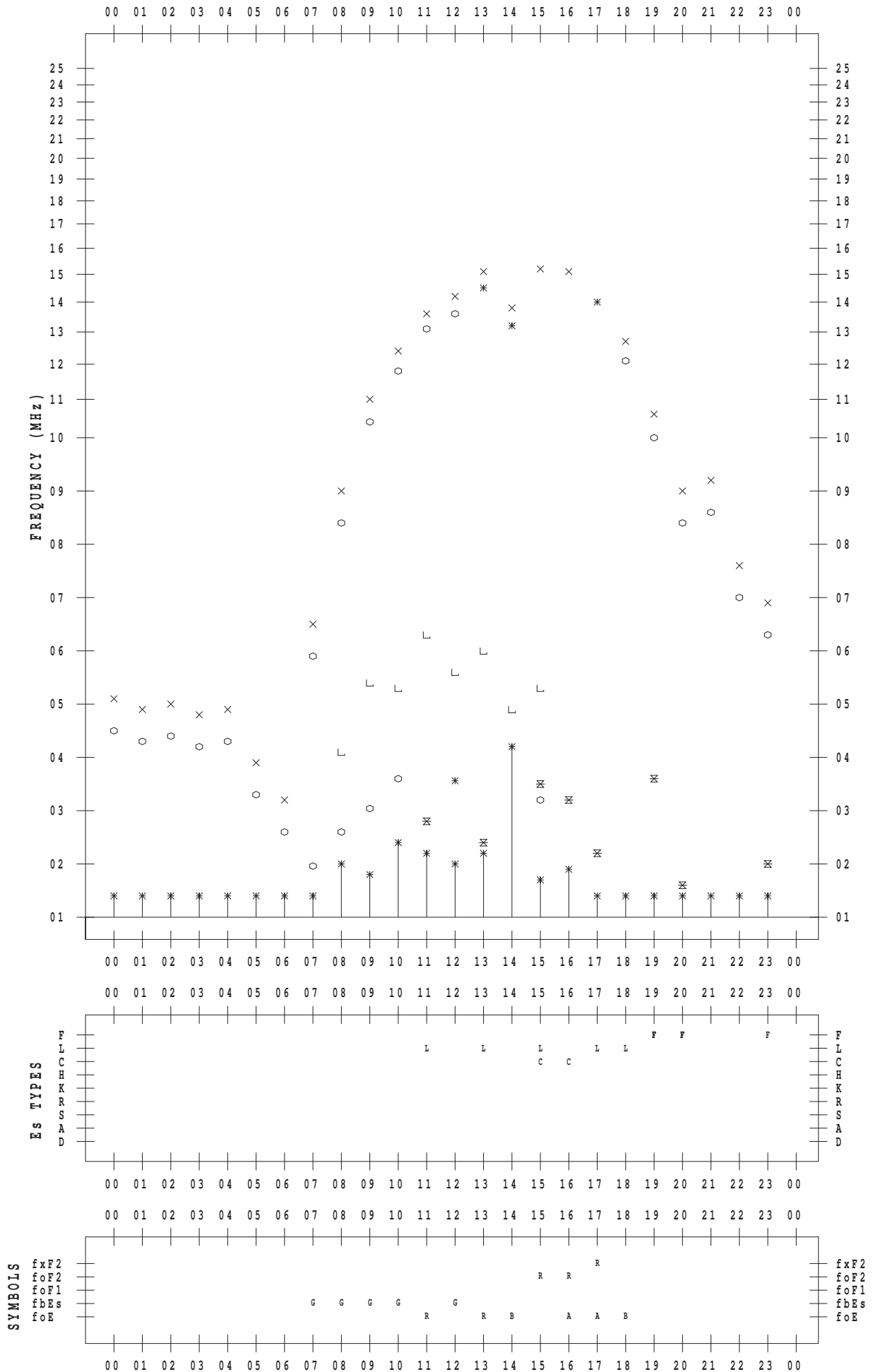
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/21

135 ° E MEAN TIME



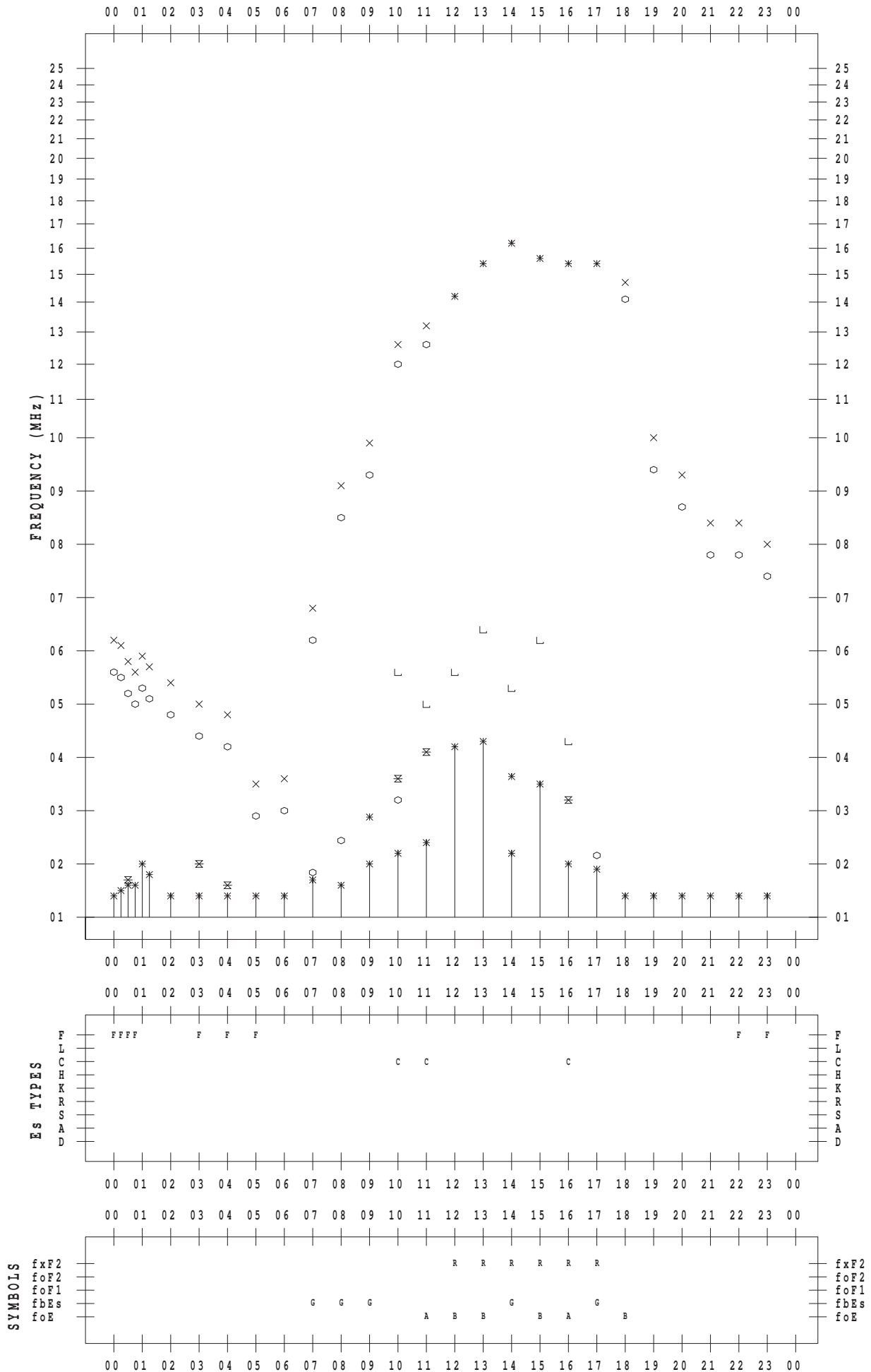
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/22

135 ° E MEAN TIME



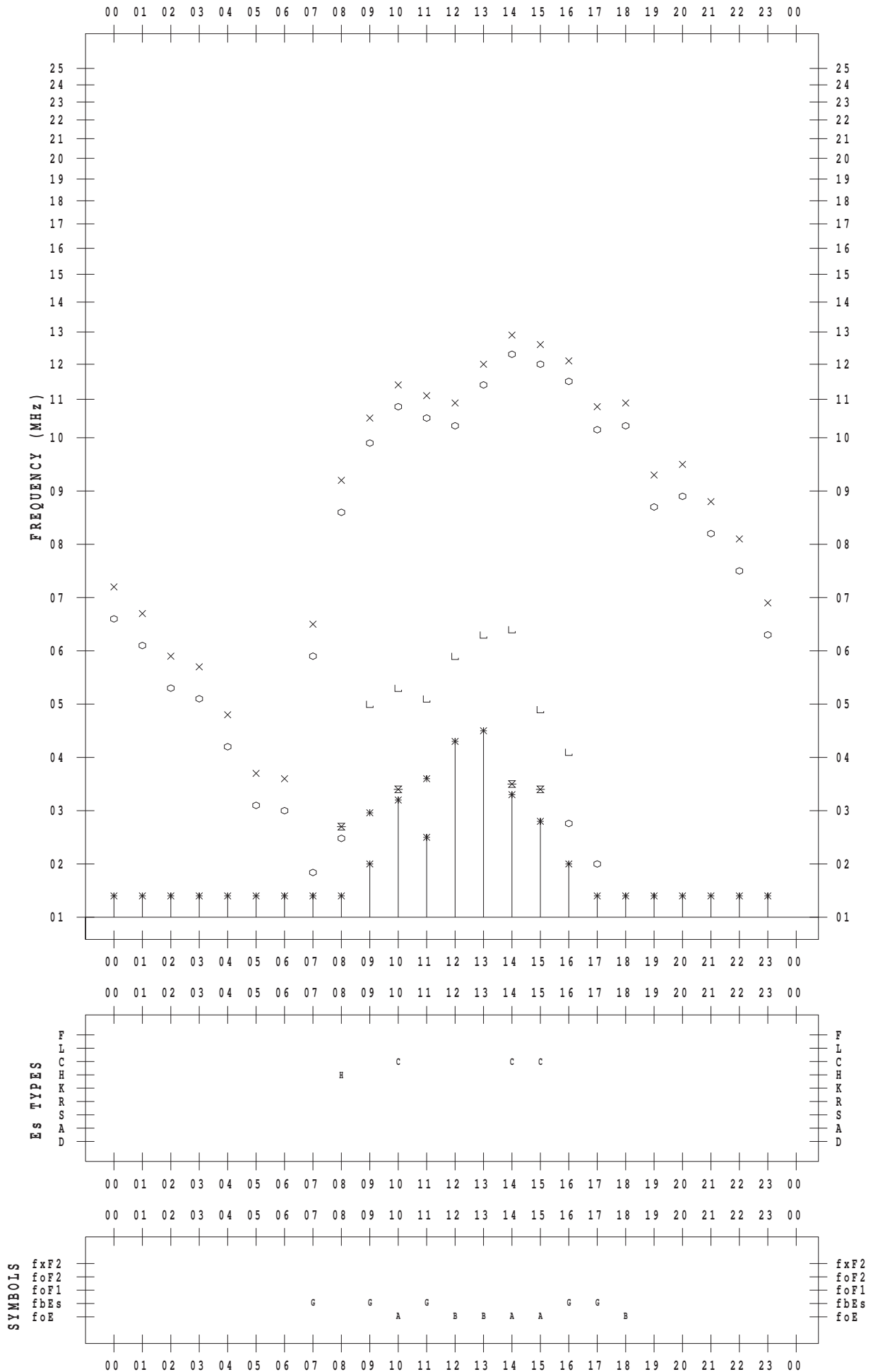
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/23

135 ° E MEAN TIME



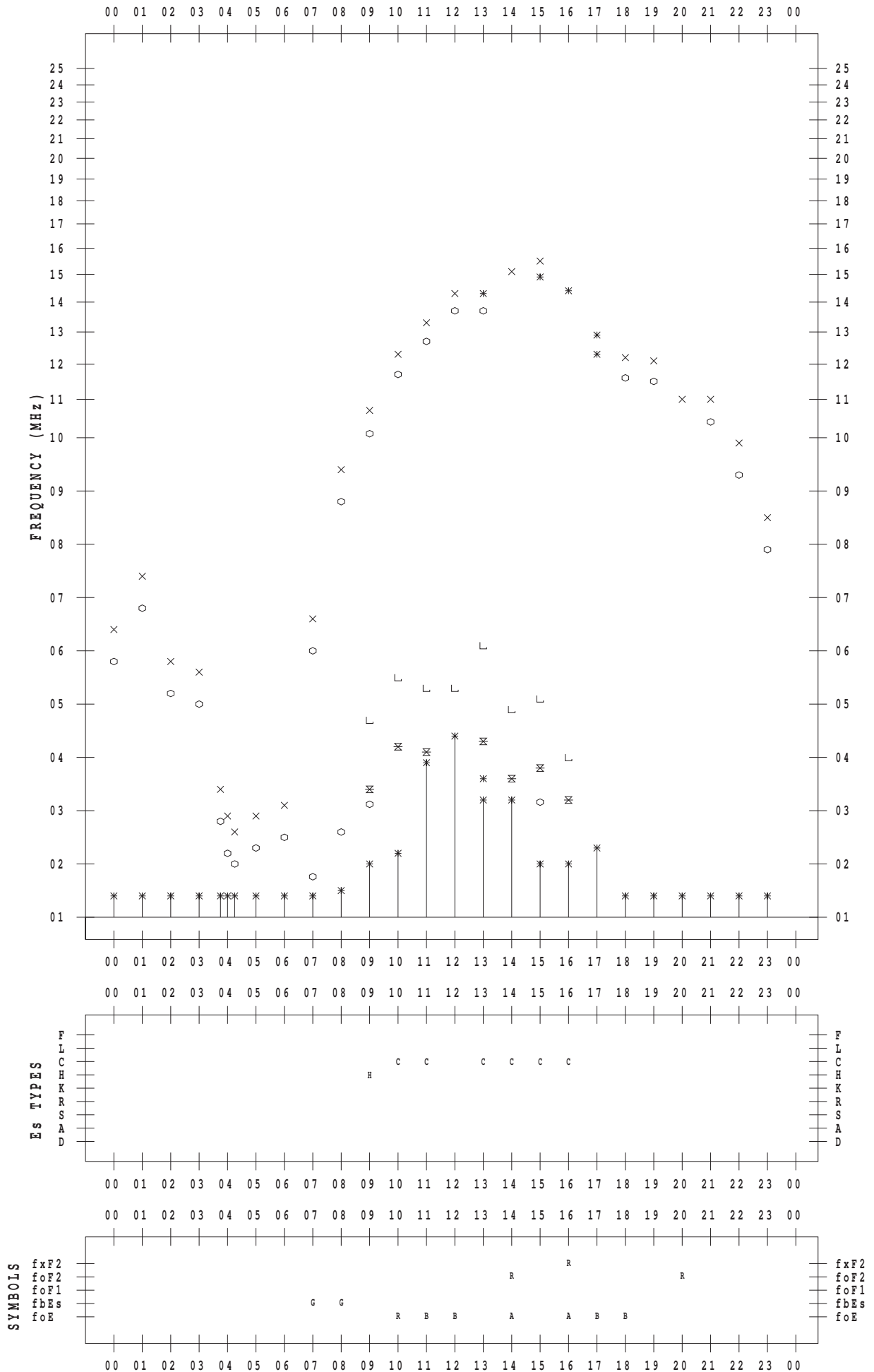
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/24

135 ° E MEAN TIME



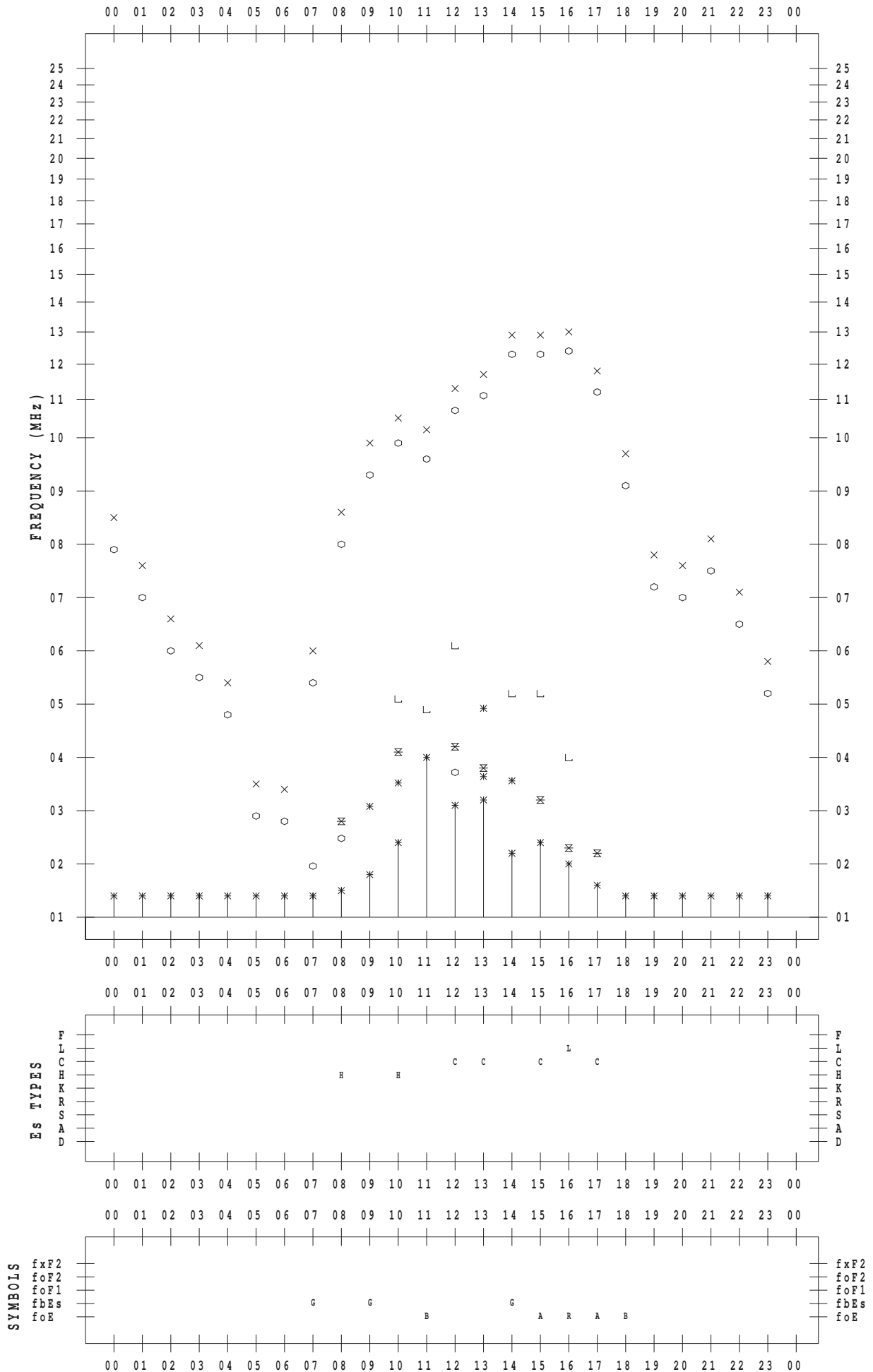
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/25

135 ° E MEAN TIME



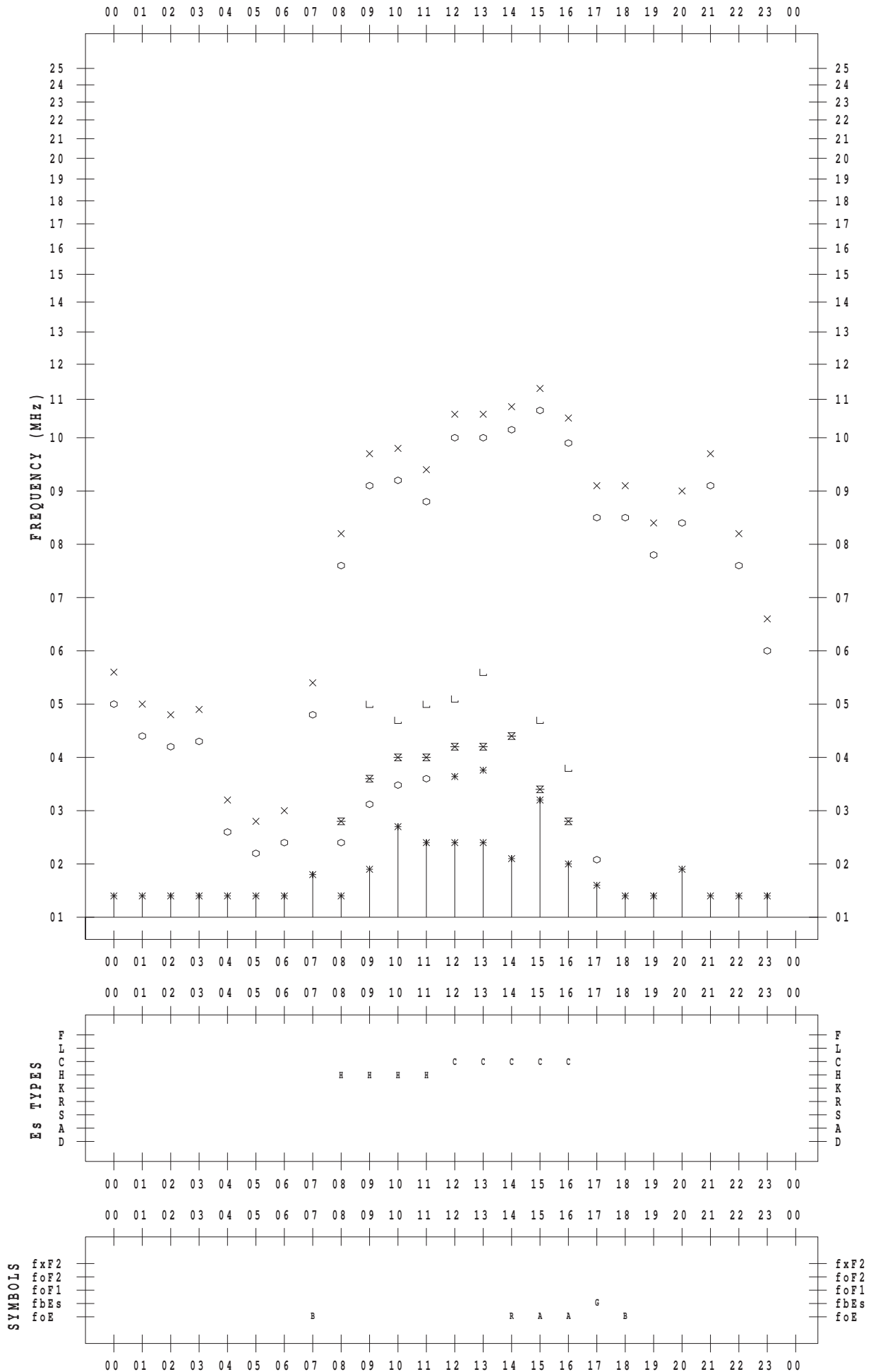
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/26

135 ° E MEAN TIME





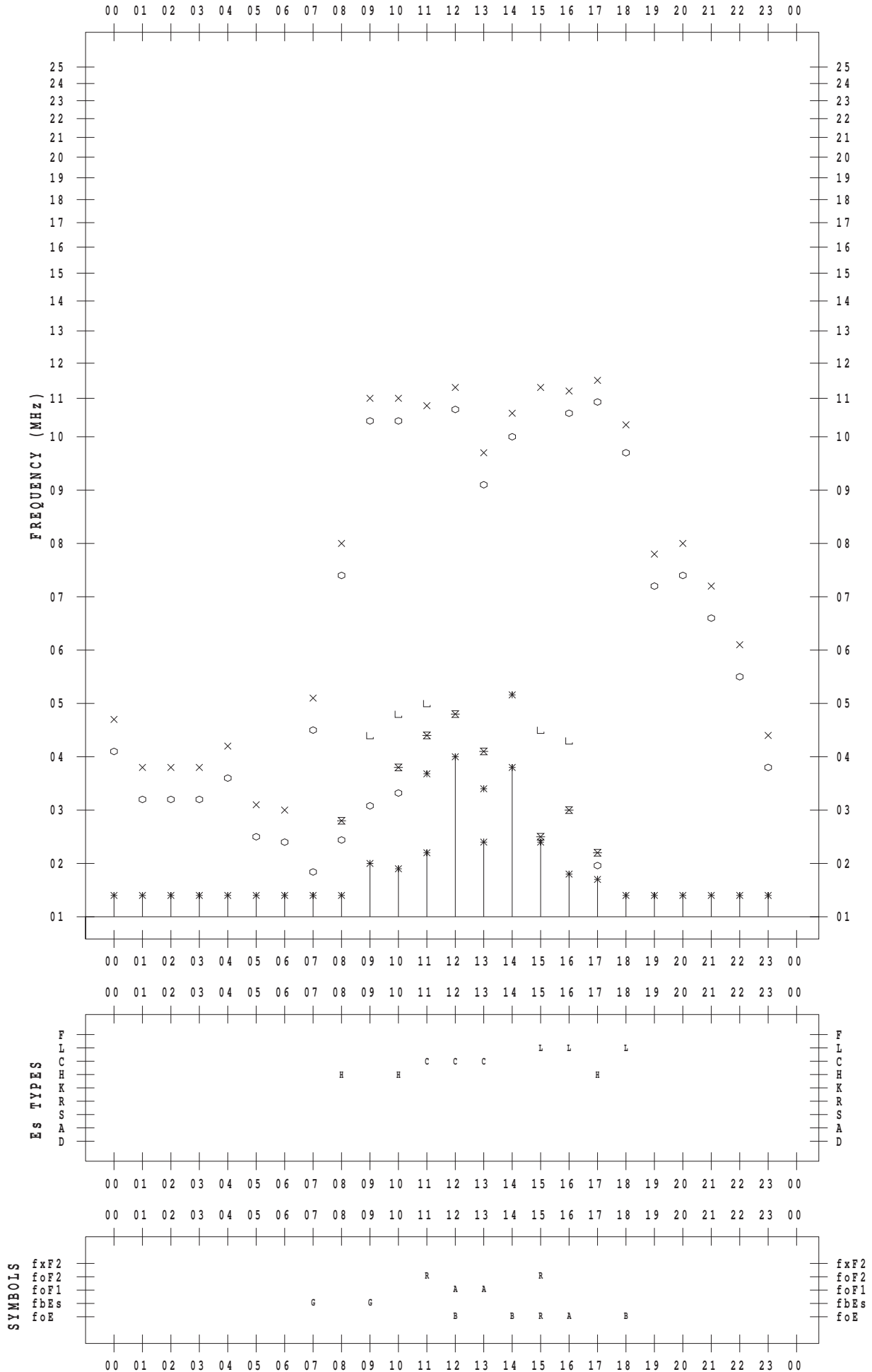
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/27

135 ° E MEAN TIME



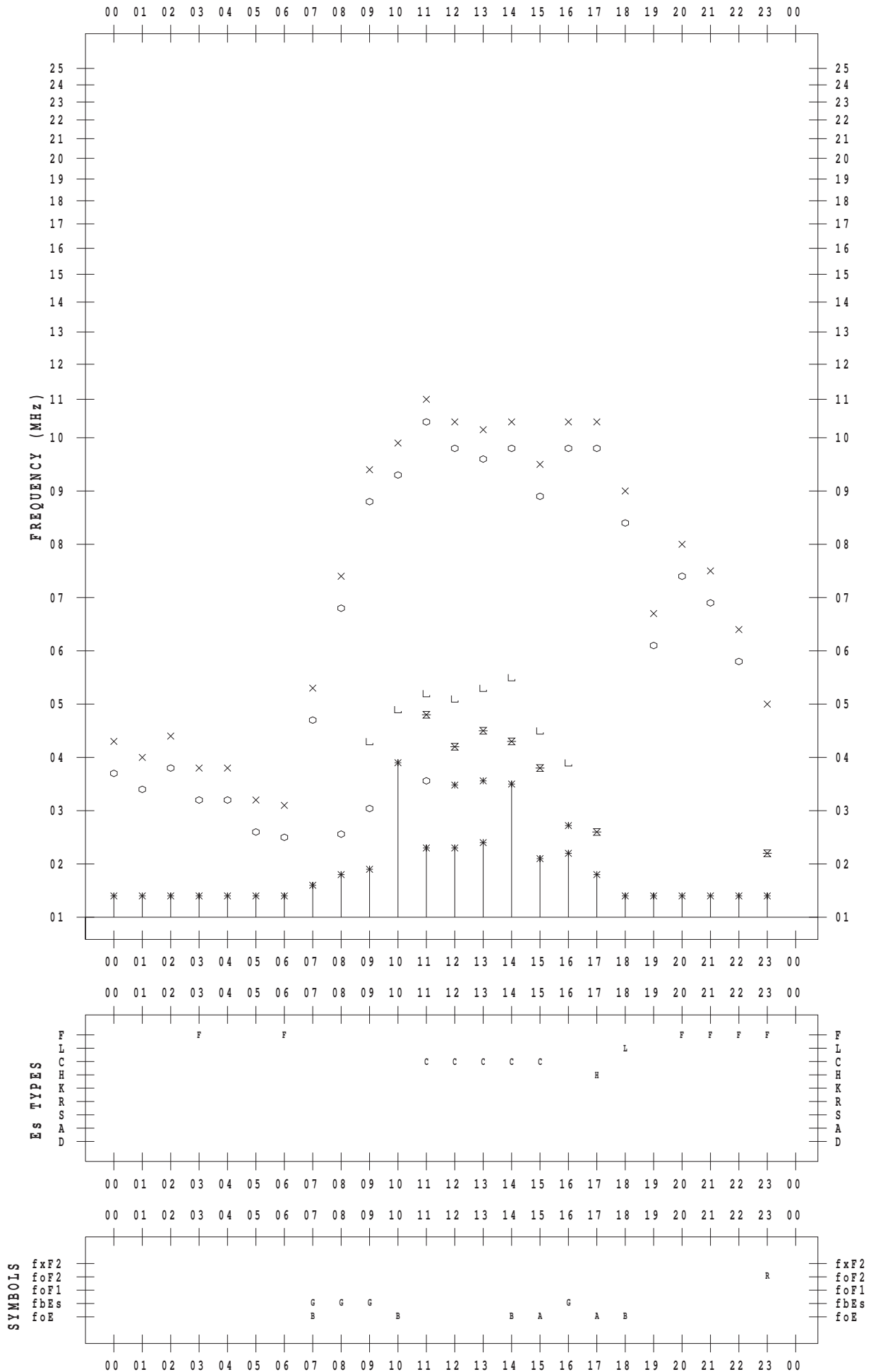
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/28

135 ° E MEAN TIME



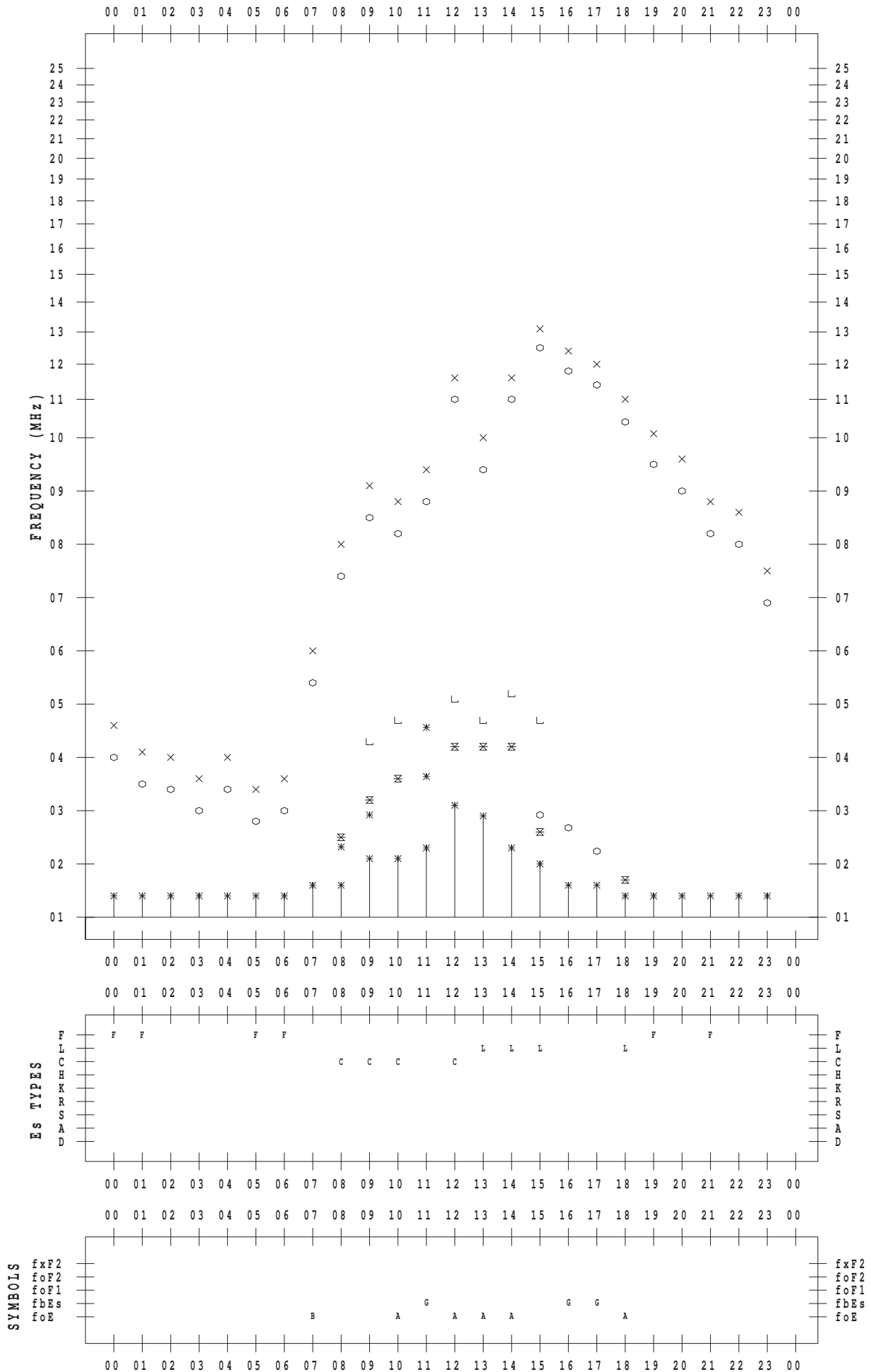
# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/29

135 ° E MEAN TIME



# f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/11/30

135 ° E MEAN TIME

