

# 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 (  $foF2$ ,  $fEs$ ,  $fmin$  ) and monthly medians of two factors (  $h'Es$ ,  $h'F$  ), daily Summary Plots and monthly medians plot of  $foF2$ .

#### a. Characteristics of Ionosphere

<b><math>foF2</math></b>	Ordinary wave critical frequency for the <b>F2</b> layer
<b><math>fEs</math></b>	Highest frequency of the <b>Es</b> layer whether it may be ordinary or extraordinary
<b><math>fmin</math></b>	Lowest frequency which shows vertical ionospheric reflections
<b><math>h'Es</math> <math>h'F</math></b>	Minimum virtual height on the ordinary wave for the <b>Es</b> and <b>F</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  $foF2$  ).
- C Impossible measurement because of any failure in observation.
- G Impossible automatic scaling because of very small ionization density of the layer ( for  $fEs$  ).
- N Impossible automatic scaling because of complex echoes.
- Blank No digital record because of problems occurring in the automatic data processing system, but existence of film record.

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

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

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

of values.

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

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

#### d. Reliability of Automatic Scaling

The results of the comparison between automatically-scaled values and manually-scaled ones showed that hourly values of  $foF2$ ,  $fEs$  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  $fxE$  and  $foE$  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>F</b> trace
<b><math>foF2</math> <math>foF1</math> <math>foE</math> <math>foEs</math></b>	Ordinary wave critical frequency for the <b>F2</b> , <b>F1</b> , <b>E</b> , and <b>Es</b> (including particle type <b>E</b> ) layers, respectively
<b><math>fbEs</math></b>	Blanketing frequency of the <b>Es</b> layer, e.g. the lowest ordinary wave frequency visible through <b>Es</b>
<b><math>fmin</math></b>	Lowest frequency that shows vertical ionospheric reflections
<b><math>M(3000)F2</math> <math>M(3000)F1</math></b>	Maximum usable frequency factor for a path of 3000 km for transmission by the <b>F2</b> and <b>F1</b> layers, respectively
<b><math>h'F2</math> <math>h'F</math> <math>h'E</math> <math>h'Es</math></b>	Minimum virtual height on the ordinary wave for the <b>F2</b> , whole <b>F</b> , <b>E</b> and <b>Es</b> layers, respectively
<b>Types of Es</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 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 ( CND )** 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. 2020

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	33	33	34	33	32	31	32	52	69	67	84	77	70	56	55	60	44	37	31	33	37	34	32	33
2	30	<sup>N</sup> 31	31	<sup>A</sup>	31	30	34	59	65	55	65	73	65	67	67	57	64	48	<sup>A</sup>	41	41	39	38	37
3	39	41	41	42	39	37	31	50	60	65	63	64	63	61	53	56	49	43	32	31	32	32	32	34
4	33	30	33	32	<sup>A</sup> 31	31	31	49	59	57	63	67	71	50	50	51	51	36	28	<sup>A</sup> 33	33	31	31	32
5	33	32	33	33	<sup>A</sup>	33	32	50	57	73	64	63	58	57	58	49	49	33	24	<sup>A</sup>	32	31	32	34
6	32	30	31	30	30	31	31	46	55	63	61	69	62	60	55	55	50	40	36	31	31	29	33	35
7	36	37	39	37	37	35	37	57	62	69	62	71	70	59	57	58	53	38	31	31	37	37	37	38
8	39	39	43	41	41	36	33	48	56	61	67	64	67	63	67	54	50	35	31	33	35	31	34	35
9	32	33	36	36	40	32	31	50	61	64	67	63	64	57	61	59	45	33	<sup>A</sup>	30	31	32	34	32
10	33	34	33	33	36	33	32	47	59	74	62	62	64	55	56	57	49	33	32	<sup>A</sup>	31	<sup>A</sup>	<sup>N</sup> 33	34
11	33	<sup>A</sup>	36	35	37	37	31	47	55	61	62	63	58	56	64	58	46	37	<sup>A</sup>	33	34	33	34	35
12	38	36	41	37	36	35	<sup>A</sup>	47	53	55	66	57	66	62	60	57	43	31	33	38		39	38	41
13	41	43	44	43	49	45	35	46	57	59	63	69	73	64	57	59	47	32	29	33	36	34	36	38
14	40	42	42	39	39	42	37	54	58	62	64	68	79	58	57	57	45	30	27	27	30	31	33	34
15	31	33	33	33	33	25	30	48	51	54	54	62	69	66	64	59	49	31	<sup>A</sup>	<sup>A</sup>	32	32	30	30
16	31	31	32	33	33	37	25	49	57	65	59	63	65	64	62	58	43	35	30	31	34	34	35	37
17	39	36	38	37	39	35	31	45	52	58	58	63	65	59	55	51	48	32	30	25	26	29	33	35
18	35	37	36	35	35	35	25	43	56	59	61	53	62	65	60	47	44	40	26	25	33	32	31	33
19	33	32	34	32	30	26	24	47	53	63	55	59	62	63	56	47	44	25	24	24	30	29	31	31
20	31	31	33	33	32	32	25	44	51	57	57	61	61	64	72	60	47	35	30	33	33	32	34	37
21	41	40	36	37	35	37	29	46	54	54	65	54	71	75	60	60	43	32	29	31	33	33	32	36
22	37	39	40	33	32	31	25	47	65	70	67	76	73	65	64	59	66	45	26	31	27	30	29	31
23	35	<sup>A</sup>	33	33	29	26	24	37	60	77	77	66	69	65	63	63	57	32	<sup>A</sup>	30	30	25	29	32
24	33	35	34	33	31	29	24	44	59	63	78	63	76	69	64	52	55	35	23	23	23	24	<sup>A</sup>	31
25	<sup>A</sup>	30	26	29	25	25	23	41	53	65	65	<sup>A</sup>	71	77	71	57	47	<sup>A</sup>	26	25	25	30	<sup>A</sup>	31
26	33	35	33	35	31	31	25	47	64	<sup>A</sup>	60	68	77	63	60	60	50	34	29	31	33	35	37	37
27	37	37	36	34	34	27	25	50	59	65	59	71	61	67	63	62	41	38	31	31	27	30	32	31
28	34	33	31	31	29	31	25	43	67	62	65	70	69	72	66	71	<sup>N</sup> 40	35	<sup>A</sup>	<sup>A</sup>	33	29	29	31
29	33	33	32	<sup>A</sup>	<sup>A</sup>	<sup>A</sup>	24	48	62	54	63	72	66	65	65	62	39	32	27	29	25	25	27	28
30	33	31	33	30	30	27	25	47	59	65	67	73	78	65	52	67	45	41	26	26	29	30	32	33
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	28	30	28	28	29	29	30	30	29	30	29	30	30	30	30	30	29	24	26	29	29	28	30
MED	33	34	34	33	33	32	30	47	58	63	63	64	66	64	60	58	47	35	29	31	32	31	32	34
U Q	37	37	38	37	37	35	32	50	61	65	66	70	71	65	64	60	50	38	31	33	33	33	34	36
L Q	33	31	33	33	31	29	25	46	55	57	61	62	63	59	56	55	44	32	26	27	29	29	31	31

HOURLY VALUES OF fEs AT Wakkanai

NOV. 2020

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	G	28	G	G	G	G	G	G	84	48	45	55	40	36	55	32	28	G	33	G	G	26	G	G
2	G	G	G	31	G	126	84	33	37	41	46	40	36	34	29	38	33	40	35	G	G	G	G	G
3	G	G	28	31	G	G	G	34	38	40	44	36	35	34	G	32	G	34	G	G	G	G	G	G
4	G	G	G	G	G	G	G	48	156	41	46	41	48	36	34	G	G	11	G	G	G	G	25	25
5	27	28	G	27	43	30	20	126	32	35	40	115	53	35	33	32	G	34	G	40	G	G	G	G
6	G	G	G	G	G	G	G	48	32	35	36	40	125	35	26	33	26	G	G	24	G	G	G	G
7	31	G	34	G	24	25	G	33	34	38	38	40	40	39	33	28	21	G	G	G	G	G	G	G
8	G	G	G	70	G	G	11	48	32	115	44	50	38	84	91	35	33	28	G	G	G	G	G	G
9	G	G	G	G	28	21	28	46	52	40	42	37	37	49	33	30	37	33	32	G	G	G	G	G
10	G	G	G	G	31	25	G	48	34	42	64	46	65	50	29	33	G	G	G	28	G	41	32	G
11	G	38	30	31	71	11	G	27	35	41	41	39	54	41	33	50	33	30	53	177	30	25	G	G
12	G	G	29	26	G	40	30	28	32	34	51	52	35	34	33	29	33	G	G	G	G	G	G	G
13	G	G	28	28	G	G	G	48	32	36	41	38	48	41	34	35	G	G	G	32	G	G	G	G
14	26	26	28	G	G	G	G	29	52	175	40	40	40	36	32	37	36	34	G	G	G	G	G	G
15	26	G	G	G	G	G	G	48	34	36	40	40	46	35	33	G	26	G	34	27	G	G	G	G
16	G	G	G	G	G	G	G	48	52	34	40	38	39	52	54	36	G	G	G	G	G	G	G	G
17	G	G	G	G	G	36	G	48	45	40	39	45	36	37	33	29	11	27	G	G	G	G	G	G
18	G	G	G	G	G	G	G	44	50	34	37	37	50	38	32	28	30	26	26	G	G	G	G	G
19	G	G	G	G	G	G	G	39	50	55	40	41	38	37	32	G	11	G	G	G	G	G	G	G
20	G	G	G	G	G	G	G	108	50	50	40	38	36	35	33	G	11	25	G	G	G	G	G	G
21	G	G	G	G	G	G	G	46	50	35	126	38	40	48	33	G	11	G	G	G	G	G	G	G
22	G	G	27	G	G	G	G	26	32	58	39	38	38	53	55	28	31	11	G	G	G	80	G	G
23	26	41	G	G	158	G	G	26	34	37	41	48	36	34	33	28	32	34	27	G	G	G	G	G
24	G	G	G	G	G	G	G	180	33	55	44	47	44	37	34	49	11	G	G	G	G	G	53	26
25	45	G	G	G	G	G	G	30	38	42	54	95	54	37	54	48	34	33	G	G	G	39	G	G
26	G	92	26	31	G	G	G	28	39	80	40	40	57	46	36	G	11	26	G	G	24	G	G	G
27	G	G	G	G	G	G	G	28	44	38	44	39	34	32	48	G	38	G	G	G	G	G	G	G
28	G	G	G	G	G	G	G	G	34	52	41	66	55	40	33	G	20	33	39	38	G	11	G	G
29	G	G	G	45	33	33	67	G	48	32	37	32	36	38	54	G	35	G	G	G	G	G	G	G
30	G	28	G	25	G	G	G	26	49	34	40	45	46	35	32	28	11	11	G	G	G	27	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	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30	30	30	30	29	28	30	29	30
MED	G	G	G	G	G	G	G	36	38	40	41	40	40	37	33	29	24	11	G	G	G	G	G	G
U Q	G	G	26	28	G	21	G	48	50	50	44	47	50	41	36	35	33	33	26	12	G	G	G	G
L Q	G	G	G	G	G	G	G	28	34	35	40	38	36	35	32	G	11	G	G	G	G	G	G	G

HOURLY VALUES OF fmin AT Wakkanai

NOV. 2020

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	15	15	14	21	15	14	14	14	15	15	15	15	14	14	15	15	14	16	15	15	15	15	14
2	14	16	15	16	16	43	15	15	14	15	14	15	15	16	15	14	15	14	15	15	17	15	16	16
3	15	17	16	16	15	14	14	15	17	13	13	15	17	14	15	15	16	14	15	14	14	14	14	14
4	16	14	14	15	15	15	14	15	16	15	14	14	14	14	15	15	16	16	16	16	14	15	15	16
5	15	15	16	16	16	16	16	15	13	16	14	15	17	17	16	15	15	14	16	16	16	17	16	15
6	15	15	14	14	14	14	15	20	15	17	16	15	15	16	15	15	14	17	16	16	14	15	14	14
7	15	16	16	15	16	16	15	14	14	14	15	14	14	14	14	15	15	16	14	16	25	14	14	14
8	16	16	15	43	15	16	14	17	15	14	14	14	14	16	14	15	15	16	16	15	15	14	14	14
9	15	14	14	16	16	15	16	14	16	15	14	14	14	14	15	15	13	16	15	15	16	16	14	14
10	14	14	14	16	16	16	15	14	14	14	14	14	15	15	15	14	16	16	16	16	15	16	16	15
11	14	16	16	16	17	16	16	15	14	14	13	14	15	15	16	15	16	17	15	15	16	15	15	14
12	14	14	15	16	14	16	16	16	15	16	14	14	14	14	15	15	15	16	15	14		14	15	14
13	14	16	16	16	16	16	16	14	15	14	14	14	14	14	16	15	15	15	16	15	16	14	14	15
14	16	16	16	16	16	15	14	16	17	16	15	14	15	15	16	14	15	16	15	14	15	14	14	14
15	16	16	16	16	16	14	19	18	16	14	14	14	15	16	16	15	16	15	15	16	16	16	15	15
16	16	15	17	14	15	15	14	18	16	16	14	13	14	14	14	14	17	16	16	14	15	14	14	15
17	15	14	14	15	15	15	14	14	15	14	13	15	14	14	15	14	17	16	15	16	97	15	15	14
18	14	14	14	13	16	14	14	15	15	16	15	15	13	14	13	14	16	16	16	14	14	15	14	14
19	15	15	15	15	15	16	16	16	16	16	13	14	13	14	14	15	15	16	15	15	15	15	15	15
20	15	15	15	15	14	14	16	16	15	13	13	14	14	14	14	15	15	16	14	15	14	18	14	15
21	15	15	14	16	16	16	15	17	15	15	14	14	14	15	16	14	16	15	14	14	14	14	14	14
22	14	15	16	16	14	15	14	15	16	15	15	14	15	13	14	15	15	14	16	14	14	14	16	15
23	16	16	14	16	19	17	17	15	16	16	14	13	15	16	15	15	16	15	15	16	14	14	14	14
24	15	15	17	14	14	14	15	16	16	13	15	15	15	15	16	15	16	16	16	16	15	16	15	16
25	15	16	14	15	14	14		15	14	14	15	16	15	14	14	16	15	15	15	17	15	15	16	16
26	15	16	16	16	15	15	14	15	14	13	14	15	15	15	16	14	14	16	15	14	14	15	20	14
27	14	15	16	16	14	15	17	15	16	16	14	14	15	16	15	15	17	15	20	14	14	15	14	14
28	14	14	15	14	15	15	14	15	15	17	15	15	15	15	16	16	15	16	15	16	16	16	16	16
29	14	15	16	15	17	15	17	16	15	16	16	16	15	16	15	14	15	17	14	14	15	15	13	14
30	14	15	15	15	15	16	14	16	15	16	17	14	15	17	16	15	16	16	16	14	16	16	14	16
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30
MED	15	15	15	16	15	15	15	15	15	15	14	14	15	15	15	15	15	16	15	15	15	15	14	14
U Q	15	16	16	16	16	16	16	16	16	16	15	15	15	16	16	15	16	16	16	16	16	16	15	15
L Q	14	15	14	15	15	15	14	15	14	14	14	14	14	14	14	14	15	15	15	14	14	14	14	14

HOURLY VALUES OF fof2                      AT Kokubunji

NOV. 2020

LAT. 35°43.0'N LON. 139°29.0'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	31	29	32	31	31	30	37	56	67	95	78	76	64	60	57	53	51	55	N 51	39	41	32	25	N 29	
2	30	29	30	30	A	26	34	55	69	69	66	65	78	61	69	67	53	49	51	A	35	35	33	30	
3	33	N 31	32	34	32	31	35	51	65	64	73	64	54	62	62	64	58	44	36	A	A	35	33	31	
4	A	31	30	31	29	27	39	52	A	61	73	69	A	A	65	53	51	45	34	A	A	A	29	30	
5	A	30	30	29	33	27	32	51	55	64	75	78	63	51	60	55	55	43	A	A	A	34	31		
6	30	N 31	30	30	30	26	33	53	56	55	61	59	55	60	59	54	68	50	33	33	31	28	30	33	
7	32	N 31	32	31	34	30	34	62	72	66	74	70	A	64	66	60	54	51	31	31	A	32	34	35	33
8	35	34	34	35	34	31	33	47	54	61	65	81	66	62	66	72	55	41	32	A	36	33	A	A	
9	A	A	32	34	33	32	33	55	61	80	81	72	58	57	61	64	59	39	25	30	31	33	32	33	
10	34	36	33	33	35	30	35	52	58	66	70	64	58	57	58	62	54	33	26	31	31	27	30	31	
11	31	32	32	33	30	25	31	52	59	60	72	63	56	61	60	65	56	N 45	A	30	29	32	30	30	
12	30	32	31	31	30	30	31	48	49	60	67	73	65	56	59	61	50	A	A	34	34	33	32	28	
13	30	31	32	31	33	25	33	48	57	61	69	70	67	64	65	62	62	43	31	A	A	30	31	32	32
14	34	33	33	33	34	31	33	63	59	56	75	82	67	66	62	61	55	37	A	A	33	34	31	31	
15	31	31	33	32	33		25	49	57	61	68	75	58	65	75	67	61	35	25	30	31	33	34	31	
16	31	31	30	30	34	32	27	50	53	59	63	71	63	63	64	61	55	38	30	A	31	29	32	31	
17	32	32	31	31	30	31	26	51	51	54	61	N 67	56	59	59	63	58	43	N 24	30	N 25	N 25	27	27	
18	29	30	31	31	33	25	23	47	57	61	63	56	55	54	72	70	50	34	30	A	29	25	30	31	24
19	30	30	31	31	31	26	31	47	54	57	71	75	59	61	71	68	50	33	27	A	27	28	29	30	
20	30	30	30	31	30	23	25	45	54	53	64	66	57	63	74	84	59	33	25	33	37	37	33	34	
21	37	37	37	35	33	33	30	49	57	55	57	67	64	64	81	65	53	35	28	30	29	25	31	31	
22	31	A	A	33	31	23	25	53	67	66	103	67	66	71	69	69	58	47	A	A	A	A	A	29	
23	31		33		A		29	47	63	69	83	71	63	73	79	56	56	41	A	A	A	A	25	26	
24	A	30	32	30	32	23	24	49	61	70	72	66	68	73	71	68	63	39	26	31	29	26	25	31	
25	29	27	N 30	A	A	N 24	46	52	61	70	70	63	69	71	72	55	35	27	30	A	25	24	29	31	
26	30	30	N 31	A	30	26	30	54	65	63	65	75	64	87	77	56	49	A	31	32	32	31	36	33	
27	33	33	33	36	32	27	29	56	57	56	75	76	78	64	65	57	49	40	35	33	31	26	N 30	32	
28	30	31	34	33	28	N 24	27	55	N 61	73	77	67	71	74	65	64	51	37	31	31	34	35	31	31	
29	32	33	33	26	30	29	25	55	79	74	65	78	63	79	77	65	51	37	35	39	37	23	30	27	
30	30	31	31	31	31	24	24	53	65	66	83	67	78	64	69	57	60	43	33	30	30	31	30	31	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	26	28	28	29	28	27	30	30	29	30	30	30	28	29	30	30	30	28	24	21	25	26	28	29	
MED	31	31	32	31	32	27	30	52	58	61	70	70	63	63	66	64	55	40	31	31	31	31	31	31	
U Q	32	32	33	33	33	31	33	55	65	66	75	75	66	67	71	67	58	44	33	33	34	33	32	31	
L Q	30	30	31	30	30	25	25	48	54	59	65	66	58	60	61	57	51	36	26	30	29	27	29	29	



HOURLY VALUES OF fEs                      AT Kokubunji

NOV. 2020

LAT. 35°43.0'N LON. 139°29.0'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	28	G	G	G	G	G	G	44	33	32	33	57	55	38	G	N	G	G	11	29	32	29		G
2		26	G	G	31	G	33	27	39	48	50	57	42	38	124	30	31	30	31	34	31	G	G	G
3	G	G	G	G	G	G	G	107	39	34	G	40		45	30	33	36	G	27	38	54	27	30	29
4	27	G	G	G	G	G	G	47	93	40	41	40	104	75	G	28	30	G	35	85	43	32	G	26
5	47	G	G	G	G	G	G	G	31	34	36	31	35	65	47	29	34	11	35	G	35	34	30	G
6	G	G	G	G	G	G	G	45	48	29	32	57	46	34	32	33	G	11	11	G	G	G	G	G
7	G	G	G	G	G	G	G	G	36	39	42	49	70	41	31	29	28	11	G	G	G	G	G	29
8	G	G	G	G	G	G	G	23	29	40	49	51	45	40	59	63	48	57	27	41	32	45	55	38
9	59	70	G	G	G	G	G	27	33	40	55	46	G	G	G	35	G	27	G	G	26	G	26	G
10	G	G	G	G	G	G	G	23	33	37	40	55	38	36	54	37	33	34	G	G	G	G	G	G
11	25	G	29	33	26	G	G	G	33	33	43	40	60	36	31	31	G	24	31	G	G	G	G	G
12	G	G	G	G	G	G	G	49	31	29	G	36	41	39	40	40	56	54	29	28		G	G	G
13	G	G	G	G	G	G	G	31	33	43	41	41	39	48	43	34	G	29	G	G	G	G	G	G
14	G	G	G	G	G	G	G	G	31	37	45	43	41	57	37	32	G	32	33	32	31		G	G
15	G	24	G			G	G	26	30	31	41	48	50	38	38	33	G	36	G	G	G	G	G	G
16	G	G	G	G	G	G	G	27	49	34	31	44	75	40	38	32	27	40		30		24	G	G
17	G	24	G	G	G	G	G	47	27	39	45	38	38	41	42	32	38	31	24	G	G	G	G	
18	G	23	G	G	G	G	G	47	29	31	40	35	35	53	46	31	29	31	G	G	G	G	G	
19	G	G	G	G	G	G	G	37	50	N	146	63	57	37	G	31	33	32		34	29		G	G
20	G	G	G	G	G	G	G	47	29	55	48	39	40	36	34	36	27	31		G	G	G	G	G
21	G	G	G	G	G	G	G	26	29	33	49	42	41	36	29	27	G	11	G	G			G	G
22	G	G	G	G	G	G	G	G	34	176	37	40	43	51	51	47	35	32	35	39	40	34	33	G
23	24	53	32	33	32	27	G	40	53	39	35	60	47	37	43	40	G	26	70	37	40	34	28	27
24	54	25	G	29	G	G		28	37	34	34	35	56	55	42	180	G	G		G	G		G	26
25	G	G	31	G	G	G	G	32	42	G	34	40	35	33	29	G	25	26		G	G		G	
26		G	G	34	G	G	G	26	55	36	40	31	65	43	40	37	49	34	57	G	G		G	26
27	G	G	G	G	G	G	G	33	35	35	49	46	G	32	36	G	G	G	G	G			G	G
28	G	G	G	G	G	G	G	G	30	34	41	G	37	G	28	G	G	G	G	G	G	G	G	G
29	27	G	G	G	G	G	G	G	G	37	59	42	40	32	G	30	47	G	G	G			G	G
30	G	G	G	G	G	G	G	29	27	31	34	31	40	39	41	33	G	11	G	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	28	30	30	30	30	26	29	30	30	29	30	30	29	30	30	29	30	30	24	29	26	22	28	27
MED	G	G	G	G	G	G	G	28	33	35	41	42	41	38	38	32	27	26	18	G	G	G	G	G
U Q	24	G	G	G	G	G	G	44	39	39	48	49	55	45	43	36	34	32	32	33	32	29	G	26
L Q	G	G	G	G	G	G	G	23	30	32	34	38	38	36	29	29	G	11	G	G	G	G	G	G

HOURLY VALUES OF fmin                      AT Kokubunji

NOV. 2020

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

HOURLY VALUES OF fof2 AT Yamagawa

NOV. 2020

LAT. 31°12.0'N LON. 130°37.0'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	33	33	31	35	39	32	29	58	68	84	82	100	70	67	68	65	60	57	58	47	36	38	32	31
2	32	32	32	33	37	32	33	58	61	70	74	76	65	77	80	70	70	56	51	43	40	33	32	A
3	33	33	34	34	33	33	N 31	50	58	58	72	70	65	54	71	84	75	58	53	40	40	46	37	33
4	32	A	33	A	35	B 27	N 31	47	57	69	69	79	63	62	66	75	80	62	56	38	A	37	39	A
5	32	A	A	A	35	B 32	33	51	57	57	67	78	63	61	63	59	60	55	56	35	35	39	40	34
6	33	35	33	33	35	33	33	51	59	59	57	73	65	61	65	83	63	58	55	37	A	35	32	32
7	A	35	34	33	33	34	N 27	54	61	60	65	75	67	61	70	73	61	54	47	A	A	A	A	38
8	35	36	36	37	41	34	B 25	47	53	55	63	81	79	75	67	73	78	59	A	A	A	A	B 35	A
9	34	B 36	A	A	B 38	B 34	32	53	61	55	81	107	67	59	66	74	74	58	39	A	A	34	B 33	33
10	B 35	33	35	35	35	33	33	46	63	60	68	72	60	66	62	71	68	56	40	35	27	33	35	A
11	A	33	33	31	32	31	31	47	60	58	63	79	64	69	63	63	65	59	47	32	32	35	38	35
12	38	36	37	A	40	32	30	48	54	64	74	70	72	63	69	65	56	57	45	33	33	37	35	33
13	B 33	33	35	A	A	34	32	51	57	64	75	73	77	67	79	94	89	71	40	32	A	31	31	31
14	32	32	29	31	32	35	N 25	45	51	57	69	77	81	71	69	75	A	51	36	A	33	35	32	33
15	33	31	32	31	31	26	N 23	43	51	59	70	77	79	61	89	87	65	54	A	A	29	33	33	31
16	31	31	33	33	33	45	23	39	50	55	66	61	65	66	63	71	67	52	A	A	31	30	A	A
17	32	30	33	31	32	33	24	42	47	53	58	63	62	59	66	77	71	57	43	A	31	A	A	26
18	29	30	31	33	36	31	N	37	50	49	67	55	59	55	A	59	A	51	A	A	35	34	31	28
19	30	31	31	31	31	31	31	44	51	53	64	74	57	62	66	81	73	49	39	A	33	31	B	33
20	33	32	31	31	33	31	32	46	49	51	54	67	57	63	63	86	59	47	39	31	36	40	33	30
21	33	31	33	33	34	31	N 25	43	57	55	55	69	65	58	67	67	67	49	35	25	29	30	25	30
22	30	31	32	31	28	B 23		41	64	66	80	66	61	64	72	73	63	60	38	A	36	A	A	A
23	26	38	30	A	35	24	A	51	72	65	71	69	78	66	82	73	60	56	48	33	32	25	A	26
24	31	30	30	33	A	A	A	39	56	63	71	69	71	73	67	75	73	62	36	32	36	34	31	32
25	30	31	30	26	31	30	A	42	55	69	63	79	67	77	74	66	67	63	33	37	36	A	30	31
26	30	32	32	35	36	N 24	31	43	53	59	70	73	65	73	77	74	A	50	38	34	36	29	32	32
27	34	31	31	33	34	30	25	44	56	60	68	77	75	66	73	67	64	53	41	33	38	39	33	34
28	30	34	36	34	N 23	N 24	B 24	41	61	71	75	72	75	65	74	76	67	49	41	B 33	31	35	35	34
29	32	B 34	34	32	31	32	32	40	65	77	79	81	77	72	75	79	68	54	45	37	47	31	33	32
30	B 31	32	34	38	32	B 23	B 23	41	60	66	69	79	65	69	68	65	63	59	51	33	B 31	33	33	33
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	28	24	28	29	25	30	30	30	30	30	30	30	29	30	27	30	26	21	24	25	24	24
MED	32	32	33	33	34	32	31	46	57	60	69	74	65	66	68	73	67	56	42	33	34	34	33	32
U Q	33	34	34	34	35	33	32	51	61	66	74	79	75	69	74	77	73	59	51	37	36	37	35	33
L Q	30	31	31	31	32	28	25	42	53	55	64	69	63	61	66	67	63	52	39	32	31	31	32	31

HOURLY VALUES OF fEs AT Yamagawa

NOV. 2020

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	38	32	34	36	34	50	44	44	39	28	27	G	24	G	G	G	G
2	G	G	G	G	26	26	G	29	42	46	50	50	50	60	54	48	40	28	11	G	G	G	G	29
3	25	G	25	G	G	G	G	G	35	48	45	39	41	45	57	49	39	G	G	G	G	28	G	G
4	G	39	27	25	G	B	G	G	39	40	41	43	41	40	38	46	41	30	34	34	30	G	G	30
5	G	59	34	31	G	B	G	G	26	46	48	50	50	45	42	36	33	G	48	G	G	G	G	G
6	G	32	G	G	G	G	G	G	49	124	48	32	89	46	36	46	43	54	37	37	39	29	G	30
7	28	26	G	G	G	11	G	30	32	41	40	38	35	75	44	60	53	28	11	34	49	40	32	G
8	G	G	G	G	G	G	B	48	34	42	46	42	57	56	46	54	50	55	50	43	34	46	B	39
9	G	B	50	32	B	B	G	38	34	46	50	47	47	41	33	43	27	26	26	32	29	25	B	G
10	B	G	G	G	31	26	27	45	31	33	37	46	48	39	32	28	32	G	24	G	G	G	29	39
11	40	G	G	31	G	26	G	G	31	44	37	44	49	48	46	39	31	34	G	G	G	G	30	G
12	G	G	G	27	G	G	G	34	32	34	36	35	77	60	44	38	45	34	25	28	26	G	G	G
13	B	G	G	30	27	G	G	23	33	36	43	36	45	40	41	36	34	28	40	33	35	27	G	25
14	G	G	G	G	G	G	G	34	154	34	41	47	36	41	47	57	83	G	31	30	32	28	G	24
15	G	G	G	G	G	11	G	32	40	34	45	47	50	55	49	92	54	G	37	24	G	G	G	26
16	G	G	G	G	G	48	G	24	44	33	36	40	125	53	64	50	45	30	29	34	31	G	32	40
17	G	G	32	G	G	G	G	36	35	40	51	40	45	50	46	49	50	33	40	41	46	50	57	G
18	G	G	G	G	G	32	G	33	36	45	49	46	46	54	57	36	69	109	106	60	G	G	G	G
19	G	G	G	G	G	G	G	46	50	39	48	84	69	48	54	50	44	32	20	28	G	G	B	31
20	G	31	G	G	G	G	11	48	48	49	54	49	45	45	60	48	31	35	33	G	G	G	G	G
21	G	G	G	G	24	G	G	38	30	35	37	42	44	49	40	37	39	45	30	G	G	G	G	G
22	G	G	G	G	G	B	G	24	31	34	41	36	40	43	41	58	44	31	39	31	27	25	32	31
23	G	G	G	28	G	G	26	28	38	41	44	64	48	44	69	60	52	41	32	G	24	24	27	27
24	25	25	32	27	36	38	26	26	34	40	41	47	47	42	38	37	32	28	24	27	26	28	27	G
25	G	G	G	G	G	G	33	30	29	34	42	48	45	42	43	28	32	40	33	G	G	25	G	G
26	G	G	G	G	G	G	G	G	29	47	47	40	57	34	42	45	106	29	G	G	G	G	G	G
27	G	G	G	G	G	G	G	112	28	34	36	49	39	38	38	G	26	32	28	G	G	G	G	G
28	G	29	G	G	G	G	B	G	47	39	45	45	45	38	46	50	36	28	G	B	G	G	G	G
29	G	B	G	G	G	G	G	G	48	36	60	52	58	46	40	44	G	G	G	G	G	G	G	G
30	B	G	G	G	G	B	B	G	32	33	37	38	44	48	G	36	33	G	G	G	B	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	27	28	30	30	29	25	27	30	30	30	30	30	30	30	30	30	30	30	30	29	29	30	27	30
MED	G	G	G	G	G	G	G	30	34	40	44	44	47	45	44	46	40	30	28	24	G	G	G	G
U Q	G	13	G	25	G	18	G	38	42	45	48	48	50	50	49	50	50	34	37	33	30	27	27	29
L Q	G	G	G	G	G	G	G	G	31	34	37	39	44	41	40	37	32	26	11	G	G	G	G	G

HOURLY VALUES OF fmin AT Yamagawa

NOV. 2020

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	13	15	16	15	14	15	17	15	16	15	15	17	17	16	16	17	14	15	16	15	15	16	15	17
2	14	15	16	15	16	16	15	15	13	13	14	14	15	17	15	15	15	16	17	16	16	16	15	16
3	16	15	16	15	15	15	15	15	16	15	15	17	19	19	18	15	14	21	16	15	16	16	18	17
4	15	15	16	16	15	<sup>B</sup> 16	15	20	16	16	15	17	17	18	16	16	18	15	16	16	16	15	22	16
5	66	16	15	16	15	<sup>B</sup>	15	15	16	15	19	17	18	15	17	16	16	18	15	15	16	18	15	15
6	15	17	15	15	14	15	15	15	15	16	17	17	18	19	17	18	17	17	16	16	15	16	15	16
7	16	16	16	15	15	15	<sup>B</sup>	14	15	16	15	15	17	17	18	17	16	14	17	15	15	15	<sup>B</sup> 16	15
8	15	<sup>B</sup> 16	14	16	15	15		14	17	15	17	15	16	17	16	17	15	16	15	15	15	17	<sup>B</sup> 15	15
9	15	<sup>B</sup>	15	17	<sup>B</sup>	<sup>B</sup>	15	15	16	14	16	15	16	15	16	17	15	15	16	16	15	16	<sup>B</sup> 15	20
10	<sup>B</sup>	16	15	15	16	16	15	16	15	16	16	15	17	17	17	14	15	16	16	15	16	15	15	15
11	15	16	17	16	15	16	15	15	16	16	14	16	19	15	15	16	14	15	17	15	21	14	15	15
12	15	15	15	15	17	14	14	18	17	15	15	15	19	15	16	17	16	15	16	15	16	16	15	15
13	<sup>B</sup> 15	15	15	16	16	15	15	15	15	16	16	20	18	16	16	15	17	15	17	16	16	16	15	16
14	16	15	15	15	15	15	14	17	16	17	15	15	15	15	15	16	16	15	16	16	16	16	15	15
15	15	17	14	15	14	16	15	17	15	17	15	14	15	15	14	14	15	15	15	16	16	16	15	15
16	15	14	14	14	14	14	17	15	16	16	15	14	14	14	14	14	15	16	16	16	15	15	16	16
17	15	15	15	16	15	15	14	16	17	15	14	15	15	16	15	14	15	16	15	15	14	15	15	14
18	15	15	16	15	16	16	17	14	16	17	14	16	14	14	15	14	15	8	16	15	15	15	15	15
19	14	14	14	14	14	16	16	16	15	15	15	14	14	15	15	14	15	15	16	16	22	15	<sup>B</sup>	15
20	16	16	15	15	15	15	16	15	16	14	14	14	15	15	16	15	16	15	16	15	15	15	15	15
21	14	14	14	14	16	16	16	16	16	17	15	15	16	16	15	15	15	15	17	16	15	15	15	14
22	15	15	14	14	14	<sup>B</sup>	15	15	15	14	15	14	15	16	14	15	15	16	15	15	15	15	15	16
23	15	15	15	16	14	16	16	16	15	15	15	14	15	17	17	16	15	15	16	16	15	15	16	16
24	15	16	16	15	15	15	16	15	16	14	15	15	15	17	17	14	16	16	15	15	15	15	16	14
25	14	14	16	15	16	15	16	16	17	16	15	15	17	18	17	17	15	15	17	15	15	16	15	15
26	14	14	18	16	16	14	14	16	15	16	15	15	15	16	15	13	14	16	16	15	15	15	14	15
27	17	14	14	14	15	15	<sup>B</sup> 14	17	16	16	17	16	16	17	17	16	13	15	15	15	16	14	17	14
28	71	16	14	15	22	14		16	15	17	15	19	21	18	20	14	14	15	15	<sup>B</sup> 15	16	14	15	15
29	23	<sup>B</sup>	15	14	14	14	14	14	15	16	19	19	18	18	17	18	15	16	21	14	14	17	15	66
30	<sup>B</sup>	17	14	14	14	<sup>B</sup>	<sup>B</sup>	15	15	16	15	16	15	19	30	23	17	18	15	14	<sup>B</sup>	15	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	28	28	30	30	29	26	27	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	29	30
MED	15	15	15	15	15	15	15	15	16	16	15	15	16	16	16	15	15	15	16	15	15	15	15	15
U Q	16	16	16	16	16	16	16	16	16	16	16	17	18	17	17	17	16	16	16	16	16	16	15	16
L Q	15	15	14	15	14	15	15	15	15	15	15	15	15	15	15	14	15	15	15	15	15	15	15	15

HOURLY VALUES OF fof2 AT Okinawa

NOV. 2020

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	A	A	29	30	37	N 24	23	49	67	74	76	101	106	110	92	74	85	83	53	50	35	37	33	33
2	34	N 31	30	33	35	25	26	53	65	61	66	80	71	83	108	108	99	88	75	55	43	44	33	A
3	A	30	29	29	32	31	N 24	46	67	62	69	75	64	63	72	94	95	61	53	48	44	55	42	30
4	31	32	31	29	34	25	N 23	47	52	64	79	84	102	119	110	119	125	112	74	56	41	A	53	45
5	39	A	A	A	37	A	35	50	61	59	63	79	64	81	104	99	78	78	91	62	38	41	48	36
6	A	39	35	37	39	37	25	47	53	58	58	61	78	57	85	93	91	65	59	45	A	34	31	32
7	A	29	A	31	26	31	23	42	55	60	A	77	69	76	87	88	71	66	53	A	A	A	A	A
8	32	B 32	A	31	36	30	N 23	43	49	55	59	87	79	87	85	88	81	68	60	41	38	A	A	A
9	31	30	33	33	32	33	N 24	44	53	60	75	109	76	71	63	71	88	67	47	47	35	38	33	29
10	31	30	30	31	31	27	26	47	56	65	66	66	63	57	74	72	65	61	51	39	33	34	32	31
11	31	29	25	31	25	24	27	48	56	55	60	77	81	61	76	73	68	68	56	45	34	33	36	35
12	34	32	31	32	39	35	30	44	56	57	74	68	70	74	73	70	81	68	50	35	A	37	37	37
13	34	32	32	31	33	29	25	48	57	64	74	78	74	84	112	140	152	118	79	45	36	33	29	31
14	29	A	A	A	32	31	N 23	41	56	61	70	77	92	110	123	113	105	80	49	41	37	39	36	A
15	33	31	34	31	35	B	B 22	43	55	64	65	81	98	97	123	119	93	81	53	A	35	38	35	31
16	31	31	30	33	38	A	B	40	51	57	63	71	66	76	79	94	77	59	A	A	A	A	31	30
17	A	30	31	33	39	25	N 23	39	49	54	58	66	67	63	67	85	91	84	62	53	49	51	34	25
18	A	27	33	35	44	33	N 23	38	49	52	55	61	51	65	73	75	66	55	A	48	46	39	29	31
19	30	29	29	N 31	31	33	32	38	48	49	60	76	73	72	87	113	139	109	85	53	47	44	36	29
20	31	B 27	31	33	39	50	48	40	46	52	61	65	71	65	67	77	74	55	43	39	36	38	35	32
21	32	31	31	31	33	31	N 25	43	52	55	60	65	66	65	62	70	65	60	A	A	31	26	N 23	25
22	29	30	33	31	26	26	B 24	37	60	68	80	70	58	68	77	89	66	A	49	35	35	28	29	26
23	B 29	36	31	N 31	41	A	B 23	45	75	77	65	79	A	69	68	83	70	55	57	42	33	29	23	24
24	25	25	31	35	31	A	A	A	51	65	71	77	69	75	84	81	63	65	47	41	47	50	37	35
25	30	31	31	34	34	35	35	44	57	63	72	77	75	84	86	77	67	88	A	52	50	39	35	33
26	35	34	33	40	42	32	29	44	56	62	68	81	82	73	71	68	77	54	45	A	40	40	38	37
27	35	32	33	35	38	28	26	46	59	63	83	81	76	82	69	80	64	57	45	47	45	48	37	32
28	34	34	40	42	B 23	N 22	N 23	39	69	70	86	80	74	82	80	88	66	55	57	48	37	42	42	42
29	42	43	41	41	34	33	25	39	60	83	90	99	116	103	A	110	111	90	75	63	60	53	41	36
30	33	34	39	43	33	N 24	B 23	39	59	68	87	89	76	96	81	79	71	65	63	48	42	A	39	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	24	27	26	28	30	25	28	29	30	30	29	30	29	30	29	30	30	29	26	25	26	25	28	26
MED	32	31	31	32	34	31	24	44	56	62	68	77	74	76	80	86	78	67	54	47	38	39	35	32
U Q	34	32	33	35	38	33	26	47	60	65	75	81	80	84	89	99	93	83	63	52	45	44	37	35
L Q	30	30	30	31	32	25	23	39	52	57	60	70	66	65	71	75	67	59	49	41	35	34	31	30

HOURLY VALUES OF fEs                      AT Okinawa

NOV. 2020

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	31	25	G	G	G	G		45	34	36	46	44	35	42	45	55	37	33	48	21	33	G	G	G
2	G	G	G	G	G	G	G	29	38	41	45	56	60	46	69	57	67	32	28	48	G	G	G	29
3	26	G	G	26	G	G	G	25	36	40	39	41	45	48	48	50	42	32	25	29	85	26	32	25
4	23	G	G	G	G	11	G	29	34	42	159	44	46	144	59	47	45	35	48	28	32	53	28	25
5	26	33	38	32	121	32	G	G	56	42	50	52	50	51	51	59	35	32	33	61	G	G	G	G
6	26	33	G	G	G	G	G	28	52	92	37	48	40	44	46	46	43	39	28	40	59	G	30	28
7	36	G	36	26	G	G	G	118	39	57	92	61	56	58	78	48	45	38	39	76	57	73	69	33
8	27	B	38	G	G	11	G	39	49	35	57	70	48	69	48	36	32	28	31	41	G	34	59	72
9	33	25	G	G	24	G	G	38	39	60	64	54	57	59	56	34	35	30	34	40	G	G	G	G
10	G	G	G	G	G	G	G	26	33	34	35	47	47	48	46	40	36	G	11	11	G	G	G	G
11	G	G	G	24	G	G	G	39	52	38	45	54	48	47	52	41	38	G	11	36	G	G	G	24
12	G	23	24	G	G	G	G	26	30	41	48	55	57	45	39	38	35	26	19	27	35	26	G	25
13	G	G	G	G	G	G	148	28	32	40	41	42	64	56	46	40	36	38	54	41	26	G	28	G
14	G	47	29	29	25	G	G	33	34	44	36	48	48	54	54	82	48	39	32	11	G	32	33	29
15	24	31	24	G	G	B	B	G	29	35	47	59	84	65	48	45	46	32	40	58	29	25	G	G
16	G	G	G	G	G	31	B	40	36	48	51	53	41	44	56	40	51	36	43	32	34	39	24	30
17	30	166	G	28	G	24	G	G	32	57	53	50	48	54	59	56	56	35	26	36	32	32	G	G
18	31	26	G	G	22	24	G	37	42	42	46	46	64	48	52	44	46	27	48	G	G	G	G	G
19	G	26	G	142	G	G	36	23	93	33	47	92	63	63	64	60	53	56	32	33	G	G	G	G
20	G	B	G	G	24	G	48	44	49	41	48	46	93	92	47	41	34	33	31	26	G	G	G	G
21	G	G	G	G	G	G	G	165	29	54	47	49	77	60	91	61	39	49	58	37	G	G	G	G
22	G	28	G	G	G	G	B	G	34	92	36	92	48	45	39	45	50	72	39	29	G	G	G	G
23	B	G	G	G	G	25	B	G	40	38	44	48	96	91	45	47	57	39	32	32	25	G	G	G
24	G	G	G	G	G	26	50	46	38	44	45	53	60	40	41	40	35	41	33	28	25	24	G	G
25	G	G	G	G	G	G	G	G	144	34	39	43	44	38	39	39	50	115	92	48	32	25	G	G
26	G	G	G	G	26	G	G	11	30	45	44	49	46	45	47	42	32	26	39	40	G	G	G	G
27	G	G	G	G	G	G	G	G	30	92	42	50	40	65	38	33	30	34	36	G	G	G	G	G
28	G	G	G	11	B	G	G	32	31	34	35	48	48	128	39	52	46	28	11	11	G	G	G	G
29	G	G	G	G	G	G	G	G	28	37	48	63	54	92	110	57	31	28	30	11	G	G	G	G
30	G	G	G	G	11	G	B	G	48	33	39	38	46	38	36	41	40	G	G	32	28	34	25	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	28	30	30	29	29	24	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	G	G	G	G	G	G	G	28	36	41	46	50	48	52	48	45	41	33	32	32	G	G	G	G
U Q	26	26	G	24	6	11	G	39	48	48	48	55	60	65	56	55	48	39	40	40	32	26	25	25
L Q	G	G	G	G	G	G	G	G	32	36	39	46	46	45	45	40	35	28	28	26	G	G	G	G

HOURLY VALUES OF fmin AT Okinawa

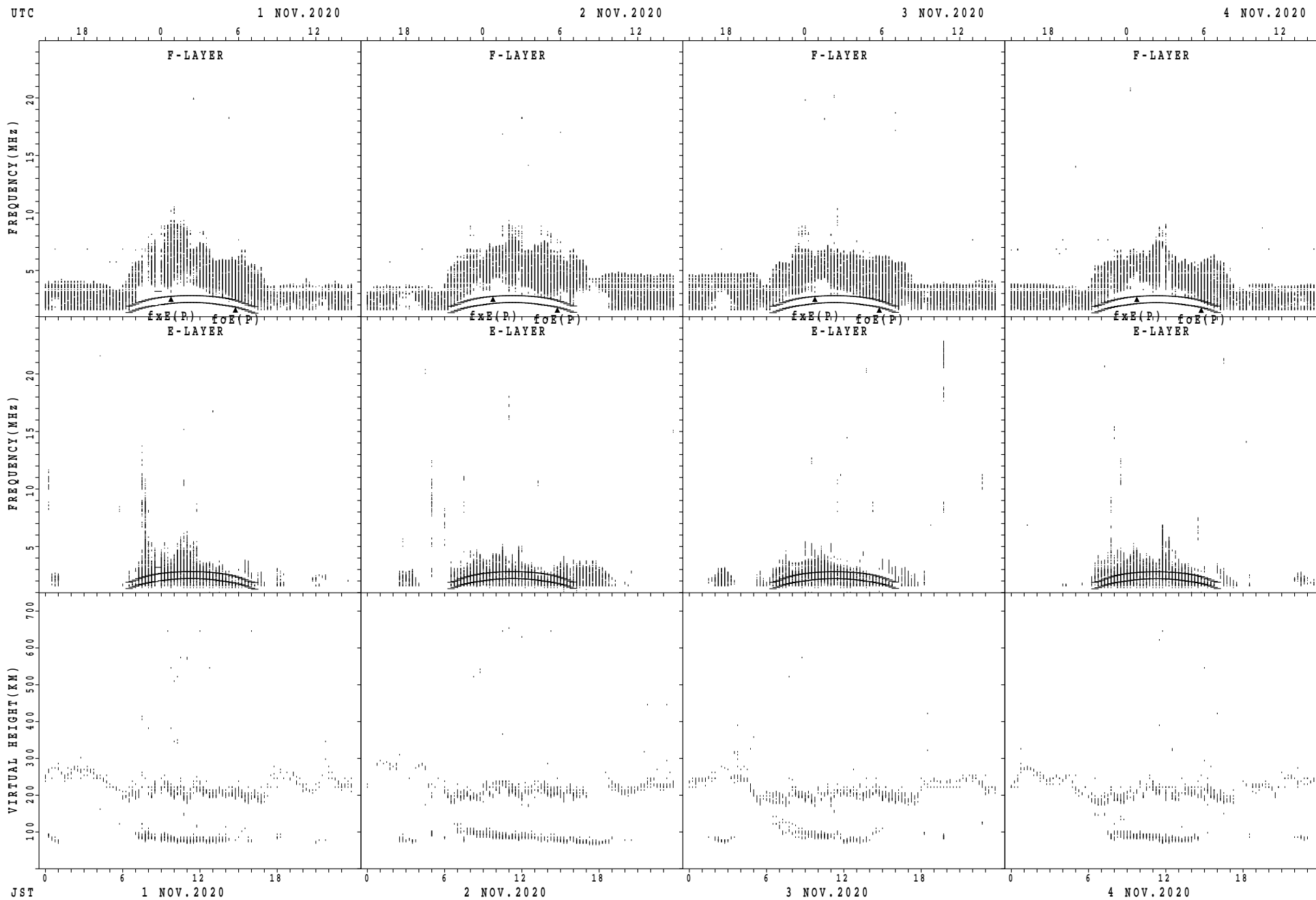
NOV. 2020

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	16	16	17	15	16	14	126	15	15	15	16	16	15	16	15	14	15	15	15	16	14	15	14	15
2	14	15	14	15	15	15	16	15	16	14	15	15	15	13	15	13	14	16	15	14	14	16	16	16
3	16	15	15	16	15	15	15	16	17	15	17	17	16	15	15	14	15	16	15	16	14	16	15	15
4	15	16	16	14	14	14	14	16	15	14	13	14	15	14	13	15	15	16	15	16	16	15	16	16
5	16	16	16	16	15	17	16	16	15	15	15	14	15	16	15	14	16	16	15	15	14	15	15	15
6	15	17	15	15	15	16	14	14	17	14	15	16	16	18	15	15	17	15	16	14	15	15	15	15
7	15	15	15	16	15	15	18	15	15	14	11	13	13	15	14	14	14	14	15	14	16	15	15	15
8	16	<sup>B</sup> 15	15	14	15	14	17	16	15	17	14	15	15	16	15	15	15	15	16	15	15	16	17	15
9	16	15	17	15	16	14	16	17	14	15	15	16	15	18	17	15	15	16	16	16	16	16	15	14
10	14	16	14	14	14	16	14	18	16	15	17	15	14	15	17	15	15	15	15	15	14	14	15	14
11	15	15	14	16	14	15	14	14	16	15	15	13	13	14	15	15	15	16	14	14	16	15	15	15
12	14	16	16	16	15	16	15	14	15	15	15	14	15	17	15	15	16	15	15	15	15	15	15	16
13	17	14	16	15	15	15	15	15	16	16	15	16	15	14	14	14	16	15	15	14	15	15	16	18
14	15	15	16	16	16	16	17	15	16	16	15	17	14	15	14	17	15	14	15	14	14	15	16	15
15	15	15	16	15	16	<sup>B</sup>	<sup>B</sup>	15	16	16	15	13	15	15	15	15	15	14	15	16	15	15	15	16
16	14	15	14	14	15	14	<sup>B</sup>	15	16	15	14	13	16	15	17	14	13	15	15	15	16	15	15	16
17	16	16	15	16	15	16	15	15	15	15	14	15	15	15	18	14	15	14	15	15	16	16	15	15
18	15	15	15	15	15	16	15	16	15	16	17	15	16	15	14	17	14	15	14	15	16	15	15	14
19	16	16	15	33	14	14	14	15	17	15	15	15	13	13	14	14	14	15	15	16	14	15	16	14
20	15	<sup>B</sup>	18	15	15	17	14	15	16	15	14	14	15	14	13	13	14	15	16	16	15	15	18	16
21	17	14	14	14	14	14	14	15	15	16	15	15	16	13	15	15	15	15	15	16	15	14	14	15
22	14	15	14	15	15	14	<sup>B</sup>	15	16	13	15	17	15	15	17	13	15	14	15	16	15	16	17	18
23	<sup>B</sup>	15	16	16	16	15	<sup>B</sup>	15	15	15	16	13	13	15	15	15	14	15	15	16	16	16	15	15
24	14	14	15	14	14	17	15	16	15	14	14	15	15	17	14	14	15	15	15	16	16	15	16	15
25	14	14	15	15	14	15	14	15	15	15	15	14	15	18	16	15	15	13	10	15	15	16	14	14
26	14	14	15	14	16	16	15	15	14	16	15	15	16	15	13	12	16	15	15	15	15	15	14	14
27	14	15	15	14	15	14	15	15	15	15	15	15	16	17	17	15	15	16	16	16	15	14	14	98
28	17	15	14	15	<sup>B</sup>	21	15	15	16	16	17	17	16	16	16	17	13	20	14	16	14	16	14	15
29	15	15	15	14	15	15	14	16	16	17	15	17	13	13	13	16	15	15	15	15	15	15	14	14
30	14	17	14	14	14	14	<sup>B</sup>	15	15	16	14	15	17	15	15	15	14	15	15	16	16	16	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	30	30	29	29	25	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
U Q	16	16	16	16	15	16	16	16	16	16	15	16	16	16	16	15	15	16	15	16	16	16	16	16
L Q	14	15	14	14	14	14	14	15	15	15	14	14	15	14	14	14	14	15	15	15	14	15	15	15

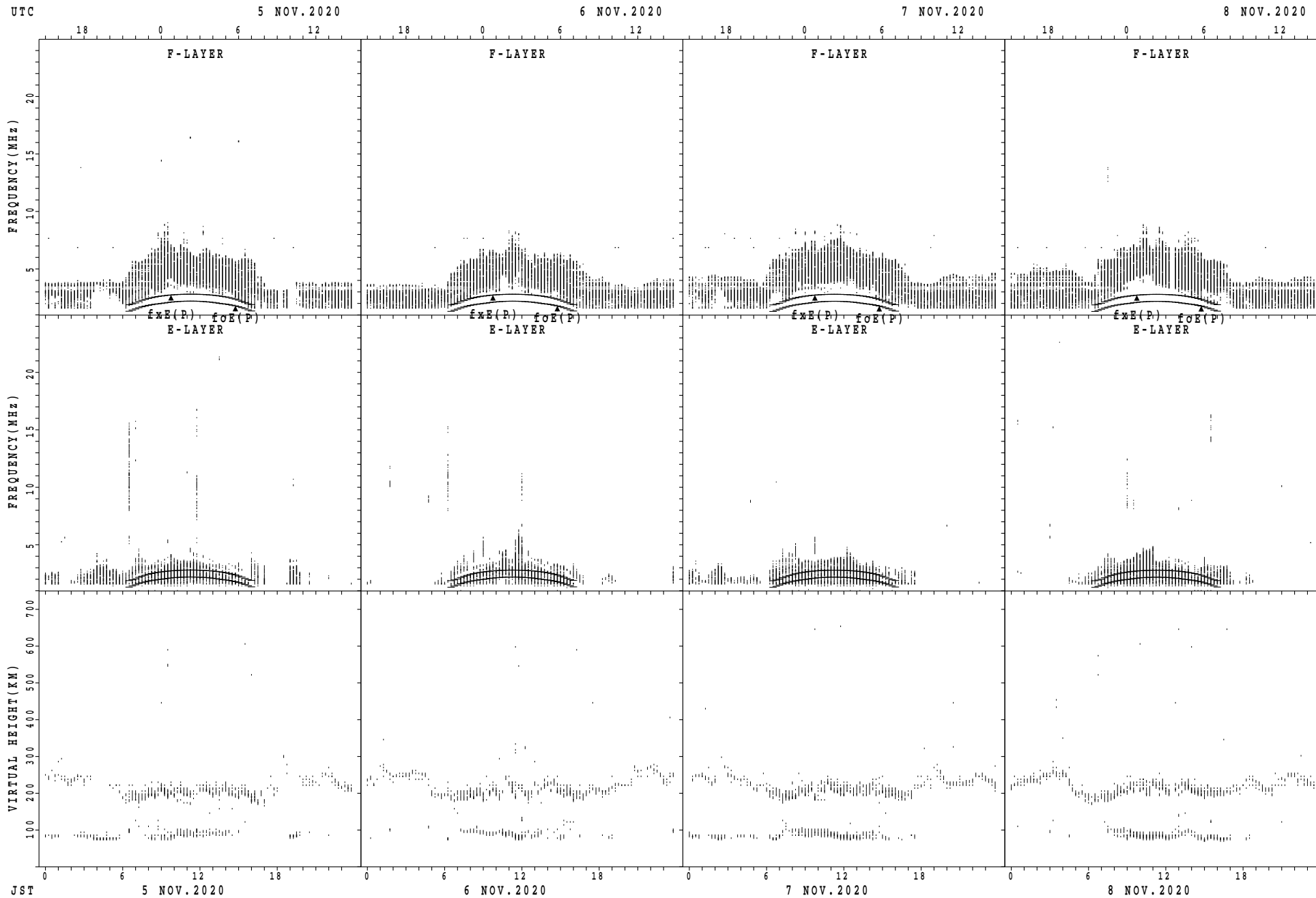


## SUMMARY PLOTS AT Wakkanai



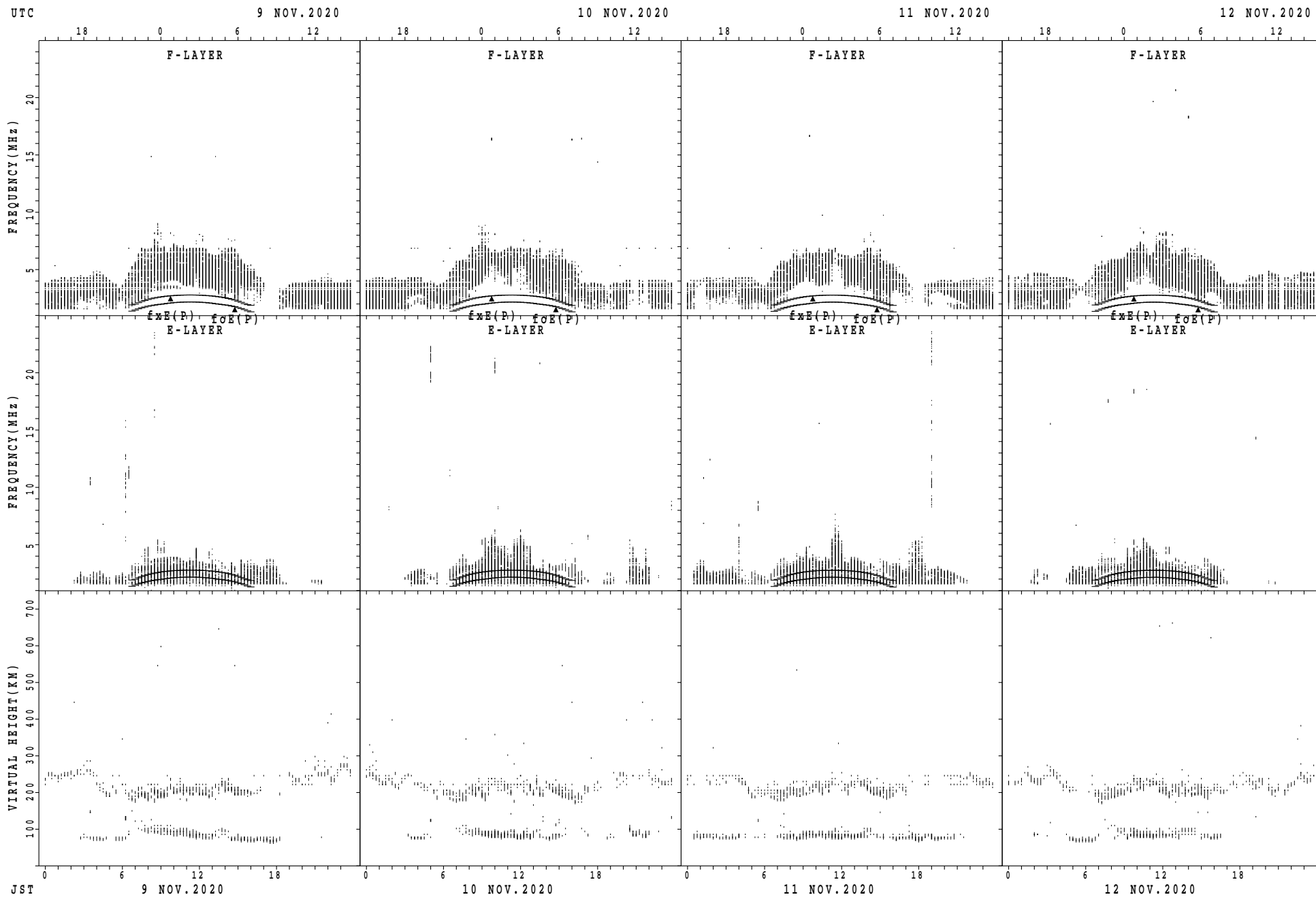
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Wakkanai



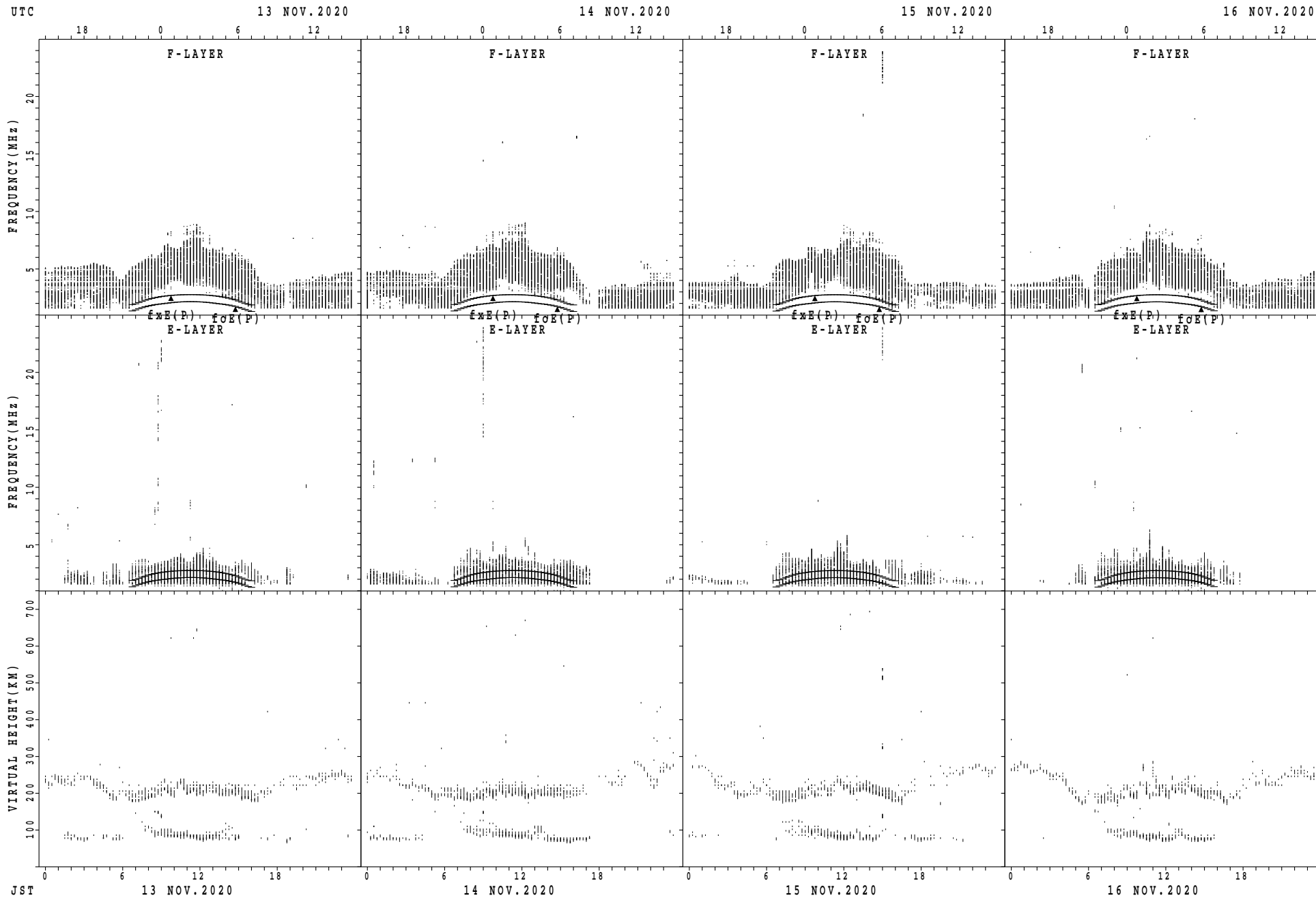
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Wakkanai



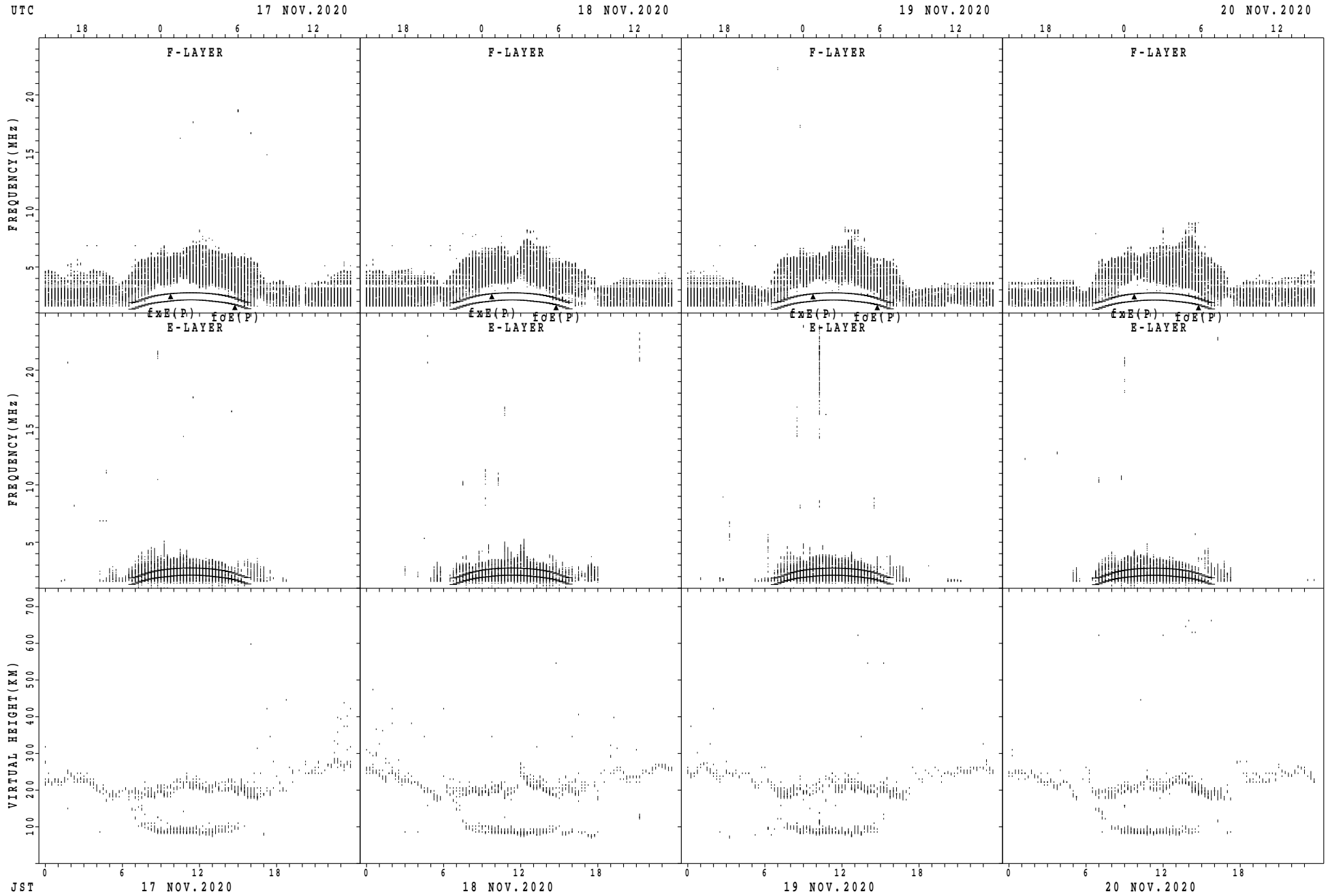
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Wakkanai



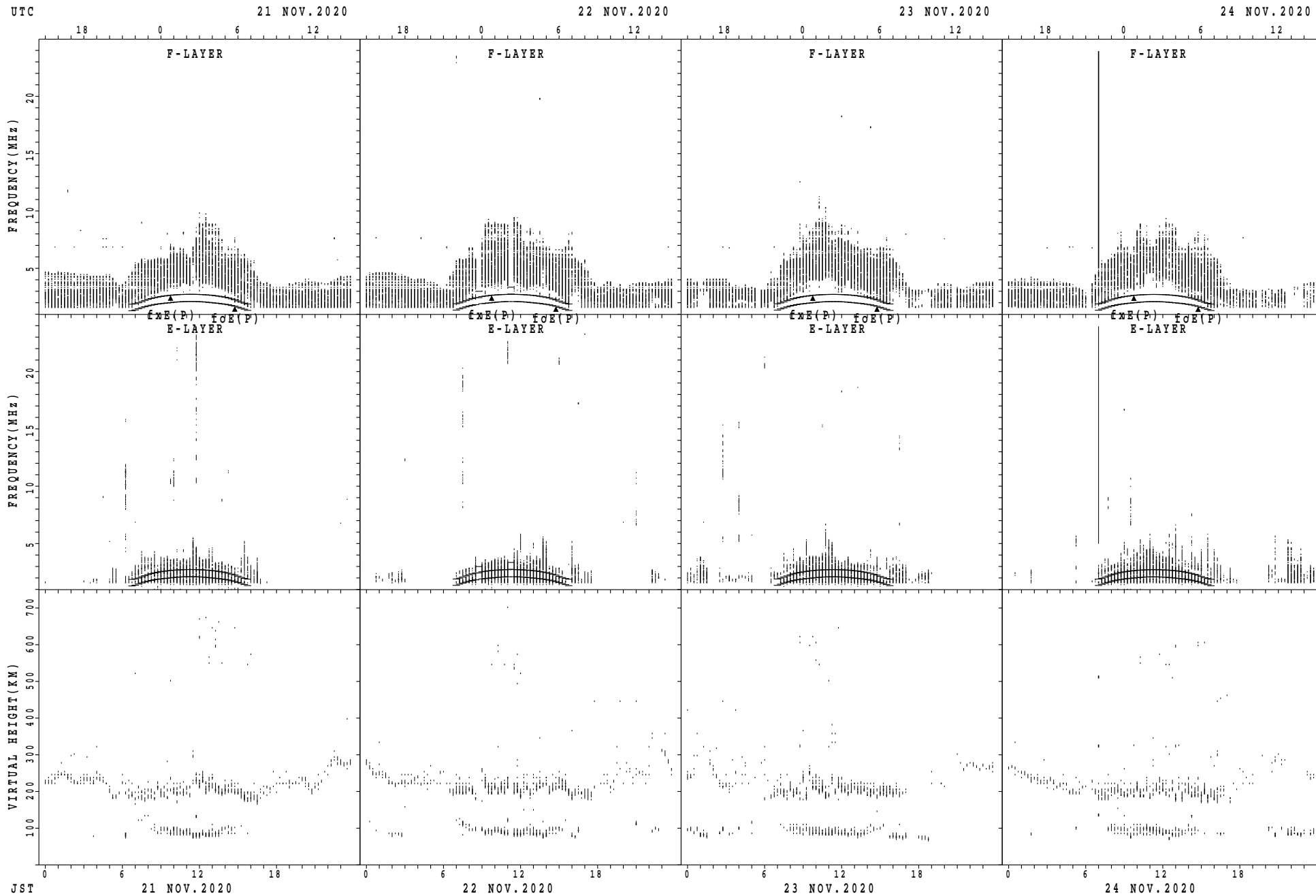
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Wakkanai



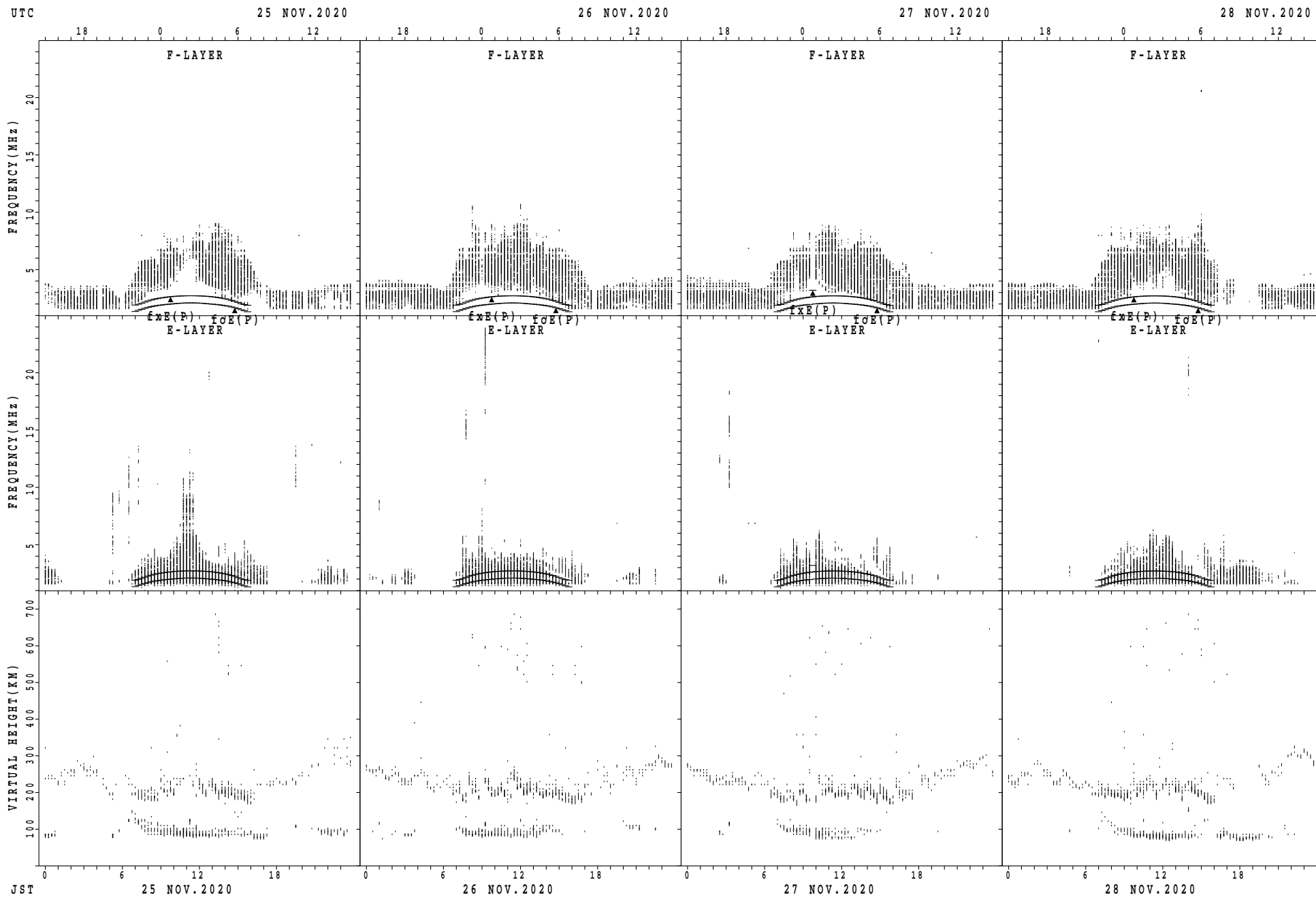
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Wakkanai



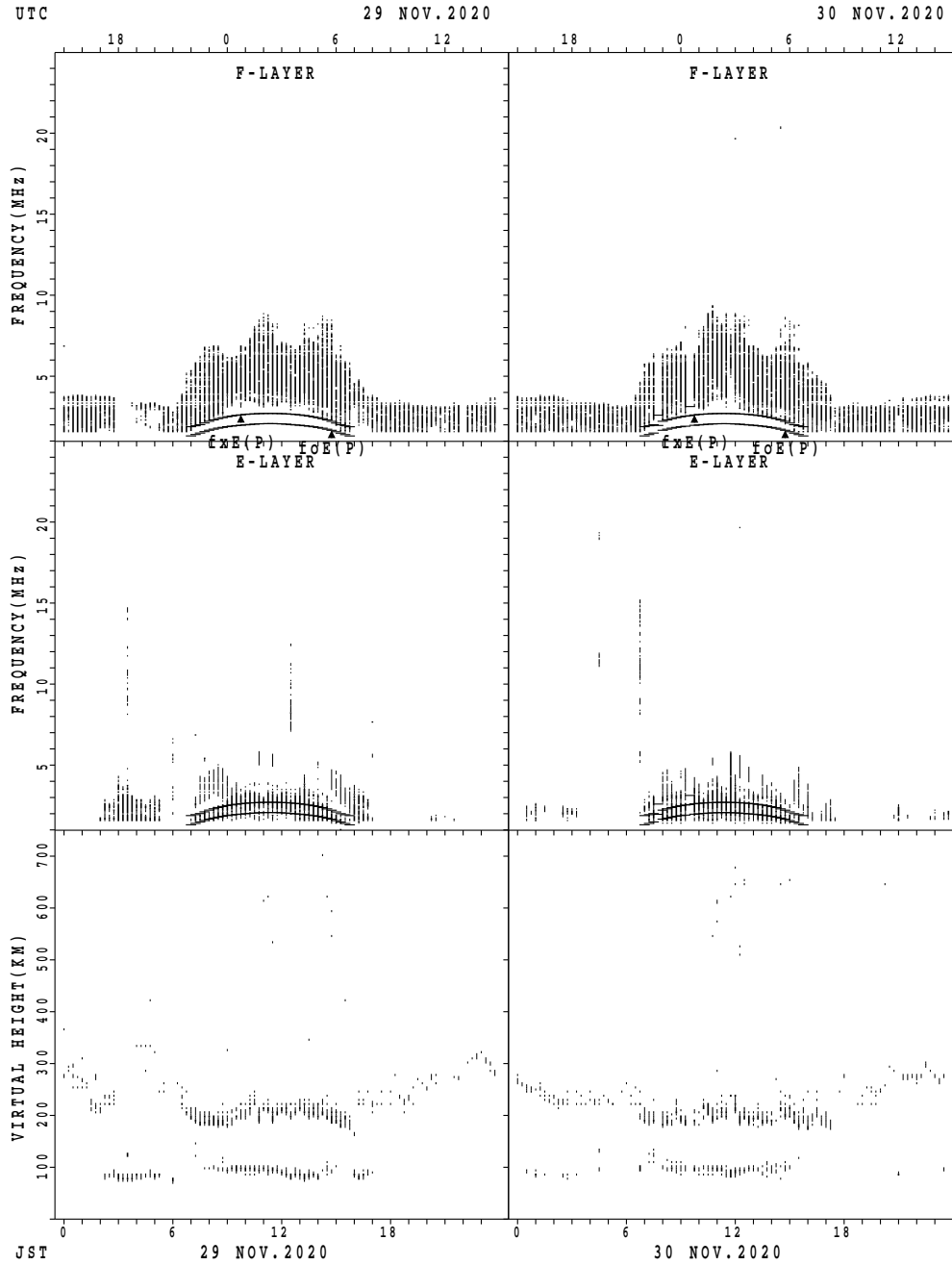
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Wakkanai



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

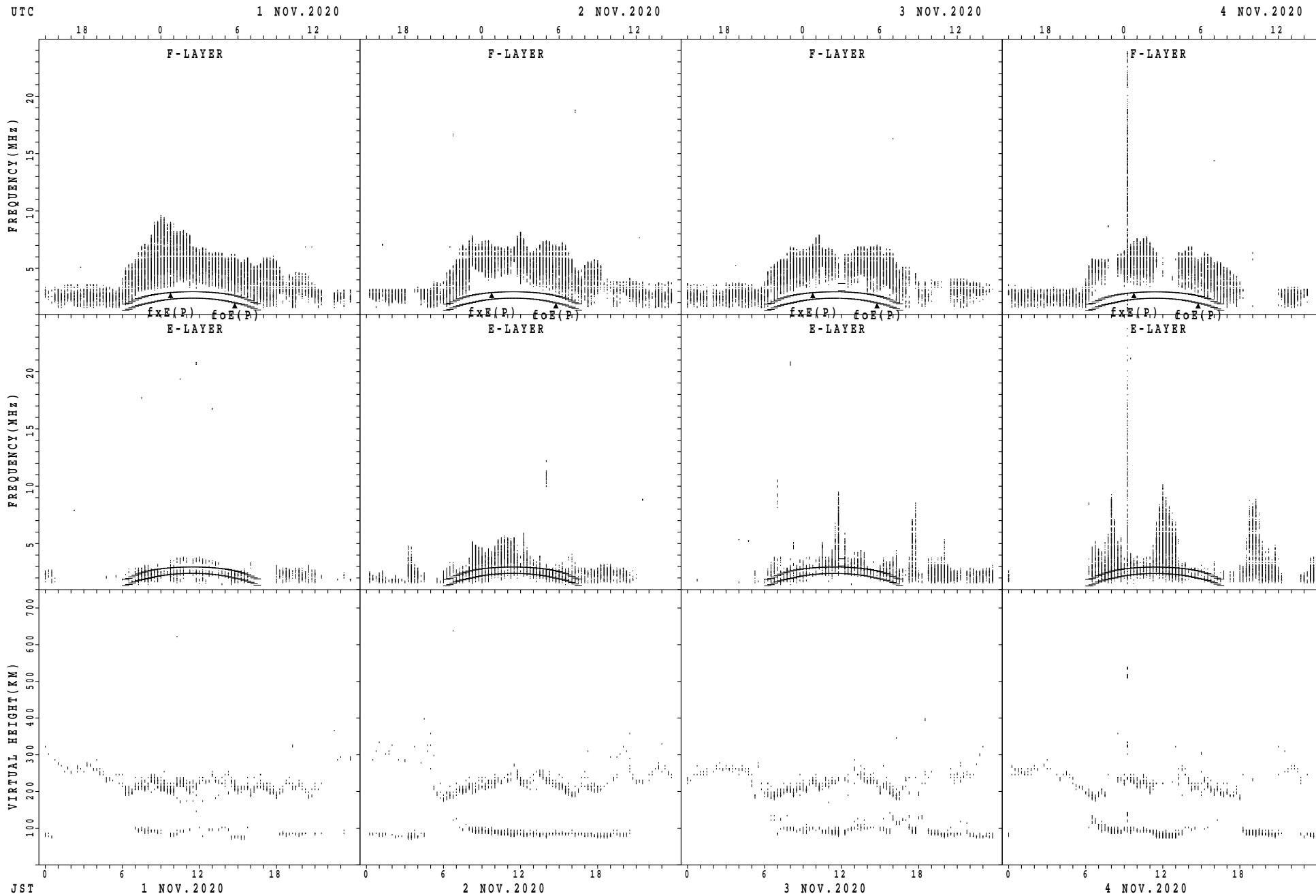
SUMMARY PLOTS AT Wakkanai



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

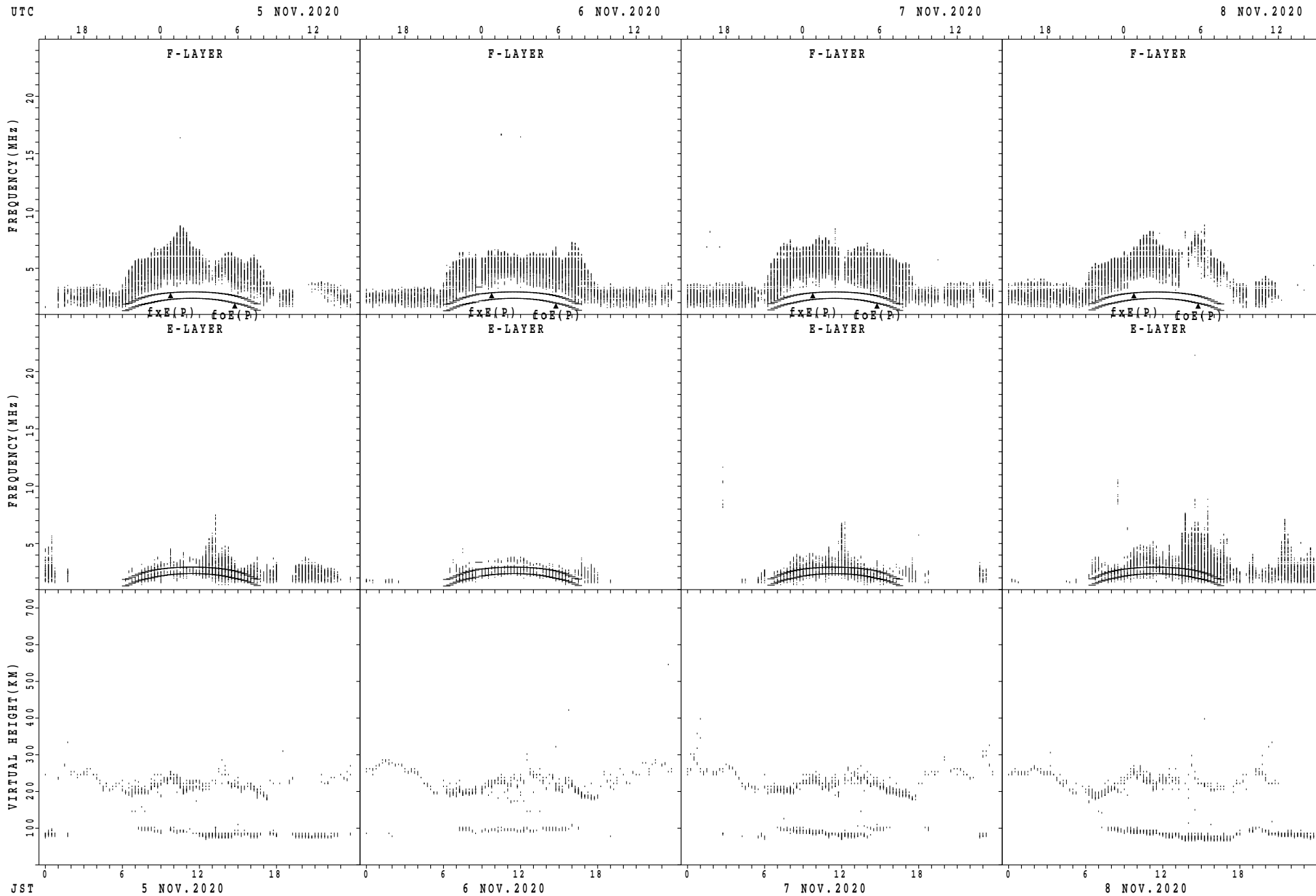


SUMMARY PLOTS AT Kokubunji



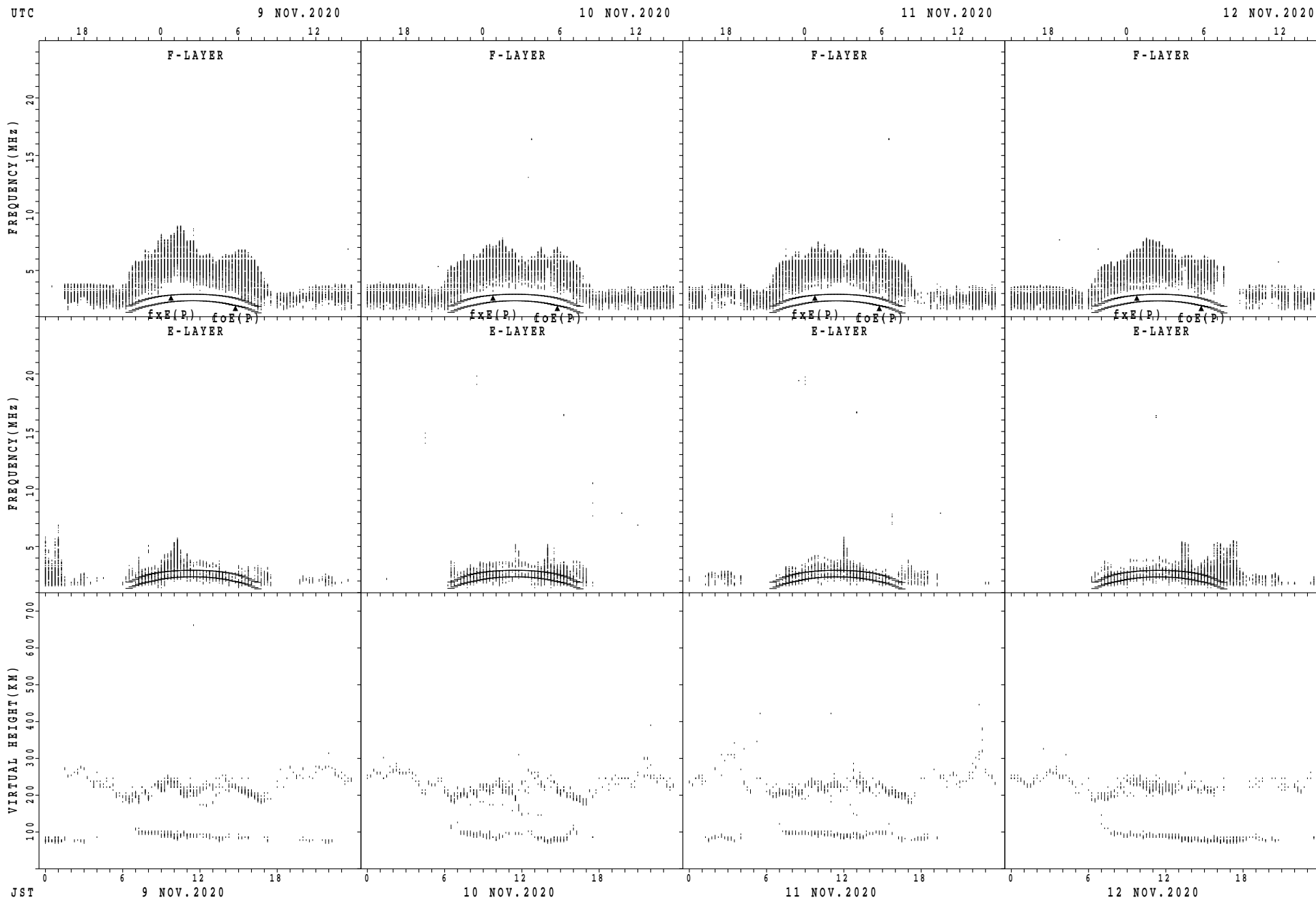
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Kokubunji



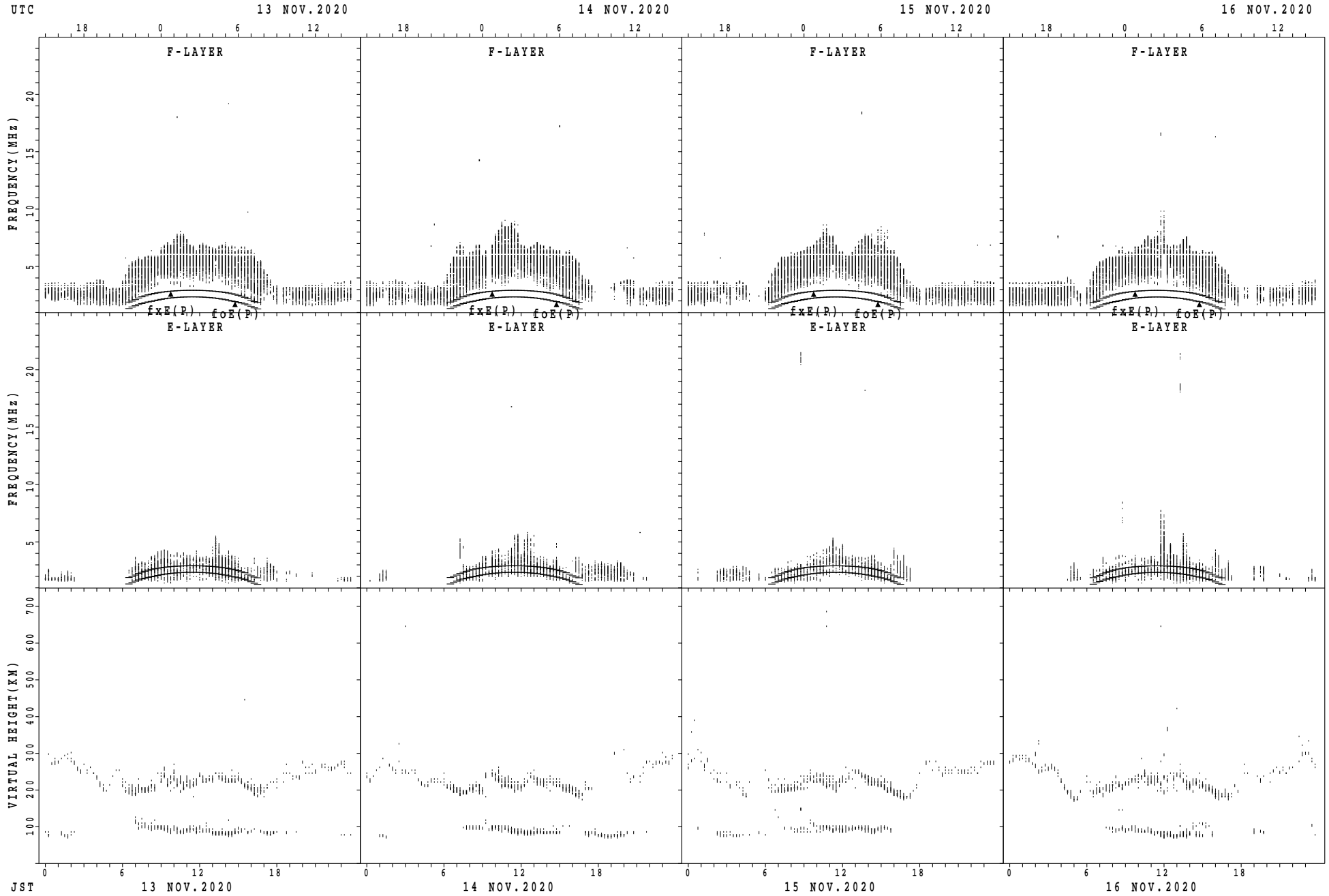
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Kokubunji



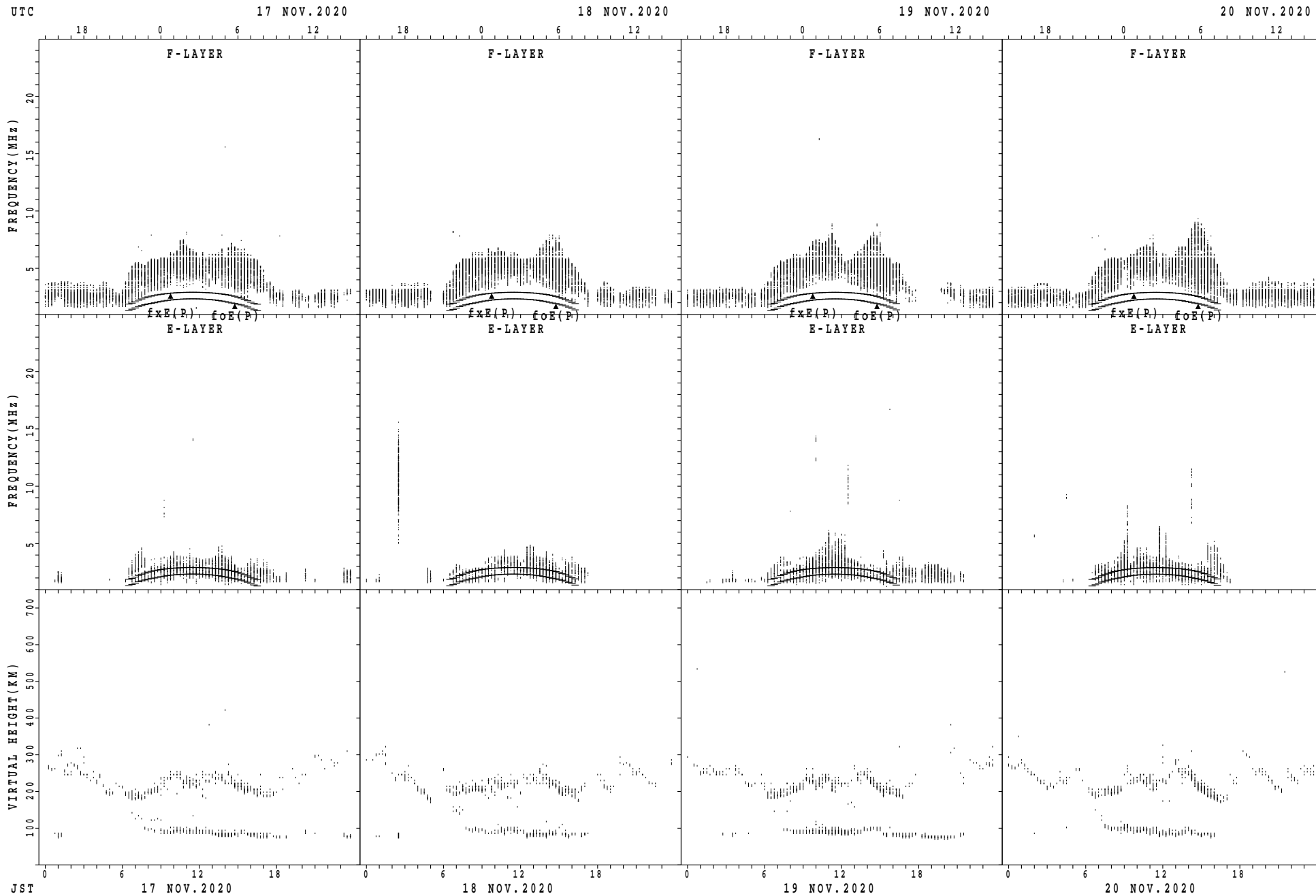
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Kokubunji



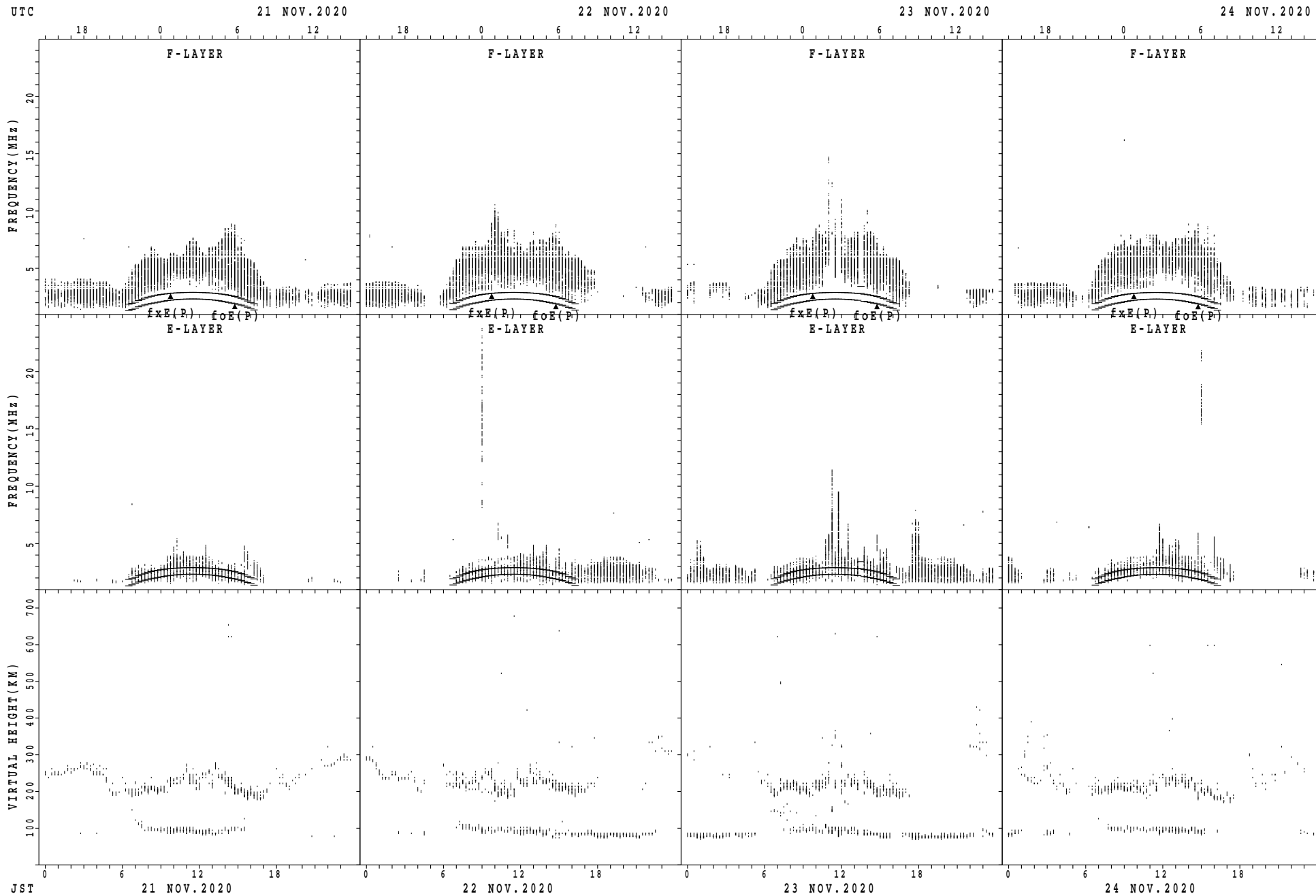
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Kokubunji



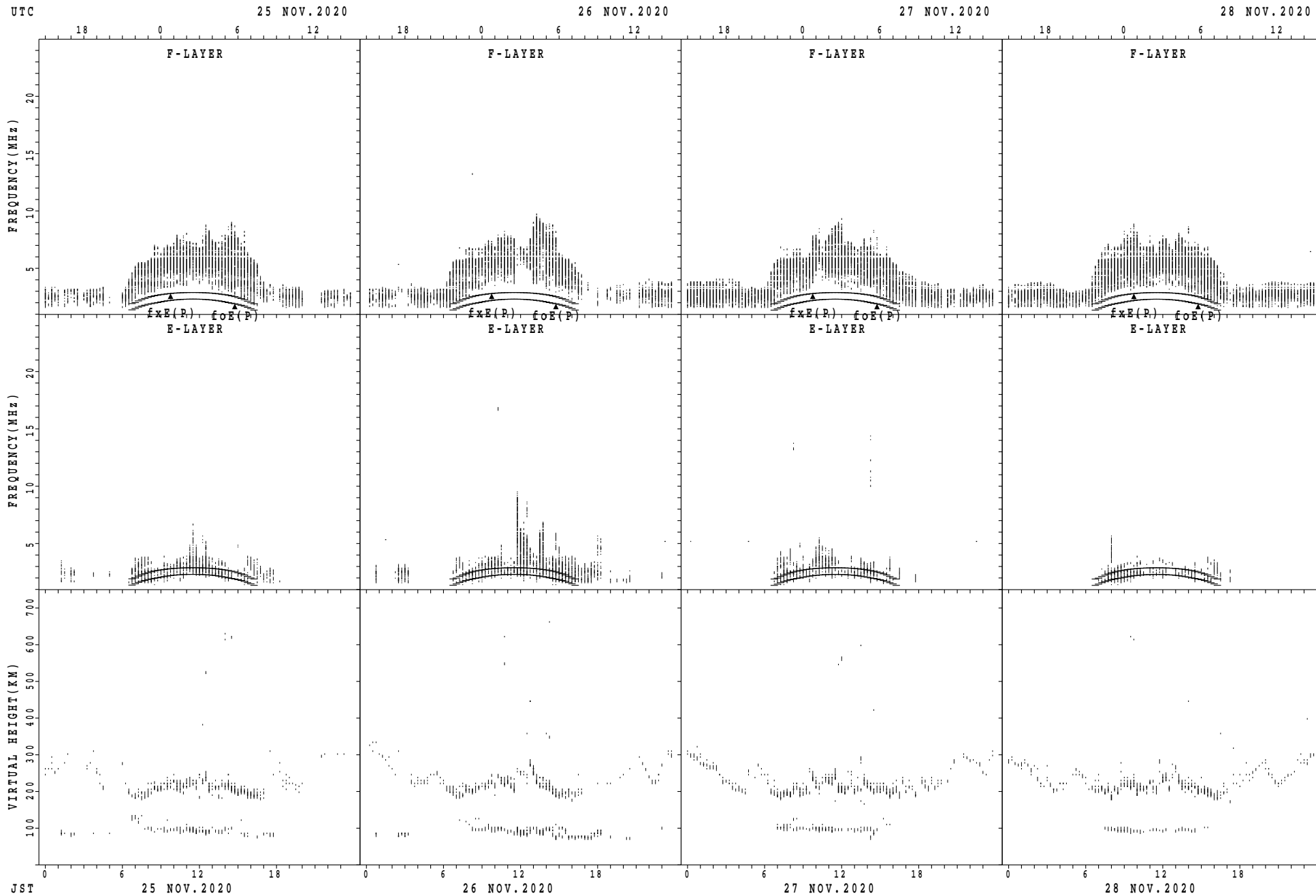
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Kokubunji



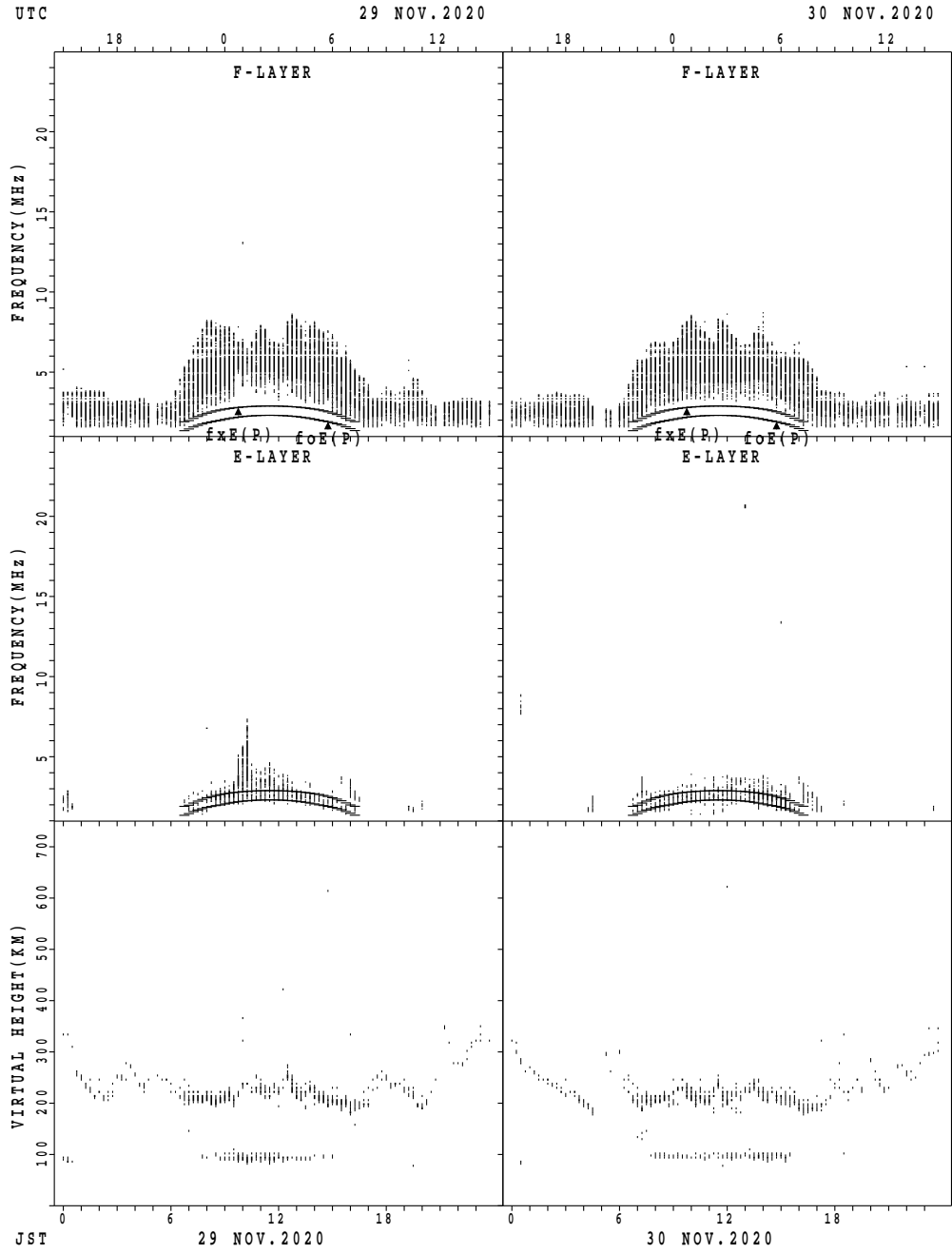
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Kokubunji



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

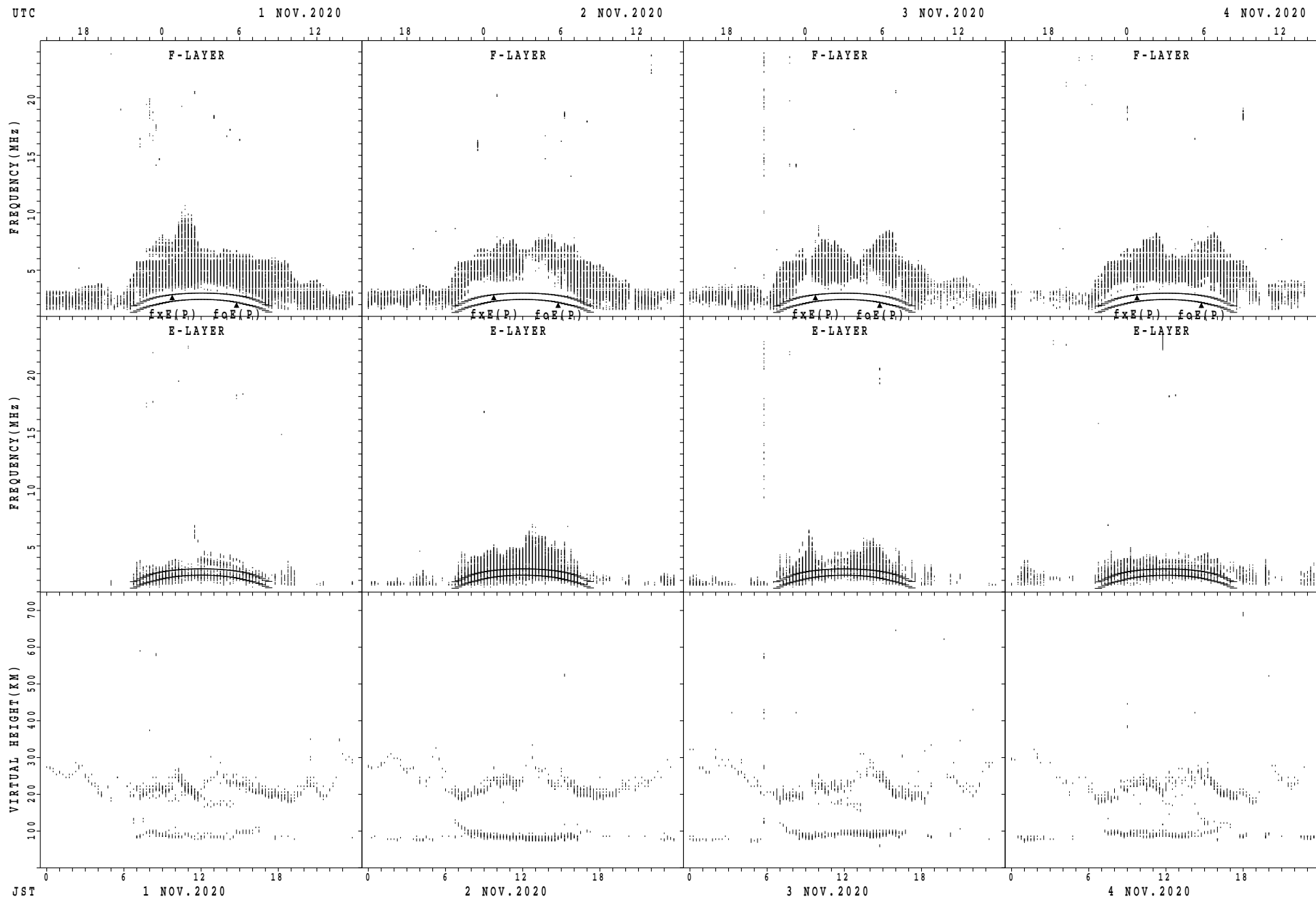
SUMMARY PLOTS AT Kokubunji



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

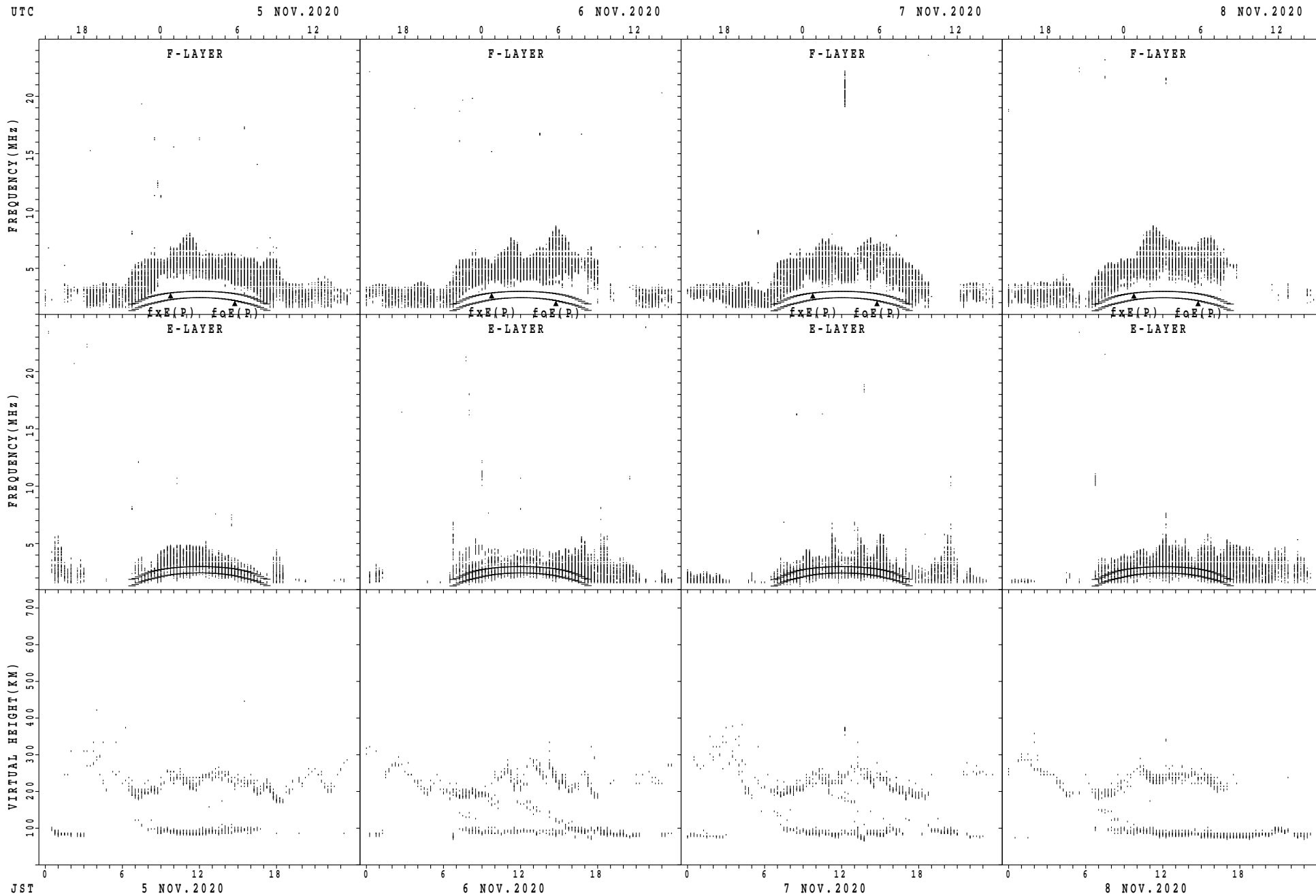


## SUMMARY PLOTS AT Yamagawa



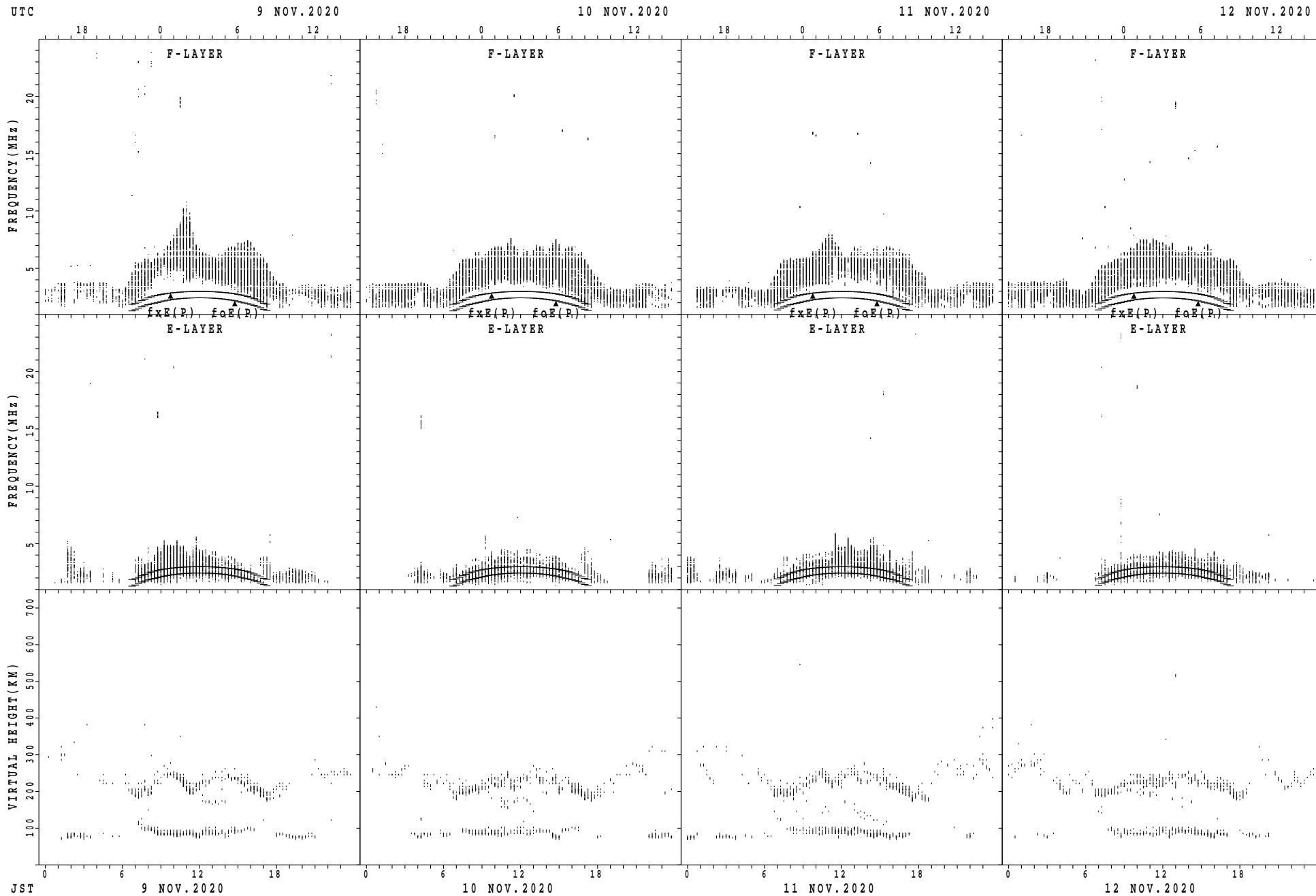
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Yamagawa



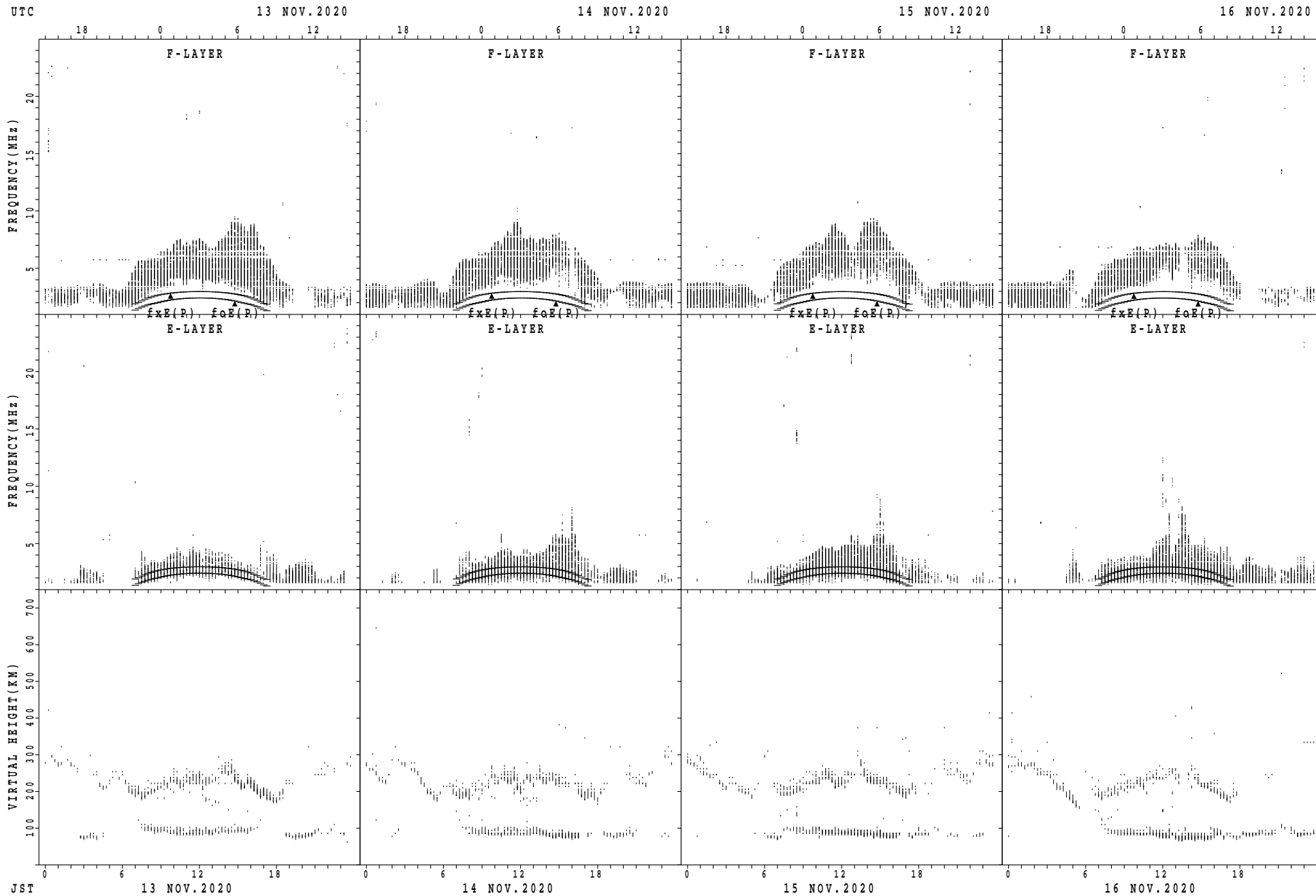
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Yamagawa



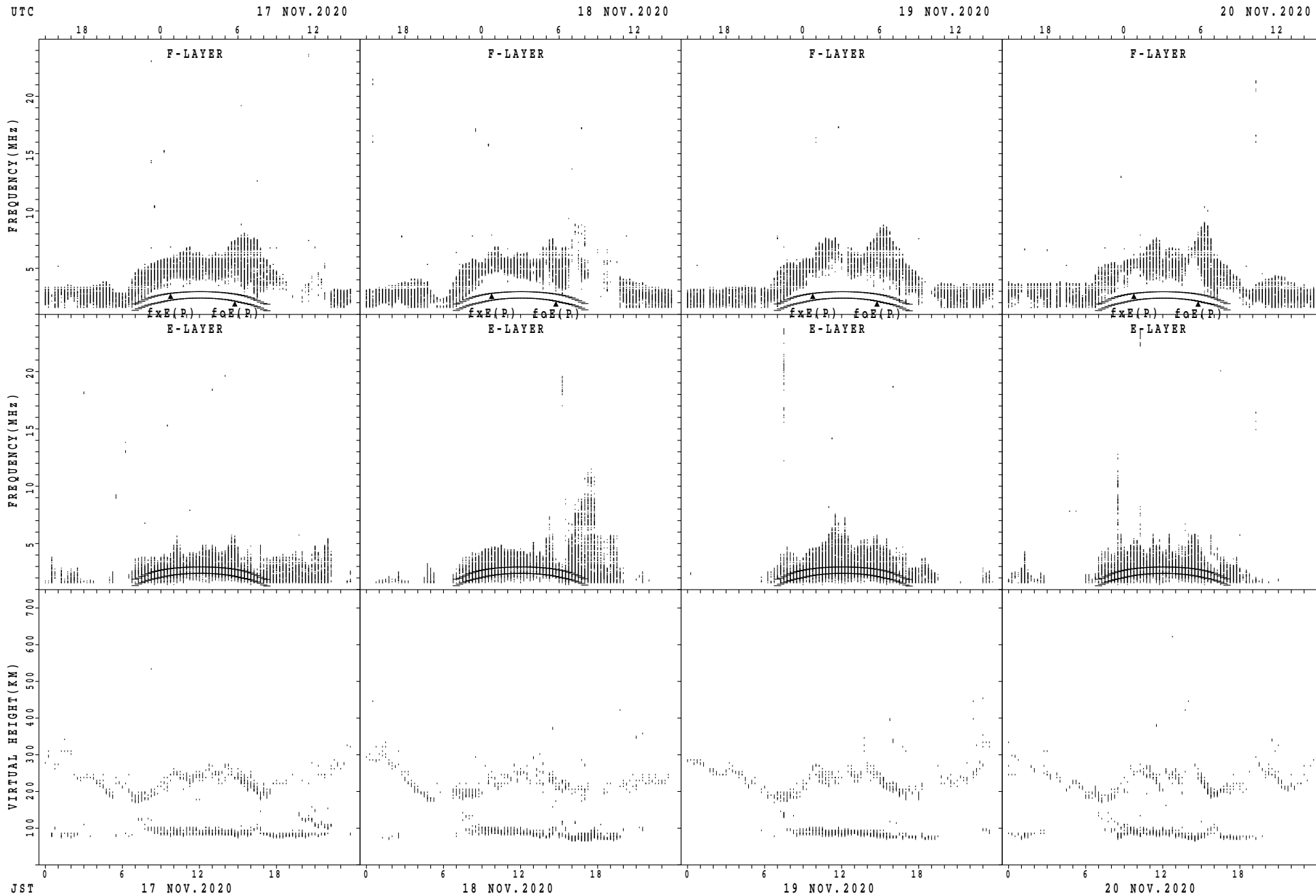
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Yamagawa



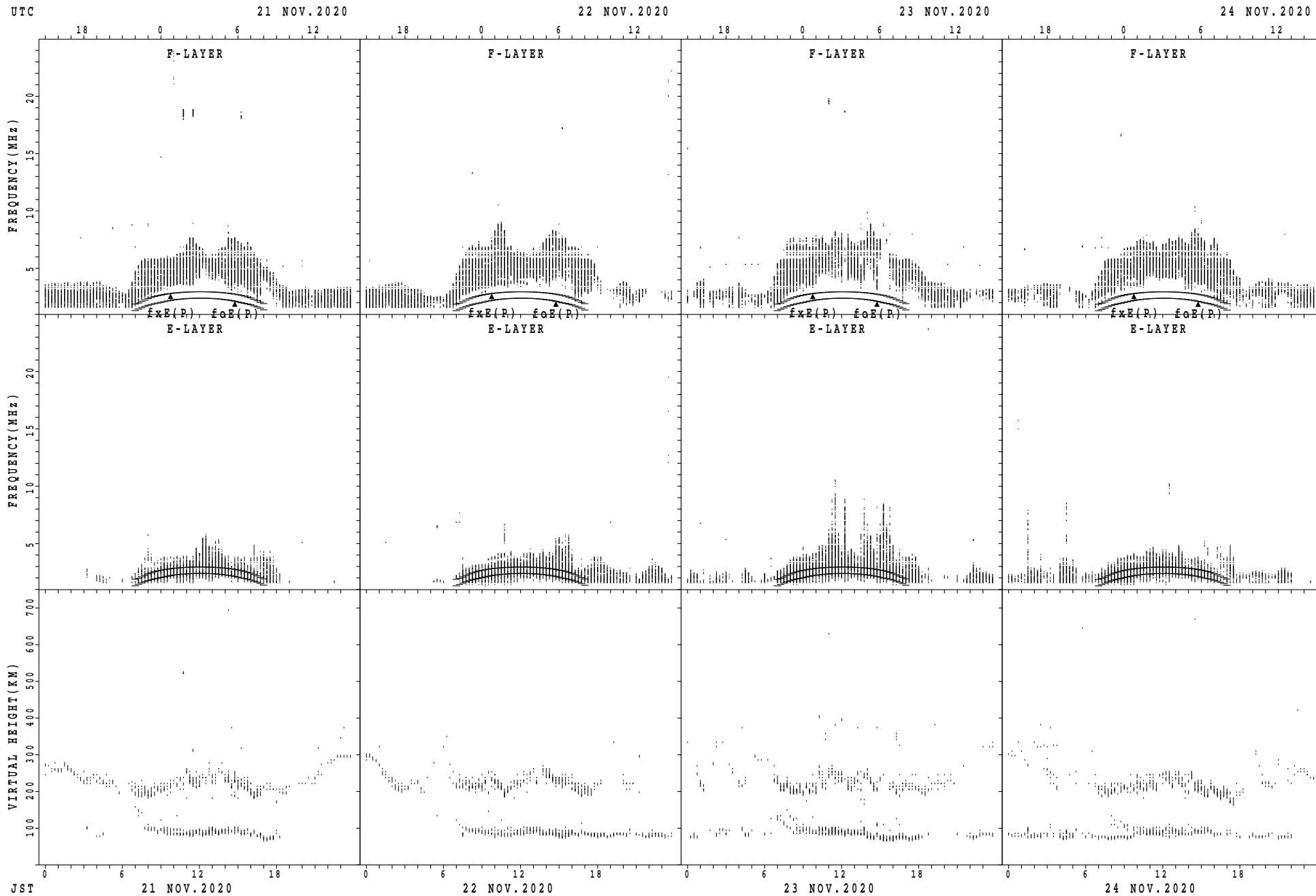
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Yamagawa



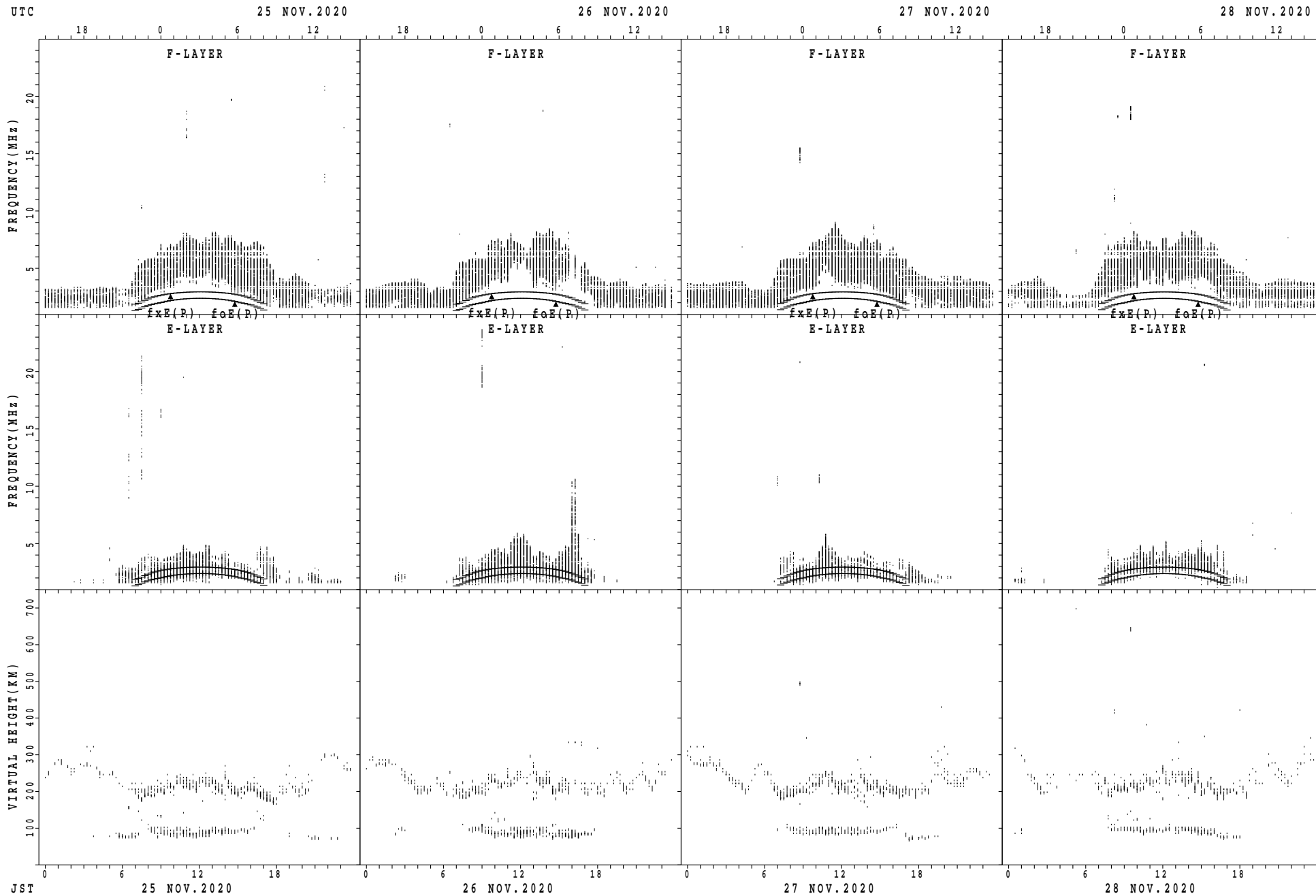
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Yamagawa



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

SUMMARY PLOTS AT Yamagawa

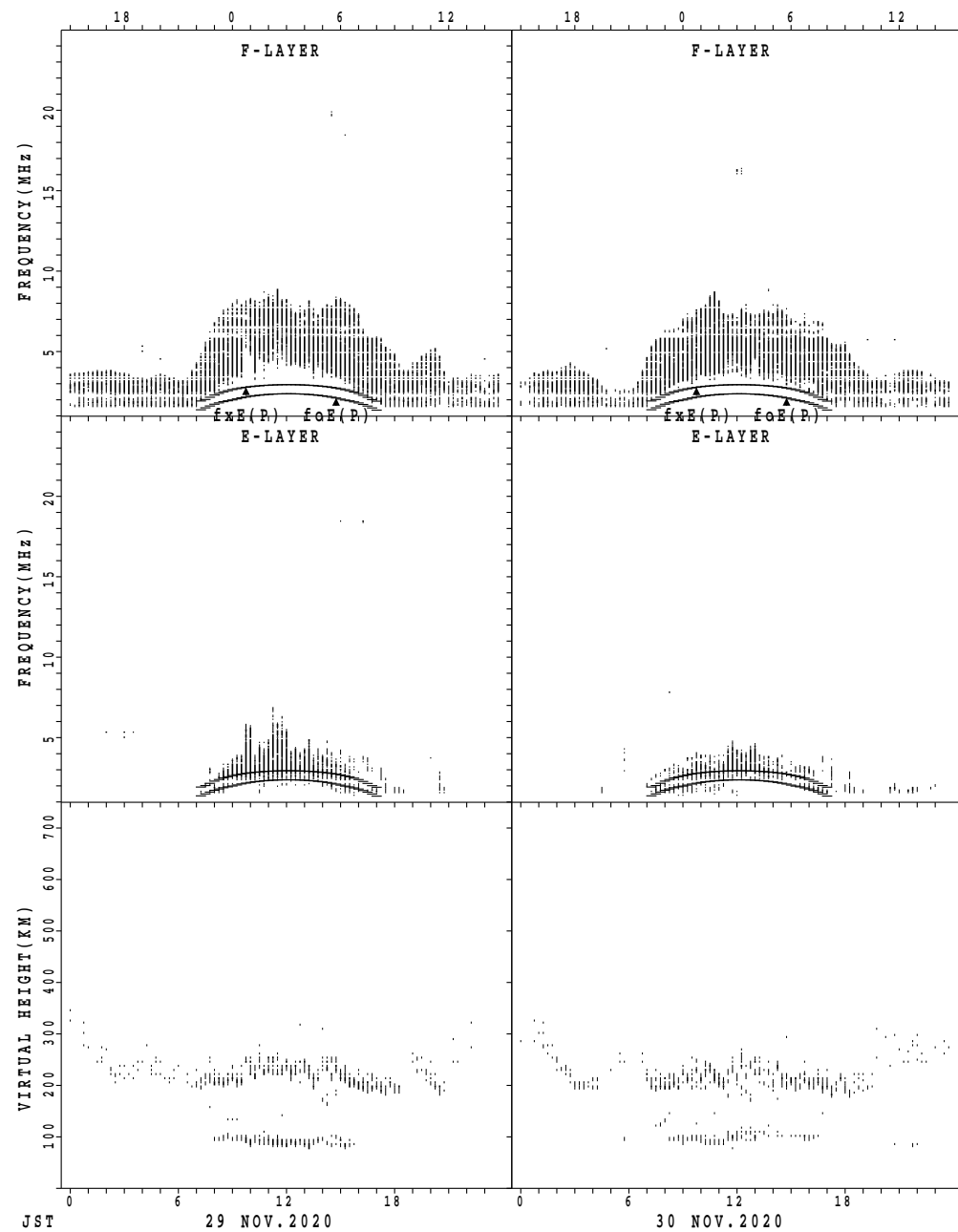


$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Yamagawa

UTC 18 0 6 12 18 0 6 12 18 0 6 12

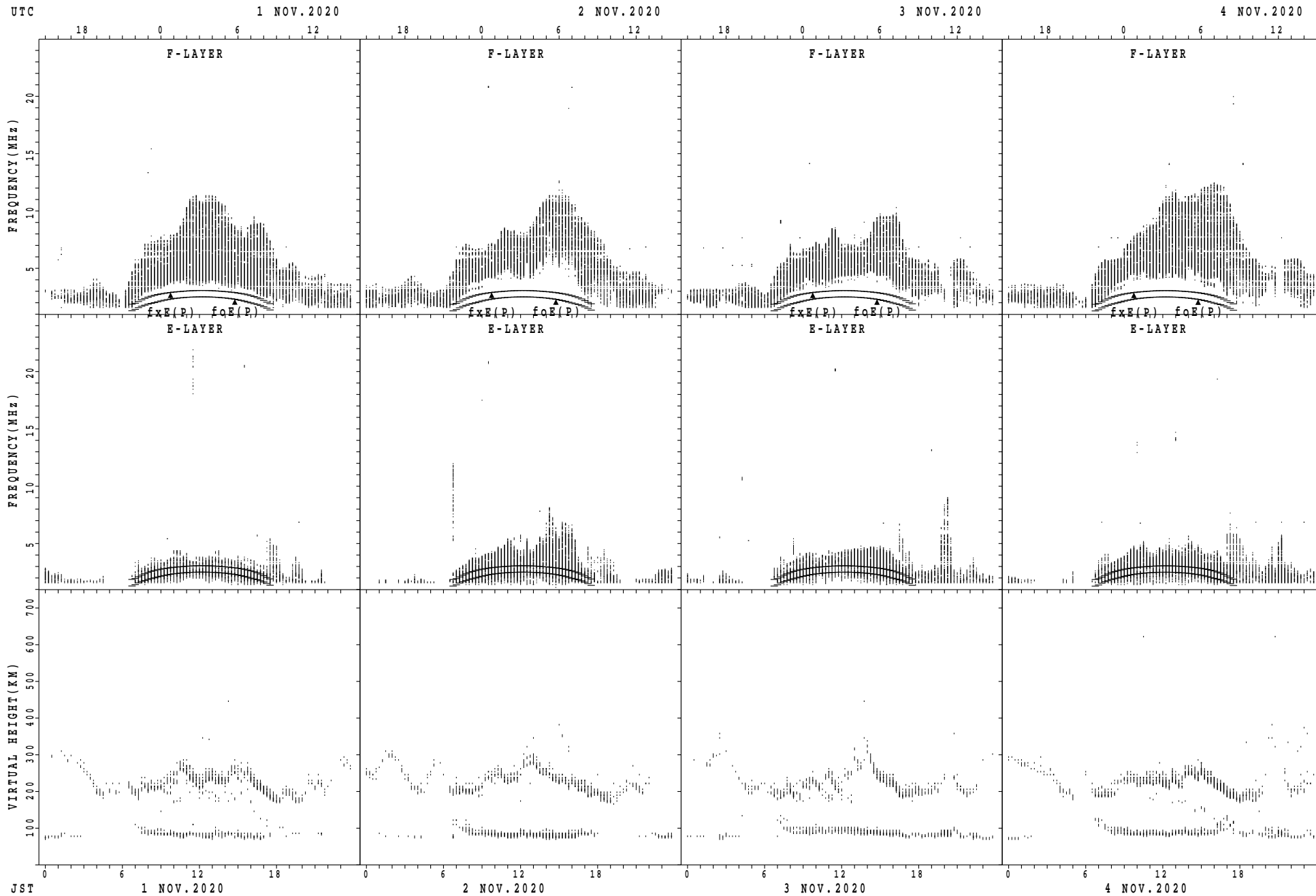
29 NOV. 2020 30 NOV. 2020



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

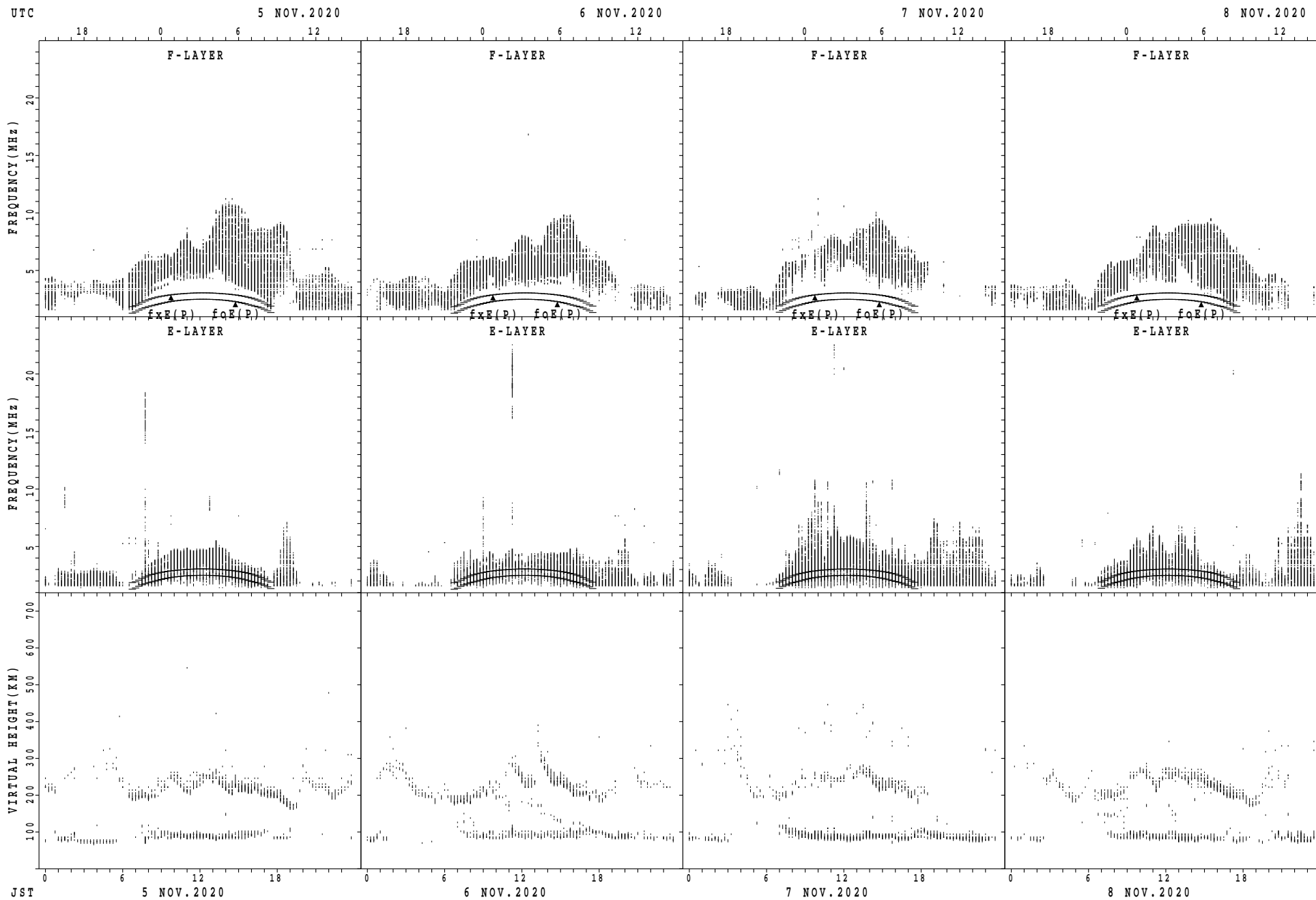


SUMMARY PLOTS AT Okinawa



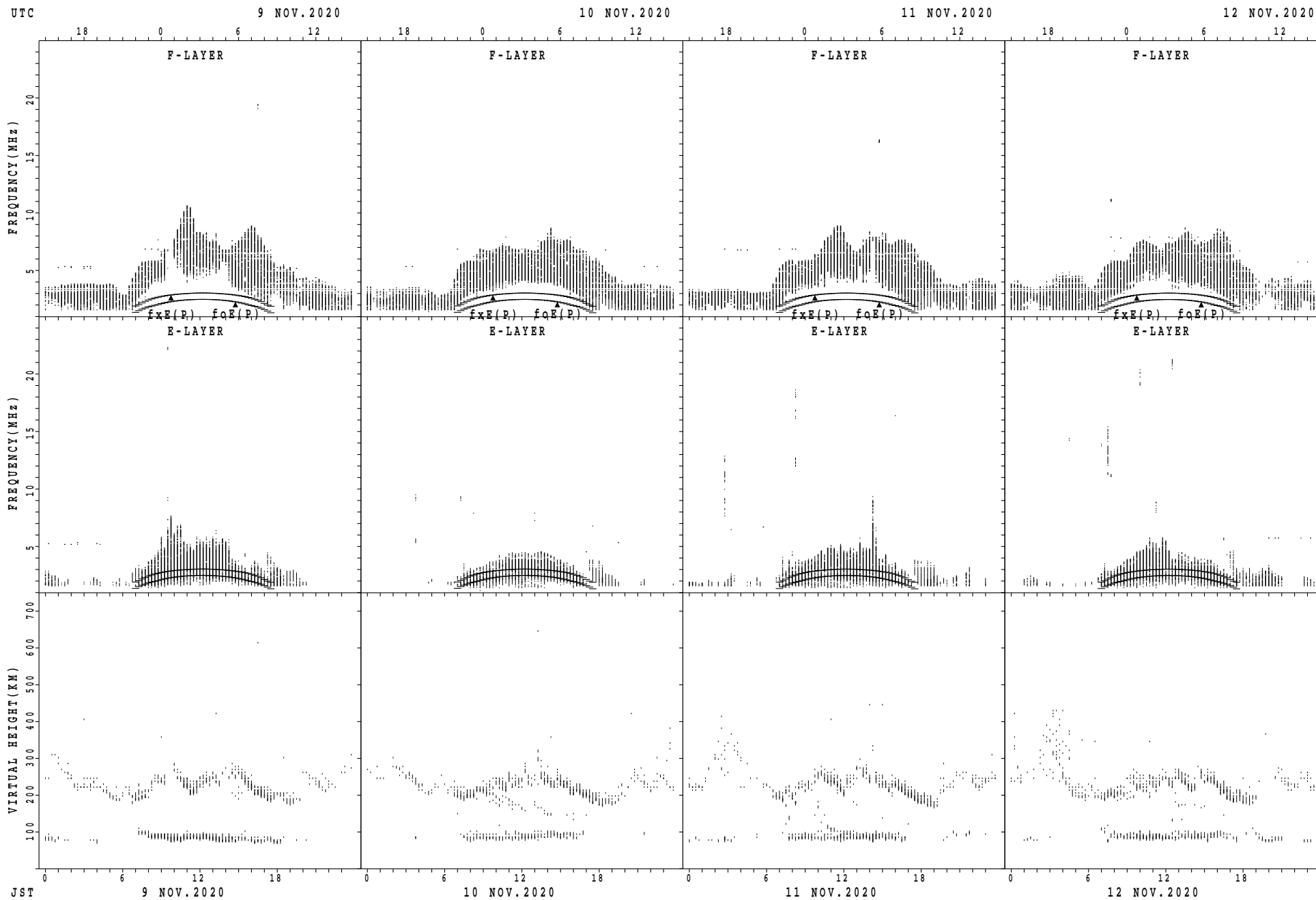
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Okinawa



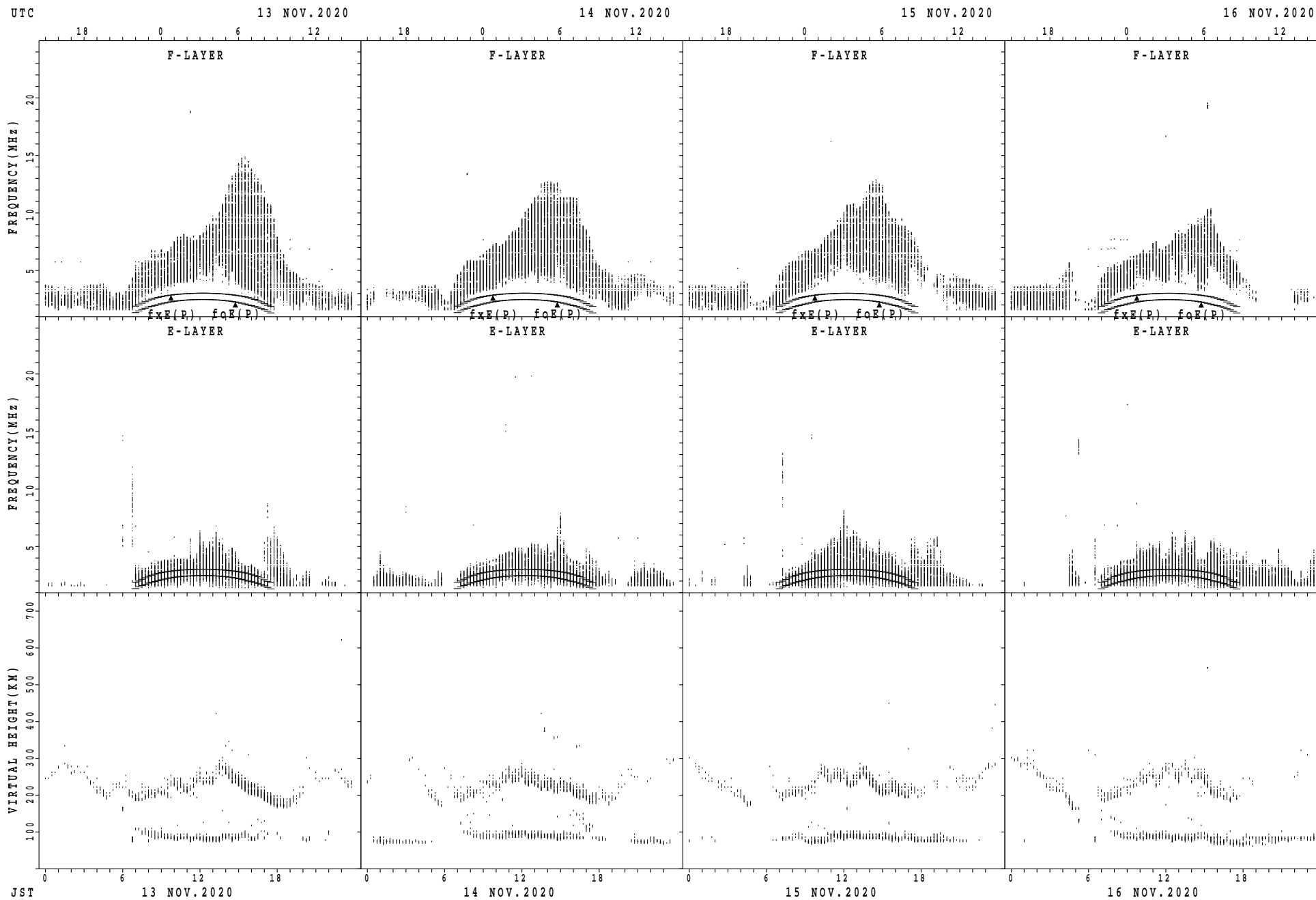
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Okinawa



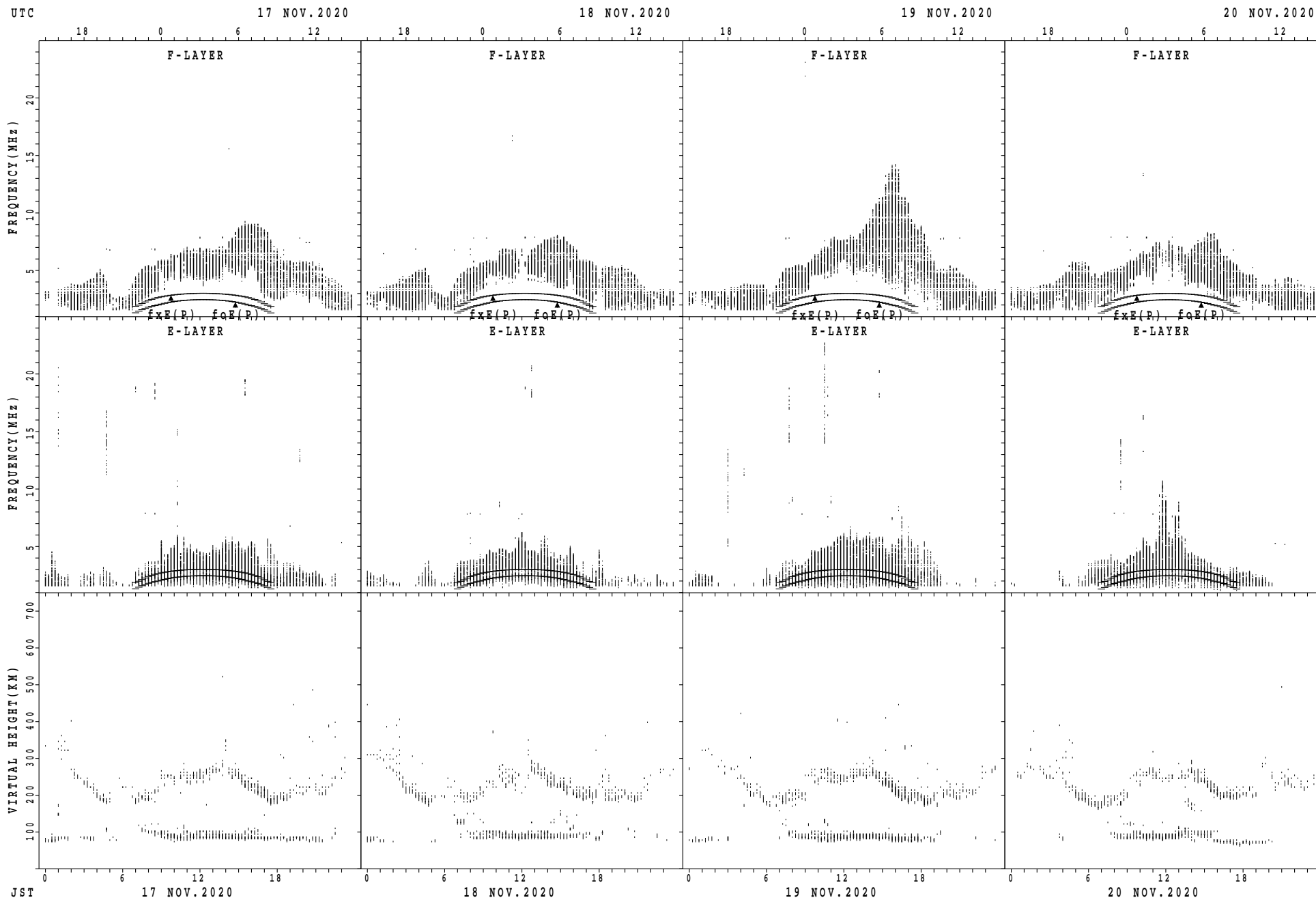
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Okinawa



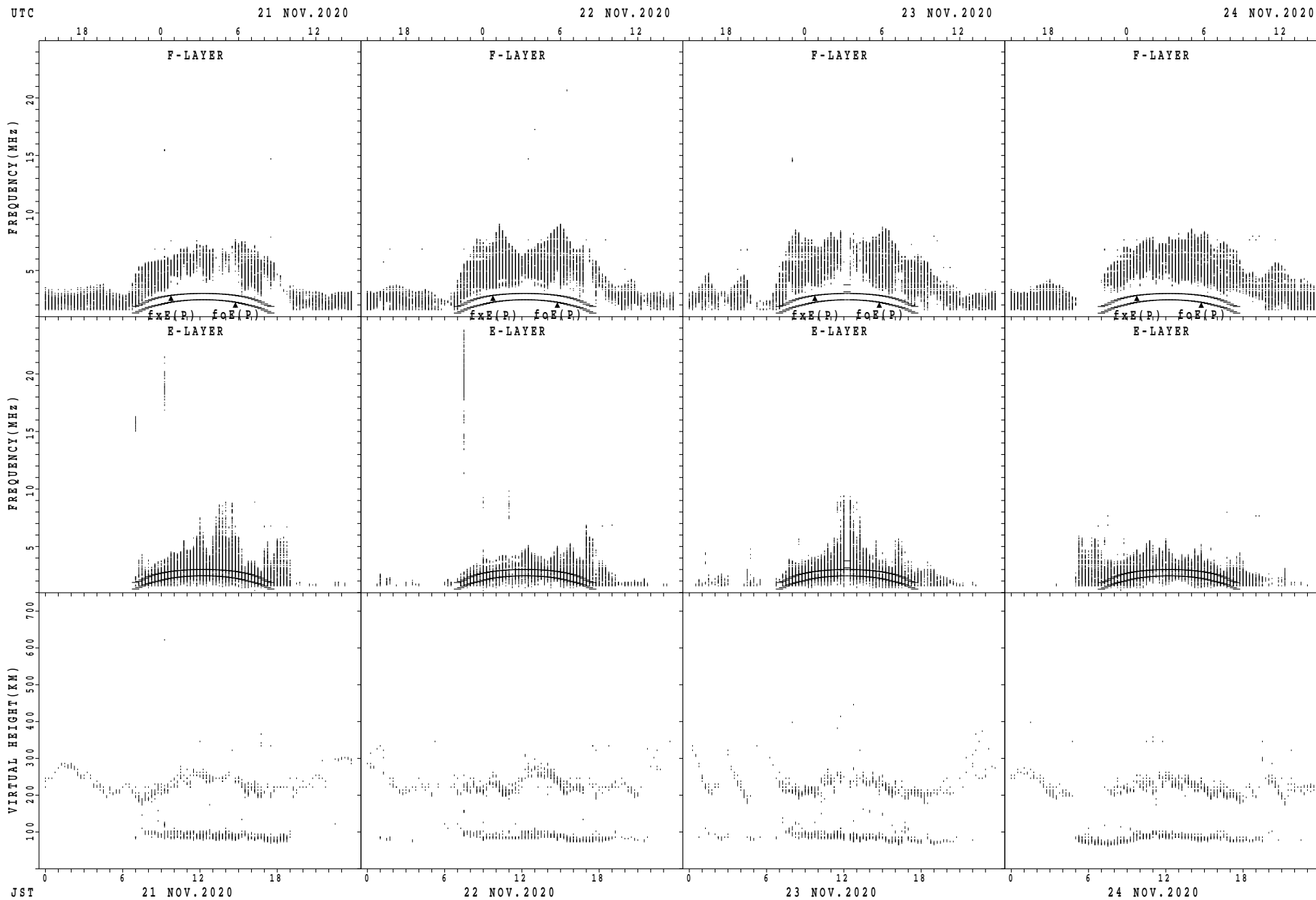
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

## SUMMARY PLOTS AT Okinawa



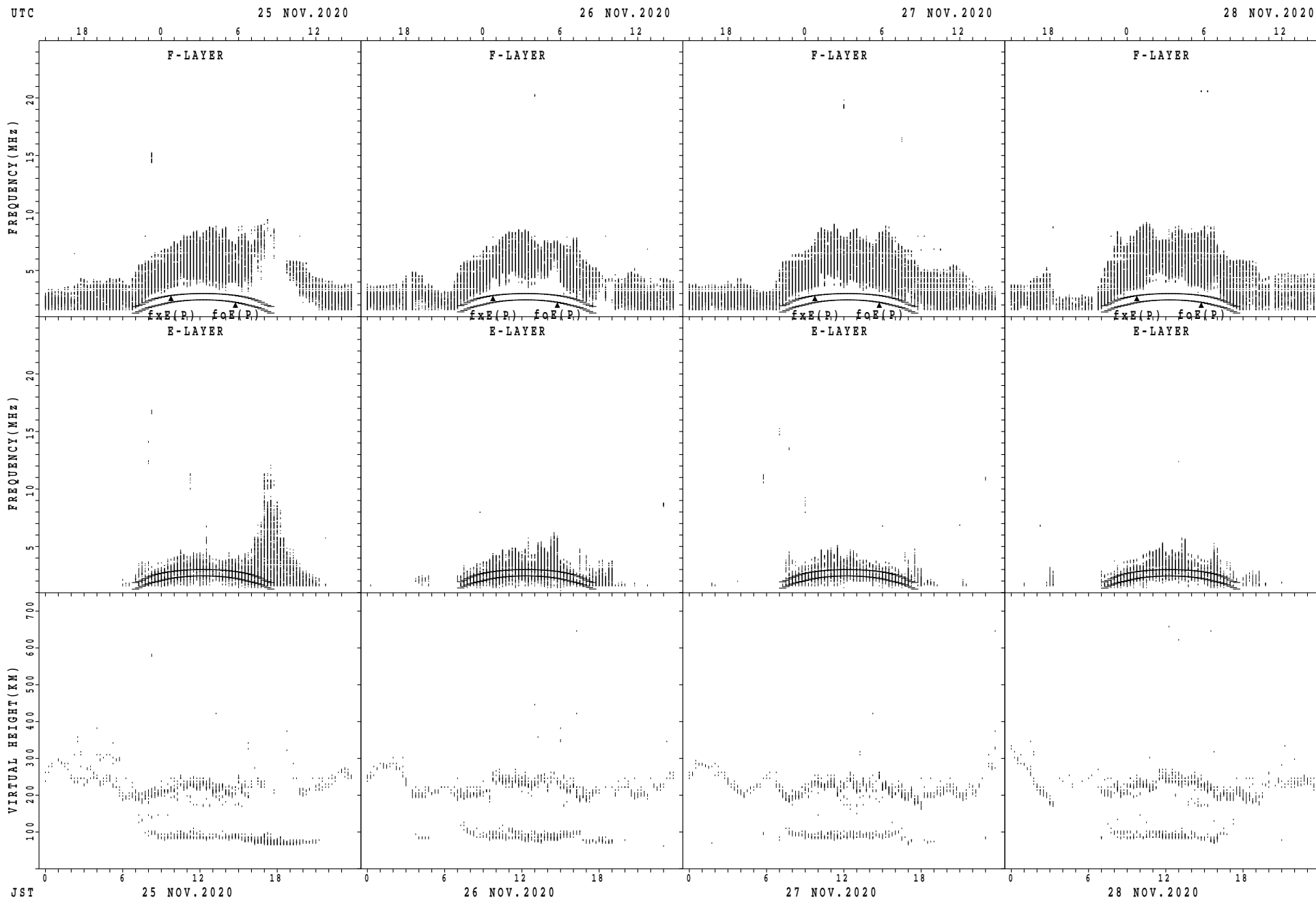
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Okinawa



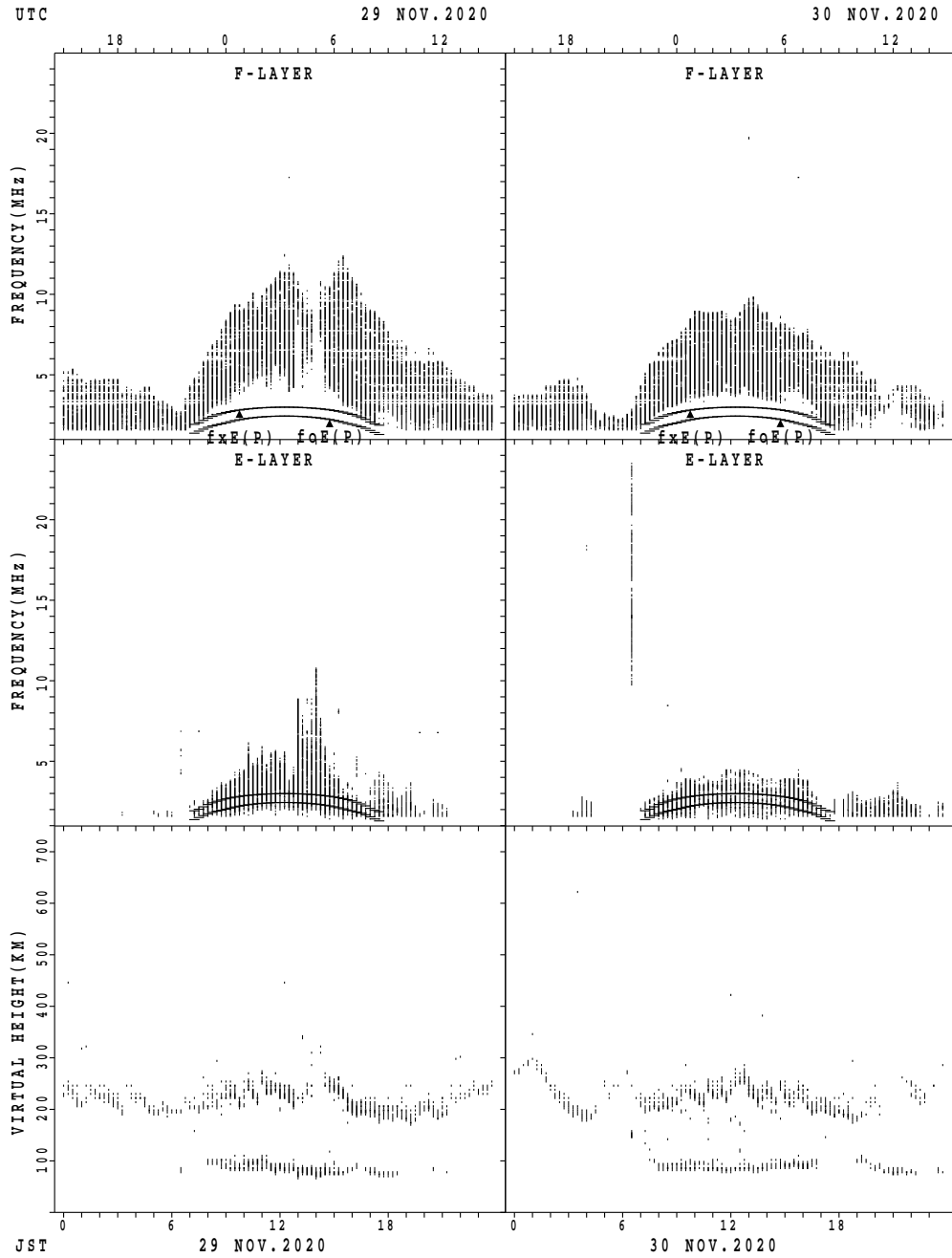
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Okinawa



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

SUMMARY PLOTS AT Okinawa



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



MONTHLY MEDIANS OF h'F AND h'Es  
 NOV. 2020 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								2	6	17	17	14	19	17	14	10	1							
MED								273	229	216	218	219	218	226	228	224	210							
U Q								326	248	232	236	242	226	238	234	230	105							
L Q								220	214	201	211	214	210	218	224	212	105							

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	17	22	21	23	21	22	14	29	30	30	30	30	30	30	30	30	24	28	21	18	19	19	13	13
MED	98	97	98	96	96	98	97	98	100	100	98	98	96	98	98	98	98	96	96	96	96	98	96	98
U Q	98	98	98	98	98	98	98	161	100	100	100	100	98	100	100	98	98	98	96	96	98	98	98	98
L Q	96	96	96	96	95	96	94	98	98	98	98	96	94	96	98	96	96	94	94	94	96	96	96	96

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	11	16	8			9	22	15	1							
MED								208	220	224	214			232	232	220	240							
U Q								104	234	239	226			259	240	232	120							
L Q								104	212	216	208			216	224	208	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	17	15	14	11	9	13	9	26	30	30	30	29	30	30	29	29	24	19	20	19	16	17	13	20
MED	96	96	98	98	96	98	98	101	100	99	98	98	97	96	96	98	98	96	96	96	96	98	98	96
U Q	98	98	98	98	98	98	98	143	100	100	100	100	98	98	98	98	98	98	98	98	98	98	98	98
L Q	94	96	96	96	96	96	96	98	98	98	96	96	94	92	96	96	96	96	96	94	96	94	96	96

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								6	11	13				7	23	13	2							
MED								220	228	242				240	232	220	249							
U Q								232	236	247				264	242	229	272							
L Q								206	208	224				222	218	212	226							

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	19	17	18	18	12	15	14	25	30	30	30	30	30	30	29	30	30	25	28	25	26	24	23	20
MED	96	96	96	96	96	96	98	98	100	98	98	98	98	98	98	96	96	98	96	96	97	98	96	96
U Q	98	98	96	98	96	98	98	115	102	100	100	98	100	98	99	100	100	98	98	98	98	98	98	98
L Q	96	95	94	96	96	96	96	96	98	98	98	96	96	96	96	92	96	94	94	96	96	96	96	96

MONTHLY MEDIANS OF h'F AND h'Es  
 NOV. 2020 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									4	12	9					30	24	17	7	1				
MED									216	235	230					232	224	216	212	226				
U Q									221	240	243					240	228	227	232	113				
L Q									208	221	226					220	206	203	198	113				

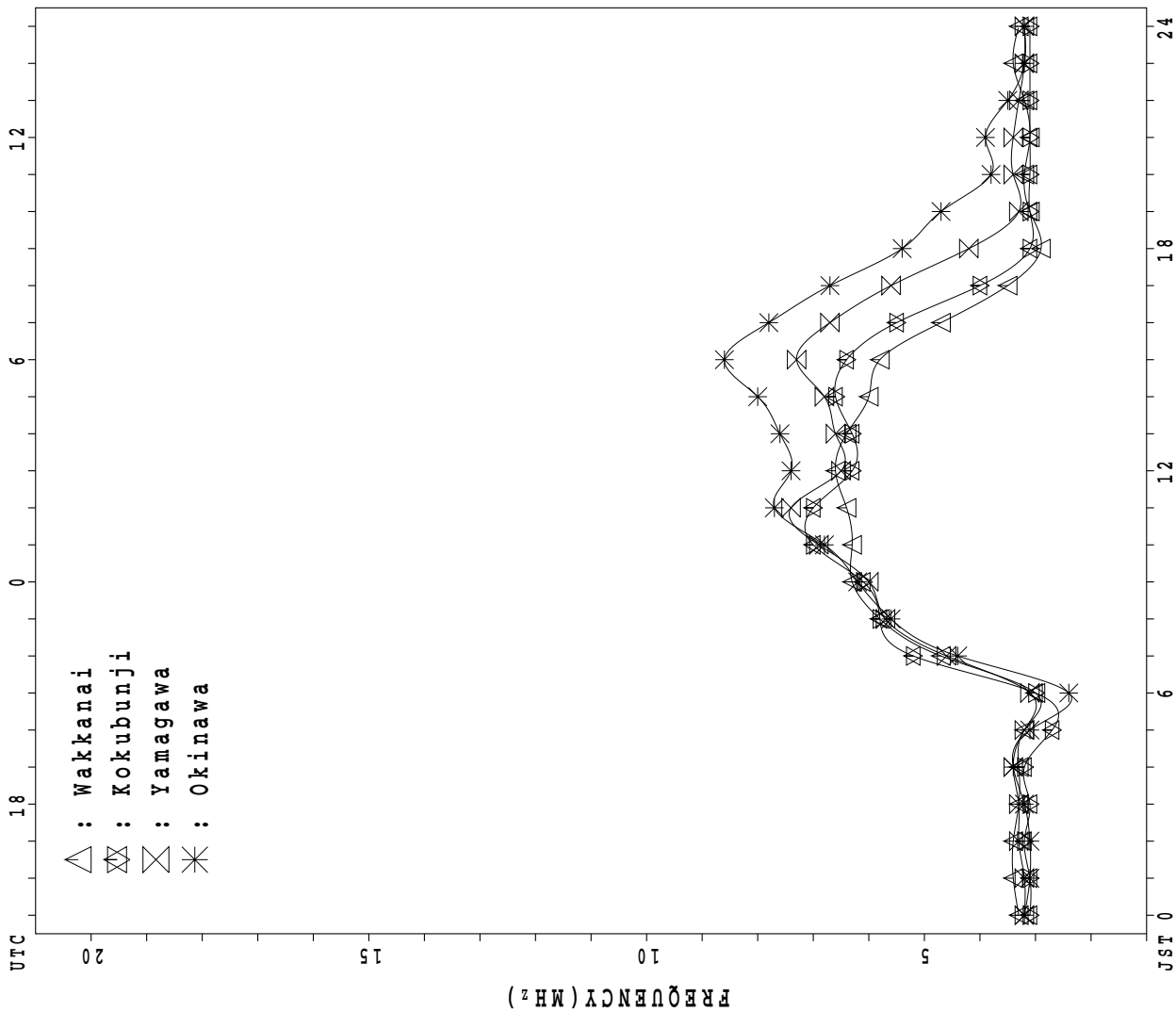
h'Es

	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	15	18	18	19	16	14	12	25	30	30	30	30	30	30	30	30	30	30	27	28	23	26	19	16
MED	96	96	96	98	98	96	97	98	98	98	98	96	98	96	96	96	96	96	96	97	98	98	98	96
U Q	98	98	98	98	98	96	133	131	100	100	98	98	98	98	98	98	98	98	98	98	98	98	98	98
L Q	96	96	96	96	96	96	94	98	98	96	96	96	96	94	94	94	94	94	94	94	94	96	96	94

MONTHLY MEDIANS PLOT OF fOF2

NOV. 2020

AUTOMATIC SCALING



## IONOSPHERIC DATA STATION Wakkanai

NOV.2020 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 41	X 40	X 43	X 43	X 41	X 37	X 40											X 44	X 37	X 41	X 43	X 40	X 40	X 40
2	X 37	X 39	X 39	X 39	X 38	X 36	X 41											X 55	X 45	X 49	X 49	X 46	X 46	X 48
3	X 47	X 48	X 49	X 49	X 49	X 52	X 39											X 51	X 39	X 38	X 40	X 40	X 40	X 41
4	X 41	X 40	X 41	X 41	X 38	X 38	X 37											X 42	X 36	X 40	X 40	X 38	X 38	X 39
5	X 39	X 39	X 41	X 40	X 38	X 41	X 39											X 40	X 30	X 35	X 40	X 38	X 32	X 33
6	X 39	X 38	X 38	X 38	X 37	X 38	X 35											O 48	X 44	X 38	X 37	X 37	X 42	X 43
7	X 44	X 45	X 46	X 45	X 44	X 41	X 44											X 44	X 38	X 38	X 43	X 45	X 44	X 45
8	X 45	X 46	X 57	X 53	X 55	X 50	X 39											X 43	X 39	X 41	X 43	X 40	X 42	X 44
9	X 40	X 42	X 44	X 44	X 47	X 40	X 36											X 41	X 37	X 37	X 39	X 44	X 48	X 41
10	X 42	X 43	X 43	X 43	X 44	X 41	X 39											X 39	X 39	X 37	X 39	X 41	X 41	X 42
11	X 42	X 42	X 43	X 42	X 44	X 44	X 38											X 45	X 37	X 40	X 41	X 41	X 41	X 44
12	X 46	X 44	X 49	X 46	X 43	X 41	X 39											X 39	X 39	X 45	X C	X 47	X 45	X 49
13	X 52	X 50	X 52	X 52	X 55	X 52	X 41											X 39	X 36	X 40	X 43	X 43	X 45	X 46
14	X 48	X 49	X 50	X 49	X 47	X 49	X 45											X 36	X 36	X 36	X 36	X 36	X 56	X 56
15	X 41	X 41	X 41	X 41	X 50	X 38	X 38											X 38	X 36	X 36	X 38	X 39	X 37	X 37
16	X 38	X 39	X 39	X 40	X 41	X 45	X 34											X 42	X 36	X 37	X 41	X 41	X 41	X 45
17	X 45	X 43	X 54	X 46	X 47	X 43	X 37											X 39	X 37	X 33	X 35	X 38	X 52	X 57
18	X 57	X 52	X 49	X 52	X 52	X 41	X 38											X 48	X 35	X 34	X 41	X 39	X 39	X 49
19	X 47	X 47	X 57	X 46	X 44	X 35	X 31											X 34	X 32	X 33	X 37	X 36	X 38	X 39
20	X 39	X 39	X 40	X 40	X 37	X 38	X 31											X 42	X 37	X 40	X 41	X 39	X 41	X 46
21	X 47	X 48	X 45	X 45	X 45	X 45	X 37											X 40	X 35	X 38	X 41	X 42	X 39	X 44
22	X 44	X 46	X 47	X 44	X 40	X 38	X 33											X 53	X 35	X 39	X 35	X 36	X 36	X 38
23	X 43	X 39	X 42	X 41	X 35	X 35	X 32											X 38	X 33	X 37	X 36	X 35	X 37	X 39
24	X 39	X 43	X 41	X 39	X 39	X 37	X 29											X 45	X 32	X 31	X 31	X 33	X 37	X 37
25	X 39	X 36	X 36	X 36	X 35	X 35	X 28											X 37	X 34	X 33	X 33	X 35	X 38	X 38
26	X 40	X 41	X 41	X 41	X 38	X 37	X 32											X 42	X 36	X 37	X 40	X 43	X 45	X 45
27	X 45	X 45	X 44	X 43	X 41	X 36	X 35									69		X 47	X 37	X 38	X 37	X 37	X 39	X 39
28	X 42	X 39	X 38	X 38	X 37	X 37	X 34											X 43	X 33	X 35	X 39	X 37	X 37	X 39
29	X 40	X 41	X 39	X 34	X 34	X 34	X 34											X 40	X 37	X 35	X 33	X 34	X 35	X 36
30	X 39	X 39	X 40	X 37	X 37	X 35	X 33											X 47	X 34	X 35	X 35	X 37	X 39	X 41
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30									1		30	30	30	29	30	30	30
MED	X	X	X	X	X	X	X									69		X	X	X	X	X	X	X
U Q	X	X	X	X	X	X	X											X	X	X	X	X	X	X
L Q	45	46	49	46	47	43	39											45	37	40	41	41	44	45
	X	X	X	X	X	X	X											X	X	X	X	X	X	X
	39	39	40	40	38	37	33											39	35	35	36	37	38	39

NOV.2020 f<sub>XI</sub> (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

NOV.2020 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

NOV.2020 foF2 (0.1MHz)

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## IONOSPHERIC DATA STATION Wakkanai

NOV.2020 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	L									
2									L	L	L	L	L	L	L									
3								L	L				L	L	L									
4											L	L	L	L	L	L								
5										L	L			L	L									
6										L	L	L	L	L	L									
7										L	L	L	404	316										
8										L	L	L	400		L	L								
9										L	L													
10									L	L	L	404	376											
11											L	L	L	L	L	L	L							
12									L		L	L	L	L	L									
13										L	L	L	L	L										
14											L	408				L								
15											L	L	L	L										
16											396	452	L	L	L	L	L							
17										364		L	L	L			L							
18										L	L	L	L	L			288							
19										L	L	L		L	L									
20										L	L	L	L	L	L	L	256							
21											L	L	L	L	L									
22										L	L	L	L	332		L								
23										396		396	L	L	L									
24											396		L	L										
25										L		L	L	L	L									
26										A	L	L	L											
27												L	L	L	L									
28											L	L	L	L	L									
29												L	L	L	L									
30											L		L	L	L		L							
31											432													
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										2	4	7	4	4		2								
MED										380	396	404	388	332		272								
U Q											414	408	402	346										
L Q											394	396	376	324										

NOV.2020 foF1 (0.01MHz)

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## IONOSPHERIC DATA STATION Wakkanai

NOV.2020 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								228	256	284	292	328	284	268	236	212	A								
2								192	252	260	280	256	244	264	244	A	A								
3								172	240	268	268	304	296	276	256	208	168								
4								204	232	264	264	244	292	268	256	208	172								
5								216	236	260	264	292	292	272	240	196	160								
6								160	236	268	280	284	284	284	244	240	188								
7								216	256	260	260	260	A	288	252	212	B								
8								168	240	268	284	248	268	268	260	A	B								
9								172	244	272	272	256	288	276	244	204	B								
10								168	252	252	240	284	284	268	240	232	B								
11								176	244	268	292	280	A	292	248	208	B								
12								192	244	252	252	248	276	272	252	200	B								
13								200	244	276	260	288	A	284	252	200	B								
14								216	232	284	284	264	304	280	256	A	B								
15								168	228	272	284	292	292	268	260	208	B								
16								184	216	268	A	276	280	260	244	208	200	A							
17								196	232	272	272	284	284	280	248	200	B								
18								172	220	264	A	264	A	264	232	196	B								
19								188	212	260	292	292	284	272	248	212	B								
20								176	240	264	276	292	292	264	248	192	B								
21								164	216	248	268	288	288	264	240	204	A								
22								180	228	252	276	276	280	276	256	184	B								
23								176	220	256	264	268	284	260	240	204	A								
24								180	236	264	284	284	292	288	248	188	A								
25								216	240	272	288	272	288	272	256	220	244	B							
26								188	224	252	280	280	300	280	260	212	B								
27								216	244	268	284	304	288	256	248	212	B								
28								168	212	248	272	288	276	296	256	208	A								
29								172	212	264	284	276	264	280	240	200	B								
30								176	204	260	280	292	300	284	256	192	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	28	30	26	30	30	27	6								
MED								180	236	264	278	282	286	272	248	208	180								
U Q								200	244	268	284	292	292	280	256	212	200								
L Q								172	220	260	266	264	280	268	244	200	168								

NOV.2020 foE (0.01MHz)

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## IONOSPHERIC DATA STATION Wakkanai

NOV.2020 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

NOV.2020 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Wakkanai

NOV.2020 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	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
2	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
3	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
4	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
5	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
6	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
7	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
8	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
9	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
10	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
11	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
12	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
13	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
14	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
15	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
17	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
18	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
19	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
20	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
21	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
22	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
23	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
24	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
25	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
26	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
27	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
28	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
29	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
30	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
31																								
	00	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	30	30	30	30	30	30	29	30	30	30	30	30
MED	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
UQ	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
LQ	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B

NOV.2020 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

NOV.2020 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

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

NOV.2020 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

NOV. 2020 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1		307	307	298	292	327	328	351	373	373	331	370	393	360	368	367	347	359	359	336	336	343	377	317	350	
2		317	296	302	297	300	325	355	354	377	363	351	361	354	340	363	363	370	370	323	336	333	332	302	301	
3		305	313	313	319	291	329	329	390	347	388	346	392	373	368	346	368	368	364	343	329	328	329	312	333	
4		322	302	302	311	323	348	348	383	362	361	360	364	379	379	379	347	364	373	349	348	348	313	328	327	
5		314	313	331	330	330	354	357	389	377	369	376	379	368	367	366	365	387	363	354	301	323	323		R	
6		322	304	323	323	322	367	366	387	386	384	384	332	385	343	348	361	360	349	347	346	R	346	311	302	330
7		306	315	334	324	324	354	343	369	377	377	317	358	358	366	341	376	364	363	328	306	353	324	324	323	
8		337	337				346	382	369	369	369	369	358	362	347	365	391	355	354	325	324	338	300	311	316	
9		315	312	311	311	327	326	325	357	383	383	374	360	371	355	353	375	375	343	338	329	312	278	277	266	
10		291	322	307	290	358	346	345	369	347	399	368	356	355	339	361	361	366	365	345	333	318	327	330	329	
11		317	316	316	320	327	365	347	360	359	370	353	361	362	335	368	367	366	365	232	318	319	318	318	318	
12		R	316	316	330	320	319	374	346	372	373	360	371	368	368	368	367	367	330	318	327	C	347	337	322	
13		F	319	316	301	318	351	343	370	370	359	359	373	372	364	368	366	365	365	344	338	328	313	312	312	
14		311	311	311	327	338	344	335	377	386	367	367	375	377	369	365	378	377	359	323	322	322	309	316	F	
15		278	302	320	319		326		370	378	345	360	371	347	347	362	373	374	355	343	325	326	326	303	320	
16		317	303	312	324	320	371	305	389	385	352	327	326	365	356	365	380	360	341	331	330	329	329	322	307	
17		308	315	294	315	328	363	335	381	386	381	363	356	355	348	351	347	V	372	372	323	323	306	298	F	
18		F	F	293			358	318	373	372	372	377	376	335	364	383	360	347	369	368	292	317	316	315	268	
19		F	F	F	F	F	344	342	372	399	R	375	359	354	362	379	357	380	371	353	324	322	321	315	293	
20		319	307	324	323	322	390	336	376	376	375	375	357	357	344	352	371	370	370	307	335	326	319	319	306	
21		329	303	302	330	291	356	324	357	376	375	366	362	362	362	384	383	358	315	349	348	326	326	291	290	
22		290	296	327		313	313	312	358	357	334	362	361	373	348	372	347	375	336	333	333	338	302	303	280	
23		320	297	297	352	330	292	300	351	380	357	347	387	361	338	331	372	371	396	319	339	338	298	298	298	
24		297	296	320	339	338	374	354	365	372	402	383	393	366	401	349	348	358	349	285	342	328	287	287	312	
25		338	322	312	311	311	382	290	365	388	348	371	326	357	372	387	332	379	332	331	331	320	319	290	290	
26		300	300	311	350	317	362	318	353	353	338	361	346	353	326	372	372	394	F	307	347	313	312	298	293	
27		293	299	332	324	324	321	321	382	343	389	389	357	373	352	370	363	F	342	349	332	332	302	301	301	
28		326	315	293	319	318	340	339	340	378	368	373	354	353	386	338	349	390	325	306	306	332	310	287	286	
29		308	307	343	305	305	305	304	364	363	378	351	332	356	350	349	380	371	355	311	334	317	308	308	288	
30		302	308	321	320	320	345	344	352	378	385	322	337	372	343	373	360	375	388	305	328	319	310	302	302	
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	26	26	30	29	30	30	29	30	30	30	30	30	30	30	29	30	30	29	30	28	27	
MED		312	308	312	320	322	347	339	370	376	369	366	360	362	356	365	366	369	359	331	330	326	314	310	306	
U Q		320	315	324	324	327	363	348	377	380	382	374	373	372	368	372	373	375	370	344	336	336	326	318	322	
L Q		301	302	302	311	317	328	320	358	363	358	353	356	355	344	351	357	360	346	318	324	318	308	300	290	

NOV. 2020 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

NOV. 2020 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	L									
2									L	L	L	L	L	L	L									
3								L	L			L	L	L										
4											418	399	L	L	L	L								
5										L	L			L	L									
6										L	L	L	L	L	L									
7									L	L	L				L									
8									L	L	L	390	371	L	L									
9									L	L		405												
10									L	L	L	395	411											
11										L	L	L	L	L	L	L								
12								L		L	L	L	L	L	L									
13									L	L	L	L	L											
14										L	L	L	L		L									
15										L	L	L	L											
16											410	382	L	L	L	L	L							
17									402		L	L	L	L			L							
18									L	L	L	L	L											
19									L	L	L	L	L	L	L									
20									L	L	L	L	L	L	L							402		
21										L	L	L	L	L	L									
22									L	L	L	L	L	421	L									
23										365	L	408	L	L	L									
24											379		L	L										
25									L			L	L	L	L									
26									A	L	L	L												
27											L	L	L	L	L									
28										L	L	L	L	L	L									
29											L	L	L	L	L									
30										L		L	L	L			L							
31											385													
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										2	4	7	4	4		2								
MED										384	398	395	408	418		410								
U Q										414	400	414	428											
L Q										382	387	398	394											

NOV. 2020 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

NOV.2020 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										242	224	212	236	222	222										
2									220	234	234	234	218	250	232										
3									246	210	224	220	228	230	230										
4										248	246	220	220	220	306										
5										238	222	222	238	224	234										
6										212	222	240	218	272	244										
7										220	246	246	230	230	242										
8										232	232	238	238	248	228										
9										228	228	222	222												
10									234	222	224	224	234	218											
11										218	244	222	226	240	236	222									
12									222		232	232	232	228	230										
13										238	224	230	230	238											
14											230	230	230		228										
15											228	228	238	244											
16											252	276	218	234	234	228									
17										228		250	232	232		230									
18										224	234	220	274	242		236									
19										218	224	232		230	216										
20										216	222	244	238	250	250	226									
21											226	224	238	238	232										
22											252	236	236	220	242	238									
23											246	246	214	218	242	222									
24												228		228	204										
25										248		244	246	242	224										
26											276	228	230	238											
27												238	226	240	234										
28											218	224	226	234	262										
29												240	244	244	226										
30											212	274	250	232	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									4	20	26	29	29	27	21	7									
MED									228	228	228	232	230	238	232	230									
U Q									240	240	236	242	238	242	237	236									
L Q									221	218	224	223	224	230	225	226									

NOV.2020 h'F2 (KM)

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## IONOSPHERIC DATA STATION Wakkanai

NOV. 2020 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

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	266	266	278	252	242	216	216	228	200	200	204	172	194	196	224	210	204	242	250	234	226	278	222	
2	232	284	278	262	276	204	234	214	214	202	206	206	184	194	214	210	216	196	242	240	212	228	258	232	
3	240	242	248	264	252 <sup>Q</sup>	206	208	202	202	194	176	176	176	190	202	210	208	190	224	244	240	240	242	228	
4	228	272	256	238	244	218	198	194	208	212	198	218	218	186	194	204	216	198	238	224	224	258	248	246	
5	258	258	238	238	208	216	196	208	214	214	194	188	180	200	212	210	206	186	210	244	220	220	242	208	
6	226	254	224	236	236	196	186	200	214	206	194	194	184	184	218	224	206	206	208	212	204	240	248	228	
7	276	254	234	250	242	218	222	206	214	210	194	194	194	194	194	222	212	212	224	266	238	238	238	252	
8	220	248	244	252 <sup>Q</sup>	262 <sup>Q</sup>	200	196	210	206	206	206	206	190	202	216	206	204	204	220	232	214	232	248	224	
9	240	250	258	258	230	202	222	208	206	204	202	188	184	216	232	218	204	216	222	260	228	270	264 <sup>Q</sup>	274 <sup>Q</sup>	
10	250 <sup>Q</sup>	240 <sup>Q</sup>	230 <sup>Q</sup>	246	228	224	210	200	200	210	198	168	200	180	228	212	212	212	222	262	250	222	250	234	
11	244	260	228	228	242 <sup>Q</sup>	192	194	208	212	184	190	184	192	192	228	208	196	204	A	234	234	246	256	230	
12	242	242	242	262	232 <sup>Q</sup>	194	206	202	212	218	200	200	200	184	216	216	208	208	216	230	216	216	224	246	
13	246 <sup>Q</sup>	246	246	246	240	210	220	200	216	196	196	196	196	206	222	222	204	208	226	236	238	244	246	260	
14	250	250	240	220	220	208	216	216	198	214	202	198	198	208	200	218	194	194	232	222	242	282	236 <sup>Q</sup>	260 <sup>Q</sup>	
15	274	274 <sup>Q</sup>	240	220	198 <sup>Q</sup>	210	210	204	204	216	188	190	190	194	228	214	200	210	210	234	246	252	264	264 <sup>Q</sup>	
16	266	288	270	250	242	202	196	196	200	220	182	192	188	188	216	200	210	200	214	234	234	242	256	246 <sup>Q</sup>	
17	230 <sup>Q</sup>	228	246	228	216	198	198	204	204	198	218	198	198	196	236	208	208	194	212	230	276	258	262	272 <sup>Q</sup>	
18	256 <sup>Q</sup>	252 <sup>Q</sup>	254 <sup>Q</sup>	226 <sup>Q</sup>	226	200	168	198	218	198	204	198	188	210	226	198	208	210	194	272	248	238	252	280 <sup>Q</sup>	
19	262 <sup>Q</sup>	270 <sup>Q</sup>	246 <sup>Q</sup>	250	242	230	218	204	204	204	196	196	218	208	198	222	204	198	228	240	250	256	266	266	
20	252	246	246	226	218	196	252	196	202	222	200	192	192	212	222	200	210	200	E B	234	226	222	256	248	256
21	228	254	238	242	242	206	206	206	210	210	216	198	212	194	208	216	196	210	222	230	236	220	270	286	
22	286	252	242	230 <sup>Q</sup>	256	246	246	222	228	198	186	206	204	192	210	230	200	208	228	214	234	250	264	314	
23	256	316	270	226	252	246	254	218	228	202	216	198	196	190	202	216	202	200	248	248	242	288	288	278	
24	266	258	232	232	214	210	196	200	214	212	212	202	196	202	228	196	196	214	246	228	256	284	266	276	
25	230	230	262	272	256	194	192	216	210	200	226	210	198	198	204	206	196	206	206	232	250	266	302	302	
26	272	272	244	226	250	216	232	228	228	A	202	198	202	224	212	208	194	184	248	218	250	234	272	292	
27	276	268	236	224	238	214	232	210	210	228	196	208	188	188	208	208	204	214	242	224	246	272	276	298	
28	246	250	270	256	234	234	234	220	216	204	200	200	190	194	204	218	196	224	196	260	236	270	300	316	
29	270	274	216	268	268	258	278	212	210	210	222	202	202	200	202	206	188	228	244	238	240	274	278	306	
30	274	256	238	252	252	234	234	214	198	202	202	202	206	196	208	208	196	204	270	236	240	280	274	280	
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	29	30	30	30	30	30	30	30	30	29	30	30	30	30	30	
MED	250	254	244	244	242	210	213	207	210	206	200	198	195	194	212	210	204	205	224	234	238	248	260	262	
U Q	266	270	256	256	252	224	232	214	214	213	206	202	200	202	222	218	208	210	242	244	246	270	272	280	
L Q	240	248	238	228	228	200	196	200	204	200	194	192	188	190	202	206	196	198	213	228	228	234	248	234	

NOV. 2020 h'F (KM)

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## IONOSPHERIC DATA STATION Wakkanai

NOV.2020 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								116	116	106	106	96	104	104	104	104	A								
2								124	114	104	104	104	104	104	104	A	A								
3								122	96	96	102	102	92	98	98	98	B								
4								118	112	112	104	104	104	104	104	104	100								
5								A	108	108	108	108	108	108	112	112	108								
6								108	108	108	108	102	102	102	102	104	86								
7								110	110	106	106	98	A	100	106	98	B								
8								98	98	106	106	92	100	116	116	A	B								
9								108	108	108	108	102	102	102	106	102	B								
10								114	114	104	104	104	104	104	104	106	B								
11								106	106	98	104	114	A	114	104	116	B								
12								116	108	106	98	98	98	98	114	108	B								
13								B	102	104	104	104	A	100	106	102	B								
14								B	102	112	112	106	108	108	108	A	B								
15								126	98	98	104	110	110	104	106	106	B								
16								B	100	100	A	100	98	100	100	100	100	A							
17								B	100	112	108	108	100	106	106	106	B								
18								110	106	106	A	106	A	106	98	104	B								
19								114	104	112	112	112	104	104	104	124	B								
20								B	112	106	106	106	112	108	104	104	B								
21								E B	114	102	94	102	102	102	112	102	A								
22								B	102	104	104	104	104	104	104	104	B								
23								126	108	108	100	100	108	104	110	110	A								
24								102	116	98	100	96	102	102	106	98	A								
25								134	114	114	114	104	104	106	108	108	96								
26								B	110	110	110	106	108	106	106	106	B								
27								128	122	116	104	100	100	100	106	106	B								
28								110	104	104	104	104	104	96	96	108	A								
29								104	110	110	110	110	110	98	98	104	B								
30								112	112	112	112	112	112	112	110	110	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								22	30	30	28	30	26	30	30	27	5								
MED								114	108	106	105	104	104	104	106	104	100								
U Q								122	112	110	108	106	108	106	108	108	104								
L Q								108	102	104	104	100	102	100	104	102	91								

NOV.2020 h'E (KM)

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## IONOSPHERIC DATA STATION Wakkanai

NOV.2020 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	B	94	94	B	94	B	B	156	110	100	96	100	100	96	96	96	92	B	102	96	96	90	90	B	
2	B	96	96	96	96	110	94	118	118	112	112	106	106	102	160	90	90	90	90	92	94	98	104	92	
3	B	98	98	92	100	B	100	132	120	110	110	108	92	92	92	118	92	B	92	B	B	B	B	B	
4	96	B	B	B	92	92	B	144	144	110	108	102	96	90	98	108	94	94	92	102	102	102	102	94	
5	94	98	98	98	98	98	98	92	148	126	94	126	114	156	142	128	102	B	B	102	102	96	B	B	
6	B	B	B	B	B	B	B	92	132	132	120	96	98	150	150	136	116	100	B	98	B	B	B	B	
7	98	102	102	92	94	96	102	102	130	108	108	108	104	98	152	94	88	94	B	94	94	B	B	94	
8	94	94	94	98	98	98	B	92	144	106	104	96	96	150	120	92	92	92	92	92	B	118	B	B	
9	B	102	B	102	90	90	90	140	140	112	110	106	110	92	148	92	92	90	86	84	92	92	100	B	
10	98	B	B	98	98	92	94	148	144	102	102	102	98	134	90	96	B	96	96	96	96	102	102	96	
11	B	96	96	96	96	96	96	96	96	102	102	102	102	98	142	144	94	94	94	94	94	94	94	94	
12	B	B	94	94	94	88	88	96	122	108	106	104	96	166	160	94	94	94	B	B	B	B	B	94	
13	B	94	94	94	104	98	90	140	126	126	108	106	96	96	118	94	B	98	94	100	96	B	B	114	
14	106	98	94	94	94	94	B	96	156	130	106	98	104	98	90	90	90	90	98	B	98	B	B	B	
15	98	98	98	98	98	B	94	G	140	124	110	110	104	150	118	110	94	94	92	92	92	92	92	92	
16	104	92	102	B	94	94	B	100	198	108	102	100	98	106	90	90	96	88	92	92	92	B	B	128	
17	110	B	B	106	B	106	B	146	128	124	112	104	122	110	178	114	100	88	94	B	90	104	B	B	
18	B	B	B	94	94	B	B	168	150	136	98	108	104	104	110	118	98	100	100	B	B	76	B	B	
19	102	92	106	96	96	96	96	102	158	150	100	108	116	140	112	138	B	94	94	94	94	86	B	B	
20	110	B	98	98	B	B	B	98	144	144	112	102	126	168	156	142	B	94	B	B	B	B	B	94	
21	98	100	B	100	100	100	B	166	146	140	104	104	100	108	158	142	100	B	B	B	B	B	B	B	
22	B	100	96	96	96	96	B	124	120	118	116	98	98	102	102	144	96	B	B	B	B	116	116	102	
23	108	100	B	100	110	112	96	142	116	106	106	106	106	134	100	136	92	92	92	92	B	B	B	B	
24	92	102	92	B	B	B	B	92	94	106	146	116	106	104	104	148	142	94	86	86	96	94	110	110	
25	100	100	B	100	B	B	B	142	130	120	114	110	106	106	106	136	102	90	B	94	104	104	104	104	
26	B	100	100	100	100	98	B	108	108	102	142	116	120	120	120	108	B	98	106	B	124	94	B	B	
27	B	90	104	104	B	92	B	134	120	120	110	110	110	120	G	98	82	96	B	B	B	B	B	B	
28	B	104	96	B	96	96	B	G	126	134	100	100	102	102	122	G	98	108	88	94	94	110	90	86	
29	B	A	108	100	100	100	B	84	100	112	130	104	104	104	88	98	98	104	130	B	92	92	84	B	
30	B	100	110	98	B	98	B	102	136	108	126	110	102	G	G	114	98	92	98	B	94	102	B	102	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	15	22	21	24	23	22	14	28	30	30	30	30	30	29	28	29	25	25	21	18	20	20	12	14	
MED	98	98	98	98	96	96	94	113	130	119	108	105	104	106	119	110	94	94	94	94	94	100	101	95	
U Q	106	100	102	100	100	98	96	142	144	130	112	108	106	137	149	136	98	97	98	96	97	104	104	102	
L Q	96	94	94	95	94	94	90	97	120	108	102	102	98	98	99	94	92	90	92	92	93	92	91	94	

NOV.2020 h'Es (KM)

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## IONOSPHERIC DATA STATION Wakkanai

NOV.2020 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

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 1	F 1		F 1			HL 12	L 6	C 4	C 3	C 3	C 2	LC 21	LC 21	LC 11	L 2		F 2	F 1	F 1	F 2	F 1		
2		F 1	F 1	F 2	F 1	F 1	F 1	C 2	C 3	C 3	C 4	C 2	C 2	C 2	HL 22	L 3	L 3	F 3	F 3	F 2	F 2	F 1	F 1	F 1	
3		FQ 11	FQ 31	FQ 21	F 1		F 1	C 3	C 2	C 4	C 3	C 2	C 1	LC 11	LC 11	C 1	L 1		F 1						
4	F 1				F 1	F 1		C 2	C 2	C 2	C 4	C 2	LC 21	LC 21	LC 21	C 2	C 1	F 1	F 1	F 1	F 1	F 1	F 2	FF 21	
5	FQ 21	F 2	F 1	F 2	FQ 61	FQ 31	F 1	LC 11	HC 22	CL 21	CL 21	C 2	CL 11	HC 11	H 2	C 2	C 1			FQ 21	FQ 11	F 1			
6								LC 11	C 2	C 2	C 2	C 2	LC 21	H 1	H 2	H 2	C 1	F 1		F 1					
7	F 2	F 2	F 4	F 2	F 1	F 1	FF 11	LC 11	CL 21	C 2	C 2	C 3	L 3	C 2	HL 21	LC 21	L 1	FF 31		F 1	F 1			F 1	
8	F 1	F 1	F 1	F 1	F 1	F 1		LH 11	H 2	C 4	C 4	C 4	LC 21	H 1	C 1	L 2	L 2	F 3	F 1	F 1		F 1			
9		F 1		F 2	F 3	F 1	F 2	H 2	C 2	C 3	C 2	C 2	CL 21	LC 11	H 1	LC 21	L 3	F 2	F 2	F 1	F 1	F 1	F 1		
10	F 1			F 1	F 5	FF 11	F 1	CL 21	CL 21	C 3	C 3	C 2	LC 31	LC 21	LC 21	LC 21		F 1	F 1	F 1	F 1	F 1	F 3	F 3	
11		F 5	F 3	F 2	F 1	F 1	F 1	LC 11	LC 11	CL 32	C 4	LC 31	L 3	LC 21	H 2	HL 21	L 2	FF 11	F 4	F 2	F 3	F 1	F 1		
12			F 2	F 1	F 1	F 3	F 3	LC 11	C 2	C 2	C 3	C 4	LC 11	HL 21	H 2	LC 11	C 2	F 1						F 1	
13		F 1	F 2	F 2	FQ 11	F 1	F 1	H 1	C 2	C 2	C 3	C 2	L 3	LC 21	CL 21	LC 22		F 1	F 1	F 2	F 1			F 1	
14	F 1	F 1	FQ 21	FQ 21	FQ 11	F 1		LH 11	HL 21	CL 21	C 2	C 4	C 2	LC 11	LC 21	L 2	L 2	F 1	F 1		F 1				
15	F 2	F 2	F 2	F 1	F 1		F 1	H 2	C 2	C 2	C 2	C 2	C 2	H 2	CL 21	C 2	L 1	F 1	F 2	F 1	F 1	F 2	F 1	F 1	
16	F 1	F 1	F 1		F 1	F 1		LH 11	HL 21	LH 22	L 3	LC 31	LC 31	C 2	LH 22	LH 32	L 1	F 1	F 1	F 1	F 1			F 1	
17	F 1			F 1		F 1		H 2	C 2	C 2	C 2	LC 21	C 2	C 3	H 1	C 2	L 1	F 1	F 1		F 1	F 1			
18				F 1	F 1			F 1	HL 21	H 2	L 2	L 2	LQ 41	L 2	C 2	C 2	L 1	FF 11	F 1					F 1	
19	F 1	F 1	F 1	F 1	F 1	F 1	F 1	LC 11	H 2	H 2	CL 21	L 2	C 2	C 2	C 2	CL 11		F 1	F 1	F 1	F 1	F 1			
20	F 1		F 1	F 1				LC 11	CL 21	CL 21	CL 21	LC 22	CL 21	HL 21	HL 21	H 2		FQ 11						F 1	
21	F 1	F 1		F 1	F 1			H 2	H 2	C 2	C 2	LC 22	LC 32	LC 21	H 2	H 2	H 2								
22		F 2	F 3	F 2	F 1	F 1		C 2	C 2	C 2	C 2	LC 21	LC 21	LC 22	L 3	HL 31	LL 31					F 1	F 1	F 1	
23	F 2	F 3		F 1	F 1	F 2	F 1	H 2	C 2	C 2	C 3	C 3	C 2	CL 21	LC 22	C 4	L 4	F 3	F 1	F 1					
24	F 1	F 1	F 1				F 1	LC 11	LC 21	CL 21	C 4	C 3	C 2	C 3	HL 21	HL 21	L 1	F 1	F 1	F 1	F 1	F 1	F 4	F 2	
25	F 2	F 2		F 1				C 3	C 3	C 2	C 3	C 4	C 2	C 2	CL 21	CL 21	C 3	F 2		F 1	F 1	F 1	F 2	F 1	
26		F 1	F 2	F 2	F 1	F 1		LC 11	LC 21	C 6	HL 21	C 2	C 2	C 2	C 2	C 2		F 1	F 1		F 1	FF 11			
27		F 1	F 1	F 1		F 1		C 2	C 2	C 2	C 2	C 2	C 2	C 1		CQ 21	L 2	F 1				F 1			
28		F 1	F 1		F 1	F 1		C 2	C 2	C 2	LC 22	LC 21	LC 21	LC 11	CL 22		L 1	F 2	F 3	FQ 21	FQ 11	F 1	F 1	F 1	
29		F 1	F 1	F 2	F 3	F 2	F 1	LC 11	LC 11	CL 11	C 1	C 2	C 2	LC 11	LC 11	LC 11	LL 11	F 1	F 1		F 1	F 1	F 1		
30		F 2	F 1	F 1		F 1		LC 11	HL 21	LC 11	C 2	C 4	C 2			LC 11	L 1	F 1	F 1		F 1	F 2		F 1	
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.2020 TYPES OF Es  
 NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

NOV. 2020 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 36	X 37	X 38	X 38	X 38	X 36													X 60	X 46	X 48	X 39	X 32	X 35	
2	X 36	X 35	X 34	X 34	X 36	X 40														X 44	X 45	X 42	X 39	X 39	
3	X 40	X 36	X 40	X 40	X 40	X 38													X 43	X 41	X 42	X 44	X 40	X 38	
4	X 38	X 38	X 36	X 36	X 36	X 36													X 41	A	X 37	X 36	X 36	X 36	
5	X 37	X 36	X 36	X 36	X 38	X 34														X 34	X 36	X 40	X 40	X 38	
6	X 36	X 36	X 35	X 35	X 35	X 35														X 39	X 36	X 36	X 36	X 38	
7	X 38	X 40	X 39	X 39	X 39	X 37														X 37	X 39	X 41	X 42	X 40	
8	X 41	X 41	X 41	X 41	X 41	X 38														X 40	X 43	X 38	X 37	X 36	
9	X 37	X 38	X 40	X 40	X 40	X 38														X 35	X 38	X 38	X 40	X 40	
10	X 40	X 41	X 40	X 40	X 41	X 36														X 37	X 38	X 36	X 38	X 38	
11	X 37	X 37	X 37	X 39	X 39	X 34														X 36	X 37	X 38	X 38	X 39	
12	X 37	X 39	X 38	X 38	X 38	X 35									X 65					X 40	X 39	X 39	X 39	X 36	
13	X 36	X 37	X 38	X 38	X 40	X 34														X 35	X 36	X 37	X 37	X 39	
14	X 41	X 39	X 39	X 39	X 40	X 36													X 32	X 36	X 39	X 39	X 37	X 38	
15	X 38	X 38	X 39	X 37	X 38	X 26														X 36	X 38	X 38	X 39	X 39	
16	X 38	X 38	X 38	X 38	X 40	X 36														X 37	X 37	X 37	X 38	X 38	
17	X 39	X 39	X 40	X 38	X 36	X 36														X 34	X 33	X 31	X 33	X 34	
18	X 34	X 34	X 37	X 37	X 38	X 30														X 36	X 32	X 36	X 36	X 32	
19	X 34	X 36	X 36	X 37	X 37	X 34														X 34	X 37	X 35	X 35	X 36	
20	X 35	X 35	X 37	X 38	X 35	X 32														X 40	X 43	X 44	X 41	X 40	
21	X 44	X 44	X 44	X 42	X 40	X 39														X 36	X 36	X 34	X 38	X 36	
22	X 38	X 38	X 39	X 39	X 37	X 27														X 35	X 34	X 36	X 34	X 34	
23	X 37	X 38	X 38	X 38	X 31	X 31														X 34	X 36	X 31	X 33	X 33	
24	X 39	X 38	X 38	X 38	X 37	X 29														X 36	X 35	X 33	X 34	X 35	
25	X 35	X 34	X 34	X 35	X 35	X 30												X 41		X 35	X 33	X 30	X 33	X 34	
26	X 34	X 35	X 37	X 37	X 37	X 34														X 37	X 39	X 39	X 42	X 41	
27	X 40	X 41	X 41	X 42	X 40	X 35														X 39	X 37	X 35	X 36	X 38	
28	X 37	X 37	X 40	X 38	X 35	X 31														X 38	X 41	X 41	X 39	X 39	
29	X 40	X 40	X 40	X 33	X 36	X 33														X 45	X 44	X 32	X 35	X 35	
30	X 36	X 37	X 38	X 38	X 37	X 29														X 36	X 37	X 37	X 38	X 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	30	30	30	30	30	30									1				1	4	29	30	30	30	30
MED	X	X	X	X	X	X									X 65				X 41	X 42	X 36	X 37	X 37	X 38	X 38
U Q	X	X	X	X	X	X														X 52	X 40	X 39	X 39	X 39	X 39
L Q	X	X	X	X	X	X														X 36	X 35	X 36	X 35	X 35	X 35

NOV. 2020 f<sub>XI</sub> (0.1MHz)

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## IONOSPHERIC DATA STATION Kokubunji

NOV.2020 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	30	31	32	32	32	30	38	56	67	91	77	76	63	60	57	53	51	55	54	40	42	33	26	29
2	30	29	28	28	30	F	34	54	72	69	66	64	77	61	70	66	54	49	53	38	39	36	33	33
3	34	32	34	34	34	32	36	51	64	63	73	64	57	62	63	65	58	45	37	35	36	38	34	32
4	32	32	30	30	30	30	38	54	A	62	71	68	59	61	65	50	51	46	35	A	31	30	30	30
5	31	30	30	30	32	28	33	52	56	62	73	79	61	51	60	56	56	45	30	28	30	34	34	32
6	30	30	29	29	29	29	33	53	57	55	63	V	59	57	60	61	56	68	50	33	33	30	30	32
7	32	33	33	33	33	31	33	60	71	66	71	70	A	64	66	60	55	51	30	31	33	35	36	34
8	35	35	35	35	35	32	34	48	54	60	66	78	66	62	67	69	56	42	33	34	37	32	31	30
9	31	32	34	34	34	32	34	56	60	76	78	71	59	57	60	63	59	40	26	29	32	32	34	34
10	34	35	34	34	35	30	36	53	58	65	70	64	V	57	58	58	61	54	34	28	31	32	F	32
11	31	31	31	33	33	28	31	52	58	59	70	64	V	56	62	60	63	56	46	28	30	31	32	F
12	31	33	32	32	32	29	30	49	50	60	67	72	65	56	59	60	51	A	33	34	33	33	33	30
13	31	31	32	32	34	28	33	50	56	61	70	69	67	62	63	60	62	44	29	29	30	31	31	33
14	35	33	33	33	34	30	33	63	58	58	73	80	66	66	60	60	56	36	26	30	33	33	31	32
15	32	32	33	32	32	20	27	49	58	59	68	72	58	63	72	66	60	36	27	30	32	32	33	33
16	32	32	32	32	34	30	29	50	53	59	63	70	63	V	63	63	61	56	39	29	31	31	31	32
17	33	33	F	32	30	30	29	50	52	55	60	66	58	58	59	63	56	45	27	28	27	25	27	28
18	28	28	31	31	32	24	26	48	54	60	60	58	54	54	69	67	50	35	30	30	26	30	30	26
19	28	30	30	31	31	28	30	48	54	58	71	71	58	61	70	68	50	34	26	28	31	29	29	30
20	29	29	31	32	29	26	26	46	54	54	62	65	59	62	72	78	58	33	28	34	37	38	35	34
21	38	38	38	36	34	33	29	48	58	55	59	66	V	62	64	77	64	52	37	28	30	30	28	30
22	32	32	33	33	31	21	27	54	64	64	95	71	66	70	67	68	59	48	35	29	28	30	28	28
23	31	32	32	32	25	25	29	51	63	69	80	71	64	72	78	56	56	42	A	28	30	25	27	27
24	F	32	32	32	31	23	25	50	60	70	70	66	68	71	71	66	V	64	39	28	30	29	27	28
25	29	28	28	29	29	24	26	46	52	60	70	69	62	72	70	70	55	35	30	29	27	24	27	28
26	28	29	31	31	31	28	30	55	64	61	64	73	65	86	76	55	51	35	31	31	33	33	36	35
27	34	35	35	36	34	29	30	56	57	56	74	75	L	76	65	65	58	50	42	35	33	31	29	30
28	31	31	34	32	29	25	29	56	61	71	78	65	V	71	73	66	62	52	38	32	32	35	35	33
29	34	34	34	27	30	27	28	56	78	73	65	75	63	79	76	66	54	38	38	39	38	26	29	29
30	30	31	32	32	31	23	26	54	64	66	81	67	74	64	69	58	60	44	33	30	31	31	32	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	30	29	30	30	29	30	30	29	30	30	30	29	30	30	30	30	29	29	29	30	30	29	29
MED	31	32	32	32	32	28	30	52	58	61	70	70	63	62	66	62	56	42	30	30	31	31	31	32
U Q	34	33	34	33	34	30	33	55	64	66	73	72	66	66	70	66	58	46	34	34	33	33	33	33
L Q	30	30	31	31	30	25	28	49	54	59	65	65	58	60	60	58	52	36	28	29	30	29	29	29

NOV.2020 foF2 (0.1MHz)

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## IONOSPHERIC DATA STATION Kokubunji

NOV.2020 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	U L 452	L	L										
2									L	A	L		L	L	L									
3										L	L	L	A	L	L									
4									A	L			A	L	A	U L 448								
5										L	L	L	L	L	L				A					
6										L	L	U L 432	L	L	L									
7										L	L	L	A	L	L									
8										L	A	A	L	L	A	A								
9										L	A	L	L	L	L									
10									L	L	L	U L 428	L	U L 412	A									
11											L	L	A				L							
12											L	U L 436	L	L			A		A					
13										L	L	U L 412	L	L	L									
14											U L 444	L	L	L										
15										L	L	L	L	L										
16											L	L	A	L										
17										L		L	L	L										
18											L	L		A	L									
19												L	L	U L 452	L									
20										A	A	L	L	U L 448	L									
21												A	U L 432	L		L								
22									L	L			L	L	L	A								
23											L	U L 368	A	A	U L 396									
24											L			A	A									
25												L	L			L								
26											L	U L 408	L	U L 408	L									
27												L				A								
28										L			U L 480	L	L									
29											A	L	L	L	L									
30													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	6	1	5		1								
MED											U L 436	U L 430	U L 480	U L 412		U L 448								
U Q											U L 444	U L 432		U L 450										
L Q											U L 368	U L 412		U L 402										

NOV.2020 foF1 (0.01MHz)

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## IONOSPHERIC DATA STATION Kokubunji

NOV.2020 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	U	R	U	A	U	R	U	R	R	U	R	B					
2							B	U	A	A	A	A	A	A	A	U	R	U	A	A	B			
3							B	U	A	A	A	R	A	A	U	A	A	A	A					
4							B	A	A	A	A	A	A	A	A	U	A	A	A	B				
5							B	U	R	U	A	A	R	R	A	A	U	A	A	B	B			
6							B	U	A	R	R	A	R	U	A	A	U	R	B	B				
7							B	U	A	A	A	A	A	A	R	U	U	R	B	B				
8							B	U	A	A	A	A	A	A	A	A	A	A	A	B				
9							B	U	R	A	A	A	U	R	R	U	U	A	B	B				
10							B	U	R	U	R	R	U	A	U	R	A	A	B	B				
11							B	U	R	R	A	A	A	A	U	U	U	R	B	B				
12							B	U	A	A	A	A	A	A	A	A	A	A	A	B				
13							B	A	A	A	A	A	U	R	A	A	A	A	B	B				
14							B	U	R	R	A	A	A	A	A	A	U	R	B					
15							B	U	R	A	A	A	A	A	U	R	U	A	B	B				
16							B	U	R	R	A	R	A	A	U	R	U	R	B	B				
17							B	U	R	A	A	U	R	R	A	A	A	A	B	B				
18							B	U	R	A	A	A	U	A	A	A	A	A	B	B				
19							B	R	U	U	A	A	A	U	R	U	R	A	B	B				
20							B	U	A	A	A	A	U	R	U	R	A	A	B	B				
21							B	U	A	U	A	A	A	U	R	U	U	R	B	B				
22							B	U	R	A	A	U	R	A	A	A	A	A	B	B				
23							B	U	R	R	A	U	A	A	A	A	U	R	B	B				
24							B	U	A	A	R	A	A	A	A	A	U	R	B	B				
25							B	A	A	A	A	A	U	R	U	U	U	A	B					
26							B	U	R	U	A	A	A	A	A	U	R	A	B	B				
27							B	A	A	A	A	A	R	R	U	A	U	A	B	B				
28							B	U	R	U	A	A	U	A	A	R	U	R	B	B				
29							B	U	R	U	A	A	A	A	U	R	U	R	B	B				
30							B	U	R	U	A	U	R	R	A	U	U	R	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								25	23	12	5	3	7	9	15	17	15							
MED								U	R	U	A	U	R	U	R	U	R	U	R					
U Q								208	252	284	304	324	320	308	288	252	204							
L Q								U	R	U	U	U	R	U	R	U	R	U	R					
								214	260	296	308	340	332	314	296	256	208							
								U	A	U	A	U	U	U	A	U	U							
								200	248	284	294	320	312	306	284	250	188							

NOV.2020 foE (0.01MHz)

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## IONOSPHERIC DATA STATION Kokubunji

NOV.2020 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 A	J A		E B	E B		J A	G									G E	B J	J A	J A	J A	J A			
2		J A		J A	J A	E B	E B			J A	J A	J A	J A	J A			J A	J A	J A	J A	J A	J A		E B	
3	E B		E B	E B								J A	J A					J A	J A	J A	J A	J A	J A	J A	J A
4	J A	E B	E B	E B	E B	E B	E B	J A	J A	J A	J A	J A	J A	J A	J A			E B	E B	J A	J A	J A	J A	J A	J A
5	J A	J A		J A	J A	E B	E B		G	G					J A	J A	J A	E B	J A		J A	J A	J A	J A	
6	J A	E B		E B	E B	E B	E B				J A							G E	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	J A			J A	J A	J A	J A					G E	E B	E B	E B	E B	E B	E B	J A
8			E B	E B	E B	E B	E B				J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
9	J A	J A		J A	J A	E B	E B			J A	J A	J A	J A					J A	J A	J A	J A	J A	J A	J A	J A
10		E B	E B	E B	E B	E B	E B		G	G					J A	J A	J A	E B	E B	E B	E B	E B	E B	E B	E B
11	J A	J A	J A	J A	J A	E B	E B		G	G	J A		J A					J A	J A	J A	J A	E B	E B	E B	E B
12		E B	E B	E B	E B	E B	E B				J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
13		J A		J A	J A	E B	E B	J A		J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	E B	J A		
14			E B	E B	E B	E B	E B		G	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	E B
15	E B	E B		J A	J A	J A					J A	J A	J A	J A					E B	E B	E B	E B	E B	E B	E B
16	E B	E B	E B	E B	E B	E B	E B		G	G		J A	J A	J A	J A				G E	B J	J A	E B	J A		
17		J A	E B	E B	E B	E B	E B		G		J A				J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	E B
18		J A	E B	E B	E B	E B	E B		G		J A		J A	J A	J A	J A	J A	J A	J A	E B	E B	E B	E B	E B	E B
19	E B						J A				J A	J A	J A	J A				J A	J A	J A	J A	J A	J A	J A	J A
20	E B	E B	E B	E B	E B	E B	E B			J A	J A	J A	J A					J A	J A	E B	E B	E B	E B	E B	E B
21	E B	E B		E B		E B	E B				J A	J A	J A	J A					E B	E B	E B	E B	E B	E B	E B
22		E B	E B						G			J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
23		J A	J A	J A	J A	J A	E B		G		J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
24	J A			J A			E B		J A				J A	J A	J A	J A	J A	J A	J A	E B	J A	E B	E B	E B	J A
25	J A	J A	J A	E B	E B	E B	J A	E B	J A									J A	J A	J A	E B	E B	J A	E B	E B
26	E B	E B	E B	J A	E B	E B	E B				J A		J A		J A			J A	J A	J A	J A	J A	J A	J A	J A
27	E B	E B	E B	E B	E B	E B	E B	J A	J A		J A	J A						E B	J A	E B	E B	E B	E B	E B	E B
28	E B	E B		J A	E B	E B	E B		G	G									E B	E B	E B	E B	E B	E B	E B
29	J A	E B	E B	E B	E B	E B	E B		G	G	J A		J A	J A	J A	J A	J A	J A	J A	E B	E B	E B	E B	E B	E B
30	E B	E B		E B	E B	E B	E B		G	G					J A				E B	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	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	21	18	18	E B	E B	E B	E B			28	33	38	38	36	34	28	27	22	J A	J A	23	20	22	16	22
U Q	J A	J A		J A	J A					J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
L Q	E B	E B	E B	E B	E B	E B	E B		G	G									E B	E B	E B	E B	E B	E B	E B

NOV.2020 foEs (0.1MHz)

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## IONOSPHERIC DATA STATION Kokubunji

NOV.2020 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

NOV.2020 fbEs (0.1MHz)

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## IONOSPHERIC DATA STATION Kokubunji

NOV.2020 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

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

NOV.2020 fmin (0.1MHz)

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## IONOSPHERIC DATA STATION Kokubunji

NOV.2020 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1		308	308	311	312	320	326	364	366	369	386	372	377	357	353	371	397	378	359	375	354	374	349	298	296	
2		314	291	304	304	297	F	376	359	370	385	382	364	370	343	362	363	393	346	373	327	298	335	325	303	
3		313	317	310	310	313	339	365	402	386	383	370	372	367	353	352	384	387	346	362	332	326	323	339	286	
4		320	321	320	320	329	333	373	401	A	371	388	403	375	340	371	344	367	369	394	A	326	310	306	330	
5		321	330	326	330	360	363	352	376	355	364	365	361	403	374	368	387	378	381	369	344	323	331	351	323	
6		319	319	315	321	338	364	353	379	386	397	314	V	387	341	366	346	362	370	385	374	354	334	343	326	305
7		324	317	321	309	334	336	374	382	374	366	373	380	A	337	364	371	364	393	342	341	300	314	325	309	
8		326	327	327	327	338	335	350	395	374	371	339	359	369	359	340	378	392	395	338	330	342	352	324	302	
9		294	290	291	330	331	337	351	397	391	379	368	390	377	387	350	361	388	379	346	326	305	315	304	324	
10		321	329	306	321	354	342	357	368	359	363	340	368	V	375	356	357	395	378	382	346	320	324	330	F	318
11		349	350	329	313	313	324	347	370	373	369	382	326	V	369	343	367	373	393	412	334	313	314	333	333	F
12		304	336	322	323	305	353	344	386	381	357	363	372	370	364	382	374	376	A	309	326	334	336	342	314	
13		308	321	314	317	340	326	355	393	386	370	361	366	350	356	355	365	362	360	368	334	318	308	310	313	
14		343	317	319	323	332	338	343	375	379	373	356	375	396	361	354	369	384	363	360	302	336	336	307	311	
15		306	314	341	354	378	351	340	375	378	369	374	380	363	328	364	382	400	379	340	312	329	330	336	306	
16		303	303	306	306	359	407	325	387	381	344	368	358	354	320	380	372	399	412	353	326	336	314	314	294	
17		313	309	F	325	344	367	353	403	388	377	351	374	359	360	355	371	386	390	354	329	327	312	314	311	
18		311	291	323	330	361	404	334	386	361	384	361	379	373	373	357	398	406	369	330	358	289	322	347	305	
19		309	326	328	320	320	352	379	383	378	381	383	371	416	338	350	379	381	382	346	336	317	280	304	304	
20		311	311	330	341	338	316	356	389	402	375	354	362	357	333	325	373	405	360	299	322	331	353	325	318	
21		312	323	324	308	327	345	354	392	372	391	365	350	384	344	344	380	383	373	331	357	335	315	318	314	
22		299	343	322	326	367	318	316	369	373	358	377	348	V	372	363	372	366	386	352	367	320	356	318	305	297
23		307	314	309	358	326	294	306	351	362	389	375	371	381	345	361	392	382	356	A	341	358	356	290	290	
24	F	302	364	304	350	356	347	356	378	383	381	348	338	358	360	387	383	387	311	336	V	351	341	318	340	
25		329	315	321	312	328	341	323	409	372	382	353	372	326	333	339	387	401	370	326	333	361	299	305	307	
26		295	306	320	325	339	343	343	382	364	351	352	366	375	325	376	403	367	326	345	350	324	298	352	306	
27		291	296	304	334	362	346	329	393	388	360	381	356	346	L	383	364	363	381	357	311	331	359	295	305	337
28		303	303	321	341	357	325	325	352	401	366	395	377	370	V	326	362	349	366	366	336	333	303	350	317	297
29		287	316	330	339	318	317	312	357	381	378	367	364	351	368	369	357	366	350	311	347	381	283	300	292	
30		287	313	319	330	385	297	314	367	371	359	378	393	373	347	380	358	372	358	336	309	303	328	316	283	
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	29	30	30	29	30	30	29	30	30	30	29	30	30	30	30	29	29	29	30	30	29	29	
MED		311	316	321	323	338	339	348	382	378	372	368	371	370	353	362	373	382	369	345	332	328	326	317	306	
U Q		320	323	326	330	357	352	356	393	386	383	378	377	375	363	369	387	392	384	364	342	342	336	330	316	
L Q		303	306	310	312	326	326	329	368	370	364	356	361	356	338	352	363	372	358	330	324	317	312	305	297	

NOV.2020 M(3000)F2 (0.01)

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## IONOSPHERIC DATA STATION Kokubunji

NOV.2020 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	U L 393	L	L										
2									L	A	L		L	L	L									
3										L	L	L	A	L	L									
4									A	L			A	L	A	U L 385								
5										L	L	L	L	L	L				A					
6										L	L	U L 407	L	L	L									
7										L	L	L	A	L	L									
8										L	A	A	L	L	A	A								
9										L	A	L	L	L	L									
10									L	L	L	U L 406	L	U L 396	A									
11											L	L	A				L							
12											L	U L 392	L	L			A		A					
13										L	L	U L 415	L	L	L									
14											U L 375	L	L	L										
15										L	L	L	L	L										
16											L	L	A	L										
17										L		L	L	L										
18											L	L		A	L									
19												L	L	U L 377	L									
20										A	A	L	L	U L 376	L									
21												A	U L 402	L		L								
22									L	L			L	L	L	A								
23											L	U L 441	A	A	U L 410					A				
24											L			A	A									
25												L	L			L								
26											L	U L 440	L	U L 418	L									
27												L				A								
28										L			U L 355	L										
29											A	L	L	L	L									
30													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	6	1	5		1								
MED											U L 392	U L 406	U L 355	U L 396		U L 385								
U Q											U L 441	U L 415		U L 414										
L Q											U L 375	U L 402		U L 376										

NOV.2020 M(3000)F1 (0.01)

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## IONOSPHERIC DATA STATION Kokubunji

NOV.2020 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											222	222	238	254											
2									240	222	236		236	246	246										
3										232	232	224	228	268	238										
4									A	238			220	268	236	308									
5										238	236	224	224	232	254				E A	246					
6										216	234	222	246	246	262										
7										236	236	224	A	262	244										
8										244	244	238	238	252	252	228									
9										236	234	222	222	224	252										
10									230	230	236	218	236	250	E A	242									
11											234	234	214			236									
12										242	242	224	224			228		A							
13										228	234	234	246	246	246										
14											240	226	220	248											
15										248	238	232	238	252											
16											242	242	264	254											
17										242		236	236	236											
18											242	228		238	238										
19												238	216	268	248										
20										220	232	232	232	286	262										
21											228	266	230		238										
22										238	242			234	234	238	214								
23										228	220	234	216	244					A						
24											230	E A	240	226											
25												226	240		240										
26											232	232		254	230										
27												230			230										
28										230			230	268											
29											236	236	246	230	230										
30													230												
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	17	22	24	26	24	19	5				1					
MED									238	236	235	231	232	249	242	228			E A	246					
U Q									240	242	238	235	238	258	252	272									
L Q									230	228	232	224	224	237	238	221									

NOV.2020 h'F2 (KM)

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IONOSPHERIC DATA STATION Kokubunji

NOV.2020 h'F (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
2	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
3	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
4	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
5	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
6	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
7	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
8	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
9	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
10	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
11	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
12	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
13	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
14	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
15	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
17	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
18	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
19	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
20	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
21	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
22	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
23	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
24	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
25	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
26	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
27	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
28	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
29	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
30	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
31																								
CNT	30	30	30	30	30	30	30	30	29	28	25	28	23	28	26	27	30	29	28	29	30	30	30	30
MED	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
UQ	257	254	249	248	232	217	206	200	202	201	198	197	192	192	201	204	198	196	202	226	233	235	245	260
LQ	272	268	258	256	246	234	218	204	206	205	204	200	198	202	206	208	204	201	214	241	248	252	258	276
LQ	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
LQ	244	240	242	232	218	208	204	196	198	194	193	192	186	186	196	200	196	192	196	216	220	222	236	244

NOV.2020 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

NOV.2020 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	108	108	108	108	108	108	108	108	108	108	B						
2							B	108	108	A	A	A	A	A	108	108	A	A	B					
3							B	108	108	108	108	A	A	108	108	108	110	110						
4							B	110	A	A	A	A	A	A	110	110	110	B						
5							B	110	110	110	110	110	110	A	A	110	A	B	B					
6							B	110	110	110	110	A	110	110	110	110	110	B	B					
7							B	110	110	A	A	A	A	110	110	110	110	B	B					
8							B	110	110	110	A	A	A	A	A	A	A	A	B					
9							B	110	110	A	A	A	110	110	110	110	110	B	B					
10							B	110	110	110	110	110	110	110	A	110	110	B	B					
11							B	116	116	116	A	A	A	116	116	116	116	B	B					
12							B	116	116	108	108	A	A	A	A	A	A	A	B					
13							B	110	110	A	A	A	110	A	A	A	A	B	B					
14							B	124	118	118	A	A	A	A	A	A	118	B						
15							B	128	124	120	A	A	A	A	120	120	120	B	B					
16							B	126	122	122	116	A	A	A	116	116	116	B	B					
17							B	116	110	110	A	110	110	A	A	A	A	B	B					
18							B	128	120	114	A	A	114	A	A	114	A	B	B					
19							B	126	116	116	A	A	A	116	116	116	A	B	B					
20							B	116	116	A	A	116	116	116	116	A	A	B	B					
21							B	116	112	112	A	A	A	112	112	112	126	B	B					
22							B	126	126	112	110	A	A	A	A	A	A	B	B					
23							B	126	120	120	120	A	A	A	A	A	120	B	B					
24							B	120	A	120	120	116	A	A	A	A	124	B	B					
25							B	118	118	118	112	112	112	112	112	112	A	B						
26							B	112	114	114	114	114	A	A	A	114	A	B	B					
27							B	A	A	114	A	A	114	114	114	114	114	B	B					
28							B	120	120	120	120	114	114	114	114	112	112	B	B					
29							B	126	126	110	A	A	A	A	110	110	110	B	B					
30							B	124	124	114	114	114	112	112	A	112	112	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								29	27	24	14	10	13	14	17	21	18	1						
MED								116	116	114	111	113	110	112	112	112	112	110						
U Q								125	120	118	116	114	114	114	116	114	118							
L Q								110	110	110	110	110	110	110	110	110	110							

NOV.2020 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

NOV.2020 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	88	88	86	B	B	98	98		G		G	G	G	G	G	G	G	B		98	98	98	96	96	96				
2	94	94	94	94	86	B	B	160	116	102	102	92	92	92		G	G	92	92	92	86	86	86	92	B				
3	B	96	B	B	96	96	92	126	126	122		96	96	122	122	138	126	114	120	88	88	88	88	88					
4	88	B	B	B	B	B	B	114	94	94	94	94	86	86	144	124	124		B	B	88	88	88	94	94				
5	90	90	90	90	92	B	B	G	G		116	112		G	G	84	84	152	92		B	92	92	90	90	92	92		
6	92	B	92	B	B	B	B	156	132		G	G		G	140	126	126		G	B	B	84	B	B	B				
7	B	B	B	B	B	B	B	80	150	120	104	104	94	88		G	142		G	B	B	B	B	B	B	84			
8	84	84	B	B	B	B	B	142	142	122	100	98	96	90	88	86	86	82	92	94	94	94	94	94	94				
9	82	82	82	82	82	B	B	142		G	106	102	102		G	G		G		90	90	108	86	86	86	86			
10	84	B	B	B	B	B	B	G		G		G		G		90	130	122	92		B	B	B	B	B				
11	86	88	88	88	88	B	B	G		G	112	104	104	92	138	134		G	G		B	B	B	B	88				
12	88	B	B	B	B	B	B	88	136	136	118	114	106	100	100	92	92	90	90	90	88	88	88	88	88				
13	88	88	88	88	B	B	B	118	118	102	100	100		G	100	90	98	98	98	98	88		104	104	90				
14	86	86	B	B	B	B	B	G		G	114	106	102	102	100	92	92		G		92	92	86	86	86	86			
15	B	B	86	86	86	86	92		G	134	120	106	102	100	100		G	G		116		88	B	B	B	88			
16	B	B	B	B	B	B	B	G		G	136		100	88	88		G	G	G		B	88	92		92	100	92		
17	92	92	B	B	B	B	B	G		G	126	126	104		G		98	96	96	90	90	88	86	88	88	88			
18	88	88	B	B	88		B	B	G		156	124	104	104	146	90	90	114	96	96		B	B	B	B	B			
19	B	88	94	94	94	94	96		G	136	136	102	102	100		G	G	G		90	90	90	86	86	86	86	86		
20	B	B	B	B	B	86	B	134	130	102	102	112		G	G	G		90	90		B	B	B	B	B	B			
21	B	B	90	B	90	B	B	138	138	138	98	98	98		G	G	G	G		B	B	B		90	90	90	90		
22	90	B	B	90	90	90	98		G	114	114		106	100	100	96	94	94	94	94	90	90	90	90	90	90			
23	90	88	88	88	88	88	B		G		116	130	102	102	102	98	86	92	92	82	86	86	86	86	96				
24	90	90	90	90	90	90	B	124	102		110	124	106	98	98	98		G	B		98	B	B	B	B	90			
25	88	88	88	B	B	88	B	130	130	124	118	118		G	G	G		G		B	B	B	B	B	B	B			
26	B	B	B	88	B	B	B	G		G	142	128	116	116	98	106	106		G		94	78	84	88	88	B	B	102	
27	B	B	B	B	B	B	B		G	106	106	112	108	108		G	G		154	132	144		96	B	B	B	B	B	
28	B	B	98	98	B	B	B	G		G	152	122	130	126		G	G	G		146		B	B	B	B	B	B		
29	98	B	B	B	B	B	B	G		G	144	102	102	102	102		G	G	G		B	B		B	B	B	B		
30	B	B	96	B	B	166	B	G		G	148	140		G	G		126	102		G	G	B	B	B		124	B	B	108
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	15	15	12	12	10	7	14	21	27	24	25	20	20	19	17	19	16	19	20	16	17	14	21					
MED	88	88	90	89	89	90	92	135	130	120	104	102	100	100	98	98	94	92	92	88	88	88	91	90					
U Q	90	90	94	92	91	96	98	142	138	136	113	107	102	104	126	128	122	95	98	92	90	91	94	94					
L Q	86	88	88	88	87	88	88	124	117	112	102	99	94	91	90	92	90	90	88	86	86	86	88	88					

NOV.2020 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

NOV.2020 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

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	F1	F1	F1			F1	L1		H1	H2									F1	F2	F1	F2	F2	F2	
2	F2	F4	F2	F2	F2			H1	C2	L2	L2	L3	L2	L2			L1	L2	L3	F2	F2	F1	F1		
3		F1			F1	F1	L2	C2	C1	C2		L2	L2	C2	C1	C2	C2	C3	F2	F3	F4	F2	F2	F3	
4	F2							C2	L3	L2	L1	L2	L2	L2	H1	C1	C2			F3	F4	F2	F1	F3	
5	F3	F2	F1	F2	F1					C2	C1			L2	L2	H1	L2		L5	F1	F3	F3	F3	F1	
6	F2		F2					H2	H1			L2		H1	C1	C1				F1					
7							L3	H1	C2	L2	L3	L2	L4		H1									F2	
8	F1	F2						H1	H1	C1	L3	L2	L2	L2	L3	L3	L3	L4	L4	F3	F2	F5	F5	F4	
9	F4	F4	F2	F2	F1			H1		L2	L2	L2				C2		L2	L1	F1	F2	F2	F2	F2	
10	F1								H1				H1		L3	HL11	C1	L1							
11	F2	F2	F1	F3	F2				C1	L1	L2	L2	L2	H1	H1			L2	L3	F2				F2	
12	F1						L1	H2	H2	C1	L1	L1	L1	L2	L2	L3	L3	L6	L2	F2	F3	F1	F2	F2	
13	F2	F2	F2	F1				C2	C2	L2	L2	L2	L2	L2	L2	L2	L2	L2	L2	F1		F1	F1	F2	
14	F2	F2							C1	L2	L2	L2	L2	L2	L2	L2		L2	L2	F3	F2	F1		F1	
15			F1	F3	F2	F1	L2		H1	C1	L1	L3	L2	L2			C1			F1				F2	
16									H1			L2	L3	L3					L1	F2		F2	F1	F2	
17	F2	F3							C1	C2	L2			L2	L2	L2	L2	L3	L2	F2	F2	F2		F1	
18	F2	F2			F1				H1	C1	L2	L2	H1	L3	L3	C1	L2	L2							
19		F1	F1	F2	F1	F2	L2		H2	H1	L2	L2	L2				L2	L3	L1	F5	F3	F2	F1	F1	
20						F1		H2	H1	L2	L2	C1					L2	L1							
21			F1		F1			H2	H2	H1	L2	L2	L2									F1	F2	F1	F1
22	F1			F2	F1	F2	L1		C1	C2		L2	L2	L2	L2	L2	L3	L2	L3	F3	F3	F5	F2	F2	
23	F2	F7	F5	F4	F5	F4			C1	H1	L1	L2	L2	L2	L2	L2	L1	L1	L3	F3	F3	F4	F2	F2	
24	F5	F2	F1	F2	F2	F1		C2	L1		C1	C1	L2	L2	L2	L2			L1					F2	
25	F1	F1	F2			F1		H2	H1	C1	C1	C2					L1	L1	L1			F1			
26				F2					H1	C2	C1	C1	L2	L1	L1		L2	L2	L2	F1	F2			F2	
27							L2	L3	C1	L2	L2				H2	C1	H1		L1						
28			F1	F2					H1	C1	C1	C1	C1				H1								
29	F2								H1	L2	L2	L2	L1							F1					
30			F2			F1			H1	H1				C1	L2						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																									

NOV.2020 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

NOV. 2020 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 35	X 36	X 36	X 39	X 42	X 31														X 53	X 40	X 42	X 34	X 33	
2	X 35	X 36	X 36	X 37	X 38	X 34	39													X 47	X 44	X 37	X 35	X 35	
3	X 36	X 37	X 37	X 37	X 37	X 37														X 43	X 45	X 48	X 39	X 33	
4	X 34	X 36	X 36	X 36	X 39	X 32														X 42	X 38	X 41	X 42	A	
5	X 36	X 36	X 35	X 35	X 35	X 32														X 40	X 40	X 42	X 43	X 35	
6	X 36	X 38	X 36	X 36	X 38	X 34														X 39	X 36	X 37	X 36	X 36	
7	X 36	X 38	X 38	X 41	X 39	X 38														X 34	A	X 37	X 39	X 40	
8	X 38	X 38	X 40	X 40	X 45	X 36														A	X 36	A	40	X 32	
9	X 36	X 37	A	X 38	X 40	X 35														X 34	X 36	X 36	X 36	X 36	
10	X 38	X 37	X 38	X 38	X 38	X 35														X 36	X 34	X 37	X 37	X 33	
11	X 38	X 37	X 35	X 35	X 35	X 32	X 32													X 35	X 36	X 38	X 40	X 38	
12	X 38	X 40	X 40	X 39	X 41	X 33														X 36	X 39	X 41	X 38	X 36	
13	X 35	X 35	X 37	X 37	X 39	X 35														X 37	X 34	X 34	X 36	X 36	
14	X 38	X 38	X 35	X 35	X 38	X 41														X 34	X 39	X 40	X 38	X 37	
15	X 38	X 38	X 38	X 36	X 36	X 34														X 35	X 39	X 40	X 38	X 38	
16	X 40	X 38	X 38	X 38	X 40	X 50														X 32	X 37	X 33	X 36	X 35	
17	X 40	X 35	X 37	X 36	X 36	X 37														X 38	X 37	A	A	X 32	
18	X 34	X 34	X 36	X 38	X 43	X 36														X 41	X 42	X 40	X 37	X 35	
19	X 34	X 34	X 36	X 36	X 36	X 36													X 46	X 35	X 38	X 36	X 37	X 40	
20	X 39	X 38	X 38	X 39	X 39	X 37														X 36	X 43	X 46	X 40	X 37	
21	X 38	X 39	X 41	X 40	X 40	X 37														X 33	X 35	X 32	X 34	X 35	
22	X 35	X 36	X 38	X 38	X 34	X 28														X 33	X 41	X 33	X 34	X 32	
23	X 34	X 43	X 34	X 36	X 40	X 30														X 39	X 38	X 32	X 33	X 33	
24	X 33	X 34	X 35	X 38	X 36	X 32														X 37	X 42	X 39	X 37	X 37	
25	X 35	X 35	X 36	X 36	X 36	X 35														X 43	X 43	X 34	X 35	X 36	
26	X 36	X 36	X 38	X 40	X 42	X 32														X 40	X 43	X 36	X 38	X 38	
27	X 37	X 37	X 37	X 38	X 41	X 34														X 40	X 46	X 45	X 40	X 40	
28	X 37	X 40	X 43	X 37	X 29	X 29														X 40	X 39	X 42	X 41	X 40	
29	X 38	X 39	X 41	X 38	X 36	X 37														X 45	X 54	X 38	X 37	X 38	
30	X 37	X 38	X 40	X 44	X 36	X 28														X 41	X 37	X 40	X 40	X 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	30	30	29	30	30	30	2												1	29	29	28	29	29	
MED	X	X	X	X	X	X													X	X	X	X	X	X	
U Q	X	X	X	X	X	X	36													46	38	39	38	37	
L Q	X	X	X	X	X	X														X	X	X	X	X	
	35	36	36	36	36	32														35	36	36	36	34	

NOV. 2020 f<sub>XI</sub> (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Yamagawa

NOV. 2020 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	29	30	30	33	36	25	27	54	64	75	78	96	65	62	64	61	58	56	58	47	34	36	28	27	
2	29	30	30	31	32	28	F	58	59	64	70	71	64	71	78	66	68	53	52	41	38	31	29	29	
3	30	31	31	31	31	31	26	48	59	58	68	68	64	54	68	78	70	56	53	37	39	42	33	27	
4	28	30	30	30	33	26	26	44	53	65	65	76	60	59	64	72	77	60	54	36	32	35	36	A	
5	30	30	29	29	29	26	26	49	54	54	63	75	61	58	58	57	57	53	55	34	34	36	37	29	
6	30	32	30	30	32	28	28	48	57	57	56	67	60	60	65	V	80	62	57	53	33	30	31	30	30
7	30	32	32	F	F	F	23	50	58	58	62	71	65	59	68	69	60	51	44	28	A	31	33	34	
8	32	32	34	34	39	30	23	45	50	52	60	80	75	68	64	70	70	57	A	A	30	A	F	26	
9	30	31	A	32	34	29	26	51	59	56	76	98	63	56	62	68	68	56	35	28	30	30	30	30	
10	32	31	32	32	32	29	28	43	58	58	65	68	59	61	59	V	66	65	54	38	30	28	31	31	27
11	32	F	29	29	29	26	26	46	54	54	61	75	62	63	61	61	63	58	43	29	30	32	34	32	
12	32	F	F	33	35	27	25	46	52	60	68	68	68	62	64	61	56	53	42	30	33	35	32	30	
13	29	29	31	31	33	29	27	47	54	60	68	68	72	63	74	92	84	65	41	31	28	30	30	30	
14	32	32	29	29	32	35	24	47	53	58	68	77	81	71	70	71	61	49	38	28	33	34	32	31	
15	32	32	32	30	30	28	21	44	53	60	68	76	76	62	88	83	64	54	38	29	32	34	32	32	
16	F	32	32	32	34	44	20	41	50	56	64	61	66	66	64	69	66	52	32	26	31	27	29	29	
17	F	29	30	30	30	31	23	43	48	53	58	64	61	60	60	74	71	58	42	34	31	A	A	26	
18	28	28	30	32	37	30	20	38	52	51	65	55	59	57	67	62	55	51	38	35	36	34	31	29	
19	28	28	30	30	30	30	29	44	51	55	63	71	59	61	63	80	70	49	40	29	32	30	31	F	
20	33	32	32	33	33	31	34	46	50	53	56	66	58	62	62	83	59	48	36	30	37	40	34	31	
21	32	33	35	34	34	31	25	43	57	55	56	68	65	58	67	68	66	48	37	27	29	26	28	29	
22	29	30	32	32	28	22	20	41	64	65	79	66	60	63	72	71	63	60	40	27	35	27	28	26	
23	28	37	28	30	34	24	24	51	71	69	70	66	77	67	V	78	71	59	56	47	33	32	26	27	27
24	27	28	29	F	30	26	21	39	56	62	70	69	67	71	68	73	73	60	37	31	36	33	31	31	
25	29	29	30	30	30	29	28	42	57	69	65	77	68	77	72	67	66	65	39	37	37	28	29	30	
26	30	30	32	34	36	26	29	44	54	59	69	71	67	72	76	72	56	52	38	34	37	30	32	32	
27	31	31	31	32	35	28	27	46	57	60	68	76	75	67	70	68	64	54	41	34	40	39	34	34	
28	31	34	37	31	23	23	23	42	58	72	74	68	73	67	74	74	66	50	42	34	33	36	35	34	
29	32	33	35	32	30	31	29	41	64	75	79	77	75	72	75	80	70	56	46	39	48	32	31	32	
30	31	32	34	38	30	22	22	42	59	66	71	78	68	68	68	66	62	59	52	35	31	34	34	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	28	28	28	28	29	29	29	30	30	30	30	30	30	30	30	30	30	30	29	29	29	28	28	28	
MED	30	31	31	32	32	28	26	44	56	58	68	71	65	62	68	70	64	55	41	33	33	32	31	30	
U Q	32	32	32	32	34	30	28	48	59	65	70	76	72	68	72	74	70	58	50	35	36	35	34	32	
L Q	29	30	30	30	30	26	23	42	53	55	63	68	61	60	64	66	60	52	38	29	30	30	30	28	

NOV. 2020 foF2 (0.1MHz)

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## IONOSPHERIC DATA STATION Yamagawa

NOV.2020 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										
2											L	U L	U L	U L	L	L	L								
3											U L	U L	L	U L	A	U L									
4											424	L	U L	440	448	448									
5											A	A	A	U L	U L										
6											L	U L	432	448	432	432	U L	A		A					
7											L	432	L	420	L	L									
8											U L	U L	A	L	L	L	L		A						
9											U L	L	L	U L	L	L									
10									L	L	L	U L	U L	L	L										
11									L	L	U L	420	436	L	U L	L		L							
12										L	L	L	L	L	U L	L	L	A							
13										L	L	L	U L	U L	U L										
14										L	U L	L	U L	L	U L		A								
15										L	L	U L	L	L	L	L	L								
16										L	L	L	U L	444	424	388									
17										L	L	U L	U L	U L	U L	L	L								
18											L	U L	L	A	A				A						
19												L	A	U L	L	L	A								
20											A	L	L	L											
21											L	U L	L	L	L	388	348								
22										L	L	L	L	L	L	A									
23												L	L	L	L										
24											L	L	L	L	L	L									
25											L	L	L	L	L										
26												L	A	L	L		A								
27											L		L	L											
28											L	L	L	L	L										
29												L	L	L	L										
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											7	10	9	15	9	3									
MED											U L	U L	U L	U L	U L	U L									
U Q											440	444	444	448	446	412									
L Q											U L	U L	U L	U L	U L										

NOV.2020 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

NOV.2020 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							BUR	A	A	AUR	UR	UR	UR	UR	UR	UR	UR	UR	B					
2							BUR	A	A	A	A	A	A	A	A	AUR	UR	UR	B					
3							BUR	A	A	A	A	A	A	A	A	A	A	B	B					
4							B	B	A	A	A	A	AUR	UR	AUR	A	A	B	B					
5							BUR	UR	A	A	A	A	A	A	A	AUR	A	AUR	B					
6							B	B	AUR	AUR	A	AUR	UR	UR	UR	UR	UR	A	B	B				
7							B	BUR	A	A	AUR	UR	UR	UR	UR	A	AUR	AUR	B					
8							BUR	UR	A	A	A	A	A	A	A	A	A	A	B					
9							BUR	UR	A	A	A	A	A	AUR	UR	UR	AUR	UR	B					
10							BUR	UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	B	B				
11							UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	A	B				
12							BUR	AUR	A	A	A	A	AUR	UR	UR	UR	UR	A	B	B				
13							BUR	UR	UR	A	A	A	AUR	UR	UR	UR	UR	A	B	B				
14							BUR	UR	A	A	A	A	A	A	AUR	UR	UR	A	B					
15							B	AUR	UR	A	A	A	A	A	A	A	A	B	B					
16							BUR	UR	AUR	AUR	UR	A	A	A	AUR	UR	UR	A	A	B				
17							BUR	A	A	A	A	A	A	A	A	A	A	A	B					
18							BUR	A	A	A	A	A	A	A	AUR	UR	A	A	B					
19							BUR	UR	UR	A	A	A	A	A	A	A	A	A	A					
20							BUR	UR	A	A	A	A	A	A	A	AUR	UR	A	B					
21							BUR	AUR	AUR	A	A	AUR	UR	UR	UR	UR	A	A	B					
22							B	BUR	UR	UR	A	A	A	A	A	AUR	UR	B	B					
23							B	BUR	A	AUR	A	A	A	A	A	A	A	A	B					
24							B	B	A	A	A	A	A	AUR	UR	UR	UR	B						
25							B	BUR	UR	UR	A	A	A	A	AUR	UR	UR	UR	B					
26							B	BUR	AUR	AUR	UR	A	AUR	UR	UR	UR	UR	A	B					
27							B	B	UR	UR	UR	AUR	UR	UR	UR	UR	UR	A	B					
28							B	UR	AUR	AUR	UR	A	A	A	A	A	A	A	B					
29							B	BUR	AUR	A	A	A	AUR	UR	UR	UR	UR	B	B					
30							B	B	AUR	AUR	A	A	AUR	UR	UR	UR	UR	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							18	19	15	11	6	5	10	11	17	13	9							
MED							UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	UR
UQ							196	256	296	312	332	340	332	312	294	246	196							
LQ							UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	UR	UR

NOV.2020 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

NOV.2020 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	21	20	E B	E B	E B	E B	E B	J A		28	32	34	G	G	G	G	33	G	G	E B		24	22	J A	E B	J A		30	
2	18	18	20	20	24	23	20		G J	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	22	22	E B	16	22	J A		27	
3	24	21	23	23	E B	23	21		G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	16
4	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
5	E B	J A	J A	J A	E B	E B	E B	E B	G	G J	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	20
6	J A	J A	J A	J A	E B	E B	E B	E B	E B	J A		31	32	34	35	G	39	35	37	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
7	J A	J A	J A	J A	E B	E B	E B	E B	J A		G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
8	20	21	20	E B	E B	E B	E B	E B	G	29	35	41	38	53	56	37	50	50	49	47	42	32	45	25	J A	J A	J A	J A	36
9		E B	J A	J A	J A	E B	E B	E B	G	G J	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	E B
10	E B	E B	E B	E B	J A	J A	J A	J A	G	G	G	G	G	G	G	G	38	34	32	G	E B	J A	E B		24	22	J A	J A	35
11	J A	J A	J A	J A	J A	J A	J A	J A	G	G	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
12		E B			E B	E B	E B	E B	G		G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	E B
13	22	20	20	J A	J A	J A	E B	E B	G	G	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
14	J A	J A	J A	J A	J A	J A	J A	J A	G	27	30	34	44	36	37	43	64	78		J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
15	22	21	E B	E B	E B	E B	E B	E B	J A	G	32	38	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
16		E B	E B	E B	E B	E B	E B	E B	G	31	31	35	37	51	55	64	52	40	27	28	29	26	22	26	44	J A	J A	J A	J A
17	21	21	J A	J A	E B	E B	E B	E B	G	28	33	46	37	37	45	44	44	51	32	36	38	41	45	50	16	J A	J A	J A	J A
18	22	22	J A	J A	E B	E B	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
19	E B	E B	E B	E B	E B	E B	E B	J A	G		J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
20	J A	J A	J A	J A	E B	E B	E B	J A	G	30	43	49	46	42	45	54	46		J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
21	E B	E B	E B	E B	E B	E B	E B	J A	J A	26	32	33	36	40	G	G	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
22		E B	E B	E B	E B	E B	E B	E B	G		G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
23	21	21	J A	E B	E B	E B	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
24	J A	J A	J A	J A	J A	J A	J A	J A	J A	25	33	36	44	42	42	42	36		J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
25	E B	E B	J A	J A	J A	J A	J A	J A	G	G	35	38	41	39	42						J A	J A	J A	J A	J A	J A	J A	J A	J A
26	E B	E B	E B	E B	E B	E B	E B	E B	G	25	32	39	37	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
27	E B	E B	E B	E B	E B	E B	E B	E B	G	31	33	46		G	G				J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
28	E B	J A	E B	E B	E B	E B	E B	E B	G	33	33	43	40	39	36	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
29	E B	E B	E B	E B	E B	E B	E B	E B	G	27	34	58	54	59	44				J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
30	E B	E B	E B	E B	E B	E B	E B	E B	G	24	30	34	35	39	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
31																													
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	30
MED	20	20	20	22	E B	E B	E B	E B	G	26	32	36	J A	J A	J A	J A	38	40	34	28	24	24	23	23	22	22	22	22	22
U Q	22	J A	J A	J A	J A	J A	J A	J A	J A	29	37	43	44	46	45	48	50	44	33	34	29	31	28	24	27	27	27	27	27
L Q	E B	E B	E B	E B	E B	E B	E B	E B	G	G	G	34	36	37	37	34	31				J A	J A	J A	J A	J A	J A	J A	J A	J A

NOV.2020 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

NOV.2020 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	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
2	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
3	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
4	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
5	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
6	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
7	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
8	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
9	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
10	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
11	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
12	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
13	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
14	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
15	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
17	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
18	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
19	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
20	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
21	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
22	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
23	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
24	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
25	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
26	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
27	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
28	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
29	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
30	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
31																								
	00	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	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
UQ	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
LQ	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B

NOV.2020 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

NOV.2020 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

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

NOV.2020 fmin (0.1MHz)

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## IONOSPHERIC DATA STATION Yamagawa

NOV. 2020 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1		317	300	300	314	351	437	337	371	382	384	332	354	368	352	346	359	366	363	365	367	343	334	354	306	
2		315	302	296	311	344	311	F	373	376	388	359	361	344	347	362	335	376	371	374	357	339	327	334	330	
3		312	317	318	318	318	341	356	390	385	366	369	363	387	344	335	348	385	368	365	363	317	356	379	321	
4		306	314	318	318	343	348	367	371	404	366	366	366	367	348	329	339	369	380	370	377	300	319	323	A	
5		334	306	319	302	302	334	334	383	374	372	376	372	376	363	363	359	359	339	370	341	328	315	357	320	
6		305	311	315	314	347	357	380	381	394	394	326	359	392	325	301	V	350	365	355	382	371	319	344	319	337
7		307	313	301	F	F	F	372	391	394	375	352	375	373	325	349	352	385	391	385	359	A	A	315	335	328
8		318	311	320	320	355	332	335	388	393	376	329	356	358	364	348	349	377	391	A	A	318	A	F	323	
9		309	289	A	328	367	364	362	378	403	357	354	384	384	359	330	354	382	393	381	318	301	321	330	319	
10		318	311	322	306	341	370	348	394	387	372	373	356	354	334	345	V	360	378	385	368	349	335	305	325	350
11		299	F	324	324	324	336	337	363	381	375	358	371	371	363	347	348	364	377	356	319	316	322	328	321	
12		336	F	F	304	369	334	332	370	365	366	360	358	366	365	346	338	365	372	386	334	310	333	333	327	
13		308	311	292	305	345	347	343	375	388	368	355	359	360	344	327	342	359	380	367	363	322	305	305	305	
14		292	321	309	327	329	380	373	381	386	370	363	362	388	352	356	362	363	378	342	310	329	328	321	310	
15		303	303	320	333	358	387	321	366	365	356	374	355	368	310	341	365	375	372	384	321	289	322	338	297	
16		F	298	298	304	342	449	354	388	371	358	376	359	355	363	345	370	384	395	389	326	320	314	331	292	
17		F	293	301	305	342	385	374	408	380	373	350	364	361	325	326	347	359	386	370	330	325	A	A	310	
18		304	297	314	308	362	389	358	384	377	384	388	377	339	354	352	347	371	386	353	337	334	343	345	350	
19		302	312	326	334	330	330	377	382	401	372	348	370	360	365	341	346	378	384	372	321	334	336	328		
20		314	309	309	314	331	325	379	395	397	369	367	351	394	359	316	354	374	382	360	296	316	334	349	326	
21		312	306	311	340	332	345	326	377	390	381	368	335	366	366	360	369	383	375	374	361	339	354	313	291	
22		291	310	337	349	347	330	330	352	361	356	360	361	361	344	347	351	370	359	387	346	354	305	323	290	
23		289	343	295	299	336	305	312	351	394	347	352	344	350	348	353	382	372	367	374	346	344	315	310	293	
24		320	306	298	F	357	371	353	371	373	368	371	357	348	335	354	376	360	384	387	328	324	332	328	306	
25		323	308	327	323	323	321	332	364	378	368	376	371	365	366	353	344	361	354	309	322	336	306	307	311	
26		320	311	308	323	364	346	371	353	359	363	362	347	365	341	368	388	392	365	356	327	343	328	348	348	
27		298	299	299	337	340	322	314	367	390	372	366	353	365	363	385	354	377	375	341	335	319	323	316	297	
28		281	316	328	349	345	352	331	354	348	365	372	370	348	352	356	380	396	368	341	326	286	304	318	292	
29		286	308	317	345	331	339	350	345	364	359	364	359	360	359	328	364	383	358	342	304	358	311	297	309	
30		295	297	330	362	367	341	336	351	370	356	358	383	346	356	356	367	365	370	356	346	309	319	319	299	
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	29	29	29	30	30	30	30	30	30	30	30	30	30	30	30	29	29	29	28	28	28
MED		308	308	314	319	343	345	348	374	382	368	362	360	365	352	347	354	373	375	370	335	324	322	328	310	
U Q		318	312	321	334	356	370	369	384	393	375	371	370	371	363	356	365	382	384	382	358	338	334	336	326	
L Q		298	301	300	307	331	331	332	364	371	363	354	356	355	344	335	347	365	367	356	322	316	314	318	298	

NOV. 2020 M(3000)F2 (0.01)

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## IONOSPHERIC DATA STATION Yamagawa

NOV.2020 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										
2											L	U L	U L	U L	L	L	L								
3											U L	U L	L	U L	L	A	U L								
4											410	417		404		365	A								
5											409		L	U L	U L	369									
6											A	A	A	U L	U L	376									
7											L	U L			U L	A			A						
8											416	401	416	416	397										
9											L		L		L	L									
10											U L	U L	L	U L	L	L									
11									L		L	U L	L	U L	L			L							
12											L	L	L	L	U L	L	L	A							
13											L	L	L	U L	U L	U L									
14											L	U L	L	U L	L	U L		A							
15											L	U L	L	L	L	L	L								
16											L	L	L	U L	U L	L									
17											L	U L	U L	U L	U L	L	L								
18												L	U L	A	A					A					
19												L	A	U L	L	L	A								
20											A	L	L	L	L										
21												L	U L	L	L	443	441								
22											L	L	L	L	L	A									
23												L	L	L	L										
24											L	L	L	L	L	L									
25											L	L	L	L	L										
26												L	A	L	L		A								
27											L		L	L											
28											L	L	L	L	L										
29												L	L	L	L	L									
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											7	10	9	15	9	3									
MED											U L	U L	U L	U L	U L	U L									
U Q											410	402	402	403	397	441									
L Q											416	415	410	416	416	448									
											U L	U L	U L	U L	U L	U L									
											402	396	394	395	380	365									

NOV.2020 M(3000)F1 (0.01)

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## IONOSPHERIC DATA STATION Yamagawa

NOV. 2020 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									242		260		244	262	254										
2											246	246	260	274	246	268	228								
3											234	234	234	244	266	246									
4											246	230	230	262	262	244									
5											236	228	228	248	248										
6										212	258	258	226	284	270	222		E A 248							
7											268	230	230	262	262	244									
8											278	236	236	236	256	250	234		A						
9											242	216	226	244	260	248									
10									218	218	238	250	236	274	252										
11									228	232	234	234	234	246	262		240								
12									240	240	240	234	226	254	260	218									
13									236	236	236	236	248	262	240										
14									240	240	240	222	228	236		236									
15									248	232	238	238	264	244	236	222									
16									242	234	252	248	248	236	236										
17									236	248	248	248	264	278	254	246									
18											246	276	276	250				E A 236							
19											230	240	240	262	246	222									
20										E A 238	244	226	236	288											
21										250	258	228	228	234	224										
22									236	236	218		270	252	228										
23											252	240	240	252											
24										252	252	252	252	252	228										
25										234	234	234	234	238											
26											260	244	258	244		212									
27										232		232	232												
28										232	232	258	246	246											
29										246	246	246	248	226											
30											226		244												
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	10	24	28	28	30	28	17	9	1	1						
MED									228	236	239	239	236	247	252	244	228	E A 248	E A 236						
U Q									242	240	249	249	245	262	262	249	238								
L Q									218	232	234	231	230	240	246	228	220								

NOV. 2020 h'F2 (KM)

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# IONOSPHERIC DATA STATION Yamagawa

NOV.2020 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	E	258	254	250	250	208	192	224	218	194	200	194	194	184	182	182	208	208	208	200	192	E	E	E	E	E	
2	E	270	270	284	256	234	286	202	202	202	202	202	202	196	204	202	194	194	196	196	194	E	E	E	E	E	
3	E	256	256	272	272	258	214	200	188	188	188	188	188	188	178		A	198	198	198	198	E	E	E	E	E	
4	E	280	294	280	266	218	220	206	194	194	204	192	192	192	188	188		A	210	204	204	182	E	E	E	E	
5	E	226	290	232	266	286	196	208	198	198	206		A	A	A							E	E	E	E	E	
6	E	278	270	270	246	216	206	202	192	192	182	182	182	182	186	186		A	202		A	192	E	E	E	E	
7	E	270	250	280	246	246	188	188	200	200	200	198	196	188	188	212	206	206	196	196	206		E	E	E	E	
8	E	248	264	246	242	214	194	206	186	194	194	194	194		A	194	200	194	194	194		A	E	E	E	E	
9	E	270	270		A	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	
10	E	246	246	246	256	248	212	212	188	186	184	184	178	178	202	196	204	204	192	192		E	E	E	E	E	
11	E	286	264	224	274	252	224	224	200	196	196	180	196	198	198	204	216	202	202	194	200	246	246	234	272		
12	E	234	256	256	246	212	220	220	204	204	198	198	198	194	182	186	202		A	202	192	224	E	E	E	E	
13	E	260	260	268	276	236	222	222	196	196	192	192	192	192	182	182	180	214	204	180	214	286	248	248	260		
14	E	260	224	248	256	242	204	204	196	196	190	188	188	188	188	210		A	198	182	234	242	222	228	266		
15	E	270	252	238	210	202	194	262	208	208	202	208	202	202	202	208	200	194	194	186	202	254	248	222	252		
16	E	252	264	258	246	210	188	228	198	198	184	206	198	198	186	178	190	208	196	194	228	E	E	E	E	E	
17	E	278	262	252	236	222	194	194	182	194	194	194	194	190	188	188	192	192	198	206	206	E	E	E	E	E	
18	E	262	268	246	230	208	188	250	194	194	194	222	192	192		A	A	204	212	202		A	E	E	E	E	
19	E	270	270	240	240	240	222	208	200	200	200	E	A		A						A	E	E	E	E	E	
20	E	252	258	258	250	230	224	192	188	188	204		A	204	194	182	192	226	200	200	188	256	236	230	214	228	
21	E	242	250	250	228	228	216	270	198	196	204	194	192	192	188	176	176	196	196	188	188	E	E	E	E	E	
22	E	278	260	222	208	222	260	222	214	208	204	194	194	204	194	194		A	202	202	196	240	230	286	244	334	
23	E	312	218	268	268	220	250	262	230	204	204	204	204	196	196	206	206	206	206	200	200	E	E	E	E	E	
24	E	268	268	300	244	224	212	220	206	206	206	198	198	192	188	188	188	194	194	194	224	222	242	224	244		
25	E	236	268	248	248	252	236	218	198	198	208	200	194	188	188	188	196	202	190	182	204	E	E	E	E	E	
26	E	256	266	266	236	200	202	202	202	202	202	224	206		A	192	192	204		A	198	198	226	202	220	208	242
27	E	272	272	266	244	222	222	238	198	198	204	200	212	194	194	206	206	206	206	198	198	202	244	218	242	242	
28	E	282	282	230	206	214	228	238	220	200	204	198	200	190	190	190	190	198	198	212	212	E	E	E	E	E	
29	E	286	266	226	214	222	222	210	208	208	218	218	218	210	194	192	190	198	198	198	224	214	208	268	268		
30	E	282	282	236	206	206	214	240	216	200	200	200	200	200	200	200	200	206	206	200	200	E	E	E	E	E	
31																											
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT		30	30	29	30	30	30	30	30	30	30	28	29	26	29	28	27	26	29	28	29	29	29	28	29	29	
MED		269	264	250	246	222	215	208	198	198	200	198	196	192	188	191	200	202	198	195	206	E	E	E	E	E	
UQ		278	270	268	256	240	222	228	206	202	204	205	201	196	194	200	206	208	202	198	224	253	247	247	269		
LQ		252	256	239	236	214	196	204	194	194	194	193	192	188	184	186	190	198	196	190	199	E	E	E	E	E	

NOV.2020 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

NOV.2020 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1							B	112	112	112	112	112	108	108	108	108	108	120		B					
2							B	120	A	A	A	A	A	A	A	120	120	120		B					
3							B	120	120	A	A	A	A	A	A	A	A	B	B						
4							B	B	A	A	A	A	A	112	112	112	112		B	B					
5							B	112	112	A	A	A	A	A	A	112	A	112		B					
6							B	B	112	112	112	108	108	108	108	108	108		B	B					
7							B	B	108	A	A	108	108	108	108	A	108	108		B					
8							B	120	120	114	A	A	A	A	A	114	A	A	A	B					
9							B	114	114	A	A	A	A	A	108	108	108	114		B					
10							B	124	112	112	112	112	112	112	112	108	108		B	B					
11								116	112	112	112	108	A	108	108	108	108		A	B					
12							B	130	126	116	108	108	A	A	108	108		A	B	B					
13							B	116	116	116	116	112	A	112	112	112	112		B	B					
14							B	122	118	108	108	A	108	A	A	112	A	120		B					
15							B	A	120	118	118	A	A	A	A	A	A	B	B						
16							B	126	122	114	108	A	A	A	A	A	A	A	B						
17							B	114	114	114	A	A	A	A	A	A	A	A	B						
18							B	122	122	114	A	A	A	A	A	A	A	A	B						
19							B	126	124	124	108	A	A	A	A	A	A	A							
20							B	122	122	122	A	A	A	A	A	A	A	A	B						
21							B	132	126	118	112	112	A	112	112	112	A	A	B						
22							B	B	112	112	112	112	112	A	A	A	A	A	B	B					
23							B	B	112	112	112	A	A	A	A	A	A	A	B						
24							B	B	112	112	A	A	A	A	A	A	108	108	108						
25							B	B	110	110	110	110	A	A	A	A	110	110	118						
26							B	B	118	118	118	118	A	118	A	A	A	A	B						
27							B	B	114	108	108	A	108	108	108	108	108		A	B					
28							B	120	120	120	120	114	114	114	A	A	A	A	B						
29							B	B	114	114	A	A	A	A	A	A	A	B	B						
30							B	B	114	114	114	114	114	A	114	122	A	134		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								18	28	24	18	13	9	11	15	17	15	9							
MED								120	114	114	112	112	108	112	108	110	108	118							
U Q								124	120	117	114	113	113	112	112	112	112	120							
L Q								116	112	112	108	108	108	108	108	108	108	110							

NOV.2020 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

NOV.2020 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	96	92	B	B	B	B	B	92	124	128	122	G	G	G	G	156	G	G	B	90	90	90	B	106
2	96	96	96	96	96	94	94	G	94	94	88	88	88	88	88	88	88	104	104	102	102	B	102	92
3	92	92	92	92	B	92	82	G	112	96	96	96	98	98	98	98	98	B	B	98	98	108	B	B
4	88	84	84	84	84	92	B	B	100	100	100	100	100	100	156	134	116	116	94	B	94	94	B	94
5	B	94	94	90	B	B	B	G	G	94	96	96	96	96	104	150	102	G	96	96	96	B	B	96
6	96	84	84	B	B	B	B	B	126	126	136	112	G	148	148	132	118	106	106	102	96	94	94	94
7	94	94	94	94	B	94	124	134	G	98	98	G	G	130	92	150	G	90	98	98	98	88	88	
8	88	88	88	B	B	B	B	G	124	112	102	102	94	94	118	90	88	88	88	88	88	96	96	90
9	90	B	90	90	B	B	90	G	G	94	94	94	90	92	G	G	132	G	94	88	88	88	88	B
10	B	B	B	88	88	88	88	G	G	G	G	G	G	146	136	128	G	B	92	B	92	92	88	88
11	82	82	82	82	90	90	90	G	G	124	G	124	104	146	136	130	G	88	88	B	B	B	88	88
12	88	B	88	88	88	B	B	G	124	G	114	114	106	102	152	142	88	88	92	92	92	92	B	B
13	92	92	92	84	84	84	B	G	G	116	116	106	G	G	G	140	124	B	90	90	100	100	98	
14	90	90	90	98	98	96	B	G	120	128	128	102	112	106	102	90	82	G	92	92	92	92	114	94
15	94	86	B	B	B	B	B	G	138	110	100	100	94	94	92	92	92	92	92	92	92	92	92	92
16	92	B	B	B	B	B	B	G	138	132	160	92	92	88	88	88	90	90	92	92	92	92	100	100
17	100	100	96	96	B	B	B	G	120	114	102	102	100	100	100	94	94	94	94	94	94	108	108	B
18	80	80	80	80	80	B	B	80	132	118	104	102	98	94	88	G	84	84	84	84	94	100	100	86
19	B	B	B	B	B	86	86	G	G	128	116	98	98	98	98	96	88	88	88	88	B	B	B	100
20	100	90	90	90	B	B	94	G	124	120	104	104	104	98	88	88	G	88	88	88	B	100	B	B
21	B	B	B	B	92	92	92	92	132	132	128	114	104	G	G	G	92	82	84	84	88	88	B	B
22	88	B	B	B	B	B	88	B	G	G	124	120	120	106	100	92	92	92	92	92	92	92	92	92
23	92	92	102	96	B	96	96	134	134	114	114	96	96	96	88	82	G	G	G	82	82	82	82	88
24	88	88	88	88	88	88	88	88	120	118	104	104	104	104	G	104	G	G	96	90	90	90	90	B
25	B	B	90	90	90	86	86	86	G	G	108	108	92	94	98	G	G	G	90	90	90	90	84	84
26	B	B	B	100	B	B	B	B	128	144	142	128	98	G	98	98	92	92	92	B	B	B	B	B
27	B	B	B	B	B	B	B	B	G	154	146	102	G	G	170	166	G	86	78	82	82	B	B	B
28	B	88	B	B	B	B	B	B	G	114	124	124	124	124	160	100	100	100	92	92	92	B	B	B
29	B	B	B	B	B	B	B	B	150	146	106	106	98	98	G	98	G	B	B	B	B	B	98	B
30	B	B	B	B	B	B	B	B	124	138	132	132	122	114	G	152	114	G	B	B	130	106	90	98
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	20	18	18	18	11	14	14	8	19	25	28	27	25	24	23	25	22	19	25	24	24	22	19	19
MED	92	90	90	90	88	91	90	90	124	124	112	102	100	98	100	98	92	90	92	91	92	92	92	92
U Q	95	92	94	96	92	94	94	113	132	132	126	114	105	106	136	133	114	94	94	93	95	100	100	98
L Q	88	86	88	88	84	86	88	86	120	106	102	98	96	94	94	91	88	88	88	88	90	90	88	88

NOV.2020 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

NOV. 2020 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

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	F1	F1						L2	C2	C1	C2					H1				F1	F1	F1		F1
2	F1	F1	F2	F1	F3	F2	L1		L3	L2	L3	L3	L4	L3	L2	L2	L1	L1	L1	F1	F2		F2	F4
3	F4	F3	F2	F2		F2	L1		C2	L5	L2	L1	L1	L1	L3	L2	L2			F1	F1	F1		
4	F1	F4	F2	F2	F1	F1			L3	L2	L2	L1	L1	L2	H1	H2	C3	C1	L3		F2	F2		F3
5		F3	F2	F2						L1	L4	L3	L3	L1	L2	H1	L2		L1	F2	F1			F2
6	F2	F2	F2						C2	C2	H1	C1			H1	H4	C5	L8	L3	F3	F7	F4	F2	F3
7	F7	F4	F2	F2		F1	C2	C2		L2	L2				C1	L4	H1		L1	F3	F7	F3	F3	F2
8	F1	F2	F1						C2	C2	L2	L2	L3	L2	CL22	L2	L3	L7	L8	F6	F5	F6	F2	F6
9	F2		F3	F2			L1			L2	L4	L2	L2	L2			H1		L2	F2	F2	F1	F1	
10				F1	F4	F2	L2							H1	C1	CL22			L1		F1	F1	F2	F4
11	F7	F1	F1	F2	F2	F2	F2		C1		C2	L3	H2	CL13	CL23		L2	L2					F3	F1
12	F1		F1	F2	F1				C2		C2	C1	L1	L2	H1	H2	L3	L3	L2	F3	F2	F1		
13	F1	F1	F2	F2	F2	F2					C2	C1	L1				H2	C1		F5	F7	F2	F2	F6
14	F1	F1	F1	F1	F1	F1			C2	C1	C1	L2	C1	L1	L3	L3	L4		L1	F2	F2	F2	F1	F2
15	F2	F1				F1	L2	L3		H2	C2	L3	L3	L3	L2	L3	L3	L2	L2	F2	F1	F2	F1	F2
16	F2								H2	H2	H1	L2	L4	L4	L3	L2	L3	L1	L3	F9	F2	F1	F6	F3
17	F1	F1	F2	F1					C3	C2	L2	L2	L2	L2	L2	L2	L2	L3	L5	F5	F5	F7	F7	
18	F1	F1	F1	F1	F1		L1		C2	C4	L3	L2	L3	L2	L4		L8	L8	L6	F4	F1	F1	F2	F2
19					F1	L1			C2	C2	L4	L3	L3	L2	L2	L2	L4	L3	L2	F2				F2
20	F2	F2	F1	F1			L1		C2	C4	L3	L2	L2	L2	L5	L3		L3	L3	F2		F1		
21				F1	F1	L1	L1		C2	H2	C2	C1	L2				L2	L5	L1	F1	F1	F1		
22	F2					L1					C1	C1	C2	L1	L2	L3	L2	L2	L2	F6	F2	F5	F6	F4
23	F2	F2	F1	F2		F2	L2	H2	H2	C2	C3	L2	L2	L2	L3	L3	L4	L3	L2	F2	F1	F1	F2	F2
24	F2	F2	F2	F2	F3	F2	F3	L2	CL22	CL22	L2	L2	L1	L1		L2			L2	F2	F2	F3	F2	
25			F1	F1	F1	F2	L2	L2			C1	C1	L1	L1	L1				L1	F1	F1	F3	F1	F1
26			F1						C1	H2	H2	CL22	L4		L1	L3	L4	L3	L1					
27										H2	H1	L2			H1	H1		L1	L3	F1	F2			
28		F1							C2	C2	C2	C2	C2	H1	L1	L3	L3	L3	L2	F1				
29									H2	H1	L2	L2	L3	L2		L1							F1	
30									C1	H1	H2	C1	C2	L2		H1	L1				F1	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. 2020 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

NOV.2020 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 34	X 34	X 35	X 36	X 43	X 31	X 28													X 56	X 44	X 47	X 41	X 40		
2	X 42	X 38	X 36	X 40	X 42	X 33	X 34														X 62	X 52	X 53	X 46	X 36	
3	X 34	X 34	X 33	X 34	X 37	X 37	X 30														X 56	X 50	X 61	X 48	X 37	
4	X 38	X 38	X 38	X 35	X 39	X 31	X 26														X 63	X 50	X 56	X 61	X 52	
5	X 46	X 43	X 42	X 42	X 43	X 40	X 43														X 68	X 45	X 50	X 54	X 45	
6	X 46	X 46	X 46	X 44	X 46	X 44	X 33														X 53	X 37	X 40	X 37	X 38	
7	X 30	X 33	X 34	X 34	X 34	X 38	X 26														A	X 35	X 39	X 39	X 38	
8	X 39	X 38	X 38	X 37	X 42	X 36	X 28													X 65	X 50	X 47	X 45	X 41	A	
9	X 37	X 38	X 39	X 39	X 38	X 38	X 30															X 55	X 43	X 45	X 39	X 36
10	X 38	X 36	X 36	X 37	X 37	X 35	X 32															X 49	X 39	X 40	X 38	X 39
11	X 36	X 34	X 32	X 35	X 34	X 31	X 32															X 54	X 43	X 39	X 43	X 42
12	X 41	X 38	X 36	X 37	X 52	X 48	X 38															X 44	X 43	X 45	X 43	X 43
13	X 39	X 37	X 37	X 38	X 40	X 33	X 32															X 54	X 45	X 40	X 36	X 36
14	X 36	X 36	X 35	X 35	X 38	X 38	X 26															X 48	X 48	X 47	X 44	X 40
15	X 39	X 39	X 39	X 37	X 40	X 24	X 27															X 53	X 48	X 45	X 42	X 37
16	X 36	X 37	X 38	X 39	X 45	X 32	X 24															X 37	X 35	X 35	X 36	X 35
17	X 34	X 35	X 39	X 40	X 48	X 32	X 28															X 59	X 60	X 58	X 40	X 34
18	X 36	X 39	X 43	X 46	X 51	X 38	X 28															X 55	X 54	X 45	X 34	X 36
19	X 35	X 34	X 34	X 36	X 38	X 39	X 37															X 60	X 55	X 51	X 42	X 34
20	X 36	X 36	X 37	X 40	X 47	X 56	X 54															X 46	X 43	X 45	X 42	X 39
21	X 38	X 36	X 37	X 39	X 36	X 31	X 31															X 40	X 36	X 32	X 30	X 33
22	X 34	X 35	X 39	X 36	X 34	X 32	X 26													X	X 55	X 40	X 42	X 36	X 33	X 34
23	X 33	X 42	X 37	X 36	X 46	X 27	X 27													X	X 65	X 48	X 41	X 34	X 31	X 31
24	X 34	X 33	X 37	X 41	X 36	X 29	A															X 47	X 53	X 57	X 44	X 42
25	X 36	X 36	X 38	X 40	X 42	X 43	X 42															X 59	X 59	X 46	X 42	X 40
26	X 43	X 39	X 40	X 46	X 47	X 38	X 34															X 46	X 48	X 48	X 45	X 45
27	X 42	X 40	X 40	X 42	X 44	X 36	X 34															X 54	X 54	X 54	X 44	X 38
28	X 38	X 40	X 45	X 48	X 28	X 29	X 30															X 55	X 46	X 50	X 49	X 49
29	X 52	X 50	X 48	X 48	X 40	X 40	X 32															X 72	X 66	X 60	X 50	X 44
30	X 40	X 41	X 45	X 50	X 41	X 28	X 27															X 54	X 49	X 44	X 45	X 39
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	29													3	29	30	30	30	29	
MED	X 38	X 38	X 38	X 38	X 40	X 36	X 30														X 65	X 54	X 46	X 45	X 42	X 38
U Q	X 40	X 39	X 40	X 42	X 45	X 38	X 34														X 65	X 58	X 52	X 51	X 45	X 42
L Q	X 35	X 35	X 36	X 36	X 38	X 31	X 27														X 55	X 48	X 43	X 40	X 38	X 36

NOV.2020 f<sub>XI</sub> (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

NOV. 2020 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

$\begin{matrix} H \\ D \end{matrix}$	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	28	28	29	30	37	25	22	50	68	73	74	99	105	109	102 <sup>R</sup>	80	84	84	54	50	38	41 <sup>R</sup>	35	34	
2	36	32	30	33	36	27	28	54	65	61	66	79	75	88	106	113 <sup>H</sup>	104	89	80	56	45	46 <sup>J</sup>	40 <sup>R</sup>	30	
3	28	28	27	28	31	31	24	46	66	62	68	73	66 <sup>H</sup>	63	72	94	92	62	53	49	44	55	42	31	
4	31	32	32	29	33	25	20	47	52	63	76	82	106 <sup>V</sup>	115	108	115	119	110	75	57	44	50	55	46	
5	40	37	36	36	37	34	36	50	61	58	62	76	64	84 <sup>R</sup>	102	101	84 <sup>J</sup>	86 <sup>R</sup>	87	62	39	44	48	39	
6	40	40	40	38	40	38	27	47	54	58	57	59	77	68	84	91	88	64	59	47	31	34	31	32	
7	24	27	28	28	28	32	20	42	54	60	66	77	68	84	86	90	74	67	54	A	29	33	33	32	
8	33	32	32	31	36	30	22	43	50	54	61	85	76	85	86	87	82	66	59	43	41	39	34	A	
9	31	32	33	33	32	32	24	44	52	63	74	102	77	72	64	71	84	68	50	49	37	39	33	29	
10	32	30	30	30	31	29	26	46	56	63	64	68	62	60	76	74	66	62	54	43	33	34	32	F	
11	30	28	26	29	28	25	26	47	56	56	60	76	78	62	76	77	70	70	58	48	37	34	37	36	
12	34	32	30	31	F	F	F	44	56	57	72	68	69	73	71	70	83	69	50	38	37	39	37	37	
13	33	31	31	32	34	27	26	48	57	63	71	76	75	89	113	140	137	114	76	48	39	34	30	30	
14	30	30	29	29	32	31	20	42	57	60	69	76	90	109	124	116	109	80	48	42	42	41	38	34	
15	33	33	33	31	34	18	21	42	56	62	65	79	96	Z	122	115	91	78	57	47	42	39	36	31	
16	30	31	32	33	38	26	18	39	51	56	62	69	67	80	84 <sup>H</sup>	93	78	58	40	31	29	29	30	29	
17	28	29	F	34	42	26	22	40	50	54	58	66	65	62	66	82	87	81	61	53	V	54	52	34	28
18	F	F	F	F	F	32	22	38	48	52	55	62	A	65	73	73	66	55	48	49	48	39	28	29	
19	29	28	28	30	32	33	30	39	48	50	59	74	72	73	90	110	139	108	88	54	48	45	36	28	
20	30	30	31	34	41	50	48	41	46	51	61	66	74	66	66	75	72	56	44	40	37	39	36	33	
21	32	30	31	31	33	30	25	44	52	54	59	65	67	65	62	69	65	59	48	34	30	26	24	27	
22	28	29	33	30	28	26	20	38	63	72	82	70	58	66	75	86	65	A	49	34	36	30	27	28	
23	27	36	31	30	40	21	21	44	75	74	65	79	78	68	70	80	71	56	58	42	35	28	25	25	
24	28	27	31	35	30	F	A	39	52	66	70	74	68	75	82	80	63	64	48	41	47	51	38	36	
25	30	30	32	34	36	37	36	43	56	63	70	76	74	84	83	75	69	86	72 <sup>R</sup>	52	53	40	36	34	
26	37	33	34	40	41	32	28	43	56	63	68	79	79	71	72	69	73	55	46	40	42	42	39	39	
27	36	34	34	36	38	29	28	46	59	63	80	80	74	81	V	79	65	H	46	48	48	47	38	33	
28	32	34	39	42	22	23	24	38	69	70	84	81	73	81	78	84	69	57	58	49	40	44	43	43	
29	46	44	42	42	34	34	26	38	60	80	87	94	111	101	91	110	107	90	77	66	60	54	44	38	
30	34	34	39	44	35	21	21	40	60	69	85	85	H	78	94	H	78	72	63	62	48	43	38	33	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	30	30	30	30	30	29	30	30	30	30	30	29	30	30	30	30	29	30	29	30	30	30	29	
MED	31	31	32	32	34	30	24	43	56	62	67	76	74	78	82	83	80	67	56	48	40	39	36	32	
U Q	34	33	33	36	38	32	28	46	60	63	74	80	78	88	91	101	91	85	62	51	45	45	39	36	
L Q	28	29	30	30	32	25	21	40	52	56	61	69	68	66	72	75	69	60	48	42	37	34	32	29	

NOV. 2020 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

NOV.2020 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	424	472	464	468	436	412									
2										U L	448	448	460	456	A	432	A	216							
3										L	L	452	444	488	456										
4									U L	L	408	432	452	452	444	444	420	L							
5										L	436	444	448	440	432		L								
6									U L	L	384	424	456	436		416									
7									A	L		A	A	A	L										
8										U L	412	416		L	460	440	428	L							
9										L	A	448	456	452	448										
10									276	L	L	440	448	440	444	436	392	L							
11									L	L	424	448	448	456	436	428									
12										L	416	428	456	444	432	404									
13										L	L	456	460	444	444	432									
14										L	432	448	464	436	444										
15										U L	L	436	448	452	452	440	416	L		L					
16										L	448	480	452	424	408										
17										A	440	452	464	464	420										
18											L	A	A	448	424	408									
19											L	A	A	440	432	420									
20											L	412	456	440	424										
21									272	L	L	436	464	444	428										
22										L	L	440	472	456						A					
23										L	L		L	L	L										
24										L	L	436	448	464	448	420									
25									256		L	L	L	L	L	448									
26										L	L	464	460	456	L	396									
27										L	L	456	460		428										
28									L		L	456	464	452	452	420									
29								176	L	L	L	L	A	L	L										
30										L	L	460	452	452											
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								1	3	2	11	23	23	28	25	18		1							
MED								176	272	396	432	448	456	452	440	420		216							
U Q								276		U L	436	456	460	462	446	428									
L Q								256		L	424	440	452	444	432	408									

NOV.2020 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Okinawa

NOV.2020 foE (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1								A	240	284		A	A	320	312	304		A	260	212					
2								A	248	272		A	A	A	A	A		A	A	A					
3								A	232	280	312	320	328		A	308	288		A	A	B				
4								A	A	272	292	300		A	A	A		A	256	192					
5								176	240	280	304	316	324	308		A	A		A	256	192				
6								A	232	288	312	324	336	316	304		A		A	248	196				
7								A	228	284	296	316	316	304		A	A	A	A	A					
8								A	220	A	300		A	A	A	A		A	252	A					
9								A	A	A	A	A	A	A	A		292	260		A	A				
10								A	A	272	304	316		A	316		A	A	252	180					
11								A	A	256	288	320	328	316	288	284		A	A	B					
12								180	236	272	292	312		A	A	A		A	248	172					
13								A	A	292		A	A	A	A	A		A	260		A	B			
14								A	212	268	300	316	328		A	A	A		A	A	A				
15								A	212	A	300	316	332		A	A	A		A	A	A				
16								A	216	280	304	304			A	A	A		264	A	A	A			
17								A	240	264	288	300	312		A	A	A		A	A	A				
18								B	204	252	300	304	312	304	284		A	A	A	A					
19								A	212	256	280	296	316	308		A	A	A	A	A					
20								B	200	244	296	316	312		A	304		A	A	A	A				
21								A	204	A	292	308		A	300		A	A	A	A					
22								B	220	264	292	312	324	316	308		A	A	A						
23								B	208	268	296	324	316		A	A		A	A						
24								A	A	272	304	320		A	A	A		A	264		A	A			
25								B	224	280	304	316	324	316	304	292		A	A	A					
26								B	224	288		A	316	332	324	288		A	244	176					
27								B	228	276	308	320	320	328	320	288	220		A	B					
28								B	208	244	304	328	336	316	308	288	252	168							
29								B	216	A	312	332		A	A	A		A	244		A	A			
30								B	196	248	300	316	320	316	312	284		A	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								2	24	25	25	25	19	15	12	10	15	8							
MED								178	220	272	300	316	324	316	304	288	252	186							
U Q									232	280	304	320	328	316	308	292	260	194							
L Q									210	260	292	310	316	308	296	284	248	174							

NOV.2020 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION Okinawa

NOV.2020 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	J A	J A	J A	J A	E B	E B	E B		28	31	35	38	35	34	J A	J A	30	27	J A	21	19	18	E B	E B
2	E B	J A	J A	J A	J A	J A	J A	J A	30	34	J A	J A	J A	J A	J A	J A	J A	J A	J A	E B	E B	J A	J A	J A
3	J A	J A	J A	J A	E B	E B	E B		28	33	34	35	38	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
4	J A	J A	J A	J A	E B	E B	E B	J A	28	35	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
5	J A	J A	J A	J A	J A	J A	J A	J A	30	35	46	44	43	44	49	32	28	26	J A	J A	E B		18	20
6	J A	J A	J A	J A	J A	E B	E B		28	36	34	36	G	37	39	38	J A	J A	J A	J A	J A	J A	J A	J A
7	J A	J A	J A	J A	E B	E B	E B		J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
8	J A	J A	J A	J A	E B	E B	E B		28	34	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
9	J A	J A	J A	J A	J A	E B	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
10	J A	J A	J A	J A	E B	E B	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
11	J A	J A	J A	J A	E B	E B	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
12	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
13	E B	J A	J A	J A	E B	E B	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
14	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
15	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
16	E B	J A	J A	J A	E B	E B	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
17	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
18	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
19	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
20	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
21	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
22	J A	J A	J A	J A	E B	E B	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
23	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
24	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
25	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
26	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
27	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
28	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
29	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
30	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
31																								
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	18	19	18	16	16	16	16	20	28	34	38	42	44	42	43	37	36	28	27	24	20	19	18	18
U Q	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
L Q	E B	E B	E B	E B	E B	E B	E B	E B	26	31	35	37	38	38	36	34	28	22	18	19	18	18	16	16

## IONOSPHERIC DATA STATION Okinawa

NOV.2020 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

NOV.2020 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

NOV.2020 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	16	16	16	16	16	16	16	16	16	16	17	19	19	18	17	14	14	14	16	16	16	16	16	16
2	16	16	16	16	16	16	16	16	16	16	15	16	15	14	16	13	16	16	16	16	15	16	16	16
3	16	16	16	16	16	16	16	16	16	16	16	16	18	17	16	14	15	16	16	16	16	16	16	16
4	16	16	16	16	16	16	16	16	15	15	14	16	16	16	16	16	16	16	16	16	16	16	16	16
5	16	16	16	16	16	16	16	16	16	16	18	16	16	18	16	14	16	16	16	16	16	16	16	16
6	16	16	16	16	16	16	16	16	16	15	17	18	18	20	17	16	15	14	16	16	16	16	16	16
7	16	16	16	16	16	16	16	16	16	16	16	15	15	17	16	15	14	14	14	16	16	16	16	16
8	16	16	16	16	16	16	16	16	16	16	17	16	18	17	16	16	14	16	16	16	16	16	16	16
9	16	16	16	16	16	16	16	16	16	16	16	16	16	19	18	16	16	16	16	16	16	16	16	16
10	16	17	16	16	16	16	16	16	16	16	16	16	15	15	18	16	16	16	16	16	16	16	16	16
11	16	16	16	16	16	16	16	16	16	15	15	15	14	16	16	16	17	17	16	16	16	16	16	16
12	16	16	16	16	16	16	16	16	16	16	17	16	18	18	16	16	16	16	16	16	16	16	16	16
13	16	16	16	16	16	16	16	16	16	16	16	20	16	15	14	14	17	16	16	16	16	16	16	16
14	16	16	16	16	16	16	16	16	16	16	14	21	17	17	16	17	16	14	14	16	16	16	16	16
15	16	16	16	16	16	15	16	16	16	14	14	14	15	17	16	16	15	14	16	16	16	16	16	16
16	16	16	16	16	16	16	16	16	16	16	16	16	19	16	20	15	13	15	16	16	16	16	16	16
17	16	16	16	16	16	16	16	16	16	17	15	16	17	16	18	14	14	14	14	16	16	16	16	16
18	16	16	16	16	16	16	16	16	16	16	18	16	19	18	16	17	14	14	16	16	16	16	16	16
19	16	16	16	16	16	16	16	16	16	16	15	16	14	15	16	15	15	16	16	16	16	16	16	16
20	16	16	16	16	16	16	16	16	16	14	15	15	15	14	14	14	14	16	16	16	16	16	16	16
21	16	16	16	16	16	16	16	16	16	16	16	16	18	17	16	16	16	16	16	16	16	16	16	16
22	16	16	16	16	16	16	16	16	16	14	14	17	15	16	19	14	14	16	16	16	16	16	16	16
23	16	16	16	16	16	16	16	16	16	16	17	16	16	14	15	15	14	16	16	16	16	16	16	16
24	16	16	16	16	16	16	16	16	16	15	15	18	18	19	16	15	16	16	16	16	16	16	16	16
25	16	16	16	16	16	16	16	16	16	16	16	16	16	20	17	15	15	16	16	16	16	16	16	16
26	16	16	16	16	16	16	16	16	16	16	15	17	18	16	14	14	16	16	16	16	16	16	16	16
27	16	16	16	16	16	16	16	16	16	16	16	16	18	18	17	18	15	16	15	16	16	16	16	16
28	16	16	16	16	16	16	16	16	16	15	16	18	16	18	20	17	15	15	16	16	16	16	16	16
29	16	16	16	16	16	16	16	16	16	16	17	20	18	16	19	16	14	14	16	16	16	16	16	16
30	16	16	16	16	16	16	16	16	14	15	15	17	18	16	15	16	16	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	16	16	17	16	15	15	16	16	16	16	16	16	16
U Q	16	16	16	16	16	16	16	16	16	16	17	18	18	18	18	16	16	16	16	16	16	16	16	16
L Q	16	16	16	16	16	16	16	16	16	15	15	16	15	16	16	14	14	14	16	16	16	16	16	16

NOV.2020 fmin (0.1MHz)

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## IONOSPHERIC DATA STATION Okinawa

NOV.2020 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

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		313	324	302	322	392	359	324	385	385	368	339	336	358	317	286	R 300	339	367	388	365	341	298	R 326	288	
2		308	308	305	332	379	321	334	366	390	364	350	355	310	286	324	H 308	321	341	324	363	305	316	J R 276	322	
3		315	313	315	311	338	360	342	368	390	381	365	345	H 349	327	293	337	364	373	369	338	303	332	383	283	
4		306	325	322	320	383	412	351	387	381	354	371	367	V 332	340	326	328	357	378	356	376	309	317	362	345	
5		333	324	326	334	339	358	333	370	397	381	349	381	343	R 315	322	331	J 312	R J R 300	366	395	304	320	363	321	
6		309	309	309	317	351	372	369	391	399	380	366	319	354	305	326	344	382	368	378	353	312	327	330	360	
7		293	301	321	323	338	381	325	366	378	381	353	364	354	292	335	336	348	374	349	A	314	297	316	310	
8		309	305	321	323	363	396	325	380	385	358	328	361	334	335	320	342	348	378	375	369	291	325	292	A	
9		324	309	321	340	341	366	374	382	363	354	339	370	342	334	326	328	356	366	354	333	285	313	333	314	
10		312	328	313	318	352	350	364	380	384	378	363	339	351	318	325	344	356	372	355	324	344	310	340	F 332	
11		347	344	274	331	349	308	357	379	402	373	353	350	390	333	346	H 324	351	367	361	344	307	312	330	326	
12		331	324	313	327	F 320	F 346	F 339	376	377	358	366	375	353	343	371	331	340	375	367	348	300	316	333	337	
13		324	308	319	312	341	360	352	382	366	381	362	362	339	H 316	309	333	344	362	371	342	315	297	308	343	
14		328	310	315	313	338	363	352	376	373	366	367	339	322	334	Z 328	323	346	361	353	338	272	317	327	312	
15		306	317	328	329	386	376	331	354	375	365	351	348	341	313	H 326	345	332	368	350	300	274	337	334	311	
16		297	309	325	351	350	435	322	378	389	369	357	355	333	330	H 309	349	363	399	359	355	329	340	317	310	
17		316	293	F 310	F 332	F 344	F 395	369	376	386	374	369	365	357	334	309	336	359	379	359	346	V 311	341	333	306	
18		F 301	F 306	F 316	F 343	F 388	F 388	407	379	396	364	339	346	A 343	355	354	378	348	326	348	359	367	325	338		
19		314	305	310	307	318	369	427	379	387	359	357	359	358	331	295	334	347	356	321	364	329	331	362	302	
20		322	318	312	318	318	355	388	405	395	354	367	351	341	361	340	338	384	378	350	347	310	333	325	329	
21		330	306	306	321	346	366	350	370	378	371	362	368	353	361	365	357	350	376	384	330	328	320	326	295	
22		304	306	340	360	333	376	331	345	328	359	339	376	356	330	334	366	363	A 362	358	328	354	316	294		
23		278	341	350	300	359	317	F 301	A 347	376	385	350	364	359	367	328	354	350	369	357	351	310	339	319	305	
24		306	303	319	339	362	314		365	359	364	367	385	348	354	366	373	358	377	367	365	316	360	335	345	
25		313	296	320	312	316	332	378	375	378	365	375	365	363	361	380	350	336	351	R 340	313	338	337	315	305	
26		312	300	304	336	372	364	345	354	374	346	345	356	354	356	359	361	369	392	H 358	329	320	342	309	313	
27		307	295	312	326	352	338	325	356	378	360	354	353	360	V 377	337	369	340	H 338	323	318	308	359	341	302	
28		281	312	341	397	336	339	331	359	348	343	350	347	353	355	341	363	357	359	355	345	313	304	322	315	
29		288	321	327	362	350	365	380	332	333	346	334	332	357	359	H 316	310	354	322	342	351	319	353	308	318	
30		296	292	323	362	358	359	312	344	364	363	355	364	H 328	H 347	H 328	351	360	355	349	357	357	308	331	319	
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	29	30	30	30	30	30	29	30	30	30	30	29	30	29	30	30	30	29	
MED		310	309	318	326	350	362	345	376	378	364	354	358	353	334	327	340	352	368	356	348	312	326	326	314	
U Q		322	321	323	339	362	376	369	380	389	374	366	365	357	355	341	354	360	376	367	360	328	340	334	330	
L Q		304	305	310	318	338	346	328	359	373	358	349	347	340	318	320	331	344	356	349	336	305	313	316	305	

NOV.2020 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

NOV. 2020 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														
2											416	368	383	372	390	398								
3											L	L	L	L	L	A								
4											L	L	L	L	L	A								
5											395	385	383	391	433		368							
6											L	A					L							
7											390		412											
8											U	L	U	L	L		L							
9											418	453	394	417			378							
10											A	L	A	A	A	L								
11											U	L	L	A		L	L							
12											426	431				379	372							
13											L	A			L	L	L							
14												396	398	386	382									
15											L	L	L	L	L	L	L							
16											439	389	404	417	401	383	387							
17											L	L	L	L	A	L	L							
18											421	374	396	423		379								
19											L	L	L	A	L	L	L							
20											408	420		409	378	400								
21											L	L	L	L	L	L	L							
22												392	395	411	393	376								
23											L				L									
24											387	406	383	421	389									
25											U	L	L	L	L	L	L							
26											L	L	L	L	L	L	L							
27											381	376	398	388	390	382								
28											L	L	L	L	L	L	L							
29											A				L	L	L							
30											391	380	374	366	374									
31											L	A	A		L	L	L							
											L	A	A		396	388	378							
											L	A			L									
											425		388	427										
											L	L	L	L	L	L	L							
											446		392	374	376	399								
											L	L	L	L	L	L	L							
											L	L		L	L	L	L							
												L	L	L	L	L	L							
											L	L	L	L	L	L	L							
											L	L	L	L	L	L	L							
											463		401	388	397	394								
											L	L	L	L	L	L	L							
											379	384	388		L	L	L							
											L	L	L	L	L	L	L							
											394	391		400										
											L	L	L	L	L	L	L							
											387	389	399	384	389									
											L	L	L	L	L	L	L							
											453													
											L	L	L	L	L	L	L							
											L	L	L	L	L	L	L							
											379	392	386											
	00	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	3	2	11	22	21	25	22	18					1			
MED								453	446	406	390	392	392	388	386	384					433			
U Q								463		416	404	400	405	393	392									
L Q								439		385	383	384	383	382	376									

NOV. 2020 M(3000)F1 (0.01)

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## IONOSPHERIC DATA STATION Okinawa

NOV.2020 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									218	228	236	264	228	250	232	250								
2										230	258	238	262	294	258	238	230	216						
3										226	232	256	218	306	322	246								
4										248	230	236	232	238	264	264	230							
5										230	254	226	246	252	232	226	226							
6										228	232	286	252	242		250								
7										230	262	242	256	266	264									
8											282	240	272	264	258	250	230							
9										246	270	234	242	258	270	276	234							
10									212	230	248	254	240	266	252	244	222							
11									208	230	258	246	216	286	254	246	242							
12										242	234	240	258	260	226	252	234							
13										224	244	224	262	248	274	244	220							
14										242	238	266	268	246	232									
15										238	256	252	258	242	248	216	226	210						
16											258	266	286	256	252	248	216							
17											246	248	262	280	320	258								
18											254		A 278	244	238	220								
19											248	254	250	268	264	244								
20											250	262	248	242	280	256								
21									202		242	246	262	254	236	234	228							
22											242	220	240	290	272	232			A					
23											238	250		238	248	248	220							
24											226	238	220	248	242	236	228	214						
25									204		228	234	234	222	218	252	218							
26											254	248	242	244	230	236	240							
27											232	246	238	234	222	240	228	218						
28										242		240	232	254	246	252	232							
29									218	222	238	224	264	238	222	236	252							
30											232	238	238	250	246	248	238	234						
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	7	18	29	30	28	30	29	28	19	2						
MED								218	212	230	244	246	249	251	252	245	226	213						
U Q								222	238	255	254	260	266	264	251	234								
L Q								204	228	237	236	239	242	236	235	220								

NOV.2020 h'F2 (KM)

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## IONOSPHERIC DATA STATION Okinawa

NOV. 2020 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	286	250	276	250	200	200	246	204	208	192	186	222	194	190	190	198	246	208	186	198	180	206	206	266		
2	254	256	290	244	200	240	238	214	214	200	200	224	182	174	A	A	A	208	198	184	200	214	224	238		
3	262	270	284	276	240	200	218	196	214	188	194	182	194	176	188	232	232	204	204	192	220	218	188	252		
4	272	262	256	252	206	192	242	200	204	200	214	198	182	188	H E A	232	224	226	202	188	192	E A	214	290	188	208
5	222	212	240	242	228	226	224	206	206	208	224	A	208	A	A	172	212	214	202	178	238	218	210	208		
6	246	252	262	246	202	194	204	194	196	196	206	174	176	178	270	242	216	218	198	216	E A	290	246	218	224	
7	312	278	282	262	252	202	270	204	216	A E A	244	A	A	A	202	236	224	212	210	A	E A	274	292	264	264	
8	270	272	252	244	222	192	232	206	206	208	182	190	176	H	A	204	214	196	212	198	182	226	218	286	A	
9	248	264	246	224	224	202	196	202	206	202	A	182	202	E A	E A	216	180	222	210	196	182	268	240	226	256	
10	274	240	270	248	222	204	218	212	192	204	194	188	176	170	240	208	210	210	188	184	204	234	210	242		
11	214	220	296	238	220	256	220	208	198	196	186	210	198	164	A	210	192	212	194	176	218	244	240	236		
12	240	220	246	254	254	210	196	208	212	202	202	204	260	186	188	182	220	204	192	192	250	244	220	230		
13	238	268	264	252	216	200	224	202	208	200	196	204	188	174	166	218	214	204	182	182	200	246	234	238		
14	234	256	256	274	250	206	248	208	214	208	206	196	202	176	182	230	218	206	188	196	234	238	232	280		
15	282	250	240	220	204	E B	194	264	208	220	208	214	216	188	200	174	206	202	202	188	204	228	228	222	262	
16	288	274	264	224	220	172	296	204	212	222	A	208	186	182	230	198	208	202	232	230	226	250	250	258		
17	282	284	276	242	204	178	208	192	204	220	A	196	196	192	186	228	230	212	192	186	204	218	220	254		
18	310	282	262	220	198	182	190	206	196	212	214	224	A	222	180	214	A	206	200	192	208	198	232	240		
19	254	294	276	274	246	198	184	202	204	206	A	A	A	196	192	190	218	196	194	184	210	200	212	258		
20	258	266	272	248	248	204	186	182	194	204	A	188	A	212	178	224	216	208	200	202	254	238	212	226		
21	230	276	276	246	226	214	216	210	190	222	226	196	E A	232	216	210	214	194	208	208	200	216	236	254	298	
22	290	294	230	216	234	202	266	218	222	222	210	204	200	218	214	208	224	A	198	210	230	192	258	262		
23	338	246	218	290	222	270	294	240	222	224	214	188	246	198	170	222	210	206	198	198	194	216	268	258		
24	260	262	258	212	206	262	A	218	212	220	194	198	196	214	188	206	196	202	188	190	240	198	222	220		
25	242	290	246	232	246	240	196	204	160	212	210	190	180	202	196	172	190	218	198	230	196	216	230	258		
26	244	284	278	240	200	206	226	202	212	208	190	222	204	212	212	192	218	198	196	218	230	208	234	222		
27	254	288	256	238	210	220	246	224	206	206	222	216	190	H	H	190	200	202	178	202	222	204	218	278		
28	320	272	222	188	220	228	248	222	216	216	216	218	208	194	178	178	204	204	204	196	232	228	232	240		
29	232	212	230	214	222	198	194	180	204	208	208	198	A	A	228	198	208	204	190	192	202	196	228	236		
30	266	294	242	206	190	242	276	222	216	208	186	182	188	168	218	204	228	212	202	190	E A	212	270	236	228	
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	30	30	30	30	30	30	29	30	30	29	25	27	25	26	27	29	28	29	30	29	30	30	30	29		
MED	259	267	260	243	221	203	224	206	207	208	206	198	194	190	190	208	215	206	197	192	219	220	227	242		
U Q	282	282	276	252	234	226	248	212	214	214	214	216	203	212	216	223	223	212	200	202	234	244	236	260		
L Q	242	250	246	224	204	198	200	202	204	201	194	188	184	176	180	191	203	203	188	184	204	208	218	229		

NOV. 2020 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Okinawa

NOV.2020 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1								A	112	112		A	A	108	104	104		A	110	114					
2								A	104	104		A	A	A	A	A		A	A	A					
3								A	104	104	104	104	104		A	104	104		A	A	B				
4								A	A	104	104	104		A	A	A		A	112	108					
5								136	110	106	106	100	104	104		A	A		110	106					
6								A	102	102	108	106	106	102	102		A		110	120					
7								A	106	106	102	108	108	102		A	A	A	A	A					
8								A	114	A	106		A	A	A	A		100		A					
9								A	A	A	A	A	A	A	A		104	110		A	A				
10								A	A	100	100	100		A		A	A		104	108					
11								A	A	102	102	102	102	102	102	102		A	A	B					
12								112	104	104	102	102		A	A	A	A		106	106					
13								A	A	106		A	A	A	A	A		108		A	B				
14								A	106	106	104	104	104		A	A	A		114	A	A				
15								A	100	A	102	102	104		A	A	A		A	A	A				
16								A	106	102	102	102		A	A	A		104	A	A	A				
17								A	118	104	102	102	102		A	A	A		A	A	A				
18								B	104	102	104	102	100	102	102		A	A	A	A					
19								A	106	102	100	102	102	104		A	A	A	A	A					
20								B	102	102	102	102	100		A	100		A	A	A	A				
21								A	104	A	104	104		A	104		A	A	A	A	A				
22								B	104	104	104	102	102	102	102		A	A	A						
23								B	104	104	104	106	102		A	A		102	A	A					
24								A	A	104	108	106		A	A	A		112	106	A	A				
25								B	106	106	104	104	104	104	102	102		A	A	A					
26								B	118	106	A	106	106	106	106		A	108	104	A	B				
27								B	104	104	104	104	104	104	102	102	102		A						
28								B	102	102	102	104	104	104	104	102	110	110			B				
29								B	102	A	104	104		A	A	A	A		A	A					
30								B	102	102	102	102	102	102	104	104		A	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								2	24	25	25	25	19	15	12	10	15	8							
MED								124	104	104	104	104	104	104	102	103	108	108							
U Q									106	106	104	104	104	104	104	104	110	112							
L Q									103	102	102	102	102	102	102	102	104	106							

NOV.2020 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

NOV.2020 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	88	88	88	88	88	B	B	154	148	148	174	168	164	156	96	96	168	130	90	110	98	98	B	B	
2	B	94	92	92	92	92	94	128	114	106	104	98	102	100	94	94	96	98	92	B	B	92	94	94	
3	94	88	88	92	88	B	B	122	122	114	168	110	108	108	106	102	100	96	96	96	100	98	92	86	
4	84	84	84	B	80	B	B	124	128	108	106	108	104	104	102	108	132	138	94	98	108	104	90	90	
5	90	94	96	90	90	84	88	90	122	116	106	106	106	104	108	108	174	114	100	120	B	98	96	92	
6	92	108	92	96	82	82	B	130	138	122	132	120	G	108	156	134	128	120	114	102	98	98	98	96	
7	96	96	94	92	B	B	B	126	118	110	104	102	104	102	106	140	102	96	118	104	100	96	96	94	
8	96	96	96	B	B	B	B	164	182	156	134	110	102	102	96	98	98	G	124	94	86	86	96	90	92
9	92	92	B	88	86	B	B	126	108	104	102	102	102	98	94	96	92	88	86	92	90	90	B	B	
10	88	B	B	B	B	92	B	144	108	G	G	116	100	116	148	154	148	G	B	88	B	B	B	B	
11	90	88	92	88	B	104	94	146	152	108	152	120	110	106	102	140	98	150	B	B	92	108	126	104	
12	B	94	92	92	90	88	96	150	196	120	106	104	102	112	108	102	154	138	108	124	92	92	96	88	
13	B	B	92	88	88	B	B	120	144	146	124	112	100	98	100	150	96	130	102	B	94	100	102	96	
14	B	92	90	86	80	80	B	146	138	156	134	110	110	106	102	98	150	126	96	B	B	90	94	82	
15	86	96	90	90	B	B	B	90	166	126	90	106	100	106	104	100	98	114	96	94	92	90	84	84	
16	B	86	B	B	B	B	B	150	140	126	114	106	102	100	96	110	104	110	100	96	98	98	98	96	
17	94	94	94	94	94	92	90	86	G	114	104	114	110	110	104	102	120	98	98	96	96	94	94	88	
18	92	90	86	92	86	86	86	144	144	126	118	116	106	108	108	150	124	102	96	B	120	90	106	92	
19	96	90	88	B	B	B	B	172	180	144	114	114	102	104	104	100	98	98	94	88	136	108	96	B	
20	86	B	B	92	96	B	B	B	160	128	114	114	104	118	112	108	108	86	86	84	84	84	B	B	
21	96	B	B	B	B	B	B	160	150	178	116	116	104	102	104	102	100	98	92	102	98	104	128	98	
22	86	98	94	92	90	B	B	132	132	124	134	142	132	112	122	120	104	96	94	94	98	98	96	96	
23	120	104	96	96	96	92	B	B	126	136	130	120	102	102	102	154	94	92	86	86	86	86	90	B	
24	B	B	94	B	B	94	108	86	86	112	110	110	108	102	100	96	G	90	90	96	104	92	92	84	
25	B	B	B	B	B	B	B	88	G	160	124	114	110	114	G	G	108	96	88	88	88	88	88	B	
26	B	B	B	B	96	96	B	B	176	160	118	126	114	114	108	106	182	88	94	86	86	B	B	B	
27	B	B	82	B	B	B	B	84	172	176	148	110	114	160	G	G	150	86	88	88	88	B	B	B	
28	B	96	B	B	B	B	B	92	130	178	152	118	116	108	126	G	146	132	B	82	116	82	B	B	
29	B	B	B	B	B	B	B	B	180	112	118	118	98	92	90	94	168	90	90	86	92	88	94	B	
30	B	B	B	B	B	B	B	B	160	150	122	150	130	144	152	108	104	104	B	112	94	92	90	84	
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	20	20	17	16	12	10	24	28	29	29	30	29	30	28	27	28	29	26	25	26	27	22	19	
MED	92	94	92	92	89	92	94	129	142	126	118	114	104	106	104	104	108	98	94	96	95	94	94	92	
U Q	96	96	94	92	93	93	108	148	160	149	133	118	110	114	108	134	149	125	98	102	100	98	98	96	
L Q	88	89	88	88	86	85	88	106	123	113	106	106	102	102	100	98	98	93	90	87	90	90	90	86	

NOV.2020 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

NOV.2020 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	F	F	F	F	F				HC	HL	HL	HL	HL	HL	L	L	HL	HL	L	FF	F	F				
2		F	F	F	F	F	F	F	C	C	C	C	L	C	C	L	L	L	L			F	F	F	F	
3	F	F	F	F	F				CL	C	C	H	C	C	C	C	C	L	L	F	F	F	F	F	F	
4	F	F	F	F	F				C	C	C	C	C	C	CH	CH	H	H	L	L	F	F	F	F	F	
5	F	F	F	F	FQ	FQ	F	L	C	C	C	C	C	C	CH	C	H	C	C	F		F	F	F	F	
6	F	F	F	F	F	F		H	H	C	H	C		C	HC	HC	C	CL	C	F	F	F	F	F	F	
7	F	F	F	F				C	C	C	C	C	C	C	C	HC	C	L	C	F	F	F	F	F	F	
8	F	F	F	F			F	H	HC	H	C	C	C	L	L	L		C	L	F	F	F	F	F	F	
9	F	F		F	F			CH	C	C	C	C	C	L	L	L	L	L	L	F	F	F	F			
10	F				F			H	CL			C	C	C	HC	HC	H			F						
11	F	F	F	F	F	F	H	HL	HL	C	HC	C	C	C	C	HC	L	H			F	F	F	F	F	
12		F	F	F	F	F	HC	H	C	C	C	C	C	C	C	H	H	C	FF	F	F	F	F	F	F	
13			F	F	F		C	HC	HC	C	C	C	L	L	HC	L	HC	C		F	F	F	F	F	F	
14		F	F	F	F	F	H	H	H	H	C	C	C	C	C	LH	HL	C	L			F	F	F	F	
15	F	F	F	F			L	H	C	LC	C	C	C	C	LQ	L	L	CL	LQ	FQ	F	F	F	F	F	
16		F					H	H	CH	C	C	C	C	C	LH	C	CL	CL	CL	F	FF	F	F	F	F	
17	F	F	F	F	F	F	L		C	C	C	C	C	C	C	C	CL	LH	L	F	F	F	F	F	F	
18	F	F	F	F	F	F	H	H	C	C	C	C	C	C	C	HC	CL	C	L		F	F	F	F	F	
19	F	F	F				HL	HC	H	C	C	C	C	C	C	C	L	L	L	F	F	F	F	F		
20	F			F	F			HC	C	C	C	C	C	C	C	CH	L	L	F	F	F	F	F			
21	F						H	H	HL	C	C	C	C	C	C	C	C	L	L	F	F	F	F	F	F	
22	F	F	F	F	F	F	H	C	H	H	H	C	C	C	C	C	L	L	L	F	F	F	F	F	F	
23	F	F	F	F	F		C	HQ	H	C	C	C	C	C	C	H	L	LC	L	F	F	F	F	F	F	
24			F		F	FF	L	L	CL	C	C	C	C	C	C	L	L	LQ	FQ	F	F	F	F	F	F	
25							L	H	C	C	C	C	C	C			CL	LQ	LQ	F	F	F	F	F	F	
26				F	F			HC	H	C	C	C	C	C	C	C	HL	LH	L	F	F	F				
27			F			F		H	H	H	C	C	C	H			HC	L	L	F	F					
28		F					L	H	HC	H	C	C	C	C	C	H	H	H	F	F	F	F	F	F	F	
29								H	C	C	C	L	L	L	L	L	H	L	L	F	F	F	F	F	F	
30								HC	H	C	H	H	H	H	HC	C	C	C		F	FF	F	F	F	F	
31								11	1	1	1	1	1	1	11	1	1	2	1	2	21	7	2	2	1	
		00	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.2020 TYPES OF Es  
 NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## 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

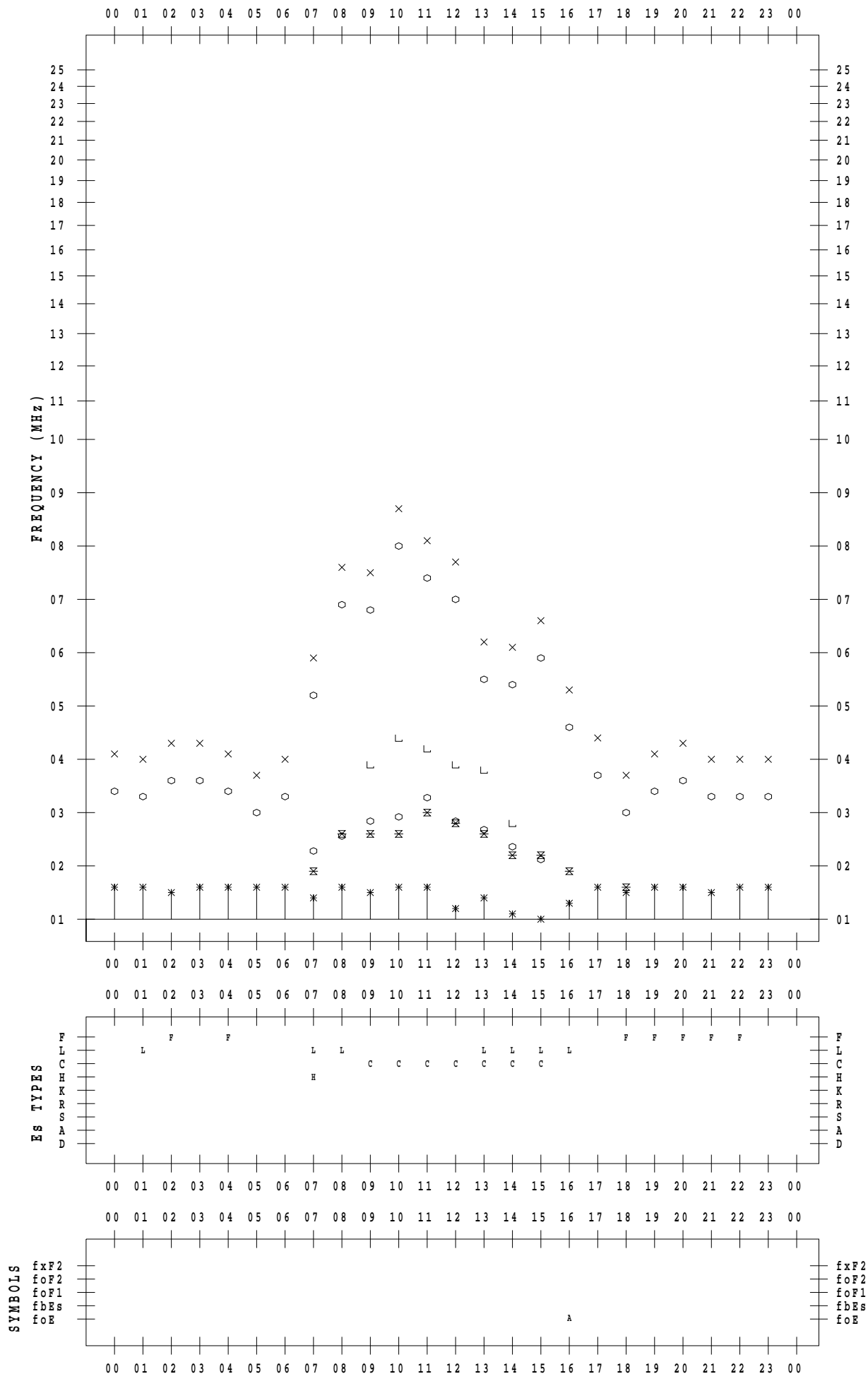
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/ 1

135 ° E MEAN TIME



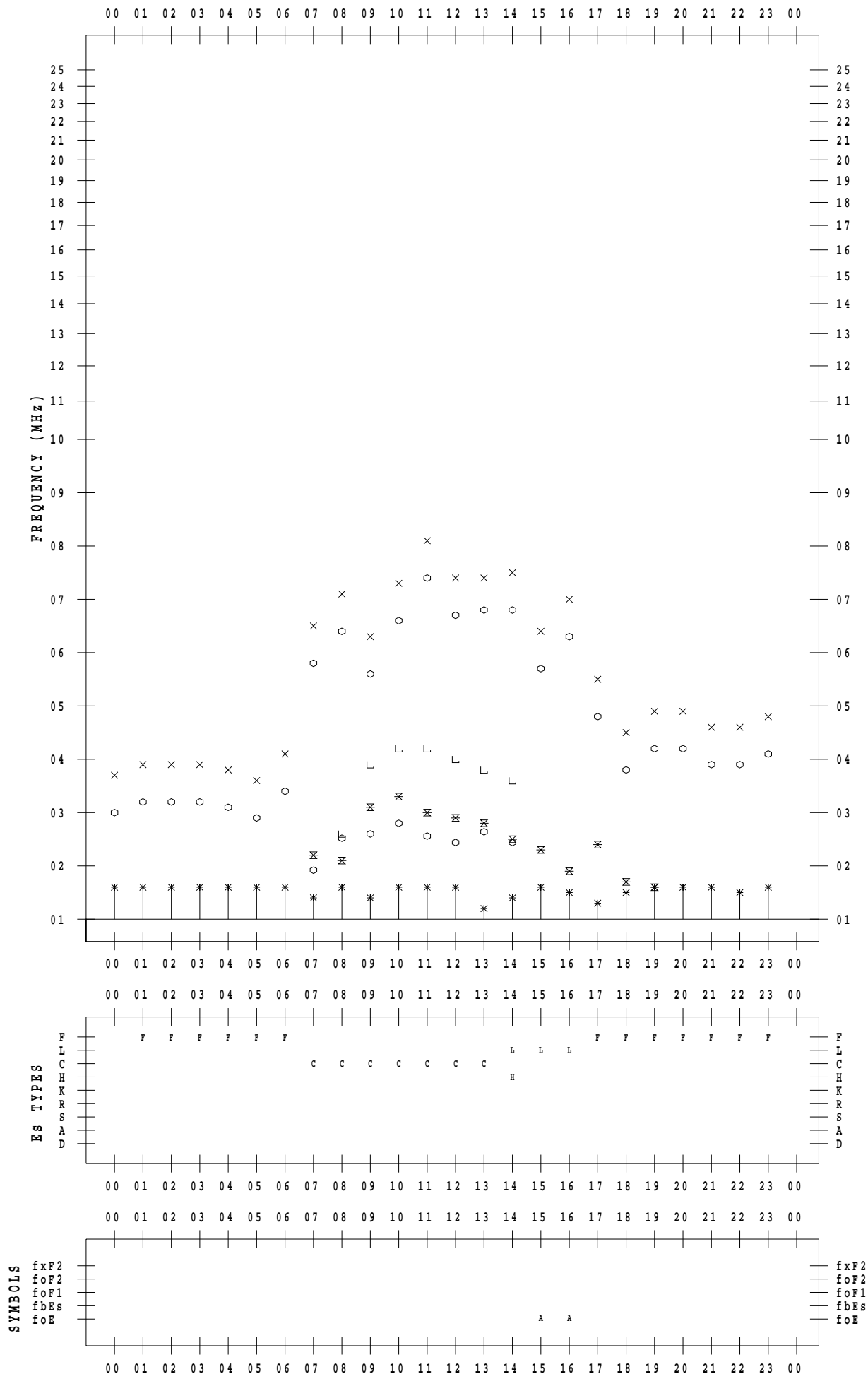
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/ 2

135 ° E MEAN TIME



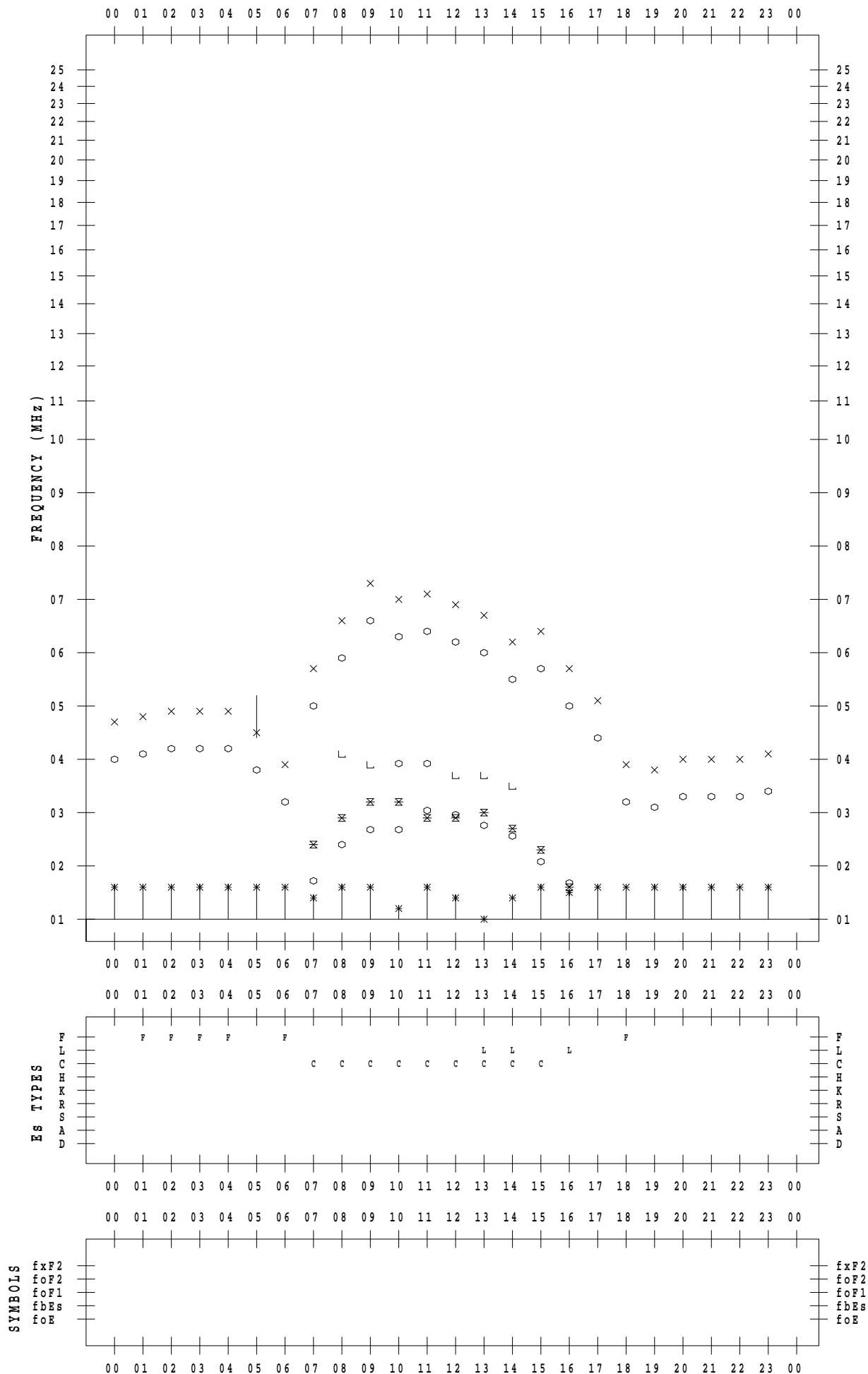
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/ 3

135 ° E MEAN TIME



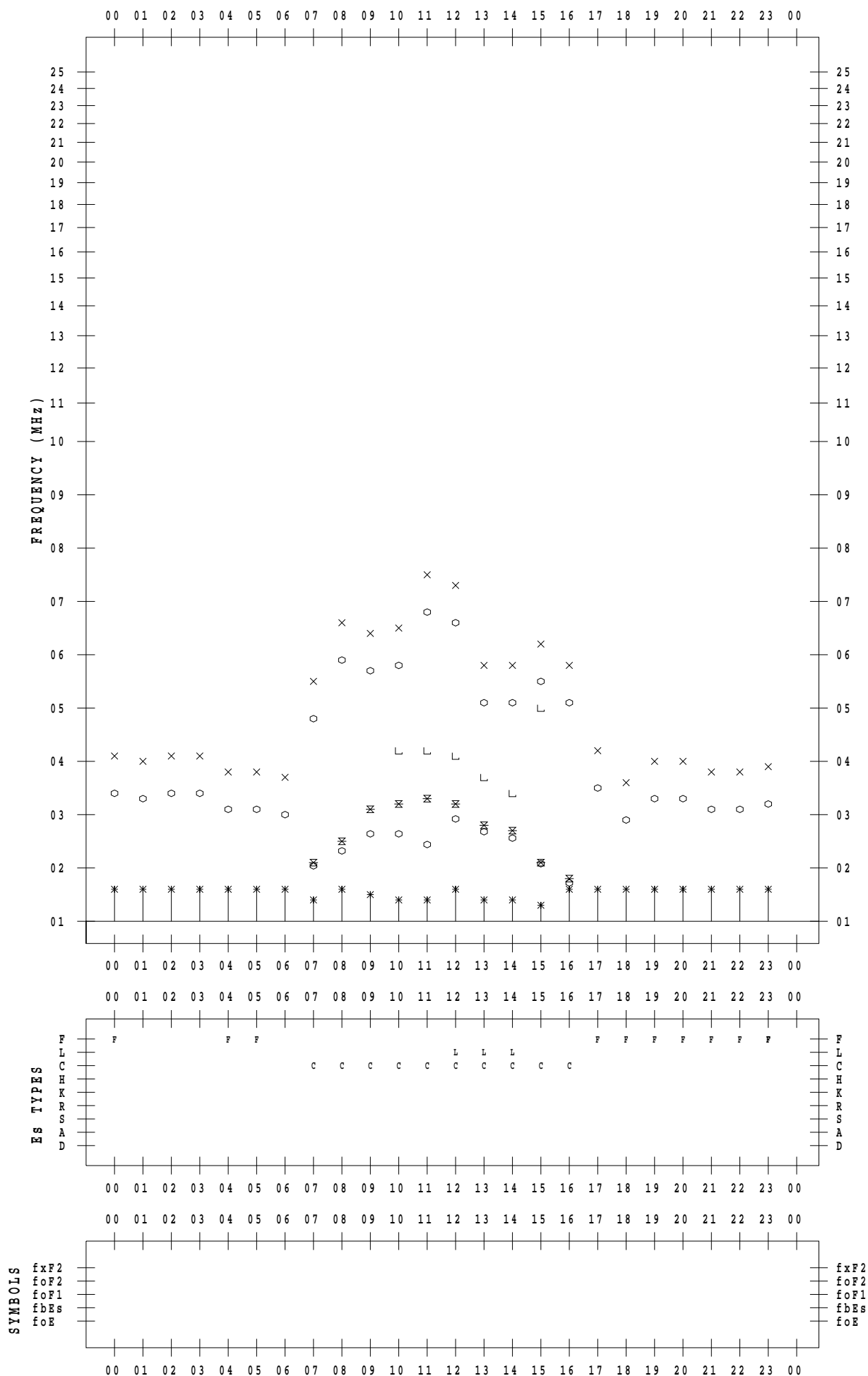
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/ 4

135 ° E MEAN TIME





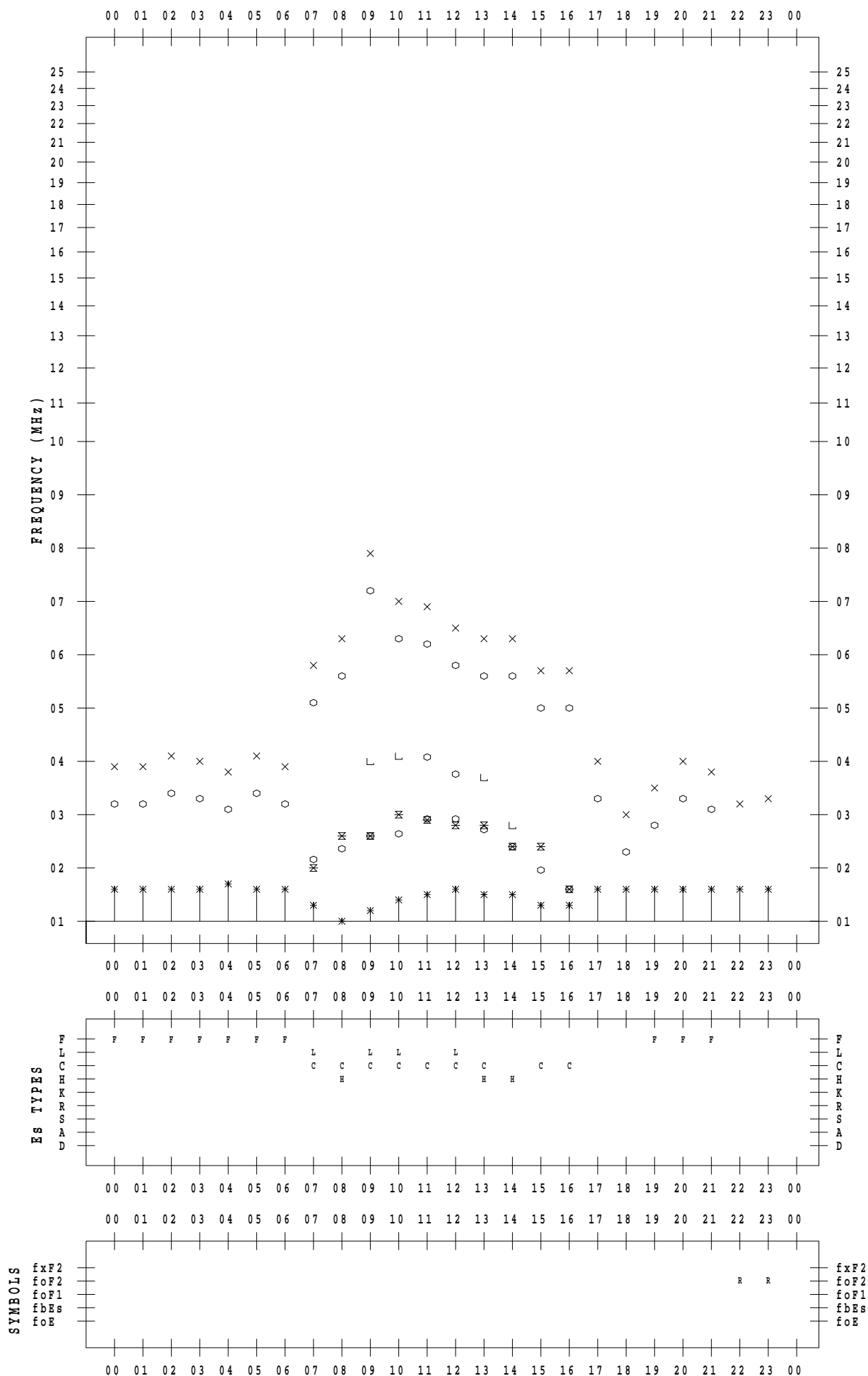
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/ 5

135 ° E MEAN TIME



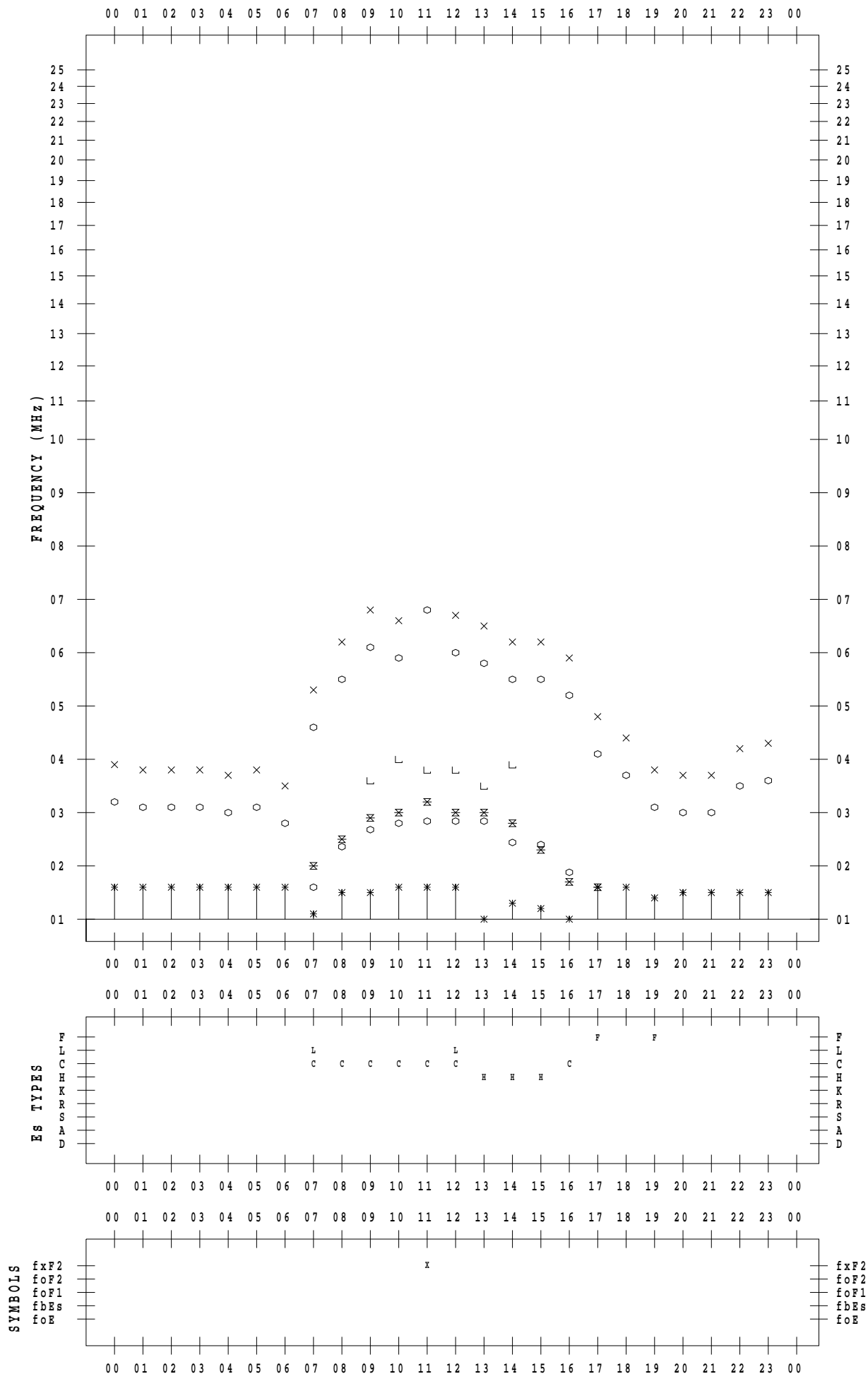
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/ 6

135 ° E MEAN TIME



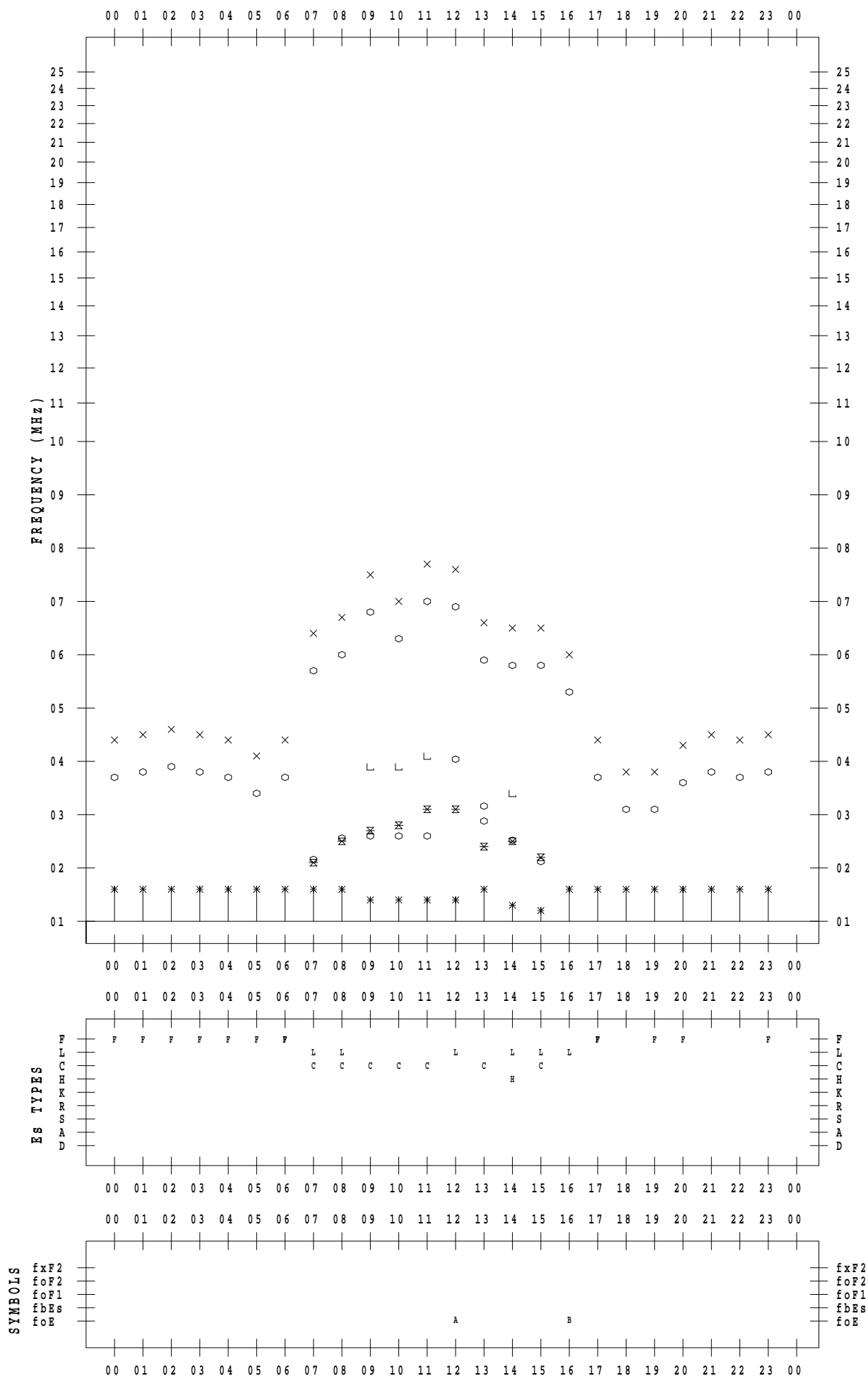
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/ 7

135 ° E MEAN TIME



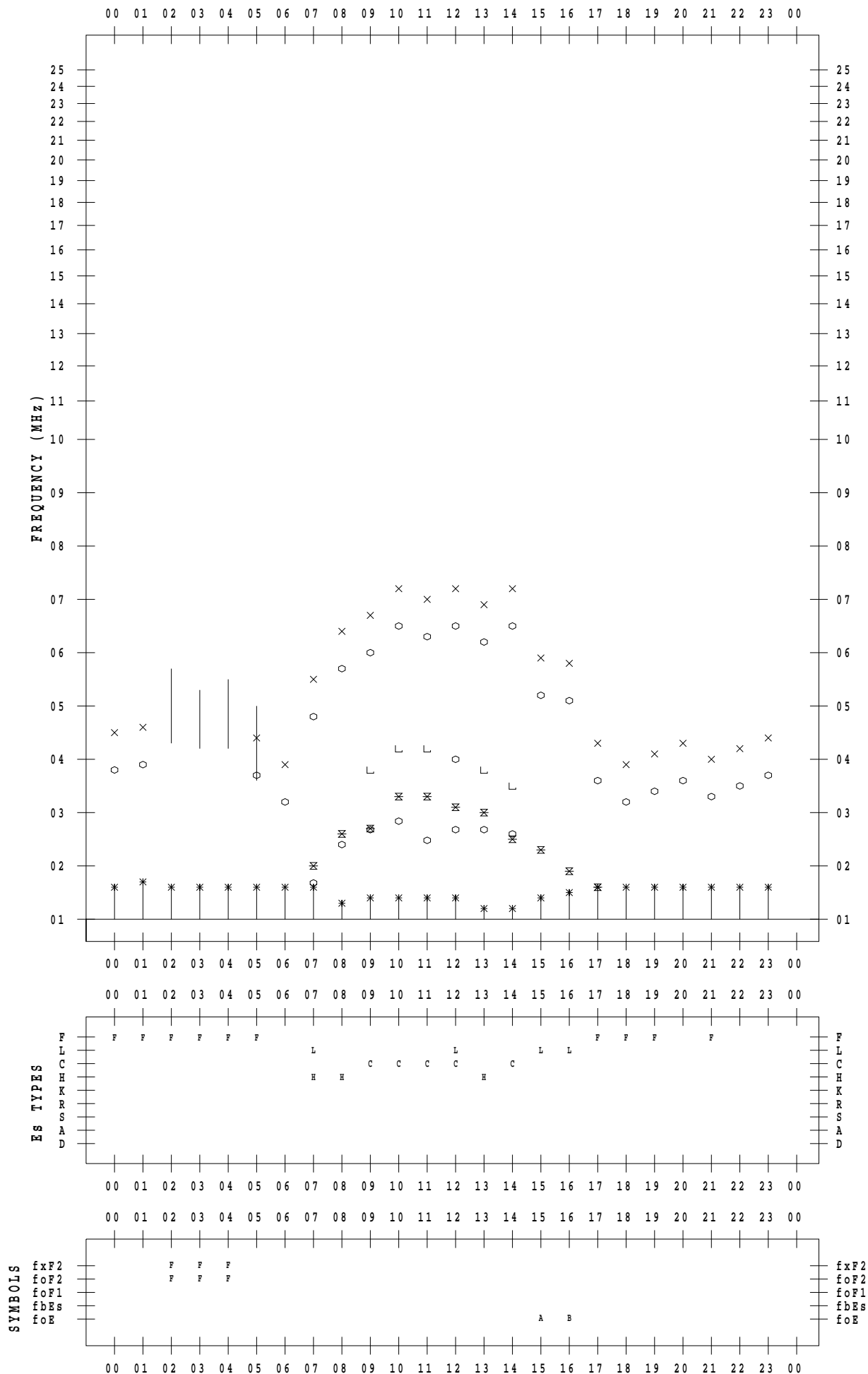
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/ 8

135 ° E MEAN TIME



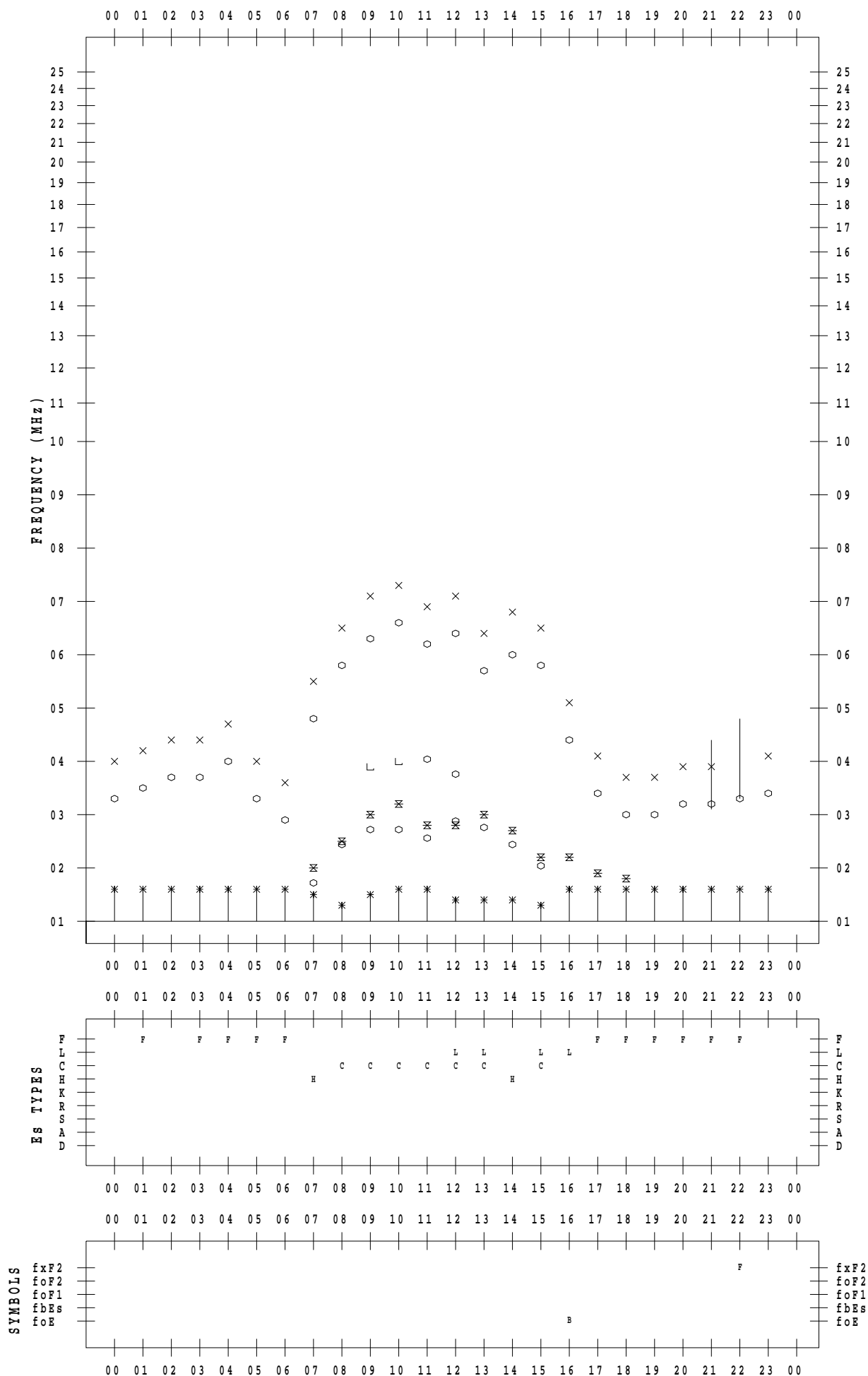
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/ 9

135 ° E MEAN TIME



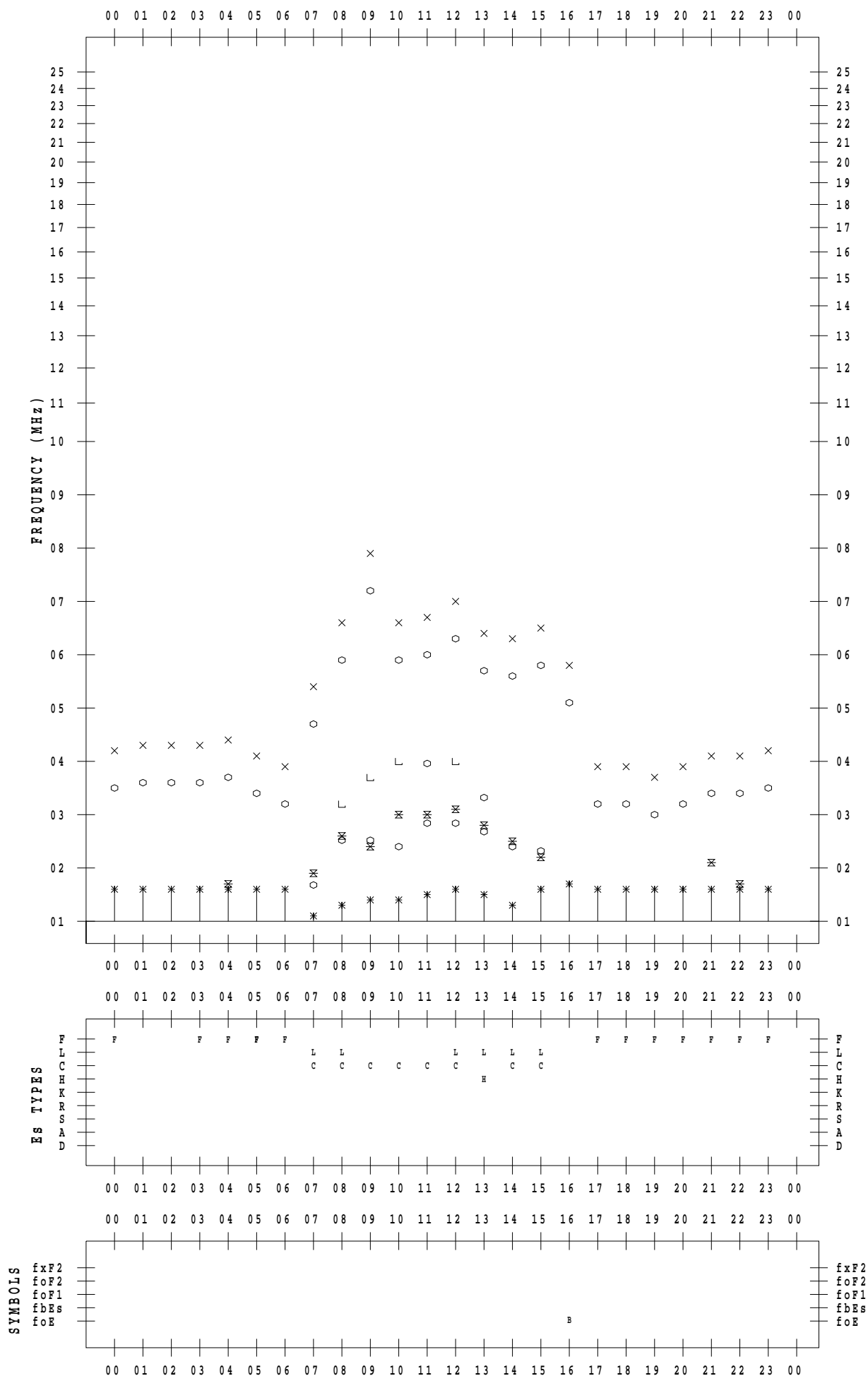
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/10

135 ° E MEAN TIME



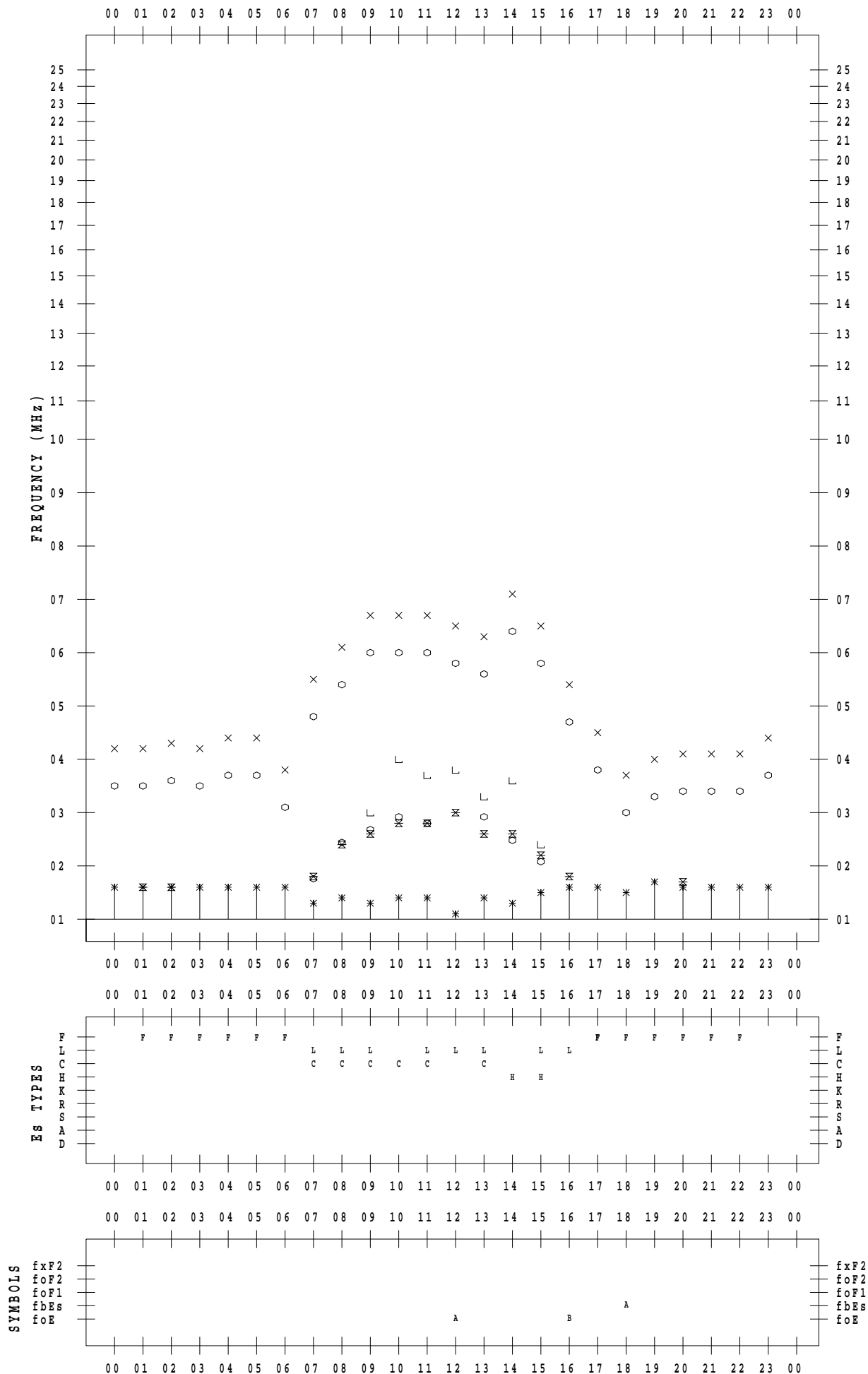
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/11

135 ° E MEAN TIME



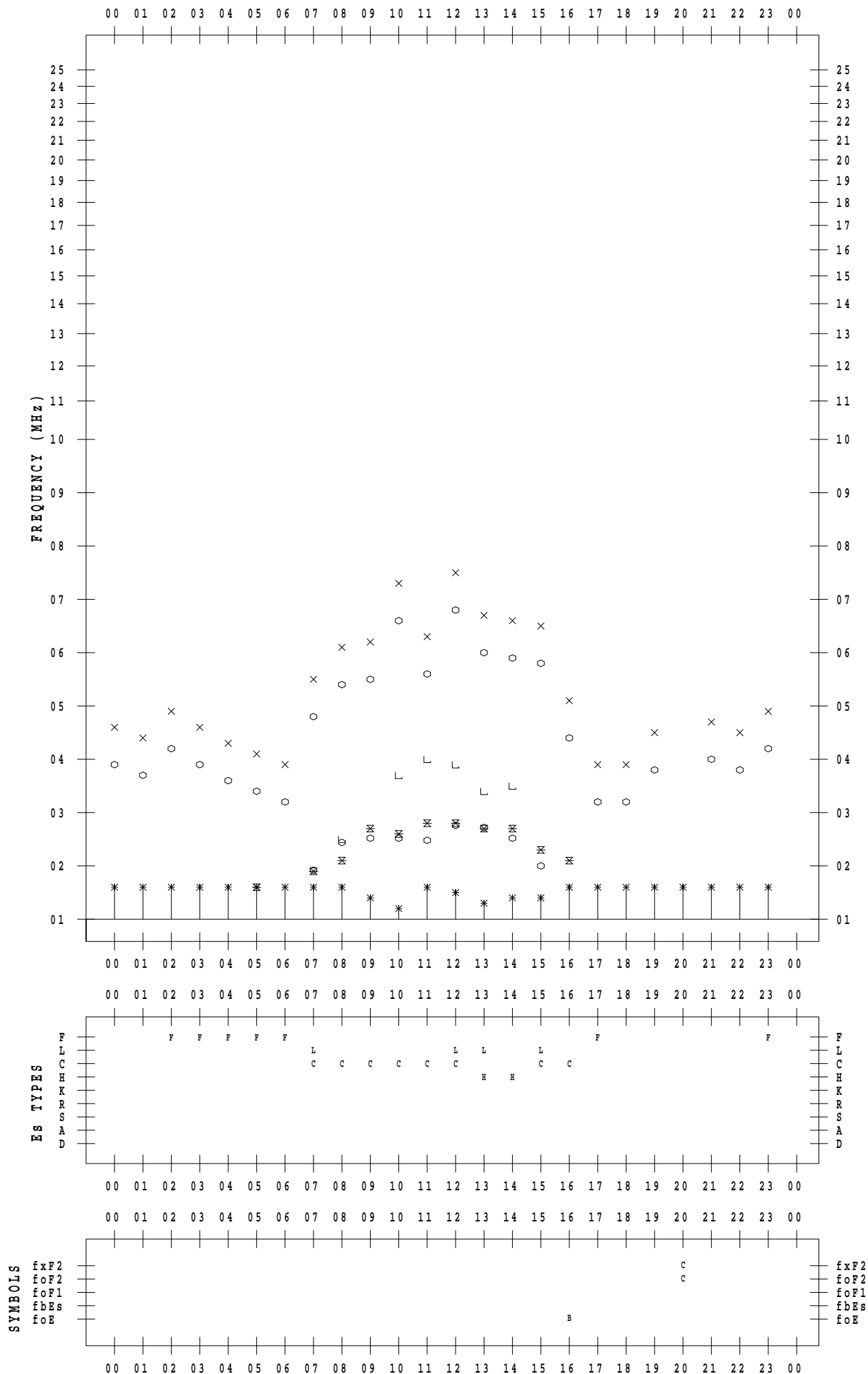
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/12

135 ° E MEAN TIME





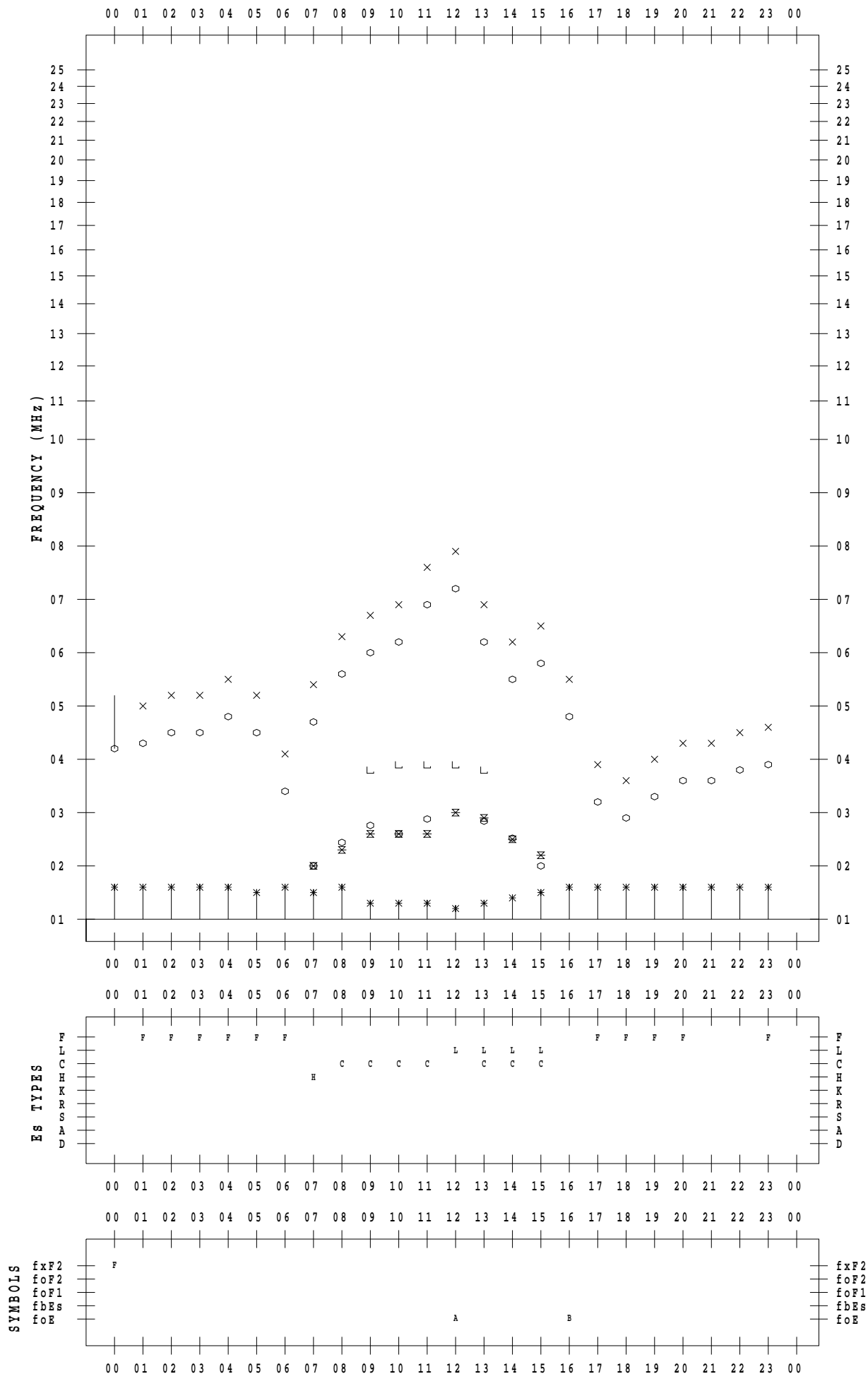
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/13

135 ° E MEAN TIME



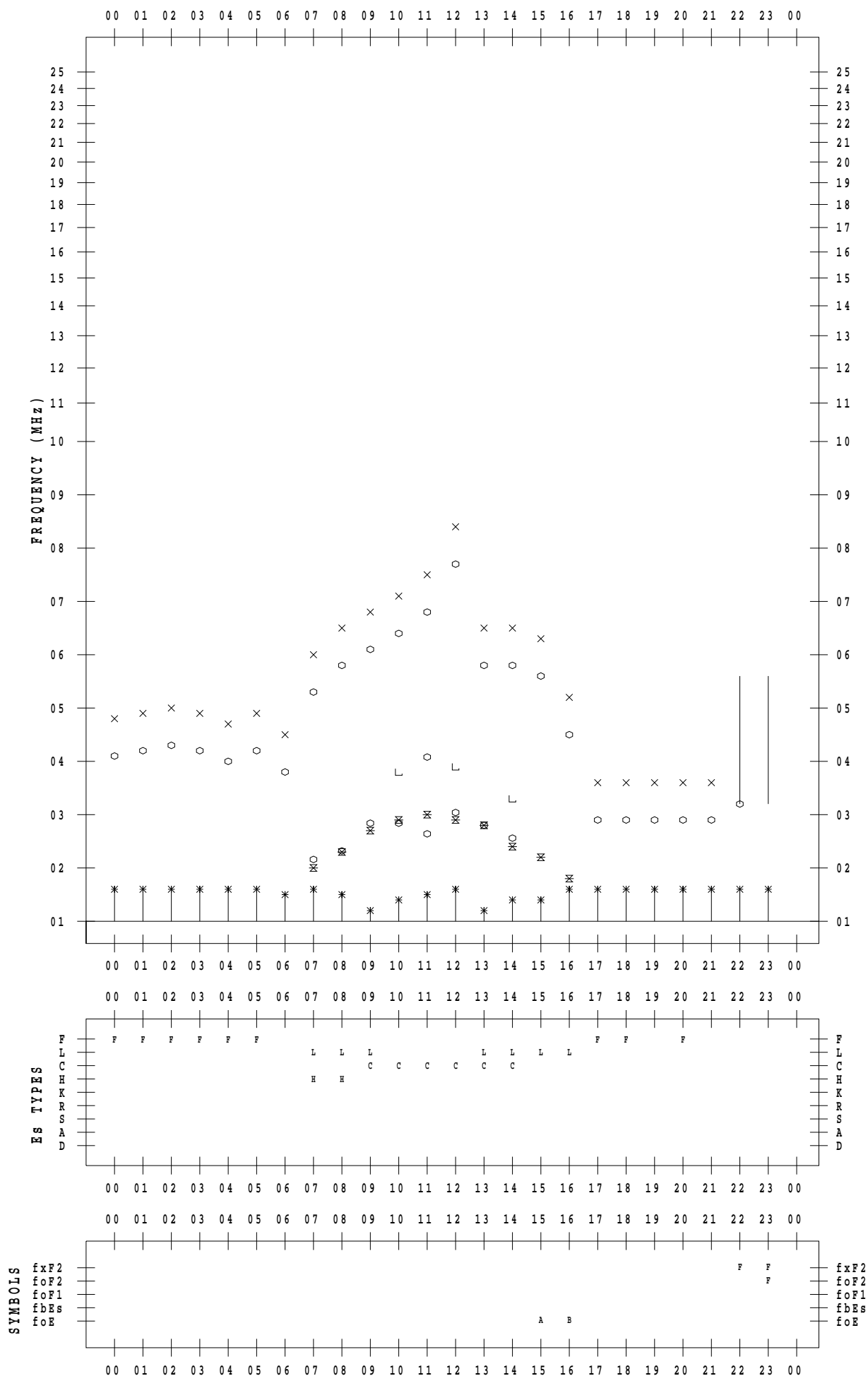
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/14

135 ° E MEAN TIME



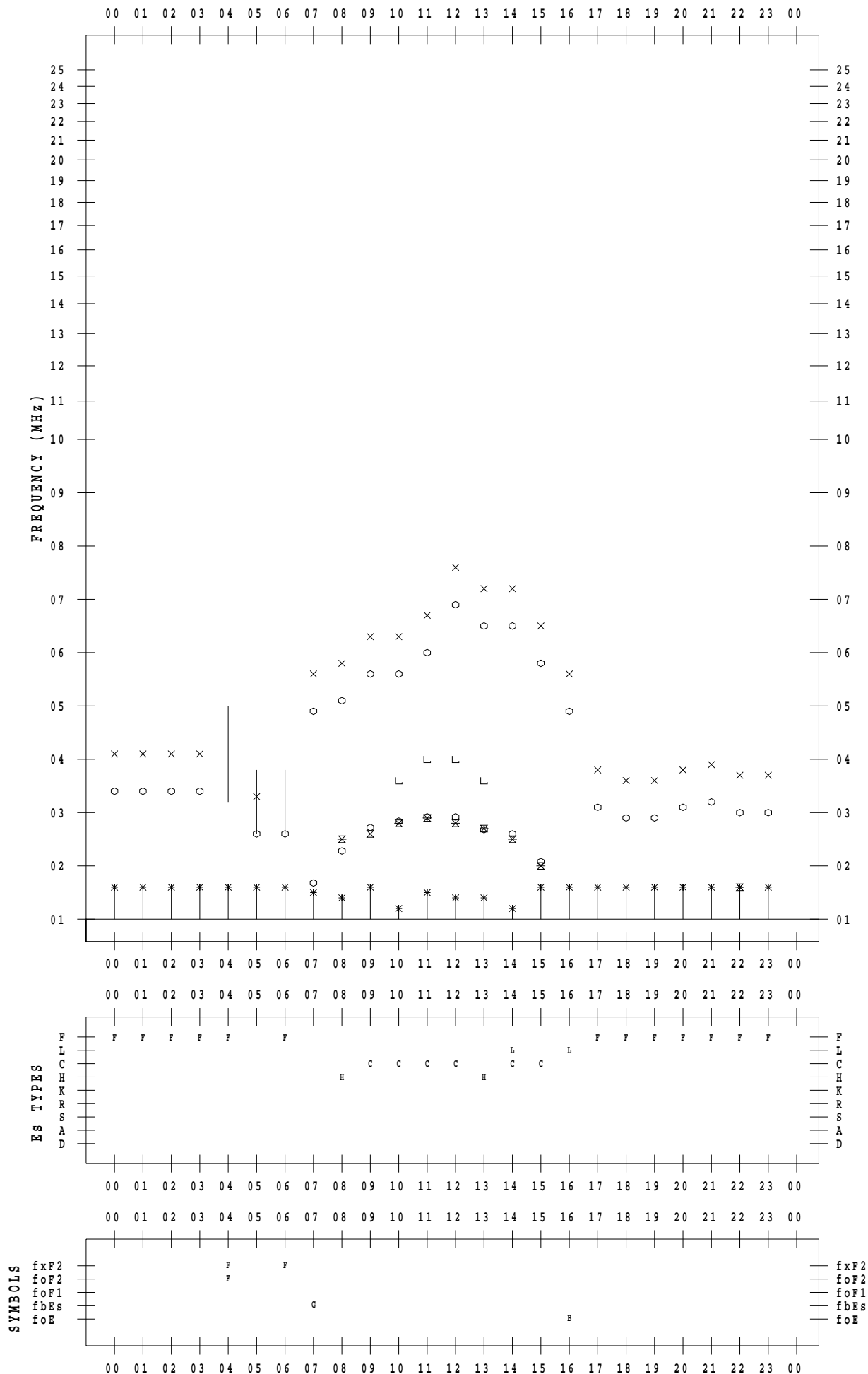
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/15

135 ° E MEAN TIME



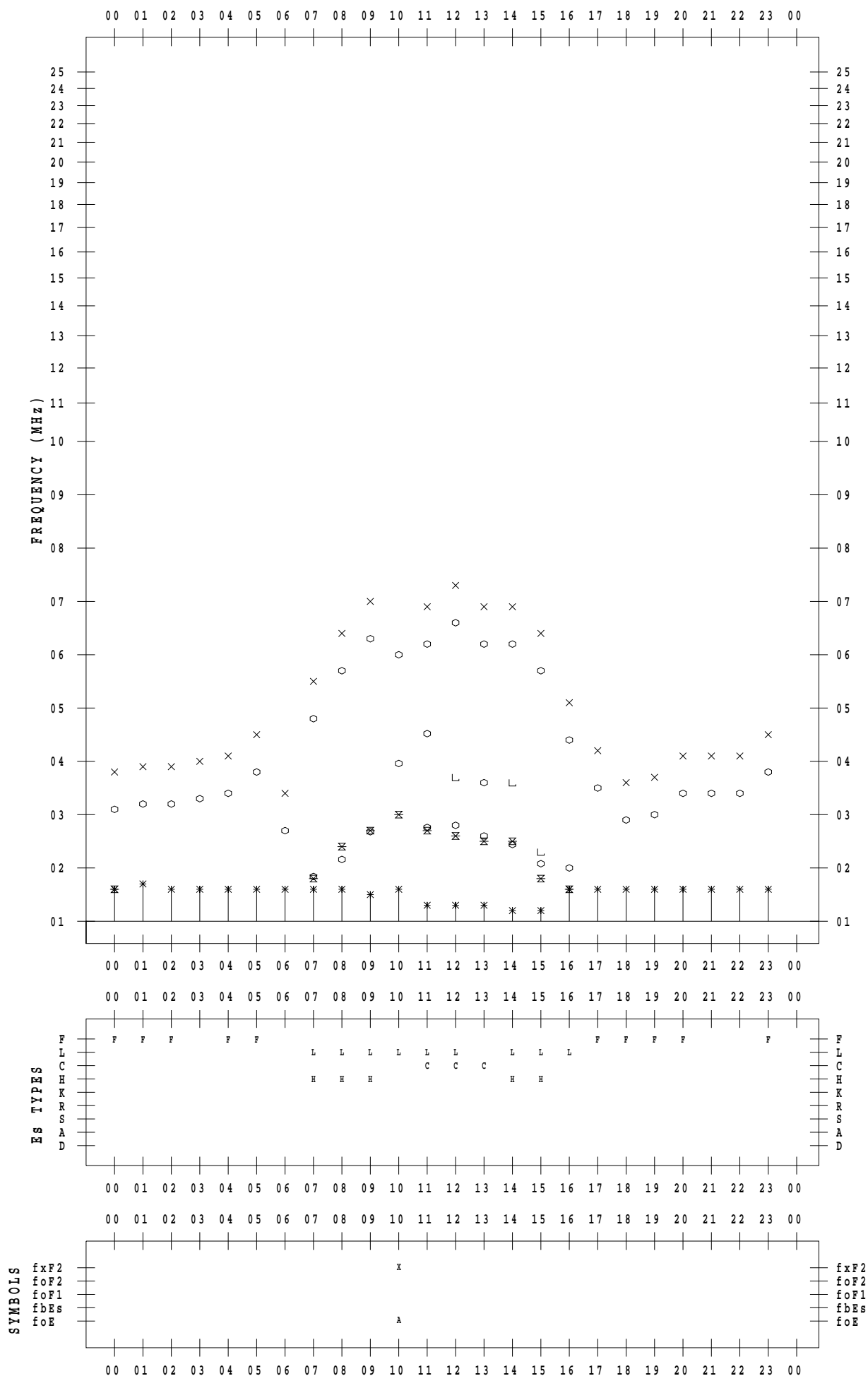
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/16

135 ° E MEAN TIME



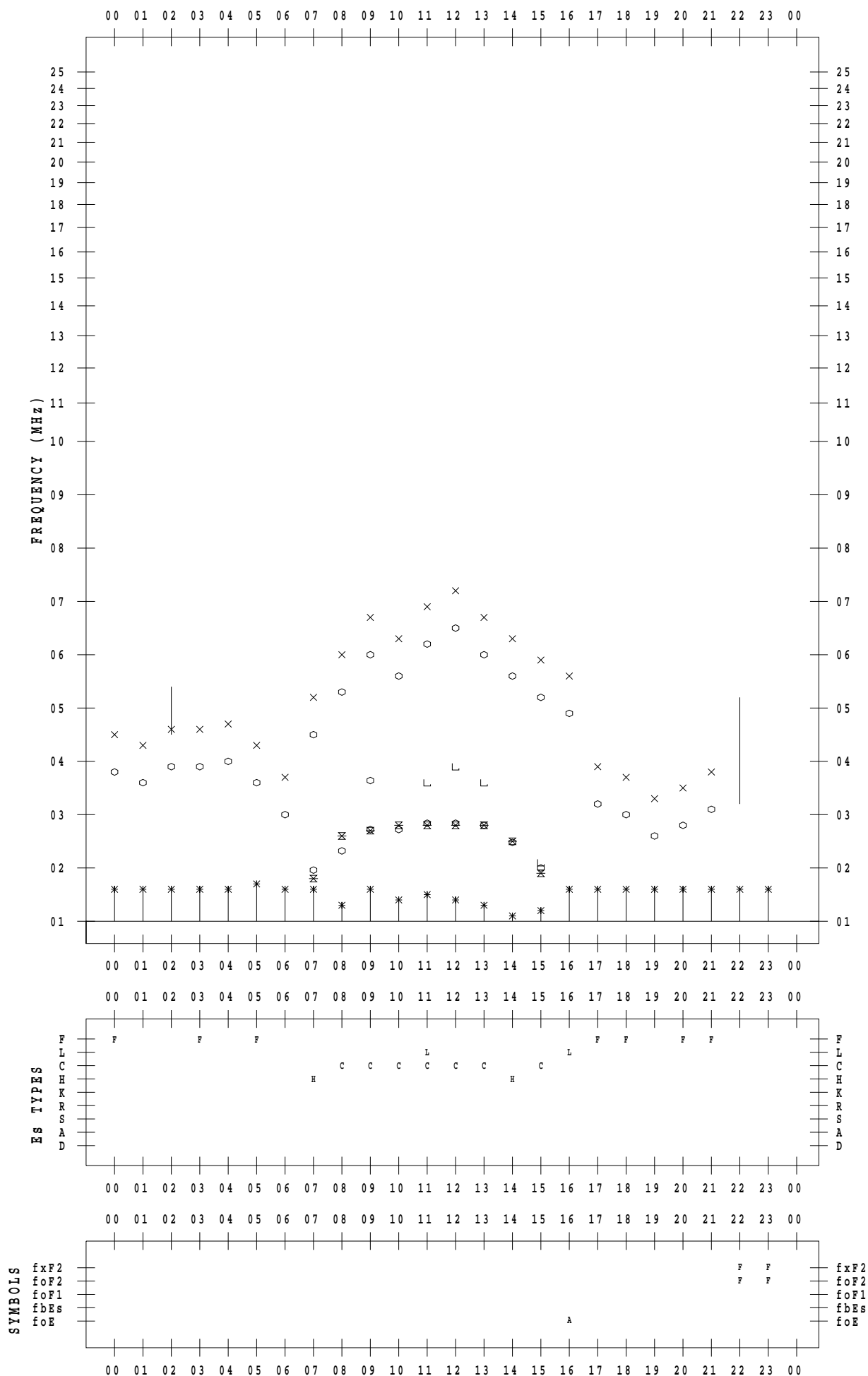
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/17

135 ° E MEAN TIME



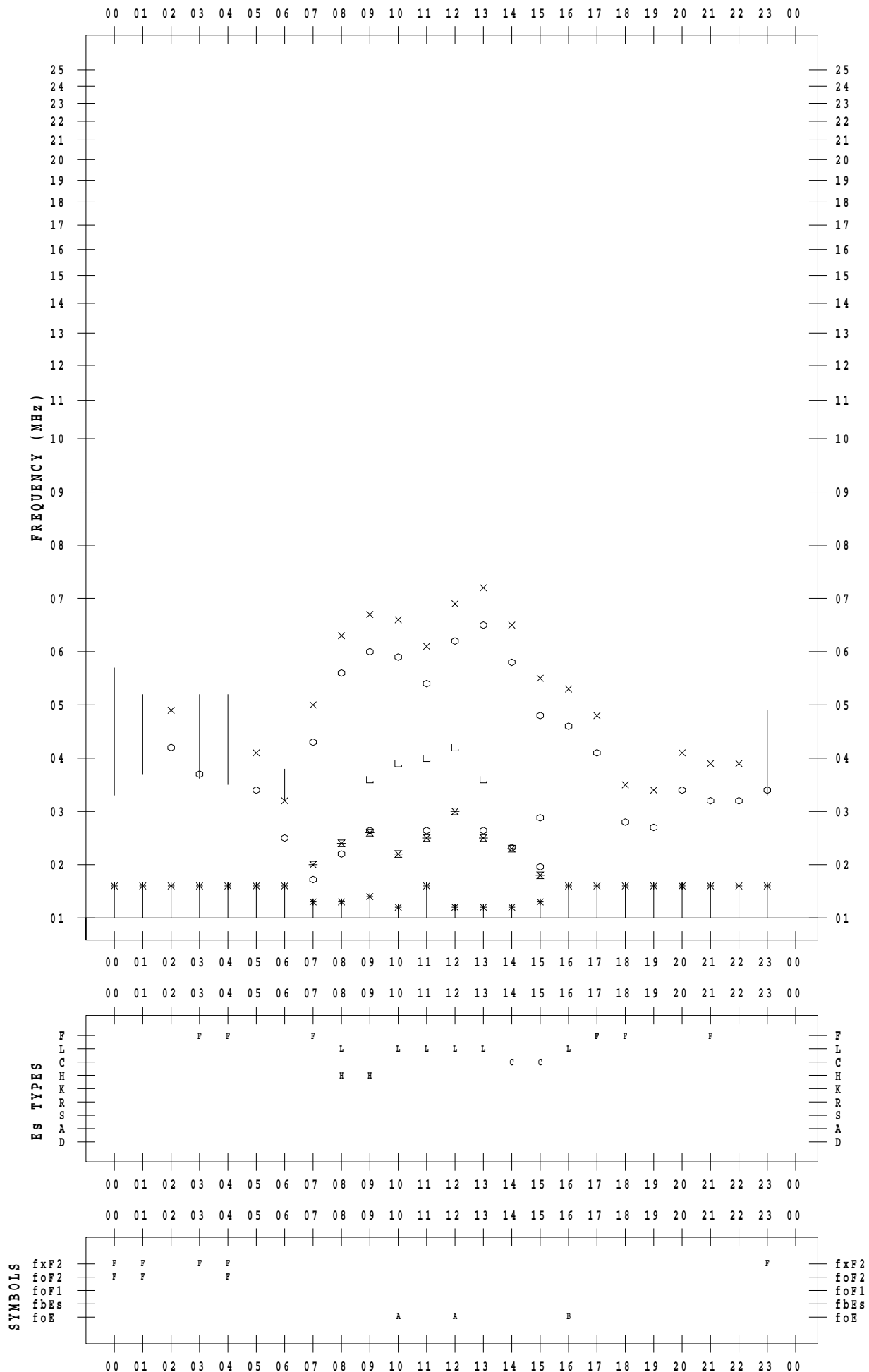
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/18

135 ° E MEAN TIME



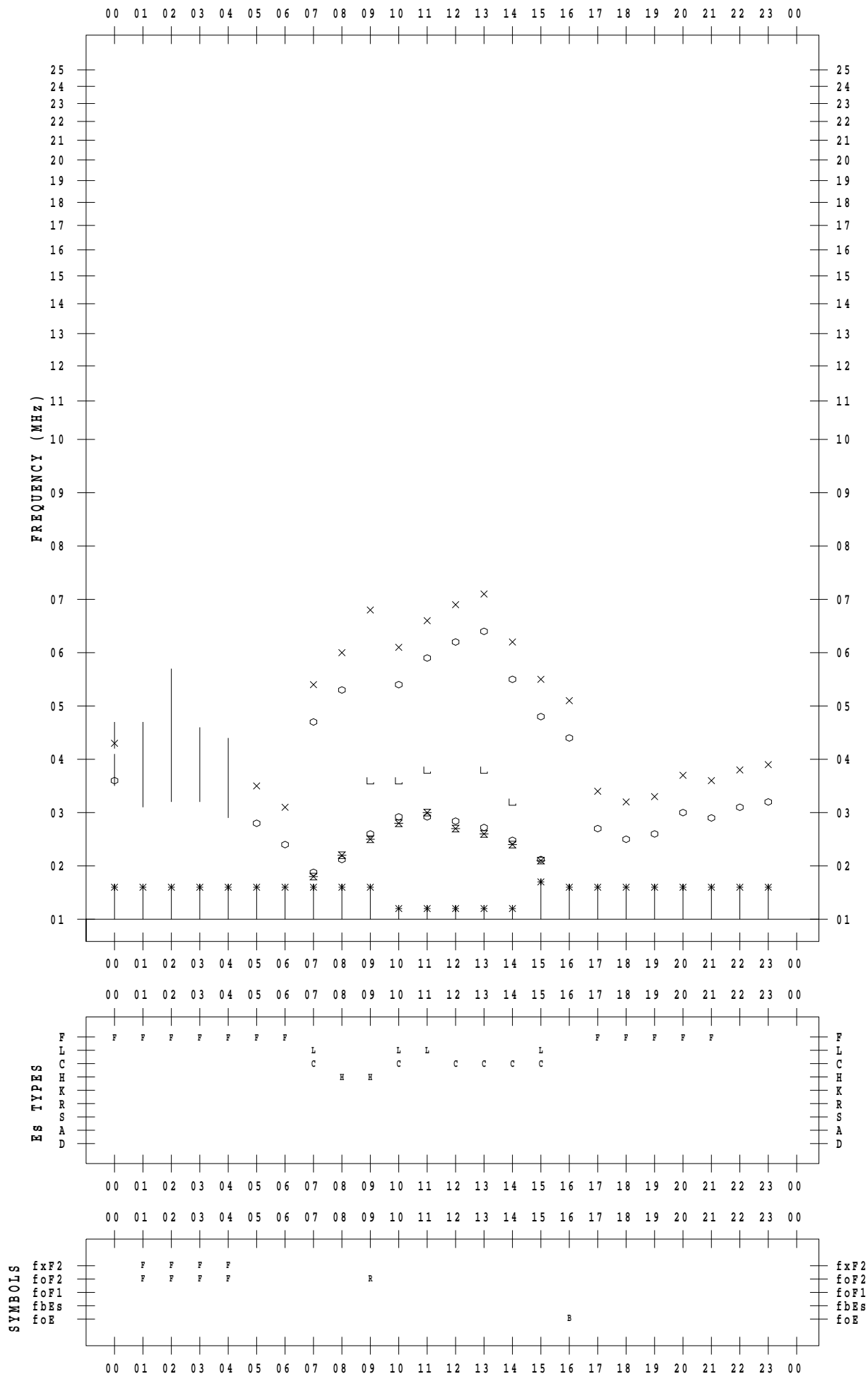
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/19

135 ° E MEAN TIME



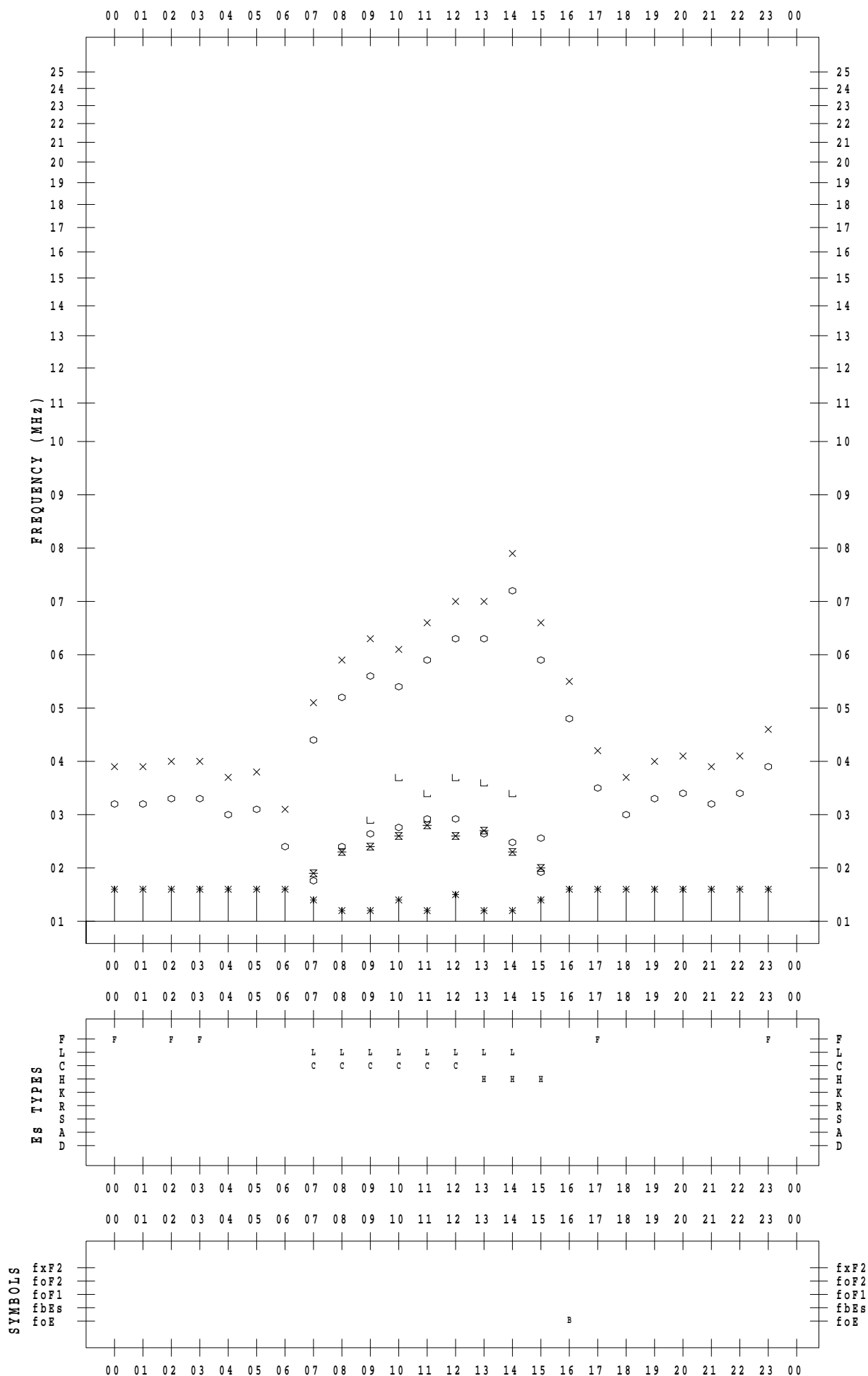
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/20

135 ° E MEAN TIME





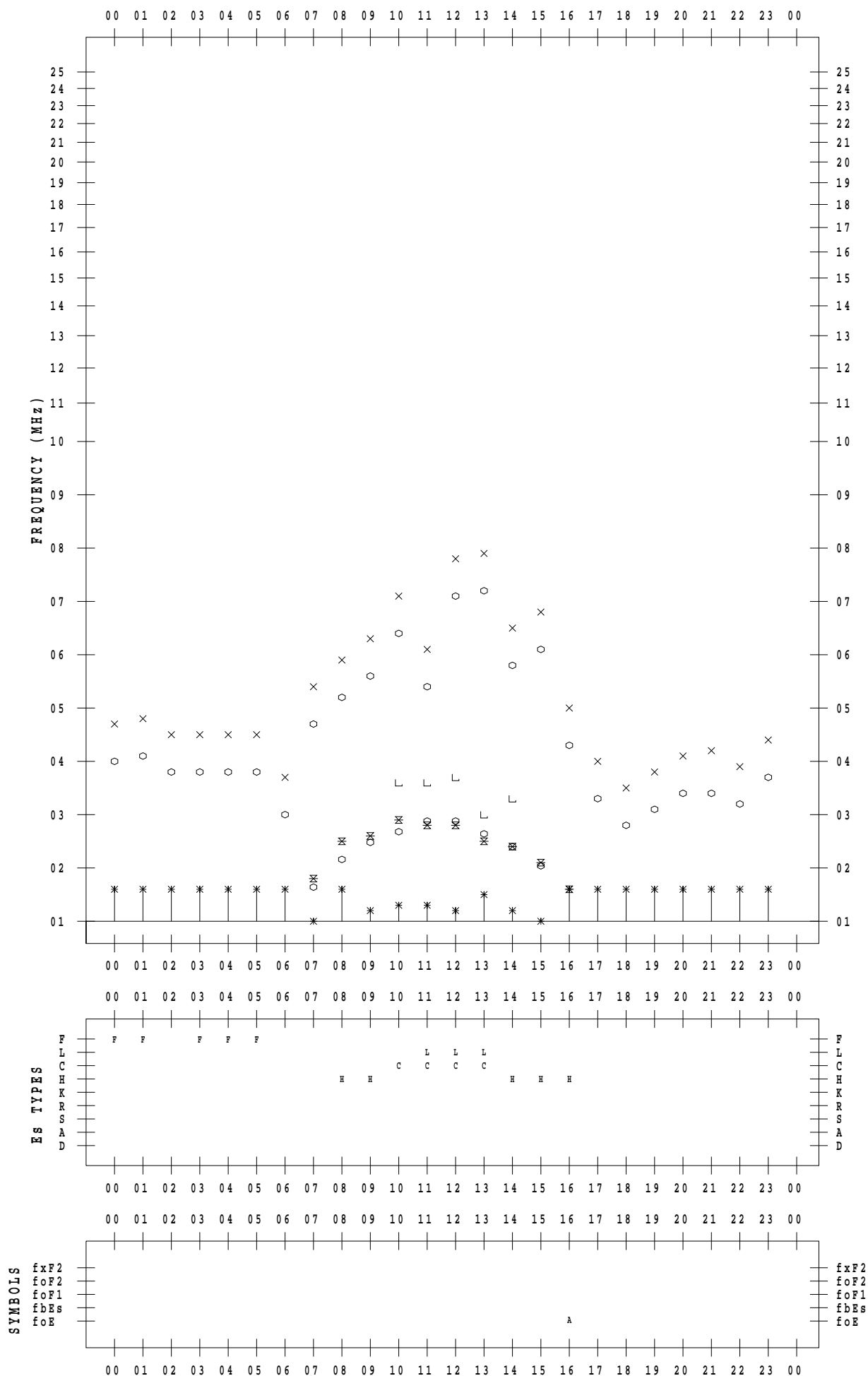
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/21

135 ° E MEAN TIME



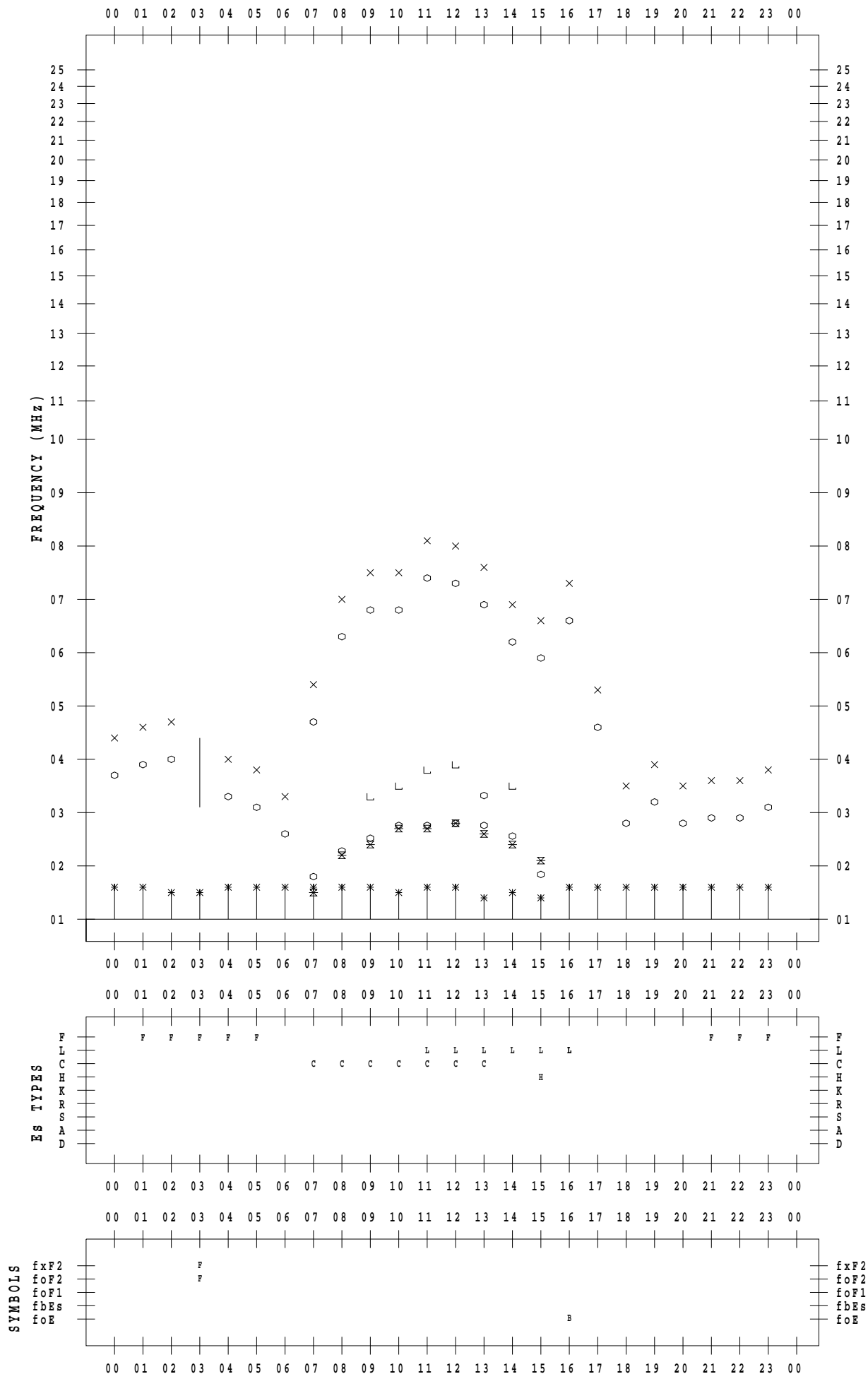
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/22

135 ° E MEAN TIME



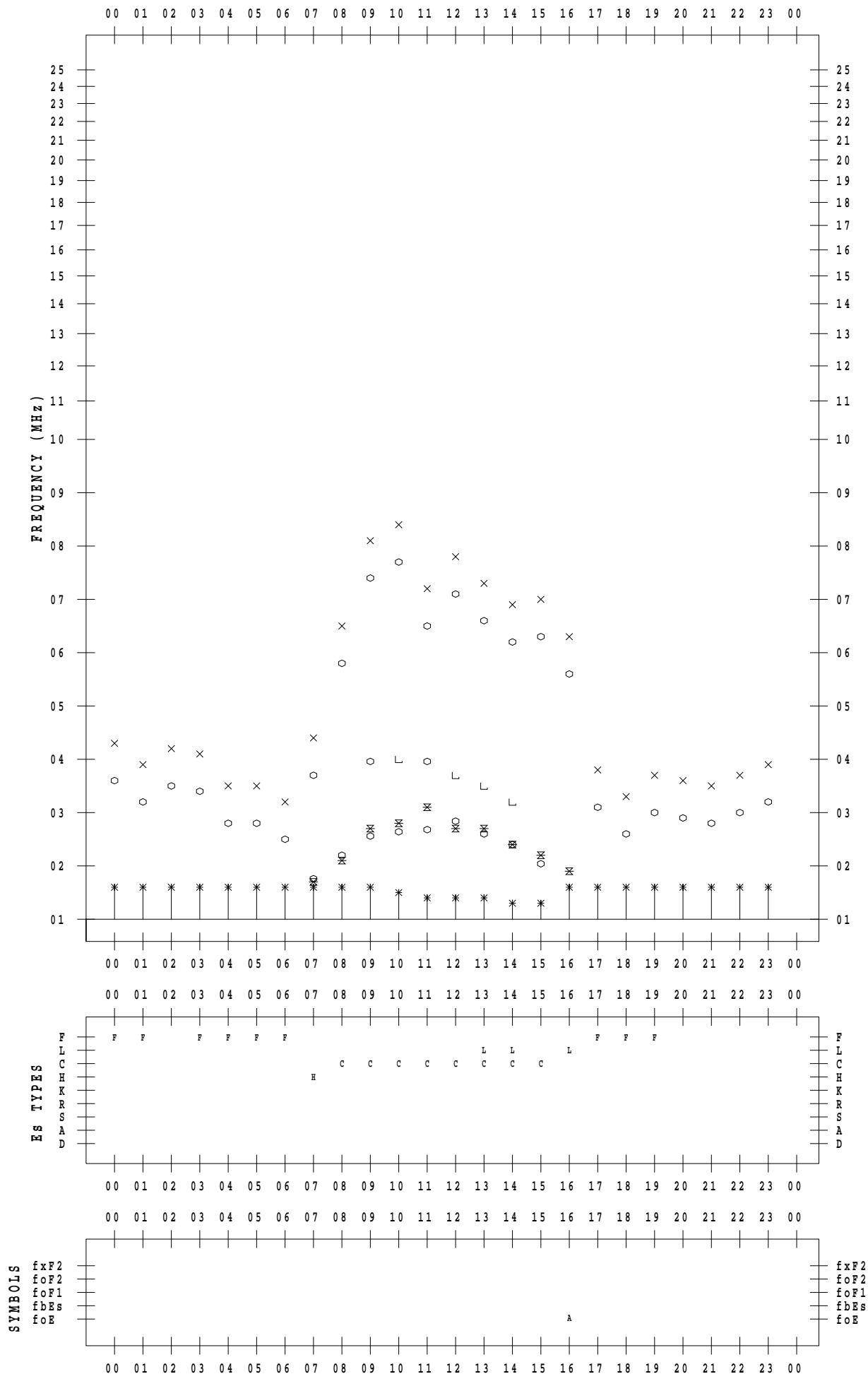
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/23

135 ° E MEAN TIME



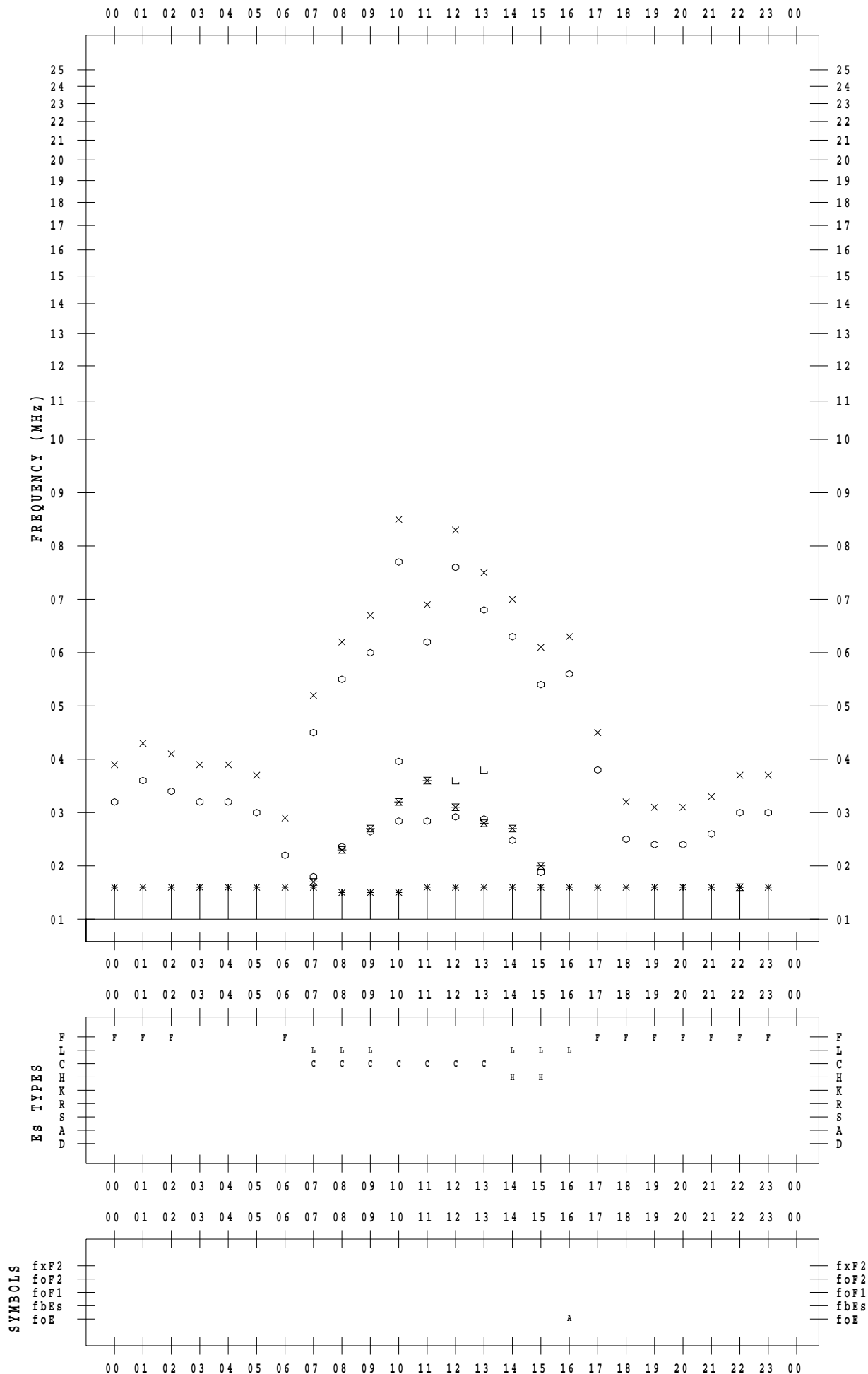
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/24

135 ° E MEAN TIME



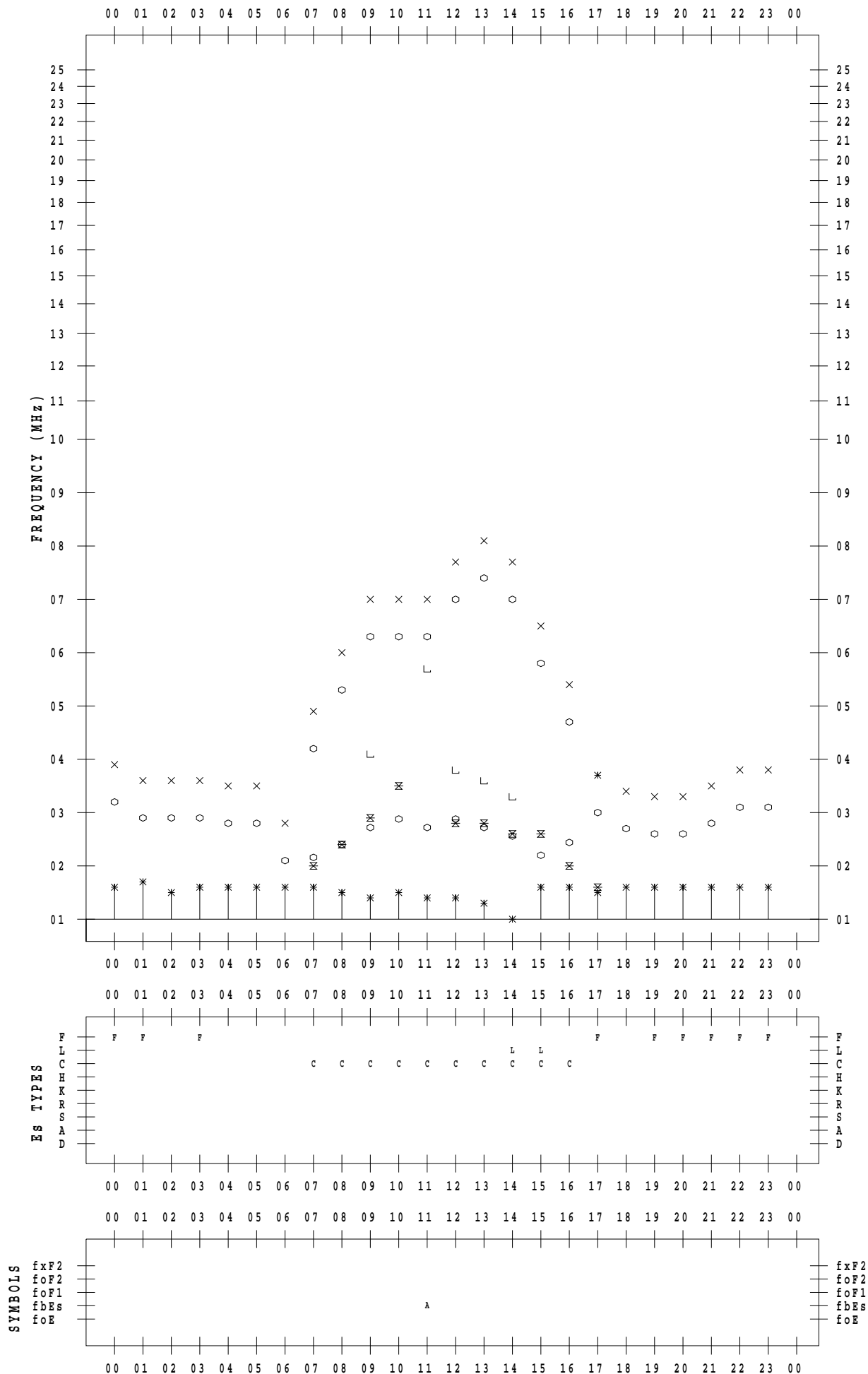
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/25

135 ° E MEAN TIME



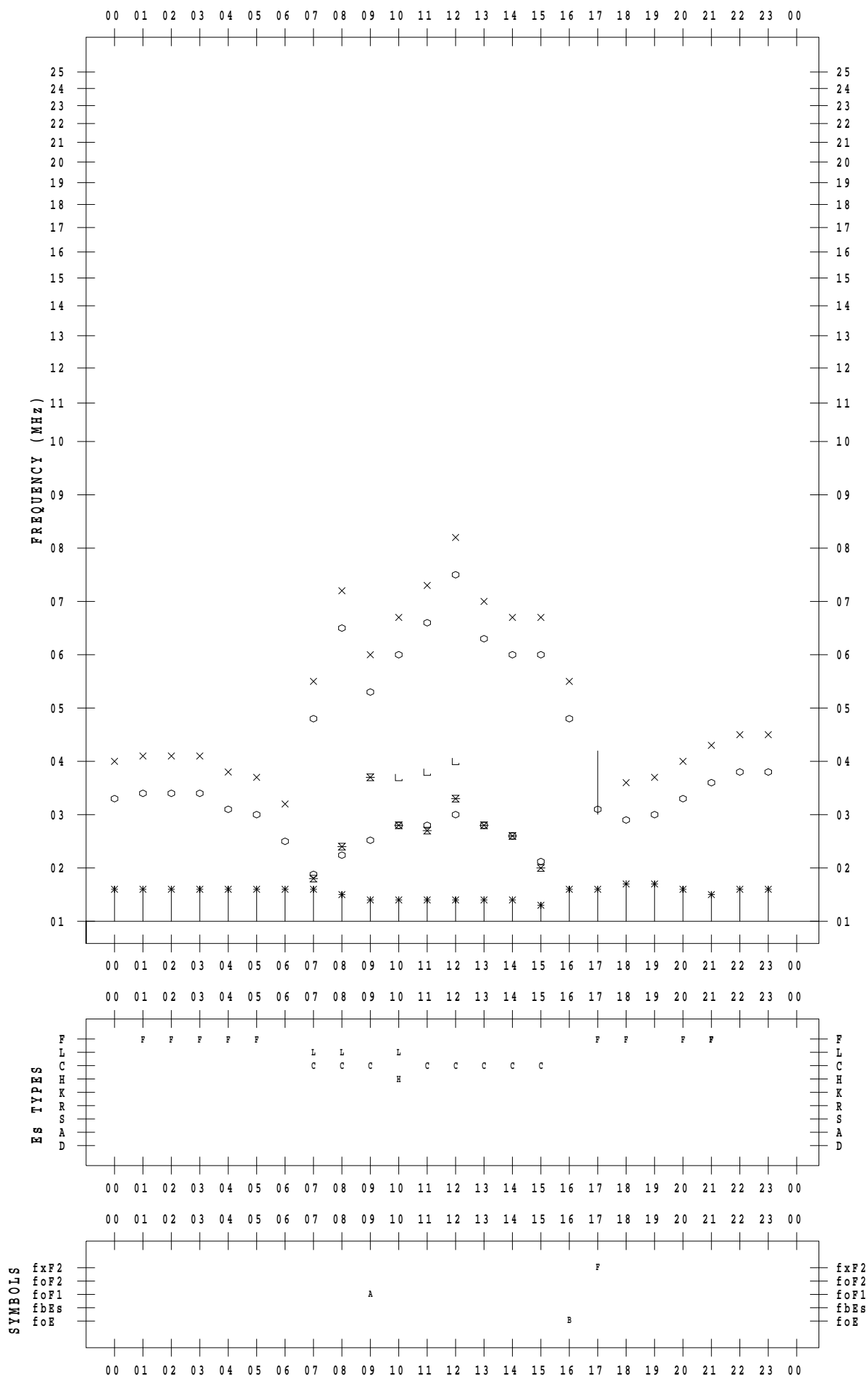
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/26

135 ° E MEAN TIME



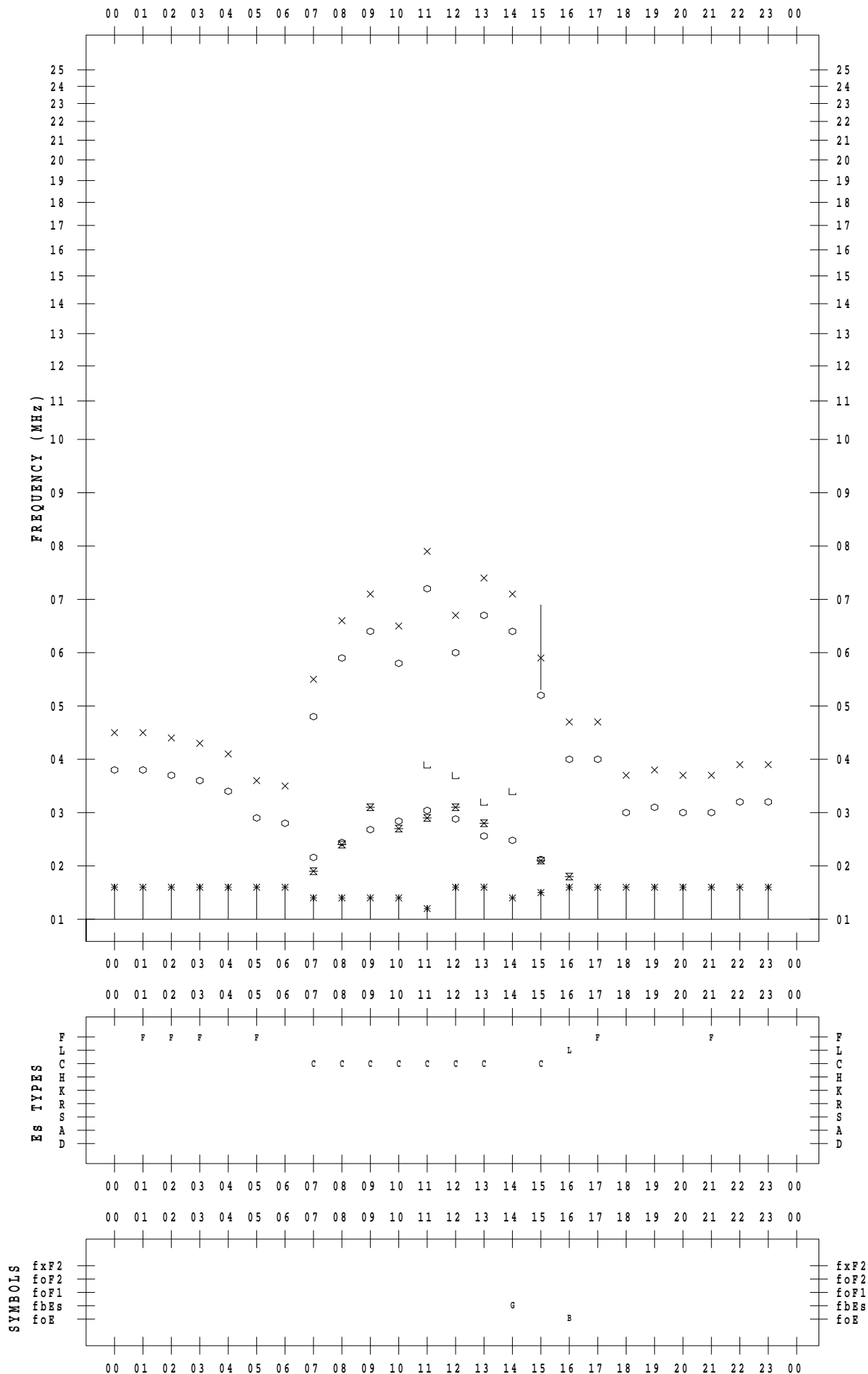
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/27

135 ° E MEAN TIME



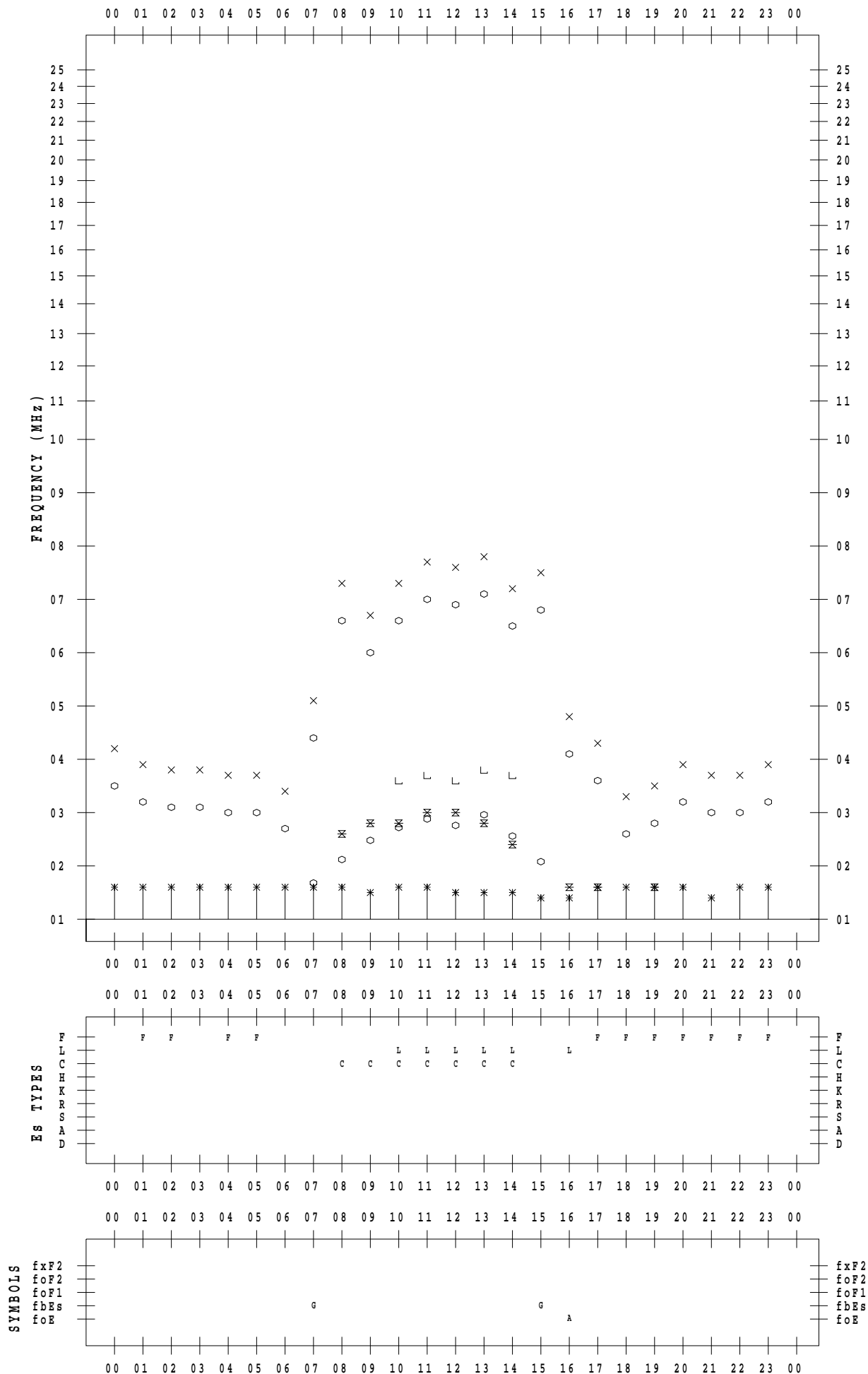
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/28

135 ° E MEAN TIME





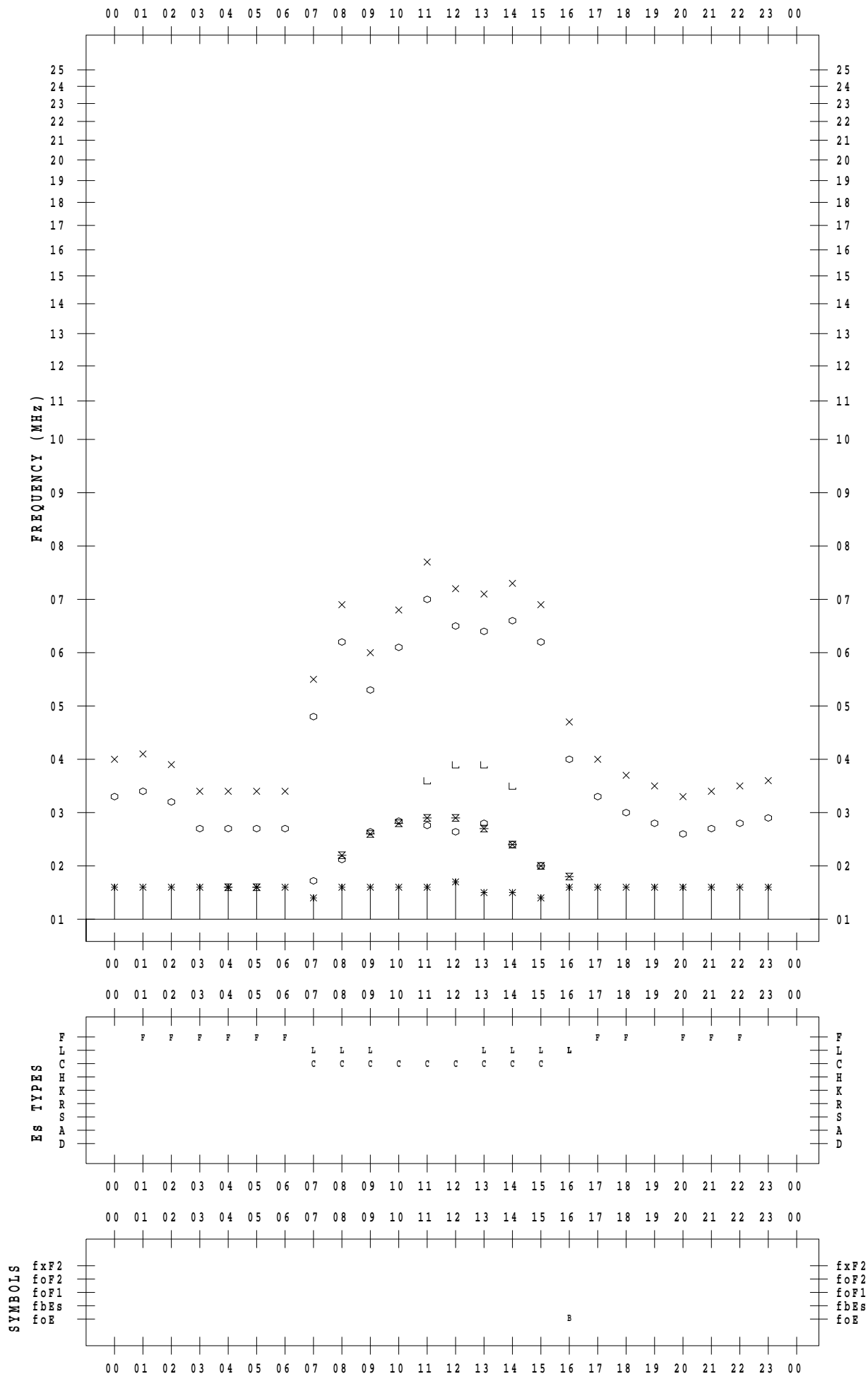
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/29

135 ° E MEAN TIME



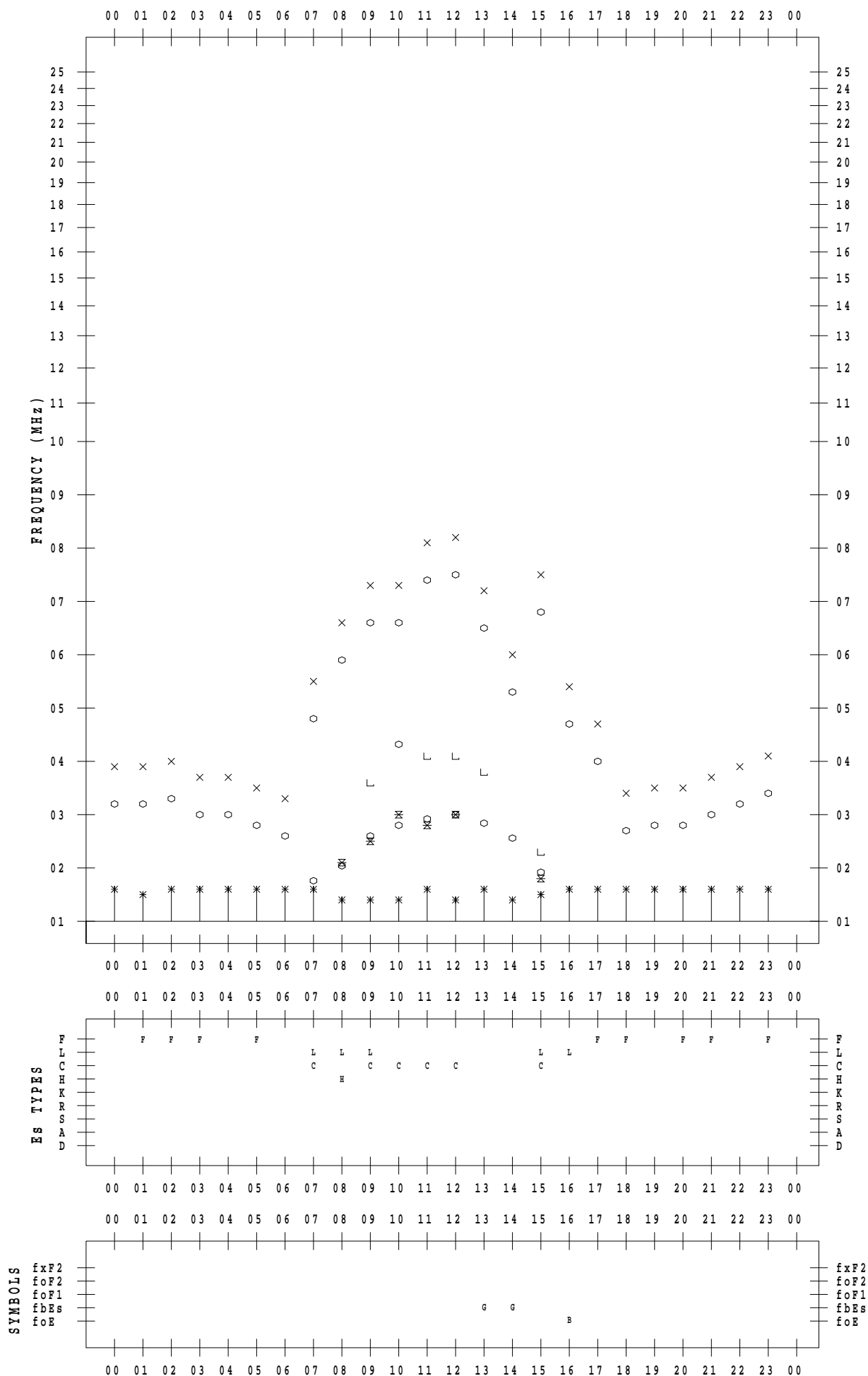
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/11/30

135 ° E MEAN TIME



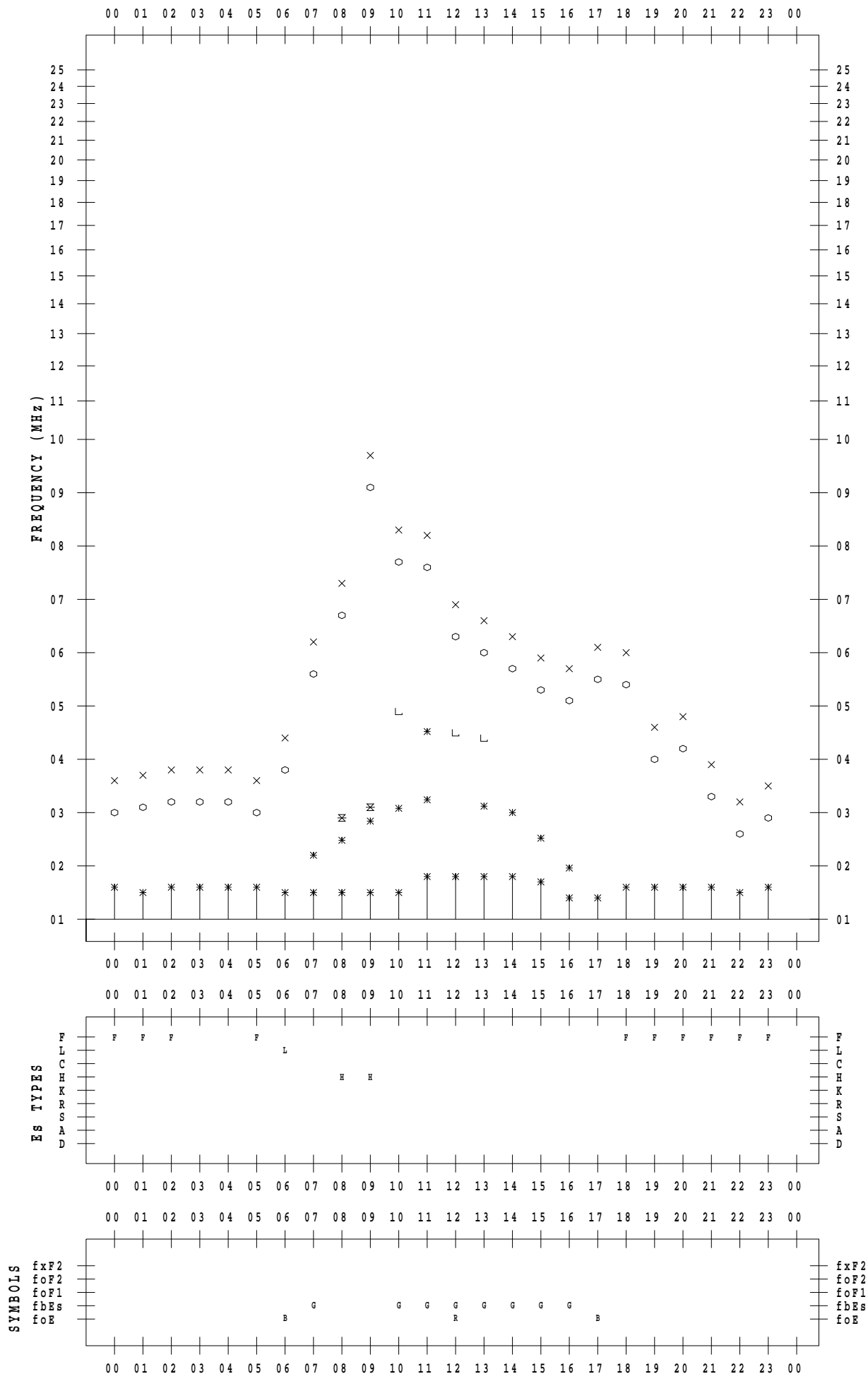
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/ 1

135 ° E MEAN TIME



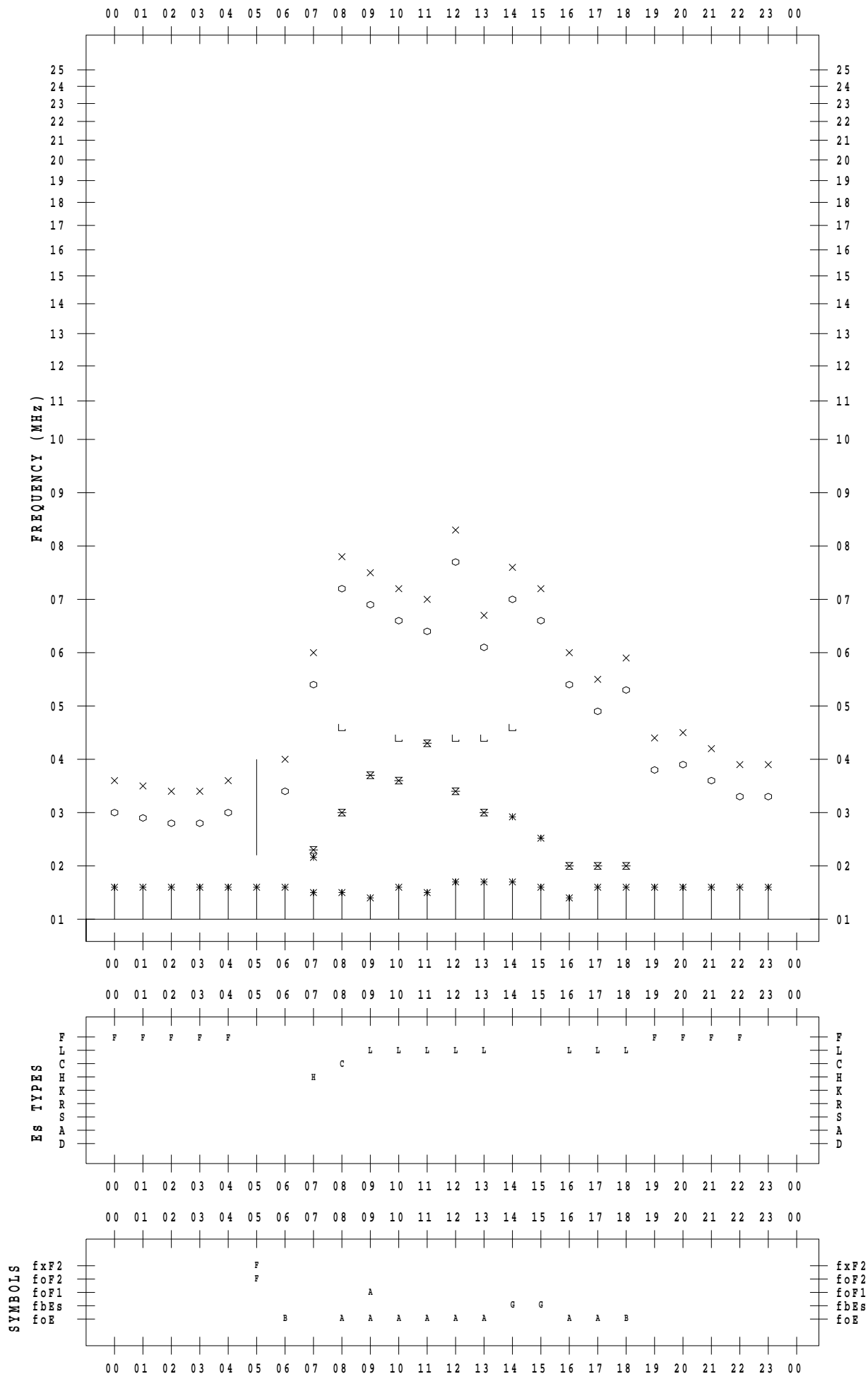
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/ 2

135 ° E MEAN TIME



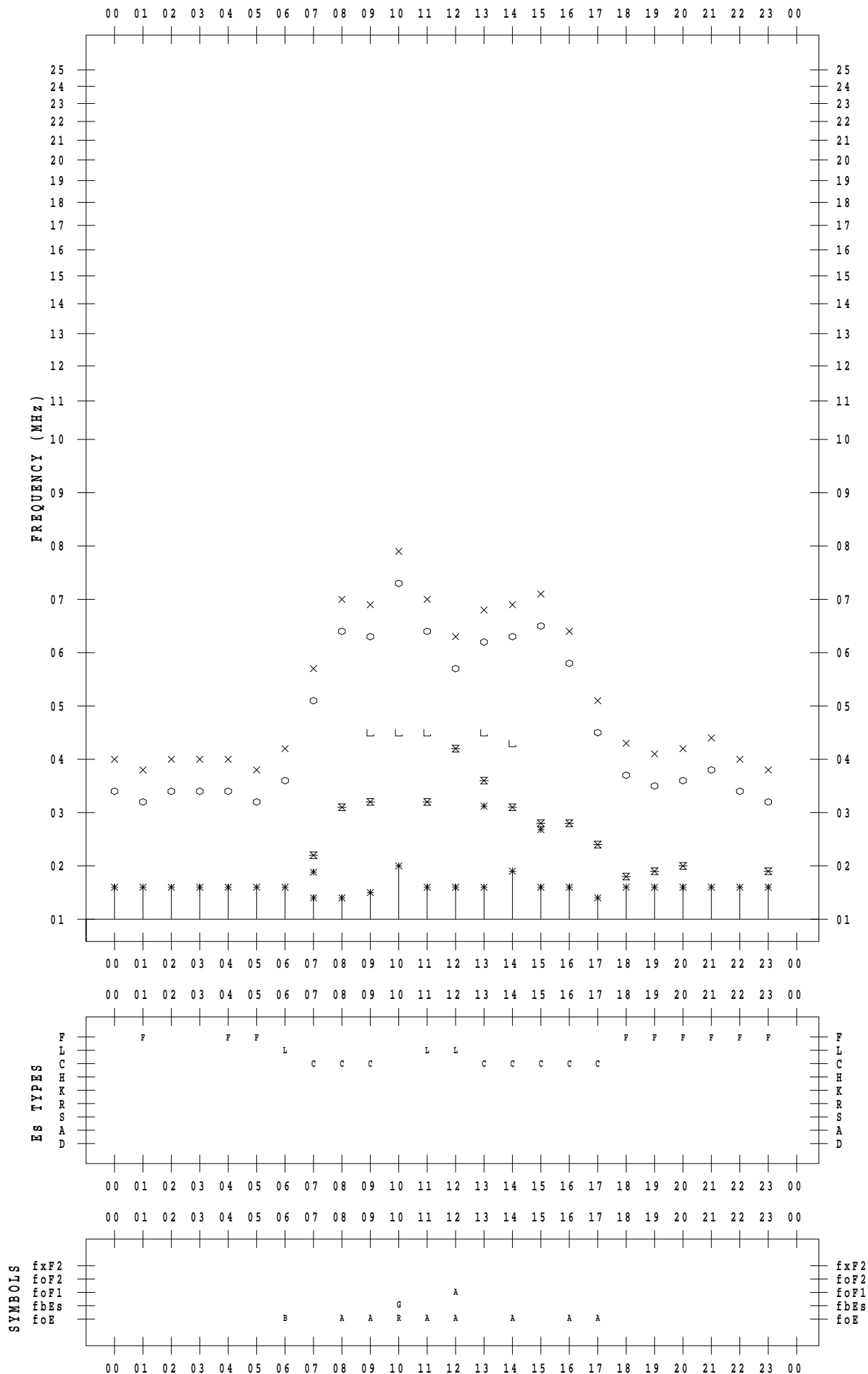
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/ 3

135 ° E MEAN TIME



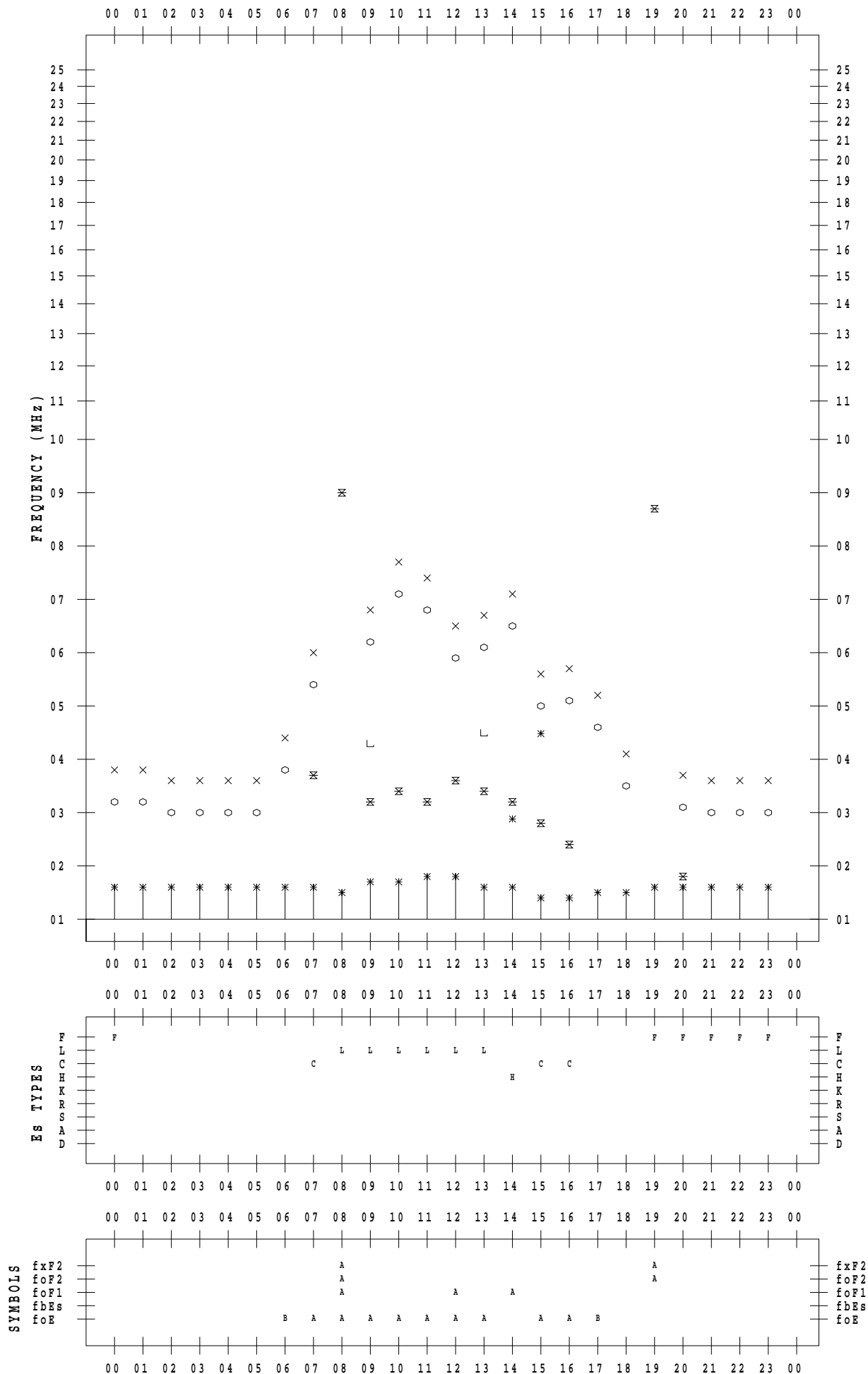
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/ 4

135 ° E MEAN TIME



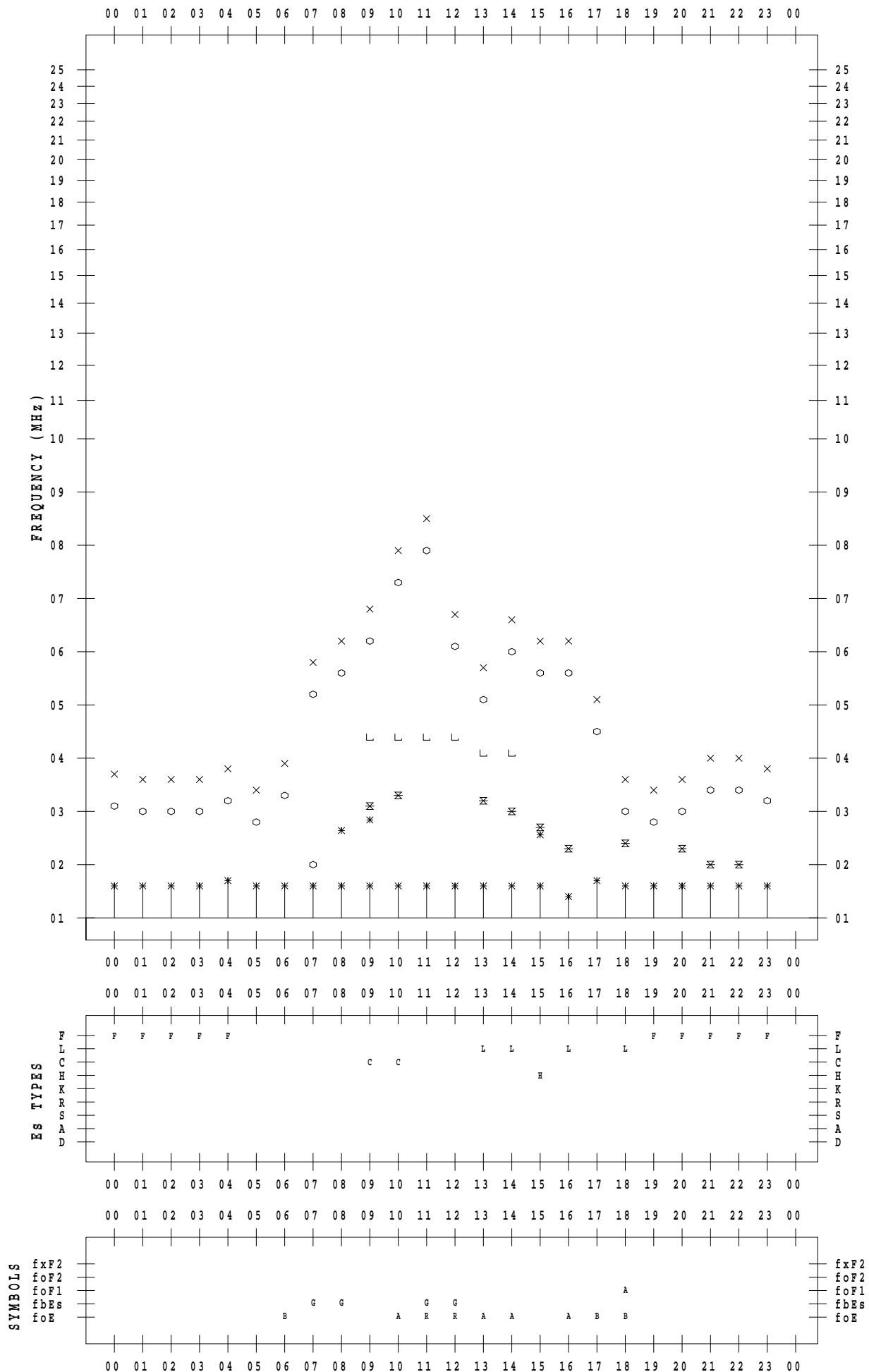
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/ 5

135 ° E MEAN TIME



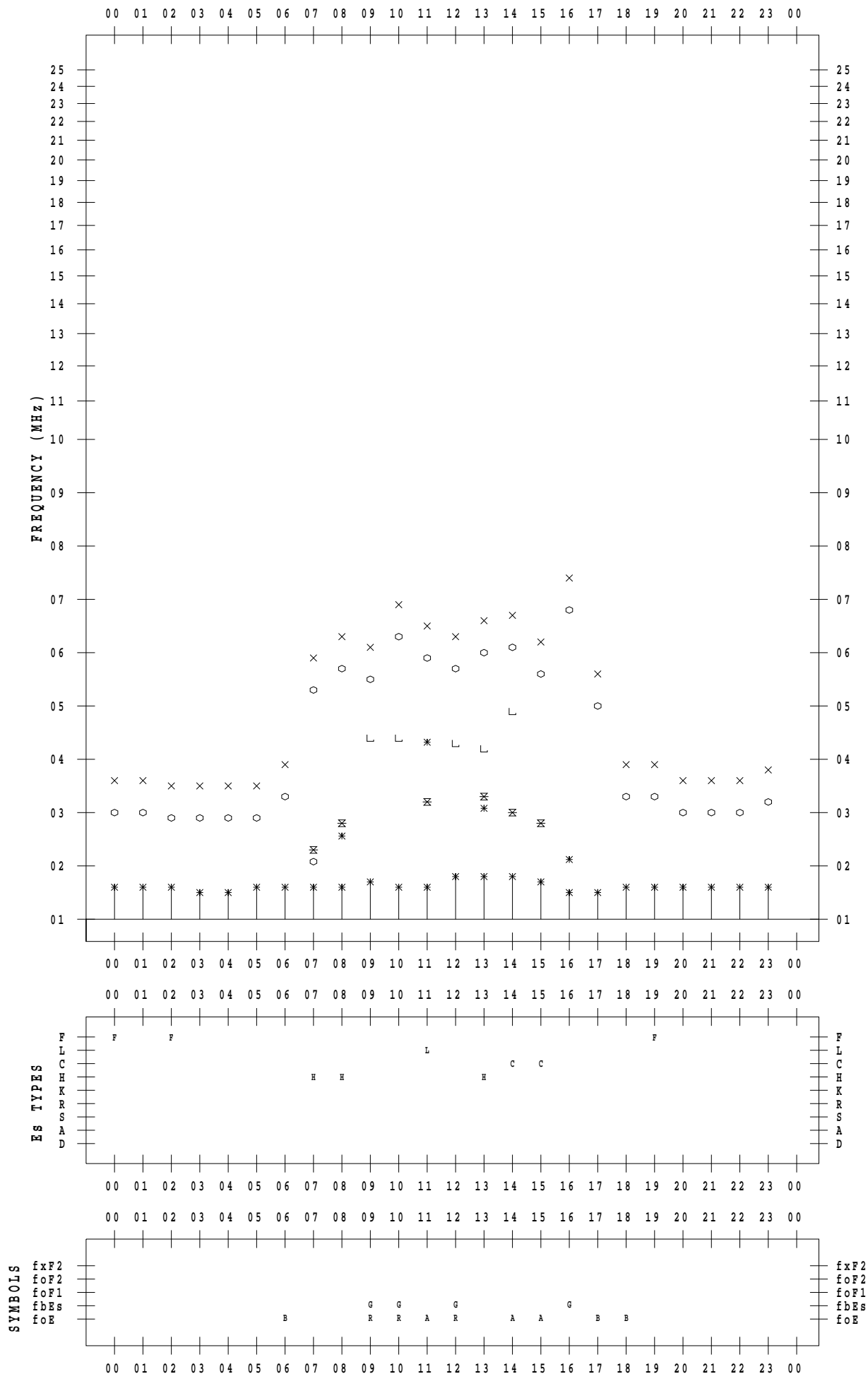
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/ 6

135 ° E MEAN TIME





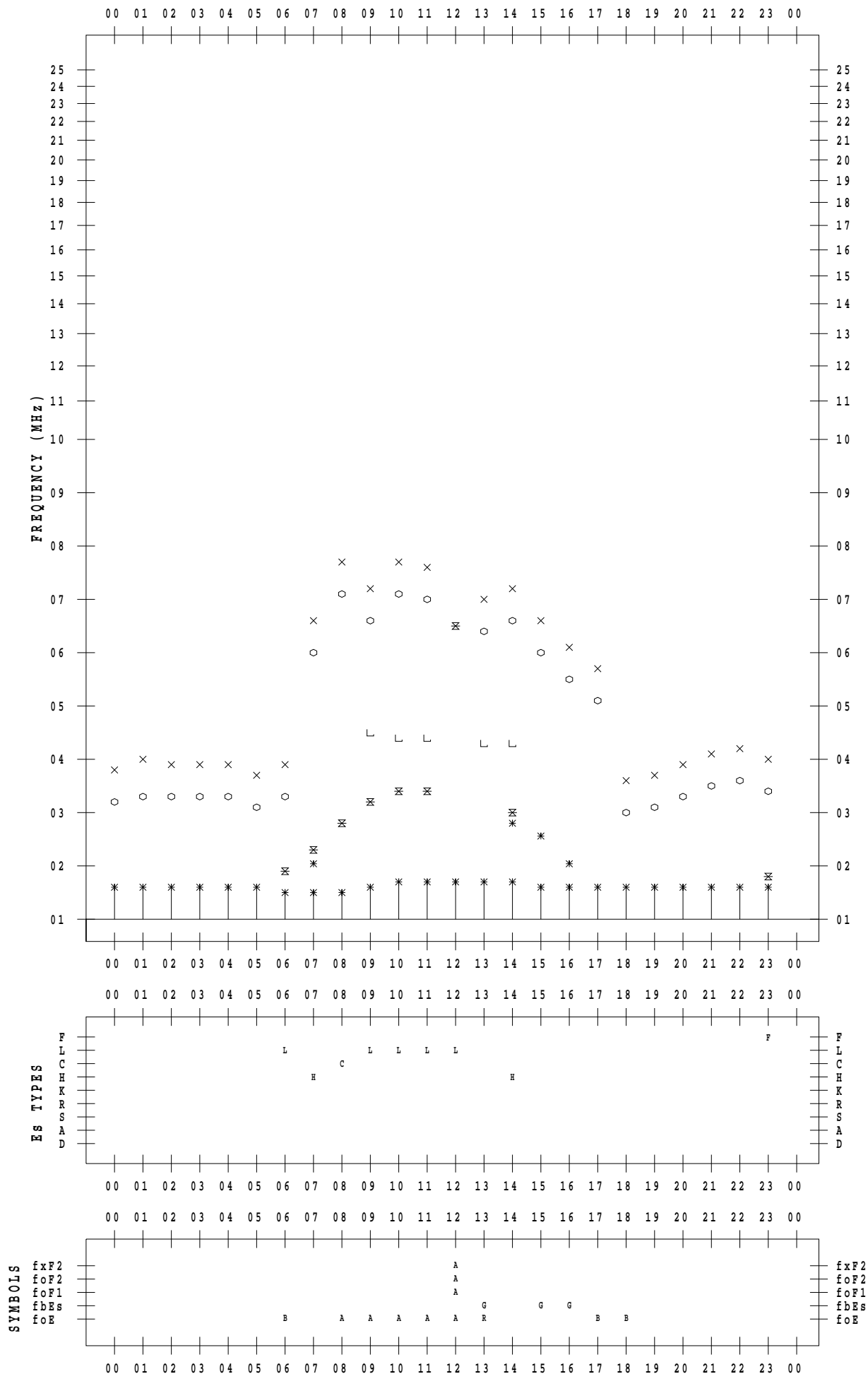
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/ 7

135 ° E MEAN TIME



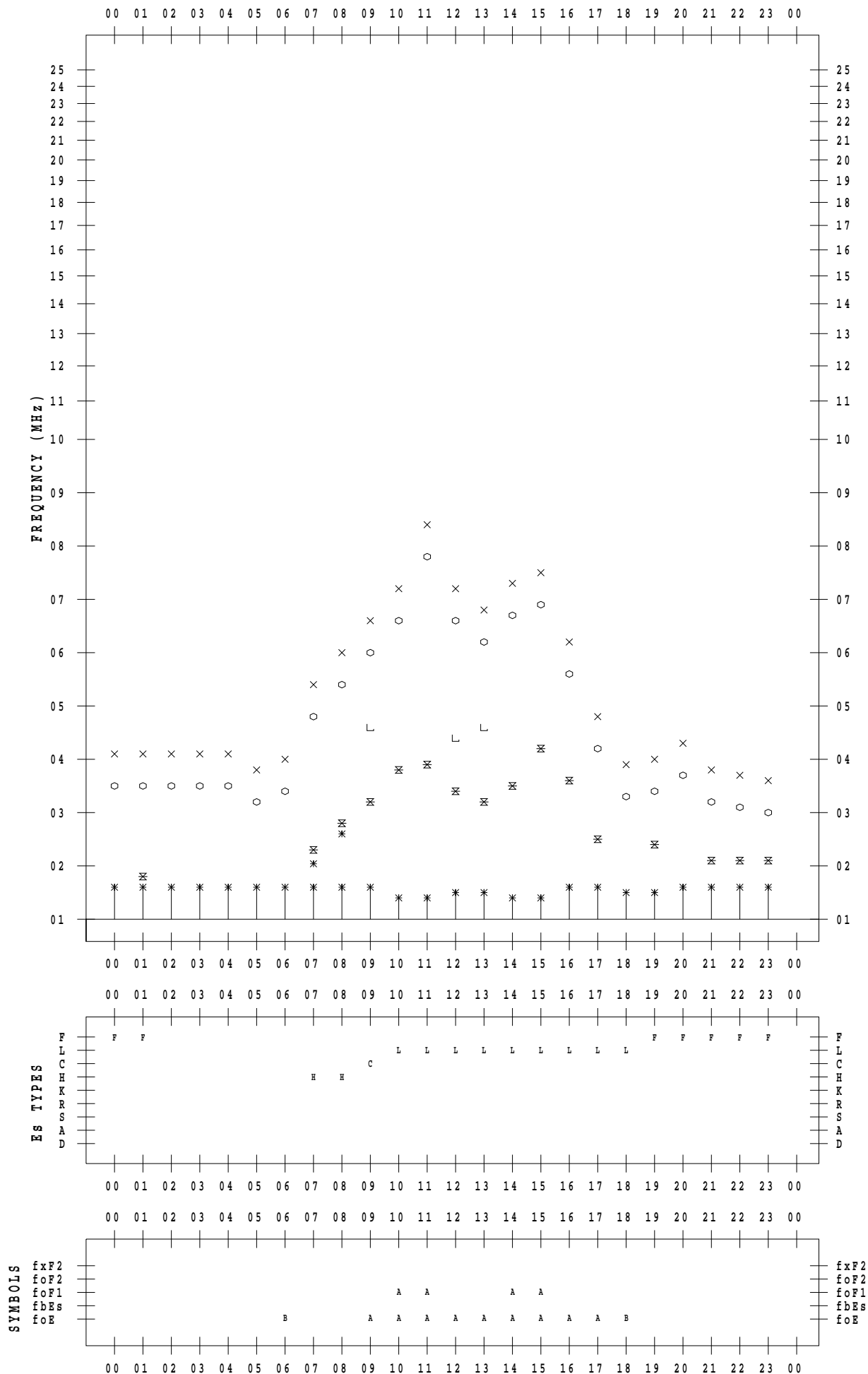
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/ 8

135 ° E MEAN TIME



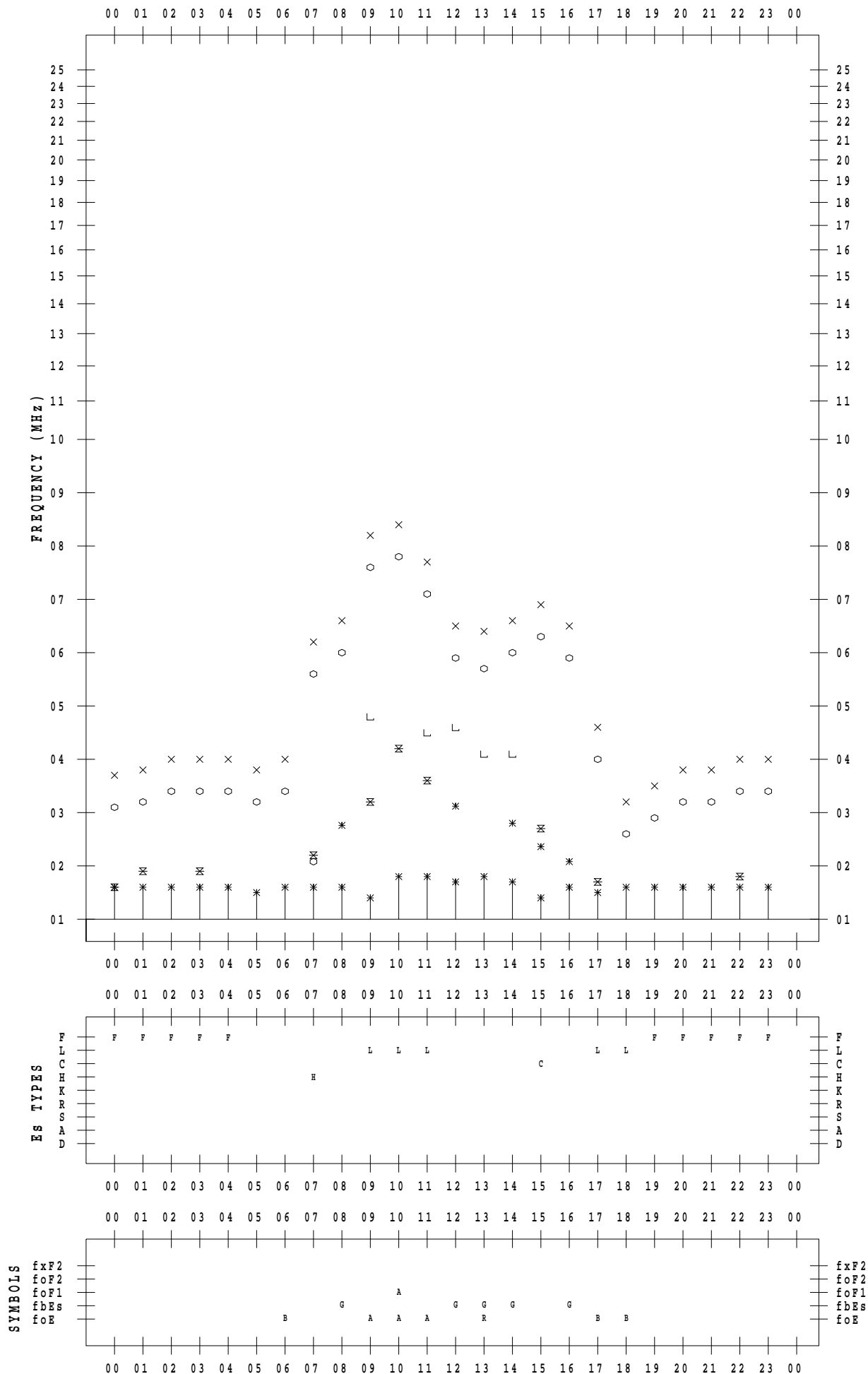
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/ 9

135 ° E MEAN TIME



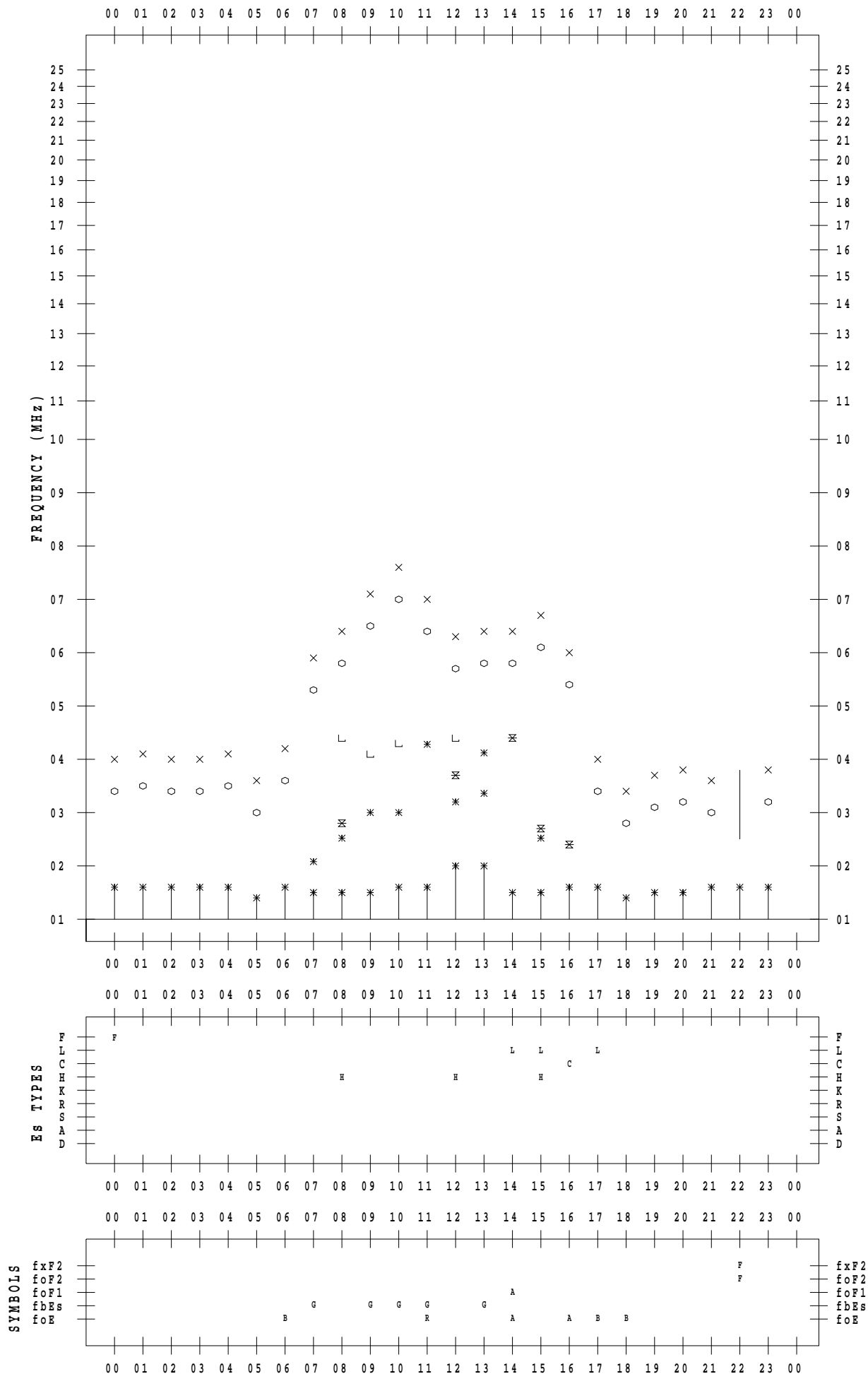
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/10

135 ° E MEAN TIME



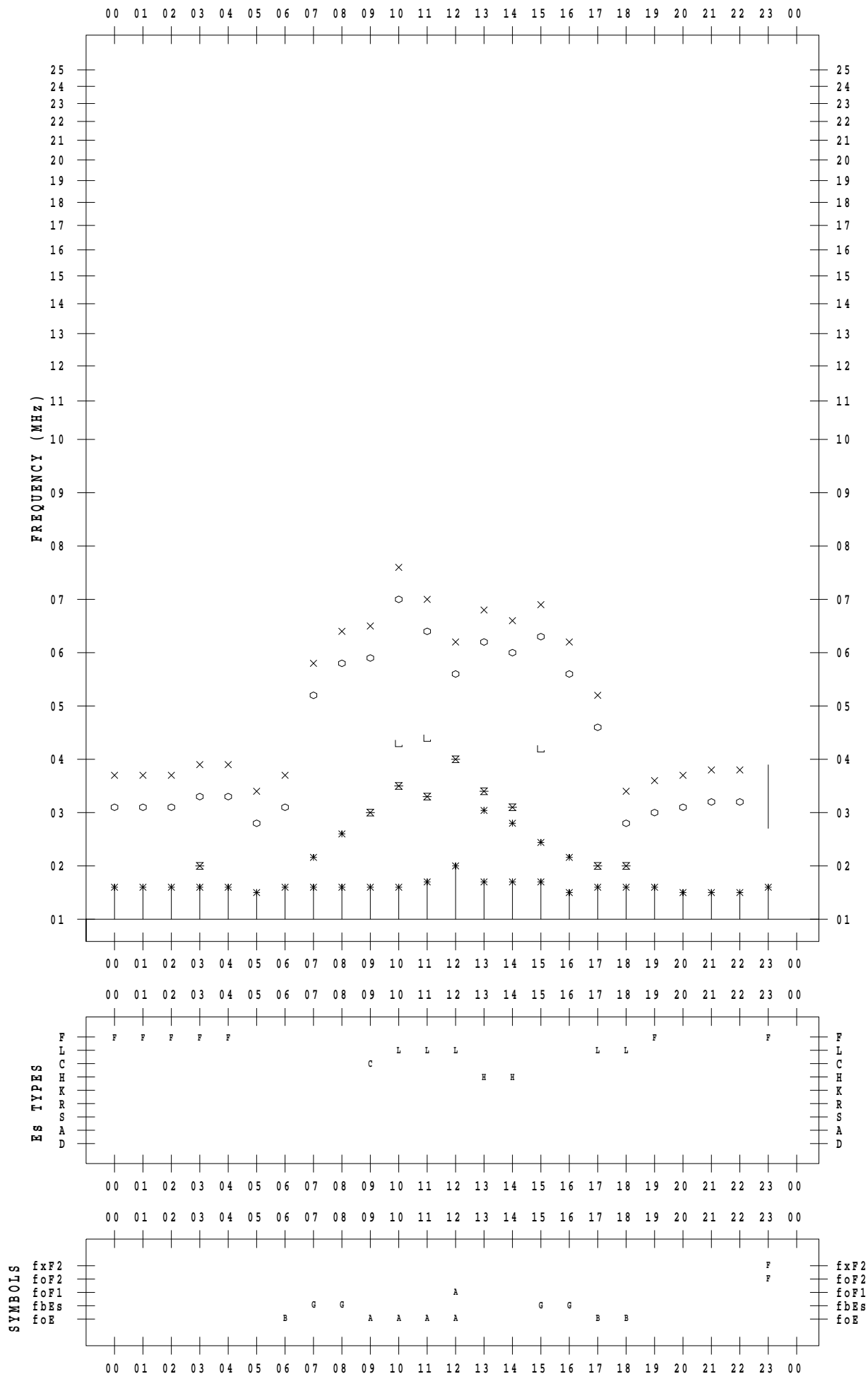
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/11

135 ° E MEAN TIME



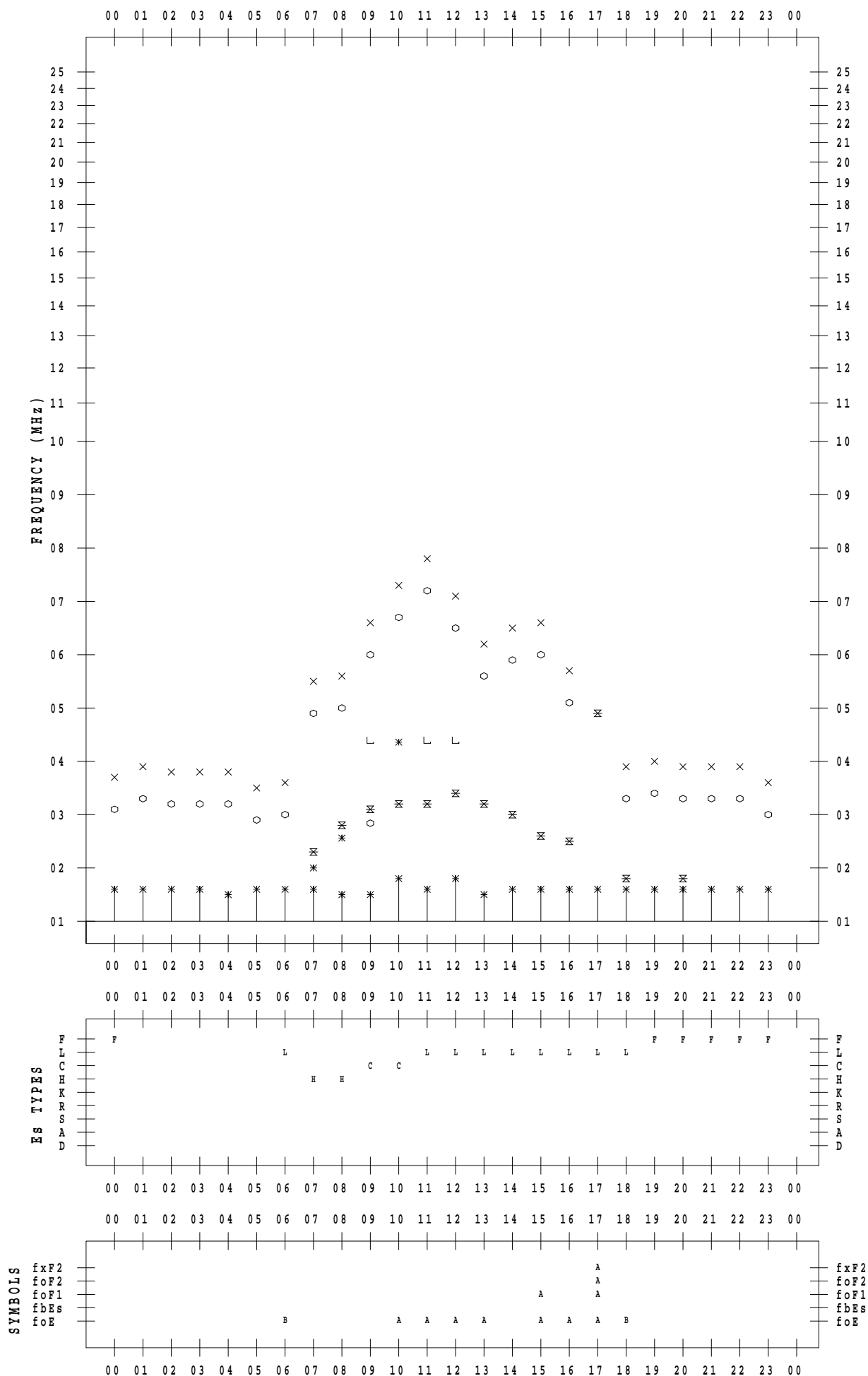
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/12

135 ° E MEAN TIME



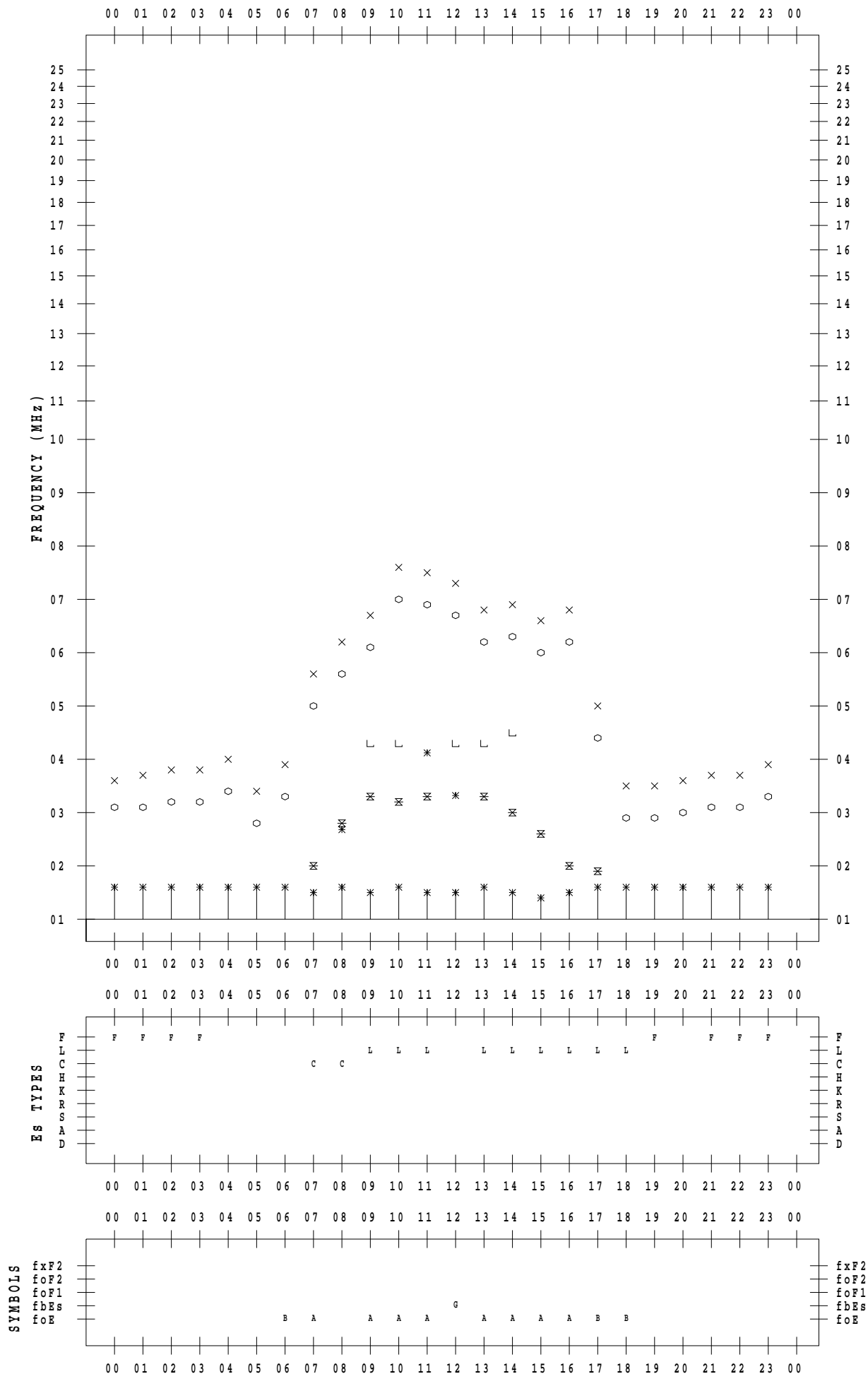
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/13

135 ° E MEAN TIME



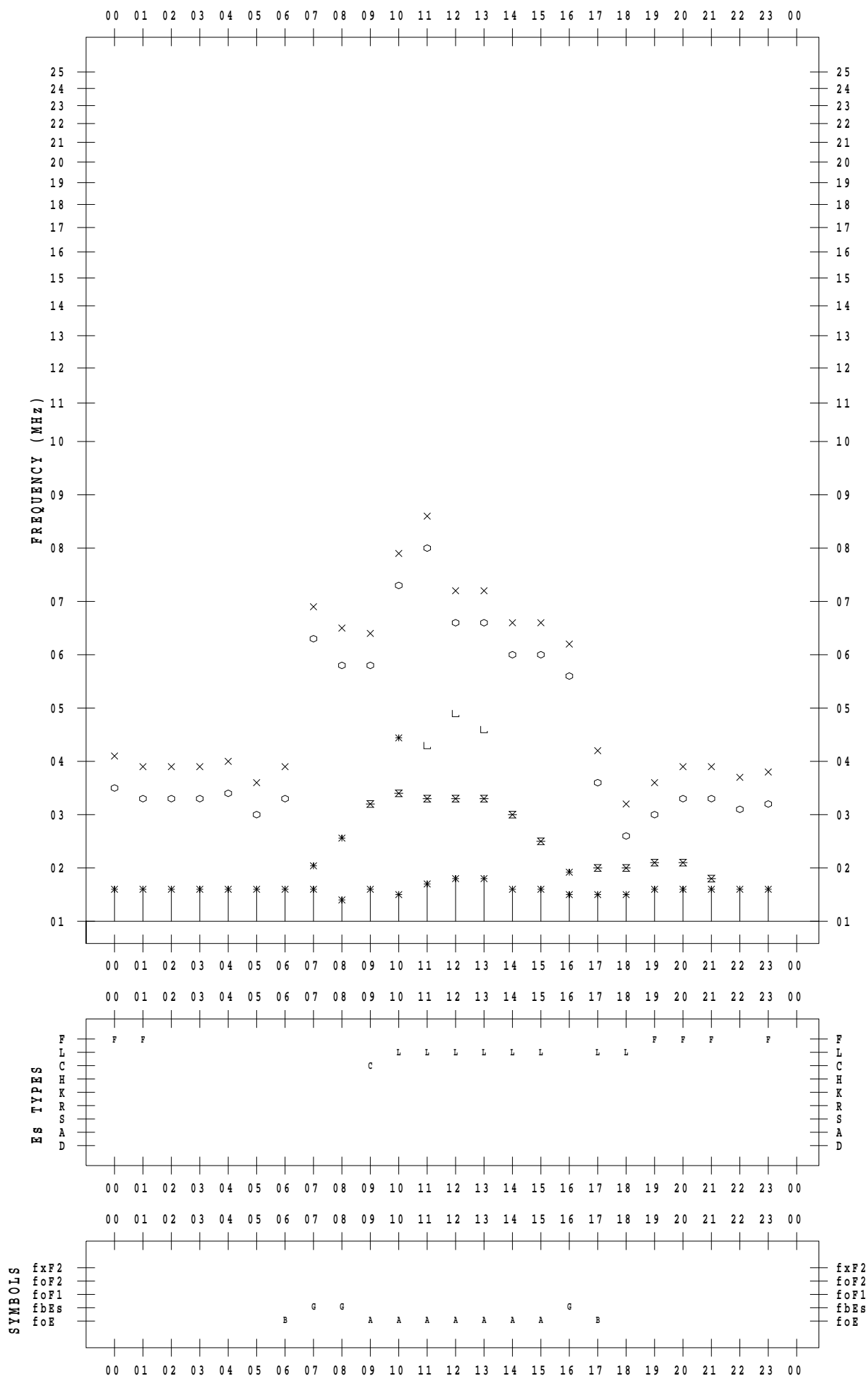
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/14

135 ° E MEAN TIME





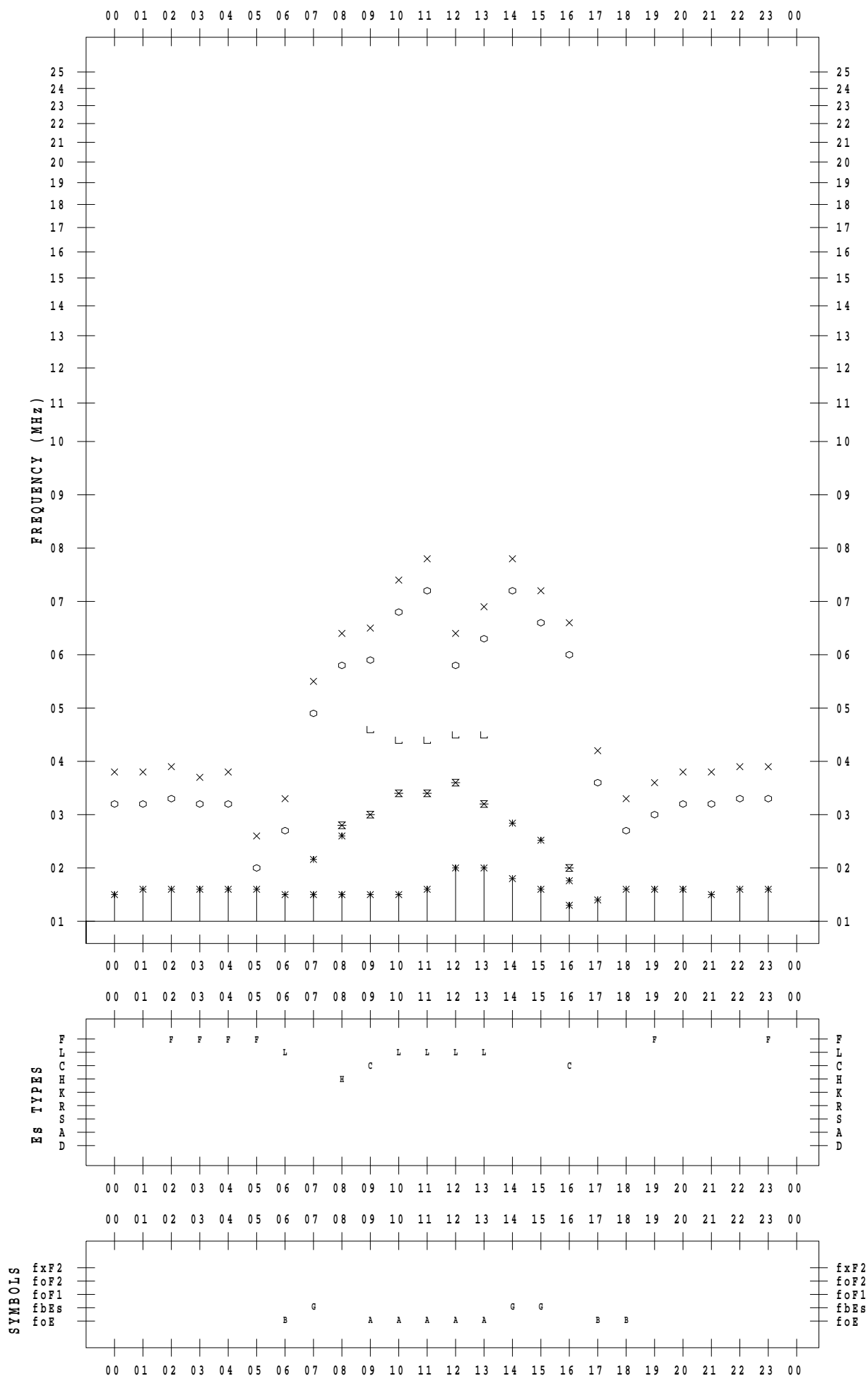
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/15

135 ° E MEAN TIME



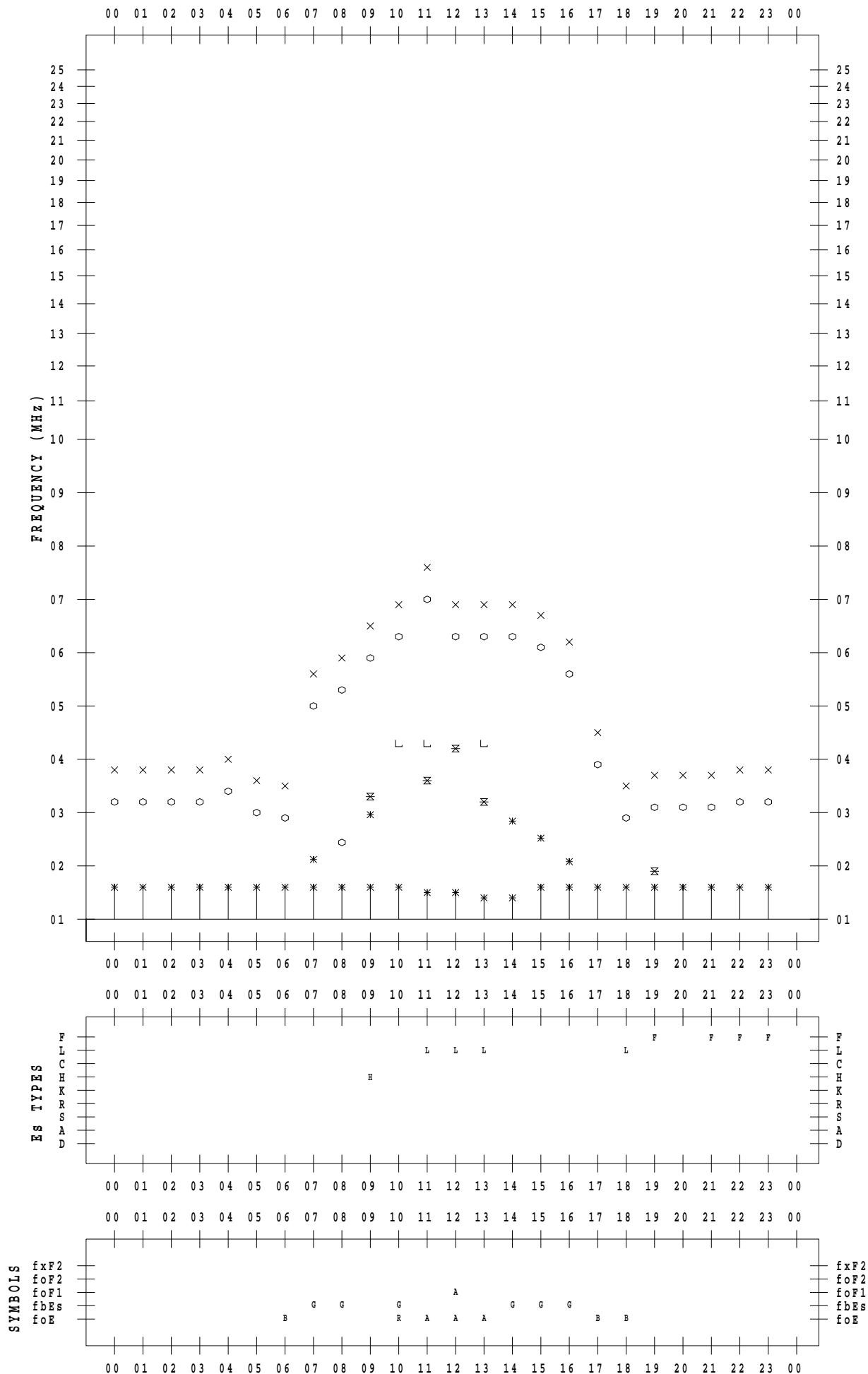
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/16

135 ° E MEAN TIME



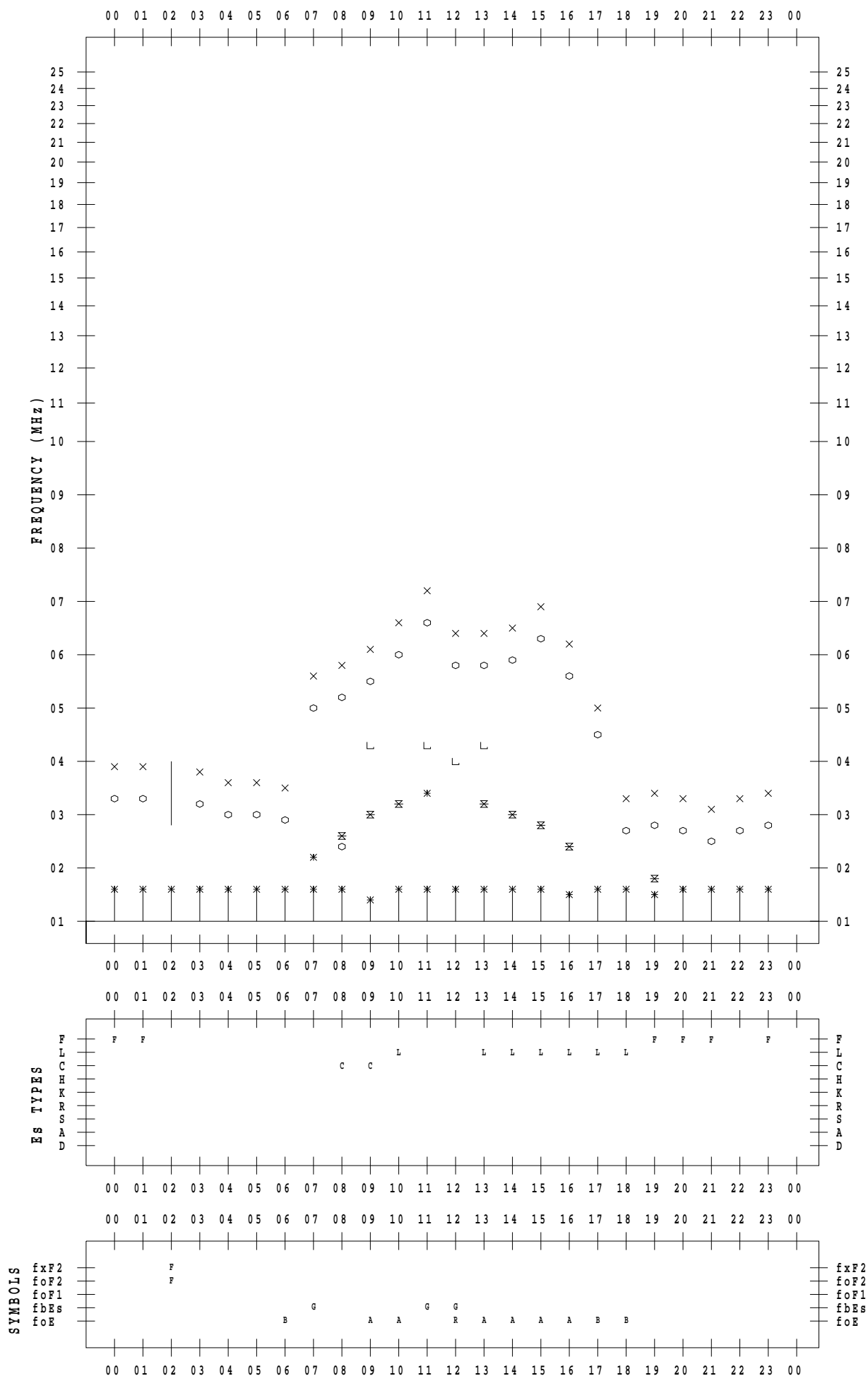
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/17

135 ° E MEAN TIME



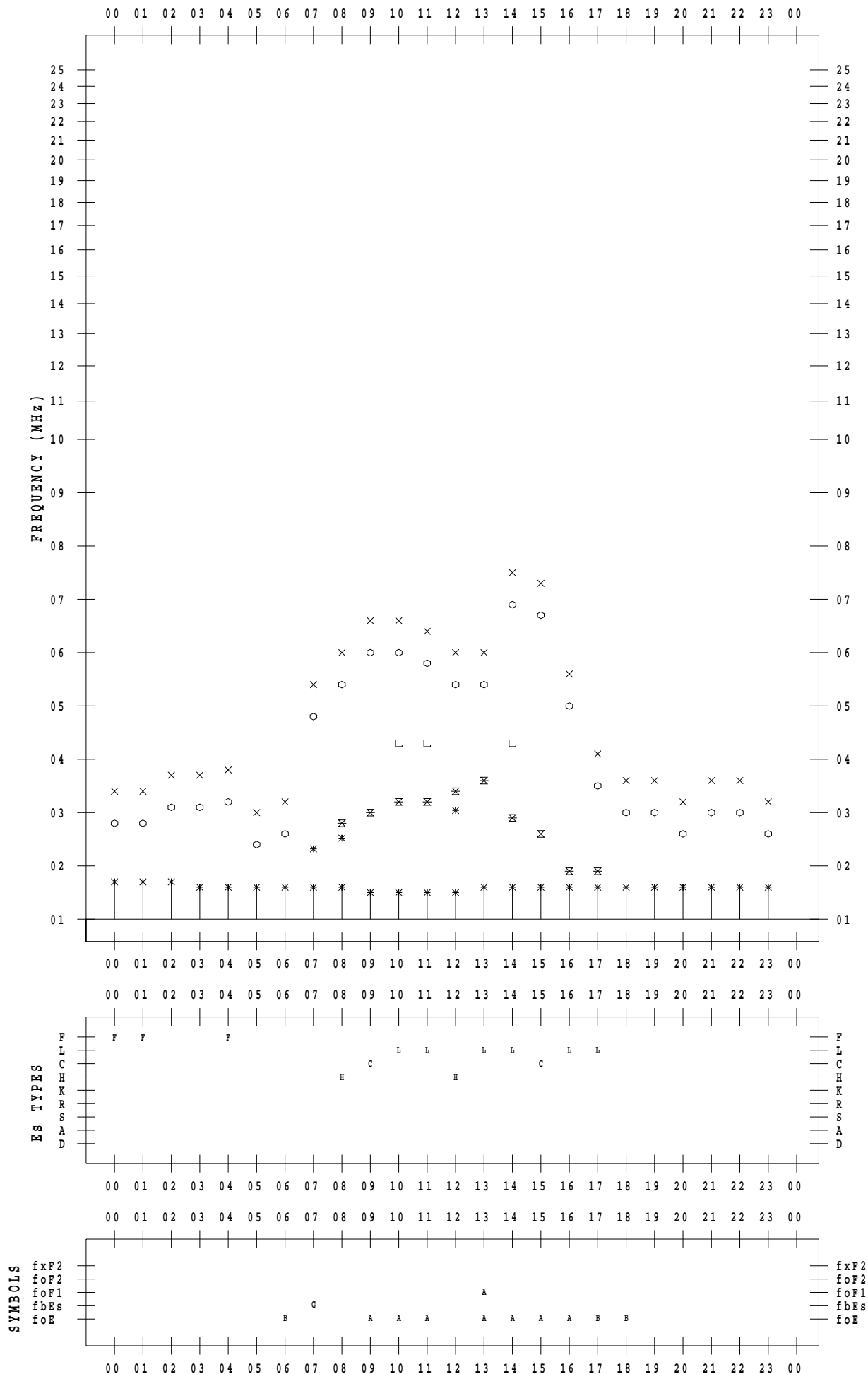
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/18

135 ° E MEAN TIME



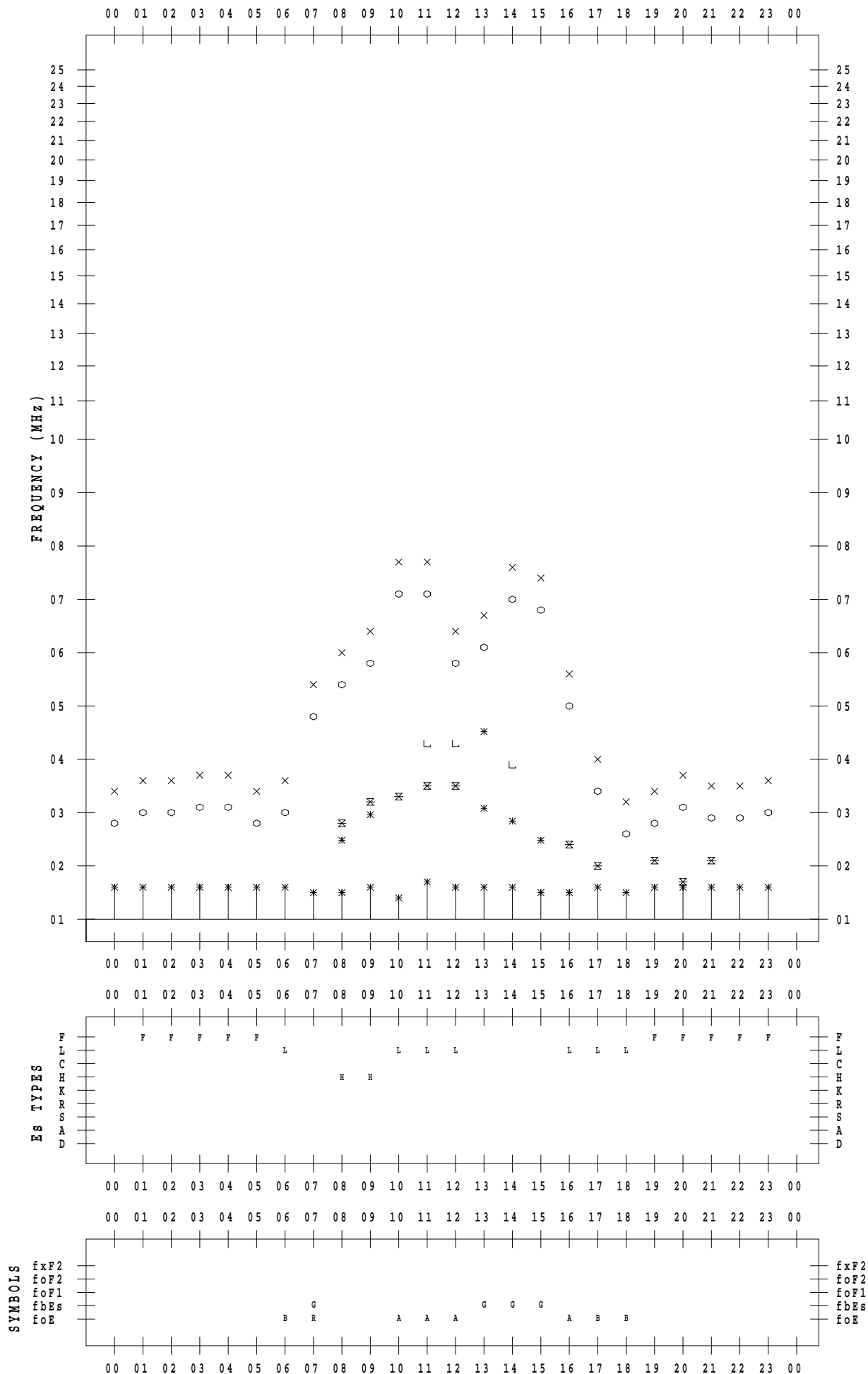
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/19

135 ° E MEAN TIME



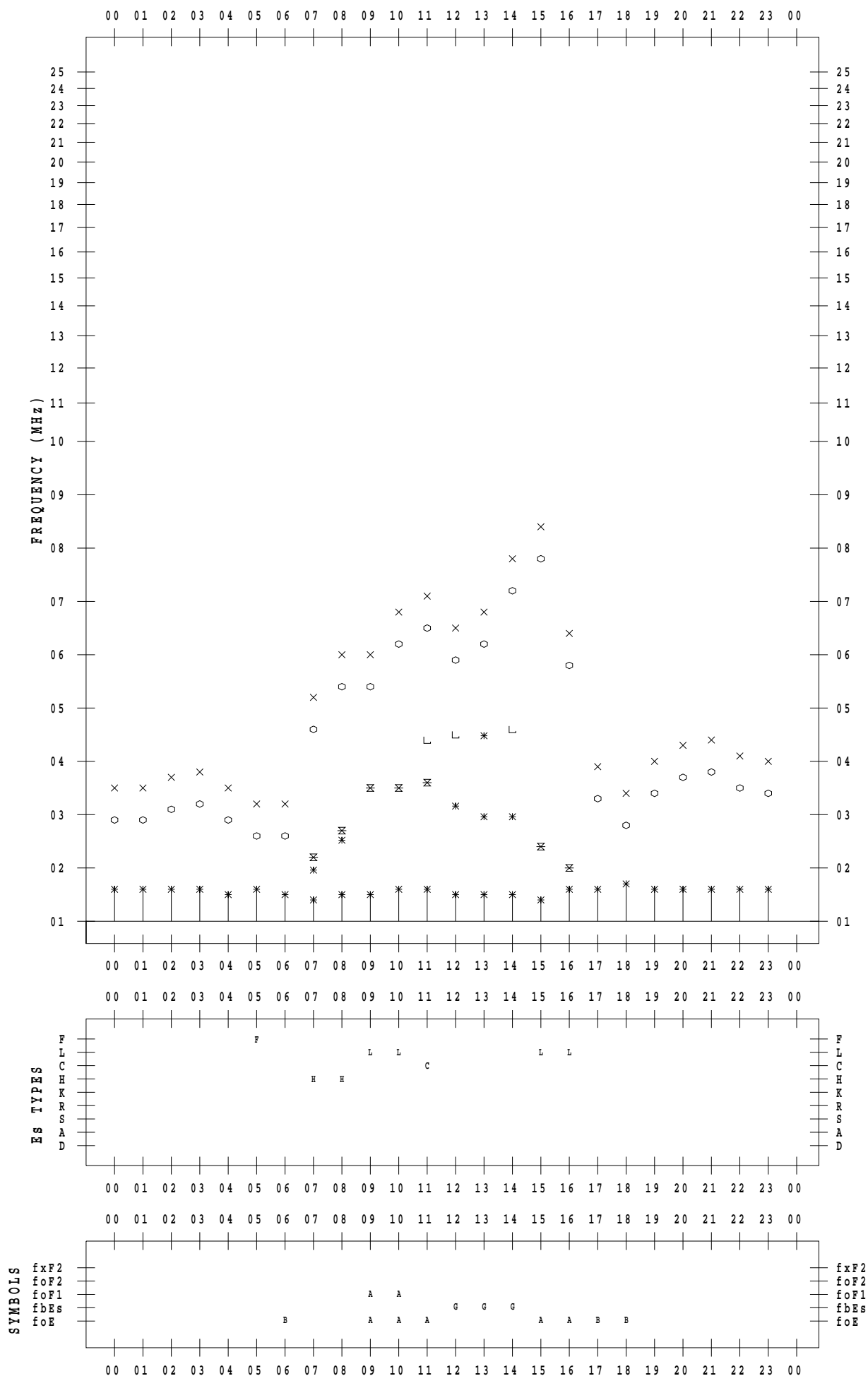
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/20

135 ° E MEAN TIME



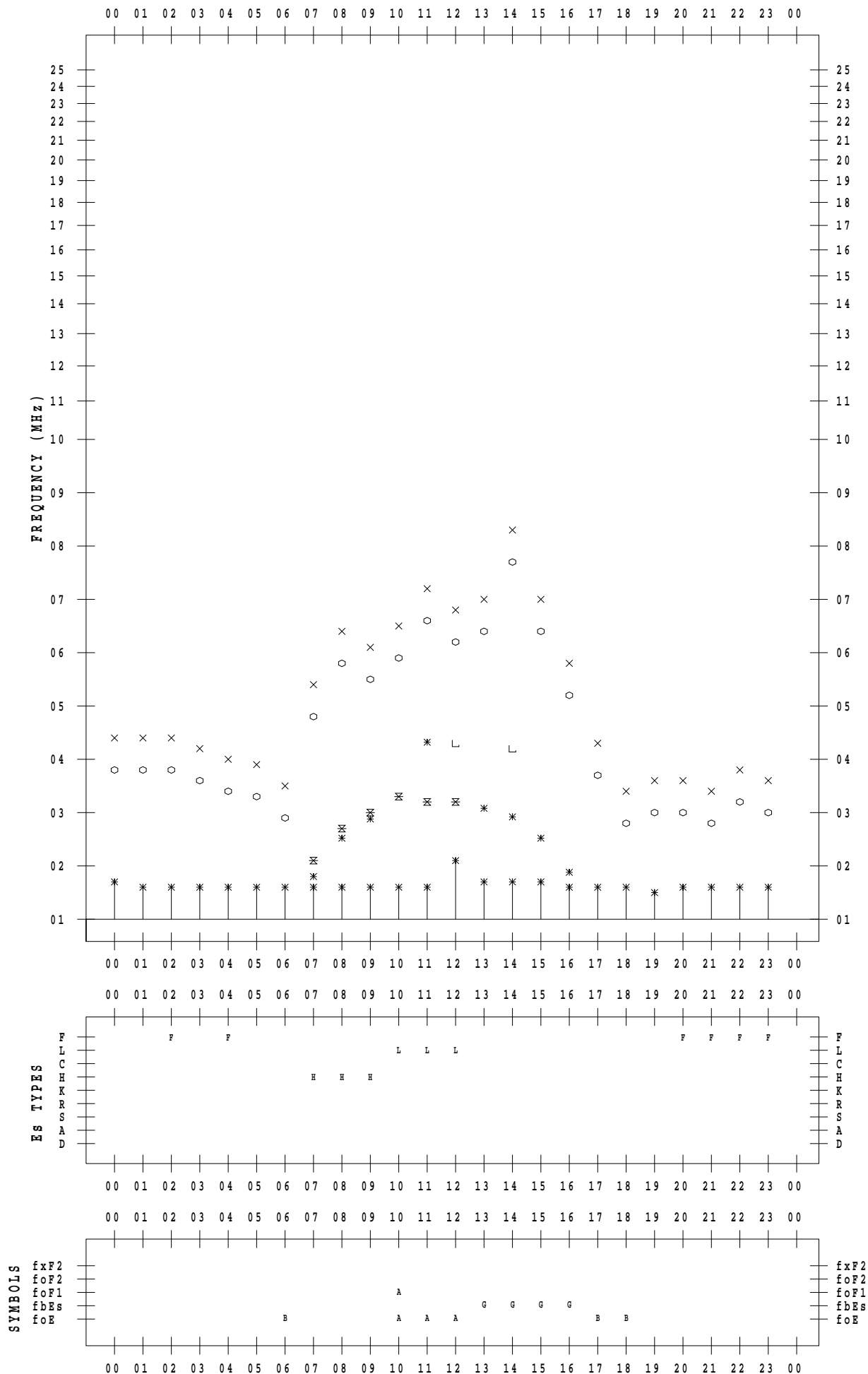
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/21

135 ° E MEAN TIME



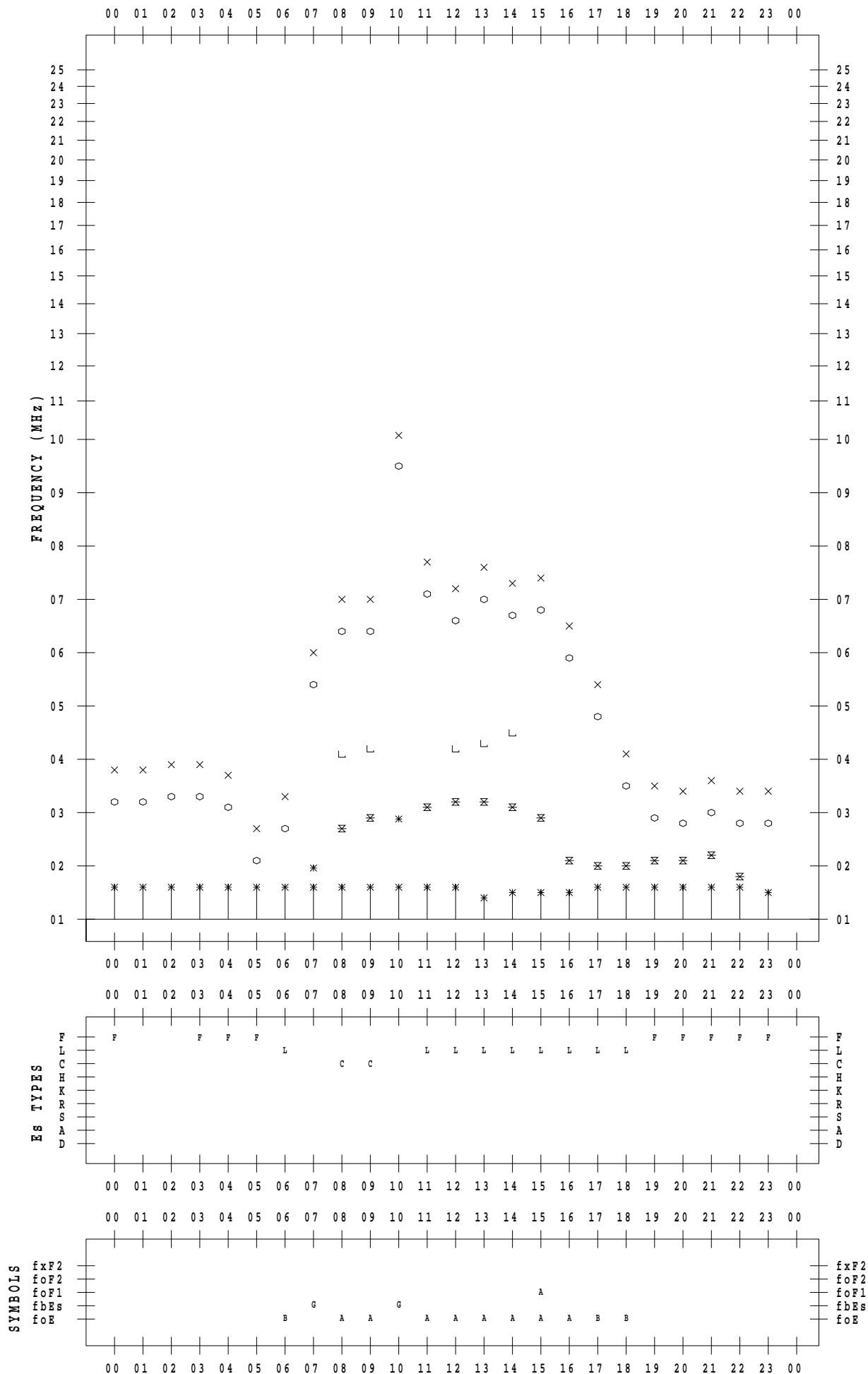
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/22

135 ° E MEAN TIME





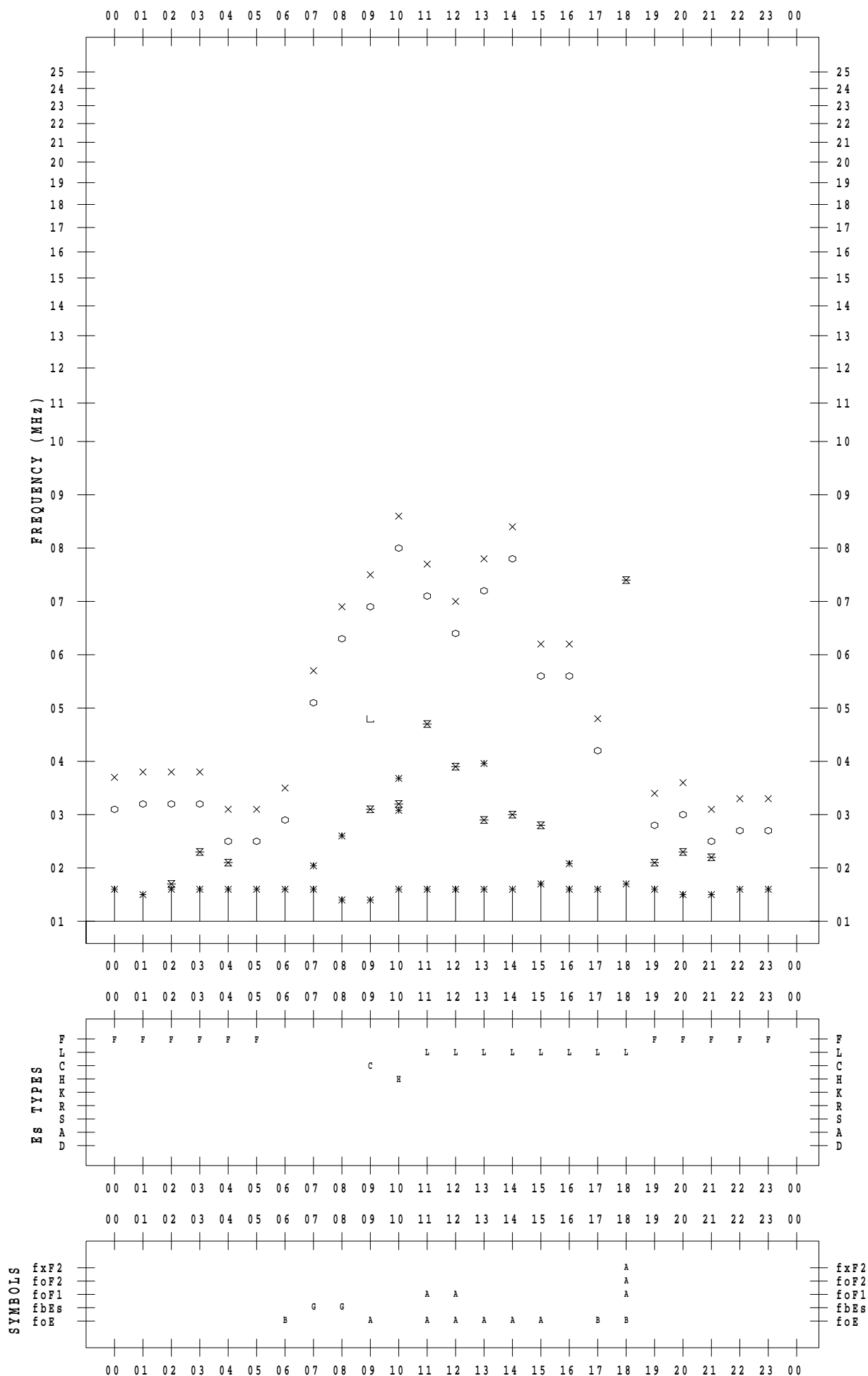
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/23

135 ° E MEAN TIME



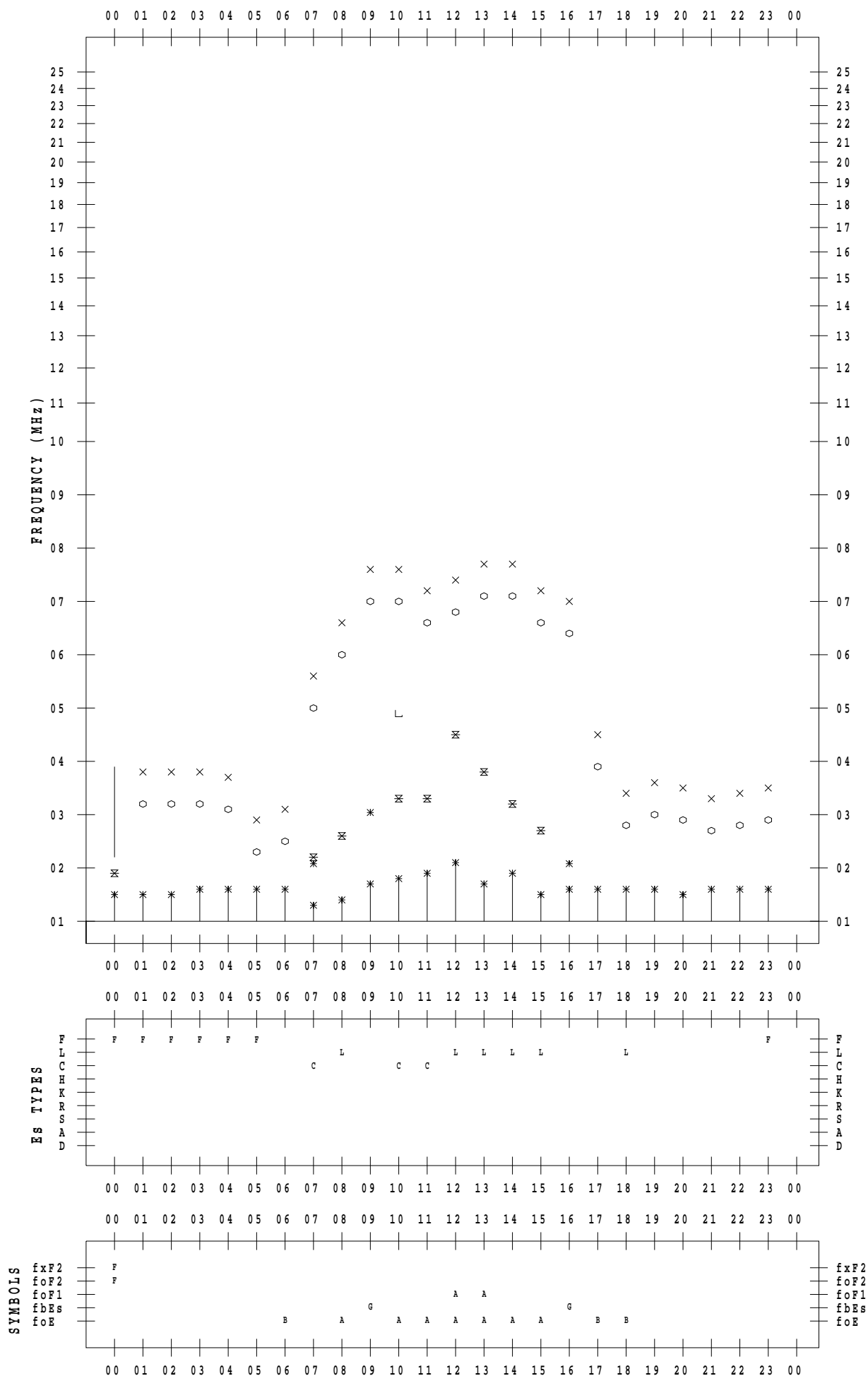
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/24

135 ° E MEAN TIME



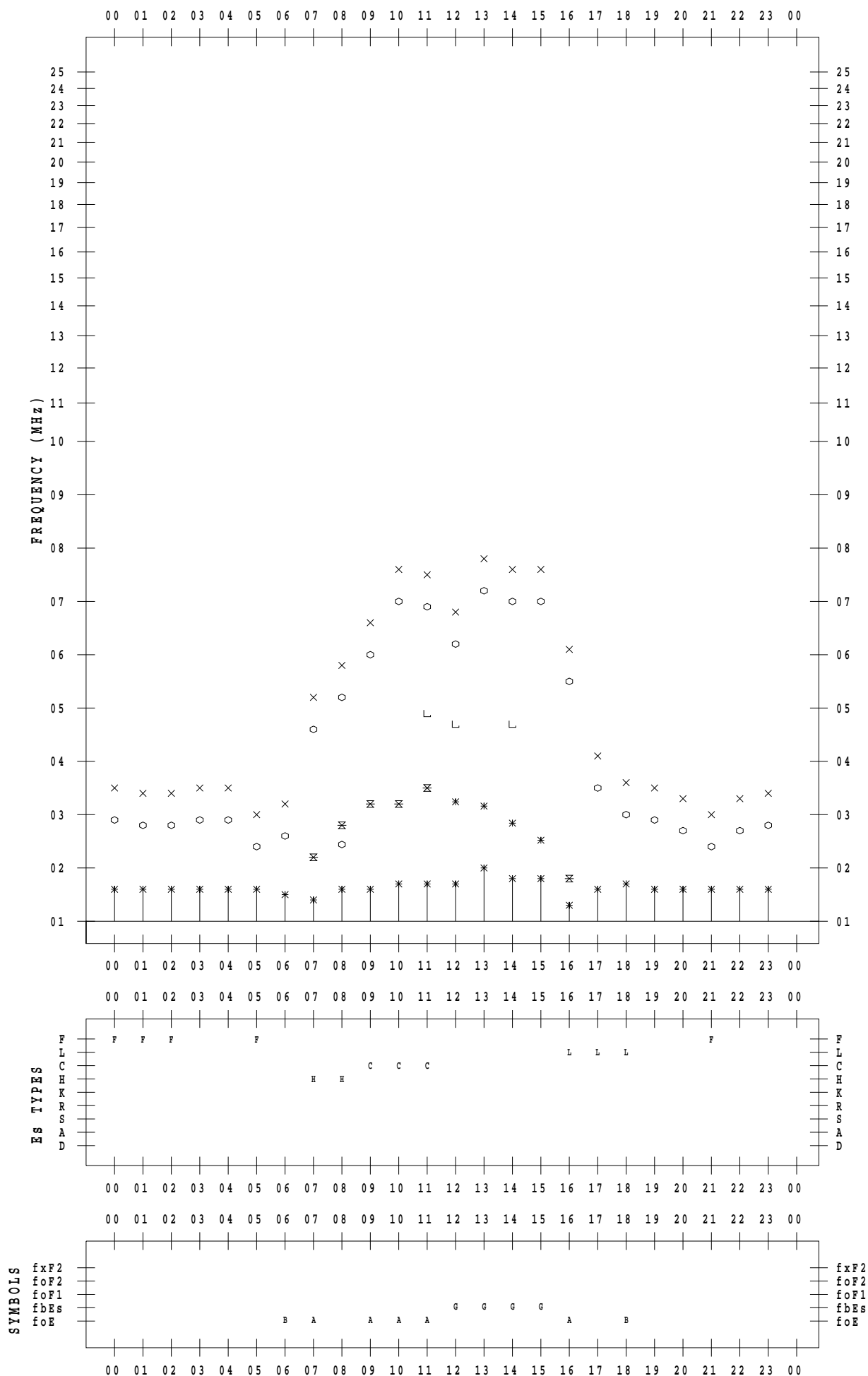
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/25

135 ° E MEAN TIME



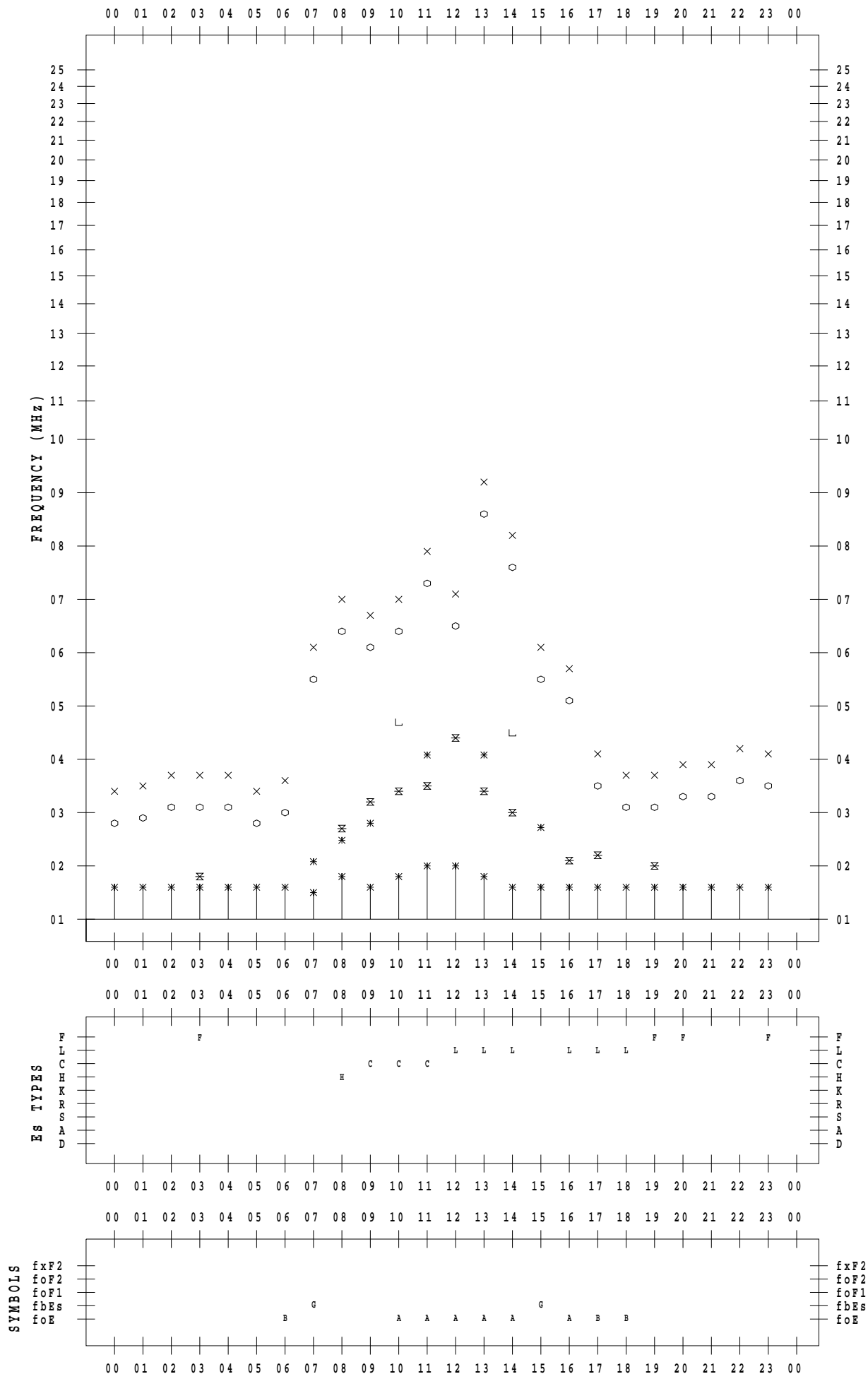
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/26

135 ° E MEAN TIME



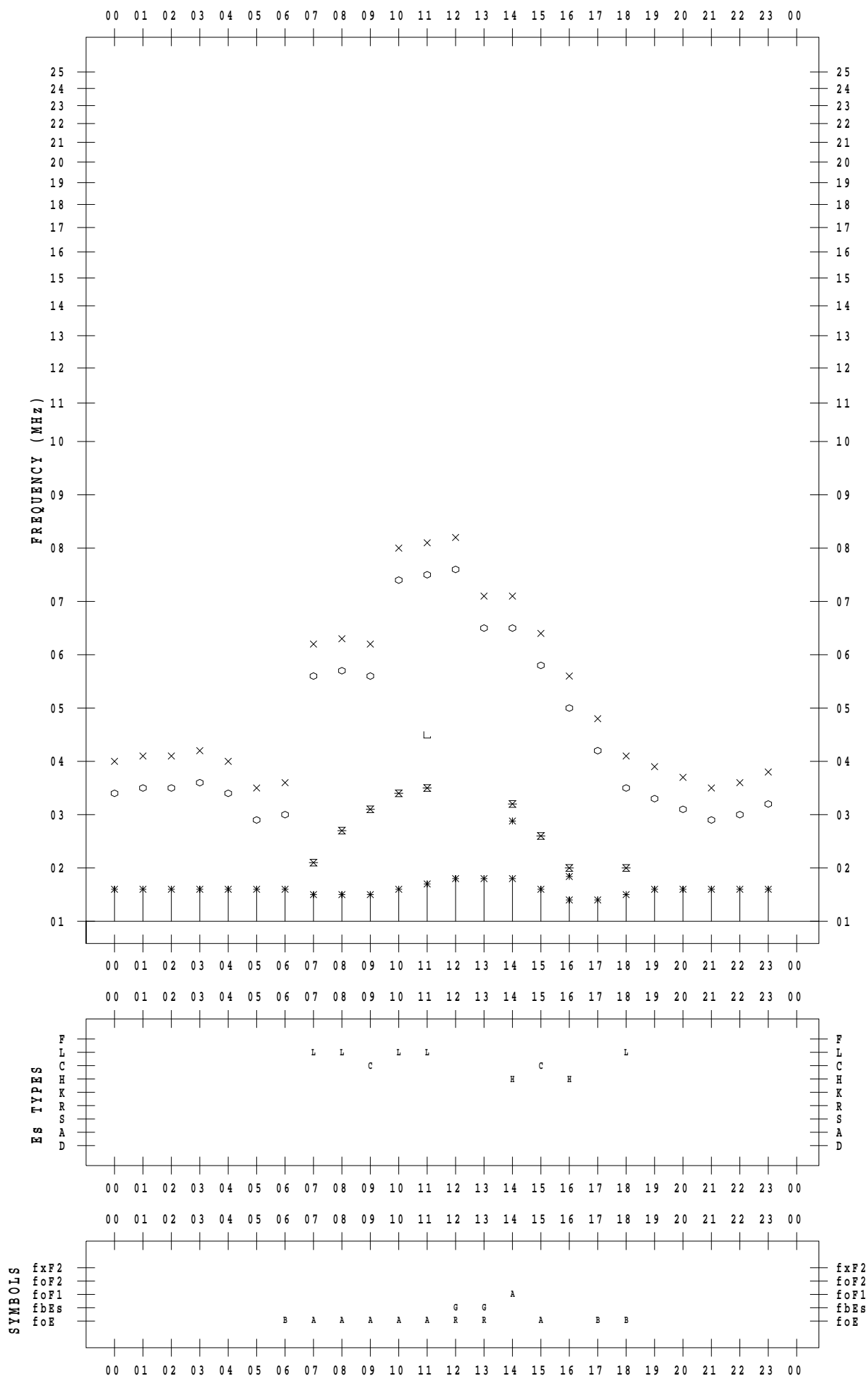
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/27

135 ° E MEAN TIME



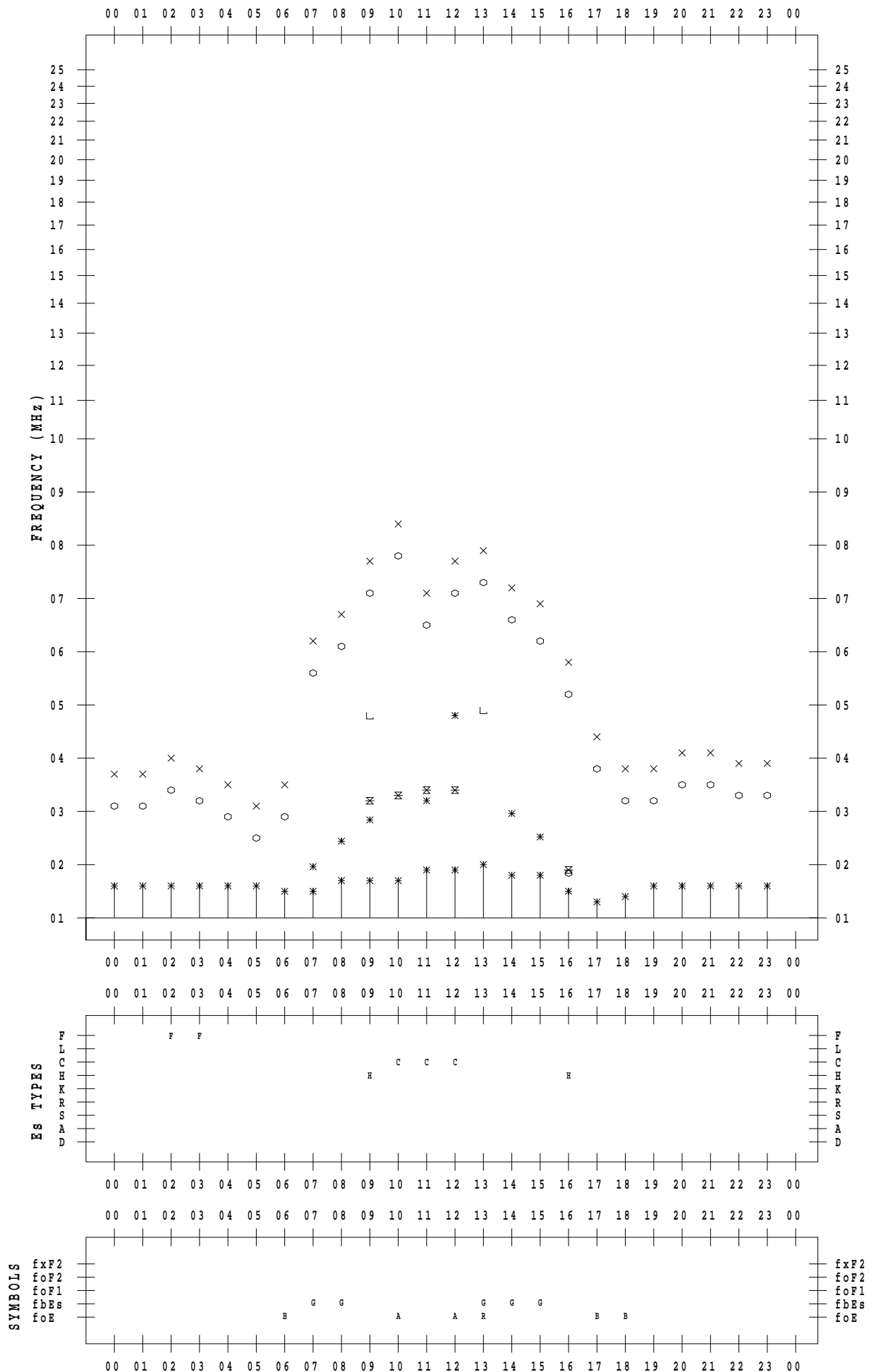
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/28

135 ° E MEAN TIME



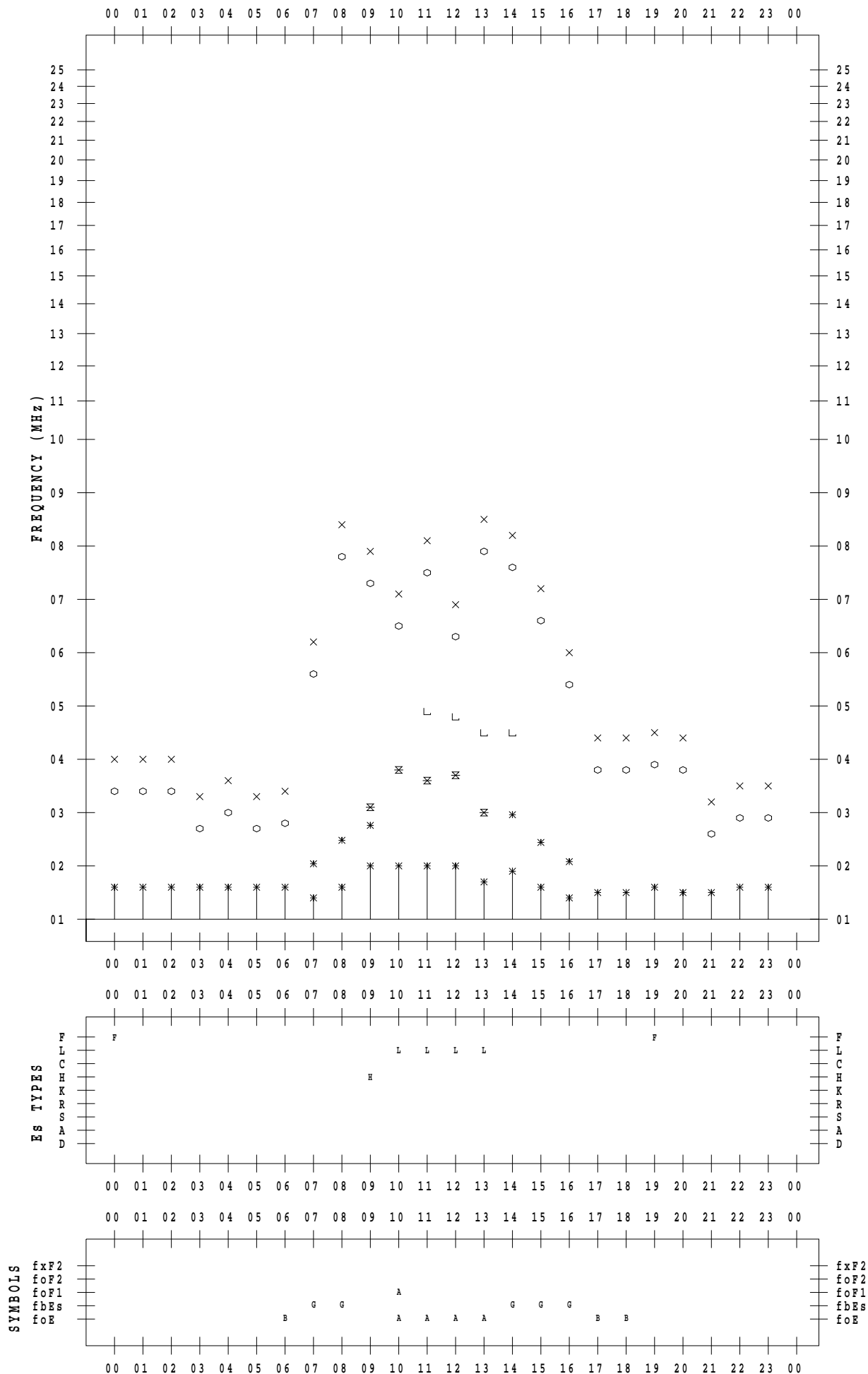
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/29

135 ° E MEAN TIME



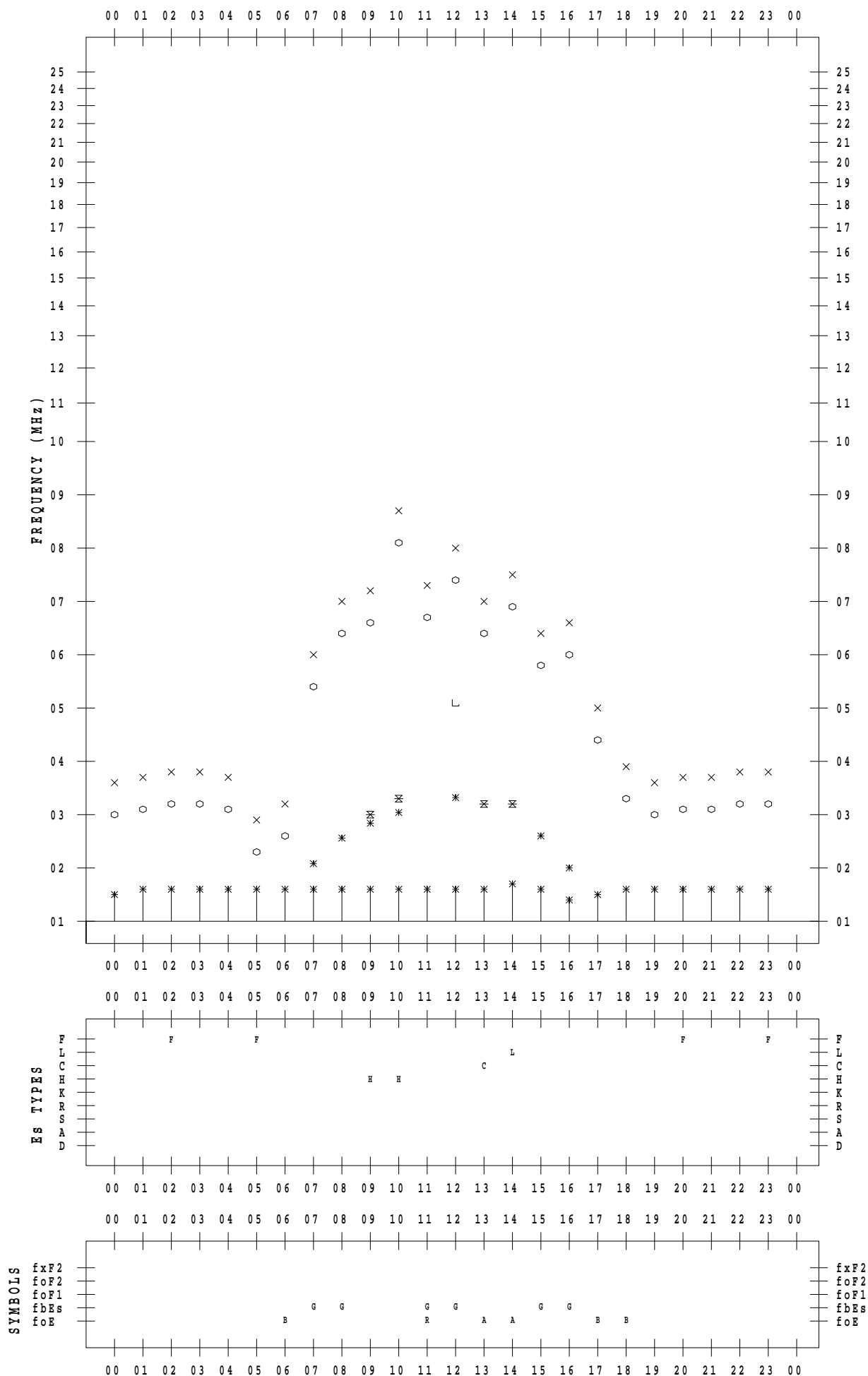
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/11/30

135 ° E MEAN TIME





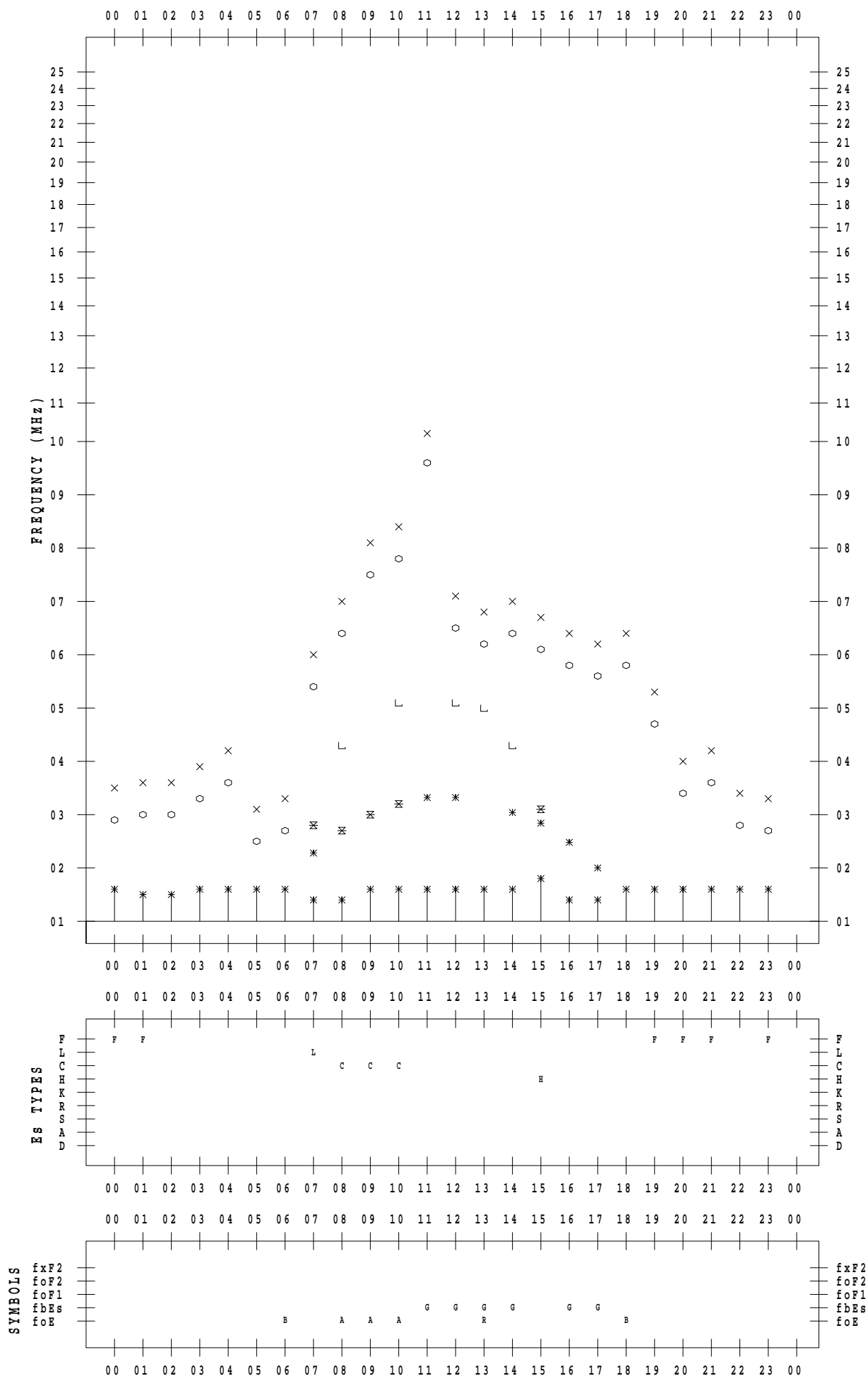
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/ 1

135 ° E MEAN TIME



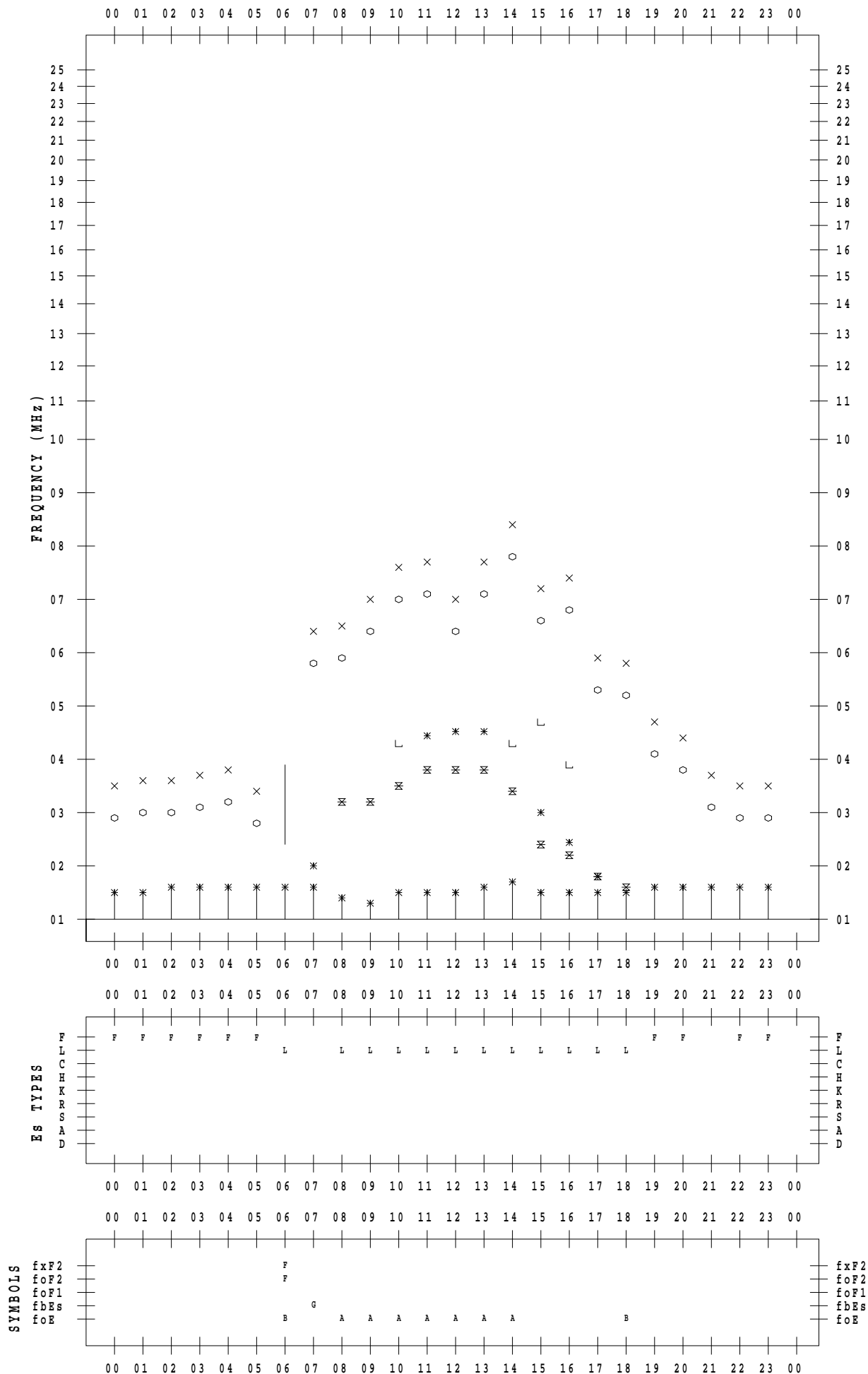
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/ 2

135 ° E MEAN TIME



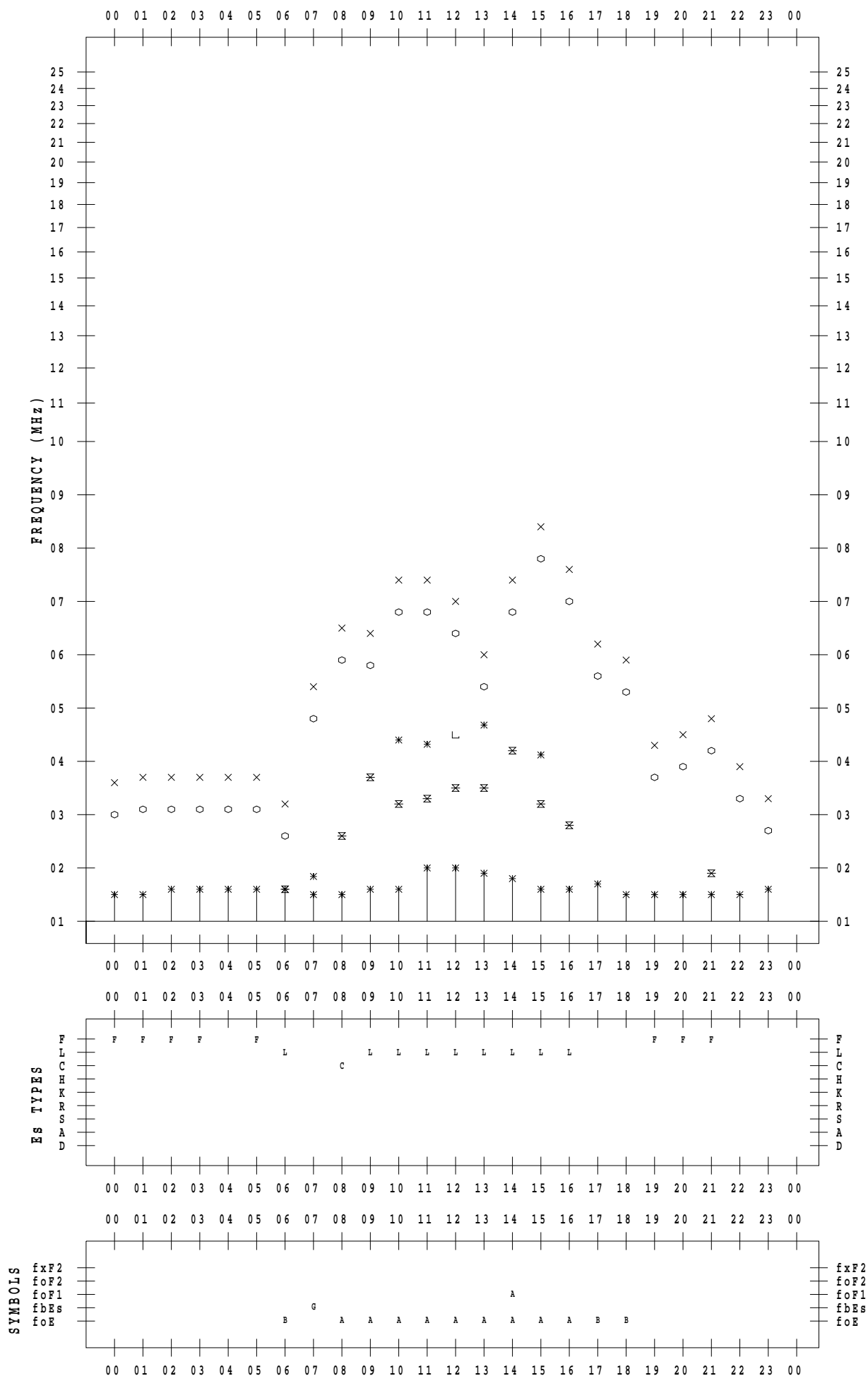
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/ 3

135 ° E MEAN TIME



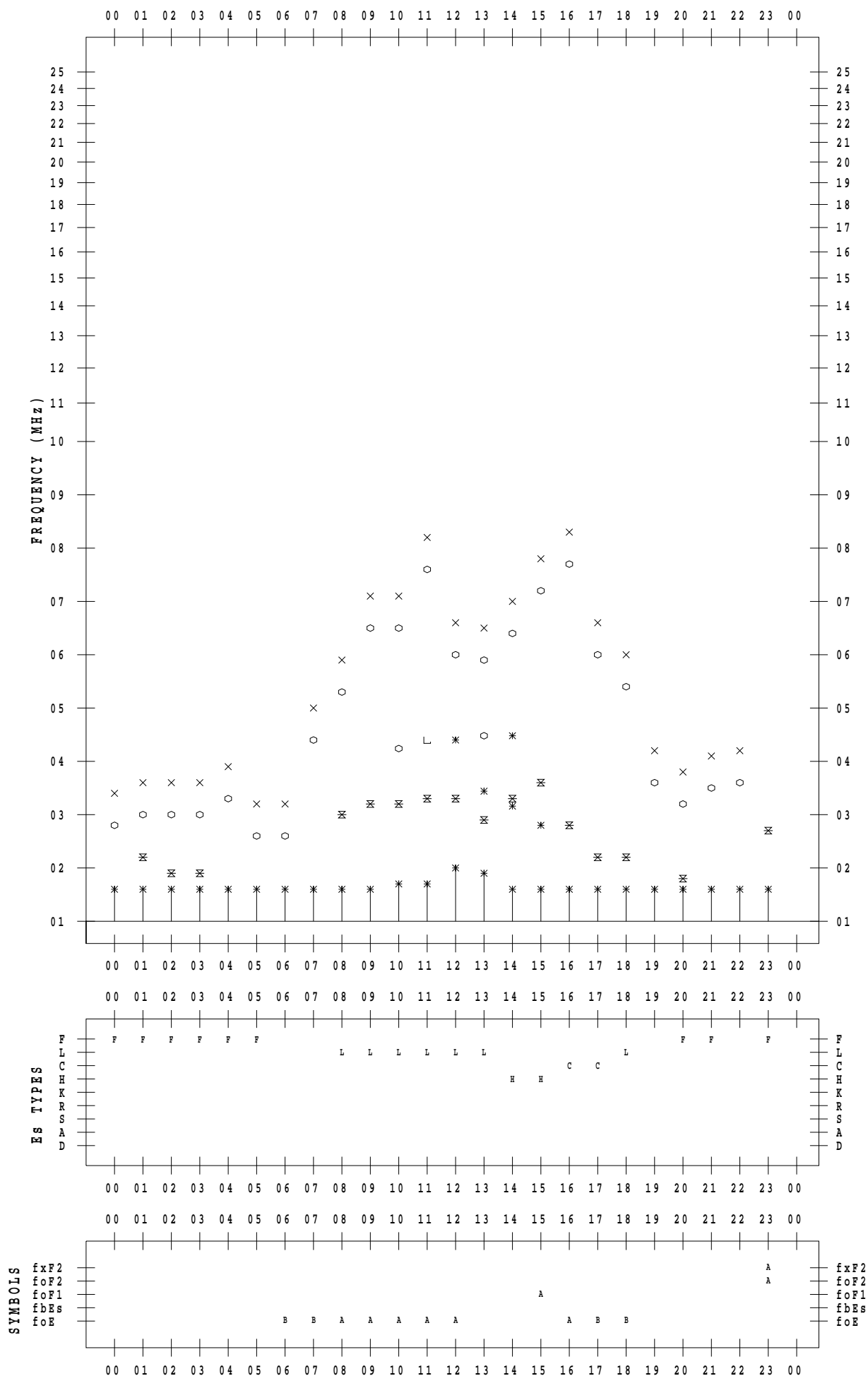
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/ 4

135 ° E MEAN TIME



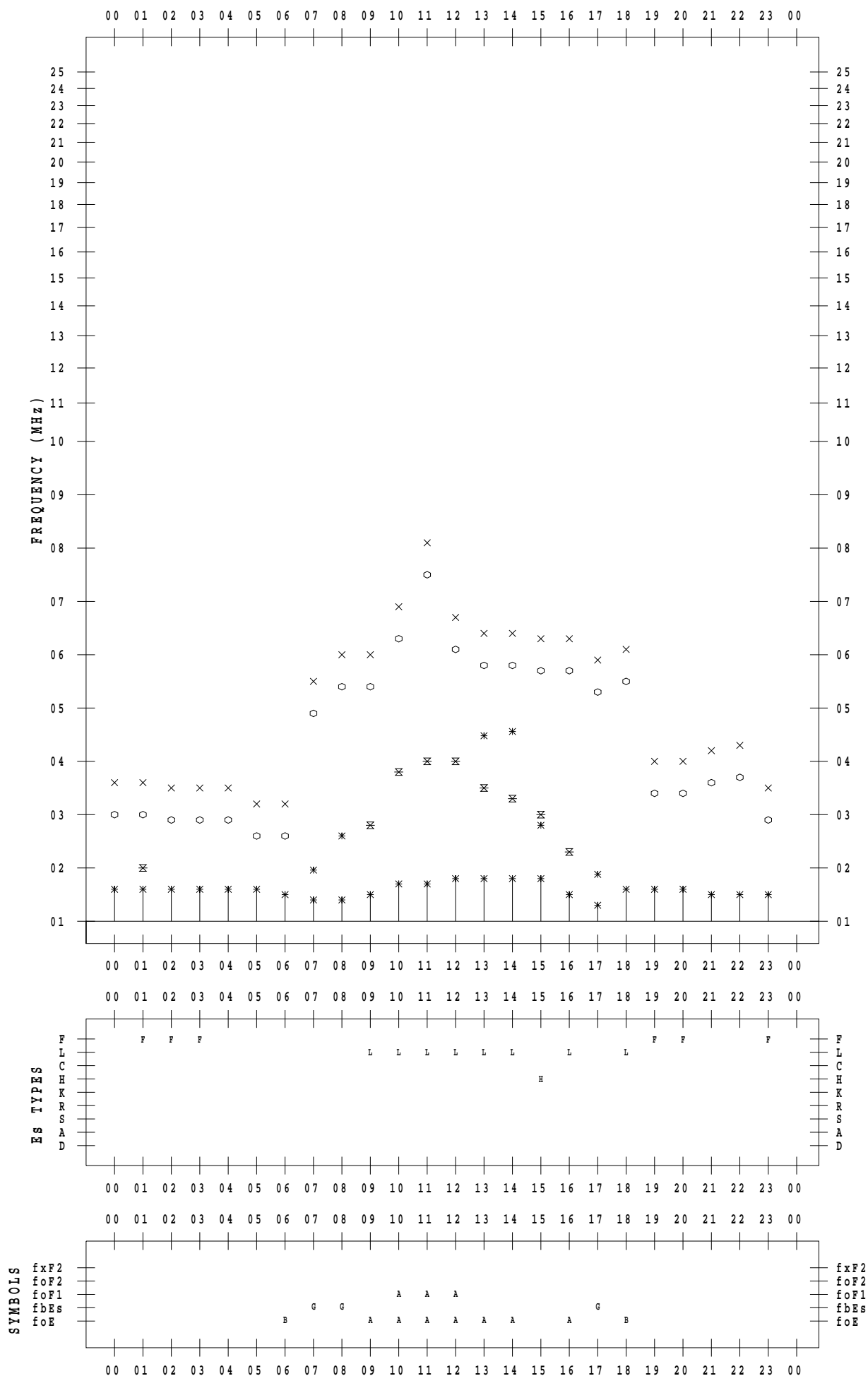
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/ 5

135 ° E MEAN TIME



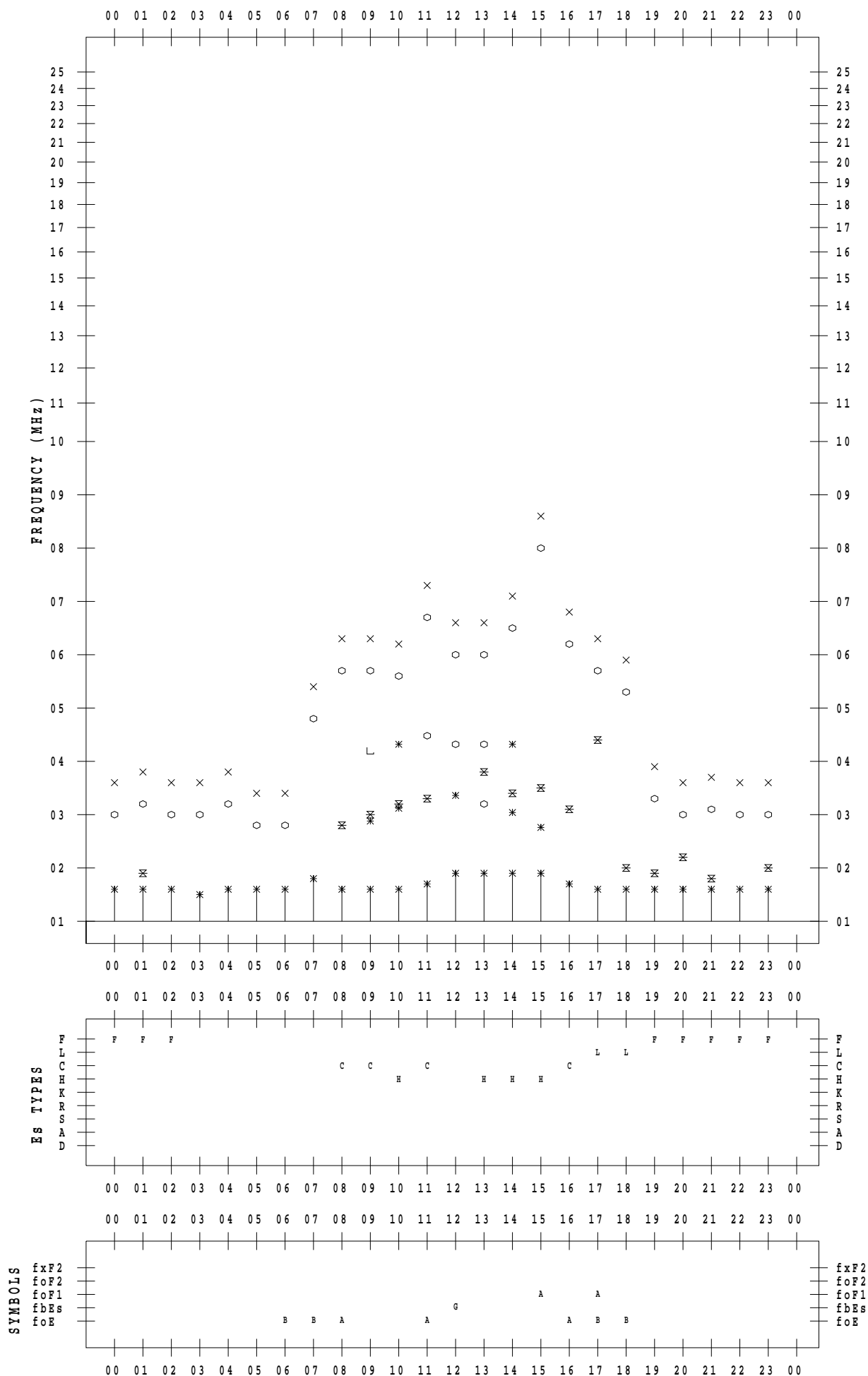
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/ 6

135 ° E MEAN TIME



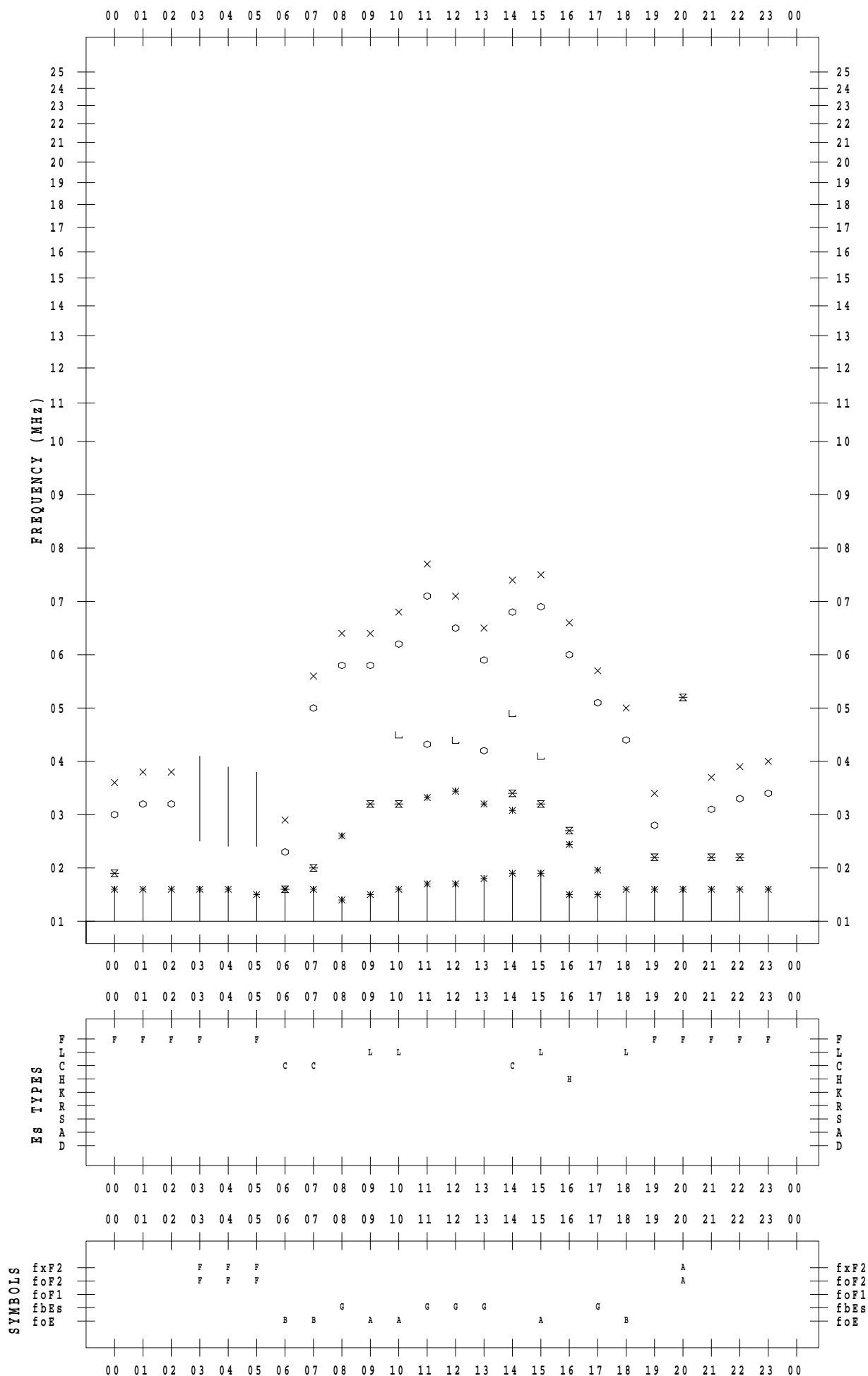
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/ 7

135 ° E MEAN TIME



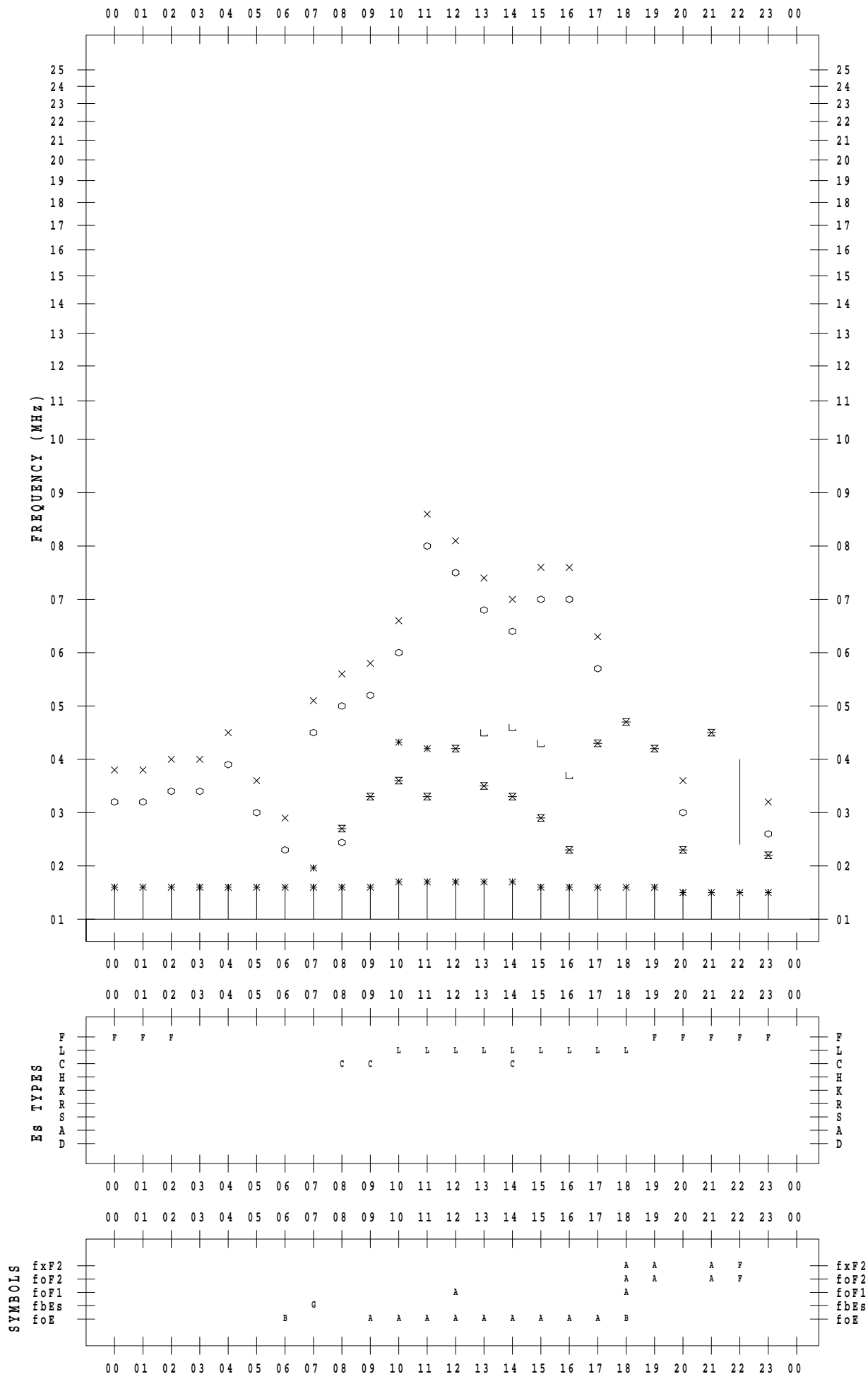
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/ 8

135 ° E MEAN TIME





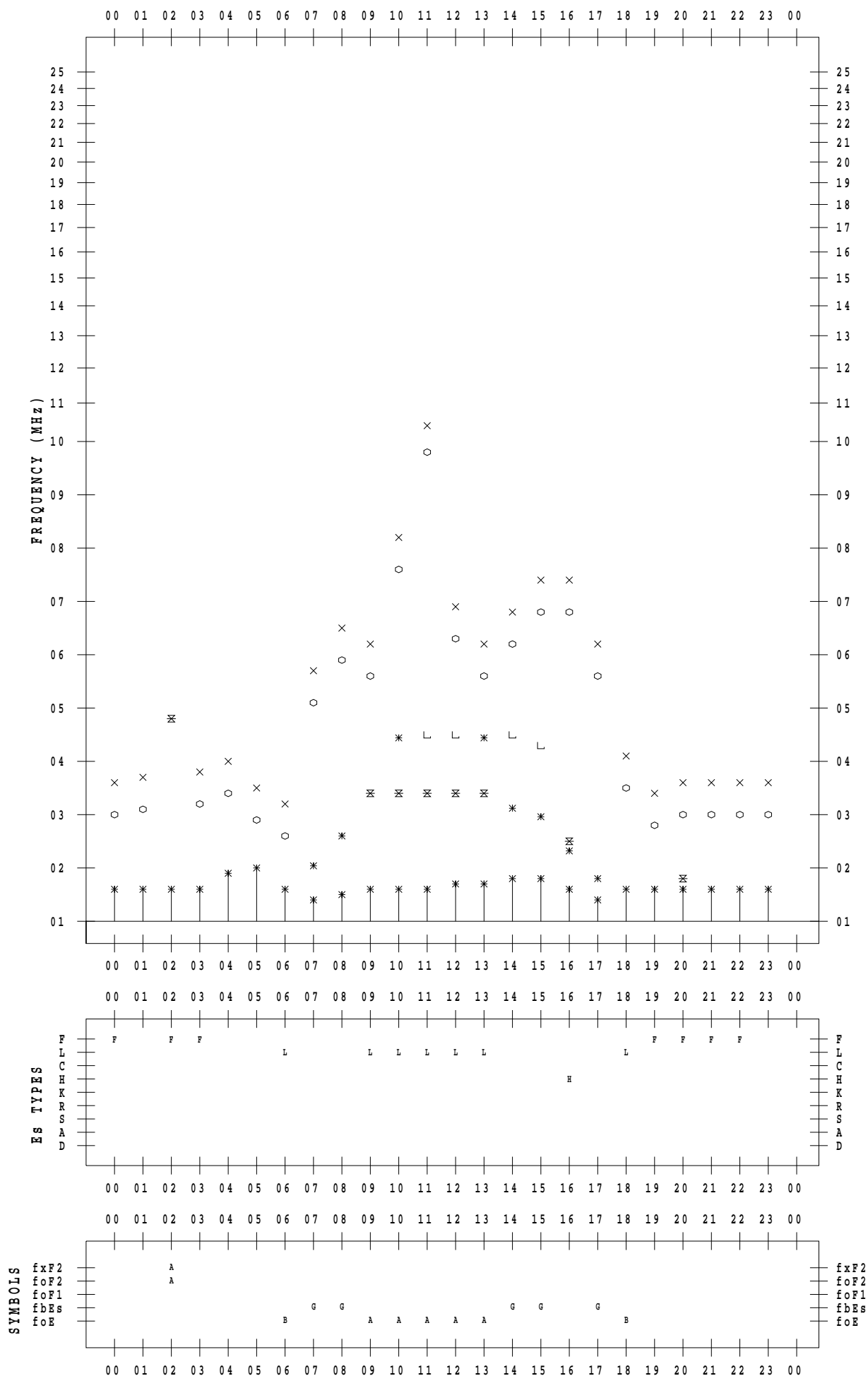
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/ 9

135 ° E MEAN TIME



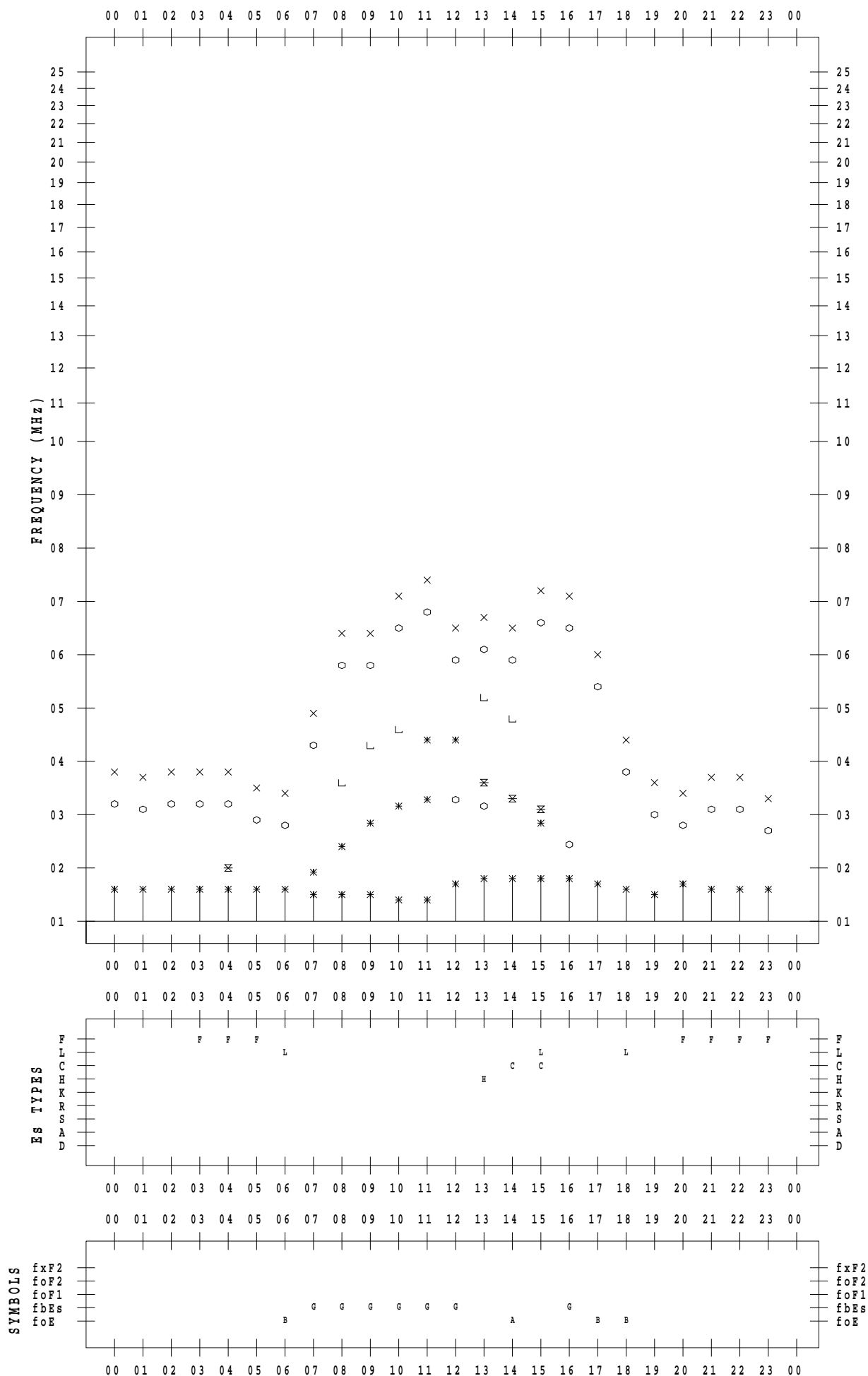
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/10

135 ° E MEAN TIME



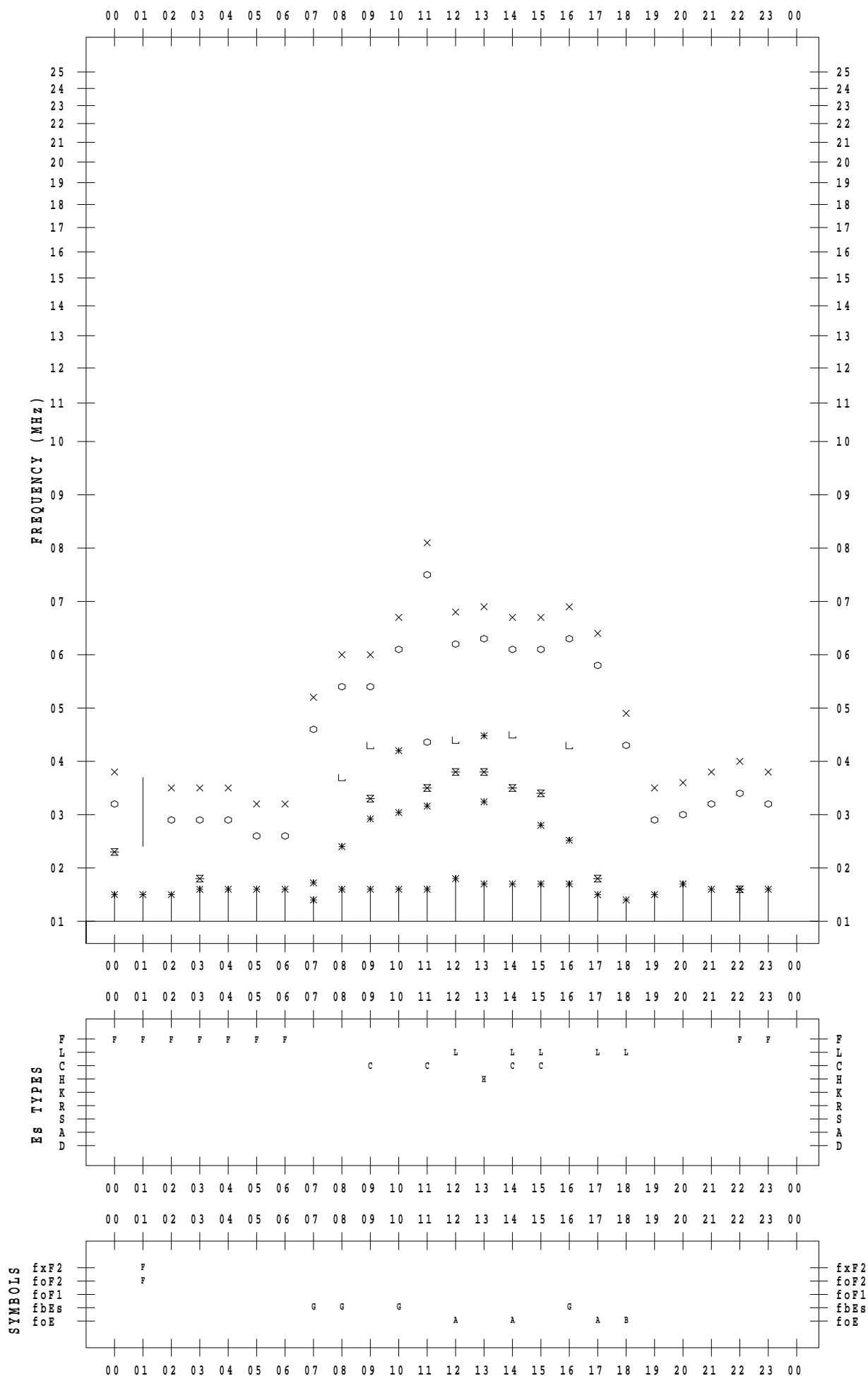
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/11

135 ° E MEAN TIME



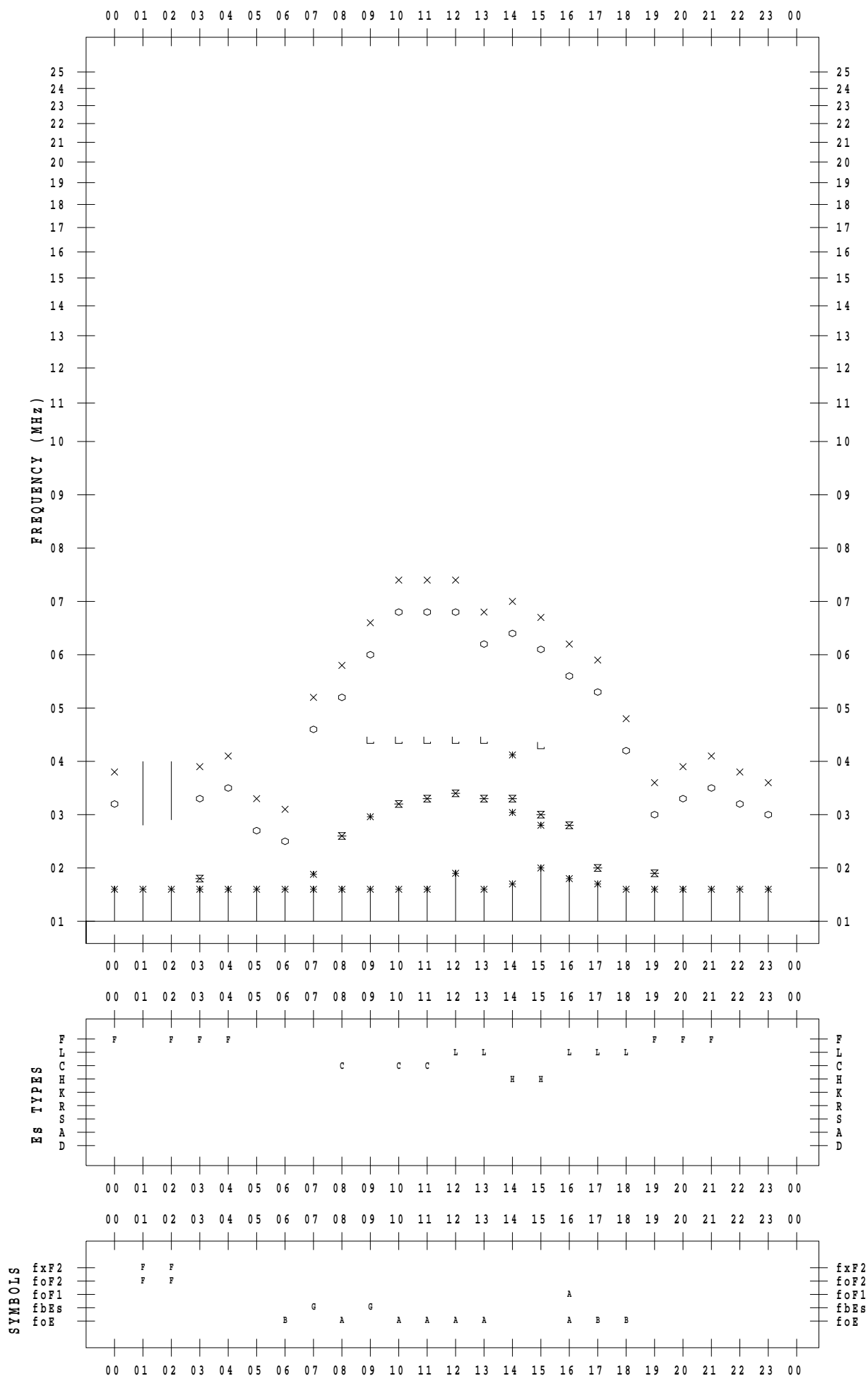
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/12

135 ° E MEAN TIME



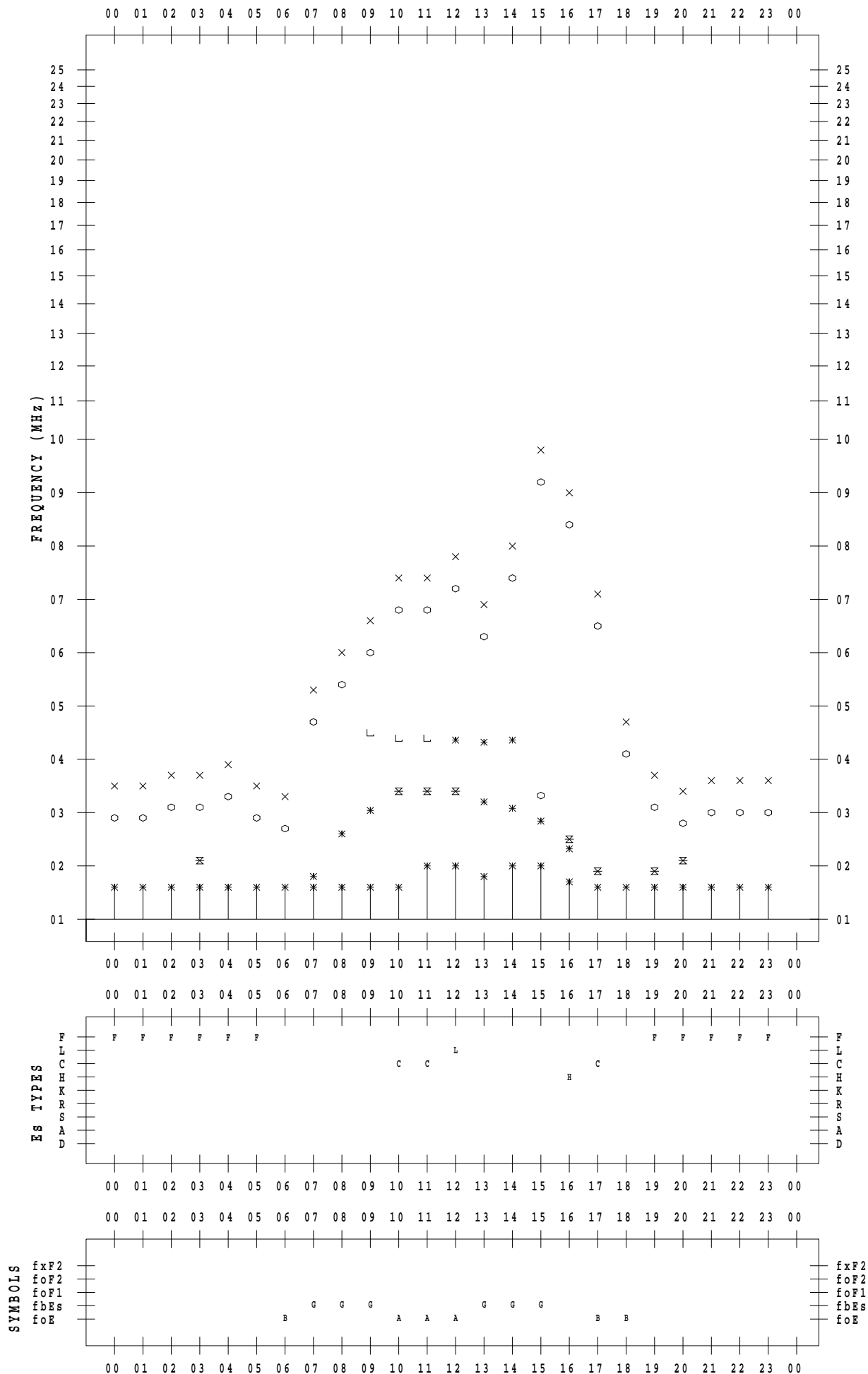
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/13

135 ° E MEAN TIME



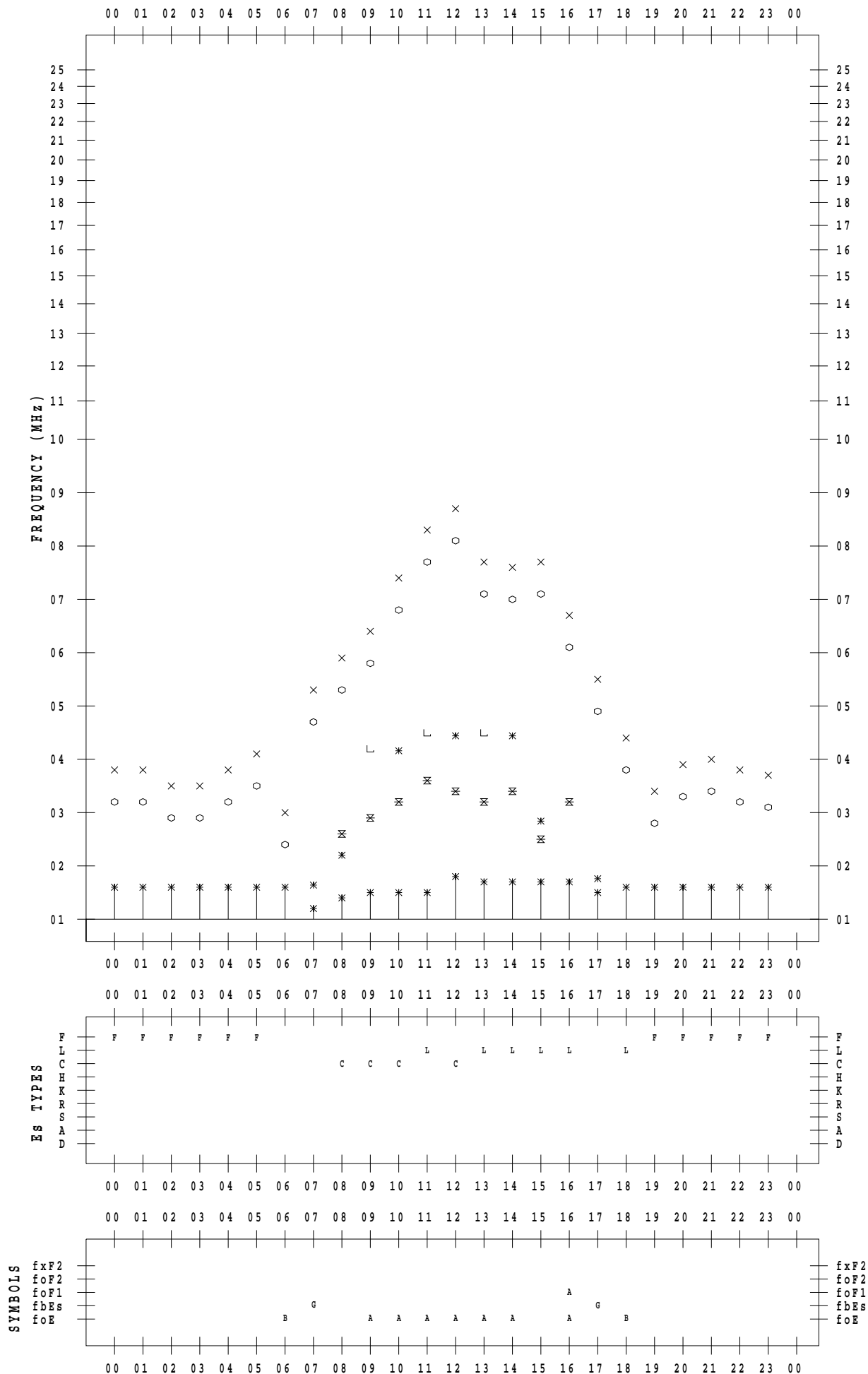
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/14

135 ° E MEAN TIME



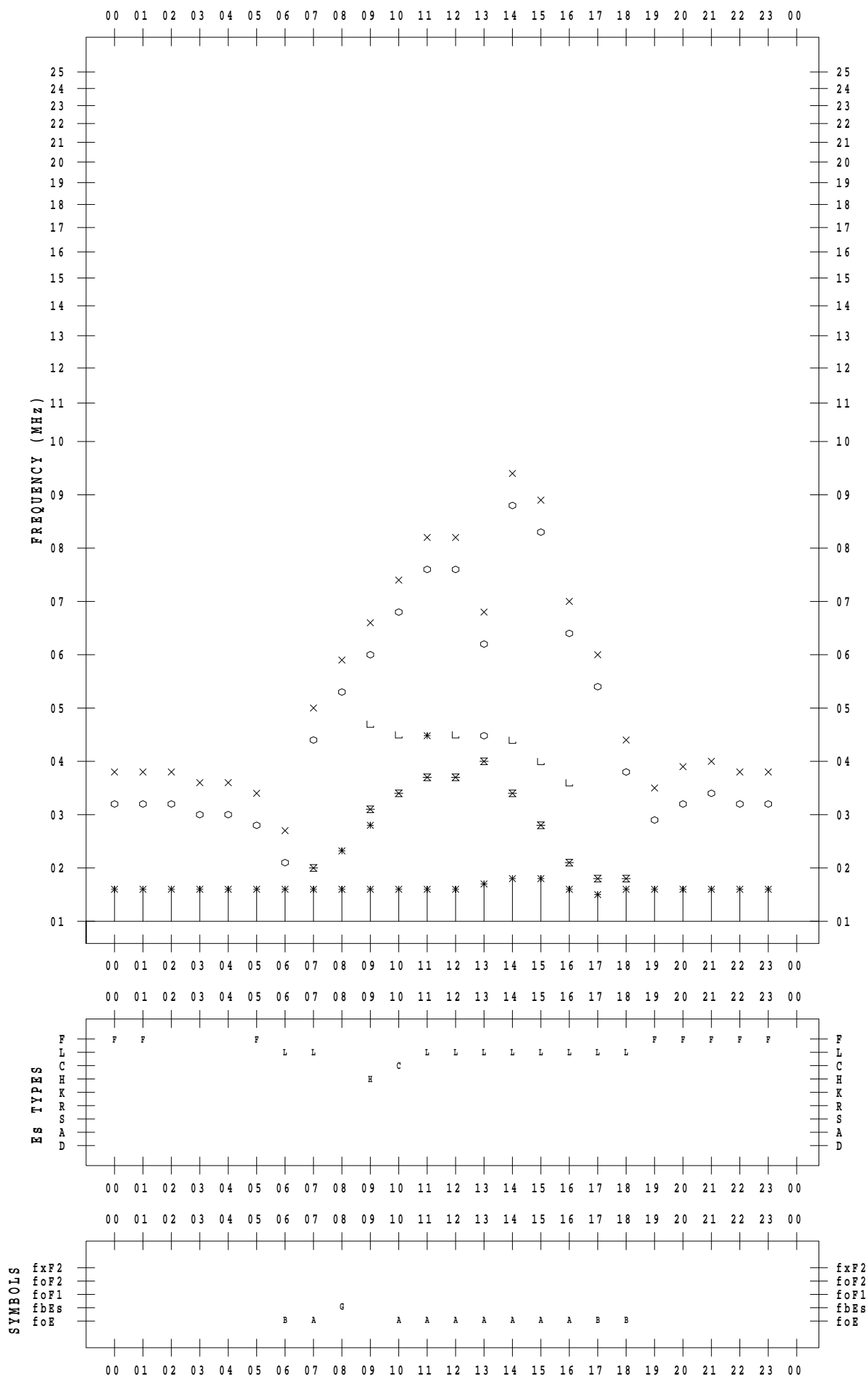
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/15

135 ° E MEAN TIME



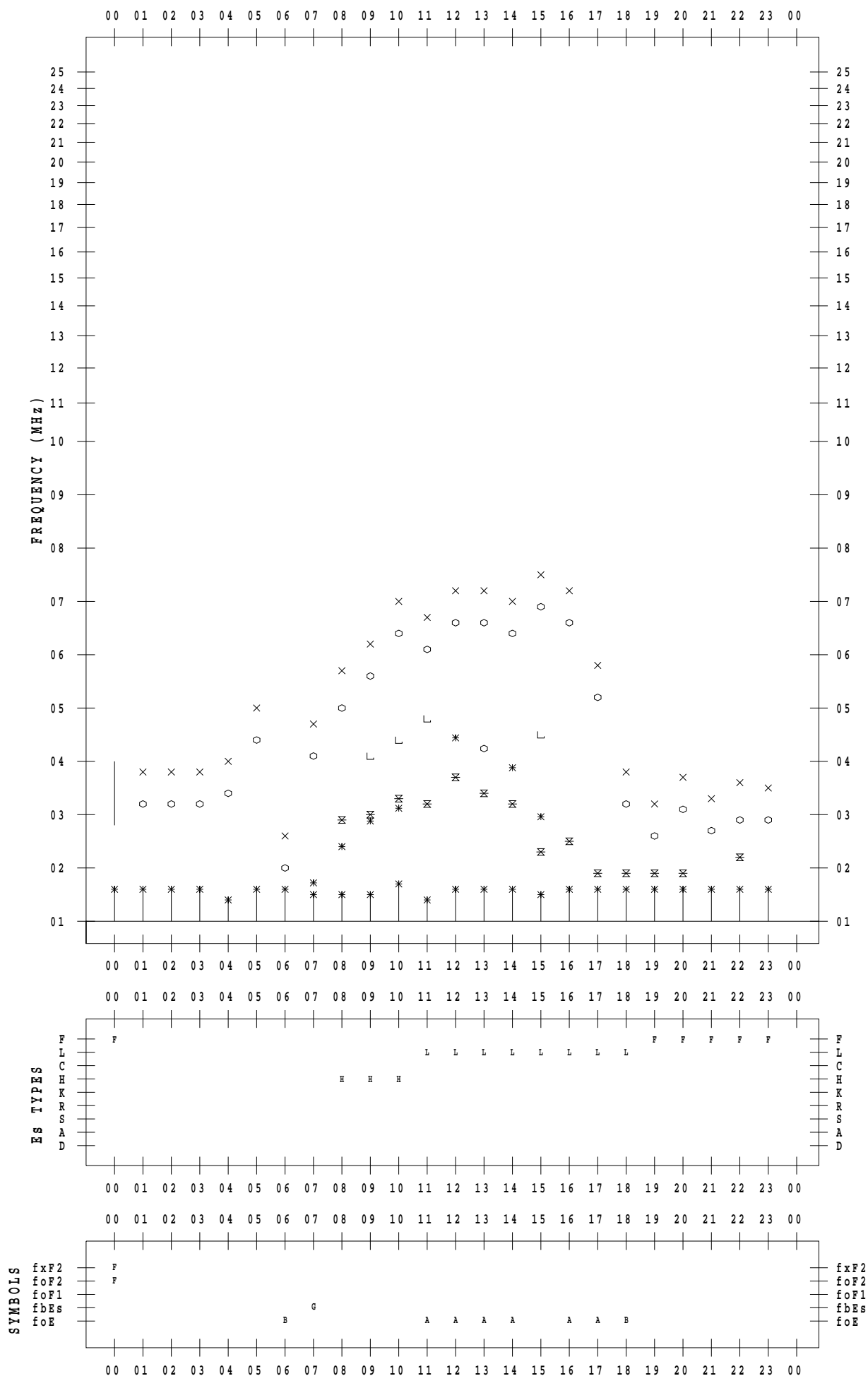
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/16

135 ° E MEAN TIME





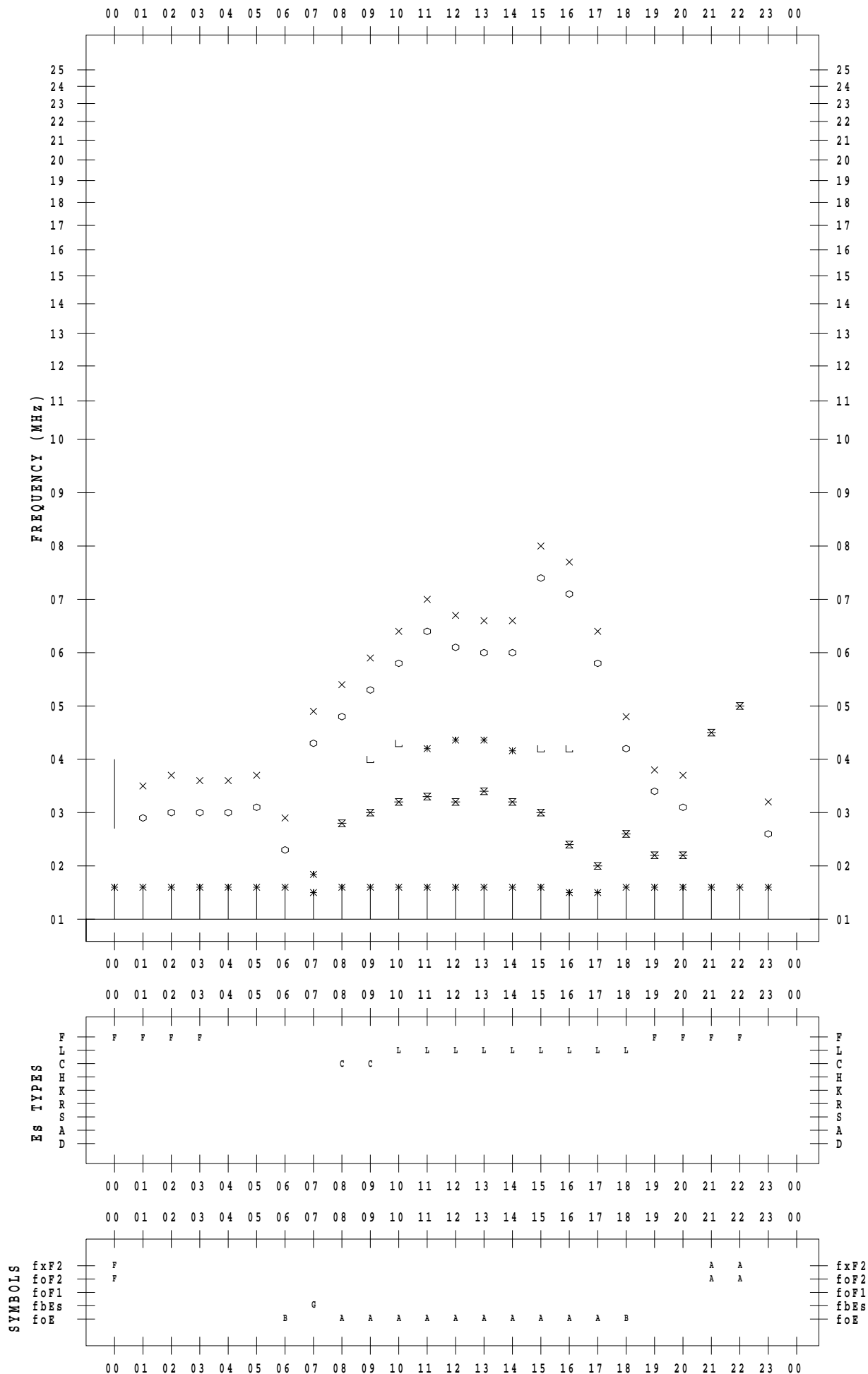
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/17

135 ° E MEAN TIME



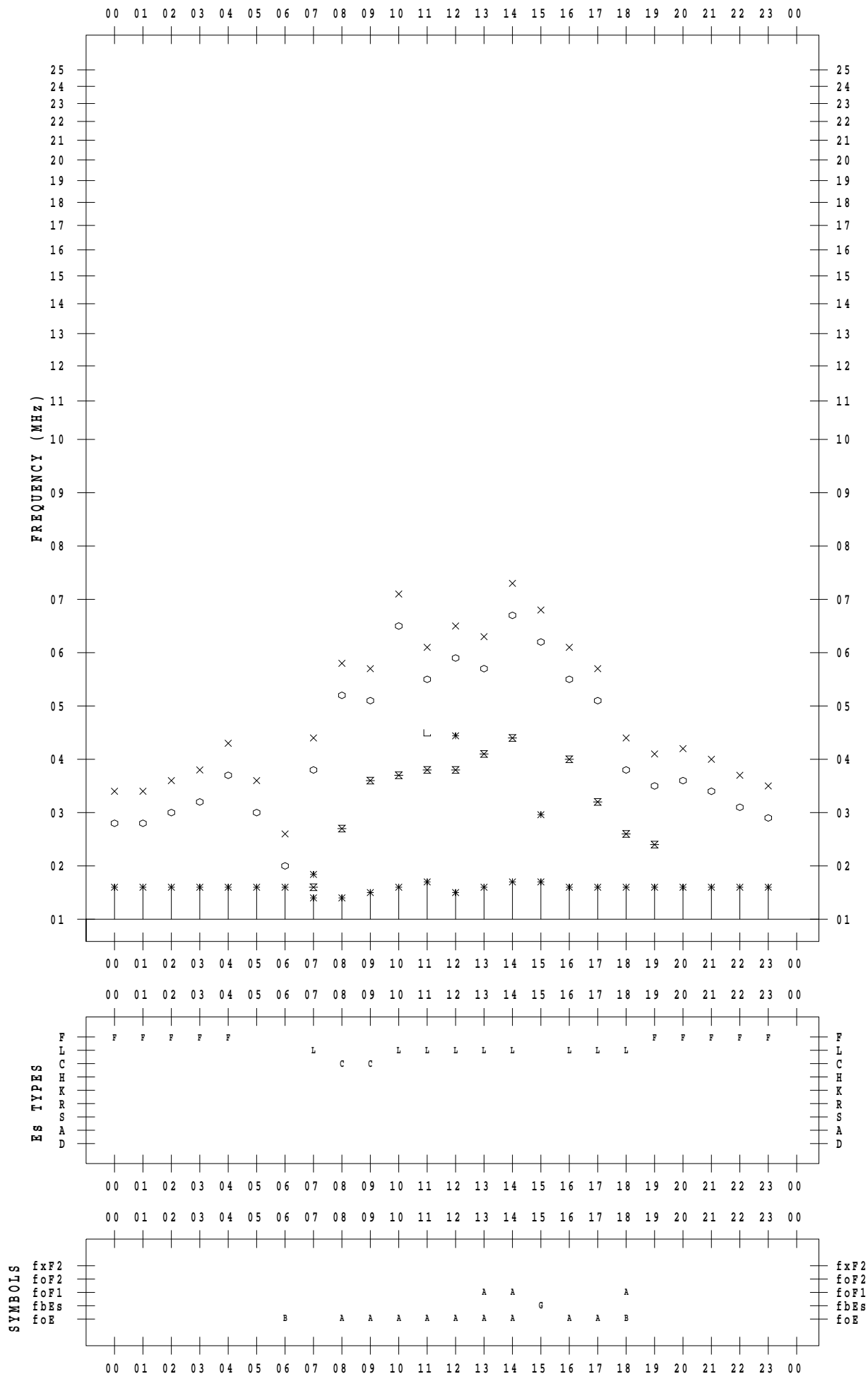
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/18

135 ° E MEAN TIME



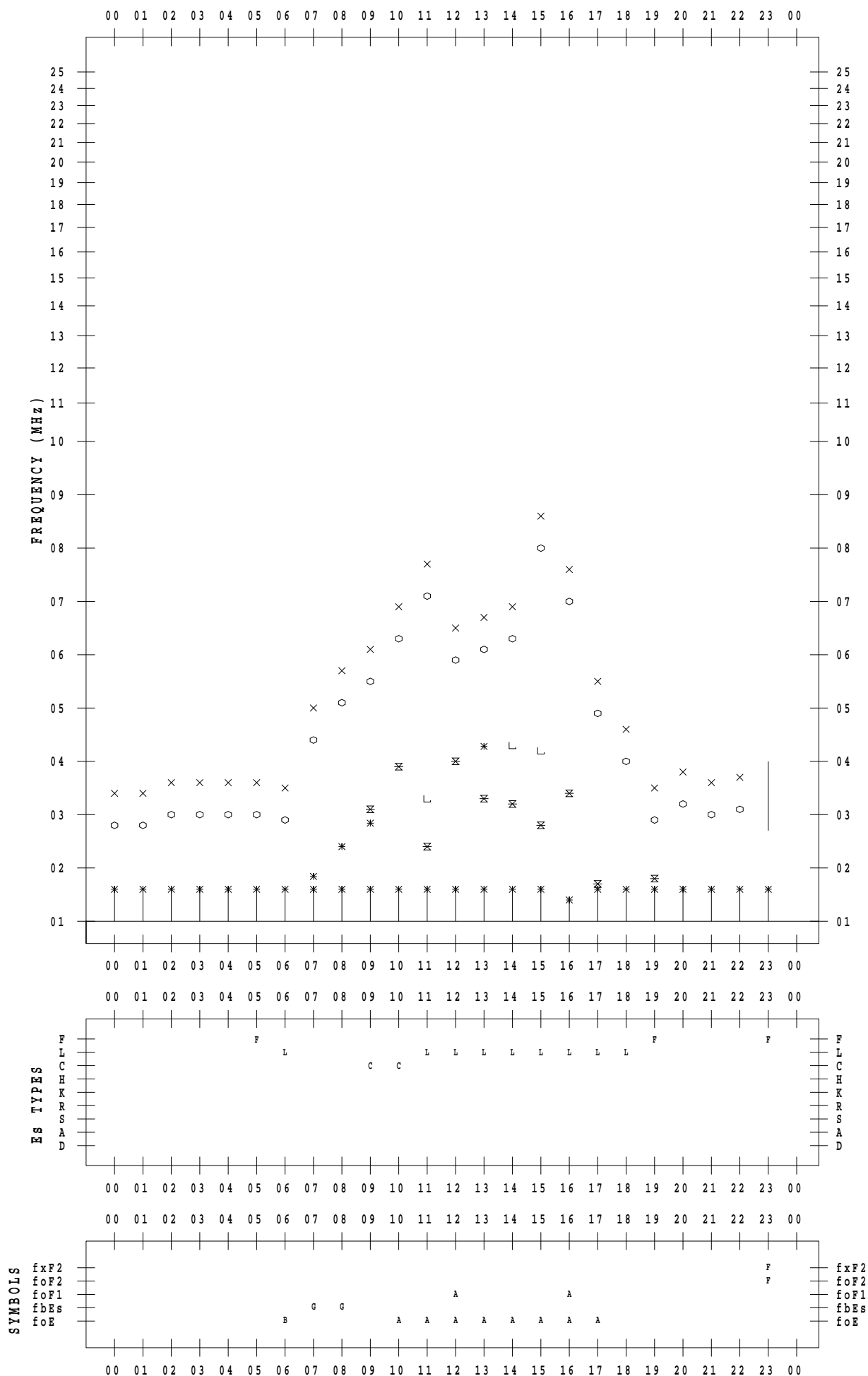
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/19

135 ° E MEAN TIME



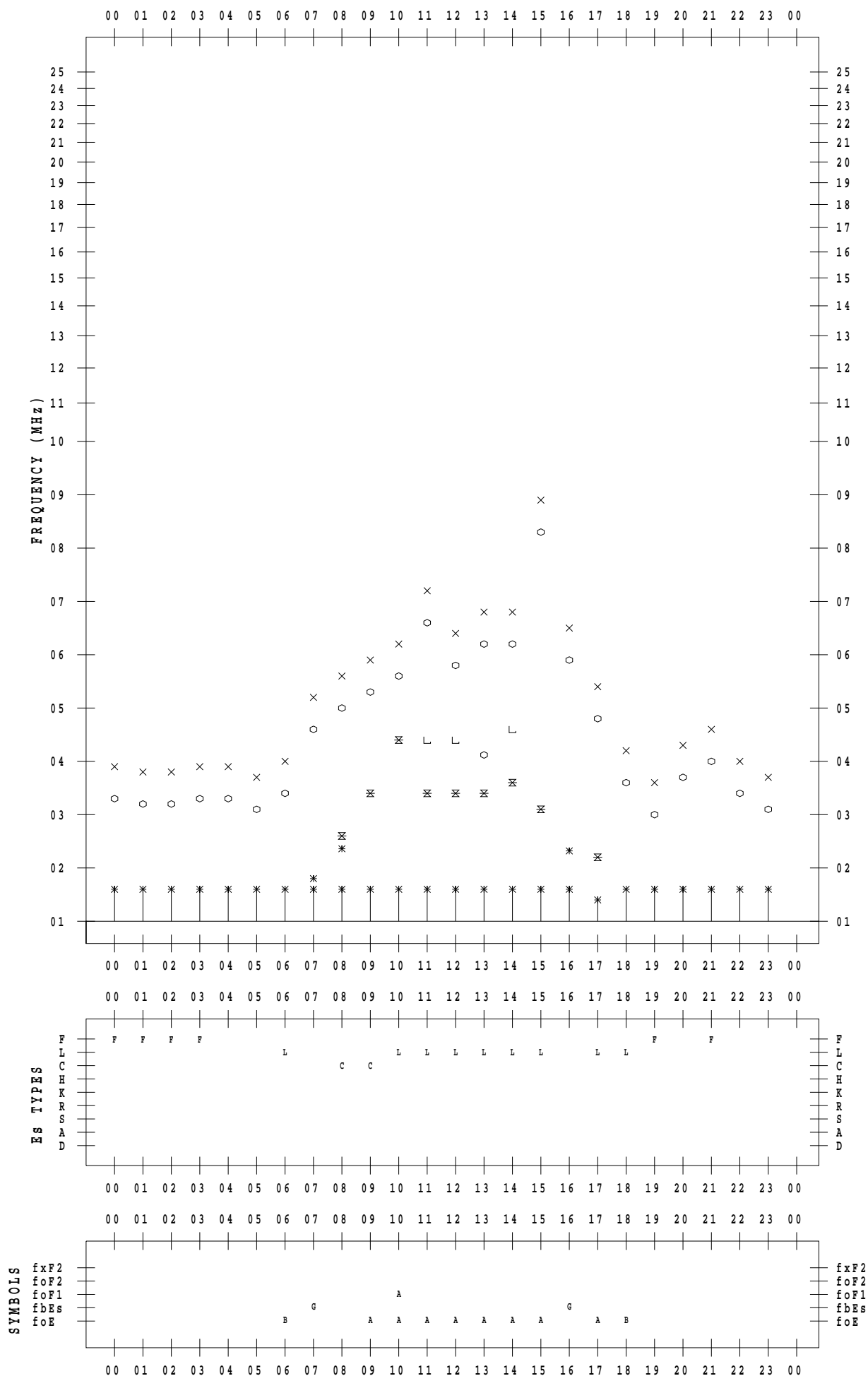
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/20

135 ° E MEAN TIME



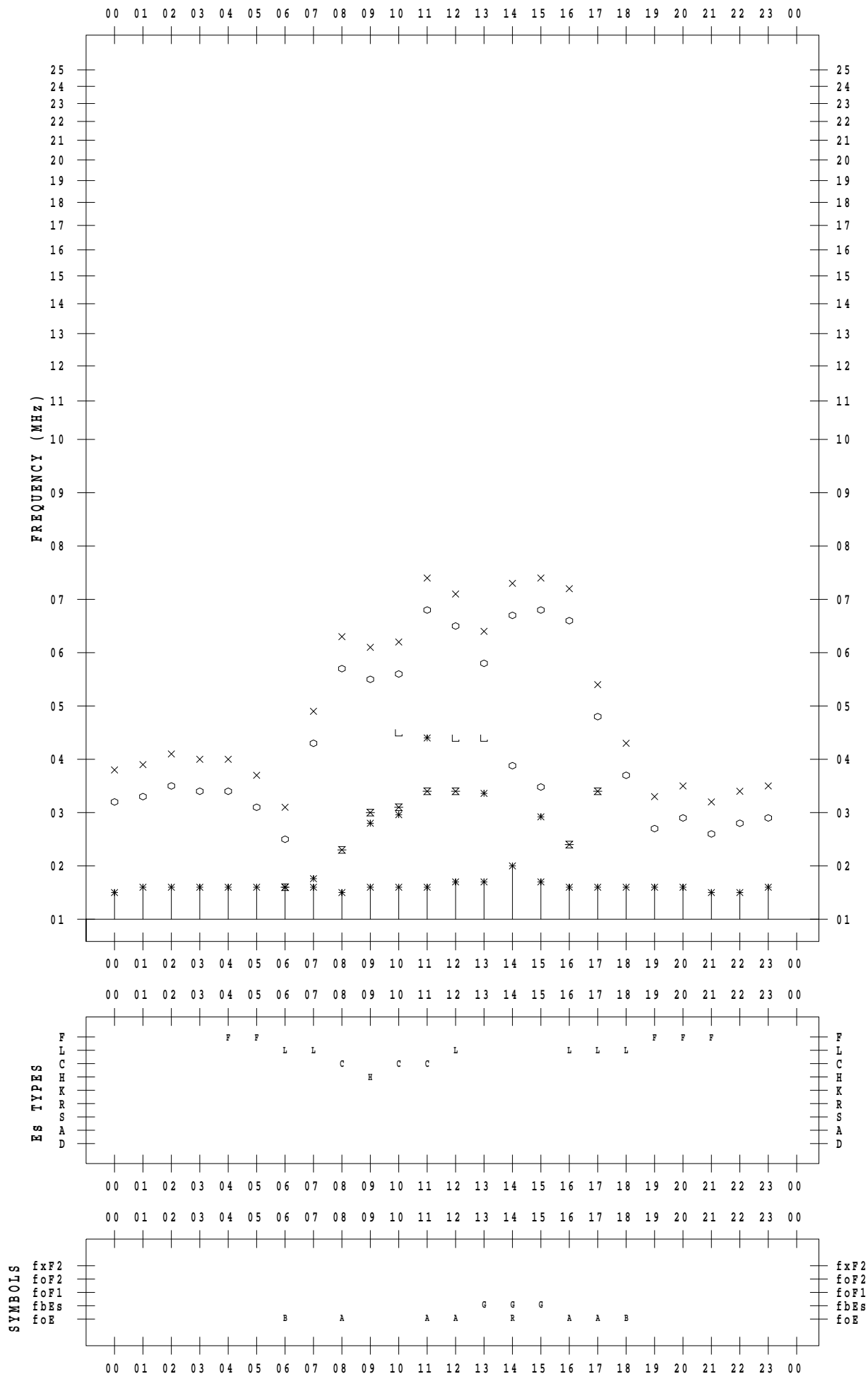
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/21

135 ° E MEAN TIME



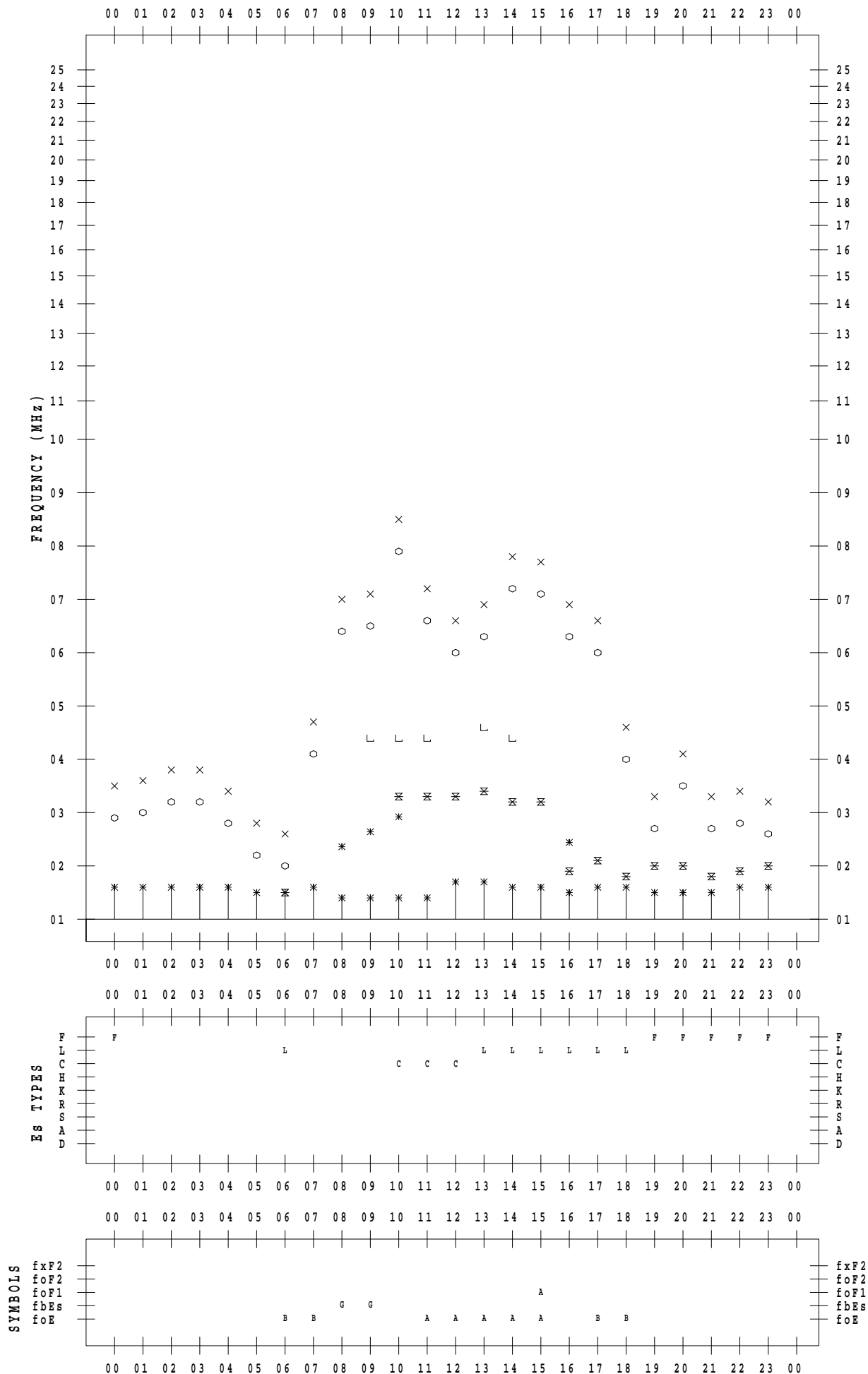
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/22

135 ° E MEAN TIME



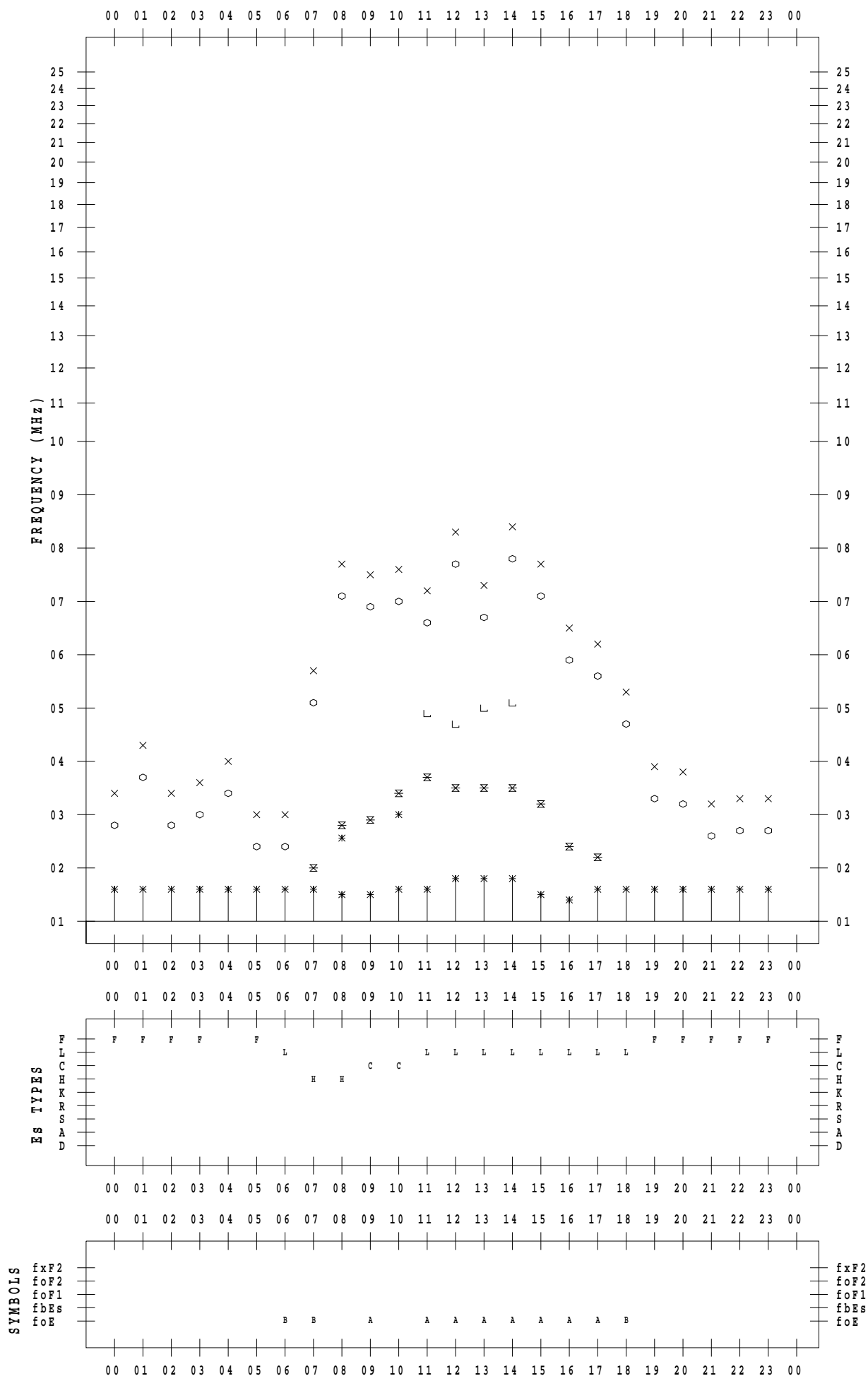
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/23

135 ° E MEAN TIME



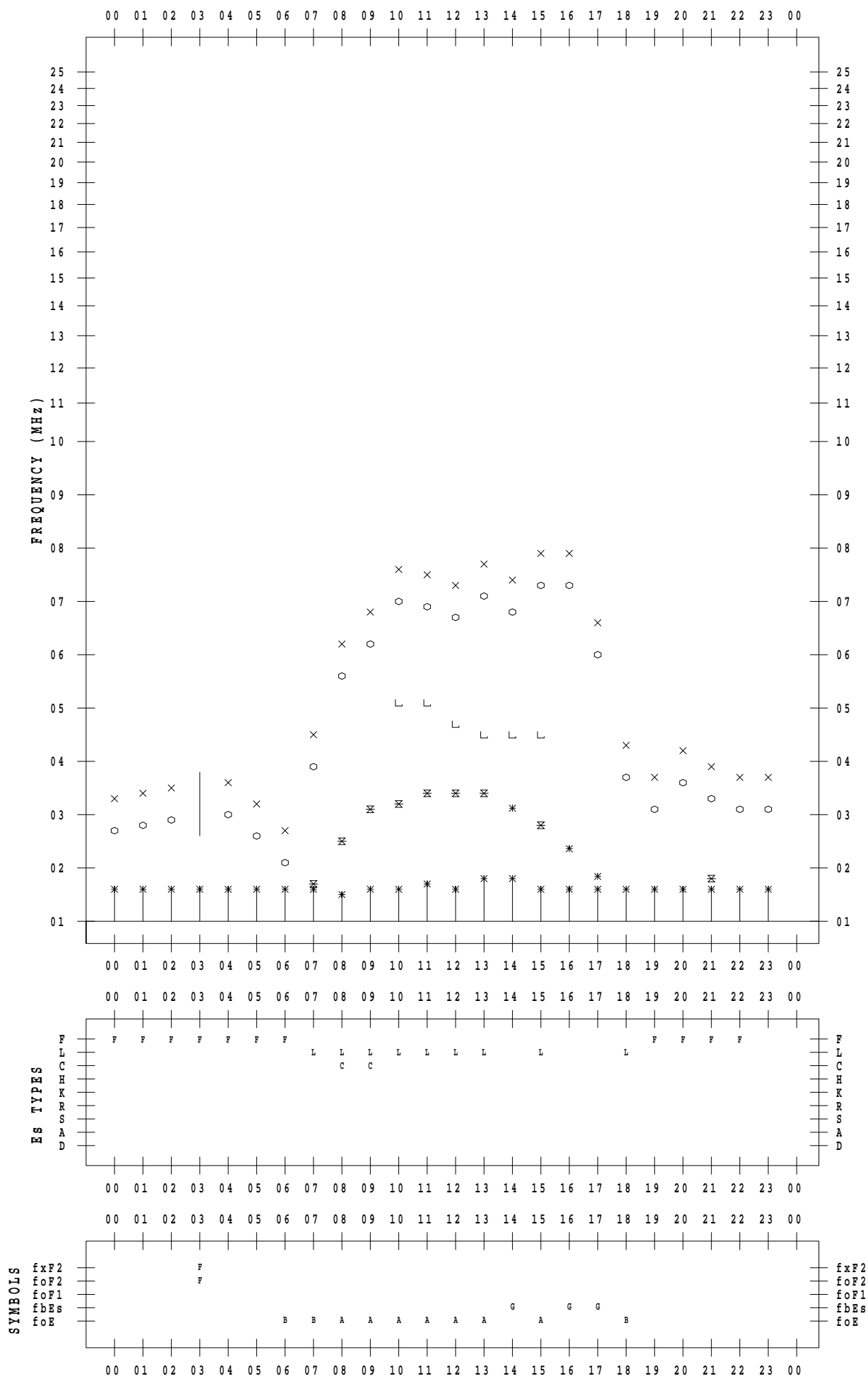
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/24

135 ° E MEAN TIME





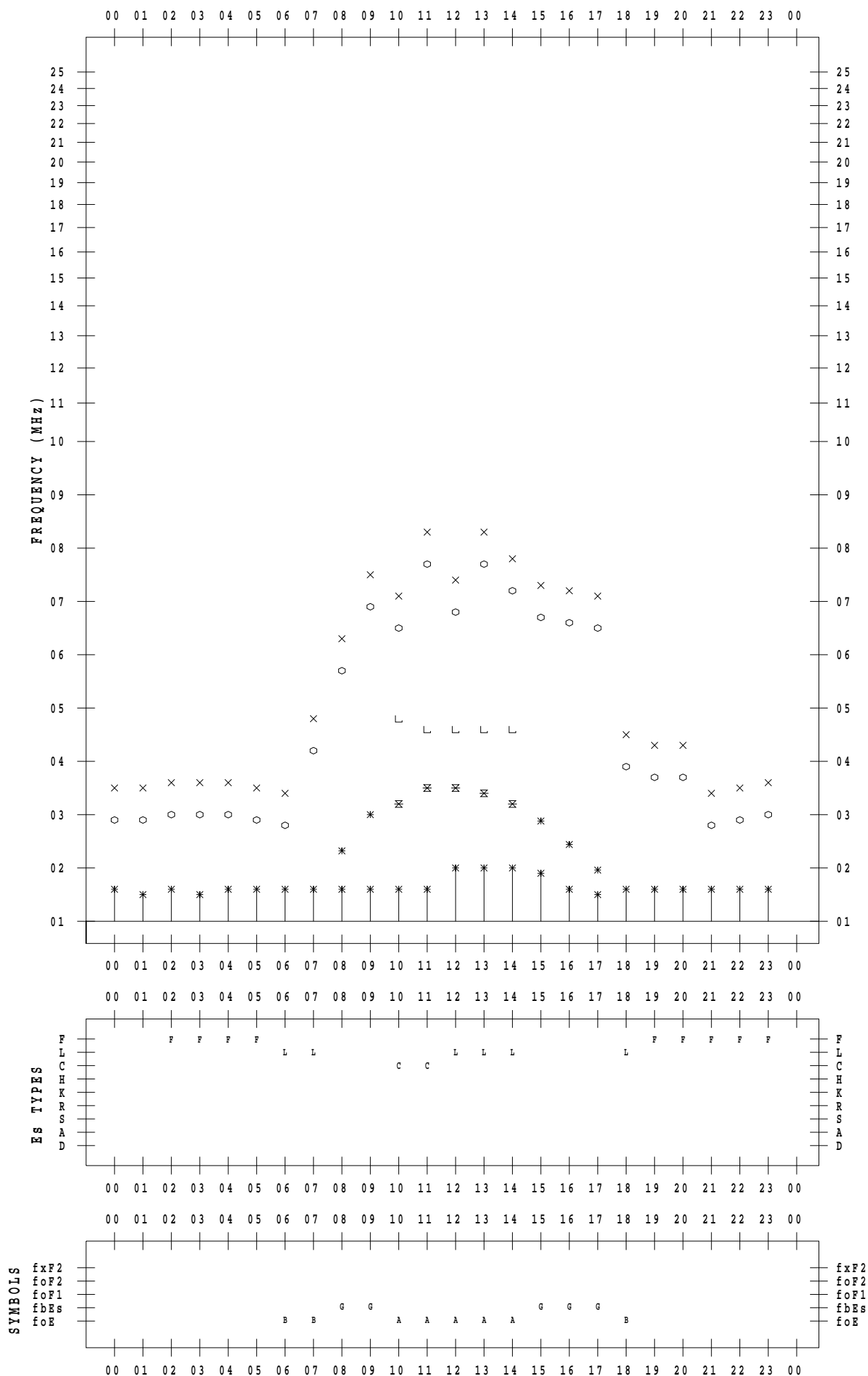
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/25

135 ° E MEAN TIME



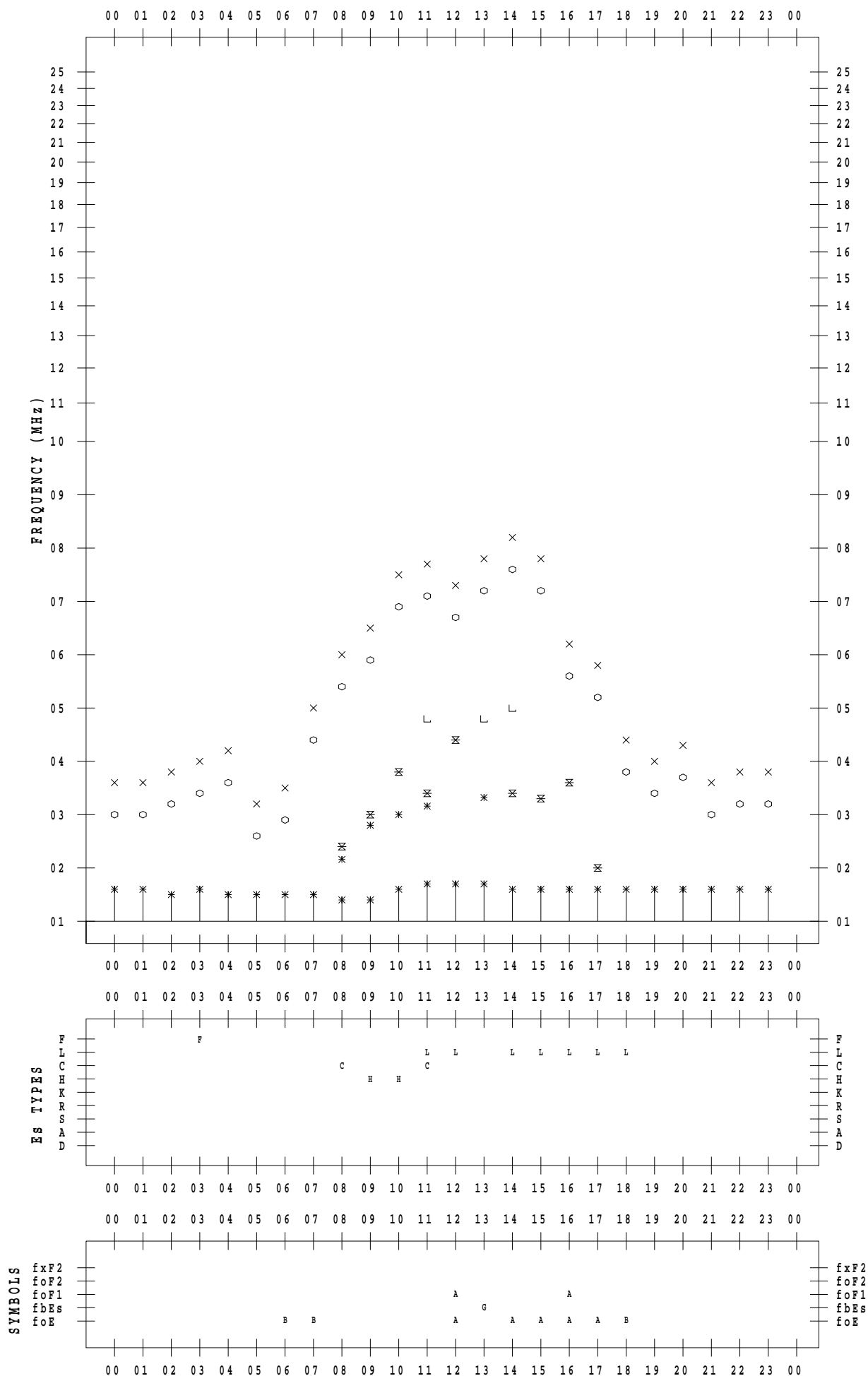
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/26

135 ° E MEAN TIME



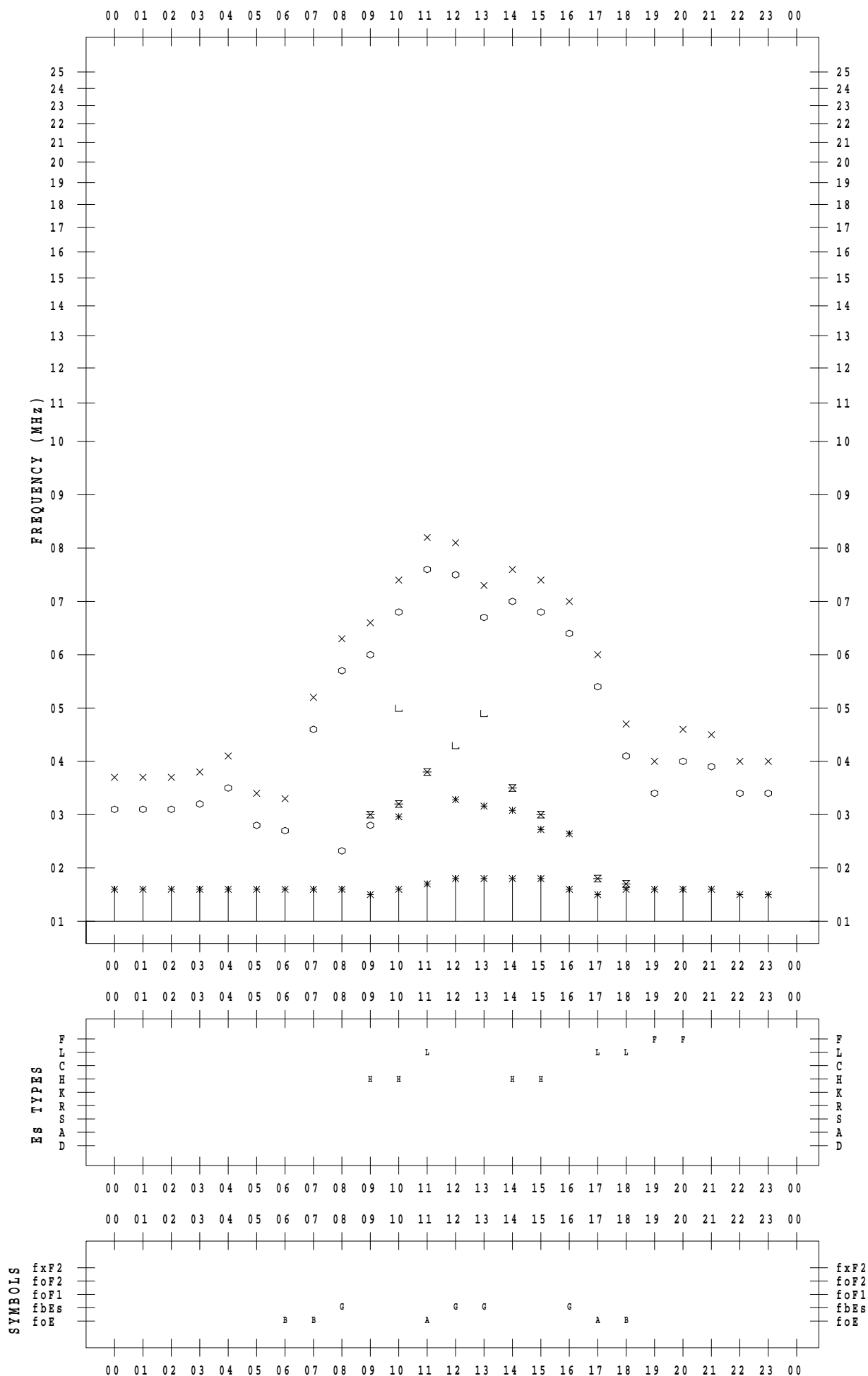
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/27

135 ° E MEAN TIME



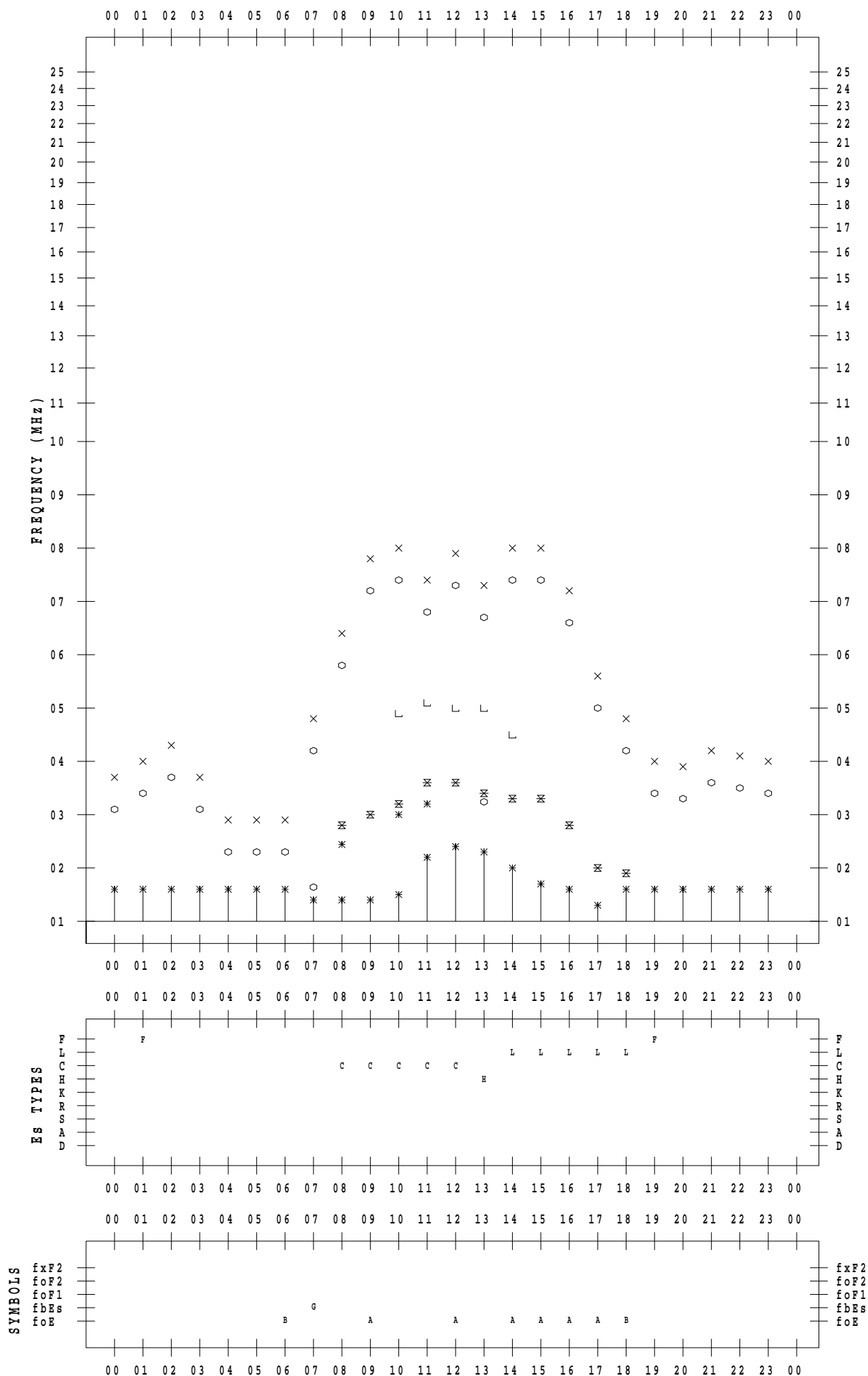
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/28

135 ° E MEAN TIME



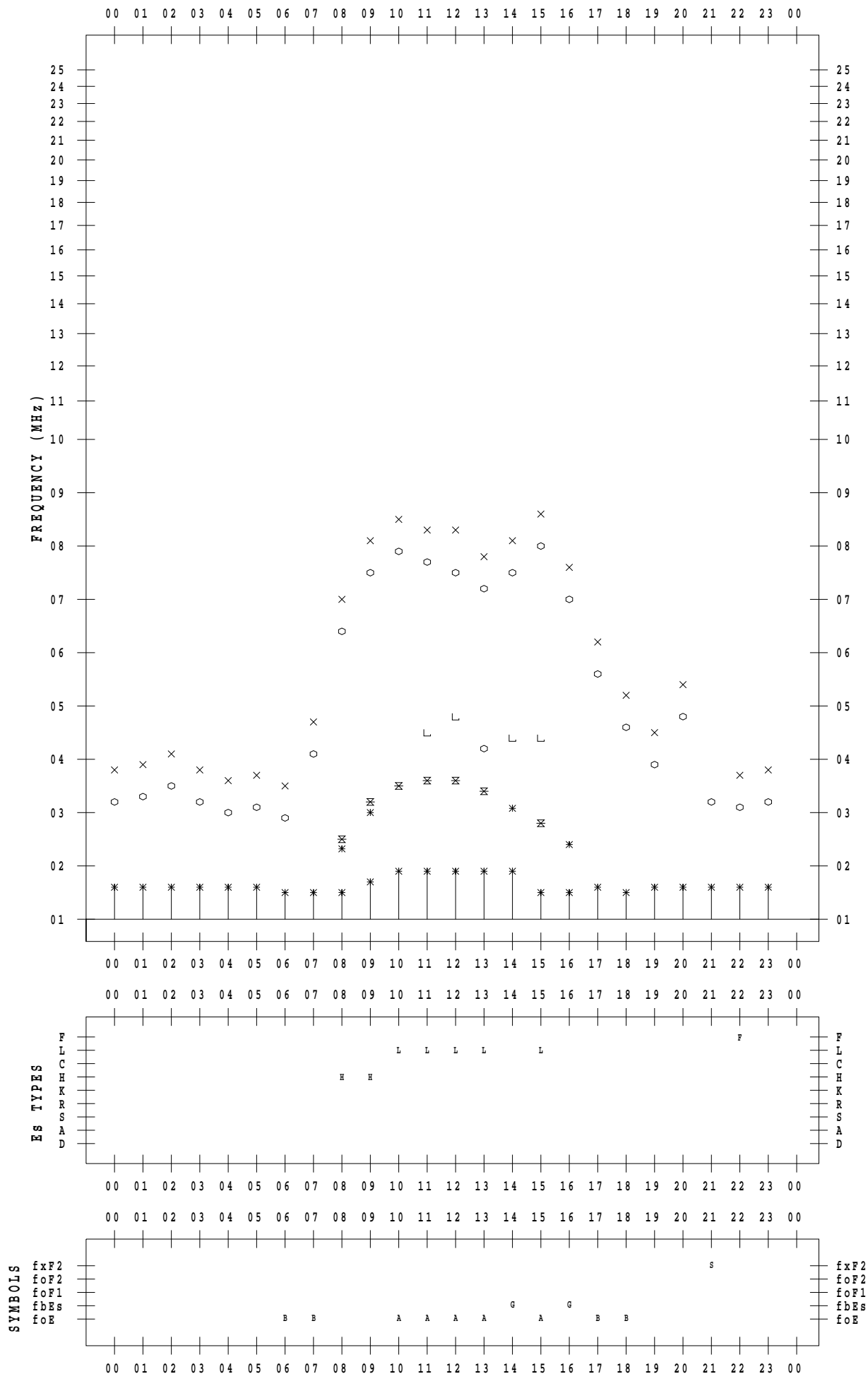
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/29

135 ° E MEAN TIME



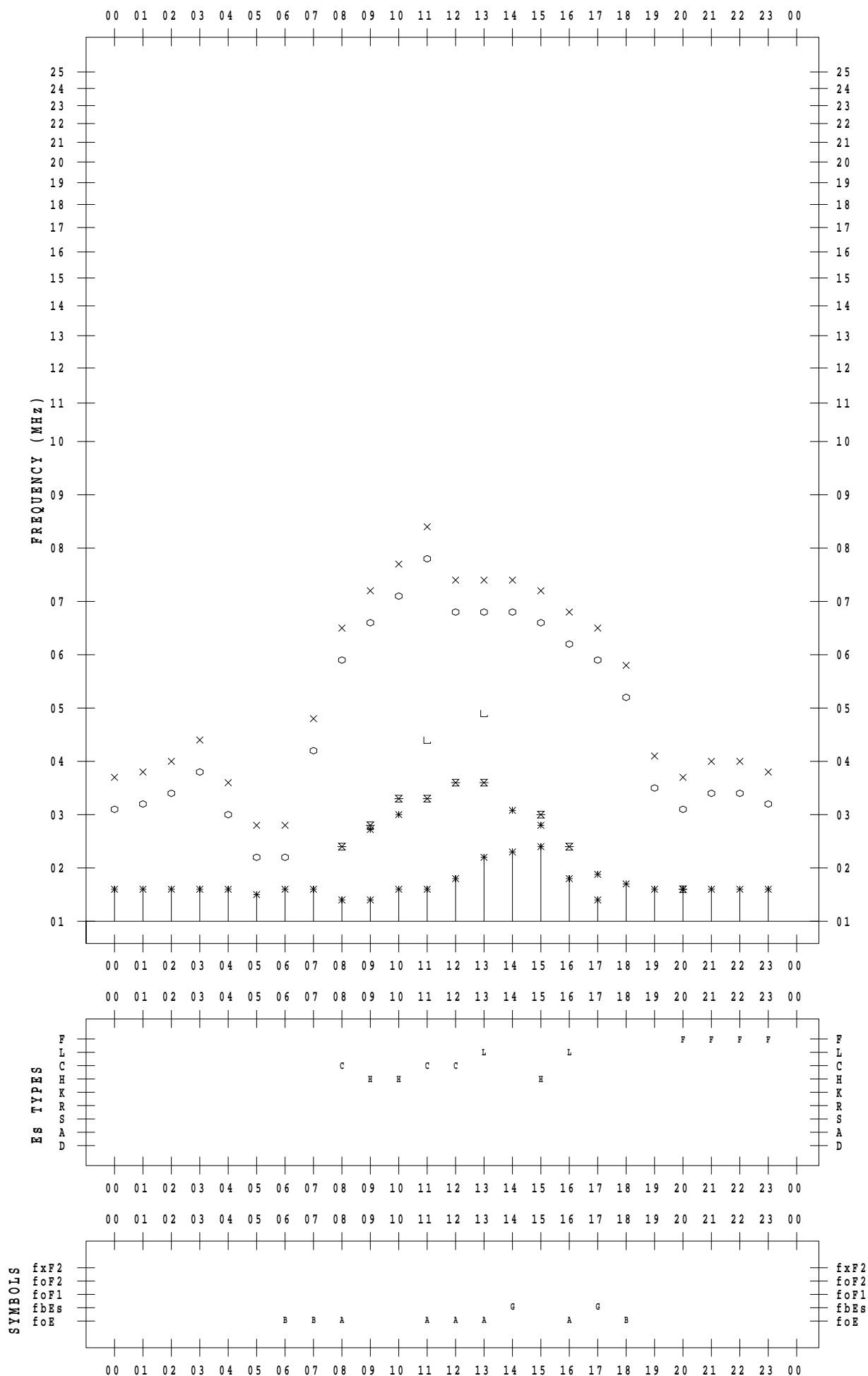
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/11/30

135 ° E MEAN TIME



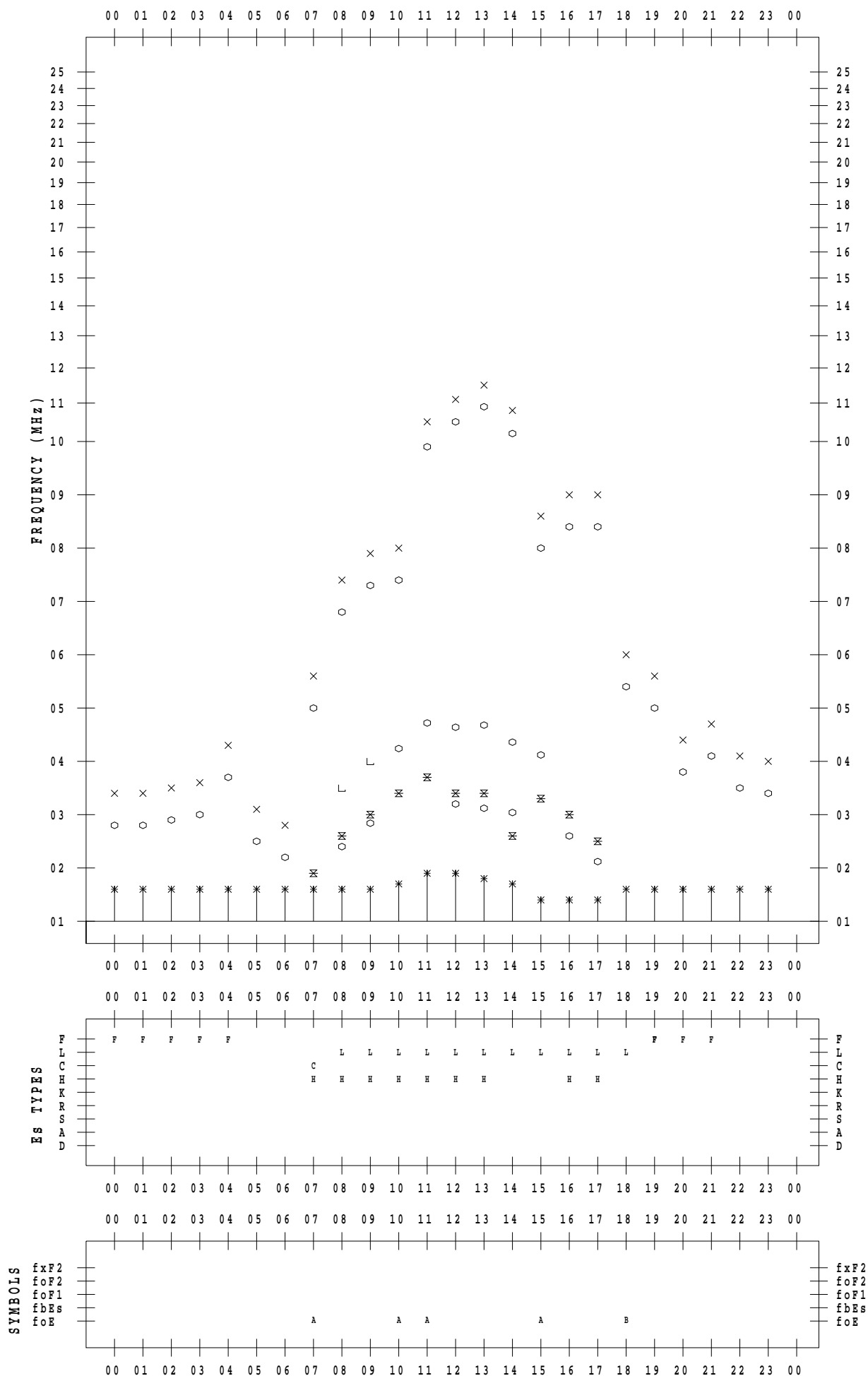
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/ 1

135 ° E MEAN TIME



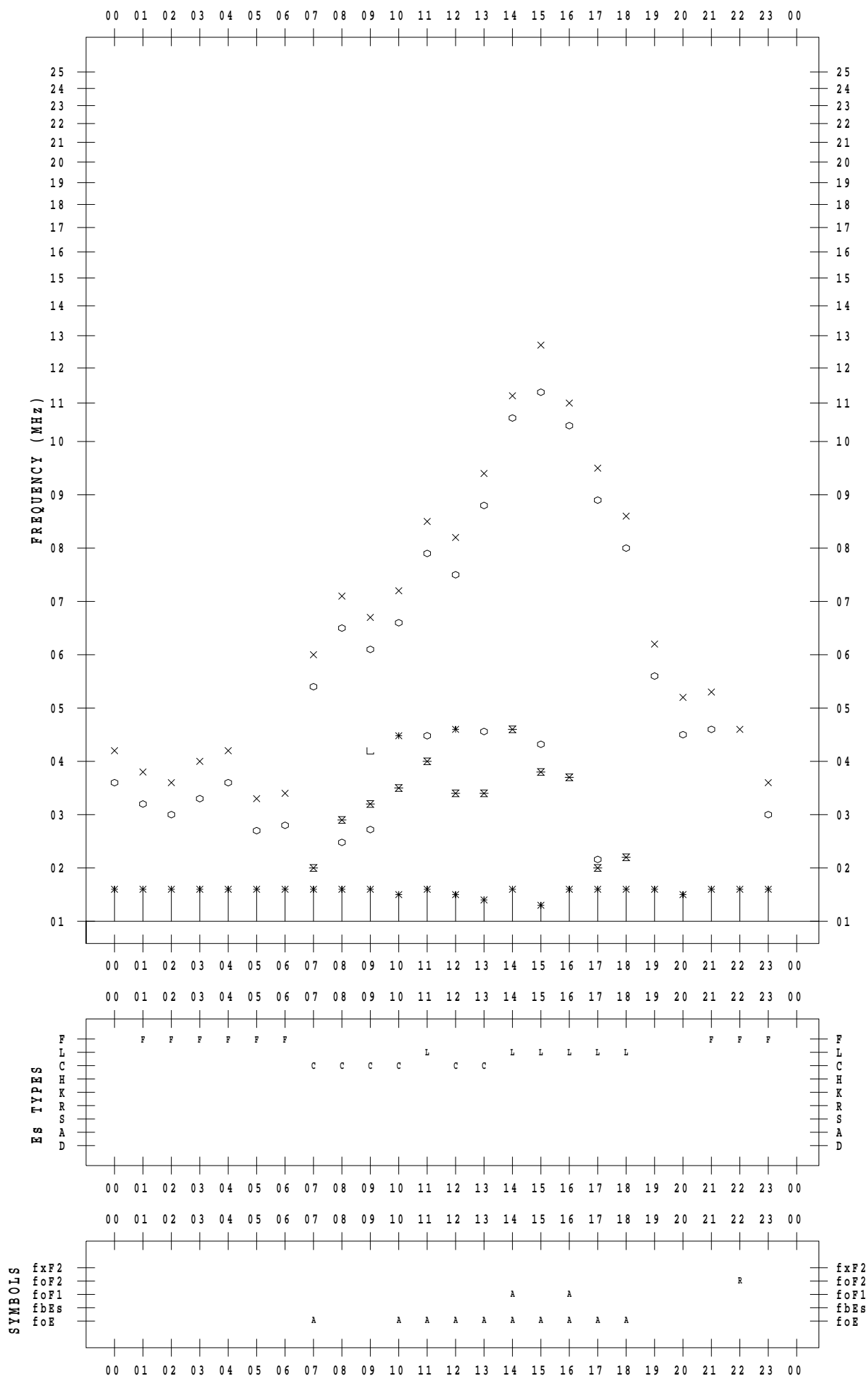
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/ 2

135 ° E MEAN TIME





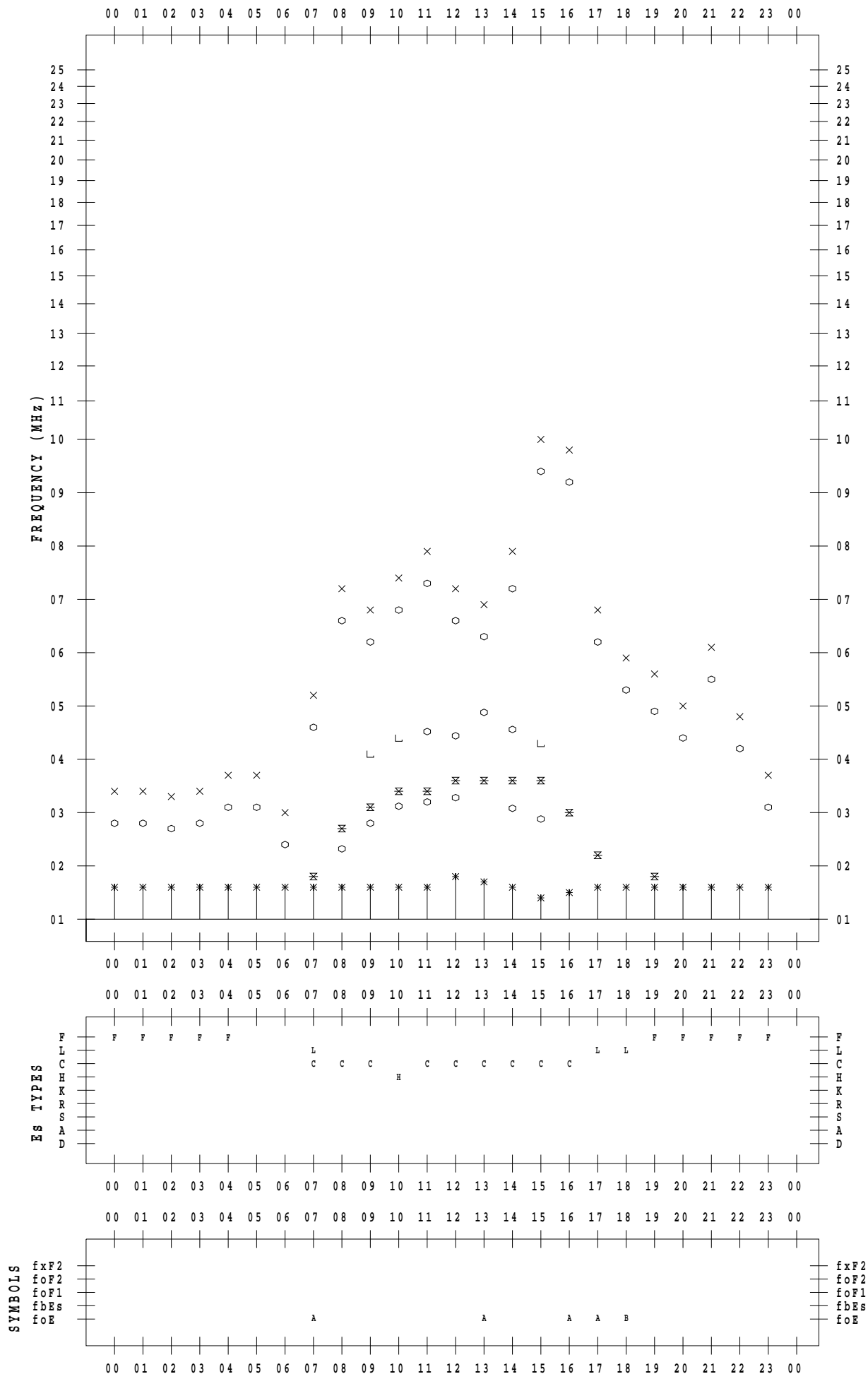
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/ 3

135 ° E MEAN TIME



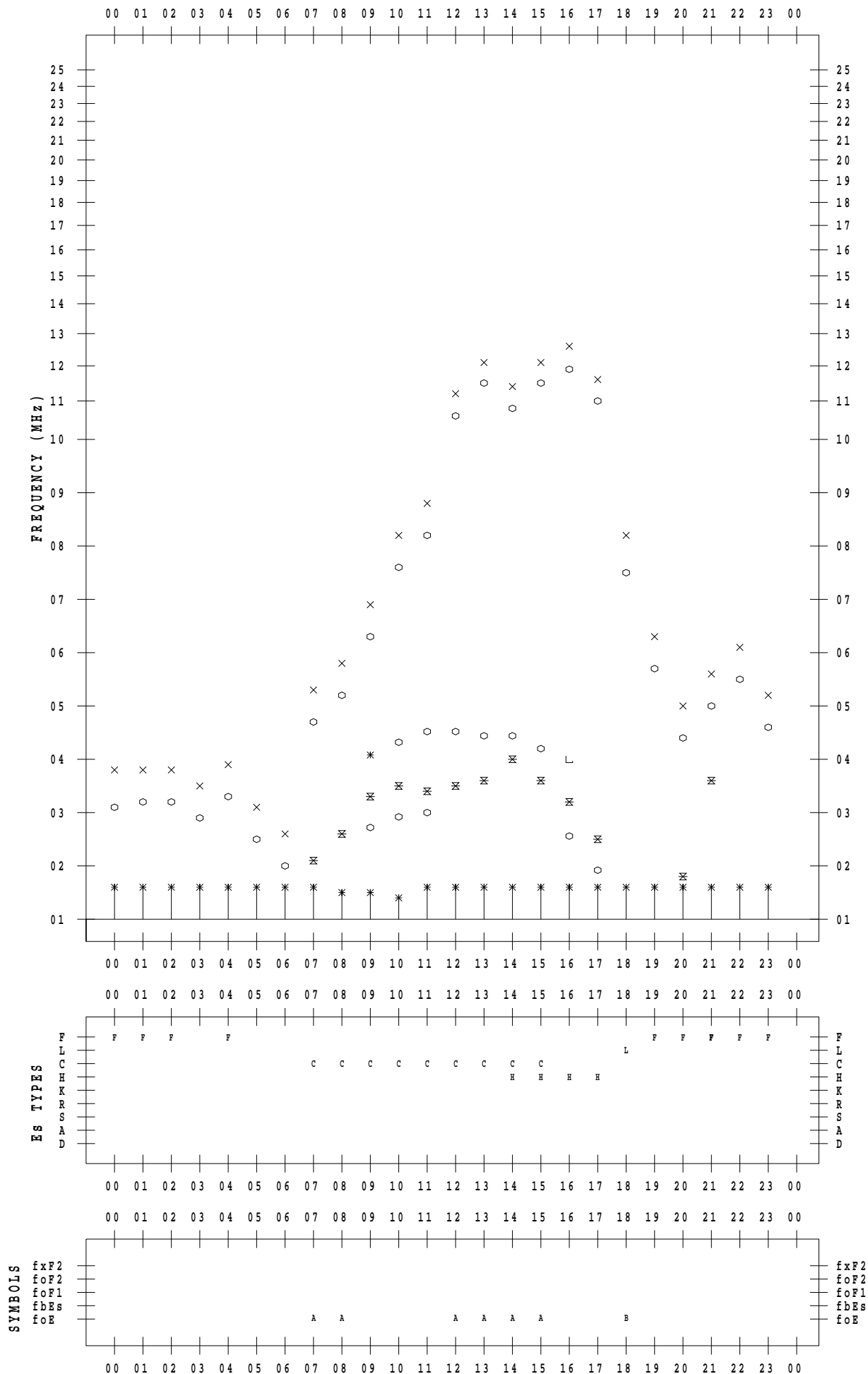
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/ 4

135 ° E MEAN TIME



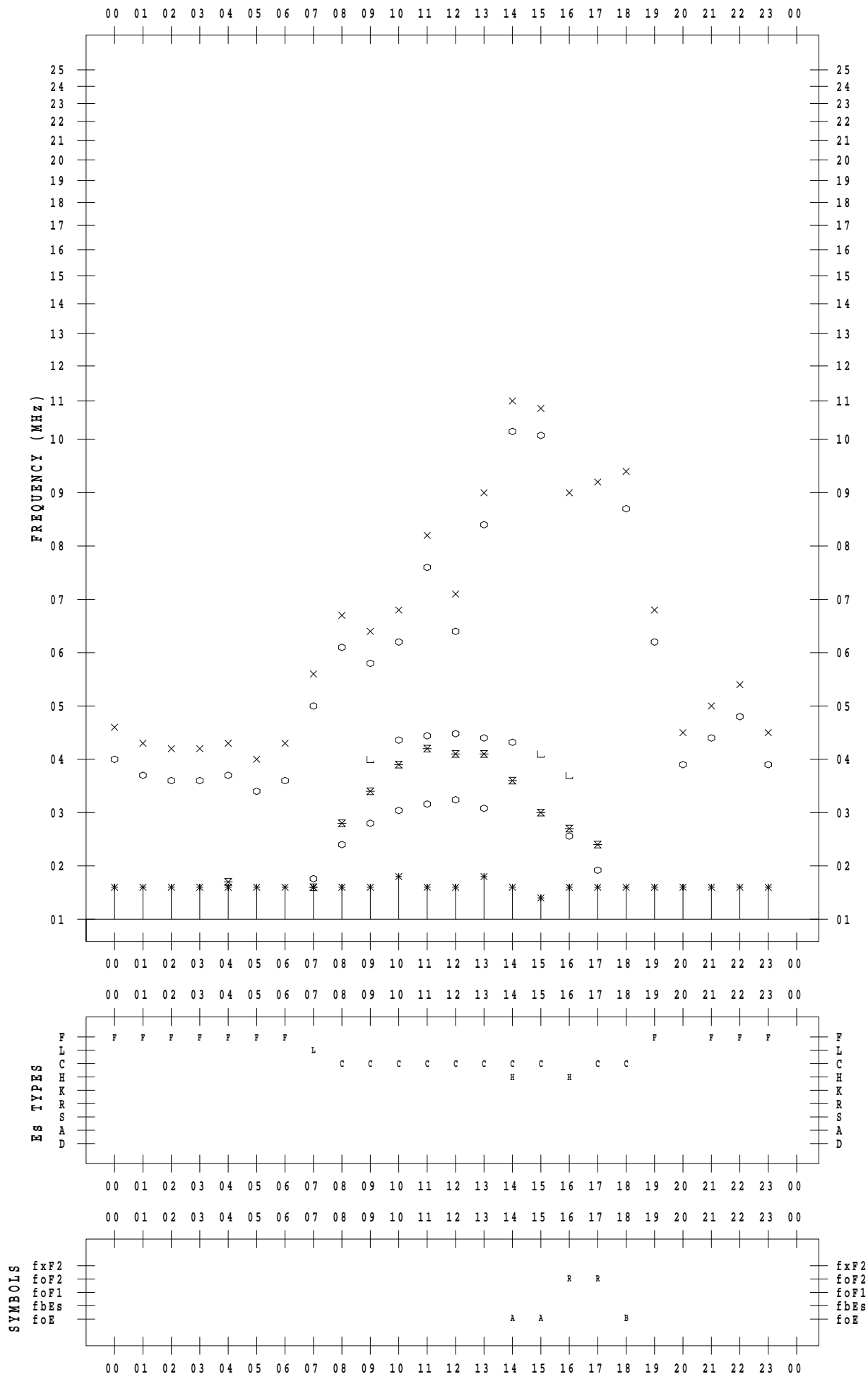
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/ 5

135 ° E MEAN TIME



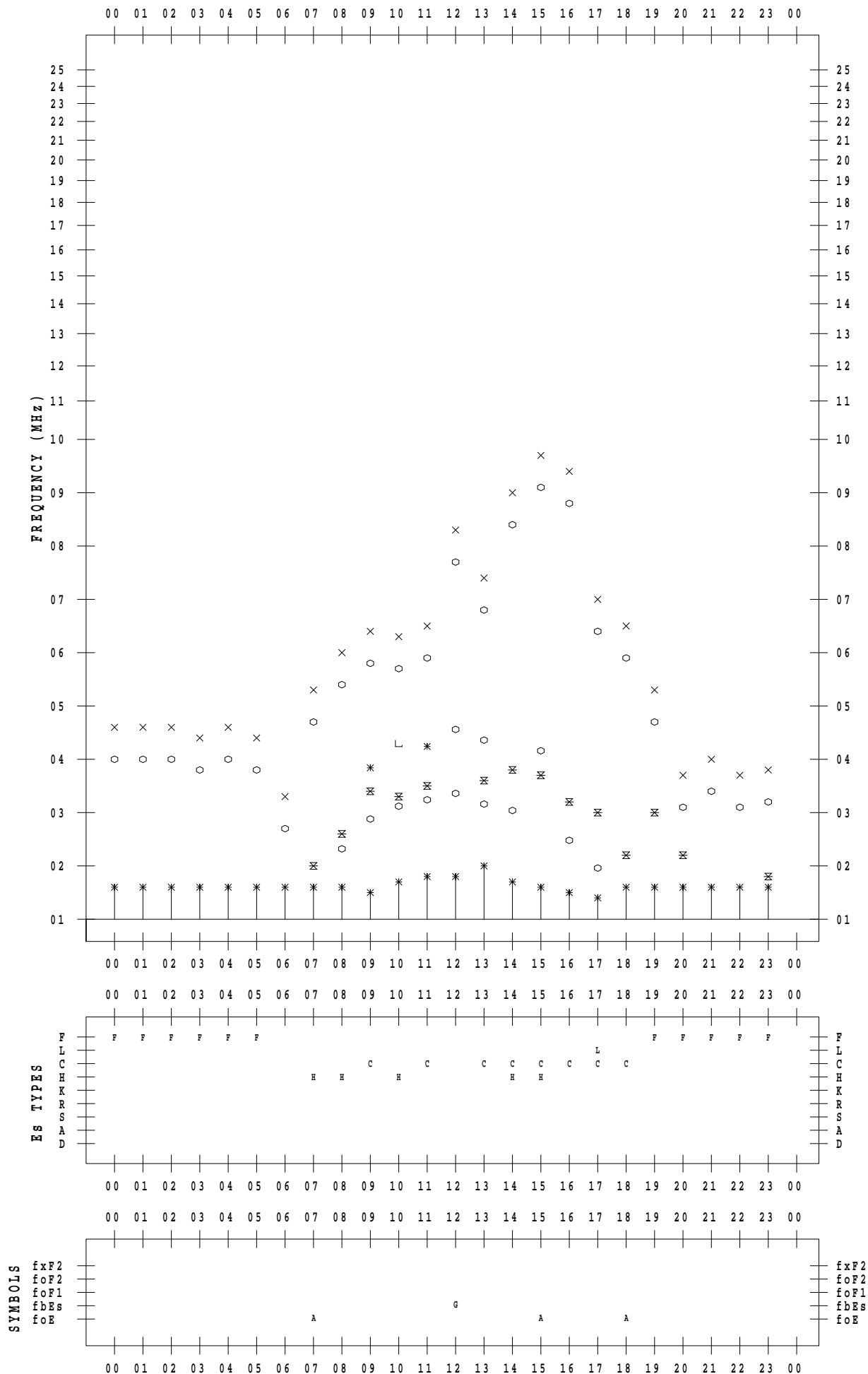
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/ 6

135 ° E MEAN TIME



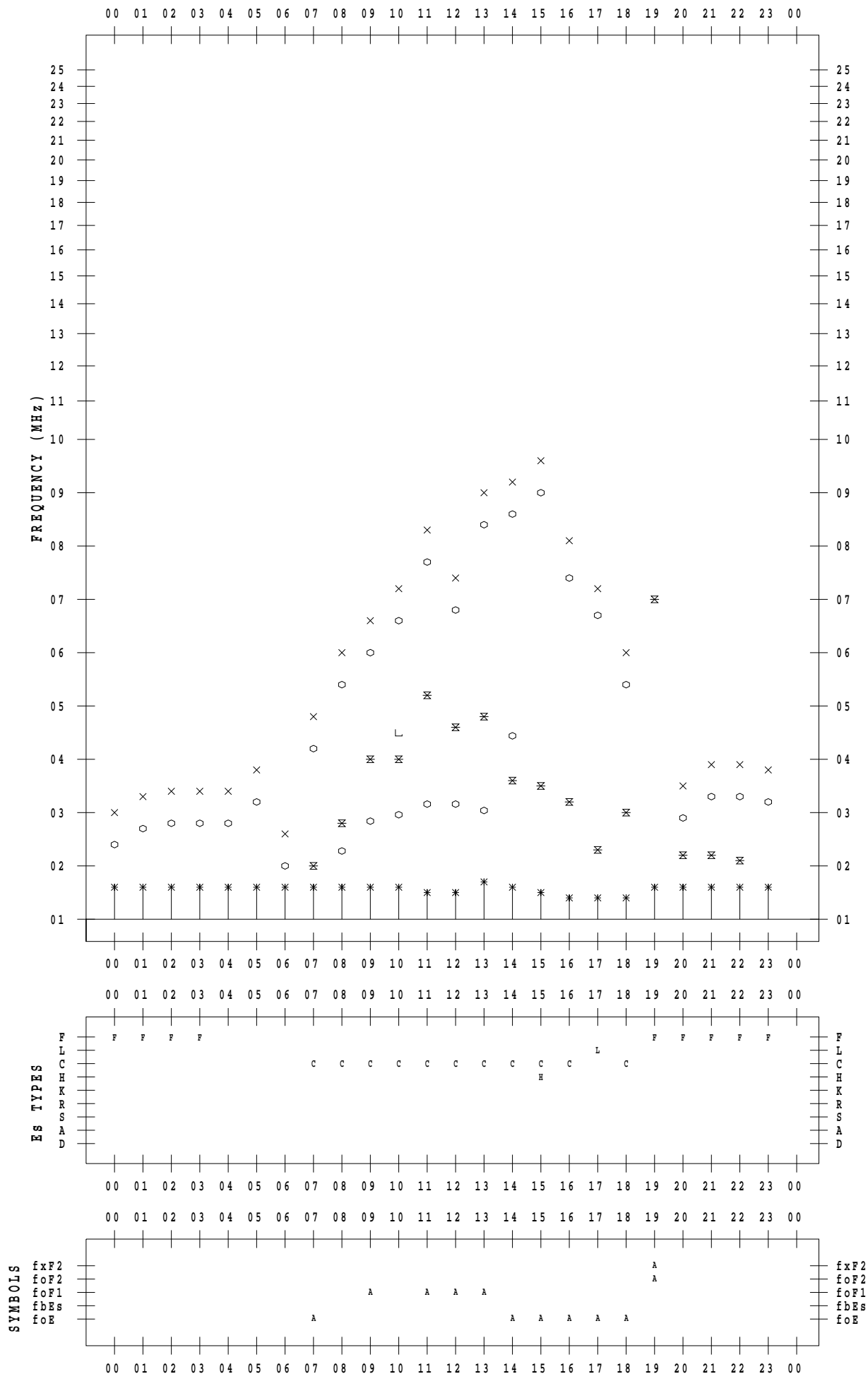
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/ 7

135 ° E MEAN TIME



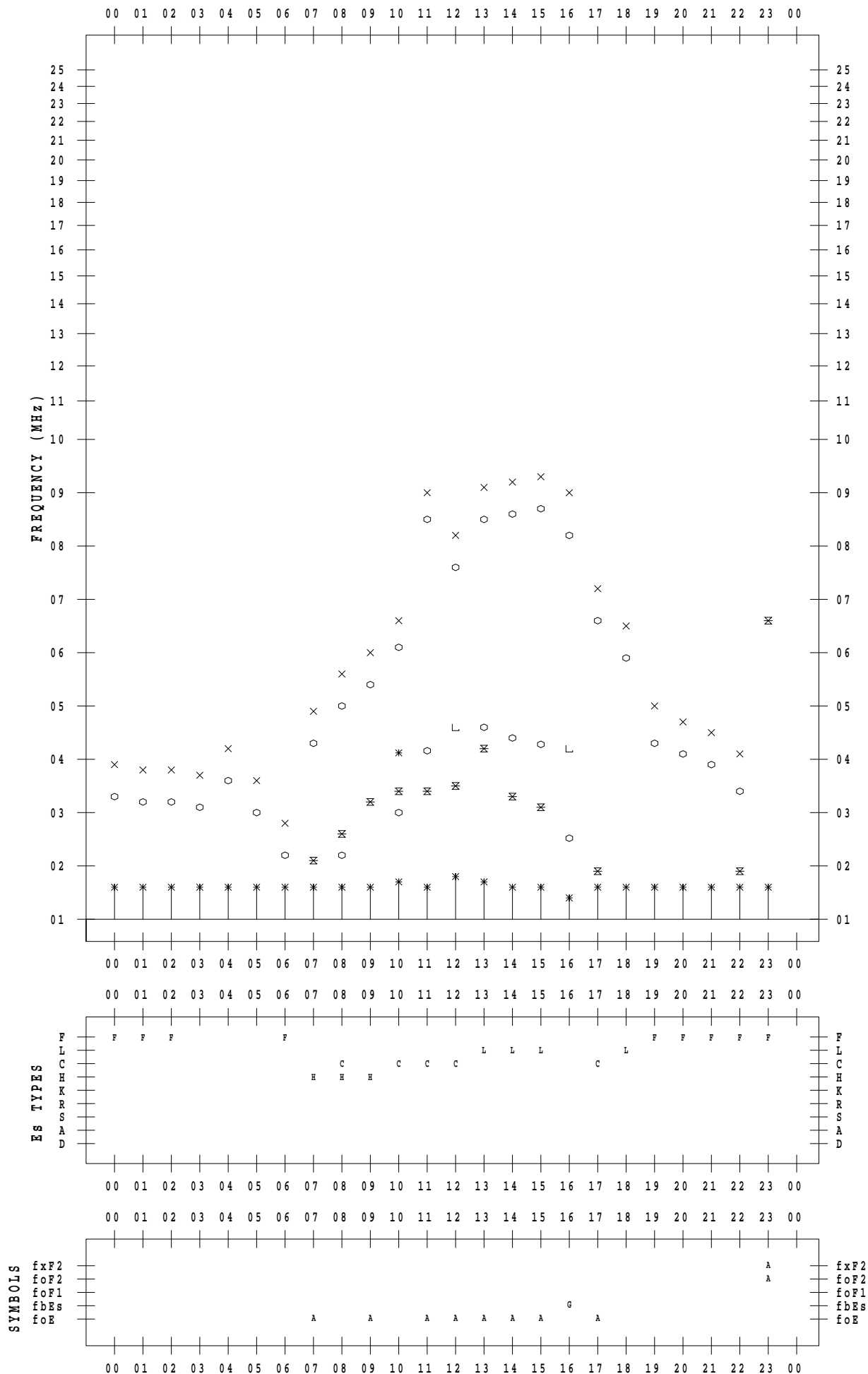
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/ 8

135 ° E MEAN TIME



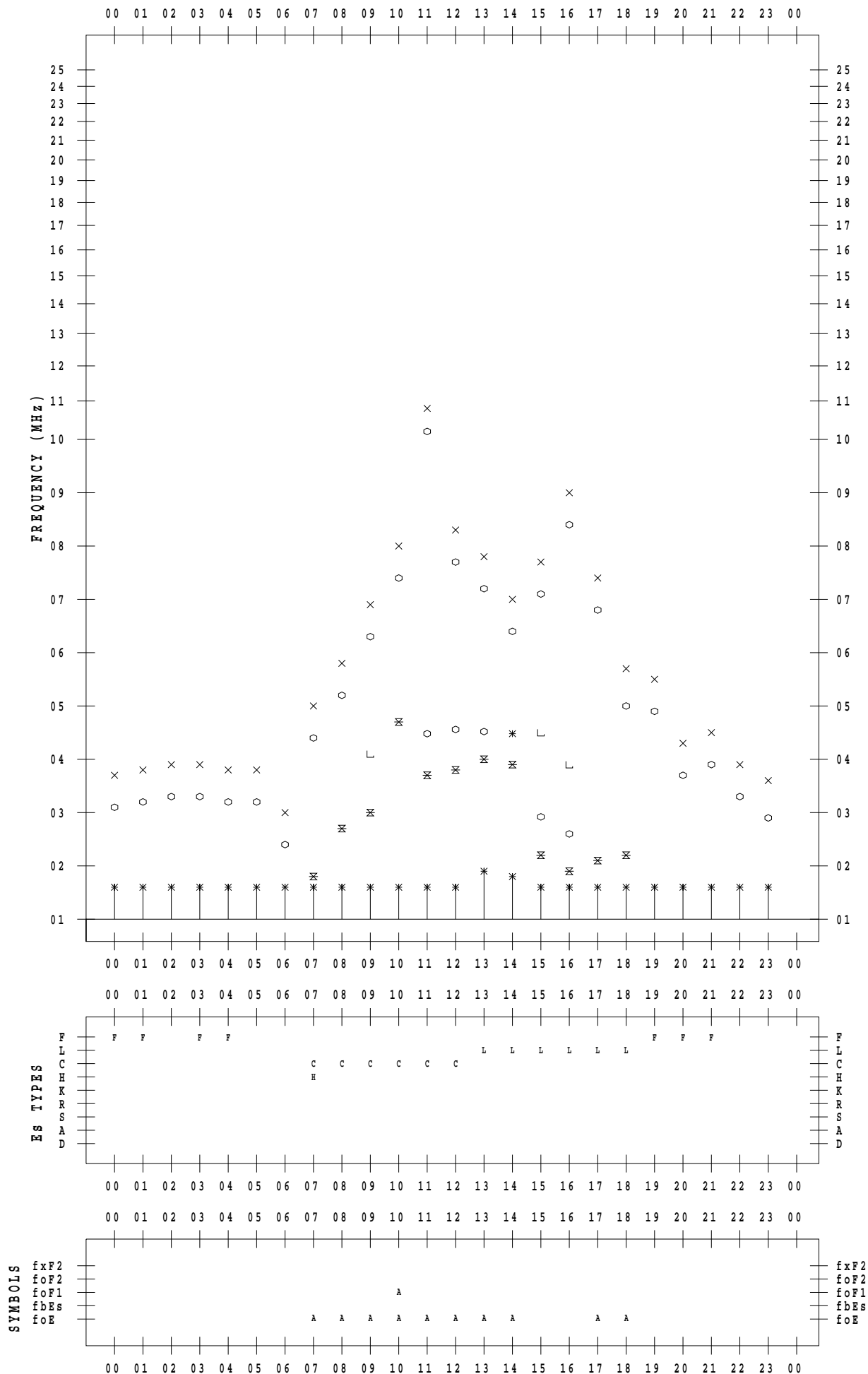
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/ 9

135 ° E MEAN TIME



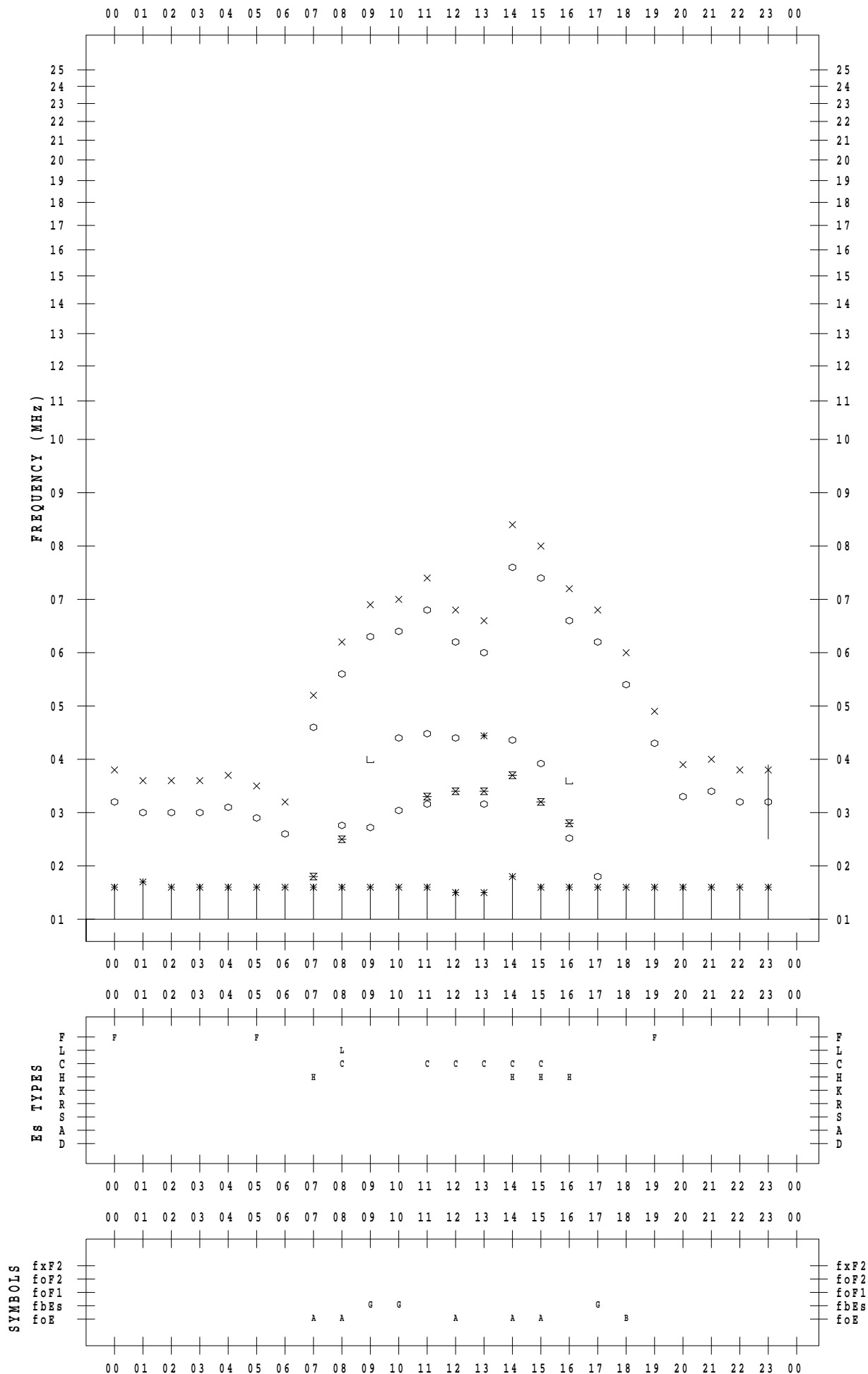
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/10

135 ° E MEAN TIME





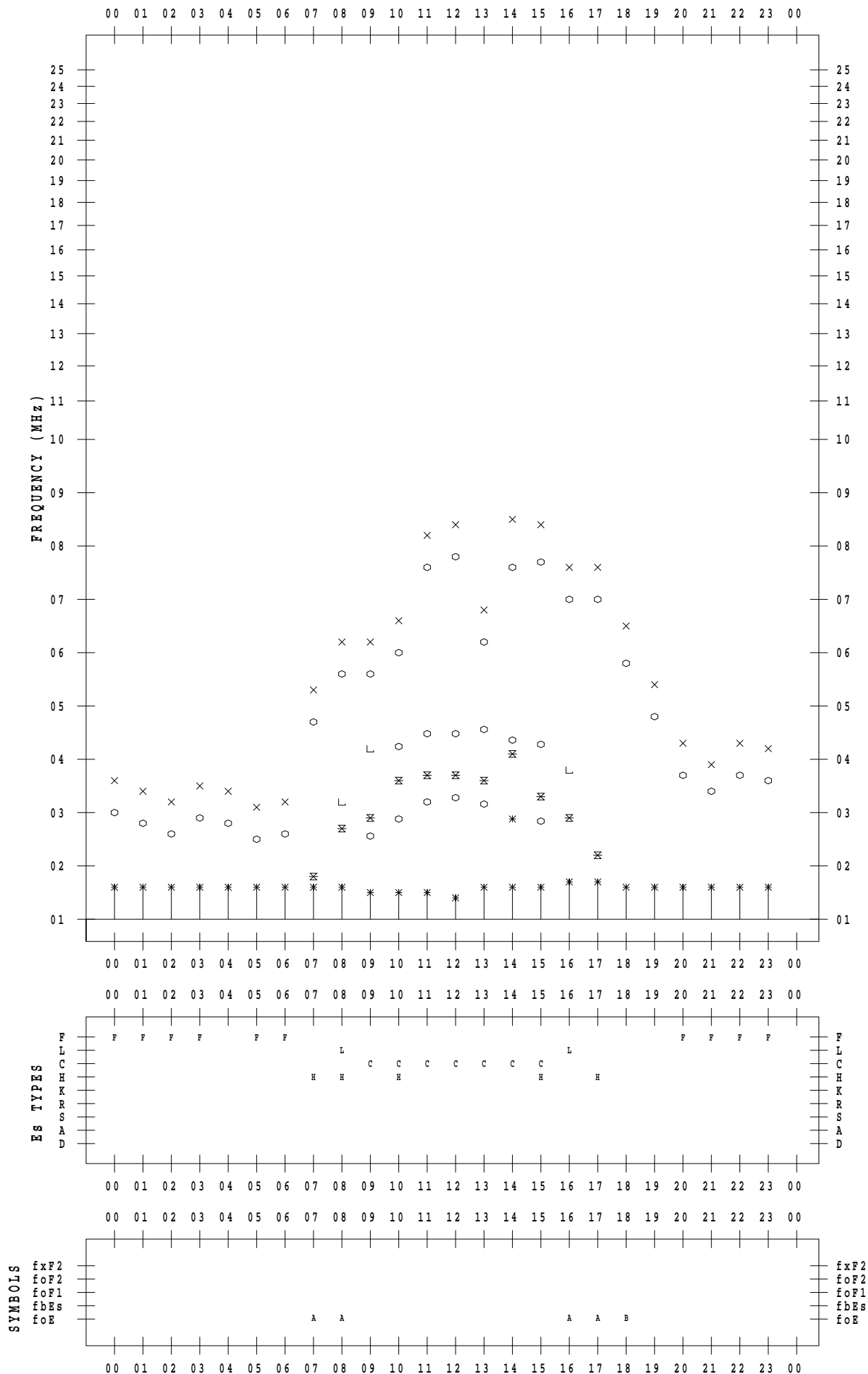
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/11

135 ° E MEAN TIME



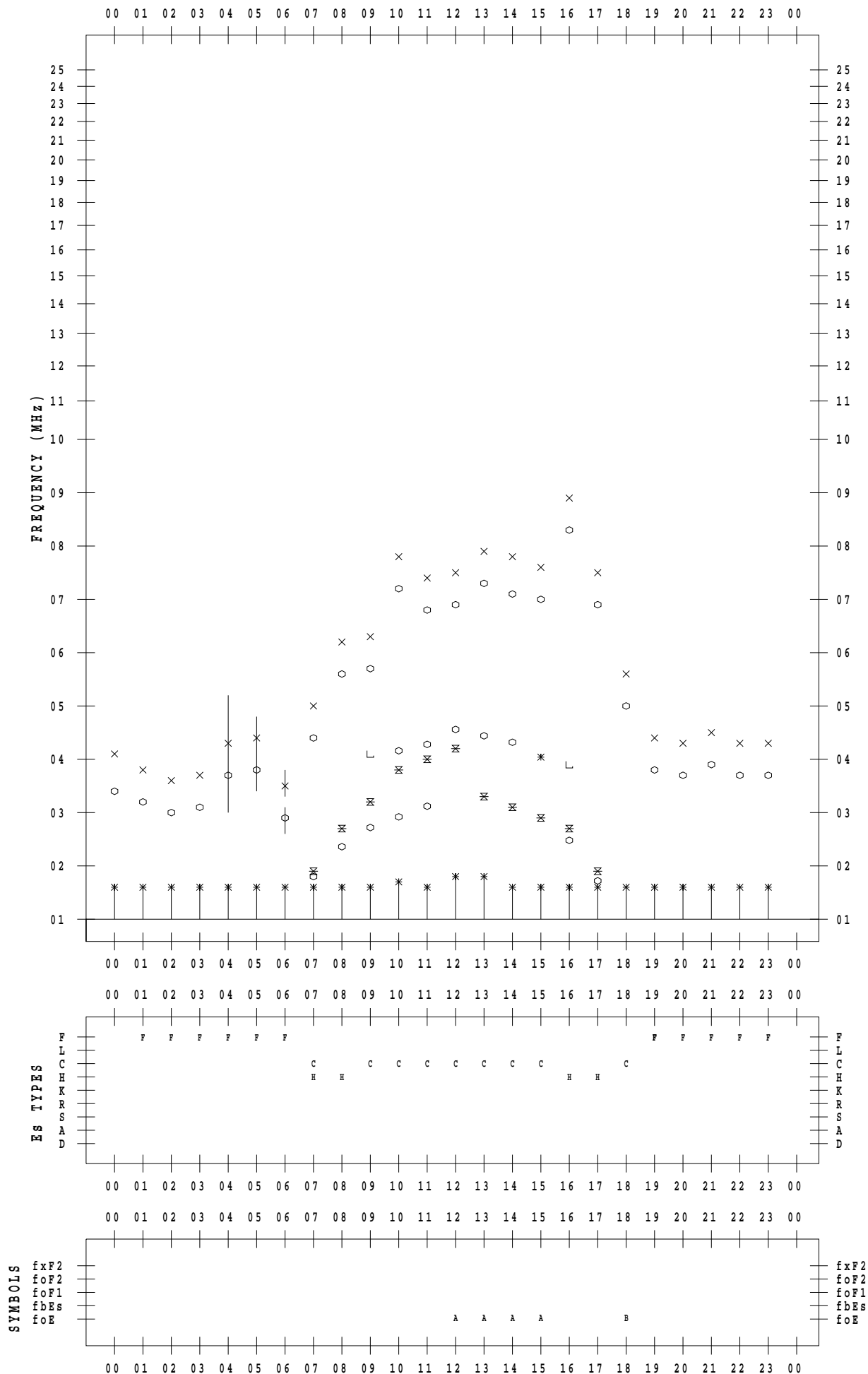
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/12

135 ° E MEAN TIME



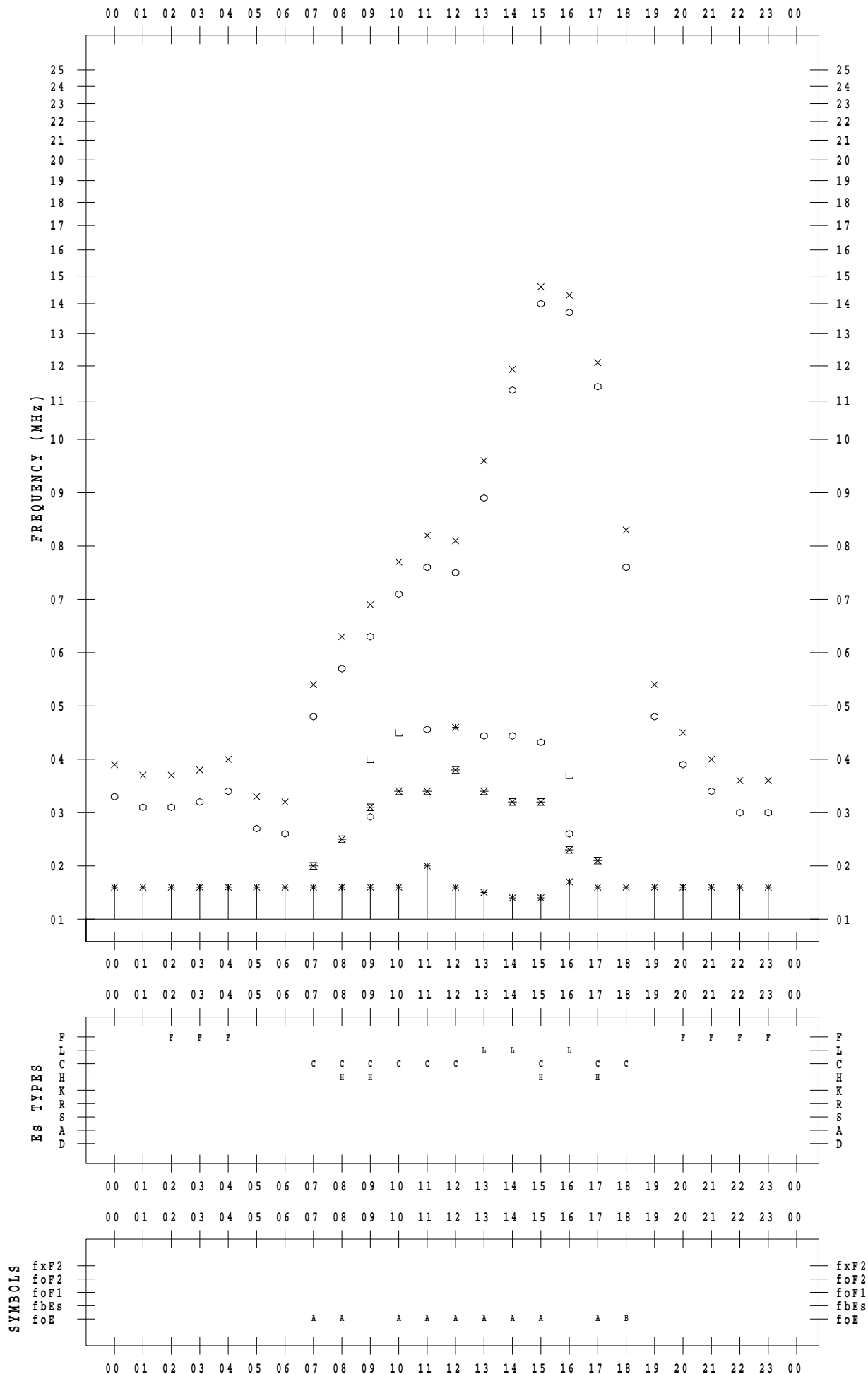
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/13

135 ° E MEAN TIME



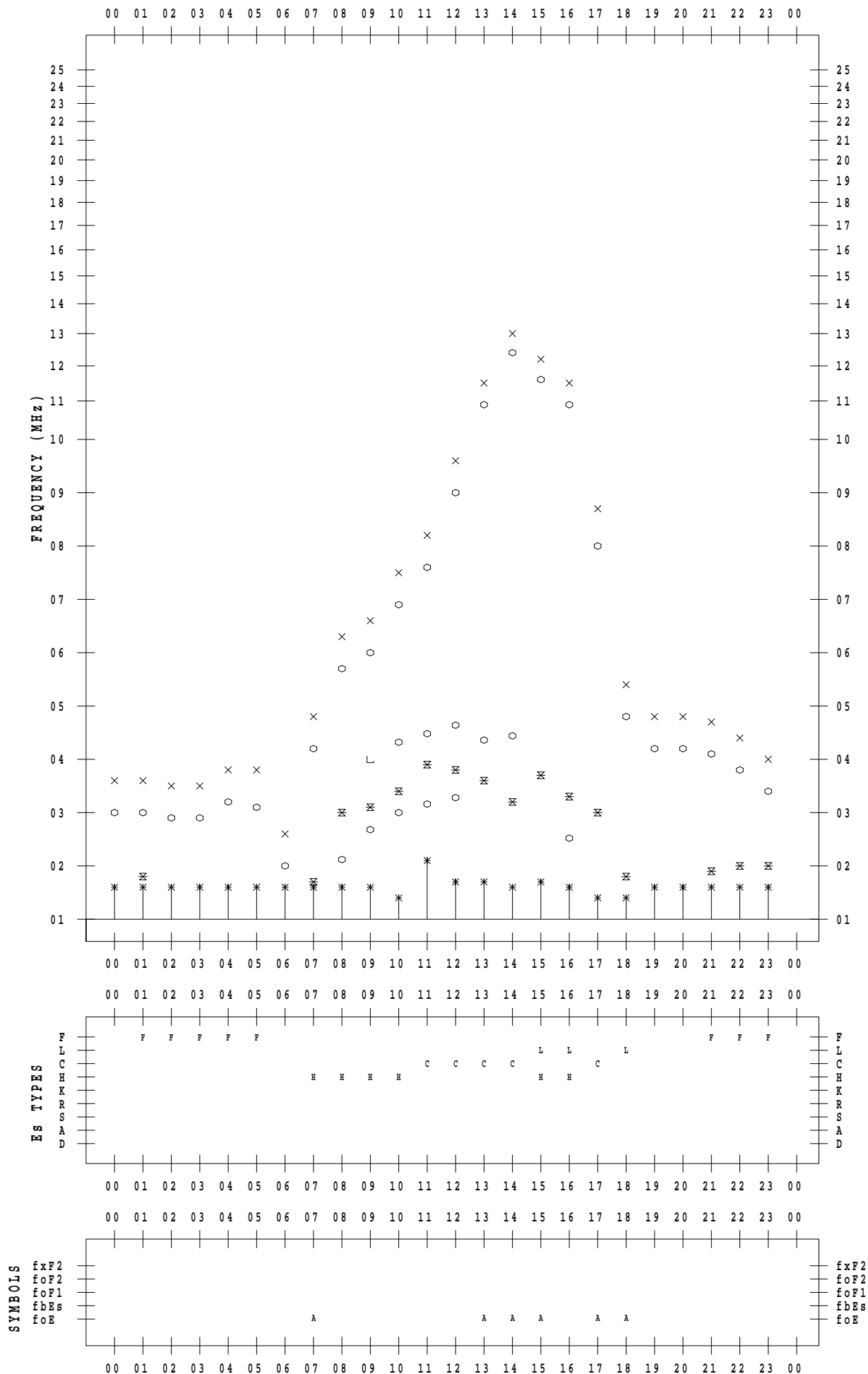
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/14

135 ° E MEAN TIME



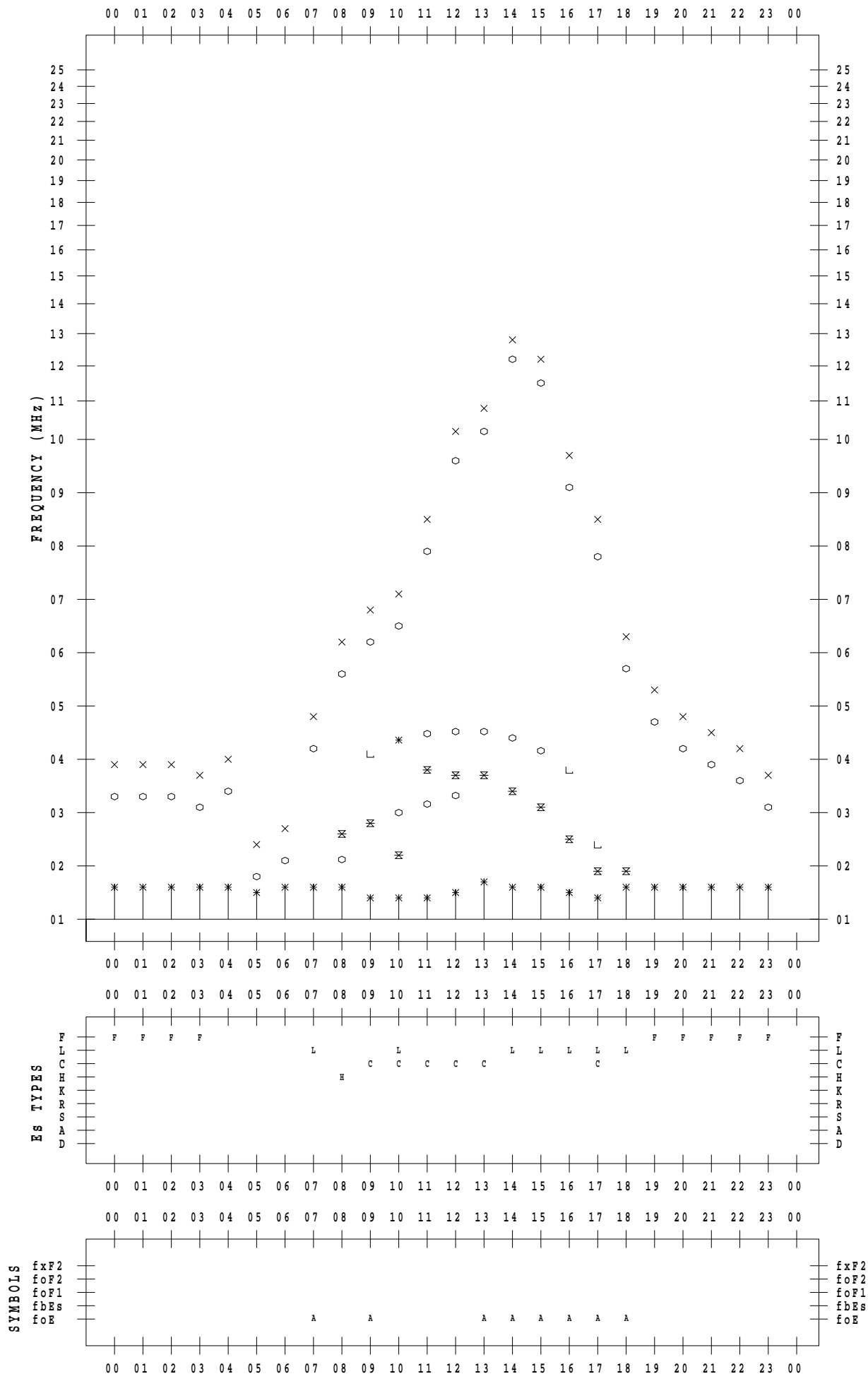
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/15

135 ° E MEAN TIME



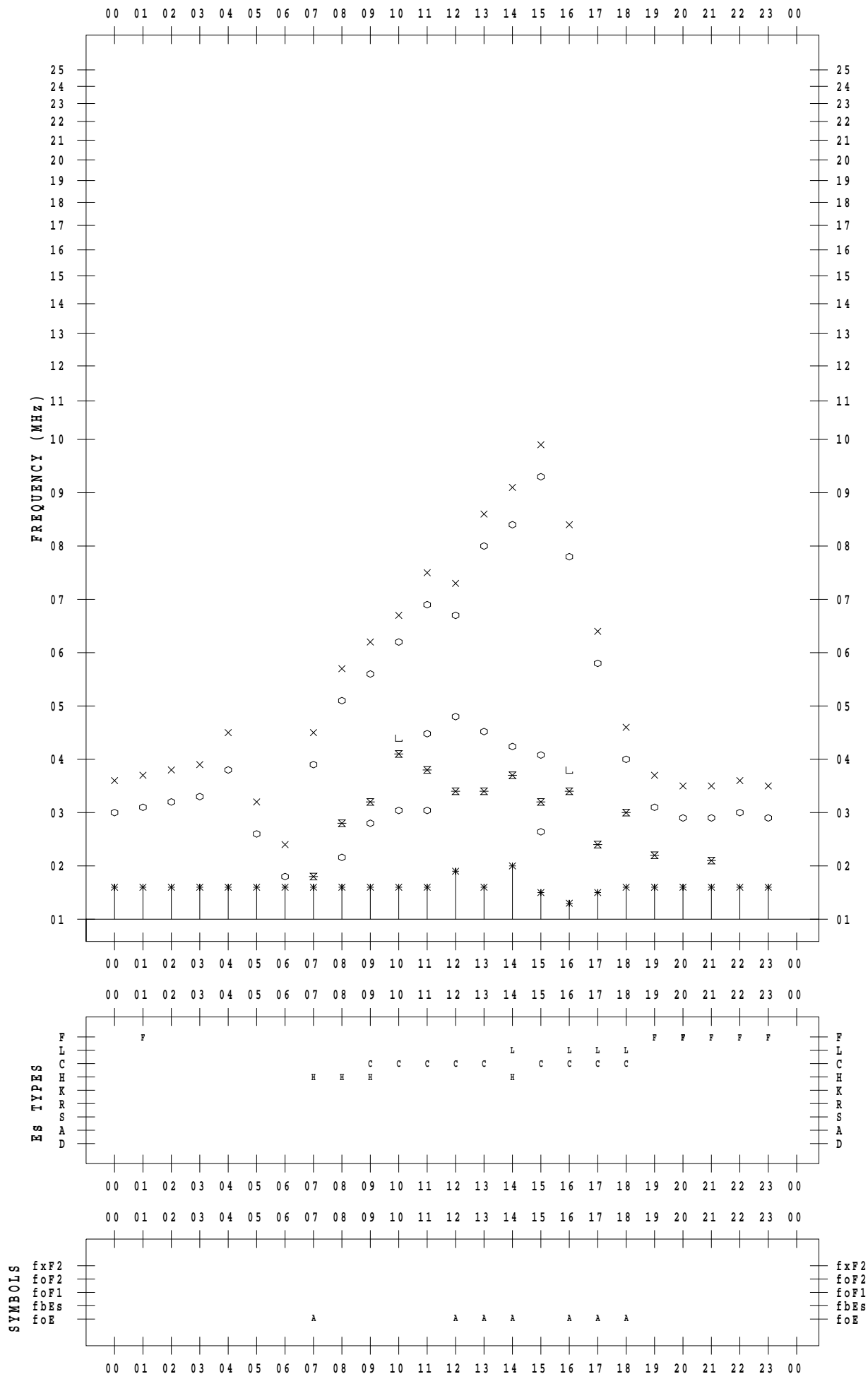
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/16

135 ° E MEAN TIME



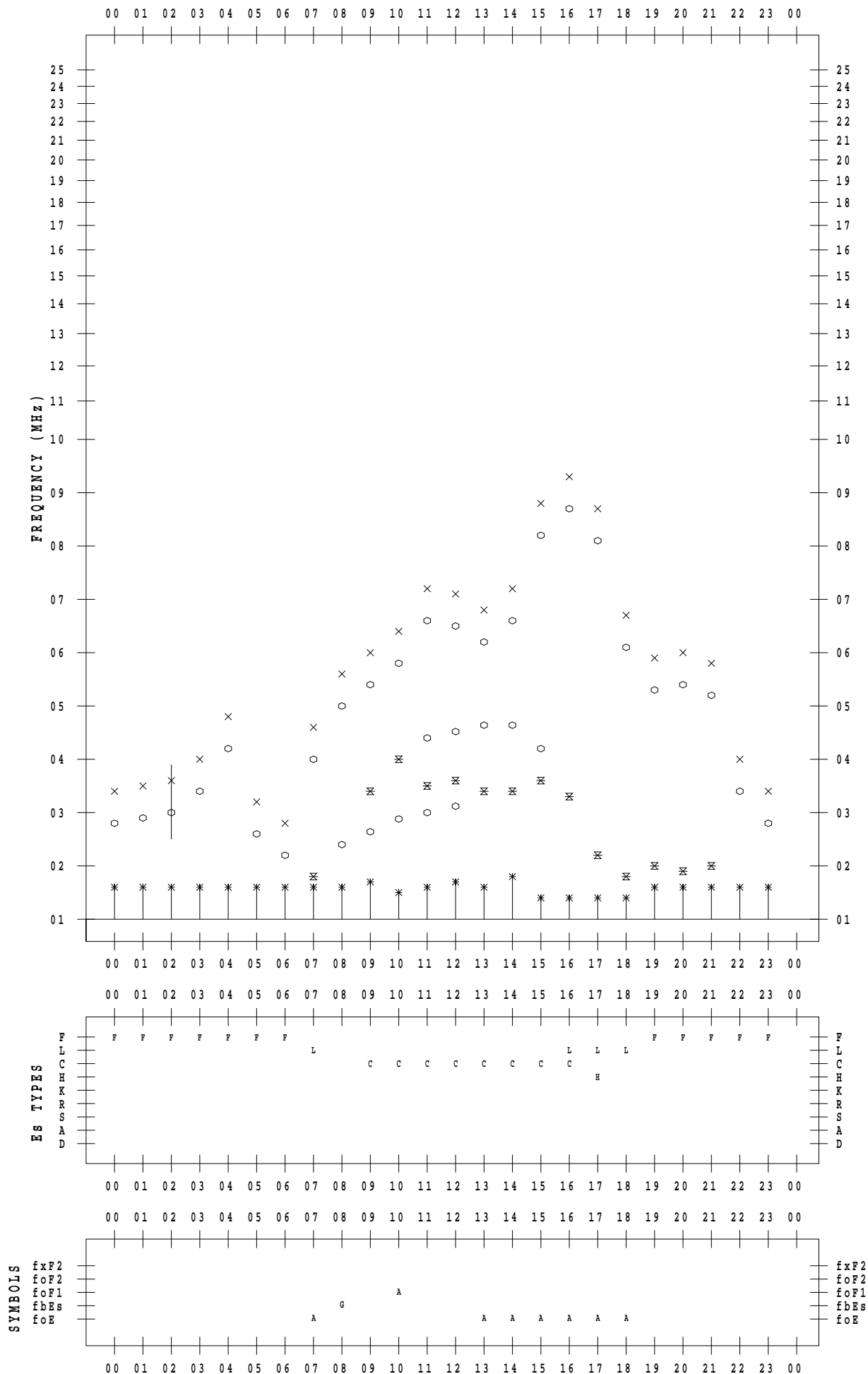
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/17

135 ° E MEAN TIME



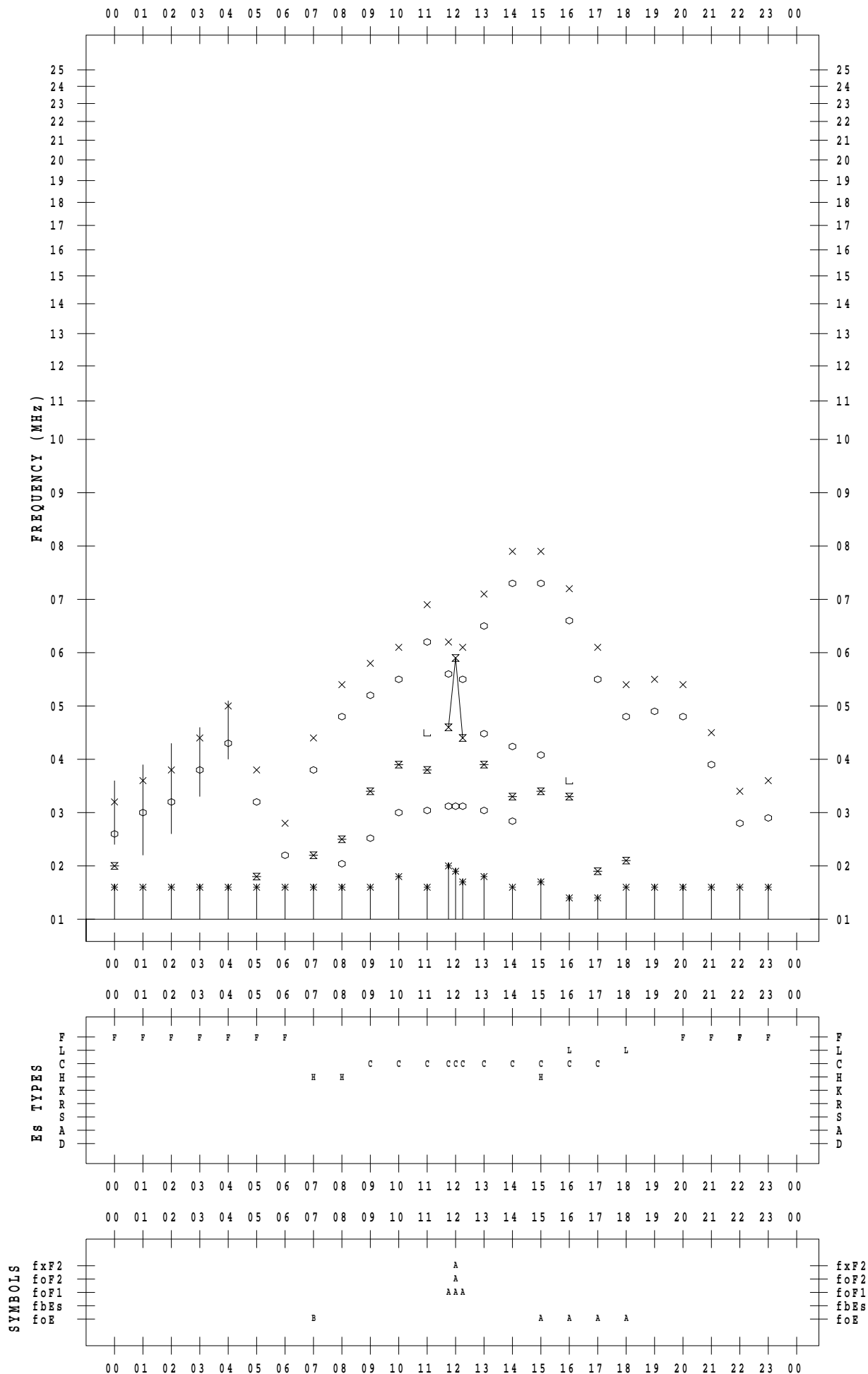
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/18

135 ° E MEAN TIME





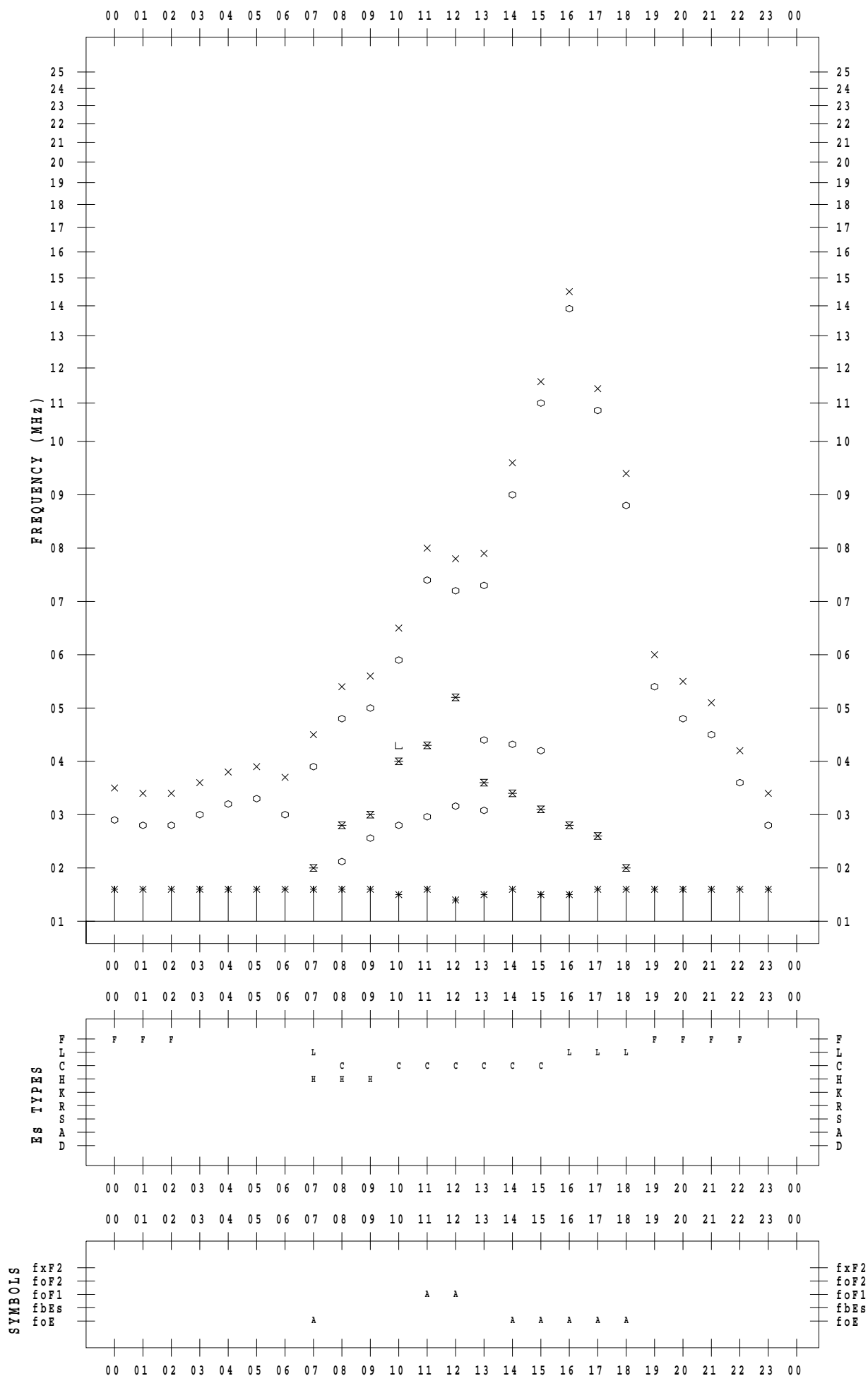
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/19

135 ° E MEAN TIME



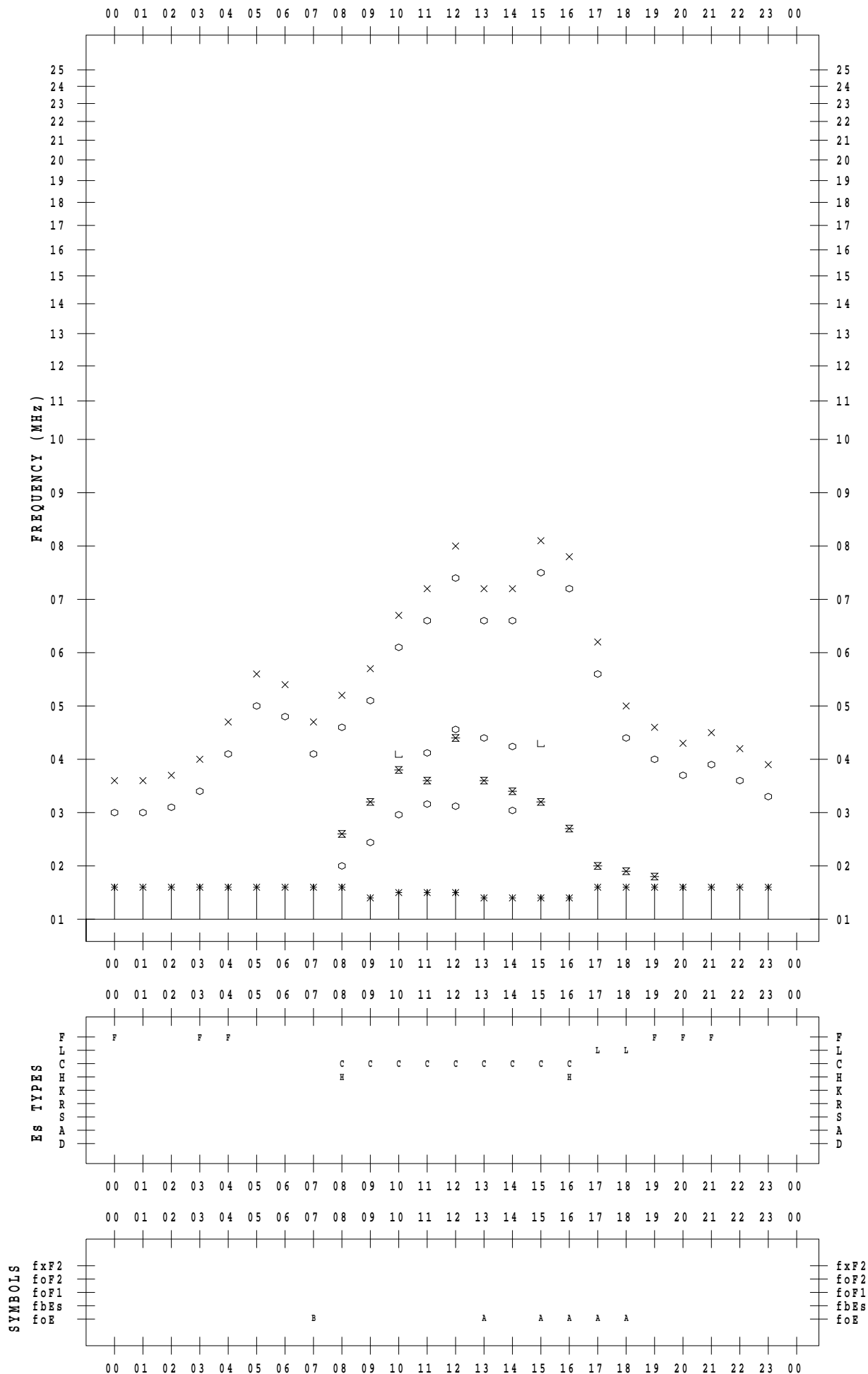
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/20

135 ° E MEAN TIME



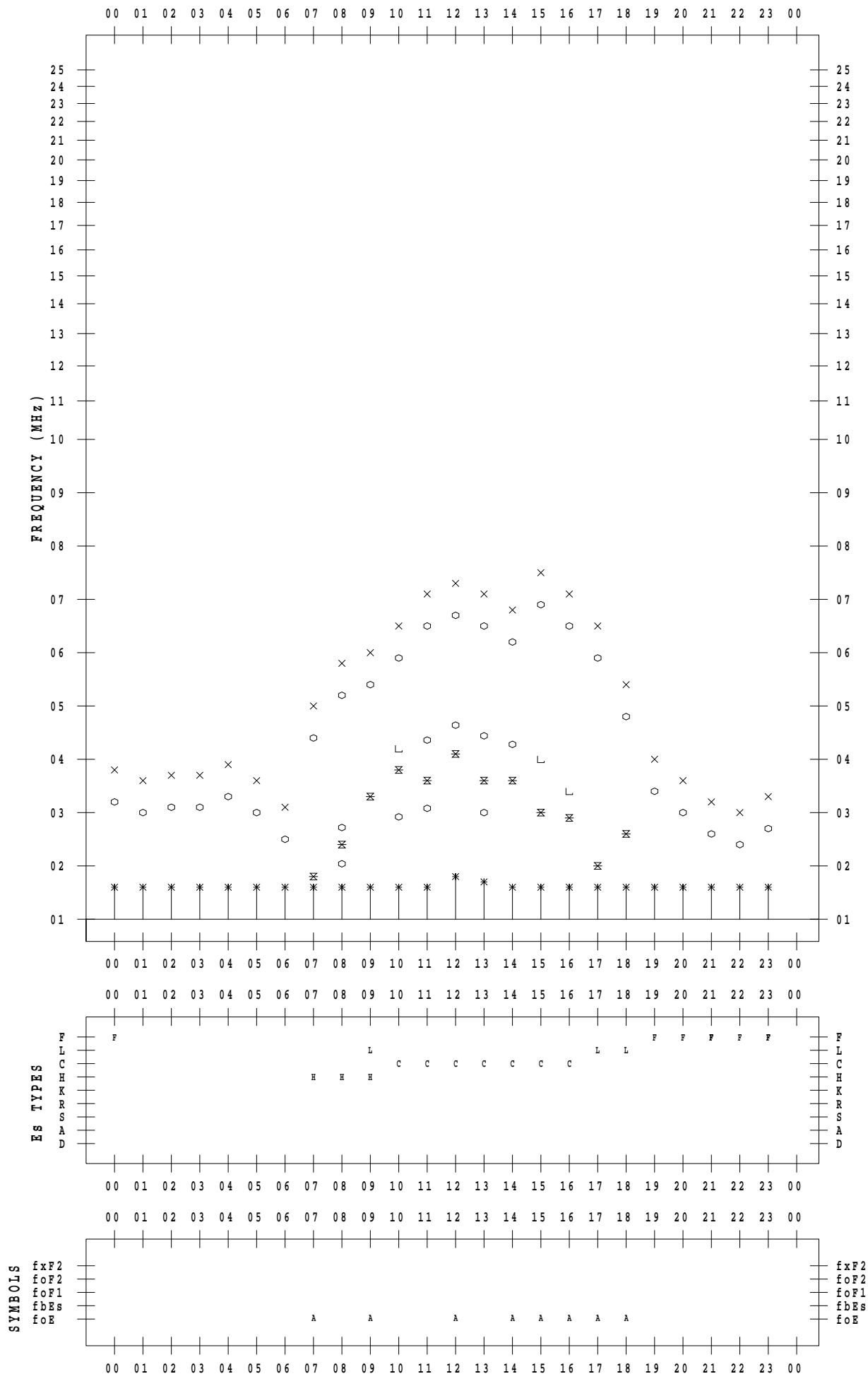
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/21

135 ° E MEAN TIME



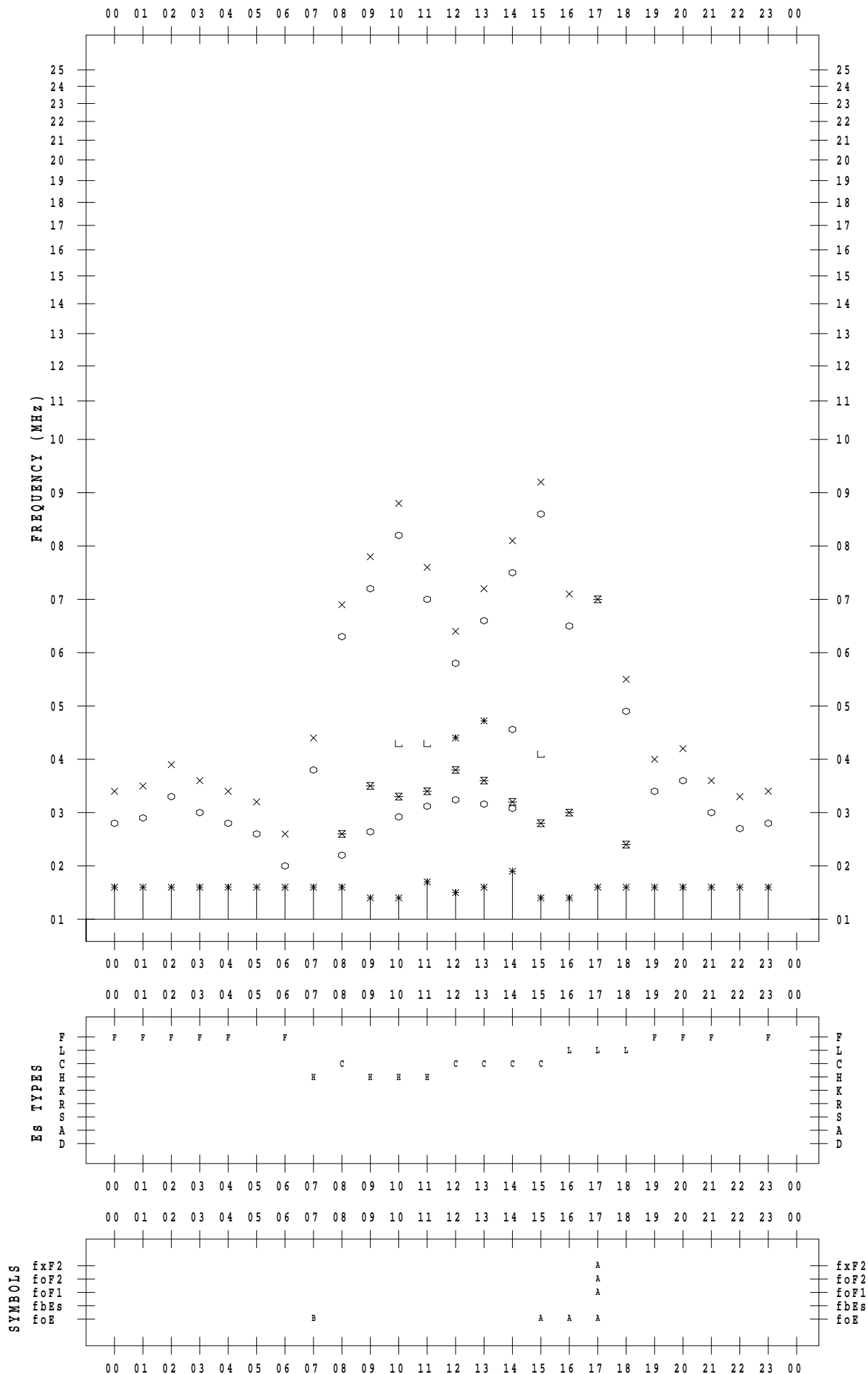
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/22

135 ° E MEAN TIME



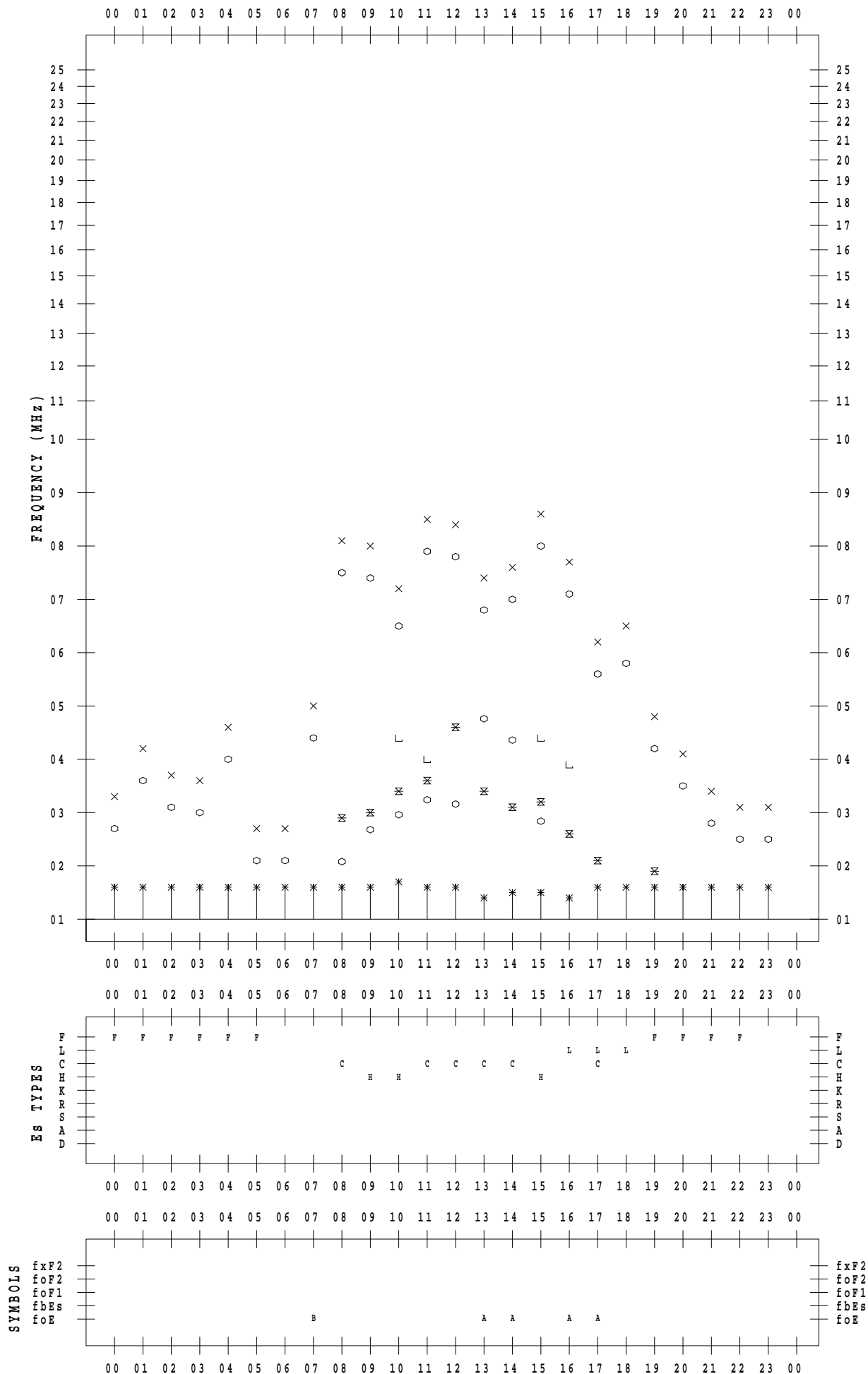
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/23

135 ° E MEAN TIME



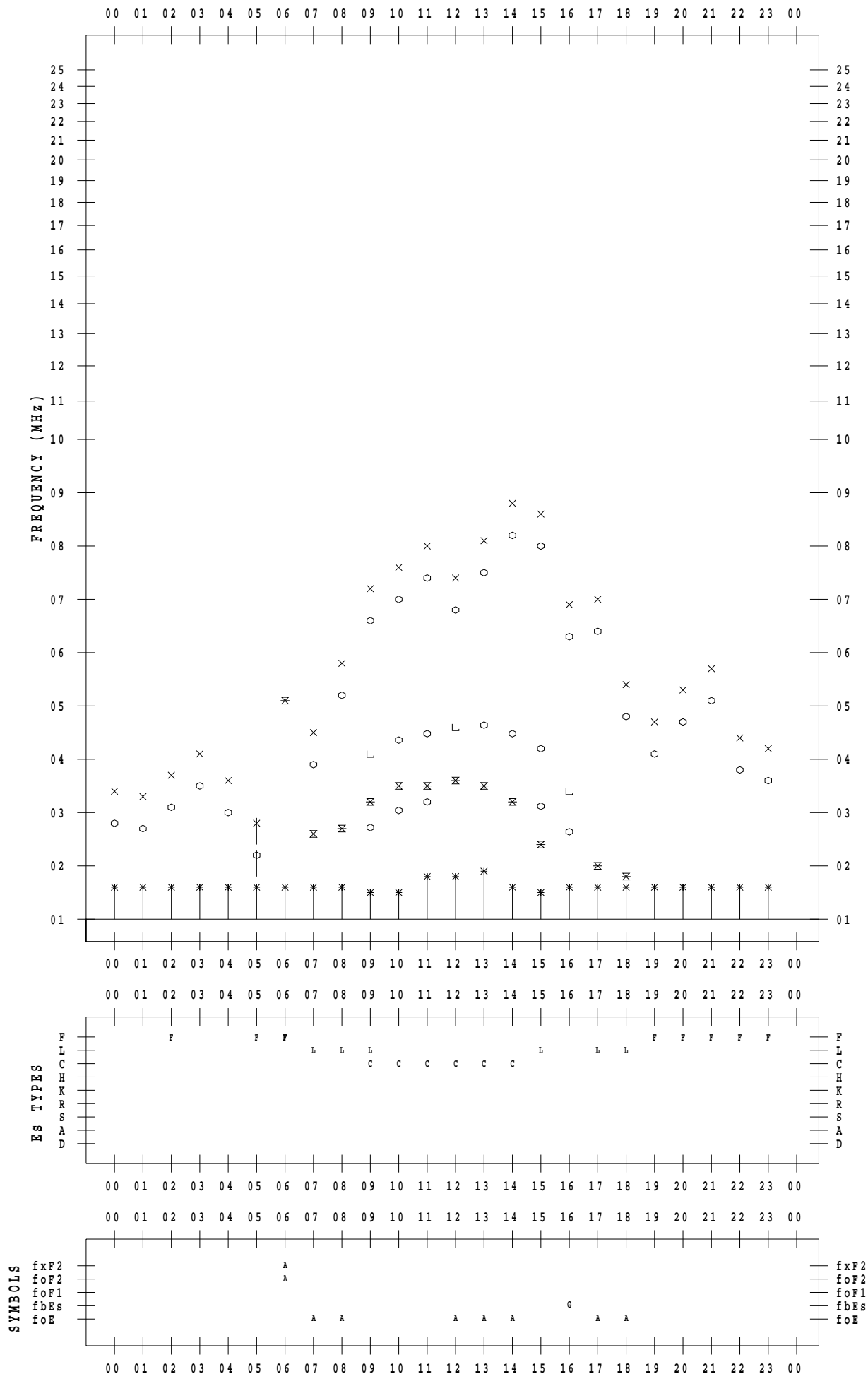
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/24

135 ° E MEAN TIME



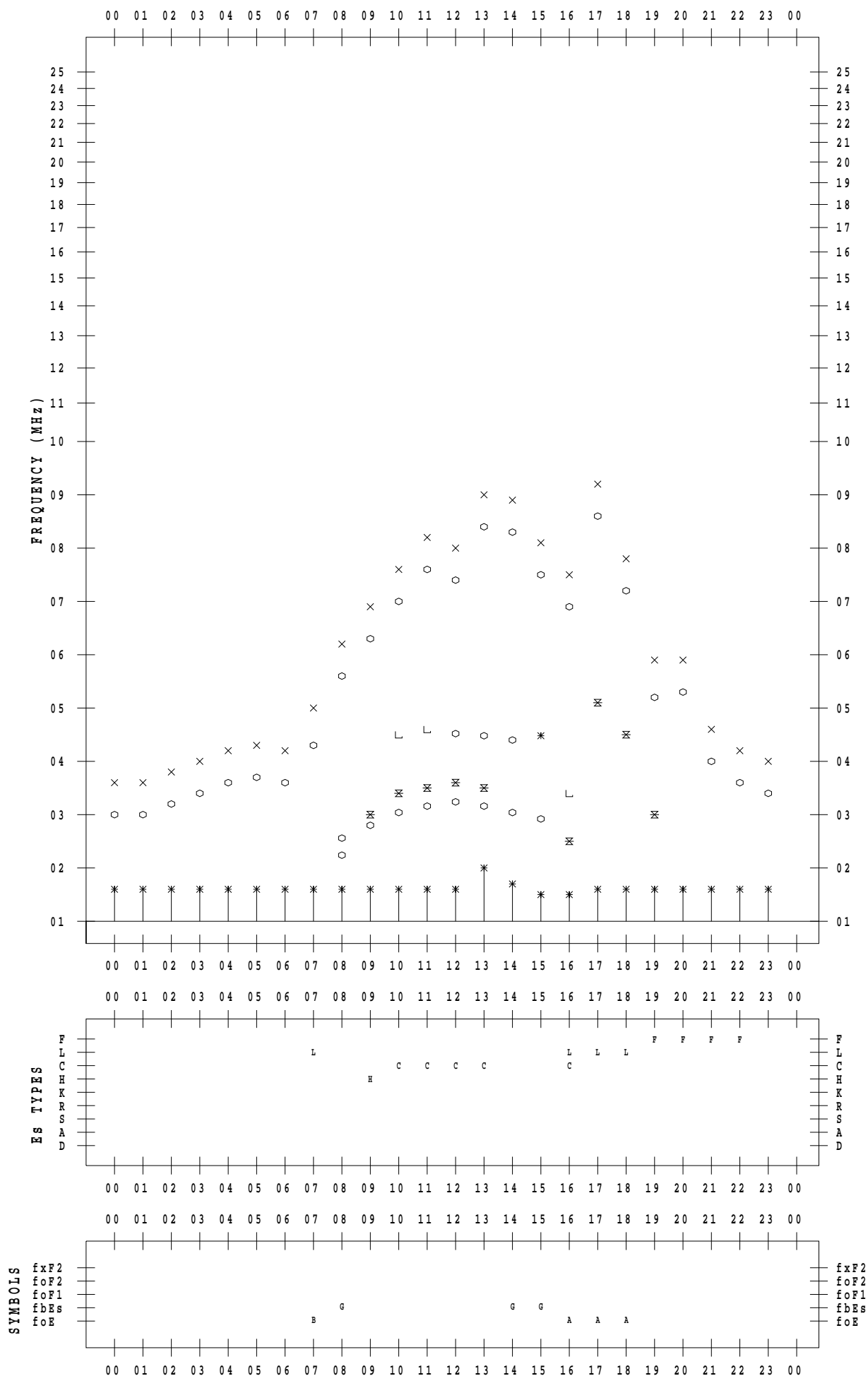
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/25

135 ° E MEAN TIME



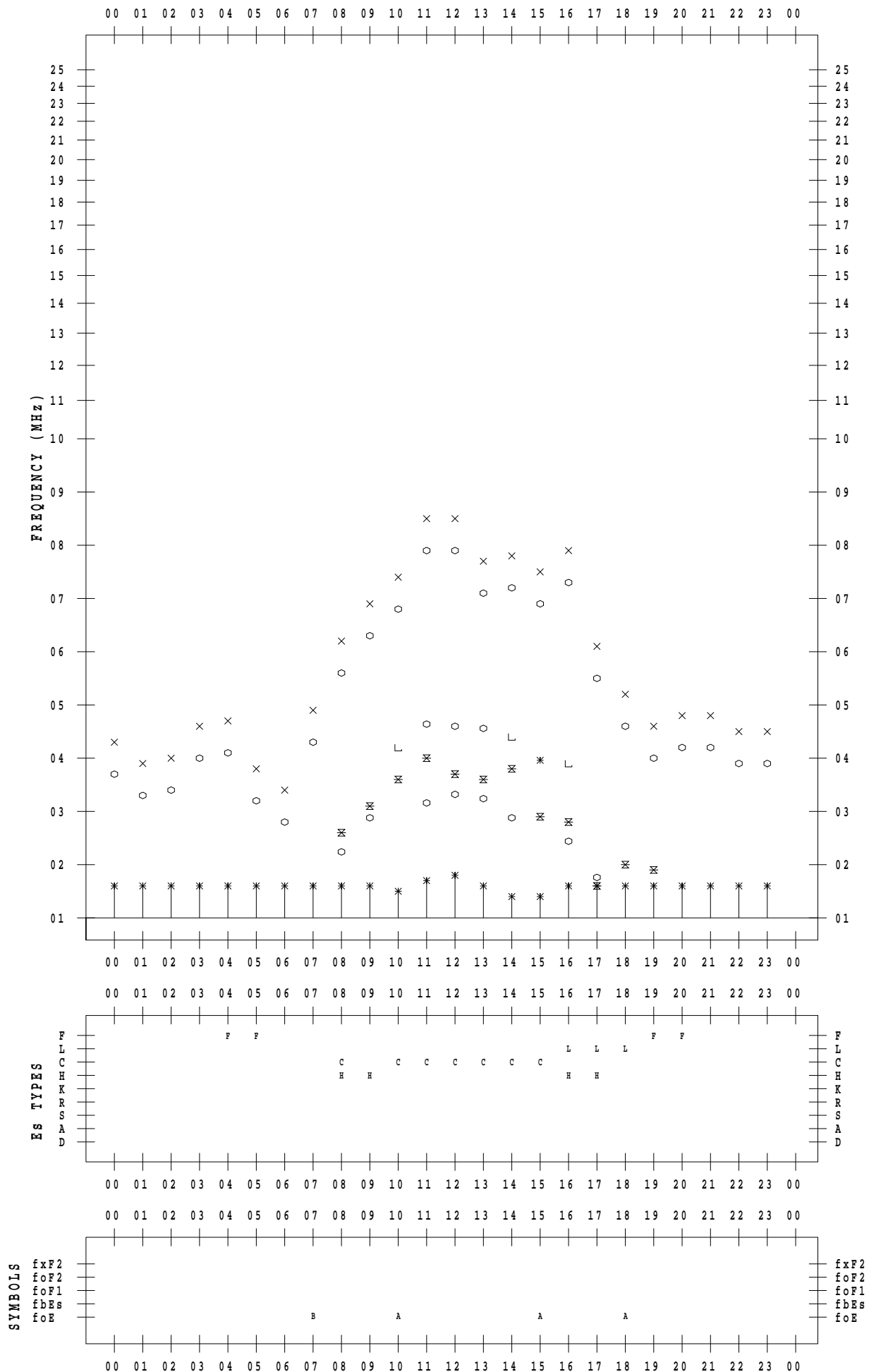
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/26

135 ° E MEAN TIME





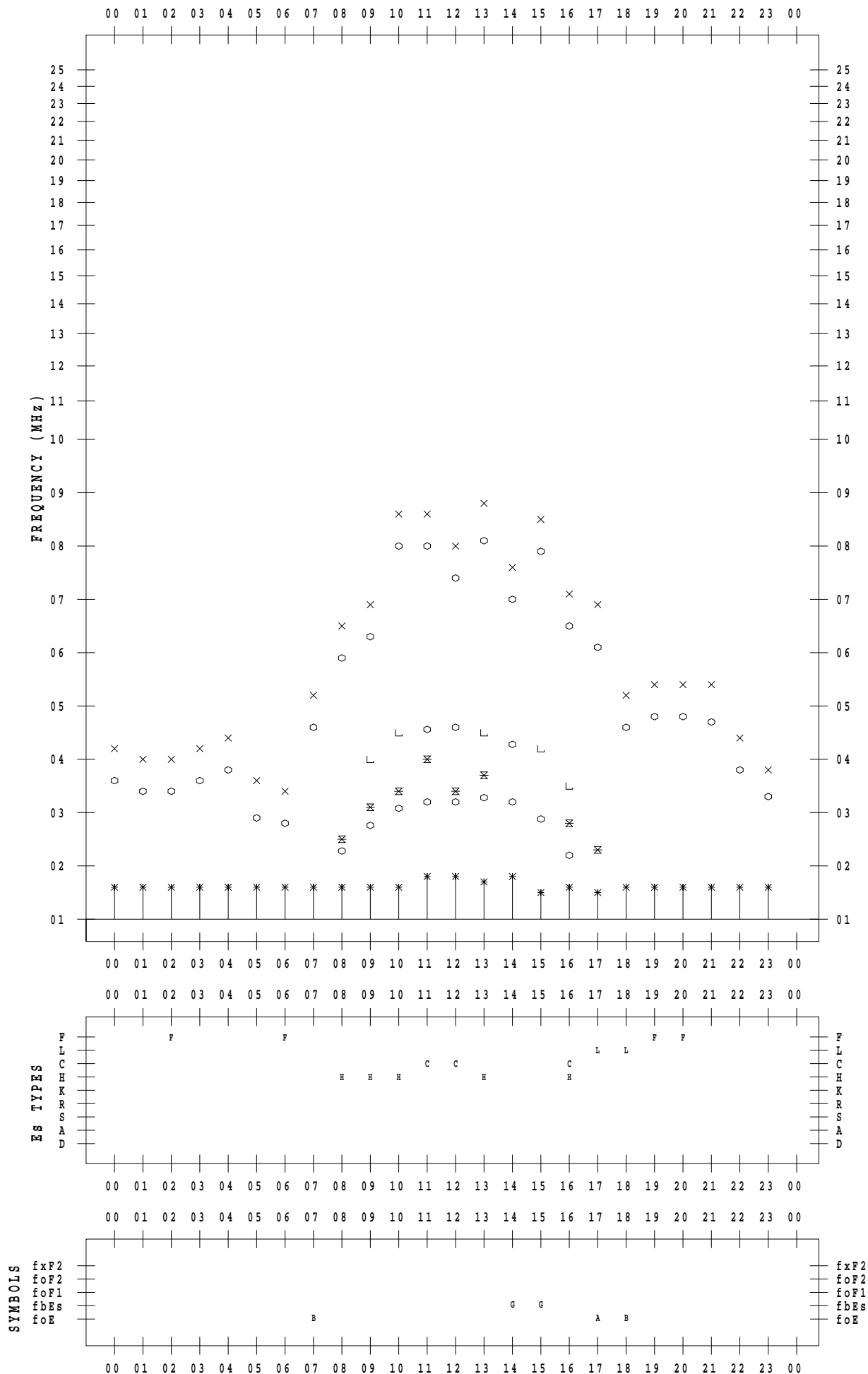
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/27

135 ° E MEAN TIME



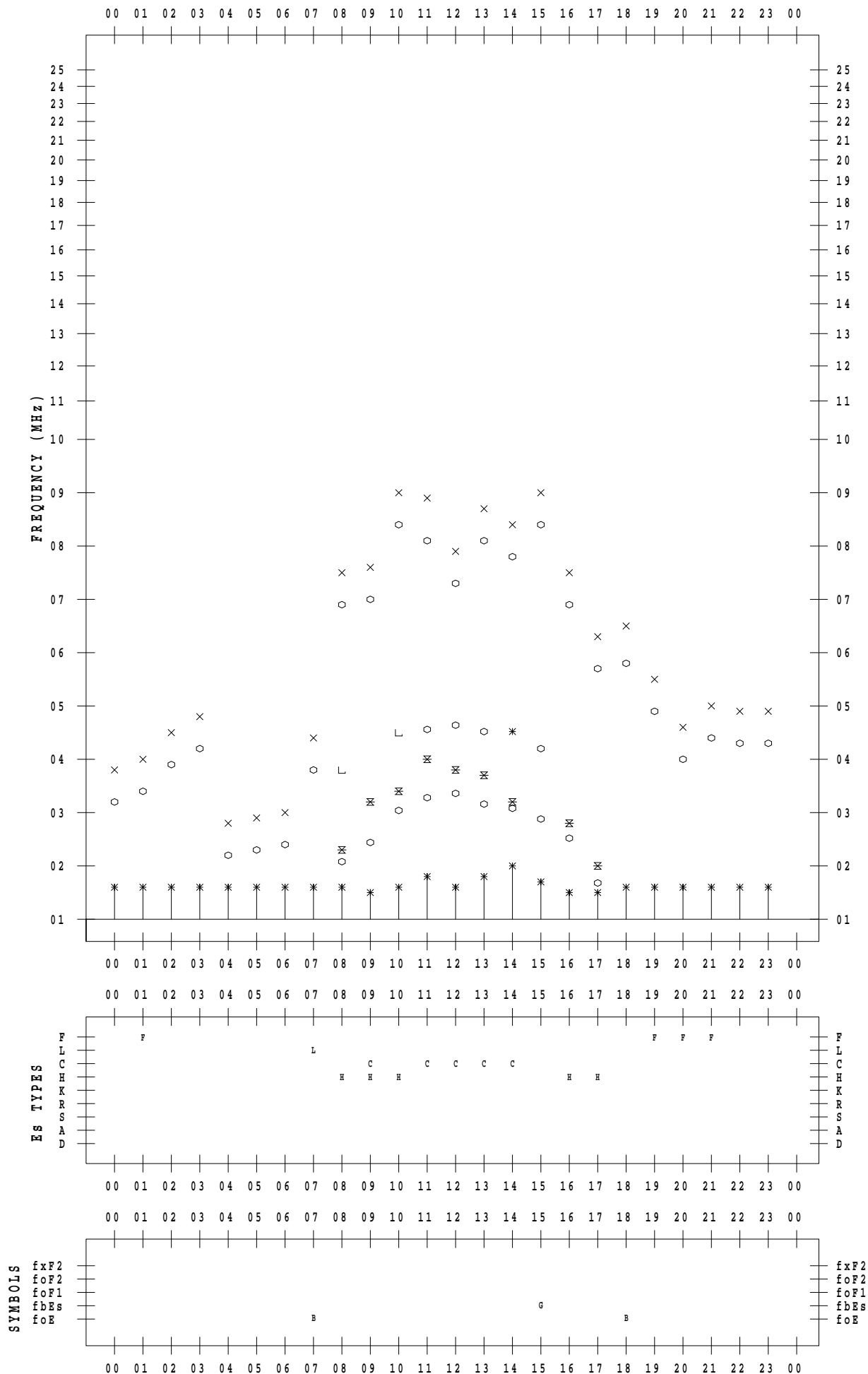
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/28

135 ° E MEAN TIME



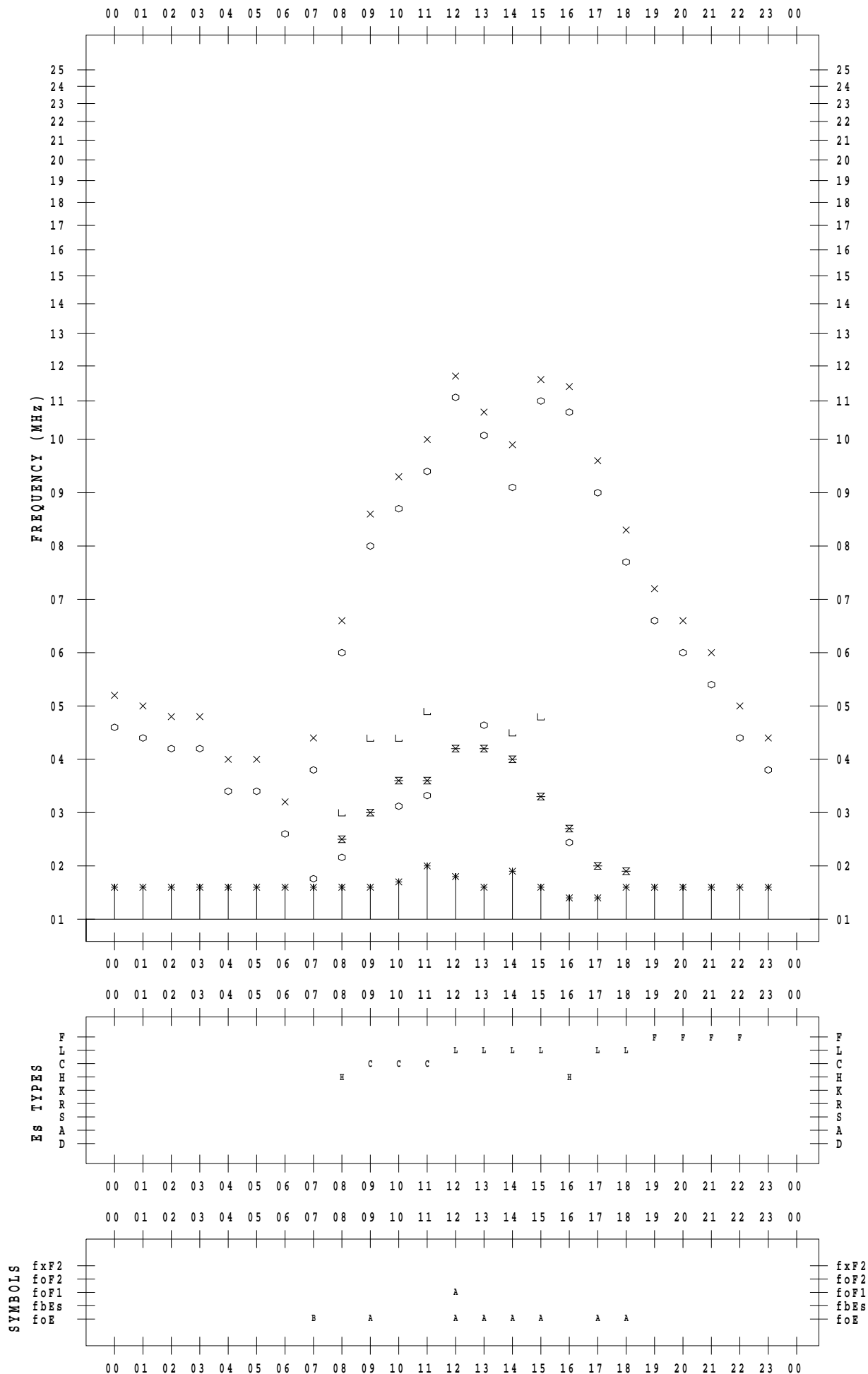
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/29

135 ° E MEAN TIME



# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/11/30

135 ° E MEAN TIME

